2017

Austin 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

Austin 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, Austin County prepared a new countywide multi-jurisdictional Hazard Mitigation Plan (HMAP). Austin 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 Austin 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

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

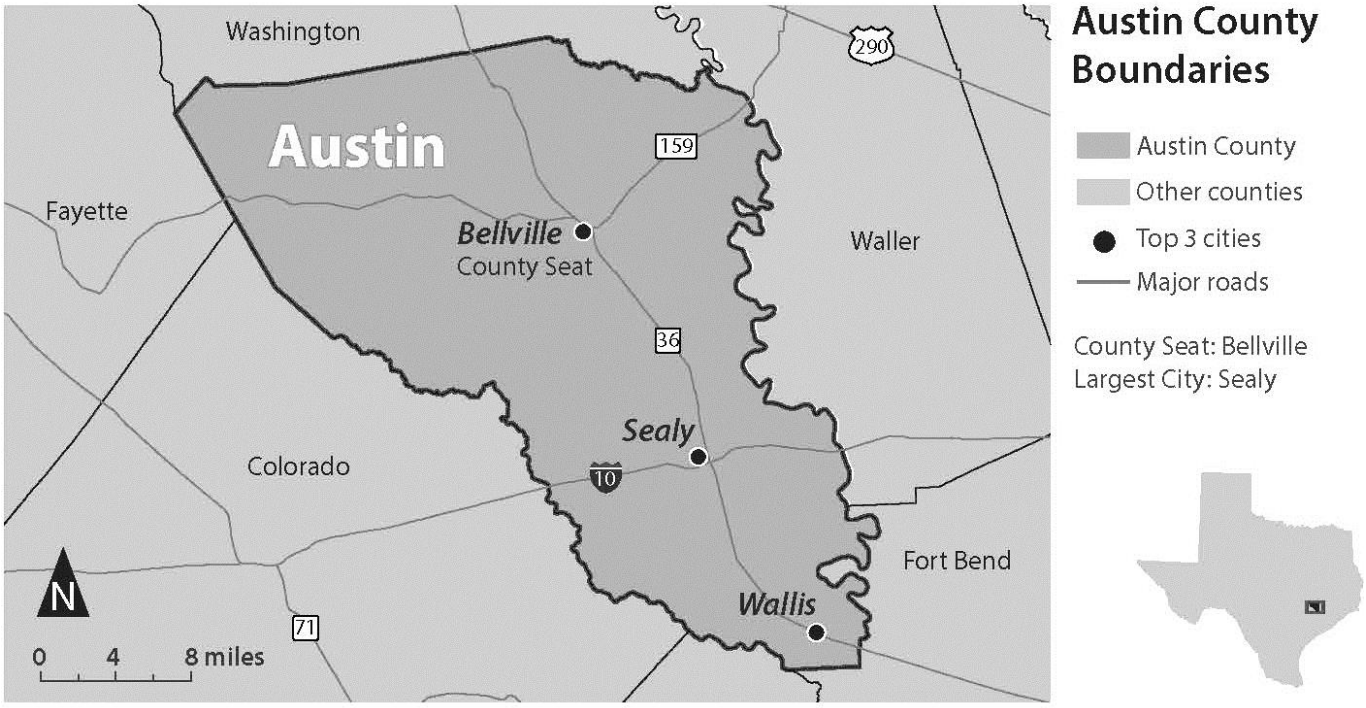
- Austin County (Unincorporated)
- City of Bellville
- City of Brazos Country
- Town of San Felipe
- City of Sealy
- City of Wallis

Presidential Declared Disasters

Austin 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	Disaster No.	Declaration Type	Incident Type	Title
12/26/1991	930	Major Disaster Declaration	Flood	Severe Thunderstorms
9/10/1993	3113	Emergency Declaration	Drought	Extreme Fire Hazard
10/18/1994	1041	Major Disaster Declaration	Flood	Severe Thunderstorms and Flooding
8/26/1998	1239	Major Disaster Declaration	Severe Storm	Tropical Storm Charley
10/21/1998	1257	Major Disaster Declaration	Flood	TX-Flooding 10/18/98
9/1/1999	3142	Emergency Declaration	Fire	Extreme Fire Hazards
9/2/2005	3216	Emergency Declaration	Hurricane	Hurricane Katrina Evacuation
9/21/2005	3261	Emergency Declaration	Hurricane	Hurricane Rita
9/24/2005	1606	Major Disaster Declaration	Hurricane	Hurricane Rita
1/11/2006	1624	Major Disaster Declaration	Fire	Extreme Wildfire Threat
3/14/2008	3284	Emergency Declaration	Fire	Wildfires
8/29/2008	3290	Emergency Declaration	Hurricane	Hurricane Gustav
9/10/2008	3294	Emergency Declaration	Hurricane	Hurricane Ike
9/13/2008	1791	Major Disaster Declaration	Hurricane	Hurricane Ike
5/29/2015	4223	Major Disaster Declaration	Severe Storm	Severe Storms, Tornadoes, Straight-Line Winds and Flooding
4/25/2016	4269	Major Disaster Declaration	Flood	Severe Storms and Flooding
6/11/2016	4272	Major Disaster Declaration	Flood	Severe Storms and Flooding
8/25/2017	4332	Major Disaster Declaration	Hurricane	Texas Hurricane Harvey

Planning Area Map



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.

The HMAP profiles the following hazards:

- Flooding
- Wildfire
- Drought
- Severe Thunderstorms
- Tornados/Microburst
- Erosion
- Hail
- Expansive Soil
- Winter Weather
- Heat Events

Part 2: Planning Process

Part 2: PLANNING PROCESS

This section includes a description of the process used by H-GAC, Austin 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 Austin 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 18, 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 and risk assessment.

The planning process culminated in a Mitigation Strategy, i.e. identification of specific mitigation actions, which when viewed, 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 Section 7. 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 Austin 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
Harris County Flood Control District Watershed Studies	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	2011 Regional Hazard Mitigation Plan

Planning Team

Austin 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 18, 2017. Members were asked to attend all public meetings in person, but were provided an online alternative if they were unable to do so. 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	Jurisdiction
Ray Chislet, Emergency Management Coordinator	Austin County
Tim Lapham, County Judge	Austin County
Larry Matthews, Chief of Police	City of Bellville
Shawn Jackson, City Manager	City of Bellville
Joe Ed Lynn, Mayor	City of Bellville
Charles A. Kalkomey, Mayor	City of Brazos Country
Sue Foley, Town Secretary	Town of San Felipe
Warren Escovy, Director of Planning	City of Sealy
Gretchen Hajdik, GIS Tech	City of Sealy
Lawrence Siska	City of Sealy
Sharon Flagg, Treasurer	City of Wallis
Wanda Andel, City Administrator	City of Wallis
Joey Kaspar, Senior Regional Planner	H-GAC
Amy Combs, Regional Planner	H-GAC

Meeting Dates & Details

October 18, 2017: Hazard Mitigation Kickoff Meeting

H-GAC and the Planning Team hosted a public meeting at the Austin County Commissioners Courtroom, 836 Austin St., Hempstead, TX, 77445. 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 notices, public service announcements, through social media, and local media outlets: Bellville Times, KNRG Radio, Wallis New-Review, and the New Ulm Enterprise. See Appendix A for meeting agenda, attendees list, 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. See Appendix A for meeting agenda and sign-in sheet.

April 12, 2017: Community Health and Resource Management (CHARM) Workshops

The County had the opportunity to partner with Texas A&M's AgriLife to host a set of workshops for all jurisdictions in the county (https://tcwp.tamu.edu/charm/); members of the planning team attended as well as representatives from surrounding jurisdictions that were not directly participating in the HMAP (See Appendix A for a complete sign-in sheet). April 5th was for jurisdictions in the north part of the county. April 6th was for the jurisdictions in the southern part. The workshops utilized GIS to explore current conditions including data such as 100 year-floodplain overlays and social vulnerability throughout the jurisdictions. After current conditions were presented, the workshop participants discussed what they wanted future land use to look like given the current conditions.

Stakeholders

Neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority regulate development, each contributed to the development of the HMAP. The chart below demonstrates the variety of stakeholders who participated and contributed:

Regional & Regulatory Stakeholders	Representative Position/Title	Contact Method
Houston-Galveston Area Council	Community and Environmental Planning Department	In-person, Email
Office of Emergency Management	Austin County Emergency Management Coordinator	Phone Call, Email
Regional Homeland Security Council	Public Services Planner	In-person, Email
Neighboring Jurisdictions		
Austin County	Emergency Management Coordinator	Phone Call, Email
Waller County	Emergency Management Coordinator	Phone Call, Email
Local Stakeholders		
Austin County	Emergency Management Coordinator, County Engineer	Phone Call, Email
City of Bellville	City Manager, City Secretary	Email
City of Brazos Country	Mayor	Email
Town of San Felipe	Town Secretary	Email
City of Sealy	Planning Director, City Secretary	Email
City of Wallis	City Administrator, City Secretary	Email

Participation & Public Input

Public input and participation is a crucial element of hazard mitigation planning. Feedback and input from the public during the October 18th Hazard Mitigation Kick-off meeting was used to identify vulnerabilities in each jurisdiction, identify valuable assets, and develop the risk assessment. Although the public was given the opportunity to attend public meetings in person, the first public meeting followed shortly after Hurricane Harvey. Many residents and local staff were busy with recovery efforts at the time, and attendance was difficult. To ensure the public's ability to participate in the planning process, H-GAC hosted all HMAP-related materials online and

advertised both the meetings and the website link (http://www.h-gac.com/community/community/hazard/austin-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 the H-GAC website (see Appendix A). Examples of online participation include submitting mitigation actions, completing the NFIP survey, and conversations over email.

The Austin County Office of Emergency Management also distributed hardcopies of the surveys and forms to each participating jurisdiction that was unable to attend the public meeting on October 18th, 2017. These jurisdictions then had the option to either mail in the packet to H-GAC's office for processing, or submit the online surveys. The data from capability assessment survey was used to develop the risk assessment and identify vulnerabilities. The online mitigation action portal allowed jurisdictions to submit their proposed projects, and later used to develop the mitigation strategy. County and City Certified Floodplain Managers (CFMs) also submitted surveys which helped develop the flood hazard analysis and mitigation strategies for flooding.

The chart below demonstrates the method and type of participation by each jurisdiction.

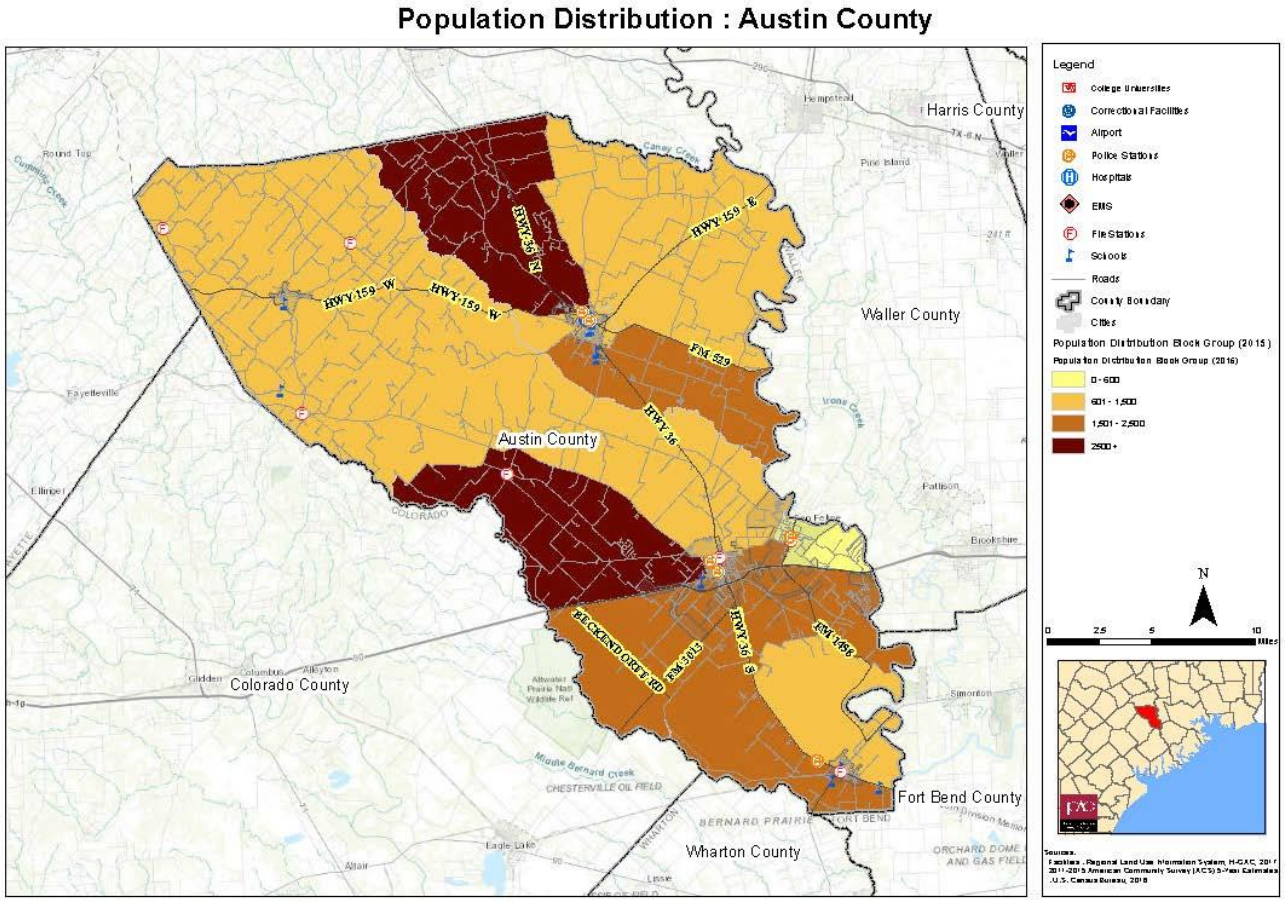
Jurisdiction	Participated in Plan Maintenance Development	Participated in Mitigation Strategy Development	Online or Mail-in Participation:			
			Capability Assessment	Risk Assessment	Mitigation Actions	NFIP Survey
Austin County	x	x	x	x	x	x
City of Bellville	x	x	x		x	x
City of Brazos Country		x		x	x	x
Town of San Felipe	x	x	x	x	x	x
City of Sealy	x	x	x	x	x	x
City of Wallis	x	x	x		x	x

Part 3: County Profile

Part 3: COMMUNITY PROFILE

Austin County sits between the San Bernard River on the west and the Brazos River on the east and is located 35 miles west of Houston. The county is covered in prairieland, with flat coastal prairies in the county's southern tip and hills to the north. State Highway 36 runs north-south through the center of the county. Interstate 10 and State Highway 159 both cut across Austin County east-west.

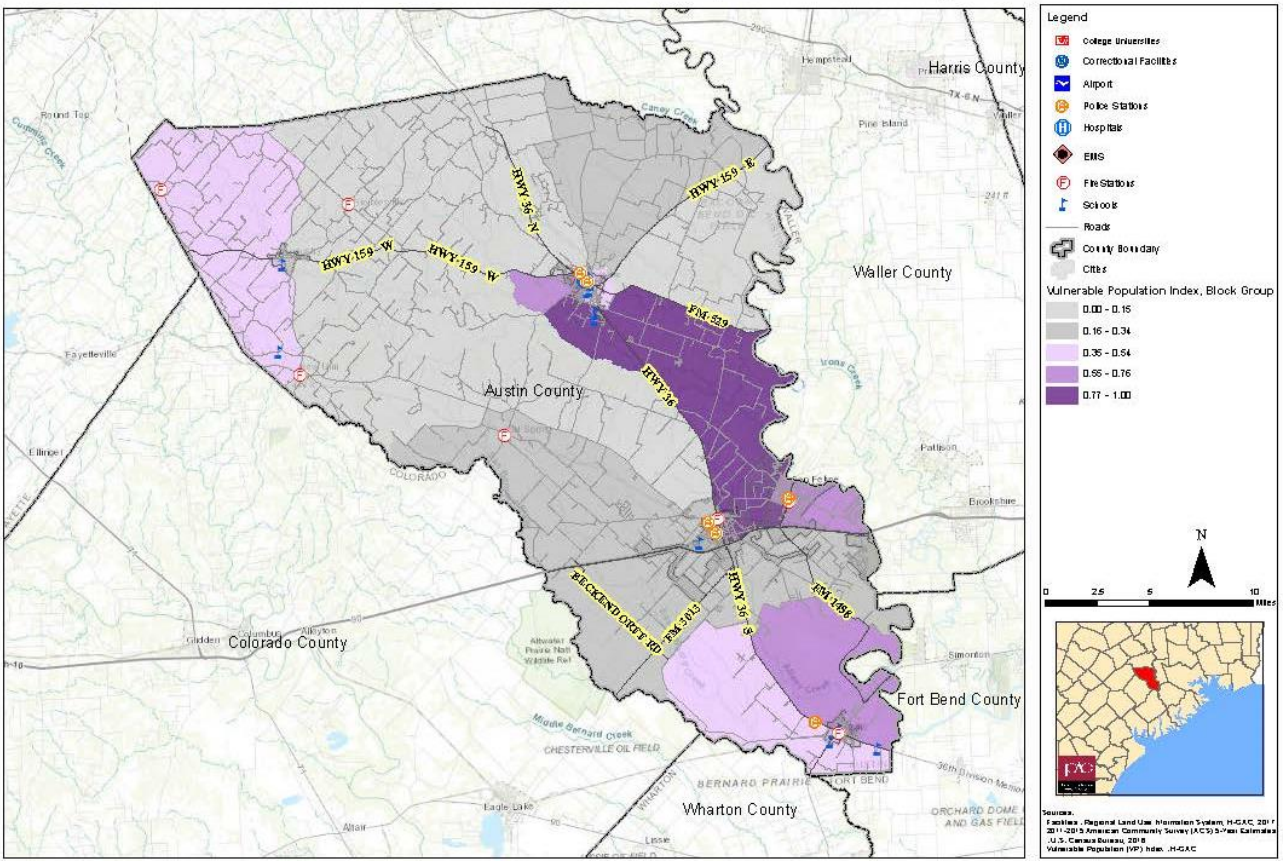
In 2016, Austin County had around 29,000 residents and is expected to expand due to Houston's westward growth, potentially reaching 50,000 by 2040. Its three largest cities are Sealy, Bellville and Wallis. Sealy is at the crossroads of Interstate 10 and Highway 36, with nearly 6,500 residents. Bellville, the county seat, boasts 4,300 residents and Wallis has around 1,300.



Austin County's economy includes agriculture (with an annual market value of $43.5 million)[iv], varied manufacturing, distribution, and oil and gas services.[v] It ranks third in the State of Texas for nursery, greenhouse, floriculture, and sod production.[vii] The county's unemployment rate in 2016 was 5.3%, slightly higher than the national average.

Austin County's annual median household income is $53,700, just above the median income for the State of Texas. The county also has a larger elderly population, with 17% of residents over the age of 65 compared to 10% for the region as a whole. Austin County residents spend about 54% of their earnings on costs related to housing and transportation. The county also has a much higher share of households living in RVs and mobile homes (17 percent) compared to the State of Texas with only 8 percent.

Vulnerable Population Map : Austin County



The Vulnerable Population Index identifies areas throughout Austin County that may not have the means or the resources to act when a natural disaster occurs in Austin 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 Austin County. Defining and mapping vulnerable populations provides the opportunity to demonstrate where perhaps the most need is throughout Austin County.

[i] U.S. Census

[ii] Texas State Historical Association

[iii] Houston-Galveston Area Council

[iv] USDA 2012 Census of Agriculture

[v] U.S. Cluster Mapping

[vi] USDA 2012 Census of Agriculture

[vii] USDA 2012 Census of Agriculture

[viii] U.S. Cluster Mapping

[ix] U.S. Cluster Mapping

[x] Federal Reserve Bank of Saint Louis, Bureau of Labor Statistics

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 10 natural hazards which could affect the county and local jurisdictions.

Other common hazards in the region not profiled are lightning and dam and levee failure. There are no identified vulnerabilities or documented occurrences and damage caused by lightning since 1996. There are 19 known dams and levees in Austin County. All of the dams have been classified as 'Low' in the hazard potential classification. Because there is no risk to dam or levee failure in Austin County, it will not be profiled in this plan.

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. These floods are characterized by heavy rain that inundates waterways and infrastructure, such as bridges and roads. 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.

Austin County is located approximately 68 miles inland from the Gulf of Mexico. The winds from Tropical Storms and Hurricane winds have substantially weakened, and have no impact on Austin County. The rains generated from tropical storms and hurricanes do have a significant impact on flooding. For this Hazard Mitigation Plan, flooding caused by Hurricanes and tropical storms will be profiled in flooding. Hurricanes Rita, Ike, and Harvey are recent examples of the type of flooding impact hurricanes and tropical storms have on the county and its local jurisdictions.

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.[iv] 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 .[v]

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, vi] 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.[vii] 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. [viii]

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.[ix] 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[x]. 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.[xi]

Tornado/Microburst

Tornadoes are a violently rotating column of air touching the ground, usually attached to the base of a thunderstorm.[xii] 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 .[xiii]

A microburst typically occurs during a severe thunderstorm or rain shower. It is an intense and concentrated downdraft that is emitted during a thunderstorm. Microbursts occur when weather conditions produce three specific cycles: a downburst of wind, an outburst of wind, and followed by the cushion stage called "Suriano's Stroke".[1] A microburst can fell trees, cause power outages, knock over telephone poles, and move or destroy objects in a similar manner as a weak tornado. Austin County experienced a microburst in 2016. Because the impact and mitigation techniques are similar to those used to address tornados, this plan will profile microbursts and tornados together.

Erosion

Soil erosion is comprised of two types: wind erosion and water erosion. Wind erosion is a common occurrence, which typical occurs when winds blow across flat, sparsely vegetated, or disturbed land, lifting soil into the air or displacing soil to a new location. Wind erosion can cause soil deterioration and air pollution.xiv Water erosion can occur over land or in streams and channels. Water erosion that takes place over land may result from rain, shallow sheets of water flowing off the land, or surface flow, which is concentrated in areas of lower elevation. Stream channel erosion may occur as the volume and velocity of water flow increases enough to cause movement of the streambed and bank soils.xv

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.[xvi]. 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.

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 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.xviiDrought may also worsen the effects of land subsidence. Land subsidence is identified as a common hazard by the State of Texas. However, land subsidence was not brought up throughout the planning process and there were no recorded events or damage found throughout the county. Consequently, land subsidence is not identified as a natural hazard in this plan.

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.[xviii] 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.

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.

References

[i] Texas Division of Emergency Management. (2013, October 15). *State of Texas Hazard Mitigation Plan 2013 Update*. Page 74. Retrieved from https://www.dps.texas.gov/dem/Mitigation/txHazMitPlan.pdf.

[ii] Texas Division of Emergency Management. (2013, October 15). *State of Texas Hazard Mitigation Plan 2013 Update*. Page 259. Retrieved from https://www.dps.texas.gov/dem/Mitigation/txHazMitPlan.pdf.

[iii] NOAA National Severe Storms Laboratory, Flood Basics. Retrieved from www.nssl.noaa.gov/education/svrwx101/floods/.

[iv] National Parks Service, U.S. Department of the Interior. Wildland Fire: Wildfire Causes | U.S. National Park Service. Retrieved from: www.nps.gov/fire/wildland-fire/learning-center/fire-in-depth/wildfire-causes.cfm.

[v] DTS Wildfire. TxWRAP - Home. Retrieved from: texaswildfirerisk.com/.

[18] US Department of Commerce, NOAA, National Weather Service. (2017, June, 1). Severe Weather Definitions. *Retrieved from:* www.weather.gov/bgm/severedefinitions.

[vi] *National Weather Service*, NWS Drought Types Page Retrieved from: www.nws.noaa.gov/om/drought/types.shtml.

[vii] US Department of Commerce, NOAA, National Weather Service. (2001, January 1) Retrieved from: www.nws.noaa.gov/om/drought/impacts.shtml.

[viii] NPR, "Everything You Need to Know About the Texas Drought. Retrieved from: stateimpact.npr.org/texas/tag/drought.

[ix] National Weather Service. Severe Weather Safety Guide.

[x] US Department of Commerce, NOAA, National Weather Service.(2015, July 23) What Constitutes a Severe Thunderstorm? Retrieved from: www.weather.gov/bmx/outreach_svr.

[xi] US Department of Commerce, NOAA, National Weather Service. (2016, Sept., 21)"What Is a Microburst?" Retrieved from www.weather.gov/bmx/outreach_microbursts.

[xii] NOAA National Severe Storms Laboratory. Tornado Basics. Retrieved from: www.nssl.noaa.gov/education/svrwx101/tornadoes/.

[xiii] National Geographic. (2017,Sept. 2017). Tornadoes. *Tornado Facts and Information*. Retrieved from: www.nationalgeographic.com/environment/natural-disasters/tornadoes/.

[xiv]Purdue. Wind Erosion, Retrieved from: milford.nserl.purdue.edu/weppdocs/overview/wndersn.html.

[xv] US Department of Commerce, NOAA (2016, Aug.17). "Coastal Hazards." Retrieved from: oceanservice.noaa.gov/hazards/natural-hazards/.

[xvi] *NOAA National Severe Storms Laboratory*, Hail Basics. Retrieved from: www.nssl.noaa.gov/education/svrwx101/hail/.

[xvii] Geology. Expansive Soil and Expansive Clay. Retrieved from: geology.com/articles/expansive-soil.shtml.

[xviii] US Department of Commerce, NOAA, National Weather Service.(2017, June 1) Severe Weather Definitions. Retrieved from: www.weather.gov/bgm/severedefinitions.

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 Austin 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 18, 2017, Austin County officials reviewed and updated this list, including adding additional valuable assets within the community. Following this process, the Planning Team determined 96 facilities are considered critical or valuable assets, and 12,771 residential and commercial structures are considered 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. The full Hazus analysis is catalogued in Appendix C. A summary of the facilities is provided below.

Critical Facilities & Valuable Assets

Asset Description	Quantity
Dam	19
Electric Substation	8
EMS	7
Fire Station	12
Hospitals/Urgent Care	3
Local Emergency Operation Center	2
Police Station	19
Schools	14
Shelters	16
Toxic Release Inventory Facility	5
Residential Units	12,092
Commercial Units	679

Capability Assessment

The participating jurisdictions completed local capability and risk assessment surveys 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.

List of Existing Plans & Regulations

HMAP: Hazard Mitigation Plan
DRP: Disaster Recovery Plan
FMP: Floodplain Management Plan
EOP: Emergency Operations Plan
COOP: Continuity of Operations Plan
SO: Subdivision Regulation
FDPO: Flood Damage Prevention Ordinance
COMP: Comprehensive Land Use Plan
CIP: Capital Improvements Plan

Jurisdiction	HMAP	DRP	FMP	EOP	COOP	SO	FDPO	COMP	CIP
Austin County	x	x	x	x		x	x		
Bellville	x			x		x			x
Brazos Country	x					x			
San Felipe	x	x	x	x	x				
Sealy	x					x	x	x	x
Wallis	x					x	x		

Expand and Improve

Participating jurisdiction examined their existing authorities, policies, programs and resources. Participating jurisdiction then identified ways to improve upon and expand their existing authorities to support the mitigation strategy.

Jurisdiction	Capability Expansion Opportunities
Unincorporated Austin County	Identified their local budget as a factor that decreases their capability to implement mitigation actions and reduce future damages. Austin County will apply for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards.
Bellville	Need for technical staff and larger budget. Will apply for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards.
Brazos Country	Low local budget and technical staff as a weakness in their current funding. Will apply for federal funding to help reduce the impacts of natural hazards within the community
San Felipe	Identified the low local budget as a barrier for implementing the mitigation strategy. Will apply for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards.
Sealy	Low local funding as a barrier for implementing projects. Will apply for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards.
Wallis	Identified a low local budget to implement mitigation actions. Will apply for federal funds to reduce the impact of natural hazards within the jurisdiction.

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 Austin 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	Wildfire
	3	Drought
	4	Severe Thunderstorm
Moderate	5	Tornado/Microburst
	6	Erosion
	7	Hail
	8	Expansive Soil
Low	9	Winter Storms
	10	Extreme Heat

Part 6: Hazard Analysis

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 18, 2017, public meeting. At this meeting, stakeholders and members of the public 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

The National Oceanic and Atmospheric Administration (NOAA) collects historic climate data for the entire nation. NOAA's storm event data can be accessed on the National Climatic Data Center (NCDC) storm events database. A condensed version of the Austin County flood events data from 1996 - present is provided in the table below. Information about flooding due to Hurricane Harvey was not yet available when this plan was drafted.

Event Year	Fatalities	Property Damage (2015 Dollars)	Crops Damage (2015 Dollars)	Total Damage (2015 Dollars)
1996	0	$15,000.00	$-	
1997	0	$5,000.00	$-	
1997	0	$10,000.00	$-	
1997	0	$5,000.00	$-	
1997	0	$5,000.00	$-	
1998	0	$1,000.00	$-	
1998	0	$25,000.00	$-	
1998	0	$50,000.00	$-	
1998	0	$15,000.00	$-	
1998	0	$-	$-	
1998	0	$-	$-	
1998	0	$10,000.00	$-	
1998	0	$5,000.00	$-	
1998	0	$10,000.00	$-	
1998	0	$20,000.00	$-	
1998	0	$10,000.00	$-	
1998	0	$5,000.00	$-	
2002	0	$20,000.00	$-	
2004	0	$5,000.00	$-	
2004	0	$25,000.00	$-	
2004	0	$-	$-	
2004	0	$-	$-	
2007	2	$8,000.00	$-	
2007	0	$-	$-	
2007	0	$-	$-	
2007	0	$-	$-	
2007	0	$60,000.00	$-	

2013	0	$20,000.00	$-	
2015	0	$-	$-	
2015	0	$-	$-	
2015	0	$-	$-	
2015	0	$-	$-	
2016	1	$2,300,000.00	$-	
2017	0	$-	$-	
2017	0	$100,000.00	$50,000.00	$150,000.00
2017	0	$-	$-	

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

Austin County Disaster Declarations

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

Declaration Year	Title	Disaster Number
1991	SEVERE THUNDERSTORMS AND FLOODING	930
1994	SEVERE THUNDERSTORMS AND FLOODING	1041
1998	TX-FLOODING 10/18/98	1257
2016	SEVERE STORMS AND FLOODING	4269
2016	SEVERE STORMS AND FLOODING	4272
2017	TX-HURRICANE HARVEY	4332

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

NFIP Participation

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.

NFIP Participants in Austin County:
Austin County
Bellville
Brazos Country
San Felipe
Sealy
Wallis

Flood Damage Prevention Ordinance: Adopted Aug 09, 2010

Each of the jurisdictions participating in the NFIP program has a certified floodplain manager on staff, and/or function under the regulatory umbrella of Austin County. To remain NFIP compliant, the CFM's office conducts jurisdiction wide permit review, grants or denies approval, and conducts outreach. Resources and program compliance are the identified barriers for the NFIP program across Austin County. The Austin County CFM's office will seek to expand its budget to better implement the program.

Repetive Loss Properties

Consistent and destructive flooding is one of Austin County's greatest challenges. Many NFIP insured properties have flooded multiple times. Repetitive loss properties (RL) are those that have received at least two insurance payments of $1,000 or more from the NFIP within the last 10 years. Austin County has a total of 85 RL properties and SRL properties totaling $11,816,076.10 in insurance payouts in the past decade. A comprehensive list of all RL and SRL properties are in Appendix D.

Jurisdiction	Residential RLPs	Non-Residential RLPs	SRL Properties	Total RLPs
Unincorporated Austin County	25	0	2	27
San Felipe	6	0	0	6
Sealy	1	1	0	2
Wallis	1	0	0	1

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 extent 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. 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 Austin County. Shelter needs were also projected using this method. The complete HAZUS report is in Appendix C. H-GAC maintains a database of critical facilities in Austin 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. These findings are provided in condensed charts for each jurisdiction.

Austin County (All participating jurisdictions)

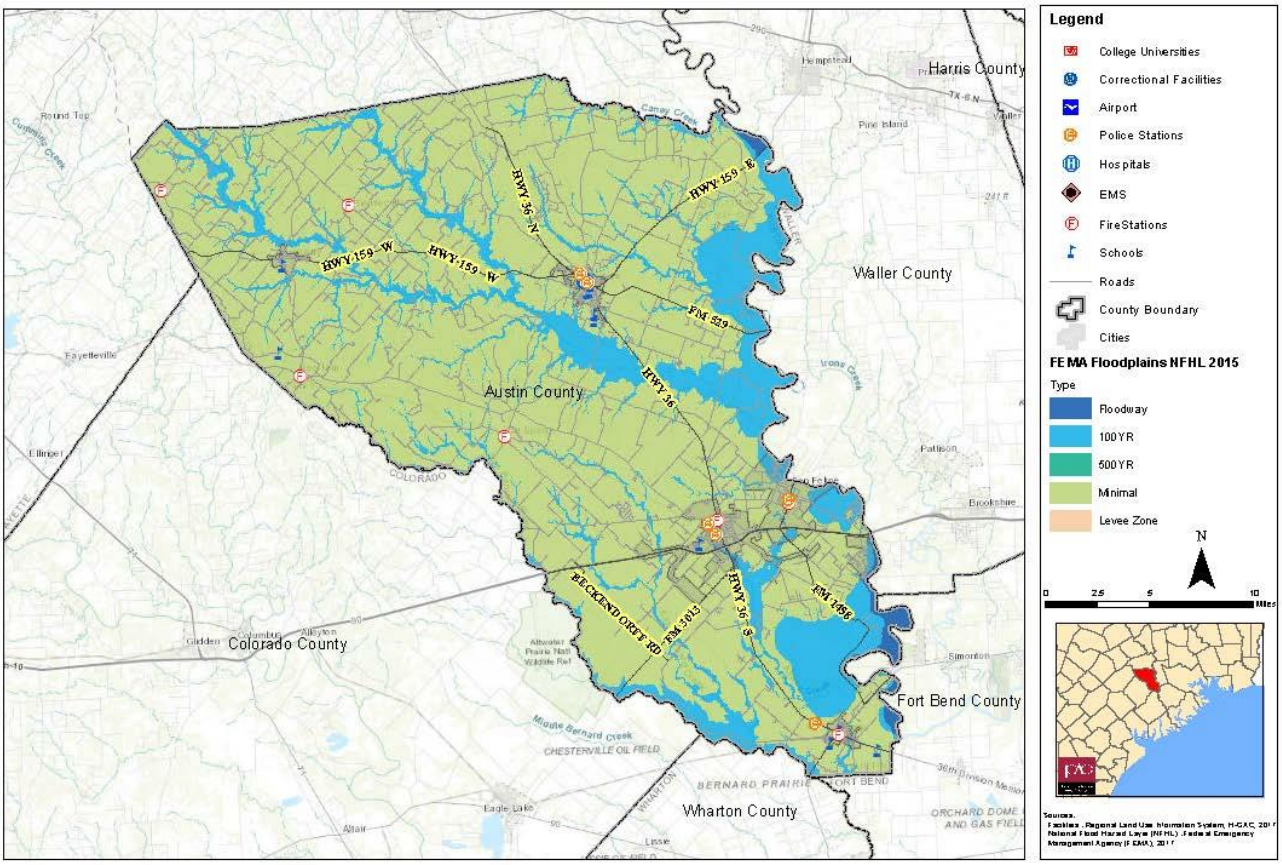
Identified Vulnerabilities:

- Individuals who reside or work within the 100 year or 500 year floodplain
- Communities without emergency shelters, local hospitals, or fire stations- relying on the county or larger jurisdiction for emergency services/ response
- Local or national business owners whose shops or commercial property flood
- Industrial sites located throughout the county

Identified Impacts:

- Major roadways blocked by floodwaters may create an increase of serious injuries or loss of life due to responders not being able to reach those injured or in danger
- Lack of shelters and emergency responders throughout the county may lead to an increase in response time which may lead to a loss of life or serious injury
- Economic and financial loss for cities and individuals including property loss and loss of economic activity from loss of major employers including industrial and farming activities

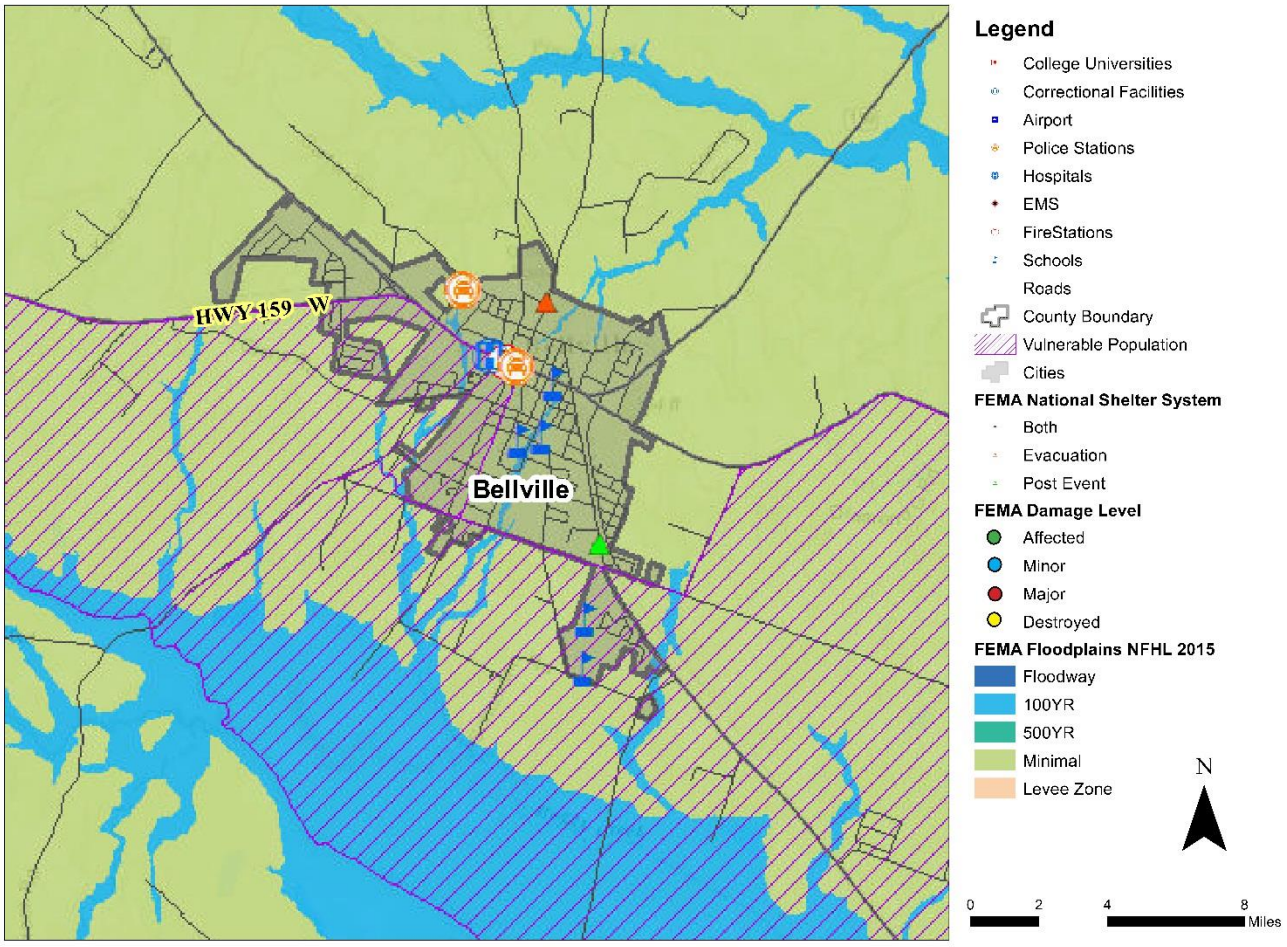
Austin County



Unincorporated Austin County			
Planning Area (sq. mi):	624.6	**Occurrences since 1996:**	36
Area Affected:	17.1%	**Annual Event Average:**	1.64
Probability of Occurring in the next 5 years:	Very likely; 8.2 events estimated to occur within next 5 years.		
Greatest Occurrence:	Approximately 50 homes flooded during Hurricane Harvey flooding, and 10'-12' feet of water over roads.		
Extent:	Up to 8' of flood water in homes, and 12' - 14' of water over roads.		

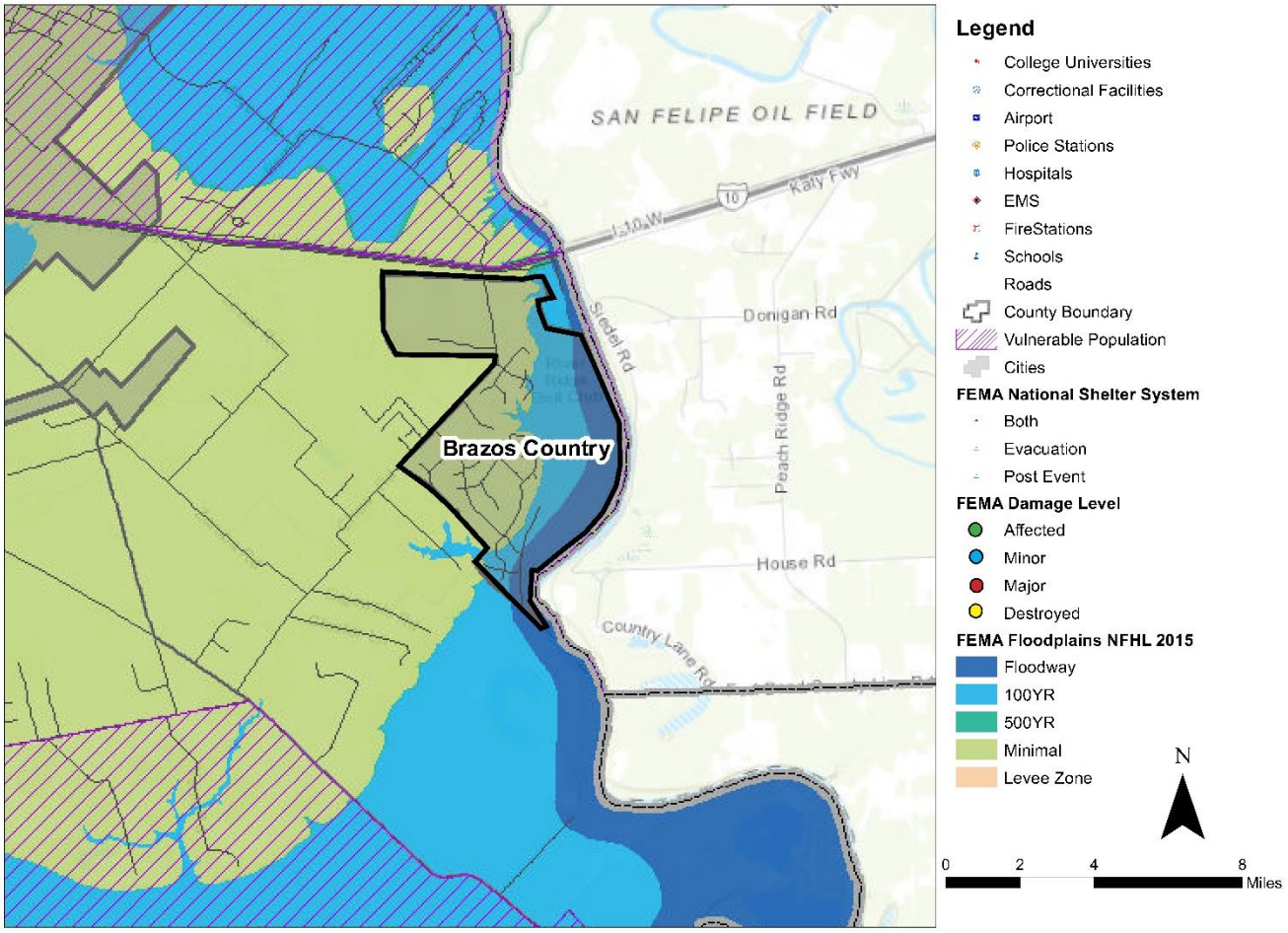
Vulnerability	Impact
2,067 residential structures are at risk. Road Closures caused by flooding: Hwy 36, FM 1458, Bartlett Ro, Meyer Road, and I-10. Cunningham Road Bridge and Svoboda Bridge damaged in flood; caused transportation and rescue complications.	Home are costly to repair, and residents cannot be adequately sheltered. Flooded roadway prevents emergency response efforts and evacuations during major flood events.

Bellville



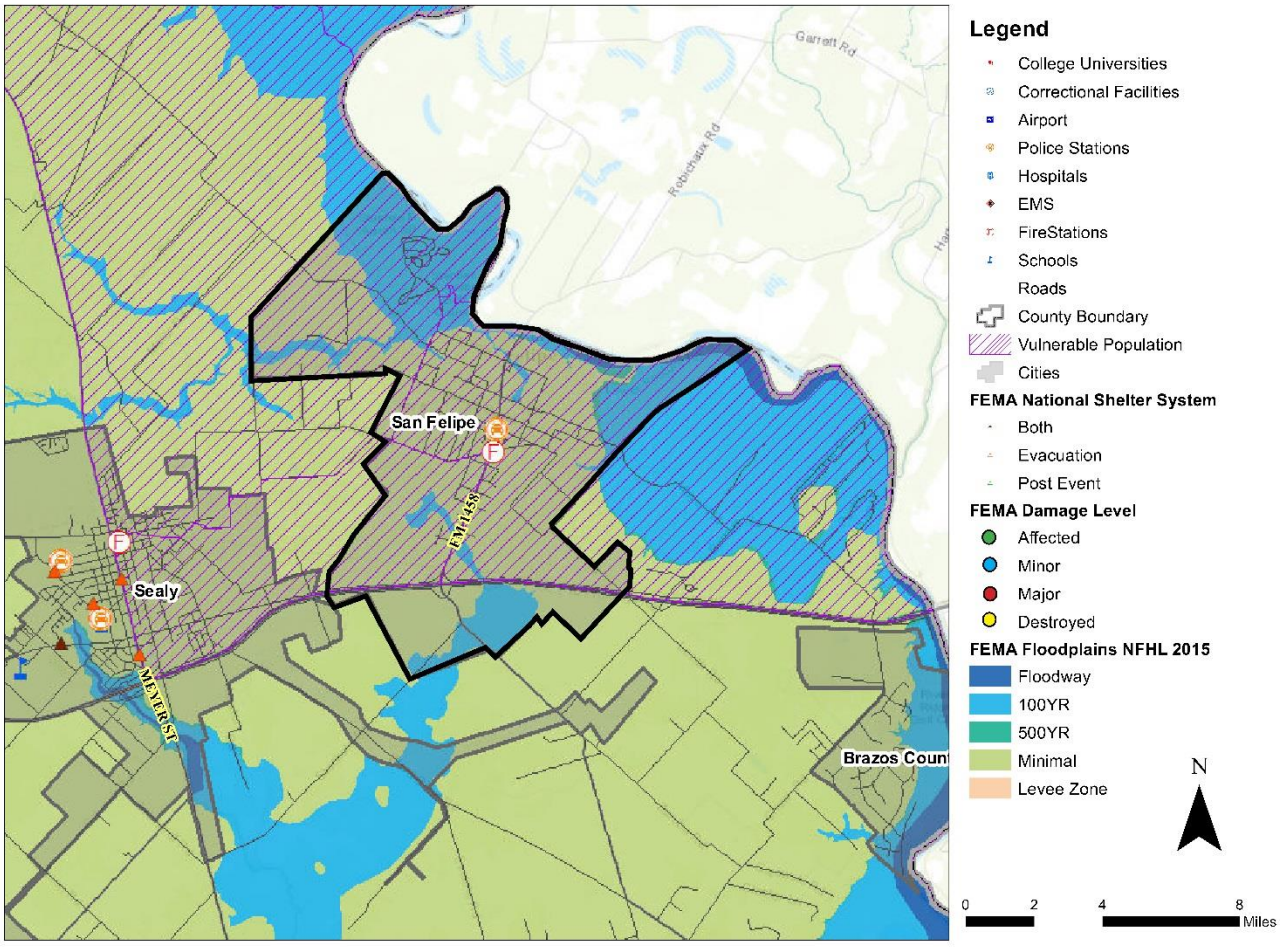
Bellville			
Planning Area (sq. mi):	2.7	**Occurrences since 1996:**	6
Area Affected:	9%	**Annual Event Average:**	0.27
Probability of Occurring in the next 5 years:	Very likely; 1.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	3'-4' of water over roadways, and up to $1 million in infrastructure damage.		
Extent:	Up to 8' of water over roads, and 2' of water in homes.		
Vulnerability		**Impact**	
140 residences at risk of flooding during 500-year event. Road flooding cut off fire stations and EMS stations from their response areas.		Flooded roadway prevents emergency response efforts and evacuations during major flood events. Disruption of services during major flood events could result in loss of life.	

Brazos Country



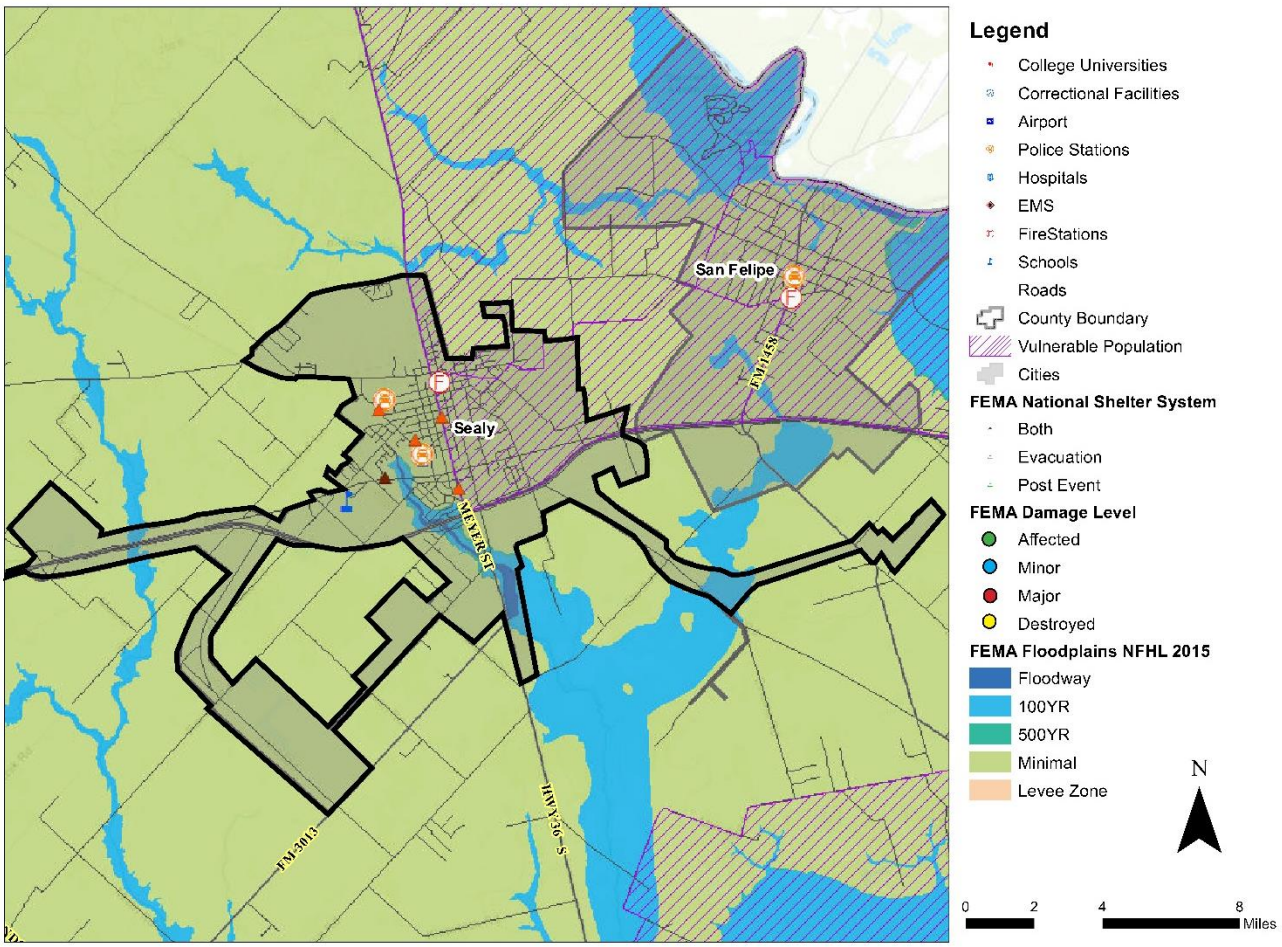
Brazos Country			
Planning Area (sq. mi):	5.0	**Occurrences since 1996:**	5
Area Affected:	31.8%	**Annual Event Average:**	0.23
Probability of Occurring in the next 5 years:	Very likely; 1.2 events estimated to occur within next 5 years.		
Greatest Occurrence:	10' of flood water over roadways, and up to 8' in homes.		
Extent:	Up to 14' of flood water over roadways, and up to 10' of flood water in homes.		
Vulnerability		**Impact**	
54 residences at risk of flooding during 500-year event.		Displaced residents cannot be safely housed during major flood events, and home repairs are costly.	

San Felipe



San Felipe			
Planning Area (sq. mi):	8.7	**Occurrences since 1996:**	5
Area Affected:	25.5%	**Annual Event Average:**	0.23
Probability of Occurring in the next 5 years:	Very likely; 1.2 events estimated to occur within next 5 years.		
Greatest Occurrence:	8' of flood water over roadways, and 6' of flood water in 34 homes.		
Extent:	Up to 12' of flood water over roadways, and 10' of flood water in homes.		
Vulnerability		**Impact**	
83 residences at risk of flooding during 500-year event. Some of the community's valuable assests, the Golf Course and State Park, have been devasted by flooding.		Displaced residents cannot be safely housed during major flood events. Home and property repairs repairs are costly.	

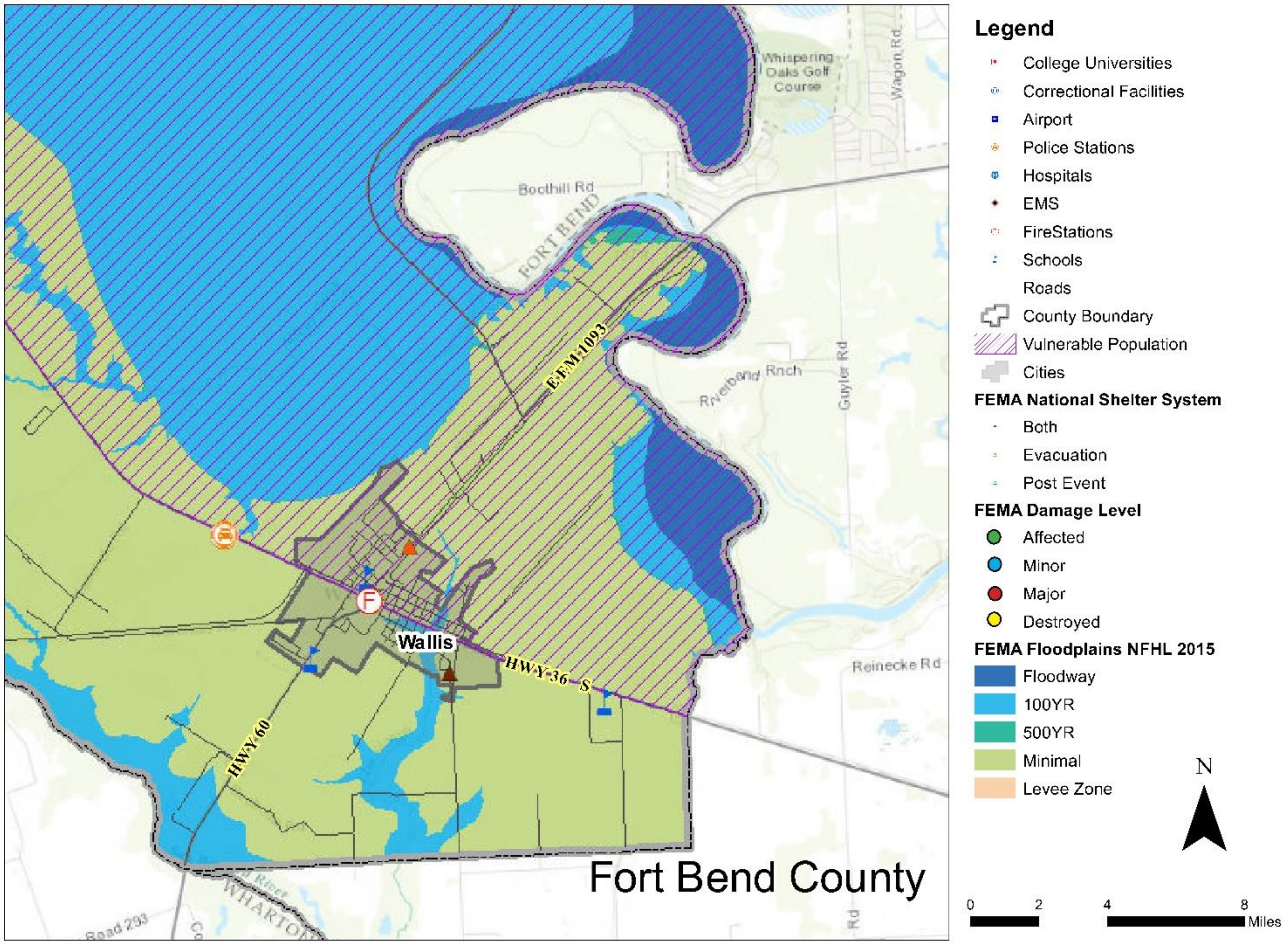
Sealy



Sealy			
Planning Area (sq. mi):	13.5	**Occurrences since 1996:**	5
Area Affected:	5.1%	**Annual Event Average:**	0.23
Probability of Occurring in the next 5 years:	Very likely; 1.2 events estimated to occur within next 5 years.		
Greatest Occurrence:	I-10 evacuation route became flooded closed, up to $2 million in flood damage from Harvey.		
Extent:	Up to 10' of flood water in over roadways, and 8' of flood water in homes.		

Vulnerability	Impact
126 residences at risk of flooding during 500-year event.	Displaced residents cannot be safely housed during major flood events, and repairs would be costly.
City of Sealy's PD & backup dispatch are located in floodway, and flooded during Hurricane Harvey	Disruption of emergency response services during major flood events could result in loss of life.
Sealy Jr. High regularly floods.	Disruption of education services.

Wallis



Wallis			
Planning Area (sq. mi):	1.5	**Occurrences since 1996:**	5
Area Affected:	17.1%	**Annual Event Average:**	0.23
Probability of Occurring in the next 5 years:	Very likely; 1.2 events estimated to occur within next 5 years.		
Greatest Occurrence:	10' of flood water over roadways.		
Extent:	Up to 14' of flood water over roadways, and 2' of flood water in homes		

Vulnerability	Impact
105 residences at risk of flooding during a 500-year event.	Displaced residents cannot be safely housed during major flood events, and home repairs are costly.

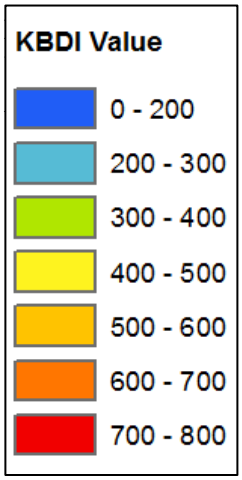
Part 6.2 Wildfires

6.2 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 Austin 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.

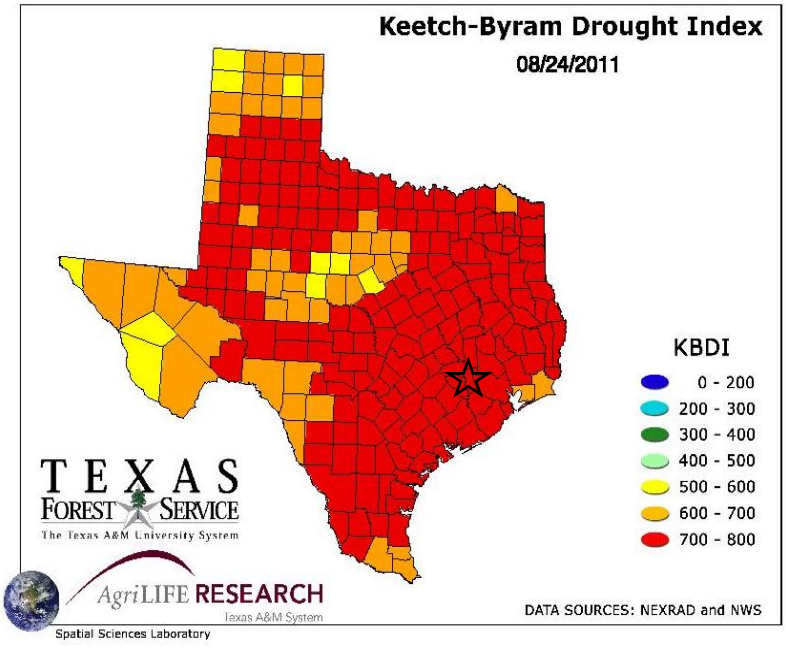
The Texas Wildfire Risk Assessment uses a variety of factors, such as fuels, vegetation, weather, and topography, to determine the fire potential of a specific land area. Particularly vulnerable are the Wildland Urban Interface (WUI) areas. These areas occur at the intersection of development and wildland. 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.

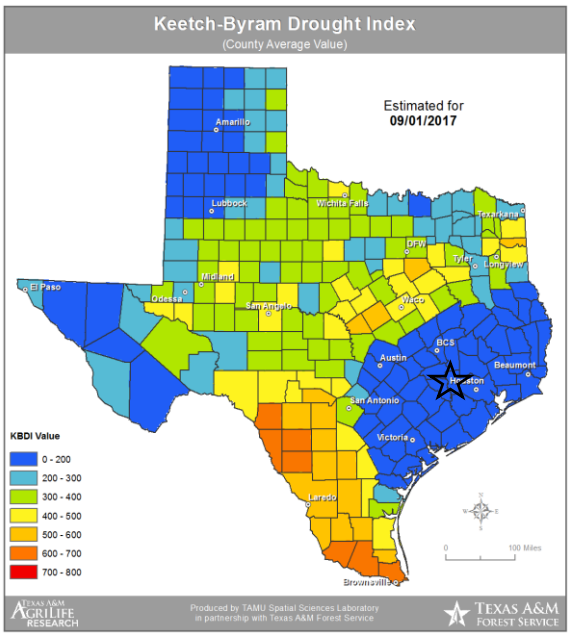
Wildland Fire Assessment System (WFAS) KBDI Value Scale:



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

Austin County Wildfire Disaster Declarations

Declaration Date	Title	Disaster Number
9/1/1999	Extreme Fire Hazards	3142
1/11/2006	Extreme Wildfire Threat	1624
3/13/2008	Wildfires	3284

https://www.FEMA.gov/

Historic Occurrence

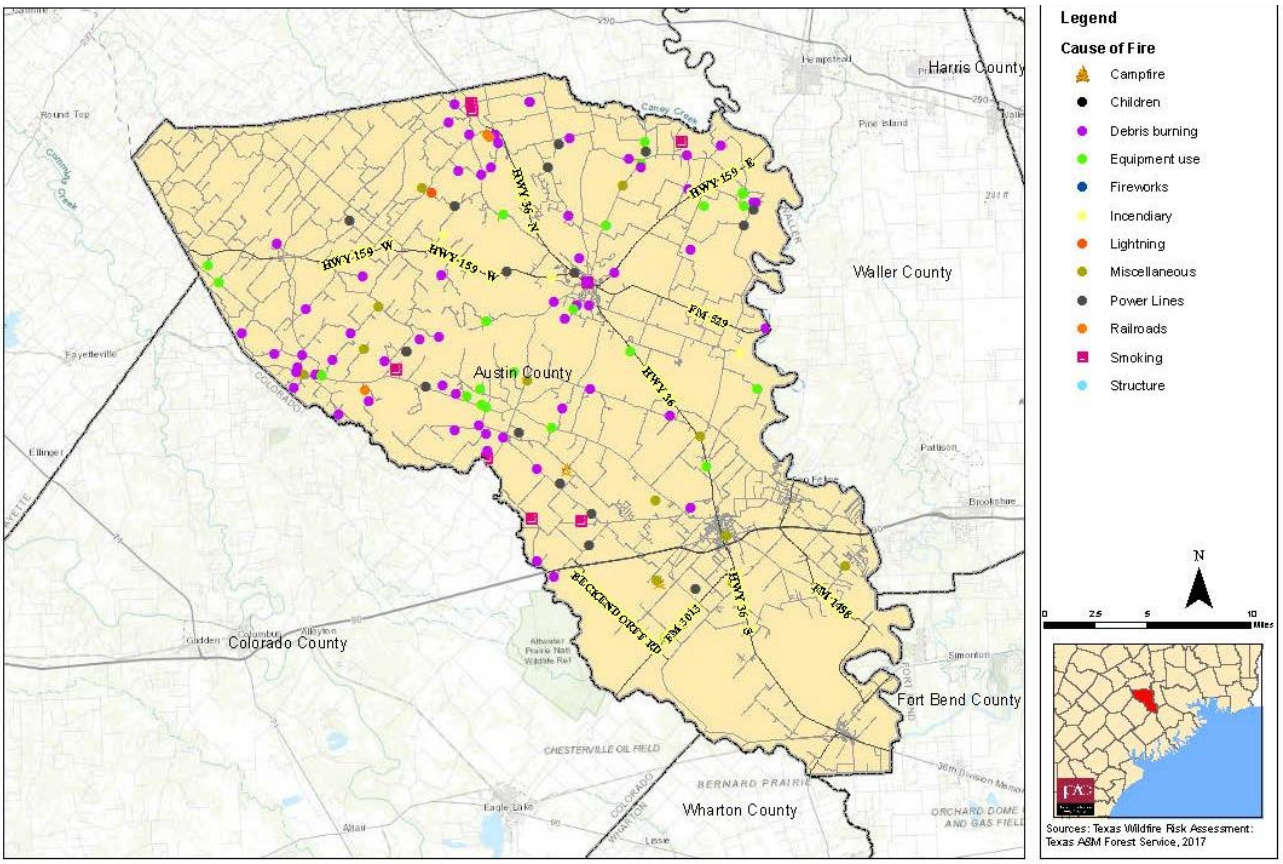
The Texas A&M Forest Service tracks wildfire events, acres destroyed, and the initial ignition cause of the fire. Below is the historic data associated with any burns that caused recorded damage from 2005 to present. No events were reported in 2014 and 2015.

County Name	Cause Name	Damaged Acres	Year of Start Date
Austin	Debris burning	10	2006
Austin	Smoking	30	2006
Austin	Campfire	138	2006
Austin	Miscellaneous	30	2007
Austin	Campfire	20	2008
Austin	Incendiary	3	2009
Austin	Miscellaneous	3	2009
Austin	Equipment use	5	2009
Austin	Equipment use	10	2009
Austin	Debris burning	10	2009
Austin	Debris burning	10	2009
Austin	Equipment use	10	2009
Austin	Debris burning	20	2009
Austin	Debris burning	30	2009
Austin	Debris burning	30	2009
Austin	Miscellaneous	30	2009
Austin	Equipment use	75	2009
Austin	Debris burning	10	2010
Austin	Power Lines	15	2010
Austin	Debris burning	35	2010
Austin	Power Lines	3	2011
Austin	Debris burning	3	2011
Austin	Debris burning	3	2011
Austin	Equipment use	4	2011
Austin	Power Lines	4	2011
Austin	Miscellaneous	5	2011
Austin	Lightning	5	2011
Austin	Debris burning	5	2011
Austin	Railroads	10	2011
Austin	Power Lines	10	2011
Austin	Equipment use	10	2011
Austin	Debris burning	10	2011

Austin	Equipment use	10	2011
Austin	Debris burning	12	2011
Austin	Railroads	12	2011
Austin	Equipment use	15	2011
Austin	Debris burning	18	2011
Austin	Smoking	18	2011
Austin	Equipment use	20	2011
Austin	Debris burning	20	2011
Austin	Miscellaneous	20	2011
Austin	Power Lines	22	2011
Austin	Debris burning	25	2011
Austin	Power Lines	40	2011
Austin	Debris burning	3	2012
Austin	Debris burning	10	2012
Austin	Miscellaneous	10	2012
Austin	Debris burning	3	2013
Austin	Equipment use	7	2013
Austin	Miscellaneous	8	2013

Source: Texas Wildfire Risk Assessment Portal, Texas A&M Forest Service https://www.texaswildfirerisk.com/

Fire Ignition Point (2000 – 2015)



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 data is the most extreme data recorded during a storm or hazard event, and the extent data represents the worst damage a jurisdiction could experience. Information from stakeholders, Texas Forest Service, FEMA, and NOAA are the sources of data for the analysis. The analysis identified all structures, agricultural land, and gross acreage located within the 500 to 800 KBDI zones. Neither stakeholders or the GIS analysis identified any critical facilities located in the 500 to 800 KBDI zones.

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

- GIS analysis of residential structures and critical facilities within 500 to 800 KBDI zones;
- GIS analysis of agricultural and gross acreage within 500 to 800 KBDI zones; and
- Stakeholder identified vulnerabilities.

Austin County (All Participating Jurisdictions)

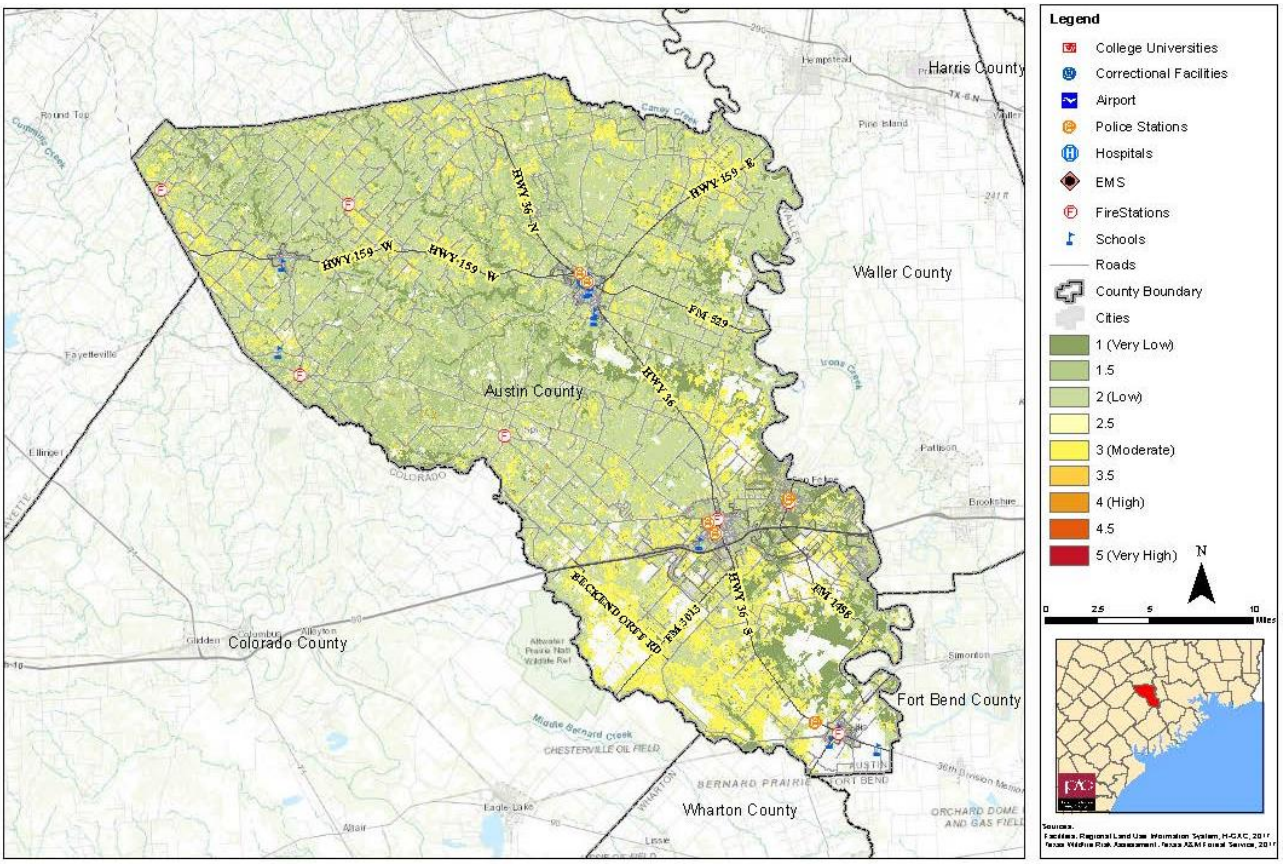
Identified Vulnerabilities:

- Residential structures throughout the county
- Vulnerable populations throughout the county (mapped and identified in Part 3)
- Agricultural areas and parklands throughout the county
- Industrial or commercial areas throughout the county

Identified Impacts:

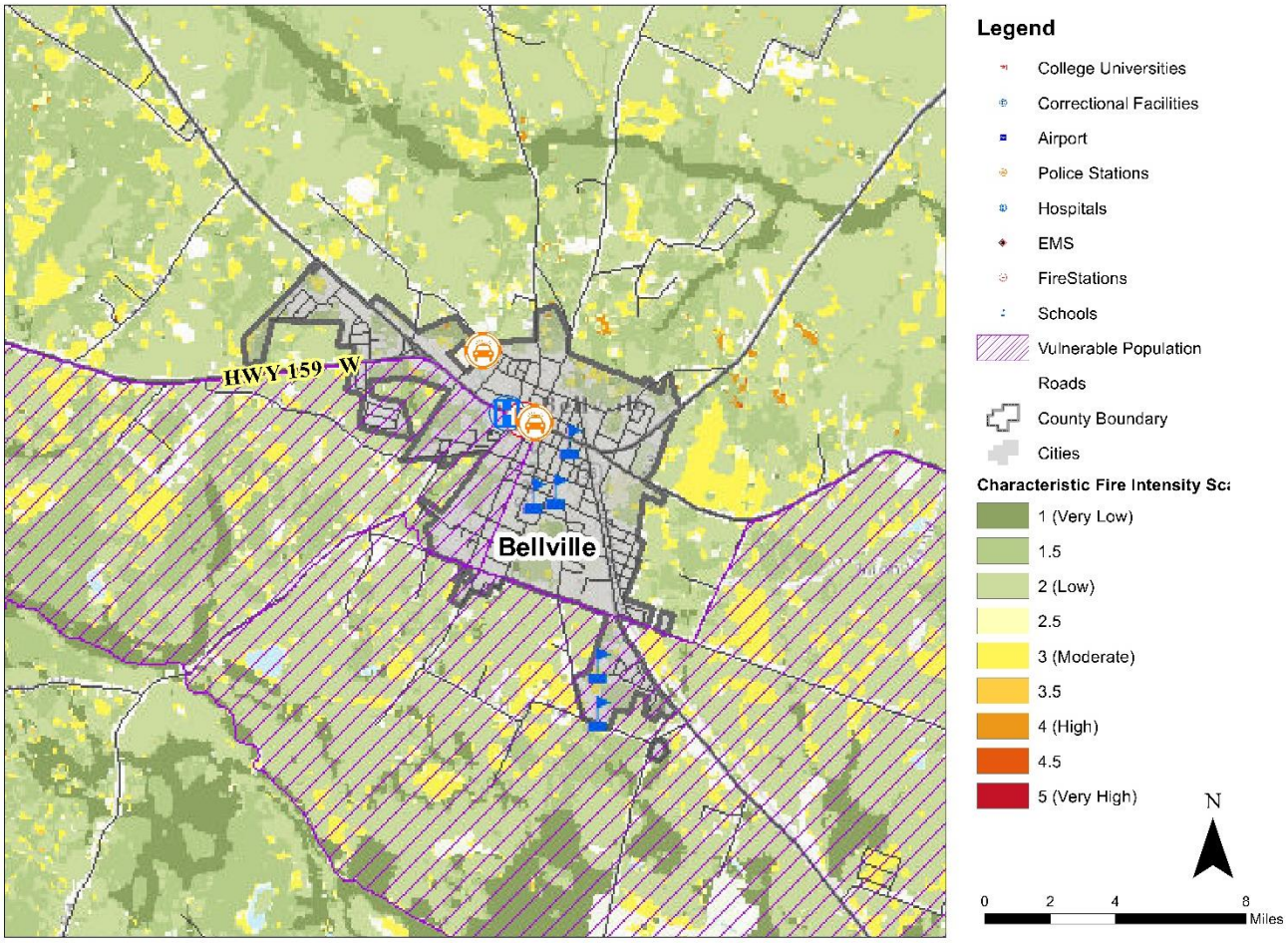
- Residential and commercial property loss throughout the county may lead to a financial loss for residents and jurisdictions
- Significant injury or loss of life particularly for children or older individuals due to potentially poor air quality
- Loss of agriculture land throughout the county may lead to an economic loss for the county and a loss for local farmers and business/ residents that rely on agriculture throughout the county as well
- If an industrial or chemical site catches fire this may lead to a technical hazard leading to an increase in property loss, serious injuries or loss of life

Unincorporated Austin County



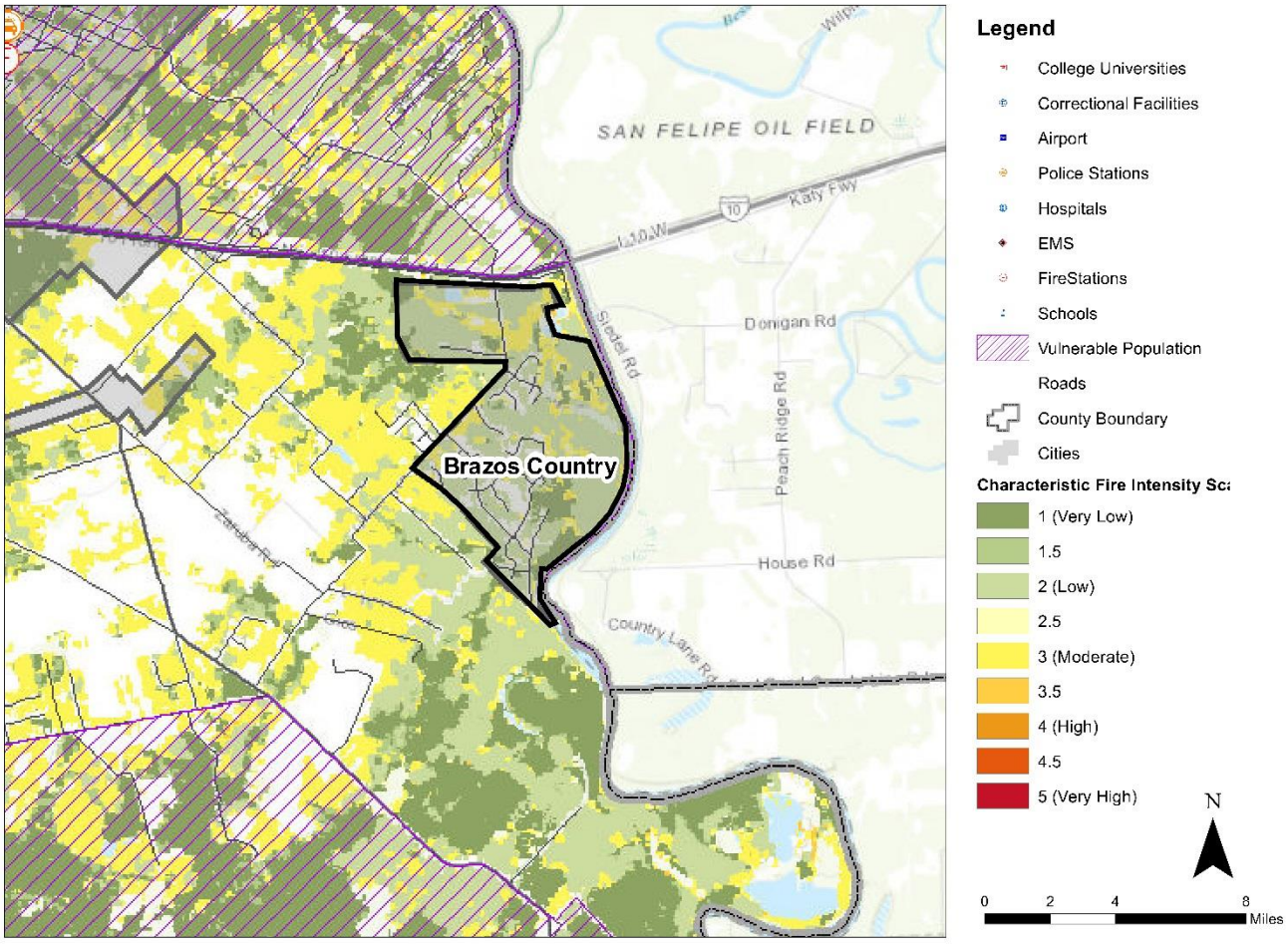
Unincorporated Austin County			
Planning Area (acres):	399,744	**Occurrences since 2005:**	28
Area Affected:	15.2%	**Annual Event Average:**	2.1
Probability of Occurring in the next 5 years:	Very likely; 10.8 events estimated to occur within next 5 years.		
Greatest Occurrence:	Approximately 87 acres burn annually, and the largest wildfire experienced burned 138 acres.		
Extent:	Up to 200 acres burned in one event.		
Vulnerability		**Impact**	
60,761 acres are at high risk, and most of the at-risk property is agricultural land.		Significant agricultural losses if a large wildfire were to occur, and potential loss of life.	
County does not have the capacity to address the wildfire threat during an intense wildfire season. During a high burn season, assistance from the State Forest Service is required.		Additional loss of property and potential loss of life.	

Bellville



Bellville			
Planning Area (acres):	1,728	**Occurrences since 2005:**	22
Area Affected:	3.8%	**Annual Event Average:**	1.7
Probability of Occurring in the next 5 years:	Very likely; 8.5 events estimated to occur within next 5 years.		
Greatest Occurrence:	35 acres burned in one wildfire event		
Extent:	Up to 45 acres burn in one wildfire event		
Vulnerability		**Impact**	
66 acres at high risk.		Potential loss of life and property.	
60 residential parcels at risk.		Potential loss of life and property.	

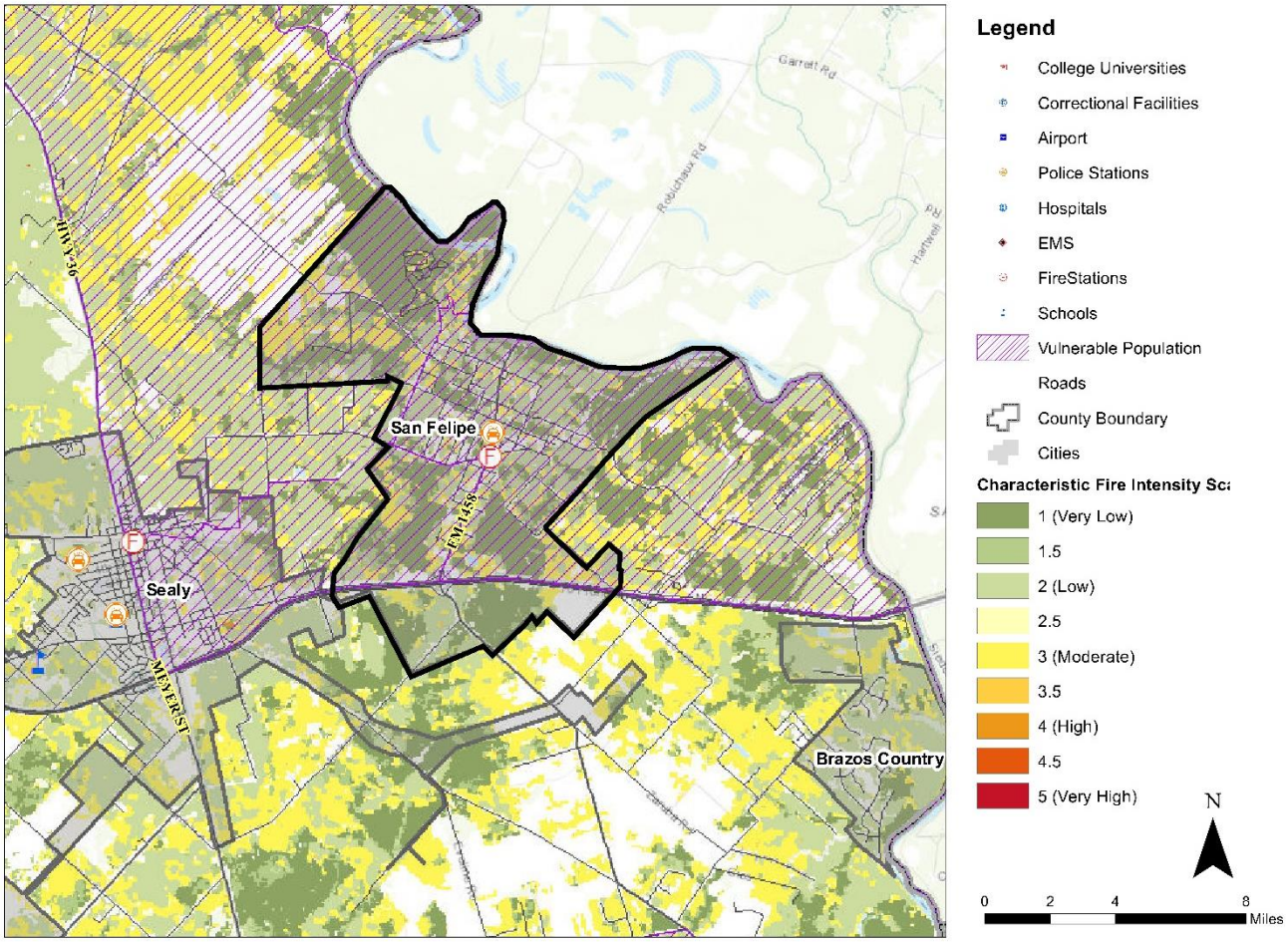
Brazos Country



Brazos Country			
Planning Area (acres):	3,200	**Occurrences since 2005:**	1
Area Affected:	14%	**Annual Event Average:**	0.1
Probability of Occurring in the next 5 years:	Likely; 40% chance event will occur within next 5 years.		
Greatest Occurrence:	17 acres burned in one wildfire event		
Extent:	Up to 30 acres burn in one wildfire event		

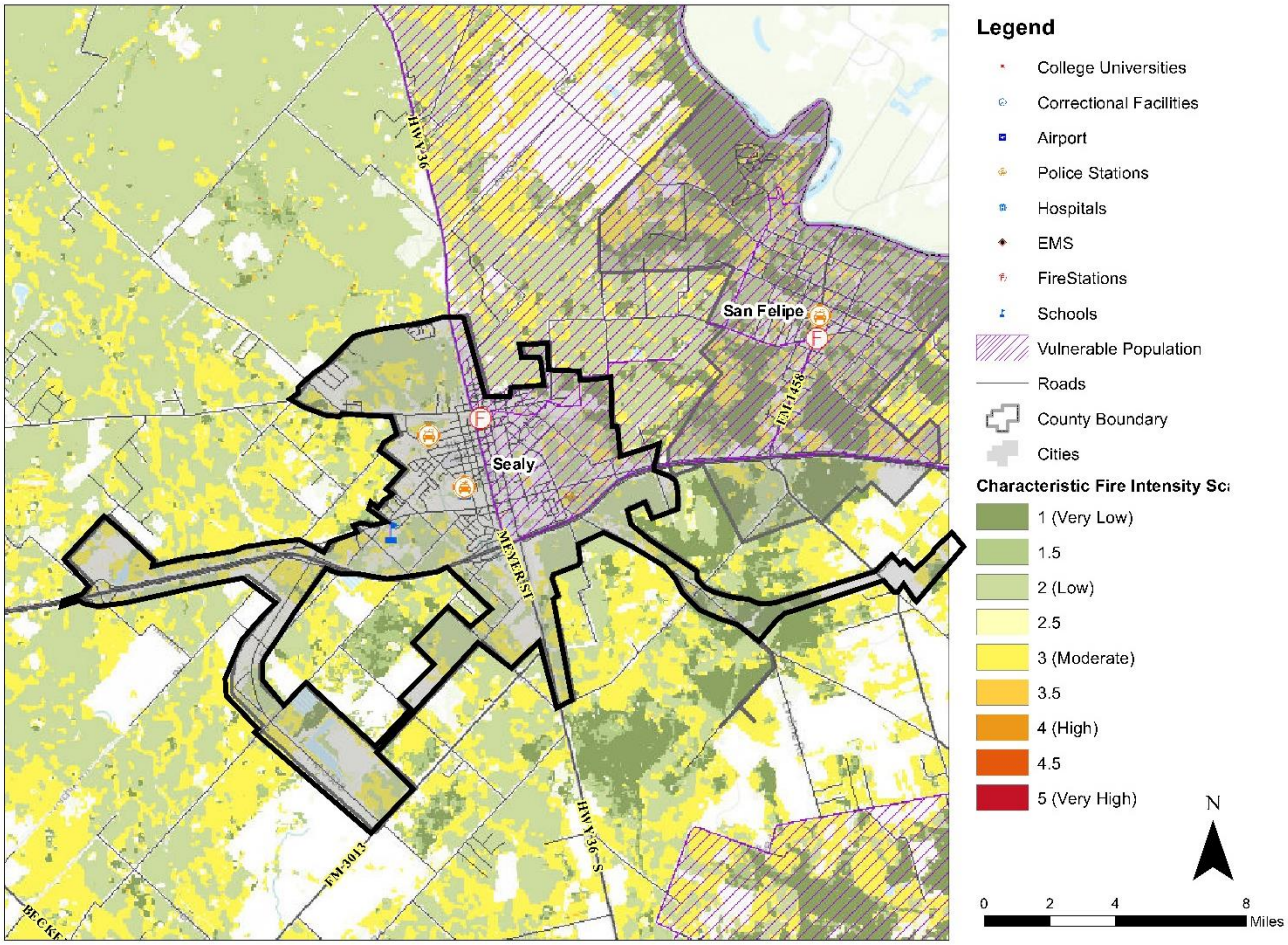
Vulnerability	Impact
448 acres at high risk.	Potential loss of life and property.
24 residential parcels at risk.	Potential loss of life and property.

San Felipe



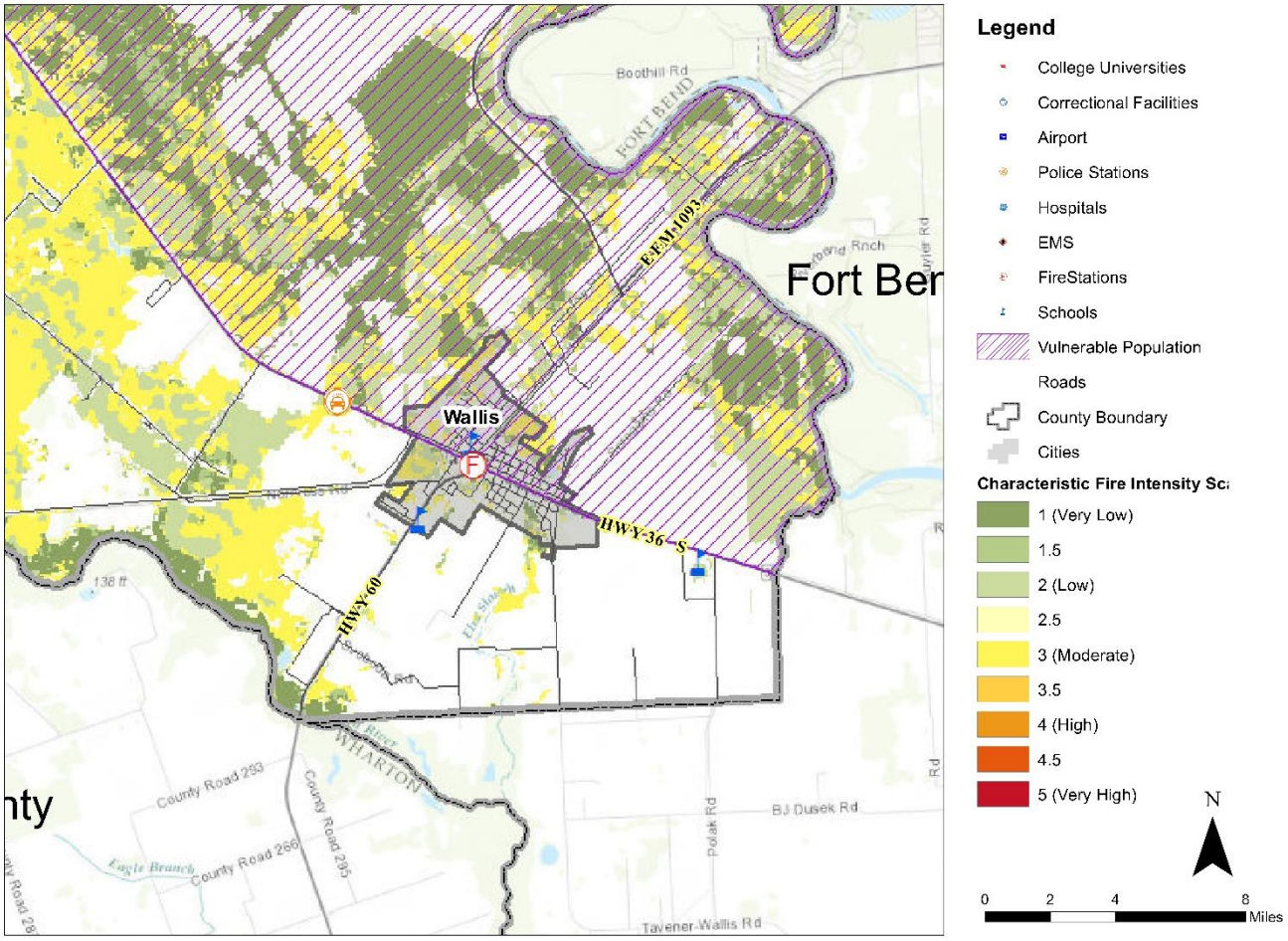
San Felipe			
Planning Area (acres):	5,568	**Occurrences since 2005:**	0
Area Affected:	9.7%	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years. Nearby jurisdiction Brazos Country has experienced wildfires, and San Felipe shares similar geographic conditions. San Felipe can expect some occurrences in the future.		
Greatest Occurrence:	N/A		
Extent:	Up to 30 acres burn in one wildfire event		
Vulnerability		**Impact**	
540 acres at high risk.		Potential loss of life and property.	
31 residential parcels at risk.		Potential loss of life and property.	

Sealy



Sealy			
Planning Area (acres):	8,640	**Occurrences since 2005:**	9
Area Affected:	12.4%	**Annual Event Average:**	0.7
Probability of Occurring in the next 5 years:	Very likely; 3.5 events estimated to occur within next 5 years.		
Greatest Occurrence:	75 acres burned in one wildfire event		
Extent:	Up to 150 acres burn in one wildfire event		
Vulnerability		**Impact**	
1,071 acres at high risk.		Significant agricultural losses if a large wildfire were to occur, and potential loss of life.	
306 residential parcels at risk.		Potential loss of life and property.	

Wallis



Wallis			
Planning Area (acres):	960	**Occurrences since 2005:**	0
Area Affected:	10.2%	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years. Nearby areas have experienced wildfires, and Wallis shares similar geographic conditions. Wallis can expect some occurrences in the future.		
Greatest Occurrence:	N/A		
Extent:	Up to 30 acres burn in one wildfire event		

Vulnerability	Impact
98 acres at high risk.	Potential loss of life and property.
62 residential parcels at risk.	Potential loss of life and property.

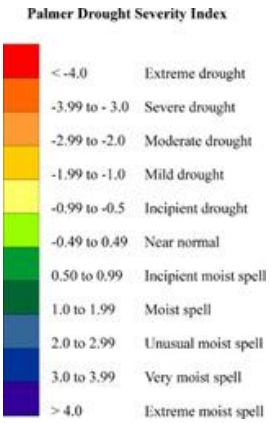
Part 6.3 Drought

6.3 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 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 Austin 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 Austin County's recent history, there have been three notable droughts. Two of the droughts are known to have caused agricultural and financial losses that impacted Austin County. This information is listed below at the county level. The USDA estimates that there were agricultural losses totaling $7.6 billion across the state due to the 2010-2014 drought. For the 2011 – 2014 drought, there is no county-level data available. Members of the community did report economic losses due to the drought, but comprehensive data for the county is not available.

Date	Description	Property Damage (2015 Dollars)	Crop Damage (2015 Dollars)
1996	Extreme Drought 4/1/1996 – 6/1/1996		
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/

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 historic and 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.

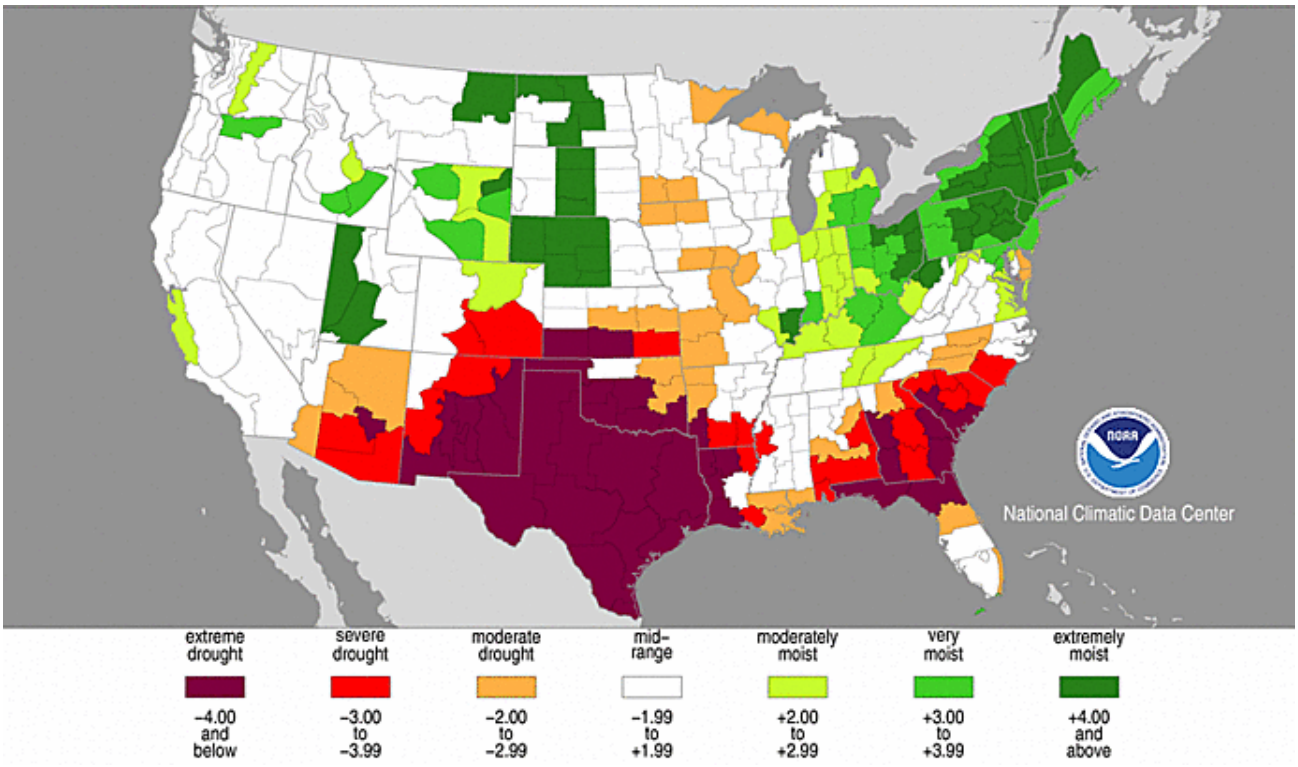
To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- Analysis reported by the USDA and NCDC; and
- Stakeholder identified vulnerabilities.

Droughts often last multiple years and have an economic impact that last longer than the droughts themselves. Austin County's agricultural industry has been determined the most vulnerable asset to drought. Austin County has 369,960 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 $43,542,000 annually; with 40% of revenues from crops, and 60% of revenue from livestock production.

Drought: Countywide

Palmers Drought Severity Index: October 2011



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

All Participating Jurisdictions: Unincorporated Austin County, Bellville, Brazos Country, San Felipe, Sealy, and Wallis			
Planning Area (acres):	419,840	**Occurrences since 1990:**	9
Area Affected:	100% - Entire Planning Area	**Annual Event Average:**	0.33
Probability of Occurring in the next 5 years:	Very likely; 1.7 events estimated to occur within next 5 years.		
Greatest Occurrence:	1 year of extreme drought conditions; < -4.0 PHDI rating		
Extent:	Up to 2 years of extreme drought conditions; < -4.0 PHDI rating		
Vulnerability		**Impact**	
Livestock and Agricultural production; 369,960 acres of agricultural land.		An accumulative loss of an estimated $8,300,000 million in agricultural economic production in one year (catastrophic drought event)	

Part 6.4 Severe Thunderstorm

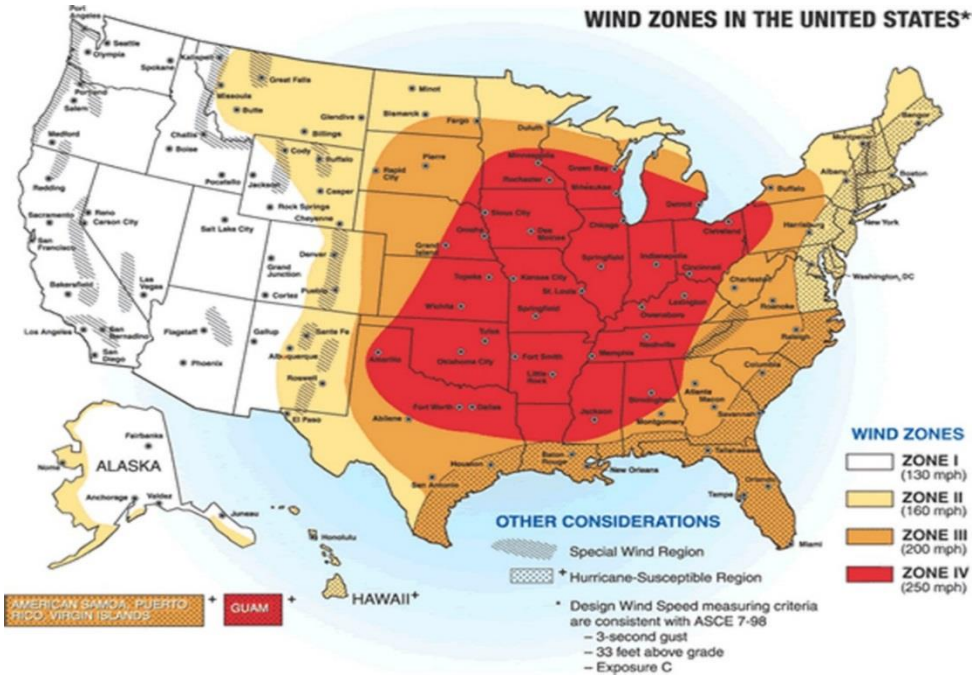
6.4 Severe Thunderstorm

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. Austin 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

Date	Jurisdiction	Property Damage (2015 Dollars)	Crop Damage (2015 Dollars)	Wind Speed (mph)
4/29/1996	Sealy		0	$ 5,000.00
9/20/1996	Bellville		0	$ 5,000.00
9/20/1996	Countywide	63	0	$ 10,000.00
4/11/1997	Countywide		0	$ 10,000.00
5/21/1997	Sealy		0	$ 5,000.00
5/30/1997	Bellville		0	$ 5,000.00
6/17/1997	Countywide		0	$ 5,000.00
12/23/1997	Countywide		0	$ 3,000.00
2/10/1998	Countywide		0	$ 25,000.00
2/10/1998	Sealy		0	$ 5,000.00
2/10/1998	Wallis		0	$ 10,000.00
2/10/1998	Bellville		0	$ 10,000.00
6/5/1998	Bellville		0	$ 2,000.00
5/2/2000	Wallis		0	$ -
7/23/2000	Countywide		0	$ 15,000.00
7/23/2000	Countywide		0	$ 15,000.00
9/2/2000	Countywide		0	$ 25,000.00
9/2/2000	Bellville		0	$ 15,000.00
9/2/2000	Countywide		0	$ 15,000.00
11/5/2000	Countywide		0	$ 100,000.00
11/12/2000	Bellville		0	$ 10,000.00
11/12/2000	Sealy		0	$ 80,000.00
11/12/2000	Bellville		0	$ 15,000.00
8/6/2001	Sealy		0	$ 10,000.00
9/21/2001	Bellville		0	$ 2,000.00
10/13/2001	Bellville	60	0	$ -
3/30/2002	Sealy	69	0	$ 8,000.00
12/12/2002	Countywide		0	$ 5,000.00
12/23/2002	Wallis	60	0	$ 45,000.00
6/13/2003	Countywide	67	0	$ 8,000.00
8/11/2004	Bellville	75	0	$ 50,000.00
8/11/2004	Countywide	58	0	$ 10,000.00
11/23/2004	Countywide	58	0	$ 5,000.00
10/31/2005	Bellville	61	0	$ 13,000.00
4/21/2006	Countywide	58	0	$ 5,000.00
3/12/2007	Countywide	55	0	$ 1,000.00
3/14/2007	Wallis	67	0	$ 25,000.00
4/25/2007	Bellville	60	0	$ -
5/14/2008	Countywide	66	0	$ 2,000.00
12/24/2009	Countywide	60	0	$ 10,000.00
5/29/2010	Wallis	60	0	$ 10,000.00
8/23/2010	Countywide	60	0	$ -
8/24/2011	Bellville	63	0	$ 3,000.00
8/24/2011	Sealy	63	0	$ 2,000.00

9/29/2011	Wallis	58	0	$ 3,000.00
2/18/2012	Bellville	65	0	$ 2,000.00
2/18/2012	Wallis	65	0	$ 2,000.00
8/10/2012	Bellville Arpt	63	0	$ -
4/16/2015	Countywide	60	0	$ -
4/25/2015	San Felipe	58	0	$ 3,000.00
4/25/2015	San Felipe	63	1	$ 2,000.00
4/27/2015	Countywide	63	0	$ 12,000.00
5/25/2015	Countywide	69	0	$ -
5/25/2015	Sealy	69	0	$ -
5/25/2015	Sealy	65	0	$ -
5/27/2015	Bellville	62	0	$ 2,000.00
5/23/2017	Sealy	100	0	$ 1,000,000.00

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.

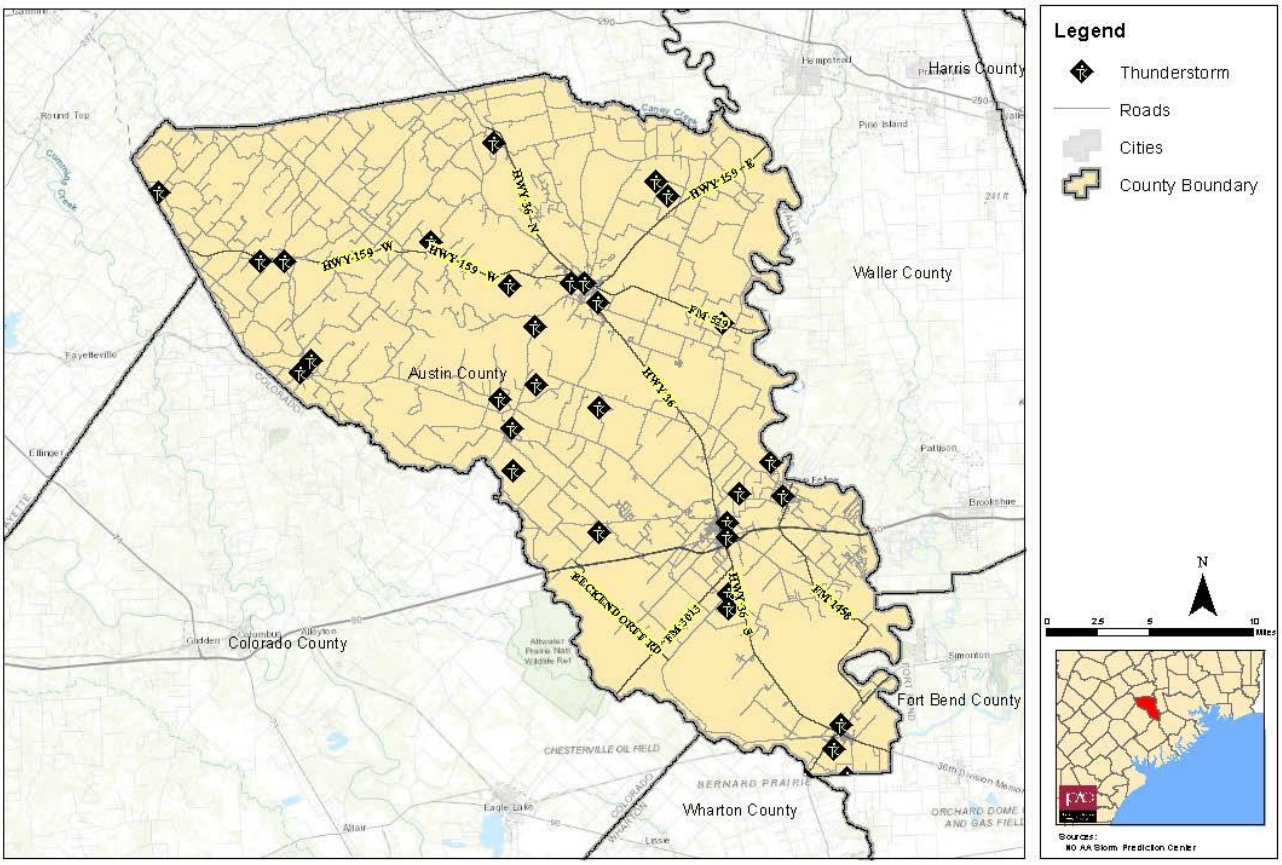
The greatest historic occurrence data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. The extent is the worst the jurisdiction could possibly experience. Information from stakeholders, FEMA, and NOAA are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

Severe Thunderstorm Locations



Austin County (All participating jurisdictions)

Identified Vulnerabilities:

Similar to the hurricane section, this section identifies vulnerabilities from high winds. High winds can tear down powerlines, trees, barns, fences, and multitude of other debris can be blown into roadways and homes during the event.

Additionally, residences and commercial buildings could be damaged or destroyed due to wind events; older residential neighborhoods and structures without a permanent foundation were identified as one of the main vulnerabilities throughout the county. While current building codes address the vulnerability of wind damage to structures, older buildings (particularly residential buildings) were built when less stringent building codes were in place; therefore, older residential building and residences without a permanent foundation are a focus in this section.

- Older public and private structures throughout the county
- Vulnerable populations throughout the county (Identified in Part 3)

Identified Impacts:

- Downed powerlines could impact communication and daily active leading to a finical loss for the county, cities and individuals, and could impede first responders from reaching those in need or residents evacuating
- Strong winds could prevent first responders from traveling to assist individuals, because of unsafe driving conditions such as debris hitting emergency vehicles
- Critical facilities could sustain wind damage, potentially delaying first responders reaching those in need and city services during and after the event
- Economic and financial loss for cities and individuals including property loss

Unincorporated Austin County

Planning Area (sq. mi):	487.7	**Occurrences since 1996:**	22
Area Affected:	100%	**Annual Event Average:**	1.1
Probability of Occurring in the next 5 years:	Very likely; 5.2 events estimated to occur within next 5 years.		
Greatest Occurrence:	$100,000 in property damage from one event 66 mph wind speeds		
Extent:	Up to 85 mph winds.		

Vulnerability	Impact
12,092 structures and 369,960 acres in agricultural production are at risk of damage by severe thunderstorms.	$13,381 in annual losses to direct property damage and repairs.
Critical faciltities at risk: 7 electrical substations, 2 local emergency operation centers, 1 EMS station, 1 fire station, and 7 police stations	A disruption in emergency response services, shelters, and loss of secure inmate housing while repairs are made to critical facilities.

Bellville			
Planning Area (sq. mi):	3.5	**Occurrences since 1996:**	38
Area Affected:	100%	**Annual Event Average:**	1.8
Probability of Occurring in the next 5 years:	Very likely; 9 events estimated to occur within next 5 years.		
Greatest Occurrence:	$50,000 in property damage from one event 75 mph wind speeds		
Extent:	Up to 90 mph winds.		
Vulnerability		**Impact**	
1,566 structures are at risk of damage by severe thunderstorms.		$134,000 in annual losses to direct property damage and repairs.	
Critical faciltities at risk: 5 schools, 2 shelters, 2 police stations, 1 EMS station, 2 fire station, and 2 hospitals		A disruption in emergency response services, shelters, educational services, and hospital care while repairs are made to critical facilities.	

Brazos Country			
Planning Area (sq. mi):	5.0	**Occurrences since 1996:**	22
Area Affected:	100%	**Annual Event Average:**	1.1
Probability of Occurring in the next 5 years:	Very likely; 5.2 events estimated to occur within next 5 years.		
Greatest Occurrence:	69 mph wind speeds		
Extent:	Up to 90 mph winds.		
Vulnerability		**Impact**	
172 structures are at risk of damage by severe thunderstorms.		Expensive repairs of damaged structures, and interruption of regular community services.	

San Felipe			
Planning Area (sq. mi):	3.2	**Occurrences since 1996:**	24
Area Affected:	100%	**Annual Event Average:**	1.2
Probability of Occurring in the next 5 years:	Very likely; 5.7 events estimated to occur within next 5 years.		
Greatest Occurrence:	$3,000 in property damage and 1 death caused by a thunderstorm event 63 mph wind speeds		
Extent:	Up to 63 mph winds.		
Vulnerability		**Impact**	
327 structures are at risk of damage by severe thunderstorms.		$238 in annual losses to direct property damage and repairs.	
Critical faciltities at risk: 2 police stations		A disruption in emergency response services while repairs are made to critical facilities.	

Sealy			
Planning Area (sq. mi):	9.3	**Occurrences since 1996:**	32
Area Affected:	100%	**Annual Event Average:**	1.5
Probability of Occurring in the next 5 years:	Very likely; 7.6 events estimated to occur within next 5 years.		
Greatest Occurrence:	$1,000,000 in property damage from one event 100 mph wind speeds		
Extent:	Up to 115 mph winds.		
Vulnerability		**Impact**	
2,472 structures are at risk of damage by severe thunderstorms.		$53,095 in annual losses to direct property damage and repairs.	
Critical faciltities at risk: 1 electric substation, 1 EMS station, 2 fire stations, 5 police stations, 4 schools, and 5 shelters.		A disruption in emergency response services, shelters, educational services, and power outages while repairs are made to critical facilities.	

Wallis			
Planning Area (sq. mi):	7.2	**Occurrences since 1996:**	29
Area Affected:	100%	**Annual Event Average:**	1.4
Probability of Occurring in the next 5 years:	Very likely; 6.9 events estimated to occur within next 5 years.		
Greatest Occurrence:	$200,000 in crop damage from one event 67 mph wind speeds		
Extent:	Up to 67 mph winds.		
Vulnerability		**Impact**	
618 structures are at risk of damage by severe thunderstorms.		$4,524 in annual losses to direct property damage and repairs.	
Critical faciltities at risk: 1 EMS station, 1 fire station, 3 police stations, 3 schools, and 2 shelters.		A disruption in emergency response services, shelters, and educational services while repairs are made to critical facilities.	

Part 6.5 Tornado

6.5 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 more than 109 yards; high-rise buildings have significant structural deformation; incredible phenomena will occur.

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

Historic Occurrence

Austin County has experienced seven tornados and one microburst since 1990.

Date	Rating	Location	Property Damage (2015 Dollars)	Crop Damage (2015 Dollars)	Deaths
7/31/1992	F0	Austin County	$ 25,000.00	$0	0
5/13/1994	F1	Austin County	$ 50,000.00	$0	0
5/13/1994	F0	Austin County	$ -	$0	0
5/13/1994	F0	Austin County	$ 5,000.00	$0	1
1/12/1995	F0	Sealy	$ 50,000.00	$0	0
10/23/1997	F0	Bellville	$ 5,000.00	$0	0
11/12/2000	F0	Bellville	$ 15,000.00	$0	0
5/23/2017	Microburst	Sealy	$ 1,000,000.00	$0	0

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 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:

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

Austin County (All participating jurisdictions)

Identified Vulnerabilities:

Similar to the hurricane and severe thunderstorm section, this section identifies vulnerabilities from high winds. High winds can tear down powerlines, trees, barns, fences, and multitude of other debris can be blown into roadways and homes during the event.

Additionally, residences and commercial buildings could be damaged or destroyed due to wind events; older residential neighborhoods and structures without a permanent foundation were identified as one of the main vulnerabilities throughout the county. While current building codes address the vulnerability of wind damage to structures, older buildings (particularly residential buildings) were built when less stringent building codes were in place; therefore, older residential building and residences without a permanent foundation are a focus in this section.

- Public and residential structures throughout the county
- Vulnerable populations throughout the county (Identified in Part 3)

Identified Impacts:

- Downed powerlines could impact communication and daily active leading to a finical loss for the county, cities and individuals, and could impede first responders from reaching those in need or residents evacuating
- Strong winds could prevent first responders from traveling to assist individuals, because of unsafe driving conditions such as debris hitting emergency vehicles
- Critical facilities could sustain wind damage, potentially delaying first responders reaching those in need and city services during and after the event
- Economic and financial loss for cities and individuals including property loss

Unincorporated Austin County			
Planning Area (sq. mi):	624.6	**Occurrences since 1990:**	5
Area Affected:	100%	**Annual Event Average:**	0.17857142857142858
Probability of Occurring in the next 5 years:	Very likely; 90% chance event will occur within next 5 years.		
Greatest Occurrence:	F1 tornado; Tornado appeared to touch down on the north side of the County. $500,000 in property damage occurred.		
Extent:	Up to an F4 tornado		

Vulnerability	Impact
12,092 structures and 331,520 acres in agricultural production are at risk of damage by a tornado.	$3,810 in annual losses to direct property damage and repairs, and potential loss of life.
Critical faciltities at risk: 7 electrical substations, 2 local emergency operation centers, 1 EMS station, 1 fire station, and 7 police stations	A disruption in emergency response services, shelters, and loss of secure inmate housing while repairs are made to critical facilities.

Bellville			
Planning Area (sq. mi):	2.7	**Occurrences since 1990:**	2
Area Affected:	100%	**Annual Event Average:**	7.1428571428571425E-2
Probability of Occurring in the next 5 years:	Likely; 40% chance event will occur within next 5 years.		
Greatest Occurrence:	F0 tornado; There was $15,000 in property damages.		
Extent:	Up to an F4 tornado		

Vulnerability	Impact
1,566 structures are at risk of damage by tornados.	$952 in annual losses to direct property damage and repairs, and potential loss of life.
Critical faciltities at risk: 5 schools, 2 shelters, 2 police stations, 1 EMS station, 2 fire station, and 2 hospitals	A disruption in emergency response services, shelters, educational services, and hospital care while repairs are made to critical facilities.

Brazos Country			
Planning Area (sq. mi):	5.0	**Occurrences since 1990:**	0
Area Affected:	100%	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; Nearby jurisdictions have experienced tornados and Brazos Country can assume they are at risk.		
Extent:	Up to an F4 tornado		
Vulnerability		**Impact**	
172 structures are at risk of damage by tornado.		Costly repairs, interruption of city services, and potential loss of life.	

San Felipe			
Planning Area (sq. mi):	8.7	**Occurrences since 1990:**	0
Area Affected:	100%	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years.		
Greatest Occurrence:	N/A; Nearby jurisdictions have experienced tornados and San Felipe can assume they are at risk.		
Extent:	Up to an F4 tornado		
Vulnerability		**Impact**	
327 structures are at risk of damage by tornado.		Costly repairs, interruption of city services, and potential loss of life.	
Critical faciltities at risk: 2 police stations		A disruption in emergency response services while repairs are made to critical facilities.	

Sealy			
Planning Area (sq. mi):	13.5	**Occurrences since 1990:**	2
Area Affected:	100%	**Annual Event Average:**	7.14285714285714 25E-2
Probability of Occurring in the next 5 years:	Likely; 40% chance event will occur within next 5 years.		
Greatest Occurrence:	Sealy experienced an F0 tornado, and has experienced a microburst. The tornado caused $50,000 in damage and the Microburst caused $1.5 million in damage.		
Extent:	Up to an F4 tornado		
Vulnerability		**Impact**	
2,472 structures are at risk of damage by tornado.		$73,810 in annual losses to direct property damage and repairs, and potential loss of life.	
Critical faciltities at risk: 1 electric substation, 1 EMS station, 2 fire stations, 5 police stations, 4 schools, and 5 shelters.		A disruption in emergency response services, shelters, educational services, and power outages while repairs are made to critical facilities.	

Wallis			
Planning Area (sq. mi):	1.5	**Occurrences since 1990:**	0
Area Affected:	100%	**Annual Event Average:**	0
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	N/A; Nearby jurisdictions have experienced tornados and Prairie View can assume they are at risk.		
Extent:	Up to an F4 tornado		

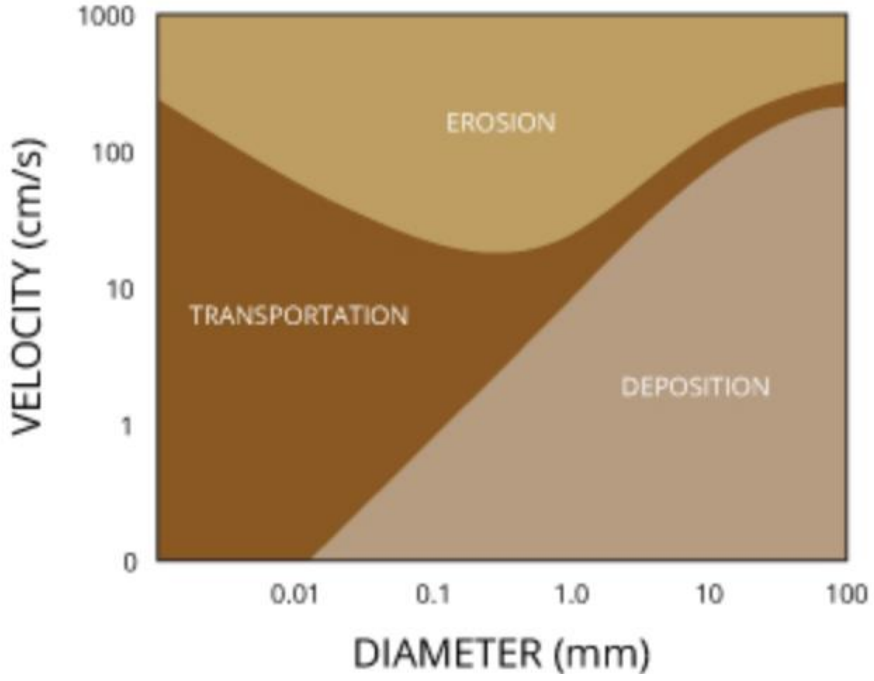
Vulnerability	Impact
618 structures are at risk of damage by tornado.	Costly repairs, interruption of city services, and potential loss of life.
Critical faciltities at risk: 1 EMS station, 1 fire station, 3 police stations, 3 schools, and 2 shelters.	A disruption in emergency response services, shelters, and educational services while repairs are made to critical facilities.

Part 6.6 Erosion

6.6 Erosion

Erosion, or the movement of soil and vegetation from one place to another, is accompanied by deposition, or the settling of this soil and vegetation in a new location; this relationship is illustrated through the chart below. Erosion is measured through the rate of change in the displacement of a river or stream bank over a period. In other words, erosion is measured by how much soil is moving and then settling in a new area within a particular timeframe. Feet per year is the most common way to measure the extent of erosion.

Relationship Between Erosion and Deposition



Source: www.nrcs.usda.gov

Historic Occurrence

In Austin County's recent history, there are only two notable occurrences of erosion. The most notable occurrence in the county was in San Felipe; Steven F. Austin State Park reported building damage due to erosion. The golf course in Brazos Country has also experienced erosion, but no damage has been reported. San Felipe, Brazos Country, and parts of unincorporated Austin County are located on the Brazos River and susceptible to the effects of erosion. Because no other reports of damage caused by erosion, this plan will only profile San Felipe, Brazos Country, and unincorporated Austin County. However, there is a data deficiency throughout the county. There is no data documenting the displaced soil or feet per year of erosion. There is a mitigation action in Part 7 of this plan to address this deficiency.

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 historic and 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 are the sources of data for the analysis.

Unincorporated Austin County			
Planning Area (sq. mi):	487	**Occurrences since 2000:**	1
Area Affected:	4%	**Annual Event Average:**	0.6
Probability of Occurring in the next 5 years:	Likely**;** 27% chance that an event will occur within next 5 years.		
Greatest Occurrence:	Minor river bank erosion during Hurricane Harvey flooding.		
Extent:	Annual loss of 3 feet of river bank erosion		

Vulnerability	**Impact**
Erosion can greatly affect agriculture production. Austin County has 369,960 acres of agricultural land.	Lost revenue and agricultural production.
Public and private property throughout the county, but particularly along the Brazos River.	Damage to public and private property requiring costly repairs and infrastructure reinforcement.

Brazos Country			
Planning Area (sq. mi):	5.0	**Occurrences since 2000:**	1
Area Affected:	10%	**Annual Event Average:**	0.06
Probability of Occurring in the next 5 years:	Likely**;** 27% chance that an event will occur within next 5 years.		
Greatest Occurrence:	Minor erosion at the golf course was reported.		
Extent:	A significant loss of land and revenue due to erosion along the Brazos River.		

Vulnerability	**Impact**
Property along the Brazos River, particularly the golf course.	Private property requiring costly repairs, loss of land, and lost revenue.

San Felipe			
Planning Area (sq. mi):	3.2	**Occurrences since 2000:**	1
Area Affected:	10%	**Annual Event Average:**	0.06
Probability of Occurring in the next 5 years:	Likely**;** 27% chance that an event will occur within next 5 years.		
Greatest Occurrence:	Structural damage caused by erosion on the Brazos River.		
Extent:	Loss of entire structures to erosion along the Brazos River.		

Vulnerability	Impact
Property along the Brazos River, particularly the structures at Stephen F Austin State Park.	Private and public property requiring costly repairs, and loss of land.

Part 6.7 Hail

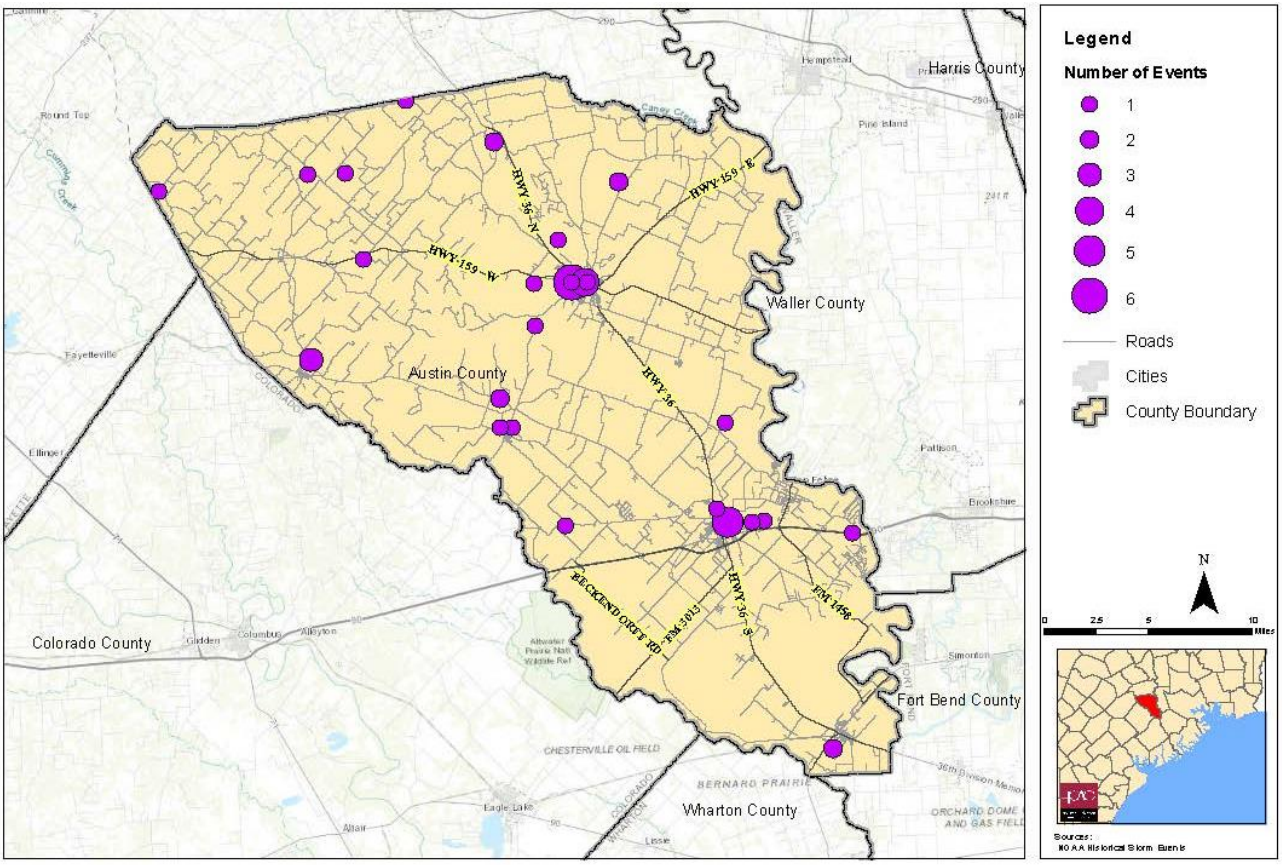
6.7 Hail

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/

Location of Hail Events



Historic Occurrences

Since 1996, Austin County experienced 33 hail events and 19 were considered severe (quarter sized and above). Golf ball sized hail or size H10 is the largest size hail the County experienced.

Event Date	Jurisdiction	Size	Total Damage (2015 Dollars)
4/5/1996	Sealy	1.75	$ 20,000.00
4/5/1996	Sealy	1.75	$ 20,000.00
8/12/1996	Wallis	1.75	$ 10,000.00
9/20/1996	Bellville	1.00	$ 5,000.00
5/30/1997	Bellville	1.75	$ 10,000.00
2/16/1998	Austin County	0.88	$ 3,000.00
6/5/1998	Austin County	1.00	$ 3,000.00
2/27/1999	Wallis	0.75	$ 3,000.00
5/12/1999	Bellville	0.75	$ 10,000.00
5/30/1999	Sealy	2.00	$ 30,000.00
5/2/2000	Bellville	0.75	$ 10,000.00
5/4/2000	Austin County	1.00	$ 15,000.00
11/12/2000	Bellville	1.75	$ 25,000.00
2/26/2001	Bellville	1.00	$ 5,000.00
3/14/2001	Sealy	0.75	$ 5,000.00
9/21/2001	Bellville	0.88	$ 2,000.00
3/30/2002	Austin County	0.75	$ 5,000.00
3/30/2002	Sealy	0.75	$ 5,000.00
10/19/2002	Sealy	0.75	$ 5,000.00
3/13/2003	Sealy	0.75	$ 5,000.00
4/24/2003	Sealy	1.00	$ 2,000.00
8/8/2003	Austin County	0.75	$ 2,000.00
4/10/2004	Bellville	1.75	$ 30,000.00
6/4/2004	Sealy	0.75	$ 30,000.00
6/4/2004	San Felipe	0.88	$ 20,000.00
12/21/2006	Austin County	0.75	$ 3,000.00
6/3/2007	Austin County	0.75	$ -
3/18/2008	Bellville	0.75	$ 2,500.00
6/26/2008	Bellville	1.75	$ 13,000.00
3/20/2013	Bellville	1.00	$ -
3/20/2013	Bellville	1.75	$ 25,000.00
5/10/2013	Bellville	1.00	$ -
4/19/2015	Sealy	1.50	$ 3,000.00
5/21/2016	Bellville	0.75	$ -
5/23/2017	Austin County	0.75	$ -

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.

Austin County (All participating jurisdictions)

Identified Vulnerabilities:

- Critical facilities including emergency response vehicles (fire trucks, ambulances etc.) throughout the county:
    - Uncovered parking lots may lead to damaged vehicles
    - Facility's generators located outside may be damaged.
    - Damage to critical facilities, including roof damage or window damage, may occur as well.

- Identified vulnerable populations throughout the county, identified in the county profile, may be more vulnerable financially if they sustain damage to a personal vehicle, property

Identified Impacts:

- Strong winds or hail could prevent first responders from traveling to assist individuals, because of unsafe driving conditions such as debris hitting emergency vehicles

- Critical facilities could sustain hail damage- windows of response vehicles broken, potentially delaying first responders reaching those in need and city services during and after the event

- Financial loss for individuals whose vehicles or homes are damaged by hail-including cost to repair hail damage and potential financial loss from potential loss of a job because of the lack of transportation to and from their job

- Financial loss for jurisdictions that need to replace damaged buildings or infrastructure, including damaged roofs or equipment

Unincorporated Austin County			
Planning Area (sq. mi):	624.6	**Occurrences since 1990:**	35
Area Affected:	100%	**Annual Event Average:**	1.7
Probability of Occurring in the next 5 years:	Very likely; 8.3 events estimated to occur within next 5 years.		
Greatest Occurrence:	H4 size hail stones (1 inch) $15,000 in damage from single hail event		
Extent:	Up to H11 size hail stones (3 inch)		
Vulnerability		**Impact**	
12,092 structures and 369,960 acres in agricultural production are at risk of damage by a major hail event.		$1,476 in annual losses to direct property damage. Costly repairs to structures, interruption of city services, damage to vehicles, and potential loss of life.	
Critical faciltities at risk: 7 electrical substations, 2 local emergency operation centers, 1 EMS station, 1 fire station, and 7 police stations		A disruption in emergency response services, shelters, and loss of secure inmate housing while repairs are made to critical facilities.	

Bellville			
Planning Area (sq. mi):	2.7	**Occurrences since 1990:**	14
Area Affected:	100%	**Annual Event Average:**	0.7
Probability of Occurring in the next 5 years:	Very likely; 3.3 events estimated to occur within next 5 years.		
Greatest Occurrence:	H7 size hail stones (1.75 inch) $25,000 in damage from single hail event		
Extent:	Up to H11 size hail stones (3 inch)		
Vulnerability		**Impact**	
1,566 structures are at risk of damage by a major hail event.		$3,476 in annual losses to direct property damage. Costly repairs to structures, interruption of city services, damage to vehicles, and potential loss of life.	
Critical faciltities at risk: 5 schools, 2 shelters, 2 police stations, 1 EMS station, 2 fire station, and 2 hospitals		A disruption in emergency response services, shelters, educational services, and hospital care while repairs are made to critical facilities.	

Brazos Country			
Planning Area (sq. mi):	5.0	**Occurrences since 1990:**	1
Area Affected:	100%	**Annual Event Average:**	0.2
Probability of Occurring in the next 5 years:	Likely; 20% chance event will occur within next 5 years.		
Greatest Occurrence:	H1 size hail stones (0.5 inch)		
Extent:	Up to H11 size hail stones (3 inch)		
Vulnerability		**Impact**	
172 structures are at risk of damage by a major hail event.		Costly repairs to structures, interruption of city services, damage to vehicles, and potential loss of life.	

San Felipe			
Planning Area (sq. mi):	8.7	**Occurrences since 1990:**	1
Area Affected:	100%	**Annual Event Average:**	0.2
Probability of Occurring in the next 5 years:	Likely; 20% chance event will occur within next 5 years.		
Greatest Occurrence:	H3 size hail stones (2.75 inch) $20,000 in damage from single hail event		
Extent:	Up to H11 size hail stones (3 inch)		
Vulnerability		**Impact**	
327 structures are at risk of damage by a major hail event.		$952 in annual losses to direct property damage. Costly repairs to structures, interruption of city services, damage to vehicles, and potential loss of life.	
Critical faciltities at risk: 2 police stations		A disruption in emergency response services while repairs are made to critical facilities.	

Sealy			
Planning Area (sq. mi):	13.5	**Occurrences since 1990:**	10
Area Affected:	100%	**Annual Event Average:**	2.4
Probability of Occurring in the next 5 years:	Very likely; 2.4 events estimated to occur within next 5 years.		
Greatest Occurrence:	H7 size hail stones (2.75 inch) $30,000 in damage from single hail event		
Extent:	Up to H11 size hail stones (3 inch)		
Vulnerability		**Impact**	
2,472 structures are at risk of damage by a major hail event. None of Sealy's emergency vehicles have covered parking, and are vulnerable to hail damage.		$5,952 in annual losses to direct property damage. Costly repairs to structures, interruption of city services, damage to vehicles, and potential loss of life.	
Critical faciltities at risk: 1 electric substation, 1 EMS station, 2 fire stations, 5 police stations, 4 schools, and 5 shelters.		A disruption in emergency response services, shelters, educational services, and power outages while repairs are made to critical facilities.	

Wallis			
Planning Area (sq. mi):	1.5	**Occurrences since 1990:**	2
Area Affected:	100%	**Annual Event Average:**	0.5
Probability of Occurring in the next 5 years:	Likely; 50% chance event will occur within next 5 years.		
Greatest Occurrence:	H3 size hail stones (2.75 inch) $10,000 in damage from single hail event		
Extent:	Up to H11 size hail stones (3 inch)		

Vulnerability	Impact
618 structures are at risk of damage by a major hail event.	$619 in annual losses to direct property damage. Costly repairs to structures, interruption of city services, damage to vehicles, and potential loss of life.
Critical faciltities at risk: 1 EMS station, 1 fire station, 3 police stations, 3 schools, and 2 shelters.	A disruption in emergency response services, shelters, and educational services while repairs are made to critical facilities.

6.8 Expansive Soils

6.8 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

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 extent 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. 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. A data deficiency for "Occurrences" was addressed by assigning 1 occurrence for any jurisdiction that had Very High shrink swell classes.

Austin County Expansive Soils Data

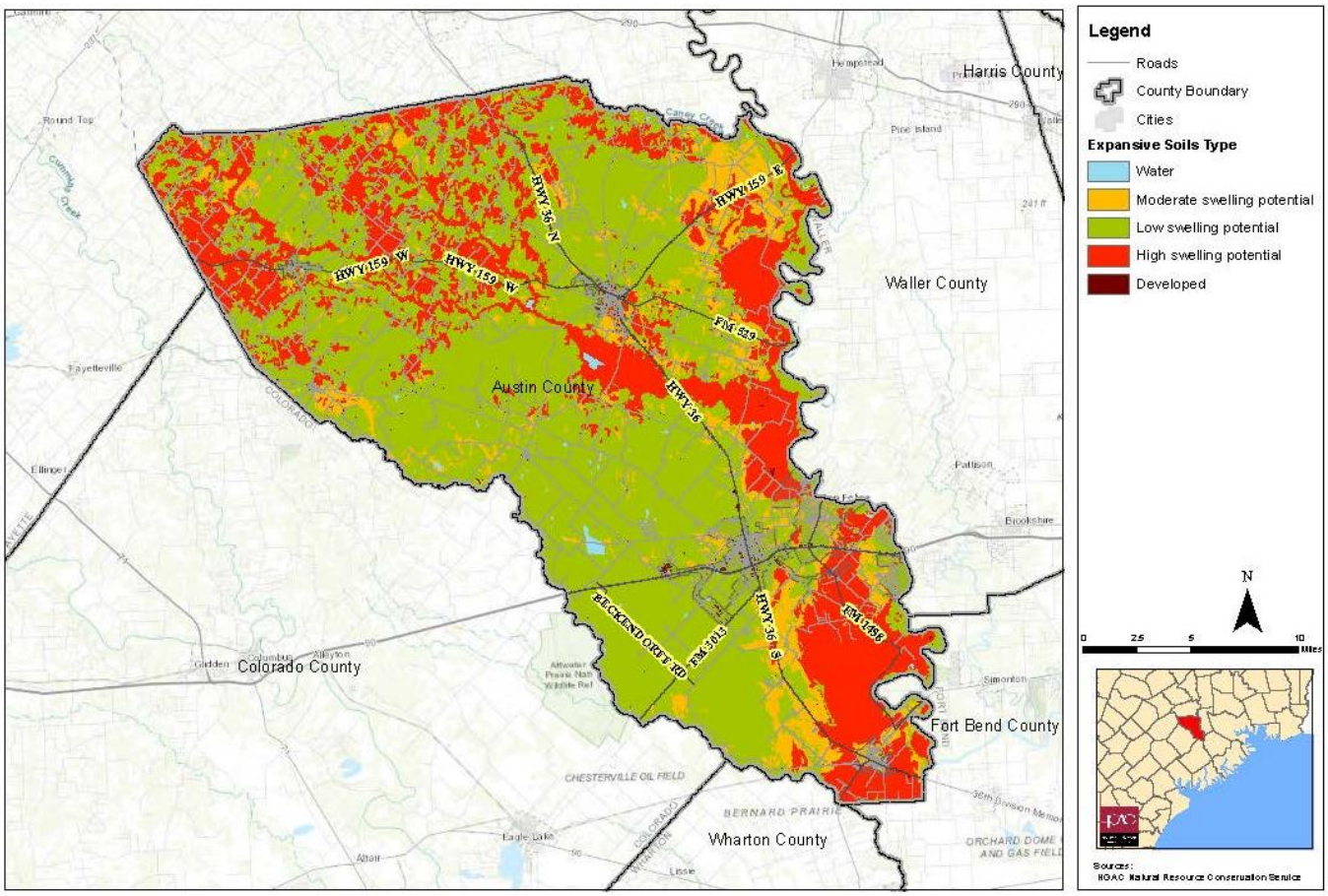
Jurisdiction	Low Swelling Potential	Moderate Swelling Potential	High Swelling Potential
Unincorporated Austin County	61.3%	9.7%	27.2%
Bellville	81.6%	11.6%	4.0%
Brazos County	52.7%	18.6%	22.3%
San Felipe	69.7%	7.9%	2.7%
Sealy	0.2%	51.9%	29.4%
Wallis	39.0%	10.8%	6.8%

Austin County (All Jurisdictions)

Identified Vulnerabilities:
Broken foundations and water pipes in commercial and residential buildings and public property. While newer buildings can be impacted; older buildings including critical facilities and homes are more likely to be impacted; this is due to older buildings being exposed to numerous weather events and seasons, having building standards that do not take expansive soils into account, and the lack of engineering solutions to mitigate expansive soils in the past. Therefore, the vulnerabilities focus on older buildings in each of the jurisdictions.

Identified Impacts:
Jurisdictions can be impacted by expensive financial costs to repair foundations and water lines for public facilities. School districts, home owners, and business owners could also be impacted by broken pipes, cracked foundations, and other structural repairs caused by expanding and contracting soils. Pipes in critical facilities may also lead to a loss of service, or damaged roads/bridges can increase response time to get to someone in need.

Expansive Soil Map: Austin County



Unincorporated Austin County			
Planning Area (sq. mi):	624.6	**Occurrences since 1996:**	1
Area Affected:	27.2%	**Annual Event Average:**	0.05
Probability of Occurring in the next 5 years:	Very likely; 1 events estimated to occur within next 5 years.		
Greatest Occurrence:	Damage to roads, overpasses, and cracked foundations in structures throughout the county.		
Extent:	Extensive damage to roads, overpasses, water and sewer lines, and structure foundations that require expensive repairs or replacement		

Vulnerability	Impact
3,289 structures at risk of damage due to expansive soils	Costly repairs and potential interruption of county services.
19 roadway bridges and 3 electric substations are constructed on soils with high swelling potential	Expensive repairs of major roadways, overpasses and bridges. A potential interruption of county services and transportation thoroughfares.

Bellville			
Planning Area (sq. mi):	2.7	**Occurrences since 1996:**	1
Area Affected:	6.8%	**Annual Event Average:**	0.05
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	Reports of foundations shifting and requiring repairs.		
Extent:	Foundations requiring major repairs, and water and sewer line breaks due to expanding soils.		
Vulnerability		**Impact**	
106 structures at risk of damage due to expansive soils		Costly repairs and potential interruption of city services.	
3 roadway bridges are constructed on soils with high swelling potential		Expensive repairs of bridges, and a potential interruption of transportation thoroughfares.	

Brazos Country			
Planning Area (sq. mi):	5.0	**Occurrences since 1996:**	1
Area Affected:	4.0%	**Annual Event Average:**	0.05
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	Reports of foundations shifting and requiring repairs.		
Extent:	Foundations requiring major repairs, and water and sewer line breaks due to expanding soils.		
Vulnerability		**Impact**	
7 structures at risk of damage due to expansive soils		Costly repairs and potential interruption of city services.	

San Felipe			
Planning Area (sq. mi):	8.7	**Occurrences since 1996:**	1
Area Affected:	22.3%	**Annual Event Average:**	0.05
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	Foundations of structures shifting requiring repairs, and water and sewer line damage.		
Extent:	Foundations requiring major repairs, and water and sewer line breaks due to expanding soils.		
Vulnerability		**Impact**	
73 structures at risk of damage due to expansive soils		Costly repairs and potential interruption of services.	
1 roadway bridge is constructed on soils with high swelling potential		Expensive repairs of major roadways and bridges, and a potential interruption of transportation thoroughfares.	

Sealy			
Planning Area (sq. mi):	13.5	**Occurrences since 1996:**	1
Area Affected:	2.7%	**Annual Event Average:**	0.05
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	Damage to roads, bridges, and cracked foundations in structures throughout the city.		
Extent:	Extensive damage to roads, bridges, water and sewer lines, and structure foundations that require expensive repairs or replacement.		
Vulnerability		**Impact**	
67 structures at risk of damage due to expansive soils		Costly repairs and potential interruption of city services.	
3 roadway bridges are constructed on soils with high swelling potential		Expensive repairs of major roadways and bridges, and a potential interruption of transportation thoroughfares.	

Wallis			
Planning Area (sq. mi):	1.5	**Occurrences since 1996:**	1
Area Affected:	29.4%	**Annual Event Average:**	0.05
Probability of Occurring in the next 5 years:	Not Likely, Less than 10% chance event will occur within the next 5 years		
Greatest Occurrence:	Foundations of structures shifting requiring repairs, and water and sewer line damage.		
Extent:	Foundations requiring major repairs, and water and sewer line breaks due to expanding soils.		
Vulnerability		**Impact**	
182 structures at risk of damage due to expansive soils		Costly repairs and potential interruption of city services.	
3 schools and 1 shelter are constructed on soils with high swelling potential.		Costly repairs and potential interruption of education and sheltering services.	

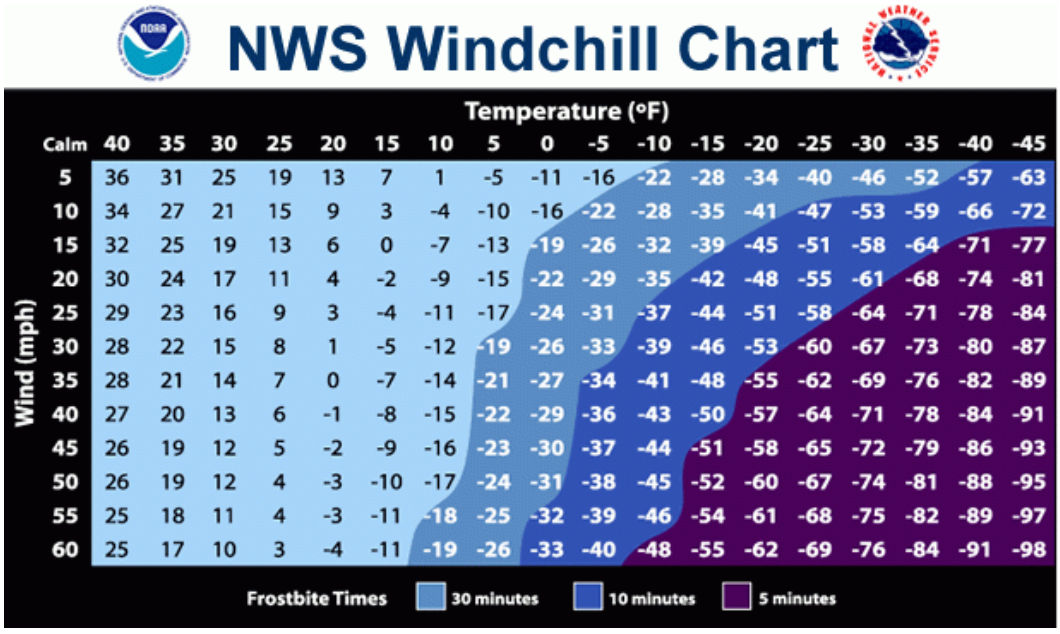
Part 6.9 Winter Weather

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
12/23/1998	Winter Storm	0	$15,000	$0
1/16/2007	Ice Storm	0	$1,000	$0
2/3/2011	Ice Storm	0	$0	$0
2/3/2011	Ice Storm	0	$0	$0
12/7/2013	Winter Storm	0	$0	$0
1/23/2014	Winter Storm	0	$0	$0
3/3/2014	Winter Storm	0		

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 23.8% of the population in Austin County is vulnerable to winter weather.

Austin 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.

Unincorporated Austin County			
Planning Area (sq. mi):	624.6	**Occurrences since 1996:**	8
Area Affected:	100%	**Annual Event Average:**	0.4
Probability of Occurring in the next 5 years:	Very likely; 1.9 events estimated to occur within next 5 years.		
Greatest Occurrence:	$15,000 in property damage from one event, and countywide power outages caused by ice accumulation on trees limbs that fell on powerline.		
Extent:	Up to 1" of ice forms on bridges, structures, and roadways and falling limbs cause extensive power outages.		
Vulnerability		**Impact**	
3,768 residents are considered vulnerable to winter weather. Power outages and icy roads put vulnerable populations at greater risk during winter weather events.		Potential loss of life due to freezing weather, dangerous roadways, and power outages that are costly to repair.	

Bellville			
Planning Area (sq. mi):	2.7	**Occurrences since 1996:**	8
Area Affected:	100%	**Annual Event Average:**	0.4
Probability of Occurring in the next 5 years:	Very likely; 1.9 events estimated to occur within next 5 years.		
Greatest Occurrence:	1/10" of an inch of ice formed on bridges from freezing rain and sleet.		
Extent:	Up to 1" of ice forms on bridges, structures, and roadways and falling limbs cause power outages.		
Vulnerability		**Impact**	
1,037 residents are considered vulnerable to winter weather. Power outages and icy roads put vulnerable populations at greater risk during winter weather events.		Potential loss of life due to freezing weather, dangerous roadways, and power outages that are costly to repair.	

Brazos Country			
Planning Area (sq. mi):	5.0	**Occurrences since 1996:**	8
Area Affected:	100%	**Annual Event Average:**	0.4
Probability of Occurring in the next 5 years:	Very likely; 1.9 events estimated to occur within next 5 years.		
Greatest Occurrence:	1/2" thick ice accumulations on bridges, trees, and roofs of structures		
Extent:	Up to 1" of ice forms on bridges, structures, and roadways and falling limbs cause power outages.		
Vulnerability		**Impact**	
80 residents are considered vulnerable to winter weather. Power outages and icy roads put vulnerable populations at greater risk during winter weather events.		Potential loss of life due to freezing weather, dangerous roadways, and power outages that are costly to repair.	

San Felipe			
Planning Area (sq. mi):	8.7	**Occurrences since 1996:**	8
Area Affected:	100%	**Annual Event Average:**	0.4
Probability of Occurring in the next 5 years:	Very likely; 1.9 events estimated to occur within next 5 years.		
Greatest Occurrence:	1/10" of sleet and ice accumulation on roads and highways.		
Extent:	Up to 1" of ice forms on bridges, structures, and roadways and falling limbs cause power outages.		
Vulnerability		**Impact**	
155 residents are considered vulnerable to winter weather. Power outages and icy roads put vulnerable populations at greater risk during winter weather events.		Potential loss of life due to freezing weather, dangerous roadways, and power outages that are costly to repair.	

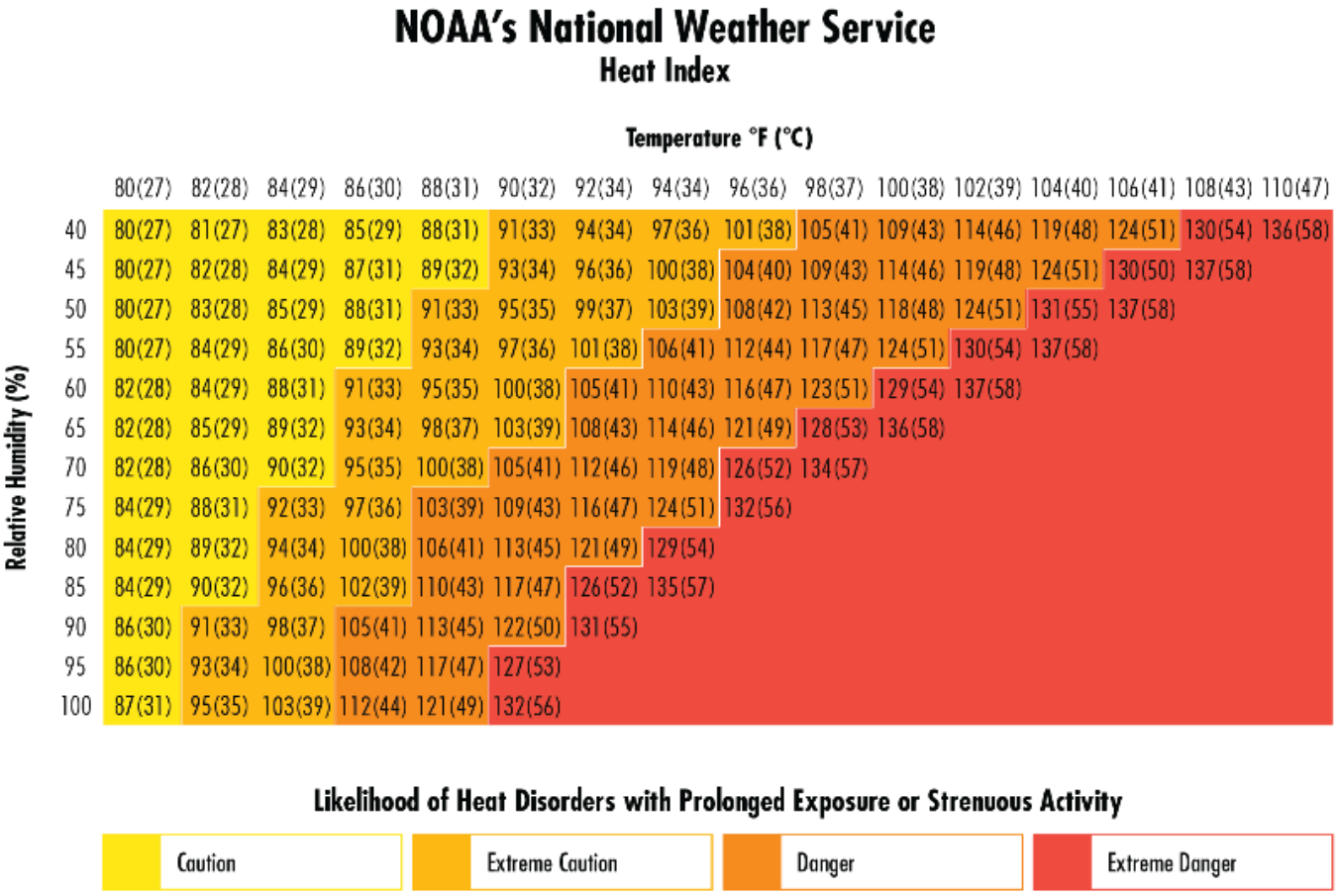
Sealy			
Planning Area (sq. mi):	13.5	**Occurrences since 1996:**	8
Area Affected:	100%	**Annual Event Average:**	0.4
Probability of Occurring in the next 5 years:	Very likely; 1.9 events estimated to occur within next 5 years.		
Greatest Occurrence:	1/5" ice accumulated on roadways, especially bridges and overpasses.		
Extent:	Up to 1" of ice forms on bridges, structures, and roadways and falling limbs cause power outages.		
Vulnerability		**Impact**	
1,318 residents are considered vulnerable to winter weather. Power outages and icy roads put vulnerable populations at greater risk during winter weather events.		Potential loss of life due to freezing weather, dangerous roadways, and power outages that are costly to repair.	

Wallis			
Planning Area (sq. mi):	1.5	**Occurrences since 1996:**	8
Area Affected:	100%	**Annual Event Average:**	0.4
Probability of Occurring in the next 5 years:	Very likely; 1.9 events estimated to occur within next 5 years.		
Greatest Occurrence:	1/10" of an inch of ice formed on bridges from freezing rain and sleet.		
Extent:	Up to 1" of ice forms on bridges, structures, and roadways and falling limbs cause power outages.		
Vulnerability		**Impact**	
255 residents are considered vulnerable to winter weather. Power outages and icy roads put vulnerable populations at greater risk during winter weather events.		Potential loss of life due to freezing weather, dangerous roadways, and power outages that are costly to repair.	

Part 6.10 Heat Event

6.10 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 Austin County could experience the most severe heat, with average temperatures between 90 and 100 degrees.

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

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 greatest recorded occurrence for each participating jurisdiction. The greatest 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 represents the worst conditions a jurisdiction can expect. Information from stakeholders, USDA, 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
- 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 these specified populations suggests that approximately 38.3% of the population in Austin County is vulnerable to heat related illnesses.

Austin County (All participating jurisdictions)

Identified Vulnerabilities:

While heat events have the potential to damage buildings and crops, vulnerable populations are most at risk in the county during these events. 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.

- Individuals throughout the county 18 years old or younger and 65 years and above
- Farmland throughout the county (631,021 acres in total)
- Any critical facility acting as a cooling facility or any correctional facility that may lose power due to brown outs due to high power demand

Identified Impacts:

- 631,021 acres in total throughout the county in farmland (accounting for 118,236,00 dollars in revenue) may be impacted resulting in financial loss for farmers and the county as a whole
- Serious illness or loss of life throughout the county

Unincorporated Austin County			
Planning Area (sq. mi):	624.6	**Occurrences since 2000:**	6
Area Affected:	100%	**Annual Event Average:**	0.4
Probability of Occurring in the next 5 years:	Very likely; 2 events estimated to occur within next 5 years.		
Greatest Occurrence:	6 consecutive days of temperatures over 105 degrees Fahrenheit; 113 degrees is highest recorded temperature		
Extent:	Up to 7 consecutive days of temperatures over 110 degrees Fahrenheit		
Vulnerability		**Impact**	
6,064 residents are considered vulnerable to heat events.		Potential loss of life due to elevated temperatures and heat related illnesses.	
369,960 acres of agricultural land and livestock production.		$26,067,000 potential annual loss in livestock.	
Critical faciltities at risk: 7 electrical substations		Wide spread power outages during peak heat hours, and residents are unable to cool themselves; potential loss of life.	

Bellville			
Planning Area (sq. mi):	2.7	**Occurrences since 2000:**	6
Area Affected:	100%	**Annual Event Average:**	0.4
Probability of Occurring in the next 5 years:	Very likely; 2 events estimated to occur within next 5 years.		
Greatest Occurrence:	113 degrees Fahrenheit is highest recorded temperature		
Extent:	Up to 118 degrees Fahrenheit		
Vulnerability		**Impact**	
1,491 residents are considered vulnerable to heat events.		Potential loss of life due to elevated temperatures and heat related illnesses.	

Brazos Country			
Planning Area (sq. mi):	5.0	**Occurrences since 2000:**	6
Area Affected:	100%	**Annual Event Average:**	0.4
Probability of Occurring in the next 5 years:	Very likely; 2 events estimated to occur within next 5 years.		
Greatest Occurrence:	108 degrees Fahrenheit is highest recorded temperature		
Extent:	Up to 115 degrees Fahrenheit		
Vulnerability		**Impact**	
88 residents are considered vulnerable to heat events.		Potential loss of life due to elevated temperatures and heat related illnesses.	

San Felipe			
Planning Area (sq. mi):	8.7	**Occurrences since 2000:**	6
Area Affected:	100%	**Annual Event Average:**	0.4
Probability of Occurring in the next 5 years:	Very likely; 2 events estimated to occur within next 5 years.		
Greatest Occurrence:	108 degrees Fahrenheit is highest recorded temperature		
Extent:	Up to 115 degrees Fahrenheit		
Vulnerability		**Impact**	
329 residents are considered vulnerable to heat events.		Potential loss of life due to elevated temperatures and heat related illnesses.	

Sealy			
Planning Area (sq. mi):	13.5	**Occurrences since 2000:**	6
Area Affected:	100%	**Annual Event Average:**	0.4
Probability of Occurring in the next 5 years:	Very likely; 2 events estimated to occur within next 5 years.		
Greatest Occurrence:	5 consecutive days over temperatures over 100 degrees Fahrenheit		
Extent:	Up to 7 consecutive days of temperatures over 105 degrees Fahrenheit		
Vulnerability		**Impact**	
2,624 residents are considered vulnerable to heat events. Critical faciltities at risk: 7 electrical substations		Potential loss of life due to elevated temperatures and heat related illnesses. Wide spread power outages during peak heat hours, and residents are unable to cool themselves; potential loss of life.	

Wallis			
Planning Area (sq. mi):	1.5	**Occurrences since 2000:**	6
Area Affected:	100%	**Annual Event Average:**	0.4
Probability of Occurring in the next 5 years:	Very likely; 2 events estimated to occur within next 5 years.		
Greatest Occurrence:	5 consecutive days over temperatures over 100 degrees Fahrenheit		
Extent:	Up to 7 consecutive days of temperatures over 105 degrees Fahrenheit		
Vulnerability		**Impact**	
371 residents are considered vulnerable to heat events.		Potential loss of life due to elevated temperatures and heat related illnesses.	

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.

Goal
Reduce repetitive damage to private and public structures and loss of life due to flooding and erosion throughout the county

Objective
Eliminate the number of vulnerable structures in areas susceptible to repetitive flooding

Objective
Alert motorist with permanent postings at roadways where flooding or flash flooding is prevalent

Objective
Reestablish Brazos River watershed to an original natural drain pattern.

Goal

Reduce the loss of life and serious injury, and property loss throughout the county due to natural hazards

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 oversee implementing the actions, how the county or local jurisdiction plan to pay for these actions, and the estimated time for implementing these actions.

Each jurisdiction and the county prioritized their 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 cost-benefit ratio of mitigation actions was included in the feasibility ratings, and used to help prioritize the mitigation actions. Actions with a cost-benefit ratio lower than 1:4 were re-evaluated. Upon re-evaluation, the actions were either excluded or improved to meet a minimum of a 1:4 ratio. After evaluating the mitigation actions based on priorities and feasibility, the actions were ranked. The actions are separated by jurisdiction and then ranked as described. The subsequent charts demonstrate the final ranking of mitigation actions based on their scoring.

All Participating Jurisdiction Mitigation Actions

Jurisdiction:	Austin County and All Participating Jurisdictions		**Action Number:**	A1
Hazard(s) Addressed:	Floods			
Project Title:	Improve Drainage			
Project Description:	Project will clear obstacles, widen and reshape ditches, and upgrade culverts to restore adequate drainage to mitigate flooding in all participating jurisdictions.			
Responsible Entity:	County Judge, Mayors, and County/City Engineers			
Losses avoided:	Reduction in flooding of homes and commercial structures throughout the county			
Cost Estimate:	$2,500,000	**Timeframe:**	60 months	
Potential Funding Sources:	HMGP, PDM	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
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:	Austin County and All Participating Jurisdictions		**Action Number:**	A2
Hazard(s) Addressed:	Wildfire			
Project Title:	Technical Support			
Project Description:	The county and partnering cities will provide incentives and technical support for property owners to reduce underbrush throughout the county to properly cut back trees, upgrade fences, and replace landscape materials with nonflammable materials			
Responsible Entity:	County OEM			
Losses avoided:	Homes within the wild-urban interface and residents living within these areas			
Cost Estimate:	$50,000	**Timeframe:**	6 months	
Potential Funding Sources:	HMPG, Current county and city budget/ staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
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:	Austin County and All Participating Jurisdictions		**Action Number:**	A3
Hazard(s) Addressed:	Severe Thunderstorms Tornado/Microburst Hail			
Project Title:	Retrofitting Structures for Hail and Wind Protection			
Project Description:	All participating jurisdictions will retrofit city and county owned structures with roofs and window panes that can withstand hail and high wind damage			
Responsible Entity:	County OEM office, and Building Department or Mayors office of each participating jurisdiction			
Losses avoided:	Buildings damage decreased considerably, and injury prevention of city/county employees during major hail and wind events			
Cost Estimate:	$150,000	**Timeframe:**	36 months	
Potential Funding Sources:	HMGP, PDM, Local budgets	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
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:	Austin County and All Participating Jurisdictions		**Action Number:**	A4
Hazard(s) Addressed:	Winter Weathers			
Project Title:	Warning System for Winter Weather			
Project Description:	All participating jurisdictions will install signage and sensors to alert drivers during winter weather on major roadways, curved roads, and steep roads			
Responsible Entity:	County Emergency Coordinator			
Losses avoided:	Prevent injury and/or death of residents, emergency responders, and visitors traveling throughout the county			
Cost Estimate:	$150,000	**Timeframe:**	18 months	
Potential Funding Sources:	HMGP, FPS Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
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:	Austin County and All Participating Jurisdictions		**Action Number:**	A5
Hazard(s) Addressed:	Drought			
Project Title:	Ordinance Adoption			
Project Description:	All participating jurisdictions will develop an ordinance to require incorporating drought tolerant landscape design into all new county and city owned properties.			
Responsible Entity:	County Commissioners Court and City Council of each participating jurisdiction			
Losses avoided:	Reduction in water needs during drought, and preserving much needed ground water for agricultural purposes throughout the county			
Cost Estimate:	$1000	**Timeframe:**	3 months	
Potential Funding Sources:	Staff time and wages	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
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:	Austin County and All Participating Jurisdictions		**Action Number:**	A6
Hazard(s) Addressed:	Floods Wildfire Severe Thunderstorms Tornado/Microburst Drought Hail Winter Weathers Expansive Soils Heat Events Erosion			
Project Title:	Education and Mitigation Techniques			
Project Description:	Implement an outreach and education campaign to educate the public on mitigation techniques for all hazards to reduce loss of life and property			
Responsible Entity:	County Judge and City Manager's office or Mayor for each participating jurisdiction			
Losses avoided:	Preservation of property, decreased financial losses due to natural hazards, and mitigating the loss of human life and injuries			
Cost Estimate:	$7,000	**Timeframe:**	12-24 months	
Potential Funding Sources:	Local budget and salary, HMPG	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
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:	Austin County and All Participating Jurisdictions	**Action Number:**	A7
Hazard(s) Addressed:	Erosion		
Project Title:	Protection Program		
Project Description:	All participating jurisdictions will develop an erosion protection program for high hazard areas		
Responsible Entity:	County OEM and City Manager's office or Mayor for each participating jurisdiction.		
Losses avoided:	Preserve property and prevention of costly repairs.		
Cost Estimate:	$3,000	**Timeframe:**	12-24 months
Potential Funding Sources:	HMAP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
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:	Austin County and All Participating Jurisdictions	**Action Number:**	A7
Hazard(s) Addressed:	Erosion		
Project Title:	Developing and Distributing Maps		
Project Description:	The county will work with all participating jurisdictions to develop maps showing the extent of soil erosion throughout the county. This map will be distributed for public viewing		
Responsible Entity:	County OEM and City Manager's office or Mayor for each participating jurisdiction.		
Losses avoided:	Preserve property and prevention of costly repairs.		
Cost Estimate:	$5,000	**Timeframe:**	12-24 months
Potential Funding Sources:	HMAP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
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:	Austin County and All Participating Jurisdictions	**Action Number:**	A8
Hazard(s) Addressed:	Expansive Soils		
Project Title:	Moisture sensing irrigation systems		
Project Description:	The County and participating jurisdictions will 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		
Responsible Entity:	County OEM and City Manager's office or Mayor for each participating jurisdiction		
Losses avoided:	Prevent the loss of property and costly foundation or pipe repairs.		
Cost Estimate:	$15,000	**Timeframe:**	12-24 months
Potential Funding Sources:	HMPG, Local budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
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:	Austin County and All Participating Jurisdictions	**Action Number:**	A9
Hazard(s) Addressed:	Heat Events		
Project Title:	Installing misting stations		
Project Description:	The county and partnering jurisdictions will install misting stations throughout city and county owned parks and property		
Responsible Entity:	Emergency Coordinator		
Losses avoided:	Human life and health; Residents especially the elderly and children; Also protects visitors for festival and local events.		
Cost Estimate:	$3,000	**Timeframe:**	6-12 months
Potential Funding Sources:	HMPG, Current city and staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
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 Specific Mitigation Actions

Bellville

Jurisdiction:	City of Bellville	**Action Number:**	B1
Hazard(s) Addressed:	Severe Thunderstorms Tornado		
Project Title:	Public Information and Awareness		
Project Description:	The City will develop a severe weather audible alert system		
Responsible Entity:	Emergency Management		
Losses avoided:	Residents and Business Owners		
Cost Estimate:	$50,000	**Timeframe:**	12 months
Potential Funding Sources:	City and County general funds, USDA Rural Utilities Service-Weather radio Grant program, PDM, FEMA-Hazardous Materials Assistance Program, FEMA Emergency Management Performance Grant, HMGP, FEMA-All Hazards Operational Planning	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
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:	City of Bellville	**Action Number:**	B2
Hazard(s) Addressed:	Tornado		
Project Title:	Public Information and Awareness		
Project Description:	Increase public awareness for safe room construction in homes and schools		
Responsible Entity:	City of Bellville Police Department		
Losses avoided:	Life and property		
Cost Estimate:	$5,000	**Timeframe:**	12 months
Potential Funding Sources:	PDM Program, FEMA Emergency Management Performance Grant, HMGP, FEMA-All Hazards Operational Planning, US Small Business Administration, Pre-Disaster Mitigation Loans	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
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 Bellville	**Action Number:**	B3
Hazard(s) Addressed:	Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado		
Project Title:	Public Information and Awareness		
Project Description:	Expand evacuation and alert system to accommodate population growth		
Responsible Entity:	City of Bellville		
Losses avoided:	Prevent loss of life and property through early and broad notification		
Cost Estimate:	$0 / Pamphlets donated	**Timeframe:**	36 months
Potential Funding Sources:	General fund of City of Bellville and Austin County, USDA Rural Utilities Service-Weather Radio Grant program, PDM, FEMA-Hazardous Materials Assistance Program, FEMA Emergency Management Performance Grant, HMGP, FEMA-All Hazards Operational Planning	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
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:	City of Bellville	**Action Number:**	B4
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Adopting land-use ordinance		
Project Description:	The city shall adopt a land-use ordinance which prohibits building residential or commercial structures in the 100-year floodplain		
Responsible Entity:	City Manager, City Council, Office of Code Enforcement		
Losses avoided:	Future buildings and infrastructure that may have been built within the 100-year flood plain		
Cost Estimate:	$5,000	**Timeframe:**	4 months
Potential Funding Sources:	Current city budget and salary, HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
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 Bellville	**Action Number:**	B5
Hazard(s) Addressed:	Tornado		
Project Title:	Structural Project, Emergency Services		
Project Description:	Develop city ordinance requiring construction of tornado/severe weather shelter in all mobile home parks		
Responsible Entity:	Emergency Management		
Losses avoided:	Life and property		
Cost Estimate:	$5,000	**Timeframe:**	12 months
Potential Funding Sources:	HMGP, US Small Business Administration, Pre-Disaster Mitigation Loans, PDM	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
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:	City of Bellville	**Action Number:**	B6
Hazard(s) Addressed:	Wildfire		
Project Title:	Reducing underbrush for wildfire protection		
Project Description:	The city will work to reduce underbrush on identified wild-urban interface areas through techniques such as using skid steers or goats		
Responsible Entity:	Emergency Management		
Losses avoided:	current and future buildings and residents in wild-urban interface areas		
Cost Estimate:	$500,000	**Timeframe:**	12 - 24 months
Potential Funding Sources:	HMGP, local budget and current salary, fire prevention and safety grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
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 Bellville		**Action Number:**	B7
Hazard(s) Addressed:	Hurricane/ Tropical Storms Severe Thunderstorms Tornado			
Project Title:	Structural Project			
Project Description:	Construct tornado/severe weather shelters in existing mobile home parks.			
Responsible Entity:	Emergency Management			
Losses avoided:	Life and Property			
Cost Estimate:	$65,000	**Timeframe:**	24 months	
Potential Funding Sources:	HMGP, US Small Business Administration, Pre-Disaster Mitigation Loans, PDM	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
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

Brazos Country

Jurisdiction:	City of Brazos Country		**Action Number:**	C1
Hazard(s) Addressed:	Floods			
Project Title:	Prevention			
Project Description:	Adopt and enforce floodplain ordinance regulating the elevation of structures in a floodplain			
Responsible Entity:	City Council			
Losses avoided:	Loss of property by requiring structures to be 24" above the Base Flood Elevation			
Cost Estimate:	$2,000	**Timeframe:**	12 months	
Potential Funding Sources:	General Funds	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
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 Brazos Country		**Action Number:**	C2
Hazard(s) Addressed:	Wildfire			
Project Title:	Emergency Services			
Project Description:	Improve water system to support wildfire fighting activities			
Responsible Entity:	City Council			
Losses avoided:	Life and property			
Cost Estimate:	$200,000	**Timeframe:**	12 months	
Potential Funding Sources:	Water revenues, FEMA-Fire Mgmt. Assistance Grants, FEMA-Emergency Mgmt. Performance Grants, FEMA-All Hazards Operational Planning	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
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 Brazos Country		**Action Number:**	C3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado			
Project Title:	Public Information and Awareness			
Project Description:	Expand evacuation and alert system to accommodate population growth			
Responsible Entity:	City Council			
Losses avoided:	Loss of life and property through early and broad notification of weather and wildfire events			
Cost Estimate:	3,000	**Timeframe:**	12 months	
Potential Funding Sources:	General Fund, HMGP, PDM, FEMA-Hurricane local grant program, FEMA-Emergency Management Performance Grant, Flood Mitigation Assistance Program,	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
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 Brazos Country	**Action Number:**	C4
Hazard(s) Addressed:	Floods		
Project Title:	Public Information and Awareness		
Project Description:	Acquire signage for road closures and detours during flood event to inform citizens of flood danger		
Responsible Entity:	City of Council		
Losses avoided:	Protection of life and loss of property (vehicles)		
Cost Estimate:	$2,000	**Timeframe:**	12 months
Potential Funding Sources:	General Fund, HMGP, PDM	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
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

San Felipe

Jurisdiction:	Town of San Felipe	**Action Number:**	D1
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms Tornado		
Project Title:	Street Elevation		
Project Description:	Elevate road base to prevent flooding of roadways in the area		
Responsible Entity:	Town of San Felipe		
Losses avoided:	current and future buildings, residents, business and streets.		
Cost Estimate:	$500.000	**Timeframe:**	36-48 months
Potential Funding Sources:	Hazard Mitigation grant program, Flood Mitigation assistance grant, Pre-disaster Mitigation grant program	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
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

Sealy

Jurisdiction:	City of Sealy		**Action Number:**	E1
Hazard(s) Addressed:	Floods			
Project Title:	Pond Improvements to Cryan Park			
Project Description:	Widen Cryan Park Pond to increase flood water detention capacity			
Responsible Entity:	City of Sealy			
Losses avoided:	Avoid Floods			
Cost Estimate:	$125,000	**Timeframe:**	6-18 months	
Potential Funding Sources:	City Drainage Fund	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
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 Sealy		**Action Number:**	E2
Hazard(s) Addressed:	Floods			
Project Title:	Pond Improvements to BPW Park			
Project Description:	Improve and expand drainage and flow capacity in the BPW Park to help reduce flooding throughout the area			
Responsible Entity:	City of Sealy			
Losses avoided:				
Cost Estimate:	$1000,000	**Timeframe:**	6-18 months	
Potential Funding Sources:	City Drainage Fund	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
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 Sealy		**Action Number:**	E3
Hazard(s) Addressed:	Floods			
Project Title:	Improvements to Allens Creek			
Project Description:	Deepen, widen, and clear debris from Allens Creek channel to decrease flooding and improve drainage			
Responsible Entity:	City of Sealy			
Losses avoided:	high density residential to the east			
Cost Estimate:	$250,000	**Timeframe:**	12-18 months	
Potential Funding Sources:	City Damage Fund	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio	
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

Wallis

Jurisdiction:	City of Wallis		**Action Number:**	F1
Hazard(s) Addressed:	Hurricane/ Tropical Storms Severe Thunderstorms Tornado			
Project Title:	Property Protection			
Project Description:	Construct new government/command center facilities which can resist high winds and other inclement weather conditions			
Responsible Entity:	City Administration, Police Department, Fire Department, Emergency Management			
Losses avoided:				
Cost Estimate:	$375,000	**Timeframe:**	18 Months	
Potential Funding Sources:	FEMA Emergency Operations Center Grant, FEMA All Hazard Emergency Operational Planning, HMGP, 406 Public Assistance Program.	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio	
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 Wallis		**Action Number:**	F2
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Severe Thunderstorms			
Project Title:	Flood Prevention			
Project Description:	Re-route the upstream floodwaters that funnel directly into the city			
Responsible Entity:	City of Wallis			
Losses avoided:	Flooded homes, washed out culverts, damaged streets			
Cost Estimate:	$100,000	**Timeframe:**	24 months	
Potential Funding Sources:	At this time the city does not have funding for this project	**Benefit-Cost Ratio:**	Approximately a 1:4 cost-benefit ratio	
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

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 entirety of the written plan and planning process. 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	Austin County Emergency Management Coordinator
Jurisdiction	**Responsible Entity**
Austin County	Austin County OEM and County Judge
City of Bellville	Mayor, City Manager
City of Brazos Country	Mayor
Town of San Felipe	Mayor
City of Sealy	Mayor, Director of Planning
City of Wallis	Mayor

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 notify the public of all annual meetings through by posting online and printed copies of the meeting agenda and posting 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.

Any new mitigation actions, strategies, or required studies, suggestions for improvements or changes to the entire written plan or planning process will be submitted to the County's representative. The representative will evaluate the items for compliance with TDEM and FEMA regulations before leading the process to adopt or approve the new items or suggestions. Recommended changes, updates, and revisions will be implemented based on available funding to support revisions, and updates and will be assigned to appropriate officials with pre-determined timelines for completion. Updates to the HMAP will then be adopted by the appropriate governing body.

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 HMAP and suggested improvements to the entire current written plan, public participation and planning process 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 and each representative will report on all suggestions received throughout the passed year on the planning process and the entire written plan and discuss how to incorporate these suggestions into current and future planning efforts.	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 12 months before it expires. The update strategy will include: 1) Identify 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. 4) Review the entirety of the plan; discuss hazards, vulnerabilities and impacts identified in the plan and what to include/ revise in the update	12 months prior to HMAP's expiration	PMT, and PMT Leader

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:

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 1: Adoption and Integration Procedures	
Austin County	HMAP and plan amendments will be presented to the Commissioner's Court by the Austin County Emergency Management Office. An agenda for the meeting will be posted 30 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 Bellville	The Bellville PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented to the City Council for consideration. Bellville will advertise the amendment no less than 14 days before the meeting where it will be discussed.
City of Brazos Country	Brazos County's PMT representative will select mitigation actions to be budgeted into the City's annual budget to be implemented the following year and then present these actions to the Board for approval
Town of San Felipe	San Felipe's PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented to the City Council for approval.
City of Sealy	The Sealy PMT representative will draft a proposal for incorporating the HMAP's mitigation recommendations into their existing planning mechanisms. The proposal will be presented to the City Council for consideration. Sealy will advertise the amendment no less than 14 days before the meeting where it will be discussed. If approved, the PMT representative will work with the City Manager to implement the proposal.
City of Wallis	Wallis' PMT representative will select mitigation actions to be budgeted into the City's annual budget to be implemented the following year. The proposal will be presented before City Council. An agenda will be published 14 days in advance.

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.
Floodplain Management Plan	Austin 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 6.1 of this plan.
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/Zoning Ordinance	All participating jurisdictions 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	Austin County and each participating jurisdiction will review their annual budget each year for opportunities to fund their highest priority mitigation actions.
Flood Damage Prevention Ordinance	When the plan is updated or revised, the PMT will propose the adoption of codes that support mitigation strategy and mitigation activities.
Capital Improvements Plan	Jurisdictions will review their capital improvements plan for projects that can also serve as natural hazard mitigation infrastructure. The CIP will be updated with project schedules and policies that support the implementation of each jurisdiction's highest priority projects.

2017

Appendix A: Planning Process

APPENDIX A: Planning Process Documentation

Public Meeting Attendees: October 18, 2017

Name	Organization
Clint McManus	H-GAC
Joey Kaspar	H-GAC
Katy Sealy	Property Owner
Gretchen Hajdik	City of Sealy
Lawrence Siska	City of Sealy
Ray Chislett	Austin County
Alexis Hall	FEMA
Jamie Price	FEMA
Tim Lapham	Austin County
Lorena Reyes	TDEM

Multi-jurisdictional Meeting Attendees: December 18, 2017

Name	Organization
Brian Cantrell	Waller County Office of Emergency Management
Glenn LaMont	Brazoria County Office of Emergency Management
Ray Chislett	Austin County Office of Emergency Management
Butch Davis	Walker County Office of Emergency Management
Sherri Pegoda	Walker County Office of Emergency Management
Morgan Lumbley	Montgomery County Office of Emergency Management
Darren Hess	Montgomery County Office of Emergency Management
Tom Branch	Liberty County Office of Emergency Management
Yancy Scott	Waller County Office of Emergency Management
Joey Kaspar	Houston - Galveston Area Council
Amy Combs	Houston - Galveston Area Council
Cheryl Mergo	Houston - Galveston Area Council
Jeff Taebel	Houston - Galveston Area Council

Press Release Email List:

Contact	Title	Organization
Betty Hollon	City Secretary	City of Bellville
Dayl Cooksey	City Secretary	City of Sealy
Linda Williams	City Secretary	City of Brazos Country
Sheila Moseley	City Secretary	City of Wallis
Sue Foley	City Secretary	Town of San Felipe
Ashley Tompkins	Managing Editor	Sealy News
Bruce White	Editor/Publisher	Bellville Times
Chris Hunter	News Director	KNRG Radio 92.3 FM
David Emswiler	Community News Reporter	Bellville Times
Joanie Griffin	Publisher	Wallis News-Review
Johnny Griffin	Managing Editor	Wallis News-Review
Maridel Dungen	Owner & Publisher	The New Ulm Enterprise
Mary Hogan	Community News Reporter	Sealy News
Robert Anderson	Editor	The New Ulm Enterprise

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)

AUSTIN COUNTY HAZARD MITIGATION PLAN KICK-OFF MEETING

The Houston-Galveston Area Council (H-GAC), in partnership with Austin County, City of Bellville, City of Brazos Country, Town of San Felipe, City of Sealy, and City of Wallis, is hosting the first public meeting to develop Austin County's Hazard Mitigation Plan. The meeting will be held from 9:00 a.m. to noon, October 18, Austin County Courthouse, 1 East Main St., Bellville, TX 77418.

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 Austin 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/10-18-17-Austin-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.

-30-

Austin County
Hazard Mitigation Plan Kick-Off Meeting

October 18, 2017
9:00 am – 12:00 pm
Austin County Courthouse
1 East Main St
Bellville, TX 77418

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

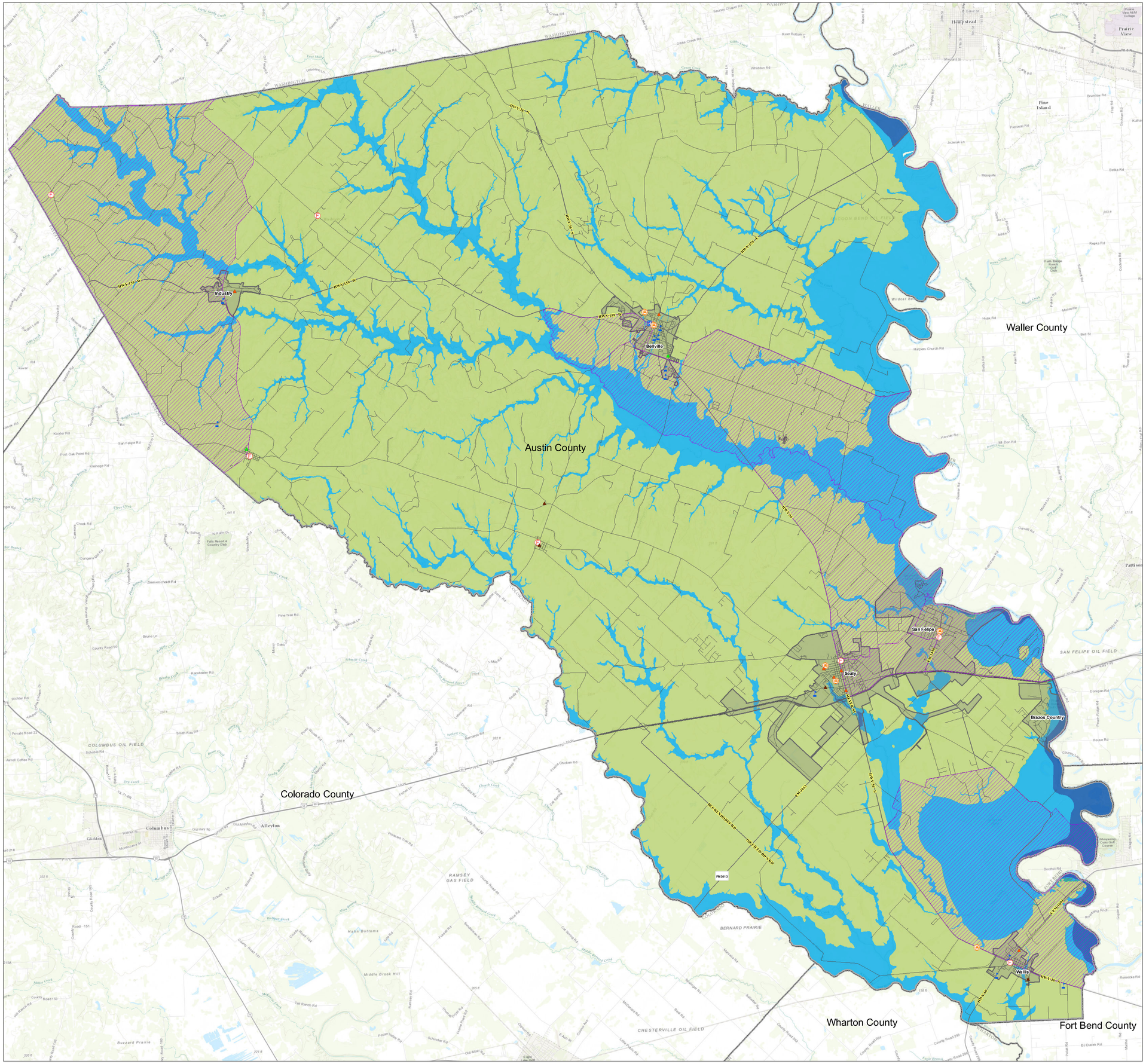
APPENDIX B: Critical Facilities

Facility Type	Name (if applicable)	Jurisdiction
Dam	Butler Dam	Austin County
Dam	Aj Smith Gss	Austin County
Dam	Fenner And Taylor Pond Dam	Austin County
Dam	Lucas Dam	Austin County
Dam	Peters Lake Dam	Austin County
Dam	Plowden Lake Dam	Austin County
Dam	Conner Lake Dam	Austin County
Dam	Hillbolt Lake Dam	Austin County
Dam	Koy Dam	San Felipe
Dam	Moore Lake Dam	Austin County
Dam	Dunn Lake Dam	Austin County
Dam	Mewis Lake Dam	Austin County
Dam	Arnold Lake Dam	Austin County
Dam	George Alexander Dam	Austin County
Dam	Mikeska Gss	Austin County
Dam	Cook Lake Dam	Austin County
Dam	Beaman Dam	Austin County
Dam	Mawis Lake Dam	Austin County
Dam	Traylor Gss	Austin County
Electric Substation	Unknown307339	Austin County
Electric Substation	Unknown307308	Austin County
Electric Substation	Bellville South	Bellville
Electric Substation	Sealy	Sealy
Electric Substation	Racoon Bend	Austin County
Electric Substation	Unknown307315	Austin County
Electric Substation	Unknown307316	Austin County
Electric Substation	Wallis	Wallis
Ems	New Ulm Volunteer Fire Department	New Ulm
Ems	Sealy Emergency Medical Services	Sealy
Ems	Cat Springs Volunteer Fire Department	Cat Spring
Ems	Austin County Emergency Medical Services	Bellville
Ems	Bleiblerville Volunteer Fire Department Incorporated	Bleiblerville
Ems	Wallis Volunteer Fire Department	Wallis
Fire Station	New Ulm Vfd	New Ulm
Fire Station	San Felipe/Frydek Vfd	Sealy
Fire Station	Sealy Vfd	Sealy
Fire Station	Cat Spring Vfd	Cat Spring
Fire Station	Bellville Fire Dept.	Bellville
Fire Station	Blieblerville Vfd	Bellville
Fire Station	Wallis Vfd	Wallis
High Schools	Sealy H S	Sealy

High Schools	Bellville H S	Bellville
High Schools	Brazos H S	Wallis
Hospital	Chi St Joseph Health Bellville Hospital	Bellville
Hospital	Bellville General Hospital	Bellville
Local Emergency Operation Center	Austin County Emergency Operations Center	Bellville
Local Emergency Operation Center	Austin County Emergency Operations Center-Alternate	Bellville
Police Station	Austin County Constable - Precinct 2	Industry
Police Station	San Felipe Police Department	San Felipe
Police Station	Sealy Independent School District Police - Sealy High School	Sealy
Police Station	Sealy Independent School District Police- Sealy Junior High	Sealy
Police Station	Sealy Police Department	Sealy
Police Station	San Felipe Police Dept	San Felipe
Police Station	Sealy Police Dept	Sealy
Police Station	Sealy Police Dept	Sealy
Police Station	Austin County Sheriffs Office / Austin County Jail	Bellville
Police Station	Bellville Police Department	Bellville
Police Station	Austin County Constable - Precinct 1	Bellville
Police Station	Austin County Constable - Precinct 2	Bellville
Police Station	Austin County Constable - Precinct 3	Bellville
Police Station	Austin County Sheriff's Dept	Bellville
Police Station	Bellville Police Dept	Bellville
Police Station	Austin County Constable - Precinct 4	Wallis
Police Station	Wallis Police Department	Wallis
Police Station	Wallis Police Dept	Wallis
School	Columbus Alternative School New Ulm Campus	New Ulm
School	West End El	Industry
School	Selman Int	Sealy
School	Selman El	Sealy
School	Sealy J H	Sealy
School	Spicer Alter Ed Ctr	Bellville
School	Bellville J H	Bellville
School	O'bryant Int	Bellville
School	O'bryant Pri	Bellville
School	Brazos Middle	Wallis
School	Prairie Harbor Alternative School	Wallis
Shelter	St. John's Lutheran Church	New Ulm
Shelter	Fireman's Hall	Industry
Shelter	American Legion Post 442	Sealy
Shelter	W.E. Hill Community Center	Sealy
Shelter	First Baptist Church	Sealy
Shelter	St. John's Episcopal Church	Sealy
Shelter	Knights Of Columbus Hall	Sealy
Shelter	Cat Spring Agricultural Hall	Cat Spring
Shelter	St. John Lutheran Church	Cat Spring
Shelter	Sts. Peter And Paul Cathlic Church	Bellville

Shelter	St. John/San John Lutheran Church	Bellville
Shelter	Guardian Angel Catholic Church	Wallis
Shelter	Knights Of Columbus Hall	Wallis
Solid Waste Landfill	County Waste Inc	Sealy
Toxic Release Inventory Facility	Acme Brick Co - San Felipe Plant	Sealy
Toxic Release Inventory Facility	Bae Systems Tactical Vehicle Systems Lp	Sealy
Toxic Release Inventory Facility	Maass Flange Corp- Sealy	Sealy
Toxic Release Inventory Facility	Bellville Operations Div	Bellville
Toxic Release Inventory Facility	Western International Gas & Cylinders Inc	Bellville

Harvey Map : Austin County



Legend

- College Universities
- Correctional Facilities
- Airport
- Police Stations
- Hospitals
- EMS
- FireStations
- Schools
- Roads
- County Boundary
- Vulnerable Population
- Cities

FEMA National Shelter System

- Both
- Evacuation
- Post Event

FEMA Damage Level

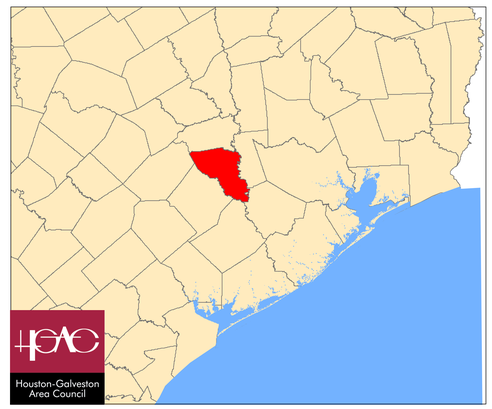
- Affected
- Minor
- Major
- Destroyed

FEMA Floodplains NFHL 2015

- Floodway
- 100YR
- 500YR
- Minimal
- Levee Zone

N

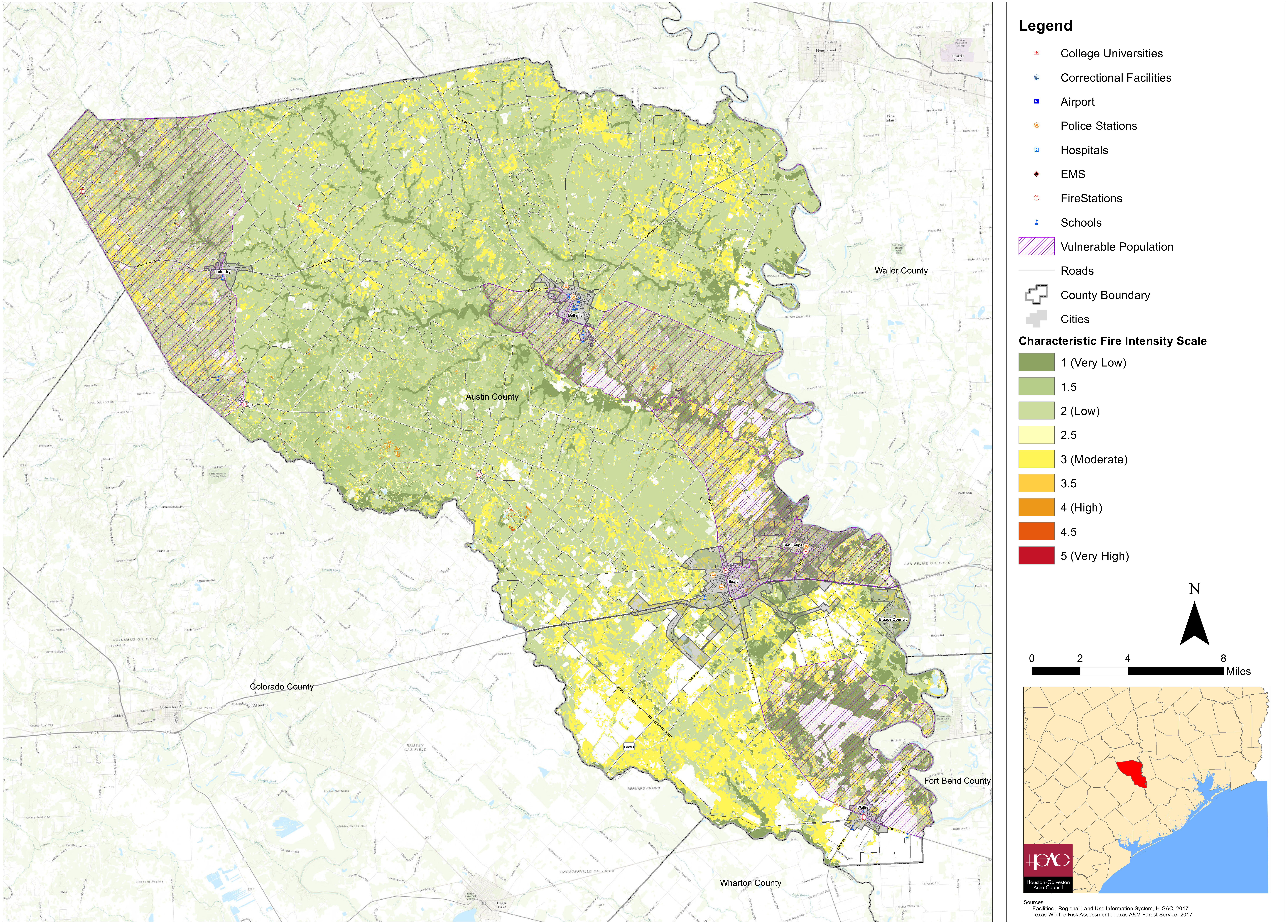
0 2 4 8 Miles



Houston-Galveston Area Council

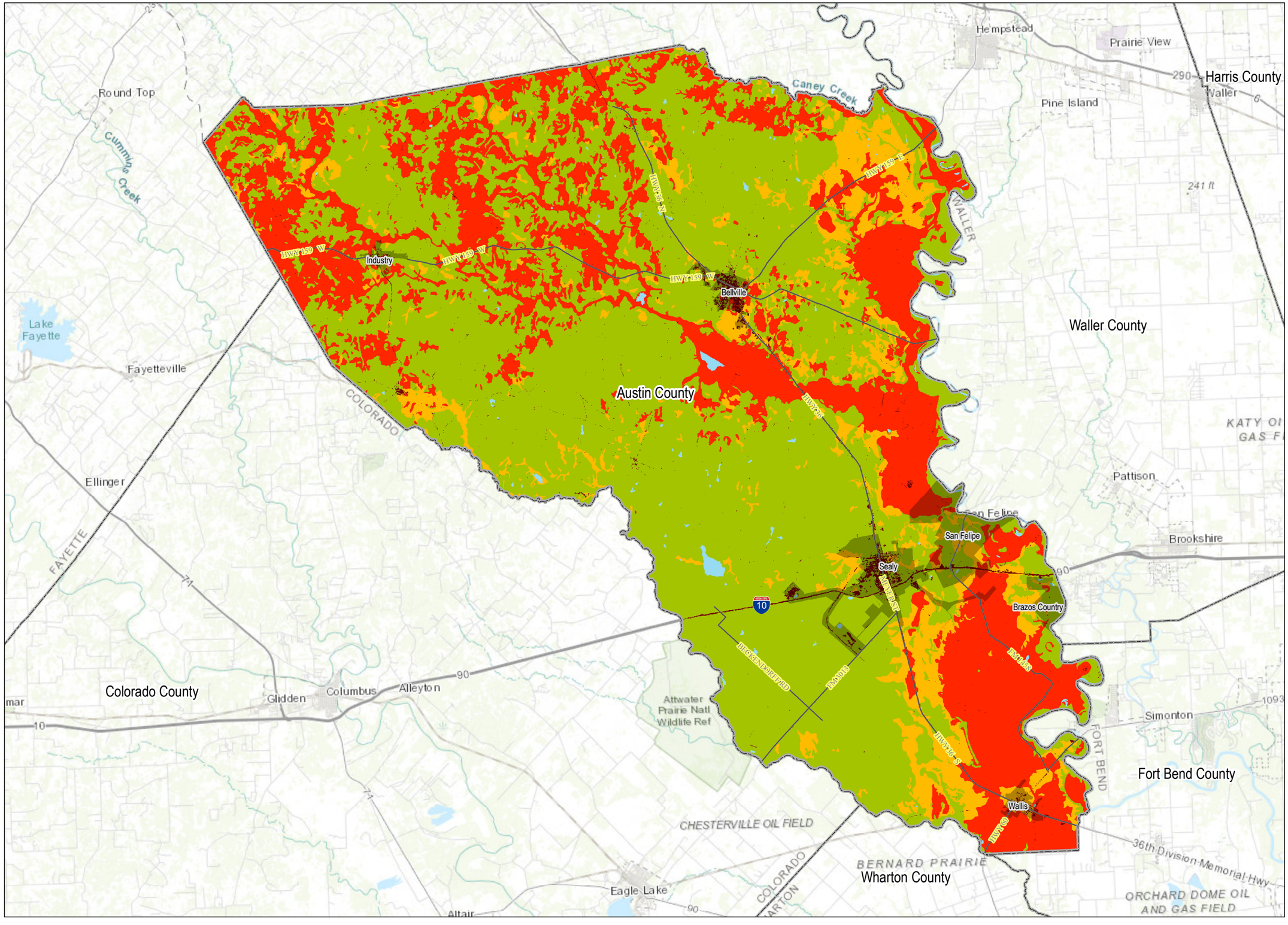
Sources:
Facilities : Regional Land Use Information System, H-GAC, 2017
National Flood Hazard Layer (NFHL) : Federal Emergency Management Agency (FEMA), 2015
National Shelter System : Federal Emergency Management Agency (FEMA), 2017
FEMA Preliminary Damage Assessment : Federal Emergency Management Agency (FEMA), 2017

Wildfire : Austin County



Sources:
Facilities : Regional Land Use Information System, H-GAC, 2017
Texas Wildfire Risk Assessment : Texas A&M Forest Service, 2017

Expansive Soil Map : Austin County



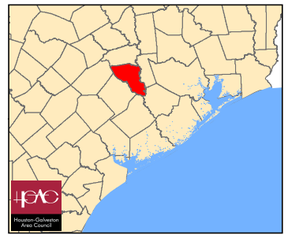
Legend

Expansive Soils Type

- Water
- Moderate swelling potential
- Low swelling potential
- High swelling potential
- Developed
- Cities
- County Boundary

N

0 1.75 3.5 7 Miles



Sources:
HGAC Natural Resource Conservation Service

2017

Appendix C: Hazus Analysis

Quick Assessment Report

November 9, 2017

Study Region : Austin County

Scenario : Probabilistic

Regional Statistics

Area (Square Miles)	656
Number of Census Tracts	6
Number of People in the Region	28,417

General Building Stock

Occupancy	*Building Count*	*Dollar Exposure ($ K)*
Residential	12,092	2,587,774
Commercial	679	270,888
Other	428	220,076
Total	13,199	3,078,738

Scenario Results

Number of Residential Buildings Damaged

Return Period	*Minor*	*Moderate*	*Severe*	*Destruction*	*Total*
10	2	0	0	0	2
20	92	3	0	0	95
50	969	84	3	5	1,060
100	2,002	316	23	28	2,370
200	2,944	720	94	91	3,849
500	3,751	1,352	282	251	5,636
1000	4,206	1,962	526	465	7,159

Number of Buildings Damaged

Return Period	*Minor*	*Moderate*	*Severe*	*Destruction*	*Total*
10	5	0	0	0	5
20	103	3	0	0	106
50	1,038	98	5	5	1,145
100	2,142	366	32	29	2,569
200	3,152	827	120	93	4,192
500	4,009	1,536	346	256	6,147
1000	4,489	2,214	639	473	7,815

Shelter Requirements

Return Period	*Displaced Households (#Households)*	*Short Term Shelter (#People)*
10	0	0
20	0	0
50	0	0
100	0	0
200	15	2
500	125	25
1000	352	78

Economic Loss (x 1000)

	Property Damage (Capital Stock) Losses		Business Interruption
ReturnPeriod	Residential	Total	(Income) Losses
10	195	201	0
20	4,878	4,987	260
50	21,495	22,831	1,992
100	50,474	55,043	7,672
200	104,629	116,592	19,547
500	218,829	246,384	42,507
1000	362,968	409,170	68,979
Annualized	2,421	2,663	377

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: Hurricane Global Risk Report

Region Name: Austin County

Hurricane Scenario: Probabilistic 1000-year Return Period

Print Date: Thursday, November 09, 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 656.38 square miles and contains 6 census tracts. There are over 10 thousand households in the region and has a total population of 28,417 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 13 thousand buildings in the region with a total building replacement value (excluding contents) of 3,079 million dollars (2014 dollars). Approximately 92% of the buildings (and 84% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 13,199 buildings in the region which have an aggregate total replacement value of 3,079 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.

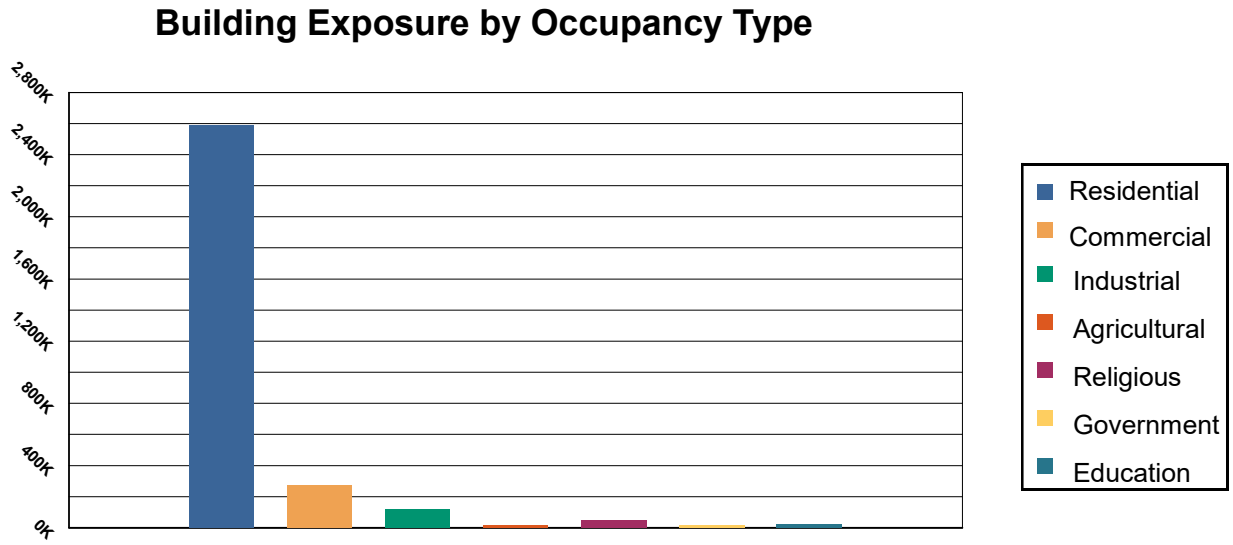


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	2,587,774	84.05 %
Commercial	270,888	8.80%
Industrial	116,607	3.79%
Agricultural	17,629	0.57%
Religious	45,322	1.47%
Government	15,308	0.50%
Education	25,210	0.82%
Total	**3,078,738**	**100.00%**

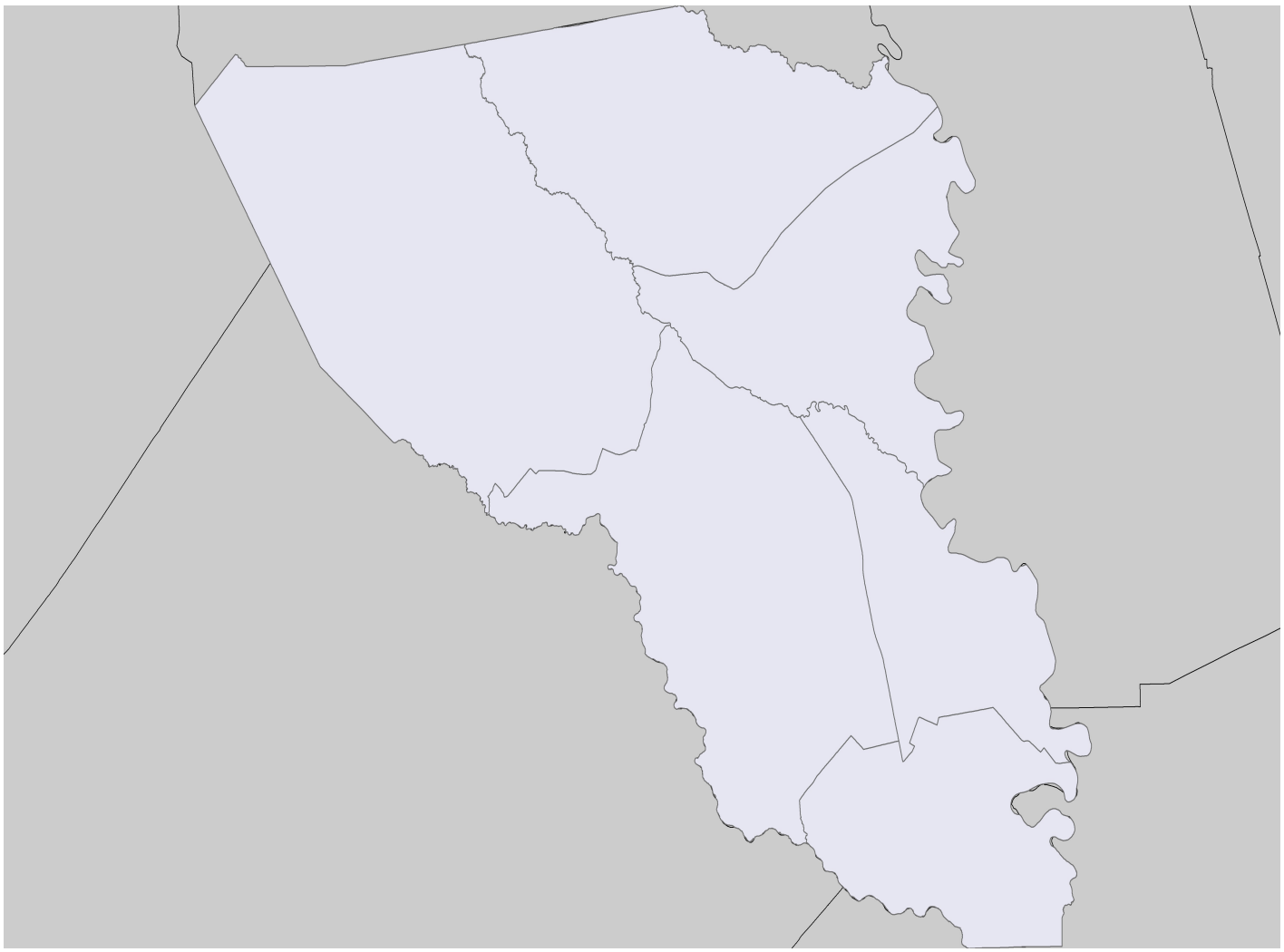
Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 26 beds. There are 14 schools, 6 fire stations, 6 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 3,326 buildings will be at least moderately damaged. This is over 25% of the total number of buildings in the region. There are an estimated 473 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.

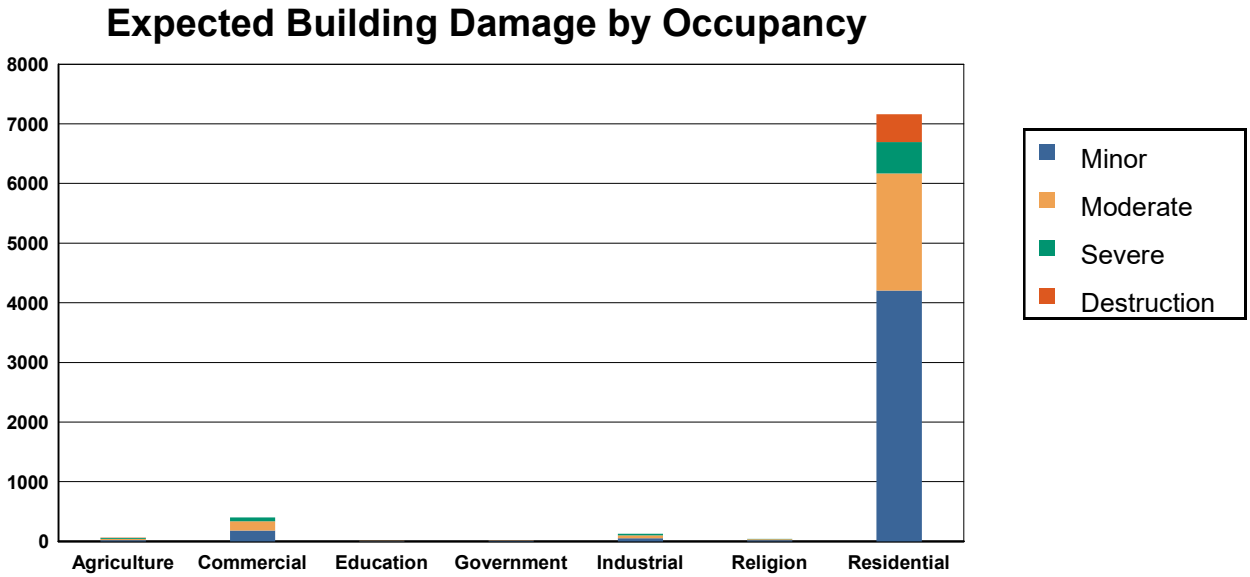


Table 2: Expected Building Damage by Occupancy : 1000 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	34	35.39	19	19.84	20	20.95	17	17.73	6	6.09
Commercial	278	40.95	178	26.23	160	23.49	62	9.08	2	0.24
Education	10	48.51	5	23.98	4	19.66	2	7.84	0	0.00
Government	14	46.65	7	24.87	6	20.07	2	8.41	0	0.00
Industrial	87	40.49	54	25.18	49	22.72	24	11.28	1	0.34
Religion	29	42.02	20	28.33	15	20.85	6	8.80	0	0.01
Residential	4,933	40.79	4,206	34.78	1,962	16.22	526	4.35	465	3.85
Total	**5,384**		**4,489**		**2,214**		**639**		**473**	

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

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	40	40.32	22	22.19	26	26.41	11	11.08	0	0.00
Masonry	456	41.58	355	32.43	203	18.50	61	5.57	21	1.91
MH	1,837	89.35	65	3.15	73	3.57	12	0.56	69	3.37
Steel	99	40.97	49	20.20	61	25.50	31	12.99	1	0.35
Wood	3,428	37.92	3,436	38.01	1,472	16.28	423	4.68	282	3.12

Essential Facility Damage

Before the hurricane, the region had 26 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, 100.00% 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

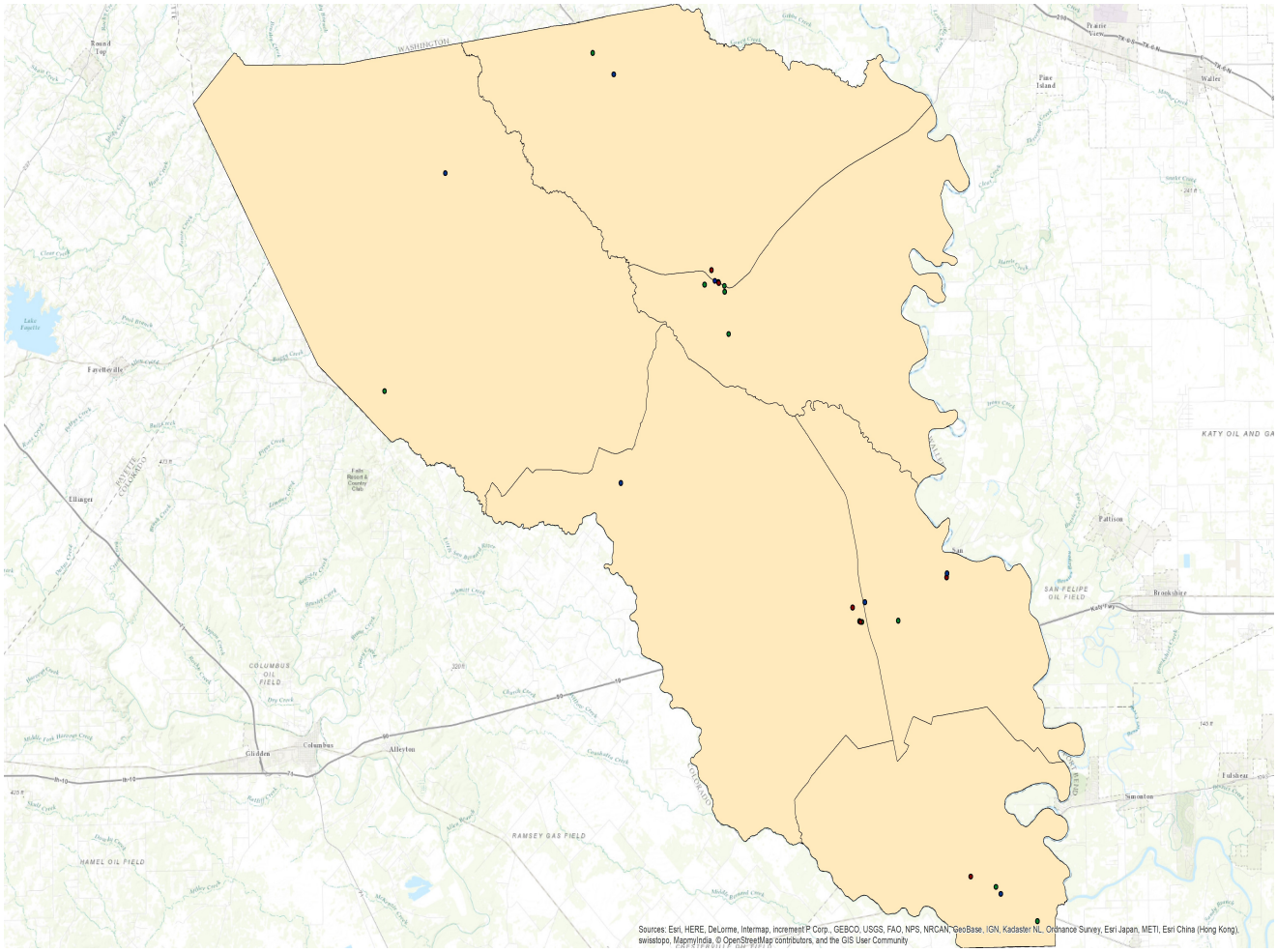
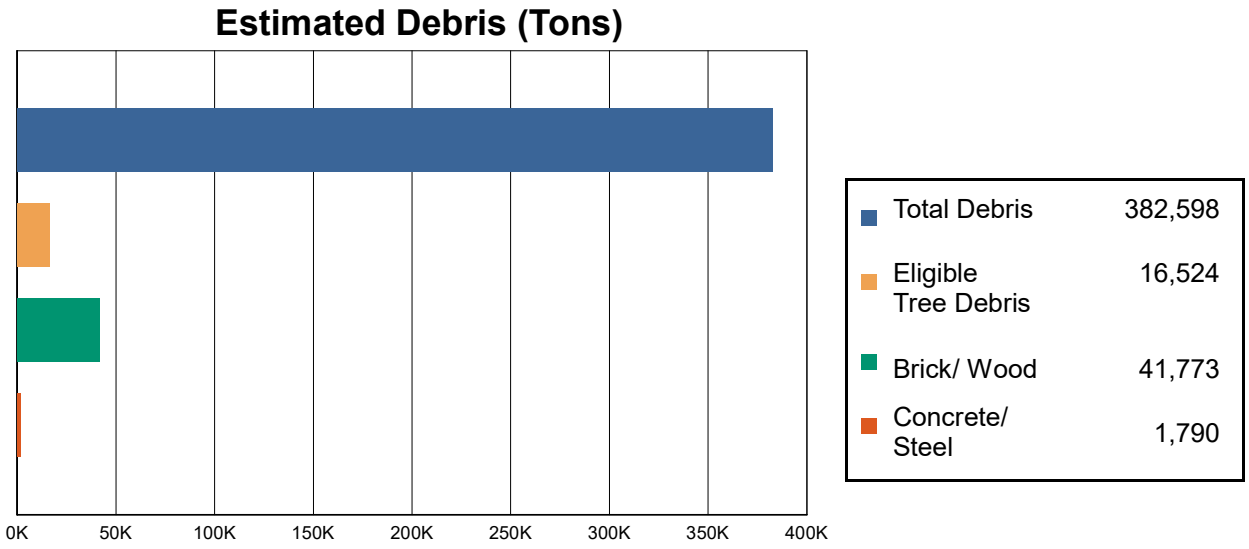


Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
Fire Stations	6	0	0	6
Hospitals	1	0	0	0
Police Stations	6	1	0	6
Schools	14	8	0	0

Induced Hurricane Damage

Debris Generation

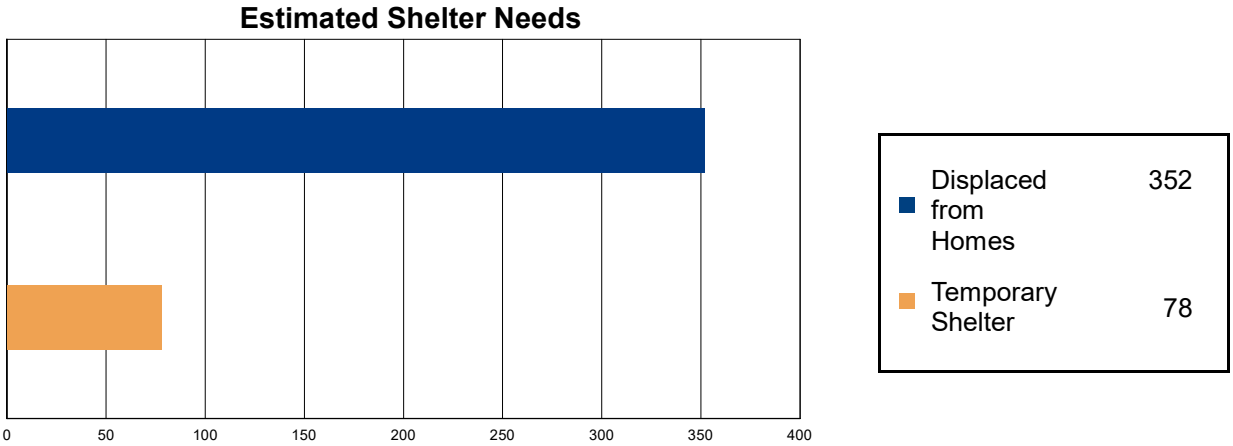


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling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

The model estimates that a total of 382,598 tons of debris will be generated. Of the total amount, 322,923 tons (84%) is Other Tree Debris. Of the remaining 59,675 tons, Brick/Wood comprises 70% of the total, Reinforced Concrete/Steel comprises of 3% 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 1726 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 16,524 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 352 households to be displaced due to the hurricane. Of these, 78 people (out of a total population of 28,417) will seek temporary shelter in public shelters.

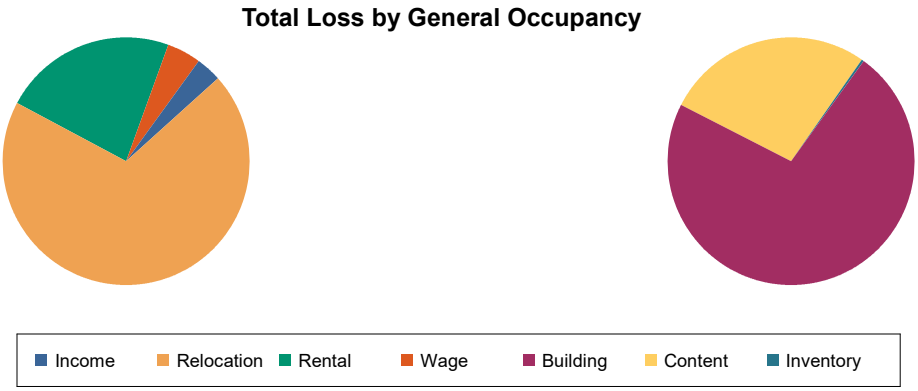
Economic Loss

The total economic loss estimated for the hurricane is 478.1 million dollars, which represents 15.53 % 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 478 million dollars. 2% 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 88% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.



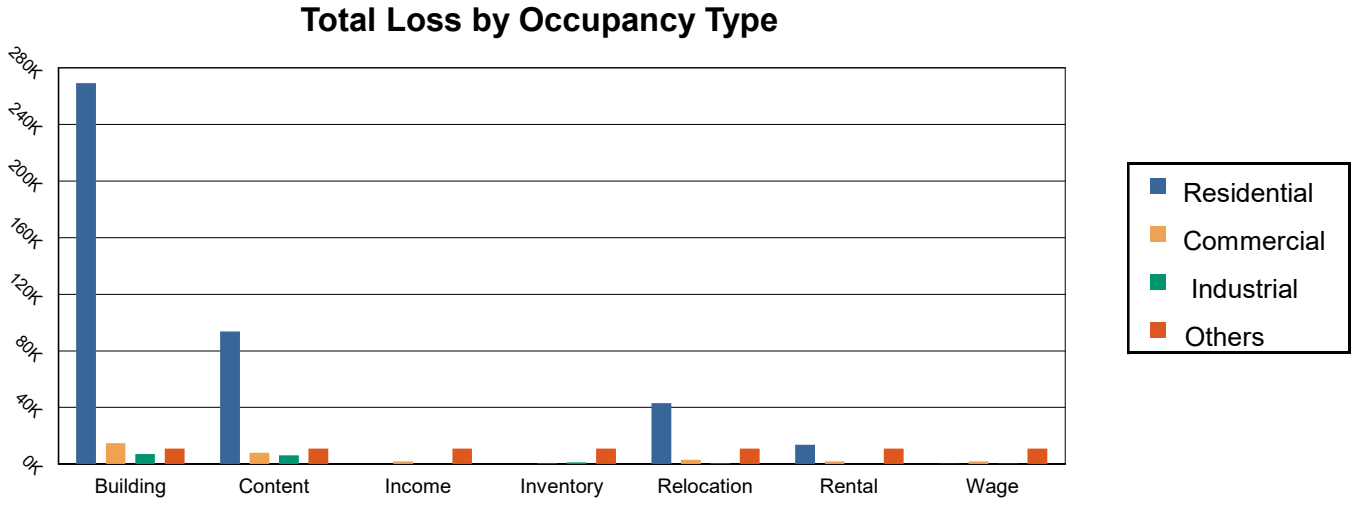


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	269,222.71	14,731.01	7,176.11	5,085.30	296,215.14
	Content	93,745.62	8,088.68	6,184.83	3,356.17	111,375.30
	Inventory	0.00	305.76	1,121.73	151.98	1,579.46
	Subtotal	**362,968.33**	**23,125.45**	**14,482.67**	**8,593.44**	**409,169.90**
Business Interruption Loss						
	Income	104.65	1,866.72	157.44	149.32	2,278.12
	Relocation	43,064.14	3,066.81	597.10	1,243.97	47,972.02
	Rental	13,618.42	1,776.72	109.57	96.98	15,601.69
	Wage	245.09	1,817.16	251.11	814.16	3,127.53
	Subtotal	**57,032.30**	**8,527.41**	**1,115.22**	**2,304.43**	**68,979.36**
Total						
	Total	**420,000.63**	**31,652.86**	**15,597.89**	**10,897.87**	**478,149.26**

Appendix A: County Listing for the Region

Texas
- Austin

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Texas				
Austin	28,417	2,587,774	490,964	3,078,738
Total	**28,417**	**2,587,774**	**490,964**	**3,078,738**
Study Region Total	**28,417**	**2,587,774**	**490,964**	**3,078,738**

Hazus-MH: Flood Global Risk Report

Region Name: Austin County

Flood Scenario: 500-Year

Print Date: Thursday, November 09, 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.

FEMA

RiskMAP
Increasing Resilience Together

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 648 square miles and contains 2,144 census blocks. The region contains over 11 thousand households and has a total population of 28,417 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 13,199 buildings in the region with a total building replacement value (excluding contents) of 3,079 million dollars (2010 dollars). Approximately 91.61% of the buildings (and 84.05% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 13,199 buildings in the region which have an aggregate total replacement value of 3,079 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	2,587,774	84.1%
Commercial	270,888	8.8%
Industrial	116,607	3.8%
Agricultural	17,629	0.6%
Religion	45,322	1.5%
Government	15,308	0.5%
Education	25,210	0.8%
Total	**3,078,738**	**100.0%**

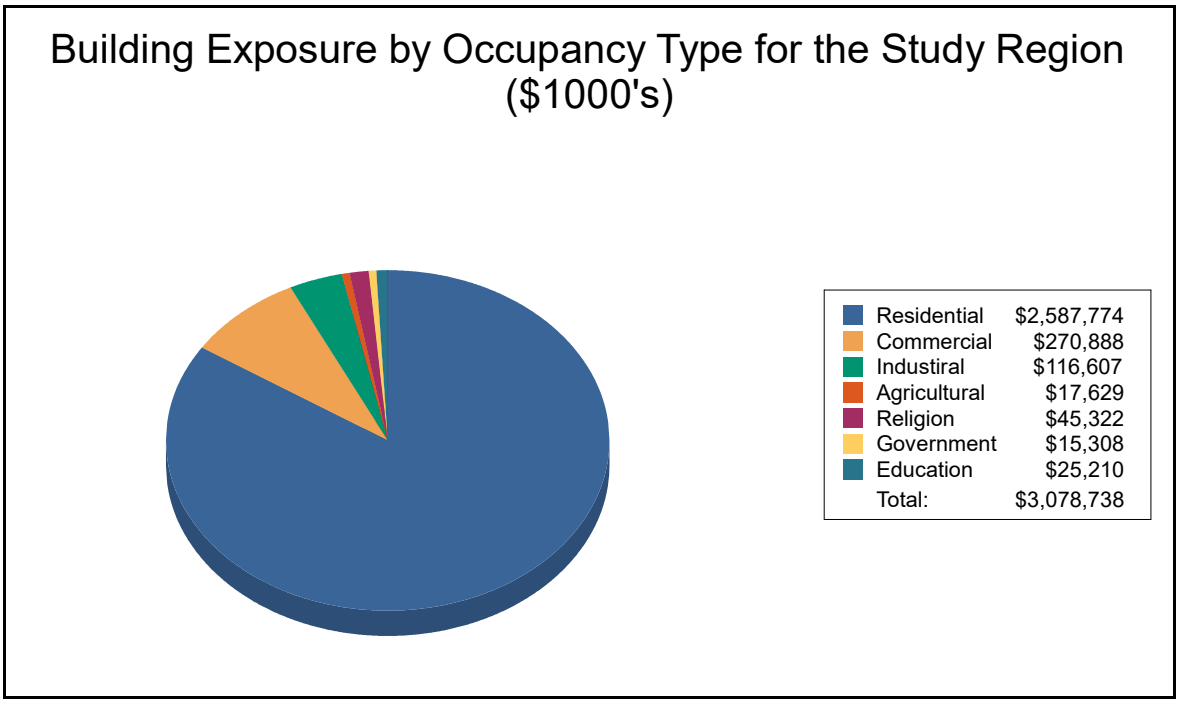
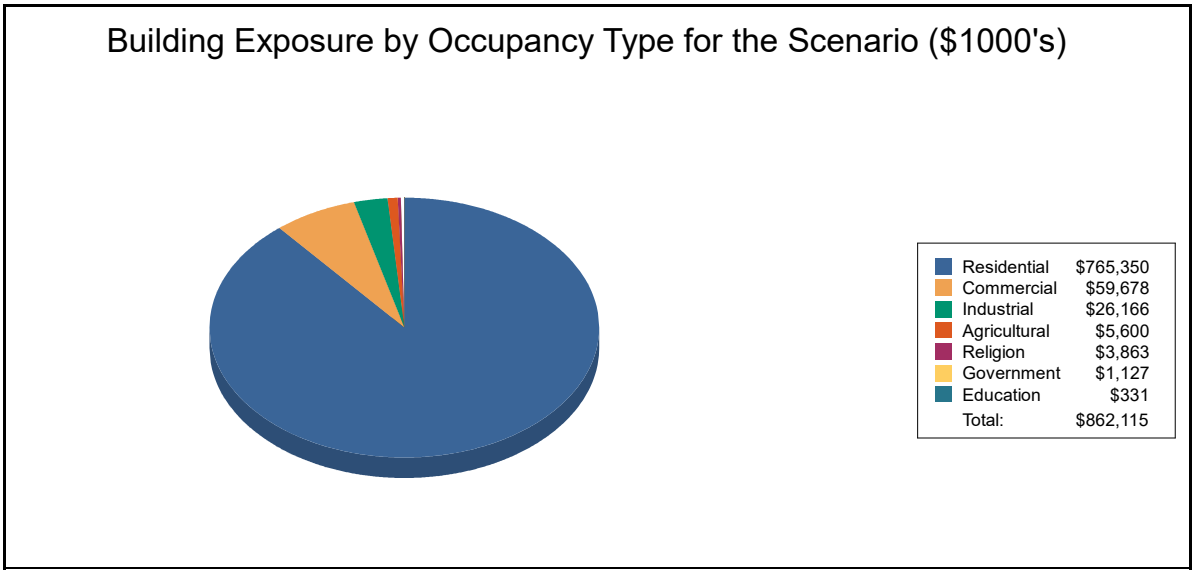


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	765,350	88.8%
Commercial	59,678	6.9%
Industrial	26,166	3.0%
Agricultural	5,600	0.6%
Religion	3,863	0.4%
Government	1,127	0.1%
Education	331	0.0%
Total	**862,115**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 26 beds. There are 14 schools, 6 fire stations, 6 police stations and no emergency operation centers.

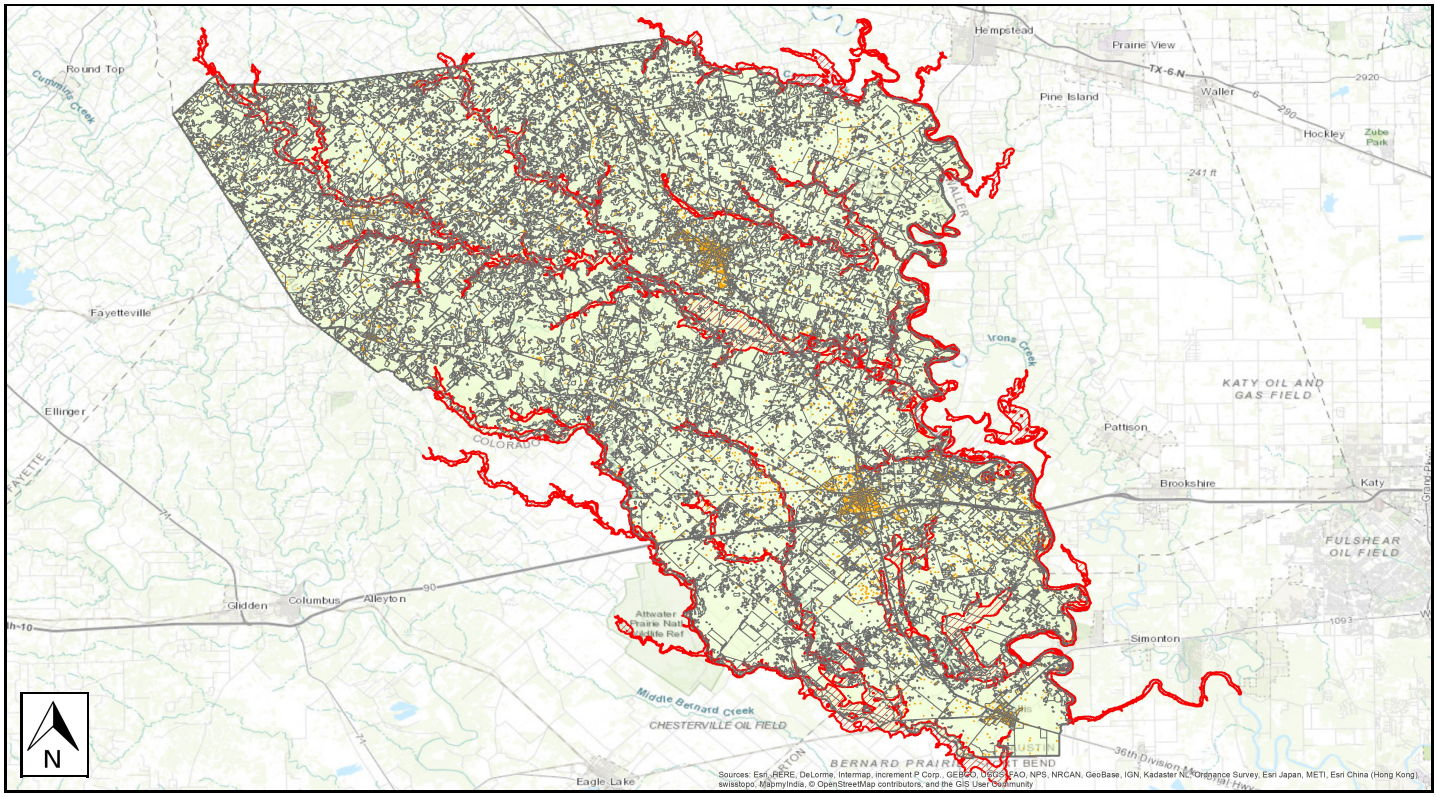
Flood Scenario Parameters

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

Study Region Name:	Austin 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 32 buildings will be at least moderately damaged. This is over 59% of the total number of buildings in the scenario. There are an estimated 6 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

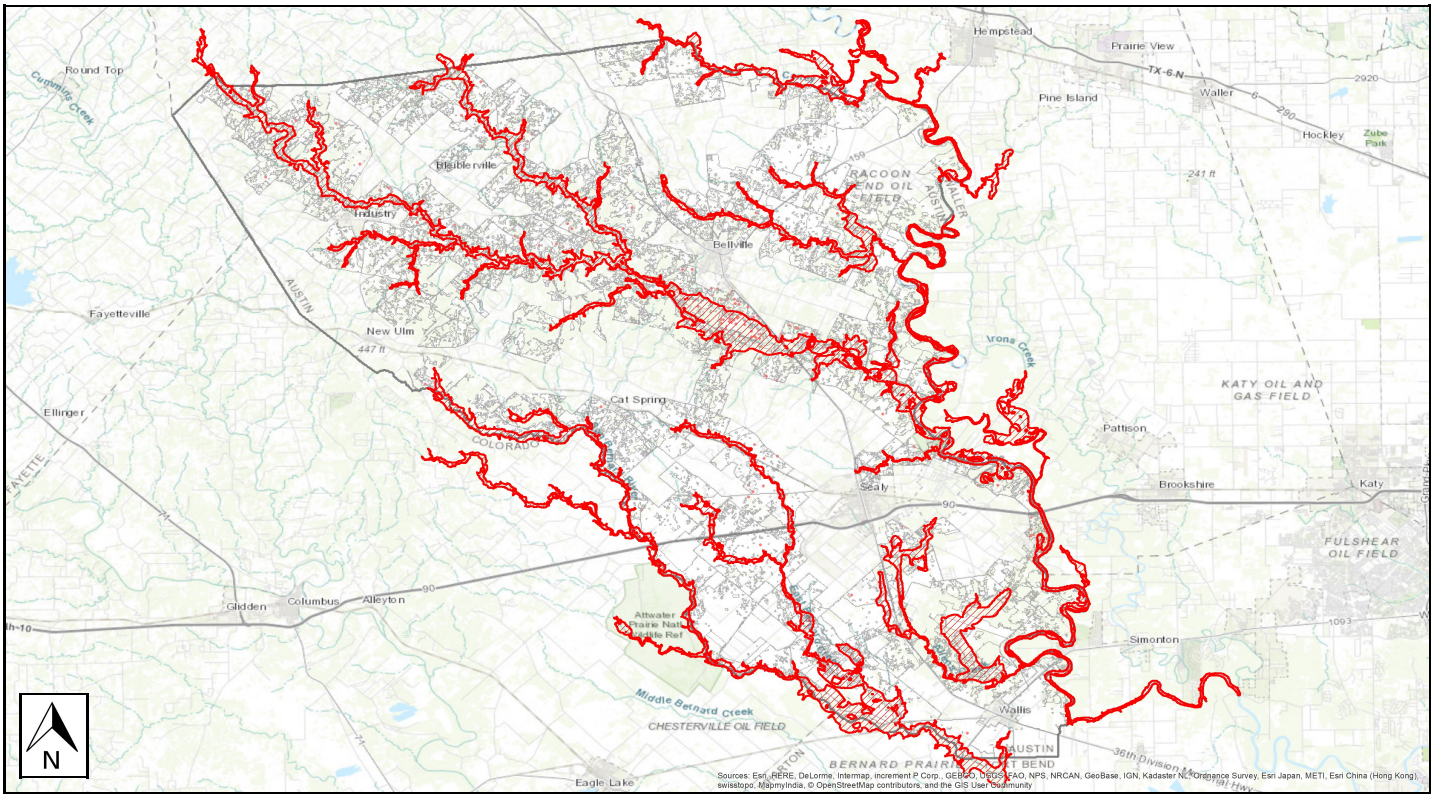


Table 3: Expected Building Damage by Occupancy

	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	7	17.95	15	38.46	4	10.26	4	10.26	3	7.69	6	15.38
Total	**7**		**15**		**4**		**4**		**3**		**6**	

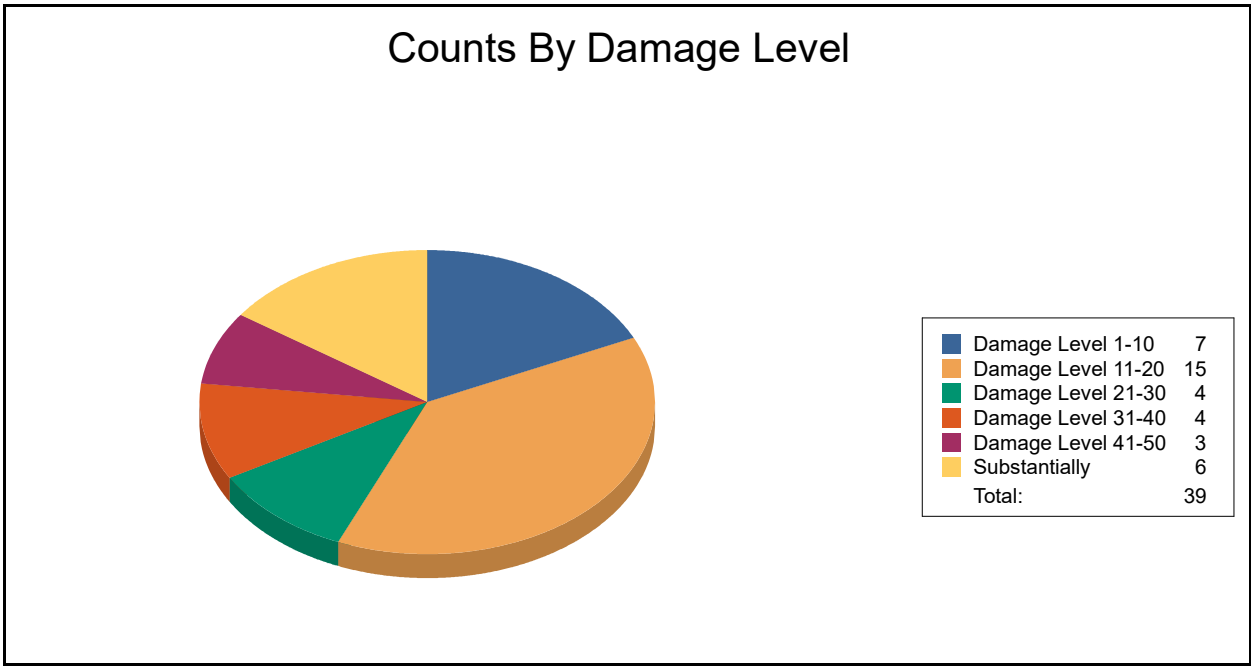


Table 4: Expected Building Damage by Building Type

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	0	0	0	0	0	0	0	0	0	0	2	100
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	7	19	15	41	4	11	4	11	3	8	4	11

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 26 hospital beds available for use. On the day of the scenario flood event, the model estimates that 26 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	6	0	0	0
Hospitals	1	0	0	0
Police Stations	6	0	0	0
Schools	14	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

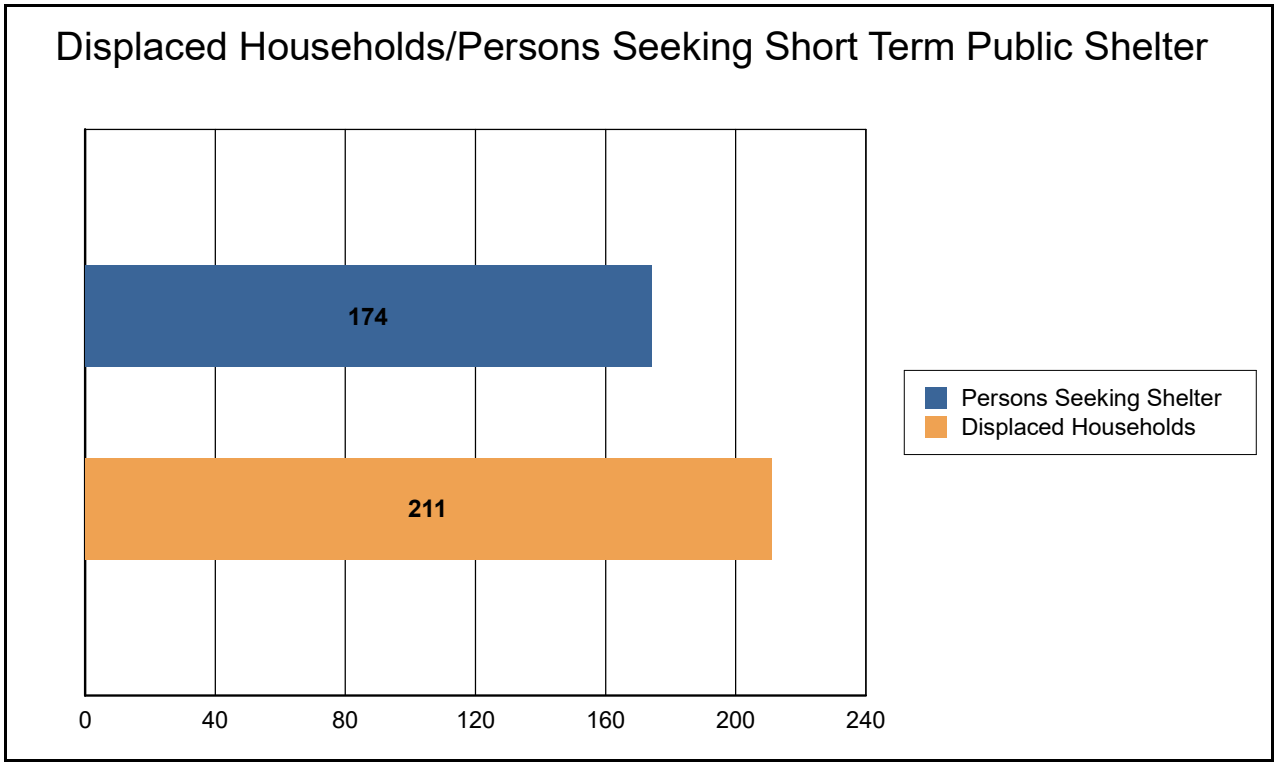
Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because 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 211 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 174 people (out of a total population of 28,417) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 27.35 million dollars, which represents 3.17 % of the total replacement value of the scenario buildings.

Building-Related Losses

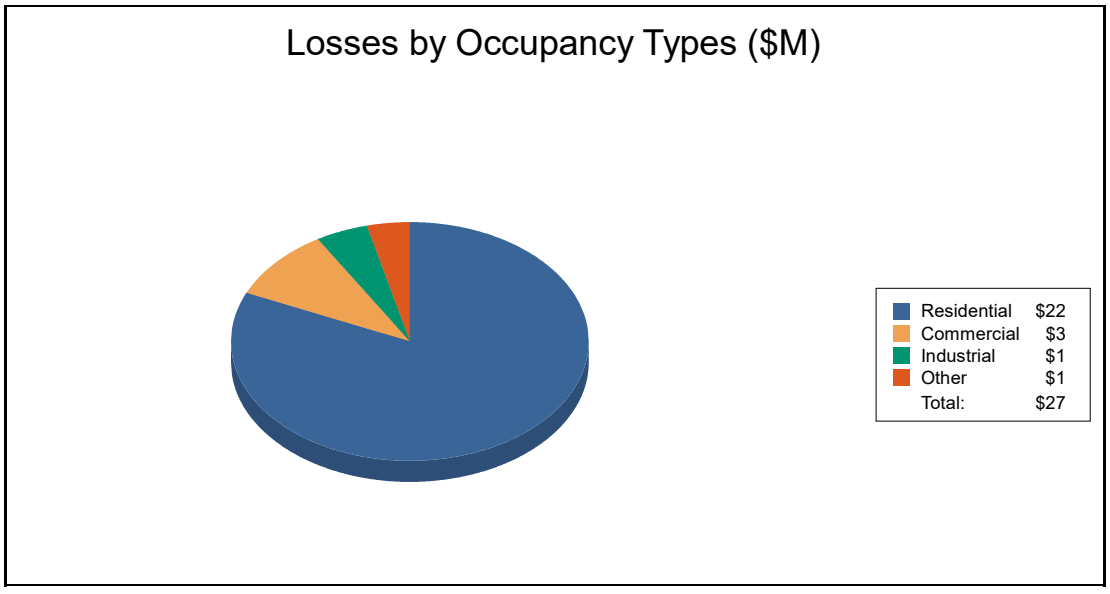
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability 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 27.32 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 81.62% 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	14.46	0.69	0.36	0.14	15.65
	Content	7.86	1.98	0.77	0.83	11.44
	Inventory	0.00	0.03	0.14	0.07	0.24
	Subtotal	**22.32**	**2.70**	**1.27**	**1.04**	**27.32**
Business Interruption						
	Income	0.00	0.01	0.00	0.00	0.01
	Relocation	0.01	0.00	0.00	0.00	0.01
	Rental Income	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.01	0.00	0.01	0.01
	Subtotal	**0.01**	**0.01**	**0.00**	**0.01**	**0.03**
ALL	**Total**	**22.33**	**2.71**	**1.27**	**1.05**	**27.35**



Appendix A: County Listing for the Region

Texas

- Austin

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Texas				
Austin	28,417	2,587,774	490,964	3,078,738
Total	**28,417**	**2,587,774**	**490,964**	**3,078,738**
Total Study Region	**28,417**	**2,587,774**	**490,964**	**3,078,738**

Hazus-MH: Flood Global Risk Report

Region Name: Austin County

Flood Scenario: 100-Year

Print Date: Thursday, November 09, 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.

FEMA

RiskMAP
Increasing Resilience Together

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 648 square miles and contains 2,144 census blocks. The region contains over 11 thousand households and has a total population of 28,417 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 13,199 buildings in the region with a total building replacement value (excluding contents) of 3,079 million dollars (2010 dollars). Approximately 91.61% of the buildings (and 84.05% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 13,199 buildings in the region which have an aggregate total replacement value of 3,079 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	2,587,774	84.1%
Commercial	270,888	8.8%
Industrial	116,607	3.8%
Agricultural	17,629	0.6%
Religion	45,322	1.5%
Government	15,308	0.5%
Education	25,210	0.8%
Total	**3,078,738**	**100.0%**

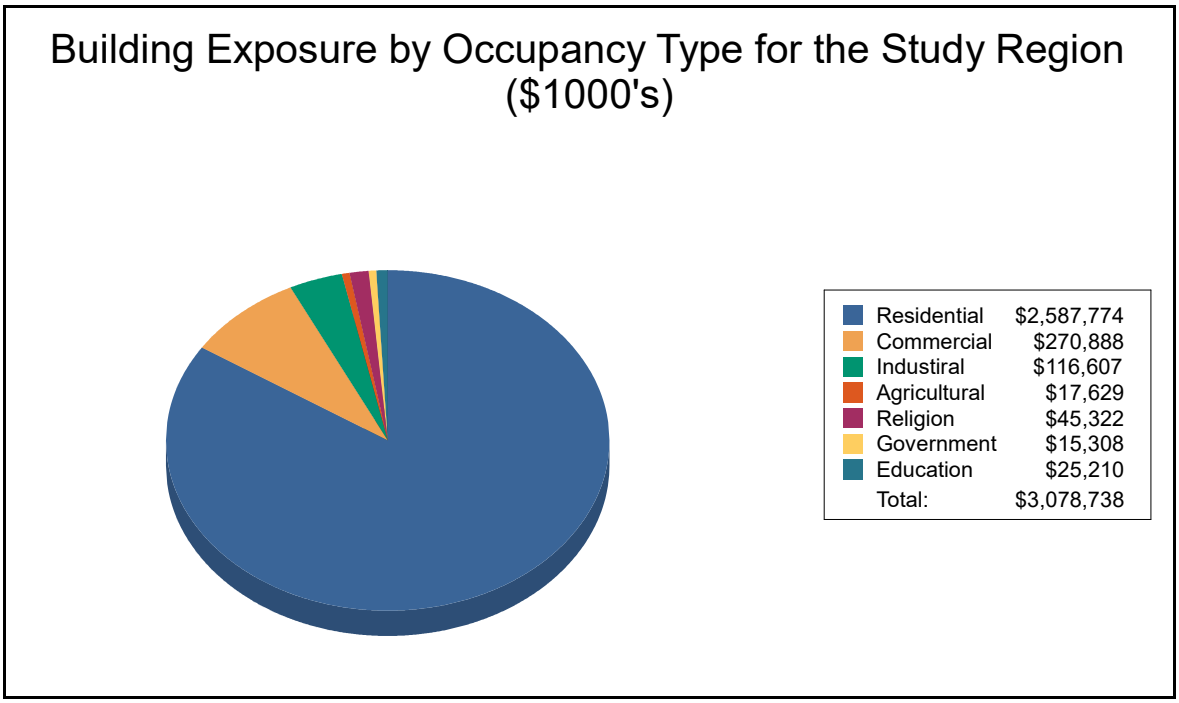
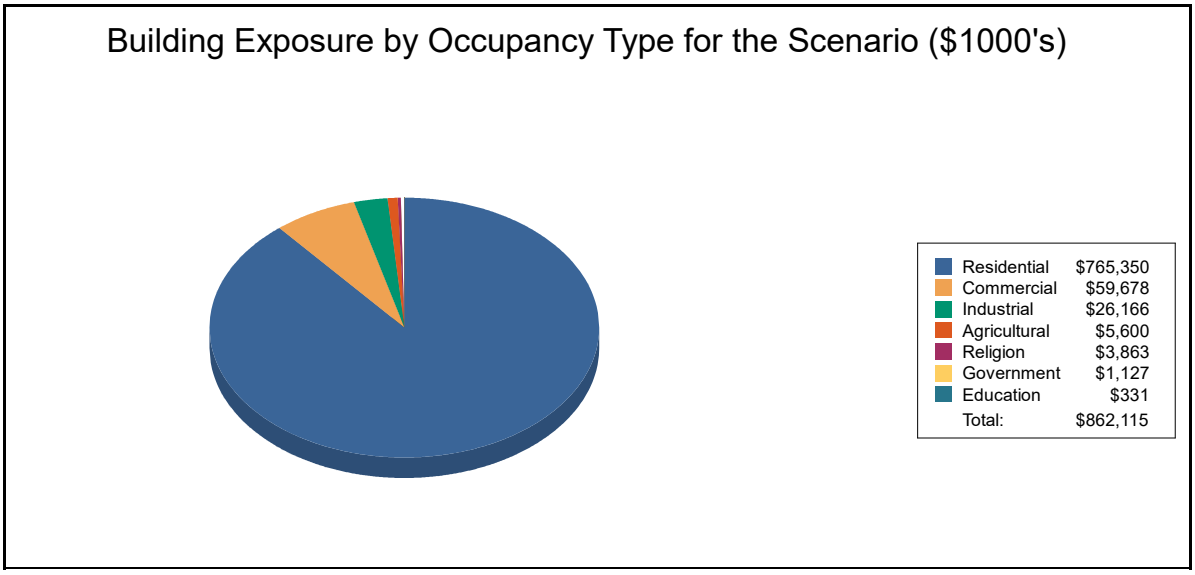


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	765,350	88.8%
Commercial	59,678	6.9%
Industrial	26,166	3.0%
Agricultural	5,600	0.6%
Religion	3,863	0.4%
Government	1,127	0.1%
Education	331	0.0%
Total	**862,115**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 26 beds. There are 14 schools, 6 fire stations, 6 police stations and no emergency operation centers.

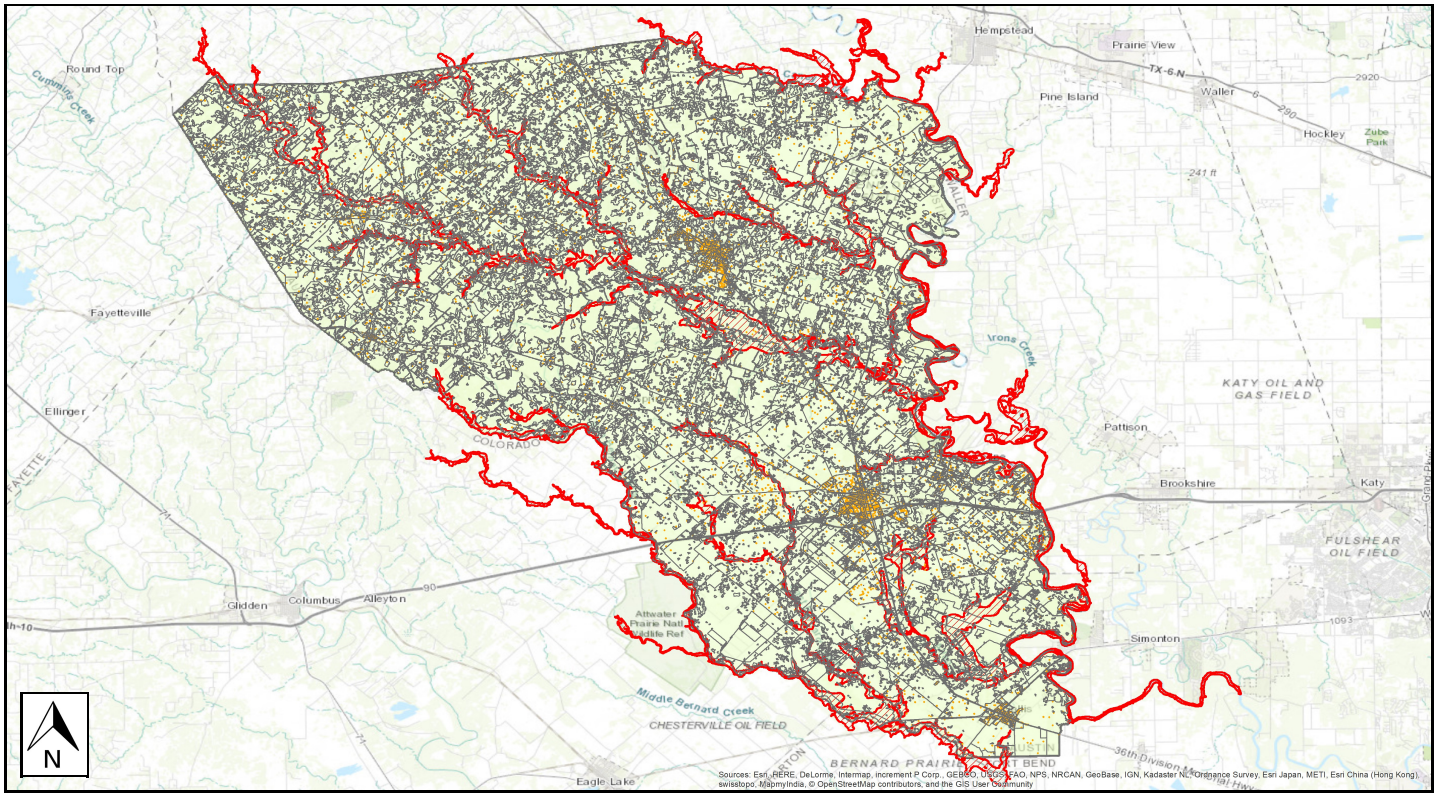
Flood Scenario Parameters

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

Study Region Name:	Austin 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 15 buildings will be at least moderately damaged. This is over 52% of the total number of buildings in the scenario. There are an estimated 2 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

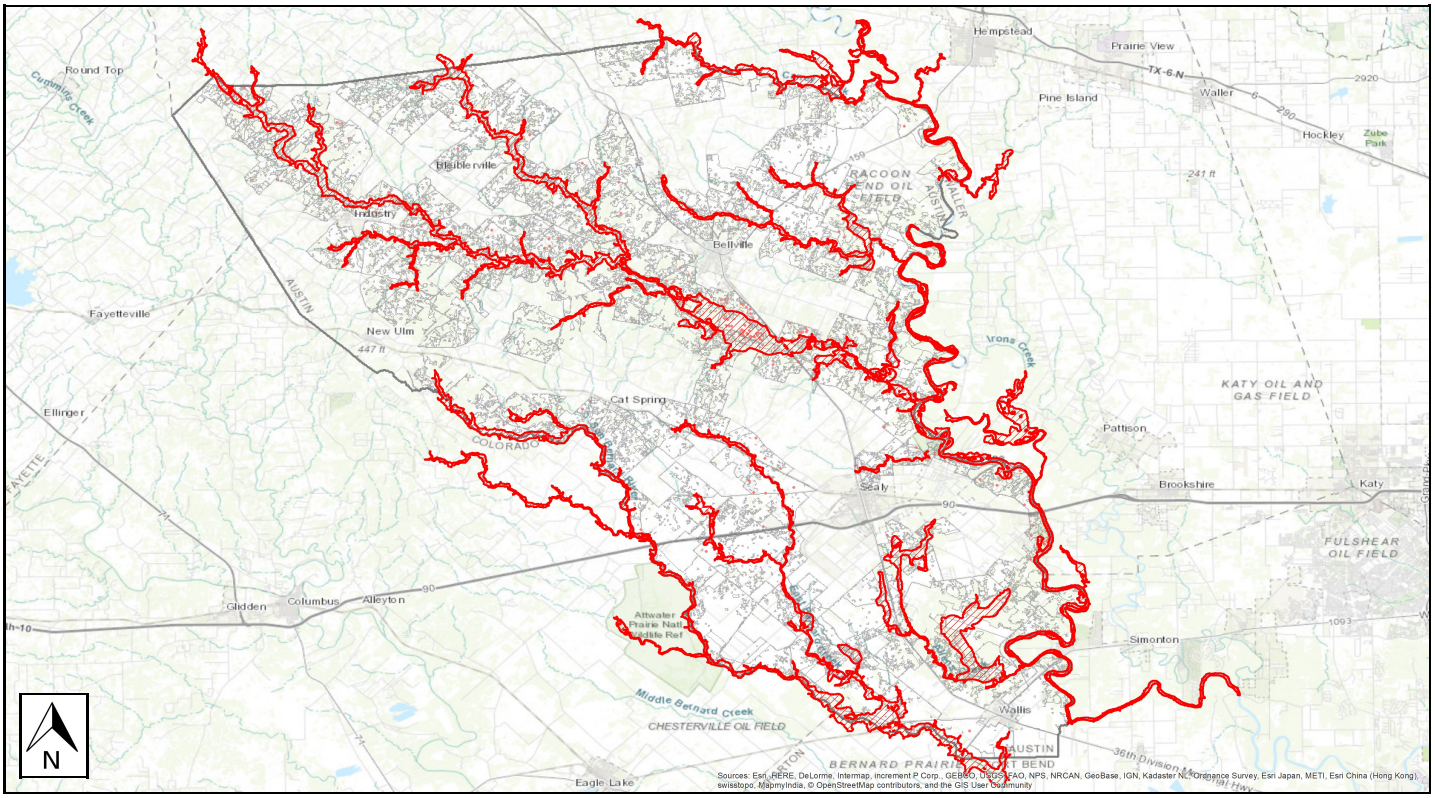


Table 3: Expected Building Damage by Occupancy

	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	7	31.82	7	31.82	1	4.55	3	13.64	2	9.09	2	9.09
Total	**7**		**7**		**1**		**3**		**2**		**2**	

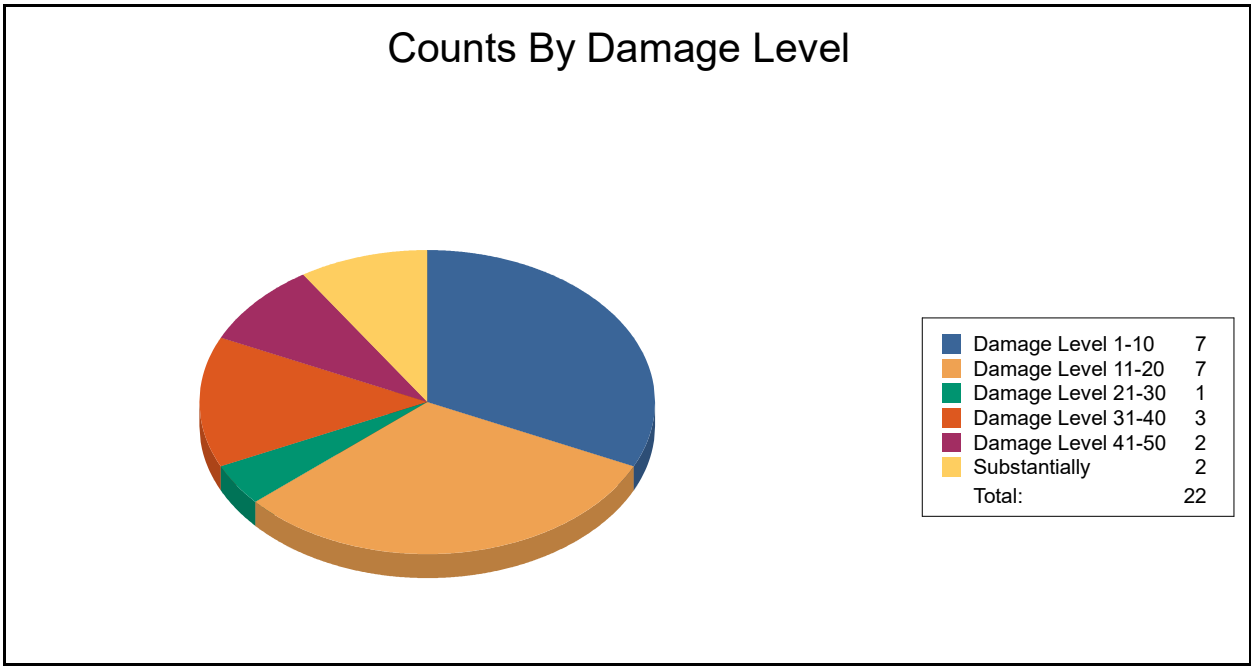


Table 4: Expected Building Damage by Building Type

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	0	0	0	0	0	0	0	0	0	0	1	100
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	7	33	7	33	1	5	3	14	2	10	1	5

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 26 hospital beds available for use. On the day of the scenario flood event, the model estimates that 26 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	6	0	0	0
Hospitals	1	0	0	0
Police Stations	6	0	0	0
Schools	14	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

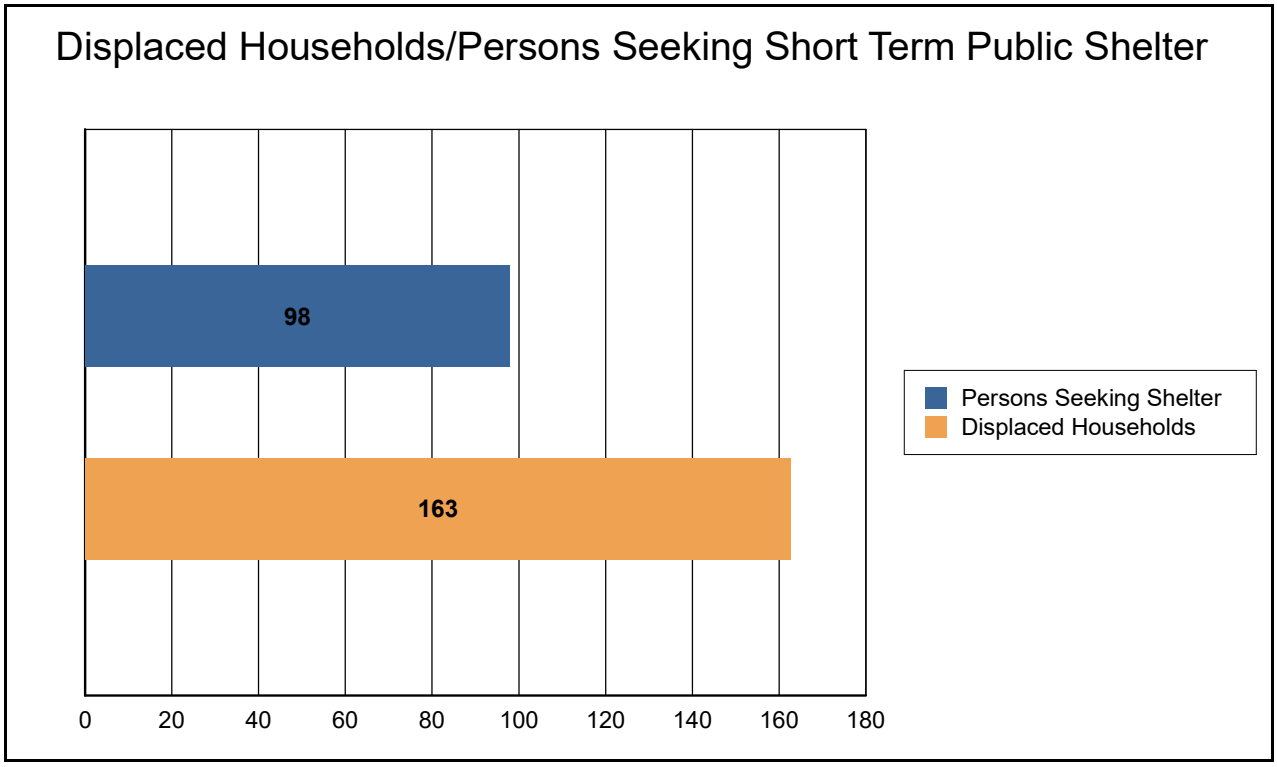
Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because 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 163 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 98 people (out of a total population of 28,417) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 18.15 million dollars, which represents 2.11 % of the total replacement value of the scenario buildings.

Building-Related Losses

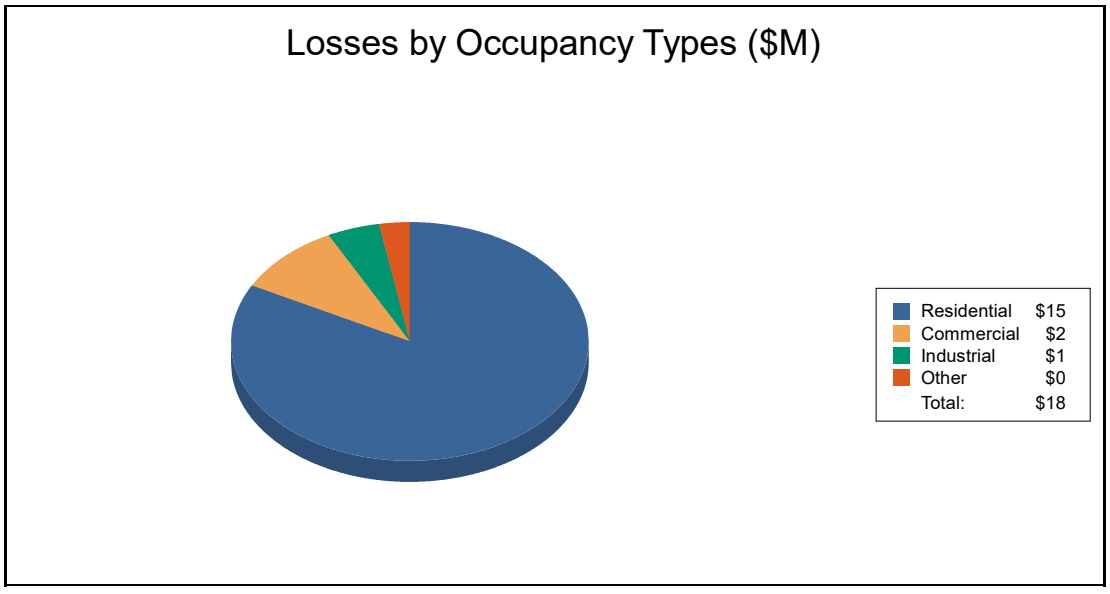
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability 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 18.14 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 82.91% 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	9.75	0.41	0.25	0.06	10.47
	Content	5.30	1.31	0.52	0.41	7.54
	Inventory	0.00	0.02	0.09	0.02	0.13
	Subtotal	**15.05**	**1.74**	**0.87**	**0.49**	**18.14**
Business Interruption						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental Income	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.01
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**
ALL	**Total**	**15.05**	**1.74**	**0.87**	**0.50**	**18.15**



Appendix A: County Listing for the Region

Texas

- Austin

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Texas				
Austin	28,417	2,587,774	490,964	3,078,738
Total	**28,417**	**2,587,774**	**490,964**	**3,078,738**
Total Study Region	**28,417**	**2,587,774**	**490,964**	**3,078,738**

2017

Appendix D – Repetitive Loss Properties

APPENDIX D: REPETITIVE LOSS PROPERTIES

Prop Locatr	Community Name	Insured?	Occupancy	Total Losses	Total Paid	SRL Indicator
0250515	Austin County	Yes	Single Fmly	2	$445,883.45	
0173897	Austin County	No	Single Fmly	2	$11,422.09	
0071887	Austin County	No	Single Fmly	2	$22,706.40	
0071579	Austin County	No	Single Fmly	2	$4,518.98	
0172996	Austin County	Yes	Single Fmly	3	$206,361.99	
0260370	Austin County	Yes	Single Fmly	2	$316,784.78	
0249368	Austin County	No	Single Fmly	3	$44,921.52	
0132881	Austin County	No	Single Fmly	2	$247,320.62	
0248152	Austin County	Yes	Assmd Condo	2	$73,084.65	
0250030	Austin County	Yes	Single Fmly	2	$184,635.52	
0248378	Austin County	Yes	Single Fmly	2	$95,000.00	
0262419	Austin County	Yes	Single Fmly	2	$44,252.47	
0240813	Austin County	Yes	Single Fmly	2	$53,267.28	
0100252	Austin County	No	Single Fmly	5	$334,946.19	VU
0250298	Austin County	Yes	Single Fmly	2	$133,115.88	
0248362	Austin County	Yes	Single Fmly	3	$219,421.15	
0250516	Austin County	Yes	Single Fmly	2	$45,296.42	
0262420	Austin County	Yes	Single Fmly	2	$96,280.90	P
0253599	Austin County	Yes	Single Fmly	2	$14,957.98	
0100251	Austin County	No	Single Fmly	2	$62,741.95	
0250828	Austin County	No	Single Fmly	2	$81,565.05	
0243389	Austin County	No	Single Fmly	2	$20,897.50	
0249330	Austin County	Yes	Assmd Condo	2	$198,416.53	
0250490	Austin County	Yes	Single Fmly	3	$101,636.10	
0250011	Austin County	Yes	Single Fmly	3	$10,019.42	
0249337	San Felipe, Town Of	No	Single Fmly	3	$91,831.42	
0248837	San Felipe, Town Of	No	Other-Nonres	3	$913,418.78	
0242764	Sealy, City Of	Yes	Single Fmly	3	$101,295.30	
0097187	Sealy, City Of	No	Single Fmly	3	$48,238.53	
0101086	Sealy, City Of	Yes	Single Fmly	3	$143,012.05	
0088121	Sealy, City Of	No	Single Fmly	5	$102,500.42	
0248389	Sealy, City Of	Yes	Single Fmly	2	$72,167.94	
0249374	Sealy, City Of	Yes	Single Fmly	2	$95,081.72	
0104572	Wallis, City Of	No	Single Fmly	2	$127,794.67	

2017

Appendix E: Plan Adoption

HAZARD MITIGATION PLAN

FOR

AUSTIN COUNTY, TEXAS

2017

Adopted in Commissioner's Court October 8, 2018
Order #: 18-295

Tim Lapham, Austin County Judge

Austin County Hazard Mitigation Plan Resolution

WHEREAS, Certain areas of Austin 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, Austin 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 jurisdiction 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, Austin County, in order to meet this requirement, has initiated development of a local Hazard Mitigation Plan;

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

Adopts the Austin 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 Austin County's addendum to the Hazard Mitigation Plan be developed and presented to the Austin 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 October 08, 2018.

Tim Lapham
County Judge

RESOLUTION NO. 2018-42

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SEALY, TEXAS, ADOPTING THE HAZARD MITIGATION PLAN FOR THE HOUSTON-GALVESTON AREA COUNCIL REGION.

WHEREAS, certain areas of the City of Sealy, Texas, ("City") are subject to periodic flooding and other natural hazards with the potential to cause damages to people and properties within the area; and

WHEREAS, the City of Sealy 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, the cities and counties in the H-GAC Region, in order to meet this requirement, have initiated development of a regional, multi-jurisdictional Hazard Mitigation Plan, including the City;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SEALY, TEXAS,

1. The City adopts the Houston-Galveston Area Council of Governments - Regional Hazard Mitigation Plan, which is attached hereto and incorporated herein for all purposes as Exhibit "A"; and

2. The City vests the Mayor with the responsibility, authority, and the means to:

   Inform all concerned parties of this action; and

   Develop an addendum to this Hazard Mitigation Plan if the City's unique situation warrants such an addendum.

3. The City appoints the City Manager or his designee to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City's addendum to the Hazard Mitigation Plan be developed and presented to the City Council for consideration.

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

PASSED and ADOPTED this 13th day of November 2018.

Janice Whitehead

Janice Whitehead, Mayor

ATTEST:

Dayl Cooksey, City Secretary

RESOLUTION No. R2018-9

A RESOLUTION ADOPTING THE AUSTIN COUNTY HAZARD MITIGATION PLAN AND AUTHORIZING THE MAYOR TO TAKE SUCH ACTION AS MAY BE REASONBLY NECESSARY TO CARRY OUT THE OBJECTIVES OF THE PLAN

WHEREAS, certain areas of the Town of San Felipe are subject to periodic flooding and other natural hazards that have the potential to cause damages to people and properties within the areas; and

WHEREAS, the Town Council 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, the county and cities within Austin County to include the Town of San Felipe, have initiated development of a regional, multi-jurisdictional Hazard Mitigation Plan in order to meet this requirement.

NOW THEREFORE: BE IT RESOLVED BY THE TOWN COUNCIL OF THE TOWN OF SAN FELIPE, TEXAS.

SECTION 1. The Town Council hereby adopts the Austin County Hazard Mitigation Plan ("Plan") and vests the Mayor with the responsibility, authority, and means to inform all concerned parties of this action and develop an addendum to the Plan if the Town's unique situation warrants such an addendum.

SECTION 2. The Mayor is hereby authorized to insure that the Plan is reviewed at least annually, that any needed adjustment to the Town's addendum to the Plan be developed and presented to the Town Council for consideration, and that such other official actions as may be reasonably necessary are taken to carry out the objectives of the Plan.

PASSED AND APPROVED ON THIS THE 22 day of October, 2018.

Bobby Byars, Mayor
Town of San Felipe

ATTEST:

Sue Foley
Town Secretary
Town of San Felipe

RESOLUTION 2018-33

WHEREAS, certain areas of the City of Wallis 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 Wallis desires to prepare an 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, the cities and counties in the H-GAC Region, in order to meet this requirement, have initiated development of a regional, multi-jurisdictional Hazard Mitigation Plan, including the City of Wallis;

NOW, therefore, be it resolved, that the City of Wallis, City Council hereby;

Adopts the Houston-Galveston Area Council of Governments – Regional Hazard Mitigation Plan; and

Vests the Mayor of the City of Wallis, 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 town's unique situation warrants such an addendum.

Appoints Mayor of the City to assure that the Hazard Mitigation Plan be review at least annually and that any needed adjustment to the City of Wallis addendum to the Hazard Mitigation Plan be developed and presented to the City of Wallis, 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.

PASSED AND APPROVED on this the 17th day of October, 2018

Steve Bockel, Mayor

ATTEST:

Sheila Moseley, City Secretary

RESOLUTION NO. 2018-01

FOR ADOPTION OF THE HAZARD MITIGATION PLAN FOR THE H-GAC REGION

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

WHEREAS, the City of Brazos Country 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, the cities and counties in the H-GAC Region, in order to meet this requirement, have initiated development of a regional, multi-jurisdictional Hazard Mitigation Plan, including the City of Brazos Country.

NOW, THEREFORE, be it resolved, that this City Council of the City of Brazos Country hereby:

Adopts the Houston-Galveston Area Council of Governments Regional Hazard Mitigation Plan;
and;

Vests the Mayor 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 City's unique situation warrants such an addendum.

Appoints the Mayor of the City to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City of Brazos Country's addendum to the Hazard Mitigation Plan be developed and presented to the City Council of the City of Brazos Country 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 this the 14th day of November, 2018

Charles A. Kalkomey
Mayor

ATTEST:

Linda Williams, City Secretary

RESOLUTION # 1572R

For Adoption of the Hazard Mitigation Plan
for the H-GAC Region

WHEREAS, certain areas of the City of Bellville 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 Bellville 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, the cities and counties in the H-GAC Region, in order to meet this requirement, have initiated development of a regional, multi-jurisdictional Hazard Mitigation Plan, including the City of Bellville.

NOW, THEREFORE, be it resolved, that this City Council of the City of Bellville hereby:

Adopts the Houston-Galveston Area Council of Governments Regional Hazard Mitigation Plan: and;

Vests the Police Chief 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 town's unique situation warrants such an addendum.

Appoints Police Chief Larry Matthews to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City of Bellville's addendum to the Hazard Mitigation Plan be developed and presented to the City Council of the City of Bellville 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 this the 16th day of October, 2018

Joe Ed Lynn
Mayor

ATTEST:
Betty Hollon
Betty Hollon, City Secretary