Atascosa County - McMullen County
Multi-jurisdictional Hazard Mitigation Action Plan
2020






Prepared for:
Atascosa County, Texas
Charlotte, Texas - Christine, Texas - Lytle Texas
Jourdanton, Texas – Pleasanton, Texas
Poteet, Texas – Lytle ISD – Poteet ISD

Prepared for:
McMullen County

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SECTION 1: INTRODUCTION

Background

Atascosa County and McMullen County are located in South Central Texas just south of Bexar County, home to San Antonio which is the 7th largest city in the United States. While large portions of the counties remain rural in nature, the regional population and economic growth is being felt in the area and underscores the need to plan for the mitigation of future hazards to protect people and property. Atascosa County and McMullen County are susceptible to a wide range of natural hazards, including but not limited to hurricanes, flooding, hail, extreme heat, drought, and wildfire. The counties have a hazard profile similar to many Gulf Coast communities with hurricanes and tropical storms from the gulf coast in the summer and fall and flash flooding events typically in the spring and summer. With climate change affecting weather patterns and sea level rise on the Texas coast, these and other hazards are forecast to become more frequent and greater in magnitude in the future.

These hazards can be life-threatening, destroy property, disrupt the economy, and lower the overall quality of life for individuals. Hazard mitigation is defined by the Federal Emergency Management Agency (FEMA) as sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects. Hazard mitigation planning is an investment in a community's safety and sustainability and it is widely accepted that the most effective hazard mitigation measures are implemented at the local government level, where decisions on the regulation and control of development are ultimately made. This hazard mitigation plan is a vehicle for Atascosa and McMullen Counties, including participating jurisdictions, to address hazard vulnerabilities by reducing the future impact of many different hazards on people and property that exist today and in the foreseeable future.

Participation and Scope

The Atascosa and McMullen Counties Hazard Mitigation Plan is a multi-jurisdictional plan covering two counties, 8 cities, and 2 school districts. The prior hazard mitigation plan for the area was the 2012 Alamo Area Council of Government (AACOG) Hazard Mitigation Plan which covered the larger San Antonio metropolitan area. In Addition to Atascosa and McMullen Counties this plan includes the Cities of Charlotte, Christine, Jourdanton, Pleasanton, Poteet and Lytle along with the school district of Lytle ISD and Poteet ISD as participating jurisdictions. The San Antonio River Authority (SARA) participated throughout the plan development with representatives at meetings and functioning as both a stakeholder and a resource. Additional entities that were reached

out to but chose to participate as stakeholders rather than participating jurisdictions are the ISDs of Charlotte, Christine, Jourdanton and Pleasanton. Below is an example of outreach efforts to inform the public about the upcoming Hazard Mitigation Action Plan (HMAP) development process.

Notice of mitigation planning efforts on city websites and local newspaper, Summer 2018

"The hazard mitigation focus for FEMA is looking at a broad set of threats and how those pair up to community vulnerabilities. We will be looking at everything from flood events to hurricanes, tropical storms, severe storms, tornados, hail, lightning, drought, wildfire, wildfire, extreme heat and winter storms," Rojas said.

The required plan includes a CORE Planning team with Atascosa and McMullan Counties and its participating jurisdictions along with local teams to develop specific mitigation strategies unique to each community. Once the Core and local teams are both established, Rojas said that they will conduct an on-line community survey to understand residents' top concerns, along with several public hearings. The survey will also be accessible to the public in public facilities such as libraries, city halls, and both county court houses.

The prior AACOG 2012 Regional HMAP included both San Antonio and Bexar County with a total of 56 participants, of which 11 were counties. The AACOG 2012 HMAP was diverse with both rural and urban participants and covered an area of over 10,000 sq. miles. This plan will expand upon the 2012 AACOG plan with new capabilities, risk assessments, and mitigation actions contained therein, but will also provide a more nuanced view of two counties that share similar characteristics with regard to history, landscape, risk, economy, transportation, and other factors.

This new plan scope is to develop a detailed understanding of the planning area with regard to existing capabilities and historical and future development patterns. Next, the vulnerability of the area to different hazards will be studied through a detailed hazard risk assessment that will assist the planning team in identifying and ranking mitigation activities based on their ability to reduce overall risk.

Purpose

The Mission Statement of the Plan is, ***Protect the people, property, economy, and quality of life of Atascosa and McMullen Counties from hazards and disasters.***

The Plan was prepared by Atascosa and McMullen Counties, including participating jurisdictions, and in cooperation with Langford Community Management Services and Rojas Planning, LLC. The purpose of the Plan is to minimize or eliminate long-term risks to human life and property from known hazards and to break the cycle of high-cost disaster response and recovery within the planning area. In order to accomplish this, cost-effective hazard mitigation actions within the planning area are identified along with information critical to successful implementation such as estimated cost,

responsible departments, funding sources, and timelines. In addition, a FEMA-approved hazard mitigation plan is a condition for receiving certain types of non-emergency disaster assistance, including funding for mitigation programs and projects.

A successful Hazard Mitigation Plan will:

1. Align risk reduction with other Federal, State or community objectives;
2. Build or encourage partnerships for risk reduction involving government, organizations, businesses, and the public;
3. Communicate priorities to potential sources of funding;
4. Identify long-term, broadly supported strategies for risk reduction;
5. Identify implementation approaches that focus resources on the greatest risks and vulnerabilities; and
6. Increase education and awareness around threats, hazards, and vulnerabilities.

Core Planning Team members identified ten natural hazards and two man-made hazards to be addressed by the plan. More details about these hazards are contained in Section 4 with the risk assessments for each hazard discussed in more detail in Sections 5-17. The specific goals of the Plan are identified in Section 18 with specific mitigation actions contained in Section 19. The ongoing maintenance of the Plan is discussed in Section 20 with details on how the plan is incorporated into existing plans and funding mechanisms, monitoring, evaluation, annual and 5-year updates, and a commitment to continue public involvement with the Hazard Mitigation Plan.

Authority

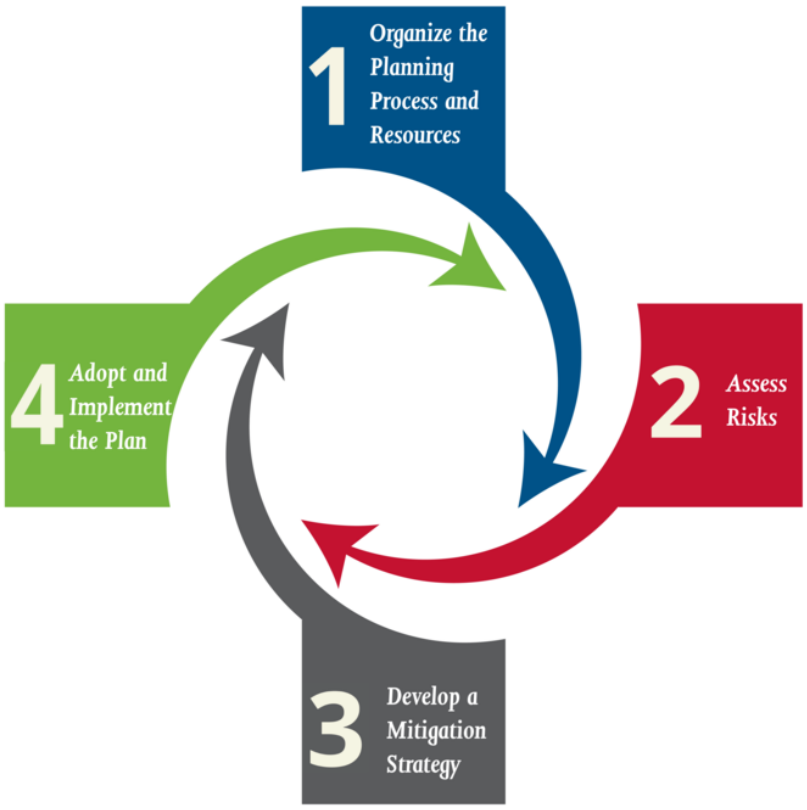
The Texas Division of Emergency Management (TDEM) and FEMA have the authority to review and approve hazard mitigation plans through the Disaster Mitigation Act of 2000.

SECTION 2: PLANNING PROCESS

Plan Preparation and Plan Development

Hazard mitigation is the effort to reduce loss of life and property by lessening the impact of disasters and is most effective when implemented under a comprehensive, long-term mitigation plan. Hazard mitigation planning involves coordination with various constituents and stakeholders to identify risks and vulnerabilities associated with natural disasters and develop long-term strategies for protecting people and property from future hazard events. Mitigation plans are key to breaking the cycle of disaster damage, reconstruction, and repeated damage. This section provides an overview of the planning process including the identification of the key steps of Plan development and a detailed description of how stakeholders and the public were involved.

Figure 2-1: Plan Development Process



1. Organize the Planning Process and Resources – At the start, the participating jurisdictions focus on assembling the resources needed for a successful mitigation planning process. This includes securing technical expertise, defining the planning area, and identifying key individuals, agencies, neighboring jurisdictions, businesses, and/or other stakeholders to participate in the process. The planning process for local and tribal governments must include opportunities for the public to comment on the plan.

2. Assess Risks – Next, the local government needs to identify the characteristics and potential consequences of hazards. It is important to understand what geographic areas

each hazard might impact and what people, property, or other assets might be vulnerable.

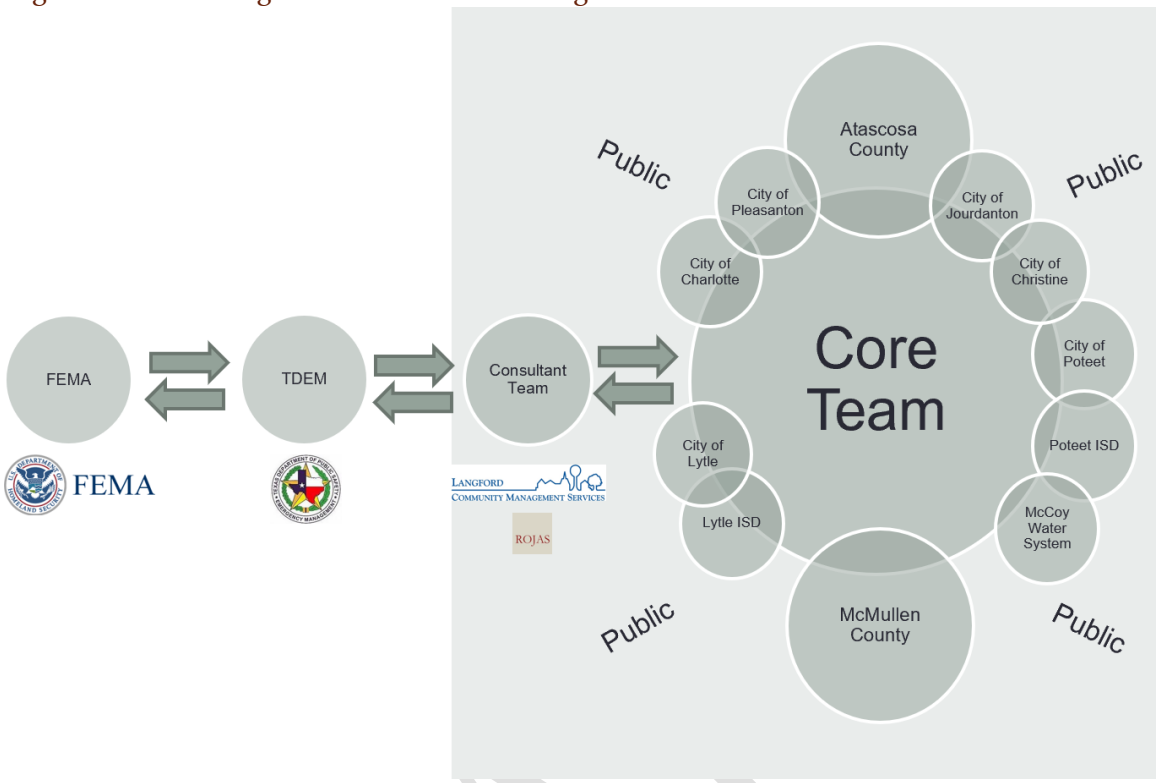
3. Develop a Mitigation Strategy – The local government then sets priorities and develops long-term strategies for avoiding or minimizing the undesired effects of disasters. The mitigation strategy addresses how the mitigation actions will be implemented and administered.

4. Adopt and Implement the Plan – Once FEMA has received the adoption from the governing body and approved the plan, the state, tribe, or local government can bring the mitigation plan to life in a variety of ways, ranging from implementing specific mitigation projects to changing aspects of day-to-day organizational operations. To ensure success, the plan must remain a relevant, living document through routine maintenance. The local government needs to conduct periodic evaluations to assess changing risks and priorities and make revisions as needed.

Planning Team

Atascosa and McMullen Counties, including participating jurisdictions, hired Langford Community Management Services and Rojas Planning to provide technical support and to oversee development of the plan. The Atascosa and McMullen Counties Multi-Jurisdictional Plan was organized using a direct representative model, each participating jurisdiction chooses and sends a representative to represent their interests. A local planning team was also setup at the jurisdictional level to assemble representatives to Plan and execute meeting and tasks and ultimately be the group responsible with developing and implementing the mitigation actions at the local level.

Figure 2-2: Planning Team and Process Diagram



The first CORE meeting was held on June 7, 2018 at Methodist South Hospital at 200 W. Calvert Ave. Jourdanton, Texas. At this meeting, an overview of the planning process was discussed as well as what the responsibilities would be of each of the participating jurisdictions and their Core Planning Team representative. Some of the responsibilities of the Core Planning Team that were discussed include capability Assessment Surveys, identifying critical facilities, providing a public survey to the general public, providing input regarding the identification of hazards, identifying mitigation goals, and developing new mitigation actions and ranking mitigation actions.

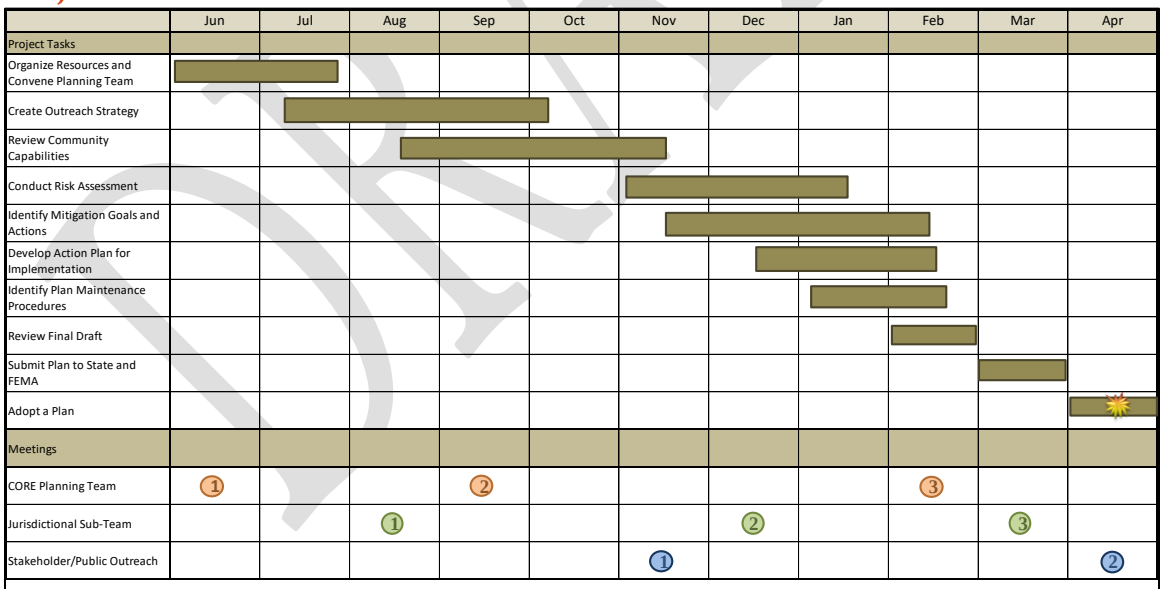
At least one member from each participating jurisdiction was present at this kickoff Core Planning Team meetings. The first Core meeting included a discussion on Plan stakeholders, options for engaging the public, and developing a schedule for Plan development. Core Planning Team members were asked to attend all workshops and any that did not attend were given copies of the meeting materials and contacted by phone or e-mail.

Table 2-1. Core Planning Team (2018 ACS Population Estimates)

Entity/Population	Position or Title	Agency
McMullen CO 749	County Judge Emergency Management Coordinator	Commissioners Court Emergency Management
City of Charlotte 1,850	City Secretary Public Works Supervisor	City Hall Public Works

City of Christine 428	City Secretary	City Hall
City of Jourdanton 4,461	City Manager Chief of Police City Secretary	City Hall Police Department
City of Lytle 2,394	City Secretary Police & EMC Director	City Hall Police Department
City of Pleasanton 10,754	City Secretary City Manager Executive Assistant	City Hall
City of Poteet 3,495	City Secretary City Administrator	City Hall
Atascosa CO 50,130	County Judge Emergency Management Coordinator	Commissioners Court Emergency Management
Lytle ISD	Facilities Director Administrative Assistant	Administration
Poteet ISD	Superintendent Administrative Assistant	Administration

Project Schedule



CORE Planning Team Meetings	
1	Introductions, outreach brainstorming, process review, and hazards review.
2	Review capaibility assessment, NFIP worksheet, survey, basemaps, outreach strategy,and Jurisdictional Sub-teams.
3	Conduct local risk assessments and identify information gaps, identify mitigation goals and actions, and develop implementation plan
Jursidictional Sub-Team	
1	Review basemaps, input on data gaps, create an outreach strategy and complete local capability assessments.
2	Input on risk assessments, mitigation goals and actions and action plan for implementation and maintenance procedures.
3	Review and approve final draft for FEMA submission.
Stakeholder/ Public Outreach Meetings	
1	Present basemaps and capability assessments for each community, get feedback and identify hazards for risk assessment.
2	Opportunity to review and comment on final draft.

Resources and Existing Plans

Resources

In order to perform the hazard risk assessments, a number of resources were utilized to synthesize and develop previous hazard events and impacts to the planning area. The preliminary results of the hazard risk assessments were presented at Core Meeting 3 and provided in their entirety after the meeting to develop mitigation actions. The information from these assessments were used to facilitate discussion that led to participants developing actions for their respective communities. Resources include the National Oceanic and Atmospheric Administration (NOAA), Texas Geographic Society, U.S. Geographic Society (USGS), U.S. Department of Health and Human Services, US Departments of Agriculture, FEMA, U.S. Army Corp of Engineers (USACE), Texas Water Development Board (TWDB), Texas A & M Forest Service, Texas Division of Emergency Management (TDEM), local reporting, and other sources.

Existing Plans

The following existing plans were used to develop background information and as a starting point for discussing past and current capabilities, hazards, and mitigation actions.

Texas State Hazard Mitigation plan - The primary role of the plan is to motivate state agencies and local government, as well as the private sector, to prevent catastrophic impact to property and people from natural hazards by addressing their potential for risk, identifying mitigation actions; and establishing priorities to follow through with those actions through collaborative, analytical mitigation planning. An additional role of the plan is to provide the framework for local planning teams to use as a springboard and resource when addressing their local mitigation planning requirements and strategies. The 2013 State Plan was the most recent throughout much of the development of this Plan, however, the 2018 State Hazard Mitigation Plan was released prior to submission and approval of this Plan.

Alamo Area Council of Governments (AACOG) 2012 Regional Mitigation Plan Update – This is the most recent Hazard Mitigation Plan to include the Atascosa and McMullen Counties planning area. The AACOG HMAP 2012 Plan was an update to the original 2005 Plan and covered 14 hazards with 11 Counties and various jurisdictions participating along with the San Antonio River Authority (SARA).

SARA Watershed Master Plan - In 2011 a Multi-County Watershed Master Plan was prepared to support flood management, safety, and emergency access efforts within Atascosa and McMullen Counties. The report includes recommendations for roadway drainage improvements to mitigate flood hazards and provide improved emergency access during major flood events.

Public and Stakeholder Involvement

The hazard mitigation planning process is an opportunity for Atascosa and McMullen Counties, including the participating jurisdictions, stakeholders, and the general public to evaluate and develop successful hazard mitigation actions to reduce future risk of loss

of life and damage to property resulting from a disaster in or around the planning area. Public participation and stakeholder involvement in the Plan are critical to ensure that the components of the Plan are accurate and relevant to the needs of the community. The Planning Team develops a greater understanding of local concerns and legacy knowledge with input from individual citizens and the community as a whole. If citizens and stakeholders are involved it also imparts more credibility on the final Plan and increases the likelihood of successfully implemented mitigation actions.

The public input process can be viewed as 3 tiers of groups based on participation and responsibility for plan development and implementation.

The first tier is the Core Planning Team Members that constitute at least one representative from every participating jurisdiction. Their responsibilities and participation rates are the highest and are required to attend every meeting in the project schedule. This includes Core Team Meetings, Jurisdictional Sub-Team Meetings, and Public Meetings. 3 Core Planning Team Meetings were held throughout the development of this plan with action items and tasks for each member.

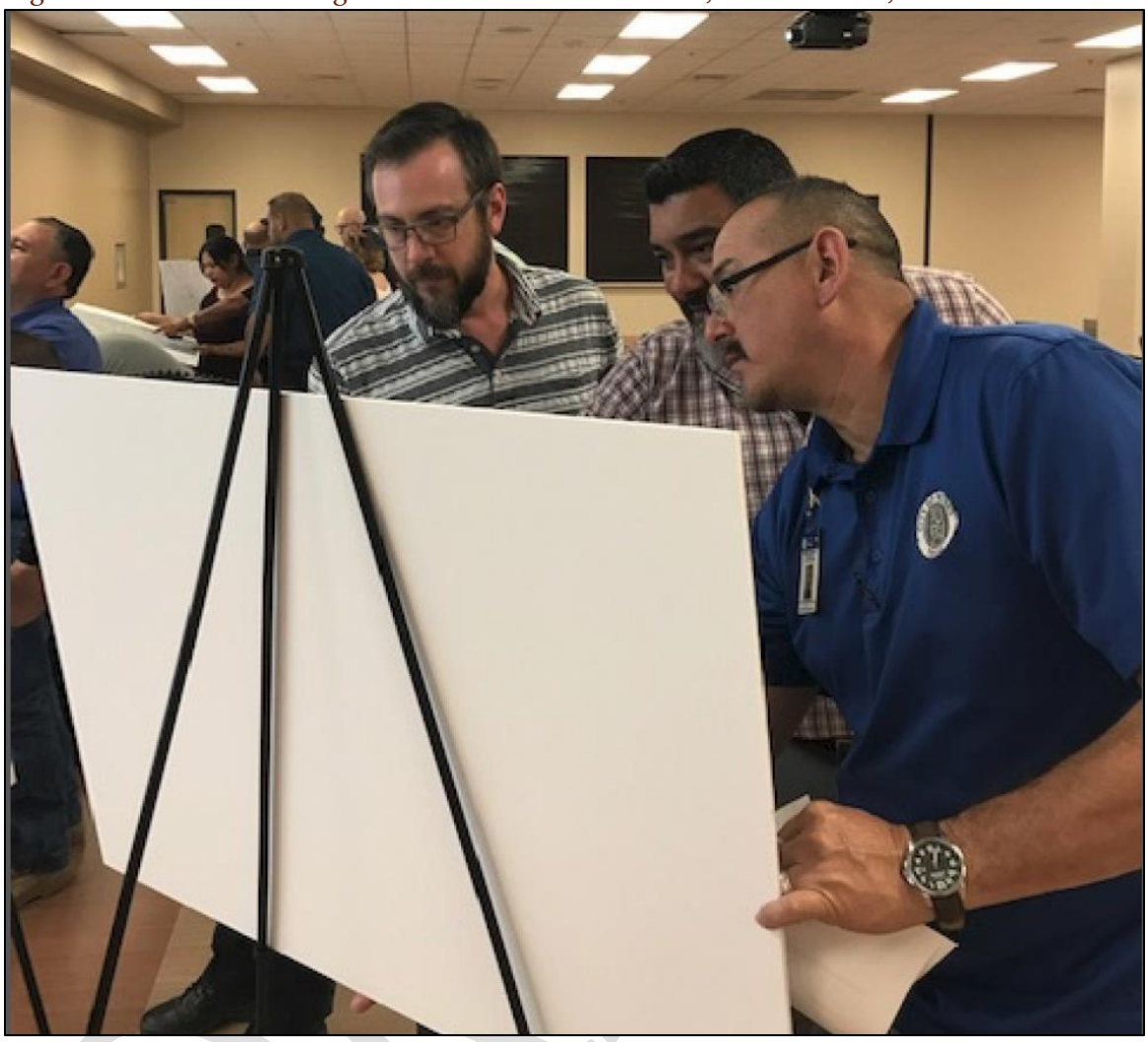
Figure 2-3: 1st Core Team Meeting, June 07, 2018

The second tier was the jurisdictional sub-teams comprised of a greater number of members from each participating jurisdiction with the representative Core Planning Team Member leading the meetings and ensuring that tasks were completed. Jurisdictional Sub-Teams are comprised of a diverse group of local officials that have day to day responsibilities for emergency response and preparedness, development review and regulations, and departmental or legislative decision-making authority. This second tier had responsibilities associated with the specific tasks assigned to each of the 3 meetings scheduled for this group.

Figure 2-4: Public Meeting at Pleasanton Civic Center, November 07, 2018

The final stakeholder group was the local officials and public that came to the public workshop and participated in the on-line and public surveys. The public workshop was held on November 7th, 2018 at the Pleasanton Civic Center. The on-line and paper surveys were "live" from October 1st, 2018 – November 26th, 2018. These workshops along with the results on the survey (Appendix B) were used to develop the final list of hazards to be studied and to understand the priorities of the community as they relate to hazard mitigation. Neighboring communities as well as local and regional stakeholders were invited via email and phone and provided an overview of the planning process and how they may work with participating jurisdictions to apply for future project funding to implement mitigation projects relative to their specific hazard risks.

Figure 2-5: Public Meeting at Pleasanton Civic Center, November 7, 2018



Summary of Findings from the Survey:

1. 157 total surveys, 42 manually entered
2. Unincorporated Atascosa County represents nearly 30% of respondents and City of Lytle a little over 28% of respondents and City of Jourdanton a little under 23%. Pleasanton was the next highest response rate at just over 12%.
3. Flooding was identified as the highest threat with over 30% of all responses, followed closely by drought, railroad derailment, Hazardous Material Incident, and Tornado.
4. Extreme heat, wildfire, tornado, and thunderstorms become more prominent responses in the hazards that had been experienced or hazards expected to be experienced.
5. Nearly 70% of respondents are not located in a floodplain, with more than 70% identified as not having flood insurance.
6. Vast majority of respondents are somewhat concerned or extremely concerned about being impacted by a disaster.

7. Majority have not taken steps to make home, business, or community more resistant with nearly 80% that would like to know more about how to.
8. Internet and mail were identified as the most effective ways to receive information about how to make home, business, or community more resistant to hazards.
9. Contact by I-info via text or e-mail was identified as the best way to alert public to an imminent disaster.
10. The mitigation activities that received the highest responses were retrofit and strengthen essential facilities, retrofit infrastructure, such as elevating roadways and improving drainage systems, and work on improving the damage resistance of utilities (electricity, communications, water / wastewater facilities, etc.).
11. Hazard prevention through building regulations and natural resource protections were identified as overall very important. Public education and Emergency services were identified as extremely important.

SECTION 3: PLANNING AREA PROFILE

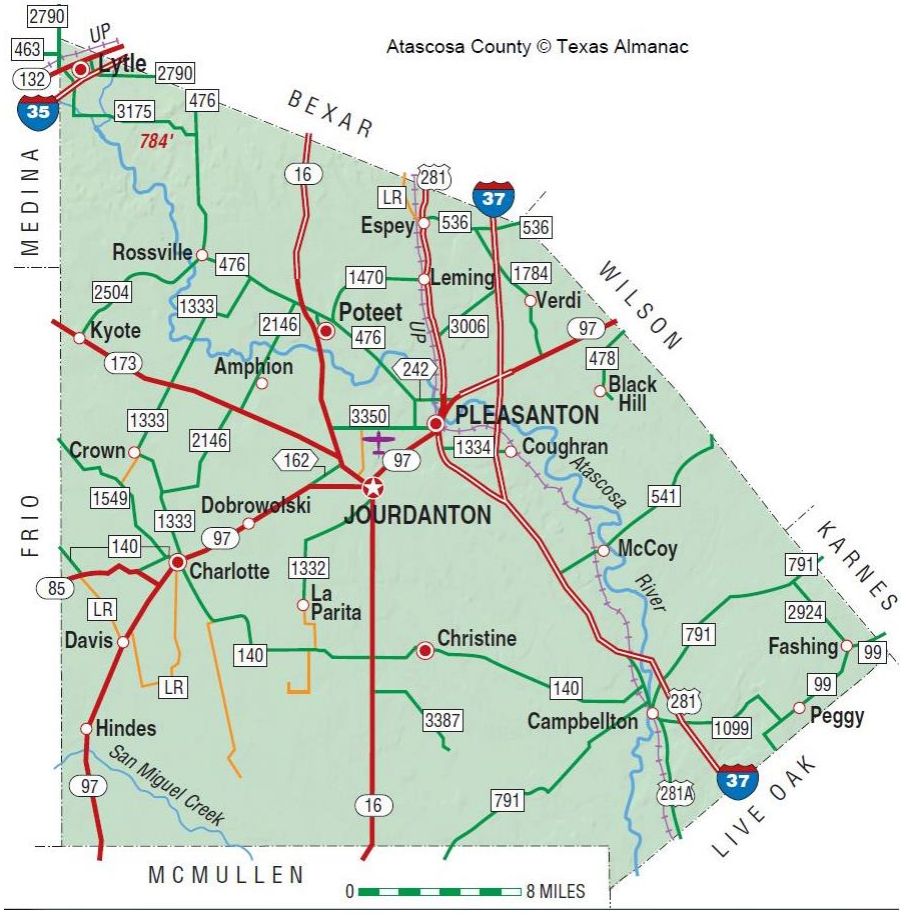
This section provides a profile of the hazard mitigation planning area.

Atascosa County

Atascosa County is south of San Antonio on Interstate Highway 37 in the Rio Grande Plain region of south-central Texas. It is bounded on the north by Bexar County, on the east by Wilson and Karnes counties, on the south by Live Oak and McMullen counties, and on the west by Frio and Medina counties. Jourdanton, the county seat, is located on state highways 16 and 97 in central Atascosa County thirty-three miles south of San Antonio and 100 miles northwest of Corpus Christi. In 1910 the residents of the county voted to make Jourdanton the county seat, and in 1912 a new mission-style courthouse was constructed, which is still in use today. Other populous communities include Pleasanton, Lytle, Charlotte, Christine, and Poteet.

The U.S. census estimates that 50,310 people live in Atascosa County as of July 1, 2018, which is a 12.0% increase from population measured in the 2010 decennial census. The 2018 Census estimates for participating jurisdictions are: Charlotte (1,850), Christine (428), Pleasanton (10,754), Poteet (3,495), Jourdanton (4,461), Lytle City (2,394). The majority of the population lives in the unincorporated County. The growth rate can largely be attributed to new single-family subdivision development in the incorporated areas.

Figure 3-1: Map of Atascosa County



Atascosa County Map

Atascosa County Map. Courtesy of the Texas Almanac. Image available on the Internet and included in accordance with Title 17 U.S.C. Section 107.

Several major highways serve the county, including U.S. Interstates 35 and 37, US Highway 281, and State highways 16, 97, and 173. The county covers 1,218 square miles of level to rolling land. Elevation ranges from 350 to 700 feet, and the soils are generally deep with loamy surface layers and clayey subsoils. In the South Texas Plains vegetation area, the subtropical dry-land vegetation consists primarily of cactus, weeds, grasses, thorny shrubs and trees such as mesquite, and live oak and post oak. Many of the open grasslands have been seeded with buffalo grass. Between 41 and 50 percent of the county is considered prime farmland. Wildlife in Atascosa County includes white-tailed deer, javelina, turkey, fox squirrel, jackrabbits, foxes, ring-tailed cats, skunks, and opossum. The main predators are bobcats and coyotes. Ducks, cranes, and geese migrate across the county. Tanks are stocked with catfish, bass, and sunfish. Mineral resources include clay, uranium, sand and gravel, and oil and gas. Other minerals and products include caliche and clay, lignite coal, construction and industrial sand, sulfur, and uranium. The majority of the county is drained by the Atascosa River with the extreme southwest portion drained by San Miguel Creek.

Figure 3-2: Atascosa County Courthouse

Source: Melissa Sutherland Hunt

Population (July 1, 2017 estimate)	50,310
Change from 2010	+12%
Area (sq.mi.)	1,218
Altitude (ft.)	350-700
Rainfall (in.)	27
Jan. avg. min. (F°)	40
July avg. max. (F°)	97

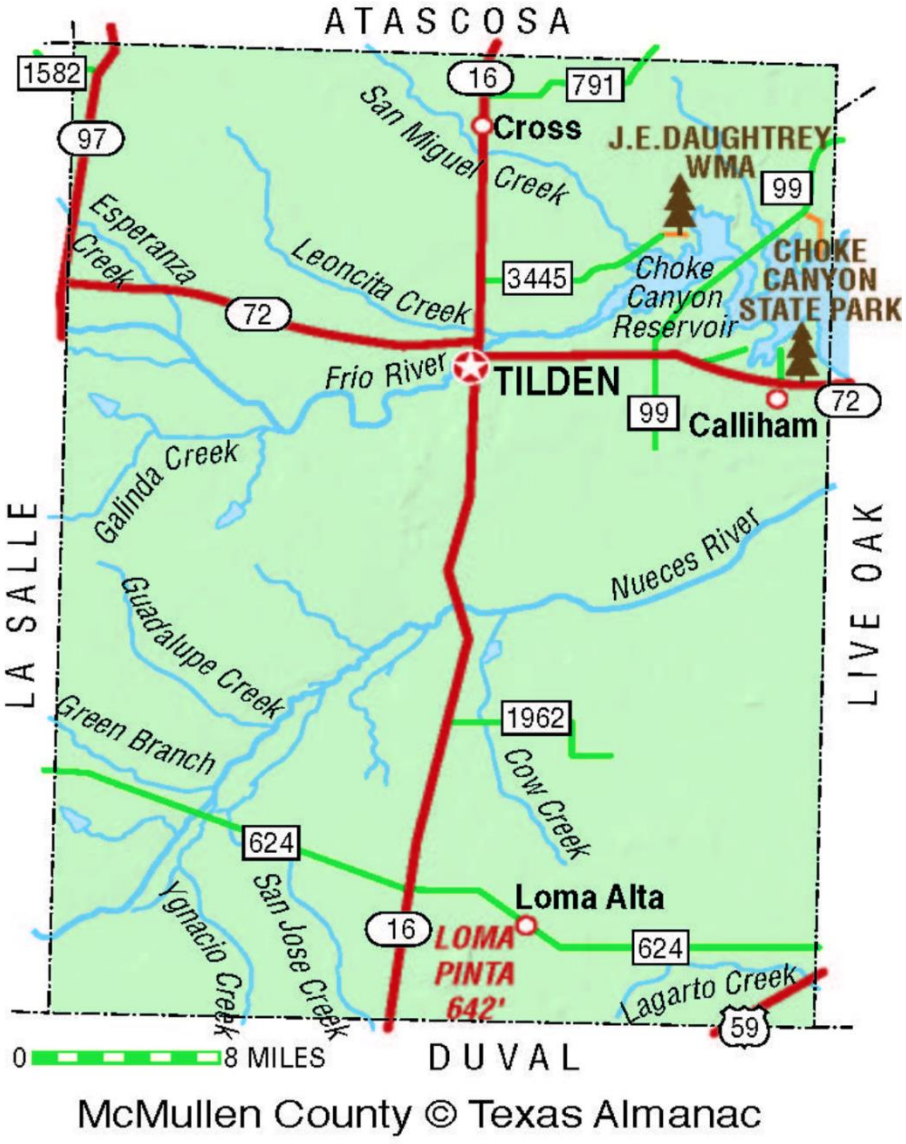
Agriculture, government services, and some light manufacturing are key elements of the area's economy. The growing season averages 282 days a year, with the last freeze in late February and the first freeze in early December. The sun shines an average 65 percent of the daylight hours. Beef cattle, strawberries, peanuts, corn, milo, wheat, and wine are the chief agricultural products. Numerous hunters are also attracted to the county, particularly during the fall and winter deer seasons. Other leading attractions include the Poteet Strawberry Festival, Jourdanton Days Celebration, and the Cowboy Homecoming and Rodeo in Pleasanton.[1]

McMullen County

McMullen County is also directly south of San Antonio surrounded by Atascosa County to the north, Live Oak County to the east, Duval County to the south, and La Salle County to the west. Tilden, the county's largest town and the county seat, is in the north central part of the county at the intersection of State highways 72 and 16. The U.S. census estimates that 749 people live in McMullen County as of July 1, 2018, which is a 5.9% increase from the population measured in the 2010 decennial census. The 2000 Census for Tilden was 450.

[1] Handbook of Texas online

Figure 3-3: McMullen County Map



McMullen County Map

McMullen County Map. Courtesy of the Texas Almanac. Image available on the Internet and included in accordance with Title 17 U.S.C. Section 107.

The county comprises 1,159 square miles of usually flat to rolling terrain covered with mesquite, scrub brush, cacti, chaparral, and grasses. Elevation ranges from approximately 150 to 450 feet. Soils in the county vary: in some areas light to dark loamy soils cover reddish, clayey subsoils, with limestone within forty inches of the surface; in others cracking, grey to black clayey soils predominate. Most of the county is drained by the Nueces River, which flows northeasterly from the southwestern corner of the county and bisects its eastern border. The northern half of McMullen County is drained by the Frio River, which empties into the Choke Canyon Reservoir in the northeastern corner of the county. Temperatures in McMullen County range from an average high of 98° F in July to an average low of 42° in January; the average annual temperature is 71° F. Rainfall averages 24 inches per year, and the growing season lasts

for 290 days. Temperatures in McMullen County range from an average high of 98° F in July to an average low of 42° in January; the average annual temperature is 71° F. Rainfall averages 24 inches per year, and the growing season lasts for 290 days.

The county was established from parts of Bexar County, Atascosa County, and Live Oak County in 1858 and later organized in 1877. It is named for John McMullen, founder of a colony in Texas.

Figure 3-4: McMullen County Courthouse

Source: Larry D. Moore

Population (July 1, 2018 estimate)	749
Change from 2010	+5.9%
Area (sq.mi.)	1,159
Altitude (ft.)	150-450
Rainfall (in.)	24
Jan. avg. min. (F⁰)	42.0
July avg. max. (F⁰)	98.0

Tilden, with an estimated population of 321 in 2014, continued to be the principal town and county seat. Its chief economic activities included kitty-litter production, tourism, and the processing of natural gas and population levels have remained even.

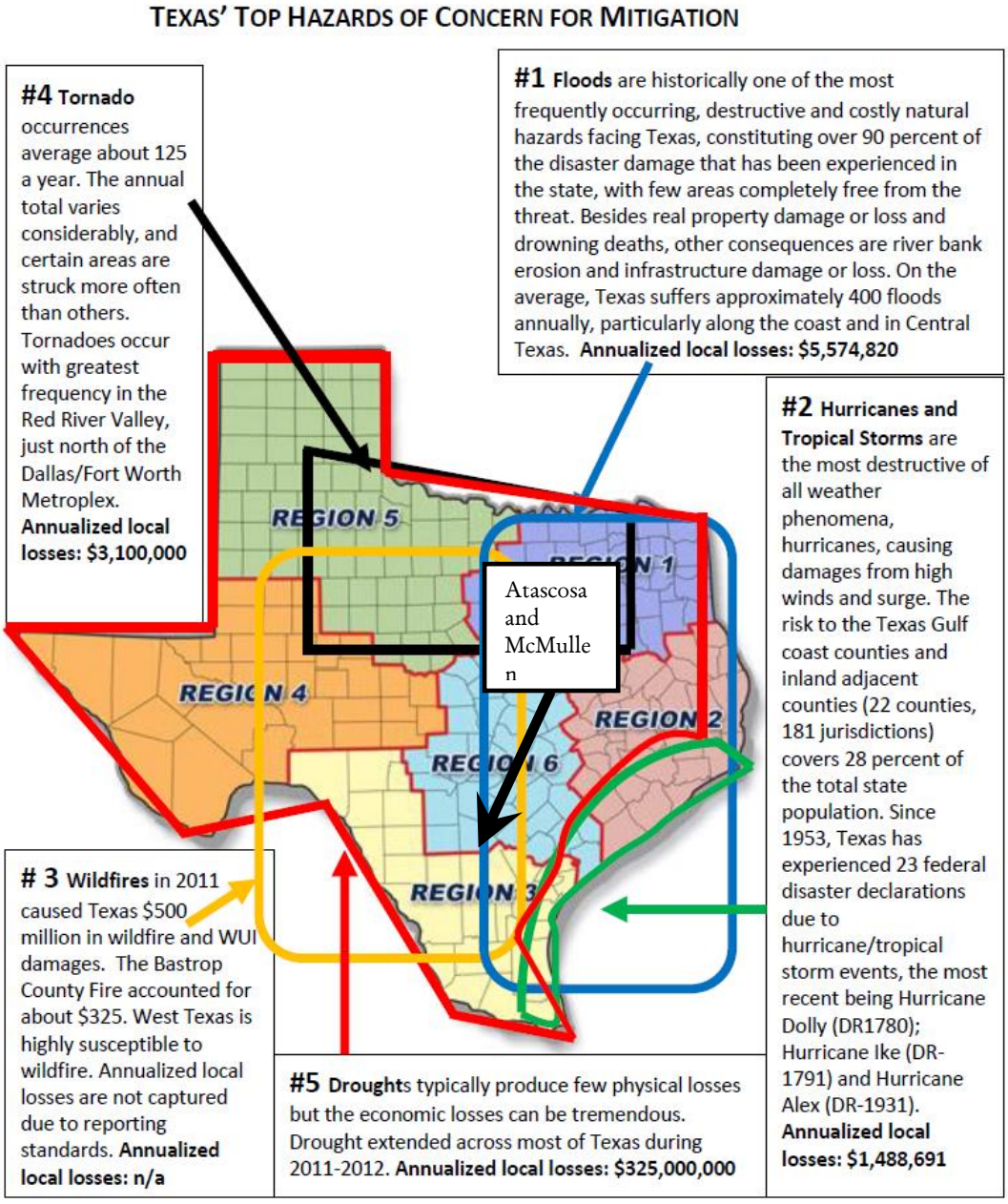
Critical Facilities and Assets

For certain activities and facilities, even a slight risk from a hazard event is too great a threat. FEMA defines these types of places as critical facilities; hospitals, fire stations, police stations, courthouse, communications, public schools and similar facilities where essential programs/services are provided. These facilities should be given special consideration when formulating regulatory alternatives, floodplain management plans, and mitigation actions. A critical facility should not be located in a floodplain if at all possible and emergency plans should be developed to continue to provide services during a flood or hazard event. If located in a floodplain it should be provided a higher level of protection so that it can continue to function and provide services during and after a flood. Hazard mitigation actions to mitigate risk to critical facilities are included in this Plan by jurisdiction in Section 19 and a summary of critical facilities is provided in **Appendix D.**

SECTION 4: HAZARDS AND RISK

According to the State Hazard Mitigation Plan the Atascosa County and McMullen County are located within three major natural hazard areas; flood, wildfire, and drought. An excerpt from the Texas State Hazard Mitigation Plan in Figure 4-1 below clearly shows the planning area within a portion of Regions 3 and 6 that are at increased risk for #1 flood, #3 Wildfire and #5 drought hazards shown as the blue, orange, and red outlines below.

Figure 4-1: Texas State Hazard Mitigation Plan



Source: Texas State Hazard Mitigation Plan Update 2013, p. 56

The increased risk for these specific hazards in the planning area is confirmed in the table below that lists disaster declarations by specific incident types. Keep in mind that the incidents listed are only those that had a level of impact sufficient to necessitate a disaster declaration and that hazards have affected the area more frequently than what the table may initially suggest. Statewide disaster declarations are not included in this list.

Table 4-1: Disaster Declarations in the Planning Area

County	Disaster Number	Year	Title
Atascosa and McMullen	232	1967	Hurricane Beulah
Atascosa and McMullen	3113	1993	Extreme Fire Hazard
Atascosa and McMullen	1239	1998	Tropical Storm Charley
Atascosa	1257	1998	TX – Flooding 10/18/98
Atascosa and McMullen	1425	2002	Severe Storms and Flooding
Atascosa and McMullen	1479	2003	Hurricane Claudette
Atascosa and McMullen	3216	2005	Hurricane Katrina Evacuation
Atascosa and McMullen	1606	2005	Hurricane Rita
Atascosa and McMullen	3261	2005	Hurricane Rita
Atascosa and McMullen	1624	2006	Extreme Wildfire Threat
Atascosa	1697	2007	Severe Storms and Tornadoes
Atascosa	1709	2007	Severe Storms, Tornadoes, and Flooding
Atascosa and McMullen	3284	2008	Wildfires
Atascosa and McMullen	3313	2010	Tropical Storm Alex
Atascosa	4223	2015	Severe Storms, Tornadoes, Straight-line winds and Flooding

Source: www.FEMA.gov

Since the US Federal Government began issuing disaster declarations in 1954, Atascosa County has had 15 disaster and McMullen County has had 11disasters where individual and/or public assistance has been approved. Based on Table 4-1 above, 13 of the 15 disaster declarations have been issued in the past 21 years, since 1998. The infographics below provide a summary of the type of hazard, year, and time of year in which it occurred.

The types of hazards that have had disaster declarations since 1954 that have occurred in the planning area.

Atascosa County

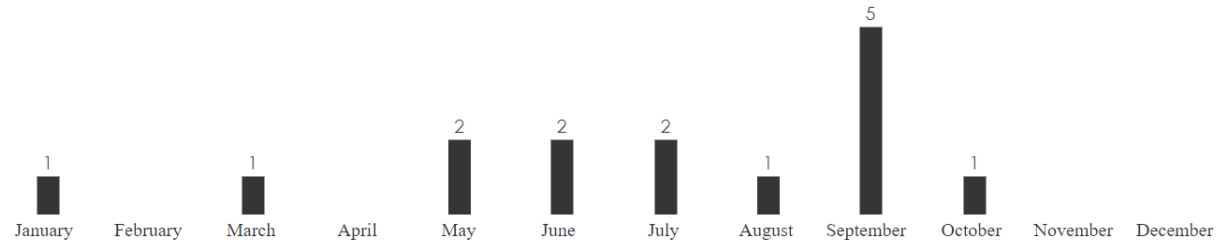
- 6 Hurricane
- 4 Severe Storm(s)
- 2 Fire
- 2 Flood
- 1 Drought

McMullen County

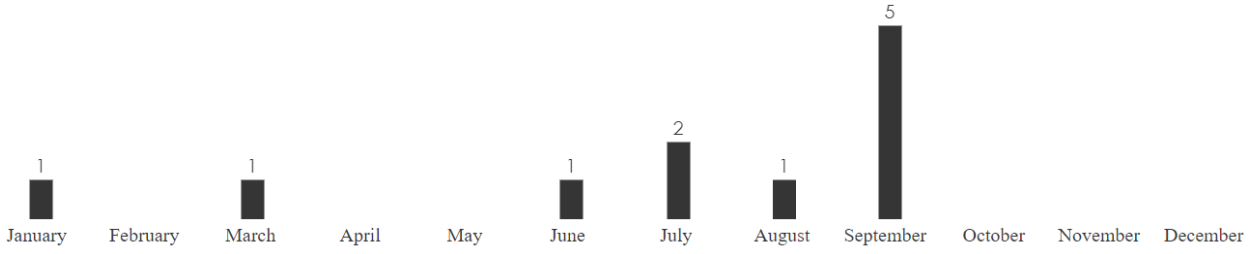
- 6 Hurricane
- 2 Fire
- 1 Drought
- 1 Flood
- 1 Severe Storm(s)

The months during which disasters have historically occurred and been declared in the planning area.

Atascosa County

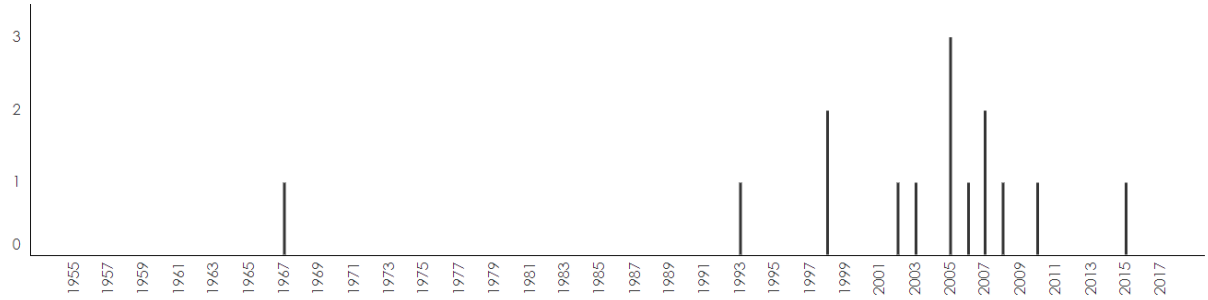


McMullen County

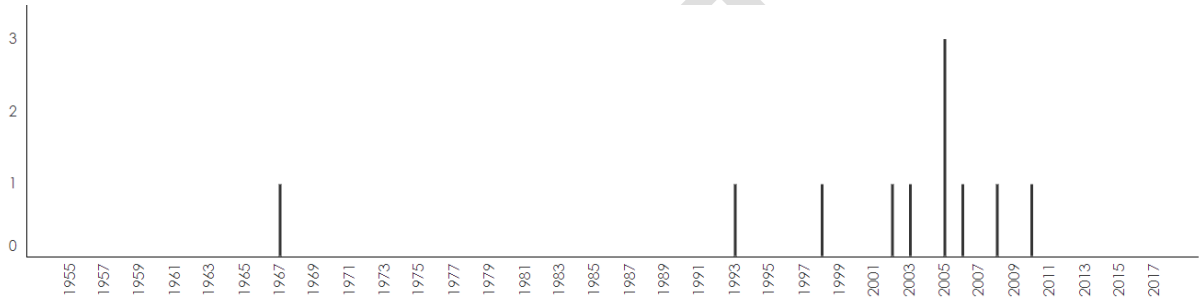


The years in which disasters have historically occurred and been declared in the planning area.

Atascosa County



McMullen County



Hazard Description

The following 11 hazards are those required by the State of Texas to be considered in any local Hazard Mitigation Action Plan.

HAZARD	DESCRIPTION
HYDROLOGIC	
Floods	Flooding is a general or temporary condition of partial or complete inundation of water, usually floodplains. The floodplain is an area of land susceptible to being inundated by floodwater from any source.
Drought	A deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.
ATMOSPHERIC	
Tornado	A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground.
Lightning	These are sudden charges of electricity that develop from storms or excessive heat.
Dam/Levee Failure	Dam/Levee failure can occur with little warning from intense storms, flash flooding, or engineering failures. Flooding can occur within minutes or hours of a failure.

Expansive Soils	Expansive Soils expand when water is added that shrink when they dry out. This movement can cause homes to move unevenly and crack.
Extreme Heat	Extreme Heat is a condition when temperatures hover above local excessive heat criteria combined with high humidity levels.
Hailstorm	Hail is showery precipitation in the form of irregular pellets or balls of ice more than 5 mm in diameter.
Severe Winter Storms	A condition when temperatures hover below freezing and can include ice, snow, and sleet.
Windstorms	Severe wind storms can occur alone, or when accompanied by severe thunderstorms. Flying debris can cause major damage to utilities, infrastructure, and property.
OTHER	
Wildfire	Wildfires are an unplanned, unwanted fire burning in a natural area, like a forest, grassland, or prairie. Buildings and human development that are susceptible for wildfires are considered the wildland urban interface.

Dam/Levee failure and Expansive Soils were two hazards that were considered by the Core Planning Team to present such a low risk to the planning area that it was not necessary to include them in the hazard assessment. There has been no history of impacts from expansive soil, therefore, it is not expected to impact the planning are in the future. However, earthquake, railroad derailment, and hazardous materials incident have been included in the hazard assessment due to the risk they present to the area.

Risk Analysis Overview

The risk analysis involves performing a historical review based on past data gathered with regard to hazards and their specific impacts to the planning area. Tables 4-2 (Texas), 4-3 (Atascosa), and 4-4 (McMullen) below compare crop, building, injury, and fatality impacts due to hazard events from 1996-2016 for the State of Texas, Atascosa County, and McMullen County.

Table 4-2: State of Texas Hazard Impact Summary

	Property Losses (2016 dollars)	Crop Losses (2016 dollars)	Deaths	Injuries
HURRICANE TS/D	17,506,951,656	6,283,362	56	2,435
DROUGHT	1,400,610,801	13,818,144,105	5	32
HAIL	9,717,032,805	699,876,770	5	140
S. COASTAL FLOOD	10,365,657,465		13	
RIVERINE FLOODING	4,642,220,070	981,322,641	354	6,984
TORNADO	2,189,735,158	97,084,372	84	1,491
SEVERE WINDS	1,343,349,529	128,929,747	48	433
WILDFIRE	688,686,114	196,355,458	31	170
WINTER WEATHER	496,986,037	17,614,279	138	1,486
LIGHTNING	67,928,501	1,131	57	252
COLD	13,563,095	2,428,624	19	6
HEAT	268,604	556,200	346	941
Total	**48,432,989,835**	**15,948,596,689**	**1,156**	**14,370**

	% of Prop. Losses	% of Crop Losses	% of Deaths	% of Injuries
HURRICANE TS/D	36%	0%	5%	17%
DROUGHT	3%	87%	0%	0%
HAIL	20%	4%	0%	1%
S. COASTAL FLOOD	21%		1%	
RIVERINE FLOODING	10%	6%	31%	49%
TORNADO	5%	1%	7%	10%
SEVERE WINDS	3%	1%	4%	3%
WILDFIRE	1%	1%	3%	1%
WINTER WEATHER	1%	0%	12%	10%
LIGHTNING	0%	0%	5%	2%
COLD	0%	0%	2%	0%
HEAT	0%	0%	30%	7%
Total	**100%**	**100%**	**100%**	**100%**

Source: Texas Geographic Society, Champs 2018

Table 4-3: Atascosa County Hazard Impact Summary

	Prop. Losses (2016 dollars)	Crop Losses (2016 dollars)	Deaths	Injuries
HURRICANE TS/D	$911,141	$130,163	1	
DROUGHT	$2,984,424	$8,953,271		
HAIL	$247,166	$80,813		
S. COASTAL FLOOD*				
RIVERINE FLOODING	$1,063,618	$673,447		
TORNADO	$127,847	$2,939		
SEVERE WINDS	$1,984,840	$254,513		1
WILDFIRE*	$159,738		1	
WINTER WEATHER				
LIGHTNING	$166,860			
COLD				
HEAT				
TOTAL	**$7,645,634**	**$10,095,146**	**2**	**1**

Atascosa County Historical Impact Percents

	% of Prop. $-Losses	% of Crop $-Losses	% of Deaths	% of Injuries
HURRICANE TS/D	11.9%	1.3%	50.0%	
DROUGHT	39.0%	88.7%		
HAIL	3.2%	0.8%		
S. COASTAL FLOOD*				
RIVERINE FLOODING	13.9%	6.7%		
TORNADO	1.7%	0.0%		
SEVERE WINDS	26.0%	2.5%		100.0%
WILDFIRE*	2.1%		50.0%	
WINTER WEATHER				
LIGHTNING	2.2%			
COLD				
HEAT				
TOTAL	**100%**	**100%**	**100%**	**100%**

* 12-year Base Period

Source: NCEI Storm Events Database 1996 to 2017 subset for Texas: TxGS - 7/1/2018.

Table 4-4: McMullen County Hazard Impact Summary

	Prop. Losses (2016 dollars)	Crop Losses (2016 dollars)	Deaths	Injuries
HURRICANE TS/D				
DROUGHT				
HAIL	$7,195			
S. COASTAL FLOOD*				
RIVERINE FLOODING	$161,207			
TORNADO				
SEVERE WINDS	$41,474			
WILDFIRE*				
WINTER WEATHER				
LIGHTNING				
COLD				
HEAT				
TOTAL	$209,876			

McMullen County Historical Impact Percents

	% of Prop. $-Losses	% of Crop $-Losses	% of Deaths	% of Injuries
HURRICANE TS/D				
DROUGHT				
HAIL	3.4%			
S. COASTAL FLOOD*				
RIVERINE FLOODING	76.8%			
TORNADO				
SEVERE WINDS	19.8%			
WILDFIRE*				
WINTER WEATHER				
LIGHTNING				
COLD				
HEAT				
TOTAL	100%			

* 12-year Base Period

Source: NCEI Storm Events Database 1996 to 2017 subset for Texas: TxGS - 7/1/2018.

These historic impact summaries that look at the last 21-year span of hazard data show the similar hazard profile for Atascosa County and McMullen Counties except for drought. In Atascosa County, 39% of property loss and 88.7% of crop loss has been due to Drought. Atascosa County has experienced 26% of historical property losses to severe winds while in McMullen County nearly 20% of losses have been due to severe winds. The priority hazards for these communities to protect people and property from, based on the historical impact summary analysis, are Drought, Severe Winds, Flooding, and Hurricanes. This is followed by Hail, Wildfire, Lightning, and then Tornadoes. All other hazards included in this present a lower mitigation priority based on the historical severity of impact. The Earthquake, Railroad Derailment, and Hazardous Material Incident summaries are not included in the above summaries but are included in this plan based on local input and an increase in activity has been noted for these hazards.

Vulnerability Summary Overview

Some problem statements developed by the Core Planning Team are provided below.

"Drought has historically caused large crop losses for the planning area, particularly in Atascosa County."

"Some populated areas of the county are cutoff due to low water crossings being flooded in frequent rain events."

"There are localized drainage problems where standing water can become a problem."

"Water supply and sufficient pressure can be challenging when fighting wildfires and building fires."

"Better warning systems are needed for residents when faced with a hazard emergency."

"The last time there was a railroad derailment near the school, we were getting conflicting reports from authorities about whether to shelter-in-place or flee the premises."

"The school district does not have a way to communicate between campuses during emergencies."

"The County would like a more integrated communication system with local officials."

"There needs to be a designated shelter or community safe room that can be used in an emergency."

"Critical facilities that are at risk of flooding in frequent storms, such as the wastewater treatment plant, need backup generators or need to be storm-proofed."

SECTION 5: HURRICANE

Description

A hurricane is an intense tropical weather system of strong thunderstorms with a well-defined surface circulation and maximum sustained winds of 74 mph or higher. Hurricanes, along with Tropical Storms and Depressions, produce a variety of potential hazards including damaging winds, coastal flooding due to storm surge, severe storms with heavy rainfall and high winds, and even tornados.

The information in this chapter covers historical damage to the Atascosa and McMullen Counties associated with Hurricanes/Tropical Storms/Depressions including severe winds and other hurricane-related hazards. Severe winds pose a threat to lives, property, and vital utilities primarily due to the effects of flying debris or downed trees and power lines. Severe winds typically cause the greatest damage to structures of light construction, particularly manufactured homes. While future severe wind risk is addressed in this chapter, future tornado risks are specifically addressed in Chapter 8: Windstorms.

Location

Hurricanes and Tropical Storms occur throughout the planning area and are not confined to any geographic area; however, the likelihood of impact decreases the further a location is from the coast. Atascosa and McMullen Counties are equally proximal to the coast at roughly 75-80 miles away from the Gulf of Mexico at their closest points. The table below lists Hurricanes or Tropical Storms events with a storm track (center of the storm) that crossed the planning area and in order of the reported date of the event. Storm tracks are categorized according to the Saffir-Simpson wind intensity scale with the category assigned as the "peak magnitude" of the storm at some time during its lifespan and not necessarily when the storm track crossed the planning area.

Table 5-1: Hurricane/TS/D Storm Track Events Table

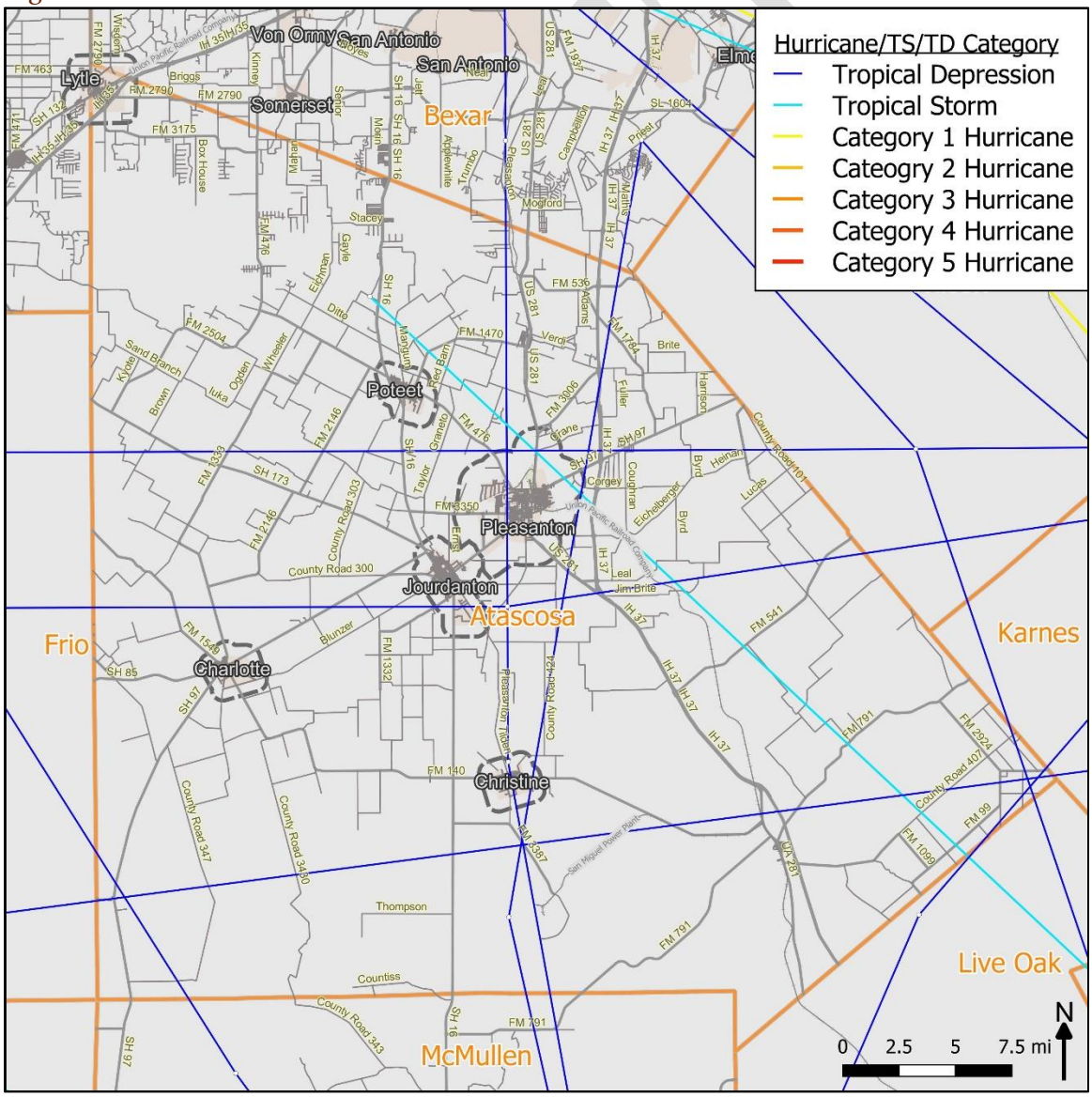
Storm Name	Year	Dates	Category
UNNAMED (McMullen Only)	1851	Jun 26	Tropical Storm (TS)
UNNAMED (McMullen Only)	1869	Aug 17	Tropical Storm (TS)
UNNAMED	1874	Sep 5-6	Tropical Storm (TS)
UNNAMED (McMullen Only)	1934	Jul 25-26	Category 1 Hurricane
UNNAMED (Atascosa Only)	1936	Jun 28	Tropical Storm (TS)
UNNAMED	1960	Jun 25	Tropical Depression (TD)
ABBY (Atascosa Only)	1964	Aug 8	Tropical Storm (TS)
CELIA (McMullen Only)	1970	Sep 4-7	Tropical Storm (TS)
AMELIA	1978	Jul 31	Tropical Storm (TS)
DANIELLE (Atascosa Only)	1980	Sep 7	Tropical Storm (TS)
CHARLEY(McMullen)	1998	Aug 22-23	Tropical Storm (TS)

FAY (Atascosa Only)	2002	Sep 7	Tropical Storm (TS)
CLAUDETTE (McMullen)	2003	Jul 16	Tropical Storm (TS)

WWW.NOAA.ORG

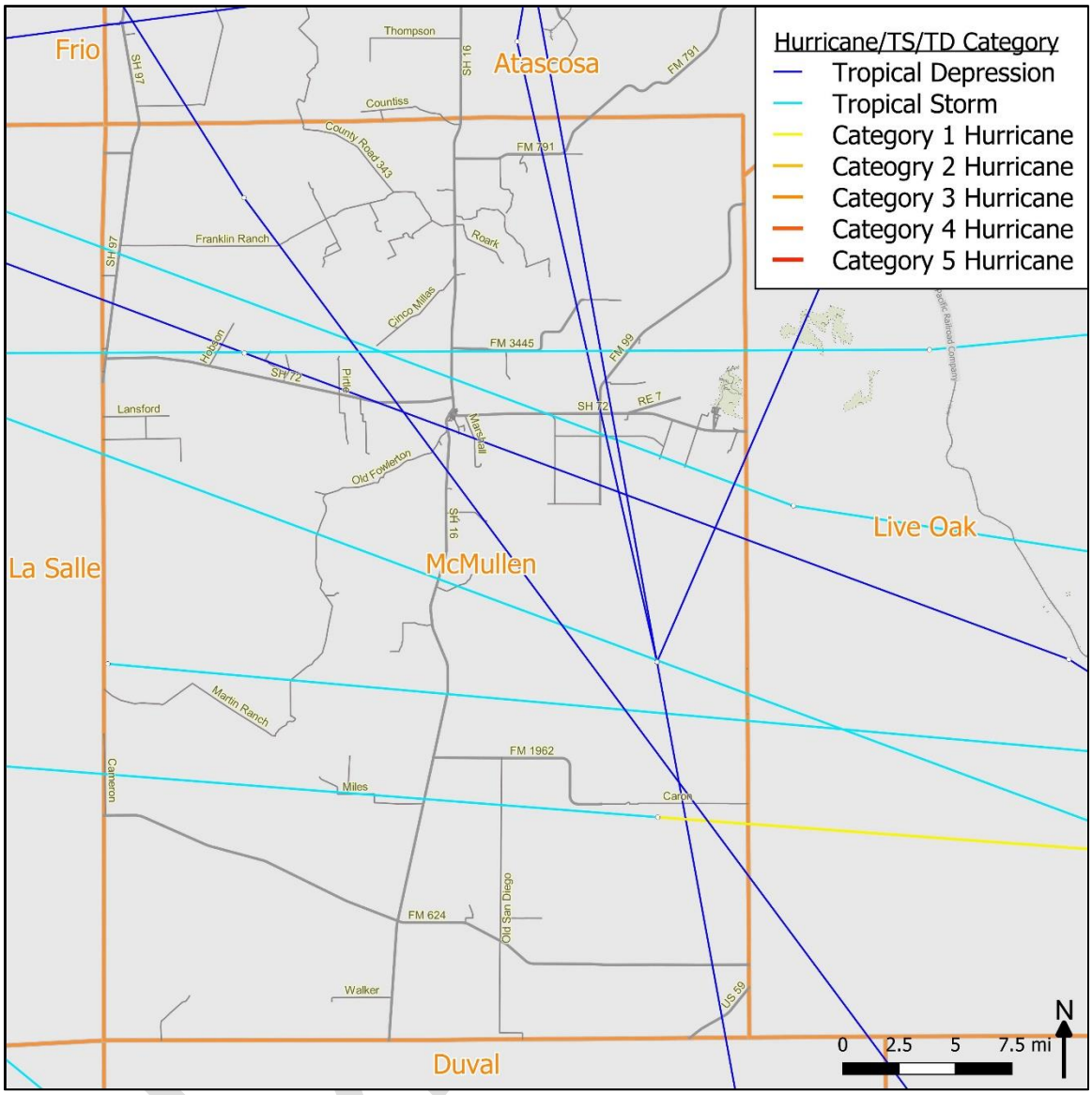
The map below shows the historical tracks of hurricanes through the planning area from 1842 to 2017. The category assigned to each storm on the map is its magnitude at the time it crossed into Atascosa or McMullen Counties. This can be clearly seen with the storm track of the 1934 unnamed hurricane that went from a Category 1 Hurricane on July 25 (yellow line) to a Tropical Storm (light blue line) on July 26 almost immediately after crossing in McMullen County from Live Oak County. Based on data provided by NOAA's National Climatic Data Center (NCDC), Atascosa and McMullen Counties are ranked in the mid-top 20% of total number of Hurricane/TS/D storm track events compared to other Texas counties.

Figure 5-1: Atascosa Hurricane/TS/D Storm Tracks



Source: *National Climatic Data Center (NCDC), International Best Track Archive for Climate Stewardship (IBTrACS) dataset.*

Figure 5-2: McMullen Hurricane/TS/D Storm Tracks



Source: *National Climatic Data Center (NCDC), International Best Track Archive for Climate Stewardship (IBTrACS) dataset.*

Extent

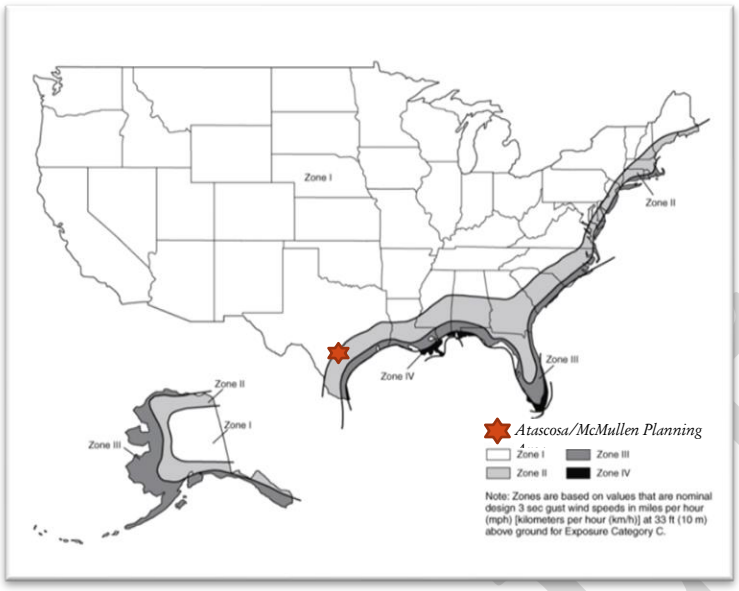
For Hurricanes, extent can be expressed separately for flood, wind, and surge. Flooding will be examined in the next section and surge is not an issue for Atascosa and McMullen Counties since they are located at least 75 miles from the coast. For hurricane wind extent, the Saffir-Simpson Hurricane Wind Scale (SSHWS) scale is the scientific scale most often used to measure hurricane winds. The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating based on a hurricane's sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous, however, and require preventative measures. Wind speeds range from 39-73 mph for Tropical Storms and Tropical Depressions have wind speeds equal to or less than 38 mph.

Table 5-2: Saffir Simpson Scale

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (Major)	111-129 mph	Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (Major)	130-156 mph	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (Major)	157 mph or higher	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

According to the FEMA Wind Zones Map used to determine building standards, Atascosa and McMullen Counties are both located in Zone II with average wind speeds of 90-110mph during a hurricane or tropical storm event. Based on the location and the historical storm tracks for hurricanes and tropical storms in the Atascosa/McMullen planning area, the extent to be mitigated for is a Category 1 hurricane.

Figure 5-3: FEMA Wind Zone Map (www.FEMA.gov)



Historical Occurrences

Hurricanes and Tropical Storms that had a direct path through the Atascosa/McMullen County planning area as well as tracks that went through adjacent counties yet still impacted the Atascosa/McMullen planning area are identified in this section. Based on historical storm events by impact data provided by NOAA's National Climatic Data Center (NCDC), Atascosa and McMullen Counties are ranked in the top 20% of Texas counties. Table 5-3 below lists the storms that have impacted the planning area during the years of 1996 through 2017.

Table 5-3: Historical Hurricane/TS/D Impact Events Table, 1996-2017

County	Year	Month	Magnitude	Injuries	Fatalities	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Atascosa	2003	July	Tropical Storm	0	1	$911,141	$130,163

Source: *NOAA NCEI Storm Events Database, August 2019*

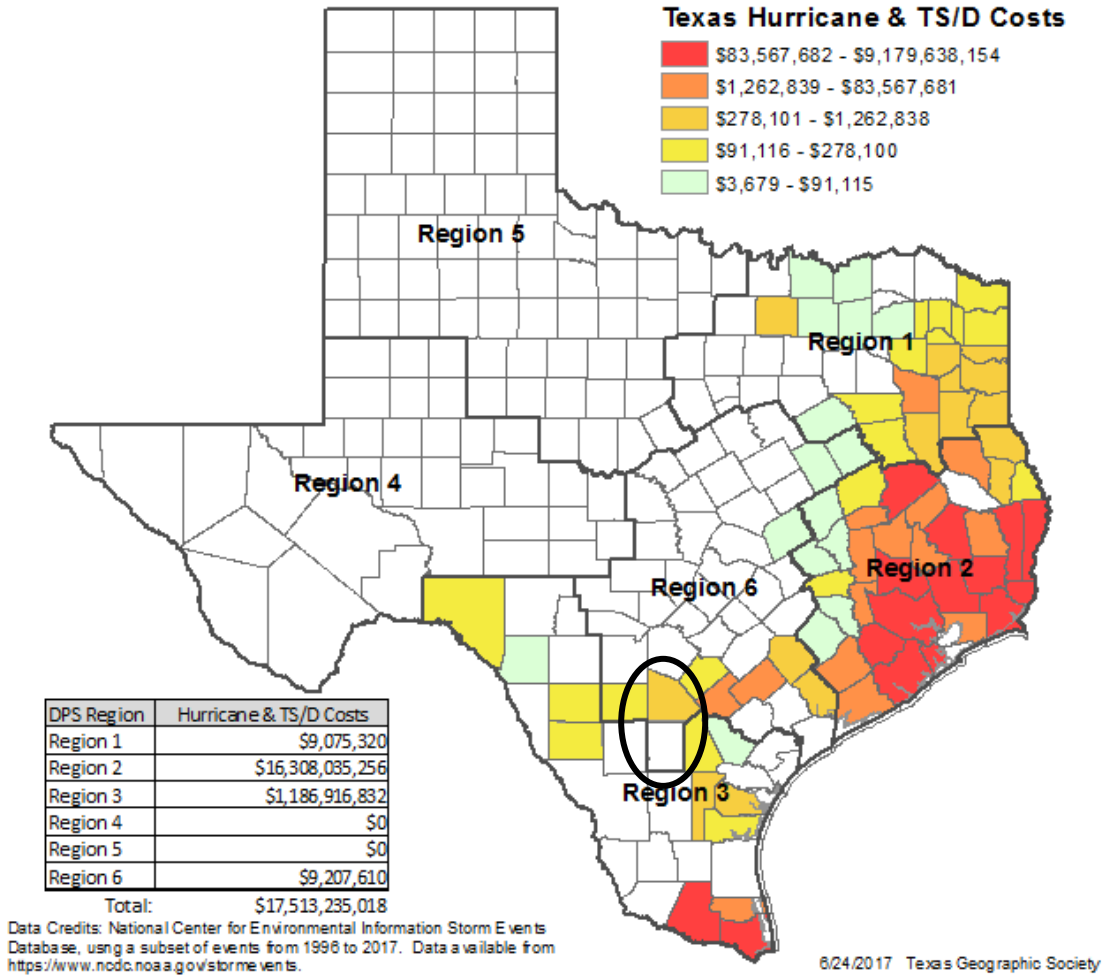
Significant Events

Hurricane Claudette – July 15, 2003

Hurricane Claudette strengthened just before making landfall on July 15 striking Port O'Connor, Texas as a Category 1 hurricane on the Saffir-Simpson Hurricane Scale with 90 mph (150 km/h) winds. Residents along and inland of the central Texas coast were caught off guard both by its intensity and its time of arrival. The hurricane was projected to make landfall in the evening hours of July 15, but instead came ashore before noon. Hurricane Claudette was also slow to dissipate maintaining tropical storm intensity for over 24 hours after landfall, a rarity for such a weak storm.

The high winds from former Hurricane Claudette, now Tropical Storm Claudette, struck in the evening of July 15 and continued through most of the night - mainly over the southern part of the county. Winds were unofficially estimated at between 60 and 70 mph with gusts near 80 mph. About 100 homes lost power for a period of several hours to two days. 5 to 6 trailers were blown over by the high winds along mile markers 81 and 91 of I-37 in southern Atascosa County. Minor damage was reported to 6 homes, most of it to the roofs. The greatest tragedy of the Hurricane occurred near 7 pm in the evening when a 13 year-old boy from Jourdanton was leaving his front yard to get in a vehicle. Just before he entered the vehicle, a large tree was blown over by the high winds and landed on top of him. In spite of rapid response by neighbors and EMS, the youth died.

Figure 5-: Texas Hurricane/TS/D Costs



DPS Region	Hurricane & TS/D Costs
Region 1	$9,075,320
Region 2	$16,308,035,256
Region 3	$1,186,916,832
Region 4	$0
Region 5	$0
Region 6	$9,207,610
Total:	$17,513,235,018

Data Credits: National Center for Environmental Information Storm Events Database, usng a subset of events from 1996 to 2017. Data available from https://www.ncdc.noaa.gov/stormevents.

Probability of Future Events

The probability of future events relies on measuring the number of previous occurrences of a hurricane or tropical storm event over the 21-year reporting period. Based on 1 occurrence of a hurricane or tropical storm in the planning area during this time, it is forecast that such a storm event will happen approximately once every 21 years. This

frequency provides an unlikely likelihood or future probability that a hurricane or tropical storm will impact some portion of the planning area.

Frequency of Occurrence	
Highly likely:	Event probable in next year.
Likely:	Event probable in next 3 years.
Occasional:	Event possible in next 5 years.
Unlikely:	Event possible in next 10 years.

Vulnerability and Impact

The proximity of Atascosa and McMullen Counties to the Texas Coast makes this area vulnerable to flooding from hurricanes and hurricane-force winds that cause damage across large areas. This exposes all building, facilities, and populations in the planning area equally to the impact of a hurricane or tropical storm. Damage to towers, trees, and underground utility lines from uprooted trees and fallen poles can cause damage to utility infrastructure and cause considerable disruption. Debris such as small items left outside, signs, roofing materials, and trees can become extremely hazardous in hurricanes and tropical storms and strong winds can easily destroy poorly constructed buildings, barns and mobile homes. Hurricanes and tropical storms also produce large amounts of rain increasing the risk of flooding. This rain can overwhelm drainage systems as hurricanes or tropical storms that have weakened after making landfall can continue to drop significant quantities of water. The impacts to communities from a Category 5 storm can result in complete destruction of houses, commercial property, cropland resulting in large-scale economic impacts and population displacement. Warning time for hurricanes, however, has lengthened due to modern and early warning technology allowing the community time to reduce the impact of tropical storm and hurricane events.

Historic Hurricane Impacts

Below are summary tables aggregated by County, 5-4 and 5-5, that show the 21-year column totals and the average annual (Per Year) losses in these categories. Each table also shows per capita dollar loss rates for the total and average annual losses. These rates are important measures for comparing losses between different areas. The average annual loss estimate of property and crop is $43,388 (in 2016 dollars) for Atascosa County and $0 (in 2016 dollars) for McMullen County.

Table 5-4: Atascosa County Hurricane Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, Atascosa County				
21-year Total	1	0	$911,141	$130,163
Per Year	0	0	$43,388	$6,198
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$20	$3
Per Year	0	0	$1	$0

Source: NCEI Storm Events Database, using a subset of events from 1996-2017

Table 5-5: McMullen County Hurricane Impacts by Year

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, McMullen County				
21-year Total	0	0	$0	$0
Per Year	0	0	$0	$0
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$0	$0
Per Year	0	0	$0	$0

Source: NCEI Storm Events Database, using a subset of events from 1996-2017

Table 5-6 below distributes the countywide impacts presented previously in Tables 5-4 and 5-5 amongst the various participating jurisdictions based on ratios of population and total area.

Table 5-6: Hurricane Losses by Jurisdiction 1996-2017

Jurisdiction	Est. Prop. Losses (2016 dollars)	Est. Crop Losses (2016 dollars)	Total Est $-Losses
Atascosa County	**$911,141**	**$130,163**	**$1,041,304**
City of Charlotte	**$34,793**	**$211**	**$128,453**
City of Christine	**$7,912**	**$190**	**$8,102**
City of Jourdanton	**$78,534**	**$369**	**$78,902**
City of Lytle	**$50,557**	**$474**	**$51,031**
City of Pleasanton	**$181,250**	**$895**	**$182,145**
City of Poteet	**$66,138**	**$179**	**$66,317**
McMullen County	**$0**	**$0**	**$0**

Source: Texas Geographic Society, Champs 2018

Tables 5-7 and 5-8 show the forecast annual impacts of Hurricanes in Atascosa and McMullen Counties and the total dollar-losses (property plus crop) forecasted by year. These forecasts are extrapolations of the average annual impacts in the base period modified by expected changes in:

1. The county populations and built environments (not used for forecasting crop losses) and
2. The frequency and intensity (damage producing capacity) of weather events.

Table 5-7: Atascosa County Hurricane Forecast Impacts

Atascosa Co. Forecast Impacts for Hurricane TS/D					
	Property $-Losses	Crop $-Losses	Deaths	Injuries	Total $-Losses
2019	$54,068	$7,375	0		$61,442
2020	$55,677	$7,478	0		$63,155
2021	$57,334	$7,583	0		$64,917
2022	$59,040	$7,689	0		$66,729
2023	$165,207	$38,982	0		$68,594
Forecast Loss Summary					
5-yr Total	$286,917	$37,920	0		$324,837
Per Year	$57,383	$7,584	0		$64,967
Per Capita Dollar Loss Forecast (2010 Pop)					
5-yr Total	$6.39	$0.84			$7.23
Per Year	$1.28	$0.17			$1.45

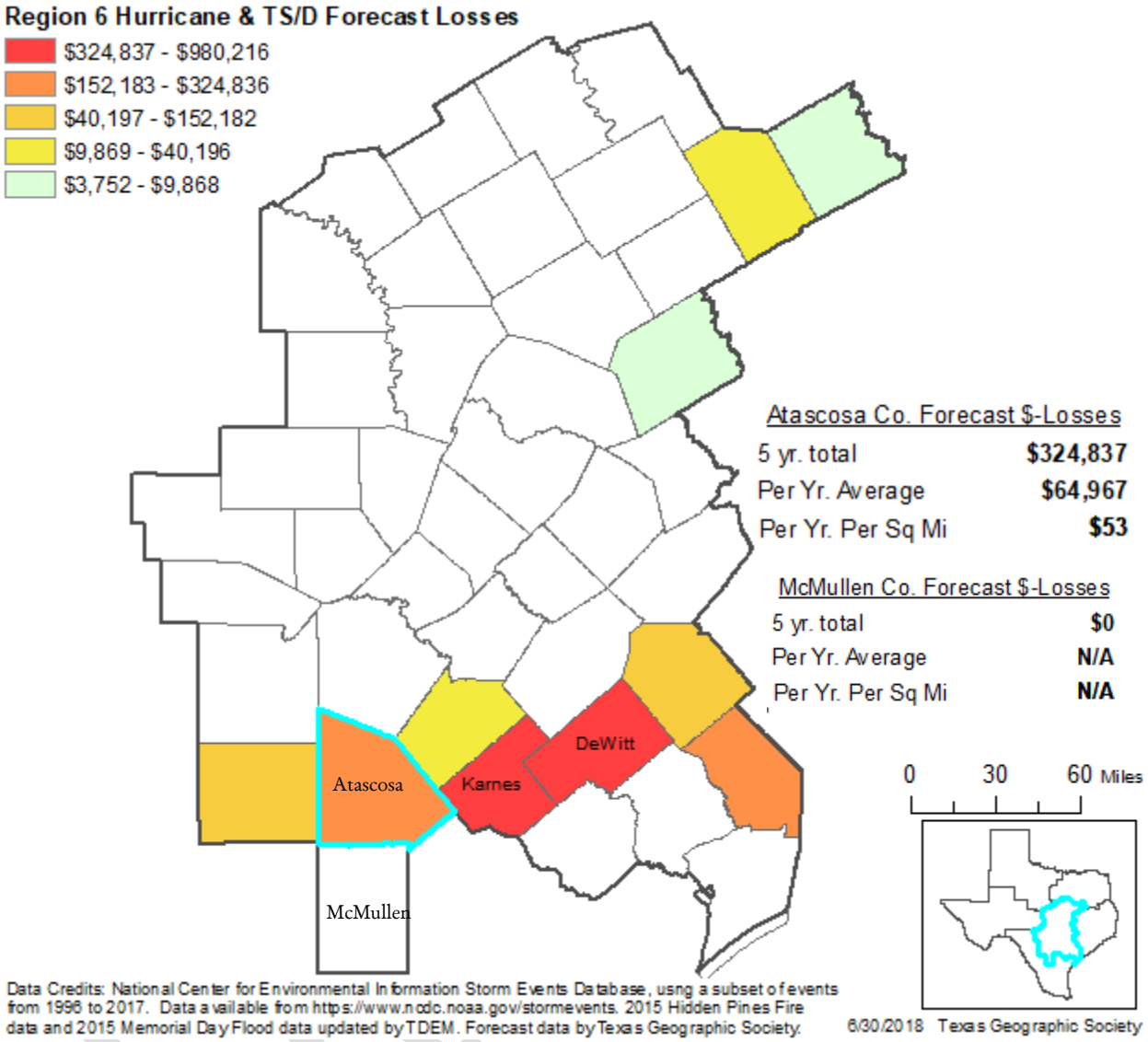
Source: Texas Geographic Society, Champs 2018

Table 5-8: McMullen County Hurricane Forecast Impacts

McMullen Co. Forecast Impacts for Hurricane TS/D					
	Property $-Losses	Crop $-Losses	Deaths	Injuries	Total $-Losses
2019					
2020					
2021					
2022					
2023					
Forecast Loss Summary					
5-yr Total					
Per Year					
Per Capita Dollar Loss Forecast (2010 Pop)					
5-yr Total					
Per Year					

Source: Texas Geographic Society, Champs 2018

Figure 5-5: Atascosa and McMullen Counties Hurricane Dollar Loss Forecast



The Atascosa and McMullen Counties planning area features mobile and manufactured home parks which are more vulnerable to hurricane winds than site-built structures. In addition, manufactured and temporary housing is located sporadically throughout rural portions of the planning area which are also vulnerable to the tropical storm and hurricane hazard but more prone to being isolated from essential needs and emergency services in the event of a disaster. Based on 2017 American Community Survey estimates, there are 372 housing units in McMullen County of which 24.5%, or 91 units, are manufactured homes. There are 18,141 housing units in Atascosa County of which 31.6%, or 5,731 units, are manufactured homes. In addition, 38.4% (approximately 7,109 structures) of the housing units in the overall planning area were built before 1980. These structures are likely to have been built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant events.

Table 5-9: Structures at Greater Risk by Jurisdiction

Jurisdiction	Total Housing Units	Manufactured Homes	Housing units built prior to 1980
McMullen County*	372	91 (24.5%)	169 (45.5%)
City of Charlotte	736	252 (34.2%)	464 (63%)
City of Christine	152	51 (33.6%)	66 (43.5%)
City of Jourdanton	1,478	377 (25.5%)	684 (46.2%)
City of Lytle	925	196 (20.2%)	502 (54.3%)
City of Pleasanton	4,017	401 (10.0%)	1,804 (44.9%)
City of Poteet	1,229	141 (11.5%)	605 (49.2%)
Atascosa County*	18,141	5,731 (31.6%)	6,940 (38.3%)
Planning Area Totals	*18,513*	*5,822 (31.4%)*	*7,109 (38.4%)*

*County totals include all jurisdictions in addition to unincorporated areas.
Source: 2013-2017 American Community Survey 5-year estimate, selected housing characteristics

Based on the ACS 2017 data, McMullen County is at higher risk of damage from hurricanes when considering age of residential structures and the higher standard of building codes enacted after 1980. Atascosa County is at a higher risk of damage from hurricanes when considering number and ratio of manufactured homes.

SECTION 6: FLOOD

Description

Floods are defined as the accumulation of water within a water body and the overflow of excess water into adjacent floodplain lands. When surface water runoff enters streams, rivers, or dry creek beds, riverine flooding conditions occur whenever the water carrying capacity of the water channel is compromised by excess runoff. Types of flooding include riverine flooding, coastal flooding, and shallow flooding. If the local basin drainage area is relatively flat then slow-moving floodwater can last for days. In drainage areas with substantial slope, or the channel is narrow and confined, rapidly moving and extreme highwater conditions, called a flash flood, can occur.

Common impacts of flooding include damage to personal property, buildings, and infrastructure; bridge and road closures; service disruptions; and injuries and fatalities. In this report, historical damage from flooding is reported here and in Chapter 1 (along with other hurricane related damages).

Location

The Digital Flood Insurance Rate Map (DFIRM) data provided by FEMA for Atascosa and McMullen Counties delineates the Special Flood Hazard Areas (SFHAs) for areas at highest risk of flooding. Flood areas or zones from the most recent DFIRMs from FEMA for Atascosa and McMullen Counties, and all participating jurisdictions, are illustrated in Figures 6-1 to 6-5.

Figure 6-1: Atascosa County Floodplain Map

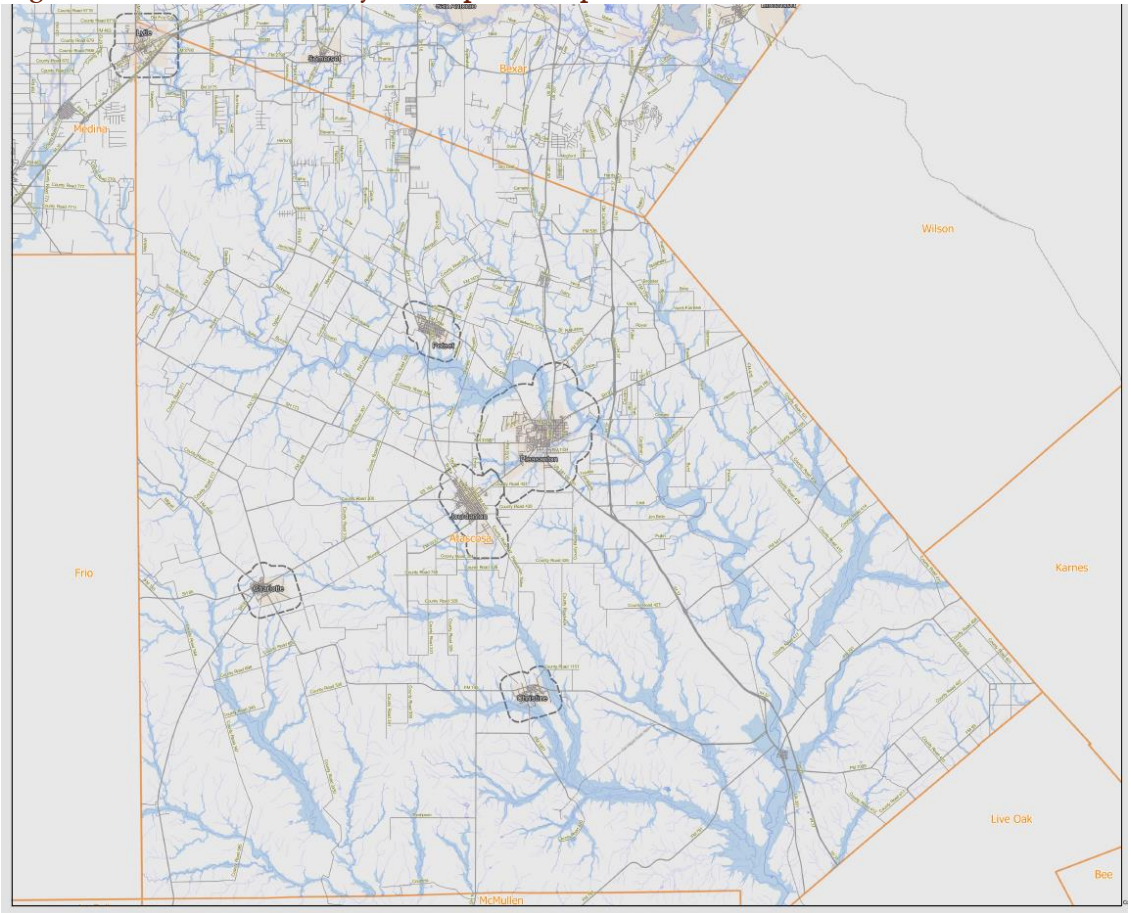


Figure 6-2: City of Charlotte Floodplain Map

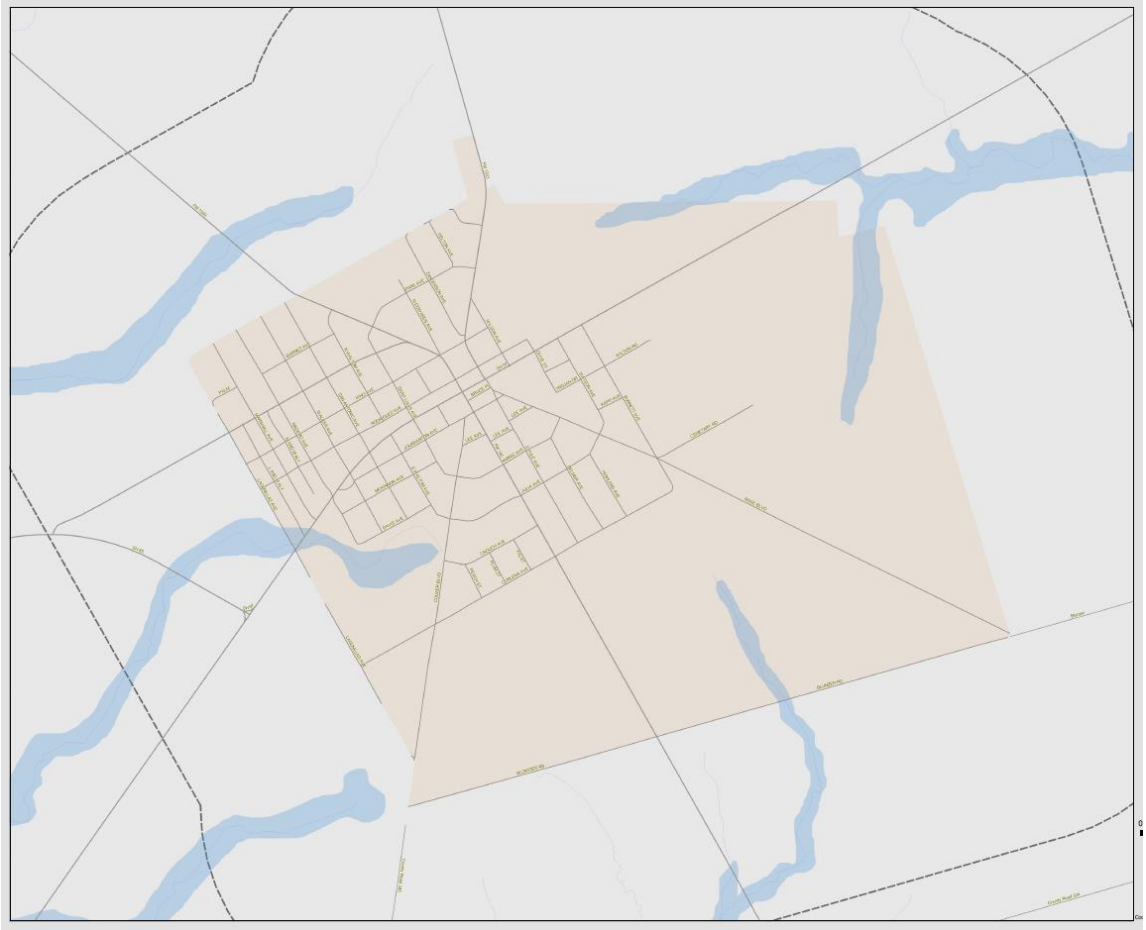


Figure 6-3: City of Christine Floodplain Map

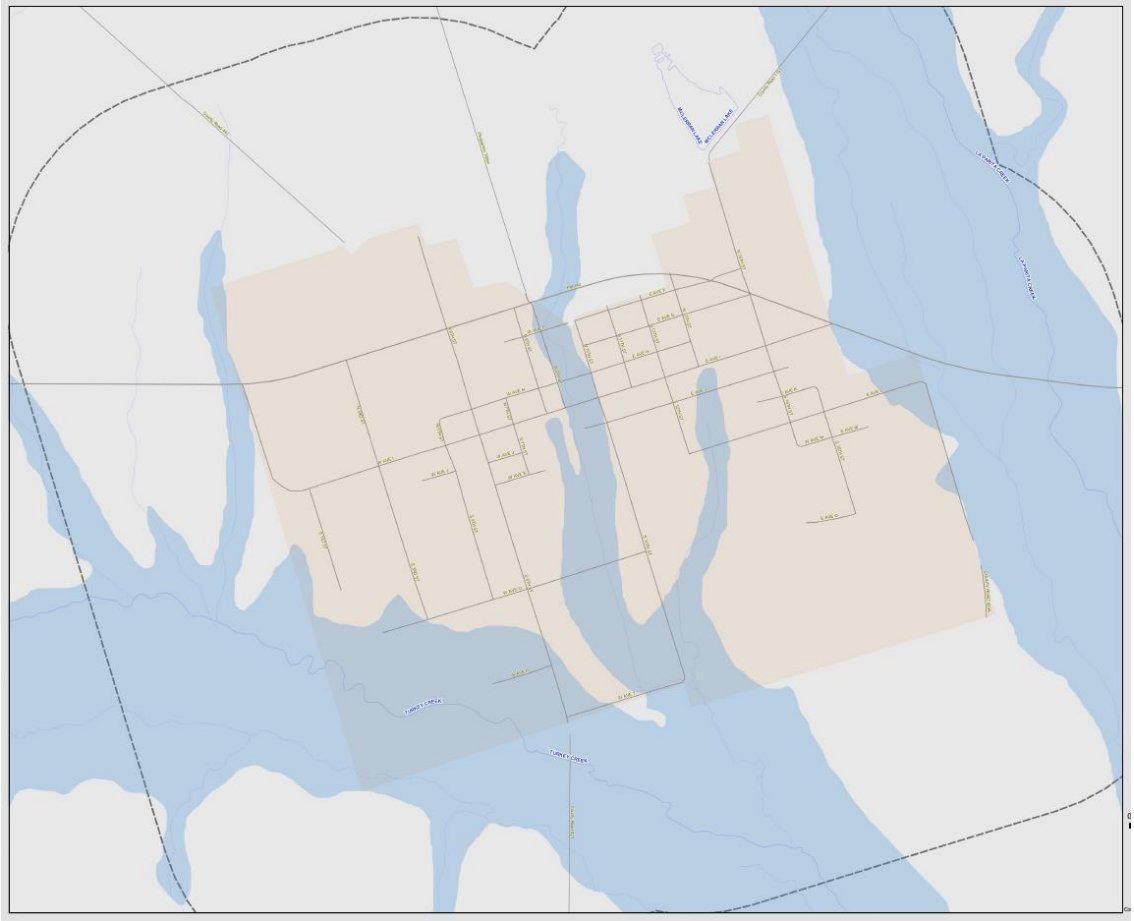


Figure 6-4: City of Jourdanton Floodplain Map

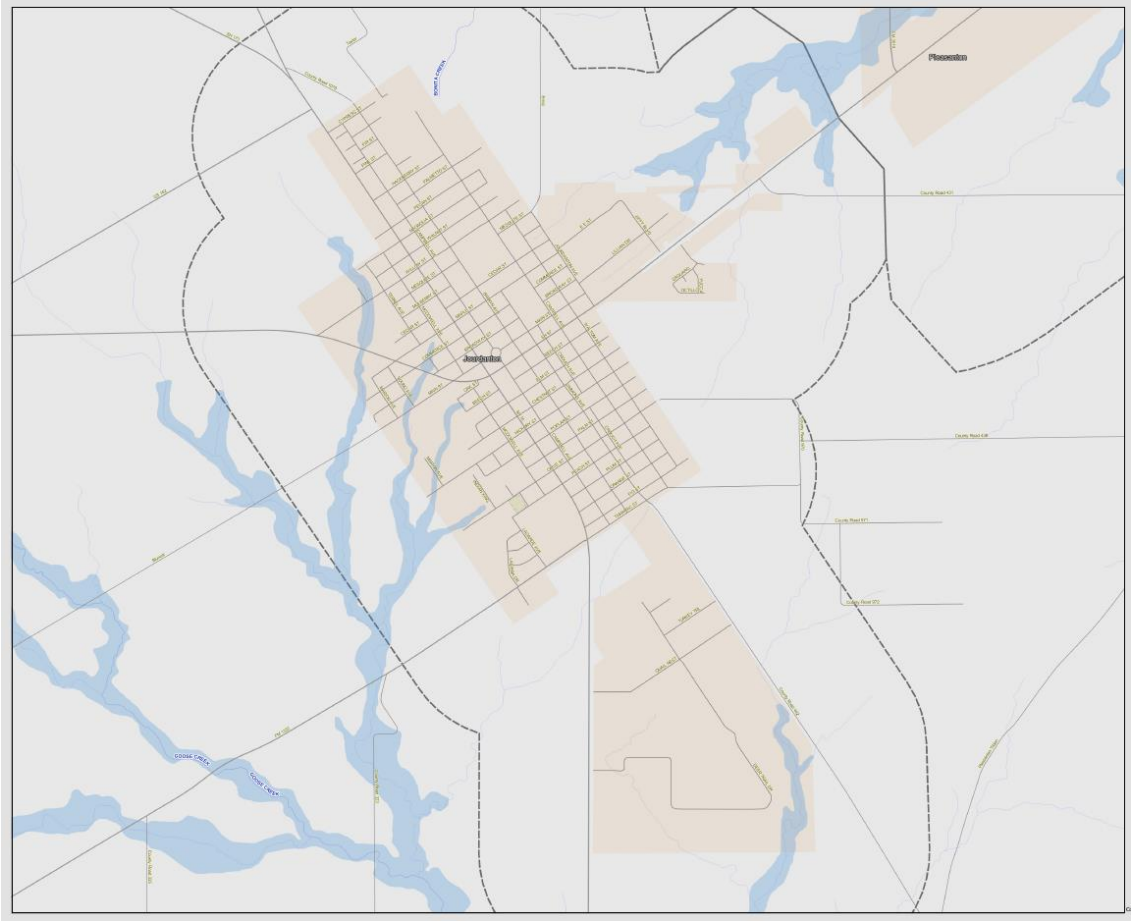


Figure 6-5: City of Lytle Floodplain Map

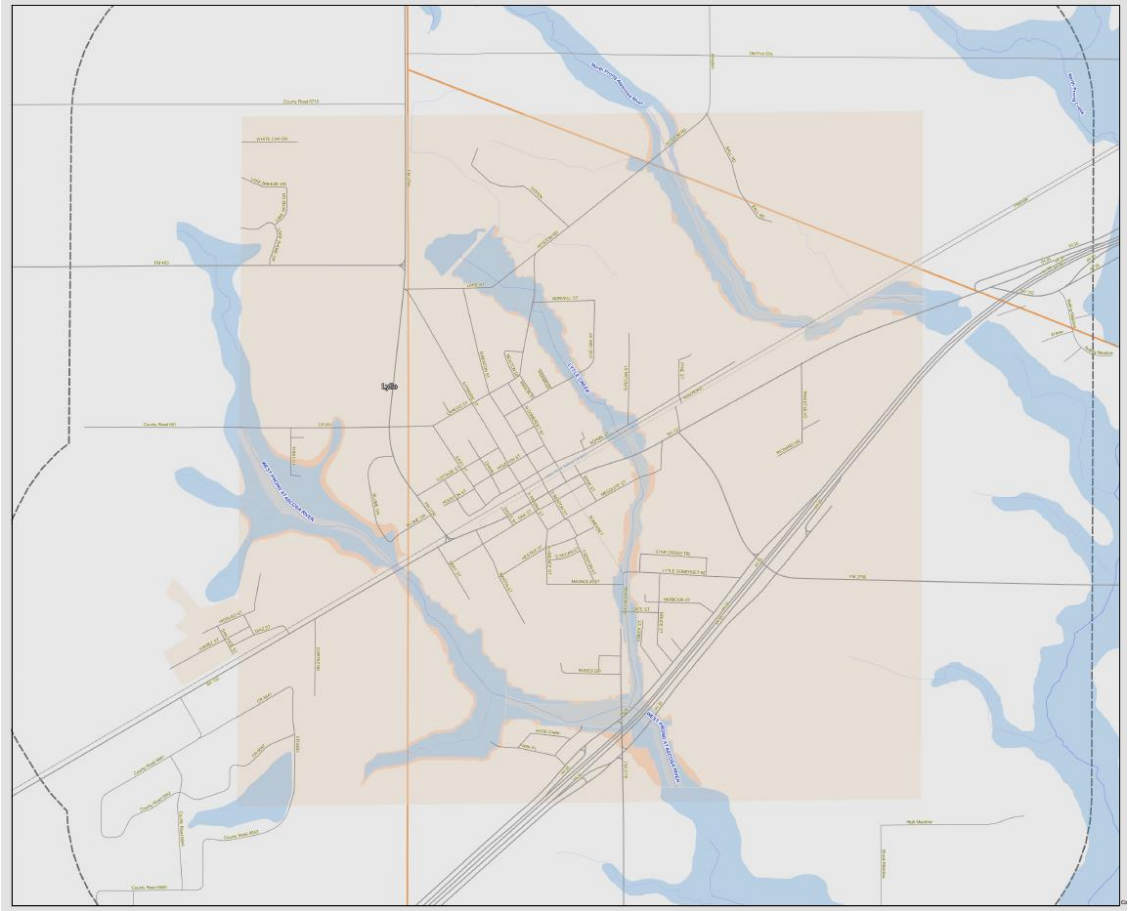


Figure 6-6: City of Pleasanton Floodplain Map

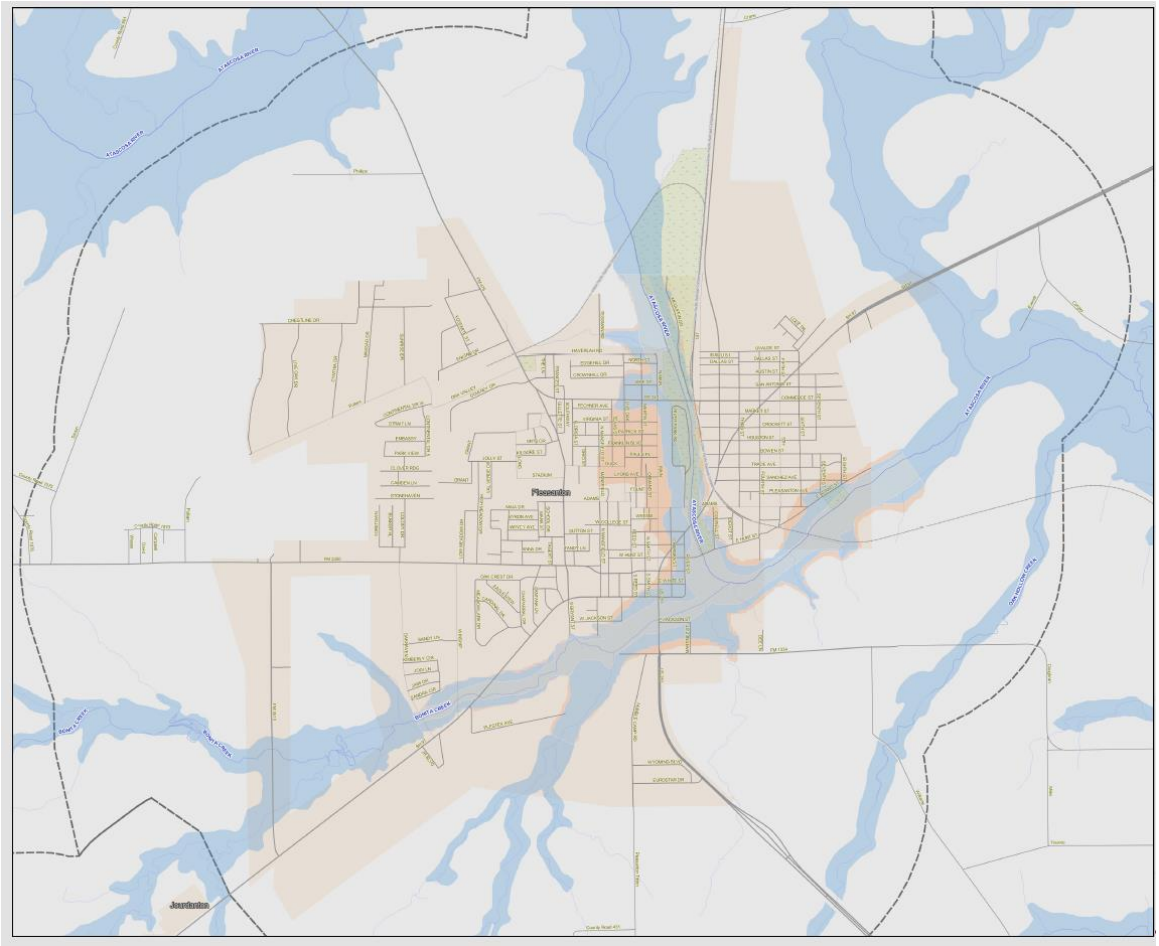


Figure 6-7: City of Poteet Floodplain Map

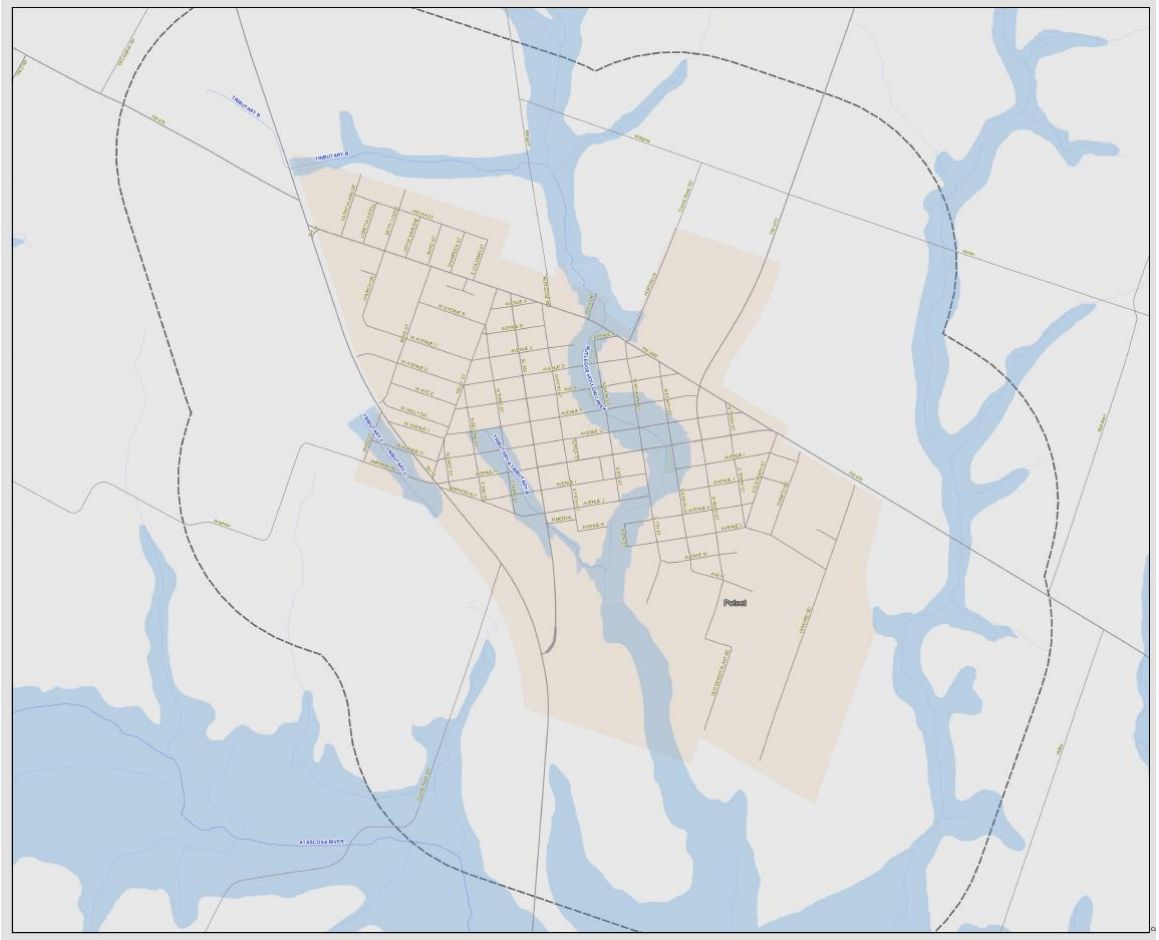
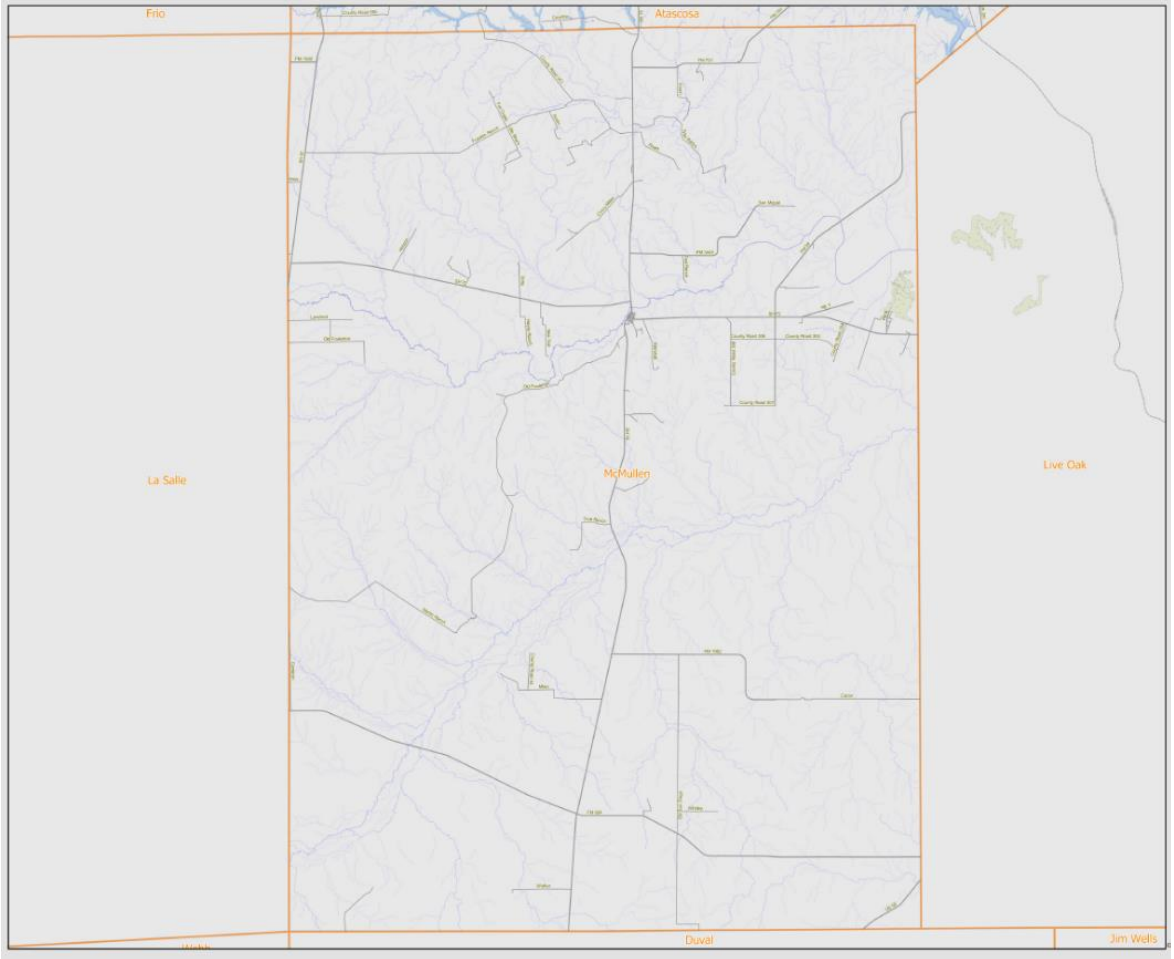


Figure 6-8: McMullen County Floodplain Map



Extent

Flood event severity is a complex science studied by hydrologists and engineers. The severity of a flood event is established by a combination of several factors including stream and river basin topography and physiography, precipitation and weather patterns, recent soil moisture conditions, and degree of vegetative clearing and impervious surface. Urbanization, due to its relationship to increased impervious cover, contributes to flood severity. Based on historical occurrences, floods events can last anywhere from a couple of hours to several days.

A Flood Zone provides a measure of a flood's intensity and magnitude. A base flood is defined by FEMA as a flood having a one percent change of being equaled or exceeded in any given year. It is also known as the "100-year flood" or the "1% annual chance event". The base flood is the national standard used by the National Flood Insurance Program. Flood zones are delineated on Flood Insurance Rate Maps, and the depths of flooding can be interpreted from the summary data and profiles in the Flood Insurance Study. Flood depths may range from less than one foot to more than 5 feet in places and depending on the severity of the event (as measured in annual chance exceedance). Table 6-1 provides a description of FEMA flood zones and the flood impact in terms of severity

or potential harm. Flood Zones A, AE, AO, and X are the hazard areas mapped in the planning area and determine the intensity of a potential flood event.

Table 6-1: FEMA Flood Zone Categories

Flood Zone	Description
Floodway	A "Regulatory Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations. For streams and other watercourses where FEMA has provided Base Flood Elevations (BFEs), but no floodway has been designated, the community must review floodplain development on a case-by-case basis to ensure that increases in water surface elevations do not occur, or identify the need to adopt a floodway if adequate information is available.
Zone A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
Zone AE	Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.
Zone AO	Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet. Average flood depths derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply.
0.2 SFHA	These are the areas that have a 0.2 percent chance of being equaled or exceeded on any given year.
Zone X	The areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent-annual-chance flood, are Zone X

Historical Occurrences

Figure 6-9: Flash Flooding in Atascosa, Pulliam Dr.; May 20, 2015

Source: pleasantonexpress.com

Historical evidence indicates that areas within the planning area are susceptible to flooding, especially in the form of flash flooding. It is important to note that only reported flood events have been factored into this risk assessment, therefore it is likely that additional flood occurrences have gone unreported before and during the recording period. Table 6-2 identifies historical flood events that resulted in damages, injuries, or fatalities within the planning area. Historical Data is provided by the Storm Prediction Center (NOAA), NCEI database for Atascosa and McMullen Counties.

Table 6-2: Historical Flood Events

Year	Month	County	Location	Direct Fatalities	Direct Injuries	Property Damage (adj2016)	Crop Damage (adj2016)	Total Losses
1996	August	Atascosa	Countywide	0	0	$15,264		$15,264
1996	August	Atascosa	Countywide	0	0	$30,529		$30,529
1997	April	Atascosa	Coughran	0	0	$74,611		$74,611
1997	June	Atascosa	Countywide	0	0	$7,461		$7,461
1997	June	Atascosa	Countywide	0	0	$4,477		$4,477
1998	February	Atascosa	Countywide	0	0	$7,347		$7,347
1998	February	Atascosa	Countywide	0	0	$4,408		$4,408
1998	August	Atascosa	Countywide	0	0	$29,387	$29,387	$58,774
1998	August	Atascosa	Countywide	0	0	$14,693	$14,693	$29,386
1998	August	McMullen	Calliham	0	0			
1998	October	Atascosa	Countywide	0	0	$73,466	$146,933	$220,399
1999	June	Atascosa	Southeast	0	0	$4,313		$4,313
1999	June	Atascosa	Pleasanton	0	0	$71,879	$14,376	$86,255
2000	May	Atascosa	North	0	0	$13,908		$13,908
2000	June	Atascosa	North	0	0	$27,816		$27,816
2000	November	Atascosa	Countywide	0	0	$4,172		$4,172
2000	November	Atascosa	Southeast	0	0	$13,908		$13,908
2001	August	Atascosa	Countywide	0	0	$40,570	$67,617	$108,187
2001	August	Atascosa	North	0	0	$27,047	$67,617	$94,664
2001	September	Atascosa	Countywide	0	0	$27,047		$27,047
2001	September	McMullen	East	0	0			
2001	November	Atascosa	Southeast	0	0	$108,187		$108,187
2001	November	Atascosa	Southeast	0	0	$13,523		$13,523
2001	November	McMullen	North	0	0			
2001	November	McMullen	Countywide	0	0			
2001	November	McMullen	Countywide	0	0			
2002	April	Atascosa	North	0	0	$66,565	$266,259	$332,824
2002	July	Atascosa	Countywide	0	0			
2002	July	Atascosa	South	0	0			
2002	July	Atascosa	North	0	0			
2002	July	Atascosa	Southeast	0	0			
2002	July	Atascosa	Countywide	0	0			
2002	July	Atascosa	Southwest	0	0			
2002	September	Atascosa	Countywide	0	0	$133,130	$66,565	$199,695
2002	September	McMullen	Southeast	0	0			
2002	September	McMullen	Central	0	0			
2002	September	McMullen	Countywide	0	0			
2002	September	McMullen	Countywide	0	0			
2002	September	McMullen	Countywide	0	0			

2002	October	Atascosa	North	0	0	$39,939		$39,939
2002	October	Atascosa	Countywide	0	0	$66,565		$66,565
2003	July	Atascosa	Countywide	0	0	$65,082		$65,082
2003	September	Atascosa	South	0	0	$6,508		$6,508
2003	September	Atascosa	South	0	0	$13,016		$13,016
2003	September	Atascosa	Countywide	0	0	$13,016		$13,016
2003	October	McMullen	North central	0	0			
2003	October	McMullen		0	0			
2003	October	McMullen		0	0			
2004	April	Atascosa	Countywide	0	0			
2004	April	Atascosa	North	0	0			
2004	April	Atascosa	Southeast	0	0			
2004	June	Atascosa	Countywide	0	0			
2004	June	Atascosa	Countywide	0	0			
2004	June	Atascosa	South	0	0			
2004	June	Atascosa	North	0	0			
2004	June	Atascosa	North	0	0			
2004	August	McMullen	South central	0	0			
2004	November	Atascosa	Countywide	0	0			
2004	November	Atascosa	North	0	0			
2005	February	Atascosa	Lytle	0	0			
2005	May	Atascosa	Jourdanton	0	0			
2005	September	Atascosa	Northeast	0	0			
2005	October	Atascosa	East	0	0			
2006	July	Atascosa	Fashing	0	0			
2006	September	Atascosa	North	0	0			
2007	March	Atascosa	Hindes	0	0			
2007	March	Atascosa	Pleasanton	0	0			
2007	April	Atascosa	Campbellton	0	0			
2007	May	Atascosa	Charlotte	0	0			
2007	May	Atascosa	Pleasanton	0	0			
2007	June	Atascosa	Lytle	0	0	$34,660		$34,660
2007	June	Atascosa	Pleasanton	0	0			
2007	July	Atascosa	Jourdanton	0	0			
2007	July	Atascosa	Poteet	0	0			
2007	July	Atascosa	Lytle	0	0			
2007	July	Atascosa	Leming	0	0			
2007	July	McMullen	Tilden	0	0			
2008	March	Atascosa	Jourdanton	0	0			
2008	August	Atascosa	Rossville	0	0	$11,124		$11,124
2010	April	Atascosa	Leming	0	0			
2010	April	Atascosa	Leming	0	0			

2010	April	McMullen	Tilden	0	0	$109,812		$109,812
2010	April	McMullen	Calliham	0	0			
2010	June	Atascosa	Verdi	0	0			
2010	May	McMullen	Wantz	0	0			
2012	March	Atascosa	Campbellton	0	0			
2012	March	McMullen	Tilden	0	0			
2012	May	Atascosa	Leming	0	0			
2013	October	McMullen	Tilden	0	0	$51,395		$51,395
2014	June	Atascosa	N. Pleasanton	0	0			
2015	April	Atascosa	Lytle	0	0			
2015	May	McMullen	Tilden	0	0			
2016	August	Atascosa	Verdi	0	0			
2016	August	Atascosa	Lytle	0	0			
2016	August	McMullen	Tilden	0	0			
2016	September	McMullen	Tilden	0	0			
2016	September	McMullen	Calliham	0	0			

Significant Events

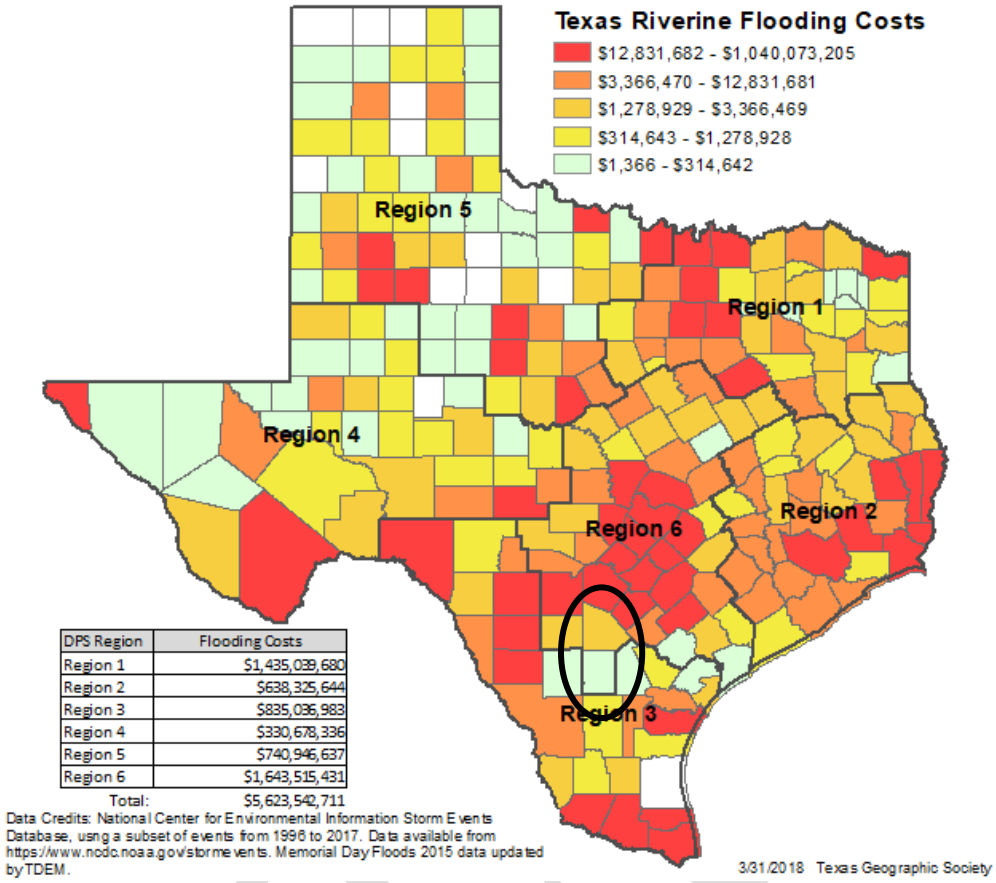
April 15, 2010

Thunderstorms with very heavy rainfall trained for much of the night across northern McMullen county, dumping up to 10-15 inches of rainfall and producing widespread flash flooding. Highways 16, 72, and 99 were all closed near Tilden due to flooded roads. A portion of FM 3445 was washed out and a vehicle swept into the high water. A successful high-water rescue was performed.

September 8, 2002

Very heavy rain redeveloped in the evening hours from Hondo south to Pearsall and southeastward to Pleasanton. General rain amounts averaged near 2 inches with over 5 inches from Frio Town to Charlotte. Within the stretch from Frio Town to Charlotte, areas were indicated with up to 8-inch totals. Parts of this area received up to 11 inches of rain. Considerable damage was reported along FM140. Flash flooding over these three counties developed in the evening hours and continued just past sunrise next morning.

Figure 6-10: Texas Riverine Flooding Costs



Probability of Future Events

FEMA states that flooding is the most common natural disaster in the United States, affecting every region and every state. Based on recorded historical occurrences and extent within the Atascosa and McMullen Counties planning area, 97 recorded flooding events in the 21-year reporting period provides a probability of occurrence of at least 1 event per year. This frequency supports a highly likely probability of future events meaning that an event is probable in the next year.

Frequency of Occurrence	
Highly likely:	Event probable in next year.
Likely:	Event probable in next 3 years.
Occasional:	Event possible in next 5 years.
Unlikely:	Event possible in next 10 years.

Vulnerability and Impact

The flood hazard areas throughout Atascosa and McMullen Counties are subject to periodic inundation, which may result in loss of life and property, reduction in health and safety hazards, disruption of commerce and governmental services, and extraordinary public expenditures for flood protection and relief, all of which adversely

affect public safety. Riverine Flooding has killed and injured more people than any other weather-related hazard and the greatest number of deaths is due to people driving into water going over roads. The location and proximity to the floodplain or SFHA determines a property's vulnerability to a flood. Structures that lie along banks of a waterway are the most vulnerable and are often repetitive loss structures. Future development is encouraged to be outside of the floodplain, although there are some critical facilities, homes, and businesses already located in the floodplain due to being built before current floodplain regulations.

Flood losses are exacerbated by the cumulative effect of obstructions in floodplains. Occupancy of flood hazard areas is especially hazardous when development is inadequately elevated, flood-proofed, or otherwise protected from flood damage. Moreover, increased development in floodplain can increase flood heights and velocities making flooding more intense and widespread then predicted. Mitigation actions are included to address flood maintenance issues as well (Section 15), including routinely clearing debris from roadside ditches and bridges and expanding drainage culverts and storm water structures to more adequately convey flood waters. Tables 6-3 and 6-4 below shows Atascosa and McMullen Counties dollar losses from January 1996 through December 2016.

Table 6-3: Atascosa County Impact from Flooding

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, Atascosa County				
21-year Total	0	0	$1,063,618	$673,447
Per Year	0	0	$50,648	$32,069
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$24	$15
Per Year	0	0	$1	$1

Source: NCEI Storm Events Database 1996 to 2017 subset for Texas: TxGS - 7/1/2018Table

Table 6-4: McMullen County Impact from Flooding

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, McMullen County				
21-year Total	0	0	$161,207	$0
Per Year	0	0	$7,677	$0
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$228	$0
Per Year	0	0	$11	$0

Source: NCEI Storm Events Database 1996 to 2017 subset for Texas: TxGS - 7/1/2018Table

Table 6-5 below distributes the countywide impacts presented previously in Tables 6-3 and 6-4 amongst the various participating jurisdictions based on ratios of population and total area.

Table 6-5: Flood Losses by Jurisdiction 1996-2017

Jurisdiction	Est. Prop. Losses (2016 dollars)	Est. Crop Losses (2016 dollars)	Total Est $-Losses
Atascosa County	$1,063,618	$673,447	$1,737,065
City of Charlotte	$40,616	$1,090	$41,706
City of Christine	$9,236	$981	$10,217
City of Jourdanton	$91,676	$1,907	$93,583
City of Lytle	$59,018	$2,452	$61,469
City of Pleasanton	$211,582	$4,631	$216,213
City of Poteet	$77,206	$926	$78,132
McMullen County	$161,207	$0	$161,207

Source: *Forecast data by the Texas Geographic Society: TxGS - 7/1/2018*

Tables 6-6 and 6-7 show the forecast annual impacts of Flooding in Atascosa and McMullen Counties and the total dollar-losses (property plus crop) forecasted by year. These forecasts are extrapolations of the average annual impacts in the base period modified by expected changes in:

1. The county populations and built environments (not used for forecasting crop losses) and
2. The frequency and intensity (damage producing capacity) of weather events.

Table 6-6: Atascosa County Flood Impacts Forecast by Year

	Property $-Losses	Crop $-Losses	Deaths	Injuries	Total $-Losses
2019	$55,762	$33,710			$89,471
2020	$56,855	$33,845			$90,699
2021	$57,970	$33,980			$91,950
2022	$59,106	$34,116			$93,222
2023	$60,265	$34,252			$94,518
Forecast Loss Summary					
5-yr Total	$289,958	$169,903			$459,860
Per Year	$308,805	$37,543			$91,972
Per Capita Dollar Loss Forecast (2010 Pop)					
5-yr Total	$6.46	$3.78			$10.24
Per Year	$1.29	$0.76			$2.05

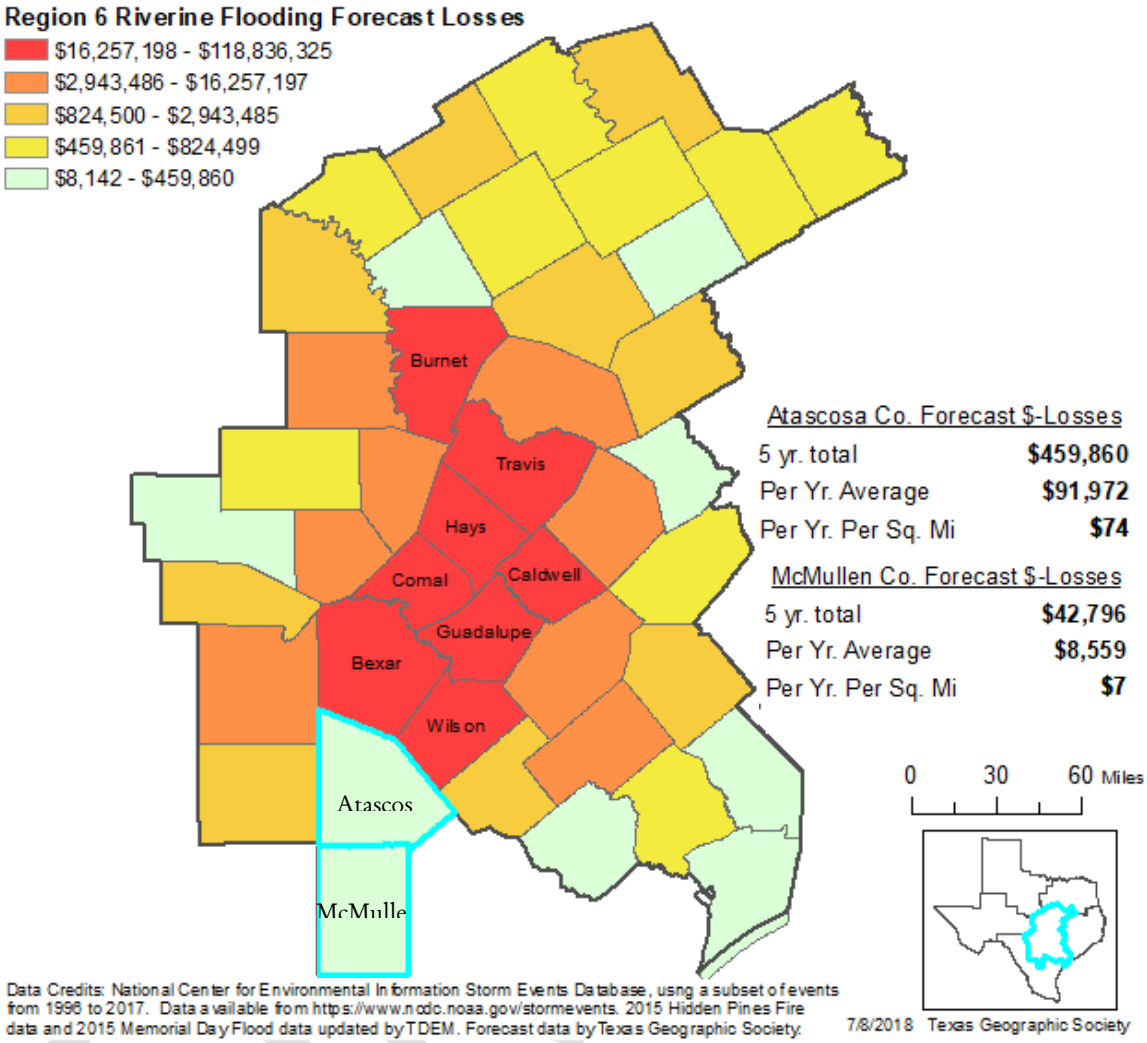
Source: *Forecast data by the Texas Geographic Society: TxGS - 7/1/2018*

Table 6-7: McMullen County Flood Impacts Forecast by Year

	Property $-Losses	Crop $-Losses	Deaths	Injuries	Total $-Losses
2019	$8,319				$8,319
2020	$8,437				$8,437
2021	$8,558				$8,558
2022	$8,679				$8,679
2023	$8,803				$8,803
Forecast Loss Summary					
5-yr Total	$42,796				$42,796
Per Year	$8,559				$8,559
Per Capita Dollar Loss Forecast (2010 Pop)					
5-yr Total	$60.53				$60.53
Per Year	$12.11				$12.11

Source: *Forecast data by the Texas Geographic Society: TxGS - 7/1/2018*

Figure 6-11: Atascosa and McMullen Counties Flood Dollar Loss Forecast



National Flood Insurance Program (NFIP) Participation

Atascosa and McMullen Counties, in addition to all participating jurisdictions, participate in the National Flood Insurance Program (NFIP). The NFIP protects businesses and homeowners from devastating losses in the event of a flood hazard. As an additional indicator of floodplain management responsibility, communities may choose to participate in FEMA's Community Rating System (CRS). This is an incentive-based program that allows communities to undertake flood mitigation activities that go beyond NFIP requirements. Currently, none of the communities in Atascosa and McMullen Counties participate in CRS. It is the purpose of all NFIP jurisdictions participating in the Hazard Mitigation plan to continue to promote the public health, safety, and general welfare by minimizing public and private losses due to flood conditions in specific areas. These communities are guided by their local Floodplain Management Ordinance and will continue to comply with NFIP requirements through

their local permitting, inspection, and record-keeping requirements for new and substantially developed construction.

Table 6-8: NFIP Summary by Participating Jurisdiction

Jurisdiction	Number of Policies	Insurance in Force	Total Paid Losses	Total Paid Amount	Repetitive Loss Buildings	Repetitive Loss Payment	Target Rep. Loss Buildings
Atascosa County	117	27,838,700	18	324,119	1	91,200	1
City of Charlotte	0	0	0	0	0	0	
City of Christine	0	0	0	0	0	0	0
City of Jourdanton	3	1,200,000	1	6,066	0	0	0
City of Lytle	17	3,726,200	3	21,216	0	0	0
City of Pleasanton	42	11,887,600	10	103,192	0	0	0
City of Poteet	8	1,496,800	5	43,106	0	0	0
McMullen County	11	3,111,200	4	31,278	0	0	0

Source: FEMA NFIP

The land use of the repetitive loss structure in Atascosa County is single-family residential.

SECTION 7: DROUGHT

Description

Drought is deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people. Droughts are defined as a moisture deficit at a magnitude high enough to have social, environmental or economic effects and can become very prolonged and persist from one year to the next. Common effects of drought include crop failure, water supply shortages, and fish and wildlife mortality. The Texas Hazard Mitigation Plan describes the climate of 2/3rds of Texas Counties as arid or semi-arid with these Counties almost always in varying stages of drought.

Location

Droughts vary greatly in their intensity and duration and can occur regularly throughout Atascosa and McMullen Counties, including all participating jurisdictions, equally. Drought is monitored nationwide by the National Drought Mitigation Center (NDMC) which provides the Drought Monitor map in Figure 7.1 showing the entirety of the planning area currently experiencing abnormally dry (D0) conditions or moderate drought (D1). The planning area has experienced exceptional drought conditions within the last ten years, particularly during the drought of summer 2011 where the entire state of Texas was in some level of drought (Figure 7.2).

Figure 7.1: US Drought Monitor, August 20, 2019

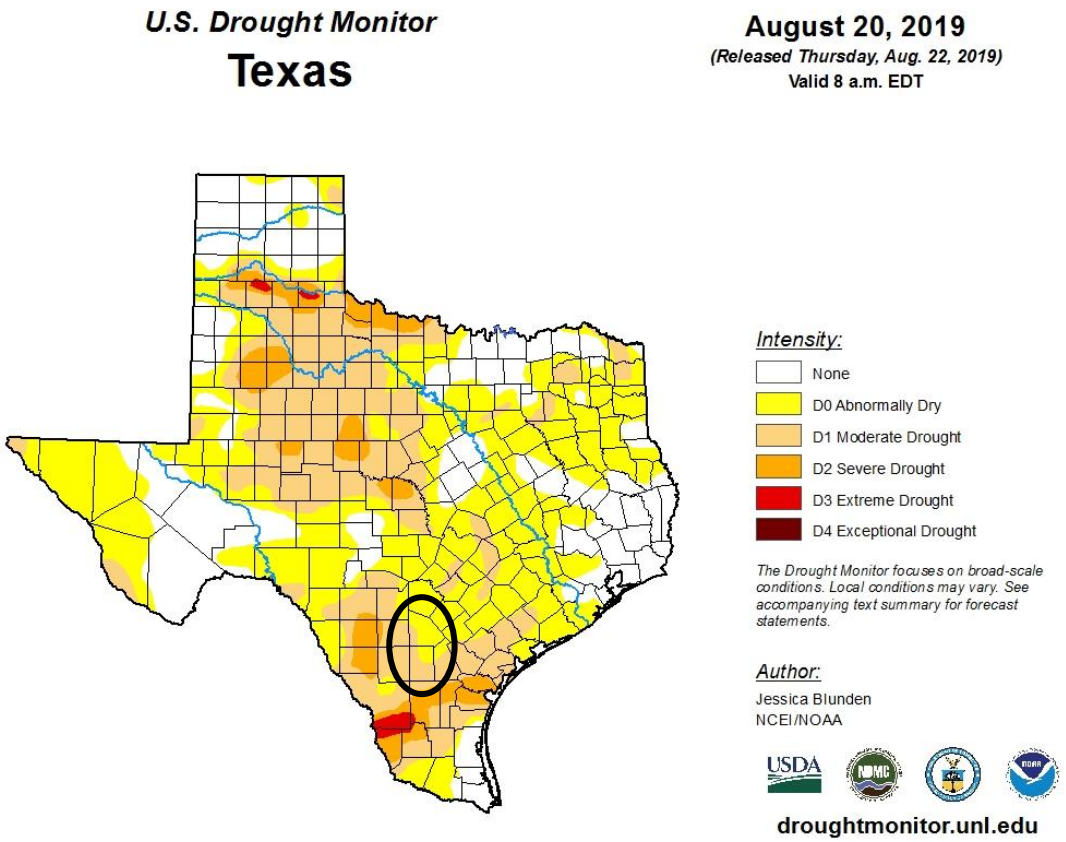
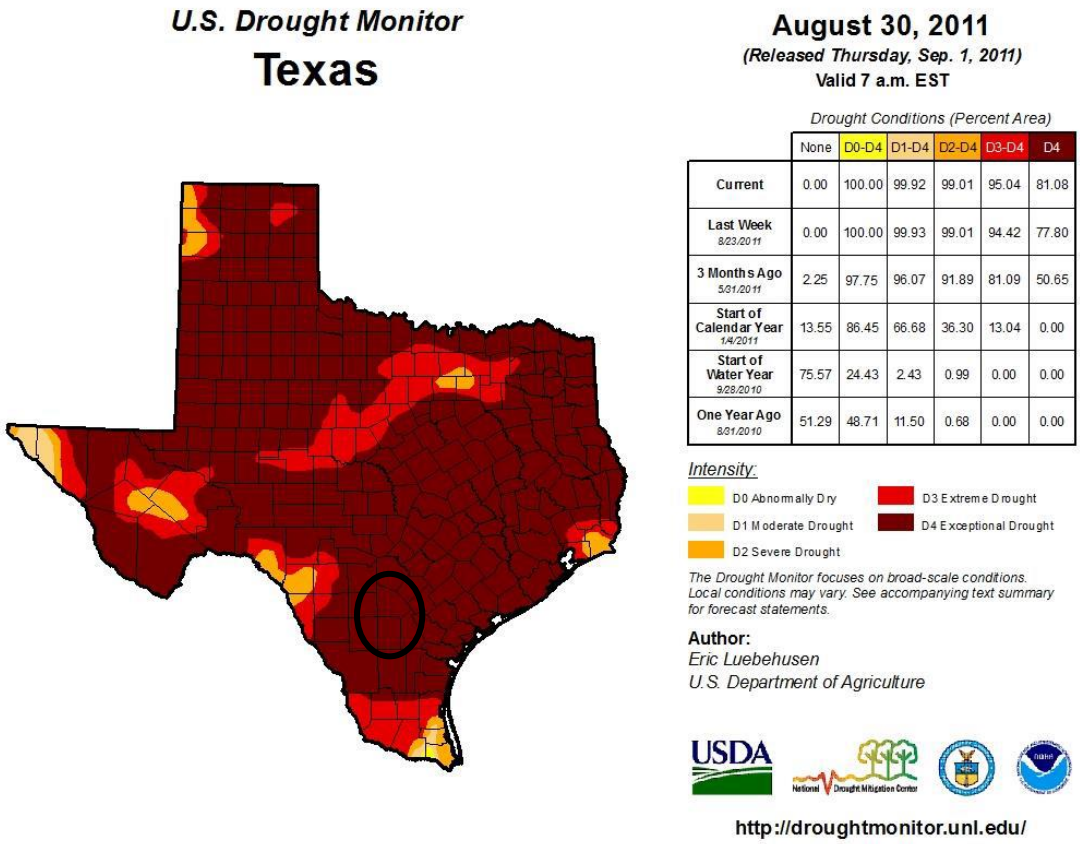


Figure 7.2: US Drought Monitor, August 30, 2011



Extent

The Palmer Drought Severity Index (PDSI) is based on precipitation and temperature and is used to measure the extent of drought. The index measures the moisture supply of the environment. The PDSI classifications vary roughly between -4.0 and +4.0 ranging from extremely dry to extremely wet periods. NOAA's United States Drought Monitor (USDM) Categories range from D0 to D4 according to the intensity of drought and are based on a number of indicators, including the PDSI, and used to describe broad scale drought conditions across the United State. Table 7-1 describes the basic PDSI classification descriptions and Table 7-2 depicts the magnitude of drought with descriptions of possible impacts.

Table 7-1: PDSI Classifications for Dry and Wet Periods	
4.00 or more	Extremely Wet
3.00 to 3.99	Very Wet
2.00 to 2.99	Moderately Wet
1.00 to 1.99	Slightly Wet
0.50 to 0.99	Incipient Wet Spell
0.49 to -0.49	Near Normal
-0.50 to -0.99	Incipient Dry Spell
-1.00 to -1.99	Mild Drought
-2.00 to -2.99	Moderate Drought
-3.00 to -3.99	Severe Drought
-4.00 or less	Extreme Drought

http://drought.unl.edu/whatis/indices.htm

Table 7-2: Drought Severity Classification

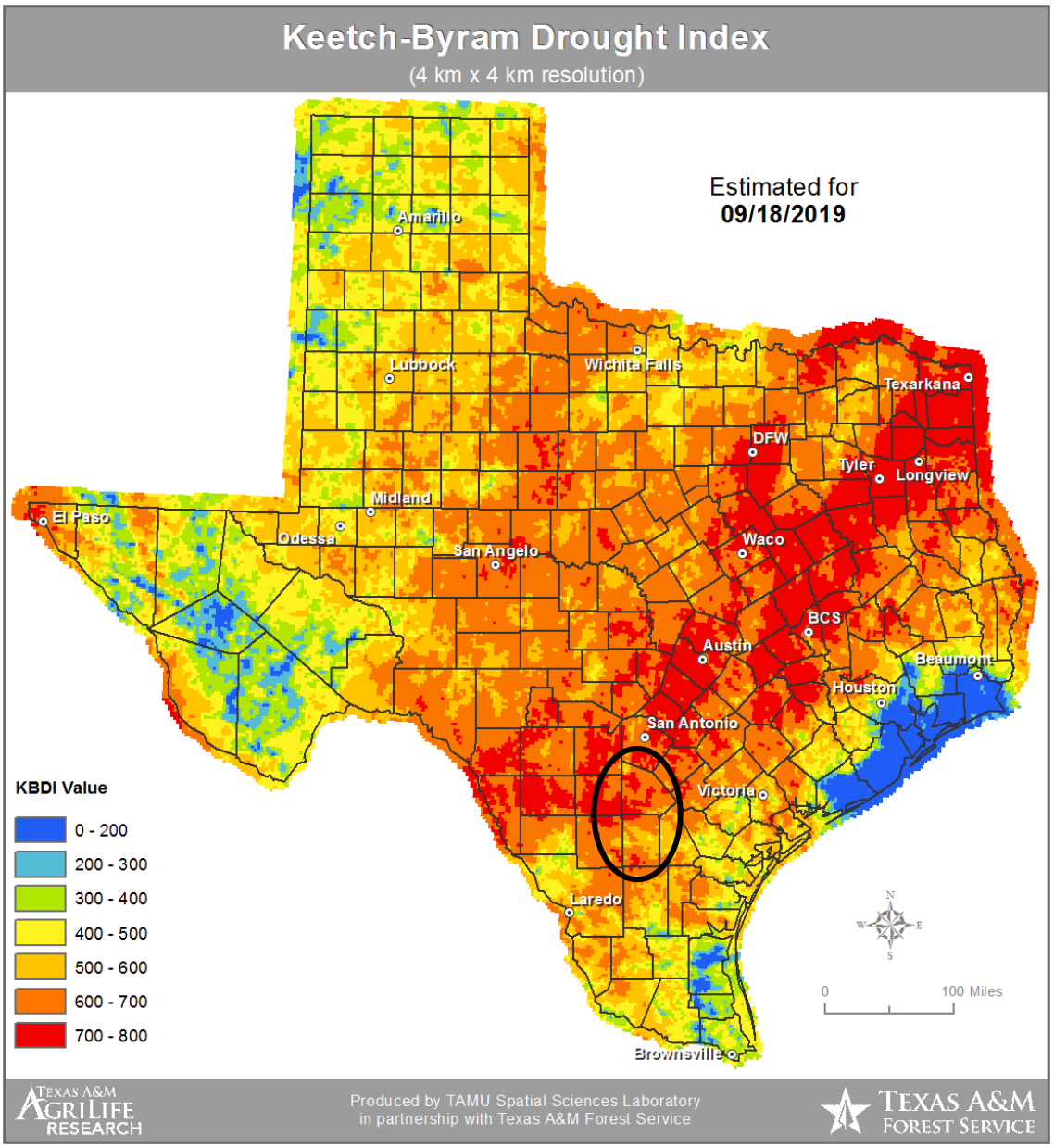
			Ranges				
Category	Description	Possible Impacts	Palmer Drought Severity Index (PDSI)	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures Coming out of drought: some lingering water deficits pastures or crops not fully recovered	-1.0 to -1.9	21 to 30	21 to 30	-0.5 to -0.7	21 to 30
D1	Moderate Drought	Some damage to crops, pastures Streams, reservoirs, or wells low, some water shortages developing or imminent Voluntary water-use restrictions requested	-2.0 to -2.9	11 to 20	11 to 20	-0.8 to -1.2	11 to 20
D2	Severe Drought	Crop or pasture losses likely Water shortages common Water restrictions imposed	-3.0 to -3.9	6 to 10	6 to 10	-1.3 to -1.5	6 to 10
D3	Extreme Drought	Major crop/pasture losses Widespread water shortages or restrictions	-4.0 to -4.9	3 to 5	3 to 5	-1.6 to -1.9	3 to 5
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses Shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0 to 2	0 to 2	-2.0 or less	0 to 2

Based on the extent and location for historic and current drought conditions, the Atascosa and McMullen County planning area can anticipate a range of drought from abnormally dry to exceptional, or D0 to D4 based on the USDM Drought Intensity Category.

The Keetch-Byram Drought Index is used by the Texas Forest Service to determine the fire potential based on daily water balance, precipitation, and soil moisture. Figure 7-3 shows the Keetch-Byram Drought Index rating classification for all of Texas and color coded by County with a scale of 0 to 800 (low risk to high risk). Both Atascosa and

McMullen Counties are in the 400-800 risk category at the time this report was written. The Keetch-Byram Drought Index is also discussed in relation to wildfires in section 13.

Figure 7-3: Keetch-Byram Drought Index



Historical Occurrences

Atascosa and McMullen Counties have often experienced moderate to significant drought in the past. It is difficult to identify the start of prolonged drought since they develop over an extended period of time. The hydrological impacts of drought such as depleted reservoir and groundwater levels take longer still to develop.

Significant Events

1950-1957, Statewide
Driest period in state history. By 1956, 244 of 254 counties are declared federal disaster areas with an annual estimated economic loss of $3.5 billion.

1995-1996, Statewide
Agricultural losses of more than $5 billion statewide exceed previous record.

2005, South, East, Central, and Northeast Texas
The state records only 4.93 inches average rainfall as the third driest period in 110 years.

May 2011 – March 2012, Statewide
The drought of 2011 in South Central Texas was the most severe one-year drought ever for Texas. Agricultural losses in the state due to the 2011 drought reached a record $7.62 billion, making it the costliest drought in history, according to totals by Texas AgriLife Extension Service economists. "2011 was the driest year on record and certainly an infamous year of distinction for the state's farmers and ranchers," said Dr. David Anderson, AgriLife Extension livestock economist. "The $7.62 billion mark for 2011 is more than $3.5 billion higher than the 2006 drought loss estimates, which previously was the costliest drought on record.[2] Drought conditions began in May and were exacerbated by a La Niña event causing below normal rainfall. Conditions began to improve in the spring of 2012 when the La Niña event weakened and most of South-Central Texas saw above normal rainfall.

The data used to assess the historical experience with drought for the planning area came from the NOAA's NCEI National Storms Database. This database contains extensive and authoritative information for weather related event in the country from 1996 thru 2016 (a 21-year period). Agricultural producers such as farmers and ranchers purchase crop insurance to protect their yield in the event of a natural disaster such as drought, hail, or flood. Historical crop damages are typically not found in the public record and likely much higher than quantified by NCEI data due to agricultural losses being a transaction between the agricultural landowner and insurance policy holder. Furthermore, the extent of crop loss due to drought is difficult to quantify because a drought during a growing season can impact the next two years of crop production. Table 7-3 lists historical events that have occurred in Atascosa and McMullen Counties as reported in the NCEI.

Table 7-3: Historical Occurrences of Drought

County	Date Range	Direct Injuries	Direct Fatalities	Property Damage (adj2016)	Crop Damage (adj2016)	Total Losses
Atascosa	April, 1996 – May, 1997	0	0	$2,984,424	$8,953,271	$11,937,695
	July - October, 2000	0	0	0	0	0
	May, 2011 - April, 2012	0	0	0	0	0

[2] https://today.agrilife.org/2012/03/21/updated-2011-texas-agricultural-drought-losses-total-7-62-billion/

	January - February, 2012	0	0	0	0	0
	August, 2013	0	0	0	0	0
McMullen	April, 1996	0	0	0	0	0
	January - September, 2006	0	0	0	0	0
	January 2008 - December, 2009	0	0	0	0	0
	December 2010 – July, 2012	0	0	0	0	0
	March - April, 2013	0	0	0	0	0

Data provided the by NOAA drought monitor also provides a perspective of historical occurrences of drought in the planning area by summarizing the percent of area in each drought category by County and on a weekly basis. The table below provides a summary of the number of weeks in each drought category or the magnitude of the drought that describes the drought condition for the majority of the county for each weekly period from 1/4/1990 to 9/10/2018. This nearly 28-year window of drought data provides a clear picture as to how often the occurrence of different drought categories can be expected in the future.

Table 7-4: Historical Drought Magnitude

Drought Category	Description	Atascosa County		McMullen County	
None	Normal to Wet Conditions	429	43%	449	45%
D0	Abnormally Dry	158	16%	170	17%
D1	Moderate Drought	186	19%	159	16%
D2	Severe Drought	66	7%	103	10%
D3	Extreme Drought	97	10%	67	7%
D4	Exceptional Drought	56	6%	44	4%
	Total	992	100%	992	100%

Source: https://droughtmonitor.unl.edu/Data/DataDownload/ComprehensiveStatistics.aspx

Probability of Future Events

Based on available records of historic events from NCEI, there have been five (5) time periods of drought within a 21-year reporting period. This provides a probability of occurrence of one event every four to five years. Based on the drought monitor data for a 28-year reporting period, the planning area is in severe to exceptional drought approximately 16% of the time for Atascosa County and 11% for McMullen County. This frequency supports an occasional probability of future events occurring within the Atascosa and McMullen Counties planning area which means that an event is probable in the next 5 years.

Frequency of Occurrence	
Highly likely:	Event probable in next year.
Likely:	Event probable in next 3 years.
Occasional:	Event possible in next 5 years.
Unlikely:	Event possible in next 10 years.

Vulnerability and Impact

Drought affects large areas creating vulnerability for people, animals, property, agriculture, and the environment. Over the entirety of the planning area the biggest impacts of drought are dead crops and grazing land, edible plants for animals, and even trees. This primarily affects farming and wildlife but people can be directly impacted as well due to shortages of potable water supply. Communities will also ration the use of water during prolonged drought, particularly for lawn care and irrigation. Drought is related to and can exacerbate the natural hazards of wildfires and extreme heat. Drought can contribute to the cause of wildfires due to dying vegetation serving as ignition and can be intensified by extreme heat. The impacts of drought mostly affect water shortages and crop/livestock losses and do not typically extend to buildings and critical facilities.

The entire population of Atascosa and McMullen Counties are vulnerable to water supply shortages which present widespread health risks since people can only survive a few days without water. Potable water is used for many essential functions such as drinking, bathing, heating and cooling systems, and some electricity production. This affects vulnerable populations more acutely such as children, older adults, and people with illnesses or fragile health conditions. Also, vulnerable populations that do not have adequate air conditioning units in their homes are more at risk for injury or fatalities. The planning area has a total population of 71,389 according to the 2017 ACS population estimate. Those over the age of 65 represent 9.6% (6,855) of the total population and children under the age of 5 represent 4.9% (3,492) of the total population. This is a total of 10,347 potentially vulnerable residents. Table 7-5 presents the 2017 American Community Survey population and age cohort estimates below.

Table 7-5: Populations at Greater Risk by Jurisdiction

Jurisdiction	Population 65 and Older	Population Under 5
McMullen County	**159**	**45**
City of Charlotte City	326	90
City of Christine	38	19
City of Jourdanton	411	303
City of Lytle	465	18
City of Pleasanton	734	1,542
City of Poteet	499	154
Atascosa County	**6,696**	**3,447**
Total	**6,855**	**3.492**

Source: 2017 American Community Survey (Note: County totals include both incorporated and unincorporated areas)

The environment of the Atascosa and McMullen Counties planning area is also vulnerable to damage during drought. Through lack of food and water and habitat degradation, aquatic and terrestrial species both can experience significant reductions due to death and lower reproduction rates. Land can experience damage as well due to shrinking, subsidence, and erosion in some areas during extreme or prolonged drought.

Water is central to the ability of people to inhabit and transact commerce in a region and the economic impacts of drought can be significant, especially during prolonged drought. The ability to produce goods and provide services is dependent on direct and indirect access to clean water. Due to the interconnected nature of supply and production chains, the negative effects of droughts can have ripple effects on many industries and sectors of the economy. The overall impact of damages caused by periods of drought is dependent on its extent and duration. It is rare that drought alone leads to a direct risk to the health and safety of people in the Atascosa and McMullen Counties planning area, however severe water shortages could lead to a direct risk to the health and safety of the population. The severity of the impact of a drought event can be mitigated by preparedness and planning by the community comprised of government, businesses, and citizens.

The National Drought Mitigation Center (NDMC) at the University of Nebraska-Lincoln developed the drought impact reporter to provide a national database of drought impacts by county. The number of impacts in nine distinct impact categories from 2009 – 2019 are provided below. Table 7-6 lists the drought impacts in Atascosa and McMullen based on reports received by the Drought Impact Reporter. These reports are predominantly provided by the media, but can also come from NWS, other agencies, CoCoRaHS, legacy reports, and user reports.

Table 7-6: Drought Impacts, 2009-2019

ATASCOSA COUNTY		MCMULLEN COUNTY	
Energy	1	Energy	1
Fire	6	Fire	7
Plants & Wildlife	44	Plants & Wildlife	44
Relief, Response & Restrictions	12	Relief, Response & Restrictions	9
Society & Public Health	1	Society & Public Health	1
Water Supply & Quality	32	Water Supply & Quality	32
County Impacts	77	**County Impacts**	74

Source: https://droughtreporter.unl.edu/map/

Based on 21 years of data from the NCEI, the direct impacts of droughts in the Atascosa and McMullen Counties planning area has resulted in no known property or crop losses and no known injuries and fatalities. The impact to the planning area from drought has been limited and negligible based on data reported to the NCEI from 1996-2016. Drought impact reports like those presented above, however, come from a number of

different sources and provide a different perspective of the impact that drought can have on communities beyond direct monetary property or crop damages that typically aren't reported publicly. It is important to consider that crop damage information is typically not publicly reported and water availability issues are not easily quantified so the impact is likely much more pronounced than the direct losses attributed to this hazard.

Historic Drought Impacts

No injuries, fatalities, property, or crop damages were reported in the 21-year period of analysis. Based on historical records, annual loss impacts and estimates are considered to be negligible.

Drought Impacts Forecast

No injuries, fatalities, property, or crop damages were reported in the 21-year period of analysis. Based on historical records, forecast impact estimates are considered to be negligible.

SECTION 8: WINDSTORMS

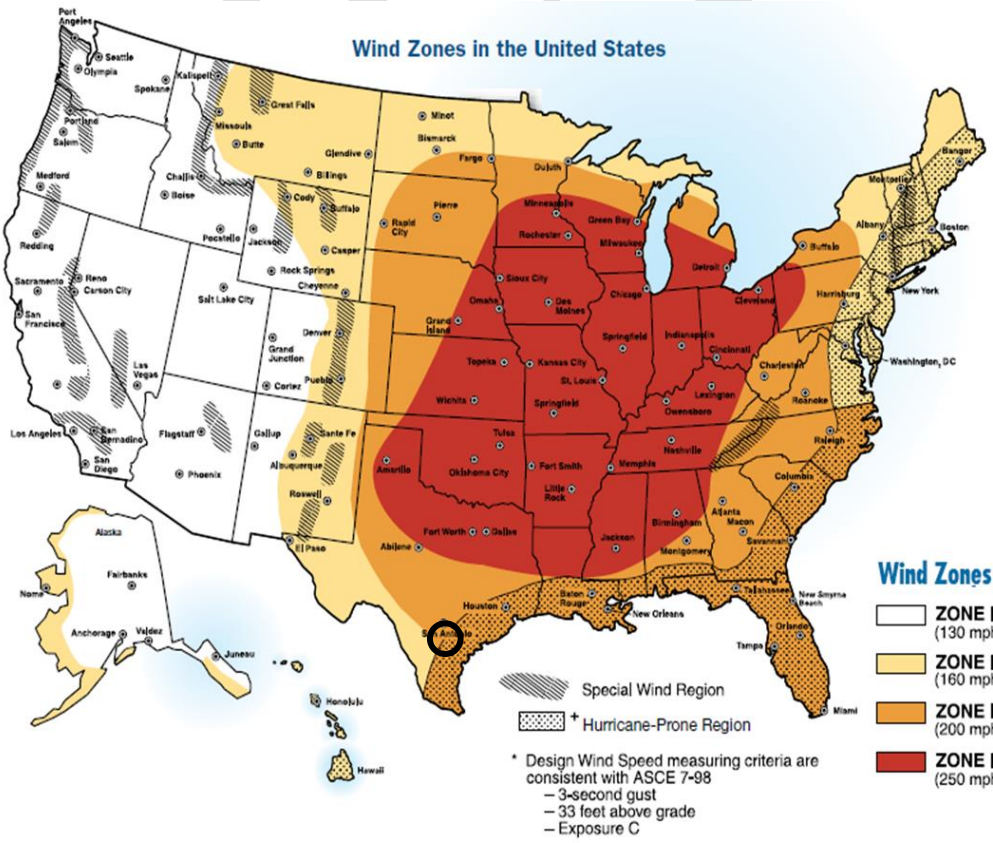
Description

Severe Wind can occur as straight-line events (derechos), or with other natural hazards including hurricanes and severe thunderstorms. According to the National Weather Service (NWS), a thunderstorm occurs when thunder accompanies rainfall. Thunderstorms create extreme wind events and are created when heat and moisture near the Earth's surface is transported to the upper levels of the atmosphere. The clouds, precipitation, and severe wind that become the thunderstorm are the result of this process. Straight line winds can have gusts of 87 knots (100 mph) or more and are responsible for most thunderstorm wind damages. One type of straight-line wind, the downburst, is a small area of rapidly descending air beneath a thunderstorm. A downburst can cause damage equivalent to a strong tornado and make air travel extremely hazardous.

Location

Thunderstorms develop randomly and are not confined to any geographic area and can occur at any location within the planning area. It is assumed that Atascosa and McMullen Counties, including all participating jurisdictions, are uniformly exposed to the threat of thunderstorm winds. According to FEMA Wind Zones in the United States (Figure 8-1), the planning area is located in Wind Zone III which is associated with winds as high as 200 mph and in a coastal region that is susceptible to hurricanes.

Figure 8-1: FEMA wind zones in the United States



Source: FEMA and the American Society of Civil Engineers (ASCE)

Extent

The extent or magnitude of a specific thunderstorm wind event is measured by the Beaufort Wind Scale, developed in 1805. Table 8-1 describes the Beaufort Wind Scale, with different intensities of wind events in terms of speed and effect, from calm to violent and destructive.

Table 8-1: Beaufort Wind Scale

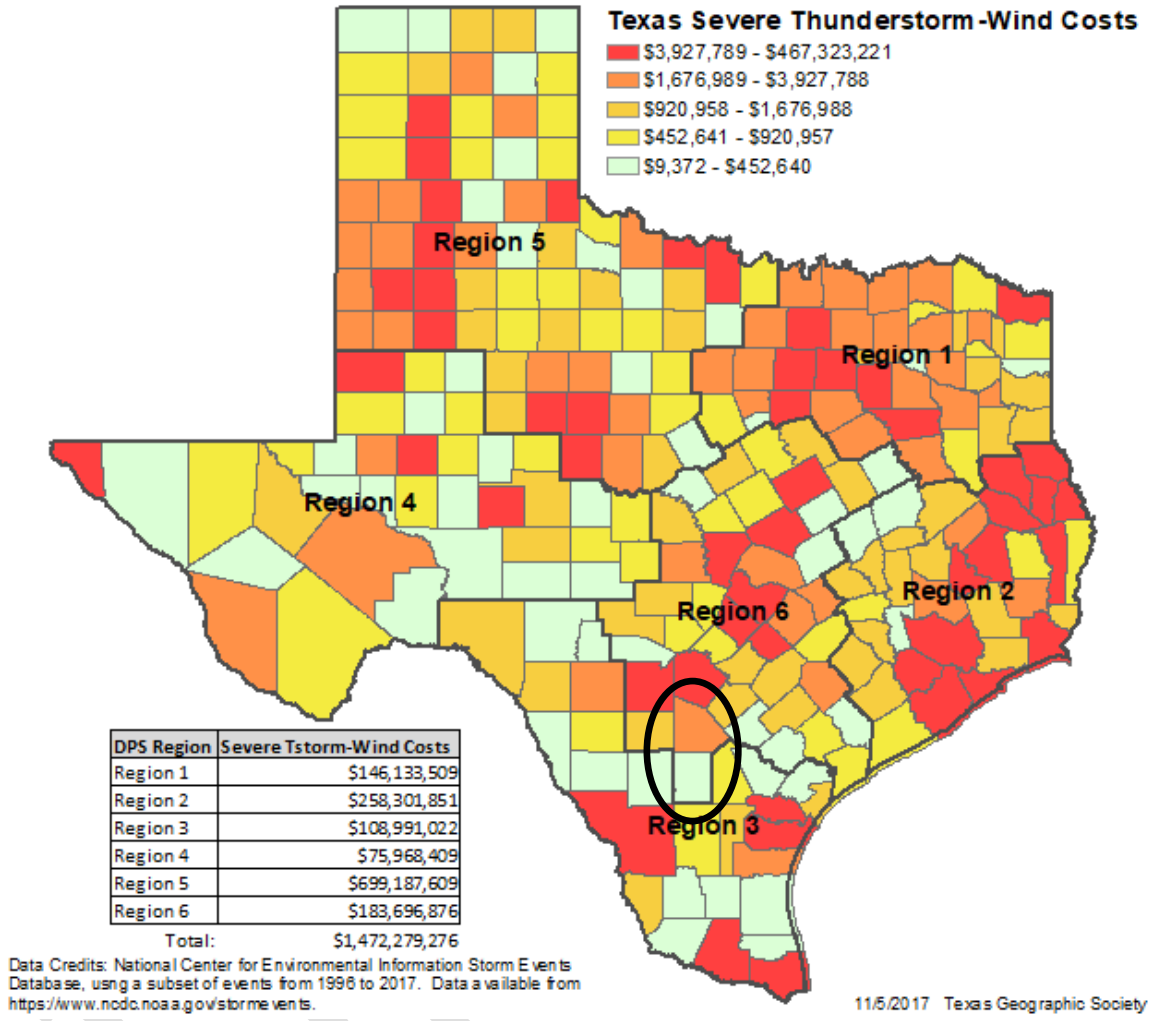
Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	**On Land**
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 ft taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-19 ft, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (18-25 ft) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Twigs breaking off trees, generally impedes progress
9	41-47	Strong Gale	High waves (23-32 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (29-41 ft) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high (37-52 ft) waves, foam patches cover sea, visibility more reduced	
12	64+	Hurricane	Air filled with foam, waves over 45 ft, sea completely white with driving spray, visibility greatly reduced	

Source: www.spc.noaa.gov/faq/tornado/beaufort.html

Historical Occurrences

Figure 8-2 shows total county losses (property plus crop losses) from severe thunderstorm wind for the State of Texas from 1996-2017. County colors indicate their losses relative to other counties in the state. Each color represents approximately 20 % of the counties that had these impacts and white represents zero-dollar losses.

Figure 8-2: Total County Losses in Texas from Thunderstorm-Wind, 1996-2017



Historical occurrences of thunderstorm wind events with resulting damages that have impacted the Atascosa and McMullen Counties planning Area are shown below in Table 8-2. Only high wind events associated with thunderstorm wind are considered in this section. Wind damage associated with other hazards, such as tornados or hurricanes, are accounted for in other sections. From 1996-2017, there have been 48 thunderstorm wind events recorded in the NCEI storm events database that have impacted the Atascosa and McMullen Counties planning area. The NCEI, organized under the National Oceanic and Atmospheric Administration, is the largest archive available for climate data, however, it is important to note that only incidents and damages reported to the NCEI have been factored into this risk assessment. Some occurrences seem to appear multiple times which is due to reports from various locations throughout the planning area.

Table 8-2: Historical Thunderstorm-Wind Events, 1996-2017

County	Jurisdiction	Year	Month	Magnitude	Injuries	Fatalities	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Atascosa	PLEASANTON	1996	July		0	0	$15,264	
Atascosa	POTEET	1996	August		0	0	$15,264	
Atascosa	CHARLOTTE	1996	August		0	0	$15,264	
Atascosa	CAMPBELLTON	1996	August		0	1	$45,793	
Atascosa	PLEASANTON	1996	August		0	0	$15,264	
Atascosa	PLEASANTON	1997	May		0	0	$44,766	
Atascosa	POTEET	1997	September		0	0	$119,377	
McMullen	TILDEN	1997	May	50	0	0		
McMullen	TILDEN	1997	May	50	0	0		
McMullen	TILDEN	1997	June	50	0	0		
Atascosa	POTEET	1998	February		0	0	$29,387	$73,466
Atascosa	LYTLE	1998	February		0	0	$73,466	$7,347
Atascosa	CHARLOTTE	1998	March		0	0	$117,546	
McMullen	TILDEN	1998	March	60	0	0		
McMullen	CALLIHAM	1998	August	55	0	0		
Atascosa	POTEET	1999	May		0	0	$57,503	
McMullen	TILDEN	1999	May	50	0	0		
Atascosa	CAMPBELLTON	2001	May		0	0	$67,617	$40,570
Atascosa	LYTLE	2002	March		0	0	$665,648	$133,130
Atascosa	COUNTYWIDE	2003	June	60	0	0	$130,163	
Atascosa	POTEET	2003	June	55	0	0	$39,049	
McMullen	TILDEN	2003	March	50	0	0		
McMullen	TILDEN	2003	June	52	0	0		
McMullen		2003	July	53	0	0		
Atascosa	PLEASANTON	2004	April	60	0	0	$126,787	
Atascosa	LYTLE	2005	February	60	0	0		
Atascosa	LYTLE	2006	May	65	0	0		
Atascosa	POTEET	2007	April	70	0	0	$86,650	
McMullen	TILDEN	2007	April	60	0	0	$5,777	
Atascosa	JOURDANTON	2008	March	60	0	0	$278,100	
Atascosa	CHARLOTTE	2009	March	52	0	0		
Atascosa	CHRISTINE	2009	March	52	0	0		
Atascosa	CHRISTINE	2009	March	50	0	0		
Atascosa		2009	April	50	0	0	$22,331	
Atascosa	LYTLE	2010	June	52	0	0		
Atascosa	POTEET	2010	June	52	0	0	$549	
Atascosa	ROSSVILLE	2010	August	43	0	0	$5,491	
Atascosa	NORTH PLEASANTON	2012	June	39	0	0	$3,129	

Atascosa	LEMING	2012	June	43	0	0	$5,216	
Atascosa	ROSSVILLE	2012	June	43	0	0	$5,216	
Atascosa	CHRISTINE	2013	May	61	0	0		
McMullen	CAHHAM	2013	May	52	0	0	$25,697	
Atascosa	AMPHION	2014	May	61	0	0		
Atascosa	NORTH PLEASANTON	2014	May	61	0	0		
Atascosa	HAIDUK	2014	November	52	0	0		
Atascosa	LYTLE	2015	April	65	0	0		
McMullen	TILDEN	2015	April	52	0	0		
McMullen	WANTZ	2016	November	52	0	0	$10,000	

Source: NCEI Storm Events Database

Significant Events

March 29, 2008 – Jourdanton, Atascosa County

A weak frontal boundary drifted northward into South Central Texas producing thunderstorms which caused large hail, strong winds and flash flooding in Atascosa County. A National Weather Service storm survey concluded that a microburst caused numerous trees down near downtown Jourdanton. Trees were down along Maple, Cedar, Main streets, along with other side roads near the courthouse. A lawn furniture manufacturing plant near the corner of Zanderson and maple was demolished with roof pieces being thrown several blocks away. There was other minor roof damage observed to a bail bonds business across the street from the Sheriff's office near the intersection of Oak Street and Campbell Avenue.

March 19, 2002 – City of Lytle, Atascosa County

Severe winds in the Lytle area damaged or destroyed three mobile homes, while blowing over trees, limbs, road signs, and damaging roofs in the area.

May 10, 2013 – McMullen County

A moderately unstable air mass developed over South Texas in advance of a frontal boundary draped across portions of south-central Texas. Scattered strong to severe thunderstorms developed over the Hill Country southwest into the higher terrain of northern Mexico in the afternoon of May 10th as an upper level disturbance approached from the west. The thunderstorms moved into the Brush Country during the evening hours producing wind damage and large. A complex of thunderstorms moved across Laredo late in the evening into the early morning hours of May 11th and produced locally heavy rainfall. Rainfall amounts of 2 to 3 inches in Laredo produced flash flooding in the city. In McMullen County, high winds blew down four power poles and caused damage to a garage northeast of the community of Cross.

Probability of Future Events

Windstorms are most likely to strike during the spring in the months of March, April, and May. There is also a brief period in September when the likelihood of windstorm hazards increases. The Atascosa and McMullen Counties planning area has experienced, on average, approximately 2 thunderstorm wind events every year. Wind events categorized as Forces 10-12 on the Beaufort scale with hurricane force winds have

routinely impacted the area and is the level of windstorm hazard the area should mitigate for in the future. The probability of future events is highly likely, meaning that an event is probable within the next year for the planning area.

Frequency of Occurrence	
Highly likely:	Event probable in next year.
Likely:	Event probable in next 3 years.
Occasional:	Event possible in next 5 years.
Unlikely:	Event possible in next 10 years.

Vulnerability and Impact

Thunderstorm winds exist at different strength levels and occur randomly throughout the planning area with the potential to cause injury and property damage. All people, animals, existing and future structures, and facilities in Atascosa and McMullen Counties planning area could potentially be impacted and remain vulnerable to strong winds. A thunderstorm wind event can impact human health including injuries from windblown debris, direct injuries, traffic accidents, and in rare cases, fatalities. Debris from damaged structures can also damage to other buildings not directly impacted by the event. Infrastructure, such as power lines, poles, radio towers, water towers and streetlights are vulnerable to the impacts of severe thunderstorm winds. In addition, street signs, garbage cans, outdoor furniture, storage sheds, roofs, vehicles, trees, and other objects commonly found outdoors are at risk. While these vulnerabilities do exist, the overall impacts of thunderstorm wind are limited in scope and have not resulted in any reported injuries or fatalities.

The Atascosa and McMullen Counties planning area features mobile and manufactured home parks which are more vulnerable to thunderstorm-winds than site-built structures. In addition, manufactured and temporary housing is located sporadically throughout rural portions of the planning area which are also vulnerable to the tornado hazard but more prone to being isolated from essential needs and emergency services in the event of a disaster.

The Atascosa and McMullen Counties planning area features mobile and manufactured home parks which are more vulnerable to hurricane winds than site-built structures. In addition, manufactured and temporary housing is located sporadically throughout rural portions of the planning area which are also vulnerable to the tropical storm and hurricane hazard but more prone to being isolated from essential needs and emergency services in the event of a disaster. Based on 2017 American Community Survey estimates, there are 372 housing units in McMullen County of which 24.5%, or 91 units, are manufactured homes. There are 18,141 housing units in Atascosa County of which 31.6%, or 5,731 units, are manufactured homes. In addition, 38.4% (approximately 7,109 structures) of the housing units in the overall planning area were built before 1980. These structures are likely to have been built to lower or less stringent construction standards

than newer construction and may be more susceptible to damages during significant events.

Table 8-3. Structures at Greater Risk by Jurisdiction

Jurisdiction	Total Housing Units	Manufactured Homes	Housing units built prior to 1980
McMullen County*	372	91 (24.5%)	169 (45.5%)
City of Charlotte	736	252 (34.2%)	464 (63%)
City of Christine	152	51 (33.6%)	66 (43.5%)
City of Jourdanton	1,478	377 (25.5%)	684 (46.2%)
City of Lytle	925	196 (20.2%)	502 (54.3%)
City of Pleasanton	4,017	401 (10.0%)	1,804 (44.9%)
City of Poteet	1,229	141 (11.5%)	605 (49.2%)
Atascosa County*	18,141	5,731 (31.6%)	6,940 (38.3%)
Planning Area Totals	*18,513*	*5,822 (31.4%)*	*7,109 (38.4%)*

*County totals include all jurisdictions in addition to unincorporated areas.
Source: 2013-2017 American Community Survey 5-year estimate, selected housing characteristics

Based on the ACS 2017 data, McMullen County is at higher risk of damage from hurricanes when considering age of residential structures and the higher standard of building codes enacted after 1980. Atascosa County is at a higher risk of damage from hurricanes when considering number and ratio of manufactured homes.

Historic Windstorm Impacts

Below are summary tables aggregated by County, Table 8-4 and 8-5, that show the 21-year column totals and the average annual (Per Year) losses in these categories. The bottom half of each table shows per capita dollar loss rates for the total and average annual losses. These rates are important measures for comparing losses between different areas. The average annual loss estimate of property and crop is $72,451 (in 2016 dollars) for McMullen County and $10,776 (in 2016 dollars) for Atascosa County.

Table 8-4: McMullen County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, McMullen County				
21-year Total	0	0	$41,474	$0
Per Year	0	0	$1,975	$0
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$59	$0
Per Year	0	0	$3	$0

Table 8-5: Atascosa County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, Atascosa County				
21-year Total	1	0	$1,984,840	$254,513
Per Year	0	0	$94,516	$12,120
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$44	$6
Per Year	0	0	$2	$0

Windstorm Impact Forecast

Tables 8-6 and 8-7 show the forecast annual impacts of windstorms in McMullen and Atascosa Counties and the total dollar-losses (property plus crop) forecasted by year. These forecasts are extrapolations of the average annual impacts in the base period modified by expected changes in:

1. The county populations and built environments (not used for forecasting crop losses) and
2. The frequency and intensity (damage producing capacity) of weather events.

Table 8-6: McMullen County Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Thunderstorm-Wind, McMullen County				
2019	0	0	$2,036	$0
2020	0	0	$2,057	$0
2021	0	0	$2,078	$0
2022	0	0	$2,099	$0
2023	0	0	$2,120	$0
Forecast Loss Summary				
5-year Total	0	0	$10,390	$0
Per Year	0	0	$2,078	$0
Per Capital Dollar Losses (2010 pop)				
5-year Total	0	0	$14.70	$0
Per Year	0	0	$2.94	$0

Table 8-7: Atascosa County Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Thunderstorm-Wind, Atascosa County				
2019	0	0	$98,993	$12,120
2020	0	0	$100,532	$12,120
2021	0	0	$102,094	$12,120
2022	0	0	$103,681	$12,120
2023	0	0	$105,293	$12,120
Forecast Loss Summary				
5-year Total	0	0	$510,593	$60,598
Per Year	0	0	$102,119	$12,120
Per Capital Dollar Losses (2010 pop)				
5-year Total	0	0	$11.37	$1.35
Per Year	0	0	$2.27	$0.27

The lower portions of the tables show the 5-year totals and the average annual losses in these categories. Since weather varies year-to year, forecasts of specific years are less likely to be true (less reliable) than these totals and averages for the period. The second summary table shows per capita dollar loss rates (based on 2010 population). This is an important measure for comparing historical or forecast losses between different hazards and timeframes. Comparing the Per Year rates in this table with the historical rates in Tables 8-4 and 8-5 above, reveals expected changes between base and forecast periods.

Table 8-8: Windstorm Losses by Jurisdiction 1996-2017

Jurisdiction	Est. Prop. Losses (2016 dollars)	Est. Crop Losses (2016 dollars)	Total Est $-Losses
*McMullen County**	$41,474	$0	$41,474
City of Charlotte	$75,794	$412	$76,206
City of Christine	$17,236	$371	$17,607
City of Jourdanton	$171,079	$721	$171,799
City of Lytle	$110,134	$927	$111,060
City of Pleasanton	$394,838	$1,750	$396,588
City of Poteet	$144,076	$350	$144,426
*Atascosa County**	$1,984,840	$254,513	$2,239,353

SECTION 9: EXTREME HEAT

Description

Extreme Heat is a condition where temperatures exceed local average high temperatures by ten degrees or more for an extended period of time and is also characterized by high humidity levels. Extreme heat is a common occurrence in Texas during the summer months. Extended periods of extreme heat are called heat waves and can lead to illness and death, particularly among vulnerable populations. In fact, heat waves have been the top cause of U.S. weather fatalities, on average, over the past 30 years.[3] Texas had a particularly deadly year in 2011, when 203 heat-related deaths were reported. The major human risks associated with severe summer heat include: heat cramps, sunburn, dehydration, fatigue, heat exhaustion, and even heat stroke. In addition, extreme heat can lead to power outages as heavy demands for air conditioning strain the power grid and prolonged exposure to excessive temperatures can damage crops and injure or kill livestock. As the Earth's climate warms overall heat waves are expected to become more frequent, longer, and more intense.[4]

Location

Extreme heat is not confined to any specific geographic area and can occur anywhere within the planning area. City residents can face a heightened risk to extreme heat because of warmer temperatures in cities from the urban heat island effect. The urban heat island effect is caused by large amounts of paved surfaces that absorb and re-radiate heat and the lack of green spaces and tree cover in these areas. Since the counties of Atascosa and McMullen do not have any large major metropolitan areas, the urban heat island effect is not as pronounced. This results in a negligible difference in extreme temperatures due to heat waves in the unincorporated areas of the counties and the incorporated areas.

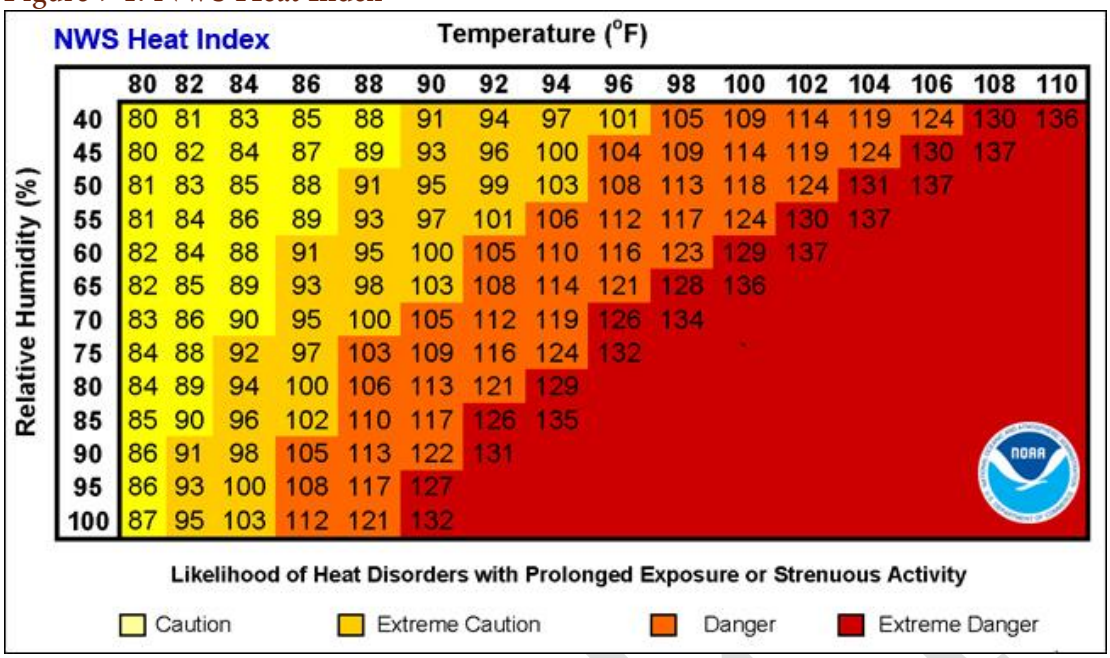
Extent

The "Heat Index" is the relationship between temperature and relative humidity established by the National Oceanic Atmospheric Administration (NOAA) to measure magnitude or intensity of an extreme heat event. This index combines the effect of high temperatures with high humidity to determine how hot it feels outside. Figure 9-1 below describes the heat index as it relates to the likelihood of heat disorders due to prolonged exposure or strenuous activity. As an example, if the air temperature is 98°F and the relative humidity is 65%, the heat index, or how hot it feels, is 128°F. The red area indicates extreme danger and the example above would fall into this category. Also, exposure to full sunshine can increase heat index values by up to 15°F since the heat index values in the chart below were devised for shady light wind conditions.

[3] http://www.nws.noaa.gov/om/hazstats.shtml

[4] Melillo, J.M., T.C. Richmond, and G.W. Yohe (eds.). 2014. Climate change impacts in the United States: The third National Climate Assessment. U.S. Global Change Research Program. http://nca2014.globalchange.gov.

Figure 9-1: NWS Heat Index



Source: NOAA

The likelihood of heat disorders associated with ranges of heat index values are displayed below. The classifications of "Caution," "Extreme Caution," "Danger," and "Extreme Danger" are associated with increasingly harmful effects on the body. Effects on the body depend on the magnitude or intensity of the event with the shaded rows in the table below (Table 9-1) corresponding to the colors in the chart above (Figure 9-1). The National Weather Service will initiate alert procedures when the Heat Index is expected to exceed 105°-110°F, depending on local climate, for at least 2 consecutive days.

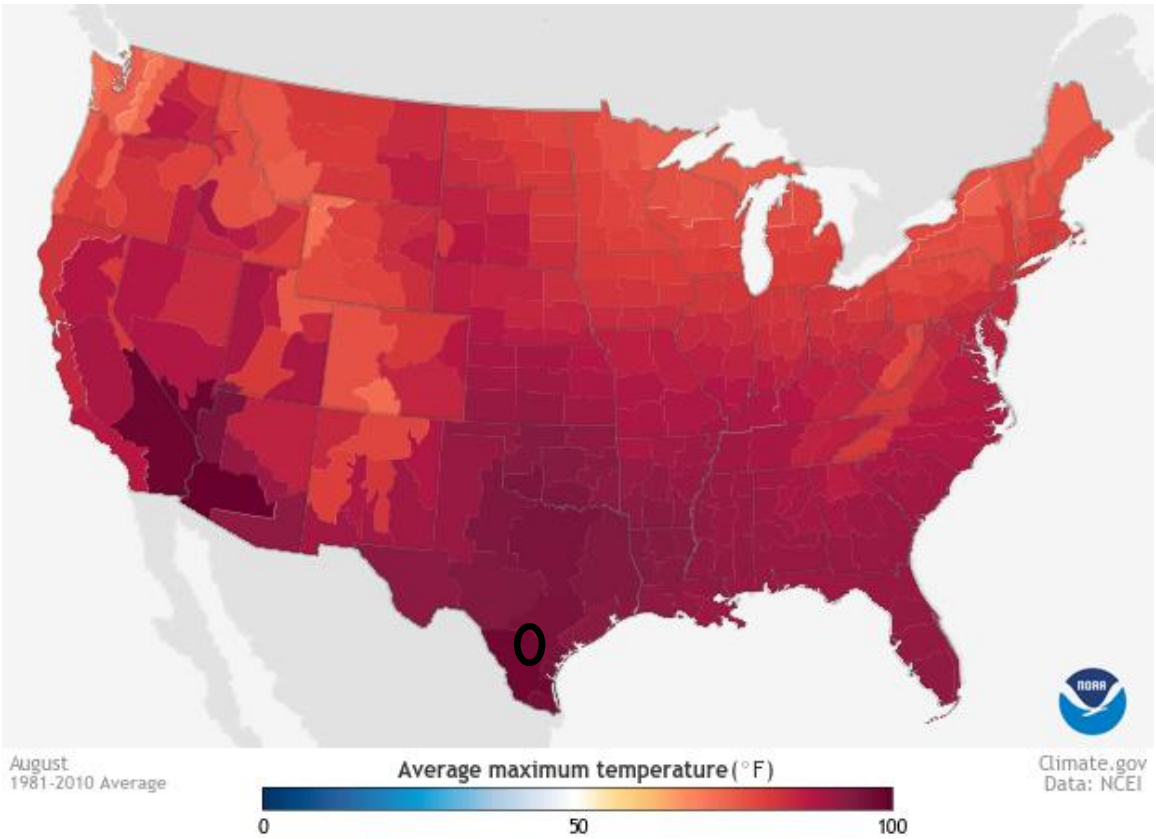
Table 9-1: Heat Index and Warnings

Classification	Heat Index	Effect on the body
Caution	80°F - 90°F	Fatigue possible with prolonged exposure and/or physical activity
Extreme Caution	90°F - 103°F	Heat stroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity
Danger	103°F - 124°F	Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity
Extreme Danger	125°F or higher	Heat stroke highly likely

source: https://www.weather.gov/ama/heatindexH

The hottest month of the year for the Atascosa and McMullen Counties planning area is typically August with an average relative humidity of 65%. The National Oceanic and Atmospheric Administration (NOAA) provides the map below that shows the long-term average maximum temperature in each climate division across the contiguous United States for the month of August. This data is based on daily observations from 1981-2010. The planning area exhibits an average maximum temperature of 90-100°F or above based on historical data and has the potential to reach "dangerous" heat index levels at just 92°F and "extremely dangerous" heat index levels at 98°F.

Figure 9-2: Average Maximum Temperature, Contiguous United States, August 1981-2010



https://www.climate.gov/maps-data/data-snapshots/averagemaxtemp-monthly-1981-2010-cmb-0000-08-00?theme=Temperature

Based on the average maximum temperature(90-100°F) and the average relative humidity(65°F) in the Atascosa and McMullen Counties planning area, extreme heat events to the extent of "Danger" and "Extreme Danger" should be mitigated for. When the heat index reaches a "Danger" classification, effects can include sunstroke, muscle cramps, heat exhaustion, and potential heatstroke with prolonged exposure. When the heat index reaches an "Extreme Danger" classification, effects on the body can include all of the above in addition to heat stroke and even death.

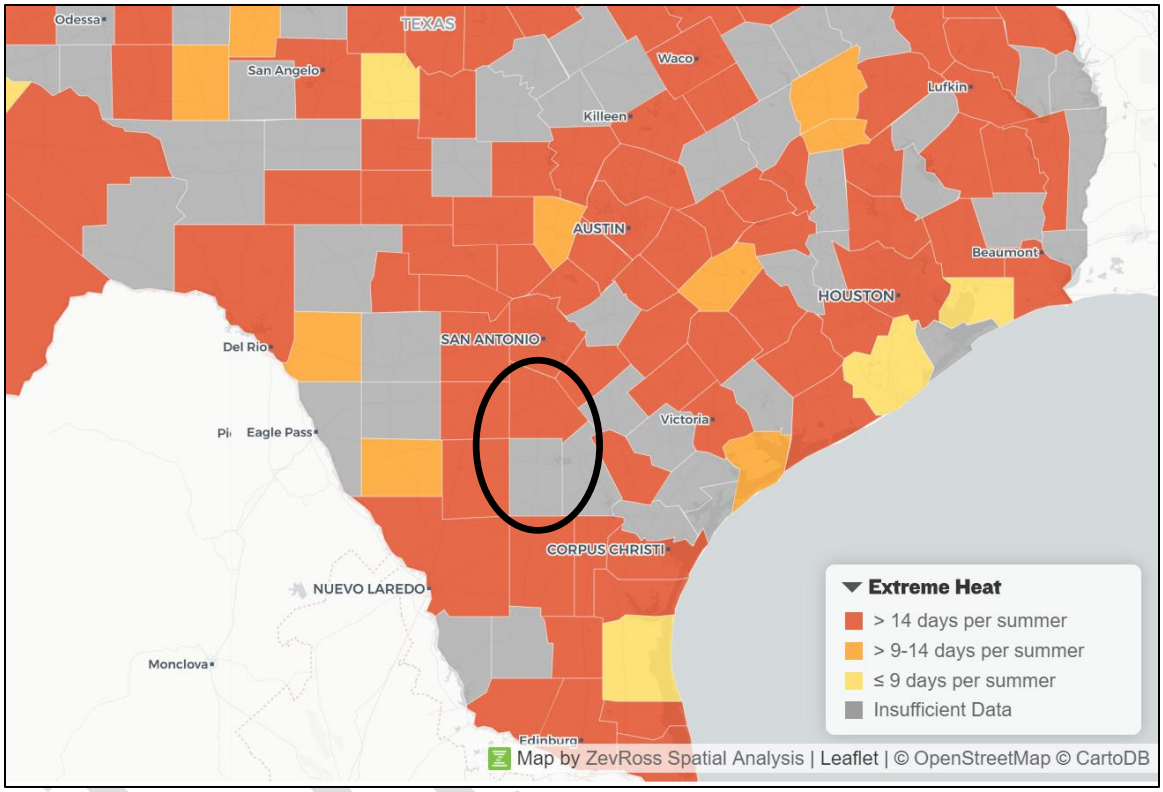
Historical Occurrences

There are no historical occurrences of extreme heat found in the NCEI database for the Atascosa and McMullen Counties Planning Area. This does not necessarily indicate that the area has never experienced an extreme heat event or that impacts to people, property, and agriculture are negligible. The lack of any historical occurrences in the NCEI record simply reflects that injury, fatalities, property losses, or crop losses were not directly attributed to any particular extreme heat event at the time.

The map below provides an analysis of extreme heat events based on weather station records from the Global Historical Climatology Network (GHCN), formerly the National Climatic Data Center. With this analysis from the NRDC, "extreme heat days"

are defined as those days from June 1 to August 31 in the years 2007 to 2016 on which the maximum temperature exceeded the 90th-percentile value. The June to August daily maximum temperatures from the 1961 to 1990 were used as a reference period for the same monitoring station to calculate the 90th percentile. The 90th percentile value is among the more common ways to define extreme heat and map below is indicative of how the number of extreme heat days per summer periods are changing over time.

Figure 9-3: Average Maximum Temperature, Contiguous United States, August 1981-2010

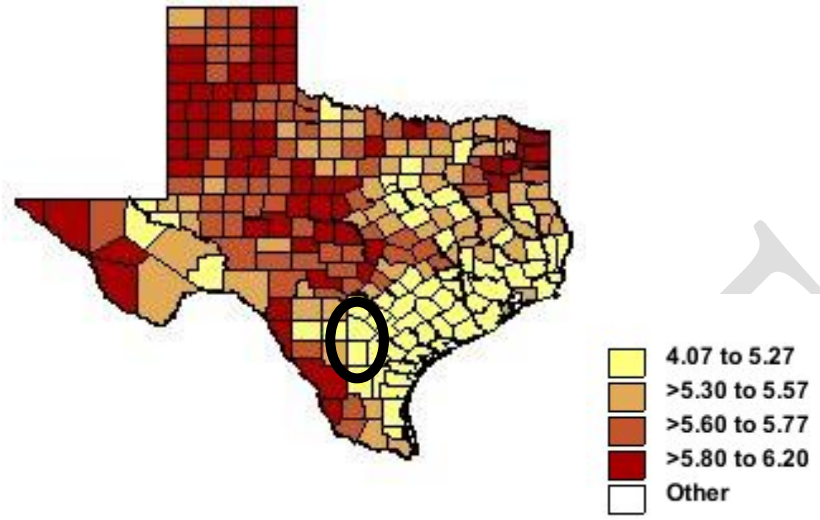


https://www.nrdc.org/climate-change-and-health-extreme-heat#/map/detail/TX

Based on historical monitoring station data from 1961-1990, areas with more than 9 days of extreme heat per summer in the map above are experiencing more days of extreme heat than they did in the past. The map above depicts Atascosa County as having greater than 14 days of extreme heat per summer. McMullen County does not have sufficient data per the map legend; however, it would also have greater than 14 days of extreme heat per summer if the data is inferred from the counties adjacent to it. This analysis clearly shows that the Atascosa and McMullen County planning area is experiencing more heat days during the summer than it did past.

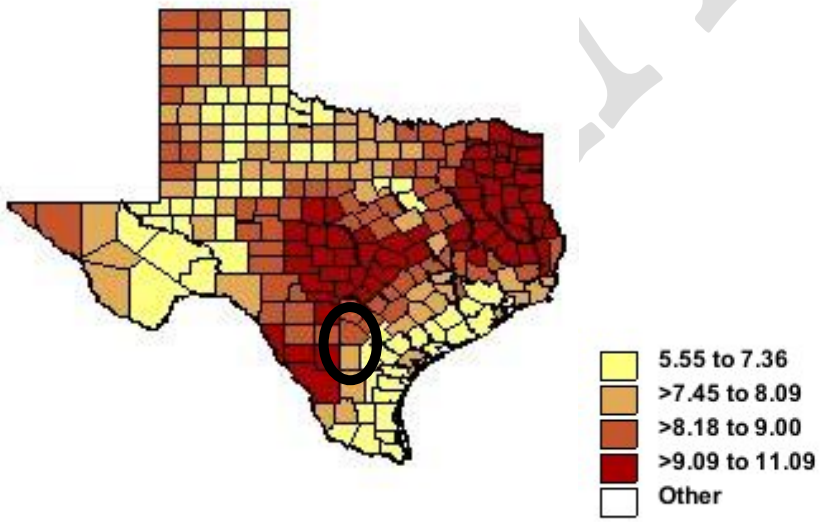
Data from CDC can also help tell a story of how the number of extreme heat days to be expected each summer are increasing. The two maps below depict a 29-year period from 1981-2010 and a 10-year period from 2000-2010. The Atascosa and McMullen Counties planning area is depicted within the black circle in the southcentral part of Texas on the maps below.

Figure 9-4: 1981-2010 Average Heat Wave Days Based on Daily Maximum Heat Index for Texas



Source: https://wonder.cdc.gov/NCA-heatwavedays-historic.html

Figure 9-5: 2000-2010 Average Heat Wave Days Based on Daily Maximum Heat Index for Texas



Source: https://wonder.cdc.gov/NCA-heatwavedays-historic.html

The Extreme Heat Events data available on the CDC WONDER website are county-level measures of the number of heat wave days in the months of May through September spanning the years 1981-2010. The CDC defines heat wave days as those that are 95th percentile of daily maximum Heat Index. The number of heat wave days is computed at the county level and the choropleth map and associated legends show the

average number of heat wave days occurring based on the selected time period and location.

Probability of Future Events

The planning area can expect at least 14 extreme heat days and at least 1 extreme heat event, or heat wave, each summer due to the warm, sunny, and humid subtropical climate in the Atascosa and McMullen Counties planning area. The probability of the area experiencing at least one extreme heat event in the next year is highly likely.

Frequency of Occurrence	
Highly likely:	Event probable in next year.
Likely:	Event probable in next 3 years.
Occasional:	Event possible in next 5 years.
Unlikely:	Event possible in next 10 years.

The probability that the number of extreme heat days will continue to increase in the future is also highly likely. According to NOAA, the top 10 warmest years on record (1880-2017) across the globe have all occurred within the past 20 years. Even more surprising, 8 of the top 10 warmest years have all occurred within the past 10 years. The table below ranks the warmest years on record with land and ocean annually averaged measurements compiled from 1880-2017.

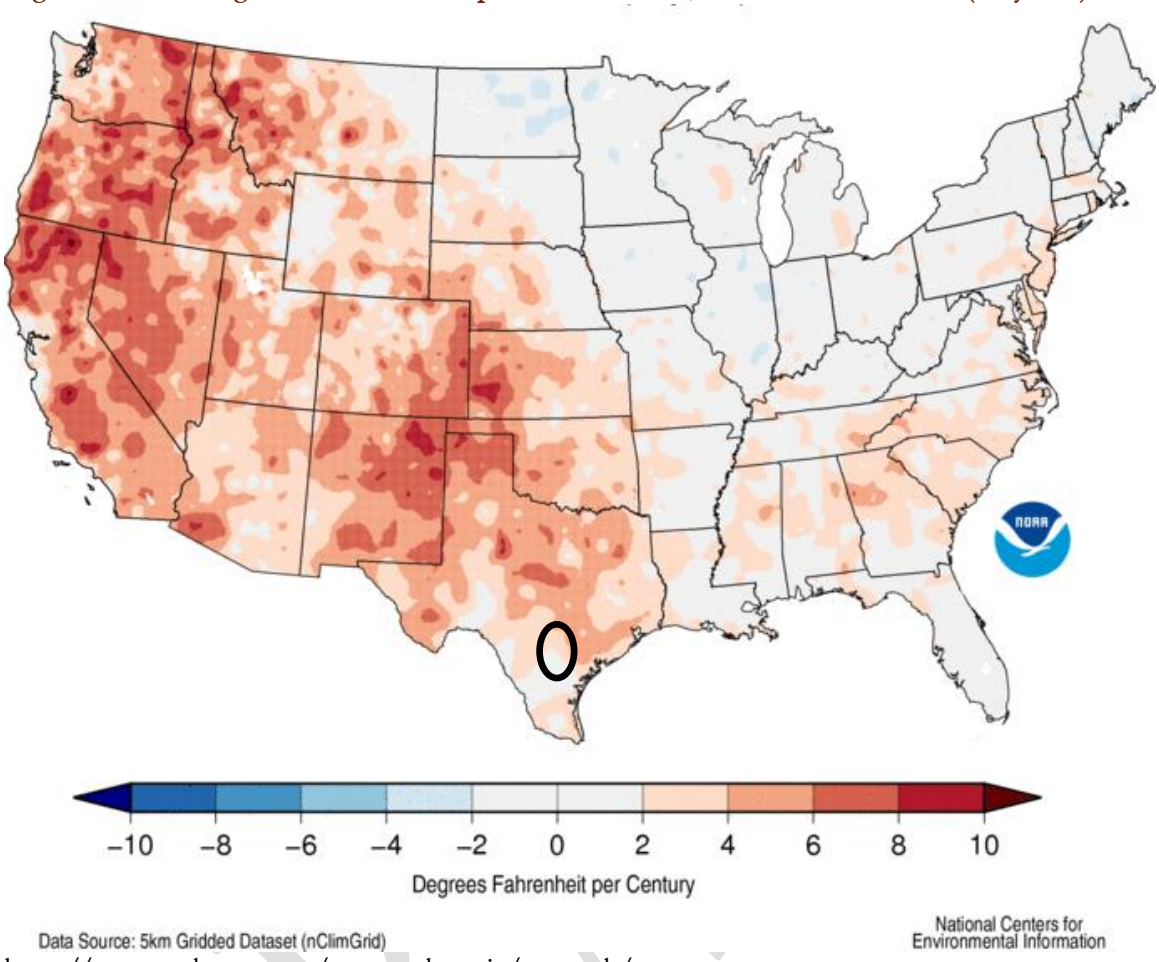
Table 9-2: Top 10 warmest years, Globally (NOAA, 1880-2017)

Rank	Year	Anomaly °F
1	2016	1.69
2	2015	1.62
3	2017	1.51
4	2014	1.33
5	2010	1.26
6	2013	1.19
7	2005	1.17
8	2009	1.15
9	1998	1.13
10	2012	1.12

"Global Climate Report – Annual 2017". NOAA. Retrieved 02 September 2018.

The average maximum temperature map in Figure 9-6 below depicts trends for the most recent complete 30-year period and is produced by the U.S. National Climatic Data Center. The map shows average maximum temperature trends across the United States during summer periods from 1988-2017. The Atascosa and McMullen Counties planning area are in an area that can expect an increase of 0-6°F in average maximum summer temperatures over the next century.

Figure 9-6: Average Maximum Temperature Trends, Summer 1988-2017 (30 years)



https://www.ncdc.noaa.gov/temp-and-precip/us-trends/

Vulnerability and Impacts

Residents of the area, especially vulnerable populations such as children under 5 and those over 65 should exercise caution by staying out of the heat for prolonged periods when a heat advisory or excessive heat warning is in effect. In addition to children and the elderly, the most vulnerable population to heat illnesses and casualties are the infirmed, who frequently live on low fixed incomes and cannot afford to run air-conditioning on a regular basis. This population is sometimes isolated, with no immediate family or friends to look out for their well-being so it is important for communities to get to know which immediate neighbors may be at highest risk to health impacts from heat. Those working or remaining outdoors for extended periods of time and overweight individuals are also at higher risk.

It is never safe to leave a baby, child, disabled person, or pet in a locked car. Cars heat up quickly in the sun and this is true even in the winter, the first toddler death due to being left in a locked car in the U.S. in 2018 occurred in February. The graphic in Figure 9-7 below is produced by NOAA with tips on how practice heat safety in different situations.

Figure 9-7: NOAA Heat safety tips

https://www.weather.gov/safety/heat

Higher heat index values (which combine temperature and humidity to describe perceived temperature) are expected to increase discomfort and aggravate health issues. Conversely, cold spells are expected to decrease. In most locations, scientists expect daily minimum temperatures—which typically occur at night—to become warmer at a faster rate than daily maximum temperatures.[5] This change will provide less opportunity to cool off and recover from daytime heat. As the region continues to warm overall, it will be important to educate the public about strategies to stay cool during extreme heat events and how to recognize and respond to heat-related illnesses.

[5] National Research Council. 2011. Climate stabilization targets: Emissions, concentrations, and impacts over decades to millennia. Washington, DC: National Academies Press

SECTION 10: LIGHTNING

Description

Lightening is sudden charges of electricity that develop from storms or excessive heat. This massive electrostatic discharge can occur between electrically charged regions within clouds, or between a cloud and the Earth's surface. A bolt of lightning, or the visible sparks, can cause air temperatures surrounding the bolt to approach 50,000ºF causing rapid air expansion leading to thunder, which often accompanies lightning strikes. Lightning is most often affiliated with severe thunderstorms, and often strikes outside of heavy rain and can occur as far as 10 miles away from any rainfall.

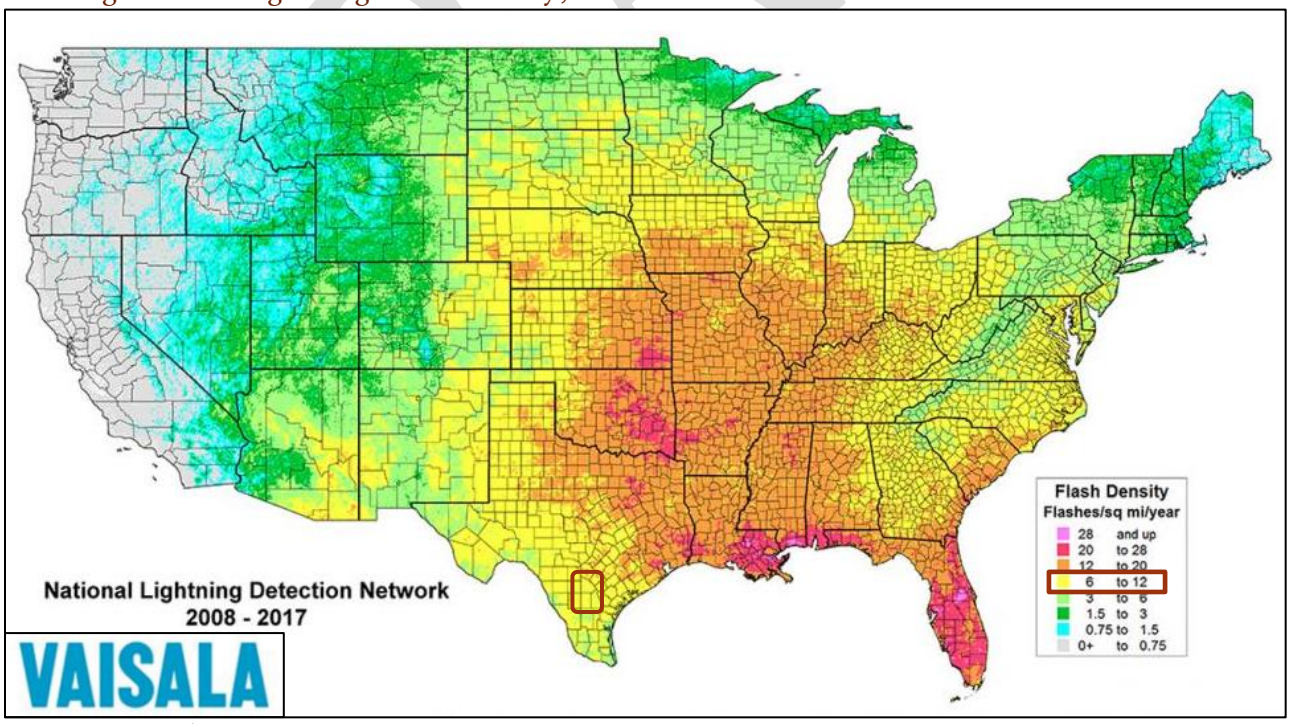
Location

The Atascosa and McMullen Counties planning area is located in a region of the country that is moderately susceptible to lightning strike. Lightning can occur at any location within the entire planning area and it is assumed that all area within Atascosa and McMullen Counties are uniformly exposed to the threat of lightning due to the consistent geography and terrain found.

Extent

Lightning extents is defined in terms of the frequency of lightning strikes within a defined geographic area and a set time period. The Vaisala's U.S. National Lightning Detection Network lightning flash density map, Figure 10-1, shows a range of 6 to 12 lightning flashes per square mile per year for the planning area from 2008-2017.

Figure 10-1: Lightning Flash Density, 2008-2017



Source: www.vaisala.com

A flash density of less than two is considered to be a minor severity and a flash density of three and greater is considered to be a major severity. Any lightning strike that causes

death or property damage is likewise considered a major severity. Based on the map, some areas within the northern portion of Atascosa County experience a lightning flash density that can reach 12-20 flashes per square mile per year.

The magnitude for lightning hazard events can also be measured in terms of the number of strikes in an interval of time. The Lightning activity levels (LALs) scale is used by NOAA to express the extent of lightning events and is on a scale of 1 to 6 along with descriptions of corresponding cloud and thunderstorm development. The LAL rankings scale reflects the frequency of lightning strikes from cloud to ground within a 15-minute interval. Lightning activity levels are described in more detail in Table 10-1 below.

Table 10-1: Lightning Activity Levels

LAL	Cloud & Storm Development	Lightning Strikes/15 min
1	No thunderstorms.	-
2	Cumulus clouds are common but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent.	1-8
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground, and lightning is infrequent.	9-15
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common and lightning is frequent.	16-25
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent and intense.	>25
6	Similar to LAL 3 except thunderstorms are dry.	

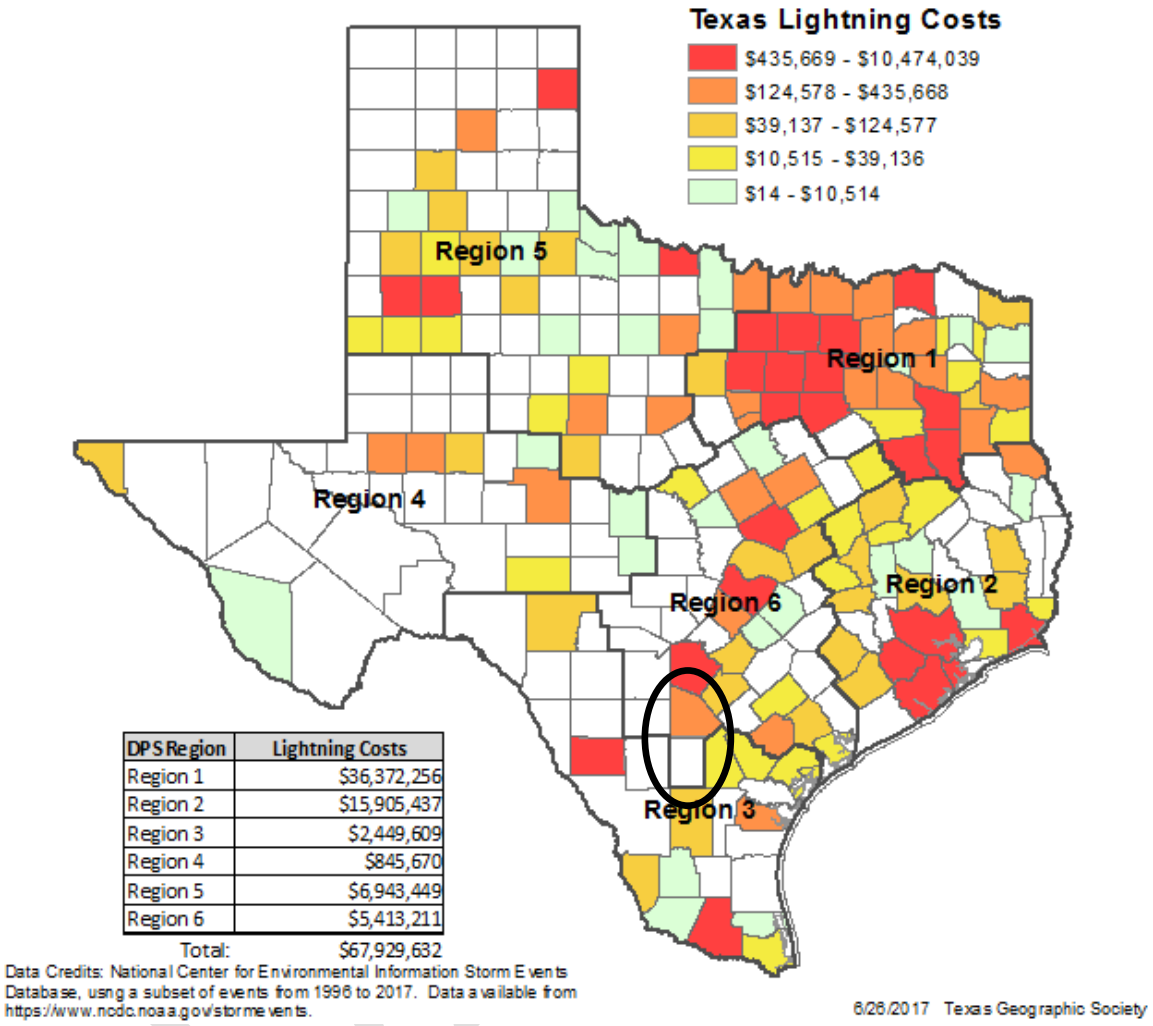
The Atascosa and McMullen Counties planning area can generally experience all lightning activity levels based on the extent and location of thunderstorm conditions. Based on Figure 10-1, the norther portion of Atascosa County is slightly more likely to experience a higher flash density, however, all areas are vulnerable to a LAL of 5, the most severe threat of lightning.

Historical Occurrences

Figure 10-2 shows total county losses (property plus crop losses) from lightning for the State of Texas from 1996-2017. County colors indicate their losses relative to other

counties in the state. Each color represents approximately 20% of the counties that had these sorts of impacts with white representing zero-dollar losses.

Figure 10-2: Total County Losses in Texas from Lightning, 1996-2017



While lightning occurs quite frequently in the planning area, the only lightning data contained within NOAA Storm Data are lightning events that result in fatality, injury and/or property and crop damage. Only one event was reported for the entire planning area since 1996 according to the NOAA National Centers for Environmental Information (NCEI) data. The lightning event that is documented in the NCEI database for the planning area, Table 10-2, resulted in the destruction of a residence in the community of Verdi. Structural damages resulting from lighting events are considered severe with risk of injury or death representing the greatest risk.

Table 10-2: Historical Lightning Events, NCEI 1996-2017

Location	Date	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage
Atascosa County, Verdi	7/8/2008	0	0	$166,860	0

Significant Events

July 8, 2008– Verdi in Atascosa County

Lightning struck a house in the Verdi area. The house was struck around 1 pm while the residents were away. The house was destroyed.

Texas Forest Service

Lightning occurrences and damages are not well documented in the NCEI data but other sources and accounts from the CORE planning team members indicate that lightning strikes occur frequently in the planning area. One other source for lightning strikes is the Texas Forest Service. Table 10-3 lists wildfires caused by lightning strikes recorded by the Texas Forest Service from 2005-2015 within the planning area and sorted by date.

Table 10-3: Texas Forest Service (TFS), Wildfire Ignition History 2005-2015

Location	Date	Name	Responder	Area Burned (Acres)
Atascosa	3/20/2006	Phifer	Jourdanton VFD	20
Atascosa	4/20/2006	Acres Lane #1	Leming VFD	1
Atascosa	4/21/2006	Acres Lane #2	Leming VFD	1
Atascosa	5/2/2006	6340 C.R. 331/ Kemp	Jourdanton VFD	30
Atascosa	5/4/2006	St Augustine #1	Leming VFD	1
Atascosa	5/14/2006	San Jose Ranch #1	Leming VFD	6
Atascosa	5/14/2006	San Jose Ranch #2	Leming VFD	6
Atascosa	5/15/2006	San Jose Ranch #3	Leming VFD	6
Atascosa	6/22/2006	2538 S.H. 97 west	Jourdanton VFD	1
Atascosa	6/3/2007	281 & North	Leming VFD	1.5
Atascosa	12/28/2008	1625 Bluntzer	Jourdanton VFD	0.5
Atascosa	7/6/2009	2282 Royal Oaks	Primrose VFD	3
Atascosa	1/8/2011	Dry Run 1	Rossville VFD	0.1
Atascosa	7/15/2011	Palo Alto Sand Pit	Poteet V F D	0.25
Atascosa	6/26/2012	Peeler1	Christine Vol. Fire Dept.	60

Atascosa	7/4/2014	Cemetery	Christine Vol. Fire Dept.	2
Atascosa	9/5/2014	Arrows/ San Miguel	Christine Vol. Fire Dept.	10

Source: Texas Wildfire Risk Assessment Portal (TWRAP); https://texaswildfirerisk.com/Map/Public

Probability of Future Events

With limited reported incidents in the planning area, the team utilized the most current lightning flash density estimate developed by Vaisala, Figure 10-1, for the risk assessment. The most current lightning flash density estimate indicates a probability of occurrence of approximately 6-12 lightning flashes per square mile per year. McMullen County is 1,142 square miles and Atascosa County is 1,236 square miles for a total of 2,378 square miles in the planning area. The Vaisala flash density estimate combined with the total area produces an estimate of approximately 14,268 to 28,536 flashes per year. A highly likely probability of occurrence for future lightning events in the Atascosa and McMullen Counties planning area is supported by this frequency. This means that an event is probable in the next year.

Frequency of Occurrence	
Highly likely:	Event probable in next year.
Likely:	Event probable in next 3 years.
Occasional:	Event possible in next 5 years.
Unlikely:	Event possible in next 10 years.

Vulnerability and Impact

Lighting strikes are random making all property and people within the Atascosa and McMullen Counties planning area vulnerable to the impact of lightning. Lightning can also be responsible for damage to buildings, electrical systems, forest and/or wildfires, and damage to infrastructure such as power transmission lines and communication towers. Lightning strikes are a cause of wildfires making agricultural land vulnerable as well. Agricultural losses from this hazard can be extensive. Lightning is attracted to tall metal structures making the drilling equipment and tanks in the areas particularly vulnerable to strikes.

Risk of injury or death represents the greatest risk for the hazard of lightning. The peak lightning season in the State of Texas is from June to August; however, the most fatalities occur in July as fatalities occur most often when people are outdoors, working or participating in some form of recreation. Moving inside will decrease a person's vulnerability to injury or death due to lightning strike.

Historic Lightning Impacts

Below are summary tables aggregated by County, Table 10-4 and 10-5, that show the 21-year column totals and the average annual (Per Year) losses in these categories. The bottom half of each table shows per capita dollar loss rates for the total and average annual losses. These rates are important measures for comparing losses between different

areas. The average annual loss estimate of property and crop is $0 (in 2016 dollars) for McMullen County and $7,946 (in 2016 dollars) for Atascosa County.

Table 10-4: McMullen County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, McMullen County				
21-year Total	0	0	$0	$0
Per Year	0	0	$0	$0
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$0	$0
Per Year	0	0	$0	$0

Table 10-5: Atascosa County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, Atascosa County				
21-year Total	0	0	$166,860	$0
Per Year	0	0	$7,946	$0
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$4	$0
Per Year	0	0	$0	$0

Lightning Impact Forecast

Tables 10-6 and 10-7 show the forecast annual impacts of Tornados in McMullen and Atascosa Counties and the total dollar-losses (property plus crop) forecasted by year. These forecasts are extrapolations of the average annual impacts in the base period modified by expected changes in:

1. The county populations and built environments (not used for forecasting crop losses) and
2. The frequency and intensity (damage producing capacity) of weather events.

Table 10-6: McMullen County Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Lightning, McMullen County				
2019	0	0	$0	$0
2020	0	0	$0	$0
2021	0	0	$0	$0
2022	0	0	$0	$0
2023	0	0	$0	$0
Forecast Loss Summary				
5-year Total	0	0	$0	$0
Per Year	0	0	$0	$0
Per Capital Dollar Losses (2010 pop)				
5-year Total	0	0	$0	$0.00
Per Year	0	0	$0	$0.00

Table 10-7: Atascosa County Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Lightning, Atascosa County				
2019	0	0	$8,322	$0
2020	0	0	$8,451	$0
2021	0	0	$8,583	$0
2022	0	0	$8,716	$0
2023	0	0	$8,852	$0
Forecast Loss Summary				
5-year Total	0	0	$42,924	$0
Per Year	0	0	$8,585	$0
Per Capital Dollar Losses (2010 pop)				
5-year Total	0	0	$0.96	$0.00
Per Year	0	0	$0.19	$0.00

The lower portions of the tables show the 5-year totals and the average annual losses in these categories. Since weather varies year-to year, forecasts of specific years are less likely to be true (less reliable) than these totals and averages for the period. The second summary table shows per capita dollar loss rates (based on 2010 population). This is an important measure for comparing historical or forecast losses between different hazards and timeframes. Comparing the Per Year rates in this table with the historical rates in Tables 10-4 and 10-5 above, reveals expected changes between base and forecast periods.

Table 10-8: Lightning Losses by Jurisdiction 1996-2017

Jurisdiction	Est. Prop. Losses (2016 dollars)	Est. Crop Losses (2016 dollars)	Total Est $-Losses
Atascosa Co	$166,860	$0	$166,860
Charlotte	$6,372	$0	$6,372
Christine	$1,449	$0	$1,449
Jourdanton	$14,382	$0	$14,382
Lytle	$9,259	$0	$9,259
Pleasanton	$33,193	$0	$33,193
Poteet	$12,112	$0	$12,112
McMullen Co	$0	$0	$0

SECTION 11: TORNADO

Description

A tornado is a narrow, violently rotating column of air that extends from the base of a cumulonimbus cloud to the ground. Tornadoes, among the most violent storms on the planet, are capable of tremendous destruction with wind speeds that can reach as high as 250-300mph. Typically, the vortex of air will remain suspended in the atmosphere and be visible as a funnel cloud. If the lower tip of the vortex touches the ground, however, the path of the tornado will often leave destruction in its wake and can be in excess of one mile wide and 50 miles long. Supercell Thunderstorms, created when horizontal wind shears (winds moving in different directions at different altitudes) begin to rotate the storm, can produce the most extreme and powerful tornadoes.

The economic and financial impacts of a tornado event on a community can be devastating depending on the scale of the event and the population density of the area that is hit. The damage caused in the aftermath of a tornado event can be minimized with collaborative preparedness and pre-event planning by government, businesses, and citizens.

Location

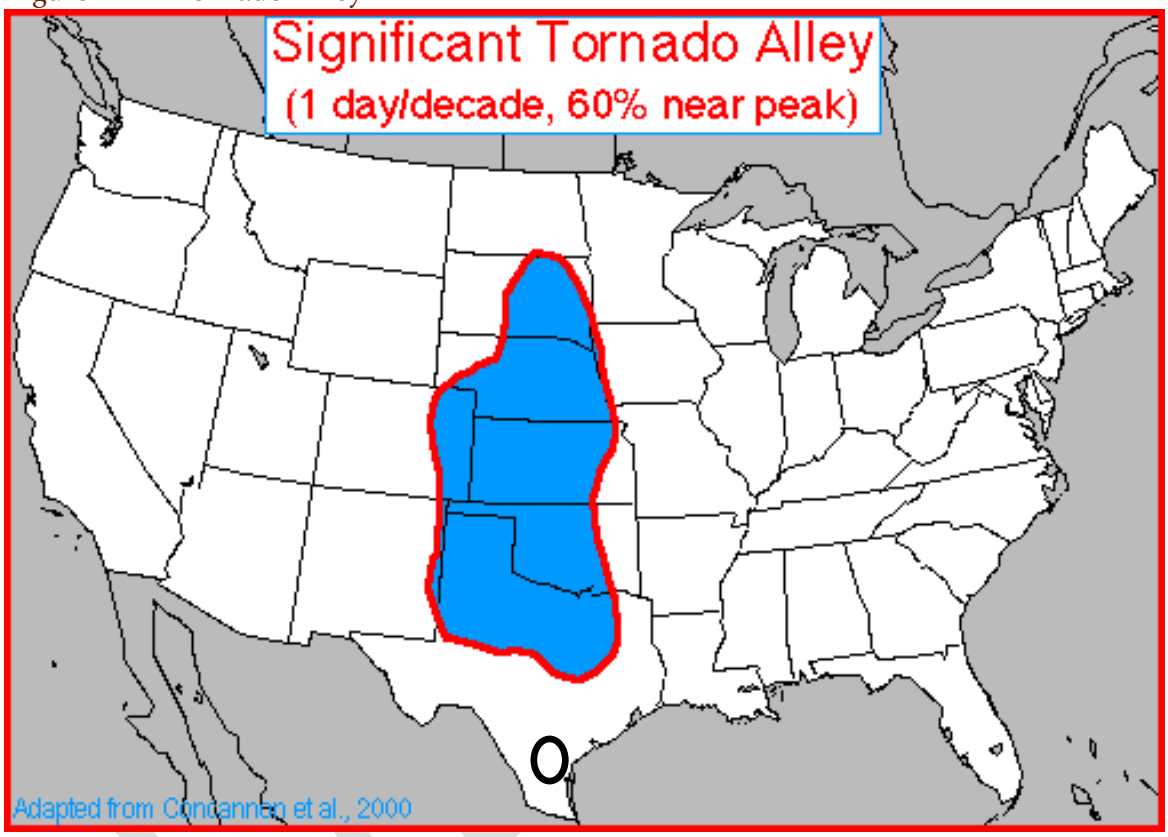
Tornadoes do not have any specific geographic boundary and can occur uniformly throughout the planning area. Atascosa and McMullen Counties are located in Wind Zone III along the Texas gulf coast (Figure 11-1), where tornado winds can be as high as 200 mph.

Figure 11-1: United States Wind Zones

www.fema.gov/plan/prevent/saferoom/tsfs02_wind_zones.shtm

Tornado Alley refers to an area in the southern plains of the central United States that experiences a higher than normal frequency of tornadoes each year due to weather patterns and geography. This area extends from central Texas to northern Iowa, and from central Kansas and Nebraska east to Western Ohio (Figure 11-2). Tornadoes in this region typically occur in late spring and occasionally in the early fall. The Atascosa and McMullen Counties planning areas are 200-300 miles south of the southern border of Tornado Alley.

Figure 11-2: Tornado Alley



https://www.ncdc.noaa.gov/file/1535

Extent

Tornado events prior to 2007 follow the original Fujita scale. The current measure of the extent of tornado damage is the enhanced Fujita scale that took effect on February 1st, 2017. The scale ranges from EF0, generally weak tornadoes with the ability to do minor damage, to EF5, tornadoes with winds in excess of 200mph and the ability to do devastating damage to areas they come in contact with. Tornados can range from weak to violent and typically cause the greatest damage to structures of light construction, such as single-family, manufactured, and mobile homes.

Table 11-1: The Enhance Fujita Tornado Scale

Scale	Wind speed estimate (mph)	Potential damage	Example of damage
EF0	65–85	Minor damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF0.	
EF1	86-110	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.	
EF2	111–135	Considerable damage. Roofs torn off from well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.	
EF3	136–165	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 are badly damaged.	
EF4	166–200	Devastating damage. Well-constructed and whole frame houses completely leveled; cars and other large objects thrown and small missiles generated.	
EF5	> 200	Incredible damage. Strong-framed, well-built houses leveled off foundations are swept away; steel-reinforced concrete structures are critically damaged; tall buildings collapse or have severe structural deformations; some cars, trucks, and train cars can be thrown approximately 1 mile (1.6 km).	

The Enhanced Fujita Scale has 28 Damage Indicators (DI), or types of structures and vegetation, each with a varying number of Degrees of Damage (DoD). Larger degrees of damage done to the damage indicators correspond to higher wind speeds. Each damage indicator has a unique Degree of Damage scale, summarized in Table 11-2. For example, damage indicator 2, One and Two-family Residences, Degree of Damage Scale is provided as Figure 11-3. For Degree of Damage Scales for the remaining Damage Indicators refer to National Oceanic and Atmospheric Administration website. http://www.spc.noaa.gov/faq/tornado/ef-scale.html

Table 11-2: Degrees of Damage Scale

DI No.	Damage indicator (DI)	Degrees of damage (DOD)
1	Small barns or farm outbuildings (SBO)	8
2	One- or two-family residences (FR12)	10
3	Manufactured home – single wide (MHSW)	9
4	Manufactured home – double wide (MHDW)	12
5	Apartments, condos, townhouses [three stories or less] (ACT)	6
6	Motel (M)	10
7	Masonry apartment or motel building (MAM)	7
8	Small retail building [fast-food restaurants] (SRB)	8
9	Small professional building [doctor's office, branch banks] (SPB)	9
10	Strip mall (SM)	9
11	Large shopping mall (LSM)	9
12	Large, isolated retail building [K-Mart, Wal-Mart] (LIRB)	7
13	Automobile showroom (ASR)	8
14	Automobile service building (ASB)	8
15	Elementary school [single-story; interior or exterior hallways] (ES)	10
16	Junior or senior high school (JHSH)	11
17	Low-rise building [1–4 stories] (LRB)	7
18	Mid-rise building [5–20 stories] (MRB)	10
19	High-rise building [more than 20 stories] (HRB)	10
20	Institutional building [hospital, government or university building] (IB)	11
21	Metal building system (MBS)	8
22	Service station canopy (SSC)	6
23	Warehouse building [tilt-up walls or heavy-timber construction] (WHB)	7
24	Electrical transmission lines (ETL)	6
25	Free-standing towers (FST)	3
26	Free-standing light poles, luminary poles, flag poles (FSP)	3

27	Trees: hardwood (TH)	5
28	Trees: softwood (TS)	5

Figure 11-3: One and Two-Family Residences Degree of Damage Indicator

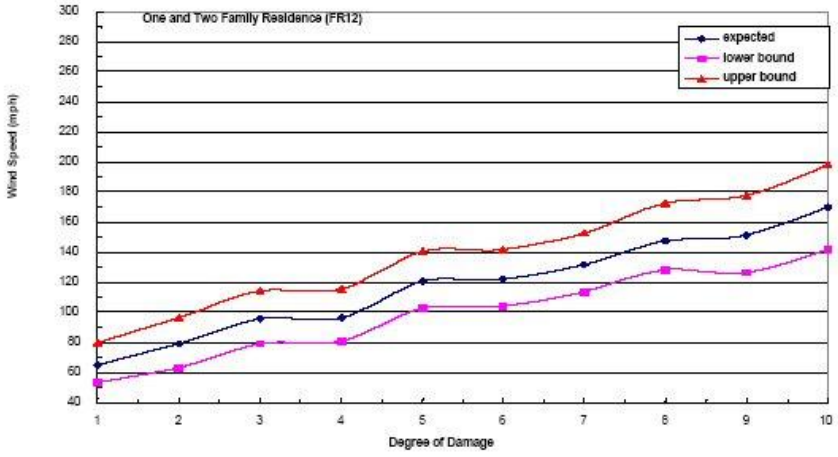
2. ONE-AND TWO-FAMILY RESIDENCES (FR12)
(1000 – 5000 sq. ft.)

Typical Construction

- Asphalt shingles, tile, slate, or metal roof covering
- Flat, gable, hip, mansard, or mono-sloped roof or combinations thereof
- Plywood/OSB or wood plank roof deck
- Prefabricated wood trusses or wood joist and rafter construction
- Brick veneer, wood panels, stucco, EIFS, vinyl, or metal siding
- Wood or metal stud walls, concrete blocks or insulating-concrete panels
- Attached single or double garage

DOD*	Damage description	EXP	LB	UB
1	Threshold of visible damage	65	53	80
2	Loss of roof covering material (<20%), gutters and/or awning; loss of vinyl or metal siding	79	63	97
3	Broken lass in doors and windows	96	79	114
4	Uplift of roof deck and loss of significant roof covering material (>20%); collapse of chimney; garage doors collapse inward; failure of porch or carport	97	81	116
5	Entire house shifts off foundation	121	103	141
6	Large sections of roof structure removed; most walls remain standing	122	104	142
7	Top floor exterior walls collapsed	132	113	153
8	Most interior walls of top story collapsed	148	128	173
9	Most walls collapsed in bottom floor, except small interior rooms	152	127	178
10	Total destruction of entire building	170	142	198

* Degree of Damage



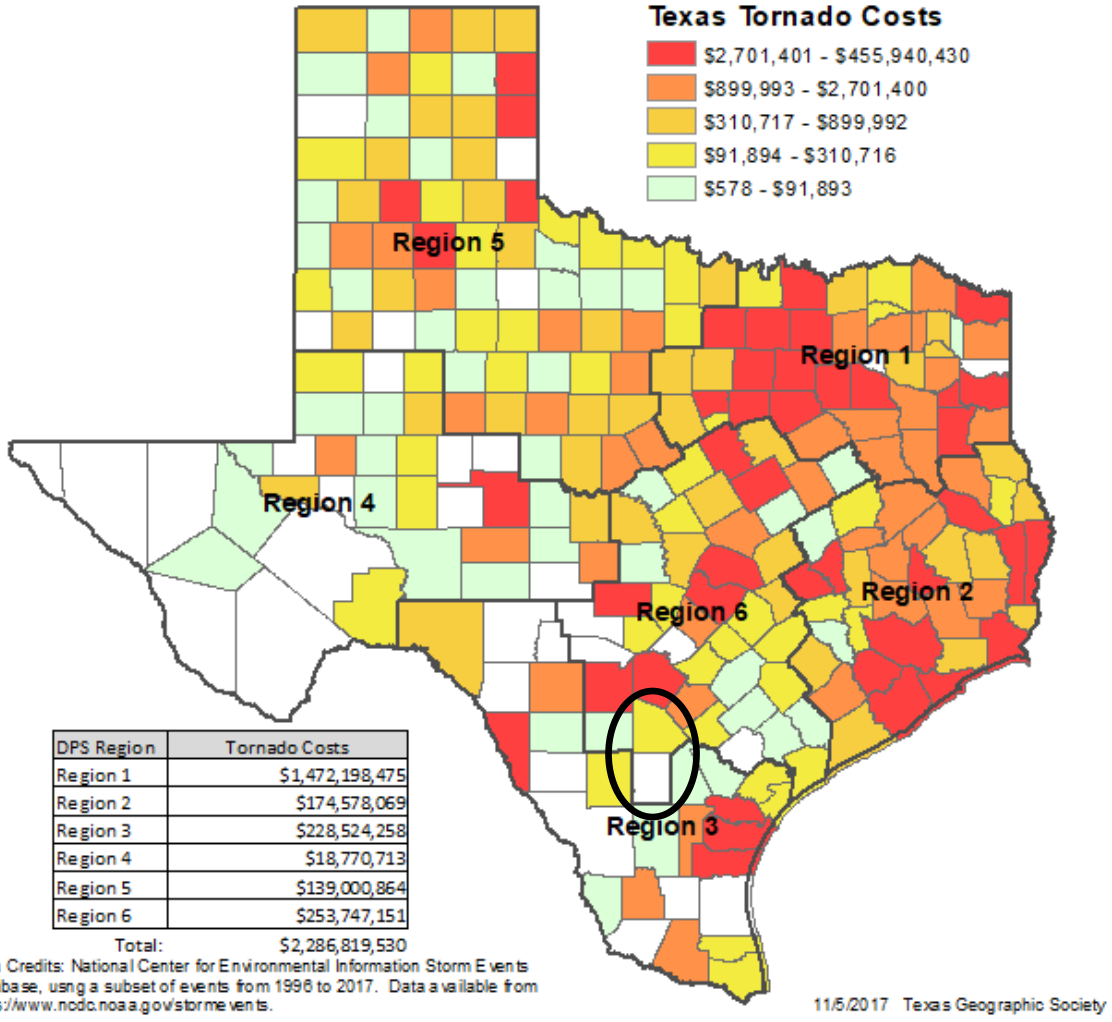
The events in Atascosa and McMullen Counties planning area have been between EF0 to an EF2 (Table 11-3). However, because Atascosa and McMullen Counties are in Wind

Zone III, the planning area could experience anywhere from an EF0 to an EF4. Therefore, the range of intensity that the planning area would be expected to mitigate is a tornado event that would be a low to severe risk, an EF0 to EF3.

Historical Occurrences

Figure 11-4 shows total county losses (property plus crop losses) from Tornados for the State of Texas from 1996-2017. County colors indicate their losses relative to other counties in the state. Each color represents approximately 20% of the counties that had these sorts of impacts -white represents zero-dollar losses.

Figure 11-4: Total County Losses in Texas from Tornados, 1996-2017



DPS Region	Tornado Costs
Region 1	$1,472,198,475
Region 2	$174,578,069
Region 3	$228,524,258
Region 4	$18,770,713
Region 5	$139,000,864
Region 6	$253,747,151
Total:	$2,286,819,530

Data Credits: National Center for Environmental Information Storm Events Database, usng a subset of events from 1996 to 2017. Data available from https://www.ncdc.noaa.gov/stormevents.

Table 11-3 lists historical tornado events in the planning area from 1996-2017 that were reported to the NCEI or NOAA. The impact of the tornado events in Atascosa and McMullen Counties are listed by date with additional impact information related to the specific jurisdiction of touchdown, magnitude of event, total dollar-losses related to crop and property damage, injuries, and fatalities.

Table 11-3: Historical Tornado Events by Jurisdiction, 1996 – 2017 (NCEI Storm Events Database)

County	Jurisdiction	Year	Month	Extent: Fujita Scale (pre-2007), Enhanced Fujita Scale (post-2007)	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Atascosa	LYTLE	1998	February	F1	0	0	$36,733	$2,939
Atascosa	POTEET	2003	June	F0	0	0	$52,065	
Atascosa	JOURDANTON	2003	June	F0	0	0	$39,049	
McMullen	WANTZ	2007	April	EF0	0	0		

Table 11-4: Historical Tornado Events Magnitude Summary, 1996 - 2007

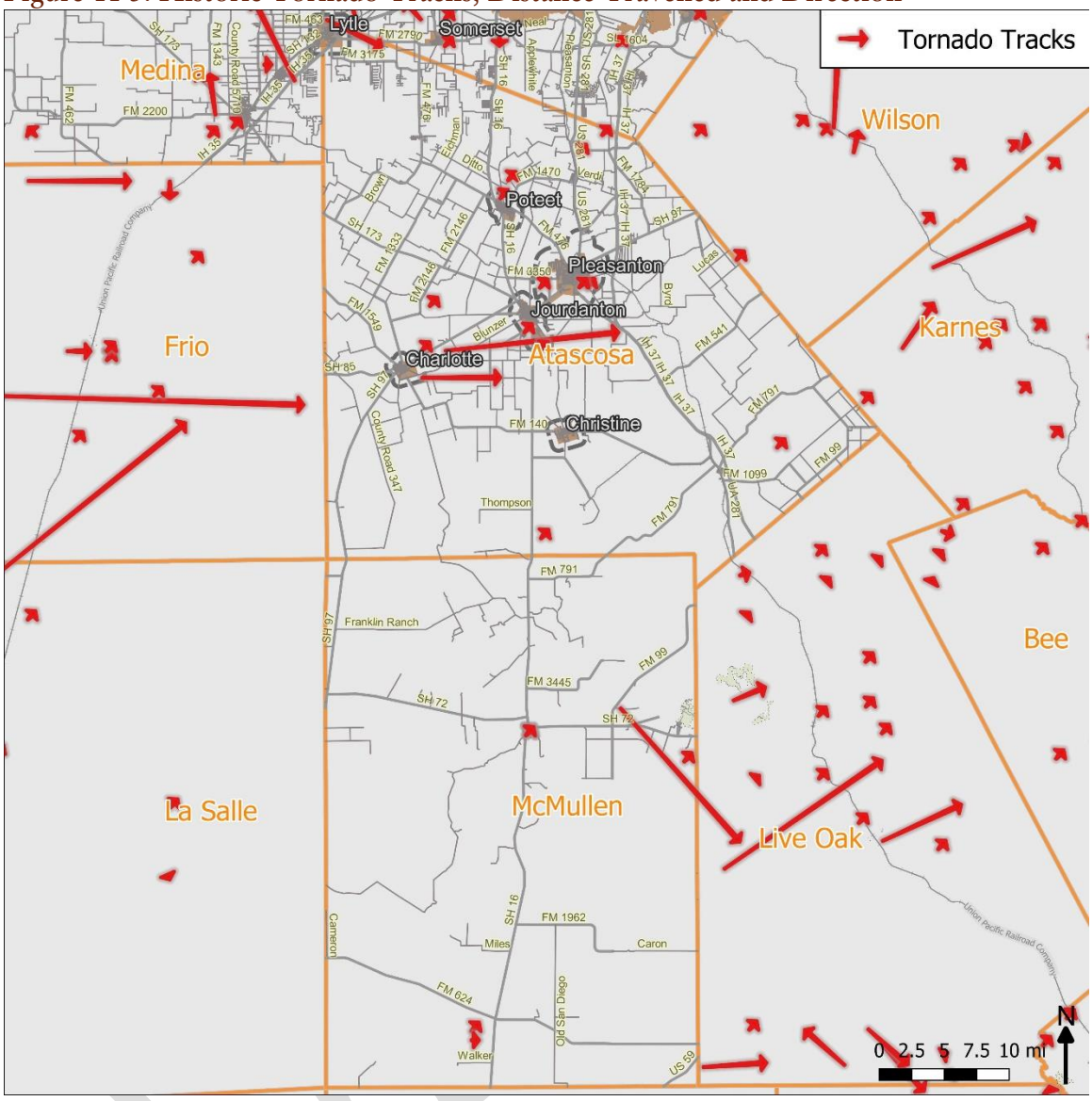
Number of Events	Magnitude (Fujita Scale)						
	N/A	F0	F1	F2	F3	F4	F5
3		2	1	0	0	0	0

Table 11-5: Historical Tornado Events Magnitude Summary, 2007-2017

Number of Events	Magnitude (Enhanced Fujita Scale)						
	N/A	EF0	EF1	EF2	EF3	EF4	EF5
1	0	1	0	0	0	0	0

The locations of previous occurrences from 1950 through 2017 in the planning area are shown in figure 11-5. This map displays the historic tornado tracks, the distance travelled, and the direction in which they travelled. Only reported tornadoes were plotted and factored into the risk assessment, however it is likely that several occurrences have gone unreported over the past 67 years.

Figure 11-5: Historic Tornado Tracks, Distance Travelled and Direction



Significant Events

June 3, 2003 – Jourdanton, Atascosa County

A small tornado struck just west of Jourdanton, knocking over trees and power lines. It was observed by a deputy sheriff as it moved nearly a quarter mile before dissipating. No other damage was indicated.

April 30, 2007 – Wantz, McMullen County

Isolated supercell thunderstorms formed in the late afternoon and early evening hours across McMullen county. A tornado was observed over open brush country just west of Highway 16 near F.M. 624, moving east.

Probability of Future Events

Tornadic storms are typically more common in the spring months during the late afternoon and evening hours but can occur at any time of year and at any time of day. A smaller, high frequency period can also emerge in the fall during the brief transition between the warm and cold seasons. Table 11-6 provides a general overview of tornado severity, probability, fatality impacts, and defining characteristics.

Table 11-6: Tornado Severity and Probability

WEAK TORNADOES	STRONG TORNADOES	VIOLENT TORNADOES
69% of all tornadoes	29% of all tornadoes	2% of all tornadoes
Less than 5% of tornado deaths	Nearly 30% of all tornado deaths	70% of all tornado deaths
Lifetime 1-10+ minutes	May last 20 minutes or longer	Lifetime can exceed one hour
Winds less than 110 mph	Winds 110 – 205 mph	Winds greater than 205 mph

According to historical records, there were 4 events in a 21-year reporting period in the planning area. This provides a probability of occurrence of approximately once every five years for the Atascosa and McMullen Counties planning area. This frequency supports an occasional probability of future events for the planning area, including all participating jurisdictions, meaning that an event is probable in the next five years.

Frequency of Occurrence	
Highly likely:	Event probable in next year.
Likely:	Event probable in next 3 years.
Occasional:	Event possible in next 5 years.
Unlikely:	Event possible in next 10 years.

Vulnerability and Impact

All existing and future buildings, facilities and populations in the Atascosa and McMullen County planning area are considered to be vulnerable to tornados and could potentially be impacted. High wind velocity, wind-blown debris, lightning, and large hail are typically the cause of damage done by a tornado. Tornados pose a significant threat to people as they commonly cause power outages which could cause health and safety risks to vulnerable populations that rely on power for medical necessities as well as patients in hospitals. Falling trees/branches, utility lines, poles and flying debris have the ability to cause injury and are also a significant safety risk. First responders and those needing to evacuate an area may also encounter blocked roads as a result of the debris rendering some areas inaccessible or inescapable. Some buildings and structures are more likely to be damaged than others from the high wind velocity associated with tornado events. The following three types of structures are most susceptible to damage by a tornado:

1. Manufactured Homes
2. Homes on crawlspaces (more susceptible to lift), and
3. Buildings with large spans, such as shopping malls, gymnasiums, and factories.

The Atascosa and McMullen Counties planning area features mobile and manufactured home parks which are more vulnerable to tornados than site-built structures. In addition, manufactured and temporary housing is located sporadically throughout rural portions of the planning area which are also vulnerable to the tornado hazard but more prone to being isolated from essential needs and emergency services in the event of a disaster.

Table 11-7: Structures at Greater Risk by Jurisdiction

Jurisdiction	Total Housing Units	Manufactured Homes	Housing units built prior to 1980
McMullen County*	372	91 (24.5%)	169 (45.5%)
City of Charlotte	736	252 (34.2%)	464 (63%)
City of Christine	152	51 (33.6%)	66 (43.5%)
City of Jourdanton	1,478	377 (25.5%)	684 (46.2%)
City of Lytle	925	196 (20.2%)	502 (54.3%)
City of Pleasanton	4,017	401 (10.0%)	1,804 (44.9%)
City of Poteet	1,229	141 (11.5%)	605 (49.2%)
Atascosa County*	18,141	5,731 (31.6%)	6,940 (38.3%)
Planning Area Totals	*18,513*	*5,822 (31.4%)*	*7,109 (38.4%)*

Source: 2016 ACS estimates - *County totals include all jurisdictions in addition to unincorporated areas.

Based on 2017 American Community Survey estimates, there are 372 housing units in McMullen County of which 24.5%, or 91 units, are manufactured homes. There are 18,141 housing units in Atascosa County of which 31.6%, or 5,731 units, are manufactured homes. In addition, 38.4% (approximately 7,109 structures) of the housing units in the overall planning area were built before 1980. These structures are likely to have been built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant events. Based on the ACS 2017 data, McMullen County is at higher risk of damage from Tornados when considering age of residential structures and the higher standard of building codes enacted after 1980. Atascosa County is at a higher risk of damage from hurricanes when considering number and ratio of manufactured homes.

Historic Tornado Impacts

Below are summary tables aggregated by County, 11-8 and 11-9, that show the 21-year column totals and the average annual (Per Year) losses in these categories. The bottom half of each table shows per capita dollar loss rates for the total and average annual losses. These rates are important measures for comparing losses between different areas. The average annual loss estimate of property and crop is $80,386 (in 2016 dollars) for McMullen County and $7,728 (in 2016 dollars) for Atascosa County.

Table 11-8: McMullen County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, McMullen County				
21-year Total	0	0	$1,688,100	$0
Per Year	0	0	$80,386	$0
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$39.00	$0
Per Year	0	0	$2.00	$0

Table 11-9: Atascosa County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, Atascosa County				
21-year Total	0	0	$127,847	$2,939
Per Year	0	0	$6,088	$140
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$3	$0
Per Year	0	0	$0	$0

Tornado Impact Forecast

Tables 11-10 and 11-11 show the forecast annual impacts of Tornados in McMullen and Atascosa Counties and the total dollar-losses (property plus crop) forecasted by year. These forecasts are extrapolations of the average annual impacts in the base period modified by expected changes in:

1. The county populations and built environments (not used for forecasting crop losses) and
2. The frequency and intensity (damage producing capacity) of weather events.

Table 11-10: McMullen County Tornado Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Tornados, McMullen County				
2019	0	0	$0	$0
2020	0	0	$0	$0
2021	0	0	$0	$0
2022	0	0	$0	$0
2023	0	0	$0	$0
Forecast Loss Summary				
5-year Total	0	0	$0	$0
Per Year	0	0	$0	$0
Per Capital Dollar Losses (2010 pop)				
5-year Total	0	0	$0	$0.00
Per Year	0	0	$0	$0.00

Table 11-11: Atascosa County Tornado Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Tornados, Atascosa County				
2019	0	0	$6,376	$140
2020	0	0	$6,475	$140
2021	0	0	$6,576	$140
2022	0	0	$6,678	$140
2023	0	0	$6,782	$140
Forecast Loss Summary				
5-year Total	0	0	$32,888	$700
Per Year	0	0	$6,578	$140
Per Capital Dollar Losses (2010 pop)				
5-year Total	0	0	$0.73	$0.02
Per Year	0	0	$0.15	$0.00

The lower portions of the tables show the 5-year totals and the average annual losses in these categories. Since weather varies year-to year, forecasts of specific years are less likely to be true (less reliable) than these totals and averages for the period. The second summary table shows per capita dollar loss rates (based on 2010 population). This is an important measure for comparing historical or forecast losses between different hazards and timeframes. Comparing the Per Year rates in this table with the historical rates in Tables 11-8 and 11-9 above, reveals expected changes between base and forecast periods.

Table 11-12: Tornado Losses by Jurisdiction 1996-2017

Jurisdiction	Est. Prop. Losses (2016 dollars)	Est. Crop Losses (2016 dollars)	Total Est $-Losses
Atascosa Co.	$127,847	$2,939	$130,786
Charlotte	$4,882	$5	$4,887
Christine	$1,110	$4	$1,114
Jourdanton	$$11,019	$8	$11,028
Lytle	$7,094	$11	$7,105
Pleasanton	$25,432	$20	$25,452
Poteet	$9,280	$4	$9,284
McMullen Co.	$0	$0	$0

SECTION 12: HAILSTORMS

Description

Hail is showery precipitation in the form of irregular pellets or balls of ice that typically measures 0.2 inches and 6 inches in diameter. It is a particularly damaging form of frozen participation resulting from thunderstorms with the size of the hail a direct result of the size and severity of the storms. Hail is produced when warm air rapidly rises into the upper atmosphere and the air mass is cooled. Frozen droplets within the cooled air mass accumulate to form ice crystals that then fall to the Earth as precipitation. The strength of the updraft is dependent on heating on the surface of the Earth with larger temperature gradients between the upper atmosphere and the surface responsible for increased suspension time and, therefore, increased hailstone size.

Location

Hailstorms are not confined to any specific geographic location, and can vary greatly in size, location, intensity and duration. As a result, all areas within the Atascosa and McMullen Counties planning area are equally at risk to the hazard of hail.

Extent

The NCEI Intensity Scale, depicted in Table 12-1, shows how the intensity category of a hailstorm depends on hail size and the potential damage it could cause. The intensity scale ranges from H0 to H10, with increments of intensity or damage potential in relation to hail size (distribution and maximum), texture, fall speed, speed of storm translation, and strength of the accompanying wind. The National Weather Service (NWS) classifies a storm as "severe" if there is hail one inch in diameter (approximately the size of a quarter) or greater, based on radar intensity or as seen by observers.

Table 12-1: Hail Intensity and Magnitude

SIZE CODE	INTENSITY CATEGORY	SIZE (Diameter Inches)	DESCRIPTIVE TERM	TYPICAL DAMAGE
H0	Hard Hail	Up to 0.33	Pea	No damage
H1	Potentially Damaging	0.33 - 0.60	Marble	Slight damage to plants and crops
H2	Potentially Damaging	0.60 - 0.80	Dime	Significant damage to plants and crops
H3	Severe	0.80 - 1.2	Nickel	Severe damage to plants and crops
H4	Severe	1.2 - 1.6	Quarter	Widespread glass and auto damage
H5	Destructive	1.6 - 2.0	Half Dollar	Widespread destruction of glass, roofs, and risk of injuries
H6	Destructive	2.0 - 2.4	Ping Pong Ball	Aircraft bodywork dented and brick walls pitted

H7	Very Destructive	2.4 - 3.0	Golf Ball	Severe roof damage and risk of serious injuries
H8	Very Destructive	3.0 - 3.5	Hen Egg	Severe damage to all structures
H9	Super Hailstorms	3.5 - 4.0	Tennis Ball	Extensive structural damage, could cause fatal injuries
H10	Super Hailstorms	4.0 +	Baseball	Extensive structural damage, could cause fatal injuries

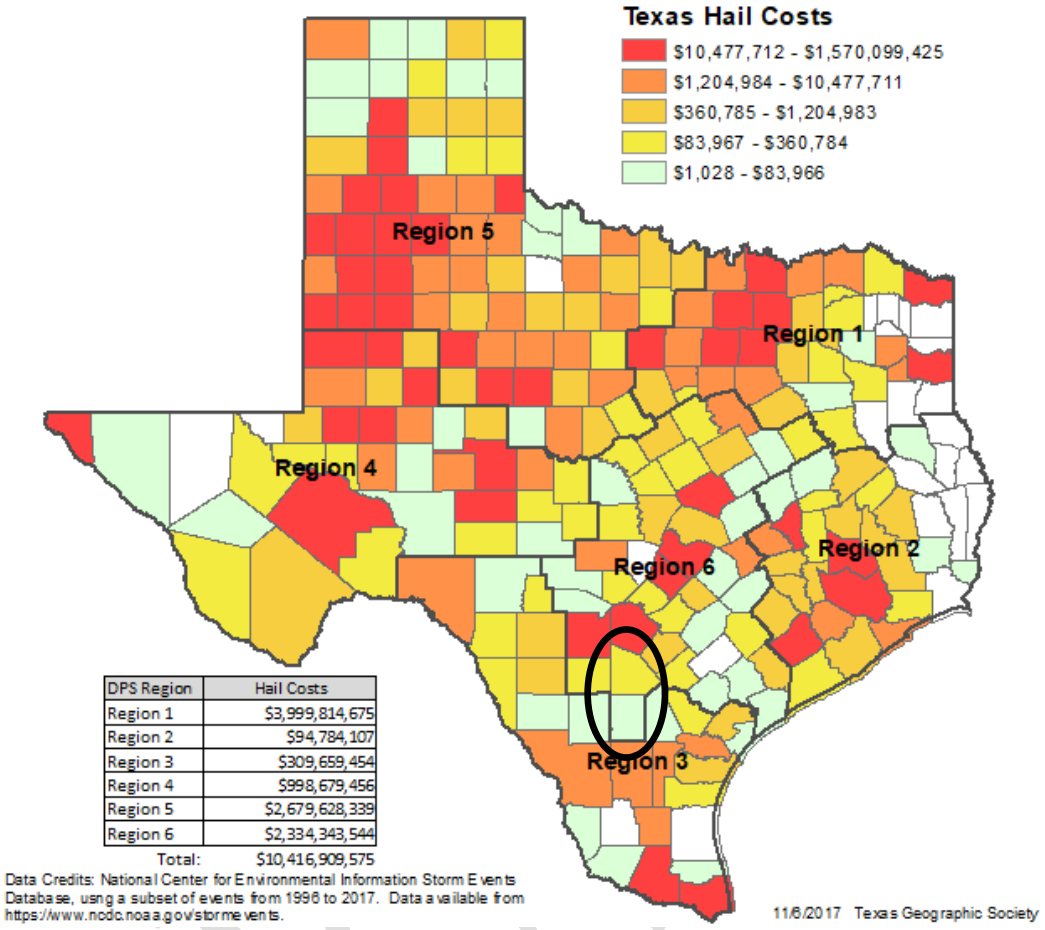
Source: NCEI Intensity Scale, based on the TORRO Hailstorm Intensity Scale.

The McMullen and Atascosa Counties planning area may experience hailstorms ranging from an H0 to an H10 based on previous occurrences for the area discussed further below. The planning area can plan to mitigate storms ranging from hard hail (low risk) to super hailstorms (high risk), the latter potentially leading to widespread destruction of glass, roofs, and potential risk of injuries.

Historical Occurrences

Figure 12-1 shows total county losses (property plus crop losses) from hailstorms for the State of Texas from 1996-2017. County colors indicate their losses relative to other counties in the state. Each color represents approximately 20% of the counties that had these sorts of impacts -white represents zero-dollar losses.

Figure 12-1, Total County Losses in Texas from Hailstorms, 1996-2017



Historical evidence for Atascosa and McMullen Counties suggests that the entire planning area is vulnerable to hail events. Historical events with reported damage, injuries or fatalities are shown in Table 12-2 below. A total of 62 reported historical hail events impacted Atascosa and McMullen Counties during the 21-year period from 1996 through 2017. These reported events may not represent all hail events to have occurred during this time since they were only the events reported to NCEI and NOAA databases.

Table 12-2: Historical Hail Events

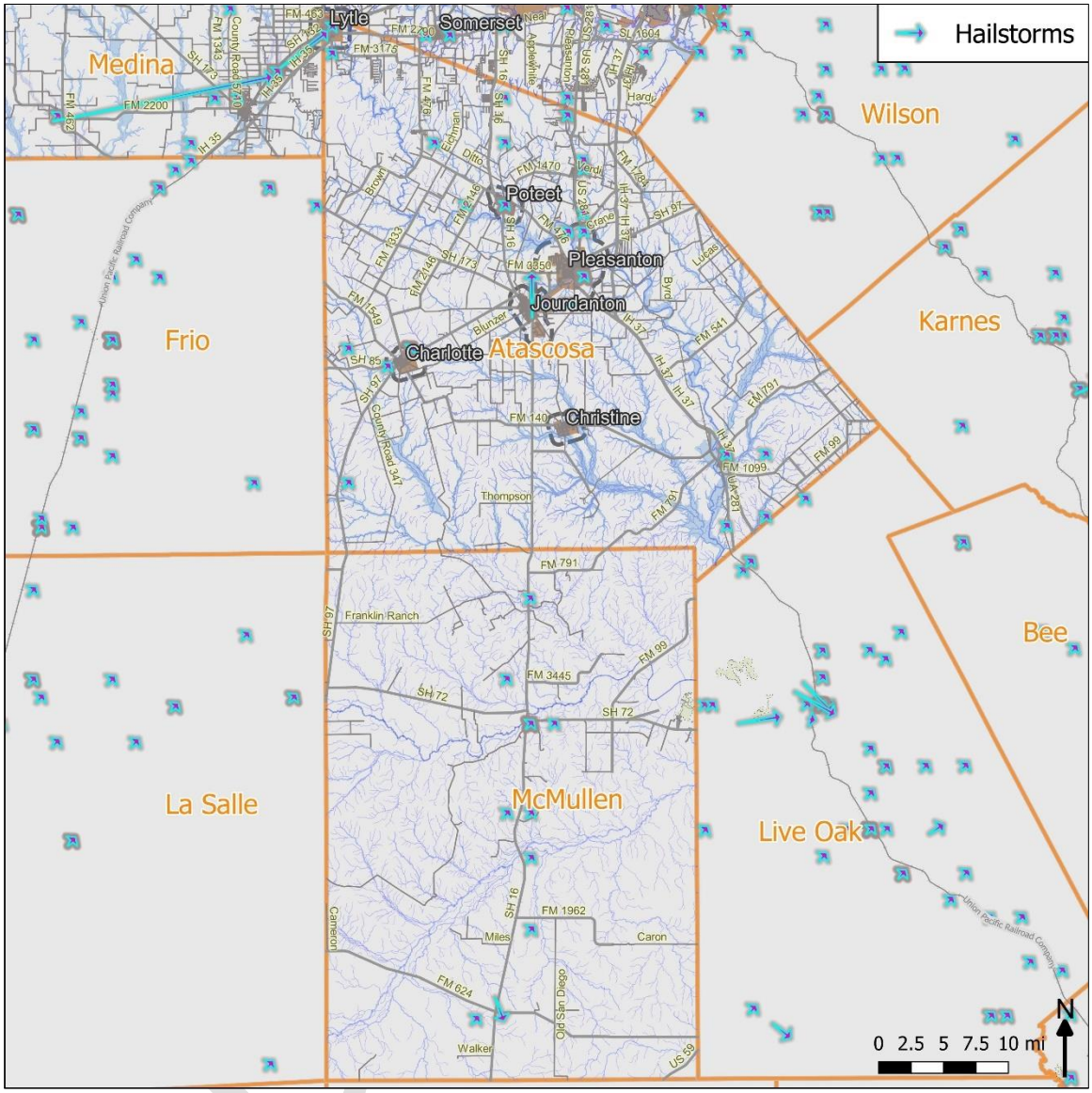
County	Jurisdiction	Year	Month	Magnitude	Injuries	Fatalities	Property Damage (adj2016)	Crop Damage (adj2016)
Atascosa	HINDES	1997	May	1	0	0		
Atascosa	CHARLOTTE	1997	December	0.75	0	0		
McMullen	TILDEN	1997	April	1.75	0	0		
McMullen	TILDEN	1997	May	0.75	0	0		
McMullen	TILDEN	1997	May	1.75	0	0		
Atascosa	JOURDANTON	1998	January	0.75	0	0		
Atascosa	LEMING	1998	February	1.75	0	0		

Atascosa	LEMING	1998	February	1.75	0	0		$50,000
Atascosa	JOURDANTON	1998	February	1	0	0		
Atascosa	CAMPBELLTON	1998	February	1	0	0		
Atascosa	CAMPBELLTON	1998	February	0.75	0	0		
Atascosa	POTEET	1998	February	0.75	0	0		
Atascosa	CHARLOTTE	1998	February	0.75	0	0		
Atascosa	LYTLE	1998	February	1.75	0	0	$73,466	$5,000
Atascosa	LEMING	1998	February	0.75	0	0		
Atascosa	CHARLOTTE	1998	February	0.75	0	0		
Atascosa	PLEASANTON	2000	March	1.5	0	0		
Atascosa	POTEET	2000	April	0.88	0	0		
Atascosa	LYTLE	2000	April	0.75	0	0		
McMullen	TILDEN	2000	May	0.75	0	0		
Atascosa	POTEET	2001	May	1.5	0	0		
Atascosa	CAMPBELLTON	2001	May	1.75	0	0	$40,570	
Atascosa	PLEASANTON	2001	November	0.88	0	0		
McMullen	TILDEN	2001	November	0.75	0	0		
Atascosa	PLEASANTON	2002	April	1.75	0	0		
Atascosa	PLEASANTON	2002	April	2.5	0	0	$133,130	
Atascosa	PLEASANTON	2002	April	1	0	0		
McMullen	TILDEN	2002	December	0.75	0	0		
McMullen	TILDEN	2002	December	1.75	0	0		
Atascosa	PLEASANTON	2004	November	1	10	0		
Atascosa	POTEET	2004	November	1.75	0	0		
McMullen	TILDEN	2005	February	0.75	0	0		
McMullen	TILDEN	2005	June	0.75	0	0		
Atascosa	CHARLOTTE	2006	April	1.25	0	0		
Atascosa	POTEET	2006	May	0.75	0	0		
Atascosa	POTEET	2006	May	2.5	0	0		
McMullen	TILDEN	2006	April	1	0	0		
McMullen	TILDEN	2007	March	0.75	0	0		
Atascosa	CHRISTINE	2008	March	0.88	0	0		
Atascosa	JOURDANTON	2008	March	0.88	0	0		
Atascosa	JOURDANTON	2008	March	1.5	0	0		
Atascosa	LYTLE	2008	March	0.88	0	0		
Atascosa	LYTLE	2009	March	0.75	0	0		
Atascosa	CHARLOTTE	2009	March	1	0	0		
Atascosa	CHRISTINE	2009	March	1.75	0	0		
Atascosa	CHRISTINE	2009	March	1.25	0	0		
Atascosa	CAMPBELLTON	2009	March	0.75	0	0		
McMullen	WANTZ	2009	April	0.88	0	0		
McMullen	WANTZ	2009	April	1.75	0	0		

McMullen	TILDEN	2009	June	1	0	0		
McMullen	TILDEN	2012	May	1.75	0	0		
McMullen	WANTZ	2013	March	0.88	0	0		
McMullen	WANTZ	2013	March	1.75	0	0	$5,139	
McMullen	TILDEN	2013	May	1	0	0	$2,056	
Atascosa	LEMING	2014	April	1	0	0		
Atascosa	KYOTE	2014	April	1.5	0	0		
Atascosa	HAIDUK	2014	April	1	0	0		
Atascosa	PLEASANTON	2014	May	0.88	0	0		
Atascosa	CAMPBELLTON	2014	May	1	0	0		
McMullen	WANTZ	2014	April	0.88	0	0		
McMullen	WANTZ	2014	June	0.88	0	0		
Atascosa	COUGHRAN	2015	April	0.75	0	0		
Atascosa	ROSSVILLE	2015	April	1.5	0	0		
McMullen	TILDEN	2015	April	1	0	0		
Atascosa	DAVIS	2016	February	1	0	0		
Atascosa	DOBROWSKI	2016	April	1	0	0		
Atascosa	CHARLOTTE	2016	April	1	0	0		
Atascosa	ROSSVILLE	2016	April	2.5	0	0		
Atascosa	LYTLE	2016	April	1	0	0		
McMullen	WANTZ	2016	May	1	0	0		

Figure 12-2 plots this historical evidence by locating past hail events in the Atascosa and McMullen Counties planning area where latitude and longitude were available.

Figure 12-2: Hailstorm Event Tracks



Significant Events

February 21, 1998 – Lytle, Atascosa County
An afternoon hailstorm with 1.75-inch size hail caused $73,466 in property damage and $7,347 in crop losses.

April 7, 2002 – Pleasanton, Atascosa County
Hail up to the size of tennis balls, driven by winds of 40 to 50 mph, damaged windows of homes and cars in the Pleasanton area.

March 31, 2013 – Wantz, McMullen County
Scattered severe thunderstorms developed over the northern Rio Grande Plains during the late afternoon and moved southeast into the Brush Country through the evening hours. An upper level disturbance moving out of southwest Texas and northern Mexico increased the wind shear aloft over South Texas. In combination with a very unstable air mass and a boundary collision from an inland moving sea breeze and a cold front moving south out of the Hill Country, the storms increased in intensity during the early evening hours. The storms produced large hail with one long lived supercell traveling from east of Cotulla to Falfurrias. This storm produced hail from baseball to grapefruit size causing damage in the communities of Freer and Benavides. NWS storm survey observed dented road signs from hail along U. S. Highway 16.

Probability of Future Events

Based on available records of historic events there were 70 events in a 21-year reporting period for the Atascosa and McMullen Counties planning area. This provides a probability of at least 1 event every year. This frequency supports a highly likely probability of future events meaning that an event is probable somewhere in the planning area in the next year.

Frequency of Occurrence	
Highly likely:	Event probable in next year.
Likely:	Event probable in next 3 years.
Occasional:	Event possible in next 5 years.
Unlikely:	Event possible in next 10 years.

Vulnerability and Impact

Hail can cause significant injury to humans and has been fatal in some circumstances. Hail poses a significant threat to people as they could be struck by hail and falling trees and branches. Also, hail could cause power outages which could cause health and safety risks to more vulnerable populations in the planning area. The most common impacts of hailstorms are to crops, trees, and landscaping since even small hail can tear plants apart in a short amount of time. Vehicles, roofs of buildings and homes, are also most commonly damaged by hail. Older structures not built to current codes may be more vulnerable to damages from hail than newer structures. HVAC and electrical service systems, particularly those on roofs, at schools and critical facilities would be vulnerable and could also be damaged.

The Atascosa and McMullen Counties planning area features mobile and manufactured home parks which are more vulnerable to hailstorms than site-built structures. In addition, manufactured and temporary housing is located sporadically throughout rural portions of the planning area which are also vulnerable to the hailstorm hazard but more prone to being isolated from essential needs and emergency services in the event of a disaster.

Table 12-3: Structures at Greater Risk by Jurisdiction

Jurisdiction	Total Housing Units	Manufactured Homes	Housing units built prior to 1980
McMullen County*	372	91 (24.5%)	169 (45.5%)
City of Charlotte	736	252 (34.2%)	464 (63%)
City of Christine	152	51 (33.6%)	66 (43.5%)
City of Jourdanton	1,478	377 (25.5%)	684 (46.2%)
City of Lytle	925	196 (20.2%)	502 (54.3%)
City of Pleasanton	4,017	401 (10.0%)	1,804 (44.9%)
City of Poteet	1,229	141 (11.5%)	605 (49.2%)
Atascosa County*	18,141	5,731 (31.6%)	6,940 (38.3%)
Planning Area Totals	*18,513*	*5,822 (31.4%)*	*7,109 (38.4%)*

*County totals include all jurisdictions in addition to unincorporated areas.
Source: 2013-2017 American Community Survey 5-year estimate, selected housing characteristics

Based on the ACS 2017 data, McMullen County is at higher risk of damage from hurricanes when considering age of residential structures and the higher standard of building codes enacted after 1980. Atascosa County is at a higher risk of damage from hurricanes when considering number and ratio of manufactured homes.

Historic Hailstorm Impacts

Below are summary tables aggregated by County, 12-4 and 12-5, that show the 21-year loss totals and the average annual (Per Year) losses in these categories. Each table shows per capita dollar loss rates for the total and average annual losses. These rates are important measures for comparing losses between different areas. The average annual loss estimate of property and crop is $343 (in 2016 dollars) for McMullen County and $15,618 (in 2016 dollars) for Atascosa County.

Table 12-4: McMullen County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, McMullen County				
21-year Total	0	0	$7,195	$0
Per Year	0	0	$343	$0
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$10	$0
Per Year	0	0	$0	$0

Source: NCEI Storm Events Database 1996 to 2017 subset for Texas: TxGS - 7/1/2018.

Table 12-5: Atascosa County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, Atascosa County				
21-year Total	0	0	$247,166	$80,813
Per Year	0	0	$11,770	$3,848
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$6	$2
Per Year	0	0	$0	$0

Source: NCEI Storm Events Database 1996 to 2017 subset for Texas: TxGS - 7/1/2018.

Hailstorm Impact Forecast

Tables 12-6 and 12-7 show the forecast annual impacts of hailstorms in McMullen and Atascosa Counties and the total dollar-losses (property plus crop) forecasted by year. These forecasts are extrapolations of the average annual impacts in the base period modified by expected changes in:

1. The county populations and built environments (not used for forecasting crop losses) and
2. The frequency and intensity (damage producing capacity) of weather events.

Table 12-: McMullen County Hailstorm Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Hailstorms, McMullen County				
2019	0	0	$353	$0
2020	0	0	$357	$0
2021	0	0	$360	$0
2022	0	0	$364	$0
2023	0	0	$368	$0
Forecast Loss Summary				
5-year Total	0	0	$1,802	$0
Per Year	0	0	$360	$0
Per Capital Dollar Losses (2010 pop)				
5-year Total	0	0	$2.55	$0
Per Year	0	0	$0.51	$0

Source: Forecast data by the Texas Geographic Society: TxGS - 7/1/2018

Table 12-7: Atascosa County Hailstorm Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Hailstorms, Atascosa County				
2019	0	0	$12,327	$3,848
2020	0	0	$12,519	$3,848
2021	0	0	$12,713	$3,848
2022	0	0	$12,911	$3,848
2023	0	0	$13,112	$3,848
Forecast Loss Summary				
5-year Total	0	0	$63,583	$19,241
Per Year	0	0	$12,717	$3,848
Per Capital Dollar Losses (2010 pop)				
5-year Total	0	0	$1.42	$0.43
Per Year	0	0	$0.28	$0.09

Source: Forecast data by the Texas Geographic Society: TxGS - 7/1/2018

The lower portions of the tables show the 5-year totals and the average annual losses in these categories. Since weather varies year-to year, forecasts of specific years are less likely to be true (less reliable) than these totals and averages for the period. The second summary table shows per capita dollar loss rates (based on 2010 population). This is an important measure for comparing historical or forecast losses between different hazards and timeframes. Comparing the Per Year rates in this table with the historical rates in Tables 12-4 and 12-5 above, reveals expected changes between base and forecast periods.

Table 12-8: Hailstorm Losses by Jurisdiction 1996-2017

Jurisdiction	Est. Prop. Losses (2016 dollars)	Est. Crop Losses (2016 dollars)	Total Est $-Losses
Atascosa Co.	$247,166	$80,813	$327,979
Charlotte	$9,438	$131	$9,569
Christine	$2,146	$118	$2,264
Jourdanton	$21,304	$229	$21,533
Lytle	$13,715	$294	$14,009
Pleasanton	$49,168	$556	$49,724
Poteet	$17,941	$111	$18,052
McMullen Co.	$7,195	$0	$7,195

Source: Jurisdictional loss data by the Texas Geographic Society: TxGS - 7/1/2018

SECTION 13: WILDFIRE

Description


Source: http://texasforestservice.tamu.edu

Wildfires are an unplanned, unwanted fire burning uncontrolled in a natural area rich with vegetative fuels, like a forest, grassland, or prairie. Meteorological conditions such as high temperatures, low humidity, droughts, and high wind increase wildfire risk. Sparks from agricultural, industrial, or automobile activity are often the cause of a wildfire with humans the most common source of initial ignition. Wildfires can also be naturally ignited by lightning strike as a part of the natural management of forest ecosystems. While wildfires can occur any time of year, they are especially likely over the spring and summer months, when fuel is often dry so flames can move unchecked through a highly vegetative area.

Location

Wildfires are most likely to occur in open grasslands but are not confined to any specific geographic location and can vary greatly in terms of size, location, intensity, and duration. The populated, urban areas of the planning area are less likely to experience large, sweeping fires. The more rural and sparsely populated unincorporated areas of Atascosa and McMullen Counties are more vulnerable to large sweeping wildfire events. The threat to people and property is greatest in the wildland urban interface/intermix, however, the entire planning area of Atascosa and McMullen Counties is at risk for wildfires.

Extent

The likelihood that a wildfire event will occur in the planning area is measured using the Keetch Byram Drought Index (KBDI) and the Texas Forest Service's Fire Intensity Scale (FIS). The KBDI describes the potential for wildfire based upon weather conditions such as daily water balance, precipitation, and soil moisture (Table 13-1). The index ranges from 0-800 with a score of 0 indicating no moisture depletion and a score of 800 representing completely dry conditions.

Table 13-1: Keetch Byram Drought Index (KBDI)

KBDI Score Range	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.

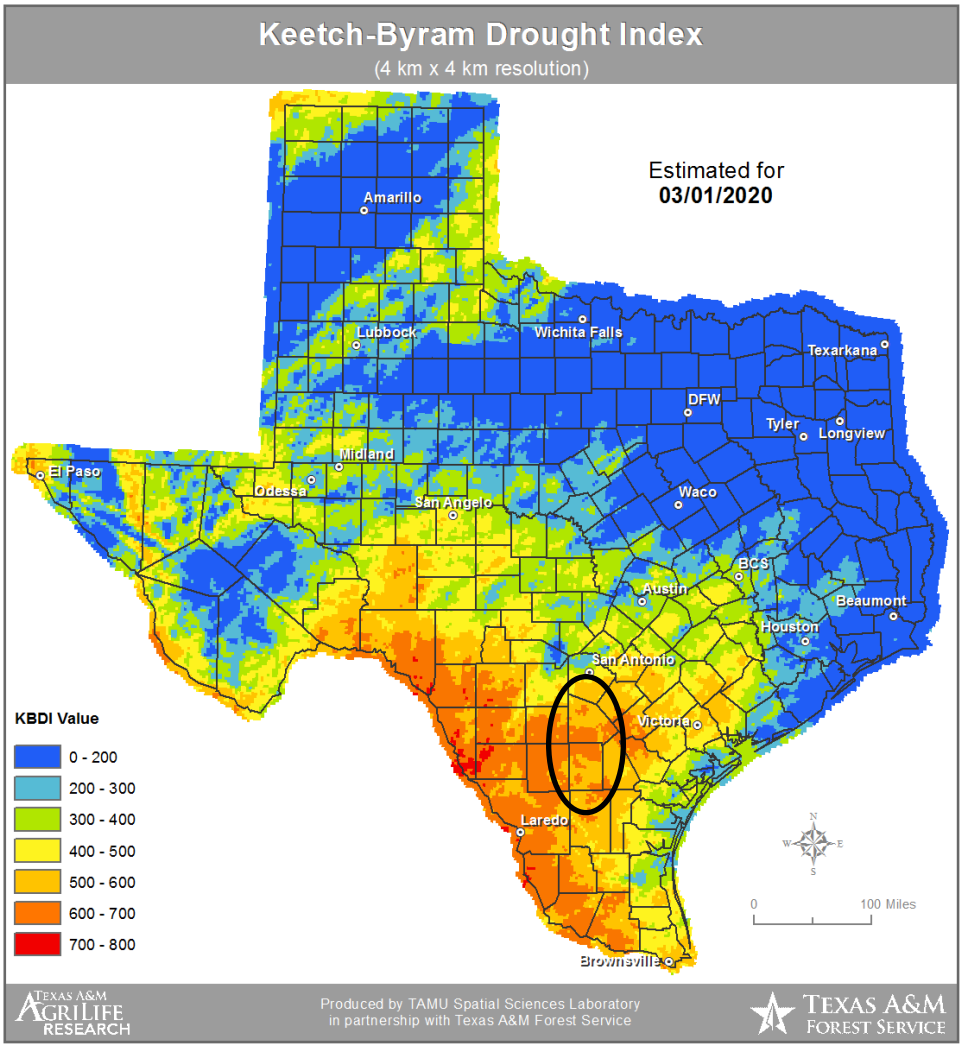
Table 13-2: 2018 Atascosa and McMullen Counties Planning Area KBDI Values

		KBDI Mean	KBDI Maximum	KDBI Minimum
Atascosa		598	668	481
McMullen		603	682	535

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

The 2018 average KBDI values for the planning area is approximately 600 and is the average extent to be mitigated for (Table 13-2). Based on Figure 13-1 below, areas of northern McMullen County have values in the 500-600 range as of the time of this report, early Spring 2020. At these levels, often associated with more severe drought, fire intensity and occurrence increases significantly and fires readily burn in all directions. The KBDI is a good measure of the readiness of fuels to ignite in the event of a wildfire. Drought or extreme weather conditions have the ability to greatly influence the KDBI in a short period of time so current KBDI should always we monitored to more accurately assess risk. The figure and data below are provided by the Texas Weather Service at Texas A&M Department of Ecosystem Science and Management and the following website can be regularly checked for updated information.

Figure 13-1: KBDI for the State of Texas on 3/1/2020



https://twc.tamu.edu/kbdi

The Texas Wildfire Risk Assessment Portal (TXWRAP) is the primary mechanism for the Texas A&M Forest Service to deploy risk information and create awareness about wildfire issues across the state. www.TexasWildfireRisk.com The tool uses the Fire Intensity Scale (FIS) layer to determine the potential fire intensity for the specified location. FIS quantifies potential fire intensity based on high to extreme weather conditions, fuels, and topography. It is similar to the Richter scale for earthquakes, providing a standard scale to measure potential wildfire intensity by magnitude. FIS consist of 5 classes where the order of magnitude between classes is ten-fold. The minimum class, Class 1, represents very low wildfire intensities and the maximum class, Class 5, represents very high wildfire intensities.

Class 1 (Very Low)	Class 2 (Low)	Class 3 (Moderate)	Class 4 (High)	Class 5 (Very High)

- **Class 1, Very Low:** Very small, discontinuous flames, usually less than 1 foot in length; very low rate of spread; no spotting. Fires are typically easy to suppress by firefighters with basic training and nonspecialized equipment.
- **Class 2, Low:** Small flames, usually less than two feet long; small amount of very short-range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.
- **Class 3, Moderate:** Flames up to 8 feet in length; short-range spotting is possible. Trained firefighters will find these fires difficult to suppress without support from aircraft or engines, but dozer and plows are generally effective. Increasing potential for harm or damage to life and property.
- **Class 4, High:** Large Flames, up to 30 feet in length; short-range spotting common; medium range spotting. Direct attack by trained firefighters, engines, and dozers is generally ineffective, indirect attack may be effective. Significant potential for harm or damage to life and property.
- **Class 5, Very High:** Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds. Indirect attack marginally effective at the head of the fire. Great potential for harm or damage to life and property.

The Fire Intensity Scale evaluates the potential fire behavior for an area, regardless if any fires have occurred there in the past. This additional information allows local officials and mitigation planners to quickly identify areas where dangerous fire behavior potential exists in relationship to nearby homes or other valued assets. The Atascosa and McMullen Counties planning area is at a moderate potential wildfire intensity uniformly. Figure 13-2 identifies the wildfire intensity for the Atascosa and McMullen Counties planning area. The blue building markers on the map represent fire station locations.

Figure 13-2: Atascosa County Fire Intensity Scale

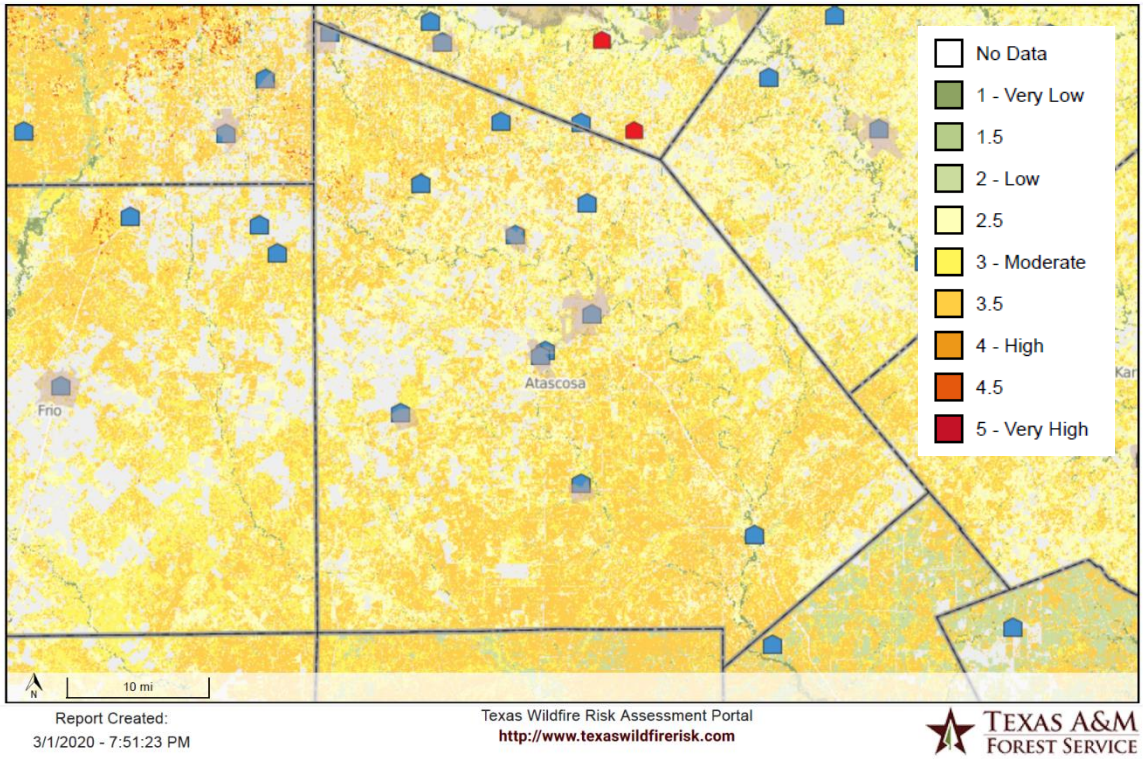
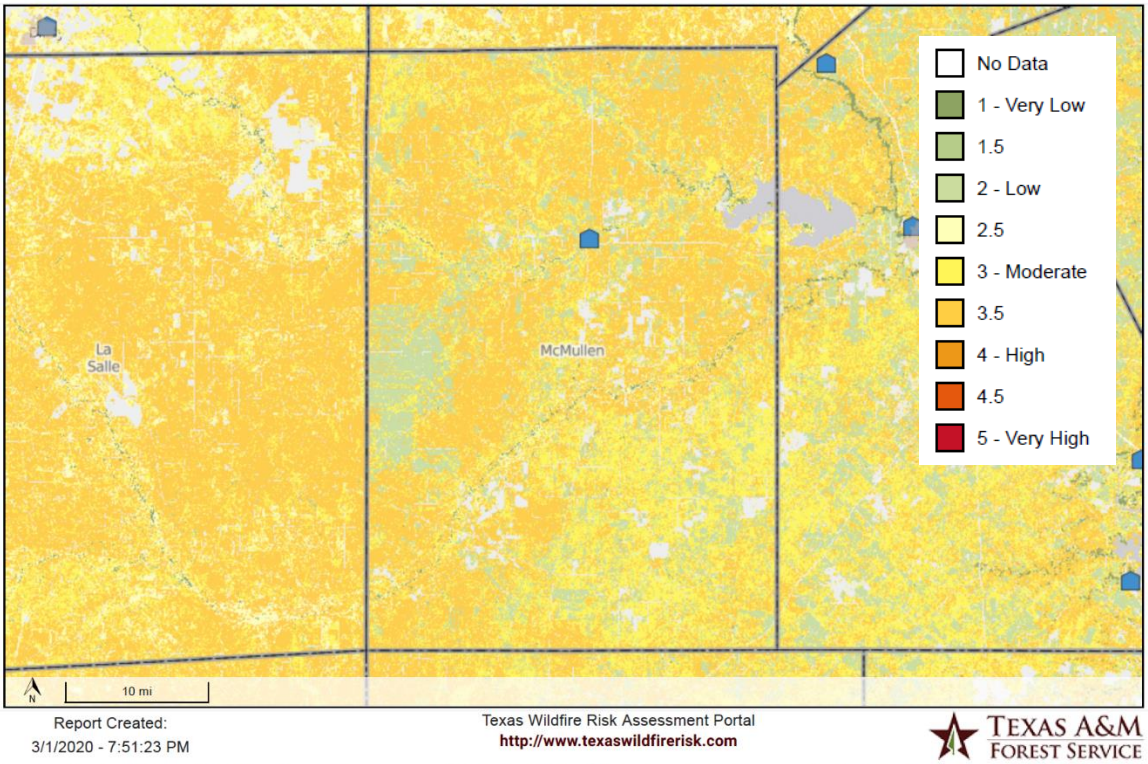


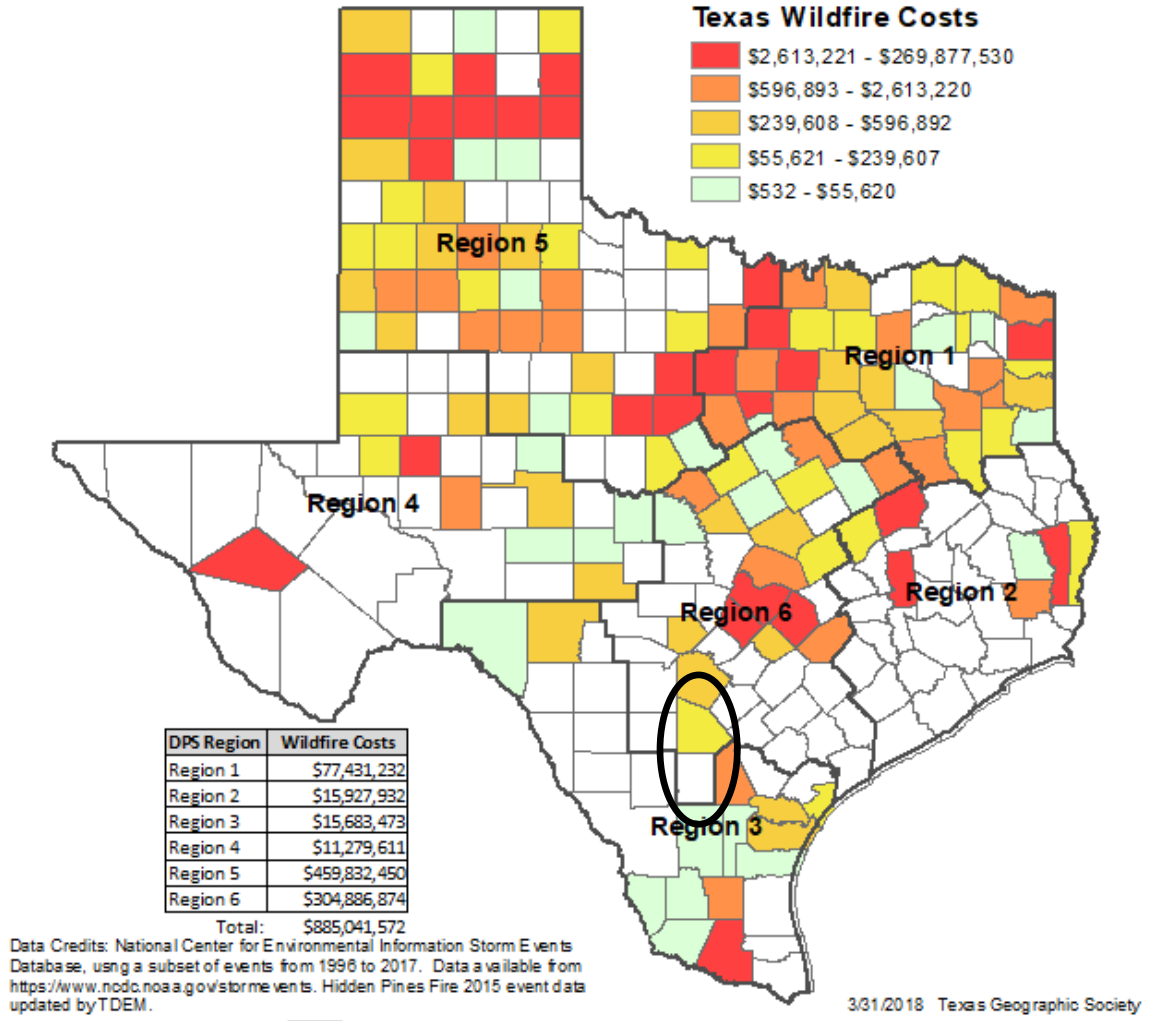
Figure 13-3: McMullen County Fire Intensity Scale



Historical Occurrences

Figure 13-4 shows total county losses (property plus crop losses) from wildfires for the State of Texas from 1996-2017. County colors indicate their losses relative to other counties in the state. Each color represents approximately 20% of the counties that had impacts from wildfires. White represents Counties with zero-dollar losses.

Figure 13-4: State of Texas Wildfire Impacts



The NCEI storm events database carries limited information on wildfire occurrence information with damage estimates of impacts, injuries, or fatalities in the planning area from 1996-2015.

Table 13-3: NCEI Storm Events Atascosa and McMullen Counties Planning Area

County	Jurisdiction	Year	Month	Injuries	Fatalities	Property Damage (adj2016)	Crop Damage (adj2016)
Atascosa	Near Poteet	2011	July	0	1	$159,738	$0
Atascosa	Near Natalia	2015	September	0	0	$0	$0

Significant Events

July 14, 2011 – Near Poteet, Atascosa County

The TRA-18 Fire was a grass fire near Poteet. The fire burned 10 acres. One man died of an apparent heart attack while trying to fight the fire with a garden hose. The fire destroyed one house and one other structure.

September 13, 2015 – Near Natalia, Atascosa County

The Boyd wildfire started September 13 one mile north of Natalia. The fire burned 375 acres and threatened 40 homes. All of the homes were saved and the fire was 100% contained on September 16.

The Texas Forest Service (TFS), started collecting wildfire data in 1985 and volunteer fire departments started reporting events in 2005. This data does not have estimated impact information but it does provide a snapshot of historical wildfire occurrence to be able to estimate a future frequency of events. The Texas Forest Service reported 2,013 wildfire events in the Atascosa and McMullen Counties planning area between 2005 and 2015. Due to a lack of recorded data for wildfire events prior to 2005, frequency calculations are based on the eleven-year period from 2005 to 2015. The maps below shows approximate locations of wildfires in Atascosa and McMullen Counties and the cause of ignitions.

Figure 13-5: Historical Wildfire Events in Atascosa County, 2005 – 2015

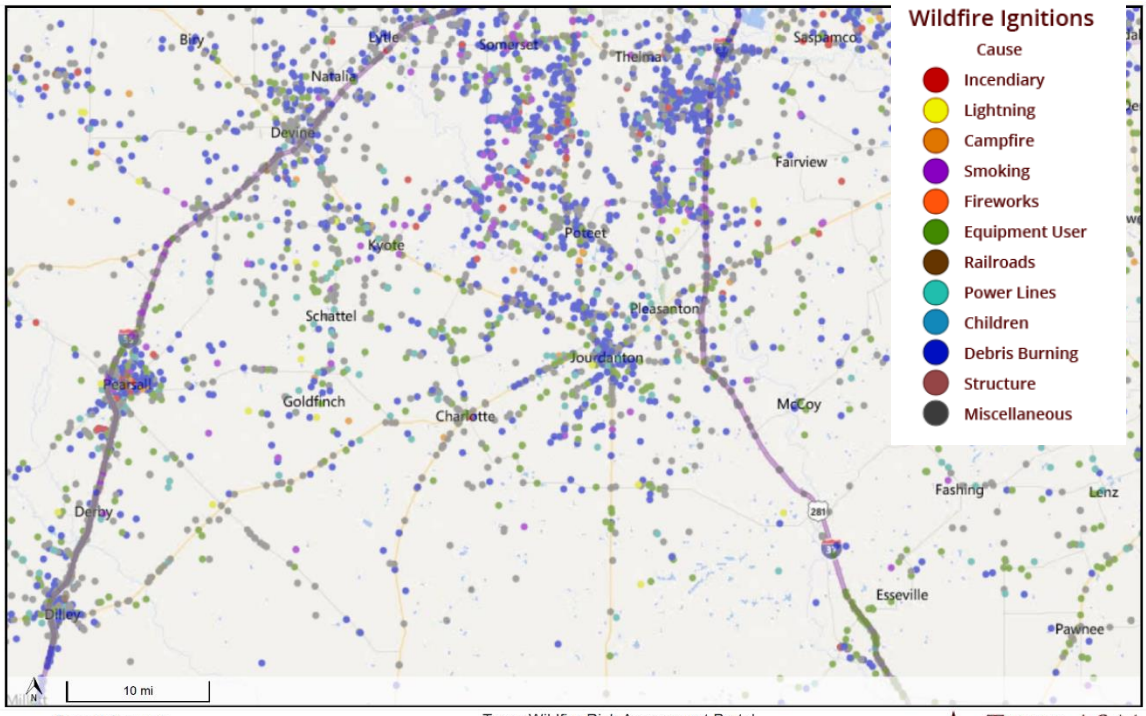


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Figure 13-6: Historical Wildfire Events in McMullen County, 2005 – 2015

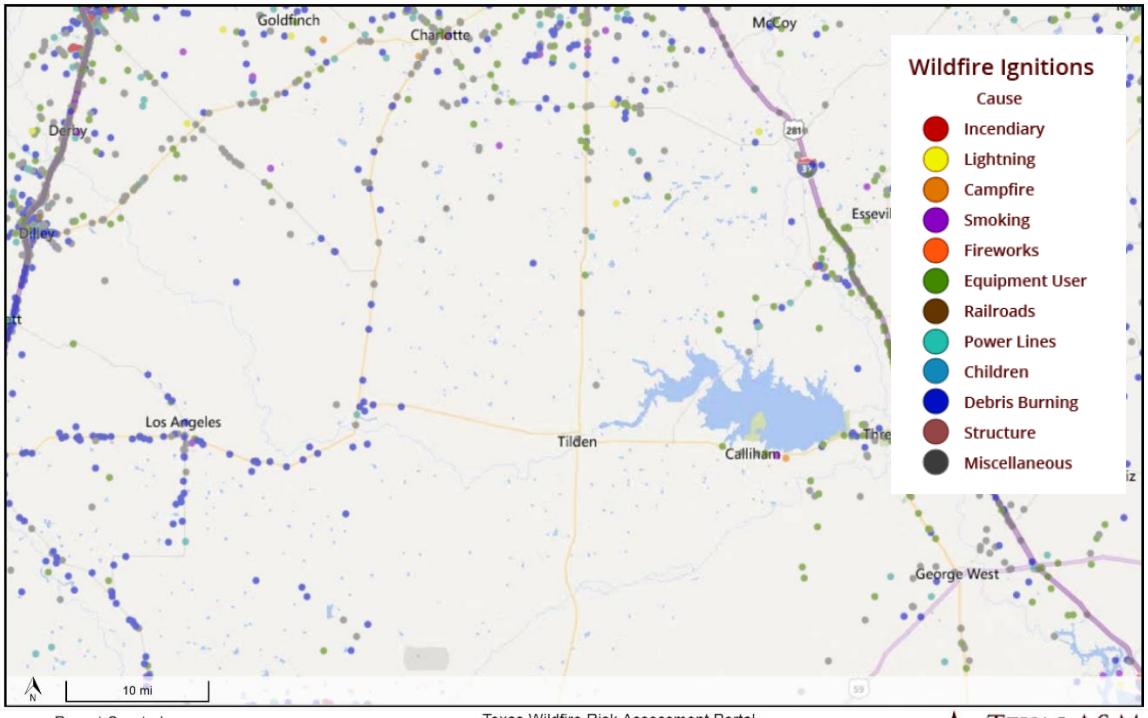

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Table 13-4 below lists the ignition causes for all wildfires in the planning area between 2005-2015, the number of times of each unique ignition cause, and the percent of total ignitions.

Table 13-4: Ignition cause distribution in planning area from 2005-2015

Ignition Cause	Count	% of Total
Campfire	19	1%
Children	17	1%
Debris burning	730	36%
Equipment use	272	14%
Incendiary	49	2%
Lightning	17	1%
Miscellaneous	727	36%
Power Lines	93	5%
Railroads	1	>1%
Smoking	28	4%
Grand Total	**2,013**	**100%**

Source: Texas Wildfire Risk Assessment Portal(TxWRAP)

Probability of Future Events

Based on reported historical occurrences of wildfire, 2,013 wildfire events occurred in an 11-year reporting period for Atascosa and McMullen Counties. This establishes an approximate probability of occurrence of 183 events per year. This frequency supports a highly likely probability of future events, meaning a wildfire event is highly probable within the next year. The risk of future wildfires with greater impact to people and property will increase if existing development patterns continue into the wildlands.

Frequency of Occurrence	
Highly likely:	Event probable in next year.
Likely:	Event probable in next 3 years.
Occasional:	Event possible in next 5 years.
Unlikely:	Event possible in next 10 years.

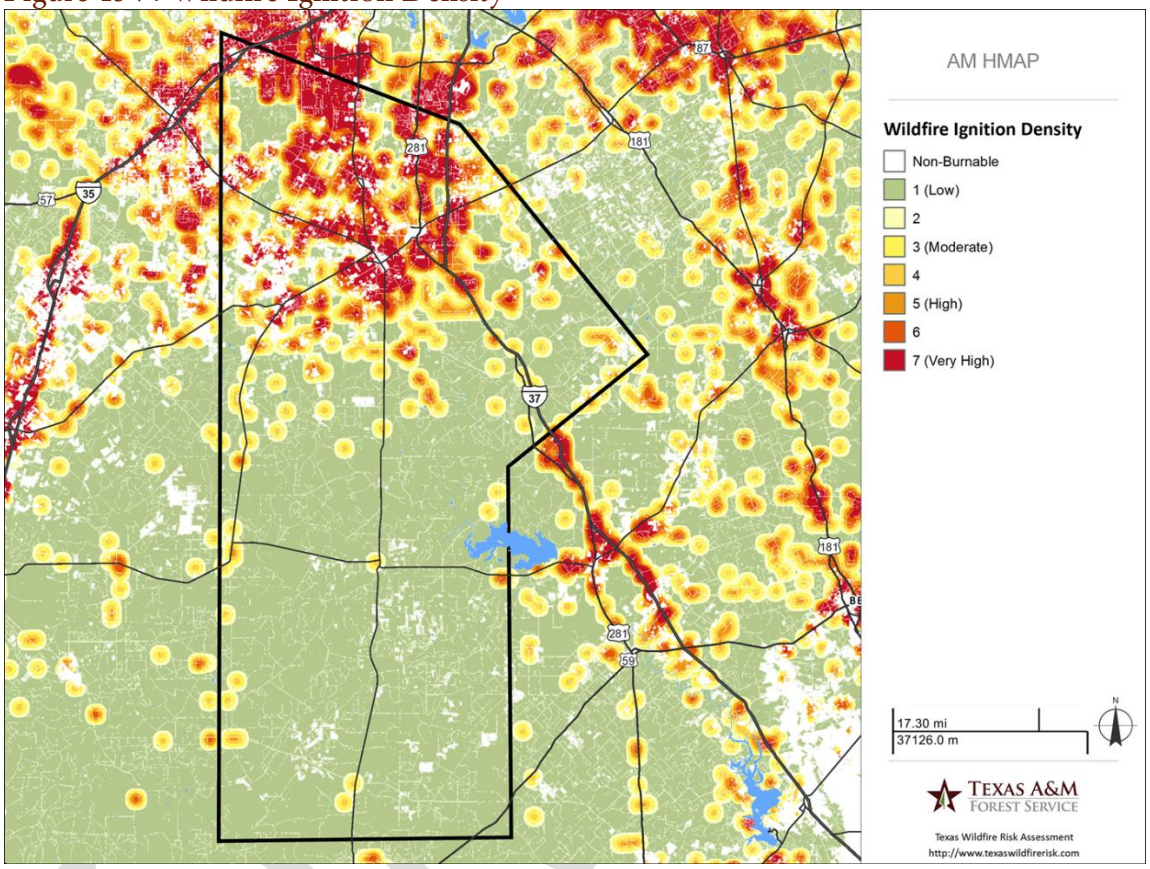
Vulnerability and Impact

Populations and structures that are most susceptible to wildfire risk are located in the wildland urban interface and/or intermix (WUI). WUI fires occur in areas where the built environment, structures and other improvements, meet undeveloped wildland or vegetative fuels. Natural vegetation provides the fuel for wildfires in natural uninhabited areas, while WUI fires consume both vegetation and materials from the built environment.

The severity of impact from major wildfire events can be substantial. Such events have caused deaths and injuries, damaged and destroyed property and critical facilities, and disrupted infrastructure and services. Severity of impact is gauged by homes and

structures lost, acreage burned, and the number of resulting injuries and fatalities. The vulnerability of the jurisdictions in the planning area to wildfire events is increased where critical facilities are in the WUI as they are more likely to sustain damage from the hazard event. Figure 13-7 shows Atascosa and McMullen Counties and the threat of wildfire across the planning area.

Figure 13-7: Wildfire Ignition Density



SECTION 14: SEVERE WINTER STORMS

Description

A severe winter storm event is when temperatures hover below freezing and precipitation includes freezing ice, snow, and sleet. Strong winds often accompany severe winter storms and combines with freezing precipitation to produce a low wind chill. Severe winter storms may include snowstorms, blizzards, cold waves and ice storms. Snowstorms include four or more inches of snow in a 12-hour period. Blizzards are characterized by low temperatures and strong winds in excess of 35 mph with large amounts of drifting snow. A cold wave is a winter cold front with a drastic drop in temperature. An ice storm occurs when rain falls out of the warm and moist upper layers of the atmosphere into a cold and dry layer near the ground. The rain freezes on contact with the cold ground and accumulates on exposed surfaces. If a half inch of rain freezes on trees and utility wires, damage can occur, especially if accompanied by high winds. Half an inch is used as the criteria before an icing event is categorized as an "ice storm." Winter storm events are generally mild and short-lived in the south-central Texas region. Figure 14-1 below lists the types of severe winter storms that can impact the planning area and a description of the winter weather conditions that accompany the severe weather alert issued by the National Weather Service (NWS).

Figure 14-1: Extent Scale – Winter Weather Alerts

Winter weather advisory	This alert may be issued for a variety of severe conditions. Weather advisories may be announced for snow, blowing or drifting snow, freezing drizzle, freezing rain, or a combination of weather events.
Winter storm watch	Severe winter weather conditions may affect your area (freezing rain, sleet or heavy snow may occur separately or in combination).
Winter storm warning	Severe winter weather conditions are imminent.
Freezing rain or freezing drizzle	Rain or drizzle is likely to freeze upon impact, resulting in a coating of ice glaze on roads and all other exposed objects.
Sleet	Small particles of ice usually mixed with rain. If enough sleet accumulates on the ground, it makes travel hazardous.

Blizzard warning	Sustained wind speeds of at least 35 mph are accompanied by considerable falling or blowing snow. This alert is the most perilous winter storm with visibility dangerously restricted.
Frost/freeze warning	Below freezing temperatures are expected and may cause significant damage to plants, crops and fruit trees.
Wind chill	A strong wind combined with a temperature slightly below freezing can have the same chilling effect as a temperature nearly 50 degrees lower in a calm atmosphere. The combined cooling power of the wind and temperature on exposed flesh is called the wind–chill factor.

Location

Severe winter storm events are not confined to specific geographic boundaries and vary in intensity and duration. All existing and future buildings, facilities, and populations in the Atascosa and McMullen Counties planning area are considered to be uniformly exposed to a winter storm hazard and could potentially be impacted.

Extent

The extent or magnitude of a severe winter storm is measured by on an intensity scale from "Mild" to "Severe" based on temperature ranges and snow accumulation levels. Table 14-1, Magnitude of Severe Winter Storms, is an index developed by the National Weather Service (NWS). This table should be referenced with the wind chill factor, Figure14-2, to better determine the intensity of a winter storm. Based on past events, the planning area can expect to experience severe winter storms with extreme intensity in the future.

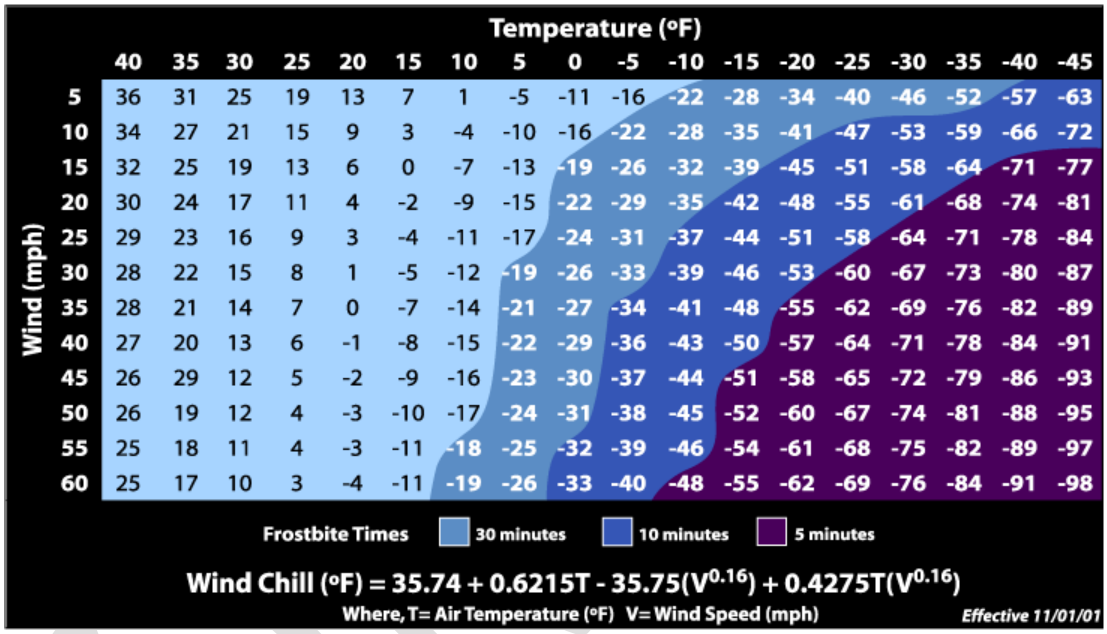
Table 14-1: Magnitude of Severe Winter Storms

Intensity	Temperature Range (Fahrenheit)	Extent Description
Mild	40°-50°	Winds less than 10 mph and freezing rain or light snow falling for short durations with little or no accumulations
Moderate	30°-40°	Winds 10 – 15 mph and sleet and/or snow up to 4 inches
Significant	25°-30°	Intense snow showers accompanied with strong gusty winds, between 15 and 20 mph with significant accumulation
Extreme	20°-25°	Wind driven snow that reduces visibility, heavy winds (between 20

		to 30 mph), and sleet or ice up to 5 millimeters in diameter
Severe	Below 20˚	Winds of 35 mph or more and snow and sleet greater than 4 inches

Wind chill temperature is a measure of how cold the wind makes real air temperature feel to the human body. Since wind can dramatically accelerate heat loss from the body, a 30° day would feel just as cold as a calm day with 0° temperatures. Figure 14-2 is a chart for calculating wind chill using the wind speed and air temperature. Please note that it is not applicable in calm winds or when the temperature is over 50°F.

Figure 14-2: Wind Chill Chart



Source: National Weather Service

Historical Occurrences

Based on NCEI data, from 1996 through August 2017 the Atascosa and McMullen Counties planning area experienced 8 severe winter events in the form of winter storms, winter weather, and heavy snow. No damages, injuries, or fatalities were reported for the following severe winter events.

Table 14-2: Historical Occurrences of Severe Winter Weather Events

County	Event Type	Year	Month	Injuries	Fatalities	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Atascosa	Winter Storm	1997	January	0	0	$0	$0
McMullen	Heavy Snow	2004	December	0	0	$0	$0
McMullen	Winter Weather	2006	December	0	0	$0	$0

Atascosa	Winter Storm	2007	January	0	0	$0	$0
McMullen	Winter Weather	2007	January	0	0	$0	$0
McMullen	Frost/Freeze	2010	January	0	0	$0	$0
Atascosa	Winter Storm	2011	February	0	0	$0	$0
McMullen	Ice Storm	2011	February	0	0	$0	$0

Significant Events

January 16, 2007 – Atascosa and McMullen Counties

Light freezing rain and drizzle began near midnight on January 15 over the northern portion of Atascosa County. And A mixture of freezing rain and ice pellets fell across portions of South Texas on the evening of the 16th and during the early morning of the 17th. Several roads and overpasses developed icy patches on them, requiring sanding by Texas Department of Transportation. The accumulation of ice forced the closing of roads and bridges north of SH97 and SH73. The ice also caused power outages to hundreds of residents in the northern third of Atascosa county. Schools and offices were closed in Lytle, Poteet and Leming on January 16.

Probability of Future Events

According to historical records the Atascosa and McMullen Counties planning area experiences approximately one winter storm event every 2-3 years. The probability of a future winter storm event occurring in the planning area is likely, with a winter storm likely to occur within the next three years.

Frequency of Occurrence	
Highly likely:	Event probable in next year.
Likely:	Event probable in next 3 years.
Occasional:	Event possible in next 5 years.
Unlikely:	Event possible in next 10 years.

Vulnerability and Impact

All infrastructure, critical facilities, populations, and buildings in the Atascosa and McMullen Counties planning area are vulnerable to severe winter events. Winter weather such as ice hazards and extremely cold temperatures, as well as snow present a risk to the planning area.

Populations of people and animals are subject to direct health risks from extended exposure to cold air and precipitation. Animals, such as pets and livestock, typically cannot survive the effects of direct exposure to severe winter weather and should be provided shelter. In addition, House fires can occur more frequently during winter storm events due to increased and improper use of alternative heating sources which can cause injury or deaths. Moreover, house fires during winter storms present a greater danger because some areas may not be easily accessible due to icy roads and water supplies may freeze and impede firefighting efforts. The people most at risk to the effects

of severe winter storms are children younger than 5 and older adults over 65. Vulnerable populations are at greater risk of death from hypothermia during these events, especially in the rural areas of the county where populations are sparse, icy roads may impede travel, and there are fewer neighbors to check in on the elderly. The population in the planning area that is over the age of 65 is 6,855 or 9.6% of the total population and children under the age of 5 is 3,492 or 4.9% of the total population, a total of 10,347 potentially vulnerable residents. Table 14-3 presents the 2017 American Community Survey population and age cohort estimates on the following page.

Table 14-3: Populations at Greater Risk by Jurisdiction

Jurisdiction	Population 65 and Older	Population Under 5
McMullen County	**159**	**45**
City of Charlotte City	326	90
City of Christine	38	19
City of Jourdanton	411	303
City of Lytle	465	18
City of Pleasanton	734	1,542
City of Poteet	499	154
Atascosa County	**6,696**	**3,447**
Total	**6,855**	**3.492**

Source: 2017 American Community Survey (Note: County totals include both incorporated and unincorporated areas)

Public and private infrastructure is also vulnerable to severe winter storms. These events can disrupt electric service for long periods of time. In addition, extended periods of freezing temperatures can cause water pipes to freeze and crack. The buildup of ice can cause power lines and tree limbs to break under the weight, potentially causing damage to property or the electric grid. During these times of ice and snow accumulation, response times will increase until public works road crews are able to clear roads of ice, snow, and other obstructions.

Historic Severe Winter Storm Impacts

No injuries, fatalities, property or crop damages were reported in the 21-year period of analysis. Based on historical records, annual loss impacts and estimates are considered to be negligible.

Severe Winter Storm Impacts Forecast

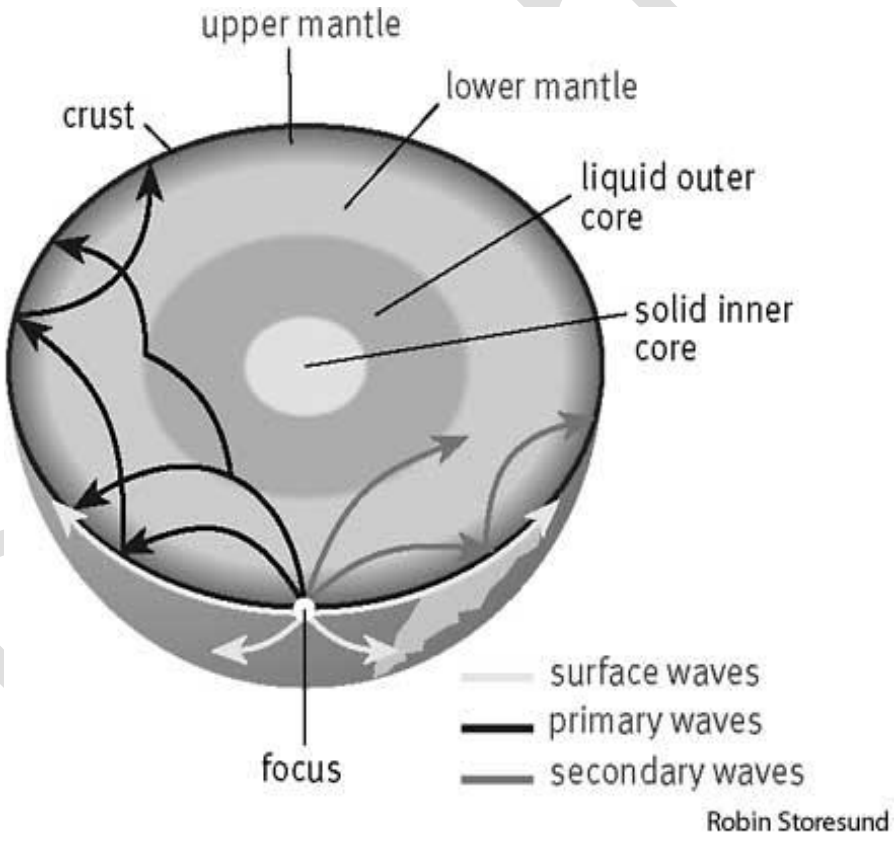
No injuries, fatalities, property or crop damages were reported in the 21-year period of analysis. Based on historical records, forecast impact estimates are considered to be negligible.

SECTION 15: EARTHQUAKES

Description

An earthquake is the shaking of the surface of the Earth resulting from the sudden release of energy created by a movement along fault lines in the earth's crust. Earthquakes can range in size from those that are so weak that they cannot be felt to those violent enough to throw people and destroy whole cities. Most earthquake-related property damage and deaths are caused by the failure and collapse of structures due to ground shaking. The level of damage that results from an earthquake depends on the extent and duration of the shaking. Earthquakes produce three type of energy waves as described in Figure 15-1 below.

Figure 15-1: Energy Waves Caused by Earthquakes



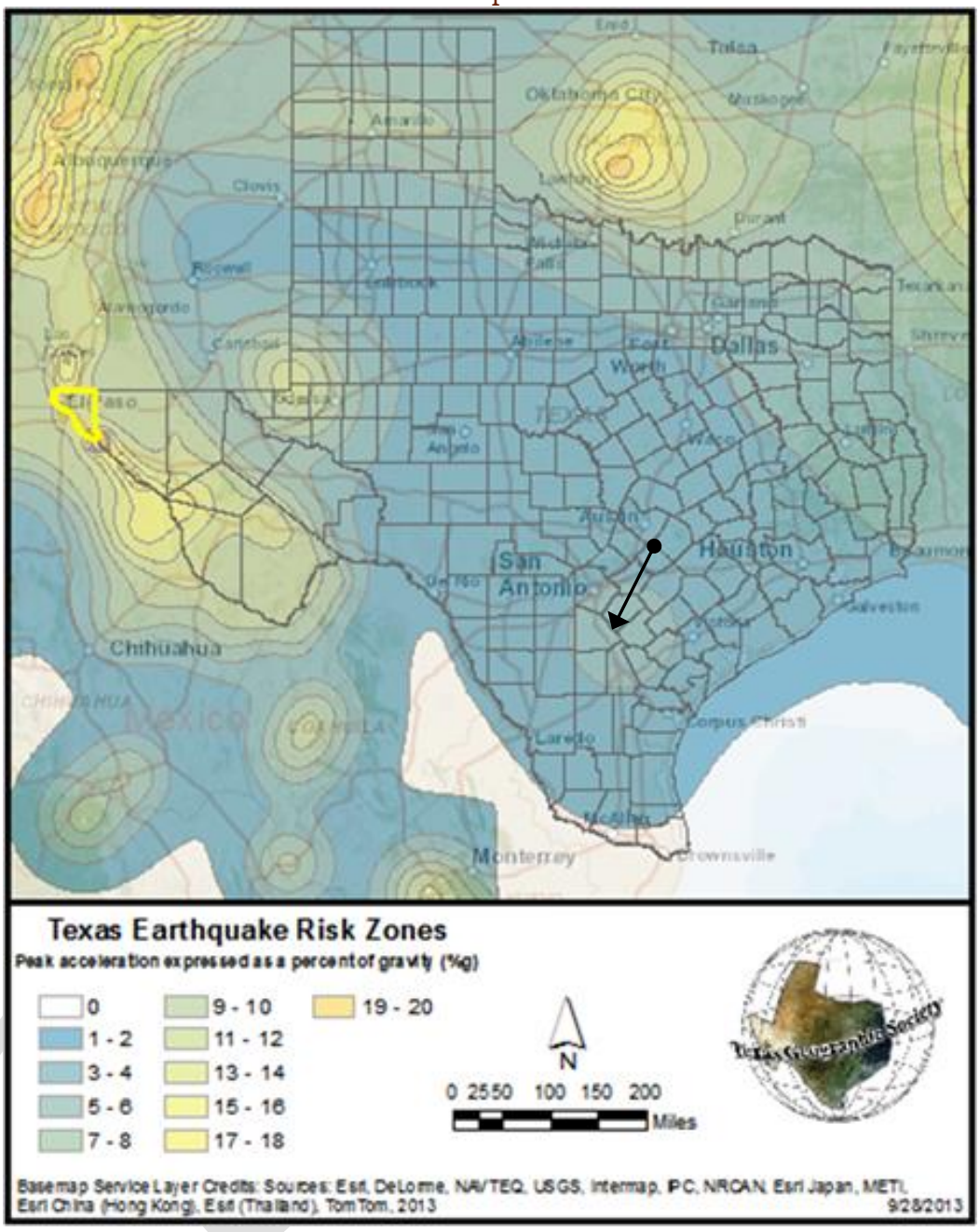
Source: *"earthquake". The American Heritage® Science Dictionary. Houghton Mifflin Company. 20 Oct. 2017. <http://www.dictionary.com/browse/earthquake>.*

Primary (P) waves have a push-pull type of vibration. Secondary (S) waves have a side-to-side type of vibration. Both P and S waves travel deep into Earth, reflecting off the surfaces of its various layers. S waves cannot travel through the liquid outer core. Surface (L) waves—named after the nineteenth-century British mathematician A.E.H. Love—travel along Earth's surface, causing most of the damage of an earthquake.

Location

Locations in West Texas and the Panhandle experience the highest frequency of earthquakes in the state. Figure 15-2 below shows locations of earthquake hazard with 2% variations in the probability for Peak Ground Acceleration of various intensities over 50 years in Texas. The map illustrates the generally low risk of earthquakes in Texas with most of the state having less than a 2% probability of having a very weak ground shaking event over 50 years. The planning area encompassed by Atascosa and McMullen Counties has a slightly higher probability of 5-8% likelihood of an earthquake over 50 years. Core Planning Team Members have also indicated that there has been an increase in earthquake activity concurrent with the substantial increase shale gas drilling operations to the east of the area in the past few years.

Figure 15-2: USGS Seismic Hazard Risk Map



Extent

The magnitude or extent of an earthquake is measured on the Richter Scale. An earthquake's magnitude is determined by the amount of ground motion measured on a seismograph. This measurement is then corrected to compensate for the distance from the epicenter. The scale is a logarithmic or a 'power of ten' scale. For example, if a magnitude 4.8 earthquake caused ground motion of 1 inch at a particular location, a 5.8 would cause ground motion of 10 inches at the same epicenter. Earthquakes above 7 on the Richter scale are considered severe. Table 15-1 provides examples of the effects of earthquakes at different magnitudes.

Table 15-1: Earthquake magnitude and corresponding effects

Magnitude	Earthquake Effects
Less than 2.5	Usually not felt, but can be recorded by seismograph
2.5 to 5.4	Often felt, but only causes minor damage
5.5 to 6.0	Slight damage to buildings and other structures
6.1 to 6.9	May cause a lot of damage in very populated areas
7.0 to 7.9	Major earthquake. Serious damage
Greater than 8.0	Great earthquake. Can totally destroy communities near the epicenter

Most of the damage done by an earthquake typically occurs in the areas nearest the epicenter which have the highest intensities. Each earthquake occurrence only has one magnitude rating but different locations experience difference surface intensities since damage will usually become less severe as one moves away from the epicenter.

The Modified Mercalli Intensity (MMI) scale is used by scientists to describe the extent of an earthquake felt in different locations. The MMI uses Roman numerals to avoid confusion with the Richter Scale and is numbered between 1-12. Table 15-2 below provides descriptions of the MMI levels.

Table 15-2: Modified Mercalli Intensity (MMI) scale

MMI	What people feel, or what damage occurs.
I	Not felt except by a very few people under special conditions. Detected mostly by instruments.
II	Felt by a few people, especially those on the upper floors of buildings. Suspended objects may swing.
III	Felt noticeably indoors. Standing automobiles may rock slightly.
IV	Felt by many people indoors, by a few outdoors. At night, some people are awakened. Dishes, windows, and doors rattle.
V	Felt by nearly everyone. Many people are awakened. Some dishes and windows are broken. Unstable objects are overturned.
VI	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.
VII	Most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.
VIII	Damage is slight in specially designed structures, considerable in ordinary buildings, great in poorly built structures. Heavy furniture is overturned.
IX	Damage is considerable in specially designed buildings. Buildings shift from their foundations and partly collapse. Underground pipes are broken.
X	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Considerable landslides occur on steep slopes.

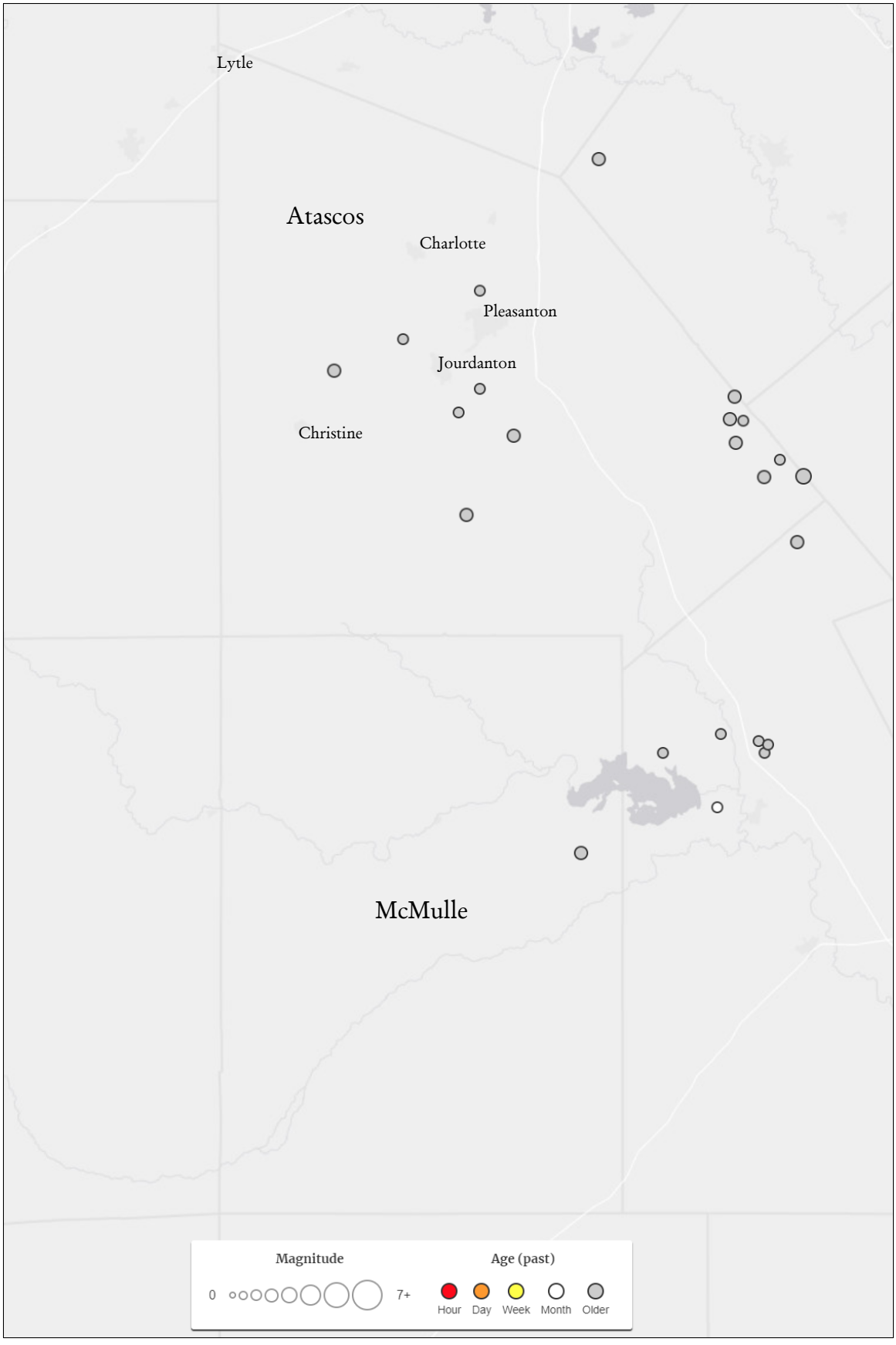
XI	Few, if any, masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.
XII	Virtually total destruction. Waves are seen on the ground surface. Objects are thrown into the air.

Source: USGS - https://pubs.usgs.gov/gip/earthq4/severitygip.html

Historical Occurrences

Based on United States Geographical Services (USGS) Earthquake Catalog of events, from 1923 through 2019 the Atascosa and McMullen Counties planning area experienced 47 earthquakes, the vast majority of which occurred in the past 4 years. This is consistent with accounts by Planning Team Members that earthquakes have been occurring far more frequently than in the past.

Figure 15-3: USGS Earthquake Map with Location and Magnitude



Source: https://earthquake.usgs.gov/earthquakes

The USGS earthquake map above in Figure 15-3 shows the location and magnitude of the earthquakes that have occurred in the area. Table 15-3 on the following page provides details for each earthquake in or around the planning area with date, locational, and specific magnitude information.

Table 15-3: Historical Occurrences of Earthquakes in and around the planning area

Date	Location	Magnitude
3/3/1984	southern Texas	3.9
8/10/1992	southern Texas	2.8
4/9/1993	southern Texas	4.1
5/16/1993	southern Texas	3
1/19/2000	southern Texas	2.6
4/11/2009	southern Texas	2.8
11/12/2011	southern Texas	3.5
2/4/2012	southern Texas	3
6/24/2012	southern Texas	3.4
9/10/2014	7km NNE of Charlotte, Texas	3.2
1/16/2015	5km NW of Jourdanton, Texas	2.8
1/7/2018	23km SSW of Poth, Texas	3.1
1/16/2018	25km WSW of Karnes City, Texas	2.9
6/1/2018	16km S of Jourdanton, Texas	3.1
9/22/2018	25km SSW of Poth, Texas	2.5

Source: https://earthquake.usgs.gov/earthquakes

Significant Events

October 11, 2011 – Atascosa County

At 10:30AM on June 1, 2018, a magnitude 3.1 earthquake had its epicenter 16 kilometers south of Jourdanton.

Probability of Future Events

Based on the USGS estimates in the seismic hazard risk map provided at the beginning of this section and produced in 2013, the planning area has a 5-8% chance of experiencing an earthquake over the next 50 years. However, more recent data paints a different picture. In the past 10 years many more earthquakes have been occurring in the area and if the period from 2010-2019 is considered in isolation, the chance of an earthquake happening rises dramatically. Over the 10-year period there are 9 occurrences of earthquakes for the Atascosa and McMullen Counties planning area. Based on most recent data, the probability of an earthquake occurring somewhere in the planning area in the next year is highly likely.

Frequency of Occurrence	
Highly likely:	Event probable in next year.
Likely:	Event probable in next 3 years.
Occasional:	Event possible in next 5 years.
Unlikely:	Event possible in next 10 years.

Vulnerability and Impact

Historical earthquake impacts for the area are 0 for number of deaths, injuries, property damage, and crop damage. This does not mean that there have not been any impacts due to earthquakes in the planning area, only that there have not been any impacts recorded. All structures, assets, and populations within Atascosa and McMullen Counties, including participating jurisdictions, are vulnerable to the impacts of earthquakes. This is especially true of the eastern part of Atascosa County. The recent history of rapidly increasing earthquake activity in the area appears to overlay exactly with the distribution and proliferation of wastewater injection wells associated with oil and gas drilling.

In addition to buildings, roads and bridges and underground assets such as utilities can also be severely damaged by earthquakes depending on the magnitude and epicenter. Subterranean utilities that can be impacted by earthquakes include underground sanitary sewer collection systems that may rupture or backup, drinking water distribution pipes that can become contaminated if pressure gaps occur allowing untreated groundwater to enter and gas and underground power lines can also be damaged generating hazardous conditions.

SECTION 16: HAZARDOUS MATERIALS INCIDENT

Description

Figure 16-1: A tractor-trailer tank truck carrying isobutane rolled over on I-10 between Houston and Beaumont in August 2010. Response operations for the leaking trailer closed the Interstate for several days.

Hazardous materials are defined as any item or agent (biological, chemical, physical) that has the potential to cause harm to humans, animals, or the environment and can come in the form of explosives, flammable and combustible substances, poisons and radioactive material. A hazardous materials incident is the release or spill of contaminants (solid, liquid, or gas) from fixed or mobile containers and can occur during production, storage transportation, use, or disposal of the material. This risk assessment will briefly discuss both fixed sites and mobile sites within the planning area.

Toxics Release Inventory (TRI)

The Toxics Release Inventory (TRI) is a resource from the Environmental Protection Agency (EPA) for learning about toxic chemical releases and pollution prevention activities reported by industrial and federal facilities. TRI tracks the management of certain toxic chemicals that may pose a threat to human health and the environment. The TRI Program was created as part of a response to several events that raised public concern about local preparedness for chemical emergencies and the availability of information on hazardous substances.

On December 4, 1984, a cloud of extremely toxic methyl isocyanate gas escaped from a Union Carbide Chemical plant in Bhopal, India. Thousands of people died that night in what is widely considered to be the worst industrial disaster in history. Thousands more died later as a result of their exposure, and survivors continue to suffer with permanent disabilities. In 1985, a serious chemical release occurred at a similar plant in West Virginia. In 1986, Congress passed the Emergency Planning and Community Right-to-Know Act (EPCRA) to support and promote emergency planning and to provide the public with information about releases of toxic chemicals in their community. Section 313 of EPCRA established the Toxics Release Inventory.

There are currently over 650 chemicals covered by the TRI Program and the TRI chemical list doesn't include all toxic chemicals used in the U.S. In general, chemicals covered by the TRI Program are those that cause:

- Cancer or other chronic human health effects

- Significant adverse acute human health effects
- Significant adverse environmental effects

Facilities that manufacture, process or otherwise use these chemicals in amounts above established levels must submit annual TRI reports on each chemical. These reports contain how much of each chemical is released to the environment and/or managed through recycling, energy recovery and treatment. (A "release" of a chemical means that it is emitted to the air or water or placed in some type of land disposal.) The information submitted by facilities is compiled in the Toxics Release Inventory. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and expanded by the Pollution Prevention Act of 1990. Each year, facilities that meet certain activity thresholds must report their releases and other waste management activities for listed toxic chemicals to the EPA and their state or tribal entity.

A facility must report if it meets the following three criteria:

- The facility falls within one of the following industrial categories: manufacturing; metal mining; coal mining; electric generating facilities that combust coal and/or oil; chemical wholesale distributors; petroleum terminals and bulk storage facilities; Resource Conservation and Recovery Act (RCRA) Subtitle C Treatment, Storage and Disposal (TSD) facilities; and solvent recovery services.
- Have ten or more full-time employee equivalents
- Manufactures or processes more than 25,000 pounds or otherwise uses more than 10,000 pounds of any listed chemical during the calendar year. Persistent, Bioaccumulative and Toxic (PBT) chemicals are subject to different thresholds of ten pounds, 100 pounds or 0.1 grams depending on the chemical.

Tier 2 Data

Tier 2 data is a publicly available database from the Texas Department of State Health Services Tier 2 Chemical Reporting Program. Under EPCRA, all facilities which store significant quantities of hazardous chemicals must share this information with state and local emergency responders and planners. Facilities in Texas share this information by filing annual hazardous chemical inventories with the Texas Department of State Health Services (DSHS), Local Emergency Planning Committees (LEPCs), and local fire departments. The Texas Tier 2 Report contains facility identification information and detailed chemical data about hazardous chemicals stored at the facility.

A facility must report if it meets the following criteria:

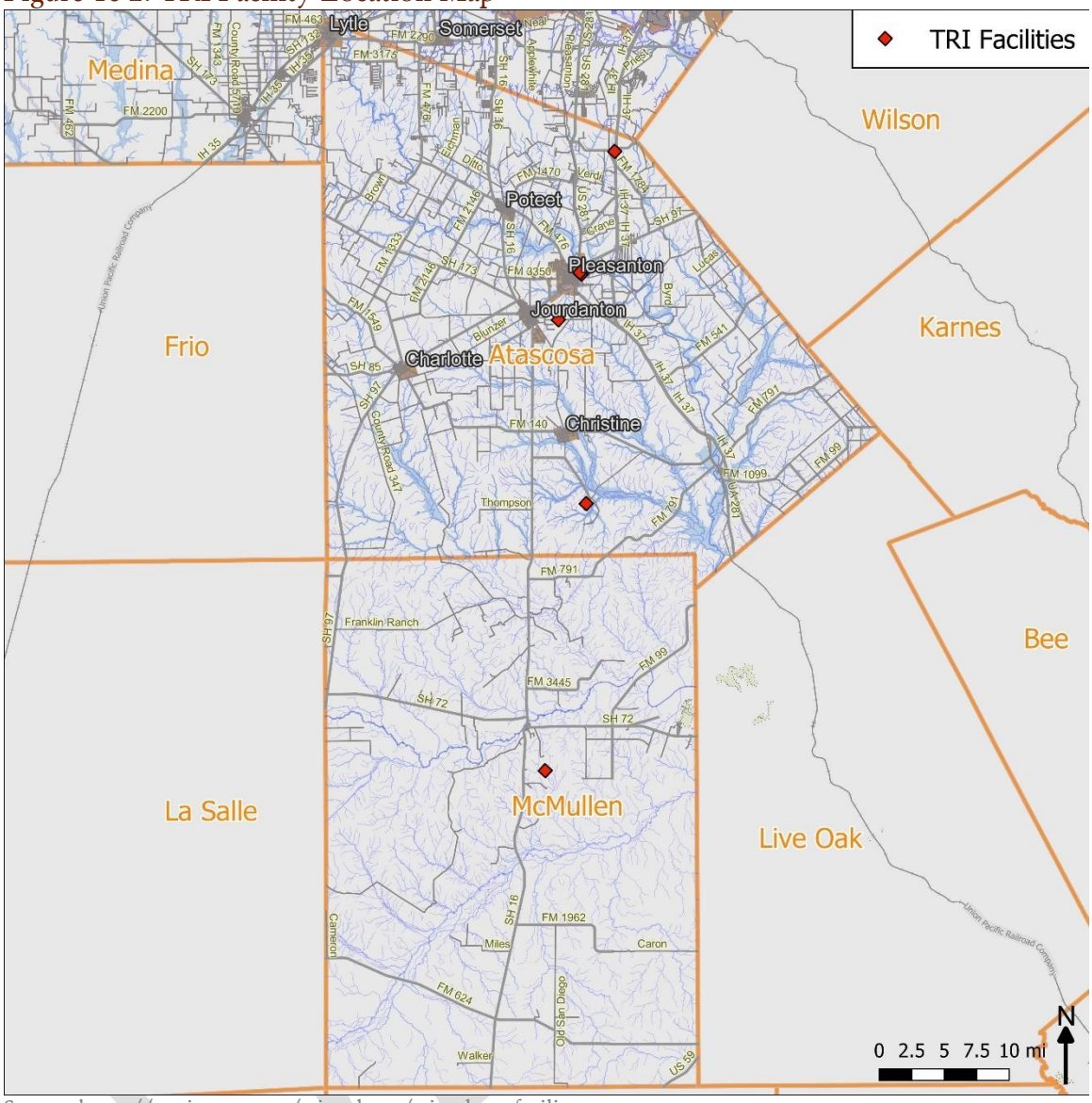
- Any company using chemicals that could present a physical or health hazard must report them, according to Tier 2 requirements.

- If an industry has an Occupational Safety and Health Administration (OSHA) deemed hazardous chemical that exceeds the appropriate threshold at a certain point in time, then the chemical must be reported. These chemicals may be on the list of 356 Extremely Hazardous Substances (EHS) or could be one of the 650,000 reportable hazardous substances (not on the EHS list). This reporting format is for a "snapshot in time." EHS chemicals have to be reported if the quantity is either greater than 500 pounds, or if the Threshold Planning Quantity (TPQ) amount is less than 500 pounds.

Location

The locations of available TRI facilities in the Atascosa and McMullen Counties planning area are shown below in Figure 16-2. The facility name, location, Industry Sector and total toxic releases (pounds) is shown in Table 16-1. There are no identified hazardous materials transportation corridors in the Atascosa and McMullen Counties planning area like there are in more urban areas such as Houston and San Antonio.

Figure 16-2: TRI Facility Location Map



Source: https://enviro.epa.gov/triexplorer/tri_release.facility

Table 16-1: TRI Facilities in the Planning Area with Toxic Release Data

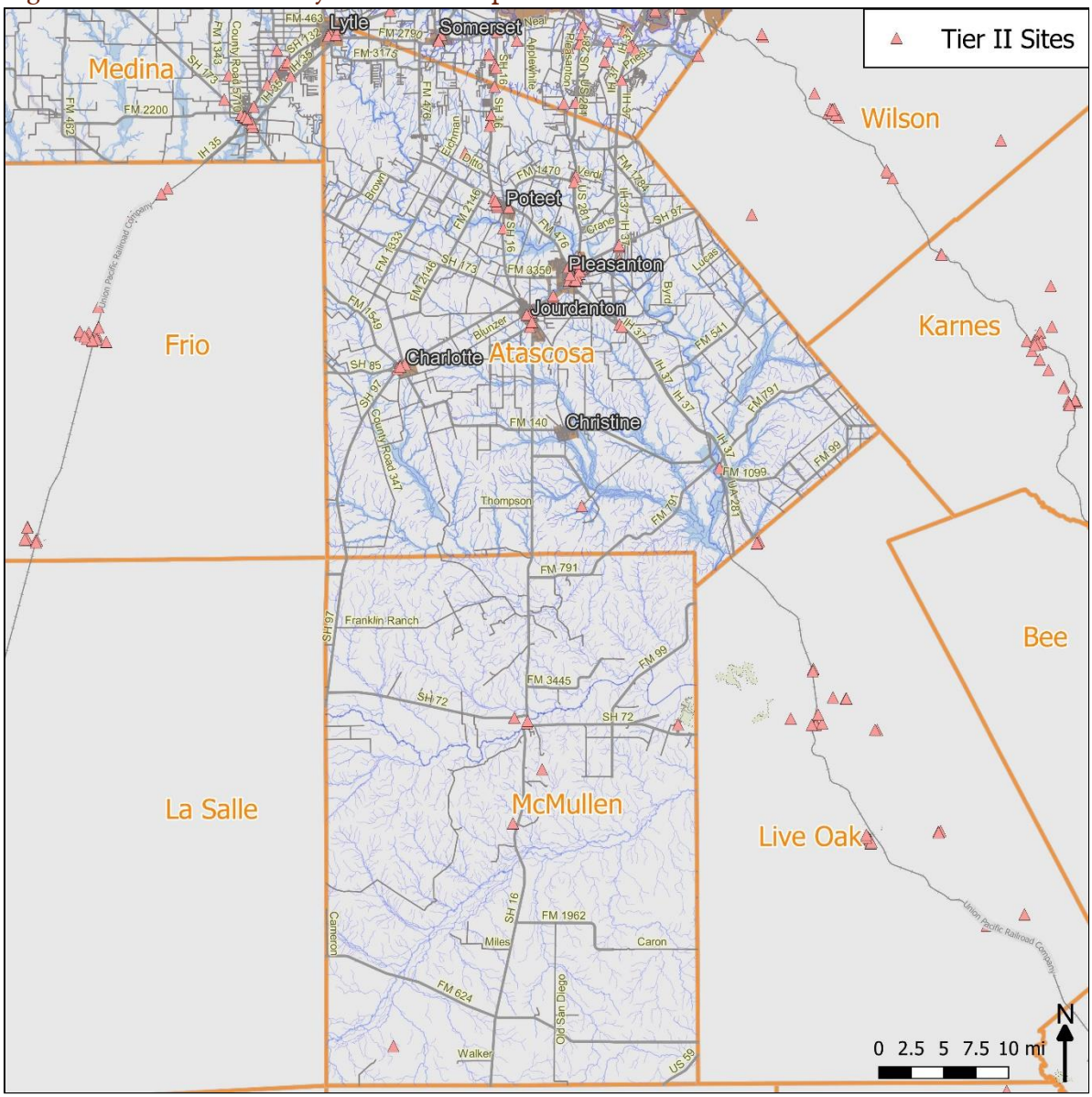
FACILITY NAME	STREET ADDRESS	CITY	COUNTY	INDUSTRY SECTOR	TOTAL RELEASES, 1988-2016 (lbs.)	TOTAL RELEASES, 2016 (lbs.)
SOLVAY USA INC (PLEASANTON)	2995 COUNTY ROAD 430	PLEASANTON	ATASCOSA	Chemicals	15,903	_
FRAC-CHEM - PLEASANTON	178 PLEASANTON PARK LN	PLEASANTON	ATASCOSA	Chemicals	1,000	500
SAN MIGUEL ELECTRIC COOPERATIVE INC	6200 FM 3387	CHRISTINE	ATASCOSA	Electric Utilities	31,806,911	1,085,832
ERGON ASPHALT & EMULSIONS INC	907 2ND ST	PLEASANTON	ATASCOSA	Petroleum	35	0
TRANS-JEFF CHEMICAL CO.	HWY. 16	TILDEN	MC MULLEN	Chemicals	1,040	_

INDEPENDENCE OILFIELD CHEMICALS LLC	472 EAGLEFORD DR.	PLEASANTON	ATASCOSA	Chemicals	2,200	2,200

Source: U.S. Department of Health and Human Service, https://toxmap.nlm.nih.gov/toxmap/download.html

A Tier II facility location map is shown below based on data provided to the Texas Commission on Environmental Quality inventory of Tier II sites.

Figure 16-3: Tier II Facility Location Map



Extent

The extent of a hazardous materials incident can be described in terms of the level of response required. Hazardous materials incidents are categorized as Level I, II, or III depending on the severity of the incident. The criteria used to determine the level of an incident include:

- The characteristics of the hazardous material.

- The nature of its release.
- The area affected by the hazardous materials incident (e.g., populations, sensitive ecosystems, waterways, transportation routes, etc.).
- The extent of multi-agency and multi-jurisdictional involvement.
- Evacuations, injuries or fatalities.
- The technical expertise and equipment needed to safely mitigate the incident.
- Duration

The determination of incident levels shall be a collective decision between the Incident Commander and the responding hazardous materials team. At the point terrorist activities are suspected in a hazardous materials incident, the incident will be classified as a Level III. Unlike standard Level III response activities, federal involvement and additional activities will be required.

Level I
A minor situation within the capabilities of first responders trained at the "operational" level. A Level I incident involves a release, or possible release, of a small amount of gas, liquid or solid of a known (identified) hazardous material. In addition, the agency on-scene has the expertise and proper equipment to safely mitigate the incident.

As a minimum, a command post and an exclusion zone should be established with all incidents. The Emergency Response Guide should be referenced for initial isolation and protective action distances. The incident commander should restrict movement of personnel into the exclusion zone. Only personnel entering for a specific reason and in the proper level of protective equipment should be allowed.

An incident should be immediately upgraded to Level II for a release or potential release of an unknown hazardous material or suspected hazardous material. Typical Level I incidents include:

- Minor leaks or spills from a 55-gallon drum, cylinders up to one-ton capacity, bags or packages.
- Minor leaks or spills which can be handled with absorbent materials and resources readily available on-site.
- Release of chemicals which do not produce an environment which is immediately dangerous to life and health (IDLH) or above the Lower Explosion Limit (LEL) of a product.
- Containers that are involved in an accident that have no visible damage.
- Chemical releases that have minimal environmental impact that do not require outside resources.
- Leaking valves on containers which do not require the product to be immediately off-loaded.
- Evacuations limited to a single intersection or building.
- No life-threatening situation from materials involved.
- Suspicious packages that the threat and substance are considered non-hazardous.

Level II

These are incidents that are beyond the capabilities of an agency with jurisdictional responsibility and that require mitigation by a hazardous materials team. This can range from a small incident involving any amount of an unknown substance to a large incident involving multiple agencies and jurisdictions. A Level II incident should be declared by the Incident Commander and the Initial Response Team if the incident involves a sufficient quantity of gas, liquid or solid of a known hazardous substance or any quantity of an unknown material that has been released or offers the potential for release.

A Level II incident should be declared for the release of any quantity of a known solid or liquid toxic material in a critical public area or for the release or potential release of any quantity of an unknown solid, liquid or gaseous toxic material or suspected toxic material (all gases other than natural gas are considered toxic). In a Level II incident, a formal and properly identified Command Post with a removed staging area, an Incident Safety Officer, and a Hazardous Materials Sector should be established. Control zones must be established and maintained as early as possible and evaluated and monitored throughout the incident. Localized evacuation may need to be implemented and outside agencies should be notified. Typical Level II incidents include:

- One or more 55-gallon drums, one-ton cylinders, nurse tanks, totes, portable containers that are leaking considerable amounts of a known substance.
- A major, liquefied gas leak due to puncture, crack or crease of a large tank where ignition sources are a real threat.
- Leaking containers, tank trucks or railroad tank cars with a hazardous material on board whose structural integrity is in question.
- Train derailments involving railroad tank cars filled with hazardous materials with leaks that can be controlled by local hazardous materials teams.
- A vehicle or train fire involving hazardous materials or hazardous wastes that pose a serious threat of a boiling liquid expanding vapor explosion (BLEVE).
- Incidents involving a fatality or serious injury attributed to the hazardous substance.
- Evacuations consisting of an apartment complex, city block or large facility with many employees.
- Chemical releases that pose a moderate threat to the environment that requires state agency involvement.
- Suspicious package that has an unknown material but due to location is considered a credible threat. When the substance is identified and declared a WMD agent, the incident should be upgraded to a Level III incident. Incidents that involved non- hazardous substances should be downgraded to a Level I incident.

Level III

This includes any incident beyond the capabilities of the hazardous materials team and local resources. The incident may be quite lengthy in duration and may necessitate large-

scale evacuations. It is likely a Level III incident will involve multiple agencies and jurisdictions, as well as resources from the private sector (including chemical manufacturers) and voluntary organizations. Examples of Level III incidents include:

- Large releases from tank cars, tank trucks, stationary tanks or multiple medium containers.
- Incidents involving large-scale evacuations that may extend beyond jurisdictional boundaries.
- Any spill, leak or fire involving hazardous materials that has gone to greater alarms.
- Any incident beyond local capabilities and resources (including the hazardous materials team) to safely identify, contain and mitigate.
- Train derailments involving railroad tank cars containing hazardous materials that require specialized resources to mitigate.
- Major leaks of compressed or liquefied gas cargo tanks or railroad tank cars caused by puncture or major structural damage.
- Suspicious packages that due to location, identification of material as WMD agent, or verbal threat that requires state and federal resources.
- Large-scale or catastrophic releases of hazardous materials (e.g., radiation, biological agents) that would likely include a Stafford Act ESF-10 activation.

Source: Mid America LEPC Regional Hazardous Materials Emergency Preparedness Plan

Historical Occurrences

A total of 1,088,532 pounds of toxic chemical releases have been recorded for Atascosa and McMullen Counties in 2016 and a total of 528,252 pounds of toxic chemical releases were recorded in 2018 according to the EPA's TRI database (Tables 16-1, 16-2). The data collected from 1987 to 2016 shows that a total of 31,827,087 lbs. of toxic chemical releases occurred in the planning area from fixed facilities that have reported toxic chemical releases to TRI. Table 16-4 shows the total release by chemical and associated facility in Atascosa County in 2018. There were no toxic chemical releases recorded for McMullen County in 2018.

Table 16-2: TRI On-site and Off-site Reported Disposed of or Otherwise Released (in pounds), for All industries, for All chemicals, Atascosa County, Texas, 2018

Facility Name	Chemical	Total On-site Disposal or Other Releases (lbs.)	Total Off-site Disposal or Other Releases (lbs.)	Total On- and Off-site Disposal or Other Releases (lbs.)
INDEPENDENCE OILFIELD CHEMICALS LLC	Ethylbenzene	500	0	500
	Methanol	1,000	0	1,000
	Toluene	1,000	0	1,000
	Xylene (Mixed Isomers)	1,146	0	1,146
SAN MIGUEL ELECTRIC	1,2,4-Trimethylbenzene	7	0	7
	Arsenic Compounds	16,130	0	16,130

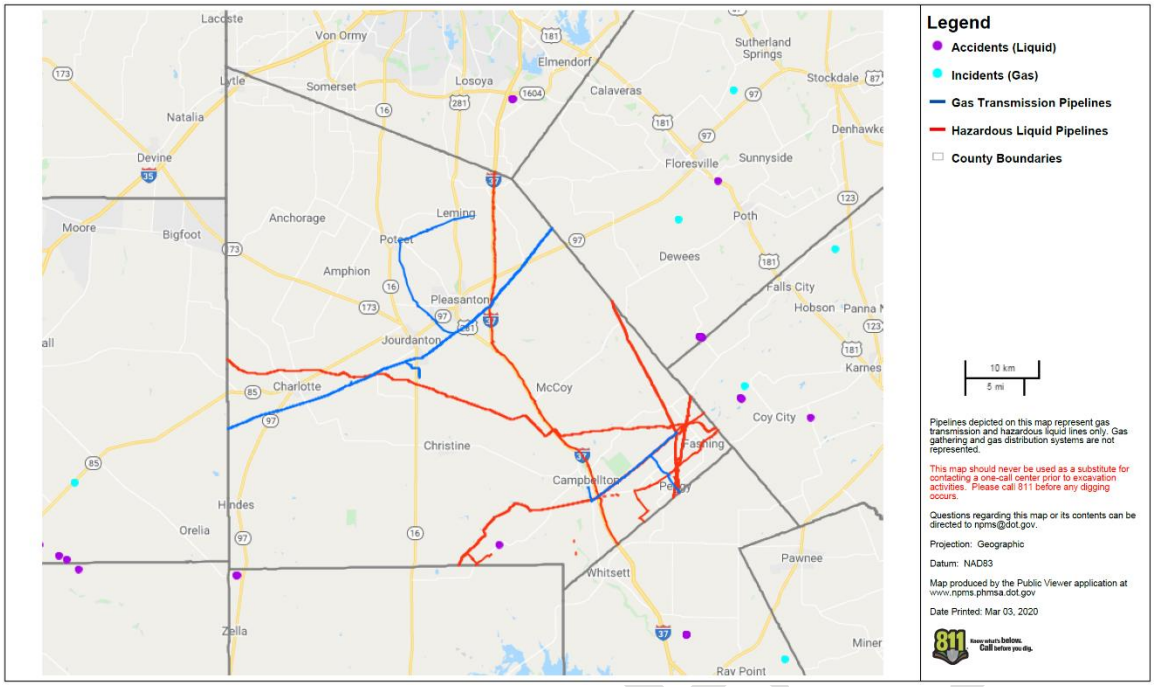
COOPERATIVE INC	Barium Compounds	81,396	0	81,396
	Chlorine	0	0	0
	Chromium Compounds	26,885	0	26,885
	Copper Compounds	43,847	0	43,847
	Dioxin and Dioxin-Like Compounds	4.59 g	0	4.59 g
	Hydrochloric Acid	16,402	0	16,402
	Hydrogen Fluoride	29,659	0	29,659
	Lead Compounds	32,628	0	32,628
	Manganese Compounds	152,878	0	152,878
	Mercury Compounds	101	0	101
	N-Hexane	7	0	7
	Nickel Compounds	16,867	0	16,867
	Selenium Compounds	25,694	0	25,694
	Sulfuric Acid	152,751	0	152,751
	Vanadium Compounds	101,265	0	101,265

Source: EPA.gov, TRI Explorer

Significant Events

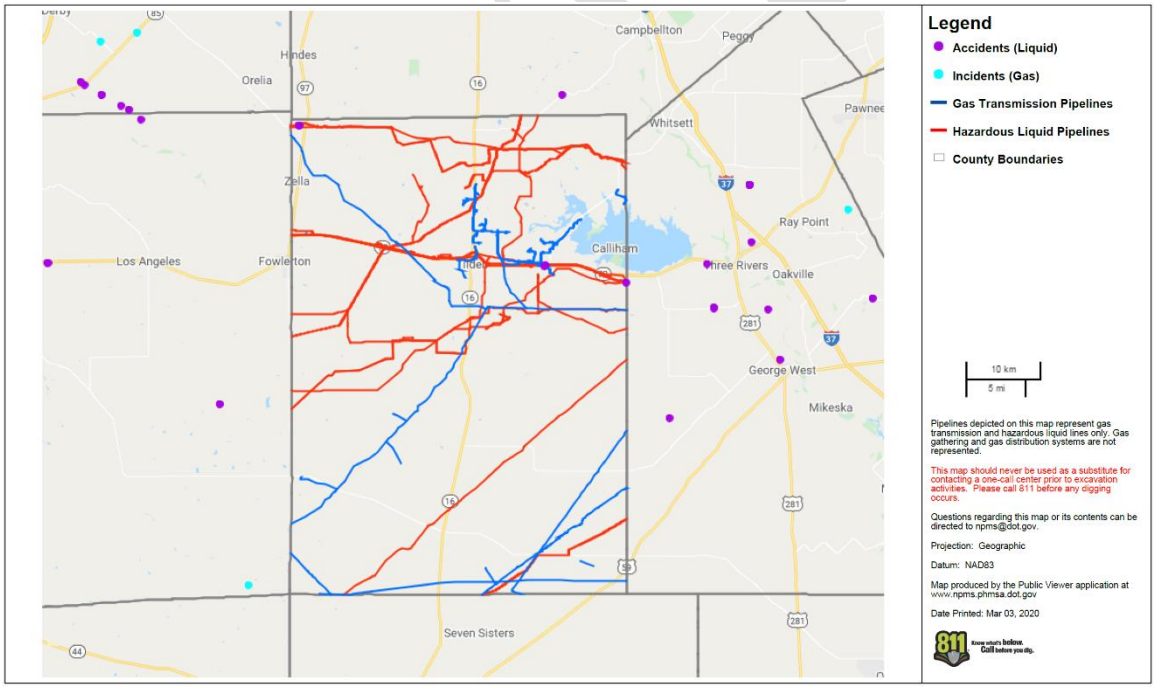
US DOT's Pipeline and Hazardous Materials Safety Administration (PHMSA) data indicates that there has been a total of 12 hazardous materials incidents in Atascosa and McMullen Counties from 2004-2019. 9 of the incidents were in Atascosa County and 3 of the incidents were in McMullen County. Hazardous materials transportation incidents are defined as incidents during the transport of, loading, and unloading of hazardous materials into vehicles. Figures 16-3 and 16-4 show the PHMSA transportation incidents and include gas transmission pipelines and hazardous liquid pipelines.

Figure 16-4: Atascosa County Pipeline and Hazardous Incident Map



Source: https://www.npms.phmsa.dot.gov

Figure 16-5: McMullen County Pipeline and Hazardous Incident Map



Source: https://www.npms.phmsa.dot.gov

Probability of Future Events

According to historical records the Atascosa and McMullen Counties planning area experiences consistent toxic chemical releases and 4 hazardous materials incidents have

occurred over the 15-year period from 2004-2019. The probability of a hazardous materials incident occurring in the planning area is probable within the next 3 years.

Frequency of Occurrence	
Highly likely:	Event probable in next year.
Likely:	Event probable in next 3 years.
Occasional:	Event possible in next 5 years.
Unlikely:	Event possible in next 10 years.

Vulnerability and Impact

Based on the prevalence and geographic proximity of major roadways that carry traffic with hazardous materials and the TRI and Tier 2 fixed locations, the majority of the planning area is vulnerable. The risk to the population depends on a variety of factors, including type and amount of chemical released, weather conditions, prevailing winds, time of day, population density, and season. The particular transportation route and fixed site involved are significant factors in determining the risk to public health and safety as well. Hazardous materials or toxic releases can have a major impact on the Atascosa and McMullen Counties planning area.

Hazardous material incidents can cause injuries and/or illnesses that result in permanent disability and even death. It is likely that inhaled hazardous gasses will result in respiratory problems, including burning sensations in the lungs, nose, and throat. Releases that involve solids or liquids can be absorbed through the skin and may cause burns on contact. Response personnel are at increased risk due to more concentrated or prolonged exposure to the agent involved in the hazardous materials incident. Response personnel also have a greater likelihood of being impacted by secondary explosions or leaks and being in more dangerous situations due to roadway or bridge damage.

Property, facilities, and infrastructure are all subject to significant impacts from hazardous materials. Gas lines, water lines, sewer lines, and communication lines can be interrupted or destroyed, depending on the nature of the event. Hazardous materials incidents often involve fire or explosions that can impact property and facilities, including roadways and bridges and can result in the complete shutdown of facilities for an extended period of time.

The environment is vulnerable in a hazardous materials incident and can be heavily damaged depending on the nature of the release. Environmental risks from hazardous materials incidents can range from minimal to catastrophic, where the recovery time is measured in years. The Chernobyl nuclear power plant disaster occurred in Northern Soviet Ukraine in 1986 and an “exclusion zone” has been setup 19 miles from the site in all directions due to radiation poisoning.

The depth and range of economic impacts to the community will depend on the nature and severity of the incident. An incident that damages transportation, utility, or

communication infrastructure could result in a significant impact to the local or regional economy. Cleanup costs, loss of access to facilities, and lost business or customers are all possible impacts after a hazardous materials incident.

Hazardous materials incidents often test the communication apparatus or emergency management officials, including evacuation orders, to the public. Misunderstood, confusing, conflicting messages, or delivery mechanisms that are ineffective, could have negative impacts to public confidence in emergency management staff and leadership. Without ongoing communication regarding hazardous materials risks and protective measures, the public may not perceive the government as aware and capable when an incident occurs.

A hazardous materials truck traffic study that includes the planning area provides useful data and recommendations.[6] The recommendations contained therein are consistent with the goals and mission of this Plan and are provided below.

Raise awareness of the public and elected officials – Lack of awareness keeps us from mitigating existing risks and preventing new ones. It also keeps us from effectively responding to and recovering from incidents when they do happen. What are the potential impacts of HazMat transport incidents? How well is the community prepared for HazMat incident response and recovery? What are the highest priority needs for addressing HazMat transport risks? How can you address those needs?

Identify training scenarios and exercise - Start with priority materials—the most frequent and most hazardous. Different segments may have different hazardous materials, so training needs may not be exactly the same for all agencies in the community. How will volunteer and paid fire departments respond to HazMat incidents? What kind of traiig do emergency responders need, and how often?

[6] *Hazardous Materials/Truck Traffic Study: Central Eagle Ford Shale Region, Texas (2013).*

Figure 16-6: Training for HazMat incident response, HMEP training grants administered by TDEM an provided by the Texas Engineering Extension Service (TEEX)

Plan for protective action - Research has shown that the public WILL ignore protective action instructions or seek out information—and often get the wrong information—if they are uncertain of the threats, the risks, or do not trust the messenger. Consistent, clear, and straightforward information from trusted sources can help prevent the spread of rumors, avoid unnecessary disasters, and make the jobs of responders easier. Who coordinates evacuations and shelter-in-place warnings in your community? Where are warnings most likely to be needed along transport routes? Who will be affected at those times? Are their pre-designated locations for evacuations? Are there shelter and evacuation protocols, assembly points, and accounting procedures for schools, day cares, hospitals, detention facilities, etc. in vulnerable zones? How do you handle concerned parents of school children?

Evaluate equipment and supplies. The right equipment and supplies are critical to effective emergency response and protecting responders, property, the public, and the environment when incidents happen. Equipment and supplies can be requested through budgetary and grants funding processes. Some items to consider are:

- Personal protective equipment;
- Chemical detection sensors;
- Equipment and supplies for spill confinement and containment (e.g., tractors, dozers, tarps, soil, drums, plugs/patches, etc.);
- Equipment and agents for neutralization, extinguishing, and dilution (e.g., hoses, pumps, nozzles, tanks, apparatus, foam, bases, etc.);

- Decontamination and cleanup equipment and supplies (e.g., showers, storage bags, brushes, soaps, etc.).

Locate and schedule critical resources - HazMat incident risks may be especially high at certain times of the day, days of the week, or seasons of the year. Risks may vary from location to location. Understanding when, where, and what risks are highest can help operations and logistics personnel better plan, schedule and preposition resources (e.g., personnel, apparatus, equipment, supplies, etc.). When and where have cargo transport accidents happened in your community? What personnel and resources are available to respond?

Conduct hazard and vulnerability assessments - Effective emergency planning and communication depends on knowing where risks are greatest and who and what are most vulnerable. Sometimes a risk or vulnerability assessment can be used to identify whether traffic controls (such as speed reductions or enhanced enforcement) or HazMat restricted routes are needed. Where are priorities for doing a HazMat transportation risk and vulnerability assessment? What information from the HazMat CFS can be used? What information from other emergency, community, or public works plans can be used?

Integrate project information with other community plans - The HazMat CFS contains a lot of information. Some of it may be useful for other community planning efforts—roadway maintenance and planning, economic development, infrastructure planning (e.g., locations of schools, hospitals, arenas, detention facilities, and other special populations), drinking water and storm water pollution prevention and environmental planning, and land use and zoning are just some of the areas that might benefit.

SECTION 17: TRAIN DERAILMENT

Description

Freight traffic in the U.S. continues to climb every year and with it the risk of derailment. Railroads are transporting record amounts of crude oil which means more hazardous materials are shipping by rail. At the same time, passenger railroads are carrying more riders and operating more trains. To help mitigate risk, new safety and training programs have been implemented to help workers more easily identify and report potential rail and equipment defects alongside more sophisticated technology that can help detect track and wheel issues before they become problematic. According to the Federal Railroad Administration, the number of derailments steadily declined in the United States by 50% between 2004 and 2013, however, this doesn't mean derailment risks have subsided. A recent trail derailment is pictured below that occurred on September 9, 2019 in Dupo, Illinois, near St. Louis. Power was cut to the area and schools were evacuated.

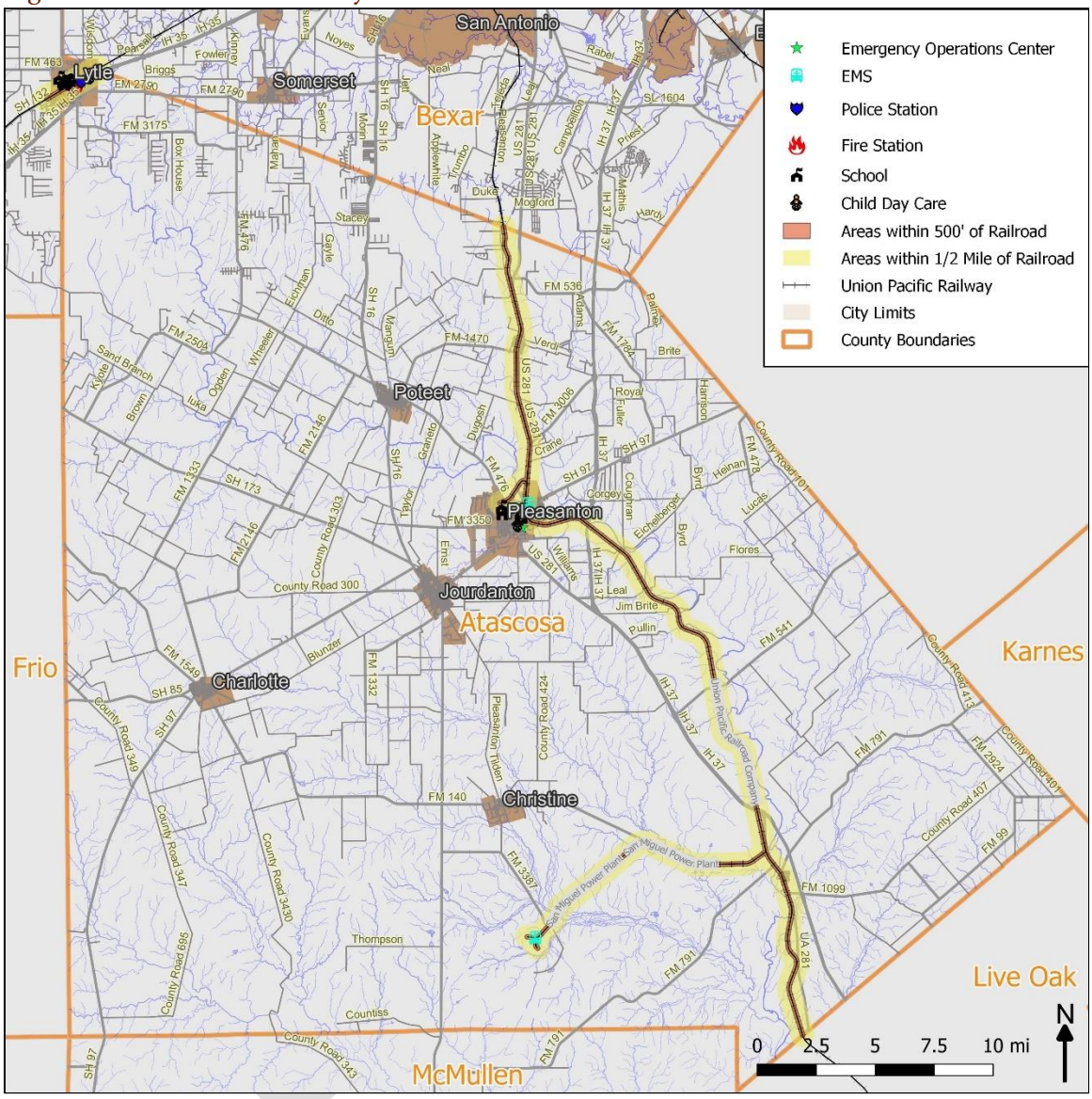
Figure 17-1: Train Derailment in Dupo, Illinois

Source: 9-10-2019, Associated Press

Location

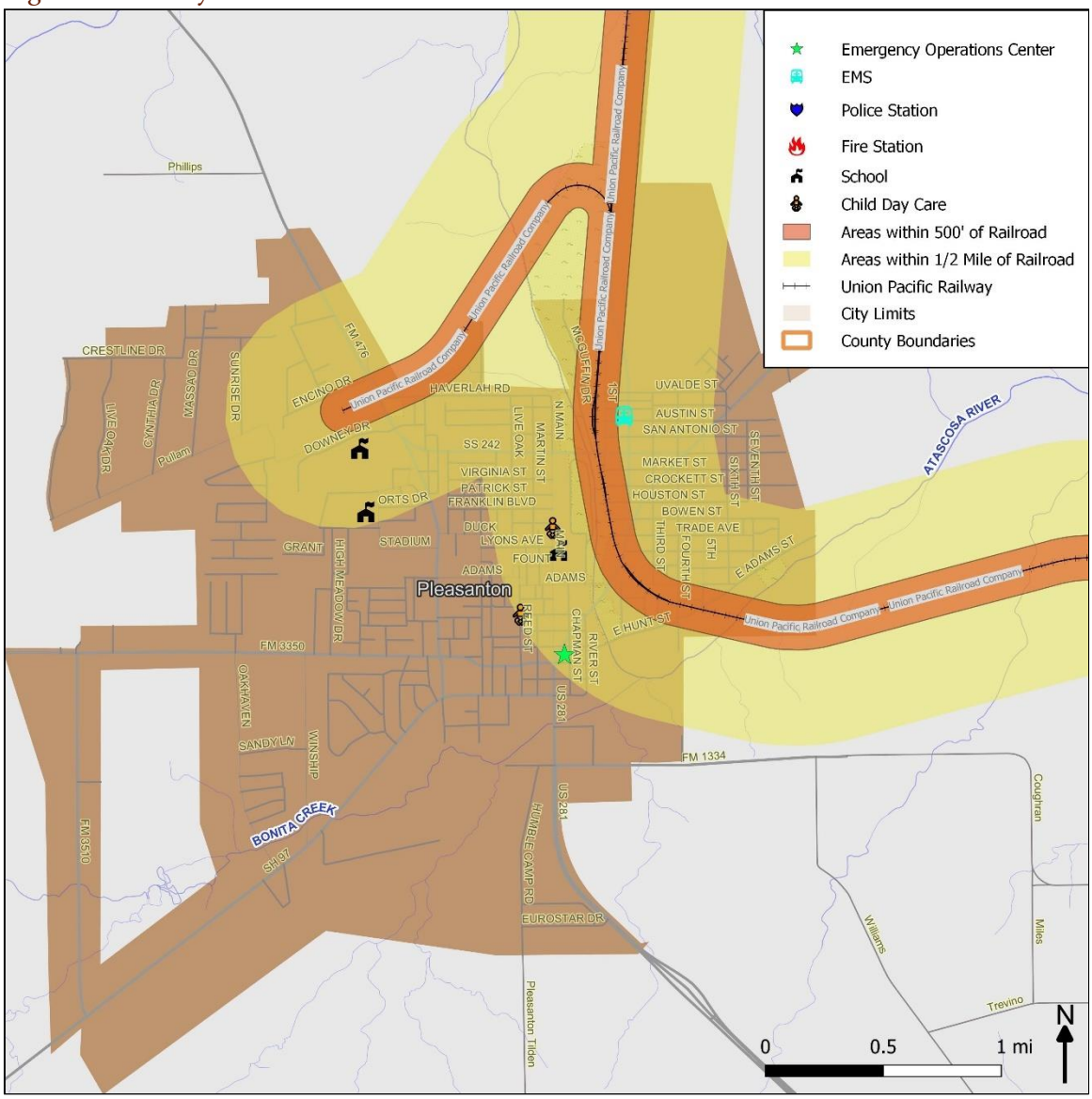
The planning area is bisected by a Union Pacific rail line from north to south. The locations of rail lines that traverse the planning area are shown below in Figure 17-2 and are considered to be limited to areas adjacent to the rail lines. The alignment of the rail corridors and the areas that trains travel through are at the highest risk of a rail derailment. A McMullen County overview is not provided since rail lines do not cross any portion of the County. The maps below show vulnerable areas and facilities within 500' and ½ mile from the centerline of the rail corridor.

Figure 17-2: Atascosa County Train Derailment Risk Assessment



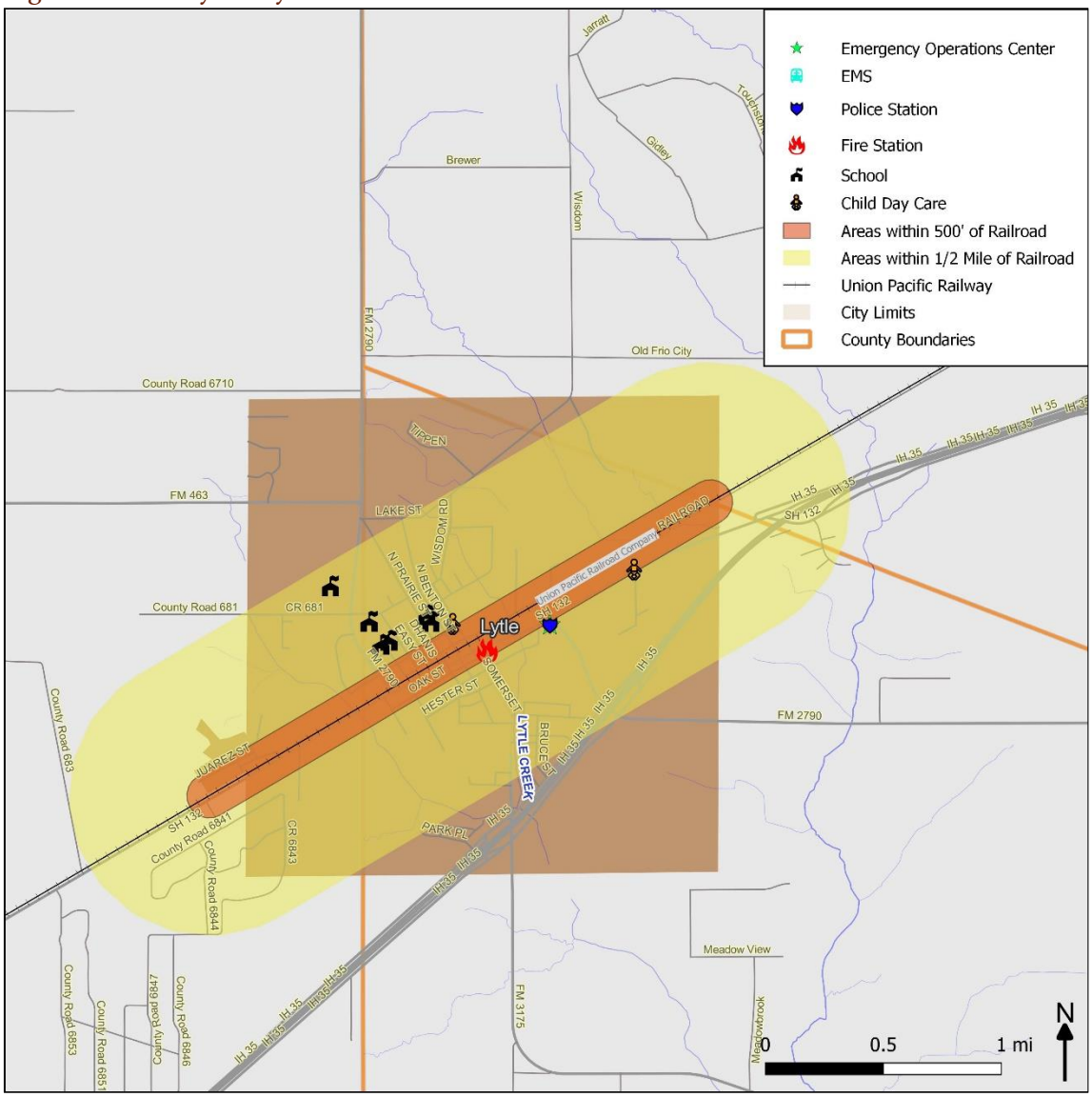
The figure below shows a detail view of the City of Pleasanton, the most populated area in the planning area that would be impacted by a train derailment. Pleasanton is emblematic of communities that grew around the railroad infrastructure with the lines a part of the fabric of the communities. A derailment thus has the potential to cause disruption or even major damage, simply due to its proximity to residential and commercial properties as well as transportation and utility infrastructure.

Figure 17-3: City of Pleasanton Train Derailment Risk Assessment



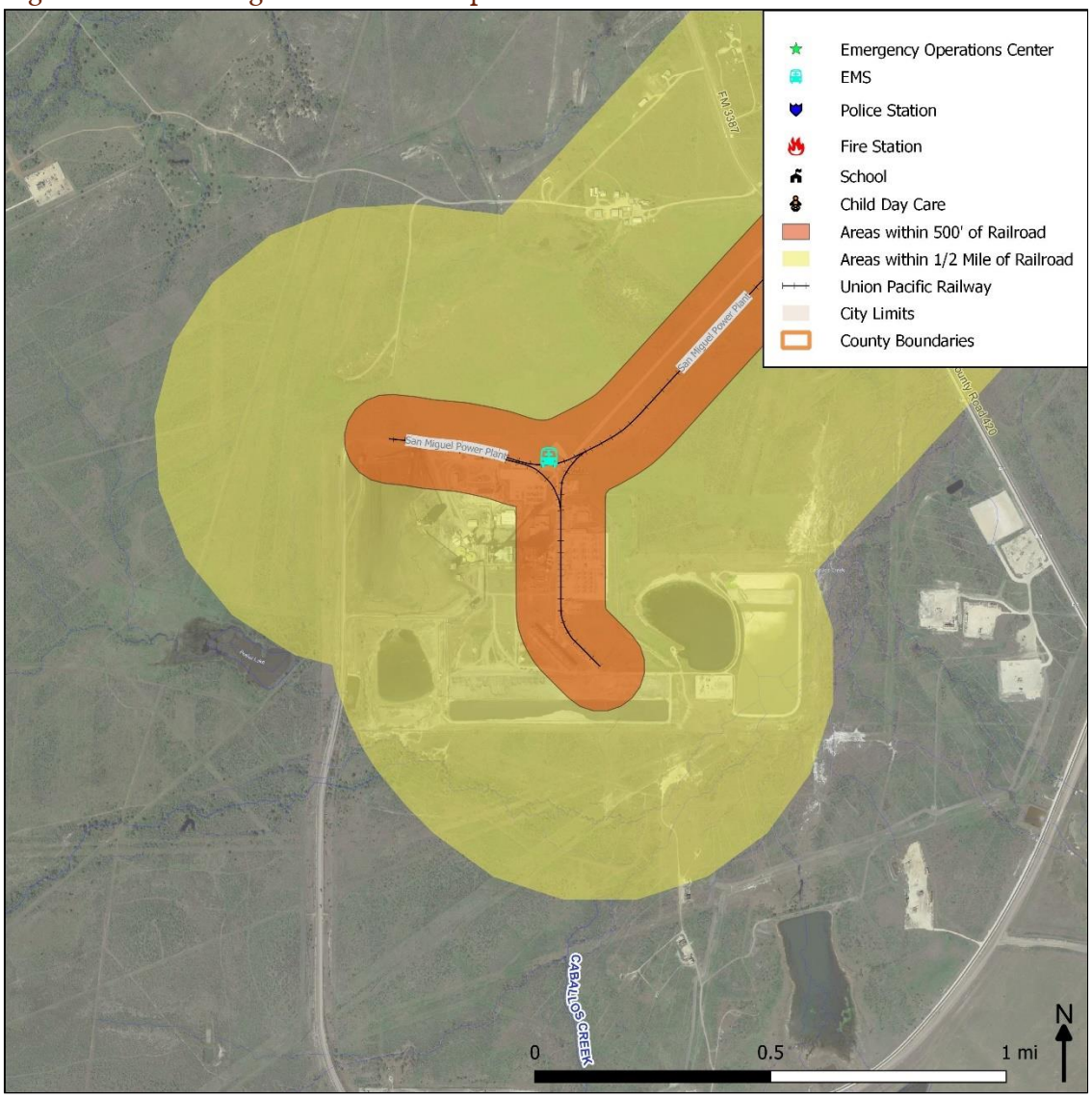
The figure below shows a detail view of the City of Lytle, the only other populated area that is at risk to a train derailment within the planning area. While the City of Lytle is not as populated as the City of Pleasanton, the vulnerability of the city to a train derailment is higher due to a higher proportion of the city being within a ½ mile of the rail corridor and the possibility of transportation disruption if areas of the city become inaccessible.

Figure 17-4: City of Lytle Train Derailment Risk Assessment



The final location within the planning area that is particularly vulnerable to a train derailment is the San Miguel Electric power plant in the southern portion of the county shown below.

Figure 17-5: San Miguel Electric Cooperative Train Derailment Risk Assessment



Extent

The extent of a train derailment incident is considered to be severe by CORE planning team members due to the speed of onset and potential for devastation damage and loss of services and access for extended periods of time. The severity of the train derailment is highly dependent on the nature and location of the specific incident.

Historical Occurrences

Historical train accident and incident data is stored by the Federal Railroad Administration, Office of Safety Analysis. Table 17-1 below provides a ten-year overview of train accidents and incidents within Atascosa County from 2010-2019. Based on data from the Federal Railroad Administration there were 20 total train accidents/incidents in the planning area between 2010-2019.

Table 17-1: Train Accident/Incident Overview within Atascosa County, 2010-2019

Category	CY 2010	CY 2011	CY 2012	CY 2013	CY 2014	CY 2015	CY 2016	CY 2017	CY 2018	CY 2019	Total
TOTAL ACCIDENTS/INCIDENTS	2	3	3	5	2	1	.	2	1	1	20
--- Total fatalities	.	.	.	1	.	.	.	.	.	.	1
--- Total nonfatal conditions	1	2	1	3	3	.	.	1	.	.	11
--- Employee on duty deaths	.	.	.	.	.	.	.	.	.	.	.
--- Nonfatal EOD injuries	1	.	.	1	2	.	.	.	.	.	4
--- Nonfatal EOD illnesses	.	.	1	.	.	.	.	.	.	.	1
--- Total employee on duty cases	1	.	1	1	2	.	.	.	.	.	5
--- Cases with days absent from work	1	.	.	1	2	.	.	.	.	.	4
--- Trespasser deaths, not at HRC	.	.	.	1	.	.	.	.	.	.	1
--- Trespasser injuries, not at HRC	.	1	.	.	1	.	.	.	.	.	2
--- Trespasser Incidents, not at HRC	.	1	.	1	1	.	.	.	.	.	3
--- Passengers kld in train accs or crossing incidents	.	.	.	.	.	.	.	.	.	.	.
--- Passengers inj in train accs or crossing incidents	.	.	.	.	.	.	.	.	.	.	.
--- Passengers kld in other incidents	.	.	.	.	.	.	.	.	.	.	.
--- Passengers inj in other incidents	.	.	.	.	.	.	.	.	.	.	.
TRAIN ACCIDENTS (Not at Grade-Crossings)	.	.	2	1	1	1	.	.	.	.	5
--- Train accident deaths	.	.	.	.	.	.	.	.	.	.	.
--- Train accident injuries	.	.	.	.	2	.	.	.	.	.	2
--- Human factor caused	.	.	.	.	.	.	.	.	.	.	.
--- Track caused	.	.	1	1	1	1	.	.	.	.	4

--- Motive power/equipment caused	.	.	1	.	.	.	.	.	.	.	1
--- Signal caused, all track types	.	.	.	.	.	.	.	.	.	.	.
--- Signal caused, main line track	.	.	.	.	.	.	.	.	.	.	.
--- Miscellaneous caused	.	.	.	.	.	.	.	.	.	.	.
--- Collisions	.	.	.	.	.	.	.	.	.	.	.
------- Collisions on main line track	.	.	.	.	.	.	.	.	.	.	.
--- Derailments	.	.	2	1	1	1	.	.	.	.	5
--- Other types, e.g., obstructions	.	.	.	.	.	.	.	.	.	.	.
--- Train accidents on main line 5/	.	.	1	1	1	1	.	.	.	.	4
--- Accidents on yard track	.	.	.	.	.	.	.	.	.	.	.
--- HAZMAT RELEASES	.	.	.	.	.	.	.	.	.	.	.
--- Cars carrying hazmat	.	.	10	.	.	.	.	.	.	.	10
--- Hazmat cars damaged/derailed	.	.	.	.	.	.	.	.	.	.	0
--- Cars releasing	.	.	.	.	.	.	.	.	.	.	0
--- Accidents with reportable damage over $100K	.	.	1	1	1	1	.	.	.	.	4
..... PERCENT of all train accidents	.	.	50	100	100	100	.	.	.	.	.
--- Accidents with reportable damage over $500K	.	.	.	1	1	1	.	.	.	.	3
..... PERCENT of all train accidents	.	.	.	100	100	100	.	.	.	.	.
--- Accidents with reportable damage over $1M	.	.	.	1	1	1	.	.	.	.	3
..... PERCENT of all train accidents	.	.	.	100	100	100	.	.	.	.	.
HIGHWAY-RAIL INCIDENTS	1	2	.	3	.	.	.	2	1	1	10
--- Highway-rail incidents deaths	.	.	.	.	.	.	.	.	.	.	.
--- Highway-rail incidents injuries	.	1	.	3	.	.	.	1	.	.	5
--- Incidents at public xings	1	2	.	3	.	.	.	2	.	.	8

..... PERCENT of total Highway-rail incidents	100	100	.	100	.	.	.	100	.	.	.
OTHER ACCIDENTS/INCIDENTS	1	1	1	1	1	.	.	.	.	.	5
--- Other incidents deaths	.	.	.	1	.	.	.	.	.	.	1
--- Other incidents injuries	1	1	1	.	1	.	.	.	.	.	4

Source: https://safetydata.fra.dot.gov/OfficeofSafety/publicsite/query/TenYearAccidentIncidentOverview.aspx

Significant Events

May 15, 2015 – Atascosa County, City of Pleasanton

Thirty-two cars carrying gravel were involved in the derailment, which occurred around 2:30 a.m. in the 3000 block of Highway 281 South. The 60-car train was heading south to San Miguel, said Union Pacific spokesman Jeff DeGraff. Southbound lanes were reduced to one lane while crews work to clear the scene, which has spilled over from the railroad tracks to the road. More than 500 feet of track were damaged during the derailment and will require repairs before reopening. DeGraff said Friday afternoon that crews hope to have the track back in working condition by Saturday morning. (source: https://www.mysanantonio.com/news/local/article/Hwy-281-shut-down-after-train-derailment-in-6265534.php#photo-7985199)

Probability of Future Events

According to the Federal Railroad Administration, the Atascosa and McMullen Counties planning area has experienced 2 railroad accidents/incidents every year for the 10-year period from 2010-2019. The probability of a railroad accident/incident occurring in the planning area is highly likely within the next year.

Frequency of Occurrence	
Highly likely:	Event probable in next year.
Likely:	Event probable in next 3 years.
Occasional:	Event possible in next 5 years.
Unlikely:	Event possible in next 10 years.

Vulnerability and Impact

There are measures that can be taken by both railroad operators and local jurisdictions. In recent years, railroads have enhanced risk mitigation through improved worker training programs and leveraging new technology for better rail and wheel flaw detection capabilities. Measure that can be taken at the local level include clear emergency response operations and clear communication from authorities on evacuation vs. shelter in place protocols. Local signage and intersection upgrades can also mitigate the risk and reduce the impact of train derailments.

SECTION 18: MITIGATION STRATEGY

The overall mitigation strategy is to reduce and eliminate the long-term risk of loss of life and property damage from the full range of disasters affecting the planning area. The success of this strategy is dependent on 3 main components: mitigation goals, mitigation actions, and an action plan for implementation. These provide the framework to identify, prioritize and implement actions to reduce risk to hazards. The goals describe long term outcomes the communities want to achieve. Objectives are broad but more measurable and connect goals with the actual mitigation actions. The actions are specific actions that the local government will take to reduce risk to hazards and the action plan describes how the actions will be prioritized and implemented. Each jurisdiction in this multi-jurisdictional plan has had the opportunity to consider ranking and implementation responsibilities in the action plan specific to its priorities and vulnerabilities.

The Planning Team developed a mitigation strategy that began with a review of the goals and objectives from the 2012 Alamo Area Council of Government Regional Mitigation Action Plan Update. This was an opportunity to evaluate the previous goals and reaffirm

or change them based on current conditions and priorities in each community. Two Mitigation Workshops were held with the Core Planning Team and sub-jurisdictional teams at the Methodist South Hospital in November 2018 and February 2019 and many of the goals and objectives from the 2012 AACOG Plan were modified for this plan and adopted at these workshops. Because the State Hazard Mitigation Plan documents the State's goals for reducing risk and allocating resources, the team considered it strategic to align the plan's goals to the State's plan so the following goals from the Texas State Hazard Mitigation Plan were also considered.

Goal 1: Reduce or eliminate hazardous conditions that may cause loss of life
Goal 2: Reduce or eliminate hazardous conditions that may inflict injuries
Goal 3: Reduce or eliminate hazardous conditions that can cause property damages
Goal 4: Reduce or eliminate hazardous conditions that degrade important natural resources
Goal 5: Reduce or eliminate repetitive losses due to frequent probability of occurrence
Goal 6: Lessen economic impact within communities when hazards occur

Mitigation Goals

Hazard mitigation goals and objectives for the Atascosa and McMullen Counties Hazard Mitigation Action Plan are presented below.

Goal #1: Increase Emergency Preparedness, response and recovery capability.

- Objective 1.1 - Ensure that emergency services organizations are prepared and have the capability to detect and promptly respond to emergency situations.

- Objective 1.2 - Maximize intergovernmental coordination on the effective use of emergency resources during response, including vital communications between multiple agencies in the emergency situation.

- Objective 1.3 – Ensure that infrastructure, equipment and support systems are maintained and/or upgraded to support emergency services response and recovery operations.

Goal #2: Build capacity for hazard mitigation at the county and municipal level through technical and financial assistance programs.

- Objective 2.1 - Promote partnerships between counties and municipalities to identify federal and state programs that provide financial assistance to help attract funds for mitigation projects and programs.

- Objective 2.2 - Promote partnerships between counties and municipalities to identify federal and state programs that provide technical assistance, such as training funds and training services for mitigation projects and programs.

- Objective 2.3 - Maximize the use of available hazard mitigation grant programs to protect vulnerable populations and structures in participating jurisdictions.

Goal #3: Reduce the impact of natural disasters on populations and private property.

- Objective 2.1 - Promote partnerships between counties and municipalities to encourage and facilitate coordination of planning and development initiatives, particularly on developments of regional impact.

- Objective 2.2 - Increase the county and municipal control over development, especially in high hazard areas.

- Objective 2.3 - Implement programs that seek to remove residential structures from high hazard areas.

- Objective 2.4 - Develop adequate and consistent development review boards to provide enforcement of ordinances and codes within and between jurisdictions to ensure that all new construction is completed using hazard resistant design techniques.

- Objective 2.5 - Implement natural resource protection projects that, in addition to minimizing hazard losses, also preserve, restore, or otherwise benefit and/or property manage the functions of the natural systems.

- Objective 2.6 - Implement projects that involve the construction of structures designed to reduce the impact of a hazard such as dams, levees, floodwalls, retaining walls, safe rooms, etc. or such structural modifications as the elevation or relocation of bridges, the anchoring of manufactured housing, or a retrofit of an existing building.

Goal #4: Identify, introduce, and implement programs designed to raise awareness of and acceptance of the principles of hazard mitigation.

- Objective 3.1 – Develop outreach programs focused on increasing public education to increase awareness of hazards and their associated risks.

- Objective 3.2 – Promote partnerships between counties and municipalities to continue to develop a regional approach to identifying and implementing mitigation actions.

- Objective 3.3 – Promote partnerships between counties and municipalities to monitor an publicize the effectiveness of mitigation initiatives implemented in the community.

- Objective 3.4 – Develop outreach programs focused on increasing participation in mitigation programs by business, industry, institutions and community groups.

Goal #5: Reduce the potential impact of natural disasters on critical facilities and infrastructure.

- Objective 4.1 – Reduce the vulnerability of critical facilities (Schools, shelters, police, fires stations, and other institutions) important to the community.

- Objective 4.2 – Reduce the vulnerability of buildings and facilities used for routine government operations.

- Objective 4.3 – Reduce the vulnerability of public and private medical and health care facilities in the community.

- Objective 4.4 – Reduce the vulnerability of lifelines (transportation facilities and systems, water and sewer systems, telecommunication systems and facilities) serving the community.

- Objective 4.5 – Ensure that critical facilities and lifelines will be constructed and/or retrofitted to minimize the potential for disruption during a disaster.

- Objective 4.6 – Local governments will strive to involve the private sector, especially utility companies, in participating in hazard mitigation planning efforts.

Goal #6: Increase regional capabilities to mitigate the effects of natural hazards.

- Objective 6.1 - Enhance the local governments' capability to conduct hazard risk assessments, demonstrate funding needs, and track mitigation activities.

- Objective 6.2 - Enhance the local governments' ability to notify the public at risk and provide emergency instruction during a disaster.

- Objective 6.3 - Address data limitations needed for hazard identification and risk assessment (definition of hazards, identification of hazard areas, and vulnerabilities).

- Objective 6.4 - Promote natural hazard studies and the development of data to support mitigation strategies for those hazards that are a threat throughout the region.

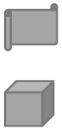
SECTION 19: MITIGATION ACTIONS

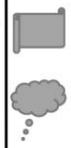
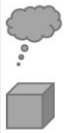
The mitigation actions developed by Core planning team members, sub-jurisdictional teams, and community stakeholder input are presented in this section and organized by jurisdiction. Core Planning Team members met for two mitigation workshops in November 2018 and February 2019 to develop mitigation actions for each of the natural and man-made hazards included in the Plan; Sections 5-17. This began with a review of mitigation actions from the prior 2012 AACOG plan to assess whether they had been completed and if not, whether they were still relevant. The Action items with a "N" in the New Action column are those that have been carried over from the previous plan. New actions were developed with unique insight from planning team members, SARA, community and regional plans, capital improvement plans, and mitigation ideas guides developed by FEMA and the Texas Department of Emergency Management (TDEM). Based on local input, the following action items from the previous 2012 plan were completed and those that were not carried forward from that plan were discarded due to lack of continued relevance. The actions below were listed in the prior 2012 AACOG plan and are listed as either completed or on-going.

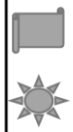
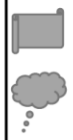
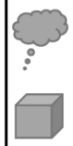
ACTION: Improve Areas in certain areas of the city that are subject to flooding – Charlotte 1	
Action Ongoing	Addressed 1 area but continue to have problem areas
ACTION: Prevent water shortage during times of excess heat – Pleasanton 1	
Action Completed	Conservation plan enacted
ACTION: Improve evacuation/response time in emergencies – Pleasanton 2	
Action Completed	Implemented full time fire department and got response times down, built new fire station, 3 new fire trucks, 24/7 air ambulance stationed at the airport and fire station equipped to be command center during emergency. Also installed 3 new sirens throughout town for better notification.
ACTION: Reduce flooding and poor drainage at Pulliam Street and Odelley Street, by increasing capacity or increasing maintenance of existing storm water system – Pleasanton 3	
Action Ongoing	Flood study completed and 3 main areas identified for a total of $21 Million in improvements.
ACTION: Land use/code enforcement, including enforcement of flood damage prevention ordinance - Pleasanton 4	
Action Completed	City Engineer named floodplain manger; new permitting and development process enacted and staying current with code updates.
ACTION: Improve water supplies to certain areas of the city by installation of additional water well – Pleasanton 5	
Action Completed	Added 1.25-million-gallon elevated storage tower and new well. Regional water line added in anticipation of new development happening in NW to NE part of the city. Drilled new well at industrial park.
ACTION: Implement an early warning system – Jourdanton 2	
Action Completed	One-call system implemented instead of siren.
ACTION: Improve water supply reservoirs and increase water well storage – Jourdanton 3	
Action Ongoing	Added 1.1M storage capacity to system, in development. New meters to help with reading and consumption levels. 2 new elevated and 1 ground storage tank still needed.
ACTION: Replace sewer lines in areas of the city to aid in public health and safety – Jourdanton 4	
Action Ongoing	Lines have been installed but new ones needed in areas of the city to eliminate septic tanks prone to failure.
ACTION: Enforcement of flood damage prevention ordinance – Jourdanton 5	

Action Ongoing	Code enforcement department is growing with 1 additional full-time employee whereas, no department at time of last plan. New subdivision ordinance addressing growth issues.
ACTION: Replace or improve inoperable communication equipment – Lytle 1	
Action Ongoing	Added repeater to water tower to improve communication. New radios and equipment still needed to improve police, fire, and EMS coordination.
ACTION: Develop or purchase water supply reservoirs and increase water well storage.	
Action Ongoing	New connections, pumps, electricity needed to complete new wells to accommodate anticipated new growth that will double the size of the city – Lytle 2
ACTION: Improve or install additional early warning siren system – Lytle 3	
Action Completed	Revamped the early warning system with new wiring and siren to anticipate growth.
ACTION: Identification of areas prone to flooding for development of drainage or other projects to address flooding issues – Lytle 4	
Action Ongoing	Have address some areas and working on others.
ACTION: Community assistance and monitoring activities in support and compliance with NFIP regulations – Lytle 5	
Action Ongoing	Code enforcement and monitoring activities are being improved and ongoing.

Core Planning Team members then took the draft mitigation actions back to their respective communities to get feedback and develop them further. The goals listed in Section 18 were used as guidance while considering such factors as existing and future growth, the hazard risk assessments, individual community priorities, critical facilities, and unique community vulnerabilities. Mitigation action types include *Local plans and regulations, Structural projects, Natural systems protection, and Education programs.* Additional information provided for each mitigation action includes the jurisdictional department responsible for implementation, estimated cost, potential funding sources, timeline for implementation, and benefit to the community. An action that is ranked as "High" indicates that the action will be implemented as soon as funding is received, both locally and through grants. A "Medium" action is one that may not be implemented right away depending on the cost and how well or how many community members are served.

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Atascosa County											
1	Implement a countywide flood early warning system.	Place flood gauges upstream of flood-prone areas to alert citizens to quickly rising water.	Hurricane, Flood		G1, G6	Y	Public Works	$300,000	Local, HMGP, PDM, CDBG	48	High
2	Backup Generators for critical facilities	Backup generators need to be provided for all Coutny critical facilities to provide power in case of emergency.	Hurricane, Flood, Wildfire, Tornado, Drought, Earthquake, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorms,Lightning, Hazardous Materials Incident, Railroad Derailment		G5	Y	Public Works	$30,000	Local, HMGP, PDM	60	High
3	Require RV parks to provide storm shelters.	Implement a storm shelter requirement for RV parks in the County.	Hurricane, Flood, Tornado, Hailstorm, Severe Winter Storm, Windstorms, Lightning.		G3, G6	Y	County Commissioners	$15,000	Local, HMGP, PDM	60	Medium
4	Conduct Wind Damage Study and implement findings	Conduct a wind damage study to assess vulnerability of population and critical facilties and implement findings.	Tornado, Windstorms		G3, G5	Y	County EMC	$60,000	Local, HMGP, PDM	60	Medium
5	Inventory low water crossings and develop and prioritize a CIP to retrofit.	Inventory all low water crossing in the County and develop and prioritize projects in a CIP for upgrade or replacement.	Hurricane, Flood, Severe Winter Storms		G2, G3	Y	County Commissioners, Public Works	$500,000	Local, HMGP, PDM	48	High

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Atascosa County											
6	Plan and Build Community Safe Rooms	Strategically place safe rooms around the county to protect the community.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G3, G5	Y	County Commissioners, County EMC	$250,000	County Budget, Grants	60	Medium
7	Storm Sirens are needed countywide	Need early warning system for county residents to warn in the case of impending emergency.	Hurricane, Flood, Wildfire, Tornado, Drought, Earthquake, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorms,Lightning, Hazardous Materials Incident, Railroad Derailment		G1	N	Public Works	$40,000	Local, HMGP, PDM	48	High
8	Develop and implement a river/creek clean out plan	Dead underbrush clogging rivers and creeks causing flooding	Hurricane, Flood		G3, G5	Y	County EMC, Public Works	$80,000	Local	60	High
9	Upgrade floodplain maps	Existing floodplain maps are over 10 years old. New Atlas 14 rainfall frequency data makes this effort even more imperative.	Hurricane, Flood		G2, G6	Y	County Commissioners, County EMC	$250,000	Local, TWDB, FEMA	60	Medium

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Atascosa County											
10	Develop and Implement Stormwater Management Plan	Study the changing the watershed hydrology based on new development and new Atlas 14 rainfall frequency data to develop regional projects that improve flooding and water quality.	Hurricane, Flood		G2, G6	Y	County Commissioners, County EMC, Public Works	$850,000	Local, HMGP, PDM	60	High
11	Develop and implement a Tie-Down Ordinance for Mobile Homes	The mobile home residences throughout Atascosa County are uniquely at risk to hazards.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G3, G4	Y	County Commissioners	$15,000	Local	60	Medium
12	Property acquisition and demolition and/or relocations	Establish and implement a voluntary "acquisition and demolition program", "acquistion and structure relocation program", "structure elevation program" to address repetitive loss, floodprone properties. Keep lands subject to repetitive flooding in natural state in perpetuity. Develop a database to identify and track RL and SRL properties as identified by FEMA.	Hurricane, Flood		G3	Y	County Commissioners	$600,000	Local, HMGP, PDM	60	High
13	Implement a countywide reverse 911 warning system	Implment alert system to warn community of hazards.	Hurricane, Flood, Wildfire, Tornado, Drought, Earthquake, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorms,Lightning, Hazardous Materials Incident, Railroad Derailment		G1	N	Public Works, County EMC	$300,000	Local, HMGP, PDM	48	High

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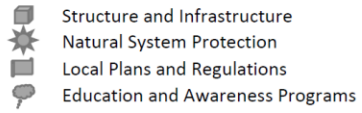
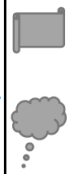
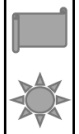


Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Charlotte											
1	Drill additional well to increase water supply and storage tank - install larger wells to accommodate growth and fire protection	More wells need to be drilled to accommodate increased demand and to mitigate against water supply and access issues, particularly during hazards.	Drought, Extreme Heat, Wildfire		G5	N	Public Works	$150,000	Local, TWDB, HMGP, PDM	24	High
2	Purchase and install Backup Generators for critical facilities	The city needs backup generators at critical facilities, particularly at the main yard well site.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G5	Y	City Council	$50,000	Local, HMGP, PDM, CDBG	24	High
3	Improve drainage in certain areas of the city that are subject to flooding	A stormwater plan is needed to identify and prioritize and implement projects that will improve drainage in areas of the city that are subject to flooding.	Hurricane, Flood		G1, G3	N	City Manager, Public Works	$350,000	Local, TWDB, HMGP	36	High
4	Hazard Education Program	Create and Implement a Hazard Educational Enhancement Program in which faculty/students can collaborate in understanding and communicating hazards of concern, such as a poster contest, essay contest, or field work that teaches practical understanding of local concerns. Encourage good practices at home such as water conservation.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G4	Y	City Manager, Charlotte ISD	$10,000	Local, CISD	24	High
5	Plant drought tolerant trees along public sidewalks, parking lots, and streets	Xeriscaping is a type of landscaping that uses little water by only using plants that are native to the area. Trees along sidewalks and parking lots provide shade from the heat and sun while preserving potable water supplies for drinking and fire suppression.	Extreme Heat, Drought		G1, G2	Y	Public Works	$40,000	Local, HMGP, PDM, Texas Forest Service, TPRD	48	Medium

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Charlotte											
6	Replace 1977 engine now in service	The current fire truck in use by the fire department has reached the end of its effective life and needs replacement.	Drought, Extreme Heat, Wildfire		G1, G5	N	City Council, Fire Department	$150,000	Local, HMGP, PDM, State Engine Replace Program?, CDBG	36	Medium
7	Enforcement of flood damage prevention ordinance	The enforcement of the flood damage prevention ordinance needs to be increased and efforts are ongoing.	Hurricane, Flood		G3	N	Code Enforcement	$30,000	Local	36	Medium
8	Construct Community Safe Room	Conduct a feasibility study to evaluate site options, including utilities, transportation, proximity to vulnerable populations, cost, and other local considerations. Basad upon study, build a Safe Room near the geographic center of the population.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment.		G3	Y	City Manager, Public Works, CISD	$250,000	Local, HMGP, PDM, TWDB, CISD	48	Medium

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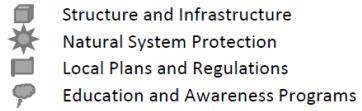
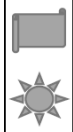


Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Christine											
1	Drill new water well	On-going - Additional water supply wells and storage is needed to ensure water for drinking and fire fighting activites, particularly in times of drought.	Drought, Extreme Heat, Wildfire		G5	N	Public Works	$500,000	Local, PDM, HMGP, TWDB	36	High
2	Improve drainage in certain areas of city that are subject to flooding.	On-going - Conduct a study to identify deficiencies in current land development code for future development and solutions to existing problems. Prioritize funding and implementation of flood control projects based on study.	Hurricane, Flood		G1, G3	N	City Manager	$350,000	Local, PDM, HMGP	36	High
3	Add New pump station for water system	On-going - Additional pump station to ensure water and pressue to support the population and growth of the enitity; ensure water and pressure for firefighting activities	Drought, Wildfire, Lightning		G3, G5, G6	N	Public Works	$500,000	Local, PDM,HMGP TWDB	60	Medium
4	Install early warning system	On-going - Provide siren sites, with electrical service and siren poles	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G1	N	Public Works	$150,000	Local, PDM, HMGP	24	Medium
5	Public education and outreach	Implement public education and outreach programs to educate citizens about mitigation against hazards; seek partnerships with county, and neighborhing communities.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G4	Y	City Manager, ISD	$5,000	Local, HMGP, ISD	36	Medium
6	Plant drought tolerant trees along public sidewalks, parking lots, and streets	Xeriscaping is a type of landscaping that uses little water by only using plants that are native to the area. Trees along sidewalks and parking lots provide shade from the heat and sun while preserving potable water supplies for drinking and fire suppression.	Extreme Heat, Drought		G1, G2	Y	Public Works	$40,000	Local, HMGP, PDM, Texas Forest Service, TPRD	24	Medium

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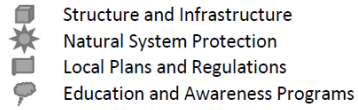
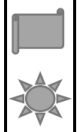
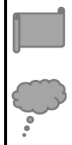


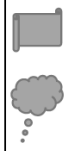
Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Jourdanton											
1	Provide emergency generator for the wastewater treatment plant	Install emergency generator at Wastewater treatment plant	Hurricane, Flood, Windstorms, Lightning, Tornado, Hailstorms, Earthquakes		G5	Y	Public Works	$120,000	Local, HMGP	24	High
2	Improve water supply reservoirs and increase water well storage.	On-going - Additional water supply wells and storage is needed to ensure water for drinking and fire fighting activites, particularly in times of drought.	Drought, Extreme Heat, Wildfire		G5	N	Public Works	$1,500,00	Local, HMGP, PDM, TWDB	24	High
3	Enforcement of flood damage prevention ordinance	On-going - New subdivions ordinance is addressing growth issues and a postion has been created to staff the code enforcement department.	Hurricane, Flood		G3	N	Code Enforcement	$30,000	Local, FEMA	24	High
4	Maintain Storm Drainage System	The drainage system collects debris in culverts and becomes ineffective in containing flood waters during rain events. The Public Works Department will maintain the storm drainage system by clearing debris and cutting and mowing vegetation in drainage ditches at least twice a year. A voluntary public creek cleanup program will be implmented.	Hurricane, Flooding		G2	Y	Public Works	$40,000	Local, CDBG	36	Medium
5	Replace sewer lines	On-going - Replace sewer lines in areas of the city to eliminate septic tanks and have centralized collection to better aid health and safety during hazard events	Hurricane, Flood, Windstorms, Lightning, Tornado, Hailstorms, Earthquakes		G5	N	Public Works	$2,000,000	Local, HMGP, PDM, TWDB	60	Medium

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Jourdanton											
6	Educational Signage	Install educational sigange such as "Turn around don't drown" at high risk low water crossings.	Hurricane, Flooding		G3	Y	City Manager, Public Works	$5,000	Local, CDBG, FEMA	36	Medium
7	Plant drought tolerant trees along public sidewalks and parking lots	Xeriscaping is a type of landscaping that uses little water by only using plants that are native to the area. Trees along sidewalks and parking lots provide shade from the heat and sun while preserving potable water supplies for drinking and fire suppression.	Extreme Heat, Drought		G1, G2	Y	Public Works	$40,000	Local, HMGP, PDM, Texas Forest Service, TPRD	48	Medium
8	Map and assess vulnerability to wildfire	Assess overall community vulnerable by implementing a GIS mapping program of wildfire hazard area, developing and maintaining a database, and creating a scenario to estimate potential injuries and damage. Work with County on effort to develop appropriate wildland-urban interface development regulations.	Drought, Extreme Heat, Wildfire		G1, G2, G4	Y	City Manager	$50,000	Local, HMGP, PDM, TNRIS	60	Medium
9	Install early warning system	Conduct a feasibility study that evaluates the coverage area, property ownership and availability, power requirements, telemetry requirements, technology, cost, and other local considerations. Based on study findings, install an emergency warning system citywide.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2	Y	City Council, Police	$100,000	Local, HMGP, PDM	36	Medium

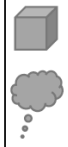
Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Jourdanton											
10	Construct Community Safe Room	Conduct a feasibility study to evaluate site options, including utilities, transportation, proximity to vulnerable populations, cost, and other local considerations. Basad upon study, build a Safe Room near the geographic center of the population.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment.		G3	Y	City Manager, JISD	$250,000	Local, HMGP, PDM, TWDB, JISD	36	Medium
11	Structural hardening of critical facilities	Harden critical facilities against impacts of all hazards.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment.		G5	Y	Public Works	$200,000	Local, HMGP	48	Medium
12	Mitigate local flooding in identified problem areas.	Identify problem flooding areas with an area drainage study and implement a program to reduce citywide and localized flooding.	Hurricane, flood		G1	N	City Manager, Public Works	$1,500,000	Local, HMGP, PDM, TWDB	48	Medium

Legend:

Structure and Infrastructure
Natural System Protection
Local Plans and Regulations
Education and Awareness Programs

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Lytle											
1	Public education and outreach	Implement public education and outreach programs to educate citizens about mitigation against hazards; seek partnerships with county, and neighborhing communities.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G4	Y	City Manager, ISD	$5,000	Local, HMGP, ISD	36	High
2	Replace or improve inoperable communication equipment	On-going - A repeater was added to the water tower which improved communication. New local radios and equipment needed when Atascosa County modernizes radio system for better countywide coordination between police, fire, EMS and other emergency personnel.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment.		G1	N	Public Works, Police Department	$150,000	Local, County, HMPG, CDBG	48	High
3	Community Saferoom and cooling center	Designate a facility and identify and implement upgrades needed to harden facility against hazards. Build a new facility if one is needed.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment.		G5	Y	City Manager	$250,000	Local, HMGP, PDM	48	Medium
4	Community assistance and monitoring activities in support and compliance with NFIP regulations	On-going - Enforcement of code and floodplain development is improving with meetings with new businesses. Monitoring activities are on-going as well.	Hurricane, Flood		G4	N	Code Enforcement	$30,000	Local, FEMA	36	Medium

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Lytle											
5	Wastewater plant upgrade	Harden facility against all hazards during upgrade.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment.		G1, G3	Y	Public Works	$300,000	Local, HMGP, PDM, TWDB	24	High
6	Replacement of aging sewer lines	Current sewer lines are close to useful lifespan and must be replaced so that they are more resilient to hazards.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment.		G5	Y	Public Works	$12,000,000	Local, HMGP, PDM, TWDB, CDBG	24	Medium
7	Replacement of aging water lines	Current water lines are close to useful lifespan and must be replaced so they are more resilient to hazards.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment.		G5	Y	Public Works	$8,000,000	Local, HMGP, PDM, TWDB, CDBG	24	Medium
8	Purchase and install generators for backup power to critical facilities	Enforce building codes, retrofit public buildings and critical facilities	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment.		G5	Y	Public Works	$100,000	Local, HMGP, PDM, CDBG	36	High

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Lytle											
9	Purchase Hazmat equipment and vehicle for hazard education and mitigation	Adopt and enforce building codes; increase hazard education and risk awareness	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment.		G1, G4	Y	Code Compliance, Fire Department	$700,000	Local, HMGP, PDM, CDBG	36	Medium
10	Develop or purchase water supply reservoirs and increase water well storage.	On-going - One water supply well was recently added to supplement the city's only water well. Coming developments may more than double the population of the city and new water supply and distribution facilities are in needed.	Drought, Extreme Heat, Wildfire		G5	N	City Manager, Public Works	$600,000	Local, HMGP, PDM, TWDB	48	High
11	Develop and implement Stormwater Management Plan	Develop a stormwater management plan and implement the structural and non-structural solutions to mitigate flooding.	Hurricane, Flood		G3, G5	N	City Manager, Engineer, Public Works	$750,000	Local, TWDB	36	High

Legend:

Structure and Infrastructure
Natural System Protection
Local Plans and Regulations
Education and Awareness Programs

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Lytle ISD											
1	Community Safe Room	Construct a safe room / building for public to go to for shelter during storms by upgrading recently retired school facility. Coordinate with the City of Lytle.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2	Y	LISD, City of Lytle	$250,000	LISD, HMGP, PDM	24	High
2	Install Backup Generators	Install backup generators at school sites.	Hurricane, Flood, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes		G1, G5	Y	LISD, Public Works	$50,000	LISD, Local, TWDB, HMGP	36	High
3	Upgrade/Harden Schools against all hazards	The Schools in Lytle are most at risk of flooding. A detailed study of cost effective measures to protect and harden schools against all hazards needs to be developed and and the findings to be implemented.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G3, G5	Y	LISD, Public Works	$300,000	LISD, Local, TWDB, HMGP	36	High
4	Replace or improve inoperable communication equipment	New local radios and equipment needed when Atascosa County modernizes radio system for better countywide coordination between police, fire, EMS and other emergency personnel. Currently school district only has handheld radios and can't communicate between campuses. Improve communication from authorities in the event of a railroad derailment. (evacuation vs. lockdown)	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment.		G1	Y	LISD, Public Works, Police Chief	$50,000	LISD, County, HMPG, CDBG, UP	36	High

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Lytle ISD											
5	Plant drought tolerant trees along school sidewalks and parking lots	Xeriscaping is a type of landscaping that uses little water by only using plants that are native to the area. Trees along sidewalks and parking lots provide shade from the heat and sun while preserving potable water supplies for drinking and fire suppression.	Extreme Heat, Drought		G1, G2	Y	LISD	$40,000	LISD, HMGP, PDM, Texas Forest Service, TPRD	24	Medium
6	Hazard Education Program	Create and Implement a Hazard Educational Enhancement Program in which faculty/students can collaborate in understanding and communicating hazards of concern, such as a poster contest, essay contest, or field work that teaches practical understanding of local concerns. Encourage good practices at home such as water conservation.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G1, G2, G3	Y	LISD	$5,000	LISD, HMGP	24	Medium

Legend:

- Structure and Infrastructure
- Natural System Protection
- Local Plans and Regulations
- Education and Awareness Programs

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
McCoy Water											
1	Add generators	Add generators to 5 booster stations (Plants 6, 7, 12, 13, and 14	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G1, G5, G6	Y	McCoy WSC	$250,000	Local, TWDB	24	High
2	Add ground storage	Upsize or add ground storage at booster stations (Plant 7 & Plant 14)	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G1, G5, G6	Y	McCoy WSC	$300,000	Local, TWDB	24	Medium
3	Drill new well	Increase supply for high demand area (Plant 13; in land acquisition stage)	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G1, G5, G6	Y	McCoy WSC	$800,000	Local, TWDB	24	High
4	Drill new well	Locate second well to support redundancy	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G1, G5, G6	Y	McCoy WSC	$800,000	Local, TWDB	24	High

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
McCoy Water											
5	Increase booster pump capacity	Upsize booster pumps at Plant 7 and Plant 14	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G1, G5, G6	Y	McCoy WSC	$260,000	Local, TWDB	24	Medium
6	Add elevated storage	Identify site for second elevated storage tank and construct it.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G1, G5, G6	Y	McCoy WSC	$350,000	Local, TWDB	24	Medium
7	Replace undersized lines	Replace 1.5 inch lines with 4" lines in accordance with prioritized McCoy Capital Improvements Plan	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G1, G5, G6	Y	McCoy WSC	$664,546	Local, TWDB	24	Medium

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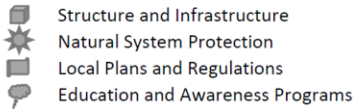

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
McMullen County											
1	Assess critical facilities for vulnerabilities to hazards and protect as necessary	Critical facilities, particularly water and wastewater treatment plants, will be hardened to protect from floods, lightning, wind, severe winter storms, earthquakes, wildfire and other hazards	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G1, G3, G5	Y	Public Works	$500,000	Local, PDM, HMGP	36	High
2	Study and map floodplains countywide	Conduct a countywide floodplain study and mapping to understand the limits of NFIP 1% annual chance and 0.2% annual chance floodplain boundaries and their effects on the community, infastructure, and critical facilities.	Hurricane, Flood		G2, G4, G5, G6	Y	County Commissioners	$450,000	Local, FEMA, TWDB	36	High
3	Study and prioritize low water crossing improvements	Many areas become inaccessible during extreme weather events due to low water crossings. These will be studied and priority will be given to projects based on community benefit. Low water crossing upgrades will be implemented throughout the county.	Hurricane, Flood		G1, G3, G5	Y	Public Works	$50,000	Local, FEMA	36	High
4	Public awareness and education on all hazards	Post educational material on the effects of hazards to homeowners on the county website and Facebook sites. Publish articles concerning hazards in the local newspaper. Provide educational handouts at all county offices and satellite buildings. Work with FEMA and other federal and state agencies to proivde NFIP community assistance and public education materials and support.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G2, G4	Y	McMullen EMC	$500,000	Local, HMGP, PDM, TWDB	24	Medium
5	Community assistance and monitoring activities in support	This will provide FEMA review of floodplain management criteria by ensuring that the community corrects NFIP program deficiencies and enforces existing ordinances that regulate planning and development.	Hurricane, Flood		G2, G4	Y	McMullen EMC	$10,000	Local, FEMA	24	Medium

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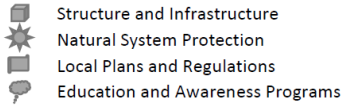
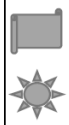
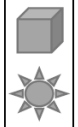


Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Pleasanton											
1	Increase water storage capacity	Build 1.0 MGD elevated water tower at the industrial site at Humble Camp and Eurostar. Build Goodwin Waterwell and Northtown Waterwell.	Drought, Extreme Heat, Wildfire		G1, G5	Y	Public Works	$4,000,000	Local, HMGP, PDM, TWDB, CDBG	36	High
2	Upgrade water distribution system	New 12 inch waterline to improve fireflows across the city.	Drought, Extreme Heat, Wildfire		G1, G5	Y	Public Works	$2,500,000	Local, HMGP, PDM, TWDB, CDBG	24	High
3	Upgrade Wastewater Plant	Expand wastewater plant with upgrades to harden plant against hazards including backup of power equipment in case of power failure.	Hurricane, Flood, Wildfire, Tornado, Drought, Earthquake, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorms,Lightning, Hazardous Materials Incident, Railroad Derailment		G1, G5	Y	Public Works	$3,000,000	Local, HMGP, PDM, TWDB, CDBG	36	Medium
4	Plant drought tolerant trees along public sidewalks and parking lots	Xeriscaping is a type of landscaping that uses little water by only using plants that are native to the area. Trees along sidewalks and parking lots provide shade from the heat and sun while preserving potable water supplies for drinking and fire suppression.	Extreme Heat, Drought		G1, G3	Y	Public Works	$40,000	Local, HMGP, PDM, Texas Forest Service, TPRD	24	Medium

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Pleasanton											
5	Education to homeowners on all hazards	Obtain printed detailed instruction checklist and other education brochures for homeowners to mitigate the threat of hazards to their homes. Distribute information through information booths at public events, social media and webpages with links to severe weather-related agencies.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Material Incident, Railroad Derailment		G4	Y	City Manager	$10,000	Local; PISD	48	Medium
6	New emergency communication infrastructure	Communication towers, recievers, and other radio equipment needed to improve function and reliability of emergency radio communication.	Hurricane, Flood, Wildfire, Tornado, Drought, Earthquake, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorms,Lightning, Hazardous Materials Incident, Railroad Derailment		G1, G6	Y	City Manager, Public Works	$300,000	Local, HMGP, PDM	36	High
7	Upgrade Wastewater Collection System	Wastewater pipeline and manhole rehabs to reduce inflow and infiltration citywide through smoke testing different areas. These upgrades will make the wastewater collection system more resilient to all hazards.	Hurricane, Flood, Wildfire, Tornado, Drought, Earthquake, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorms,Lightning, Hazardous Materials Incident, Railroad Derailment		G1, G5	Y	Public Works	$2,500,000	Local, HMGP, PDM, TWDB, CDBG	24	Medium
8	Backup Generators at water wells	Generators needed for backup power for two city wells; industrial & northtown.	Hurricane, Flood, Wildfire, Tornado, Drought, Earthquake, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorms,Lightning, Hazardous Materials Incident, Railroad Derailment		G1, G5	Y	Public Works	$30,000	Local, HMGP, PDM	36	High

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Pleasanton											
9	Relocate equipment and install new technology	Relocate wayside equipment outside of town to provide better line of defense to populated area. Implement an optical track inspection system designed to use imaging to identify defects. Also need clear source of information during emergency.	Railroad Derailment		G3, G6	Y	Union Pacific, Public Works	$1,000,000	Union Pacific, Local, HMGP, PDM	60	High
10	Reduce flooding and poor drainage by increasing capacity or increasing maintenance of existing storm water system	On-going - a flood study was completed with 3 main areas identified for flood improvements. After TxDot improvements, area around highway will get local drainage upgrades; the downtown area needs underground drainage improvements from Hunt St. to the Atascosa River; drainage improvements at Goodwin Ln. and Liberty Ln.	Hurricane, Flood		G3	N	City Manager, Public Works	$21,000,000	Local, HMGP, PDM, TWDB, TxDOT	60	High
11	Community Saferoom	Designate a facility in partnership with district or church and identify and implement upgrades needed to harden facility against hazards.	Hurricane, Flood, Wildfire, Tornado, Drought, Earthquake, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorms,Lightning, Hazardous Materials Incident, Railroad Derailment		G3	Y	City Manager, Public Works	$250,000	Local, HMGP, PDM	60	Medium

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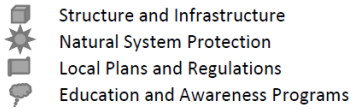
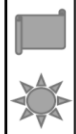
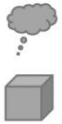


Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Poteet											
1	Improve Communication	Improve or replace inoperable communications in city departments and outside agencies.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G1, G6	N	Public Works	$50,000	Local, FEMA	36	High
2	Increase Enforcement	Increase local enforcement of the flood damage prevention ordinance by hiring a(more) full time code enforcement/permit officer.	Hurricane, Flood		G3	N	Code Enforcement	$30,000	Local	24	High
3	Install early warning system	Provide siren sites, with electrical service and siren poles. The existing siren was de-activated. The new siren needs to have the ability to be activated remotely.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G1, G3	N	Fire Department	$50,000	Local, PDM, HMGP	36	High
4	Community assistance and monitoring activities in support	This will provide FEMA review of floodplain management criteria by ensuring that the community corrects program deficiencies and enforces existing ordinances that regulate planning and development.	Hurricane, Flood		G2, G3	N	Code Enforcement	$50,000	Local, FEMA	24	Medium

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Poteet											
5	Replace Waterlines	Replace old and too small water lines. Update with USDA project information.	Drought, Extreme Heat, Wildfire, Hazardous Materials Incident, Railroad Derailment		G1, G5	N	Public Works	$500,000	Local, HMGP, PDM, TWDB	48	Medium
6	Replace Wastewater Line	Replace wastewater collection in the city to aid in public health and safety and to ensure continued service in an emergency.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G1, G5	Y	Public Works	$500,000	Local, HMGP, PDM, TWDB	60	Medium
7	Local Drainage Improvements	Study and Implement findings of study to improve local drainage at Betty Louis and School Drive.	Hurricane, Flood		G3	Y	Public Works	$250,000	Local, HMGP, PDM	60	Medium

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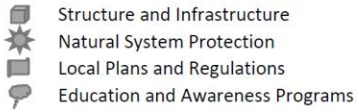
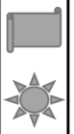


Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Poteet ISD											
1	Upgrade/Harden Schools against all hazards	The Schools in Poteet are most at risk of flooding. A detailed study of cost effective measures to protect and harden schools against all hazards needs to be developed and and the findings to be implemented.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G3, G5	Y	PISD, Public Works	$300,000	PISD, Local, TWDB, HMGP	36	High
2	Install Backup Generators	Install backup generators at school sites.	Hurricane, Flood, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes		G1, G5	Y	PISD, Public Works	$50,000	PISD, Local, TWDB, HMGP	36	High
3	Community Safe Room	Designate scdhool gyms as shelters and community saferooms and implement upgrades needed to harden facility against hazards. This could include additional cooling as cooling centers.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2	Y	PISD, City of Poteet	$250,000	PISD, HMGP, PDM	24	High

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Poteet ISD											
4	Hazard Education Program	Create and Implement a Hazard Educational Enhancement Program in which faculty/students can collaborate in understanding and communicating hazards of concern, such as a poster contest, essay contest, or field work that teaches practical understanding of local concerns. Encourage good practices at home such as water conservation.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment		G1, G2, G3	Y	PISD	$5,000	PISD, HMGP	12	Medium
5	Plant drought tolerant trees along school sidewalks and parking lots	Xeriscaping is a type of landscaping that uses little water by only using plants that are native to the area. Trees along sidewalks and parking lots provide shade from the heat and sun while preserving potable water supplies for drinking and fire suppression.	Extreme Heat, Drought		G1, G2	Y	PISD	$40,000	Local, HMGP, PDM, Texas Forest Service, TPRD	24	Medium
6	Replace or improve inoperable communication equipment	New local radios and equipment needed when Atascosa County modernizes radio system for better countywide coordination between police, fire, EMS and other emergency personnel. Currently school district only has handheld radios and can't communicate between campuses.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident, Railroad Derailment.		G1	Y	PISD, Public Works, Police Chief	$50,000	PISD, County, HMPG, CDBG	12	High

Legend:

Structure and Infrastructure
Natural System Protection
Local Plans and Regulations
Education and Awareness Programs

Mitigation Action Plan

The mitigation action plan is a way to prioritize mitigation actions and assign departmental responsibility to ensure a higher rate of successful action implementation and administration. Each jurisdiction has multiple authorities to implement the mitigation strategy including, but is limited to, local planning and zoning, public works efforts, emergency management, tax authority, building codes and ordinances, and legislative and managerial.

Each of the mitigation actions, both new and old, in this section were prioritized primarily based on FEMA's Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) criteria. These criteria are considered necessary for successful and enduring implementation of each action. Each participating jurisdiction in the plan had an opportunity to discuss and consider each of the criteria as they related to each individual action and rate them from 1 to 5. The total scores from the STAPLEE exercise were then used to assign an overall priority to each mitigation action for each of the participating jurisdictions. In addition to the STAPLEE exercise, jurisdictions analyzed each action in terms of which department or agency will be responsible for administration of the action, action timeline, potential funding sources, and the overall costs, measuring whether the potential benefit to be gained from the action outweighed costs associated with it.

SECTION 20: PLAN MAINTENANCE

This section describes how Atascosa and McMullen Counties, including participating jurisdictions, will implement the Plan and continue to evaluate and enhance it over time. As indicated in the previous section, each action has been assigned to a specific department within the jurisdiction. In order to ensure that the Plan remains current and relevant, the following plan maintenance procedures will be addressed:

1. Ensure the mitigation strategy remains current and that actions are implemented according to the timeline.

2. Develop an ongoing mitigation program throughout the community for each participating jurisdiction and work together at the county level to update and review the plan.

3. Integrate short and long-term mitigation objectives into community officials' daily roles and responsibilities.

4. Continue Public Involvement and maintain momentum with education programs and materials, routine publication of accomplishments, and briefings to decision-makers of the Plan's progress.

Table 20-1 indicates the department or title responsible for this action. Each participating jurisdiction determines he department or title of personnel responsible for implementation of mitigation strategies and implementation procedures.

Table 20-1: Team Members Responsible for Plan Maintenance

Jurisdiction/Entity	Title
Atascosa County	**Emergency Management Coordinator**
City of Charlotte	Public Works Director
City of Christine	City Manager
City of Lytle	Police Chief
Lytle ISD	Superintendent
City of Jourdanton	City Manager
City of Pleasanton	City Manager
City of Poteet	City Manager
Poteet ISD	Superintendent
McMullen County	**Emergency Management Coordinator**

Incorporation

Following adoption and approval of the Plan, Atascosa and McMullen Counties, including participating jurisdictions, will implement actions they have developed and prioritized in the plan based on funding availability and continuing public input. A timeline is provided with each action and is used to assess whether actions are being completed on time based on the date of plan adoption. Potential funding sources are also

listed for each action in Section 18 and described in more detail below. Additional funding sources can include federal disaster declarations and other non-federal grant sources.

Local Funding: This is funding that the community can allocate in the budget process and other local funding mechanisms such as impact fees and drainage utility fees. This funding can be used entirely for specific hazard mitigation activities and projects or can be used as a match to leverage federal and state funding.

HMGP: The purpose of HMGP is to help communities implement hazard mitigation measures following a Presidential Major Disaster Declaration in the areas of the state, tribe, or territory requested by the Governor or Tribal Executive. The key purpose of this grant program is to enact mitigation measures that reduce the risk of loss of life and property from future disasters.

PDM: The PDM Program, authorized by Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, is designed to assist States, U.S. Territories, Federally-recognized tribes, and local communities in implementing a sustained pre-disaster natural hazard mitigation program. The goal is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. This program awards planning and project grants and provides opportunities for raising public awareness about reducing future losses before disaster strikes. Mitigation planning is a key process used to break the cycle of disaster damage, reconstruction, and repeated damage. PDM grants are funded annually by Congressional appropriations and are awarded on a nationally competitive basis.

Methods of Incorporation of the Plan

Once per year at a minimum, participating CORE team members will conduct periodic reviews of plans and policies in place and analyze the need for amendments based on the approved plan. Team members will incorporate any mitigation policies and actions into these plans and policies as appropriate. The plans and policies that will require review include emergency operations or management plans, capital improvement plans, comprehensive land use and future growth plans, transportation plans, annual budgeting, and any building codes that guide and control development in a way that will contribute to the goals of this mitigation plan to reduce long-term risk to life and property from all hazards. A list of regulatory and planning capabilities currently available to the jurisdictions can be found in **Appendix A**. In the process of integrating the mitigation actions into new and existing planning mechanisms, the participating jurisdictions will:

- Atascosa and McMullen County – Actions will be presented to Commissioner's Court by the responsible department. Upon approval by Commissioner's Court, approved actions will be acted upon and/or integrated into existing planning mechanisms.
- Cities and ISDs – Actions will be presented to City Councils and School Boards by the responsible department. Upon approval by City Council, approved

actions will be acted upon and/or integrated into existing planning mechanisms.

Grant Applications	Hazard mitigation grant funding will be sought as a way to fund eligible action items as the funding becomes available. If a need for additional action items is presented, an amendment will be necessary to include the action in the plan.
Annual Budget Review	The Plan and mitigation actions will be reviewed annually to determine any funding needs in the budget process and will involve various departments and team members that participated in the planning process. Match requirements for grant funding will be considered by the appropriate department such as engineering, planning, code enforcement and others to achieve the mitigation action based on the timeline.
Floodplain Management Plans and watershed studies	These types of plans include preventative and corrective actions to address the flood hazard.
Regulatory Plans and future growth plans	Both Atascosa and McMullen Counties, including participating jurisdictions, have regulatory plans in place are in need of updating from time to time. This Hazard Mitigation Action Plan will be consulted when County and City departments review or revise their current regulatory planning mechanisms and growth plans such as land development and building codes, comprehensive plans, and capital improvement plans.

Monitoring

Periodic annual tracking of the Plan is required to ensure that the mitigation actions are implemented over the 5-year cycle and that the plan is kept current based on the latest information about hazards and their impacts. The team members designated by department and jurisdiction in this section are responsible for monitoring, evaluating, and updating the plan for their participating jurisdiction. Responsibilities of annual monitoring include working with various city departments to ensure that the identified mitigation actions get incorporated into existing plans and policies and that mitigations actions that are funded by Councils, Boards, and Commissioners get implemented. They are also tasked with reviewing mitigation actions to determine if they need to be re-evaluated or changed during the next update, evaluating the overall Plan as necessary to reflect new risks and hazard data, and monitoring plan maintenance to ensure that the process defined in this section is being followed.

A brief report will be prepared stating any changes needed for the Plan such as a mitigation action that has changed based on need following the annual mitigation plan monitoring exercise. These mitigation action status updates will include a feasibility assessment for implementation and funding for the remaining time left in the 5-year mitigation action planning cycle. The status updates developed by the Core Planning Team will report the need in developing a new action, if necessary, and possibly amend the plan.

Evaluation

As part of the annual tracking of the Plan, Core Planning Team members will evaluate changes in risk to determine if there are any needed changes to mitigation actions timelines, priority of actions, or if any actions need to be amended, added, or deleted. This is also an opportunity to detect if there are any new obstacles to the implementation of actions such as funding, political, legal, or coordination within departments such as changes in departmental programs and goals that may affect mitigation priorities. The annual evaluation process is necessary to make any necessary amendments to the plan to keep the plan relevant and most effective in mitigating the identified hazards in the Plan.

Updating

The designated Core Planning Team member from each community evaluating the Plan will submit annual reports that will be used to keep the Plan updated. Major changes to mitigation actions or the overall direction of the Plan or the policies contained within the Plan are subject to formal adoption by each city and the amendment will be submitted to TDEM. To determine whether to recommend approval or denial of a Plan amendment request, each County, City, or ISD will consider the following factors:

- Changes in information, data, or assumptions from those on which the Plan was based.
- New issues or needs that were not adequately addressed in the Plan.
- Errors or omissions made in the identification of issues or needs during the preparation of the Plan.

This annual Plan Maintenance process enables Atascosa and McMullen Counties, including participating jurisdictions, to keep their Hazard Mitigation Plan relevant based on the latest information, capabilities, needs and community input. This provides an opportunity to ensure that mitigation actions are meeting the goals in this Plan and that they are implemented in the manner they were intended. This is also an opportunity to identify mitigation actions in the annual report that were not successful and to recommend removal of those that are no longer needed.

Five Year Review and Update

The Plan will be thoroughly reviewed by Planning Team members at the end of three years from the approval date to determine whether there have been any significant changes in the area that may require updating, amending, or deleting parts of the Plan. It is wise to begin considering plan updates in advance of the five-year deadline due to the timelines for grant funding and to ensure eligibility. Oftentimes, the timelines for grant and planning cycles can be in excess of a year to apply and receive funding.

Much like the annual review, the 5-year Plan review provides the Planning Team an opportunity to evaluate mitigation actions that have been successful and those that may not have been successfully implemented or conceived. This is also a time to document any potential losses avoided due to the implementation of specific mitigation measures. The annual reports prepared by Core Planning Team members will be used in the review

and factors will be considered that may affect the content of the Plan such as new development in identified hazard areas, increased exposure to hazards, disaster declarations, increase or decrease in capability to address hazards, and changes to federal or state legislation.

Upon completion of the review, any revisions deemed necessary by the Core Planning Team will be summarized and integrated into the existing plan based on the plan amendment process or reserved for the 5-year plan update. Upon completion of the review and amendment/update process, the revised or new Plan will be submitted to TDEM for final review and approval in coordination with FEMA.

Continued Public Involvement

Input from the stakeholders and public was an integral part of the preparation of this Plan and will continue as the Plan is reviewed, revised, and updated. This Plan will be posted on the websites of Atascosa and McMullen Counties, including participating jurisdictions, where the public will be invited to review and provide feedback via e-mail. Core Planning Team members are tasked with notifying stakeholders and community members when the annual review of the plan is undertaken.

The Planning team may also develop a voluntary citizen/stakeholder advisory group comprised of members from throughout the planning area to provide feedback on an annual basis. It is vital that the public and stakeholders maintain a vested interest in the Plan in order to keep the plan relevant as it relates to the broader community's sustained health, safety and welfare. Media such as website, social media, local newspaper, and radio stations will be used to notify the public of any maintenance or periodic review activities taking place. Public participation is critical to creating a plan that is enduring and one that has meaning to the community. The direct involvement of local officials and the public has been and will continue to be sought during the development, implementation, and maintenance phases of this Atascosa and McMullen Counties Hazard Mitigation Plan.

APPENDIX A: CAPABILITY ASSESSMENTS

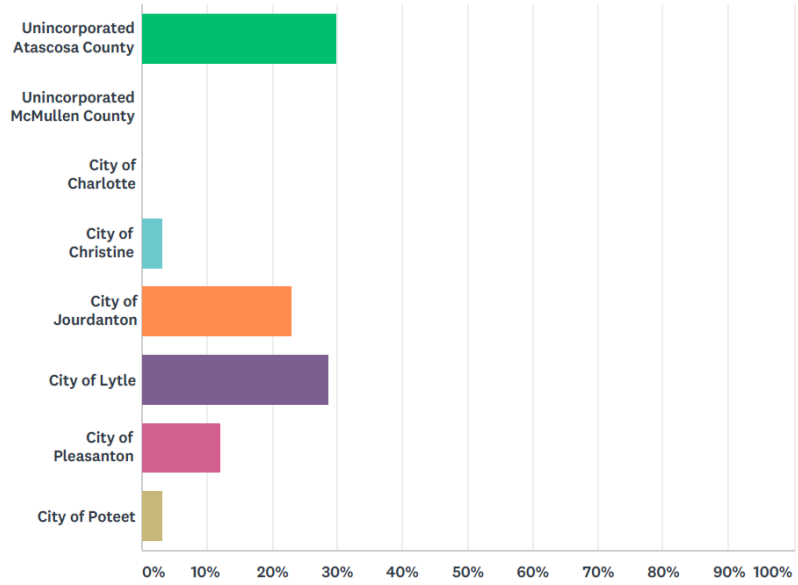
	Capabilities	**Atascosa County**	City of Charlotte	City of Christine	City of Jourdanton	City of Lytle	City of Pleasanton	City of Poteet	**McMullen County**
Planning and Regulatory	Comprehensive Plan				X		X		
	Capital Improvement Program						X	X	
	Economic Development Plan						X		
	Transportation Plans								X
	Emergency Operation Plans	X					X		X
	Continuity of Operations Plan	X							X
	Stormwater Management Plan								X
	Zoning ordinances				X			X	
	Building Codes		X	X	X	X	X	X	
	Subdivision Ordinance	X			X		X	X	X
	Floodplain Ordinance	X	X	X	X	X	X		X
Administrative and Technical	Engineers	X			X		X	X	X
	Planner	X							
	GIS Analysts	X							X
	Building inspectors				X		X	X	
	Emergency managers	X			X		X	X	X
	Grant writers				X		X		
	Chief Building Official				X		X	X	
	Floodplain Administrator	X	X	X	X	X	X	X	X
Financial	Operating budgets	X	X	X	X	X	X	X	X
	Stormwater utility fees								
	Development impact fees						X		
Education and Outreach	School programs								X
	Firewise communities								X
	Storm Ready communities	X							X
	Hazard awareness campaigns								X
	Public Information Officer				X		X		X
	Community newsletter	X					X	X	X

Planning and regulatory capabilities are identified as the most impactful to how a municipality is able to plan and develop in a way that is disaster resilient. With the lack of some fundamental items such as Capital Improvement Programs, subdivision ordinances, comprehensive plans, transportation plans and zoning codes, the most critical capabilities to address are related to planning and development. As is typical of smaller communities, many critical municipal functions and roles are carried out by people that are required to wear "many hats" as part of their job description. This strategy can be cost-effective for cash strapped municipalities but it often leads to roles being carried out by those that may be experts in one area or field and not necessarily the secondary and tertiary roles they are needed for. This also leads to the requirement to contract with outside consultants who may be experts in specific areas but do not always have the local knowledge and background that can be critical to success. This would require local focus on these items such as hiring planning, GIS, and building official personnel or developing these capabilities with grants and other means. Studies also need to be conducted to thoroughly identify gaps in capabilities and comparisons made with other communities of similar size and economy. The communities throughout the planning area currently utilize engineering and grant writing consultants that are meeting these capability needs. Fiscal mechanisms to fund growth also need to be explored throughout the two-county area such as drainage utility fees and impact fees. Lastly, educational programs and literature related to hazard mitigation should be strengthened within all municipalities which includes close coordination with the local school districts.

APPENDIX B: PUBLIC SURVEY

Q1 Please tell us where you live

Answered: 157 Skipped: 0

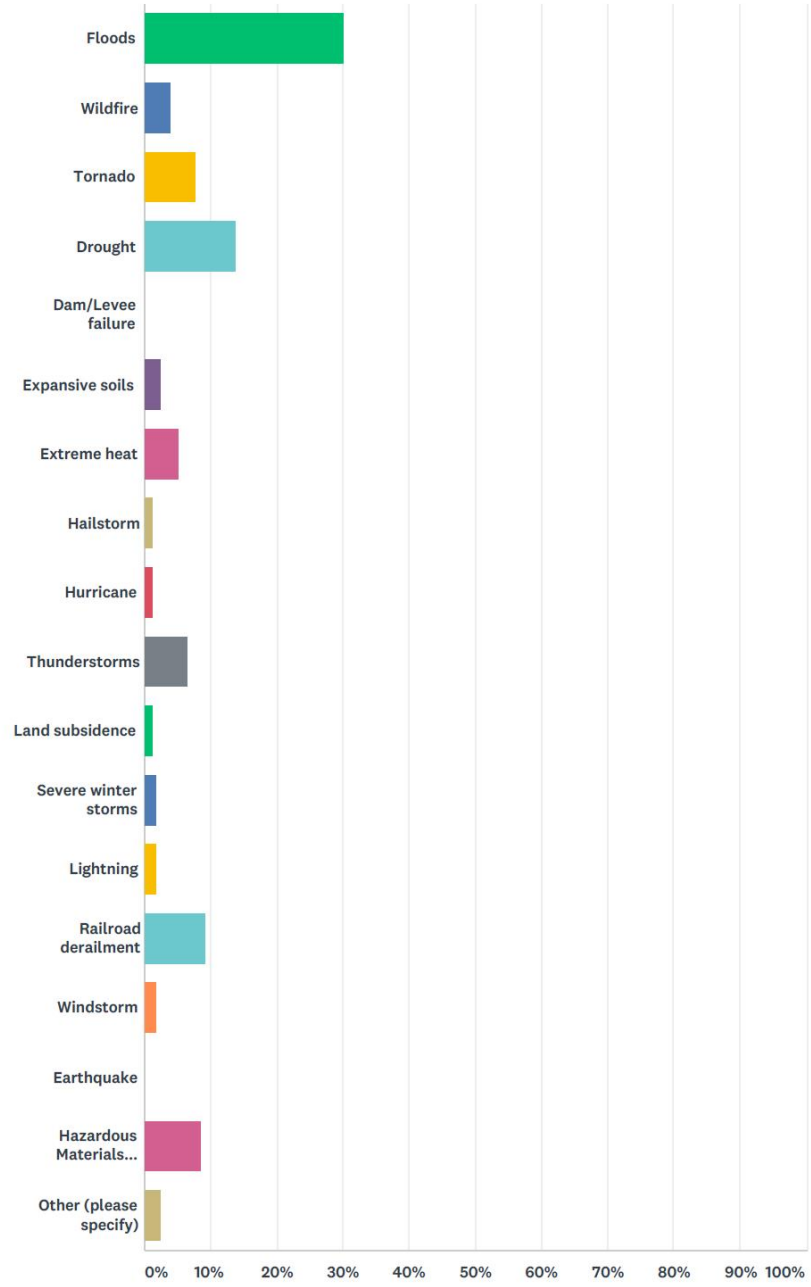


ANSWER CHOICES	RESPONSES	
Unincorporated Atascosa County	29.94%	47
Unincorporated McMullen County	0.00%	0
City of Charlotte	0.00%	0
City of Christine	3.18%	5
City of Jourdanton	22.93%	36
City of Lytle	28.66%	45
City of Pleasanton	12.10%	19
City of Poteet	3.18%	5
TOTAL		157

Q2 Please select the hazard you think is the highest threat to you, your business and/or your community. (Please check only one)

Answered: 153 Skipped: 4

Survey for Atascosa-McMullen Counties Multi-Jurisdictional Hazard Mitigation Plan Update

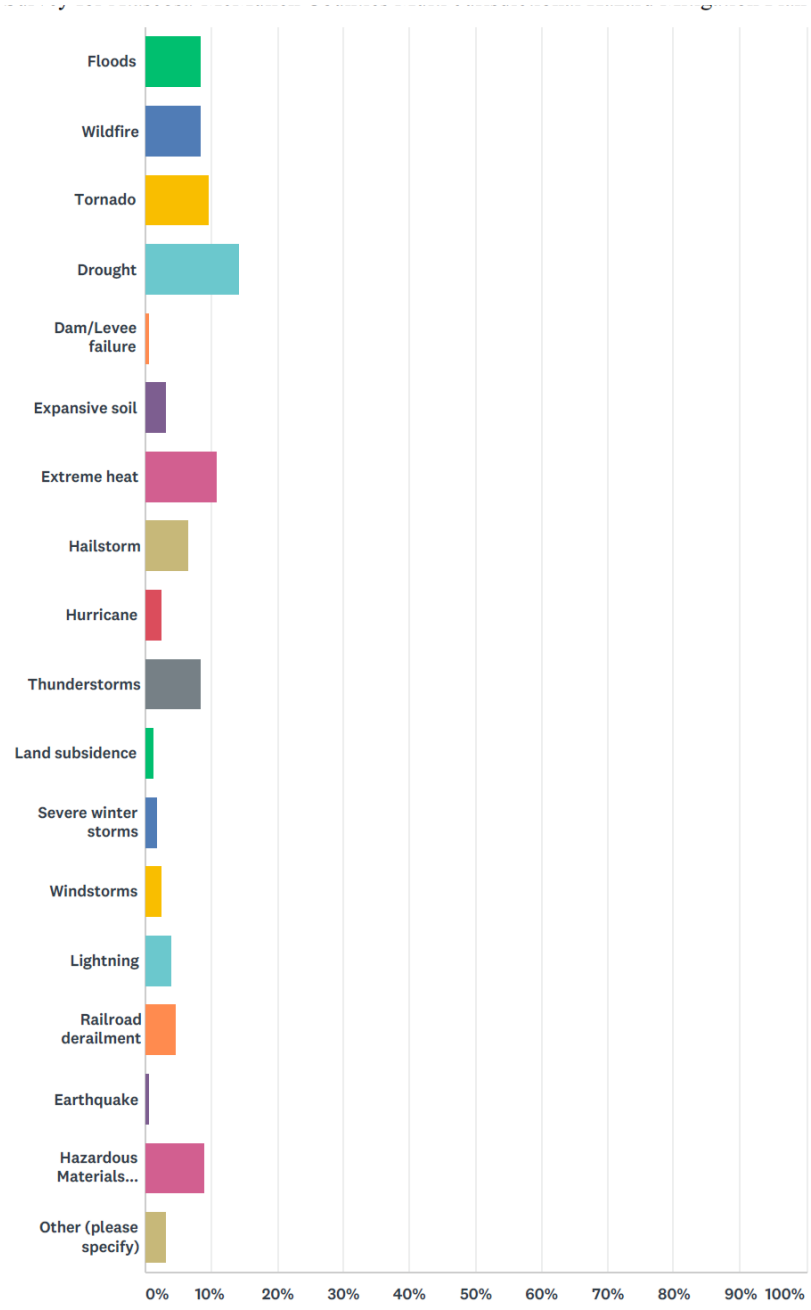


ANSWER CHOICES	RESPONSES	
Floods	30.07%	46

Wildfire	3.92%	6
Tornado	7.84%	12
Drought	13.73%	21
Dam/Levee failure	0.00%	0
Expansive soils	2.61%	4
Extreme heat	5.23%	8
Hailstorm	1.31%	2
Hurricane	1.31%	2
Thunderstorms	6.54%	10
Land subsidence	1.31%	2
Severe winter storms	1.96%	3
Lightning	1.96%	3
Railroad derailment	9.15%	14
Windstorm	1.96%	3
Earthquake	0.00%	0
Hazardous Materials Incident	8.50%	13
Other (please specify)	2.61%	4
TOTAL		153

Q3 Please select the hazard you think is the second highest threat to you, your business and/or your community. (Please check only one)

Answered: 155 Skipped: 2

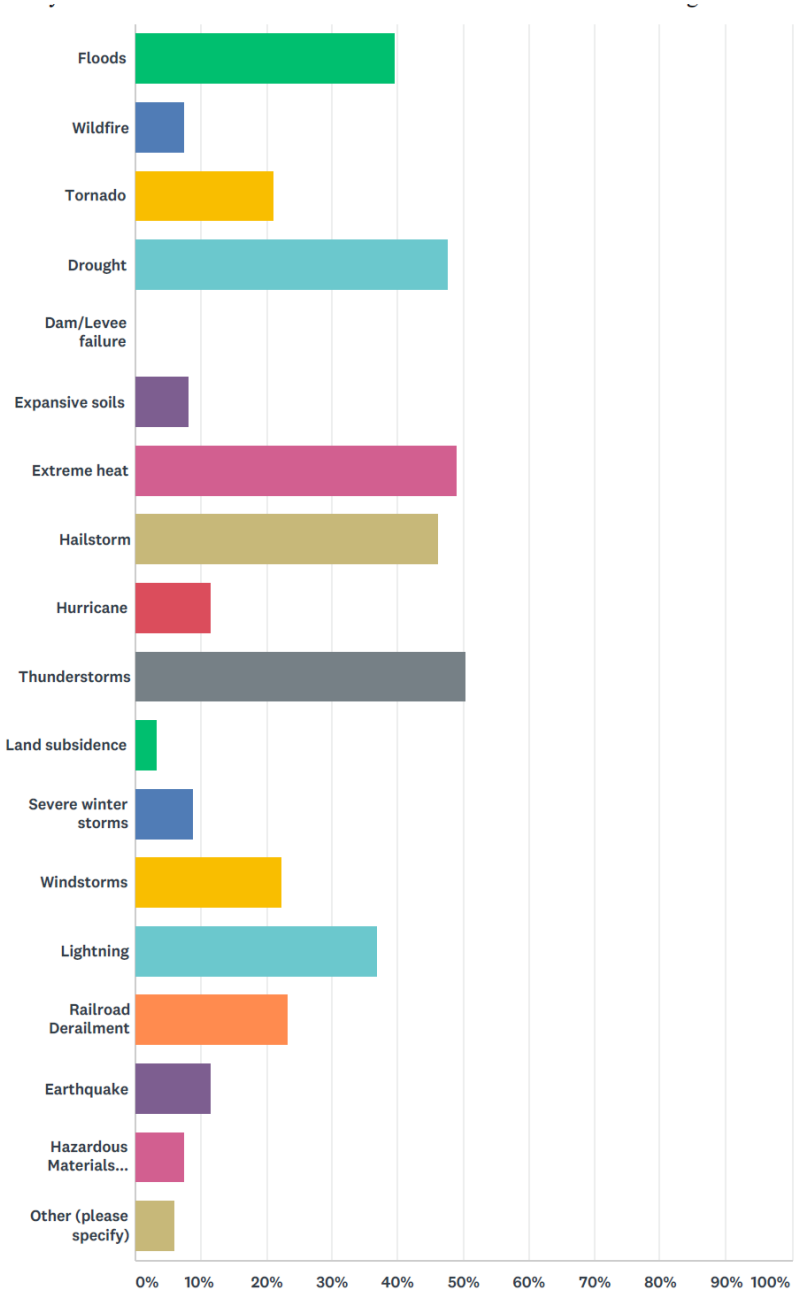


ANSWER CHOICES	RESPONSES	
Floods	8.39%	13

Wildfire	8.39%	13
Tornado	9.68%	15
Drought	14.19%	22
Dam/Levee failure	0.65%	1
Expansive soil	3.23%	5
Extreme heat	10.97%	17
Hailstorm	6.45%	10
Hurricane	2.58%	4
Thunderstorms	8.39%	13
Land subsidence	1.29%	2
Severe winter storms	1.94%	3
Windstorms	2.58%	4
Lightning	3.87%	6
Railroad derailment	4.52%	7
Earthquake	0.65%	1
Hazardous Materials Incident	9.03%	14
Other (please specify)	3.23%	5
TOTAL		155

Q4 While living here in Atascosa County or McMullen County, have you experienced a disaster? (please check all that apply)

Answered: 147 Skipped: 10

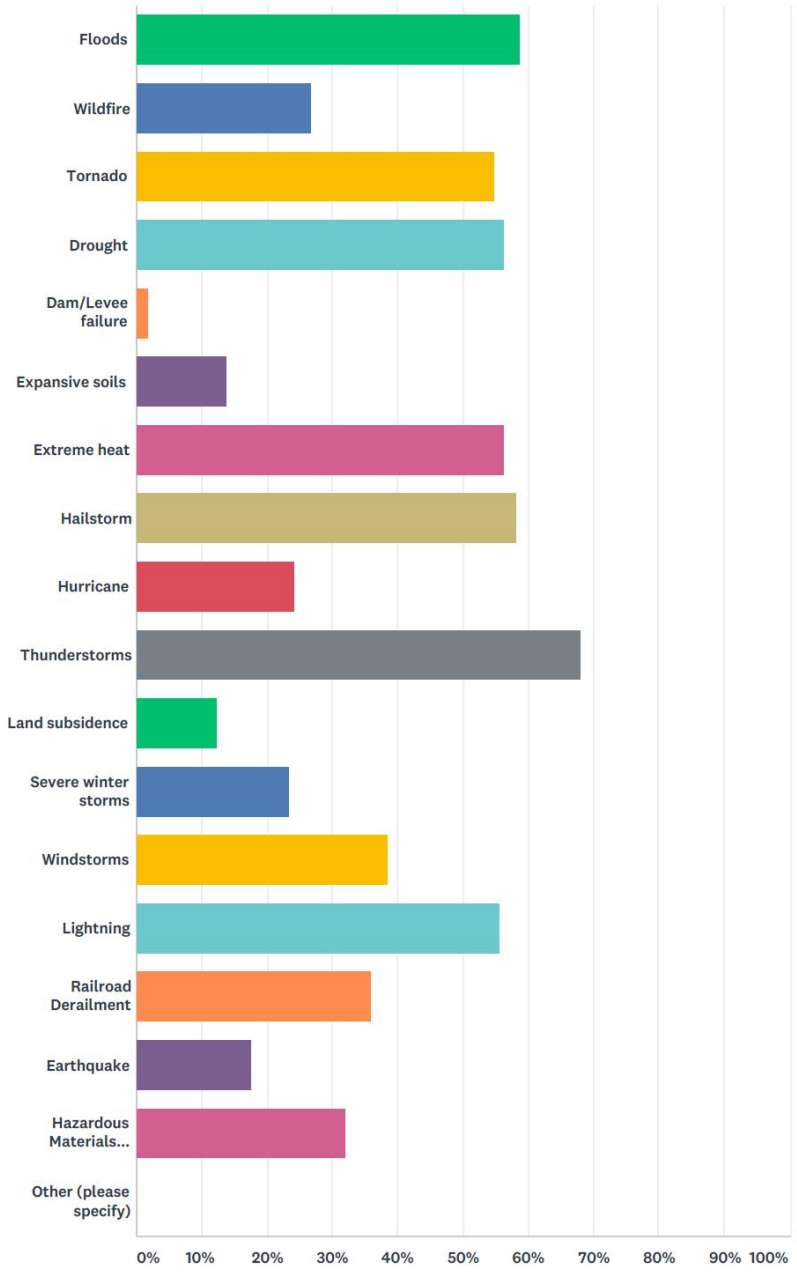


ANSWER CHOICES	RESPONSES	
Floods	39.46%	58

Wildfire	7.48%	11
Tornado	21.09%	31
Drought	47.62%	70
Dam/Levee failure	0.00%	0
Expansive soils	8.16%	12
Extreme heat	48.98%	72
Hailstorm	46.26%	68
Hurricane	11.56%	17
Thunderstorms	50.34%	74
Land subsidence	3.40%	5
Severe winter storms	8.84%	13
Windstorms	22.45%	33
Lightning	36.73%	54
Railroad Derailment	23.13%	34
Earthquake	11.56%	17
Hazardous Materials Incident	7.48%	11
Other (please specify)	6.12%	9
Total Respondents: 147		

Q5 Which of the following are likely to occur in your area at least once in your lifetime? (please check all that apply)

Answered: 153 Skipped: 4

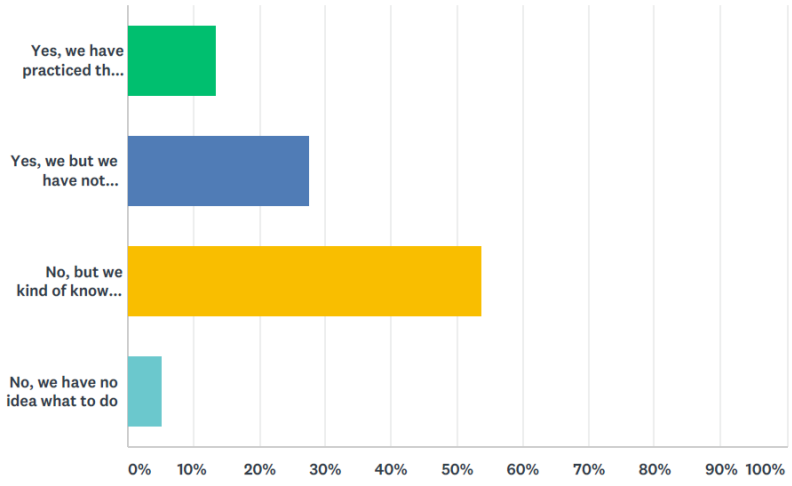


ANSWER CHOICES	RESPONSES	
Floods	58.82%	90

Wildfire	26.80%	41
Tornado	54.90%	84
Drought	56.21%	86
Dam/Levee failure	1.96%	3
Expansive soils	13.73%	21
Extreme heat	56.21%	86
Hailstorm	58.17%	89
Hurricane	24.18%	37
Thunderstorms	67.97%	104
Land subsidence	12.42%	19
Severe winter storms	23.53%	36
Windstorms	38.56%	59
Lightning	55.56%	85
Railroad Derailment	35.95%	55
Earthquake	17.65%	27
Hazardous Materials Incident	32.03%	49
Other (please specify)	0.00%	0
Total Respondents: 153		

Q6 My household has a plan in the event of a disaster such as a flood, tornado, etc.

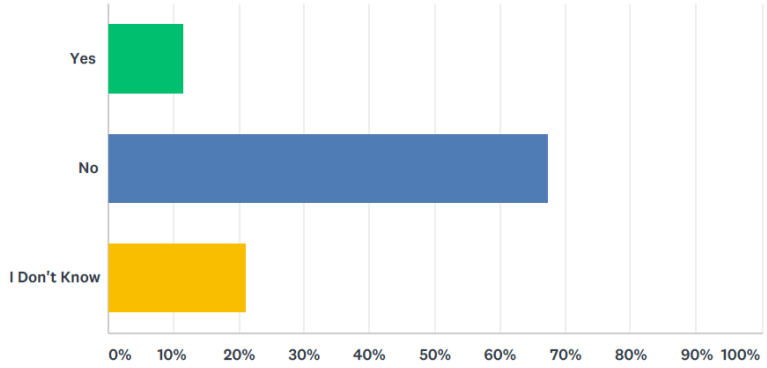
Answered: 156 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes, we have practiced the plan	13.46%	21
Yes, we but we have not practiced the plan	27.56%	43
No, but we kind of know what to do	53.85%	84
No, we have no idea what to do	5.13%	8
TOTAL		156

Q7 Is your home located in a floodplain?

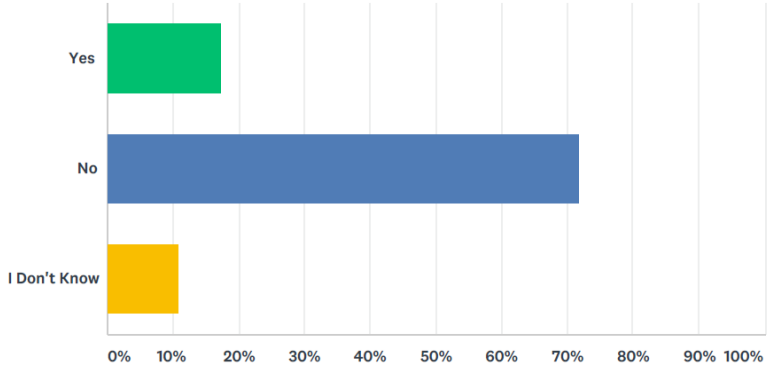
Answered: 156 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	11.54%	18
No	67.31%	105
I Don't Know	21.15%	33
TOTAL		156

Q8 Do you have flood insurance?

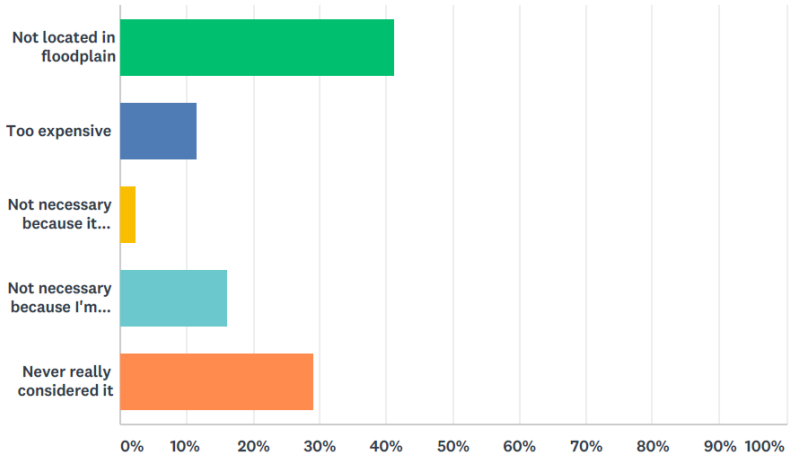
Answered: 156 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	17.31%	27
No	71.79%	112
I Don't Know	10.90%	17
TOTAL		156

Q9 If you do not have flood insurance, why not?

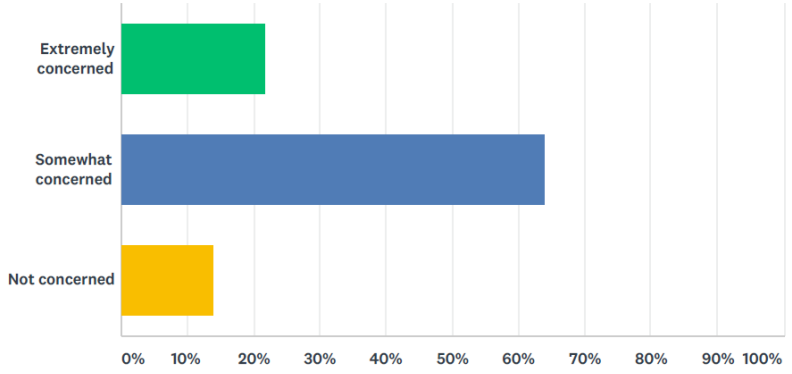
Answered: 131 Skipped: 26



ANSWER CHOICES	RESPONSES	
Not located in floodplain	41.22%	54
Too expensive	11.45%	15
Not necessary because it never floods	2.29%	3
Not necessary because I'm elevated or otherwise protected	16.03%	21
Never really considered it	29.01%	38
TOTAL		131

Q10 How concerned are you about the possibility of you or your community being impacted by a disaster?

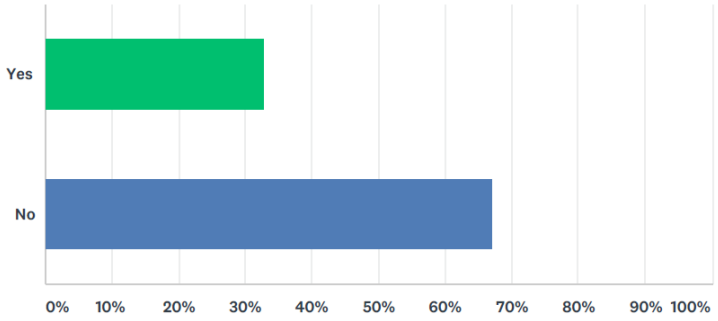
Answered: 156 Skipped: 1



ANSWER CHOICES	RESPONSES	
Extremely concerned	21.79%	34
Somewhat concerned	64.10%	100
Not concerned	14.10%	22
TOTAL		156

Q11 Have you taken any actions to make your home, business and/or community more resistant to hazards?

Answered: 155 Skipped: 2



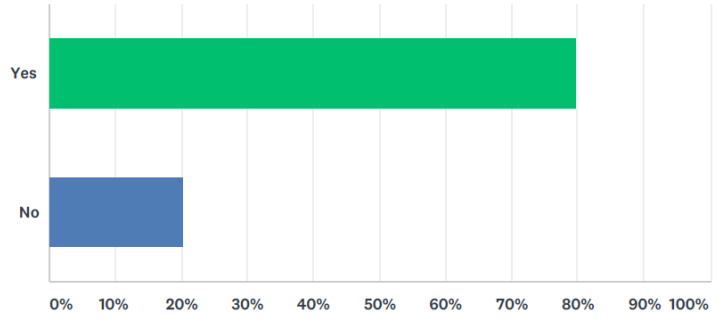
ANSWER CHOICES	RESPONSES	
Yes	32.90%	51
No	67.10%	104
TOTAL		155

Q12 If "Yes", please described the action you have taken:

Answered: 56 Skipped: 101

Q13 Are you interested in making your home, business and/or community more resistant to hazards?

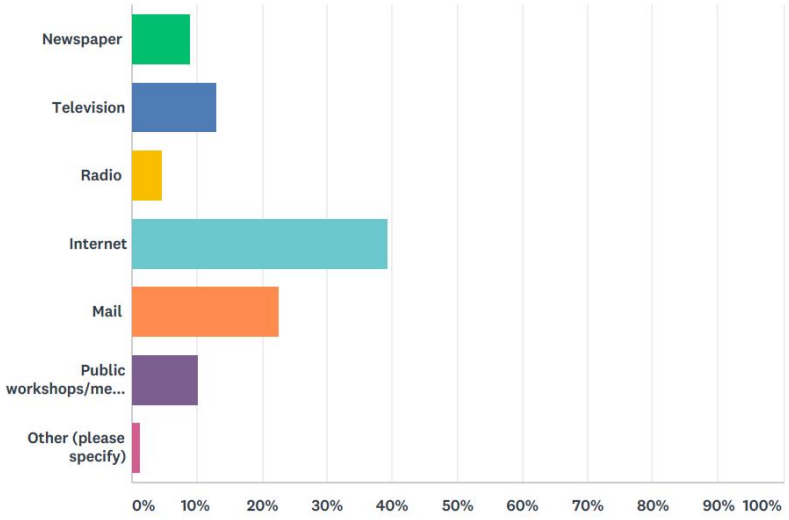
Answered: 152 Skipped: 5



ANSWER CHOICES	RESPONSES	
Yes	79.61%	121
No	20.39%	31
TOTAL		152

Q14 What is the most effective way for you to receive information about how to make your home, business and/or community more resistant to hazards?

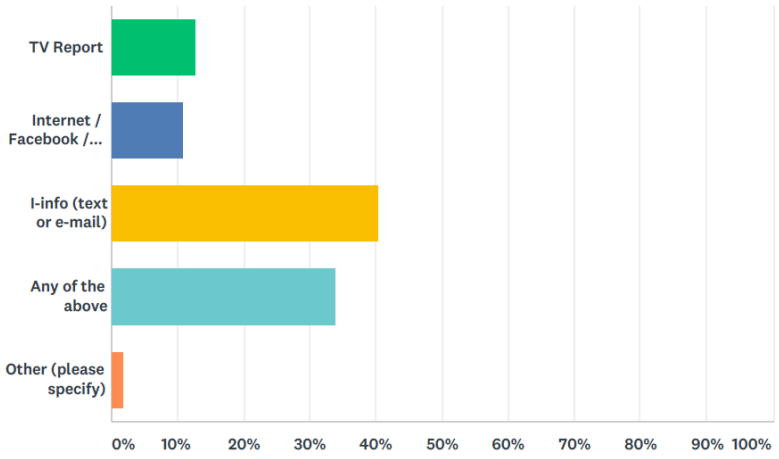
Answered: 155 Skipped: 2



ANSWER CHOICES	RESPONSES	
Newspaper	9.03%	14
Television	12.90%	20
Radio	4.52%	7
Internet	39.35%	61
Mail	22.58%	35
Public workshops/meetings	10.32%	16
Other (please specify)	1.29%	2
TOTAL		155

Q15 Which of the following would be the best way to alert you and your household to an imminent disaster?

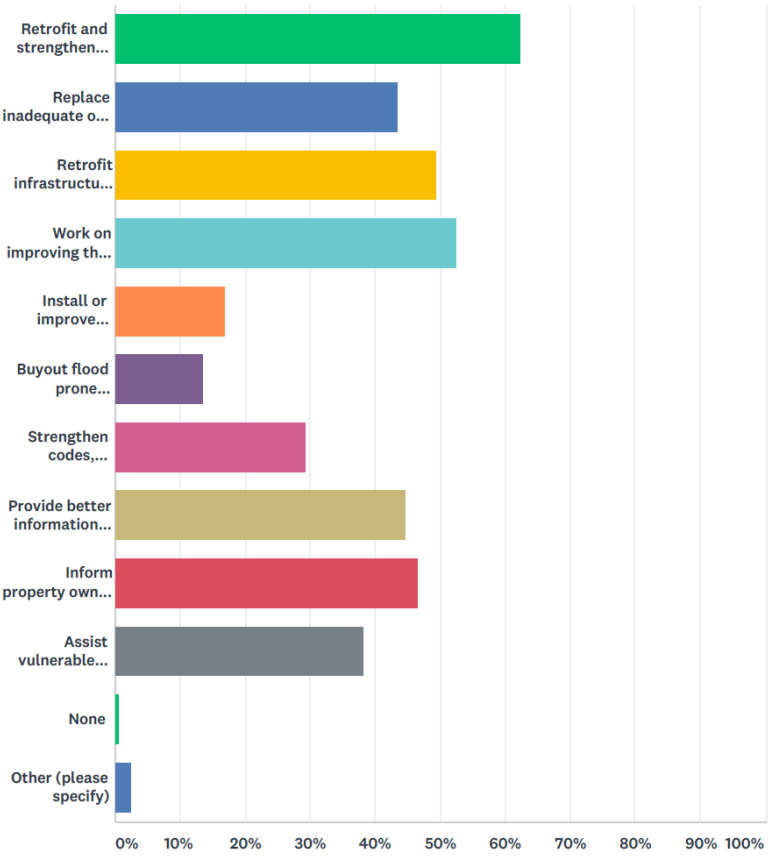
Answered: 156 Skipped: 1



ANSWER CHOICES	RESPONSES	
TV Report	12.82%	20
Internet / Facebook / Twitter / Or other social media (please specify below)	10.90%	17
I-info (text or e-mail)	40.38%	63
Any of the above	33.97%	53
Other (please specify)	1.92%	3
TOTAL		156

Q16 Which of the following mitigation activities do you believe your local government should employ to reduce or eliminate the risk of future hazard damages in your neighborhood and/or community. (Please check all that apply)

Answered: 154 Skipped: 3



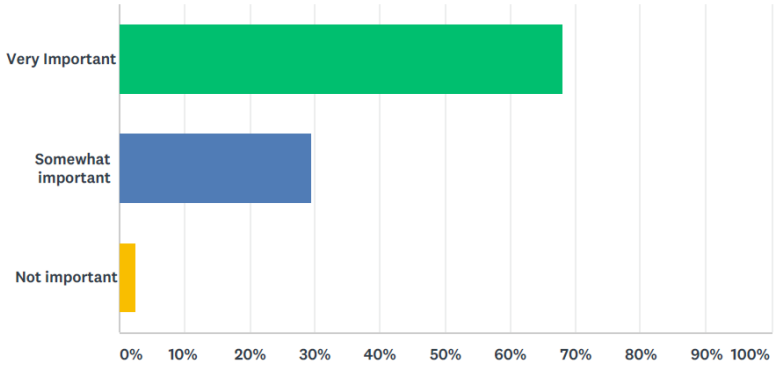
ANSWER CHOICES	RESPONSES	
Retrofit and strengthen essential facilities such as police, fire, emergency medical services, hospitals, schools, etc.	62.34%	96
Replace inadequate or vulnerable bridges and roads.	43.51%	67
Retrofit infrastructure, such as elevating roadways and improving drainage systems.	49.35%	76
Work on improving the damage resistance of utilities (electricity, communications, water / wastewater facilities, etc.).	52.60%	81
Install or improve protective structures, such as floodwalls and levees or individual/community saferooms.	16.88%	26
Buyout flood prone properties and maintain as open-space.	13.64%	21
Strengthen codes, ordinances, and plans to require higher hazard risk management standards.	29.22%	45
Provide better information about hazard risk and high-hazard areas.	44.81%	69
Inform property owners of ways they can mitigate damage to their properties.	46.75%	72
Assist vulnerable property owners with securing funding to mitigate impacts to their property(s).	38.31%	59
None	0.65%	1
Other (please specify)	2.60%	4
Total Respondents: 154		

Q17 Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important?

Answered: 56 Skipped: 101

Q18 Prevention of Hazards is any administrative or regulatory action that influences the way land is developed and buildings are built. Some examples include planning and zoning, building codes, open space prevention, and flood plain regulation. Please rank how important you believe it is for your community to pursue the prevention of hazards .

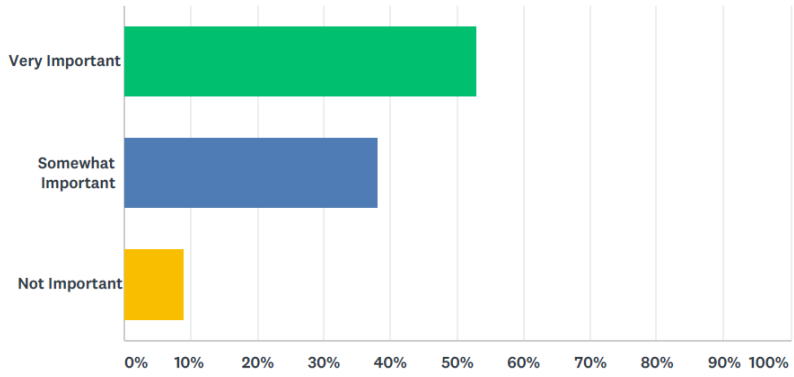
Answered: 156 Skipped: 1



ANSWER CHOICES	RESPONSES	
Very Important	67.95%	106
Somewhat important	29.49%	46
Not important	2.56%	4
TOTAL		156

Q19 Reducing community risks from hazards can also include property protection. This involves actions that involve the modification of existing buildings to protect them from a hazard or removal from the hazard area. Examples include acquisition, relocation, elevations, structural retrofits and storm shutters. How important is it to you that your community should pursue property protection?

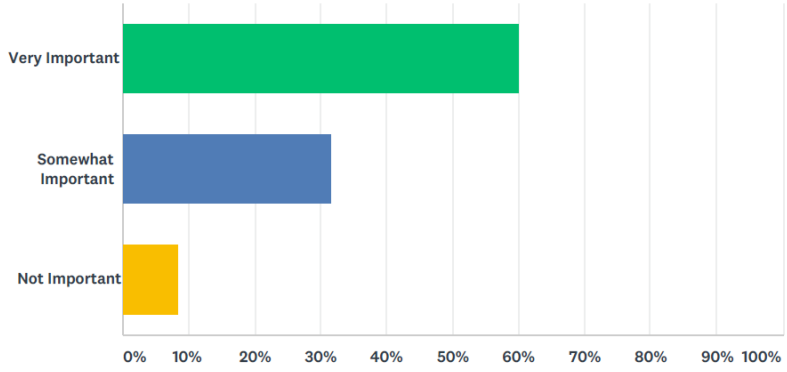
Answered: 155 Skipped: 2



ANSWER CHOICES	RESPONSES	
Very Important	52.90%	82
Somewhat Important	38.06%	59
Not Important	9.03%	14
TOTAL		155

Q20 Reducing community risks from hazards can also include natural resource protection. This kind of protection is in addition to minimizing hazard losses, preserve or restoring the functions of natural systems. Some examples include flood plain protection, habitat preservation, slope stabilization, riparian buffers and forest management. Do you believe this is important for your community to pursue? Please rank below.

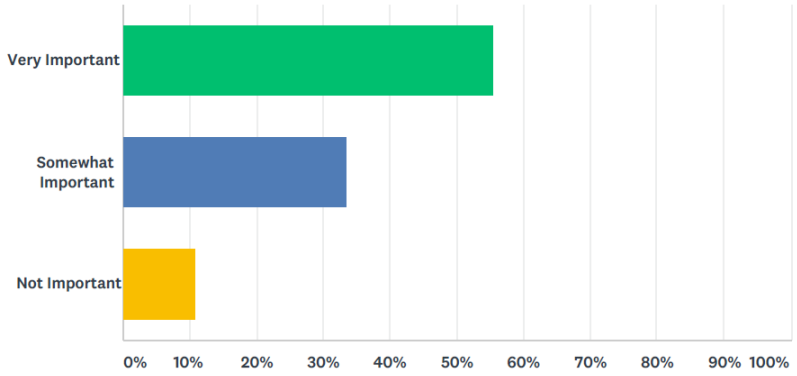
Answered: 155 Skipped: 2



ANSWER CHOICES	RESPONSES	
Very Important	60.00%	93
Somewhat Important	31.61%	49
Not Important	8.39%	13
TOTAL		155

Q21 Structural Projects can also help to reduce hazards.These actions are intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include dams, levees, seawalls, detention/retention basins, channel modifications, retaining walls and storm sewers. Do you believe this is important for your community to pursue? Please rank below.

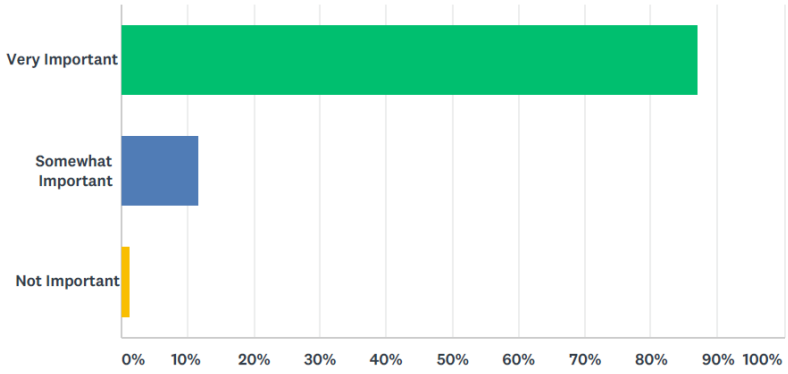
Answered: 155 Skipped: 2



ANSWER CHOICES	RESPONSES	
Very Important	55.48%	86
Somewhat Important	33.55%	52
Not Important	10.97%	17
TOTAL		155

Q22 Emergency Services are actions that protect people and property during and immediately after a hazard event . Some examples include warning systems, evacuation planning, emergency planning, emergency response training and protection of critical emergency facilities/system. Do you believe this is important for your community to pursue? Please rank below.

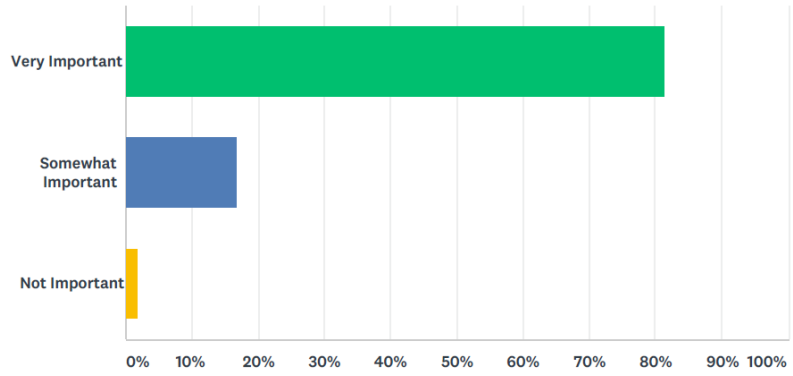
Answered: 155 Skipped: 2



ANSWER CHOICES	RESPONSES	
Very Important	87.10%	135
Somewhat Important	11.61%	18
Not Important	1.29%	2
TOTAL		155

Q23 Public Education and Awareness are actions to inform citizens about hazards and the techniques they can use to protect themselves and their property. Examples include outreach projects, school education programs, library materials and demonstration events. Do you believe this is important for your community to pursue? Please rank below.

Answered: 155 Skipped: 2



ANSWER CHOICES	RESPONSES	
Very Important	81.29%	126
Somewhat Important	16.77%	26
Not Important	1.94%	3
TOTAL		155

Q24 If you would like to be notified of upcoming public meetings for the Atascosa-McMullen Counties Hazard Mitigation Plan Update, please leave your name and email below. Thank you for your time!Name:

Answered: 49 Skipped: 108

Q25 e-mail:

Answered: 50 Skipped: 107

Q1 Please tell us where you live	
Response	Other (please specify)
City of Lytle	Sutherland Springs
City of Lytle	Castroville
Unincorporated Atascosa County	Bexar
Unincorporated Atascosa County	Medina County-Castroville
Unincorporated Atascosa County	San Antonio
City of Lytle	San Antonio, Texas
City of Lytle	Corner of Medina County
Unincorporated Atascosa County	Devine
City of Lytle	Bexar
City of Lytle	Natalia
Unincorporated Atascosa County	Medina County
Unincorporated Atascosa County	Somerset
City of Lytle	Unincorporated Bexar County
Unincorporated Atascosa County	Medina County
Unincorporated Atascosa County	San Antonio
City of Lytle	San Antonio
Unincorporated Atascosa County	City of Von Ormy
Unincorporated Atascosa County	San Antonio TX- Bexar County
City of Lytle	San Antonio

Please tell us where you live	Q2 Please select the hazard you think is the highest threat to you, your business and/or your community. (Please check only one)
Response	Other (please specify)
City of Jourdanton	Bad roads
City of Jourdanton	pot holes, sewer back ups
City of Pleasanton	None yet
City of Jourdanton	Silica dust and water pollution from the frac sand mines. They are located over our unprotected aquifers and are not only using up our precious water resources but also are contaminating the air and water with their chemicals and silica dust which poses a grave health hazard to all.

Please tell us where you live	Q3 Please select the hazard you think is the second highest threat to you, your business and/or your community. (Please check only one)
Response	Other (please specify)
City of Jourdanton	Residential roads ned to be fixed
City of Jourdanton	bad roads
City of Jourdanton	big trucks going by residence homes
City of Jourdanton	water drainage when heavy rain
Unincorporated Atascosa County	Air contamination

Please tell us where you live		Q4 While living here in Atascosa County or McMullen County, have you experienced a disaster? (please check all that apply)
Response	Other (please specify)	Other (please specify)
Unincorporated Atascosa County		No
City of Lytle		In medina county portion of Lytle
City of Lytle	San Antonio, Texas	N/A (Bexar County Resident)
City of Lytle		NA
City of Lytle	Unincorporated Bexar County	Do not live in Atascosa or McMullen County
Unincorporated Atascosa County	San Antonio	Not a resident
Unincorporated Atascosa County	San Antonio TX- Bexar County	I do not live in this area
City of Lytle	San Antonio	No
City of Lytle		No

Please tell us where you live		Q11 Have you taken any actions to make your home, business and/or community more resistant to hazards? If"Yes", please describe the action you have taken:	
Response	Other (please specif	Response	
Unincorporated Atascosa County		Yes	shred weeds to protect fire
City of Jourdanton		Yes	plan and prepare
City of Jourdanton		Yes	This is the first attempt to get pot holes fixed.
City of Jourdanton		No	Go to a safe shelter
City of Pleasanton		Yes	Keep supplies of food, water, guns and ammo on hand and a stock pile of fuel.
City of Jourdanton		Yes	Added dirt to keep water away from home with lightening rods
City of Poteet		Yes	Brush pick up and yard amintenance
City of Pleasanton		Yes	TAlked to city and they built a wall in the back of my yard where the drain is
City of Jourdanton		Yes	REinforced glass door and garage doors at shop. Dug a ditch around foundation and put in rocks for water drainage. Also double pane windows.
Unincorporated Atascosa County		Yes	Put cut telephone poles around my trailer house for added support- made entry and exit ramps for flooding.
City of Jourdanton		Yes	city and school plan
City of Jourdanton		Yes	We are part of the school & city plan
Unincorporated Atascosa County		Yes	Food preps Water prep
City of Lytle		Yes	Cut grass
Unincorporated Atascosa County		Yes	Selected site is on a stable region an dwell above flood plane. Maintenance of surface features guard against fire and wind.
City of Christine		No	na
Unincorporated Atascosa County		Yes	Home is well constructed, generator on hand, keep emergency supplies on hand.
City of Jourdanton		Yes	My husband is very proactive and is prepared for emergencies. He has generators, back up water supply and food supply, has protected our house
City of Lytle		Yes	Have a safe room
City of Lytle		Yes	Water and food supply, Generator, first aid bags, 'go' bags

City of Lytle		No	N/A
City of Jourdanton		Yes	Roof repairs, tree maintenance, etc
Unincorporated Atascosa County		Yes	Fire lanes
Unincorporated Atascosa County		Yes	Evan plan
City of Pleasanton		No	N/A
City of Pleasanton		Yes	Dug our the weep holes around the house and worked the ground up to minimize flooding impact. Replaced roof with metal. Replaced windows and siding. Installed security system with monitored fire alarms.
City of Jourdanton		Yes	Reversible osmosis sytem for the radiation in the water and other pollutants.
Unincorporated Atascosa County		Yes	Ramp for disabled husband. Not use poisonous weed killers.
City of Jourdanton		Yes	Raised My house, Put in better sealing windows.
Unincorporated Atascosa County		Yes	keep grass and brush cut to limit the chance of wildfire
City of Christine		No	Brought in top soil.
Unincorporated Atascosa County		Yes	Good roof and shelter for livestock and vehicles.
City of Lytle	Sutherland Springs	Yes	Elevated house, berm construction, monitored by protect America
Unincorporated Atascosa County	Medina County-Castroville	Yes	We have a plan in the event of any emergency. How to get out of the house, supplies on hand, and conversations within the family of what to do.
City of Jourdanton		Yes	Keep grass cut
City of Lytle		No	Na
City of Lytle		No	no
City of Lytle		No	NA
City of Lytle	Corner of Medina	Yes	Cut firebrakes in our pastures.
City of Lytle		Yes	Tin roof Native plants resistant to drought Build house on higher ground
Unincorporated Atascosa County		Yes	Our mobile home was braced, and it was set up high. Our mobile home was designed to likely withstand a Cat 1 hurricane, but is no help for tornadoes/straight line winds
City of Lytle	Natalia	Yes	EOP for the school district

			replaced light bulbs with low watt so easier for a generator to power more of the house when the power goes out. Water filter and catch. Emergency rations, bedding, clothing and water in addition to lighting and cooking.
Unincorporated Atascosa County	Medina County	Yes	We built our home with limited windows on the side where the wind and storms often are the most powerful. We have built the ditches to drain our yard efficiently.
City of Lytle		Yes	Keep the grass cut to limit grass fires due to extreme heat. Till fields so that a barrier is created.
Unincorporated Atascosa County	Somerset	Yes	na
City of Lytle		No	Keep property well maintained and monitor drainage ditches. Report problem areas to the correct city departments.
Unincorporated Atascosa County	San Antonio	Yes	Home - Building on high ground. Planting trees a good distance from the house.
Unincorporated Atascosa County		Yes	Keeping trees trimmed, bringing in furniture and items that can be tossed around by heavy winds, etc...
City of Lytle	San Antonio	Yes	We have added gutters to alleviate water coming into the house, and we have added a metal roof to help in case of wildfire and hail
Unincorporated Atascosa County		Yes	Have become more informed regarding hazards
Unincorporated Atascosa County		Yes	At home we have prepared by discussing the strategies we would use in the event of an emergency.
City of Lytle		Yes	N/A
City of Lytle	San Antonio	No	No
City of Lytle		No	Safe room
City of Lytle		Yes	

Please tell us where you live		Q14 What is the most effective way for you to receive information about how to make your home, business and/or community more resistant to hazards?
Response	Other (please specify)	Other (please specify)
City of Pleasanton		email
City of Lytle	Unincorporated Bexar County	email

Please tell us where you live		Q15 Which of the following would be the best way to alert you and your household to an imminent disaster?
Response	Other (please specify)	Other (please specify)
City of Jourdanton		Sirens
City of Lytle		email or telephone
City of Lytle	Unincorporated Bexar County	Pushed phone alert like and amber alert or weather alert

Please tell us where you live	Q16 Which of the following mitigation activities do you believe your local government should employ to reduce or eliminate the risk of future hazard damages in your neighborhood and/or community. (Please check all that apply)
Response	Other (please specify)
City of Jourdanton	replace STOP signs that are white and faded
Unincorporated Atascosa County	Have designated shelters in place with trained volunteers ready to assist with displaced citizens as needed.
City of Jourdanton	Have air and water monitoring on site and near silica frac sand mines.
Unincorporated Atascosa County	All the above

Please tell us where you live		Q17 Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important?
Response	Other (please specify)	Open-Ended Response
City of Jourdanton		Road and curbs
City of Jourdanton		Making public more aware of issues
City of Jourdanton		Fewer 18 wheelers through town
City of Jourdanton		tornado alert system
Unincorporated Atascosa County		Regular meetings where available in any particular area where locals can sit and talk about the areas' potential disasters.
Unincorporated Atascosa County		none
Unincorporated Atascosa County		Plant more trees around edges or along lines of property/house as wind breaks when otherwise open grounds to wind and weather
Unincorporated Atascosa County		Post historical stats & porjected disasters on county website
City of Jourdanton		Trucks with Hazardous material driving through town, Empty buildings and homes in poor condition being a haven for drugs and crime. Lots with over grown grass & trash.
City of Christine		No
City of Christine		oil field hazard environmental air pollution and drinking water
Unincorporated Atascosa County		I believe educating school age children about the hazards in their community and how to prepare for them would be the most effective way to reach the population of the community and surrounding areas.
City of Jourdanton		
City of Lytle		No
City of Lytle		Bomb threats Terroristic threats Threats from illegal aliens
City of Jourdanton		No
City of Lytle		No
Unincorporated Atascosa County		Funding fire departments
City of Pleasanton		NO
City of Pleasanton		Internet failure

Unincorporated Atascosa County		Yes. There is a piece of land in the middle of the residential area where my household resides that is being leased out by the neighbors to a trucking business and I believe this poses a risk to the residential and property value of the street we reside on. Children cannot safely ride their bikes and residents cannot safely use the residential street for walking/jogging due to the frequent trucking traffic. This needs to be regulated to where trucking companies cannot reside in residential areas.
City of Jourdanton		If we don't not protect and air and water there will be dire health related problems . Once our water is contaminated there is no going back. What we breathe and drink will affect our quality of life. Water is life! Why are we not protecting this precious resource?
City of Jourdanton		Fix the roadways
Unincorporated Atascosa County		too many families are living in flood prone areas
City of Jourdanton		I think the school needs less 18 wheeler/big trucks traveling on Hwy 16 during school hours. It is crazy getting kids to and from school with them.
City of Jourdanton		The residential roads are horrendous
Unincorporated Atascosa County		All these mines are changing the topography. Some of them are mining next to creeks and have retention ponds there that over flow. Further distance setbacks from flood prone areas is needed.
City of Jourdanton		None at this time
City of Christine		Keep an open communication.
Unincorporated Atascosa County		No
Unincorporated Atascosa County		No
City of Lytle		No
Unincorporated Atascosa County	Medina County-Castroville	not at this time
City of Lytle		Na
City of Lytle	San Antonio, Texas	None I can think of.
City of Lytle		flooding
City of Lytle		No
City of Lytle	Corner of Medina County	Information on areas to go in a disastrous situation

City of Lytle	Bexar	No
Unincorporated Atascosa County		The law enforcement agencies ignore the poor people in the County - especially in my area. I have called for help, and the dispatcher refuses to send an officer. In a natural disaster, my end of the County will suffer great damage, illness, and death because we are clearly ignored. The ranchers are catered to, as well as Poteet and Pleasanton and Jourdanton. The only thing LEO ever do for my end is arrest people - not help them.
Unincorporated Atascosa County		no
Unincorporated Atascosa County	Medina County	Install complete back-up generators on government/public/county properties for use in emergencies; and, they may also be utilized during periods when the electric utilities struggle to maintain sufficient energy for the grid. This could also be used as a cost reduction/reimbursement to offset, and/or re-coup initial cost.
Unincorporated Atascosa County		Having safe places to go that have updated infrastructures in place
Unincorporated Atascosa County	Somerset	If the local school is going to be used as a recovery location, then we need funding to maintain the buildings.
City of Lytle	Unincorporated Bexar County	Not at the moment.
Unincorporated Atascosa County	San Antonio	Not at this time.
Unincorporated Atascosa County		No
City of Lytle	San Antonio	no
Unincorporated Atascosa County		no
Unincorporated Atascosa County		The need of flood control
Unincorporated Atascosa County		no
City of Lytle		Not really.
Unincorporated Atascosa County	San Antonio TX- Bexar County	NA
City of Lytle	San Antonio	No
City of Lytle		No
City of Lytle		None at this time

APPENDIX C: PRIORITY RANKING FORMS

Atascosa County

STAPLEE Rating - Jurisdiction:											Timeframe Values:	Within next 2 years --> Immediate (I)
The project was evaluated based on STAPLEE criteria on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration.												2-3 years --> Near (N)
(1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)												3-5 years-->Short (S)
												More than 5 years-->Long (L)
ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	BONUS (5 pts): Addresses Multiple Hazards	BONUS (5 pts): Complements Another Entity's Efforts		TOTAL SCORE	TIMEFRAME
#2	Imp;ement reverse 911 Warning system	5	4	5	5	5	3	5	5	No other entity has this either		37	
#4	Mobile Home Tie Down Ordinance	4	4	3	4	5	4	5	5	No other entity has this either		34	
#6	Inventory low water crossings	5	5	5	5	5	3	5	5	Work in progress		38	
#9	Storm Water Management Plan	3	3	3	5	5	5	5	5	Never done before		34	
#1	River/Cleanout program	3	3	3	3	5	5	5	5	Never done before		35	
#3	Safe rooms	5	5	5	5	5	3	5	5	No other entity has this either		38	
#5	Flood guages	5	5	5	5	5	5	5	5	No other entity has this either		40	
#7	Update Flood plain maps	5	3	3	5	5	3	5	5	No other entity has this either		34	
#8	Storm Sirens	5	5	5	5	5	5	5	5	Several cities have sirens		45	
#10	Property Demolition	3	3	5	3	3	3	3	5	All cities have some type of ordinance		33	
#11	RV Park Storm Shelters	5	5	5	5	5	5	5	5	no other entity has this either		40	
#12	Back up Generators	5	5	5	5	5	5	5	5	Installed a generator at the EMS Facility this year		40	
#13	Wind survey	5	5	5	5	5	5	5	5	no other entity has this either		40	

City of Charlotte

Atascosa/Mcmullen Hazard Mitigation Plan
Prioritization Excercise

STAPLEE Rating - Jurisdiction:											Timeframe Values:	Within next 2 years --> Immediate (I)
The project was evaluated based on STAPLEE criteria on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration.												2-3 years --> Near (N)
(1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)												3-5 years-->Short (S)
												More than 5 years-->Long (L)
ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	BONUS (5 pts): Addresses Multiple Hazards	BONUS (5 pts): Complements Another Entity's Efforts		TOTAL SCORE	TIMEFRAME
1	IMPROVE DRAINAGE in CERTAIN AREAS OF CITY	5	3	3	3	3	3	5	5	5		35	N
2	DRILL ADDITIONAL WELL TO INCREASE WATER SUPPLY	5	5	5	5	5	5	5	3	3		N/I	I
3	REPLACE 1997 ENGINE NOW IN SERVICE	5	3	3	3	5	3	3	3	3		31	N
4	ENFORCEMENT OF FLOOD DRAINAGE ORDINANCE	3	3	3	3	3	3	5	3	3		29	N
5	HAZARD EDUCATION PROGRAM	3	5	3	5	3	3	3	3	5		33	I
6	PURCHASE AND INSTALL BACKUP GENERATORS	5	5	5	3	5	5	5	3	5		41	I
7	CONSTRUCT COMMUNITY SAFE ROOM	3	3	3	3	3	3	3	5	3		29	S
8	PLANT DROUGHT TOLERANT TREES ALONG SIDEWALKS	5	3	3	3	3	3	5	3	5		33	S

City of Christine

STAPLEE Rating - Jurisdiction:
The project was evaluated based on STAPLEE criteria on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration.
(1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Timeframe Values:
Within next 2 years --> Immediate (I)
2-3 years --> Near (N)
3-5 years-->Short (S)
More than 5 years-->Long (L)

ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	BONUS (5 pts): Addresses Multiple Hazards	BONUS (5 pts): Complements Another Entity's Efforts	TOTAL SCORE		TIMEFRAME
1	Install early warning system	3	3	1	1	3	3	3	5	Timeframe N	22		
2	Improve drainage in certain areas of city that are subject to flooding	3	5	3	5	5	5	3	5	Timeframe S	34		
3	Drill new water well	5	5	3	5	5	5	3	5	Timeframe S	36		
4	Adding new pump station	5	5	3	3	5	3	3	5	Timeframe L	32		

City of Jourdanton

Atascosa/Mcmullen Hazard Mitigation Plan
Prioritization Excercise

STAPLEE Rating - Jurisdiction:
The project was evaluated based on STAPLEE criteria on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration.
(1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Timeframe Values:
Within next 2 years --> Immediate (I)
2-3 years --> Near (N)
3-5 years-->Short (S)
More than 5 years-->Long (L)

ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	BONUS (5 pts): Addresses Multiple Hazards	BONUS (5 pts): Complements Another Entity's Efforts	TOTAL SCORE	TIMEFRAME
1	Improve water supply reservoirs ans increase well water storage.	5	5	5	5	5	5	5	5		40	I
2	Mitigate local flooding in identified problem areas	5	5	5	3	5	5	5	5		38	S
3	Enforcement of flood damage prevention ordinance	5	5	5	5	5	5	5	5		40	I
4	Maintain Storm Drainage System	5	5	5	5	5	5	5	5		40	N
5	Replace Seewer Lines	5	5	5	5	5	5	5	5		40	L
6	Install Early Warning System	5	5	5	4	5	5	5	5		39	N
7	Deterrmine or Construct a Community Safe Room	5	5	5	4	5	5	5	5		39	N
8	Structural Hardening of Critical Facilities	5	5	5	4	5	5	5	5		39	S
9	Educational Signage	5	5	5	5	5	5	5	5		40	N
10	Plant Drought Tolerant Trees Along Public Sidewalks and Parking Lots	5	5	5	5	5	5	5	5		40	S
11	Map ans Assess Vulerability to Wildfires	5	5	5	5	5	5	5	5		40	L

City of Lytle

STAPLEE Rating - Jurisdiction:
The project was evaluated based on STAPLEE criteria on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration.
(1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Timeframe Values:
Within next 2 years --> Immediate (I)
2-3 years --> Near (N)
3-5 years-->Short (S)
More than 5 years-->Long (L)

ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	BONUS (5 pts): Addresses Multiple Hazards	BONUS (5 pts): Complements Another Entity's Efforts	TOTAL SCORE		TIMEFRAME
1	Replace or improve inoperable communication equipment	4	4	3	4	5	4	5	5	S	34		
2	Develop or purchase water supply reservoirs and increase water well storage.	5	4	2	5	5	4	5		S	30		
3	Develop and implement Stormwater Management Plan	4	3	2	5	5	4	5		N	28		
4	Community assistance and monitoring activities in support and compliance with NFIP regulations	4	3	5	5	5	5	5		N	32		
5	Wastewater plant upgrade	5	4	4	5	5	4	5		I	32		
6	Community Saferoom and cooling center	5	4	5	5	5	5	5		S	34		
7	Purchase and install generators for backup power to critical facilities	4	4	3	5	5	5	5		N	31		
8	Purchase Hazmat equipment and vehicle for hazard education and mitigation	4	3	4	5	5	5	5		N	31		
9	Replacement of aging sewer lines	5	3	4	5	5	5	5		I	32		
10	Replacement of aging water lines	5	3	4	5	5	5	5		I	32		
11	Public education and outreach	5	5	5	5	5	5	5		N	35		

Lytle ISD

STAPLEE Rating - Jurisdiction:
The project was evaluated based on STAPLEE criteria on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration.
(1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Timeframe Values:
Within next 2 years --> Immediate (I)
2-3 years --> Near (N)
3-5 years-->Short (S)
More than 5 years-->Long (L)

ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	BONUS (5 pts): Addresses Multiple Hazards	BONUS (5 pts): Complements Another Entity's Efforts	TOTAL SCORE		TIMEFRAME
3	Community Safe Room	5	5	5	5	5	5	5	5	Immediate Working with the City of Lytle and Atascosa County,	45		
2	Install Backup Generators	5	5	5	5	5	5	4	5	Near	39		
1	Upgrade/Harden Schools Against All Hazards	5	3	5	5	5	5	5	5	Near	38		
5	Plant Drought Tolerant Trees Along School Sidewalks and Parking Lots	5	4	5	5	5	5	5	3	Immediate	37		
4	Hazard Education Program	4	3	4	4	5	4	4	3	Immediate	31		

City of Pleasanton

Atascosa/Mcmullen Hazard Mitigation Plan
Prioritization Excercise

STAPLEE Rating - Jurisdiction:
The project was evaluated based on STAPLEE criteria on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration.
(1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Timeframe Values:
Within next 2 years --> Immediate (I)
2-3 years --> Near (N)
3-5 years-->Short (S)
More than 5 years-->Long (L)

ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	BONUS (5 pts): Addresses Multiple Hazards	BONUS (5 pts): Complements Another Entity's Efforts	TOTAL SCORE	TIMEFRAME
1	Implement Flood Study	2	2	2	3	4	3	3			19	L
2	Increase Water Storage	5	5	5	5	5	5	5			35	N
3	Upgrade water Dist sys	5	5	5	5	5	5	5			35	I
4	Upgrade WW Plant	5	5	5	5	5	5	5			35	N
5	upgrade collection sys	3	3	3	3	3	3	3			21	I
6	Backup Gen. W wells	3	3	3	3	3	3	3			21	N
7	community Safe Room	3	2	2	3	2	2	3			17	L
8	Emergency comm. infrast	3	3	3	3	3	3	4			22	N
9	Relocate install (equipment) new Tech	3	3	2	2	2	3	5			20	L
10	Diversion to Home Detention	4	4	4	4	4	4	4			28	S
#11	Plant Drought	5	5	5	5	5	5	5			35	I

City of Poteet

STAPLEE Rating - Jurisdiction:
The project was evaluated based on STAPLEE criteria on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration.
(1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Timeframe Values:
Within next 2 years --> Immediate (I)
2-3 years --> Near (N)
3-5 years-->Short (S)
More than 5 years-->Long (L)

ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	BONUS (5 pts): Addresses Multiple Hazards	BONUS (5 pts): Complements Another Entity's Efforts	TOTAL SCORE	TIMEFRAME
1	Install early warning system	3	1	5	4	5	4	4	5		31	N
2	Improve Communication	5	5	3	4	5	4	4	5	5	40	N
3	Replace Waterlines	5	3	3	4	4	3	5			27	S
4	Increase Enforcement	5	5	5	5	5	5	3	5		38	I
5	Community assistance and monitoring activities in support	3	4	3	4	3	4	3	5		29	I
6	Replace Wastewater Line	5	3	3	4	5	3	4			22	L
7	Local Drainage Improvements	2	2	1	2	2	1	2			12	L

Poteet ISD

STAPLEE Rating - Jurisdiction:
The project was evaluated based on STAPLEE criteria on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration.
(1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Timeframe Values:
Within next 2 years --> Immediate (I)
2-3 years --> Near (N)
3-5 years-->Short (S)
More than 5 years-->Long (L)

ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	BONUS (5 pts): Addresses Multiple Hazards	BONUS (5 pts): Complements Another Entity's Efforts	TOTAL SCORE		TIMEFRAME
1	Retopped and updated drainage on Horton Ln	4	4	4	4	4	4	4	L	Addressed some flooding issues and safe driving issues.	28		
2	Replace or improve Communication systems	3	3	3	3	3	3	3	L	Used grant to update some of the radio systems	21		
3	Update plants to for possible drouts	3	3	3	3	3	3	3	S	Maintenace have removed some warer dependant plants and tre	21		
4	Community safe rooms	2	2	2	2	2	2	2	S	Have MOU with Red Cross to use our gyms as shelters.	14		
5	Back up Generators	1	1	1	1	1	1	1	L	Already have a Backup generator at central office	7		

McCoy Water

STAPLEE Rating - Jurisdiction: McCoy WSC
The project was evaluated based on STAPLEE criteria on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration.
(1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Timeframe Values:
Within next 2 years --> Immediate (I)
2-3 years --> Near (N)
3-5 years-->Short (S)
More than 5 years-->Long (L)

ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	BONUS (5 pts): Addresses Multiple Hazards	BONUS (5 pts): Complements Another Entity's Efforts	TOTAL SCORE		TIMEFRAME
1	Drill new well	3	5	5	5	5	3	5		5 Time Frame: -I	31		
2	Drill new well	3	3	5	5	5	3	5		5 Time Frane - I	29		
2	Add ground storage	5	5	3	5	5	5	5		5 Time Frame - I	33		
3	Add generators	3	5	5	3	5	5	3	5	5 Time Frame - I	34		
4	Replace undersized lines	3	3	5	5	3	5	3		5 Time Frame - I	27		
5	Increase booster pump capacity	5	3	3	5	5	5	3		5 Time Fream- 1	29		
6	Add elevated storage	3	5	3	3	5	5	5		5 Time Frame- I	29		

McMullen County

STAPLEE Rating - Jurisdiction: McMullen County
The project was evaluated based on STAPLEE criteria on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration.
(1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Timeframe Values:
Within next 2 years --> Immediate (I)
2-3 years --> Near (N)
3-5 years-->Short (S)
More than 5 years-->Long (L)

ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	BONUS (5 pts): Addresses Multiple Hazards	BONUS (5 pts): Complements Another Entity's Efforts	TOTAL SCORE	TIMEFRAME
1	Assess critical facilities	5	5	5	5	5	5	5	5	I IN TIMEFRAME	40	
2	Study and prioritize low water crossing	5	5	5	5	5	5	5	5	I IN TIMEFRAME	40	
3	Public awareness and education on all hazards	5	5	5	5	5	5	5	5	I IN TIMEFRAME	40	
4	Community assistance and monitoring activities	3	5	5	5	5	5	5	5	I IN TIMEFRAME	38	

APPENDIX D: CRITICAL FACILITIES

The list and location of critical and vulnerable facilities will be kept and maintained by the Emergency Management Coordinators for Atascosa and McMullen Counties. This list is provided in the form of an ArcGIS geodatabase and a Microsoft Excel spreadsheet with location and contact information. The table below is a summary of critical facilities subject that are vulnerable to hazards based on location and magnitude.

Atascosa County
1 County Courthouse, 1 Emergency Operations Center, 3 VFDs, 4 Electrical Substations, 2 Pharmacies, 1 water storage, 1 helipad, 1 kidney dialysis center
City of Charlotte
1 City Hall, 1 VFD, 2 Schools
City of Christine
1 City Hall, 1 VFD, 1 Sheriff's Facility, 2 Schools, 1 Water Tower
City of Jourdanton
1 City Hall, 1 EMS Station, 1 Police Station, 2 Fire Station, 1 County Courthouse, 2 Pharmacies, 2 Constables Offices, 1 Sherriff's Facility, 1 Water Well, 2 Lift Stations, 2 Water Storage Facilities, 1 Wastewater Plant, 1 Hospital
City of Lytle
1 City Hall, 1 Police Department, 1 EMS Station, 2 Fire Station, 1 Water Storage, 1 Wastewater Treatment Plant, 1 gas distribution, 4 schools, 1 grocery, 1 nursing home, 1 crisis unit
Lytle ISD
4 Schools, 1 Administration Building
City of Pleasanton
1 City Hall, 2 Electric Substations, 2 EMS Stations, 3 VFD, 1 Emergency Operations Center, 2 Police Facilities, 1 Sheriff's facilities, 1 Texas DPS facilities, 6 Schools
City of Poteet
1 City Hall, 1 Sheriff's Facility, 1 Police Station, 1 VFD, 1 EMS Station, 1 Electric Substation, 4 Schools
Poteet ISD
4 Schools, 1 Administration Building
McMullen County
1 County Courthouse, 2 wastewater plants, 1 lift station, 1 Electric Substations, 3 Fire Stations, 1 EMS Station, 1 Pharmacy
McCoy Water

13 Ground Storage Tanks, 1 Elevated Storage Tank, 3 Standpipes,
12 Pressure Tanks, 22 High Service Pumps, 6 Wells, 3 Production Plants,7 Booster Plants, 3 Plants with storage alone, 463.54 miles of distribution lines, 1 Field Office, 1 Administrative Office

APPENDIX E: STAKEHOLDER OUTREACH

The following stakeholders were contacted regarding participation in the HMAP process:

Amphion, Texas
Anchorage, Texas
Campbellton, Texas
Fashing, Texas
Hindes, Texas
Leming, Texas
McCoy, Texas
Peggy, Texas
Rossville, Texas
Somerset, Texas
Tilden, Texas
Pleasanton ISD
Charlotte ISD
Christine ISD
Jourdanton ISD

APPENDIX F: MEETING DOCUMENTATION

Atascosa-McMullen Multi-jurisdictional
Hazard Mitigation Action Plan
Core Meeting #1
Methodist South Hospital
1905 Hwy 97 East, Jourdanton, TX
June 7, 2018 - 1:30 – 3:30 pm

Agenda

- Introductions
- Overview and MHMAP Planning Process
- Outreach strategy
- Hazards & Risks
- Community Capabilities – First Thoughts/Data Needs
- Adjourn

MULTI-HAZARD MITIGATION ACTION PLAN UPDATE

Core Meeting No. 1
Atascosa and McMullen Counties
Including incorporated Communities with ISDs and Water System Partners
Thursday, June 8, 2018, 1:30-3:30pm
Methodist South Hospital, 1905 Hwy 97 East, Jourdanton, TX 78026

1

Today's Agenda…

- Introductions
- Overview and MHMAP Planning Process
- Outreach strategy
- Hazards & Risks
- Community Capabilities – First Thoughts/Data Needs
- Adjourn

2

"If you don't actively attack your risks, your risks will actively attack you."

Mission Statement

Protect the people, property, economy, and quality of life of Atascosa and McMullen Counties from hazards and disasters.

3

Overview of the Planning Process

- What do we want to achieve?
  - Identify cost effective actions for risk reduction that are agreed upon by stakeholders and the public
  - Focus resources on the greatest risks and vulnerabilities
  - Build partnerships by involving people, organizations, and businesses
  - Increase education and awareness of hazards and risk
  - Communicate priorities to state and federal officials
  - Align risk reduction with other community objectives

4

HMAP Process, where we are now

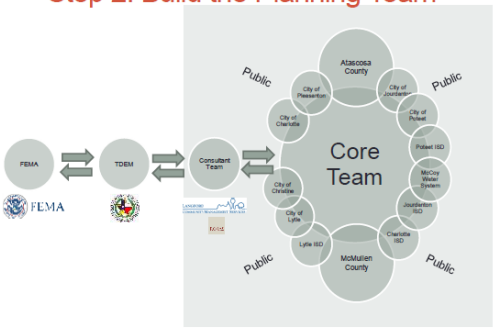
5

Step 1: Determine Planning Area and Resources

Multi-jurisdictional: Disasters don't care about political boundaries!

6

Step 2: Build the Planning Team



7

Build out Sub-Jurisdictional Teams

- Each Participating Jurisdiction identifies local sub-team (worksheet provided to help identify and document)
- Responsibilities of Sub-Jurisdictional Teams
  1. Headed by team leader that represents interests at Core Planning Group.
  2. Coordinate and facilitate local efforts.
  3. Attend Meetings.
  4. Provide information and feedback.
  5. Involve the public and community stakeholders in the planning process.
  6. Select a course of action to be followed for their communities.
  7. Adopt the plan.
  8. Implement that plan and monitor its progress.

8

Benefits of Public Involvement

- Educates people about hazards and risk
- Incorporates different perspectives
- Improves plan quality
- Ensures transparency and builds trust
- Improves opportunities for implementation by building consensus
- Strengthens community disaster resilience

Types of Stakeholders

- Elected Officials and Planning Commission Members
- Business Leaders and Large Employers
- Regional, State, and Federal Agencies
- Cultural Institutions
- Schools and Universities
- Non-Profit Organizations
- Neighborhood Groups

Outreach Methods

- Community events
- Interviews
- News media
- Presentations to governing bodies
- Questionnaires/ Surveys
- Roundtable/ Forums

9

Outreach Strategy

"Must include opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as business, academia, and other private and non-profit interests."

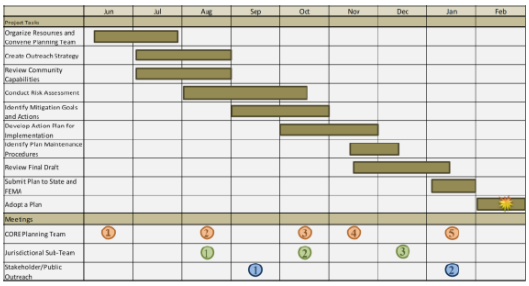
Brainstorm outreach activities
- How best to reach different groups of citizens and stakeholders (newspaper, radio, public media)

Determine objectives and schedule
- Primarily geared toward stakeholders and the public.
- Determine the input needed and when it is needed. (capability review, risk assessment, mitigation strategy)

Identify appropriate outreach methods
- Align with community values
- Press release template sent out
- Surveys - Stack of surveys (schools, churches, city hall), Newspaper, electric bill, Survey Monkey (Online)
- Public and Sub-Jurisdictional Meetings

10

Meeting Schedule



11

Meeting Descriptions

CORE Planning Team Meetings	
1	Introductions, outreach brainstorming, process review, and hazards review.
2	Review capability assessment, NFIP worksheet, survey, ,basemaps, outreach strategy,and Jurisdictional Sub-teams.
3	Conduct local risk assessments and identify information gaps, identify mitigation goals and actions.
4	Develop implemenation action plan and Identify plan maintenance procedures and review final draft.
5	Review public comments and approve final draft.
Jurisdictional Sub-Team	
1	Review basemaps, input on data gaps, create an outreach strategy and complete local capability assessments.
2	Input on risk assessments, mitigation goals and actions and action plan for implementation and maintenance procedures.
3	Review and approve final draft for FEMA submission.
Stakeholder/ Public Outreach Meetings	
1	Present basemaps and capability assessments for each community, get feedback and identify hazards for risk assessment.
2	Opportunity to review and comment on final draft.

12

FEMA Required Natural Hazards

Hazard	Description
Floods	Flooding is a general or temporary condition of partial or complete inundation of water, usually floodplains. The floodplain is an area of land susceptible to being inundated by floodwater from any source.
Wildfire	Wildfires are an unplanned, unwanted fire burning in a natural area, like a forest, grassland, or prairie. Buildings and human development that are susceptible for wildfires are considered the wildland urban interface.
Tornado	A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground.
Drought	A deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.
Dam/Levee Failure	Dam/Levee failure can occur with little warning from intense storms, flash flooding, or engineering failures. Flooding can occur within minutes or hours of a failure.
Expansive Soils	Expansive Soils expand when water is added, and shrink when they dry out. This movement can cause homes to move unevenly and crack.
Extreme Heat	Extreme Heat is a condition when temperatures hover above local excessive heat criteria combined with high humidity levels.
Hailstorm	Hail is showery precipitation in the form of irregular pellets or balls of ice more than 5 mm in diameter.
Severe Winter Storms	A condition when temperatures hover below freezing and can include ice, snow, and sleet.
Windstorms	Severe wind storms can occur alone, or when accompanied by severe thunderstorms. Flying debris can cause major damage to utilities, infrastructure, and property.
Lightning	These are sudden charges of electricity that develop from storms or excessive heat.

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Other Hazards

- Earthquake
- Thunderstorms
- Hazardous Materials Incident
- Explosive Blast
- Hazardous Materials
- Cyber Security Threat
- Railroad Derailment
- Land Subsidence
- Others?

14

Communities Capabilities Assessment

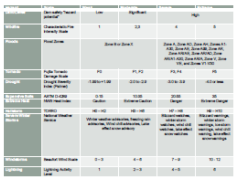
- Review 2012 capabilities assessment from AACOG plan
  - What has changed?
- Review current Community Capabilities Checklist
  1. Planning and Regulatory - Planning and regulatory capabilities are based on the implementation of ordinances, policies, local laws and State statutes, and plans and programs that relate to guiding and managing growth and development.
  2. Administrative and Technical - This refers to staff, skills, and tools a community has. Provide staff numbers and any credentials or certificate trainings in reference to hazard mitigation
  3. Financial - Resources that a jurisdiction has access to or is eligible to use to fund mitigation efforts
  4. Education and Outreach - Programs and methods already in place that could be used to implement mitigation activities

15

Next Steps…Risk Assessment

Note: Modified from U.S. Geological Survey and Oregon Partnership for Disaster Resilience Models.

Figure 5.1: Community risk from natural hazards



16

Basemap Review

- Critical Facilites
  - Critical Infrastructure (Utilities, Roads)
  - Police Station
  - Fire Station
  - EMS
- At-Risk Populations
  - Nursing Homes
  - Daycares
  - Schools
  - Hospitals
  - Prisons
- Assets
  - Public buildings central to continued governance
  - Major Employers
  - Veterinary clinics
  - Cultural and Historic Buildings and Sites

Problem Areas
- Low Water Crossings
- Areas with high tornadic activity
- Areas with high wildfire activity

17

Input on Vulnerabilities

Other Considerations
- GIS files of hazard events, problem areas, critical facilities.
- NFIP information from floodplain administrator.
- Does pipeline/ disposal well information need to be considered?
  https://www.npms.phmsa.dot.gov/PipelineDataRequest/DataRequestForm.aspx

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Atascosa-McMullen Multi-jurisdictional
Hazard Mitigation Action Plan
Core Meeting #2
Methodist South Hospital
1905 Hwy 97 East, Jourdanton, TX
September 27, 2018 - 1:30 – 3:30 pm

Agenda

- Attendance Noted
- Document members and dates of jurisdictional sub-teams and meetings held
- Review completed community basemaps
- Review, revise if needed, and approve survey format and dates
- Review community outreach strategies to get maximum survey participation
- Community Capabilities – Review completed assessments and any questions
- Adjourn

Atascosa-McMullen Multi-jurisdictional
Hazard Mitigation Action Plan
Core Meeting #2
Methodist South Hospital
1905 Hwy 97 East, Jourdanton, TX

September 27, 2018
1:30pm

Attendance: Williams Cross, Lytle ISD; Jimmy Martum, Lytle ISD; Jason Cooper, McMullen CO; David Prasifka, Atascosa CO; Crystal Preciaco, Christine; Stephen Martier; Christine Councilman; Mark Shows, Jourdonton; John Roberts, Pleasanton; Matt Dear, Lytle; Gabe Rojas, Rojas Planning LLC; Donna Chatham, Langford Community Management Services (Sign in Sheet in files)

Mr. Rojas reviewed the importance of holding sub-jurisdictional team meetings, reviewing what needs to be identified on the base maps and community capabilities electronic format sheets. Discussion followed the importance of identifying low water crossings, vulnerable populations and public facilities on the base maps. It was agreed that everyone would bring their base maps to Mr. Rojas at the public meeting to be held in October.

After a through discussion of the citizen survey that was developed, it was agreed that the survey would go "live" on October 1st with each participating entity providing hard copies at their city halls, libraries and county court houses. Suggested wording to be put on water bills would be sent by Ms. Chatham to the group. The survey would be live from October 1-November 16th, 2018 with a public meeting the later part of October or early November. Ms. Chatham said she would work with Mr. Prasifka in securing a time and date and notify everyone by email while emphasizing that at least one official representative per each participation jurisdiction must be present at the public meeting. Mr. Rojas explained that he will do the presentation regarding the HAZMAP while each local official from each jurisdiction can help in the questions/concerns/input from their citizenry.

The community capabilities survey was also discussed .

The timeline was discussed regarding the next steps after the public meeting in late October/early November.

There being no further business, the meeting adjourned at 3:00.

Core Meeting #2: September 27, 2018

Atascosa-McMullen Counties Multijurisdictional

FEMA Hazard Mitigation Plan

Public Meeting on *November 7th, 2018*

PRESS RELEASE

Atascosa and McMullen Counties, Charlotte, Christine, Jourdanton, Lytle, Pleasanton, Poteet and their school districts along with McCoy Water Supply will hold a public meeting on Wednesday, November 7th to gather public input for their FEMA Hazard Mitigation Action Plan.

The meeting is from 6:00 pm-7:00 pm at Pleasanton Civic Center
115 N. Main St. Pleasanton, Texas. The public, area businesses and organizations located throughout the planning area are invited and encouraged to attend.

Under the Disaster Mitigation Act of 2000, the Federal Emergency Management Agency (FEMA) requires communities to develop a mitigation plan to minimize or eliminate the long term risk to human life and property from known hazards. Mitigation is defined by FEMA as sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects. Hazards that may pose risk and potentially result in disaster include drought, flood, hurricane, tornado, wildfire and other high hazards.

Communities with a FEMA-approved Plan are eligible for certain grant funding under the Hazard Mitigation Assistance (HMA) program to fund critical projects such as buyouts and structural elevation of repetitive flood loss structures, drainage projects and hardening critical facilities to minimize future damage from natural disasters that affect the Atascosa County planning area.

The purpose of the public meeting is to provide a project overview from Langford Community Management Services, consultant to the project, and solicit information from citizens. Public input will help the Local Planning Teams to identify and analyze potential hazards affecting residents and recommend possible actions to reduce their impact throughout Atascosa County and the planning area.

In addition to the required meetings, the communities are conducting an on-line community survey to understand residents' top concerns. The survey is at **https://www.tiny.cc/amhmap**.

Copies of the survey can be found at the Atascosa and McMullen Court Houses along or at the local city halls and libraries of the above identified plan participants.

The communities welcome your input!

Persons with disabilities that wish to attend this meeting should contact Atascosa County EMC office to arrange for assistance. Individuals who require auxiliary aids or services for this meeting should contact Atascosa County EMC office at least two days before the meeting so that appropriate arrangements can be made. For further information, contact David Prasifka, Atascosa County Emergency Management Coordinator at *830-769-9348*.

Atascosa-McMullen Multi-jurisdictional Hazard Mitigation Action Plan Public Meeting #1

Pleasanton Civic Center
115 N. Main St. Pleasanton, Texas
November 7, 2018
6-7pm

Agenda

- Introductions
  - Recognize representatives, local officials, and residents from various jurisdictions in planning area.
- Overview and MHMAP Planning Process
- Outreach strategy - Survey Link: **tiny.cc/amhmap**
- Review Map of Resources, At-Risk Populations, Critical Facilities, Problem Areas
- Hazards & Risks
- Review Community Capabilities
- Next Steps…Conduct a Risk Assessment and Develop a Mitigation Strategy
- Adjourn

Atascosa-McMullen Counties HAZMAP
CORE Team Meeting #3
February 13, 2019
2:30pm
Methodist Hospital South Texas Regional Medical Center
1905 TX-97, Jourdanton, TX 78026

PURPOSE: Provide shared experience, capability and problem discussion related to known hazards, natural and man-made, drawing from the broader community's expertise and observation, in order to develop appropriate hazard mitigation actions.

- Attendance Noted

- Review/Discuss Public Inolvement
  - Online citizen survey results
  - How does this relate to hazards we are studying?
  - Should we limit or expand list of hazards?

- Hazard Risk Assessment
  - Review materials and statistics provided
  - Note data gaps – places where we need more information
  - Synthesis/Major oberservations

- Mitigation Actions
  - Review past mitigation actions and progress
  - Develop mitigation actions goals
  - Discuss mitigation action worksheets/homework for next jurisdictional sub-team meeting

- Other items

Atascosa-McMullen Counties HAZMAP
CORE Team Meeting #3
February 13, 2019
2:30pm
Methodist Hospital South Texas Regional Medical Center
1905 TX-97, Jourdanton, TX 78026

PURPOSE: Provide shared experience, capability and problem discussion related to known hazards, natural and man-made, drawing from the broader community's expertise and observation, in order to develop appropriate hazard mitigation actions.

Attendance noted through sign in sheet passed around.

Mr. Rojas, Rojas Planning LLC, contracted by Langford Community Management, provided an overview of the citizen survey results. There were 157 responsdents which, Mr. Rojoas stated, was an excellent response. Discusion followed regarding the citizen response and how it related to the hazards currently being studied.

Mr. Rojos led a discussion in review of the FEMA Required Nataural Hazards. It was a consensus that dam/levee failure was unnecessary to study as there were no dams tat effected Atascosa/McMullen Counties.

Discussion followed regarding the current AACOG HAZMAP goals for the expiring plan. It was agreed to add Hazardous Material in Goal #1 and leave the remaining goals as they are currently written as they are still relevant.

Mr. Rojoas discussed the next steps in developing mitigation actions goals. He reviewed the exising mitigation strategy actions for the AACOG 2012 plan and stated that new forms would be emailed out to all the Atascosa participating jursidictions to add, delete and enhance current listed actions. This is to be done at the next jurisdictional sub-tem meeting.

There being no further business, the meeting adjoured at 4:00 pm.

APPENDIX G: ADOPTION RESOLUTION

LANGFORD
COMMUNITY MANAGEMENT SERVICES

2901 CR 175
Leander ▪ Texas ▪ 78641

ROJAS

Circle Bend Drive
Austin▪ Texas ▪ 78758