Karnes County Multi-jurisdictional
Wilson County Multi-jurisdictional
Hazard Mitigation Action Plan

April 7, 2020






Prepared for:
Karnes County, Texas
Falls City, Texas Karnes City, Texas
Kenedy, Texas Runge, Texas
Karnes City ISD

Prepared for:
Wilson County, Texas
Floresville, Texas La Vernia, Texas
Poth, Texas Stockdale, Texas
La Vernia ISD

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TABLE OF CONTENTS

SECTION 1: INTRODUCTION 7
Background 7
Participation and Scope 7
Purpose 9
Authority 9

SECTION 2: PLANNING PROCESS 10
Plan Preparation and Plan Development .. 10
Planning Team *11*
Project Schedule 14
Resources and Existing Plans 14
Public and Stakeholder Involvement 15

SECTION 3: PLANNING AREA PROFILE 20
Karnes County 20
Wilson County 22
Critical Facilities and Assets 24

SECTION 4: HAZARDS AND RISK 25
Hazard Description 27
Risk Analysis Overview 28
Vulnerability Summary Overview 31

SECTION 5: HURRICANE 32
Description 32
Location 32
Extent 34
Historical Occurrences 35
Significant Events *36*
Probability of Future Events 38
Vulnerability and Impact 39

SECTION 6: FLOOD 45
Description 45
Location 45
Extent 51
Historical Occurrences 52
Significant Events *54*
Probability of Future Events 56
Vulnerability and Impact 56
NFIP Participation 60

SECTION 7: DROUGHT 63
Description 63
Location 63

Extent 64
Historical Occurrences 67
Significant Events *67*
Probability of Future Events 69
Vulnerability and Impact 69

SECTION 8: WINDSTORMS 72
Description 72
Location 72
Extent 73
Historical Occurrences 73
Significant Events *76*
Probability of Future Events 77
Vulnerability and Impact 77

SECTION 9: EXTREME HEAT 82
Description 82
Location 82
Extent 82
Historical Occurrences 84
Probability of Future Events 87
Vulnerability and Impacts 89

SECTION 10: LIGHTNING 91
Description 91
Location 91
Extent 91
Historical Occurrences 92
Significant Events *94*
Probability of Future Events 95
Vulnerability and Impact 95

SECTION 11: TORNADO 99
Description 99
Location 99
Extent 101
Historical Occurrences 106
Significant Events *108*
Probability of Future Events 109
Vulnerability and Impact 110

SECTION 12: HAILSTORMS 115
Description 115
Location 115
Extent 115
Historical Occurrences 116

Significant Events *120*
Probability of Future Events.....121
Vulnerability and Impact 121

SECTION 13: WILDFIRE 126
Description.....126
Location 126
Extent.....126
Historical Occurrences.....130
Probability of Future Events.....133
Vulnerability and Impact 133

SECTION 14: SEVERE WINTER STORMS 135
Description.....135
Extent.....136
Historical Occurrences.....137
Significant Events *138*
Probability of Future Events.....138
Vulnerability and Impact 138

SECTION 15: EARTHQUAKES 140
Description.....140
Location 141
Extent.....142
Historical Occurrences.....144
Significant Events *146*
Probability of Future Events.....146
Vulnerability and Impact 147

SECTION 16: HAZARDOUS MATERIALS INCIDENT 148
Description.....148
Location 150
Extent.....153
Historical Occurrences.....156
Significant Events *157*
Probability of Future Events.....159
Vulnerability and Impact 159

SECTION 17: MITIGATION STRATEGY 163
Mitigation Goals 164

SECTION 18: MITIGATION ACTIONS 167
Mitigation Action Plan 203

SECTION 19: PLAN MAINTENANCE 204
Incorporation 2044

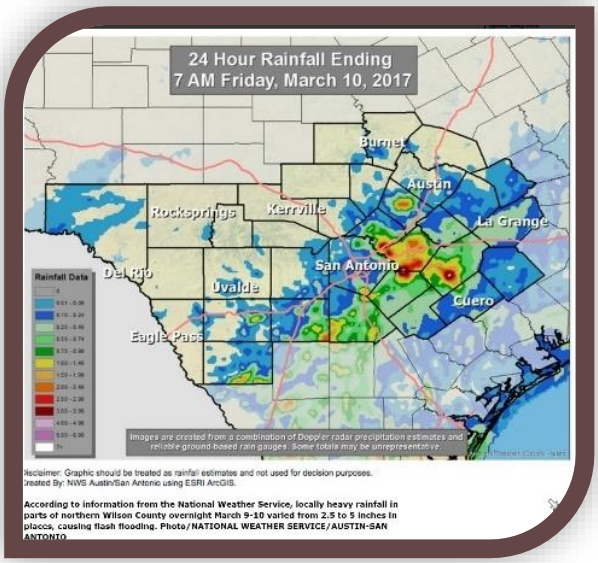
Methods of Incorporation of the Plan.....205
Monitoring.....2066
Evaluation 2077
Updating 2077
Five Year Review and Update.....2077
Continued Public Involvement 2088

APPENDIX A: CAPABILITY ASSESSMENTS 2099
APPENDIX B: PUBLIC SURVEY 2111
APPENDIX C: PRIORITY RANKING FORMS 2366
APPENDIX D: CRITICAL FACILITIES 2422
APPENDIX E: STAKEHOLDER OUTREACH 2444
APPENDIX F: MEETING DOCUMENTATION 248
APPENDIX G: ADOPTION RESOLUTIONS 2633

SECTION 1: INTRODUCTION

Background

Karnes County and Wilson County are located in South Central Texas just east of Bexar County, home to San Antonio which is the 7th largest city in the United States. While the counties remain predominantly 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. Karnes County and Wilson County are susceptible to a wide range of natural hazards, including but not limited to hurricanes, flooding, hail, extreme heat, drought, and wildfire. These counties have a unique hazard profile caught between hurricanes and tropical storms from the gulf coast and flash flooding events that are exacerbated from being directly downstream of the urbanized and largely impervious San Antonio area. Streams and rivers in these two counties will crest and flood hours and even days after there is a rainfall event in the quickly growing San Antonio metropolitan area to the west. Other hazards such as wildfire and drought also impact the area from time to time. With climate change affecting weather patterns and sea level rise on the Texas coast, these hazards 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 Karnes and Wilson 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 Karnes and Wilson 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 Karnes and Wilson Counties this plan includes the Cities of Floresville, La Vernia, Poth, Stockdale, Falls City, Karnes City, Kenedy, and Runge along with the school district of La Vernia ISD and Karnes City ISD as participating jurisdictions. The San Antonio River Authority (SARA) participated throughout the plan development with representatives at meeting 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 Floresville, Stockdale, Poth, Falls City, Kenedy and Runge. Figure 1-1 below is an example of outreach efforts to inform the public about the upcoming Hazard Mitigation Action Plan (HMAP) development process.

Figure 1-1: Notice in The Karnes Countywide

Wednesday, Nov. 1, 2017

The Karnes Countywid

Vol. 126, No. 44, Two Sections, 20 pages Karnes County's Newspaper www.mysoutex.com

Karnes County obtains FEMA grant

By Michael S. McCracken
Countywide editor

KARNES COUNTY – Karnes and Wilson counties were successful in obtaining a FEMA Hazard Mitigation Multi-jurisdictional Assistance grant in order to update their existing plan that offers practical approaches and examples for how the communities can engage in effective planning to reduce long-term risk from natural hazards and disasters.

The plan will include the cities within each county, including Falls City, Karnes City, Kenedy, Runge, Floresville, La Vernia, Poth and Stockdale. It also will include their independent school districts, San Antonio River Authority and water districts as participants in the plan development, along with stakeholders.

"Mitigation is an investment in the community's future safety and sustainability," said Karnes County Commissioner Shelby Dunik, who also serves the county as its emergency management coordinator. "Its critical importance includes protecting public safety and preventing loss of life, reduces harm to existing and future development and aids to prevent damage to a community's unique economic, culture and environmental assets."

The possible effects of a natural

(See Opportunity, 9A)

'Opportunity for good, open and honest dialogue'

(Continued from 1A)

disaster could become entwined in every aspect of the community with devastating consequences in its economic, social and environmental well-being.

Dupnik reported that the county hired Langford Community Management Services (LCMS) to help guide the process and submit the plan to FEMA. Judy Langford, with LCMS, said the plan will be built on FEMA's standards.

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

FEMA

The required plan includes a core planning team with both Karnes and Wilson 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, Langford said that they will conduct an on-line community survey to understand residents' top concerns, along with several public hearings.

Both the core and local planning teams will be reviewing the communities capabilities, conducting a risk assessment and identifying mitigation goals and actions, while gaining public input through public hearing and on-line surveys.

Once the plan is compiled, another public hearing will be held to gain final public insight. The plan will be submitted for FEMA final approval then final adoption by all the participating jurisdictions.

Once the jurisdictions adopt the FEMA approved plan, they will not only have procedures and guidelines in place for emergencies, but also will now be able to seek funding from FEMA to mitigate some of the risks when funding becomes available.

Karnes County Judge Walter R. Long, Jr. said they hope residents will become engaged, offer feedback about the plan and consider what their households would do in a wildfire, tornado or other emergency situations.

"This is an opportunity for good, open and honest dialogue," Langford added. "Maybe it's something that sparks conversation within a household or within a neighborhood association or business park. In your mind, work through how you would respond in a certain event knowing that other things were being done by the city and county."

Michael S. McCracken is the editor at The Karnes Countywide. He can be reached at 830-582-0553 or karnes@mysoutex.com.

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 and property of Karnes and Wilson Counties from hazards and disasters to ensure a resilient and enduring future."**

The Plan was prepared by Karnes and Wilson 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 one man-made hazard 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 5-16. The specific goals of the Plan are identified in Section 17 with specific mitigation actions contained in Section 18. The ongoing maintenance of the Plan is discussed in Section 19 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

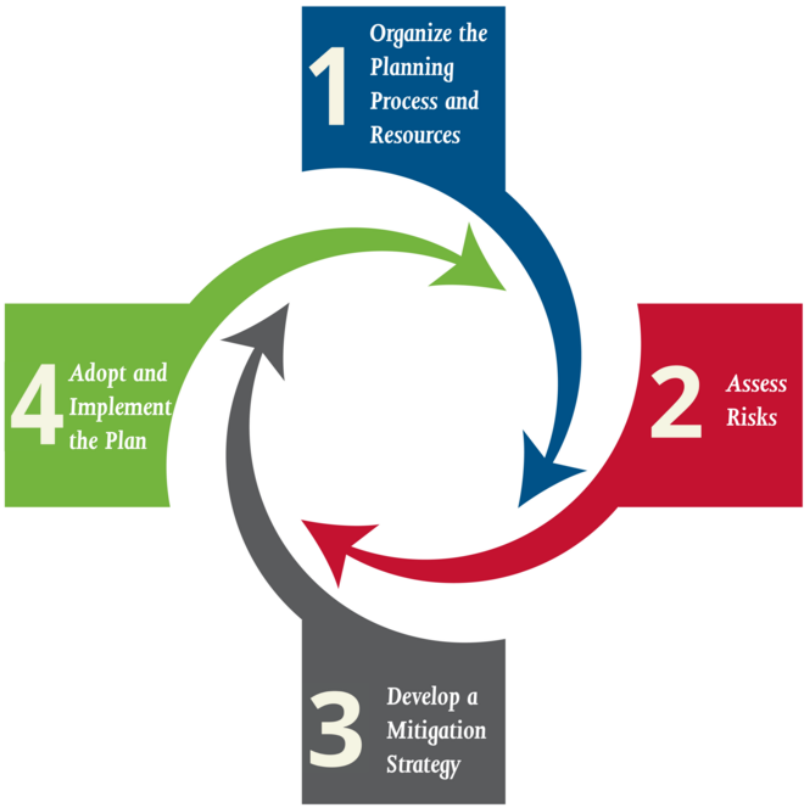
The Texas Division of Emergency Management (TDEM) and FEMA have the authority to review and approve hazard mitigation plans through the Disaster Mitigation Act of 2000.

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 1-1: 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.

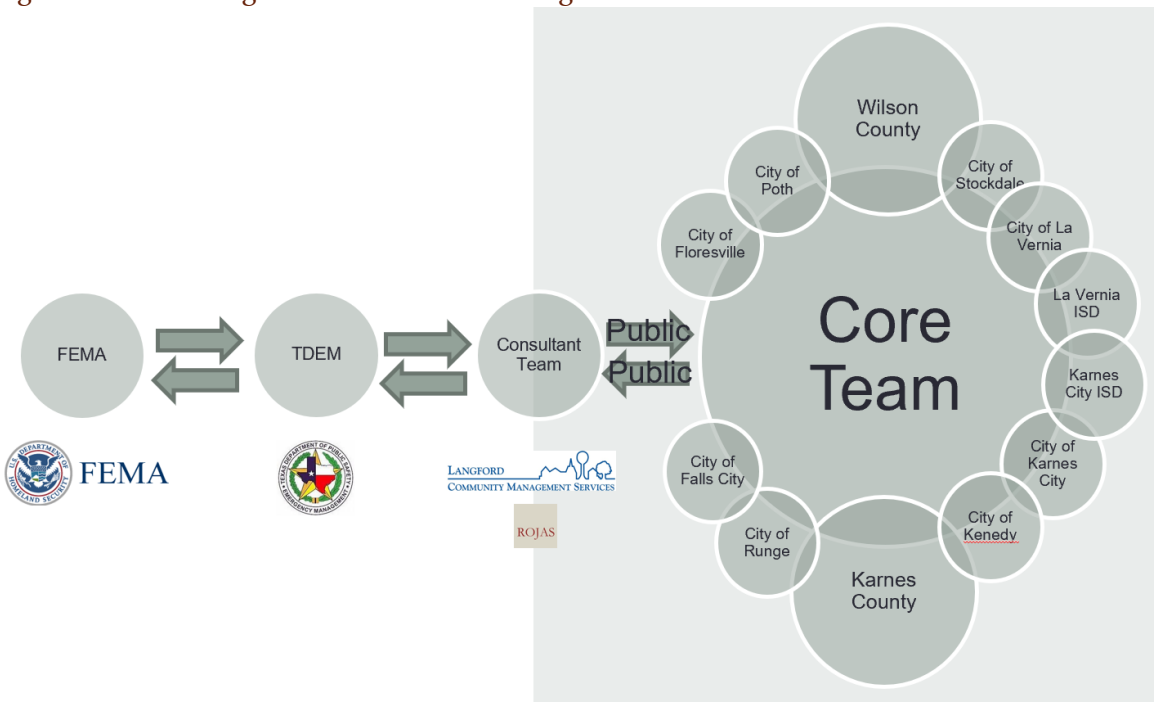
3. Develop a Mitigation Strategy – The local government then sets priorities and develops long-term strategies for avoiding or minimizing the undesired effects of disasters. The mitigation strategy addresses how the mitigation actions will be implemented and administered.

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

Karnes and Wilson Counties, including participating jurisdictions, hired Langford Community Management Services and Rojas Planning to provide technical support and to oversee development of the plan. The Karnes and Wilson Counties Multi-Jurisdictional Plan development 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. The first CORE meeting was held on October 11, 2017 at Karnes County Offices on the Square at 200 W. Calvert Ave. Karnes City, Texas.

Figure 1-2: Planning Team and Process Diagram



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.

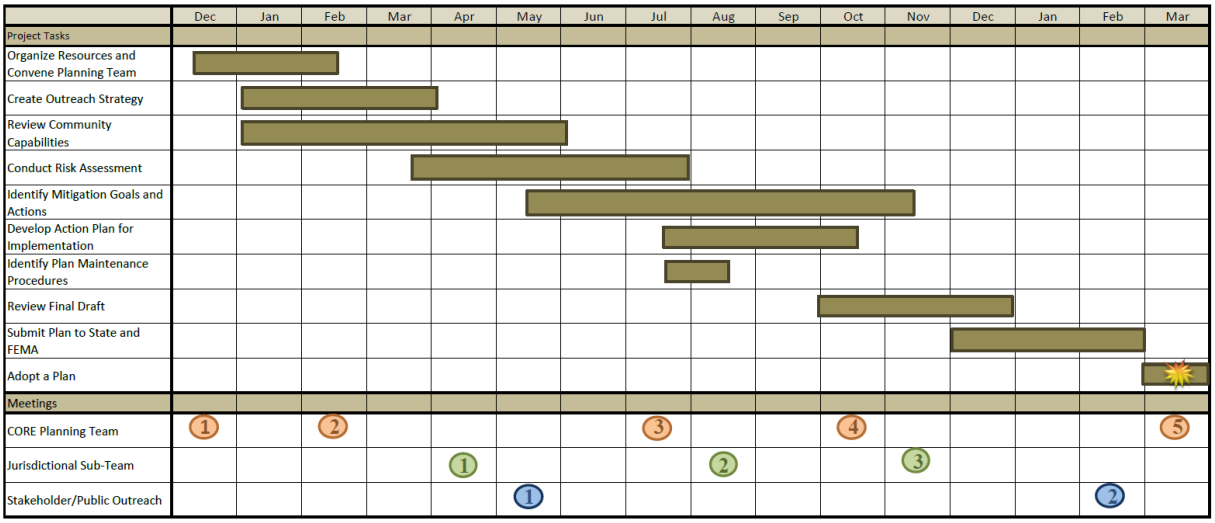
At least one member from each participating jurisdiction was present at this kickoff Core Planning Team meetings. The first Core meeting included a discussion on Plan stakeholders, options for engaging the public, and developing a schedule for Plan development. Core Planning Team members were asked to 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 (2014 Population Numbers)

Entity/Population	Position or Title	Agency
Karnes CO 14,884	County Commissioner	Commissioners Court
Falls City 485	Mayor City Secretary	City Hall
Karnes City 3,162	City Manager City Secretary	City Hall

Kenedy 3,385	County Judge Police Chief	Commissioners Court Police Department
Runge 1,138	Mayor City Secretary	City Hall
Wilson CO 44,609	County Judge Emergency Management Coordinator	Commissioners Court Emergency Management
Floresville 6,813	City Manager Community Development Manager	City Hall Economic Development
La Vernia 1,471	City Manager City Secretary	City Hall
Poth 2,070	Mayor City Secretary	City Hall
Stockdale 1,681	City Manager	City Hall
Karnes City ISD	Superintendent	ISD Central Office
La Vernia ISD	Superintendent	ISD Central Office

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.
4	Develop implemenation action plan and Identify plan maintenance procedures and review final draft.
5	Review public comments and approve final draft.

Jursidictional Sub-Team

1	Review basemaps, input on data gaps, create an outreach strategy and complete local capability assessments.
2	Approve local risk assessment, gather ideas and priorities for mitigation goals and actions.
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	Present risk assessments, mitigation goals and actions, and implementation plan for an opportunity to review 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 finalized at Core Meeting 4. 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 Karnes and Wilson 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 Wilson County Watershed Master Plan was prepared to support flood management, safety, and emergency access efforts within Wilson County. The report includes recommendations for roadway drainage improvements to mitigate flood hazards and provide improved emergency access during major flood events. In 2013, Karnes County and incorporated areas were included in the update.

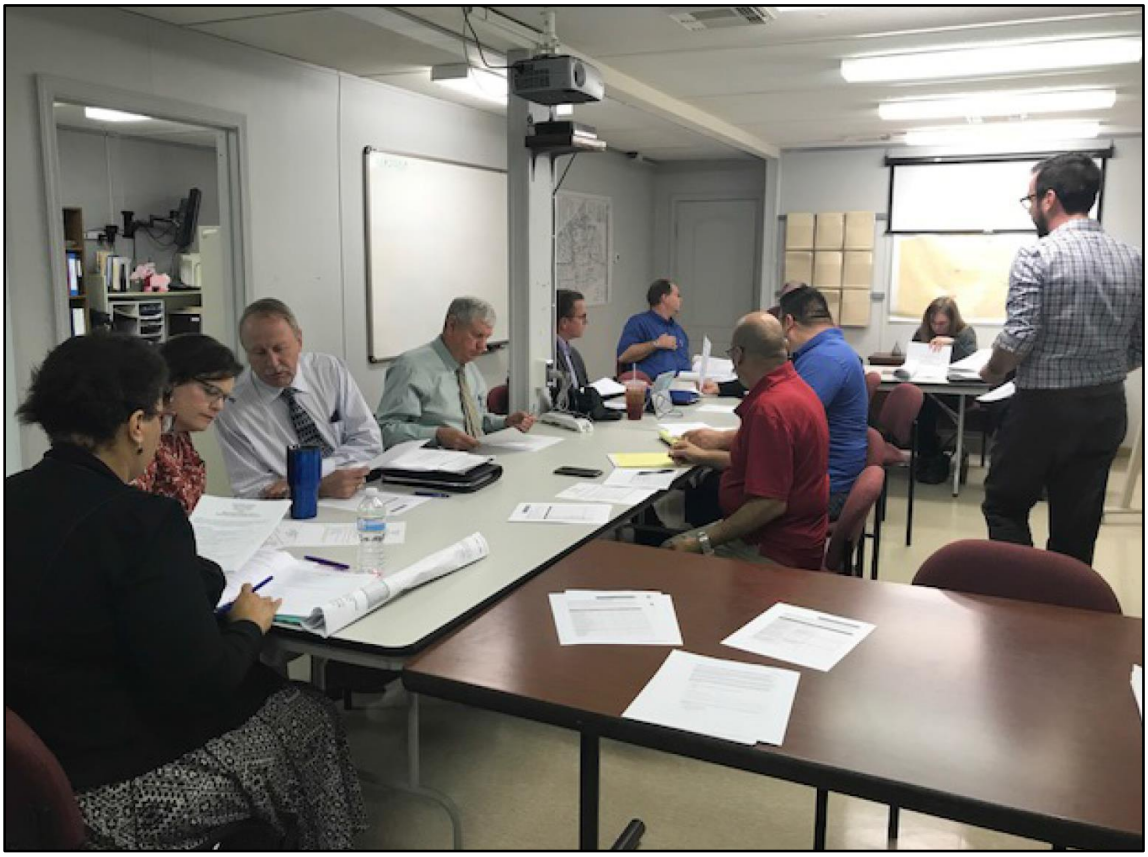
Public and Stakeholder Involvement

The hazard mitigation planning process is an opportunity for Karnes and Wilson 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. 5 Core Planning Team Meetings were held throughout the development of this plan with action items and “assignments” for each member.

Figure 1-3: 2nd Core Team Meeting, February 16, 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 such as judges and county commissioners, council members, police and fire chiefs, city administrators, building officials and others 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 1-4: 3rd Jurisdictional Sub-Team Meeting, October 24, 2018

The final stakeholder group was the local officials and public that came to the public workshops and participated in the on-line and public surveys. The first public workshop was held on May 7th, 2018 in Karnes County and May 31st, 2018 in Wilson County. The on-line and paper surveys were "live" from April 22nd, 2018 – June 7th, 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 1-5: 1st Public Meeting in Wilson County, May 31, 2018

The Citizen Participation Survey that was conducted was not only put out via the local newspaper, facebook, i-Info (local mass notification system), but it was also emailed to contacts in a massive email distribution lists, including but not limited to: churches/faith based organizations, daycares, nursing homes, schools, utility companies (water and electric), first responders, local contacts with TxDOT, ARC and DSHS, HOA's and developers/engineers/surveyors we work with on a regular basis. A list of stakeholders that was reached out to can be found in **Appendix E**.

Summary of Findings from the Survey:

1. 385 total surveys, 147 manually entered
2. Floresville represents a little over 50% of respondents and Unincorporated Wilson County represents a little over 25% of respondents.
3. Flooding was identified as highest threat at almost 25% of all responses, with wildfire and tornado threat next in the 10-12% range of responses, Drought and Hailstorm threat in the 7-9% range, and windstorm, extreme heat, Thunderstorm, and hazardous materials incident in the 4-6% range.
4. Lightning and severe winter storms become much more prominent responses in the hazards that had been experienced or hazards expected to be experienced.
5. Majority of responses not located in a floodplain, with more than 75% identified as not having flood insurance because they were not located in a floodplain.
6. Majority 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 but would like to know more about how to.
8. Text message or an "all of the above" strategy best way to alert public to an imminent disaster.
9. The mitigation activities that received above 50% were retrofit or strengthen essential facilities, replace inadequate or vulnerable bridges and roads, retrofit infrastructure, work on improving damage resistance of utilities. Those that received less than 25% were buyout flood prone properties, install or improve protective structures, or "none."
10. Hazard prevention through building regulations, natural resource protections, emergency services, and public education were all identified as very important.

SECTION 3: PLANNING AREA PROFILE

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

Karnes County

Karnes County is southeast of San Antonio in the Rio Grande plain region. It is bounded on the north by Wilson County, on the east by Gonzales and DeWitt counties, on the south by Goliad and Bee counties, and on the west by Atascosa and Live Oak counties. The county seat is Karnes City, which is fifty-two miles southeast of San Antonio. Other important communities include Kenedy, Runge, Panna Maria, Helena, Czestochowa, Pawelekville, Falls City, Hobson, Ecleto, Gillett, Coy City, and Lenz. The U.S. census estimates that 15,187 people live in Karnes County as of July 1, 2017, which is a 2.4% increase from population measured in the 2010 decennial census. The 2017 Census estimates for participating jurisdictions are: Karnes City (3,299), Kenedy (3,337), Runge (1,092), Falls City (654). The majority of the population lives in the unincorporated County. A unique feature about the population in Karnes County is that the weekday population is double the weekend population of 15,187 due to the influx of oil and gas workers to the area.

Figure 3-1: Map of Karnes County

Karnes County Map

Karnes 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 region is not new to the oil & gas industry, but the Eagle Ford drilling boom brought development levels not seen before. The county is prospective for shale oil, shale gas, and the gas-condensate or liquids-rich window of the Eagle Ford Shale formation. Karnes County drilling is focused in the central portion of the county that is prospective for wet gas and condensate and the northwest third of the county that is prospective for oil. The best shale oil wells have come online producing more than 1,000 bbls/d. This following information is provided by The University of Texas at San Antonio's (UTSA) Institute for Economic Development.[1]

- Quarterly Taxable Spending: $44,075,552 (2nd quarter 2012, an increase of 217% since 2009)
- Oil & Gas Employment: 6,092 jobs (2011)
- 10-Year Oil & Gas Employment Outlook: 14,899 jobs (2021)

Several major highways serve the county, including U.S. Highway 181, and State highways 72, 80, and 123. Karnes County covers 758 square miles of the Rio Grande plain region. The rolling to hilly land has an elevation range of 180 to 400 feet. Between 71 and 80 percent of the land in the county is considered prime farmland. The central and southern portions of the county are drained by the San Antonio River, the northern portion by Cibolo and Ecleto creeks.

Figure 3-2: Karnes County Courthouse (after restoration)

Source: Photo courtesy of Terry Jeanson, Oct. 2017

Population (July 1, 2017 estimate)	15,187
Change from 2010	+2.4%
Area (sq.mi.)	753.6
Altitude (ft.)	180–580
Rainfall (in.)	30.14
Jan. avg. min. (F⁰)	41.8
July avg. max. (F⁰)	95.1

Diversified farming of grain sorghum, corn, hay, and vegetables is a major industry. The growing season averages 280 days per year, with the last freeze in late February and the first freeze in early December. Livestock raising includes beef cattle, dairy cattle, and poultry and minerals include oil, gas, and uranium. Oil and

[1]https://eaglefordshale.com/counties/karnes-county-tx/

gas exploration, drilling, extraction, and transport have increased significantly in the Eagle Ford Shale region since the last AACOG HMAP update. Major tourist attractions are Kenedy's Bluebonnet Days in April, the church of Cestohowa, the church and museum at Panna Maria, and the courthouse museum complex at Old Helena.[2]

Wilson County

Wilson County is on the upper coastal plain of South Texas. The county seat and largest city is Floresville, which is thirty miles southeast of San Antonio. Four major highways serve the county, U.S. highways 87 and 181 and State highways 97 and 123. Wilson County covers 807 miles with an elevation of 300 to 600 feet above sea level. The U.S. census estimates that 49,304 people live in Wilson County as of July 1, 2017, which is a 14.5% increase from population measured in the 2010 decennial census. The 2017 Census estimates for participating jurisdictions are: Floresville (7,572), Poth (2,225), Stockdale (1,583), La Vernia (1,401). The majority of the population lives in the unincorporated County and much of the growth since the AACOG 2012 HMAP update has occurred in Northern Wilson County as the San Antonio urban area steadily marches toward this area of the county.

Figure 3-3: Wilson County Map

Wilson County Map

Wilson 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 terrain is nearly flat to gently undulating, surfaced by deep loamy soils with clayey subsoils that support grasses, mesquite, blackjack, post oak, live oak, thorny shrubs, and

[2] Handbook of Texas online

cacti. Between 31 and 40 percent of the land in the county is considered prime farmland. The western portion of the county is drained by the San Antonio River, the eastern portion by Cibolo and Ecleto creeks. The climate is subtropical subhumid, with mild winters and warm summers. Temperatures in January range from an average low of 40° to an average high of 65° F and in July range from 74° to 96° F. The growing season averages 280 days per year, with the last freeze in February and the first freeze in early December.

Wilson County was established by an act of the legislature on February 13, 1860. It was cut from Bexar and Karnes counties and named for Somervell expedition member and legislator, James C. Wilson. Sutherland Springs was designated the county seat and after a short period of controversy, an election was finally held in November 1873 to determine the location of county government. The new town of Floresville was selected as the new county seat, near the geographic center of the county. Floresville holds an annual Pony Express Ride, and hosts Heritage Days in the spring.

Figure 3-4: Wilson County Courthouse

Source: Photo courtesy of Larry D. Moore

Population (July 1, 2017 estimate)	49,304
Change from 2010	+14.9%
Area (sq.mi.)	808.4
Altitude (ft.)	300–804
Rainfall (in.)	29.07
Jan. avg. min. (F°)	37.2
July avg. max. (F°)	95.5

Crops include peanuts, hay, sorghum, oats, wheat, corn, watermelons, peaches, and pecans. Leading industries included agribusiness, oil and gas field services, and the manufacture of structural clay products and fabricated metal plate work. In 2002 the county had 2,157 farms and ranches covering 446,157 acres, 44 percent of which were devoted to pasture and 44 percent to crops. That year farmers and ranchers in the area earned $42,707,000; crop sales accounted for $35,109,000 of the total. Cattle, dairy products, hogs, poultry, peanuts, sorghum, corn, vegetables, watermelons, and fruit were the chief agricultural products.

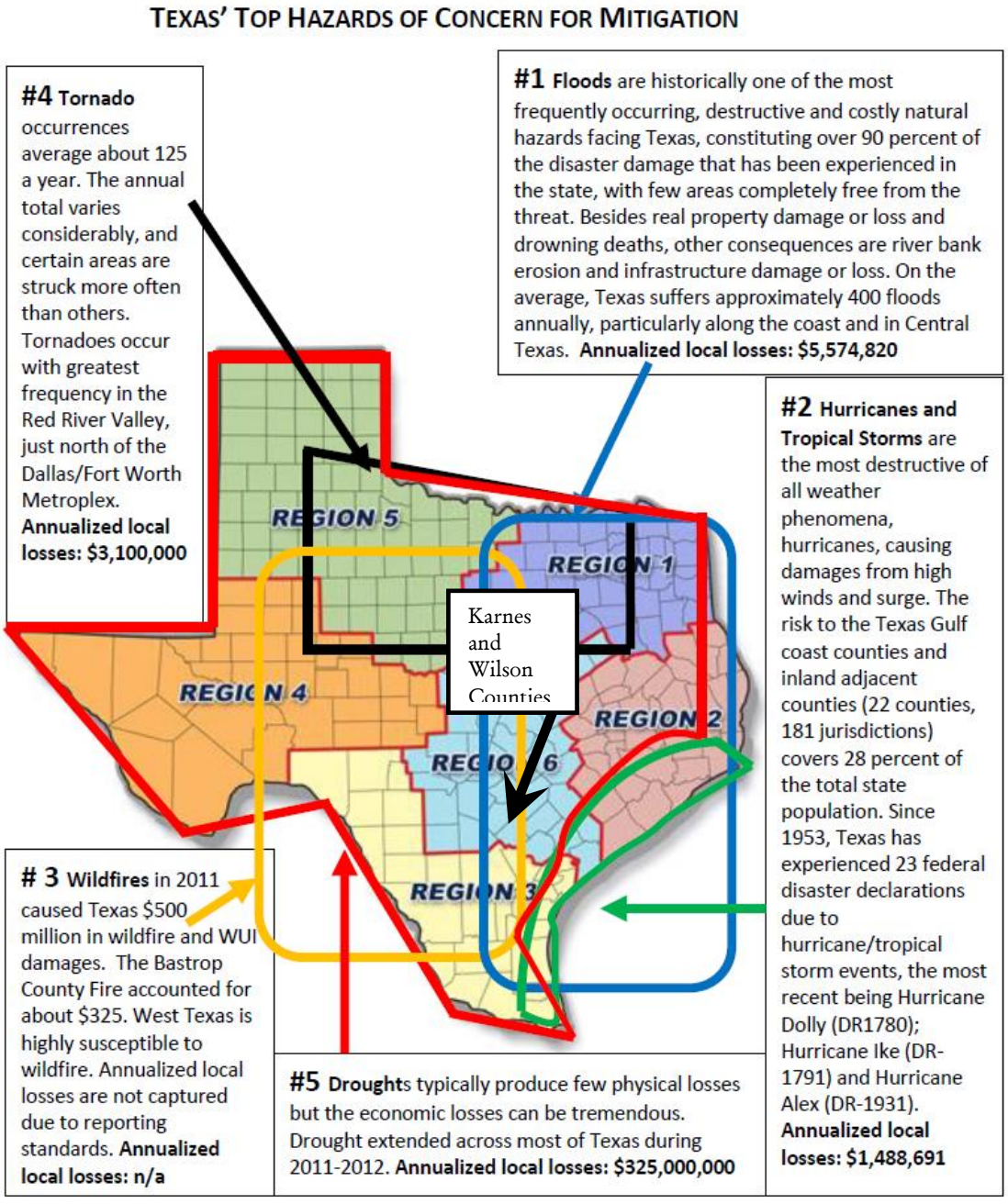
Critical Facilities and Assets

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 18 and a summary of critical facilities is provided in **Appendix D**.

SECTION 4: HAZARDS AND RISK

According to the State Hazard Mitigation Plan the Karnes County and Wilson 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 Karnes and Wilson Counties planning area within a portion of Region 6 that is at increased risk for #1_flood, #3_wildfire, and #5_drought hazards shown as the blue, yellow, 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

Disaster Number	Year	County	Declaration Date	Disaster Type	Incident Type	Title	Incident Begin Date	Incident End Date
232	1967	Karnes	9/28/1967	DR	Hurricane	HURRICANE BEULAH	9/28/1967	9/28/1967
3113	1993	Karnes and Wilson	9/10/1993	EM	Drought	EXTREME FIRE HAZARD	8/30/1993	11/15/1993
1239	1998	Karnes and Wilson	8/26/1998	DR	Severe Storm	TROPICAL STORM CHARLEY	8/22/1998	8/31/1998
1257	1998	Karnes and Wilson	10/21/1998	DR	Flood	TX-FLOODING 10/18/98	10/17/1998	11/15/1998
3142	1999	Wilson	9/1/1999	EM	Fire	EXTREME FIRE HAZARDS	8/1/1999	12/10/1999
1425	2002	Karnes and Wilson	7/4/2002	DR	Flood	SEVERE STORMS AND FLOODING	6/29/2002	7/31/2002
1479	2003	Karnes	7/17/2003	DR	Hurricane	HURRICANE CLAUDETTE	7/15/2003	7/28/2003
1606	2005	Karnes	9/24/2005	DR	Hurricane	HURRICANE RITA	9/23/2005	10/14/2005
3216	2005	Karnes and Wilson	9/2/2005	EM	Hurricane	HURRICANE KATRINA EVACUATION	8/29/2005	10/1/2005
3261	2005	Karnes and Wilson	9/21/2005	EM	Hurricane	HURRICANE RITA	9/20/2005	10/14/2005
1606	2005	Wilson	9/24/2005	DR	Hurricane	HURRICANE RITA	9/23/2005	10/14/2005
1624	2006	Karnes and Wilson	1/11/2006	DR	Fire	EXTREME WILDFIRE THREAT	11/27/2005	5/14/2006
3284	2008	Karnes and Wilson	3/14/2008	EM	Fire	WILDFIRES	3/14/2008	9/1/2008
3313	2010	Wilson	6/29/2010	EM	Hurricane	TROPICAL STORM ALEX	6/27/2010	8/14/2010
4223	2015	Wilson	5/29/2015	DR	Severe Storm	SEVERE STORMS, TORNADOES, STRAIGHT-LINE WINDS AND FLOODING	5/4/2015	6/22/2015
4245	2015	Wilson	11/25/2015	DR	Severe Storm	SEVERE STORMS, TORNADOES, STRAIGHT-LINE WINDS, AND FLOODING	10/22/2015	10/31/2015
4332	2017	Karnes	8/25/2017	DR	Hurricane	HURRICANE HARVEY	8/23/2017	9/15/2017

Source: www.FEMA.gov

Since the US Federal Government began issuing disaster declarations in 1954 the Karnes and Wilson County area has had 17 disasters where individual and/or public assistance

has been approved. Based on Table 4-1 below, 15 of the 17 disaster declarations have been issued in the past 20 years, since 1998.

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. However, the earthquake and hazardous materials incident hazards 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 (Karnes), and 4-4 (Wilson) below compare crop, building, injury, and fatality impacts due to hazard events from 1996-2016 for the State of Texas, Karnes County, and Wilson 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: Karnes County Hazard Impact Summary

	Prop. Losses (2016 dollars)	Crop Losses (2016 dollars)	Deaths	Injuries
HURRICANE TS/D	$2,603,261	$650,815		
DROUGHT				
HAIL	$41,725	$69,541		
S. COASTAL FLOOD*				
RIVERINE FLOODING	$5,871,748	$744,052		170
TORNADO	$162,281	$40,570		
SEVERE WINDS	$226,300			
WILDFIRE*				
WINTER WEATHER				
LIGHTNING				
COLD				
HEAT				
TOTAL	**$8,905,315**	**$1,504,978**		**170**

Karnes County Historical Impact Percents

	% of Prop. $-Losses	% of Crop $-Losses	% of Deaths	% of Injuries
HURRICANE TS/D	29.2%	43.2%		
DROUGHT				
HAIL	0.5%	4.6%		
S. COASTAL FLOOD*				
RIVERINE FLOODING	65.9%	49.4%		100.0%
TORNADO	1.8%	2.7%		
SEVERE WINDS	2.5%			
WILDFIRE*				
WINTER WEATHER				
LIGHTNING				
COLD				
HEAT				
TOTAL	**100%**	**100%**		**100%**

* 12-year Base Period

Source: Texas Geographic Society, Champs 2018

Table 4-4: Wilson County Hazard Impact Summary

	Prop. Losses (2016 dollars)	Crop Losses (2016 dollars)	Deaths	Injuries
HURRICANE TS/D	$65,082	$65,082		
DROUGHT				
HAIL	$736,843	$365,133		10
S. COASTAL FLOOD*				
RIVERINE FLOODING	$129,469,504	$413,772		257
TORNADO	$1,688,100			
SEVERE WINDS	$1,388,330	$133,130		
WILDFIRE*				
WINTER WEATHER				
LIGHTNING	$100,000			
COLD				
HEAT				
TOTAL	$133,447,859	$977,117		267
Wilson County Historical Impact Percents				
	% of Prop. $-Losses	% of Crop $-Losses	% of Deaths	% of Injuries
HURRICANE TS/D	0.0%	6.7%		
DROUGHT				
HAIL	0.6%	37.4%		3.7%
S. COASTAL FLOOD*				
RIVERINE FLOODING	97.0%	42.3%		96.3%
TORNADO	1.3%			
SEVERE WINDS	1.0%	13.6%		
WILDFIRE*				
WINTER WEATHER				
LIGHTNING	0.1%			
COLD				
HEAT				
TOTAL	100%	100%		100%

* 12-year Base Period

Source: Texas Geographic Society, Champs 2018

These historic impact summaries that look at the last 21-year span of hazard data show just how similar the hazard profile is for Karnes County and Wilson County. In Karnes County, 96% of total impacts have been due to hurricanes and flooding while in Wilson County 97% of impacts have been due to flooding. The priority hazards for these communities to protect people and property from, based on the historical impact summary analysis, are Hurricanes and Flooding. This is followed by Tornadoes and Severe Winds and then Hail and Lightning. All other hazards included in this present a lower mitigation priority based on the historical severity of impact. The Earthquake 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.

"New development is being concentrated in the northwestern unincorporated Wilson County with lower development standards and inaccessible to city services. This inability to get in front of growth with higher development standards and land use planning will contribute to legacy flooding and infrastructure issues if left unabated."

"Karnes County has a weekday population approximately 35,000 people and a weekend population of approximately 15,000 full-time residents due to substantial oil and gas activity in the area. This population is highly transient and dispersed throughout the county. This population would be difficult to the serve and account for in the event of an emergency."

"The amount of traffic carrying hazardous materials, more specifically "drilling mud", presents the possibility of soil, surface water and ground water contamination. Furthermore, the increase of injection wells in the county corresponds to the increase in earthquake activity which has been shown in other areas of the country to be correlated. This area does not have a high prevalence of historic earthquake activity but data points to it being a more likely occurrence in the future."

"The larger issues of climate change and rapid population growth in San Antonio are forecasted to cause the hazards of drought and flooding to be more severe and extensive in the future. Climate change issues are not ones that the communities of Karnes and Wilson Counties have particular control over, but awareness of the threat will allow for greater understanding and mitigation of the hazard."

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 Karnes and Wilson 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 14: Severe Thunderstorm Hazards.

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. Karnes is more proximal to the coast than Wilson with its southeastern border less than 70 miles away from the Gulf of Mexico. 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.

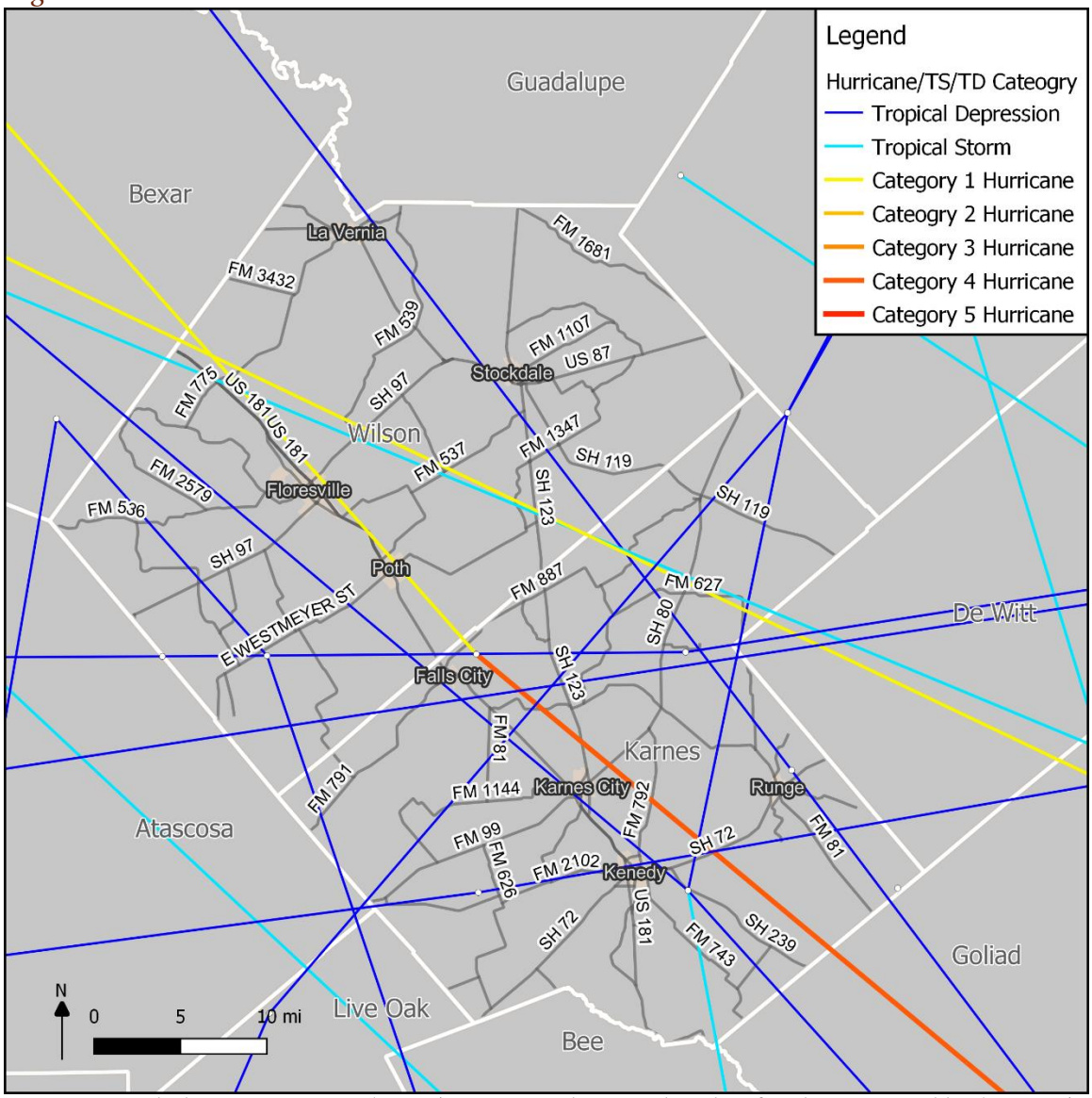
Table 5-1: Hurricane/TS/D Storm Track Events Table

Storm Name	Year	Dates	Category
UNNAMED	1881	Aug 11-14	Tropical Storm (TS)
UNNAMED	1886	Aug 12-21	Hurricane: Category 4 (H4)
UNNAMED (Karnes Only)	1912	Oct 11-18	Hurricane: Category 2 (H2)
UNNAMED	1929	Jun 27-30	Hurricane: Category 1 (H1)
UNNAMED	1942	Aug 23 - Sep 1	Hurricane: Category 3 (H3)
UNNAMED	1960	Jun 22-28	Tropical Storm (TS)
ABBY (Karnes Only)	1964	Aug 5-8	Tropical Storm (TS)
DANIELLE	1980	Sep 4-7	Tropical Storm (TS)
FAY	2002	Sep 5-11	Tropical Storm (TS)
ERIN	2007	Aug 15-19	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 Karnes or Wilson. This can be clearly seen with the storm track of the 1886 unnamed hurricane that went from a Category 4 to a Category 1 upon crossing from Karnes into Wilson County. Based on data provided by NOAA's National Climatic Data Center (NCDC), Karnes and Wilson 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: Hurricane/TS/D Storm Tracks



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

Extent

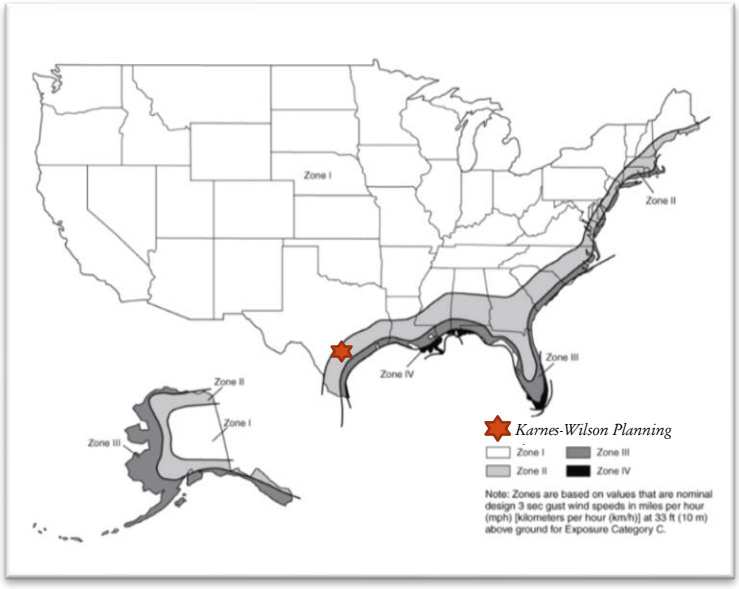
For Hurricanes extent can be expressed separately for flood, wind, and surge. Flooding will be examined in the next section and surge is not an issue for Wilson or Karnes Counties since they are located at least 70 miles from the coast. For hurricane wind extent, the Saffir-Simpson Hurricane Wind Scale (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, Karnes and Wilson 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 Karnes-Wilson planning area, the extent to be mitigated for is a Category 1 hurricane.

Figure 5-2: FEMA Wind Zone Map (www.FEMA.gov)



Historical Occurrences

Hurricanes and Tropical Storms that had a direct path through the Karnes-Wilson County planning area as well as tracks that went through adjacent counties yet still impacted the Karnes-Wilson planning area are identified in this section. Based on historical storm events by impact data provided by NOAA's National Climatic Data Center (NCDC), Karnes and Wilson 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 1960 through 2017.

Table 5-3: Historical Hurricane/TS/D Impact Events Table, 1960-2017

County	Year	Crop Damage (ADJ 2016)	Property Damage (ADJ 2016)	Injuries	Fatalities
KARNES	1961	$2,063,893	$2,063,893	2.015	0.135
	1963	$99,826	$998,257	0	0
	1967	$4,064,758	$8,129,515	0.32	0.09
	1968	$615,984	$6,159,841	0.65	0.23
	1970	$425,559	$4,143,605	6.3	0.15
	1971	$499,875	$499,875	0.05	0
	1980	$1,577,497	$15,774,974	0.07	0.01
	1988	$1,844	$184,438	0.18	0.02
	2003	$664,058	$2,656,231	0	0
	2017	$0	$0	0	0
WILSON	1961	$2,063,893	$2,063,893	2.015	0.135
	1963	$99,826	$998,257	0	0
	1967	$4,064,758	$8,129,515	0.32	0.09
	1968	$615,984	$6,159,841	0.65	0.23

	1970	$425,559	$4,143,605	6.3	0.15
	1971	$499,875	$499,875	0.05	0
	1980	$1,577,497	$15,774,974	0.07	0.01
	1988	$1,844	$184,438	0.18	0.02
	2003	$66,406	$66,406	0	0
	2017	$0	$0	0	0

***Source**: Hazards and Vulnerability Research Institute [SHELDUS dataset v.16.0], Arizona State University.*

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.

Hurricane Claudette produced widespread damage in Karnes County, knocking over hundreds of trees and power poles. Major damage was reported to 14 homes, along with minor damage to another 237. Nearly every home in Kenedy reported some type of damage. Most of the damage was caused to roofs by a combination of high winds and falling trees. An unofficial weather station at a manufacturing plant in Kenedy recorded a peak wind gust of 106 mph. However, the wind instrument was blown over to the side prior to the recorded gust, making the report of uncertain reliability. The storm knocked over several dozen power poles and hundreds of people were without power for a period of several days. The cost to repair electric services was estimated at $400,000. In Wilson County, Emergency Management personnel reported scores of trees knocked down, along with hundreds of tree limbs. Minor damage was also reported to one barn. A cow was killed in Poth when it was struck by a power pole that had been knocked down. Around 1000 people lost power for several hours.

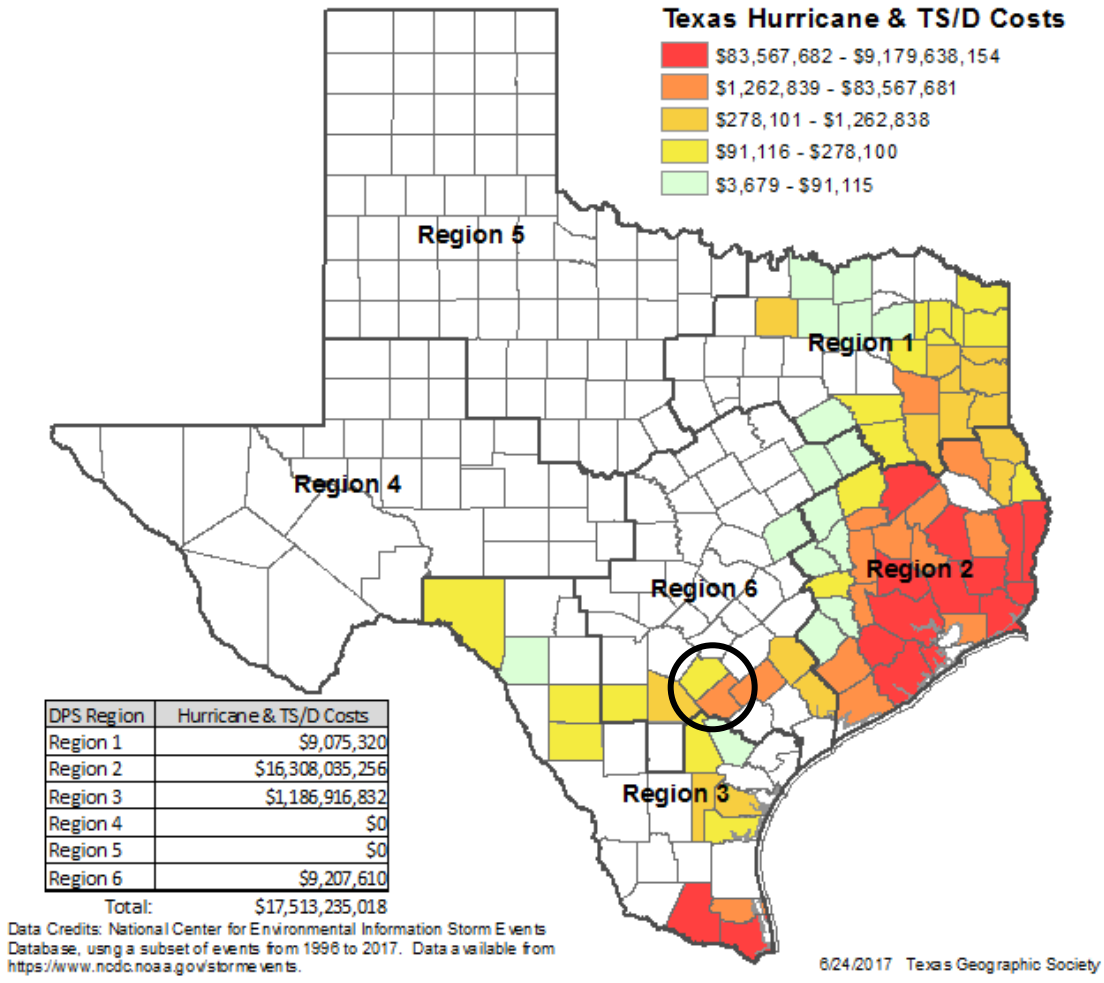
Hurricane Harvey - August 26, 2017

Hurricane Harvey moved onshore as a Category 4 hurricane over San Jose Island east of Rockport during the late evening of August 25th. Harvey moved inland entering southern DeWitt County during the morning of August 26th as a Category 1 hurricane. It continued to weaken as it moved farther inland eventually reaching south central Gonzales County as a tropical storm during the late evening of August 26th. The center of the storm made a loop through Gonzales, Karnes, and DeWitt Counties before exiting the County Warning Area during the afternoon of August 27th moving into Victoria County.

Across Karnes County, sustained tropical storm force winds brought some minor tree and branch damage but overall impact of the storm was limited to the far eastern sections of the County. Rainfall across the county averaged 3-6 inches with stream gauges peaking on August 28th and August 29th throughout the planning area. The impacts

reported to the NCEI for Hurricane Harvey are currently $0 in damage and 0 injuries or fatalities but these figures are subject to change. Winds of 30 to 40 mph were persistent across the planning area while rainfall totals averaged near 8 inches near Stockdale to only a few inches to the southwest side of the County. Few overall problems were observed across Wilson County.

Figure 5-3: 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, using 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 57-year reporting period. Based on 11 occurrences of hurricanes or tropical storms in the planning area during this time, it is forecast that such a storm event will happen approximately once every 5 years. This frequency provides an occasional 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 Karnes and Wilson 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.

Table 5-4: Karnes County Hurricane Impacts by Year

Karnes County Impacts from Hurricane TS/D					
	Property $-Losses	Crop $-Losses	Deaths	Injuries	Total $-Losses
1996					
1997					
1998					
1999					
2000					
2001					
2002					
2003	$2,603,261	$650,815			$3,254,076
2004					
2005					
2006					
2007					
2008					
2009					
2010					
2011					
2012					
2013					
2014					
2015					
2016					
Loss Summary					
21-yr Total	$2,603,261	$650,815			$3,254,074
Per Year	$123,965	$30,991			$154,956
Per Capita Dollar Losses (2010 Pop)					
21-yr Total	$176	$44			$220
Per Year	$8	$2			$10

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

Table 5-5: Wilson County Hurricane Impacts by Year

Wilson County Impacts from Hurricane TS/D					
	Property $-Losses	Crop $-Losses	Deaths	Injuries	Total $-Losses
1996					
1997					
1998					
1999					
2000					
2001					
2002					
2003	$65,082	$65,082			$130,164
2004					
2005					
2006					
2007					
2008					
2009					
2010					
2011					
2012					
2013					
2014					
2015					
2016					
Loss Summary					
21-yr Total	$65,082	$65,082			$130,164
Per Year	$3,099	$3,099			$6,198
Per Capita Dollar Losses (2010 Pop)					
21-yr Total	$2	$2			$3
Per Year	$0	$0			$0

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

Table 5-6: Karnes County Hurricane Forecast Impacts

Karnes Co. Forecast Impacts for Hurricane TS/D					
	Property $-Losses	Crop $-Losses	Deaths	Injuries	Total $-Losses
2019	$151,193	$36,873			$188,066
2020	$154,581	$37,390			$191,971
2021	$158,045	$37,913			$195,958
2022	$161,587	$38,444			$200,030
2023	$165,207	$38,982			$204,189
Forecast Loss Summary					
5-yr Total	$790,613	$189,602			$980,215

Per Year	$158,123	$37,920			$196,043
Per Capita Dollar Loss Forecast (2010 Pop)					
5-yr Total	$53.33	$12.79			$66.12
Per Year	$10.67	$2.56			$13.22

Source: Texas Geographic Society, Champs 2018

Table 5-7: Wilson County Hurricane Forecast Impacts

Wilson Co. Forecast Impacts for Hurricane TS/D					
	Property $-Losses	**Crop $-Losses**	**Deaths**	**Injuries**	**Total $-Losses**
2019	$3,944	$3,687			$7,632
2020	$4,090	$3,739			$7,829
2021	$4,242	$3,791			$8,033
2022	$4,399	$3,844			$8,243
2023	$4,562	$3,898			$8,460
Forecast Loss Summary					
5-yr Total	$21,236	$189,960			$40,197
Per Year	$4,247	$3,792			$8,039
Per Capita Dollar Loss Forecast (2010 Pop)					
5-yr Total	$0.49	$0.44			$0.94
Per Year	$0.10	$0.09			$0.19

Source: Texas Geographic Society, Champs 2018

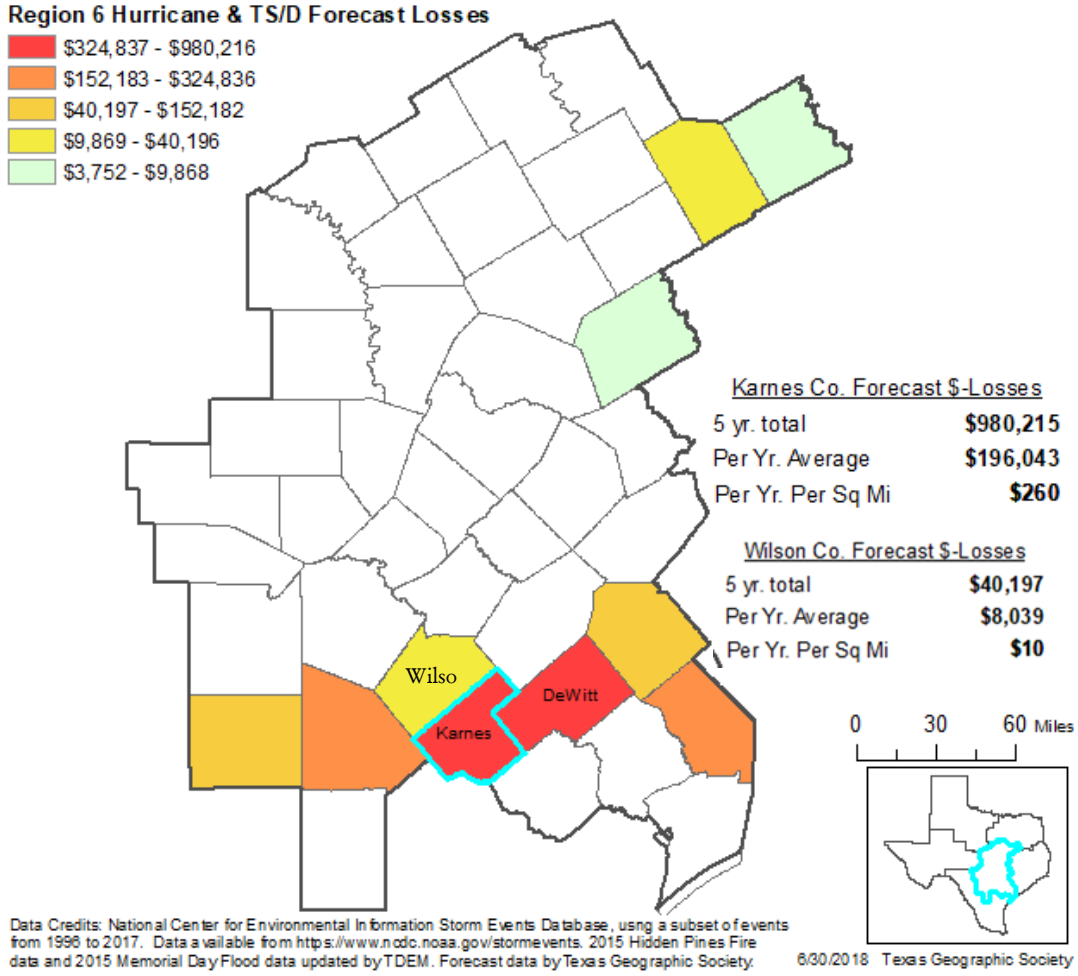
Table 5-9 below distributes the countywide impacts presented previously in tables 5-4 and 5-5 amongst the various participating jurisdictions based on ratios of population and total area.

Table 5-8: Hurricane Losses by Jurisdiction 1996-2017

Jurisdiction	**Est. Prop. Losses (2016 dollars)**	**Est. Crop Losses (2016 dollars)**	**Total Est $-Losses**
Karnes City	**$534,209**	**$1,813**	**$536,022**
Kenedy	**$578,815**	**$3,142**	**$581,957**
Falls City	**$107,298**	**$785**	**$108,084**
Runge	**$181,055**	**$1,053**	**$182,108**
Floresville	**$9,778**	**$459**	**$10,237**
La Vernia	**$1,568**	**$193**	**$1,761**
Stockdale	**$2,187**	**$137**	**$2,324**
Poth	**$2,893**	**$258**	**$3,151**

Source: Texas Geographic Society, Champs 2018

Figure 5-4: Karnes and Wilson Counties Hurricane Dollar Loss Forecast



The Karnes and Wilson 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 2016 American Community Survey estimates, there are 16,979 housing units in Wilson County of which 25.7%, or 4,370 units, are mobile homes. There are 5,809 housing units in Karnes County of which 14.6%, or 847 units, are mobile homes. In addition, 35.7% (approximately 8,129 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
City of Karnes	1,088	174 (16.0%)	759 (69.8%)
City of Kenedy	1,350	68 (0.1%)	1,017 (75.3%)
City of Falls City	325	90 (27.7%)	193 (59.4%)
City of Runge	487	74 (15.2%)	388 (79.7%)
Karnes County*	**5,809**	**847 (14.6%)**	**3,664 (63.1%)**
City of Floresville	2,753	469 (17.0%)	1,269 (46.1%)
City of La Vernia	441	63 (14.3%)	169 (38.3%)
City of Poth	696	103 (14.8%)	371 (53.3%)
City of Stockdale	528	117 (22.2%)	296 (56.1%)
Wilson County*	**16,979**	**4,370 (25.7%)**	**4,465 (26.3%)**
Planning Area Totals	*22,788*	*5,217 (22.9%)*	*8,129 (35.7%)*

*County totals include all jurisdictions in addition to unincorporated areas.
Source: 2012-2016 American Community Survey 5-year estimate, selected housing characteristics

Based on the ACS 2016 data, Karnes 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. Wilson 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 into 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 Karnes and Wilson 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 Karnes and Wilson Counties, and all participating jurisdictions, are illustrated in Figures 6-1 to 6-5.

Figure 6-1: Wilson County Floodplain Map (with La Vernia ISD)

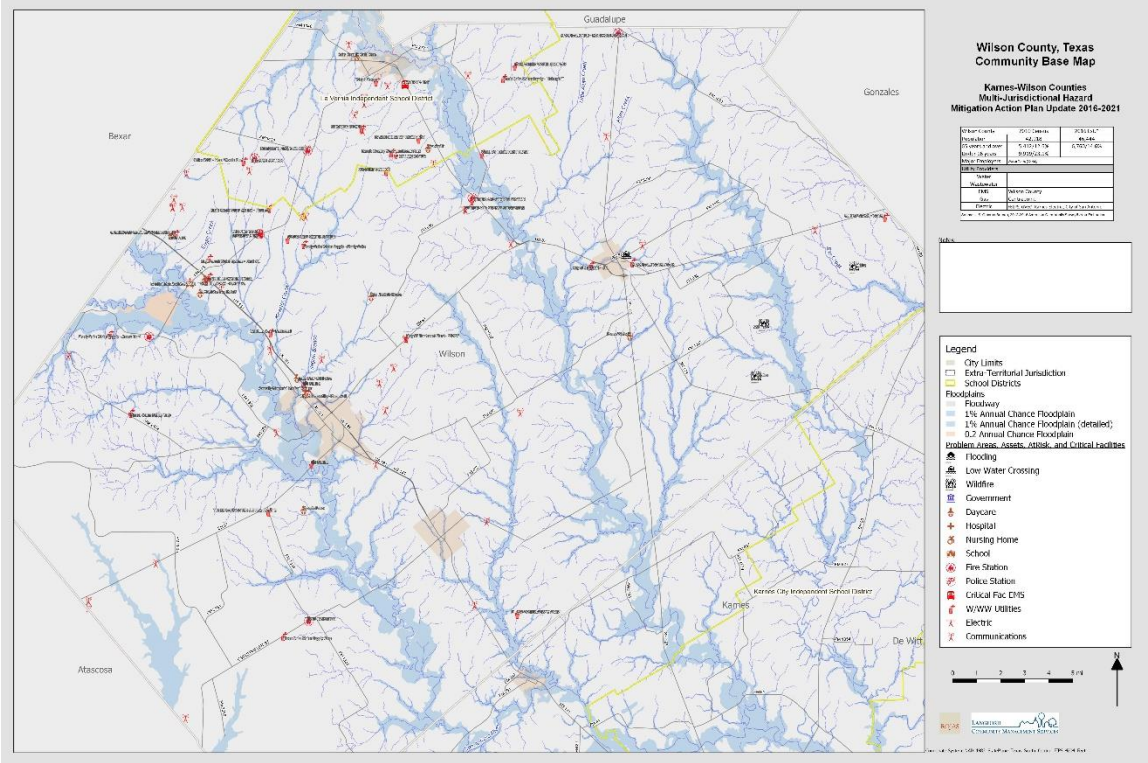


Figure 6-2: City of Floresville Floodplain Map

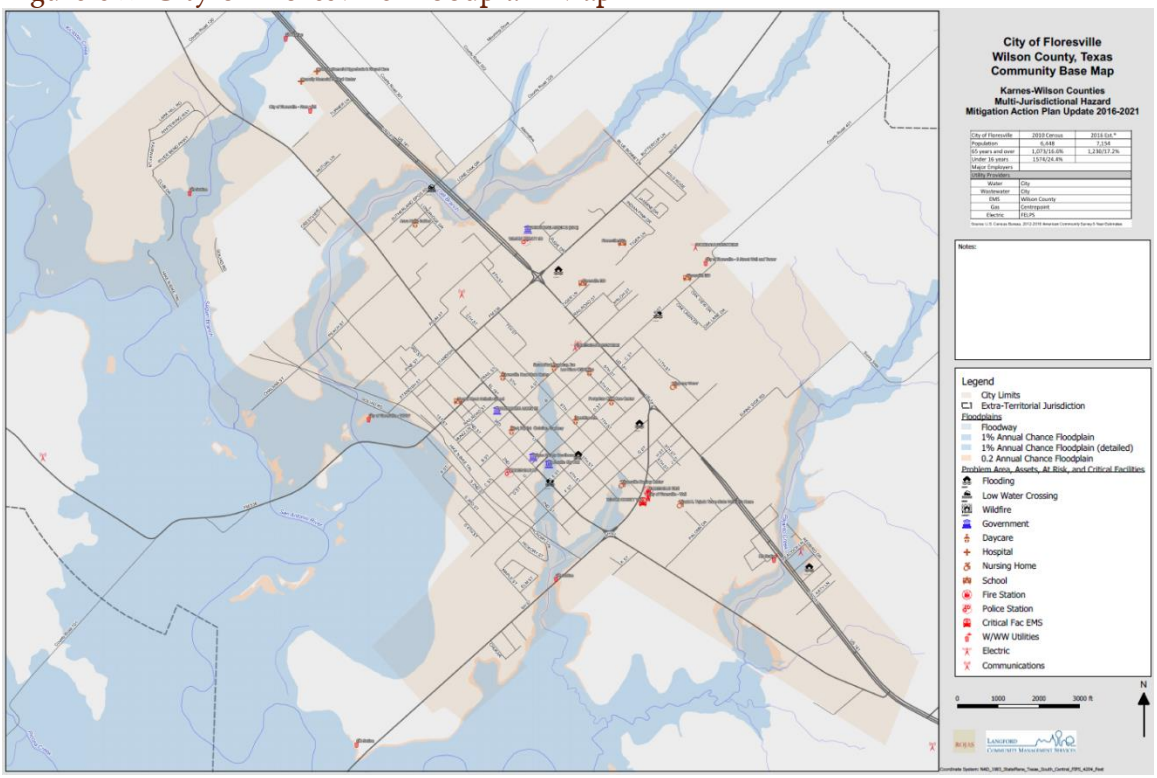


Figure 6-3: City of La Vernia Floodplain Map

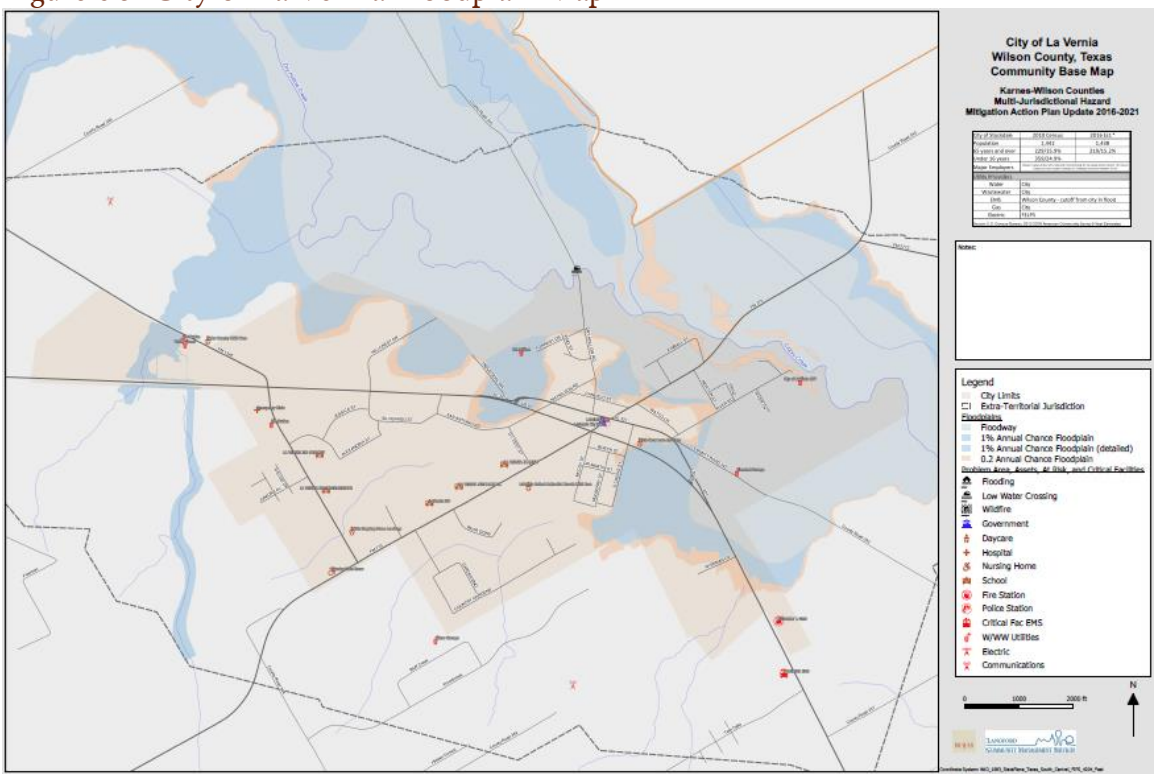


Figure 6-4: City of Poth Floodplain Map

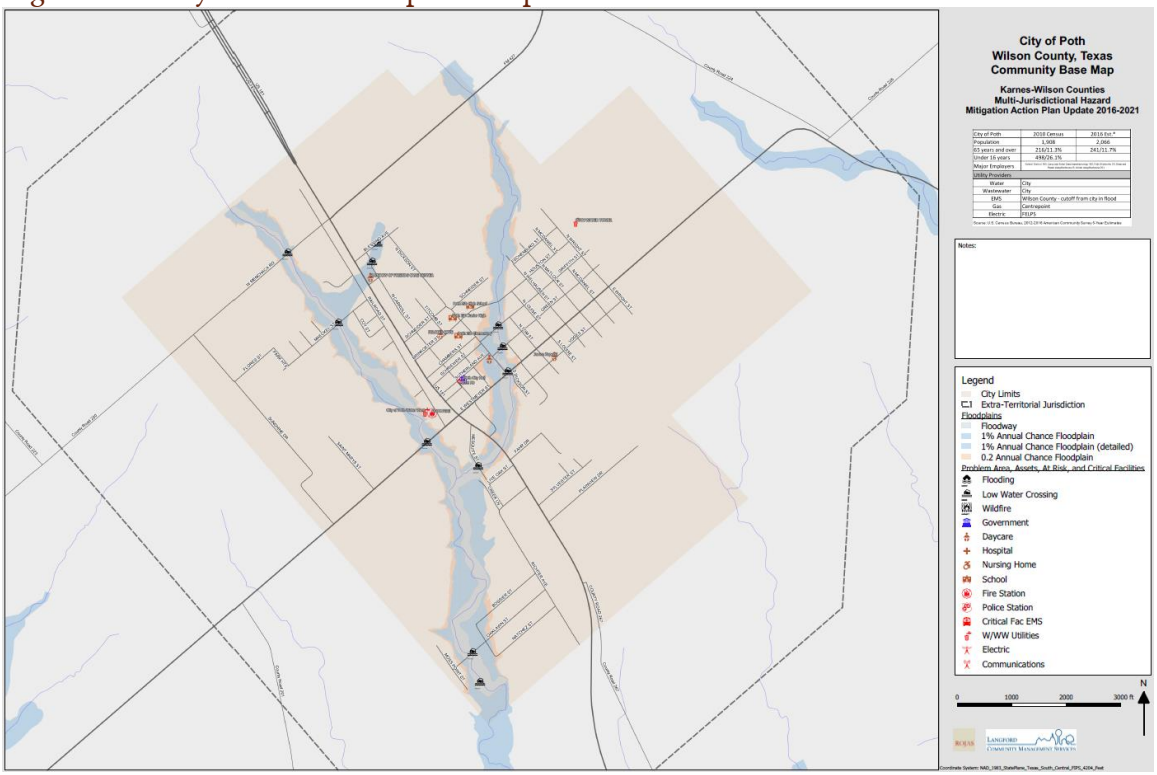


Figure 6-5: City of Stockdale Floodplain Map

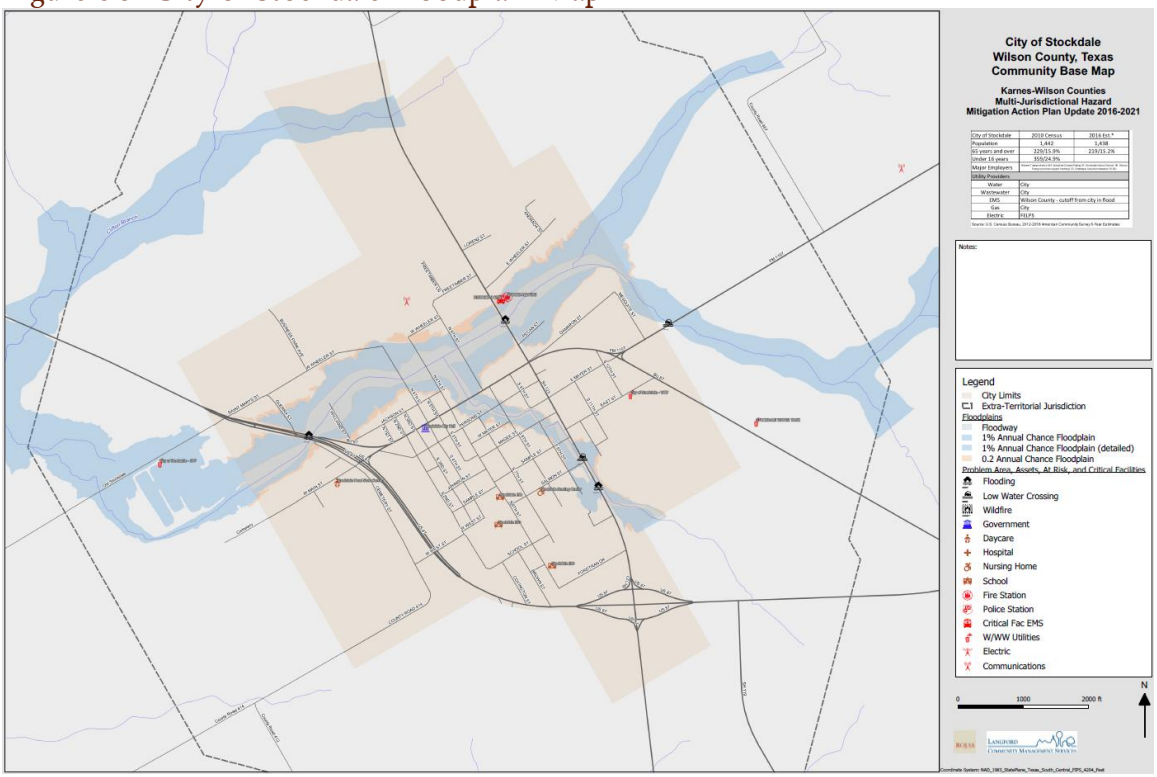


Figure 6-6: Karnes County Floodplain Map (with Karnes City ISD)

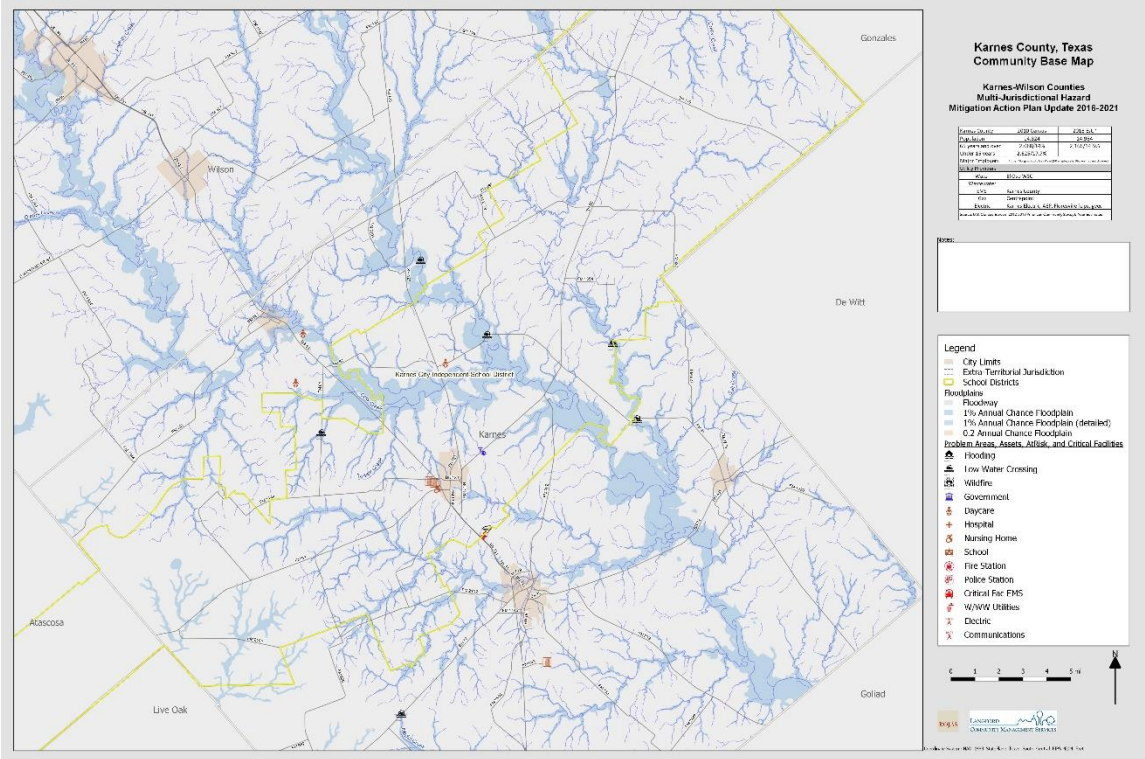


Figure 6-7: City of Falls City Floodplain Map

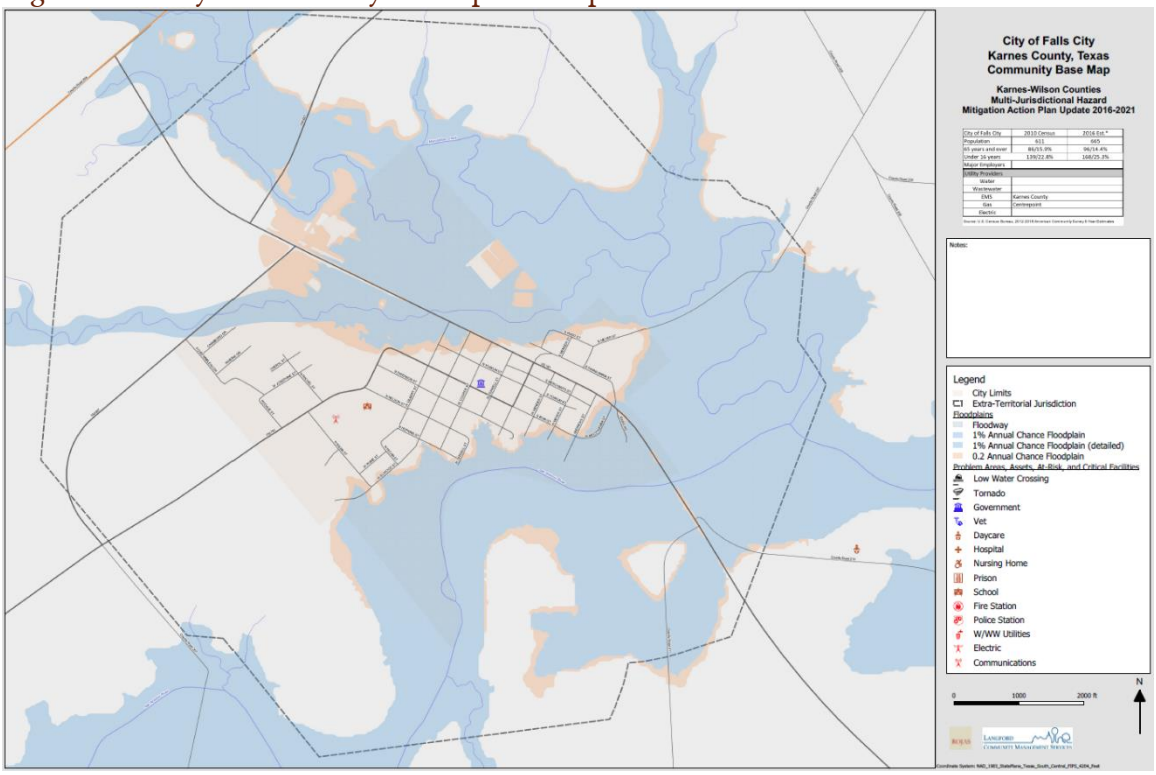


Figure 6-8: City of Karnes City Floodplain Map

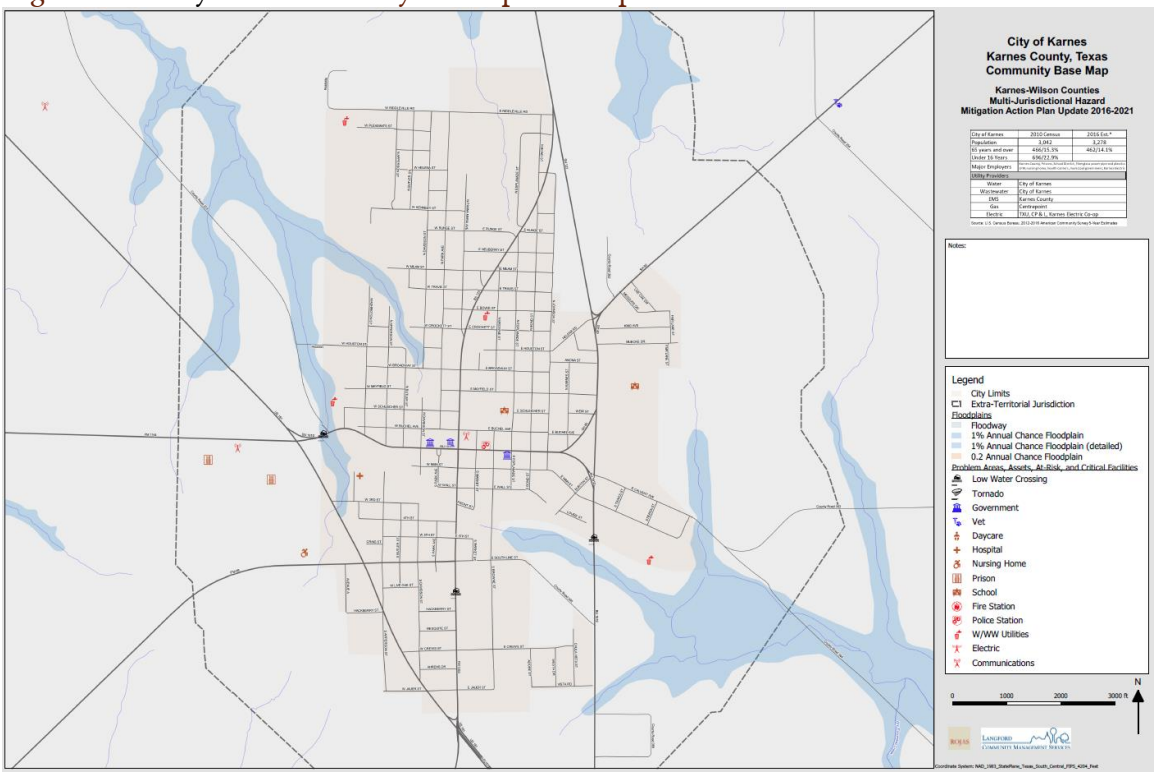


Figure 6-9: City of Kenedy Floodplain Map

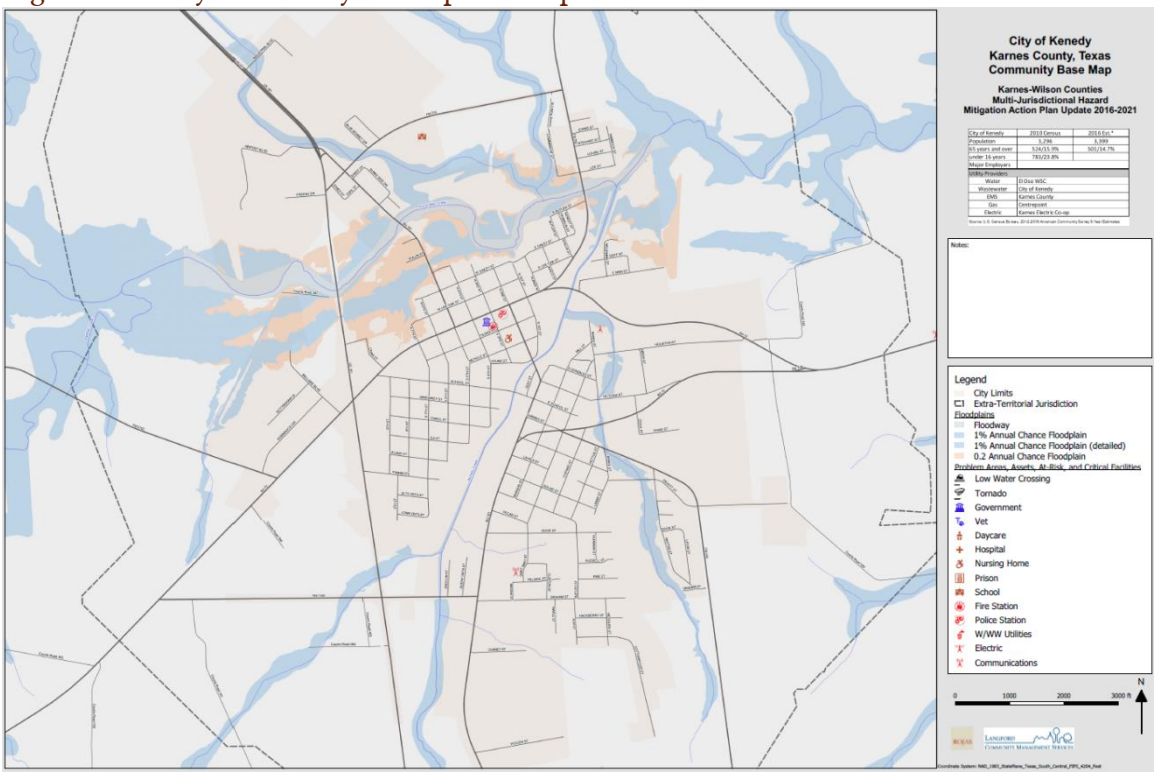
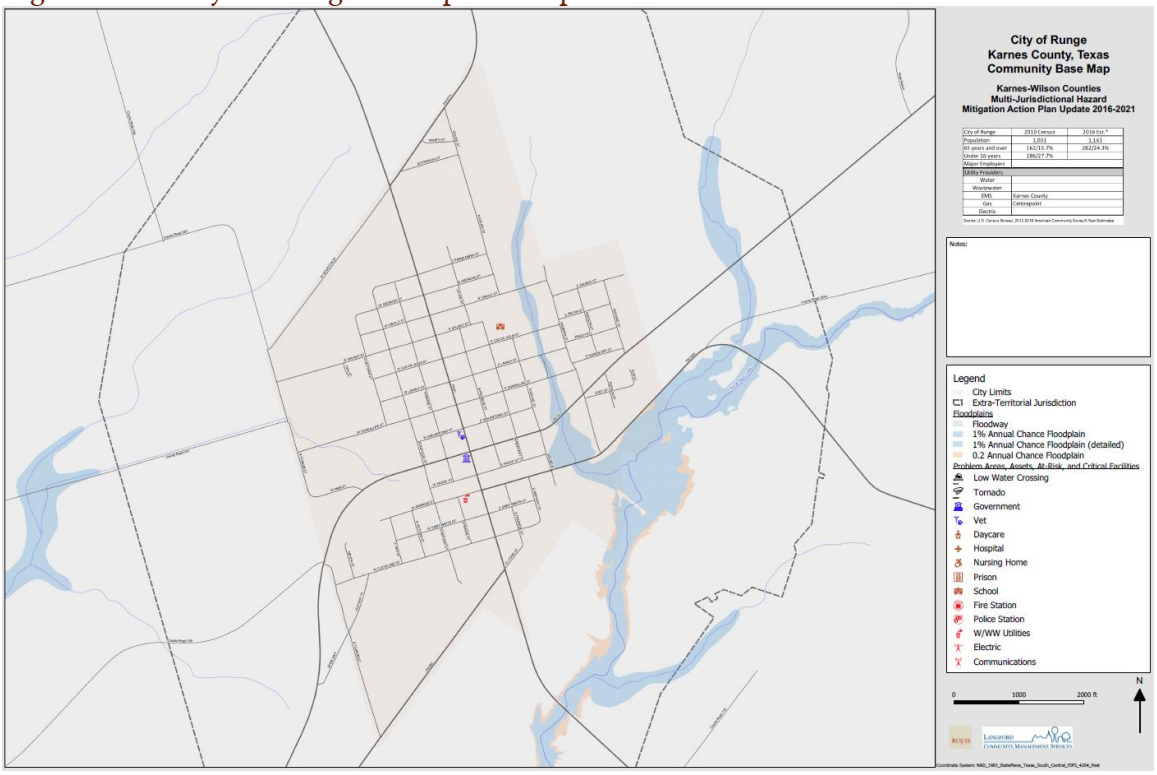


Figure 6-10: City of Runge Floodplain Map



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

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 Karnes and Wilson Counties.

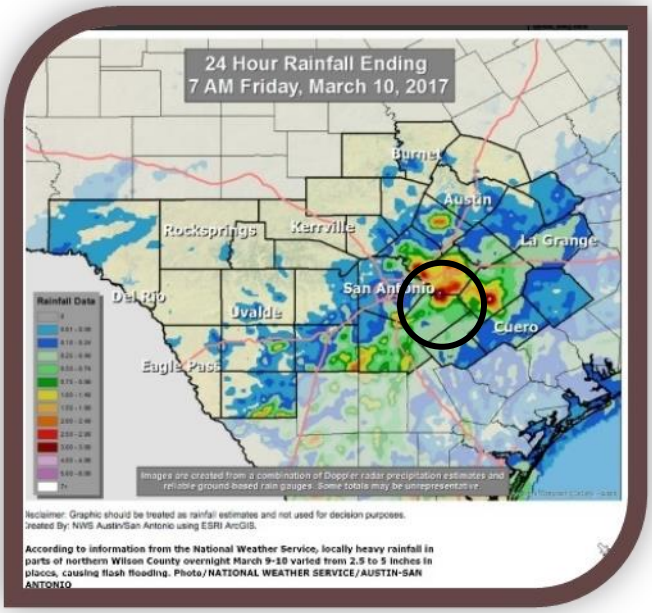


Table 6-2: Historical Flood Events

County	Location	Year	Direct Injuries	Direct Fatalities	Property Damage (adj2016)	Crop Damage (adj2016)	Total Losses
Karnes	NORTHEASTERN PORTION	1996	0	0	$15,264		$15,264
Karnes	COUNTYWIDE	1997	0	0	$44,766		$44,766
Karnes	COUNTYWIDE	1997	0	0	$29,844		$29,844
Karnes	COUNTYWIDE	1997	0	0	$74,611		$74,611
Karnes	COUNTYWIDE	1997	0	0	$7,461		$7,461
Karnes	COUNTYWIDE	1997	0	0	$4,477		$4,477
Karnes	COUNTYWIDE	1998	0	0	$29,387	$44,080	$73,467
Karnes	COUNTYWIDE	1998	0	0	$4,408	$7,347	$11,755
Karnes		1998	50	0	$4,407,975	$73,466	$4,481,441
Karnes	COUNTYWIDE	1998	50	0	$146,933	$146,933	$293,866
Karnes	COUNTYWIDE	1998	70	0	$293,865	$293,865	$587,730
Karnes	COUNTYWIDE	1999	0	0	$14,376		$14,376
Karnes	COUNTYWIDE	1999	0	0	$71,879	$43,127	$115,006
Karnes	COUNTYWIDE	1999	0	0	$14,376		$14,376
Karnes	NORTH PORTION	2000	0	0	$6,954		$6,954
Karnes	COUNTYWIDE	2000	0	0	$6,954		$6,954
Karnes	SOUTH PORTION	2001	0	0	$54,094		$54,094
Karnes	COUNTYWIDE	2001	0	0	$135,234	$135,234	$270,468
Karnes	COUNTYWIDE	2001	0	0	$27,047		$27,047
Karnes	NORTH PORTION	2001	0	0	$6,762		$6,762
Karnes	COUNTYWIDE	2001	0	0	$135,234		$135,234
Karnes	SOUTHEAST PORTION	2001	0	0	$4,057		$4,057
Karnes	COUNTYWIDE	2002	0	0	$26,626		$26,626
Karnes	COUNTYWIDE	2003	0	0	$65,082		$65,082
Karnes	COUNTYWIDE	2003	0	0	$13,016		$13,016
Karnes	HELENA	2007	0	0	$231,066		$231,066
Wilson	NORTHEASTERN PORTION	1996	0	0	$15,264		$15,264
Wilson	COUNTYWIDE	1997	0	0	$44,766		$44,766
Wilson	COUNTYWIDE	1997	0	0	$29,844		$29,844
Wilson	COUNTYWIDE	1997	0	0	$74,611		$74,611
Wilson	COUNTYWIDE	1997	0	0	$7,461		$7,461
Wilson	COUNTYWIDE	1997	0	0	$4,477		$4,477
Wilson	COUNTYWIDE	1998	0	0	$29,387	$44,080	$73,467
Wilson	COUNTYWIDE	1998	0	0	$4,408	$7,347	$11,755
Wilson		1998	50	0	$4,407,975	$73,466	$4,481,441
Wilson	COUNTYWIDE	1998	50	0	$146,933	$146,933	$293,866

Wilson	COUNTYWIDE	1998	70	0	$293,865	$293,865	$587,730
Wilson	COUNTYWIDE	1999	0	0	$14,376		$14,376
Wilson	COUNTYWIDE	1999	0	0	$71,879	$43,127	$115,006
Wilson	COUNTYWIDE	1999	0	0	$14,376		$14,376
Wilson	NORTH PORTION	2000	0	0	$6,954		$6,954
Wilson	COUNTYWIDE	2000	0	0	$6,954		$6,954
Wilson	SOUTH PORTION	2001	0	0	$54,094		$54,094
Wilson	COUNTYWIDE	2001	0	0	$135,234	$135,234	$270,468
Wilson	COUNTYWIDE	2001	0	0	$27,047		$27,047
Wilson	NORTH PORTION	2001	0	0	$6,762		$6,762
Wilson	COUNTYWIDE	2001	0	0	$135,234		$135,234
Wilson	SOUTHEAST PORTION	2001	0	0	$4,057		$4,057
Wilson	COUNTYWIDE	2002	0	0	$186,382		$186,382
Wilson	COUNTYWIDE	2003	0	0	$65,082		$65,082
Wilson	COUNTYWIDE	2003	0	0	$13,016		$13,016

Significant Events

October 17, 1998 – Wilson and Karnes Counties

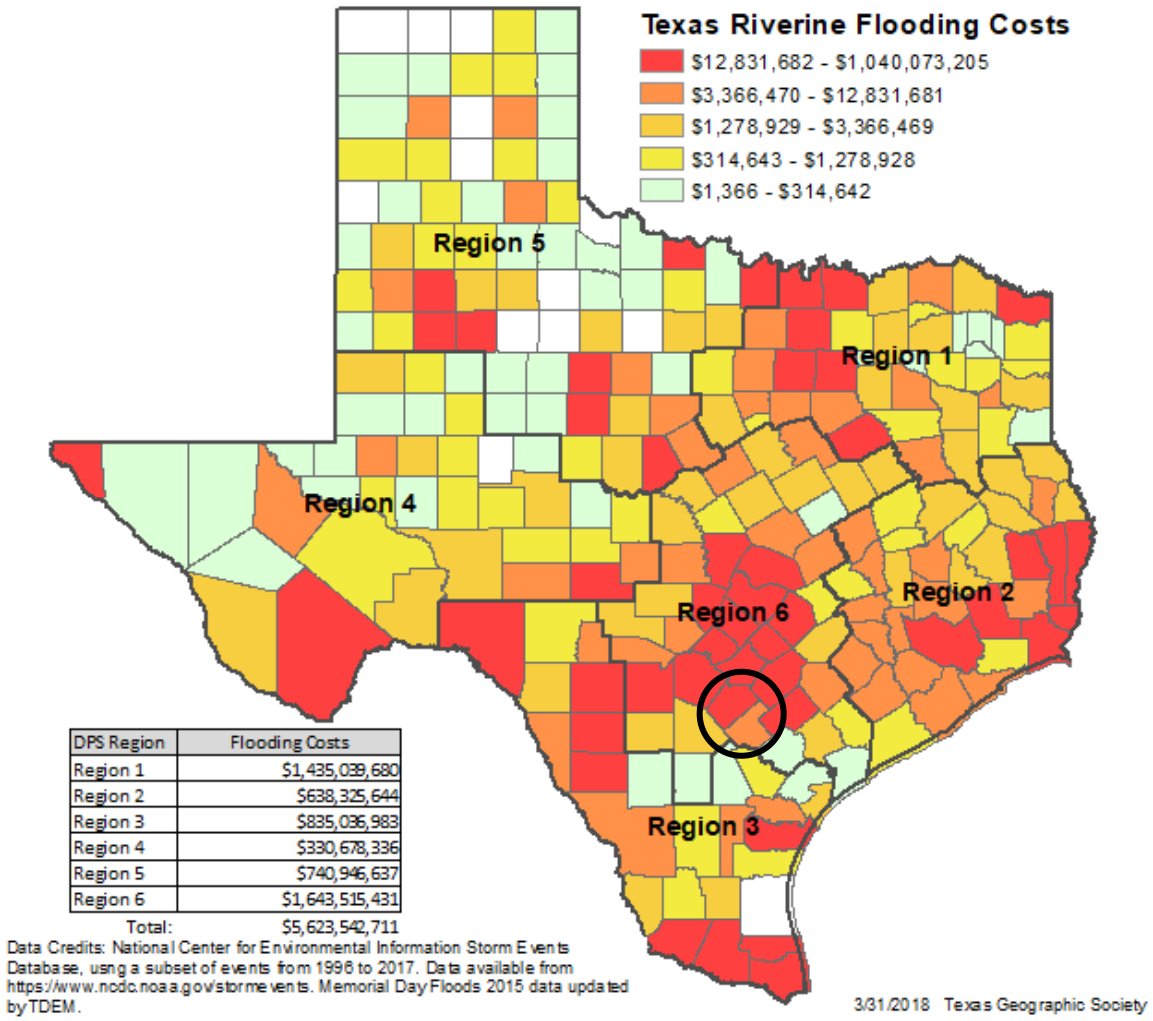
In Wilson County at Floresville, the San Antonio River flooded several houses, but residential flooding was not nearly as severe as other areas. In Karnes County near Falls City, San Antonio River flooded five homes in the southwest section of the city. In Bexar County, Cibolo Creek at Selma was gauged at 22' and rising, with flood stage at 17 feet. At Schertz, the crest was well above the 26-foot crest on June 22, 1997. Here the flood stage is at 13 feet. This crest, in excess of 30 feet, put over 17 feet of water above the tops of mobile homes. Mobile homes were floating like boats and moved downstream until they hit something permanent. Farther up on the right flood plain, another community of mobile homes, permanent homes, and RVs were completely destroyed. They too moved downstream until their path was impeded. Many homes above the city park, upstream, left bank from the Highway 78 bridge flooded. The railroad bridge trestle had water just to the tracks. Downstream, in Wilson County, near La Vernia, Cibolo Creek produced a sheet flow that surged over the flood plain in an area well over a mile wide and up to six feet deep. Many homes were flooded in this area. La Vernia volunteer firemen performed rescues in fire trucks where they could, then commandeered high powered boats. The boats were destroyed in the rescue attempts. Several businesses in La Vernia were flooded. At one point, a fire truck stalled in La Vernia for hours until the firemen themselves could be rescued. Downstream, below Sutherland Springs, Highway 87 was flooded with several feet of water for miles. Debris formed dams in the trees beside the highway as a mute testimony to remnants of houses, boats, cars, and items that flowed across the road. At Falls City in Karnes County, the Cibolo Creek crested at 39.9 feet, where flood stage is 20 feet. It accounted for a very heavy loss of livestock.

July 23, 2002 – Wilson County
The July 2002 flood affected 54 homes with the majority getting 2-4 feet of water in them with the level of damage in the large majority being 50%-90%. Some homes had as much as 12 feet of water in them and 10 of the properties that were most vulnerable to future flooding were ultimately acquired with grant funding.

August 16, 2007 – Karnes County
The area of heaviest rainfall associated with Tropical Storm Erin in South Central Texas began in Karnes County. General rainfall over the county ranged from 3 to 5 inches with up to 7 inches near Helena. Most of the roads in Karnes County were closed Thursday afternoon, including FM887, SH119, and US80.

Figure 6-12 below is provided to compare historical impacts for the study area, within the black circle, with the surrounding counties and the rest of the State. The costs presented in the legend reflect the total cost of floods to property and crops within the unincorporated areas of the counties as well as all participating jurisdictions in Karnes and Wilson Counties.

Figure 6-12: Texas Riverine Flooding Costs



DPS Region	Flooding Costs
Region 1	$1,435,039,680
Region 2	$638,325,644
Region 3	$835,036,983
Region 4	$330,678,336
Region 5	$740,946,637
Region 6	$1,643,515,431

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 Karnes and Wilson Counties planning area, 26 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 Karnes and Wilson 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 6-2 and 6-3 below show Karnes and Wilson County dollar losses from January 1996 through December 2016.

Table 6-2: Karnes County Impact from Flooding

Karnes County Impacts from Riverine Flooding					
	Property $-Losses	Crop $-Losses	Deaths	Injuries	Total $-Losses
1996	$15,264				$15,264
1997	$161,159				$161,159
1998	$4,882,568	$565,691		170	$5,448,259
1999	$100,631	$43,127			$143,758
2000	$13,908				$13,908
2001	$362,428	$135,234			$497,662
2002	$26,626				$26,626
2003	$78,098				$78,098
2004					
2005					
2006					
2007	$231,066				$231,066
2008					
2009					
2010					
2011					
2012					
2013					
2014					
2015					
2016					
Loss Summary					
21-yr Total	$5,871,748	$744,052		170	$6,615,800
Per Year	$279,607	$35,431		8	$315,038
Per Capita Dollar Losses (2010 Pop)					
21-yr Total	$396	$50			$446
Per Year	$19	$2			$21

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

Table 6-3: Wilson County Impact from Flooding, 1996-2017

Wilson County Impacts from Riverine Flooding					
	Property $-Losses	Crop $-Losses	Deaths	Injuries	Total $-Losses
1996					
1997	$11,938				$11,938
1998	$124,926,433	$249,786		250	$125,176,219
1999	$28,752	$28,752			$57,504
2000	$34,770				$34,770
2001	$3,083,342	$135,234		2	$3,218,576
2002	$186,382			5	$186,382
2003	$26,032				$26,032
2004	$126,787				$126,787
2005					
2006					
2007	$808,731				$808,731
2008					
2009					
2010	$54,906				$54,906
2011					
2012					
2013					
2014					
2015	$181,431				$181,431
2016					
Loss Summary					
21-yr Total	$129,469,504	$413,772		257	$129,883,276
Per Year	$6,165,214	$19,703		12	$6,184,918
Per Capita Dollar Losses (2010 Pop)					
21-yr Total	$3,017	$10			$3,026
Per Year	$144	$0			$144

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

Table 6-4: Karnes County Flood Impacts Forecast by Year

Karnes Co. Forecast Impacts for Riverine Flooding					
	Property $-Losses	Crop $-Losses	Deaths	Injuries	Total $-Losses
2019	$301,286	$37,244			$7,632
2020	$304,999	$37,393			$7,829
2021	$308,759	$37,542			$8,033
2022	$312,564	$37,693			$8,243
2023	$316,417	$37,843			$8,460
Forecast Loss Summary					
5-yr Total	$1,544,024	$187,715		45	$1,731,740

Per Year	$308,805	$37,543		9	$346,348
Per Capita Dollar Loss Forecast (2010 Pop)					
5-yr Total	$104.16	$12.66			$116.82
Per Year	$20.83	$2.53			$23.36

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

Table 6-5: Wilson County Flood Impacts Forecast by Year

Wilson Co. Forecast Impacts for Riverine Flooding					
	Property $-Losses	**Crop $-Losses**	**Deaths**	**Injuries**	**Total $-Losses**
2019	$6,932,137	$20,712		14	$6,952,849
2020	$7,117,870	$20,794		14	$7,138,664
2021	$7,308,579	$20,878		15	$7,329,456
2022	$7,504,397	$20,961		15	$7,525,358
2023	$7,705,463	$21,045		15	$7,726,508
Forecast Loss Summary					
5-yr Total	$36,568,445	$104,390		73	$36,672,835
Per Year	$7,313,689	$20,878		15	$7,334,567
Per Capita Dollar Loss Forecast (2010 Pop)					
5-yr Total	$852.05	$2.43			$854.49
Per Year	$170.41	$0.49			$170.90

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

Figure 6-13: Karnes and Wilson Counties Flood Dollar Loss Forecast

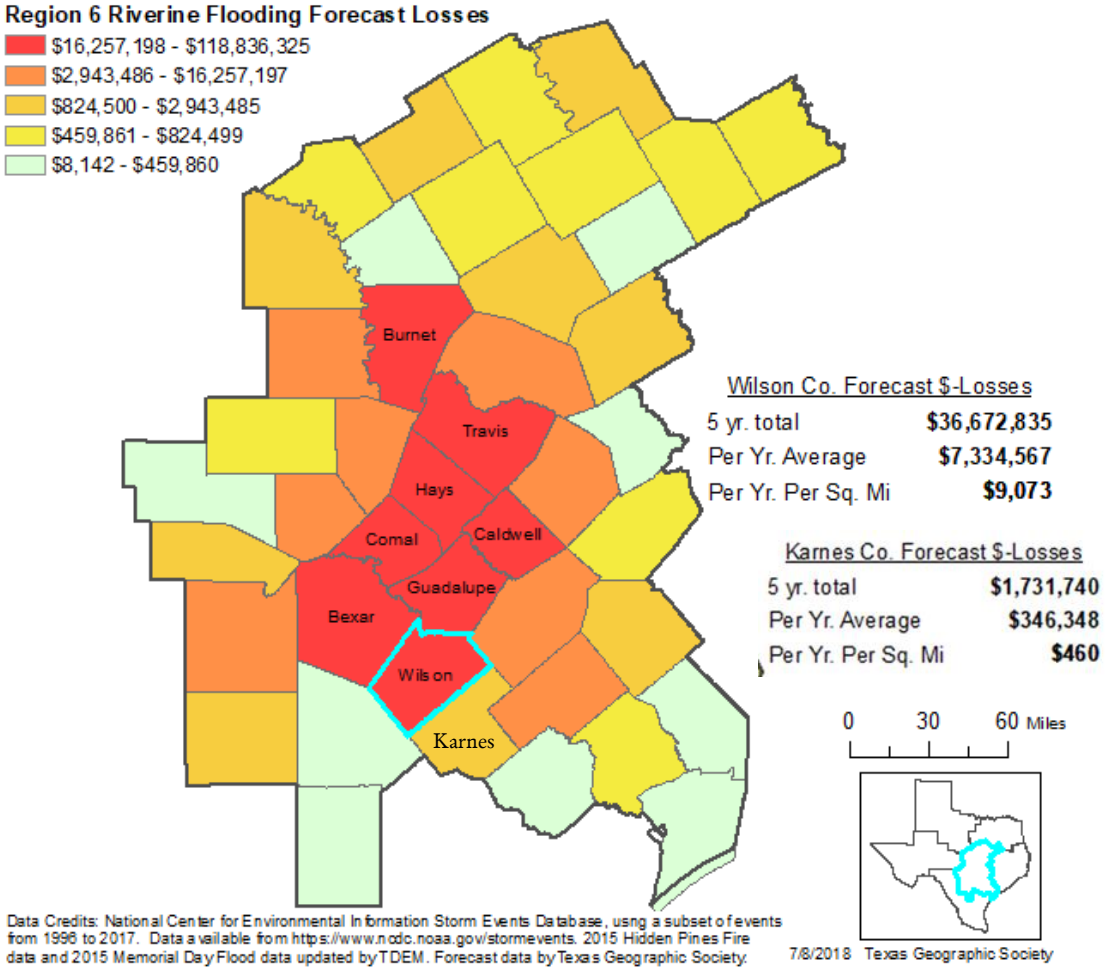


Table 6-6: Flood Losses by Jurisdiction 1996-2017

Jurisdiction	Est. Prop. Losses (2016 dollars)	Est. Crop Losses (2016 dollars)	Total Est $-Losses
Karnes City	$1,204,928	$2,072	$1,207,001
Kenedy	$1,305,537	$3,592	$1,309,129
Falls City	$242,016	$898	$242,914
Runge	$408,376	$1,204	$409,580
Floresville	$19,451,497	$2,919	$19,454,416
La Vernia	$3,119,238	$1,229	$3,120,467
Stockdale	$4,350,040	$871	$4,350,911
Poth	$5,755,809	$1,639	$5,757,448

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

NFIP Participation

Karnes and Wilson 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 Karnes or Wilson 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 will continue to comply with NFIP requirements through their local permitting, inspection, and record-keeping requirements for new and substantially developed construction.

Table 6-7: Wilson County NFIP Summary by Participating Jurisdiction

Jurisdiction	Floodplain Manager	Number of Policies	Insurance in Force	Number of Paid Losses	Amount of Paid Losses	Substantial Damage Losses
Wilson County	EMC at EOC	116	$30,761,400	23	877,864	8
City of Floresville	City Manager	23	$7,223,000	2	36,322	1
City of La Vernia	City Manager	43	$9,196,500	23	840,358	8
City of Stockdale	City Manager	6	$1,299,800	3	44,152	0
City of Poth	City Manager	11	$2,282,700	6	169,199	0

Source: Texas Water Development Board (TWDB)

Table 6-8: Wilson County Repetitive Loss Summary

Community Name	Bldg. Payments	Contents Payments	Total Payments	Avg. Payment	Losses	Properties
La Vernia, City Of	$137,711.63	$16,304.95	$154,016.58	$25,669.43	6	3
Poth, City Of	$148,169.39	$3,230.87	$151,400.26	$37,850.07	4	1
Wilson County *	$158,142.34	$22,295.04	$180,437.38	$30,072.90	6	3

Source: Texas Water Development Board (TWDB)

A deficit of information has been identified regarding the land use type (residential, non-residential, industrial, government, commercial) of the 7 properties identified as Repetitive Loss (RL) or Severe Repetitive Loss (SRL) within the Wilson County

planning area. The County reached out to FEMA but they were unable to provide any further information or distinction of property type. This deficit has been specifically addressed with action item *Wilson County 9* in Section 18 of this plan.

There were no severe repetitive losses on file at the Texas Water Development Board for Wilson County.

Table 6-9: Karnes County NFIP Summary by Participating Jurisdiction

Jurisdiction	Floodplain Manager	Number of Policies	Insurance in Force	Number of Paid Losses	Amount of Paid Losses	Substantial Damage Losses
Karnes County	EMC at EOC	20	$5,022,400	6	57,592	0
City of Falls City	City Manager	12	$2,866,900	2	35,488	0
City of Karnes City	City Manager	3	$1,130,000	0	0	0
City of Kenedy	City Manager	5	$ 1,530,000	7	10,730	0
City of Runge	City Manager	0	$0	0	0	0

Source: Texas Water Development Board (TWDB)

Karnes County Repetitive Loss Summary

There were no repetitive losses or severe repetitive losses on file at the Texas Water Development Board or FEMA for the Karnes County area.

The following table describes the floodplain managers by City/County and the title and department under which they are located.

Table 6-10: Floodplain Managers

City/ County	FPA Title, Department
Karnes Co	911 Administrator, Special Projects
Falls City	Mayor, Office of Mayor
Karnes City	City Manager, City Admin
Kenedy	Police Chief, EMC
Runge	Mayor
Wilson Co	Emergency Management Coordinator, EMC Division
Floresville	Civil Engineer, Outside Consultant
La Vernia	Police Chief, Police Dept
Poth	Civil Engineer, Outside Consultant
Stockdale	City Manager, City Admin

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 Karnes and Wilson 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 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 14, 2018

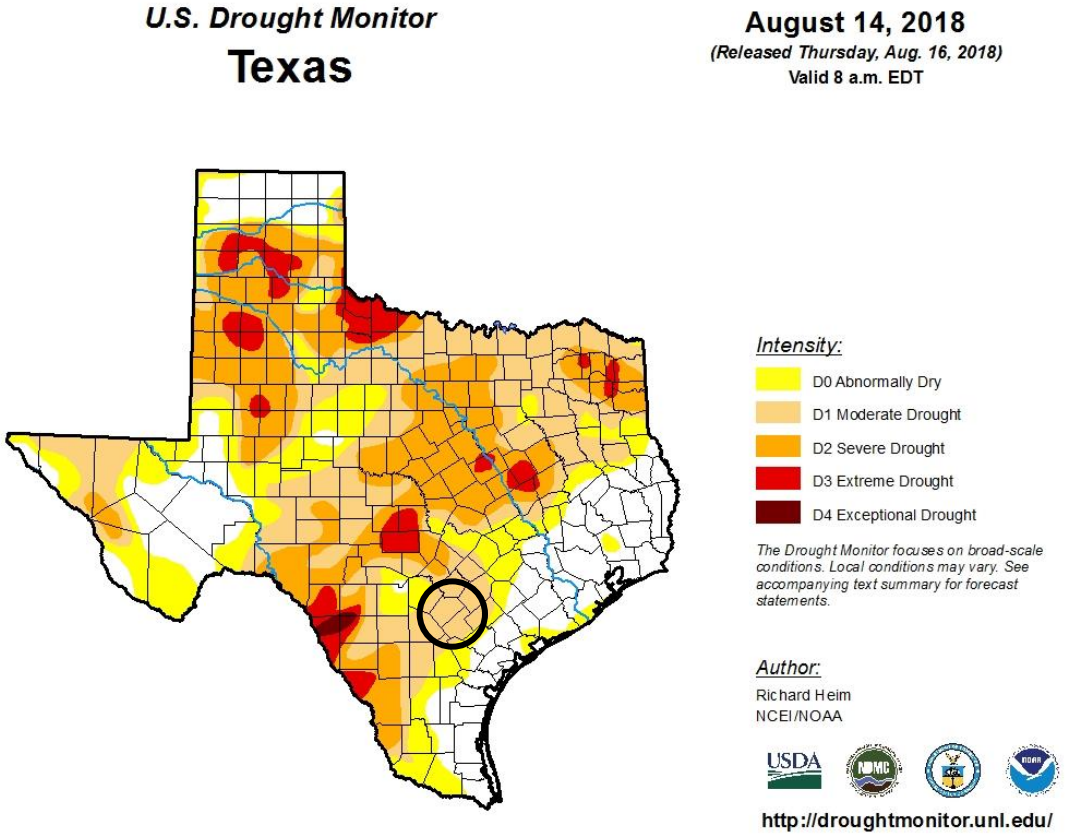
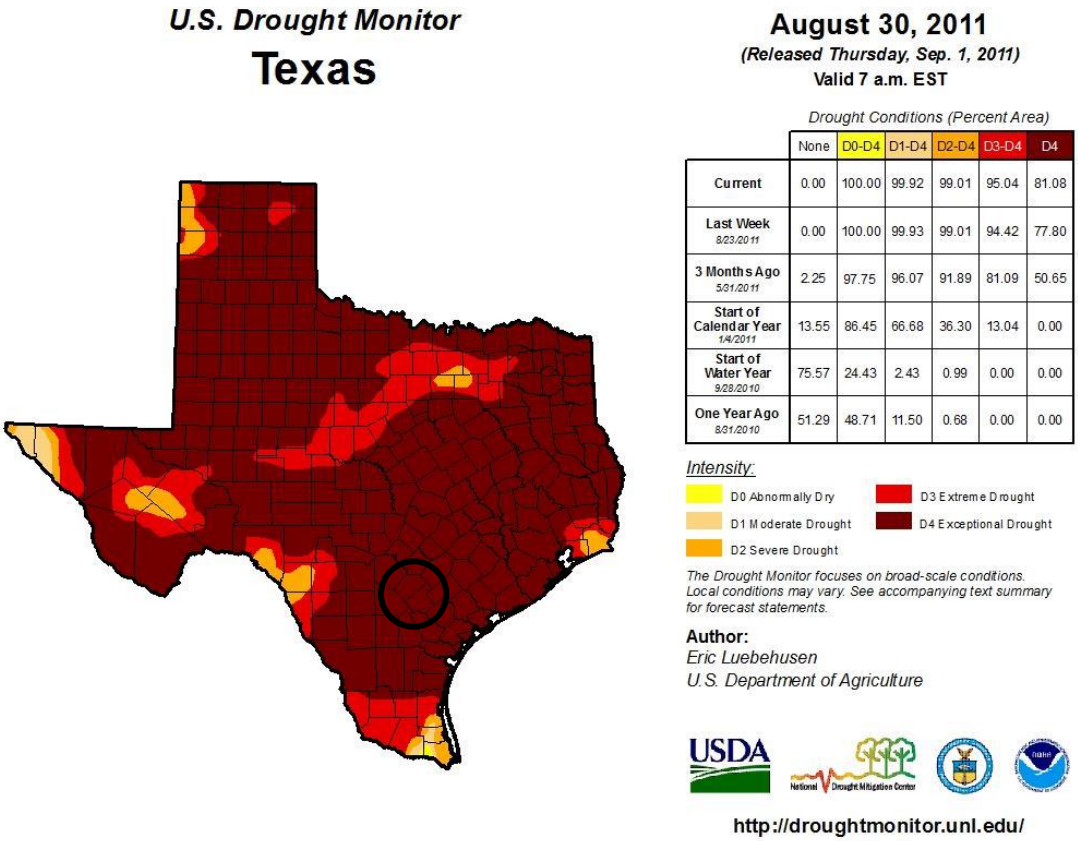


Figure 7.2: US Drought Monitor, August 30, 2011



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 7.1 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 7-1: Drought Severity Classification

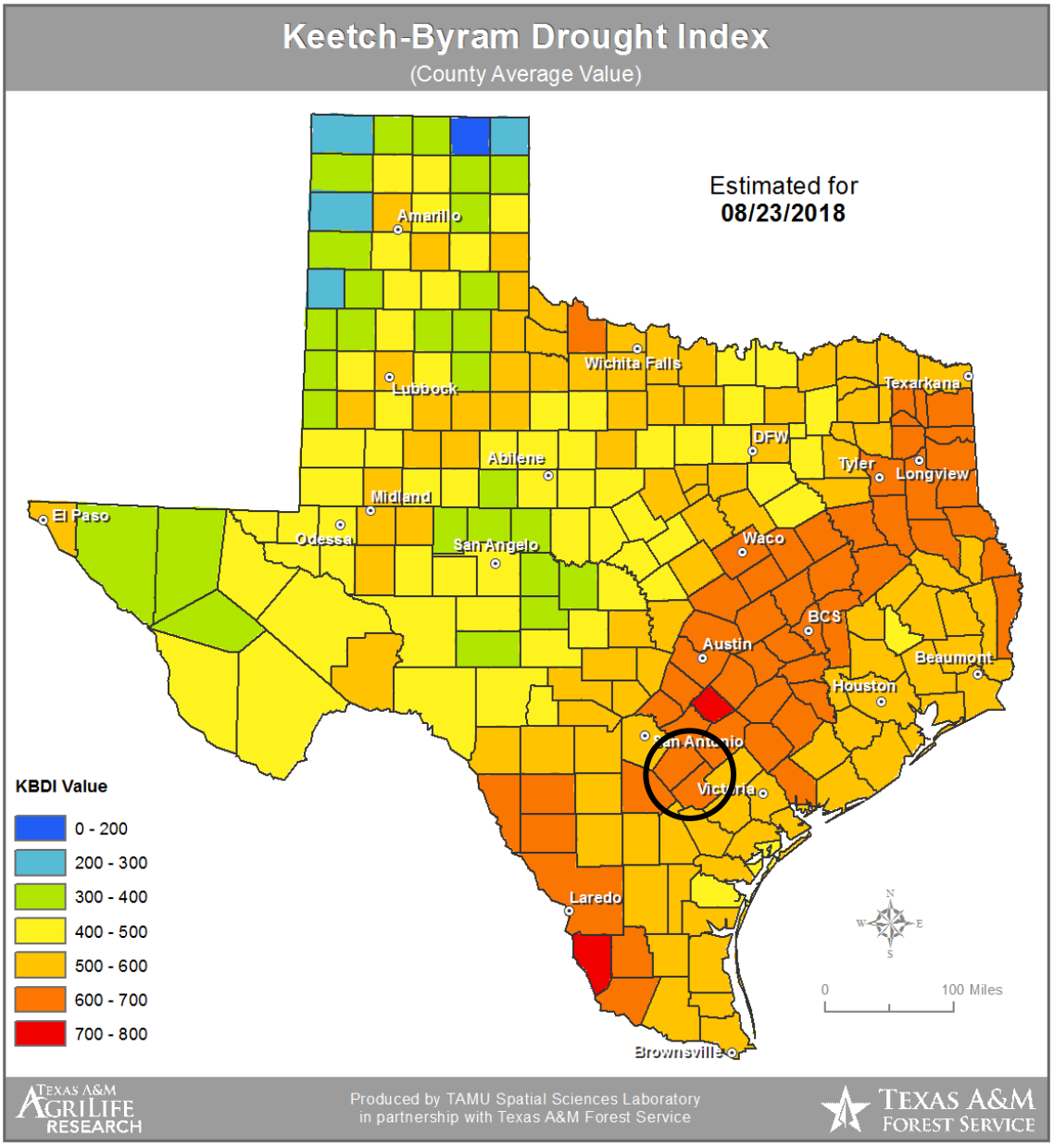
			Ranges				
Category	Description	Possible Impacts	Palmer Drought Severity Index (PDSI)	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: short-term dryness 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 Karnes and Wilson 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 Karnes and Wilson Counties are in the 600-700 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

Karnes and Wilson Counties have often experienced moderate to exceptional 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.[3] 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 land owner 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 7-2 lists historical events that have occurred in Karnes and Wilson Counties as reported in the NCEI.

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

Table 7-2: Historical Occurrences of Drought

County	Date Range	Direct Injuries	Direct Fatalities	Property Damage (adj2016)	Crop Damage (adj2016)	Total Losses
Karnes	April - December, 1996	0	0	0	0	0
	January - February, 1997	0	0	0	0	0
	August - October, 2000	0	0	0	0	0
	May - December, 2011	0	0	0	0	0
	January - February, 2012	0	0	0	0	0
	April, 2012	0	0	0	0	0
	September, 2012	0	0	0	0	0
	November - December, 2012	0	0	0	0	0
	January - April, 2013	0	0	0	0	0
	August, 2013	0	0	0	0	0
	February, 2014	0	0	0	0	0
	April, 2014	0	0	0	0	0
	October - November 2014	0	0	0	0	0
Wilson	April - December, 1996	0	0	0	0	0
	January - February, 1997	0	0	0	0	0
	July - October, 2000	0	0	0	0	0
	May - December, 2011	0	0	0	0	0
	January, 2012	0	0	0	0	0
	March - April, 2013	0	0	0	0	0
	August, 2013	0	0	0	0	0
	September - October, 2015	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 7-3: Historical Drought Magnitude

Drought Category	Description	Karnes County		Wilson County	
None	Normal to Wet Conditions	409	42%	416	43%
D0	Abnormally Dry	105	11%	166	17%
D1	Moderate Drought	202	21%	166	17%
D2	Severe Drought	122	13%	76	8%
D3	Extreme Drought	67	7%	69	7%

D4	Exceptional Drought	70	7%	82	8%
	Total	975	100%	975	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 seven extended time periods of drought within a 21-year reporting period. This provides a probability of occurrence of one event every two to three years. Based on the drought monitor data for a 28-year reporting period, the planning area is in severe to exceptional drought approximately 25% of the time. This frequency supports a likely probability of future events occurring within the Karnes and Wilson Counties planning area which means that an event is probable in 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

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 Karnes and Wilson 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 population in the planning area that is over the age of 65 is 8,926 or 29.1% of the total population and children under the age of 5 is 3,490 or 11.3% of the total population, a total of 13,419 potentially vulnerable residents. Table 7-4 presents the 2016 American Community Survey population and age cohort estimates below.

Table 7-4: Populations at Greater Risk by Jurisdiction

Jurisdiction	Population 65 and Older	Population Under 5
City of La Vernia	192/ 18%	19/ 1.8%
City of Floresville	1,230/ 17.2%	250/ 3.5%
City of Poth	241/ 11.6%	188/ 9.1%
City of Stockdale	219/ 15.2%	141/ 9.8%
Wilson County	**6,760/ 14.6%**	**2,672/ 5.8%**
City of Karnes	462/ 14.1%	285/ 8.7%
City of Kenedy	501/ 14.7%	185/ 5.4%
City of Runge	282/ 23.3%	89/ 7.7%
City of Falls City	96/ 14.5%	31/ 4.7%
Karnes County	**2,166/ 14.5%**	**818/ 5.5%**
Total	**8,926**	**3,490**

Source: 2016 American Community Survey (Note: County totals include both incorporated and unincorporated areas)

The environment of the Karnes and Wilson 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 Karnes and Wilson 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 2008 – 2018 are provided below. Table 7-5 lists the drought impacts in Karnes and Wilson 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 7-5: Drought Impacts, 2008-2018

KARNES COUNTY		WILSON COUNTY	
Agriculture	52	Agriculture	44
Business & Industry	2	Business & Industry	1
Energy	1	Energy	1

Fire	7	Fire	8
Plants & Wildlife	26	Plants & Wildlife	27
Relief, Response & Restrictions	12	Relief, Response & Restrictions	10
Society & Public Health	1	Society & Public Health	1
Water Supply & Quality	8	Water Supply & Quality	9
County Impacts	61	**County Impacts**	53

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

Based on 21 years of data from the NCEI, the direct impacts of droughts in the Karnes and Wilson 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

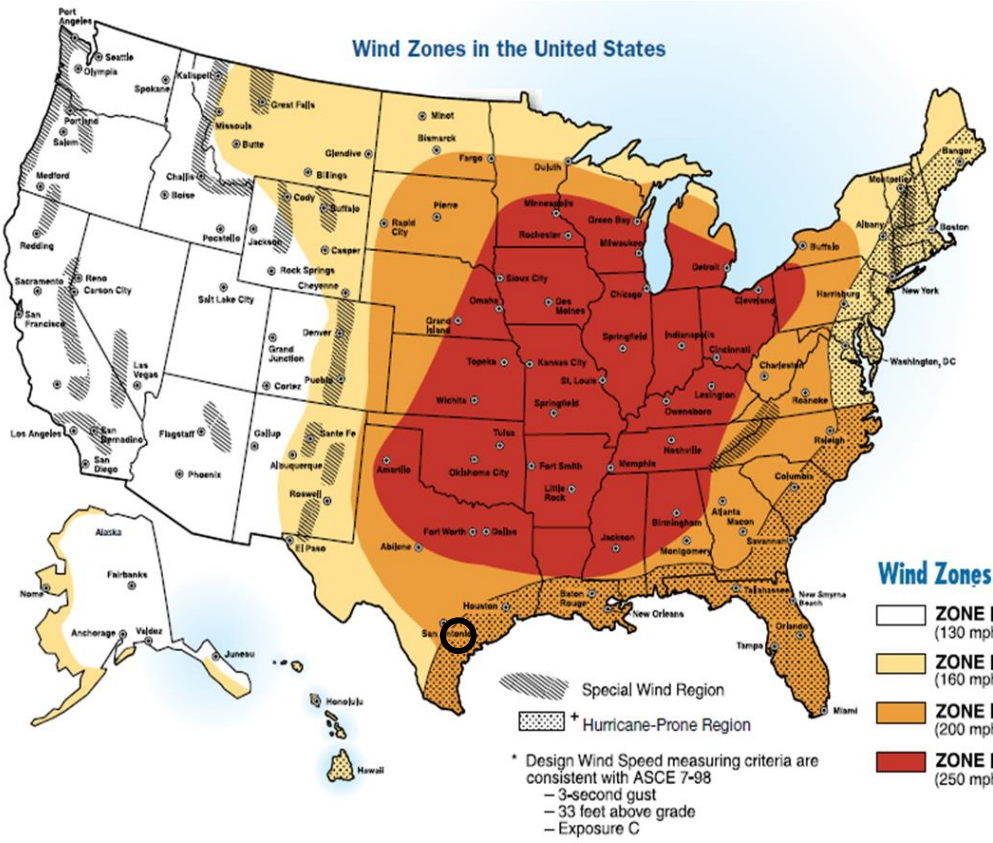
Description

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 Karnes and Wilson 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

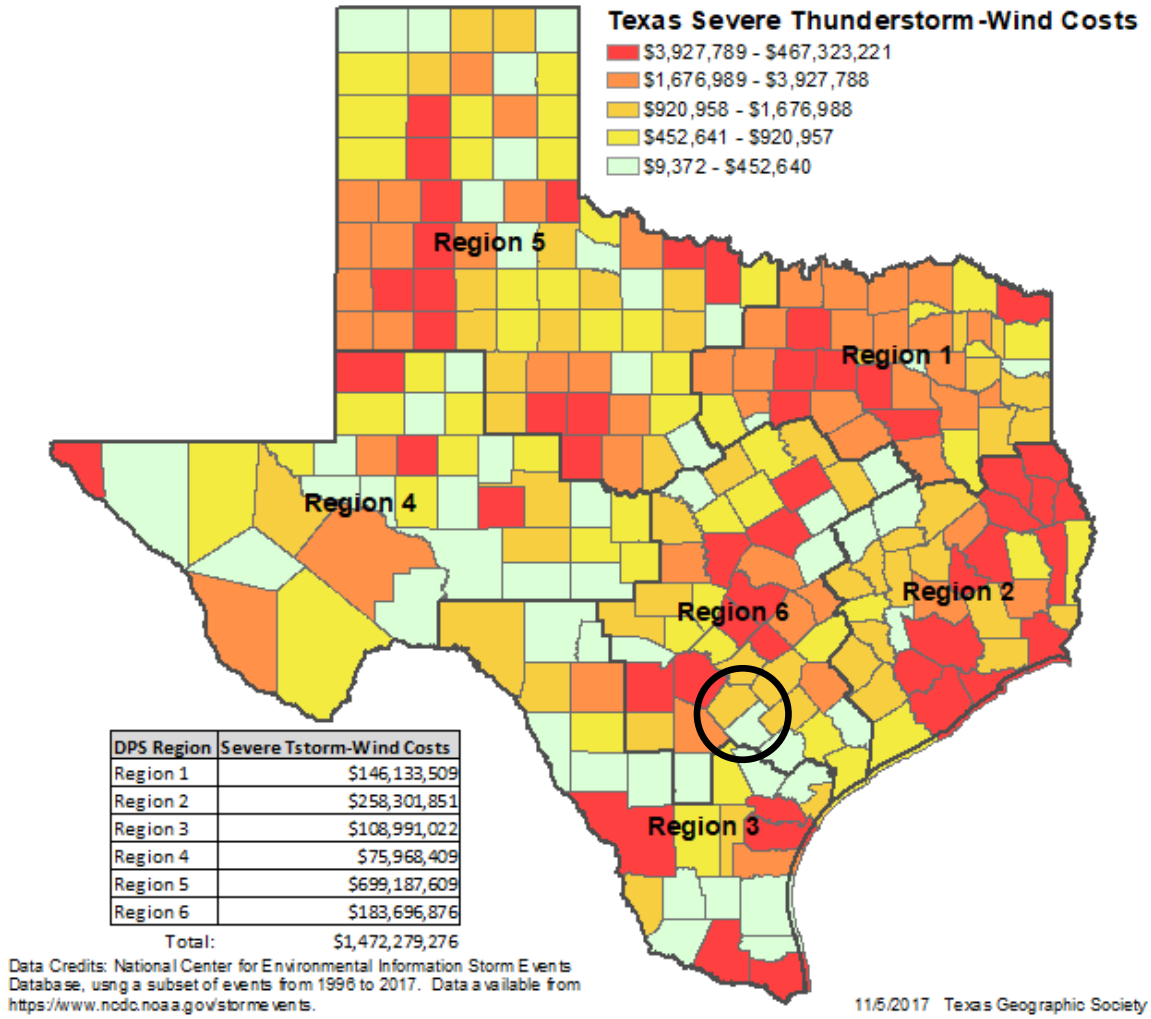
Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	**On Land**
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small 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 sorts of impacts -white represents zero-dollar losses.

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



DPS Region	Severe Tstorm-Wind Costs
Region 1	$146,133,509
Region 2	$258,301,851
Region 3	$108,991,022
Region 4	$75,968,409
Region 5	$699,187,609
Region 6	$183,696,876
Total:	$1,472,279,276

Historical occurrences of thunderstorm wind events with resulting damages that have impacted the Karnes and Wilson 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 46 thunderstorm wind events recorded in the NCEI storm events database that have impacted the Karnes and Wilson 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)
Wilson	FLORESVILLE	1996	June		0	0	$122,116	
Wilson	KOSCIUSKO	1997	April		0	0		
Wilson	LA VERNIA	1997	May		0	0	$7,461	
Wilson	LA VERNIA	1997	May		0	0	$4,477	
Karnes	KARNES CITY	1997	April		0	0	$29,844	
Karnes	RUNGE	1997	April		0	0	$7,461	
Karnes	KARNES CITY	1997	May		0	0	$14,922	
Wilson	POTH	1998	February		0	0	$44,080	
Karnes	KARNES CITY	1999	May		0	0	$115,006	
Wilson	SUTHERLAND SPGS	2000	July		0	0	$111,266	
Wilson	LA VERNIA	2000	November		0	0	$111,266	
Wilson	FLORESVILLE	2000	November		0	0	$69,541	
Wilson	SUTHERLAND SPGS	2001	April		0	0	$33,809	
Wilson	COUNTYWIDE	2002	March		0	0	$266,259	$133,130
Wilson	STOCKDALE	2004	April	80	0	0	$38,036	
Wilson	FLORESVILLE	2004	April	60	0	0	$126,787	
Wilson	FLORESVILLE	2005	February	65	0	0		
Wilson	STOCKDALE	2007	March	60	0	0	$115,533	
Wilson	FLORESVILLE	2007	April	70	0	0	$57,767	
Wilson	DENHAWKEN	2008	June	55	0	0	$11,124	
Wilson	POTH	2008	August	70	0	0	$55,620	
Wilson	FLORESVILLE	2009	July	39	0	0	$22,331	
Karnes	BAINVILLE	2009	July	45	0	0	$55,828	
Wilson	FLORESVILLE	2010	June	52	0	0	$10,981	
Wilson	FLORESVILLE	2010	September	43	0	0	$109,812	
Wilson	FLORESVILLE	2010	September	43	0	0	$54,906	
Karnes	KENEDY	2010	June	43	0	0	$2,196	
Karnes	KARNES CITY	2011	January	52	0	0		
Wilson	KOSCIUSKO	2012	May	50	0	0		

Wilson	THREE OAKS	2012	May	50	0	0		
Wilson	SUTHERLAND SPGS	2012	July	50	0	0		
Karnes	BAINVILLE	2012	June	39	0	0	$1,043	
Wilson	THREE OAKS	2013	April	50	0	0		
Wilson	LA VERNIA	2014	September	52	0	0		
Wilson	DEWEES	2015	April	60	0	0	$15,158	
Wilson	POTH	2015	April	50	0	0		
Wilson	SUTHERLAND SPGS	2015	June	50	0	0		
Wilson	LA VERNIA	2015	October	55	0	0		
Wilson	LA VERNIA	2016	May	52	0	0		
Wilson	LA VERNIA	2016	May	52	0	0		
Wilson	FLORESVILLE	2016	May	61	0	0		
Wilson	LABATT	2016	May	70	0	0		
Wilson	CALAVERAS	2016	May	52	0	0		
Wilson	FLORESVILLE	2016	May	52	0	0		
Wilson	CALAVERAS	2016	May	52	0	0		
Karnes	GILLETT	2016	March	52	0	0		

Source: NCEI Storm Events Database

Significant Events

September 2, 2010 – Floresville, Wilson County
A weak cold front moved into central Texas and combined with deep moisture from the Gulf of Mexico to cause severe thunderstorms over the central part of South-Central Texas. A thunderstorm produced wind gusts estimated at 50 mph which damaged the roof and a sign at a car dealership. There was also a tree knocked down on a van.

March 19, 2002 – Countywide, Wilson County
Severe winds, estimated at 60 to 70 knots, caused spotty damage across much of Wilson County. The worst of the damage was in the northern part of the county, where trees and tree limbs were blown down, roofs were damaged, and outbuildings were blown over.

May 19, 1999 – Karnes City, Karnes County
Brief but widespread downbursts of severe winds blew down trees and knocked over power lines across all of the above listed counties. In DeWitt County, severe winds took roofs off homes in the Smiley area as well as between Cuero and Thomaston. Severe winds destroyed a mobile home near Pearsall, rolling it over 100 feet. In the Dilley area, the roof of a school building was damaged.

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 Karnes and Wilson 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 Karnes and Wilson 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 street lights 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 Karnes and Wilson 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.

Table 8-3: Structures at Greater Risk by Jurisdiction

Jurisdiction	Total Housing Units	Manufactured Homes	Housing units built prior to 1980
City of Karnes	1,088	174 (16.0%)	759 (69.8%)

City of Kenedy	1,350	68 (0.1%)	1,017 (75.3%)
City of Falls City	325	90 (27.7%)	193 (59.4%)
City of Runge	487	74 (15.2%)	388 (79.7%)
Karnes County*	**5,809**	**847 (14.6%)**	**3,664 (63.1%)**
City of Floresville	2,753	469 (17.0%)	1,269 (46.1%)
City of La Vernia	441	63 (14.3%)	169 (38.3%)
City of Poth	696	103 (14.8%)	371 (53.3%)
City of Stockdale	528	117 (22.2%)	296 (56.1%)
Wilson County*	**16,979**	**4,370 (25.7%)**	**4,465 (26.3%)**
Planning Area Totals	*22,788*	*5,217 (22.9%)*	*8,129 (35.7%)*

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

Based on 2016 American Community Survey estimates, there are 16,979 housing units in Wilson County of which 25.7%, or 4,370 units, are mobile homes. There are 5,809 housing units in Karnes County of which 14.6%, or 847 units, are mobile homes. In addition, 35.7% (approximately 8,129 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 2016 data, Karnes 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. Wilson County is at a higher risk of damage from windstorms when considering the total number and ratio of manufactured homes.

Historic Windstorm Impacts

Below are summary tables aggregated by County, 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 Wilson County and $10,776 (in 2016 dollars) for Karnes County.

Table 8-4: Wilson County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, Wilson County				
21-year Total	0	0	$1,388,330	$133,130
Per Year	0	0	$66,111	$6,340
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$32	$3

Per Year	0	0	$2	$0

Table 8-5: Karnes County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, Karnes County				
21-year Total	0	0	$226,300	$0
Per Year	0	0	$10,776	$0
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$15	$0
Per Year	0	0	$1	$0

Windstorm Impact Forecast

Tables 8-6 and 8-7 show the forecast annual impacts of windstorms in Wilson and Karnes 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: Wilson County Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Thunderstorm-Wind, Wilson County				
2019	0	0	$70,717	$6,340
2020	0	0	$72,322	$6,340
2021	0	0	$73,964	$6,340
2022	0	0	$75,643	$6,340
2023	0	0	$77,360	$6,340
Forecast Loss Summary				
5-year Total	0	0	$370,005	$31,698
Per Year	0	0	$74,001	$6,340
Per Capital Dollar Losses (2010 pop)				

5-year Total	0	0	$8.62	$0.74
Per Year	0	0	$1.72	$0.15

Table 8-7: Karnes County Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Thunderstorm-Wind, Karnes County				
2019	0	0	$11,046	$0
2020	0	0	$11,138	$0
2021	0	0	$11,230	$0
2022	0	0	$11,324	$0
2023	0	0	$11,417	$0
Forecast Loss Summary				
5-year Total	0	0	$56,156	$0
Per Year	0	0	$11,231	$0
Per Capital Dollar Losses (2010 pop)				
5-year Total	0	0	$3.79	$0.00
Per Year	0	0	$0.76	$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 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
Karnes City	**$46,439**	**$0**	**$46,439**
Kenedy	**$50,316**	**$0**	**$50,316**
Falls City	**$9,327**	**$0**	**$9,327**
Runge	**$15,739**	**$0**	**$15,739**
Floresville	**$208,583**	**$939**	**$209,522**
La Vernia	**$33,448**	**$395**	**$33,844**

Stockdale	**$46,646**	**$280**	**$46,927**
Poth	**$61,721**	**$527**	**$62,248**

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.[4] 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.[5]

Location

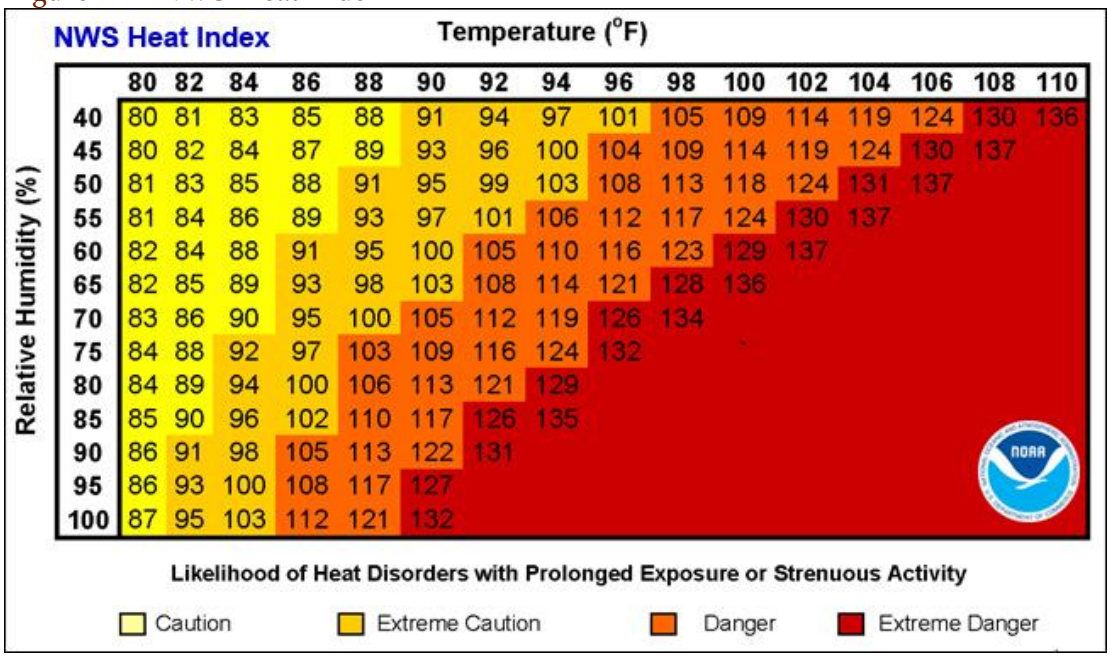
Extreme heat is not confined to any specific geographic area and can occur anywhere within the planning area. City residents can face a heightened risk to extreme heat because of warmer temperatures in cities from the urban heat island effect. The urban heat island effect is caused by large amounts of paved surfaces that absorb and re-radiate heat and the lack of green spaces and tree cover in these areas. Since the counties of Karnes and Wilson 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.

[4] http://www.nws.noaa.gov/om/hazstats.shtml
[5] 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.

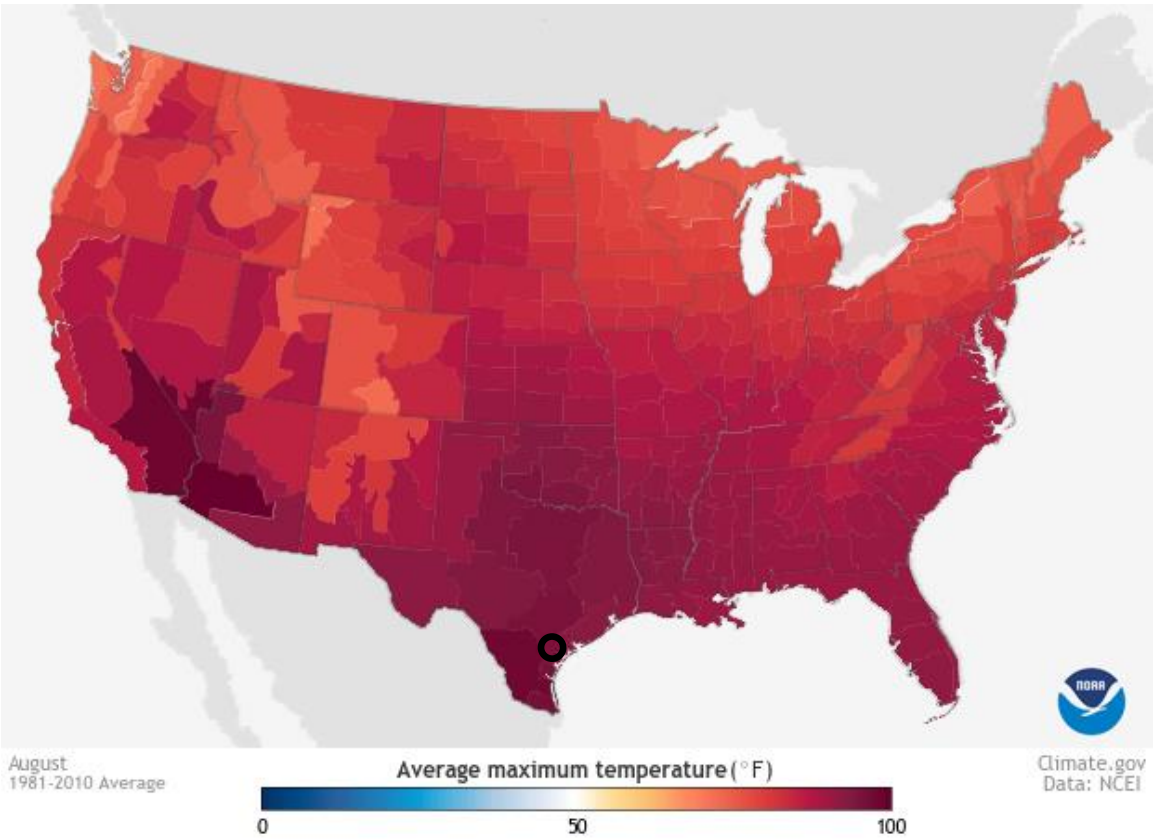
Table 9-1: Heat Index and Warnings

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 Karnes and Wilson 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 Karnes and Wilson 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.

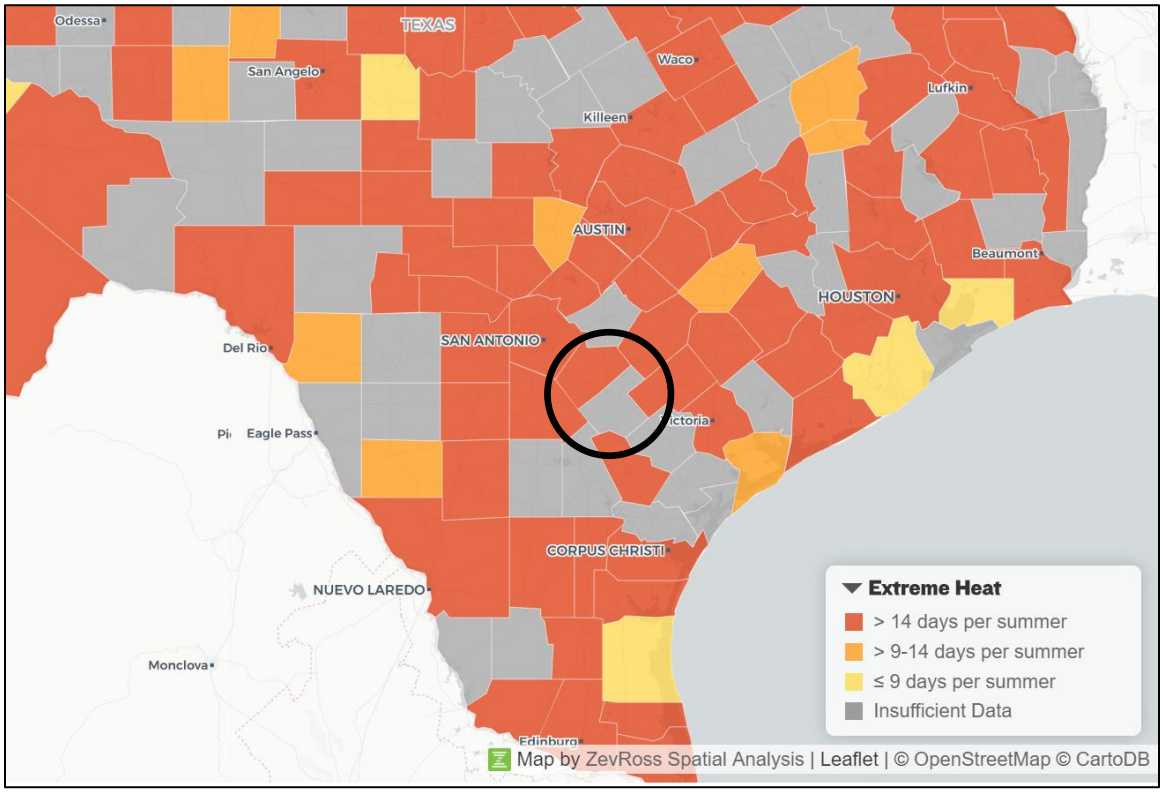
Historical Occurrences

There are no historical occurrences of extreme heat found in the NCEI database for the Karnes and Wilson Counties Planning Area. This doesn't 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



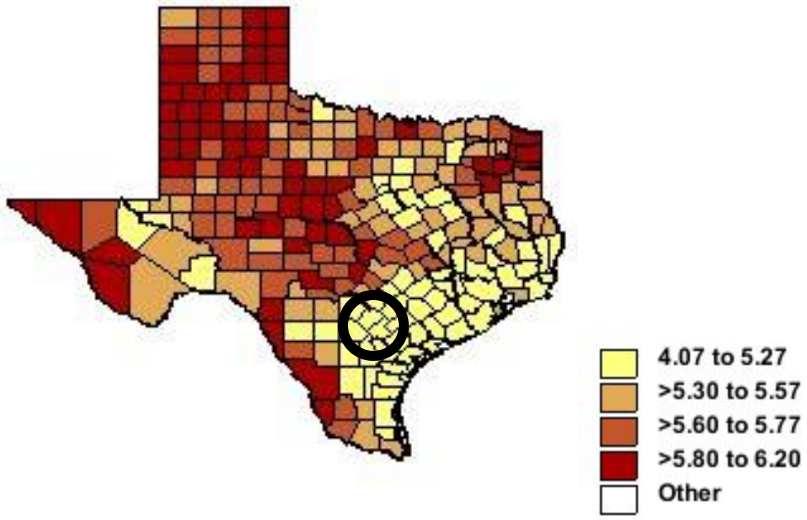
https://www.nrdc.org/climate-change-and-health-extreme-heat#/map/detail/TX

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 Wilson County as having greater than 14 days of extreme heat per summer. Karnes 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 Karnes and Wilson County planning area is experiencing more heat days during the summer than it did past.

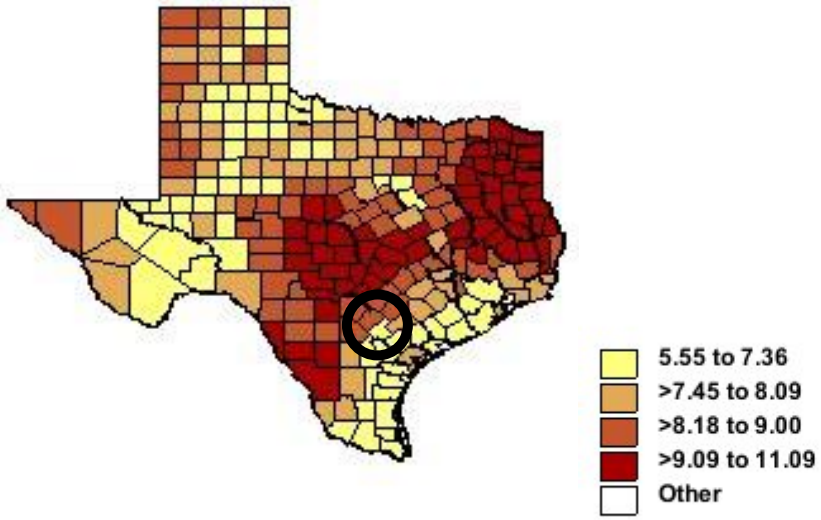
Data from CDC can also help tell a story of how the number of extreme heat days to be expected each summer are increasing. The two maps below depict a 29-year period from 1981-2010 and a 10-year period from 2000-2010. The Karnes and Wilson Counties planning area is depicted within the black circle in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

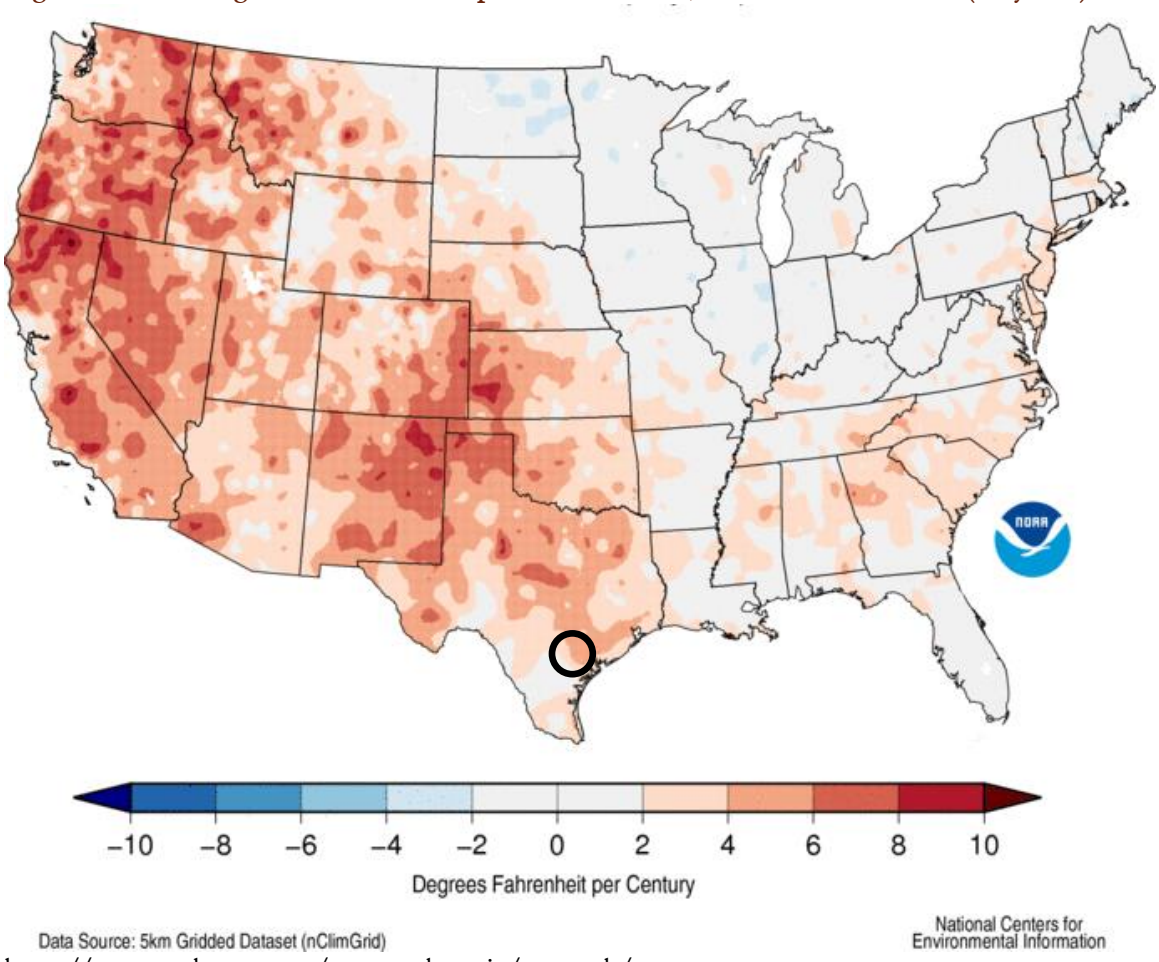
Table 9-2: Top 10 warmest years, Globally (NOAA, 1880-2017)

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 Karnes and Wilson Counties planning area are in an area that can expect an increase of 2-6ºF in average maximum summer temperatures over the next century.

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



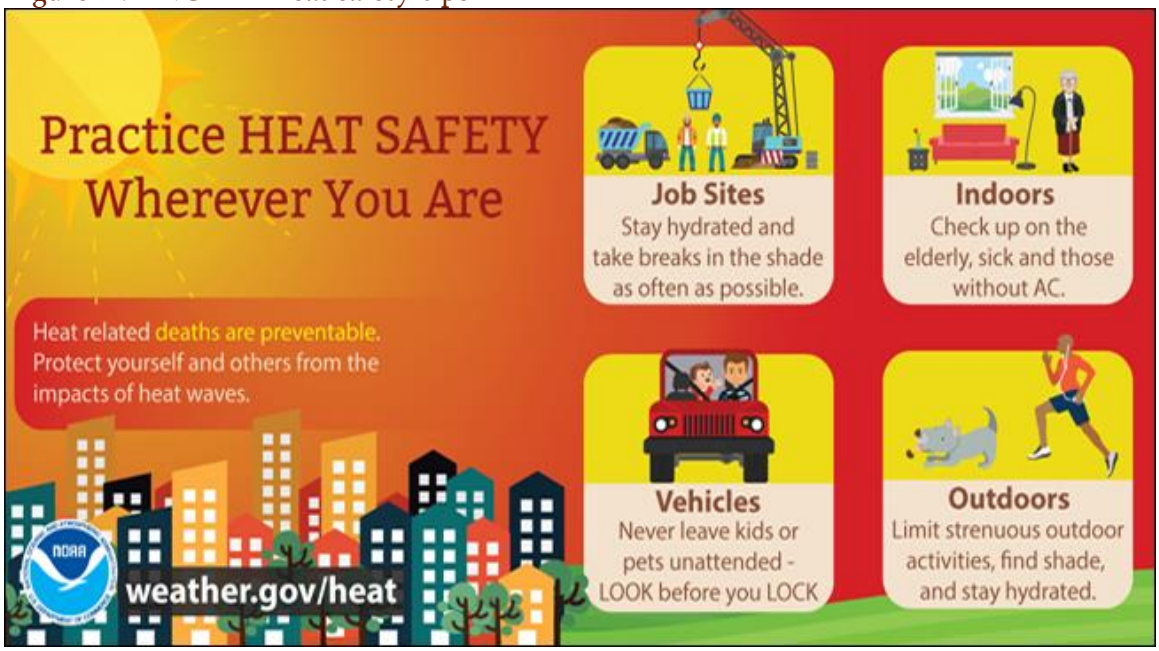
https://www.ncdc.noaa.gov/temp-and-precip/us-trends/

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.[6] 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.

[6] 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.

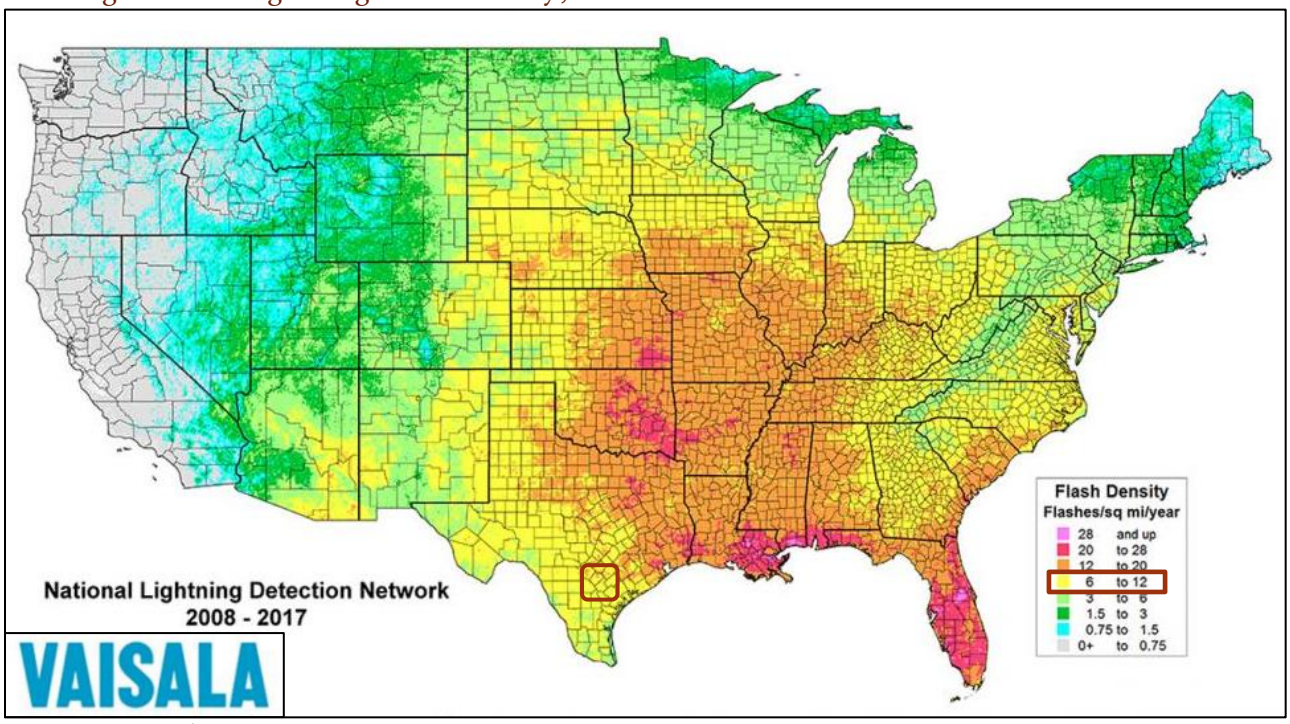
Location

The Karnes and Wilson 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 Karnes and Wilson 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, areas within the northern portion of Wilson 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.	

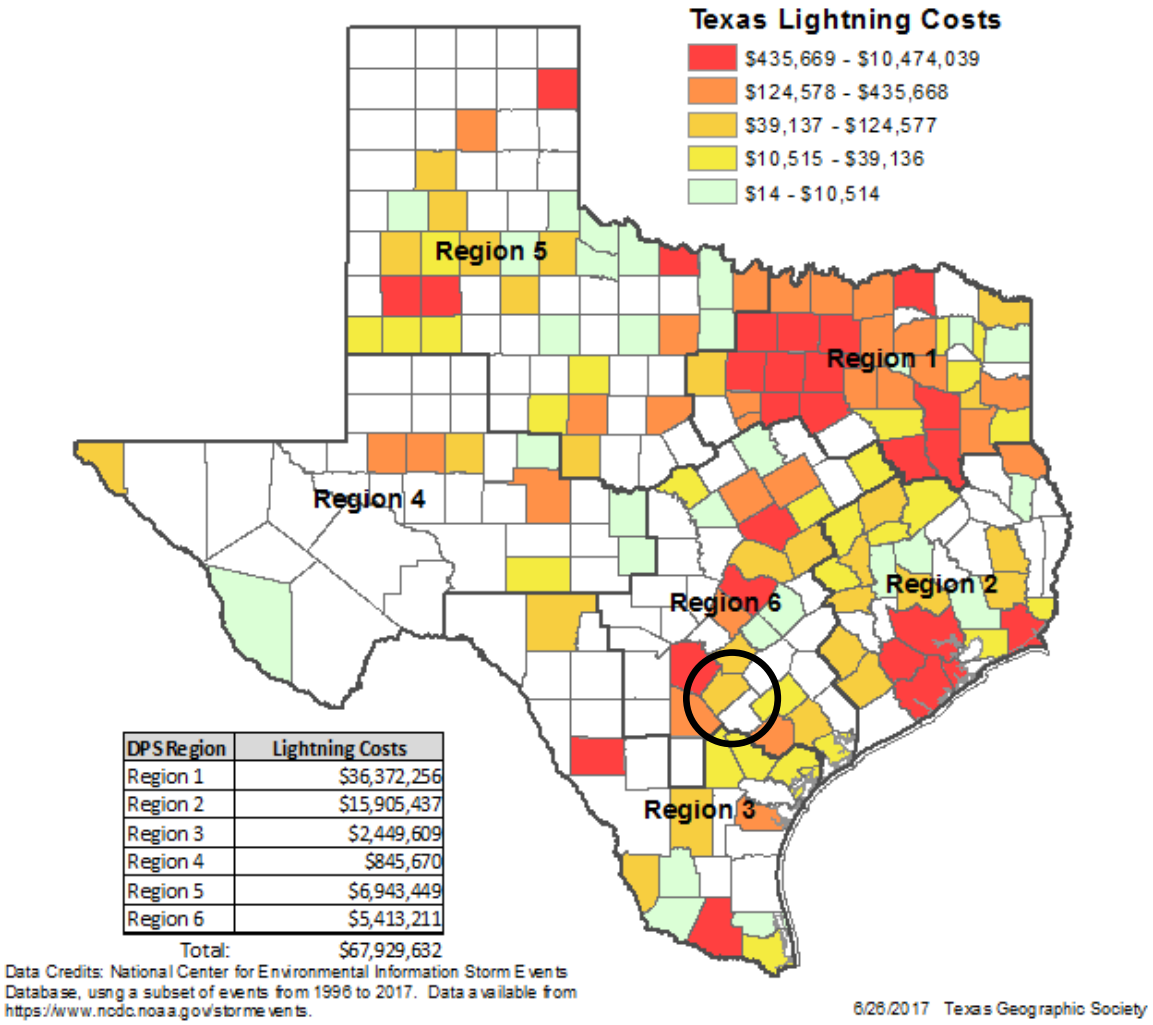
The Karnes and Wilson Counties planning area can generally experience all lightning activity levels based on the extent and location of thunderstorm conditions. Based on Figure 8.1, the norther portion of Wilson County is slightly more likely to experience a higher flash density, however, all areas are 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 -white represents zero-dollar losses.

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



DPS Region	Lightning Costs
Region 1	$36,372,256
Region 2	$15,905,437
Region 3	$2,449,609
Region 4	$845,670
Region 5	$6,943,449
Region 6	$5,413,211
Total:	$67,929,632

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 12 tank batteries in Falls City. 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	Crop Damage
THREE OAKS (Wilson County)	9/2/2016	0	0	$100,000	0

Significant Events

July 31, 1997 – Three Oaks near the Atascosa-Wilson County Line

A thunderstorm produced a lightning strike that ignited a tank battery fire in Falls City near the Atascosa-Wilson County line. Four of twelve saltwater batteries were destroyed and five site personnel had to shelter-in-place (SIP) as crews battled the fire.

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)
Wilson County	8/4/2005	Ricon	Stockdale VFD	10
Wilson County	8/4/2005	Osborne	Stockdale VFD	5
Wilson County	8/19/2005	Jarzombeck	Stockdale VFD	50
Wilson County	1/10/2006	Schumon	Stockdale VFD	8
Wilson County	1/30/2008	Rutledge	Sutherland Springs	2
Karnes County	6/21/2008	Thelma Nichols	Karnes VFD	1
Wilson County	6/25/2009	Andy Allen	Karnes VFD	30
Wilson County	7/18/2009	Brown Fire	Sutherland Springs	0.5

Wilson County	7/20/2009	Young Fire	La Vernia VFD	10
Wilson County	8/5/2009	Fire	La Vernia VFD	0
Wilson County	8/24/2010	Cemetery Ln Fire	La Vernia VFD	1
Wilson County	9/1/2010	Champions Strike Fire	La Vernia VFD	1
Wilson County	6/26/2012	Titzmann Fire	Floresville VFD	1
Wilson County	9/4/2013	Mason	Eagle Creek Volunteer Emergency	0.25
Wilson County	9/4/2013	Mason	Eagle Creek Volunteer Emergency	0.25
Karnes County	9/9/2015	Jesse Atzger	Karnes VFD	2

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 6-20 lightning flashes per square mile per year. Wilson County is 808 square miles and Karnes County is 754 square miles for a total of 1,562 square miles in the planning area. The Vaisala flash density estimate combined with the total area produces an estimate of approximately 9,372 to 31,240 flashes per year. A highly likely probability of occurrence for future lightning events in the Karnes and Wilson 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 Karnes and Wilson 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, 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 $4,762 (in 2016 dollars) for Wilson County and $0 (in 2016 dollars) for Karnes County.

Table 10-4, Wilson County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, Wilson County				
21-year Total	0	10	$100,000	$0
Per Year	0	0	$4,762	$0
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$2	$0
Per Year	0	0	$0	$0

Table 10-5, Karnes County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, Karnes 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	$0.00	$0.00
Per Year	0	0	$0.00	$0.00

Lightning Impact Forecast

Tables 10-6 and 10-7 show the forecast annual impacts of Tornados in Wilson and Karnes 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, Wilson County Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Lightning, Wilson County				
2019	0	0	$5,094	$0
2020	0	0	$5,209	$0
2021	0	0	$5,328	$0
2022	0	0	$5,448	$0
2023	0	0	$5,572	$0
Forecast Loss Summary				
5-year Total	0	0	$26,651	$0
Per Year	0	0	$5,330	$0
Per Capital Dollar Losses (2010 pop)				
5-year Total	0	0	$0.62	$0.00
Per Year	0	0	$0.12	$0.00

Table 10-7, Karnes County Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Hailstorms, Karnes 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	$0.00	$0.00
Per Year	0	0	$0.00	$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
Karnes City	**$0**	**$0**	**$0**
Kenedy	**$0**	**$0**	**$0**
Falls City	**$0**	**$0**	**$0**
Runge	**$0**	**$0**	**$0**
Floresville	**$15,024**	**$0**	**$15,204**
La Vernia	**$2,409**	**$0**	**$2,409**
Stockdale	**$3,360**	**$0**	**$3,360**
Poth	**$4,446**	**$0**	**$4,446**

SECTION 11: TORNADO

Description

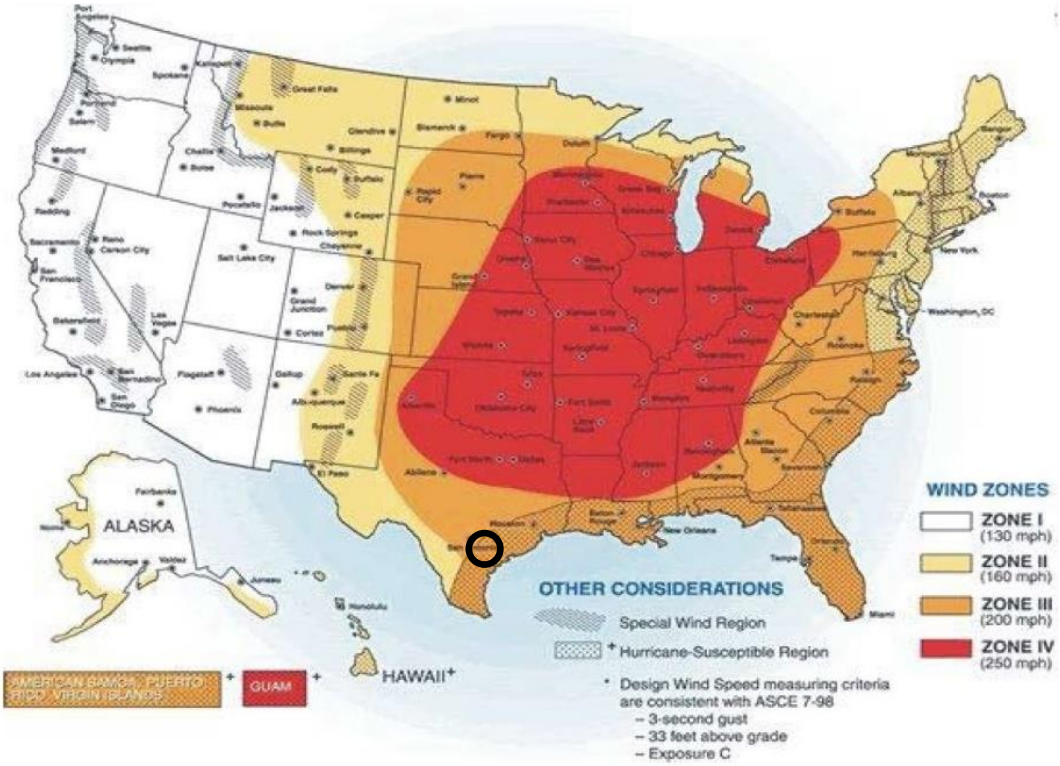
A tornado is a narrow, violently rotating column of air that extends from the base of a cumulonimbus cloud to the ground. Tornadoes, among the most violent storms on the planet, are capable of tremendous destruction with wind speeds that can reach as high as 250-300mph. Typically, the vortex of air will 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. Karnes and Wilson 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.

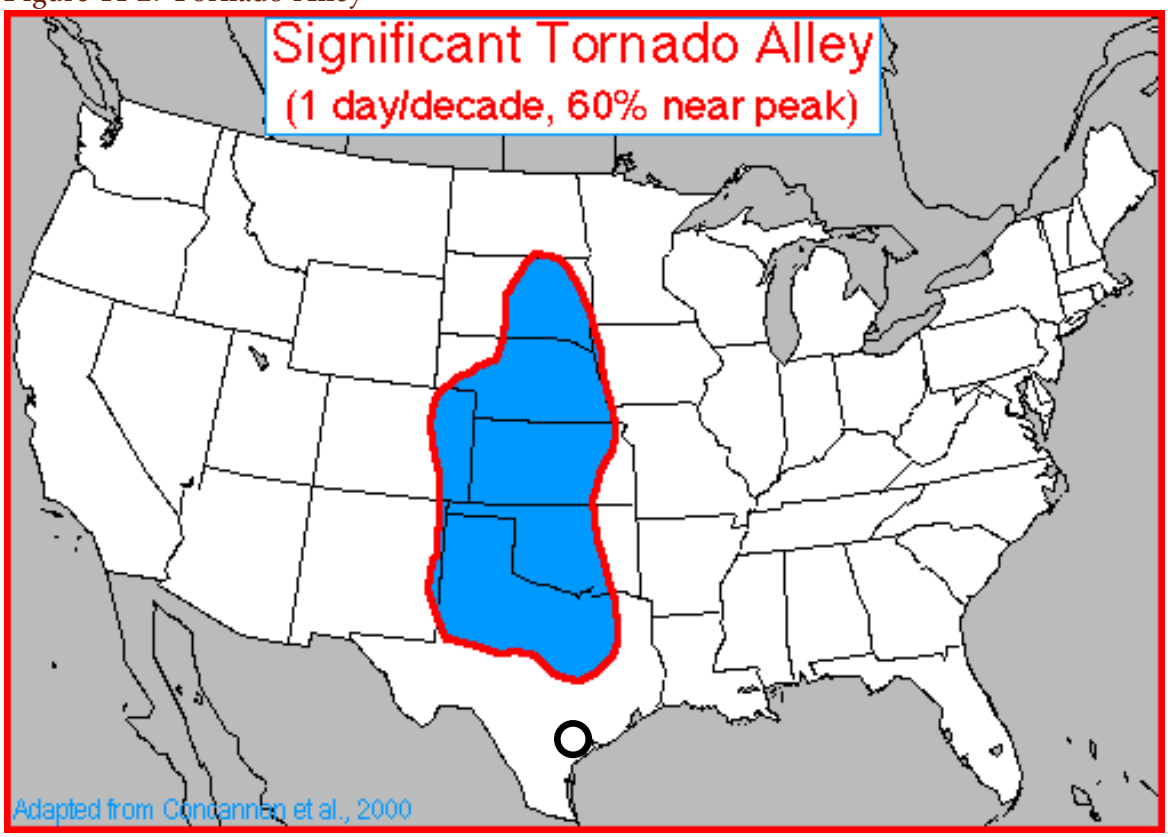
Figure 11-1: United States Wind Zones



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 Karnes and Wilson 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

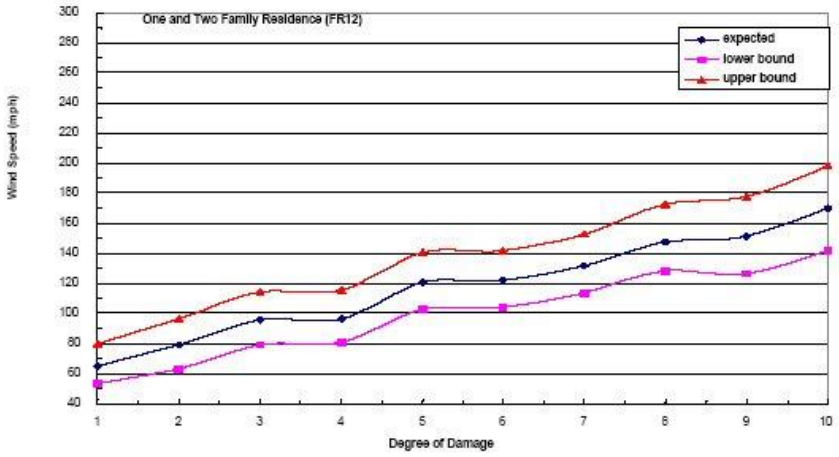
2. ONE-AND TWO-FAMILY RESIDENCES (FR12)
(1000 – 5000 sq. ft.)

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 Karnes and Wilson Counties planning area have been between EF0 to an EF2 (Table 11-3). However, because Karnes and Wilson 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 EF4.

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

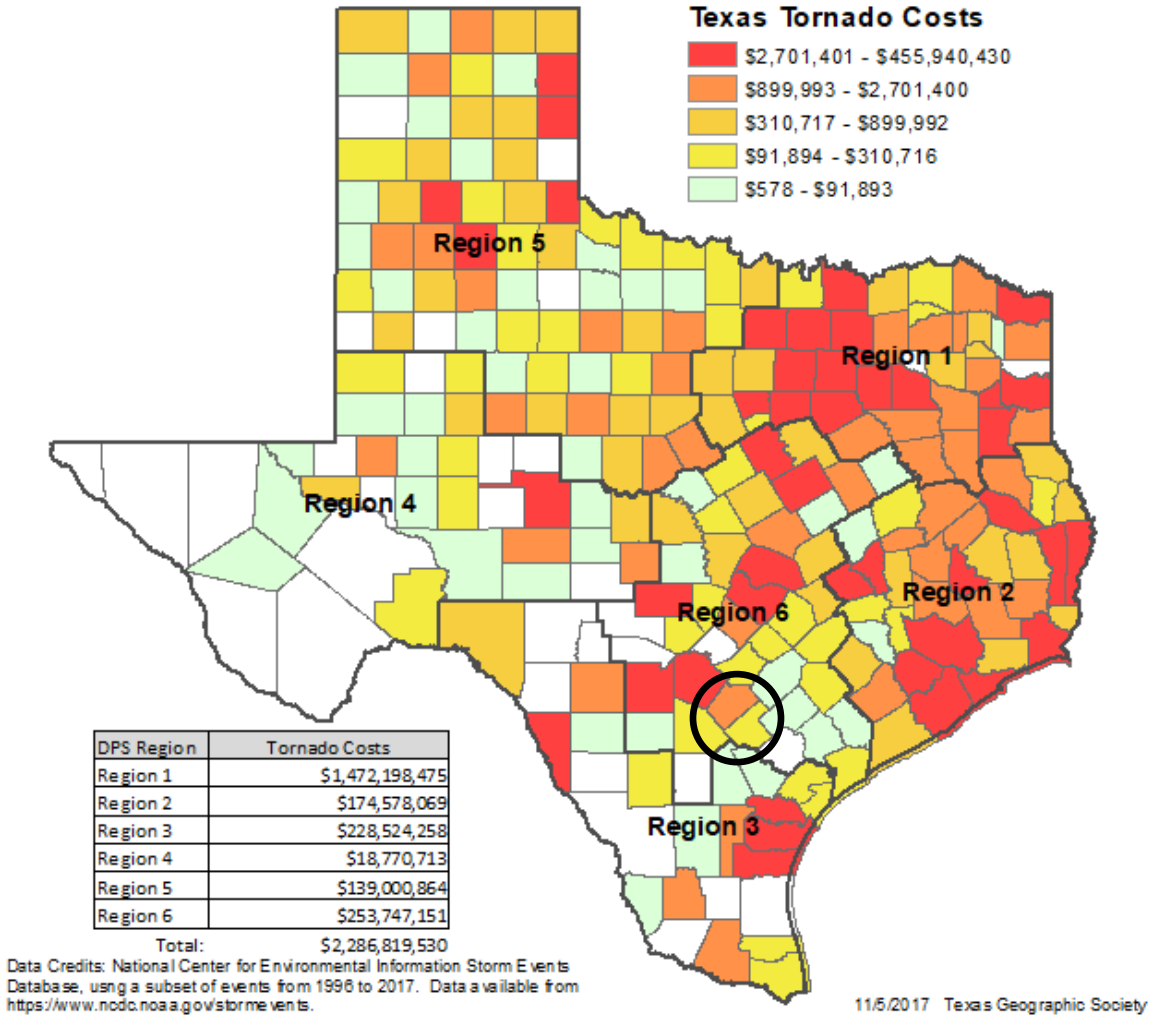


Table 11-3 lists historical tornado events in the planning area from 1996-2017 that were reported to the NCEI or NOAA. The impact of the tornado events in Karnes and Wilson Counties are listed by date with additional impact information related to the specific jurisdiction of touchdown, magnitude of event, 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)
Wilson	LA VERNIA	1998	February	F0	0	0		
Wilson	STOCKDALE	1999	January	F0	0	0		
Wilson	LA VERNIA	2000	May	F1	0	0	$111,266	
Wilson	FLORESVILLE	2001	May	F0	0	0	$20,285	
Karnes	KARNES CITY	2001	November	F0	0	0		
Karnes	KARNES CITY	2001	November	F1	0	0	$162,281	$40,570
Wilson	SASPAMCO	2003	June	F1	0	0	$3,905	
Karnes	KENEDY	2004	November	F0	0	0		
Wilson	POTH	2008	July	EF0	0	0	$11,124	
Wilson	KOSCIUSKO	2012	May	EF0	0	0		
Karnes	RUNGE	2012	March	EF0	0	0		
Wilson	LA VERNIA	2013	May	EF0	0	0	$25,697	
Wilson	POTH	2015	May	EF0	0	0		
Wilson	PANDORA	2015	May	EF0	0	0		
Wilson	FLORESVILLE	2015	October	EF2	0	0	$1,515,823	

Table 11-6: Historical Tornado Events Magnitude Summary, 1996 - 2007

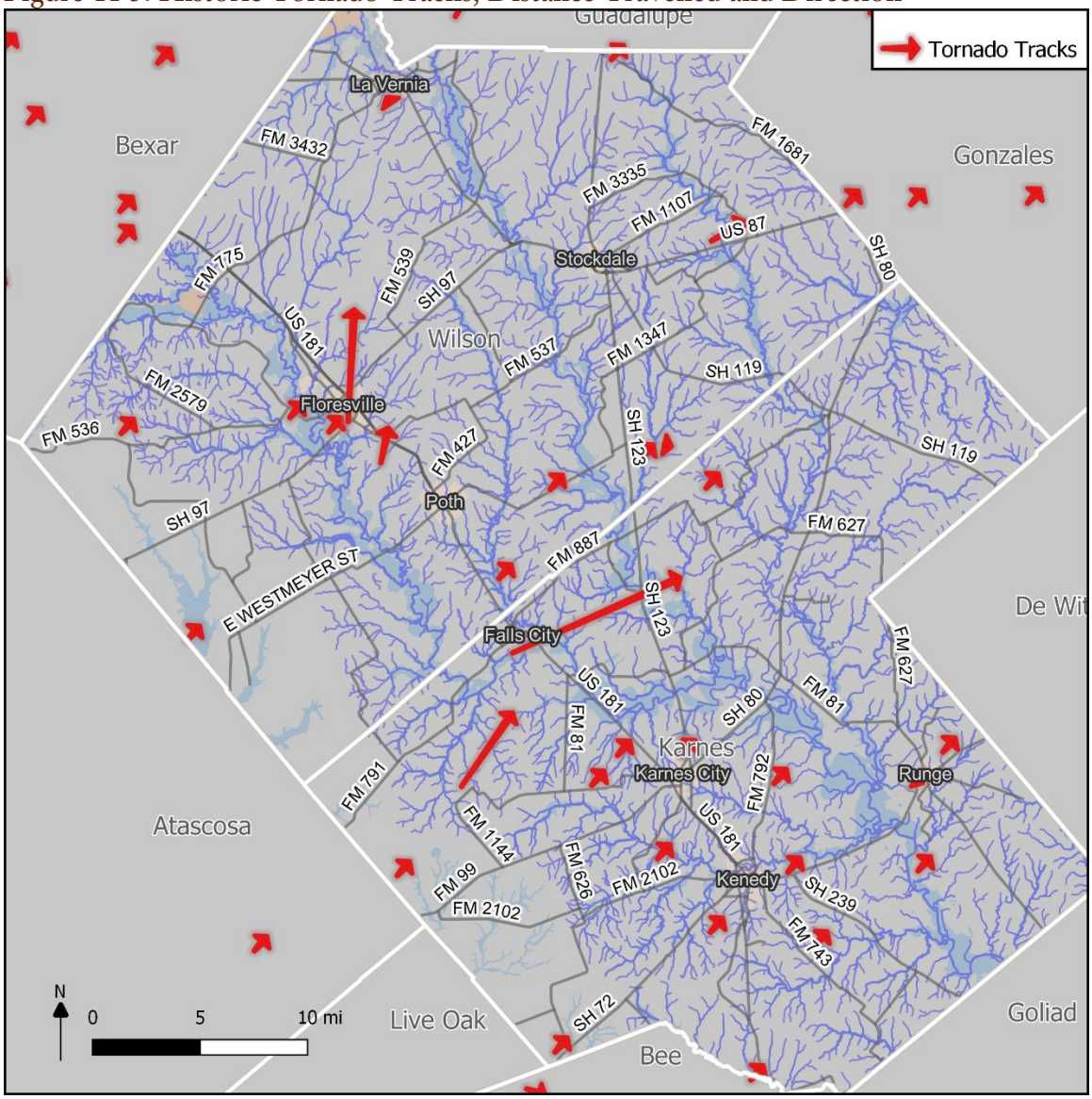
Number of Events	Magnitude (Fujita Scale)						
	N/A	F0	F1	F2	F3	F4	F5
8		5	3	0	0	0	0

Table 11-7: Historical Tornado Events Magnitude Summary, 2007-2017

Number of Events	Magnitude (Enhanced Fujita Scale)						
	N/A	EF0	EF1	EF2	EF3	EF4	EF5
7	0	6	0	1	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

May 19, 2000 – La Vernia, Wilson County

A small tornado struck a semi-rural area just southwest of the town of La Vernia. It damaged or destroyed several trees and caused damage to around a dozen homes. In a few cases, it pulled very large, old oak trees with diameters over two feet out of the

ground. An NWS survey revealed that the tornado was apparently lifting up and touching down along much of its half-mile path.

November 15, 2001 – Karnes City, Karnes County
A small tornado, rated F0, touched down briefly in an open area near Karnes City. No damage was indicated. A second and more intense Karnes County tornado touched down west of Karnes City near the Wilson County line. Rated F1, it destroyed a trailer, a metal barn, and literally hundreds of trees as it moved northeast for just over two miles.

October 30, 2015 – Wilson County
A warm front combined with an upper level trough and deep moisture produced heavy rainfall and severe thunderstorms across much of South-Central Texas on October 30th and 31st. Damage surveys confirmed four tornadoes. Along with the severe weather, excessive rainfall resulted in widespread flash flooding along the Interstate 35 corridor. A tornado touched down near Hickory Circle about 0.5 miles south of Floresville with an enhance Fujita scale Magnitude of EF2. The tornado produced tree and minor roof damage across several city streets as it moved north. The damage increased in coverage and intensity as it approached Hwy 181. Just east of the intersection of Hwy 181 and Hwy 97, substantial roof damage was observed to a few homes as well as businesses along Hwy 181. This included several campers and recreational vehicles that were destroyed. One 5th wheel camper was thrown on top of a local hotel. One large billboard metal sign and structure was destroyed along with multiple power poles. The damage peaked at Floresville high school. A large two-story classroom building on campus had the upper story wall collapse inward which appears to have caused a partial roof collapse of the building. The other side of the building had its wall blown out toward Hwy 97. Winds were estimated to be 120 mph. Other minor window damage and impact damage was observed at the school. The tornado weakened as it continued north of the high |school and west of Hwy 97, producing minor roof, shingle, and tree damage. City damage is estimated at 1.5 million dollars, this does not include insured losses and damage to the High School.

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 11-8 provides a general overview of tornado severity, probability, fatality impacts, and defining characteristics.

Table 11-8: 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 15 events in a 21-year reporting period. This provides a probability of occurrence of approximately once every year for the Karnes and Wilson Counties planning area. This frequency supports a highly likely probability of future events for the planning area, including all participating jurisdictions, 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

All existing and future buildings, facilities and populations in the Karnes and Wilson 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 Karnes and Wilson 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 11-9. Structures at Greater Risk by Jurisdiction

Jurisdiction	Total Housing Units	Manufactured Homes	Housing units built prior to 1980
City of Karnes	1,088	174 (16.0%)	759 (69.8%)
City of Kenedy	1,350	68 (0.1%)	1,017 (75.3%)
City of Falls City	325	90 (27.7%)	193 (59.4%)
City of Runge	487	74 (15.2%)	388 (79.7%)
Karnes County*	**5,809**	**847 (14.6%)**	**3,664 (63.1%)**
City of Floresville	2,753	469 (17.0%)	1,269 (46.1%)
City of La Vernia	441	63 (14.3%)	169 (38.3%)
City of Poth	696	103 (14.8%)	371 (53.3%)
City of Stockdale	528	117 (22.2%)	296 (56.1%)
Wilson County*	**16,979**	**4,370 (25.7%)**	**4,465 (26.3%)**
Planning Area Totals	*22,788*	*5,217 (22.9%)*	*8,129 (35.7%)*

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

Based on 2016 American Community Survey estimates, there are 16,979 housing units in Wilson County of which 25.7%, or 4,370 units, are mobile homes. There are 5,809 housing units in Karnes County of which 14.6%, or 847 units, are mobile homes. In addition, 35.7% (approximately 8,129 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 2016 data, Karnes 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. Wilson County is at a higher risk of damage from tornados when considering the total number and ratio of manufactured homes.

Historic Tornado Impacts

Below are summary tables aggregated by County, 11-10 and 11-11, 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 Wilson County and $7,728 (in 2016 dollars) for Karnes County.

Table 11-10, Wilson County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, Wilson 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 11-11, Karnes County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, Karnes County				
21-year Total	0	0	$162,281	$40,570
Per Year	0	0	$7,728	$1,932
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$11.00	$3.00
Per Year	0	0	$1.00	$0

Tornado Impact Forecast

Tables 11-12 and 11-13 show the forecast annual impacts of Tornados in Wilson and Karnes 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 11-12, Wilson County Tornado Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Tornados, Wilson County				
2019	0	0	$85,986	$0
2020	0	0	$87,938	$0
2021	0	0	$89,934	$0
2022	0	0	$91,976	$0
2023	0	0	$94,064	$0
Forecast Loss Summary				
5-year Total	0	0	$449,989	$0
Per Year	0	0	$89,980	$0

Per Capital Dollar Losses (2010 pop)				
5-year Total	0	0	$10.48	$0.00
Per Year	0	0	$2.10	$0.00

Table 11-13, Karnes County Tornado Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Tornados, Karnes County				
2019	0	0	$7,922	$1,932
2020	0	0	$7,987	$1,932
2021	0	0	$8,053	$1,932
2022	0	0	$8,120	$1,932
2023	0	0	$8,188	$1,932
Forecast Loss Summary				
5-year Total	0	0	$40,270	$9,660
Per Year	0	0	$8,054	$1,932
Per Capital Dollar Losses (2010 pop)				
5-year Total	0	0	$2.72	$0.65
Per Year	0	0	$0.54	$0.13

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 11-10 and 11-11 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
Karnes City	$33,301	$113	$33,414
Kenedy	$36,082	$196	$36,278
Falls City	$6,689	$49	$6,738
Runge	$11,287	$66	$11,352
Floresville	$253,620	$0	$253,620
La Vernia	$40,670	$0	$40,670

Stockdale	$56,718	$0	$56,718
Poth	$75,048	$0	$75,048

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 Karnes and Wilson 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

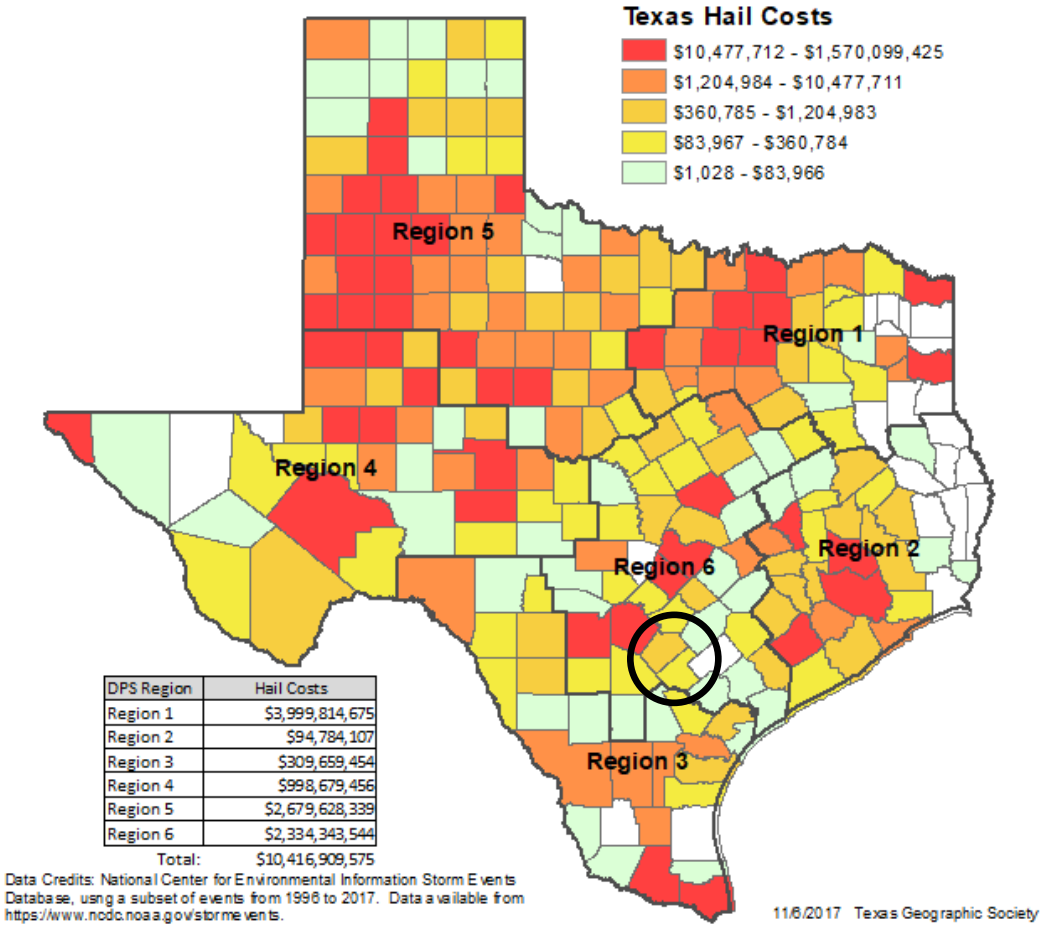
Source: NCEI Intensity Scale, based on the TORRO Hailstorm Intensity Scale.

The Wilson and Karnes 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 Karnes and Wilson 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 Karnes and Wilson 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

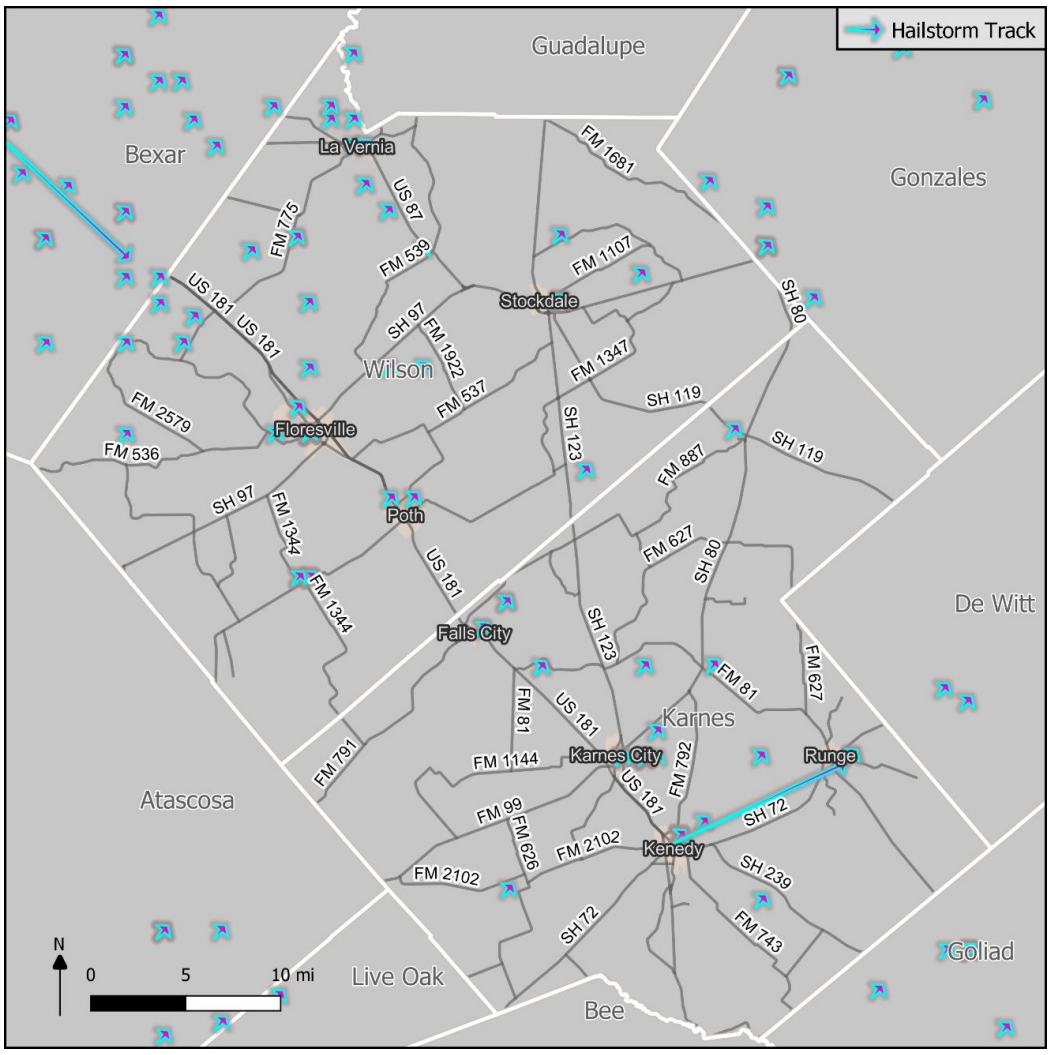
County	Jurisdiction	Year	Month	Magnitude	Injuries	Fatalities	Property Damage (adj2016)	Crop Damage (adj2016)
Wilson	FLORESVILLE	1997	April	0.75	0	0		
Karnes	HOBSON	1997	May	0.75	0	0		
Wilson	LA VERNIA	1998	February	0.75	0	0		
Wilson	POTH	1998	February	0.75	0	0		
Wilson	LA VERNIA	1998	February	0.75	0	0		
Wilson	FLORESVILLE	1998	March	0.75	0	0		
Wilson	STOCKDALE	1998	June	0.75	0	0		
Karnes	KARNES CITY	1998	February	0.75	0	0		
Karnes	KARNES CITY	1998	February	0.75	0	0		

Karnes	KENEDY	1998	February	0.75	0	0		
Wilson	SUTHERLAND SPGS	1999	March	0.75	0	0		
Wilson	LA VERNIA	1999	March	0.75	0	0		
Wilson	FLORESVILLE	2000	March	1.75	0	0		
Karnes	FALLS CITY	2000	March	1.75	0	0		
Karnes	KARNES CITY	2000	March	1.75	0	0		
Karnes	PANNA MARIA	2000	April	1.25	0	0	$41,725	$69,541
Wilson	LA VERNIA	2001	April	0.75	0	0		
Wilson	FLORESVILLE	2001	May	1.75+	0	0	$67,617	$67,617
Wilson	DEWEES	2001	May	1.75	0	0	$27,047	$27,047
Wilson	STOCKDALE	2001	May	4	0	0	$202,851	$270,469
Wilson	FLORESVILLE	2002	April	0.75	0	0		
Wilson	FLORESVILLE	2002	April	1.75	0	0		
Wilson	SUTHERLAND SPGS	2002	December	2	10	0	$399,389	
Wilson	FLORESVILLE	2002	December	1.75	0	0	$39,939	
Karnes	KENEDY	2002	May	0.75	0	0		
Wilson	FLORESVILLE	2003	February	0.75	0	0		
Karnes	KENEDY	2004	Novembe r	1.75	0	0		
Karnes	KARNES CITY	2004	Novembe r	1.75	0	0		
Wilson	LA VERNIA	2005	April	1	0	0		
Karnes	RUNGE	2005	May	0.75	0	0		
Karnes	GILLETT	2006	May	1	0	0		
Karnes	KENEDY	2006	May	1	0	0		
Karnes	KENEDY	2006	December	1.75	0	0		
Wilson	LA VERNIA	2007	April	0.88	0	0		
Karnes	KARNES CITY	2007	March	0.75	0	0		
Wilson	LA VERNIA	2009	April	1.75	0	0		
Wilson	LA VERNIA	2011	Septembe r	0.88	0	0		
Wilson	KOSCIUSKO	2012	May	1.75	0	0		
Wilson	LA VERNIA	2012	May	0.75	0	0		
Wilson	LABATT	2013	April	0.75	0	0		
Wilson	POTH	2013	April	1.75	0	0		
Wilson	THREE OAKS	2013	April	1.25	0	0		
Wilson	POTH	2013	April	1.75	0	0		
Wilson	FLORESVILLE	2013	May	0.88	0	0		
Wilson	FLORESVILLE	2014	April	1.25	0	0		
Wilson	FLORESVILLE	2014	April	0.88	0	0		
Wilson	ALUM	2014	April	1	0	0		
Wilson	STOCKDALE	2014	April	1.75	0	0		
Wilson	ALUM	2014	April	1.75	0	0		
Wilson	LA VERNIA	2015	April	0.75	0	0		
Wilson	CALAVERAS	2015	April	0.75	0	0		

Wilson	LABATT	2015	April	1.75	0	0		
Wilson	FLORESVILLE	2015	April	1	0	0		
Wilson	LA VERNIA	2015	May	0.88	0	0		
Karnes	FALLS CITY	2015	April	1	0	0		
Wilson	LABATT	2016	January	1	0	0		
Wilson	LABATT	2016	March	1	0	0		
Wilson	LABATT	2016	March	1	0	0		
Wilson	FLORESVILLE	2016	March	1	0	0		
Wilson	SUTHERLAND SPGS	2016	March	0.75	0	0		
Wilson	LA VERNIA	2016	May	1.75	0	0		
Wilson	LA VERNIA	2016	May	0.75	0	0		

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

Figure 12-2: Hailstorm Event Tracks



Significant Events

December 23, 2002 – Sutherland Springs, Wilson County

Widespread damage was reported to vehicles, as well as the roofs, walls and windows of buildings over the northern half of Wilson County. The hail ranged from 1 to 2 inches in diameter. The larger size fell around Stockdale, killing birds that were roosting in trees and piling up in the city streets 6 inches deep. Residents reported that the sound of the hail was almost deafening. Damage to city-owned properties in Stockdale alone was estimated at $100,000. Hail broke windows at one nursing home, with minor injuries to some residents.

May 20, 2001 – Stockdale, Wilson County

Very large hail damaged homes and vehicles and destroyed corn, hay and other crops in the area.

April 3, 2000 – Panna Maria, Karnes County

Large hail, driven by strong winds, caused widespread damage to windows of homes and vehicles in and around Panna Maria. Damage was also reported to gardens and crops in the area.

Probability of Future Events

Based on available records of historic events there were 62 events in a 21-year reporting period for the Karnes and Wilson 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 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 Karnes and Wilson 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
City of Karnes	1,088	174 (16.0%)	759 (69.8%)
City of Kenedy	1,350	68 (0.1%)	1,017 (75.3%)
City of Falls City	325	90 (27.7%)	193 (59.4%)
City of Runge	487	74 (15.2%)	388 (79.7%)
Karnes County*	**5,809**	**847 (14.6%)**	**3,664 (63.1%)**
City of Floresville	2,753	469 (17.0%)	1,269 (46.1%)
City of La Vernia	441	63 (14.3%)	169 (38.3%)

City of Poth	696	103 (14.8%)	371 (53.3%)
City of Stockdale	528	117 (22.2%)	296 (56.1%)
Wilson County*	**16,979**	**4,370 (25.7%)**	**4,465 (26.3%)**
Planning Area Totals	*22,788*	*5,217 (22.9%)*	*8,129 (35.7%)*

*County totals include all jurisdictions in addition to unincorporated areas
Source: 2012-2016 American Community Survey 5-year estimate, selected housing characteristics

Based on 2016 American Community Survey estimates, there are 16,979 housing units in Wilson County of which 25.7%, or 4,370 units, are mobile homes. There are 5,809 housing units in Karnes County of which 14.6%, or 847 units, are mobile homes. In addition, 35.7% (approximately 8,129 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 2016 data, Karnes County is at higher risk of damage from hailstorm when considering age of residential structures and the higher standard of building codes enacted after 1980. Wilson County is at a higher risk of damage from hailstorms when considering the total 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 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 $52,475 (in 2016 dollars) for Wilson County and $5,298 (in 2016 dollars) for Karnes County.

Table 12-4, Wilson County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, Wilson County				
21-year Total	0	10	$736,843	$365,133
Per Year	0	0	$35,088	$17,387
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$17	$9
Per Year	0	0	$1	$0

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

Table 12-5, Karnes County Loss Summary

Time Period	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Loss Summary, Karnes County				
21-year Total	0	0	$41,725	$69,541
Per Year	0	0	$1,987	$3,311
Per Capita Dollar Losses (2010 Pop)				
21-year Total	0	0	$3.00	$5.00
Per Year	0	0	$0.00	$0.00

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 Wilson and Karnes 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 12-6, Wilson County Tornado Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Hailstorms, Wilson County				
2019	0	1	$37,532	$17,387
2020	0	1	$38,384	$17,387
2021	0	1	$39,256	$17,387
2022	0	1	$40,147	$17,387
2023	0	1	$41,058	$17,387
Forecast Loss Summary				
5-year Total	0	3	$196,377	$86,396
Per Year	0	1	$39,275	$17,387
Per Capital Dollar Losses (2010 pop)				
5-year Total	0	0	$4.58	$2.03
Per Year	0	0	$0.92	$0.41

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

Table 12-7, Karnes County Tornado Impacts Forecast by Year

Year	Fatalities	Injuries	Property Damage (Adj 2016)	Crop Damage (Adj 2016)
Forecast Impacts for Hailstorms, Karnes County				
2019	0	0	$2,037	$3,311
2020	0	0	$2,054	$3,311
2021	0	0	$2,071	$3,311
2022	0	0	$2,088	$3,311
2023	0	0	$2,105	$3,311
Forecast Loss Summary				
5-year Total	0	0	$10,354	$16,557
Per Year	0	0	$2,071	$3,311
Per Capital Dollar Losses (2010 pop)				
5-year Total	0	0	$0.70	$1.12
Per Year	0	0	$0.14	$0.22

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
Karnes City	$8,562	$194	$8,756
Kenedy	$9,277	$336	$9,613
Falls City	$1,720	$84	$1,804
Runge	$2,902	$113	$3,014
Floresville	$110,703	$2,576	$113,279
La Vernia	$17,752	$1,085	$18,837
Stockdale	$24,757	$768	$25,525
Poth	$32,758	$1,446	$34,204

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 Karnes and Wilson 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 Karnes and Wilson 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.

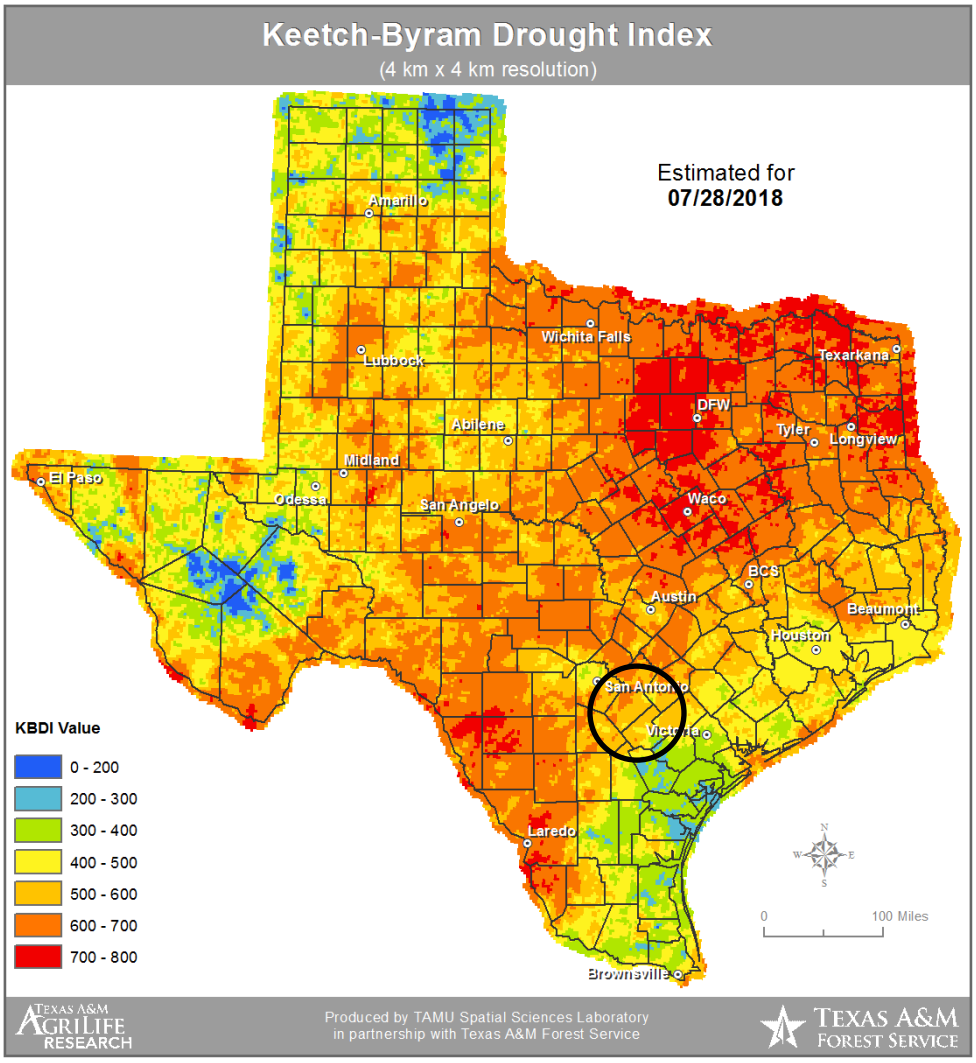
Table 13-2, 2018 Karnes and Wilson Counties Planning Area KBDI Values

	KBDI Mean	KBDI Maximum	KDBI Minimum
Karnes	503.68	604	260
Wilson	570.01	660	400

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

The 2018 average KBDI values for the planning area is within the 500-600 range and is the average extent to be mitigated for (Table 13-2). Based on figure 13-1 below, areas of northern Wilson County have values in the 600-700 range as of the time of this report, late summer 2018. 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 7/28/2018



https://twc.tamu.edu/kbdi

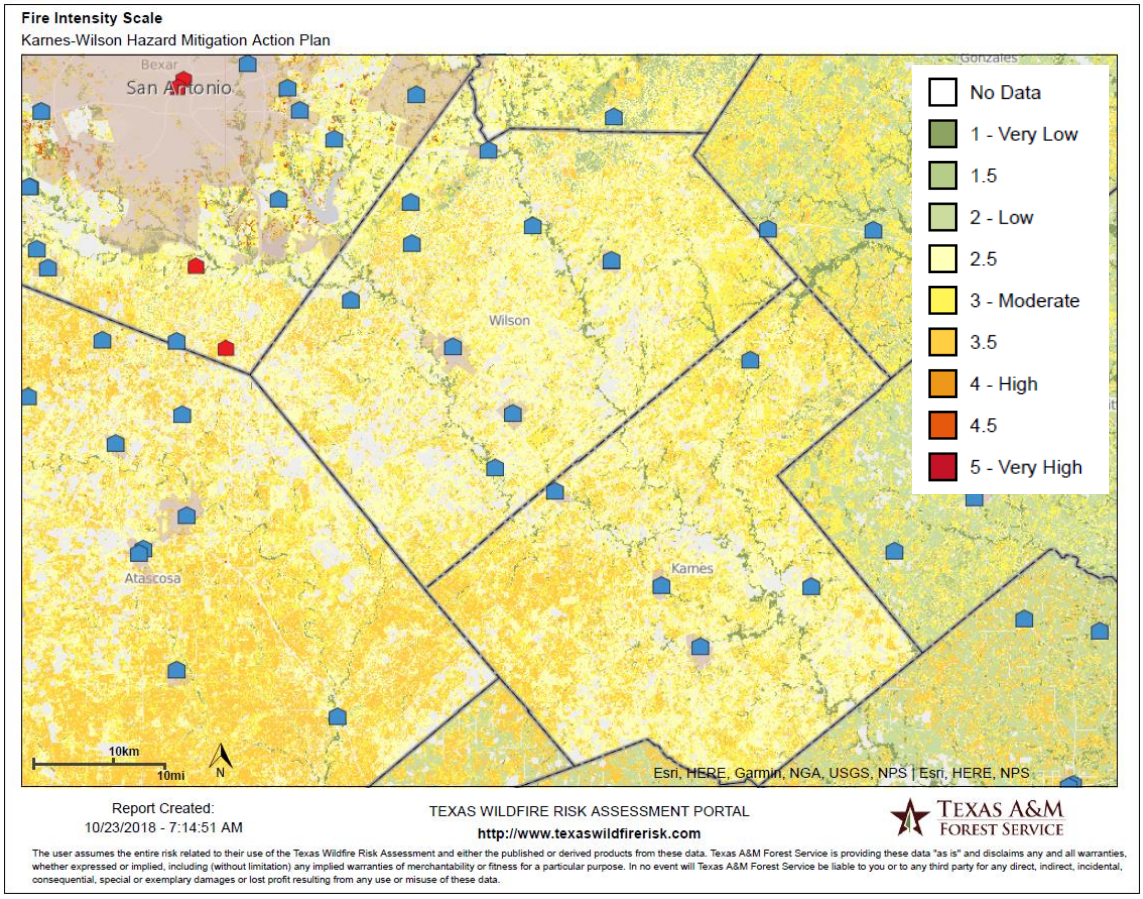
The Texas Wildfire Risk Assessment Portal (TXWRAP) is the primary mechanism for the Texas A&M Forest Service to deploy risk information and create awareness about wildfire issues across the state. www.TexasWildfireRisk.com The tool uses the Fire Intensity Scale (FIS) layer to determine the potential 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 Karnes and Wilson Counties planning area is at a moderate potential wildfire intensity uniformly. Figure 13-2 identifies the wildfire intensity for the Karnes and Wilson Counties planning area. The blue building markers on the map represent fire station locations.

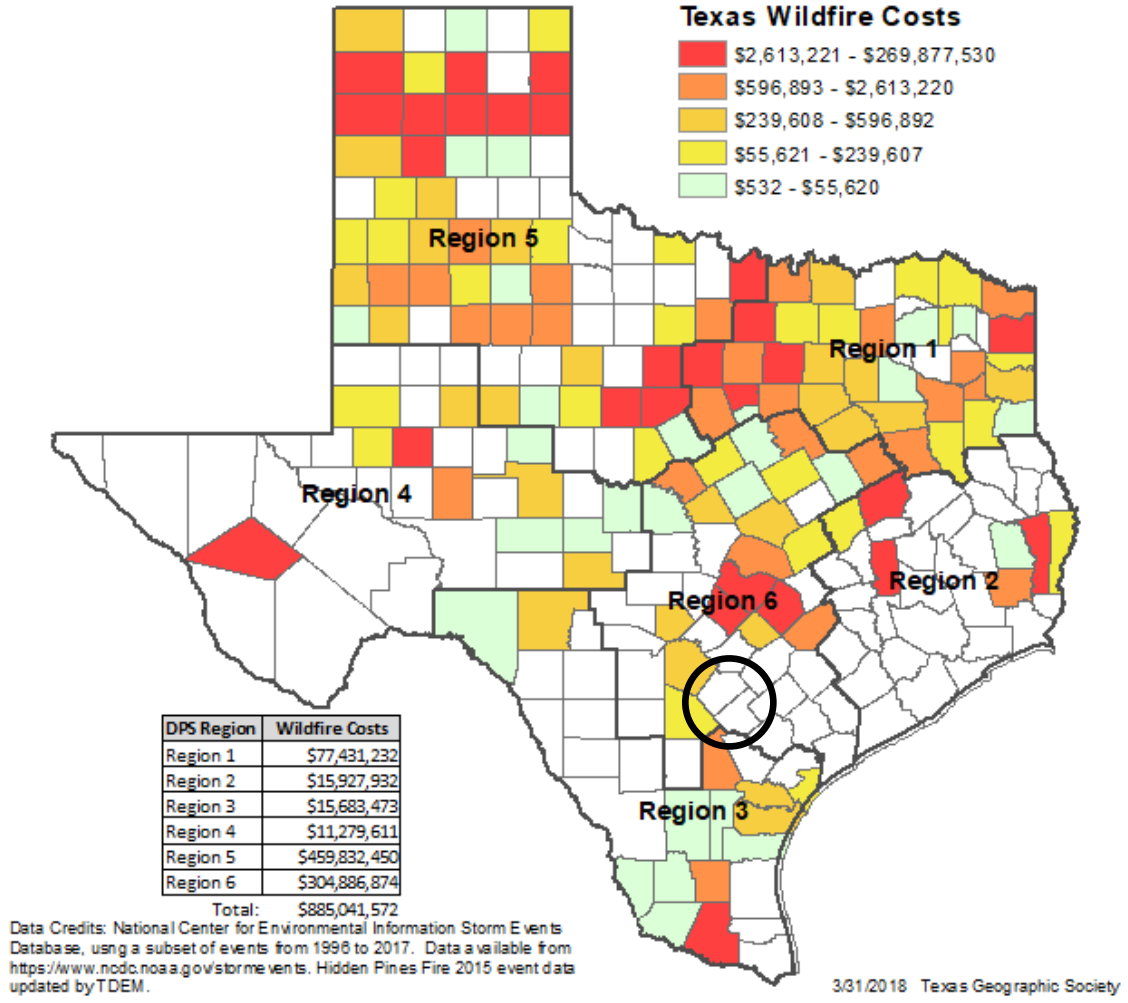
Figure 13-2, Fire Intensity Scale



Historical Occurrences

Figure 13-3 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 these sorts of impacts -white represents zero-dollar losses.

Figure 13-3, State of Texas Wildfire Impacts



As is evident from figure above, the NCEI storm events database does not have any wildfire occurrence information with damage estimates of impacts, injuries, or fatalities in the planning area from 1996-2015. The Texas Forest Service (TFS), however, 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 1,425 wildfire events in the Karnes and Wilson 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 map below shows approximate locations of wildfires in Karnes and Wilson Counties and the cause of ignitions.

Figure 13-4, Historical Wildfire Events in Karnes and Wilson Counties, 2005 – 2015

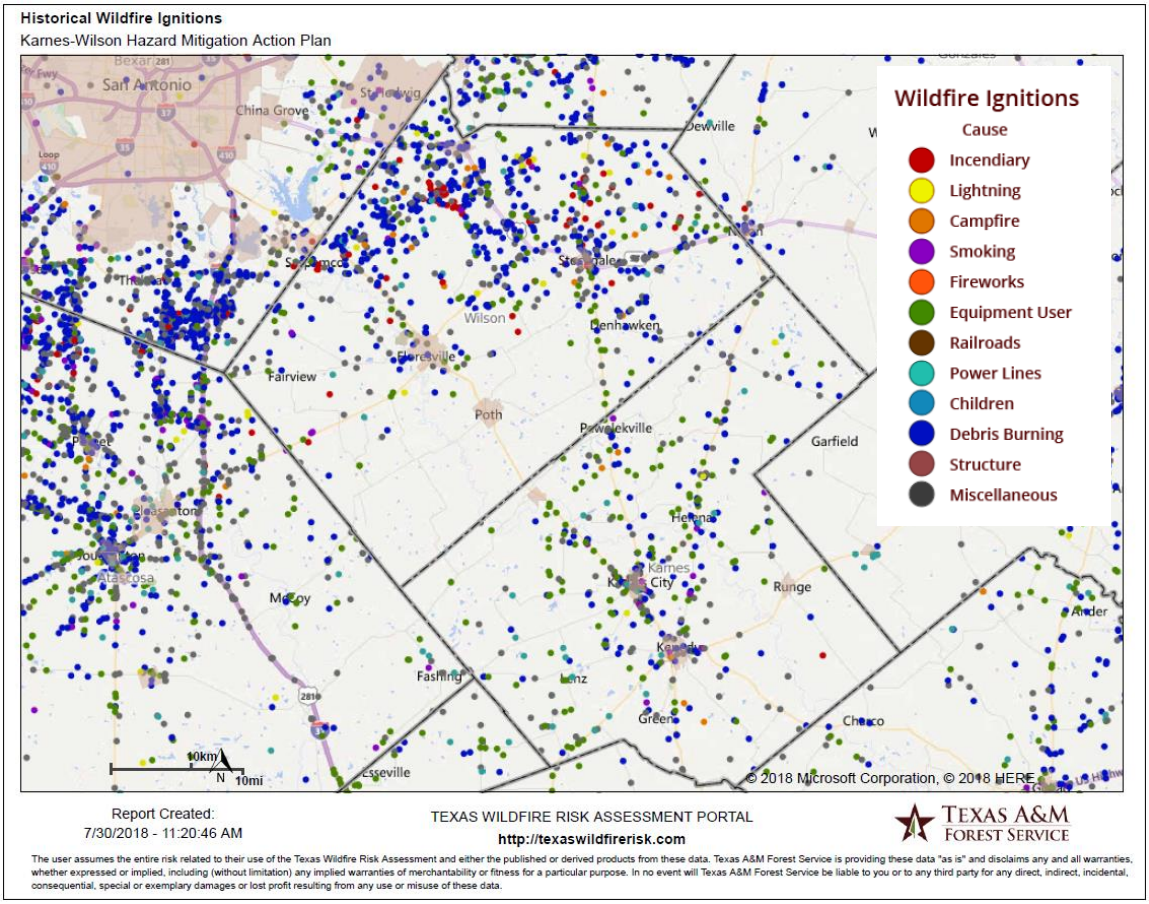


Table 13-3 below lists the ignition causes for all wildfires in the planning area between 2005-2015, the number of times of each unique ignition cause, and the percent of total ignitions.

Table 13-3, Ignition cause distribution in planning area from 2005-2015

Ignition Cause	Count	% of Total
Campfire	22	2%
Children	16	1%
Debris burning	602	42%
Equipment use	245	17%
Incendiary	89	6%
Lightning	17	1%
Miscellaneous	359	25%

Power Lines	47	3%
Smoking	28	2%
Grand Total	**1,425**	**100%**

Source: Texas Wildfire Risk Assessment Portal(TxWRAP)

Probability of Future Events

Based on reported historical occurrences of wildfire, 1425 wildfire events occurred in an 11-year reporting period for Karnes and Wilson Counties. This establishes an approximate probability of occurrence of 130 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.

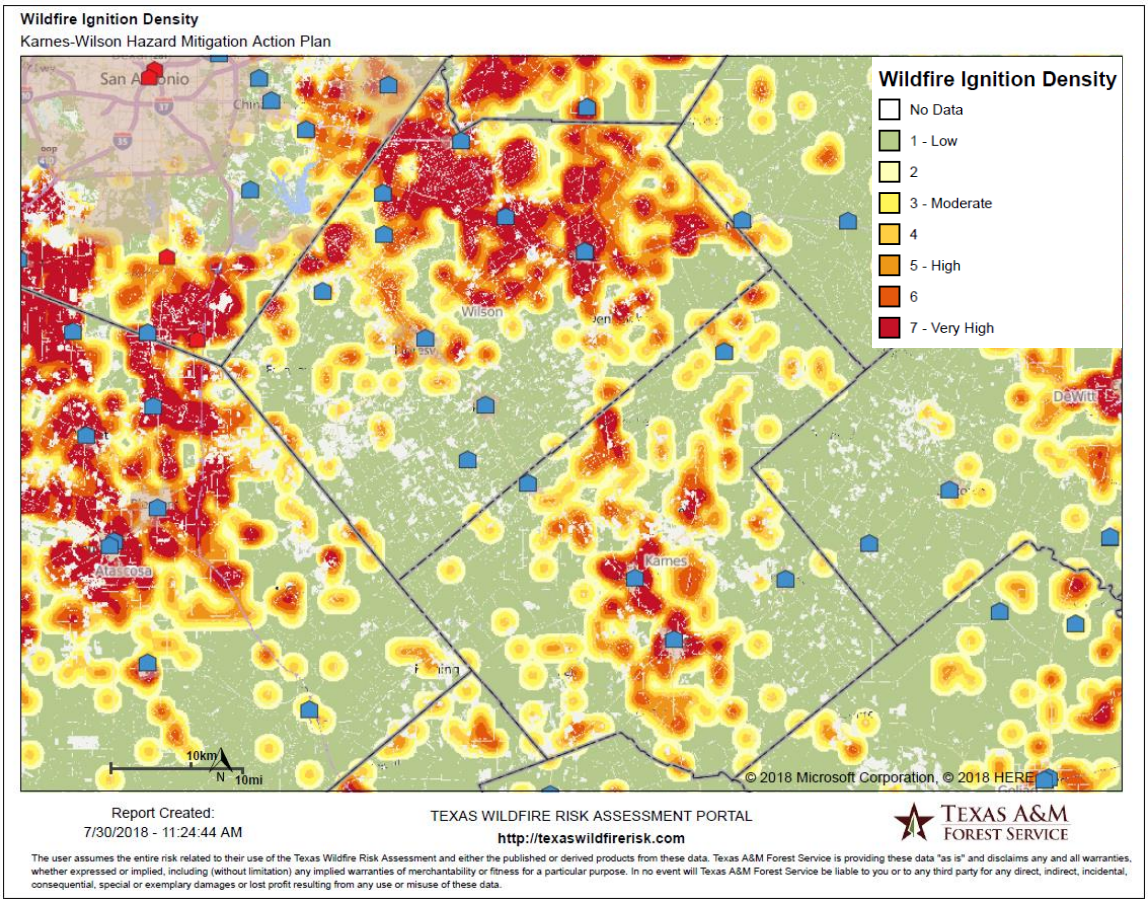
Frequency of Occurrence	
Highly likely:	Event probable in next year.
Likely:	Event probable in next 3 years.
Occasional:	Event possible in next 5 years.
Unlikely:	Event possible in next 10 years.

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 13-5 shows Karnes and Wilson Counties and the threat of wildfire across the planning area.

Figure 13-5: 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 Karnes and Wilson 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.

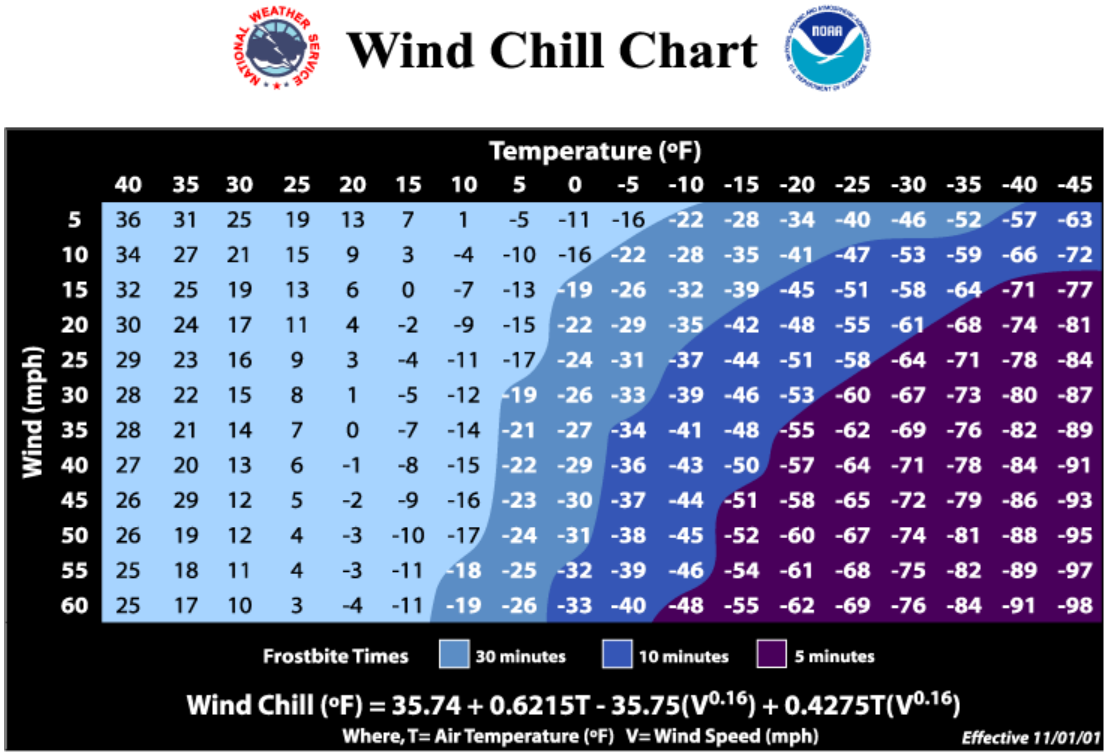
Table 14-1: Magnitude of Severe Winter Storms

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

The planning area has an anticipated range of mild to extreme severe winter storms and as low as 0-degree wind chills.

Historical Occurrences

Based on NCEI data, from 1996 through August 2017 the Karnes and Wilson 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)
Wilson	Winter Storm	1997	January	0	0	$0	$0

Karnes	Winter Storm	1997	January	0	0	$0	$0
Wilson	Winter Storm	2000	December	0	0	$0	$0
Karnes	Heavy Snow	2004	December	0	0	$0	$0
Wilson	Winter Storm	2007	January	0	0	$0	$0
Wilson	Winter Storm	2011	February	0	0	$0	$0
Karnes	Winter Storm	2011	February	0	0	$0	$0
Wilson	Winter Weather	2013	December	0	0	$0	$0

Significant Events

December 25, 2004 – Karnes County

The extremely unusual snow event turned into a White Christmas for Karnes County. Snow began falling in the evening of December 24, with the heavier amounts falling in the southeast part of the county. Heaviest amounts were estimated at 4 inches just before midnight and the snow continued to fall through the night. It finally reached a total of one inch in Falls City, five inches in Karnes City, six to eight inches in Kenedy, and seven inches in Runge. It was reported to be as deep as 10 to 12 inches in the southern part of the county. The snow began melting in the mid-morning and was gone by mid-afternoon.

Probability of Future Events

According to historical records the Karnes and Wilson Counties planning area experiences approximately one winter storm event every three 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 Karnes and Wilson 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 8,926 or 29.1% of the total population and children under the age of 5 is 3,490 or 11.3% of the total population, a total of 13,419 potentially vulnerable residents. Table 14-4 presents the 2016 American Community Survey population and age cohort estimates on the following page.

Table 14-4: Populations at Greater Risk by Jurisdiction

Jurisdiction	Population 65 and Older	Population Under 5
City of La Vernia	192/ 18%	19/ 1.8%
City of Floresville	1,230/ 17.2%	250/ 3.5%
City of Poth	241/ 11.6%	188/ 9.1%
City of Stockdale	219/ 15.2%	141/ 9.8%
Wilson County	**6,760/ 14.6%**	**2,672/ 5.8%**
City of Karnes	462/ 14.1%	285/ 8.7%
City of Kenedy	501/ 14.7%	185/ 5.4%
City of Runge	282/ 23.3%	89/ 7.7%
City of Falls City	96/ 14.5%	31/ 4.7%
Karnes County	**2,166/ 14.5%**	**818/ 5.5%**
Total	**8,926**	**3,490**

Source: 2016 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

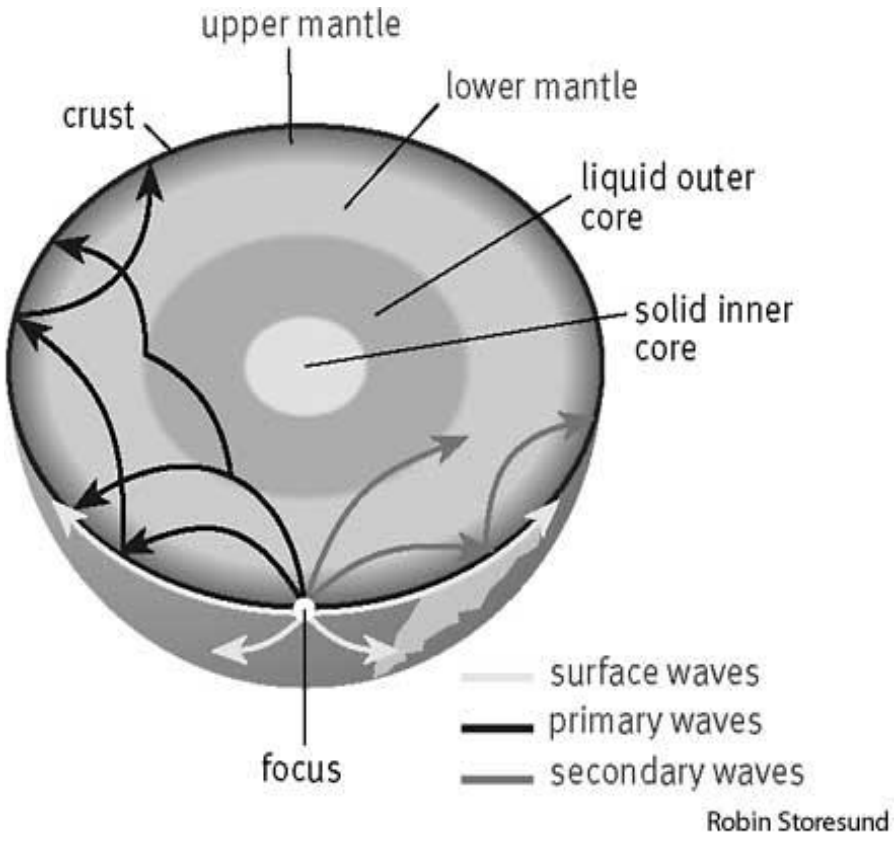
No injuries, fatalities, property or crop damages were reported in the 21-year period of analysis. Based on historical records, forecast impact estimates are considered to be negligible.

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



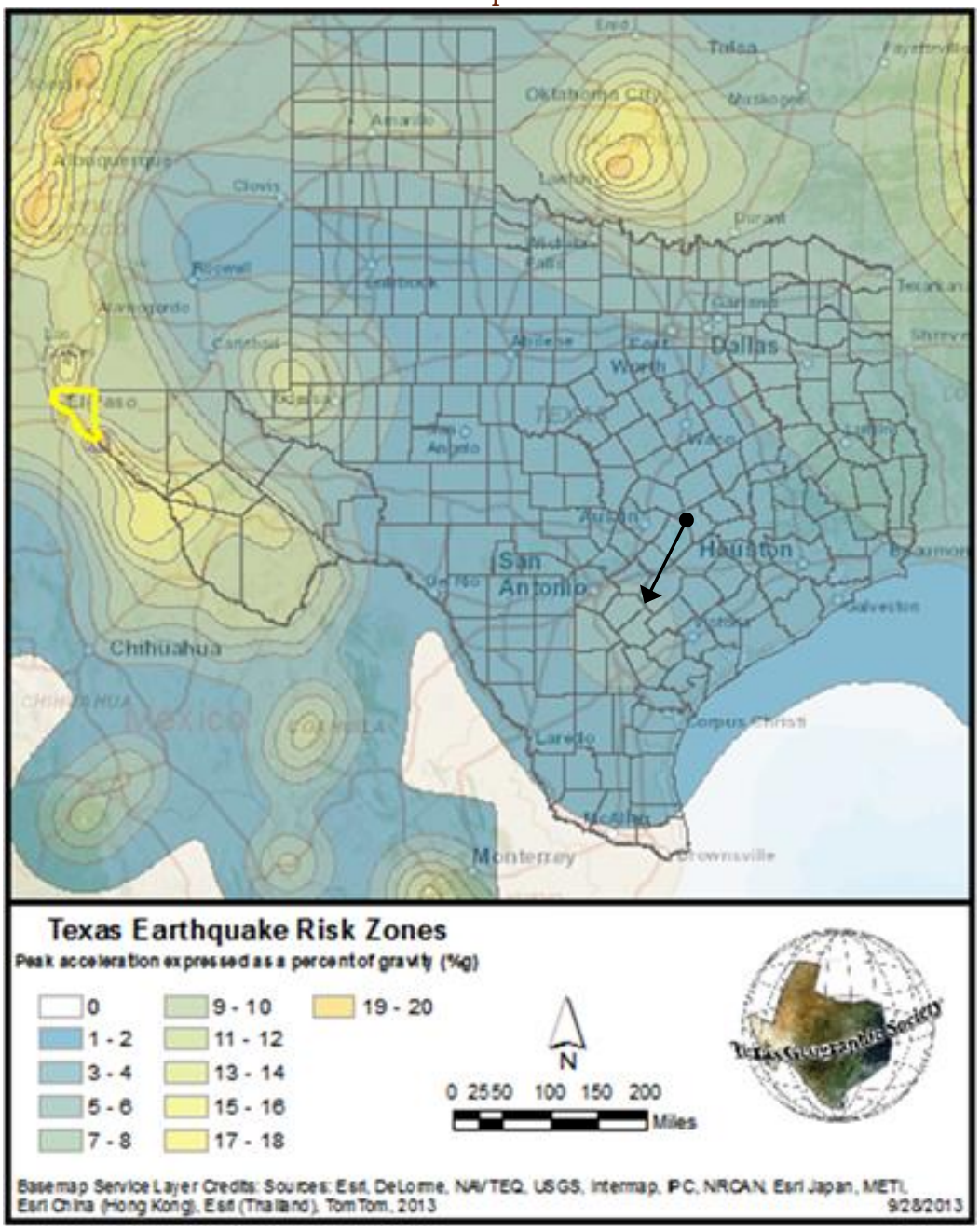
Source: *"earthquake". The American Heritage® Science Dictionary. Houghton Mifflin Company. 20 Oct. 2017. <http://www.dictionary.com/browse/earthquake>.*

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 Karnes and Wilson 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 in 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.

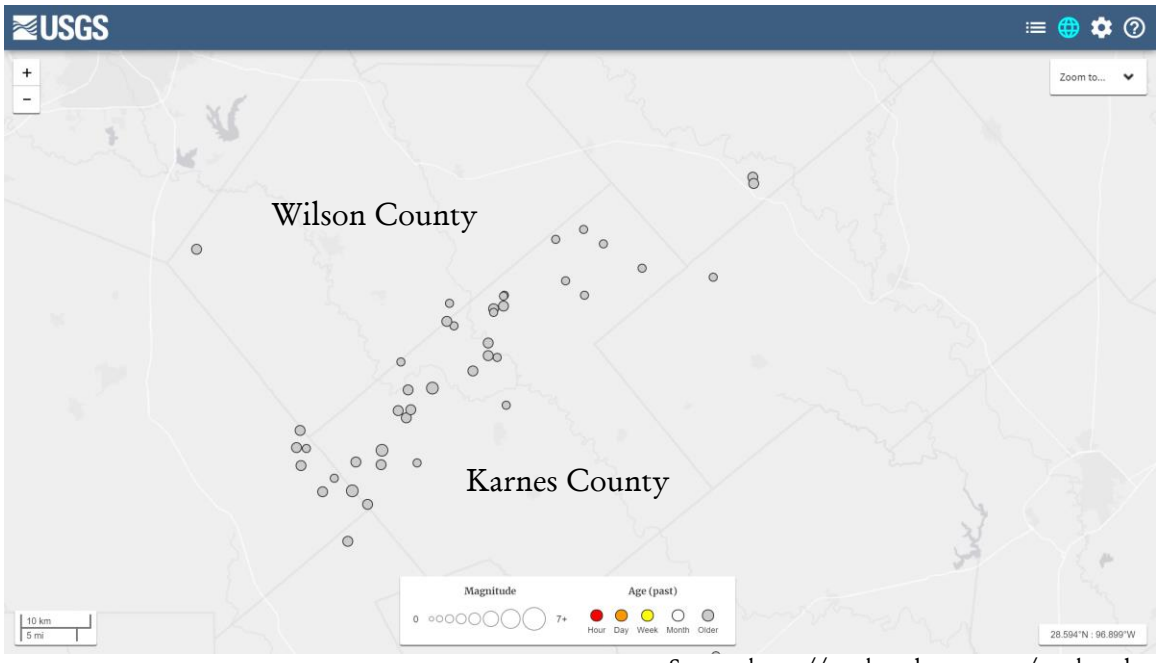
Source: USGS - https://pubs.usgs.gov/gip/earthq4/severitygip.html

The planning area has an anticipated range of magnitude 0 to magnitude 4.8 earthquakes.

Historical Occurrences

Based on United States Geographical Services (USGS) Earthquake Catalog of events, from 1923 through 2019 the Karnes and Wilson 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 15-4: USGS Earthquake Map with Location and Magnitude



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

The USGS earthquake map above in Figure 15-4 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
2/3/2019	25km WNW of Cuero, Texas	3
1/27/2019	12km NW of Three Rivers, Texas	2.6
1/26/2019	7km N of Three Rivers, Texas	2.7
1/26/2019	10km NNW of Three Rivers, Texas	2.5
1/15/2019	19km SSE of Nixon, Texas	2.6
12/22/2018	10km ESE of Poth, Texas	3
12/22/2018	18km E of Poth, Texas	3.2
11/4/2018	11km N of Karnes City, Texas	2.8
9/22/2018	25km SSW of Poth, Texas	2.5
8/16/2018	14km NNW of Yorktown, Texas	2.9
8/2/2018	19km S of Nixon, Texas	2.6
7/20/2018	18km E of Poth, Texas	2.5
7/2/2018	4km NNE of Karnes City, Texas	2.9
6/2/2018	22km WSW of Karnes City, Texas	3
5/20/2018	19km SSW of Nixon, Texas	2.4
5/1/2018	12km SSE of Poth, Texas	3.4
5/1/2018	12km NW of Karnes City, Texas	4
4/29/2018	18km NNW of Runge, Texas	2.7
4/29/2018	21km S of Nixon, Texas	2.7
4/26/2018	13km S of Poth, Texas	3.1
4/26/2018	15km WNW of Karnes City, Texas	3.1
3/13/2018	11km S of Nixon, Texas	2.6
2/19/2018	10km NNW of Karnes City, Texas	3
2/12/2018	13km N of Karnes City, Texas	3.1
2/12/2018	12km WSW of Karnes City, Texas	2.5
1/16/2018	25km WSW of Karnes City, Texas	2.9
1/9/2018	17km E of Poth, Texas	2.8
1/7/2018	23km SSW of Poth, Texas	3.1
1/6/2018	21km W of Karnes City, Texas	3.6
11/14/2017	10km SSE of Poth, Texas	2.8

11/14/2017	19km WSW of Goliad, Texas	2.7
7/2/2017	17km E of Poth, Texas	3
12/13/2016	11km N of Karnes City, Texas	3
12/14/2015	24km E of Nixon, Texas	3
9/22/2015	14km SSW of Nixon, Texas	2.9
1/31/2015	11km ESE of Poth, Texas	2.8
1/31/2015	18km WSW of Karnes City, Texas	3.1
1/30/2015	10km E of Poth, Texas	2.5
3/6/2014	14km S of Nixon, Texas	2.7
2/4/2012	southern Texas	3
11/12/2011	southern Texas	3.5
10/20/2011	southern Texas	4.8
1/10/2011	southern Texas	2.6
12/21/2010	southern Texas	3
3/8/2010	southern Texas	3
4/7/2008	southern Texas	3.9
5/16/1993	southern Texas	3
4/9/1993	southern Texas	4.1
7/20/1991	southern Texas	3.6
8/8/1984	southern Texas	3
7/23/1983	southern Texas	3.4

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

Significant Events

October 11, 2011 – Karnes County

Just after noon on October 11, 2011, a magnitude 4.8 earthquake had its epicenter in Northern Karnes County.

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. Since 2013 many more earthquakes have been occurring in the area and if the period from 2014-2019 is considered in isolation, the chance of an earthquake happening rises dramatically. Over the 5-year period the possibility of an earthquake occurring is nearly 9 earthquakes per year for the Karnes and Wilson Counties planning area. 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 haven't 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 Karnes and Wilson Counties, including participating jurisdictions, are vulnerable to the impacts of earthquakes. This is especially true of the northern part of Karnes 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, Bio accumulative 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 Karnes and Wilson 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 Karnes and Wilson Counties planning area like there are in more urban areas such as Houston and San Antonio.

Figure 16-2: TRI Facility Location Map

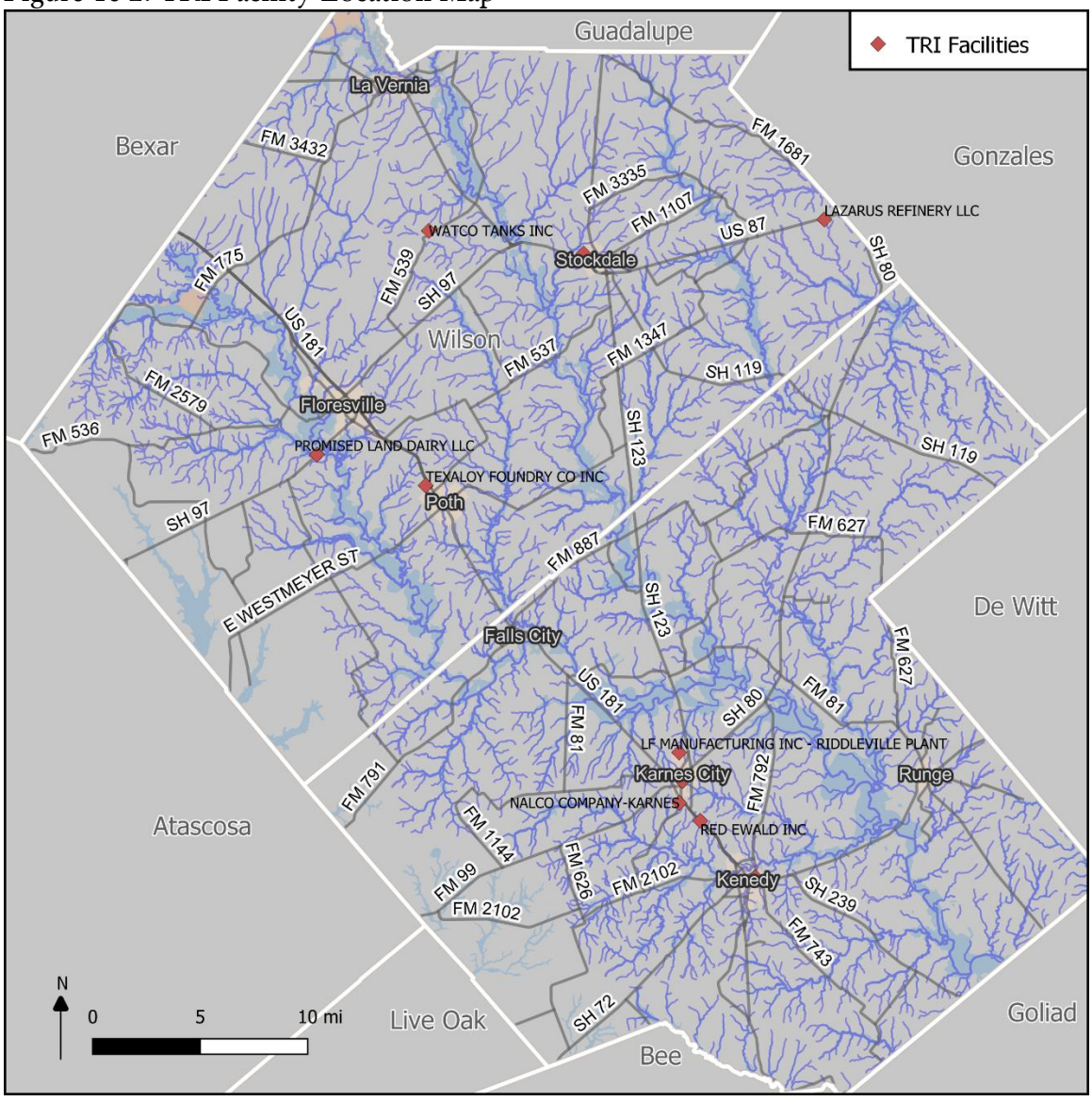


Table 16-1: TRI Facilities in the Planning Area with Toxic Release Data

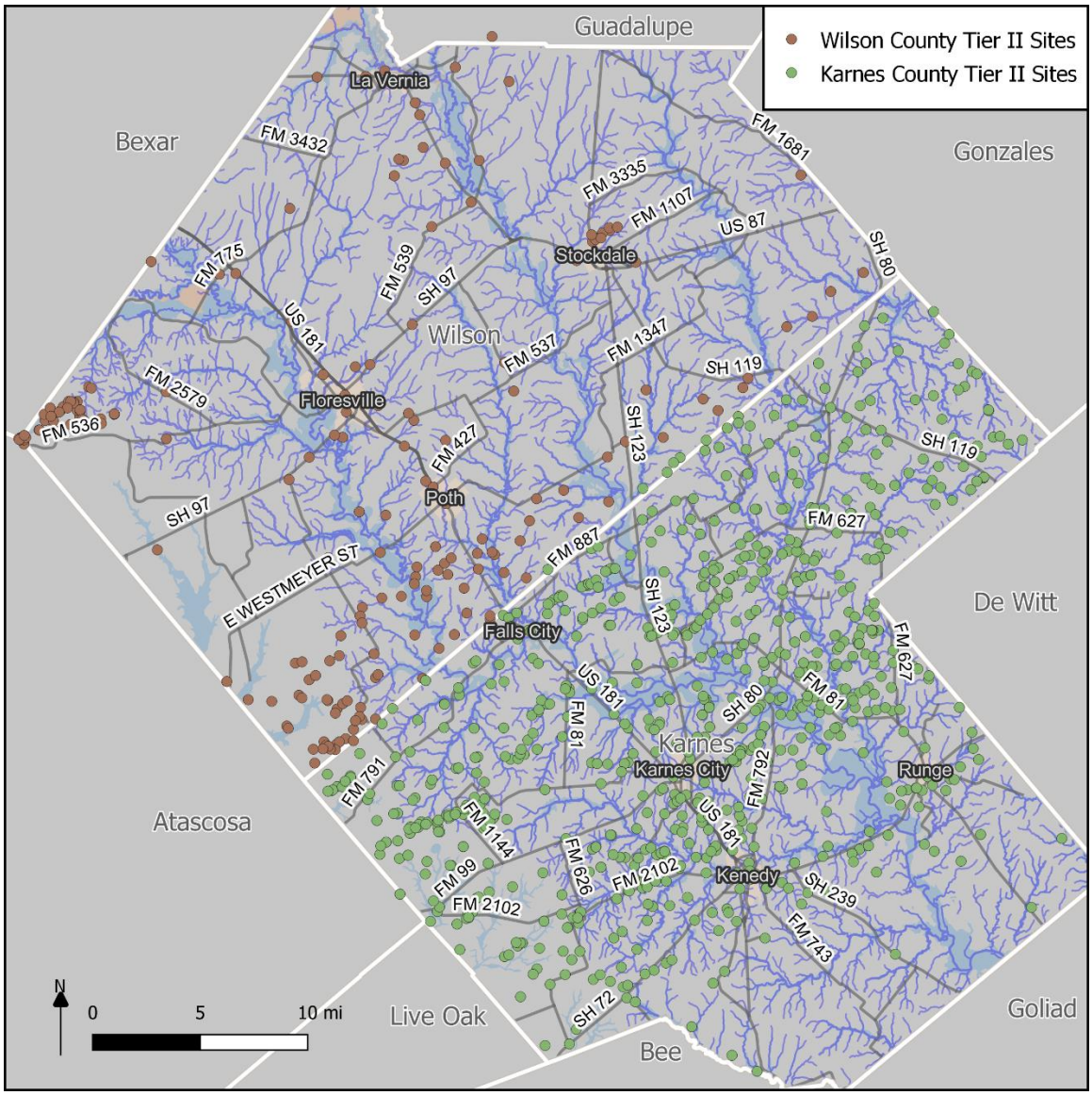
FACILITY NAME	STREET ADDRESS	CITY	COUNTY	INDUSTRY SECTOR	TOTAL RELEASES, 1988-2016 (lbs.)	TOTAL RELEASES, 2016 (lbs.)
LF MANUFACTURING INC	300 W RIDDLEVILLE	KARNES CITY	KARNES	Plastics and Rubber	601,927	20,712
RED EWALD INC	2669 S HWY 181	KARNES CITY	KARNES	Plastics and Rubber	1,744,867	54,830
POWER PIPE & PLASTICS LLC	321 S MARKET ST	KARNES CITY	KARNES	Plastics and Rubber	223,235	6,660
ASHLAND SPECIALTY INGREDIENTS GP	ONE MILL ST	KENEDY	KARNES	Chemicals	250,599	6,792
NALCO COMPANY-KARNES	1178 FM 1353	KARNES CITY	KARNES	Chemicals	17,008	3,152

TEXALOY FOUNDRY CO INC	710 4TH ST	FLORESVILLE	WILSON	Primary Metals	11,083	35
WATCO TANKS INC	5877 FM 539	FLORESVILLE	WILSON	Fabricated Metals	360,358	5,488
PROMISED LAND DAIRY LLC	2008 STATE HWY 97 W	FLORESVILLE	WILSON	Food	41,805	19,080
LAZARUS REFINERY LLC	11372 US HWY 87 E	NIXON	WILSON	Petroleum	65,750	2,556
ICP INDUSTRIES LLC	100 BUSINESS PARK AVE.	STOCKDALE	WILSON	Fabricated Metals	9	1

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 119,306 pounds of toxic chemical releases have been recorded for Karnes and Wilson Counties in 2016 according to the EPA's TRI database (Table 16-1). The data collected from 1987 to 2016 shows that a total of 3,316,641lbs. of toxic chemical releases occurred in the planning area from fixed facilities that have reported toxic chemical releases to TRI. Tables 16-4 and 16-5 show the total release by chemical in the planning area in 2017.

Table 16-4: TRI On-site and Off-site Reported Disposed of or Otherwise Released (in pounds), for All industries, for All chemicals, Karnes County, Texas, 2017.

Chemical	Total On-site Disposal or Other Releases	Total Off-site Disposal or Other Releases	Total On- and Off-site Disposal or Other Releases
CERTAIN GLYCOL ETHERS	121	33,734	33,855
METHYLENE BROMIDE	1,045	.	1,045
PROPYLENE OXIDE	5,505	.	5,505
STYRENE	94,078	.	94,078
Total	100,749	33,734	134,483

Source: EPA.gov, TRI Explorer

Table 16-5: TRI On-site and Off-site Reported Disposed of or Otherwise Released (in pounds), for All industries, for All chemicals, Wilson County, Texas, 2017.

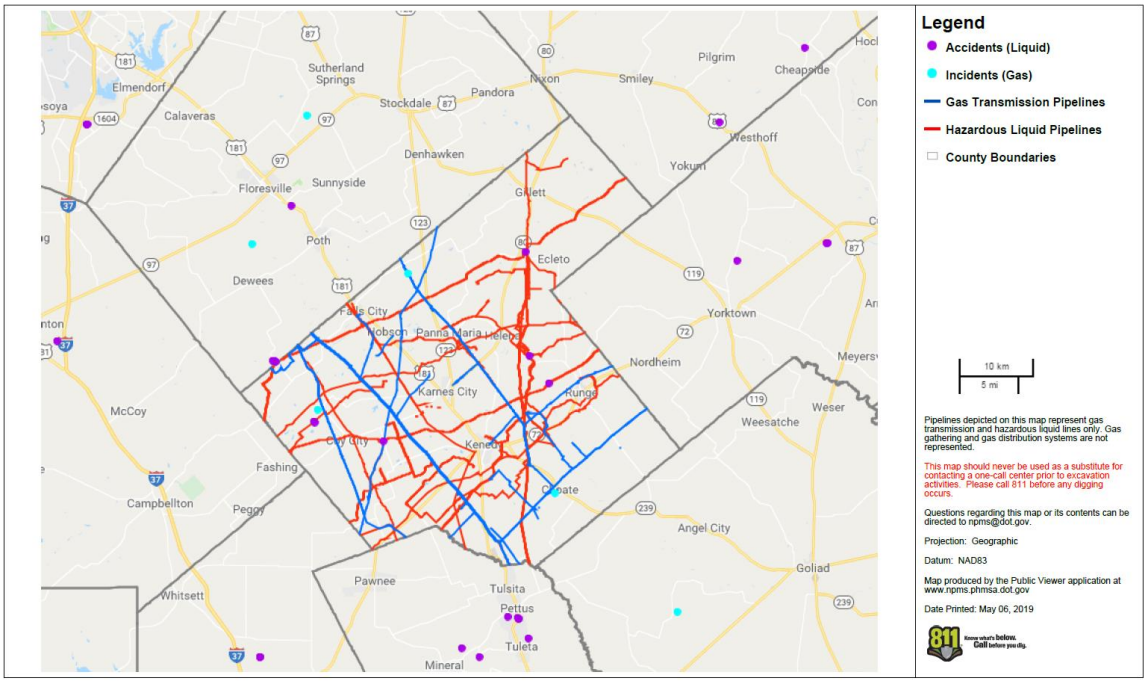
Chemical	Total On-site Disposal or Other Releases	Total Off-site Disposal or Other Releases	Total On- and Off-site Disposal or Other Releases
1,2,4-Trimethylbenzene	500	.	500
Benzene	255	5	260
Biphenyl	255	.	255
Chromium	22	83	105
Chromium Compounds (Except Chromite Ore Mined In The Transvaal Region)	1	21,198	21,199
Diisocyanates	0	.	0
Ethylbenzene	500	0.18	500
N-Hexane	1,750	.	1,750
Naphthalene	1,000	.	1,000
Nickel	22.757	47.074	70
Nitrate Compounds	23,473	.	23,473
Nitric Acid	0	.	0
Styrene	4,246	.	4,246
Xylene (Mixed Isomers)	500	0.38	500
Total	32,525	21,334	53,858

Source: EPA.gov, TRI Explorer

Significant Events

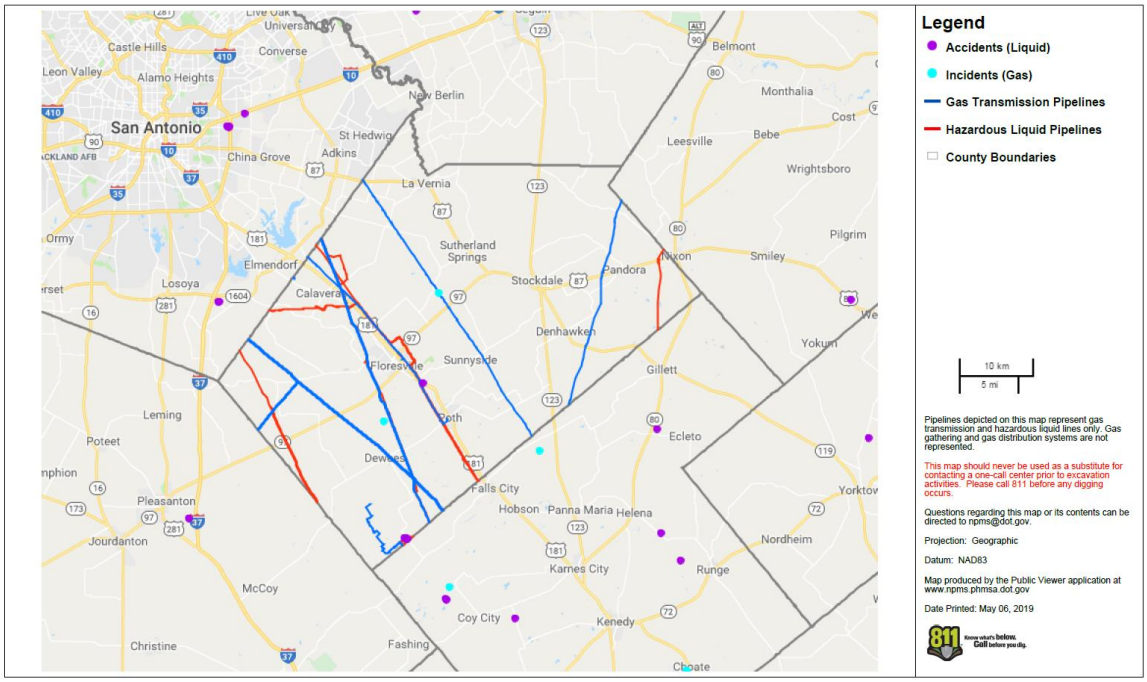
US DOT's Pipeline and Hazardous Materials Safety Administration (PHMSA) data indicates that there has been a total of 12 hazardous materials incidents in Karnes and Wilson Counties from 2004-2019. 9 of the incidents were in Karnes County and 3 of the incidents were in Wilson County. Hazardous materials 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 16-3: Karnes County Pipeline and Hazardous Incident Map



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

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



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

Probability of Future Events

According to historical records the Karnes and Wilson Counties planning area experiences consistent toxic chemical releases and 12 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 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

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 Karnes and Wilson 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.[7] 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

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

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 training do emergency responders need, and how often?

Figure 16-5: Training for HazMat incident response, HMEP training grants administered by TDEM and 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: 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 Floresville Event Center in July 2018 and October 2018 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 Karnes and Wilson 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: 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 #3: 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 #4: 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.

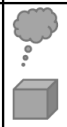
- Objective 4.5 – Ensure that critical facilities and lifelines will be constructed and/or retrofitted to minimize the potential for disruption during a disaster.

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

SECTION 18: 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 July 2018 and October 2018 to develop mitigation actions for each of the natural and man-made hazards included in the Plan; Sections 5-16. 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. New actions were developed with unique insight from planning team members, community and regional plans, capital improvement plans, and mitigation ideas guides developed by FEMA and the Texas Department of Emergency Management (TDEM).

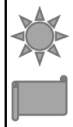
Core Planning Team member then took the draft mitigation actions back to their respective communities to get feedback and develop them further. The goals listed in Section 17 were used as guidance while considering such factors as existing and future growth, the hazard risk assessments, individual community 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
Karnes County											
1	Establish a MOU with entities within Karnes County and Wilson County.	Establish memorandum of understanding between Wilson County and Karnes County and incorporated jurisdictions to more effectively respond to hazards that affect the region.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G4	Y	County Attorney, Emergency Management	$5,000	Local	12	High
2	Continuity of Government Plan	Develop and implement a plan for Karnes County to maintain continuity of government.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1	Y	Commissioner Court	$15,000	Local	36	High
3	Provide generators at all critical and government facilities	Purchase and install portable and stationary generators to keep government and critical facilities operating during loss of electrical power.	Hurricane, Flood, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G4	Y	Maintenance / Emergency Management / County Commissioners	$100,000	Local, HMGP, PDM	24	High
4	Hire emergency manager	Hire full time emergency management coordinator for Karnes County.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1	Y	Commissioners Court, Emergency Management	$75,000	Local, Grants	12	High
5	Low water crossing signage	Identify sites and install Road Closed Signage / Warning device to alert traffic that road is closed due to high water.	Hurricane, Flood		G2, G3	Y	Karnes County Road and Bridge, Special Projects, Emergency Management.	$300,000	Local, TWDB, SARA, Grants	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
Karnes County											
6	Low Water Crossing Upgrades	Prioritize low water crossings within Karnes County and upgrade with higher level of flood protection, warnings, and signage.	Hurricane, Flood		G1, G2	Y	Karnes County, SARA	$5,000	Local, SARA	36	High
7	Establish a reverse 911 system	Establish a reverse 911 call back system for mass notification	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2	Y	Commissioners Court, Emergency Management	$50,000	Local, Grants	24	High
8	Early warning flood systems	Conduct feasibility analysis for need and location for placement and installation of an early warning system. Install early warning systems for non incorporated communities.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2, G4	Y	Sheriff Department, Emergency Management, Special Projects	$150,000	Local, HMGP	24	High
9	Wind damage assessment	Conduct wind damage assessment to understand locations and structures most at risk and implement measures to mitigate risk.	Hurricane, Windstorms, Tornado, Severe Winter Storms		G2	N	Karnes County HMT, Karnes County, Runge, Falls City, and Karnes City	$60,000	Local, TDEM	36	High
10	Update flood information and policies	Identify and compile information on flood hazard areas and residential property in flood zones, establish and implement an acquisition/elevation program based on FEMA protocol in association with SARA studies, and review permitting process based on the 100-year flood event.	Hurricane, Flood		G2, G4	N	Karnes County HMT, SARA	$100,000	Local, FEMA, SARA	12	High

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Karnes County											
11	San Antonio River drainage ownership Mapping	Develop ownership and access understanding of parcels fronting the San Antoinion River and major tributaries to have better agreements and access to areas that need flood control mitigation and erosion control.	Hurricane, Flood		G2, G4	N	Karnes County, SARA	$30,000	Local, TWDB, SARA	12	Medium
12	Maintain rivers and creeks and crossings to a higher standard	Develop and implement debris removal program(s) for creeks and tributaries leading into the San Antonio River and establish voluntary public program to mitigate against the flood hazard.	Hurricane, Flood		G1, G2	N	Karnes County HMT, SARA	$50,000	Local, SARA	24	Medium
13	Inventory of residences in floodplain	Identify residential structures that are located in flood zones or high hazard areas and develop plan and implement a program for floodproofing or acquistion. Keep a database of floodprone, repetetive loss and severe reptetive loss properties with pertinent infromation about each property.	Hurricane, Flood		G2	N	Karnes County HMT, SARA	$50,000	Local, TWDB	36	Medium
14	Drought contingency plan	Develop and assist in implementinga drought contingency plan.	Drought, Extreme Heat		G1, G2	Y	Commissioner Court	$10,000	Local, TWDB	48	Medium
15	Tie-down ordinance for mobile homes	Adopt and implement a roof tie down ordinance or strap ordinance for mobile homes.	Hurricane, Windstorm, Tornado		G2	Y	Commissioner Court / Emergency Management / County Attorney	$10,000	Local	48	Medium

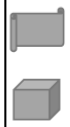
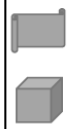
Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Karnes County											
16	Shelter requirement for RV parks	Adopt and implement an ordinance to require RV Parks to provide shelter facilities.	Hurricane , Flood, Windstorm, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2	Y	Commissioner Court / Emergency Management / County Attorney	$10,000	Local	48	Medium
17	Create Fuel Breaks in unincorporated areas	Create fuel breaks along county roads to minimize potential fuel for wildfire.	Drought, Extreme Heat, Wildfire		G1, G2	Y	Agri Life, Karnes Road and Bridge, local fire departments	$10,000	Local	∞	Medium
18	Harden critical faciliites	Identify all critical and community facilities that are deemed necessary for emergency operations and conduct a structural assessment for multiple hazards to determine if retrofits are necessary. Implement assessment findings to reduce hazards.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2, G4	N	Karnes County HMT	$120,000	Local, HMGP, PDM	12	Medium
19	Educate public on water conservation measures	Public Awareness/Education water conservation, fixtures, plants, eriscaping.	Drought, Extreme Heat		G3	Y	Agri Life, Special Projects, Water Districts	$10,000	Local, TWDB, FEMA, ISDs	∞	Medium
20	Educate public on fire reduction strategies	Public Awareness/Education construction of fuel breaks and fuel reduction.	Drought, Extreme Heat, Wildfire		G3	Y	Agri Life, Special Projects, local fire departments	$10,000	Local, ISDs	∞	Medium
21	Monitor and report earthquakes based on increasing frequency	Monitor reported earthquakes within Karnes County to understand location and frequency. Map areas reported and continue to monitor seismic activity to target efforts for outreach and preparedness.	Earthquake		G1	Y	Emergency Management, Special Projects	$5,000	Local, Grants	12	Medium

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Karnes County											
22	Earthquake activity and precaution education	Educate public how to mitigate against earthquake damage.	Earthquake		G3	Y	Emergency Management, Special Projects	$5,000	local, ISDs	24	Medium
23	Develop sinkhole data and mitigation plan	Gather sinkhole data. With data, develop and implement a process for use county-wide to mitigate against this hazard by limiting future development in areas of high likelihood.	Earthquake		G2	N	Karnes County HMT, Karnes County, Runge, Falls City, and Karnes City	N/A	Local, TDEM	36	Medium
24	Community Safe Room	Construct a safe room / building for the public to go to for shelter	Hurricane, Tornado		G1, G2	Y	Commissioner Court / Emergency Management	$1,000,000	Local, HMGP, PDM	48	Medium
25	Improve bridge at CR 337	Widen bridge at CR 337 to accommodate two way traffic in case of emergencies and to allow the conveyance of floodwaters.	Hurricane, Flood, Windstorm, Tornado, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2	Y	Karnes County Road and Bridge, Emergency Management	$500,000	Local, SARA, AACOG, HMGP, PDM	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
City of Falls City											
1	Maintain rivers and creeks and crossings to a higher standard	Develop and implement debris removal program(s) for creeks and tributaries leading into the San Antonio River to mitigate against flooding from lack of conveyance or debris blocking drains.	Hurricane, Flood		G1, G2	N	Karnes County HMT, SARA	$50,000	Local	24	High
2	Inventory of residences in floodplain	Identify residential structures that are located in flood zones or high hazard areas and develop plan and implement a program for floodproofing or acquistion.	Hurricane, Flood		G2	N	Karnes County HMT, SARA	$50,000	Local, TWDB	36	High
3	Update flood information and policies	Identify and compile information on flood hazard areas and residential property in flood zones, establish and implement an a volunteer acquisition / elevation program based on FEMA protocol in association with SARA studies, and review permitting process based on the 100-year flood event.	Hurricane, Flood		G2, G4	N	Karnes County HMT, SARA	$100,000	Local, FEMA, SARA	12	High
4	Harden critical faciliites	Identify all critical and community facilities that are deemed necessary for emergency operations and conduct a structural assessment for multiple hazards to determine if retrofits are necessary. Implement measures to mitigate risks.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2, G4	N	Karnes County HMT	$120,000	Local, HMGP, PDM	12	High
5	Flood insurance education and awareness	Provide education materials online, and to real estate and insurance agencies, to increase community understanding of flood insurance. Hold a town hall meeting with NFIP representatives to discuss the insurance purchase process.	Hurricane, Flood		G1, G2, G3	Y	City Manager, ISD, Karnes County EMS, FEMA, SARA, AACOG	$5,000	City, Karnes County, TWDB, SARA	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 Falls City											
6	Study the, San Antonio River and its tributaries	When the San Antonio River floods, the city is cutoff from rest of county (hospital and EMS) with islands lasting over a week. Install stream gauges and develop a study to identify solutions to flooding. SARA completed a study but County officials wary due to lack of coordination and results.	Hurricane, Flood		G1, G2	Y	City Council, County, SARA, Public Works	$250,000	Local; County; TWDB; HMGP; PDM	48	Medium
7	San Antonio River drainage ownership study	Develop ownership and access understanding of parcels fronting the San Antoinion River and major tributaries to have better agreements and access to areas that need flood control mitigation and erosion control.	Hurricane, Flood		G2, G4	N	Karnes County, SARA	$30,000	Local; TWDB; SARA	12	Medium
8	Conduct wind damage assessment	Conduct wind damage assessment to understand locations and structures most at risk and implement measures to mitigate risk.	Hurricane, Windstorms, Tornado, Severe Winter Storms		G2	N	Karnes County HMT, Karnes County, Runge, Falls City, and Karnes City	$60,000	Local, TDEM	36	Medium
9	Community Safe Room	Upgrade community center building to safe room standards based on its accessible location to the community to protect against multiple hazards.	Hurricane, Tornado		G1, G2	Y	Falls City, Karnes County, ISD	$200,000	Local, TDEM, CDBG	24	Medium
10	Xeriscaping	Plant drought tolerant landscaping around public buildings	Drought		G1, G2	Y	City Manager	$10,000	Local, TDEM	12	Medium
11	Develop public education program	Develop and implement a multi-hazard public awareness program. Educate homeowners on how to mitigate their homes from all hazards through distribution of pamphlets, flyers, and social media	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G2	Y	City Manager	<$10,000	Local, TDEM	12	Medium

Legend:

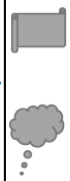
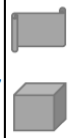
Structure and Infrastructure
Natural System Protection
Local Plans and Regulations
Education and Awareness Programs

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 Karnes City											
1	Provide generators at all critical and government facilities	Purchase and install portable generators / stationary generators to keep government and critical facilities operating during loss of electrical power.	Hurricane, Flood, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G4	Y	Maintenance / Emergency Management / County Commissioners	$100,000	Local, AACOG, HMGP PDM	24	High
2	Harden critical faciliites	Identify all critical and community facilities that are deemed necessary for emergency operations and conduct a structural assessment for multiple hazards to determine if retrofits are necessary. Implement measures to mitigate risks.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2, G4	N	Karnes County HMT	$120,000	Local, HMGP, PDM	12	High
3	Update flood information and policies	Identify and compile information on flood hazard areas and residential property in flood zones, establish and implement an a volunteer acquisition / elevation program based on FEMA protocol in association with SARA studies, and review permitting process based on the 100-year flood event.	Hurricane, Flood		G2, G4	N	Karnes County HMT, SARA	$100,000	Local, FEMA, SARA	12	High
4	Flood insurance education and awareness	Provide education materials online, and to real estate and insurance agencies, to increase community understanding of flood insurance. Hold a town hall meeting with NFIP representatives to discuss the insurance purchase process.	Hurricane, Flood		G1, G2, G3	Y	City, Karnes County EMS, FEMA, SARA, AACOG	$5,000	City, Karnes County, TWDB, SARA	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 Karnes City											
5	Treated effluent program	Establish and implement a treated effluent program for city facilities, including parks and the cemetery. Incorporate this action into the Drought Contingency Plan and the Wastewater CIP.	Drought, Extreme Heat		G2	Y	Public Works, TCEQ	$50,000	City, Karnes County, TWDB, CDBG	60	Medium
6	San Antonio River drainage ownership mapping	Develop ownership and access understanding of parcels fronting the San Antoinion River and major tributaries to have better agreements and access to areas that need flood control mitigation and erosion control.	Hurricane, Flood		G2, G4	N	Karnes County, SARA	$30,000	Local; TWDB; SARA	12	Medium
7	Maintain rivers and creeks and crossings to a higher standard	Develop and implement debris removal program(s) for creeks and tributaries leading into the San Antonio River and establish voluntary public program to mitigate against the flood hazard.	Hurricane, Flood		G1, G2	N	Karnes County HMT, SARA	$50,000	Local	24	Medium
8	Inventory of residences in floodplain	Identify residential structures that are located in flood zones or high hazard areas and develop plan and implement a program for floodproofing or acquistion.	Hurricane, Flood		G2	N	Karnes County HMT, SARA	$50,000	Local, TWDB	36	Medium
9	Conduct wind damage assessment	Conduct wind damage assessment to understand locations and structures most at risk and implement measures to mitigate risk.	Hurricane, Windstorms, Tornado, Severe Winter Storms		G2	N	Karnes County HMT, Karnes County, Runge, Falls City, and Karnes City	$60,000	Local, TDEM	36	Medium

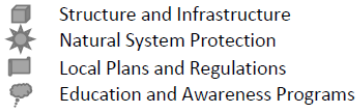
Legend:

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
Karnes City ISD											
1	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. This includes activities such earthquake hazard hunts to look for potential falling hazards and anchoring such as unsecured bookshelves and light fixtures.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2, G3	Y	KCISD	$5,000	Local, HMGP	∞	Medium
2	Community Safe Room	Construct a safe room / building for public to go to for shelter during storms.	Hurricane, Tornado		G1, G2	Y	KCISD, City of Karnes City	$150,000	Local, HMGP, PDM	24	High
3	Harden critical facilities	Identify all critical and community facilities that are deemed necessary for emergency operations and conduct a structural assessment for multiple hazards to determine if retrofits are necessary. Implement assessment findings to reduce hazards.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2, G4	Y	KCISD	$120,000	Local, HMGP, PDM	36	High
4	Strengthen existing structures and update code for new structures	Review existing school sites and structures as well as building practices for new sites to ensure that they are resistant to a range of hazards. Implement retrofits to strengthen existing buildings and updates to new building standards based on hazard mitigation best practices. This includes a review of building with Unreinforced Masonry Construction (URM).	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2	Y	KCISD	$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
Karnes City 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	KCISD	$40,000	Local, HMGP, PDM, Texas Forest Service, TPRD	24	Medium

Legend:



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 Kenedy											
1	Maintain rivers and creeks and crossings to a higher standard	Develop and implement debris removal program(s) for creeks and tributaries leading into the San Antonio River and establish voluntary public program to mitigate against the flood hazard.	Hurricane, Flood		G1, G2	N	Karnes County HMT, SARA	$50,000	Local	24	High
2	Inventory of residences in floodplain	Identify residential structures that are located in flood zones or high hazard areas and develop plan and implement a program for floodproofing or acquistion.	Hurricane, Flood		G2	N	Karnes County HMT, SARA	$50,000	Local, TWDB	36	High
3	Update flood information and policies	Identify and compile information on flood hazard areas and residential property in flood zones, establish and implement an a volunteer acquisition / elevation program based on FEMA protocol in association with SARA studies, and review permitting process based on the 100-year flood event.	Hurricane, Flood		G2, G4	N	Karnes County HMT, SARA	$100,000	Local, FEMA, SARA	12	High
4	San Antonio River drainage ownership mapping	Develop ownership and access understanding of parcels fronting the San Antoinion River and major tributaries to have better agreements and access to areas that need flood control mitigation and erosion control.	Hurricane, Flood		G2, G4	N	Karnes County, SARA	$30,000	Local; TWDB; SARA	12	High
5	Flood insurance education and awareness	Provide education materials online, and to real estate and insurance agencies, to increase community understanding of flood insurance. Hold a town hall meeting with NFIP representatives to discuss the insurance purchase process.	Hurricane, Flood		G1, G2, G3	Y	City Manager, Karnes County EMS, FEMA, SARA, AACOG	$5,000	City, Karnes County, TWDB, SARA, ISDs	36	High
6	Provide generators at all critical and government facilities	Purchase and install portable generators / stationary generators to keep government and critical facilities operating during loss of electrical power.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G4	Y	Emergency Management / County Commissioners	$100,000	Local; HMGP; PDM	24	High

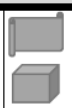
Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Kenedy											
7	Harden critical faciliites	Identify all critical and community facilities that are deemed necessary for emergency operations and conduct a structural assessment for multiple hazards to determine if retrofits are necessary and implement measures to mitigate risks.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2, G4	N	City Manager, Karnes County HMT	$120,000	Local, HMGP, PDM	12	Medium
8	Conduct wind damage assessment	Conduct wind damage assessment to understand locations and structures most at risk and implement measures to mitigate risk.	Hurricane, Windstorms, Tornado, Severe Winter Storms		G2	N	Karnes County HMT, Karnes County, Runge, Falls City, and Karnes City	$60,000	Local, TDEM	36	Medium
9	Emergency warning sirens	Warning sirens needed throughout city such as in main street and park areas	Hurricane, Flood, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G2, G3	Y	City Manager, EMS, EMC	$150,000	Local, HMGP, PDM	36	Medium
10	Community Saferoom	Upgrade community center building to safe room standards based on its accessible location to the community to protect against multiple hazards.	Hurricane, Tornado		G1, G2	Y	City Manager, EMS, EMC	$200,000	Local, HMGP, PDM	48	Medium
11	Xeriscaping	Plant drought tolerant landscaping around public buildings	Drought		G1, G2	Y	City Manager/ Public Works	$10,000	Local, TDEM	12	Medium
12	Develop public education program	Develop and implement a multi-hazard public awareness program. Educate homeowners on how to mitigate their homes from all hazards through distribution of pamphlets, flyers, and social media	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G2	Y	City Manager	<$10,000	Local, TDEM	12	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 Runge											
1	Retrofit Water Tower	Update and imporve the current water tower structure to higher standards to ensure safe and reliable provision of water.	Severe Winds, hurricanes, tornadoes, extreme heat, drought, wildfire		G1, G4	Y	Public Works	$200,000	Local, County, TWDB, HMGP, PDM	12	High
2	Provide generators at all critical and government facilities	Purchase and install portable generators / stationary generators to keep government and critical facilities operating during loss of electrical power.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G4	Y	Emergency Management / County Commissioners	$100,000	Local, HMGP, PDM	24	High
3	Study the, San Antonio River, Ojo de Agua Creek and its tributaries	Install stream gauges and develop a study to identify solutions to flooding. Implement engineering findings to reduce and mitigate risks.	Hurricane, Flood		G2, G4	Y	City Council, County, SARA, Public Works	$250,000	Local, County, TWDB, HMGP, PDM	48	High
4	Harden critical faciliites	Identify all critical and community facilities that are deemed necessary for emergency operations and conduct a structural assessment for multiple hazards to determine if retrofits are necessary. Implement measures to mitigate risks.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2, G4	N	Karnes County HMT	$120,000	Local, HMGP, PDM	12	High
5	Housing for critical pumps	Construct housing sturcture to protect critical water pumps to ensure water delivery.	Severe Winds, hurricanes, tornadoes		G1, G4	Y	Public Works	$120,000	Local, County, TWDB, 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 Runge											
6	Flood insurance education and awareness	Provide education materials online, and to real estate and insurance agencies, to increase community understanding of flood insurance. Hold a town hall meeting with NFIP representatives to discuss the insurance purchase process.	Hurricane, Flood		G1, G2, G3	Y	City Manager, Karnes County EMS, FEMA, SARA, AACOG	$5,000	City, Karnes County, TWDB, SARA	36	High
7	Update flood information and policies	Identify and compile information on flood hazard areas and residential property in flood zones, establish and implement an a volunteer acquisition / elevation program based on FEMA protocol in association with SARA studies, and review permitting process based on the 100-year flood event.	Hurricane, Flood		G2, G4	N	Karnes County HMT, SARA	$100,000	Local, FEMA, SARA	12	High
8	San Antonio River drainage ownership mapping	Develop ownership and access understanding of parcels fronting the San Antoinion River and major tributaries to have better agreements and access to areas that need flood control mitigation and erosion control.	Hurricane, Flood		G2, G4	N	Karnes County, SARA	$30,000	Local; TWDB; SARA	12	Medium
9	Maintain rivers and creeks and crossings to a higher standard	Develop and implement debris removal program(s) for creeks and tributaries leading into the San Antonio River and establish voluntary program for creek cleanups.	Hurricane, Flood		G1, G2	N	Karnes County HMT, SARA	$50,000	Local	24	Medium
10	Inventory of residences in floodplain	Identify residential structures that are located in flood zones or high hazard areas and develop plan and implement a program for floodproofing or acquistion.	Hurricane, Flood		G2	N	Karnes County HMT, SARA	$50,000	Local, TWDB	36	Medium
11	Conduct wind damage assessment	Conduct wind damage assessment to understand locations and structures most at risk and implement measures to mitigate risk.	Hurricane, Windstorms, Tornado, Severe Winter Storms		G2	N	Karnes County HMT, Karnes County, Runge, Falls City, and Karnes City	$60,000	Local, TDEM	36	Medium

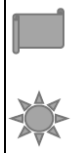
Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Runge											
12	Community Safe Room	Upgrade community center building to safe room standards based on its accessible location to the community to protect against multiple hazards.	Hurricane, Tornado		G1, G2	Y	Runge, Karnes County, ISD	$200,000	Local, TDEM, CDBG	24	Medium
13	Xeriscaping	Plant drought tolerant landscaping around public buildings	Drought		G1, G2	Y	City Manager/ Public Works	$10,000	Local, TDEM	12	Medium
14	Develop public education program	Develop and implement a multi-hazard public awareness program. Educate homeowners on how to mitigate their homes from all hazards through distribution of pamphlets, flyers, and social media	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G2	Y	City Manager	<$10000	Local, TDEM	12	Medium

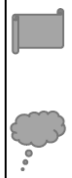
Legend:

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
Wilson County											
1	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.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G3	Y	Office of Emergency Management	$10,000	County Budget	60	High
2	Erosion at CR 401 and Cibolo Creek	Phase I: Engineering study of design solutions to erosion of CR 401 at Cibolo Creek. Phase II: Implementation of stabilization project to address stream incision and erosion CR 401 at Cibolo Creek.	Hurricane, Flood		G2, G4	Y	County Commissioners	$300,000	County Budget, Grants	48	High
3	Improve communication systems between County and jursidictions	Improve Interoperability Of Communication Systems Between First Responder Agencies And Jurisdictions In Wilson County	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1	Y	Wilson County Sherrif's Office	$50,000	County Budget, Grants	12	High
4	Portable generators for repeaters	The County will purchase emergency back-up generators for deployment in the event of extended power loss for critical communication towers.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2, G4	Y	County Commissioners	$150,000	County Budget, Grants	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
Wilson County											
5	Erosion at CR 202 East and Marcelina Creek	Phase I: Engineering study of design solutions to erosion of CR 202 East at Marcelina Creek. Phase II: Implementation of stabilization project to address stream incision and erosion CR 202 at Marcelina Creek.	Hurricane, Flood		G2, G4	Y	County Commissioners	$300,000	Local, HMGP, PDM, CDBG	48	High
6	Erosion on CR 128 drainage channel Southeast of FM 775 intersection.	Improvements to drainage structure to minimize erosion downstream and upstream.	Hurricane, Flood		G2, G4	Y	Wilson County Road & Bridge	$155,000	Local, HMGP, PDM	60	High
7	Wilson 4 - Stormwater Management Plan	Develop flood hazard information by collecting information, high water marks, and conduct engineering studies to develop the 100-year and 500-year flood elevation levels.	Hurricane, Flood		G2, G4	N	SARA	$200,000	Local, SARA, TWDB	36	Medium
8	Wilson 5 - ICS Implementation	Implement incident command system (ICS) training and exercise. Conduct "tabletop exercises" with emergency response personnel from multiple agencies, to determine further mitigation opportunities and response vulnerabilities.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1	N	Wilson County	$10,000	Local	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
Wilson County											
9	Wilson 10 - Acquisitions of flooded structures	Acquire flooded structures to remove them out of the SFHA and restrict future structures from development on the site. Consider the establishment of a voluntary "acquisition and demolition program", "acquistion and structure relocation program", "structure elevation program" to address repetitive loss, floodprone properties. Keep a database of floodprone, repetetive loss and severe reptetive loss properties with pertinent infromation about each property.	Hurricane, Flood		G2	N	Wilson County, Office of Emergency Management	$850,000	Local, HMGP, PDM	60	Medium
10	Wilson 9 - Install gates at low water crossings	Install gates at low water crossings on county roads repeatedly resulting in road closure due to rapid rising flood waters.	Hurricane, Flood		G1, G2	N	Wilson County Road & Bridge	$600,000	Local, HMGP, PDM	36	Medium
11	Wilson 7 - Upgrade low water crossings	Upgrade Infrastructure At Low Water Crossings to provide unimpeded access during a 100-year base flood event to facilitate evacuation and response by emergency vehicles.	Hurricane, Flood		G1, G2, G4	N	Wilson County Road & Bridge	$1,200,000	Local, HMGP, PDM	36	Medium
12	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	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
Wilson County											
13	Assess critical facilities for vulnerabilities to hazards and protect as necessary	Critical facilities will be hardened to protect from lightning, wind, ice, earthquakes, wildfire and other hazards	Windstorm, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, and earthquakes.		G4	Y	Wilson County, Office of Emergency Management	$150,000	Local, HMGP, PDM	36	Medium
14	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. Share information with municipalities to develop appropriate wildland-urban interface developpment regulations.	Wildfire		G2, G4	Y	Wilson County, Office of Emergency Management	$50,000	Local, HMGP, PDM, TNRIS	24	Medium
15	Assemble LEPC to collect information on hazardous materials in the community and develop a plan to mitigate the effects of a hazardous materials incident	Assemble a Emergency Planning Committees (LEPCs) whose responsibilities include collecting information about hazardous materials in the community and making this information available to the public upon request. The LEPCs is also tasked with developing an emergency plan to prepare for and respond to chemical emergencies in the community.	Hazardous Materials Incident		G1, G2, G3, G4	Y	Wilson County, Office of Emergency Management	$20,000	Local, HMGP, PDM	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
City of Floresville											
1	Purchase and install emergency generators at all schools and critical facilities.	Provide emergency generators in the case of electrical failure at all schools, water and lift station sites, the County emergency operations center, and other identified critical facilities. Also consider alarms, meters, remote controls, and switchgear upgrades.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1		Public Works	$375,000	Local, PDM, HMGP	36	High
2	Enhance floodplain management ordinances	Assess existing floodplain management ordinances and recommend improvement to mitigate the flood and water quality impacts of new development and redevelopment. This can include requirements for drainage easements, water detention, road design, Base Flood Elevation(BFE) height requirements, and green infrastrcuture.	Hurricane, Flood, Windstorms, Severe Winter Storms		G2	Y	City Council, Floodplain Manager, Planning Department	$200,000	Local, CDBG	12	High
3	Flood early warning system	Identify roadways that are submerged during high frequency rain events and develop and implement a flood/high water early warning system to notify city, county, and first responders.	Hurricane, Flood		G1, G2	Y	Engineering, Planning	$150,000	Local, PDM, HMGP	24	High
4	Early Warning Sirens to installed at strategic locations within the city boundaries.	Currently sirens cannot be heard city wide area of 4.75 sq. mile. Provide siren sites, with electrical service and siren poles	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes		G1	Y	Public Works	$125,000	Local, PDM, HMGP	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
City of Floresville											
5	Update IBC to 2015 version and enforce building codes	The city will adopt and enforce the measures and guidelines of IBC 2015. This will increase the resilence of structrues to natural hazards.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes		G2	Y	City Council, City Manager, Code Enforcement	$75,000	Local	36	High
6	Update community warning system - reverse 911	Implement a community warning system to alert citizens in the event of an emergency. Work with providers and Wilson County to coordinate and assist with outreach and education of warning system.	Hurricane, Flood, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1	Y	Wilson County, City Manager, City Council	$30,000	Local, HMGP	12	High
7	*Floresville 2* - Drainage Improvements at identified hazardous crossings	Consult SARA San Antonio River lower watershed plan and to identify and rank improvements to mitigate flooding at low water crossings and improve reliability of transportation system during hazardous events.	Hurricane, Flood, Hazardous Materials Incident		G2, G4	N	Engineering, Planning	$1,000,000	Local, PDM, HMGP	36	High
8	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. This includes installing watertight covers or inflow guards on sewer manholes and detection and prevention of illicit discharges into storm water and sewer systems from home footing drains, downspouts, and sewer pumps. The city will also look to implement a public creek cleanup program.	Hurricane, Flood		G4	Y	Stormwater Operations and Maintenance	$350,000	Local	48	High

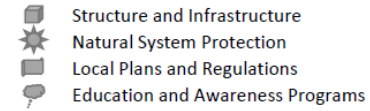
Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Floresville											
9	Create Community Saferoom	The High School Gym was hit by a tornado in 2016 and severely damaged. This structure is the best candidate for a community saferoom and should be retrofitted to withstand impact from natural hazards.	Hurricane, Tornado		G1, G2	Y	City Manager, City Council, Public Works	$250,000	HMGP	24	High
10	Develop vulnerabilty database and designate high-risk zones	Develop and maintain a database to track community vulnerability such as exposure in known hazard areas and designate these high-risk zones as special assessment districts to fund necessary hazard mitigation projects.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G3	Y	City Council, City Manager	$180,000	Local, PDM, HMGP	36	High
11	Structural hardening of critical facilities	Review opportunities and implement findings to harden critical facilities against impacts of all hazards and implement findings.	Hurricane, Flood, Windstorms, Lightning, Tornado, Hailstorms, Earthquakes		G4	Y	Public Works	$200,000	Local, HMGP	36	High
12	Conduct Tornado drills and distribute information	Conduct tornado drills in school and public buildings and distribute tornado shelter information to educate public about location and use of shelters.	Tornado, Windstorms		G3	Y	City Council, City Manager, ISD	$10,000	Local	12	High
13	Develop and adopt a Stormwater Master Plan	Phase I: Undertake storm water drainage study for the City of Floresville to protect people and property from flood events, manage the stormwater pipe system, enhance streams and floodplains, and recommend policy and regulatory enhancements. Phase II: Implement recommendations from study of most critical flood control improvements, low water crossing upgrades.	Hurricane, Flood		G2	Y	City Manager, Floodplain Manager, Engineering	$350,000	Local, CDBG, TWDB	24	High

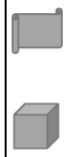
Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Floresville											
14	Improve Compliance with NFIP	Designate a local floodplain manager and provide education materials online, and to real estate and insurance agencies to increase community understanding of flood insurance. Hold a town hall meeting with NFIP representatives to discuss the insurance purchase process. Enter the Community Rating System (CRS) program to enable reduced insurance premiums within the community. The first priority is to establish a program for public information (PPI) with a PPI committee as suggested by activity 332 of the CRS coordinator's manual.	Hurricane, Flood		G1, G3	Y	Floodplain Manager	$20,000	Local, USDA, TWDB	60	Medium
15	Water System Emergency Response Plan	Develop an Emergency Response Plan to identify vulnerabilities in the water treatment and delivery systems and address possible water supply disruption or contamination scenarios.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1	Y	Engineering Department	$250,000	Local, PDM, HMGP	36	Medium
16	Online GIS	Offer GIS hazard mapping online for residents and design professionals.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G3	Y	City Manager, Planning & Engineering	$150,000	Local, PDM, HMGP, TWDB, CDBG, Regional	24	Medium
17	NOAA Weather Radios	Purchase and distribute NOAA Weather Radios with uniform technology.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1	Y	City Manager, City Council	$10,000	Local, HMGP	12	Medium

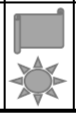
Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Floresville											
18	Citizen flood education outreach	Educate citizens about mitigation strategies prior to any flood conditions, including dangers of debris flooding roads and how to best floodproof homes and businesses.	Hurricane, Flood		G3	Y	City Council, City Manager, ISD	$10,000	Local	12	Medium
19	Sever weather awareness week	Support severe weather awareness week. Make available educational documentation regarding all a hazards.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms		G3	Y	City Council, City Manager, ISD	$5,000	Local	12	Medium
20	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.	Hurricane, Flood		G2	N	City Council, Planning	1.5 Mil	Local, PDM, HMGP	36	Medium
21	Implement process to receive latest hazard data from partners	Establish and implement a process to coordinate with State and Federal agencies to maintain up-to-date hazard data, maps, and assessments.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2	Y	City Council, City Manager, Planning, State, FEMA	$50,000	Local	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 Floresville											
22	Develop Funding Mechanism for Flood Mitigation	Implement impact fees and drainage utility fees to fund improvements to the municipal drainage and flood control network.	Hurricane, Flood		G1, G2, G4	Y	City Manager, City Council	$150,000	Local	24	Medium
23	Build hazard reserve fund	Establish a local reserve fund for public mitigation measures.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1	Y	City Council	1.5 Mil	Local	24	Medium
24	Implement Drought and Extreme Heat Contingency Plan	The city is most impacted by drought and extreme heat conditions as these conditions are prevalent most years. Thus, a contingency plan for water usage is needed. The city will create and implement a drought and extreme heat contingency plan to create water conservation stages for users based on water availability.	Drought, Extreme Heat		G1	Y	Planning Department	$120,000	Local, PDM, HMGP	72	Medium
25	Keep aerial imagery current	Keep aerial photography current, especially in rapidly developing areas.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2	Y	City Council, County, AACOG	$200,000	Local, Regional	24	Medium
26	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	24	Medium

Legend:



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 La Vernia											
1	New Flood Control Infrastructure	Study to determine master drainage plan construction of drainage culverts, acquisition of flood prone lands for detention or retention and implment findings.	Hurricane, Flood		G1, G2, G4	N	Public works	2.5 Mil	Local, TWDB, HMGP, PDM, SARA, TDEM	36	High
2	Additional flood proof at wastewater treatment plant	The wastewater treatement plan is particularly susceptible to rain events and needs to be floodproofed. If floodproofing does not meet the cost-benefit threshold, a new wastewater treatment plant needs to be built outside of the floodplain.	Hurricane, Flood		G4	N	Public Works	$350,000	Local, HMGP, PDM, TWDB, SARA	36	High
3	Develop and Implement Stormwater Management Plan	More than half the land area in city of La Vernia is within the 100-year floodplain of Cibolo Creek per the current FEMA Flood Insurance Rate Maps. US 87 is submerged going North and South out of the city during flood events which means the fire department and EMS are cutoff from the rest of the city. Conduct a detailed hydrologic and hydraulic study, and from the results, develop a flood protection plan for Cibolo Creek.	Hurricane, Flood		G2, G4	Y	Planning, Engineering	1.5 Mil	Local, HMGP, PDM, TWDB	24	High
3	Harden Critical Facilities	The elvated storage tower, 3 lift stations, and wastewater treatement plant are all within the 100-year floodplain or floodway. Appropriate methods to harden these facilities against flooding and other impacts from hazards will be explored and implemented.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G4	Y	Public Works	$500,000	Local, 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
City of La Vernia											
4	Get generators and quick connects for all schools and critical facilities	Power loss during hazard events is a common occurrence and standby generation for all critical facilities needs to be implemented as well as long-term solutions to the provision of electric service to critical facilities.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G2, G4	Y	Public Works	$300,00	Local, HMGP, PDM, TWDB	18	High
5	Maintenance of Flood Control Infrastructure	Maintain existing minor flood control infrastructure to enusre functionality during flood events; clear debris from dedicated drainage channels. Implement a voluntary public creek cleanup program.	Hurricane, Flood		G2, G4	N	Public works, SARA	$75,000	Local, County	36	Medium
6	Public education and outreach	Implement public education and outreach programs to educate citizens about mitigation against hazards; seek partnerships with county, neighborhing communities and San Antonio River Authority.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G3	N	Office of Emergency Management, ISD	$5,000	Local, HMGP, ISD	48	Medium
7	Repetitive loss properties	Offer relocation/ mitigation incentives to current flood hazard area property owners; initiate a community program to acquire repetitive loss structures identified by FEMA.	Hurricane, Flood		G2, G3	N	Office of Emergency Management, City Manager	000 + per prop	Local, HMGP, PDM, TDEM	36	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
La Vernia ISD											
1	Upgrade/Harden Schools against all hazards	The Schools in La Vernia 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		G2, G4	Y	LVISD, Public Works	$275,000	LVISD, 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		G2, G4	Y	LVISD, Public Works	$150,000	LVISD, Local, TWDB, HMGP	36	High
3	Community Safe Room	Construct a safe room / building for public to go to for shelter during storms by upgrading existing high school gym facility.	Hurricane, Flood, Drought, Windstorm, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2	Y	LVISD, City of La Vernia	$150,000	LVISD, HMGP, PDM	24	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		G1, G2, G3	Y	LVISD	$5,000	LVISD, 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	LVISD	$40,000	Local, HMGP, PDM, Texas Forest Service, TPRD	24	Medium

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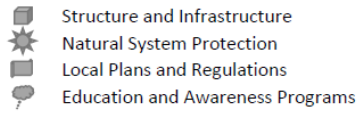


Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Poth											
1	Mitigate local flooding in identified problem areas.	Identify problem flooding areas and implement a program to reduce localized flooding.	Hurricane, flooding		G1	Y	City of Poth, ISD Police, Fire	$5,000	Local	12	Medium
2	Provide emergency generator for the wastewater treatment plant	Install emergency generator at Wastewater treatment plant	Hurricane, Flood, Windstorms, Lightning, Tornado, Hailstorms, Earthquakes, Severe Winter Stroms		G4	Y	Public Works	$120,000	Local, HMGP	24	High
3	Strengthen floodplain management ordinances	Adopt higher floodplain standards for new development	Hurricane, Flooding		G2, G4	Y	Engineering, Planning	$25,000	Local, CDBG	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	$20,000	Local, CDBG	12	High
5	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	12	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 Poth											
6	Adopt ordinances that enforce flood mitigation strategies	Institute fine for trash or wooded build-up in creek or for going around barricades setup to prevent vehicels going over flooded crossings.	Hurricane, Flooding		G2, G4	Y	City Council	$5,000	Local	24	High
7	Educational Signage	Install educational sigange such as "Turn around don't drown" at high risk low water crossings.	Hurricane, Flooding		G3	Y	City, public works	$5,000	Local, CDBG, FEMA	12	High
8	Digital signage for communication	Coordinate with school district to use sign on US 181 for emergency info and safety directions during hazard events.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Materials Incident		G1, G2	Y	ISD, City	$5,000	Local, CDBG, ISD	24	Medium
9	Early warning system education	Alert the population through education material, media and other methods about enrolling in the early warning system	Hurricane, Flooding, Tornado		G3	Y	County, Emergency mgmt.	$5,000	Local, CDBG, TWDB	48	Medium
10	Install pipe gates to close off streets	Install automated systems at low-water crossings with high rate of vehicular access resulting in frequency of accidents and loss of life.	Hurricane, Flood		G1, G2	Y	Police, Public Works	$250,000	Local, HMGP, TWDB	24	Medium
11	Drainage Study Marcelinas Creek and its major tributary	Marcelinas Creek has a floodplain that runs through the center of the city. Install stream gauges and identify alternatives to mitigate flooding. Implement study findings.	Hurricane, Flooding		G1, G2	Y	Engineering, Planning	$250,000	Local, HMGP, TWDB	36	High

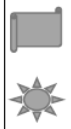
Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Poth											
12	Construct Community Safe Room	Conduct a feasibility study to evaluate site options, 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, Tornado		G2	Y	ISD, City of Poth	$250,000	Local, HMGP	36	Medium
13	Structural hardening of critical facilities	Harden critical facilities against impacts of all hazards.	Hurricane, Flood, Windstorms, Lightning, Tornado, Hailstorms, Earthquakes, Severe Winter Stroms		G4	Y	Public Works	$200,000	Local, HMGP	36	High
14	Build Detention Pond	Phase I: Perform a study to evaluate Poth Branch Watershed - Phase II: Purchase land and construct a drainage infrastructure facility in accordance with the engineering recommendations of the study.	Hurricane, Flooding		G2, G4	Y	City Council	$100,000	Local, HMGP, PDM	36	High
15	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	24	Medium
16	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 developpment regulations.	Wildfire		G1, G2, G4	Y	City Manager, City Council	$50,000	Local, HMGP, PDM, TNRIS	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
City of Stockdale											
1	Harden Critical Facilities	The water plant, emergency services Building and City Hall lose power under variety of rain events. There is an immediate need for stand- by power generation and a long-term need to harden these facilities against flood hazard or re-locate these facilities to less hazardous areas. The City of Stockdale has 48 hours of emergency water storage.	Hurricane, Flood		G1, G4	N	Engineering, Planning, Public Works	$500,000	Local; HMGP; PDM; CDBG	48	High
2	Develop and implement a stormwater management plan for Stockdale Creek.	Stockdale Creek, a tributary of Clifton Branch which flows into Cibolo Creek, does not have sufficient capacity to contain floodwater as it flows through the center of Stockdale. The railroad on the east side of town used to act as a levee, but when it was removed flooding was exacerbated throughout the city. One major impact during flooding is that the EMS is located on the north side of town at the VFD and is cutoff from the the majority of the city in a flood. A study needs to be conducted to identify solutions. Engineering recommendations to be implemented.	Hurricane, Flood		G2, G3, G4	Y	City Council, Planning, Engineering	$1,200,000	Local; TWDB; HMGP; PDM; CDBG	48	High
3	Maintain drainage system	Improve storm water drainage within residential and commercial areas by removing brush and debris, opening and widening waterways, restricting building in the flood zone, and widening bridges. Status or project was 90% complete in 2012 plan awaiting purchase of two remaining properties.	Hurricane, Flood		G1, G4	N	Engineering, Planning, Public Works	$2,000,000	Local; HMGP; PDM; TWDB; USACE	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
City of Stockdale											
4	Drainage improvements to wastewater treatment plant	A drainage improvement was completed in 2018 with 2016 disaster relief funding. Internal plumbing was buried and the size of the weir box was increased. Funding and improvements are still needed to connect 2 and 3 and cross CR401 to increase discharge capabilities. The diameter of the outfall pipe will be increased from 8in to 15in.	Hurricane, Flood		G1, G4	Y	Engineering, Planning, Public Works	$800,000	Local; HMGP; PDM; CDBG	12	High
5	New Bridges on 6th and 8th Streets	New construction of waterway bridges on 6th and 8th Streets crossing Stockdale Creek. Lift elevation profile of the two bridges that provide access to critical facilities and services within the city as well as access from the City to the surrounding region.	Hurricane, Flood		G2, G4	N	Engineering, Planning, Public Works	$500,000	Local; HMGP; PDM; TWDB	24	High
6	Testing and coding fire hydrants	Testing and coding fire hydrants to mitigate against uncontrollable spread of fire.	Drought, Extreme Heat, Wildfire, Hazardous Material Incident		G1, G2	N	City Water; Fire Department	$15,000	Local	36	Medium
7	Get generators and quick connects for all schools and critical facilities	Power loss during hazard events is a common occurrence and standby generation for all critical facilities needs to be implemented as well as long-term solutions to the provision of electric service to critical facilities.	Hurricane, Flood, Drought, Extreme Heat, Windstorms, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Hazardous Material Incident		G1, G2, G4	Y	Public Works	$250,000	Local; HMGP; PDM; CDBG	12	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 Stockdale											
8	Detention/ Retention pond on school property.	Install a Detention/retention pond and reservoir to store excess stormwater on school property along Fordtran Street.	Hurricane, Flood		G2, G4	N	Stockdale ISD, Public Works, Engineering	$1,500,000	Local; SISD; HMGP; PDM	24	Medium
9	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		G1, G2	Y	Emergency Management, Stockdale ISD	$10,000	Local; SISD	12	Medium
10	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	24	Medium

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 (STAPLE+E) 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 STAPLE+E exercise were then used to assign an overall priority to each mitigation action for each of the participating jurisdictions. In addition to the STAPLE+E 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 19: PLAN MAINTENANCE

This section describes how Karnes and Wilson 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 18-1 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 18-1. Team Members Responsible for Plan Maintenance

Jurisdiction/Entity	Title
Karnes County	**Emergency Management Coordinator**
City of Karnes City	City Manager
City of Kenedy	Police Chief
City of La Vernia	City Secretary
City of Runge	City Manager
Wilson County	**Emergency Management Coordinator**
City of Floresville	Floodplain Administrator/Coordinator
City of Falls City	Planning Manager
City of Poth	Engineering Manager
City of Stockdale	Fire Chief

Incorporation

Following adoption and approval of the Plan, Karnes and Wilson 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:

- Karnes and Wilson 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 Karnes and Wilson 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 Karnes and Wilson 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 Karnes and Wilson 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.

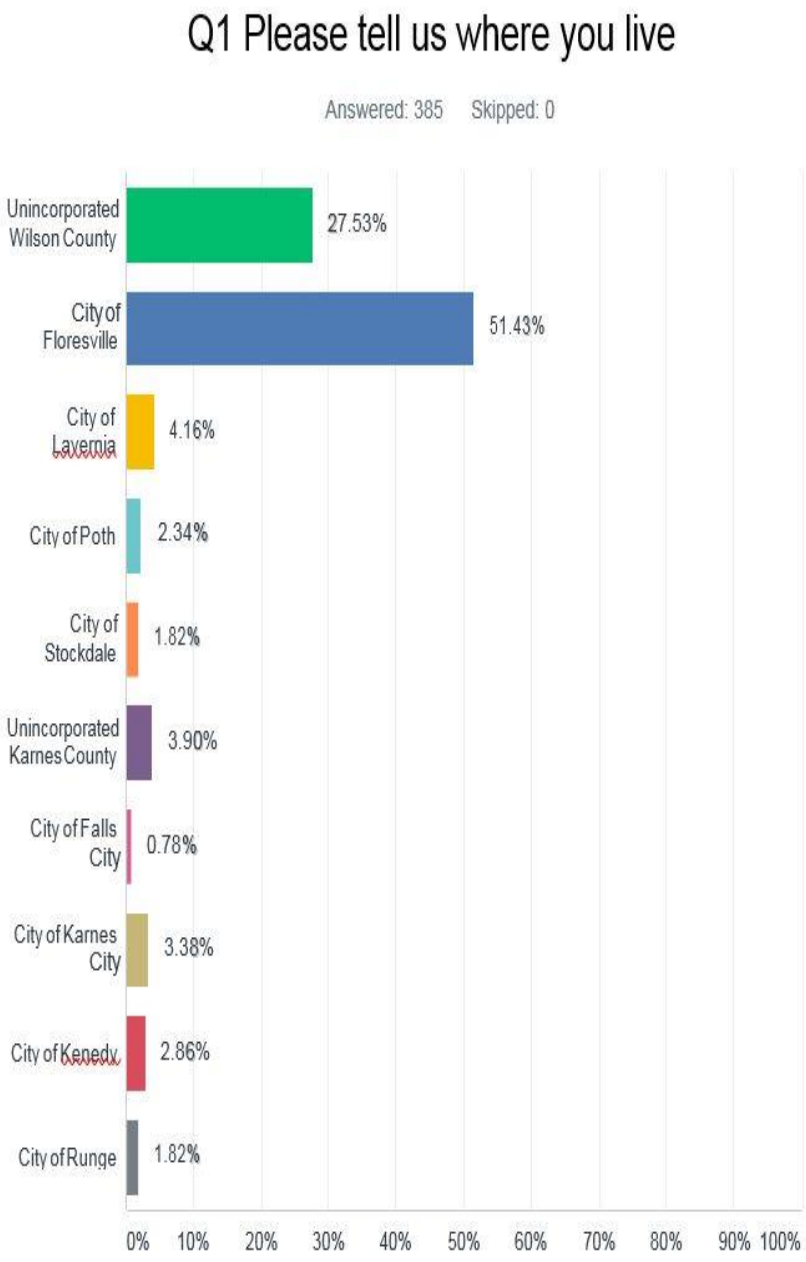
The Planning team may also develop a voluntary citizen/stakeholder advisory group comprised of members from throughout the planning area to provide feedback on an annual basis. It is vital that the public and stakeholders maintain a vested interest in the Plan in order to keep the plan relevant as it 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 Karnes and Wilson Counties Hazard Mitigation Plan.

APPENDIX A: CAPABILITY ASSESSMENTS

	Capabilities	**Wilson County**	City of Floresville	City of La Vernia	City of Poth	City of Stockdale	**Karnes County**	City of Falls City	City of Karnes City	City of Kenedy	City of Runge
Planning and Regulatory	Comprehensive Plan			X	X					X	
	Capital Improvement Program			X						X	
	Economic Development Plan										
	Transportation Plans	X					X				
	Emergency Operation Plans	X		X			X				
	Continuity of Operations Plan										
	Stormwater Management Plan										
	Zoning ordinances			X	X					X	
	Building Codes		X	X	X	X				X	X
	Subdivision Ordinance	X		X	X		X			X	X
	Floodplain Ordinance	X	X	X	X	X	X	X	X	X	X
Administrative and Technical	Engineers	X		X			X				
	Planner										
	GIS Analysts	X									
	Building inspectors	X		X			X				
	Emergency managers	X		X			X				
	Grant writers										
	Chief Building Official			X			X				
	Floodplain Administrator	X	X	X	X	X	X	X	X	X	X
Financial	Operating budgets	X	X	X	X	X	X	X	X	X	X
	Stormwater utility fees										
	Development impact fees			X							
Education and Outreach	School programs						X				
	Firewise communities										
	Storm Ready communities										
	Hazard awareness campaigns										
	Public Information Officer										
	Community newsletter			X							

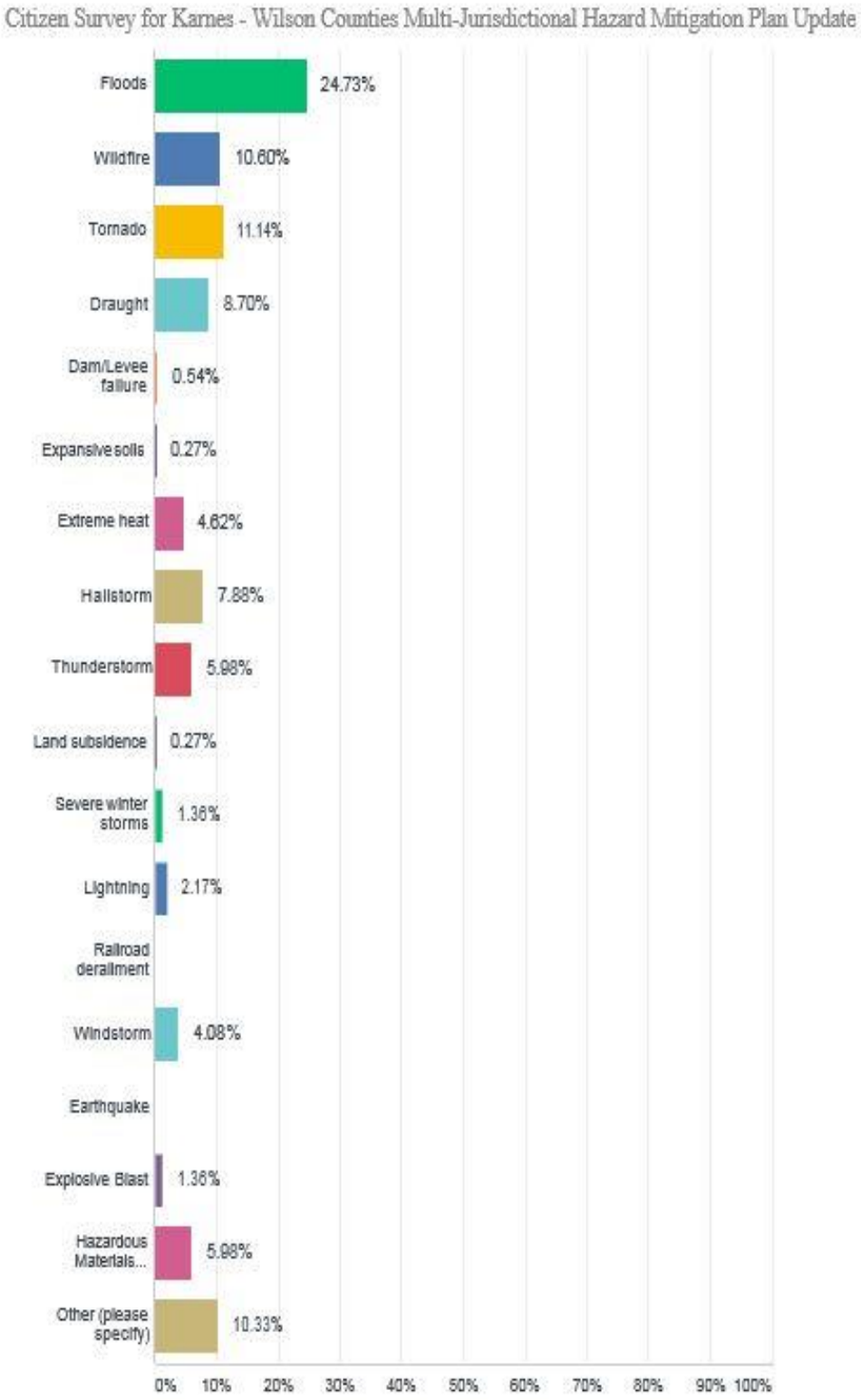
Planning and regulatory capabilities are identified as the most impactful to how a municipality is able to plan and develop in a way that is disaster resilient. With the lack of some fundamental items such as Capital Improvement Programs, subdivision ordinances, comprehensive plans, transportation plans 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 don't 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



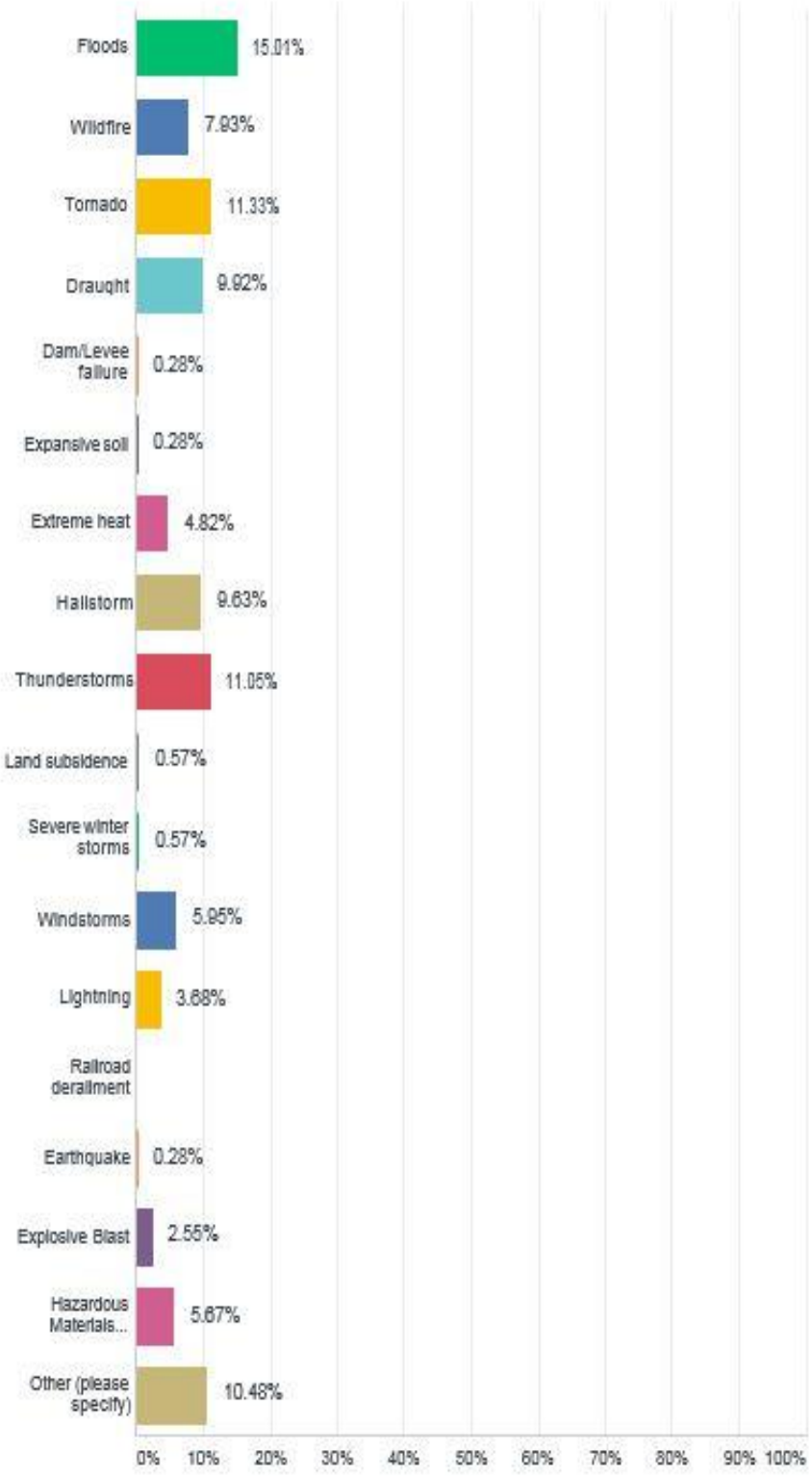
Q2 Please select the hazard you think is the highest threat to you, your business and/or your community. (Please check only one)

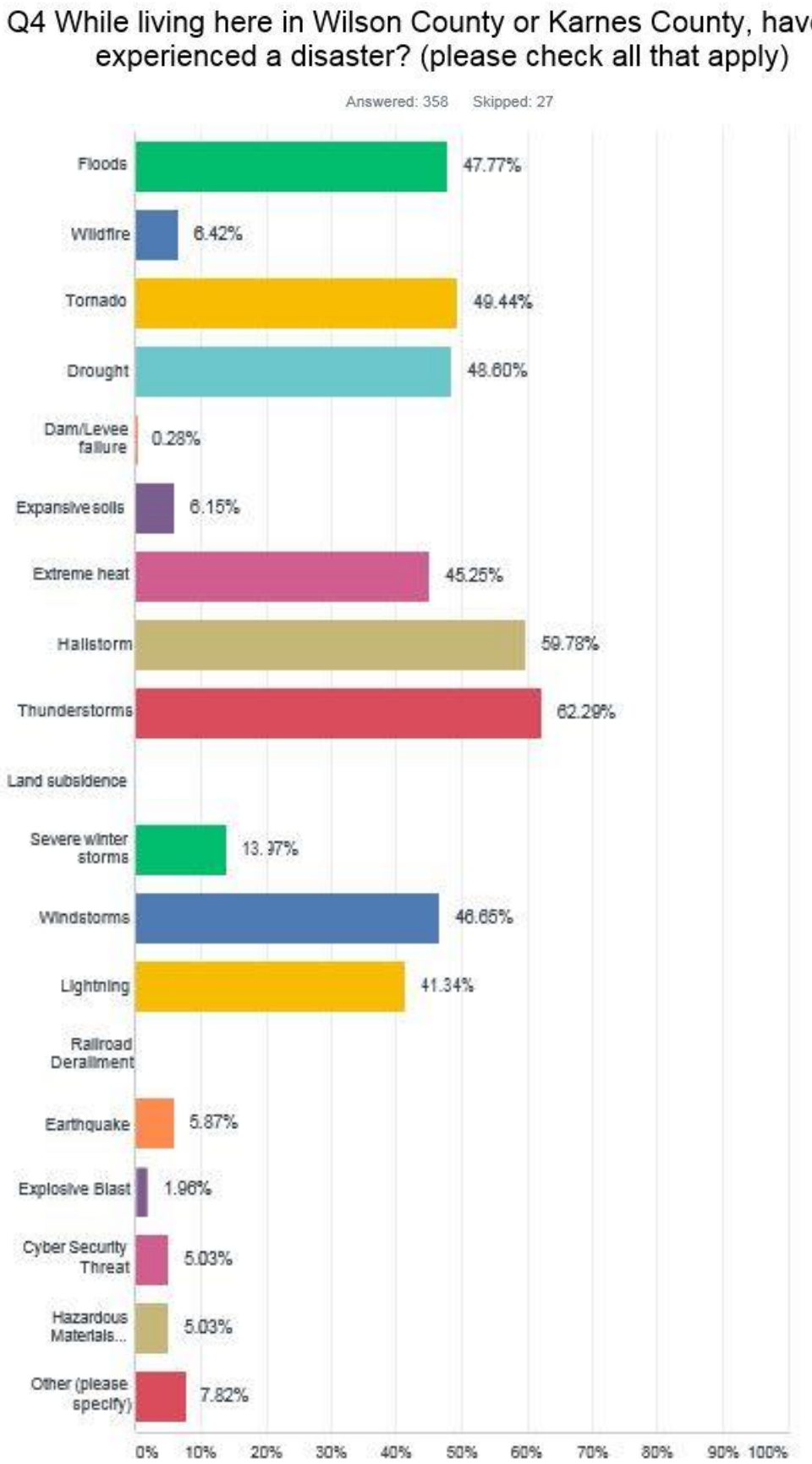
Answered: 368 Skipped: 17



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

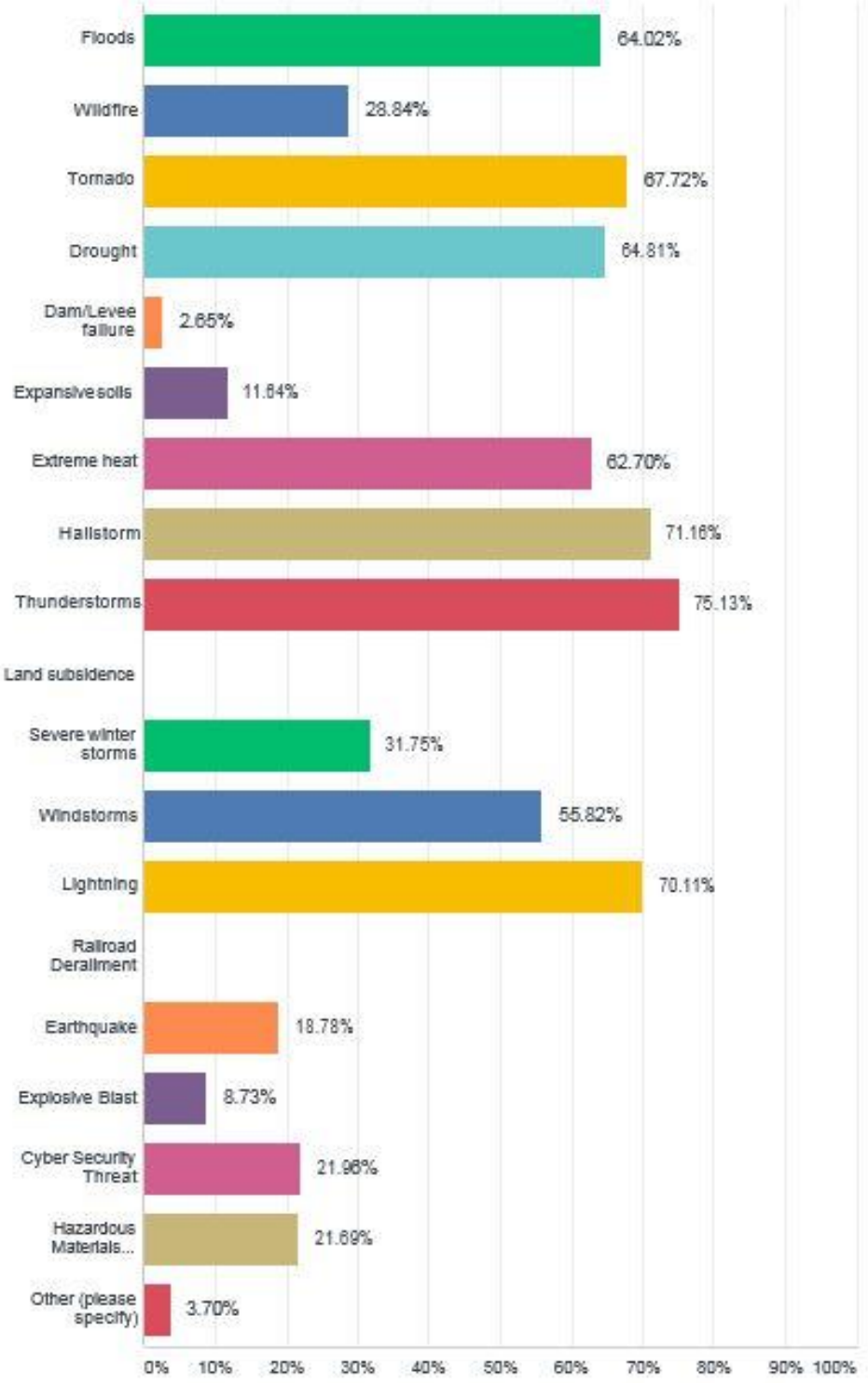
Answered: 353 Skipped: 32




Q4 While living here in Wilson County or Karnes County, have you experienced a disaster? (please check all that apply)
Answered: 358 Skipped: 27
Floods 47.77%
Wildfire 6.42%
Tornado 49.44%
Drought 48.60%
Dam/Levee failure 0.28%
Expansive soils 6.15%
Extreme heat 45.25%
Hailstorm 59.78%
Thunderstorms 62.29%
Land subsidence
Severe winter storms 13.97%
Windstorms 46.65%
Lightning 41.34%
Railroad Derailment
Earthquake 5.87%
Explosive Blast 1.96%
Cyber Security Threat 5.03%
Hazardous Materials... 5.03%
Other (please specify) 7.82%
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

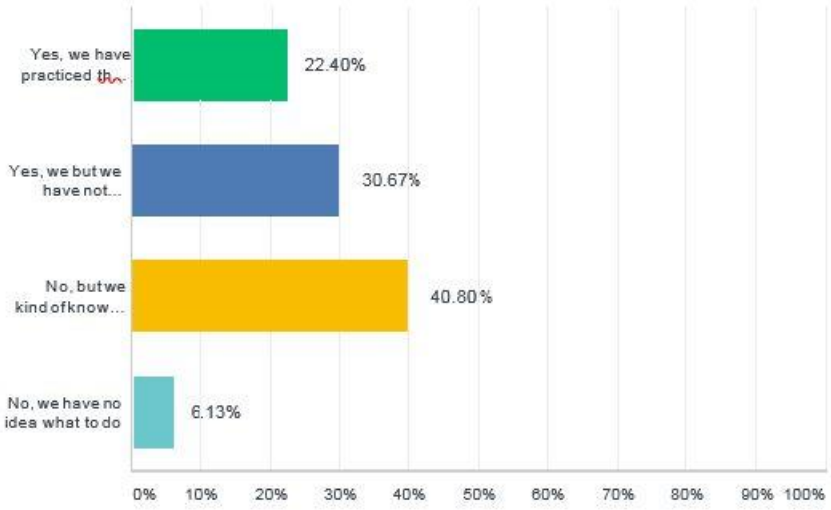
Q5 Which of the following are likely to occur in your area at least once in your lifetime? (please check all that apply)

Answered: 378 Skipped: 7



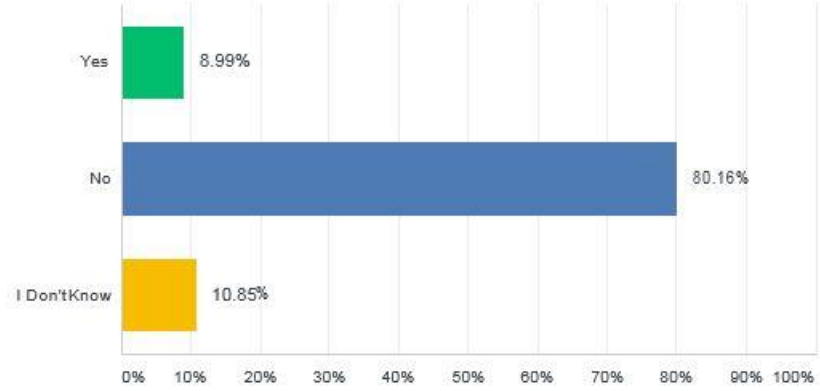
Q6 My household has a plan in the event of a disaster such as a flood, tornado, etc.

Answered: 375 Skipped: 10



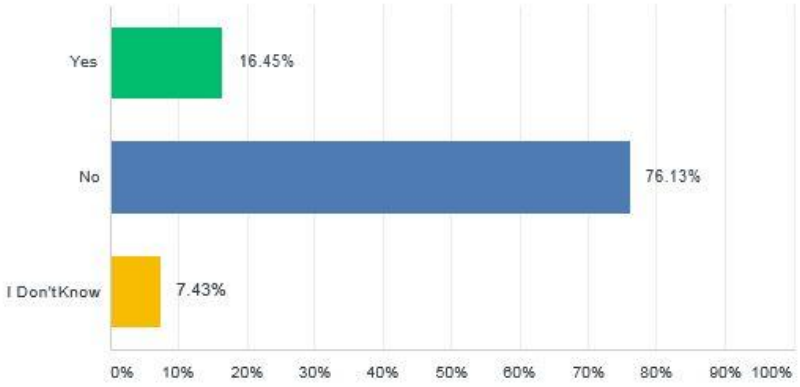
Q7 Is your home located in a floodplain?

Answered: 378 Skipped: 7



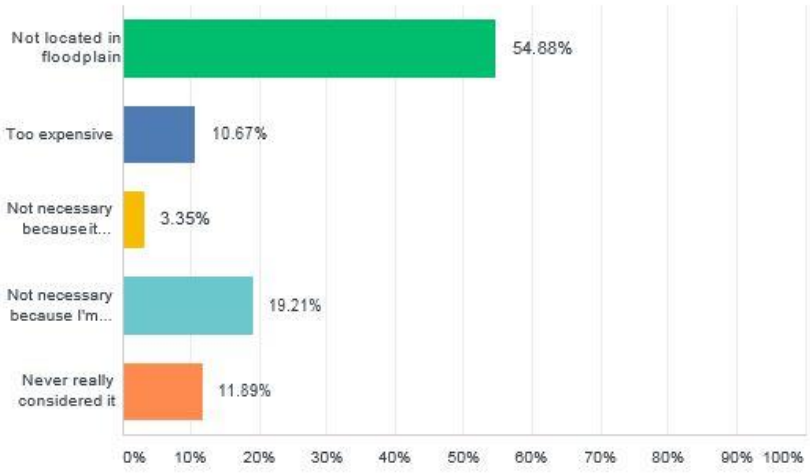
Q8 Do you have flood insurance?

Answered: 377 Skipped: 8



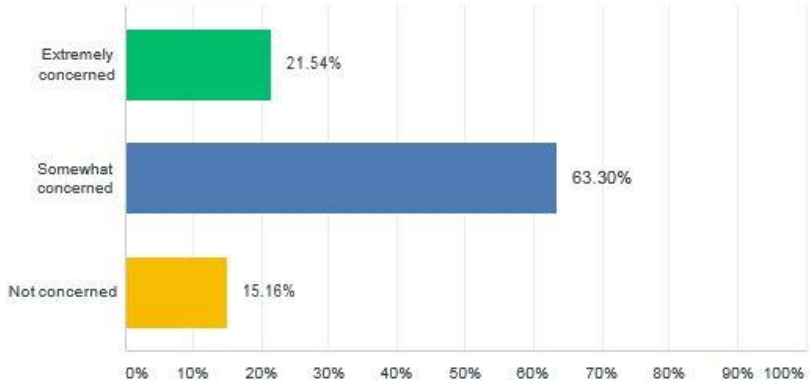
Q9 If you do not have flood insurance, why not?

Answered: 328 Skipped: 57



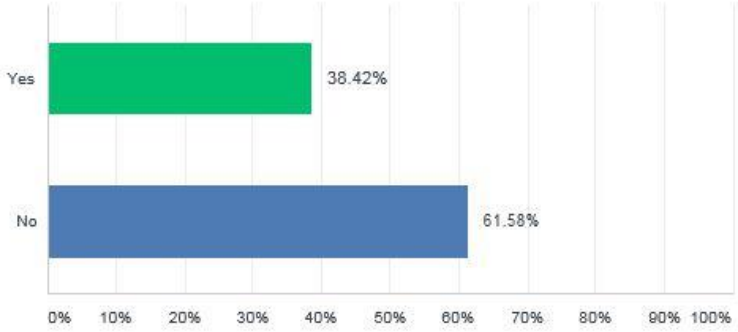
Q10 How concerned are you about the possibility of you or your community being impacted by a disaster?

Answered: 376 Skipped: 9



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

Answered: 380 Skipped: 5

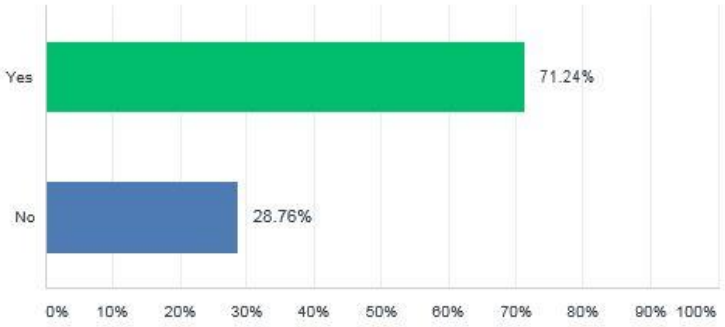


Q12 If "Yes", please described the action you have taken:

Answered: 151 Skipped: 234

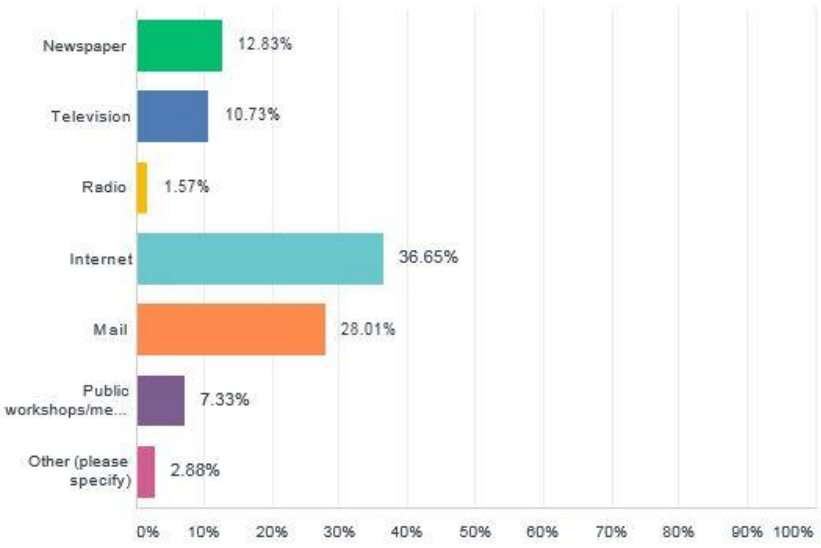
Q13 Are you interested in making your home, business and/or community more resistant to hazards?

Answered: 372 Skipped: 13



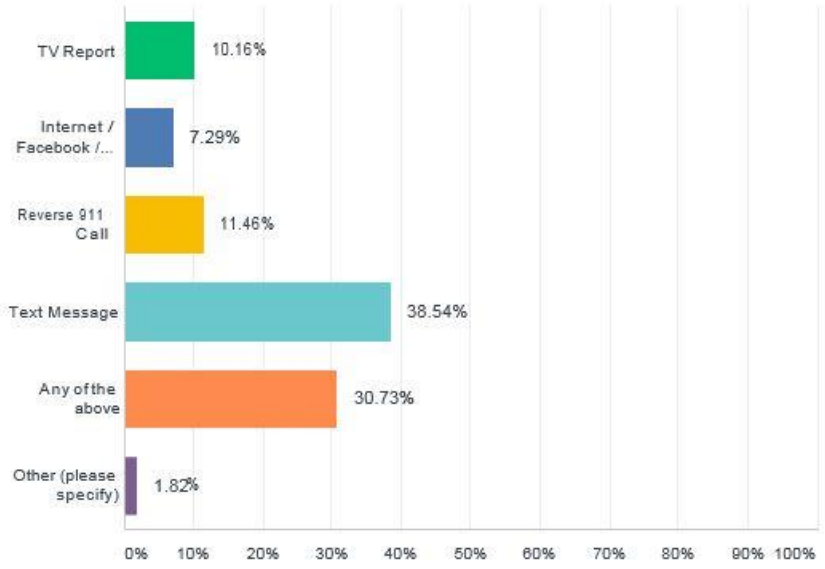
Q14 What is the most effective way for you to receive information about how to make your home, business and/or community more resistant to hazards?

Answered: 382 Skipped: 3



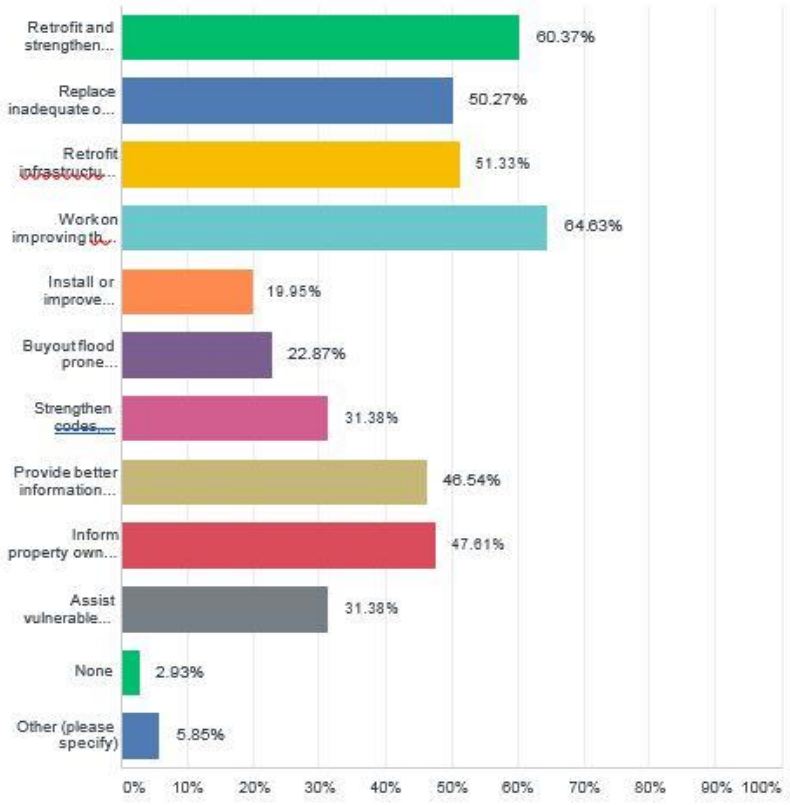
Q15 Which of the following would be the best way to alert you and your household to an imminent disaster?

Answered: 384 Skipped: 1



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: 376 Skipped: 9

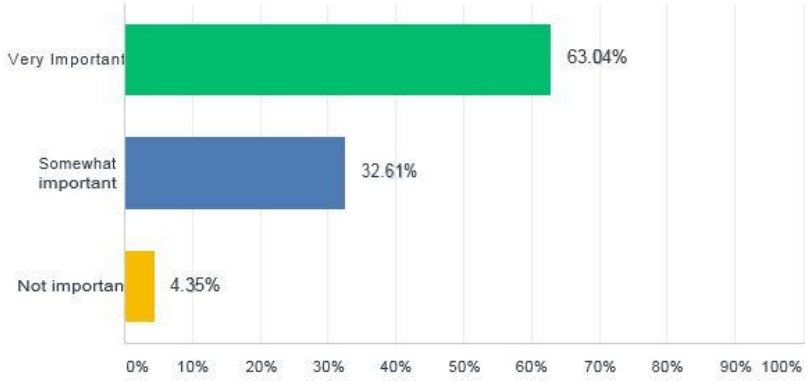


Q17 Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important?

Answered: 113 Skipped: 272

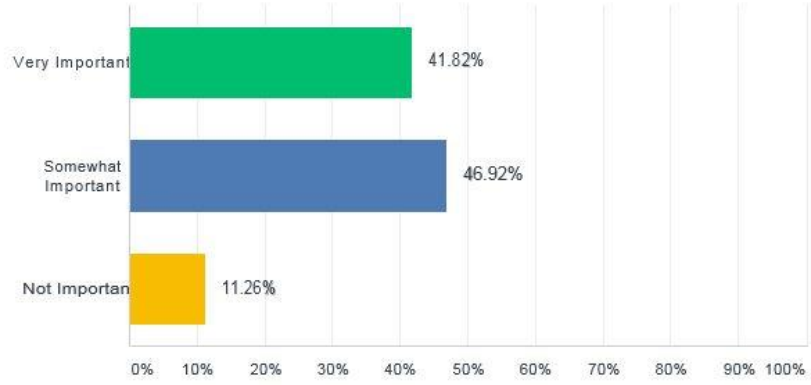
Q18 Prevention of Hazards is any administrative or regulatory action that influences the way land is developed and buildings are built. Some examples include planning and zoning, building codes, open space prevention, and flood plain regulation. Please rank how important you believe it is for your community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

Answered: 368 Skipped: 17



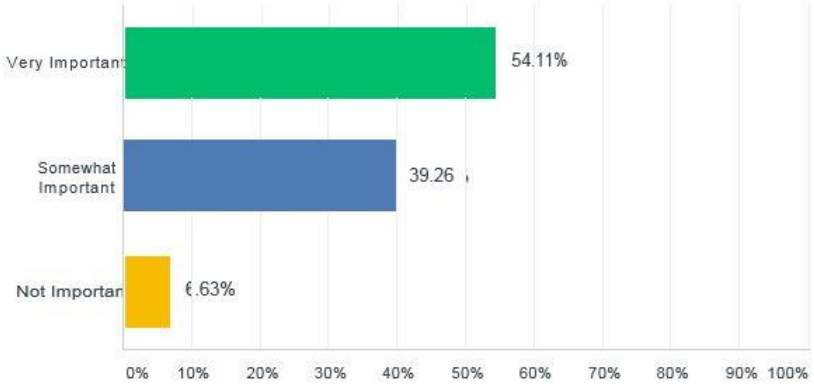
Q19 Reducing community risks from hazards can also include property protection. This involves actions that involve the modification of existing buildings to protect them from a hazard or removal from the hazard area. Examples include acquisition, relocation, elevations, structural retrofits and storm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

Answered: 373 Skipped: 12



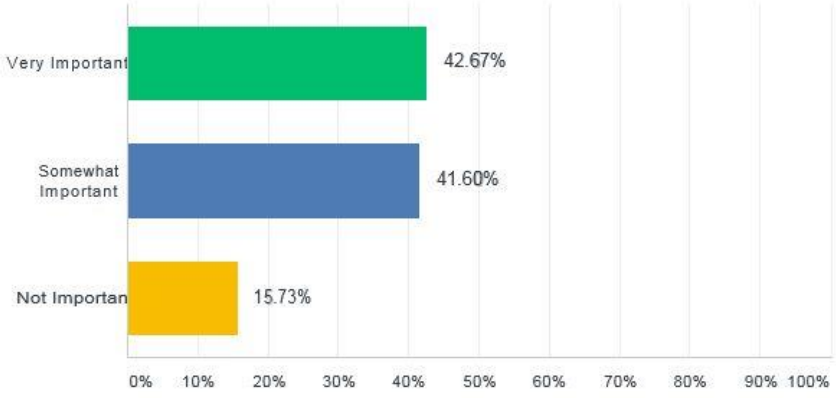
Q20 Reducing community risks from hazards can also include natural resource protection. This kind of protection is in addition to minimizing hazard losses, preserve or restoring the functions of natural systems. Some examples include flood plain protection, habitat preservation, slope stabilization,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

Answered: 377 Skipped: 8



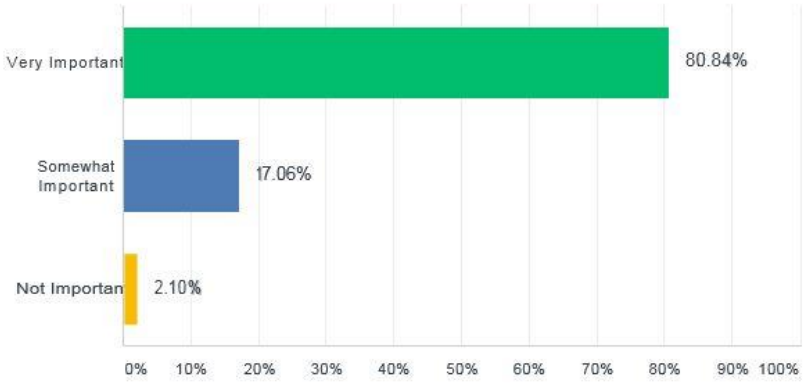
Q21 Structural Projects can also help to reduce hazards. These actions are intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include dams, levees, seawalls, detention/retention basins, channel modifications, retaining walls and storm sewers. Do you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

Answered: 375 Skipped: 10



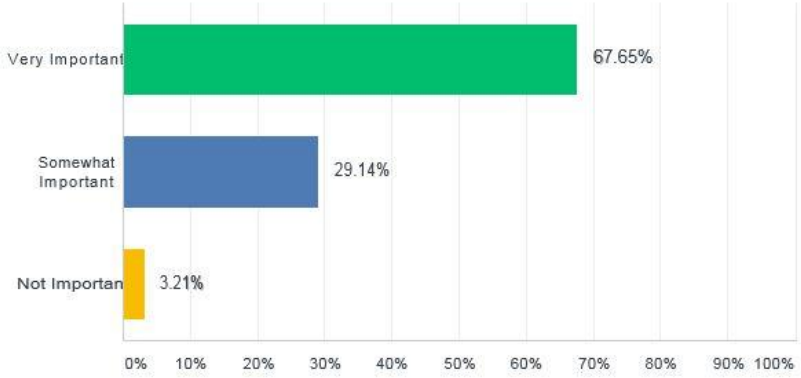
Q22 Emergency Services are actions that protect people and property during and immediately after a hazard event . Some examples include warning systems, evacuation planning, emergency planning, emergency response training and protection of critical emergency facilities/system. Do you believe this is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

Answered: 381 Skipped: 4



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: 374 Skipped: 11



Q24 If you would like to be notified of upcoming public meetings for the Karnes County and Wilson County Hazard Mitigation Plan Update, please leave your name and email. Thank you for your time!

Answered: 120 Skipped: 265

1. Please tell us where you live		2. 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)	Other (please specify)
City of Floresville		cyber security threat
City of Floresville		ground water contamination
City of Floresville		Gas leak after a storm
City of Floresville		Power outage
City of Floresville		Over charging business people by the city. The h2o is absurd.
City of Floresville		mosquitos
City of Floresville		Traffic
City of Floresville		Highway traffic - big rigs.
City of Floresville		deep ditches on side of streets
City of Floresville		Speed control.
City of Floresville		Theft
City of Floresville		Hurricane
City of Floresville		bad roads
City of Floresville		EMP-electromagnetic pulse explosion
City of Floresville		bad street and county roads
City of Floresville		hurricane
City of Floresville		city council
City of Floresville		drinking water and sewage
City of Floresville		home security
City of Floresville		chemical, nuclear, armed forces attacks
City of Floresville		theft, weather
City of Floresville		Speed of drivers on residential streets
City of Floresville		weather
City of Floresville		loss of electricity
City of Floresville		Terrorist Attacks
City of Floresville		Hurricane
City of Floresville		Theft
City of Karnes City		H25 Gas
Unincorporated Karnes County	Panna Maria, Karnes County	Excessive Oil Field Damage
City of Floresville		fast traffic in front of house
City of Floresville		increasing property taxes on seniors
City of Floresville		next door neighbor has old trailers, trees
Unincorporated Wilson County		Pipeline leak
Unincorporated Wilson County		Poor water
City of Floresville		FEMA intrusion into private property and private decisions
City of Floresville		Terrorist/shooters
Unincorporated Wilson County		ILLEGAL IMMIGRATION
Unincorporated Wilson County		Uncontaminated Water

1. Please tell us where you live		3. Please select the hazard you think is the second highest threat to
Response	Other (please specify)	Other (please specify)
City of Floresville		Electrical after storm
City of Floresville		Contaminated water
City of Floresville		You sold h20 to San Antonio and raised our water rates, unreal
Unincorporated Wilson County		city government
City of Floresville		Electrical
City of Floresville		none other
City of Floresville		Hard water and sometimes it comes out black.
City of Floresville		Drugs
City of Floresville		Crime
City of Floresville		Drainage
City of Floresville		dark roads, no lights on streets
City of Floresville		School Schooting
City of Floresville		contaminated drinking water
City of Floresville		traffic
City of Floresville		speeding vehicle inside city limits
City of Floresville		robbery
City of Floresville		wind
City of Floresville		Civilian attacks
City of Floresville		lead
City of Floresville		speeding traffic
City of Floresville		getting hit by a vehicle speeding by.
City of Floresville		Homeless
City of Floresville		cyber security
City of Floresville		too many 18-wheelers and a lot of fumes
City of Floresville		Biological
City of Floresville		Traffic Flow
City of Runge		Hurricane
City of Floresville		low h2o pressure
City of Floresville		lack of inviting reasons to make people want to live here
City of Floresville		Large truck traffic
City of Floresville		Federal and local governments using emergencies as an excuse to violate constitutional rights
City of Floresville		Having uneducatied, unqualified, idiotic people on governing boards that make less than logical decisions that end up costing millions of dollars and horrendous damage to our community.
Unincorporated Wilson County		ILLEGAL IMMIGRATION
City of Karnes City		Oil/Gas industry accident/spill or incident
Unincorporated Wilson County		can deal with other no government needed
Unincorporated Wilson County	Adkins	Adkins
City of Floresville		My house will fall if we flood again

1. Please tell us where you live		3. While living here in Wilson County or Karnes County, have you experienced a disaster? (please check all that apply)
Response	Other (please specify)	Other (please specify)
City of Floresville		lite earthquake
City of Floresville		hurricane
City of Floresville		windstorms from coastal hurricanes
City of Floresville		freeze conditions
City of Kenedy		Hurricane
City of Runge		Hurricane
City of Floresville		robberies-3 times
City of Floresville		Windshear damage to roofing
City of Floresville		none
Unincorporated Wilson County		Mass shooting
Unincorporated Wilson County		70-80 mile straight line winds
City of Floresville		massive shoting
Unincorporated Karnes County	San Antonio	hurricaine
City of Kenedy		harvey
City of Kenedy		NO
City of Kenedy		just moved to the area about 6 months ago.
City of Lavernia		Nothing of disastrous proportions
City of Lavernia		Hurricane
Unincorporated Wilson County		Hurricane and a near-tornado (path was within a mile, twice)
Unincorporated Wilson County		shifting soil
City of Kenedy		Barely averted Hurricane Harvey
City of Floresville		Fire; our house burned down.
City of Stockdale		Hurricane
Unincorporated Wilson County		Grass fires

1. Please tell us where you live		5. Which of the following are likely to occur in your area at least once in your lifetime? (please check all that apply)
Response	Other (please specify)	Other (please specify)
City of Floresville		The city is higher and has never flooded, to my knowledge. My home is higher than city.
City of Floresville		Shooting/terrorist threat
City of Floresville		Hurricane
City of Floresville		freeze conditions
City of Floresville		person getting run over
Unincorporated Wilson County		How the heck would I know?
Unincorporated Wilson County		Mass shooting
Unincorporated Wilson County		Straight line winds
Unincorporated Wilson County		water contamination
City of Karnes City		Hurricane
City of Falls City		Electromagnetic Pulse
City of Lavernia		Hurricane
City of Lavernia		Biological
City of Poth		Mass shootings like Sutherland Spring

1. Please tell us where you live		11. Have you taken any actions to make your home, business and/or community more resistant to hazards? 12. If "Yes" [in Question 11], please described the action you have taken:
Response	Other (please specify)	Open-Ended Response
City of Floresville		Emergency food and water, supplies batteries, lights, ammo, alternate power source
City of Floresville		Planted a tree as a windbreaker and shade from heat.
City of Floresville		get rid of debris that can make a easy home for mosquitos
City of Floresville		Keeping it clean inside and outside.
City of Floresville		Added more soil to property to make it higher and we have metal roofing.
Unincorporated Wilson County		sand bags for flooding
Unincorporated Wilson County		clean the flood area
City of Floresville		Electrical surge strips.
City of Floresville		keep grass mowed short
City of Floresville		Clean property, being aware of surroundings and alert for hazards in neighborhood.
City of Floresville		probably storage
City of Floresville		Keep my home and community clean and safe by avoiding hazardous materials.
City of Floresville		removed cedar shingles
City of Floresville		Have installed rod into ground to protect home for lighting damage.
City of Floresville		new roots
City of Floresville		Established yard to prevent washing and flooding. Trimmed trees for wind and hail.
City of Floresville		removed brush from yard Planned where to go if tornado comes
Unincorporated Wilson County		dredging of creek bed/ mowing Installed master fencing
City of Floresville		Plot was elevated, prior to house being built
City of Floresville		stone exterior
City of Floresville		plywood for windows, barriers to prevent flooding
City of Floresville		Better home improvements
City of Floresville		Generator, Lantern, Wood for Windows
City of Floresville		New locks on doors, installed cameras, 2 fire extinguishers
City of Floresville		Called FPD and got nowhere.
City of Floresville		trim trees, fireproof safe, evacuation plan, water purification system.
City of Floresville		Built on high ground, maintain security
City of Floresville		Generator use/emergency supplies, emergency action plan
City of Floresville		Reinforced windows, tried to improve surroundings of the home.
City of Floresville		Insurance
City of Floresville		Installed large french drain across back
City of Floresville		We installed a metal roof
City of Floresville		I made a top of steel over the roof of the trailer.
City of Floresville		Professional Inspections
City of Floresville		Rock house, not in flood area
City of Floresville		Trimmed trees on property
Unincorporated Wilson County		Smoke detectors, water dry grass, no have open fires or throw cigarettes on grass
City of Floresville		A lot of love and care into the home
City of Karnes City		Got with officials on emergency plan
City of Karnes City		Private
Unincorporated Karnes County		Fire extenguisher
Unincorporated Karnes County		Cut tall grass, trim trees and clean all around buildings
City of Floresville		We have fire extinguishers and a plan on how to get out if necessary.
City of Floresville		Fencing, reserve food, guns and ammunition
Unincorporated Wilson County		Keep area clean around house from fire and wind
City of Floresville		Make sure of proper drainage,prep for food and water and electric power
City of Floresville		Window replacements
Unincorporated Wilson County		keep fire break clearing around structures; not collecting clutter outdoors
Unincorporated Wilson County		Keep grass and trees trimmed away from home. Used fire resistant materials for home
City of Floresville		Go bag and food supplies
City of Floresville		Renovation to safety codes and better protected
Unincorporated Wilson County		Limit outdoor equipment and furniture that can become airborne during a storm, flood insurance, multiple exits of property, fire extinguishers and first aid kits available at home
Unincorporated Wilson County	Blackhill	CERT member, have a plan.
Unincorporated Wilson County		No loose gound clutter to pose treats; keep land cleared and dry growrh free.
City of Floresville		Built pad for house so that it is above flood level
City of Floresville		N/A
Unincorporated Wilson County		Cleared trees that could fall on house. Put up awning to keep hail from hitting car.
Unincorporated Wilson County		Generator, water supply

Unincorporated Wilson County			
City of Floresville			GEnerator. potapot, blankets.freezer block , extra Gas
City of Floresville			Generator, water, porta pot, gasoline,freezer blocks, extra blankets
Unincorporated Wilson County			Special windows, lightning rods, securing structures....
City of Floresville			Land scraping
City of Poth			In the event of adverse weather we take necessary precautions to limit the damage that could be caused by flying debris. Insulate house/plants properly.
City of Floresville			Being informed and aware
Unincorporated Wilson County			Windows, doors, etc
Unincorporated Wilson County			Heat related-extra insulation, low e glass. Fire related-keeping property cleaned of debris
Unincorporated Wilson County			none too expensive
City of Kenedy			Smoke detectors, double paned storm windows with safety glass, storm kits, numbers lists.
City of Floresville			Stocked food and water, developed a plan and looked to procure a saferoom.
Unincorporated Wilson County			Mowing around the perimeter of our property to slow fire spread, removing dead trees and limbs, and supporting WCESD#2.
City of Karnes City			New Roof
City of Floresville			Updated roof replacement/repairs and new windows where needed
City of Floresville			at work we are aware of what to do
Unincorporated Wilson County	Adkins . Wilson county		Restructured the tie downs on the mobile home . releveled it as well
Unincorporated Wilson County			BRUSH CLEAN UP WITHIN 100 YARDS OF MY BUILDINGS
Unincorporated Karnes County	San Antonio		sand bags
Unincorporated Wilson County			I'm stocked up for many occasions
Unincorporated Karnes County			Plans in place to respond to specific hazards.
City of Karnes City			Home has a metal roof for inclement weather and fire protection. Family has a practiced plan in place in any event. Attended county meeting of emergency action plan for recent hurricanes.
Unincorporated Wilson County			Have some dehydrated food on hand. flashlights and batteries
City of Karnes City			securing items that could blow away and cause damage to others property
Unincorporated Wilson County			We have instituted a shelter-in-place plan and a bug-out plan for our personal use,,, we are both retired.
City of Karnes City			Place of work has multiple scenario emergency plans developed.

City of Lavernia			Security Systems
City of Kenedy			with advance notice are able to secure outdoor things that can blow in a storm
Unincorporated Wilson County			braced barns and outbuildings
Unincorporated Wilson County			Elevated back yard and AC, mow back brush
Unincorporated Wilson County			Garages, carports - protection from hailstorms.
Unincorporated Wilson County			Skills training, emergency supplies and equipment, communication with emergency management. CERT membership, Emergency Communications membership. Skywarn membership.
City of Falls City			Alternate water supply Bug out bag Survival food
City of Poth			Auxiliary power
Unincorporated Wilson County			Installed water line around the back w irrigation system in the front
City of Floresville			keep extra food, water at all times. extra fuel in storage. vehicles kept full of fuel.
City of Stockdale			metal roof
Unincorporated Wilson County			Various disaster plans, proactive action when disaster is near or likely, preventative site action for fire prevention and disaster damage mitigation,
City of Floresville			Flood control, cyber security, power surge protection
Unincorporated Wilson County			insurance
Unincorporated Karnes County			We built our home on a hill on our property so it won't flood, but the rest of our land is still susceptible and it still runs over a major highway in heavy rains.
Unincorporated Wilson County			Built home on high ground, trees for shade against high heat
City of Floresville			Plan to evacuate
City of Floresville			Rental property do not own.
Unincorporated Wilson County			Defensible space around home in the event of wild fire.
Unincorporated Wilson County			none
City of Lavernia	City of Adkins		Small Food and water and safety supply stockpile.
Unincorporated Wilson County			?
City of Poth			k
Unincorporated Wilson County			clean drainage ditiches cut trees
City of Lavernia			Former board member of ESD 1, Volunteer FD, NIMS including 100,200,300,400,700&800. Written several Emergency Management plans for business and a municipality. Work in HSE in the EMS field. Highly Contagious Disease transportation and Viral Hemoragic outbreak training.
City of Floresville			Check our home to see if it is protected and how it is protected. Business: check we have appropriate hardware to keep us protected

City of Lavernia		We have a secure interior room used in case of bad weather stocked with food, water, medical kits and we have a backup generator in case power is disrupted.
Unincorporated Wilson County		Put HD roof on home. Built on hill out of floodplain. Purchased generator.
Unincorporated Wilson County	Adkins	CERT Training, HAM license
City of Floresville		We raised our mobile home a bit but it may fall again should it flood due to an erroded tank across the road from our home.
Unincorporated Wilson County		Emergency plan, emergency kits, including food
City of Poth		Practiced evacuation plans monthly for my business. Check locks, smoke detectors. Have first aid kits and fire extinguishers in each part of the home and business. Have home alarm system with fire and police.

1. Please tell us where you live		14. 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 Floresville		Reverse 911 call
City of Floresville		Personal
City of Floresville		text
Unincorporated Wilson County	Blackhill	Email
Unincorporated Wilson County		Text / email / phone app notifications
City of Floresville		Fire Dept Radio
Unincorporated Wilson County		email and mail
Unincorporated Wilson County		Newsletter from mortgage lender and insurance company
Unincorporated Karnes County		In this day and time, you need to reach out to people through both mail and internet (social media). So many young people only use their technology, but the older folks appreciate a paper copy.
City of Kenedy		E-mail
Unincorporated Wilson County		email

1. Please tell us where you live		15. 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 Floresville		Alarm siren
City of Floresville		City Siren
Unincorporated Wilson County		a siren in town
Unincorporated Wilson County	156 Martinez Lane	Emergency Alert System & I-Info
Unincorporated Wilson County		Any and all the above since not everyone utilizes any one form as their primary contact
City of Floresville		Fire Dept Radio
Unincorporated Wilson County		All of the above together not just one

1. Please tell us where you live		16. 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)	Other (please specify)
City of Floresville		Local ordinance prohibiting large trucks in residential areas.
City of Floresville		use updated plans, not from 20 years ago.
City of Floresville		Help owners/community to control insects.
City of Floresville		complete drainage improvements of city
City of Floresville		ade quate flood water drainage control
City of Floresville		Don't allow building in flood plain.
City of Floresville		provide faster and more reliable internet options
City of Floresville		Less fees on alternative energy supply or personal production
City of Runge		No
City of Floresville		The in and out entrances at the old Walmart need to be specified in-out.
Unincorporated Wilson County		We are mostly rural areas so a significant event will be addressed for the most part by individuals rather than first responders. The most important tool for induvduals in a responsive situation aside from training is communication. Focuses on ensuring communication infrastructure, namely cell phone networks, are robust and resilient.
City of Floresville		Want to be wary of relying on government to do the work. We need to become more self-sufficient.
City of Floresville		Encourage more intelligent, highly educated citizens to be more engaged in the communities where they live, work and play. Re-ignite some passion for life that doesn't necessaritly just put a dime in your OWN pocket, but actually helps others more than just your ownself or your own family or property. Follow the 10 commandments..... Be a patriot and actively, intentionally, physically LOVE your country!
City of Lavernia		Better Dispatc hing servie and equipment
Unincorporated Wilson County		property maintenance assistance
City of Kenedy		Better zoning ordinances to keep dangerous things away from neighborhoods, schools, hospitals, nursing homes, etc.
Unincorporated Wilson County		Emergency Management. School Districts also need to be more involved.
Unincorporated Wilson County		look into water preservation
Unincorporated Wilson County		Have an engaged community.
Unincorporated Karnes County		creating hazardous concerns for neighbors. Or oil and gas advancements may create problems that weren't there previously.
City of Lavernia		Emergency Services need to be under one command and control system.
Unincorporated Wilson County		Response times and resources for all events and disasters.

1. Please tell us where you live		17. 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 Floresville		Long range effects on chemicals pumped underground by oilfield companies on water table/ aquifers
City of Floresville		Anything that affects the people is very important.
City of Floresville		When our businesses close or city dies, big hazard.
City of Floresville		Larger trucks speeding through towns/residential areas.
City of Floresville		Build 2 big underground bunkers north and south of city for tornados
City of Floresville		No
City of Floresville		No
Unincorporated Wilson County		Clean the S.A. River
City of Floresville		Neighborhoods for risky factors, falling trees, stuff that can fly in a major storm, flood areas, where to go in emergencies or call.
City of Floresville		No
City of Floresville		tell people to stay home and be off roads and not drive around and take pictures
City of Floresville		Starts recycling company.
City of Floresville		traffic conditions, FISD school zones
City of Floresville		Smokers totally put out lit cigarettes, cigars.
City of Floresville		Be sure bridges are more secure.
City of Floresville		Local chruches have an amazing ability to assist and care for people during emergencies. The cities should actively work with churches.
City of Floresville		city council and city management needs to be pro-active
City of Floresville		establish a hazard mitigation plan with a project/plan manager to oversee projects and send personel to hazard
City of Floresville		disaster from thunderstorms
City of Floresville		New and faster communications network
City of Floresville		Properly assessing environmental conditions prior to construction projects, especially in the case of taxpayer funded projects. Also maintain civil, property, and constitutional rights of citizens during disasters and emergencies.
City of Floresville		No
City of Floresville		Cut the very tall weeds in the drainage ditch out of town.
City of Floresville		No

City of Floresville		I don't know
City of Kenedy		No
City of Kenedy		Medical Assistance
City of Runge		No
City of Kenedy		no
City of Floresville		Practice Drills - Get Information
City of Floresville		No
City of Floresville		Having an evacuation plan so citizen's know where to go to be safe
City of Floresville		Wired fiber optic telecommunications to homes should be emphasized/inectivized for development
Unincorporated Wilson County		no
Unincorporated Wilson County		Share preventative education with businesses and encourage surrounding counties to do the same.
City of Floresville		n/a
Unincorporated Wilson County		Thank you for being transparent and open to public input.
Unincorporated Wilson County		Require landowners in wooded areas to keep land clear of fallen limbs and debris. Enforce burn bans.
City of Stockdale		No
Unincorporated Wilson County		Our electric always goes off and on...
City of Floresville		We really need to think about the truck traffic in the 181 corridors in both Wilson and Karnes counties. While it seems to be a little safer, I am not convinced based on how fast those trucks fly out of Floresville toward Poth. Those trucks are traveling disasters themselves.
City of Floresville		Active shooter
City of Floresville		No
City of Floresville		Use a tornado siren in town
City of Floresville		We need a tornado/Flood siren. We get flash flooding all the time, and the only way for some people to know about it, is to have Facebook, but not all these old people have Facebook.
City of Poth		Training 1st responders as to hazards of oil field related chemicals being transported by trucks through this area
City of Floresville		Instead of treating all citizens as potential looters, encourage people to organize and contribute to community defense, carrying their own weapons and checking on their neighbors
City of Floresville		No
City of Floresville		no
City of Floresville		Not that we can think of.
City of Floresville		Better drainage and runoff systems
City of Floresville		Not that I'm aware of
City of Lavernia		Not that I can think of

Unincorporated Wilson County		I think investing in a second-responder service, such as CERT, would be a great asset to assist the community in case of major events, such as wildfires, major flooding, etc.
Unincorporated Wilson County		Adequate water management to fight wildfires.
Unincorporated Karnes County		We need an air monitoring system to alert the citizens of any toxins in the air due to flaring and drilling.
Unincorporated Wilson County		No
Unincorporated Wilson County	156 Martinez Lane	Public awareness and education on disaster preparedness and mitigation starting at the grade school level (STEP) and involving the whole community concept.
City of Floresville		If/when the voters of this community will catch a VISION for the importance of more long-term planning and less short-term planning, for instant gratification and getting as much as they can for themselves; when the Powers-That-Be would hire skilled, highly qualified, responsible people to do the necessary jobs, instead of just "giving jobs" to their cousins and amigos who don't get the job done (but draw fat paychecks); WHEN qualified people will turn off their TV's, put down their cell phones, kick their kids outside to play, do some chores and help the neighbors, instead of allowing them to be "gamers" and couch-potatoes; When we allow law enforcement and prosecutors to do their jobs, MAYBE, just maybe the community can pay attention to being more prepared for Natural Disasters. Until there is a VISION, the people will continue down the path of destruction....yep, they will perish!
Unincorporated Wilson County		No required drainage along roadways or residential areas. Builders need to be held responsible. FEMA mapping isn't accurate. We bought a house that floods 4 to 5 times a year yet isn't in a flood plain. Also, roadway is inadquate for emergency situation and evacuation. CR 320 is a dead end trap when the water goes over the road at low water crossing near 181. We had to evacuate our house for flooding and couldn't make it out to main road. Slept in car, wet, with pets. We we're trapped. How is this a legal infrastructure?
City of Floresville		Have CERT classes and let the public no for they can attend
Unincorporated Karnes County		N/a
Unincorporated Wilson County		N/A
City of Poth		none at this time.
City of Floresville		No
City of Floresville		Being alert to possibilities of problems
Unincorporated Wilson County		No
Unincorporated Wilson County		No one cares about us in our little area. All they are doing is building up homes over $350,000 in subdivisions not caring about the damage they are doing to the homes around them.

City of Floresville			Emergency plan and power recovery
Unincorporated Wilson County			County Dispatch for Emergency Services appears to be inadequate. Regional and County HazMat response is haphazard and illequipped.
City of Karnes City			no
City of Floresville			Proper City avenues of alerting people to dangers as they occur and not a week later!
City of Floresville			County Government and City Government must work hand in hand to meet these needs
Unincorporated Wilson County	Adkins . Wilson county		No
Unincorporated Wilson County			NO
Unincorporated Karnes County	San Antonio		no
Unincorporated Wilson County			WATER
Unincorporated Wilson County			No.
Unincorporated Karnes County			Central communication system may be helpful
City of Karnes City			Oil and Gas industry traffic and emergency proceedures
Unincorporated Wilson County			N/A
City of Floresville			Not at this time.
City of Karnes City			no
Unincorporated Wilson County			Figure out a way to shake some sense into people to get their heads out of the sand and pay attention to what's going on.
City of Floresville			no
City of Karnes City			none
City of Kenedy			n/a
City of Lavernia			Old Building across from La Vernia City Hall which is falling apart. Roofing material blowing and falling on sidewalk and road way which could do major damage to someone. Brick walls have major cracks and may fall or collapse on people or cars. Again major damage or Death to anyone hit
Unincorporated Wilson County	La Vernia area		No
City of Karnes City			Continue to improve emergency services funding and resources.
City of Falls City			no
Unincorporated Wilson County			Offer free or low cost HVAC maintenance/repair/replacement programs for nonprofit, public buildings.
Unincorporated Wilson County			No
City of Floresville			NA
Unincorporated Wilson County			I worry about increased cost impact for providing above checked improvements.
Unincorporated Wilson County			No

City of Stockdale			flood drainage, and fire station has no self powered generator
Unincorporated Wilson County			To a large extent, I believe disaster preparedness falls into the individual's hands. Information and resources should be available, but the implementation falls to the landowner/homeowner. I do not think we should be regulated into compliance. County resources should be used to sustain county buildings and infrastructure.
Unincorporated Karnes County			With the increase in oil and gas production in our area, I think the community needs to strongly consider the possibility of hazards related to this and how it would impact the community. For example, lightning hitting the tanks at Shale just north of Karnes City and starting huge fires, the increased transport of oil out of the county, and potential earthquakes or erosion from fracking.
Unincorporated Wilson County			Water protection - our water source is vulnerable to excessive lawn watering, even acreages in county subdivisions. This is by county water systems and personal water wells. Need to limit this excess to protect our limited water supply for uses that are necessary for living, not watering grass on sandy soil.
Unincorporated Wilson County			unknown at this time
City of Lavernia	City of Adkins		No
City of Kenedy			No. I think you have covered them very well.
Unincorporated Wilson County			oil field active
City of Floresville			Not that I can think of
City of Lavernia			The emergency and disaster management plans need to be first easily accessible. Then they need to be desiminated to all participants to rehearse and work out any issues. This should be a quarterly requirement.
Unincorporated Wilson County			none
Unincorporated Wilson County			People need to know that they should be able to take care of themselves in an emergency and not expect the government to be there asap to rescue them.
City of Floresville			I'm very afraid of what will happen should we get 6" or more of rain.
City of Poth			Criminal activity and making your home and valuables more safe.
Unincorporated Wilson County			Yes, there needs to be a single Emergency Services District (ESD) to cover all of Wilson County.

1. Please tell us where you live		24. If you would like to be notified of upcoming public meetings for the Karnes County and Wilson County Hazard Mitigation Plan Update, please leave your name and email. Thank you for your time!
Response	Other (please specify)	Open-Ended Response
City of Floresville		yes (local paper)
City of Floresville		It would be nice to see more beautiful sights upon the highway into town. Flowers, trees, Oleander, ect. ect
City of Floresville		No just send a letter.
City of Floresville		Several of these questions are obviously written by a socialist and/or an AGENDA 21 advocate. There needs to be respect for private property rights, and more discussion and brainstorming of more sincere and long term solutions. Trite/pat/predictable answers that other people have agreed do, may not work in Wilson County. There are some truly brilliant, genius people who live here that would like to have some input toward the conversation. However, they don't tolerate fools very well and have a tendency to want to stay home instead of throwing their pearls before swine. Can't blame them really. BUT, a strategic plan must be developed to coax these folks to bring their ideas to the table. Sorry, I don't have that answer. But I bet somebody does!! Our Founding Fathers did not write the US Constitution in a single day. They spent months hammering it out. Only after limping along with other "not quite good enough" documents that served as guidelines. Our Bill of Rights (the first ten amendments) and the Declaration of Independence and US Constitution are still relevant today and we would all do well to review those docs. The best selling and oldest book of all times, the Bible, is also a good resource for community building and relationship making. Please, don't throw the baby out with the bath water. Think, act and do justly, love mercy and walk humbly with God. Walk daily with our fellow travelers with respect, dignity and grace. Thank you for this opportunity to share some thoughts. :)

APPENDIX C: PRIORITY RANKING FORMS

Wilson County

ID	MITIGATION ACTION	SOCIALLY ACCEPTABLE	TECHNICALLY FEASIBLE	ADMINISTRATIVELY POSSIBLE	POLITACALLY ACCEPTABLE	LEGAL	ECONOMICALLY SOUND	ENVIRONMENTALLY SOUND	BONUS (5 PTS) -ADDRESSES MULTIPLE HAZARDS	BONUS (5 PTS) - COMPLEMENTS ANOTHER ENTITY'S EFFORTS	TOTAL SCORE	TIMEFRAME (W/N 2 YEARS - IMMEDIATE; 2-3 YRS - NEAR; 3-5 YRS - SHORT; MORE THAN 5 YRS - LONG)
1	Phase I: Engineering study of design solutions to erosion of CR 401 at Cibolo Creek. Phase II: Implementation of stabilization project to address stream incision and erosion CR 401 at Cibolo Creek.	5	5	5	5	5	4	5		5	39	I
2	Phase I: Engineering study of design solutions to erosion of CR 202 East at Marcelina Creek. Phase II: Implementation of stabilization project to address stream incision and erosion CR 202 East at Marcelina Creek.	5	4	5	5	5	1	5		5	35	I
3	IMPROVE INTEROPERABILITY OF COMMUNICATION SYSTEMS BETWEEN FIRST RESPONDER AGENCIES AND JURISDICTIONS IN WILSON COUNTY	5	4	5	5	5	4	1	5	5	39	I
4	Upgrade Infrastructure At Low Water Crossings to provide unimpeded access during a 100-year base flood event to facilitate evacuation and response by emergency vehicles.	5	3	5	5	5	3	1			27	L
5	Install gates at low water crossings on county roads repeatedly resulting in road closure due to rapid rising flood waters.	5	4	5	5	5	4	1			29	N
6	Acquire flooded structures to remove them out of the SFHA and restrict future structures from development on the site. Consider the establishment of a voluntary "acquisition and demolition program", "acquistion and structure relocation program", "structure elevation program" to address repetitive loss, floodprone properties.	2	5	5	5	5	2	5			29	L

ID	MITIGATION ACTION	SOCIALLY ACCEPTABLE	TECHNICALLY FEASIBLE	ADMINISTRATIVELY POSSIBLE	POLITACALLY ACCEPTABLE	LEGAL	ECONOMICALLY SOUND	ENVIRONMENTALLY SOUND	BONUS (5 PTS) -ADDRESSES MULTIPLE HAZARDS	BONUS (5 PTS) - COMPLEMENTS ANOTHER ENTITY'S EFFORTS	TOTAL SCORE	TIMEFRAME (W/N 2 YEARS - IMMEDIATE; 2-3 YRS - NEAR; 3-5 YRS - SHORT; MORE THAN 5 YRS - LONG)
7	The County will purchase emergency back-up generators for deployment in the event of extended power loss for critical communication towers.	5	4	5	5	5	4	1	5	5	39	N
8	Post material on the effects of hazards to homeowners on the county website and Facebook sites. Publish articles concerning hazards in the local newspaper. Provide handouts at all county offices and satellite buildings.	5	4	5	5	5	5	1	5	5	40	I
9	Develop flood hazard information by collecting information, high water marks, and conduct engineering studies to develop the 100-year and 500-year flood elevation levels.	5	4	2	4	5	3	5		5	33	L
10	Implement incident command system (ICS) training and exercise. Conduct "tabletop exercises" with emergency response personnel from multiple agencies, to determine further mitigation opportunities and response vulnerabilities.	5	3	4	4	5	4	5			30	N
11	Improvements to drainage structure at CR 128 drainage channel Southeast of FM 775 intersectionto minimize erosion downstream and upstream.	5	5	5	5	5	4	5			34	I

City of Floresville

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
2-3 years --> Near
3-5 years-->Short
More than 5 years-->Long

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	ENHANCE FLOODPL MANAGEMT ORD	5	5	5	5	5	5	5	5	2	40	2-3
8	PURCHASE EMER GENERATOS	5	5	5	5	5	5	5	5	1	40	2
16	FLOOD EARLY WARN SYSTEM	5	5	5	5	5	5	5	5	3	40	2
7	SIRENS	5	5	5	5	5	5	5	5	4	40	2
1	UPDATE IBC	5	5	5	5	5	5	5	5	5	40	2-3
3	STORM WATER MASTER PLAN	5	4	4	4	4	5	5	5	13	36	2-3
4	COMPL W/ NFIP	5	4	4	4	4	5	5	5	14	36	2-3
9	WATER SYSTEM PL	5	4	4	4	4	5	5	5	15	36	3-5
11	DRAINAGE	5	5	5	4	4	5	5	5	8	38	3-5
19	DATABASE	4	5	4	4	5	5	5	5	10	37	3-5
25	GIS	4	4	4	4	5	5	5	5	16	36	3-5
12	REVERSE 911	5	5	5	5	5	5	5	5	6	40	3-5
17	PROPERTY	4	3	4	3	4	5	5	5	20	33	3-5
6	DRAINAGE	5	4	4	5	5	5	5	5	7	38	5
20	HAZARD DATA	4	3	4	3	4	5	5	5	21	33	5
14	CRITICAL FAC	5	4	4	5	4	5	5	5	11	37	5
15	SAFE ROOM	5	4	4	5	5	5	5	5	9	38	5

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
2-3 years --> Near
3-5 years-->Short
More than 5 years-->Long

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
18	FUNDS	4	3	3	3	4	5	5	5	22	32	5
5	FUNDS	4	3	3	3	4	5	5	5	23	32	5
10	CONTINGENCY PLAN	4	3	3	3	4	5	5	5	24	32	5
22	TORNADO	5	4	4	5	4	5	5	5	12	37	5
23	AWARENESS WEEK	5	3	3	5	3	5	5	5	19	34	5
24	OUT REACH	5	3	3	5	3	5	5	5	18	34	5
13	RADIOS	5	4	3	3	5	5	5	5	17	35	5
21	DERALL	5	3	3	3	3	5	5	5		32	5

City of Stockdale

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 (More than 5 years-->Long)	TOTAL SCORE	TIMEFRAME
#1	STANDBY Generation EMS	5	5	5	5	5	5	5	3	3	41	Immediate
#2	STORMWATER Mgmt	5	5	5	5	5	5	4	5	5	44	Long
#3	RAISE Bridge	4	5	5	5	5	5	3	5	5	42	Long
#4	W/W PLANT Improvement	5	5	5	5	5	5	5	4	4	43	NONE
#5	STORM WATER DRAINAGE	5	5	5	5	5	5	4	5	5	44	Short-
#6	TEST FIRE Hydrants	3	5	5	5	5	5	5	3	3	44	NONE
#7	SAME AS #3	4	5	5	5	5	5	3	5	5	42	Long
#8	School Detention	3	5	5	5	5	5	4	3	3	38	NONE
#9	STAND by Generation Utilities	5	5	5	5	5	5	5	5	5	45	Immediate

City of La Vernia

Ranking	Mitigation Action Title	Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	Bonus (5pts): Addresses Multiple Hazards	BONSU (5PTS) Complements Another Entity's Efforts	Total Score	TIMEFRAME
1	New Flood Control Infrastructure	5	5	5	5	5	5	5	5		40	3-5 Years
2	Additional flood proof at wastewater treatment plant	5	5	5	5	5	5	5			35	2 Years
3	Develop and Implement Stormwater Management Plan	5	5	5	5	3	5	5			33	3-5 Years
4	Harden Critical Facilities	5	5	5	5	3	3	5			31	3-5 Years
5	Get generators and quick connects for all schools and critical facilities	3	5	5	3	3	5	5			29	3-4 Years
6	Maintenance of Flood Control Infrastructure	5	5	3	5	3	3	3			27	4-5 Years
7	Upgrade Schools to meiigate flooding	3	3	3	3	3	3	3			21	4-5 Years
8	Public education and outreach	3	3	3	3	3	3	3			21	4-5 Years
9	Repetive loss properties	1	1	3	3	3	3	3			17	4-5 Years

City of Poth

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
2-3 years --> Near
3-5 years-->Short
More than 5 years-->Long

Rank 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
12	Construct Community Safe Room	~~3~~ 3	~~3~~ 3	~~2~~ 2	~~3~~ 3	~~3~~ 3	~~1~~ 1	~~3~~ 3	~~2~~ 2	~~3~~ 3	~~45~~ 23	~~Long~~ Near
1	Establish clear evacuation procedures	5	5	5	5	5	5	5	5	5	45	Near
5	Install early warning system	4	2	4	4	4	3	5	5	5	36	Short
8	Digital signage for communication	4	3	3	3	4	4	4	3	3	31	Short
10	Install pipe gates to close off streets	3	3	3	3	Arial 17pt 3	3	3	3	3	27	Long
4	Maintain Storm Drainage System	5	5	5	4	4	4	4	4	3	38	Near
7	Educational Signage	4	4	4	4	4	3	4	3	2	32	Near
11	Study Marcelinas Creek & major tributary	3	3	3	2	3	2	3	3	3	25	Short
3	Strengthen floodplain ordinances	4	5	5	4	5	5	5	4	4	41	Near
6	Adopt ordinances enforce flood mitigation	4	3	4	4	4	4	4	3	4	34	Near
9	Early warning system education	4	3	4	3	4	3	4	2	3	30	Short
13	Structural hardening of critical facilities	2	2	2	2	3	1	3	3	3	21	Long
2	Emergency generator wastewater plant	5	5	5	5	5	5	5	4	4	43	Short
14	Purchase land for possible detention site	1	1	2	2	2	1	2	2	2	15	Long

Karnes County

More than 5 years-->Long

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.	Establish MOU	5	5	5	5	5	5	5	5	5	45	24
2.	Continuity of Gov.	5	5	5	5	4	5	5	5	5	44	36
3.	Generators at facilities	5	5	5	5	5	4	4	5	5	43	24
4.	Hire Emergency Manager	4	4	5	4	5	5	5	5	5	42	12
5.	Low Water Crossing Signage	5	4	4	5	5	5	5	4	4	41	36
6.	Inventory Low Water Crossing	5	4	4	5	5	4	4	5	5	40	36
7.	Reverse 911 System	4	3	4	5	5	4	5	5	5	39	24
8.	Early Warning Flood Systems	5	4	5	5	5	4	3	4	3	38	24
9.	Wind Damage Study	5	4	3	4	5	4	3	3	5	36	36
10.	Update Flood Information	5	5	2	5	5	5	5	1	2	35	12
11.	SA River Drainage Study	4	2	2	5	4	4	3	5	5	34	12
12.	Maintain River/Creek Crossings	4	4	4	5	4	3	3	1	5	33	24
13.	Inventory of Residences	3	3	1	3	3	4	4	5	5	31	36
14.	Drought Contingency Plan	4	2	3	3	2	2	3	5	5	29	48
15.	Tie-Down Ordinance	2	3	2	4	4	3	4	4	2	28	48
16.	Shelter for RV Parks	3	1	3	3	3	3	4	3	4	27	48
17.	Create Fire Breaks	4	2	2	3	3	3	3	2	4	26	On-Going

More than 5 years-->Long

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
18.	Harden Critical Facilities	3	2	2	3	3	2	3	2	4	24	12
19.	Educate Public on Water	3	2	2	3	3	2	3	2	3	23	On Going
20.	Educate Public on Fire Reduction	3	2	2	3	3	2	3	2	3	23	On Going
21.	Monitor/Report Earthquakes	3	2	2	3	3	2	3	1	3	22	12
22.	Earthquake Prevention/Education	2	2	2	3	3	2	2	1	3	20	24
23.	Develop Dam Data	2	2	2	3	3	2	2	1	2	19	12
24.	Develop Sinkhole Data	2	2	2	3	3	2	2	1	1	18	36
25.	Community Safe Room	2	2	2	3	2	2	2	1	1	17	48
26.	CR 337 Bridge	2	2	2	3	2	2	2	1	1	17	24

City of Karnes City

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
2-3 years --> Near
3-5 years-->Short
More than 5 years-->Long

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
	Provide Generators	5	5	5	5	5	5	5	5	3	43	imm
	Hardin critical facilities	3	3	4	4	5	3	5	5	3	35	short
	* All others have not been investigated enough to differentiate by numerical value											

City of Kenedy

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
2-3 years --> Near
3-5 years-->Short
More than 5 years-->Long

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	TOTALSCORE	TIMEFRAME
1	Flood Ins	3	5	5	3	5	3	3	3	County	30	I
2	Generators	5	5	3	5	5	3	3	3	County	32	I
3	Hidden Facilities	5	5	3	5	5	1	3	3	~~County~~	30	N
4	Flood Info	5	5	5	5	5	5	5	5	County	40	S
5	River Drain	5	5	5	5	5	5	5	5	FEMA / S.A.	40	S
6	Rivers + Creeks	5	5	5	5	5	5	5	5	/ S.A.	40	L
7	Flood Zones	5	5	5	5	5	5	5	5	FEMA	40	L
8	Wind Damage	1	1	1	1	1	1	1			8	L
9	N/A											n/a
10	N/A											n/a

City of Falls City

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
2-3 years --> Near
3-5 years-->Short
More than 5 years-->Long

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	Flood insurance education and awareness	3	3	3	3	3	3	3	3		24	n
2	Study the San Antonio River and its tributaries	3	3	3	3	3	3	3	3		24	s
3	Falls City 1-Harden critical facilities(FC 3 from previous plan has been merged with this one due to similarity	3	3	3	3	3	3	3	3		24	n
4	Falls City 2 - Update flood information and policies	3	3	3	3	3	3	3	3		24	n
5	Falls City 4-San Antonio River drainage ownership sutdy	3	3	3	3	3	3	3	3		24	s
6	Falls City 5-Maintain rivers and creeks and crossings to a higher standard	5	5	5	5	5	5	5	5		40	s
7	Falls City 6-Inventory of residences in floodplain	5	5	5	5	5	5	5	5		40	s
8	Falls City 7-Conduct wind damage study	3	3	3	3	3	3	3	3		24	L
9	Falls City 8- Develop dam indunation data	3	3	3	3	3	3	3	3		24	L
10	Falls City 9- Develop sinkhole data	3	3	3	3	3	3	3	3		24	L

City of Runge

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
	WATER TOWER	3	5	3	3	3	5	5	5	NEW CONTROL VALVES (PROJECT)	37	I
	CITY HALL BLDG	5	3	3	5	3	5	5	5		29	I
	ANDREW ST. BRIDGE WASHOUT IN FLOOD PLAIN	5	5	3	3	3	5	5	5	ROADWAY ISSUES (FLOOD ISSUES)	39	I
	OJO DE AGUA Tributary Drainage	3	5	3	3	3	5	5	5	FLOOD PLAIN (STREAMS)	37	I

APPENDIX D: CRITICAL FACILITIES

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

Karnes County
1 Hospital, 1 Water Storage, 4 Electrical Substations, 2 Pharmacies
City of Karnes City
1 City Hall, 1 Emergency Operations Center, 1 Police Station, 1 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/Clinic
City of Karnes City ISD
4 Schools, 1 Administration Building
City of Kenedy
1 City Hall, 1 Sheriff's Facility, 1 Police Station, 1 VFD, 1 EMS Station, 1 Electric Substation, 4 Schools, 1 Airport, 4 Pharmacies
City of Falls City
1 City Hall, 1 VFD, 2 Schools
City of Runge
1 City Hall, 1 Sheriff's Facility, 2 Schools, 1 Water Tower
Wilson County
4 Electric Substations, 7 Fire Stations, 2 EMS Station, 1 Pharmacy, 2 Lift Stations, 39 Communication Towers, 10 Water Treatment Plants, 2 Water Storage
City of Floresville
1 City Hall, 2 Electric Substations, 1 Hospital, 2 Private Ambulance Services, 1 VFD, 1 Emergency Operations Center, 2 Police Facilities, 1 Sheriff's facilities, 1 Texas DPS facilities, 6 Schools
City of La Vernia
1 City Hall, 1 Police Department, 1 EMS Station, 1 Fire Station, 3 Water Storage, 1 Wastewater Treatment Plant, 3 Lift Stations
City of La Vernia ISD
4 Schools, 1 Administration Building
City of Poth
1 City Hall, 1 Police Department, 1 Fire Station, 1 Water Treatment Plant, 1 Water Storage, 3 Schools
City of Stockdale

1 City Hall, 1 Sheriff's Facility, 1 Fire Station, 1 EMS Station, 1 Water Treatment Plant, 1 Water Storage, 1 Wastewater Treatment Plant

APPENDIX E: STAKEHOLDER OUTREACH

ISD Reachout and resulting PJs:
Email sent by LCMS staff March 22, 2018

Wilson CO ISDs reachout via email included:
Floresville ISD Superintendent
LaVernia ISD Superintendent
Stockdale ISD Superintendent
Poth ISD Superintendent

LaVernia ISD became a PJ.

Karnes CO ISDs reachout via email included :
Karnes City ISD Superintendent
Falls City ISD Superintendent
Kenedy ISD Superintendent
Runge ISD Superintendent

Karnes City ISD became a PJ.

Church Outreach
Church of Christ, Floresville
Rock of Revelation Church, San Antonio
Floresville Churches:
First Baptist Church
Our Lady of Perpetual Help Church, Floresville
First Lutheran Church
Floresville Christian Fellowship
Marcello Baptist Church
El Merdez United Methodist Church
Sacred Heart Catholic Church
Oak Hills Baptist Church
Floresville United Methodist Church
Greater Bethel Ministries
Turning Point Church
Kingdom Hall of Jehovah's Witness
Landmark Ministry Baptist Church
LaVernia Churches:
St Anne's Catholic Church
Grace Bible Church
Oakwood Country Church
LaVernia Christian Teaching Center
Unity Baptist Church
LaVernia Church of Christ

Immanuel Lutheran Church
First Baptist Church of LaVernia
LaVernia United Methodist Church
Life Church
Cowboy Fellowship

New Life Church, Kenedy

Poth Churches:
Emmanuel Assembly of God
St John Lutheran Church
Glory of Faith Church

Stockdale Churches:
Christian Baptist Church
Church of Christ
First Baptist Church of Stockdale
St John Lutheran Church
Church United Methodist
Calvary Cowboy Fellowship
St Mary's Catholic Church

Caregiver Operations/Caregivers
Cubs Country Child Care
Emerald Child Care
Giggles and Smiles Learning Center
Grandma's House Child Care Center
LaVernia Academy
LaVernia Learning Academy
LaVernia United Methodist Church Child Care
Little Bear Child Care Center
Little Peeps Learning Center
Little Pirates Learning Center
Los Ninos
Pirates Cove
Rainbow of Friends Care Center
Sandbox Learning Center
Starlings Darlings Learning Center
Stockdale Child Development Center, LLC
The Sonshine Ark
Y School Age @ LaVernia

Water Supply Districts/WCID serving Karnes-Wilson Counties
City of Nixon/Manager, Nixon
SS WSC/Manager
East Central WSC/Manager

Three Oaks WSC/Manager
Sunko WSC/Manager
Oak Hills WSC/Manager
Picosa WSC/Manager
Aqua Tx / Manager
San Antonio River Authority/Outreach Mngr
Spring Hill WSC
Shady Oaks WSC
Lake Valley Water Co
McCoy WSC
El Oso WSC
C-Willow Water

Electric Companies Serving Karnes-Wilson Counties
FELPS-Manager, Floresville
GVEC-Manager, LaVernia
Karnes Electric Coop-Manager, Karnes City
City Public Service-Manager, Karnes City

Governmental/Nonprofit Outreach
TXDOT –Local Government Specialist
ARC – Disaster Program Specialist
DSHS – Preparedness and Response Team/Manager
Alamo Area Council of Governments-Local Government Specialist
Home Owners Associations: Presidents
Shannon Ridge HOA, President
Abrego Lake HOA, President
Eden Crossing HOA, President

Various Local Contacts:

Organization:	Titles:
TXDOT	District Engineer
ARC	Disaster Program Specialist
DSHS	Preparedness and Respone Team Lead and the Preparedness Manager
HOAs	Shannon Ridge HOA, Abrego Lake HOA and Eden Crossing HOA

Churches:

CONGREGATION	ADDRESS	CITY	STATE	ZIP	TELEPHONE:	E-MAIL:
Church of Christ	1200 Third St.	Floresville	Texas	78114		
Rock of Revelations Church	9215 Walhalla	San Antonio	Texas	78221		
First Baptist Church	1115 B Street	Floresville	Texas	78114	830-216-4946	office@fbcforg
Our Lady of Perpetual Help Church						2/9/2016 No Mail Receptacle
First Lutheran Church	1406 Sixth Street	Floresville	Texas	78114		office@dojoy.org
Floresville Christian Fellowship	2000 Tenth St.	Floresville	Texas	78114	830-216-4939	pastordennie@scsalive.org
Marcelina Baptist Church	510 CR 404	Floresville	Texas	78114		
Floresville Apostolic Church	1801 Bentwood Drive	Floresville	Texas	78114		
Northview Baptist Church	PO Box 561	Floresville	Texas	78114	830-393-4999	
El Mesias United Methodist Church	983 2nd Street	Floresville	Texas	78114	830-393-4509	
Sacred Hearth Catholic Church	1009 Trail Street	Floresville	Texas	78114	830-393-6117	
First Lutheran Church	1406 Sixth Street	Floresville	Texas	78114	830-393-2747	www.fvfirstlutheran.com
Oak Hills Community Church	90 Eagle Creek Ranch	Floresville	Texas	78114	830-216-2273	www.ohccfamily.org
Floresville United Methodist Church	1210 4th Street	Floresville	Texas	78114	830-393-2425	www.floresvillemethodistchurch.com
Floresville Church of Christ	1204 Third Street	Floresville	Texas	78114	830-393-6154	cocflor@flepsis.net
Greater Bethel Missionary						2/9/2016 No Mail Receptacle
Turning Point Church	1801 Bentwood Drive	Floresville	Texas	78114	830-542-4233	
Kingdom Hall of Jehovah's Witness	776 State hwy 97 E	Floresville	Texas	78114		
Landmark Missionary Baptist Church	45 CR 331	Floresville	Texas	78114	830-393-7032	
El Triunfo De La Fe Baptist	105 Paloma Drive	Floresville	Texas	78114	830-393-6188	
Igelesia Bautista El Calvario	901 Trail Street	Floresville	Texas	78114	830-393-4033	
Bethel Baptist Church	602 Tenth Street	Floresville	Texas	78114	210-723-6785	kjvevangelist@yahoo.com
St. Ann's Catholic Chruch	14151 US Hwy 87 W	LaVernia	Texas	78121		
Grace Bible Church	390 FM 1346 S	LaVernia	Texas	78121	830-779-5200	www.grace-bible.net
Oakwood Country Church	4848 FM 775	LaVernia	Texas	78121	830-947-3702	www.oakwoodcountrychurch.org
LaVernia Christian Teaching Center	10688 US Hwy 87 W	LaVernia	Texas	78121	830-779-6361	
Unity Baptist Church					210-655-2805	2/9/2016 No Mail Receptacle
LaVernia Church of Christ	133 Industrial Drive	LaVernia	Texas	78121	830-779-2525	
Immanuel Lutheran Church	310 Degiun Road	LaVernia	Texas	78121	830-253-8121	
First Baptist Church of LaVernia	201 S Crews Street	LaVernia	Texas	78121	830-253-1239	www.fbc-people.com
LaVernia United Methodist Church	210 Bluebonnet	LaVernia	Texas	78121	830-779-2621	www.laverniaumc.org
First Baptist Church/Sutherland Sp.	206 4th St.	Sutherland Spring	Texas	78161	830-947-3333	www.ssfb.net
New Life Church UPLCI INC	P.O. Box 117	Kenedy	Texas	78119		
Emanual Assembly of God	P.O. Box 271	Poth	Texas	78147		
Blessed Sacrament Catholic Church	462 W. Westmeyer St.	Poth	Texas	78147	830-484-3302	
St. John Lutheran Church	116 Titcomb Street	Poth	Texas	78147	830-484-3691	stjohn@awesomenet.net
Glory of Faith Church	408 N Storts Street	Poth	Texas	78147	830-484-0106	
Amazing Grace Missionary Church	4226 St. Hwy 123 N	Stockdale	Texas	78160	830-789-2101	
Church of Christ			Texas	78160	830-996-3495	www.stockdalecofc.org
First Baptist Church of Stockdale	PO Box 95	Stockdale	Texas	78160	830-996-3456	
St. Johns Lutheran Church	3778 State Hwy 119	Stockdale	Texas	78160	830-379-8713	
Christ Untied Methodist Church	102 West Main	Stockdale	Texas	78160	830-996-3007	www.stockdaleumc.org
Calvary Cowboy Fellowship	5449 State Hwy 123 N	Stockdale	Texas	78160	830-996-0007	davidgillian@dbacamps.org
St. Mary's Catholic Church	1201 St. Marys Street	Stockdale	Texas	78160	830-996-3415	stmarys@stelera.net
Life Church	PO Box 1440	LaVernia	Texas	78121	830-947-3480	jfrawley@lifechurchlv.com
Cowboys Fellowship	100 Hickory Run	LaVernia	Texas		830-769-3733	Chris 830-542-0307

Foster Care:

Margie Withof	605 Terrance Hill Lane	Floresville	3 older foster care patients: 58,57 & 48 (a		830-200-9816	210-867-1280 Cell

Childcare:

Operation/Caregiver Name	Address	City	State	Zip	Phone	Email Address	Operation #	Capacity
Brenda Felux	678 COUNTY ROAD 144	FLORESVILLE	TX	78114	830-534-8262		230538	12
Cubs Country Child Care	212 FM 1346	LA VERNIA	TX	78121	830-779-2004	melbaramzinski@yahoo.com	514896	186
Emerald Daniell Travieso	1007 STANDISH ST	FLORESVILLE	TX	78114	210-730-2063		1501822	12
Giggles and Smiles Learning Center	2000 10TH ST	FLORESVILLE	TX	78114	830-393-3814	pastorjeannette@fcfalive.org	1557279	147
Grandma's House Child Care Center	117 S PARKWAY DR STE A	LA VERNIA	TX	78121	830-779-1737	grandmashouse62@yahoo.com	1631264	77
Janie Mora	112 PARKVIEW DR	FLORESVILLE	TX	78114	210-865-0876		1630887	12
La Vernia Academy	7218 FM 775	LA VERNIA	TX	78121	830-328-0362	laverniacademy@outlook.com	1627600	85
La Vernia Learning Academy	134 INDUSTRIAL DR	LA VERNIA	TX	78121	210-240-6182	lvlearningacademy@gmail.com	1627451	46
La Vernia United Methodist Church Ch	210 BLUEBONNET	LA VERNIA	TX	78121	830-779-5117	LVUMCChildCare@Hotmail.com	814187	150
Little Bear Child Care Center, Inc.	12992 US HIGHWAY 87 W	LA VERNIA	TX	78121	830-253-1166	littlebearccc@gmail.com	1630112	129
Little Peeps Learning Center	1512 STANDISH ST	FLORESVILLE	TX	78114	830-393-0575	littlepeepslearningcenter@hotmail.com	1255386	68
Little Pirates Learning Center	308 SUTHERLAND	POTH	TX	78147	830-484-2650	h_pollok@hotmail.com	510213	65
Los Ninos	1600 B ST	FLORESVILLE	TX	78114	830-393-3980	Kathleramir56@gmail.com	246088	37
Pirates Cove	209 BRINKOETER UNIT B	POTH	TX	78147	830-484-2900	piratescove78147@yahoo.com	1600696	20
Priscilla Soto	203 W SAMPLE ST	STOCKDALE	TX	78160	830-996-3089		1532904	12
Rainbow of Friends Care Center	1000 N STORTS	POTH	TX	78147	830-484-2152	colorsoftherainbowpoth@yahoo.com	1146647	34
Sandbox Learning Center	88 SANDBOX LN	FLORESVILLE	TX	78114	830-393-6013		553870	51
Sandy Cavazos	1215 W MAIN ST	STOCKDALE	TX	78160	830-243-1435		1646022	12
Starlings Darlings Learning Center	1888 COUNTY ROAD 128	FLORESVILLE	TX	78114	830-216-3955	texasgal87@ymail.com	1589816	77
Stockdale Child Development Center, I	109 FORDTRAN ST	STOCKDALE	TX	78160	830-996-0024	stockdalecdc@yahoo.com	1647219	57
The Sonshine Ark	1406 6TH ST	FLORESVILLE	TX	78114	830-393-7646	vrodgers@dojoy.org	411916	125
Y School Age @ La Vernia	249 S FM 1346	LA VERNIA	TX	78121	210-924-2277	childcare@ymcasatx.org	1547458	75

Nursing Homes:

FACILITY	ADDRESS	CITY	ADMINISTOR/Alt	CELL	PHONE	E-MAIL:	# OF STAFF	BED CAPACITY
Frank M. Tejeda	200 Veterans Drive	Floresville	Laura Moore	512-698-3160	830-216-9456	administrator@tejedavehome.com	154	160
Floresville Nursing Center	1811 6th St.	Floresville	Eloy Carvajal -Dirct.	210-705-9668	210-383-6200	ecarvajal@floresvillecare.com	50	110
Regancy Manor Nursing	1615 11th St, Floresville		Roger Dyer		(830) 216-7090	adm.regencymanor@daybreakventure.com	20	100
County Care Manor	2736 FM 775 , LaVernia		Carl Strange	210-849-4017	(830) 779-2355	MDS@countrycare-manor.com	88	82
Stockdale Nursing Home	300 Salmon, Stockdale		Jason Black		(830) 996-3721	jason.black@stockdalecare.com	50	60

Water Service Providers:

Company:	Contact:	Cell Phone:	Phone:	# of Customers:	Last Updated:
City of Poth	Keith Griffin	830-534-4967	830-484-2000	760	5/14/2015
City of Stockdale	Margaret	830-391-3110	830-96-3125	710	5/14/2015
City of Floresville	Andres Ibarra	830-393-3105	830-391-3342	2557	5/19/2015
City of LaVernia		830-779-4541	830-581-9662	700	5/11/2015
City of Nixon	Martina R. or Jeremy Bustos	830-857-5226	830-582-1924	12	5/19/2015
SS WSC	Herb Williams	830-779-2837	830-779-2837	4655	5/26/2015
East Central WSC	Jill	210-649-2383	210-649-2383	400	5/11/2015
Three Oaks WSC	Jim Pruski	830-391-2198	830-484-2541	560	5/11/2015
Sunko WSC	Joe Wiatrek	830-745-2399	830-745-2399	1350	5/11/2015
Oak Hills WSC	Stephanie Bell	210-825-4304	830-393-7739	1700	5/19/2015
Picosa WSC	Cindy	210-336-7887	830-393-4424	800	5/11/2015
Aqua Texas	Scott Foltz	877-987-2782	512-844-6475	700	5/11/2015
SARA	Daniel Flores	210-302-4200	210-302-4219	340	5/11/2015
Spring Hill WSC	Devin	830-379-7683		20	5/11/2015
Shady Oaks Water Co	Sandy Strozier	830-391-4406*	830-391-4406	249	5/22/2015
Lake Valley Water Co	Kurt Flower	210-663-2288	210-663-2288	136	5/26/2015
McCoy WSC	Gabby	830-569-5575	830-569-5575	28	5/19/2015
El Oso WSC	Caraloyn Black	830-299-0269	830-583-3543	95	5/11/2015
C-Willow Water	David&Sandra Strozier	830-391-4406	830-393-3055	11/22/2016	

Electric Companies:

Company:	Contact:	Cell Phone:	Phone:	# of Connections:	E-mail:	Address:	Last Updated:
FELPS	Mike Fenell		830-216-7000x272	14,500	mike.finell@felps.us	PO Box 218, Floresville, TX 78115	7/31/2018
GVEC	Scott Jenschke	800-223-4832	830-386-4399	13849	sjenschke@gvec.org	13849 US Hwy 87W LaVernia, TX 78121	4/12/2017
	Bobby Christmas	830-386-4422	830-857-5069				
	Jeff Bowles	830-401-8315	830-263-2817				
Karnes Electric Coop	Janet	830-780-3952	830-780-3952	19,174	lkerlic@karnesec.org	1007 N. Hwy 123, KC 78118	5/8/2015
City Public Service	Joe Trevino	210-353-3400	210-462-6861	126	JJTrevino@CPSenergy.com		5/27/2015

APPENDIX F: MEETING DOCUMENTATION

TODAY'S AGENDA....

- Introductions
- Overview of the MHMAP Planning Process
- Outreach Strategy
- Community Capabilities: First Thoughts/Data Needs
- Hazards and Risks: First Thoughts/Data Needs

FEMA

MULTI-HAZARD MITIGATION ACTION PLAN

Core Meeting No. 1

Karnes & Wilson Counties and Its Partners

Wednesday, October 11, 2017

LANGFORD COMMUNITY MANAGEMENT SERVICES

INTRODUCTIONS

YOUR LANGFORD / MEI TEAM

Chris Stewart

Donna Chatham

Suellen Jordan

BUT THAT'S ENOUGH ABOUT ME....

WHY ARE WE HERE?

- Talk about risk
- Gain understanding of how we currently address it
- Learn something new
- Position ourselves best to take advantage of FEMA $$

OVERVIEW OF THE PLANNING PROCESS

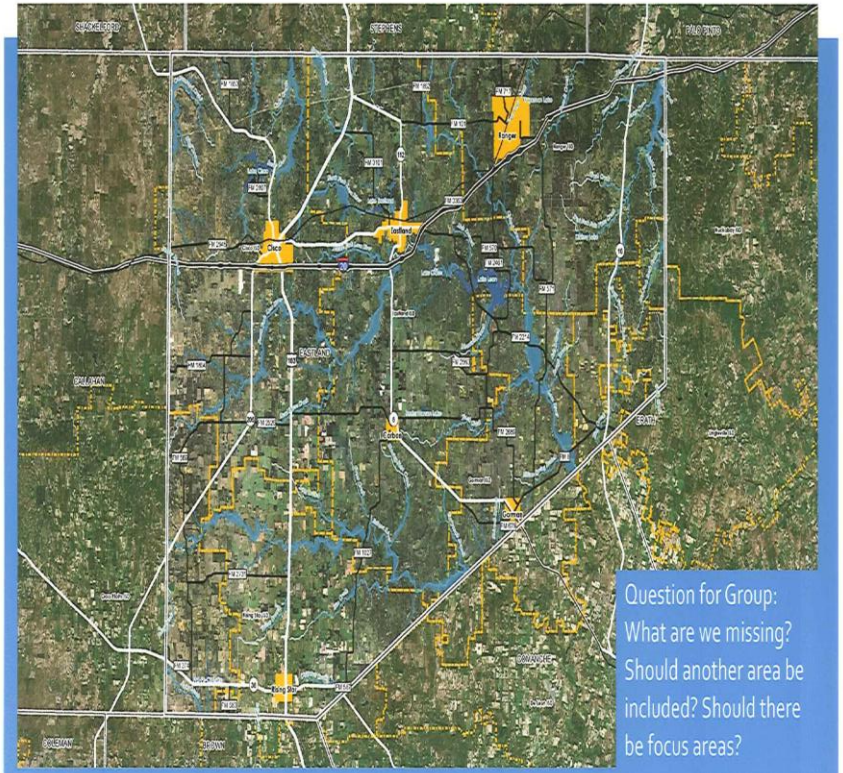
- What do we want to achieve?
  - Identify cost effective actions for risk reduction that are agreed upon by stakeholders and the public
  - Focus resources on the greatest risks and vulnerabilities
  - Build partnerships by involving people, organizations, and businesses
  - Increase education and awareness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

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.

OVERVIEW OF THE MHMAP PLANNING PROCESS

STEP 1: DETERMINE PLANNING AREA AND RESOURCES



Question for Group: What are we missing? Should another area be included? Should there be focus areas?

OTHER HAZARDS

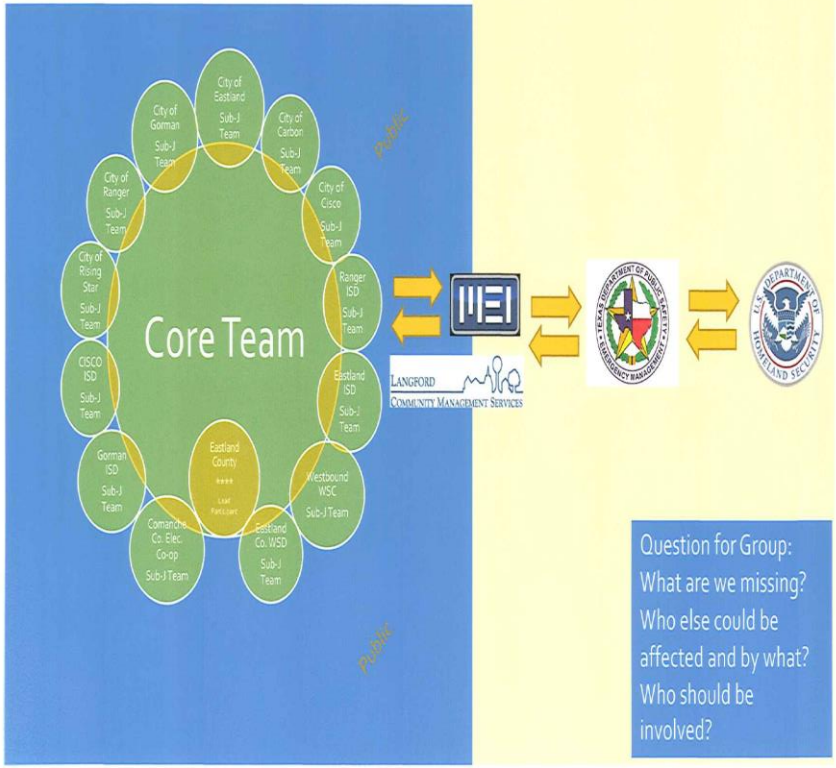
- Particular challenges for Karnes/Wilson Counties??

STEP 3: CREATE OUTREACH STRATEGY

- Team Organization
  - CORE Team
  - Sub-J Teams
- Organizational Channels
  - City
  - Social Media
  - School District
- Public Meetings
  - First Public Meeting- 2018
  - Second Public Meeting (July-August)
  - Final Public Meeting (September)
- Survey
  - https://www.surveymonkey.com/r/update

Question for Group: What are we missing? Are there other ways that people communicate?

STEP 2: BUILD THE PLANNING TEAM



Question for Group: What are we missing? Who else could be affected and by what? Who should be involved?

STEP 6: DEVELOP A MITIGATION STRATEGY

STEP 4: REVIEW COMMUNITY CAPABILITIES

- ❑ Planning and Regulatory
  - ❑ Comprehensive Plans
  - ❑ Capital Improvement Programs
  - ❑ Economic Development Plan
  - ❑ Transportation Plans
  - ❑ Emergency Operation Plans
  - ❑ Zoning ordinances
  - ❑ Building Codes
  - ❑ Subdivision Ordinance
  - ❑ Floodplain Ordinance
- ❑ Administrative and Technical – This refers to staff, skills, and tools a community has.
  - ❑ Emergency managers
  - ❑ Chief Building Official
  - ❑ Floodplain Administrator
- ❑ Financial – resources that a jurisdiction has access to or is eligible to use to fund mitigation efforts
- ❑ Education and Outreach – programs and methods already in place that could be used to implement mitigation activities
  - ❑ School programs
  - ❑ Hazard awareness campaigns (e.g. Tornado Awareness Month)
  - ❑ Public Information Officer
  - ❑ Community newsletter
- ❑ Other

Question for Group: What are we missing? Are there other organizational capabilities out there?

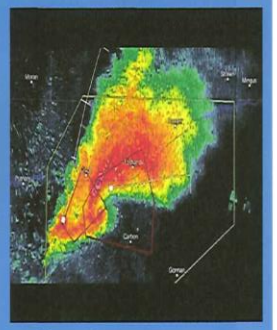
STEP 5: CONDUCT A RISK ASSESSMENT

Hazard	Scale	Weak	Moderate	Severe	Extreme
Dam/Levee	Dam safety "hazard potential"	Low	Significant	High	
Wildfire	Characteristic Fire Intensity Scale	1	2,3	4	5
Floods	Flood Zones	Zone B or Zone X		Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30	
Tornado	Fujita Tornado Damage Scale	F0	F1, F2	F3, F4	F5
Drought	Drought Severity Index (Palmer)	-1.99 to +1.99	-2.0 to -2.9	-3.0 to -3.9	-4.0 or less
Expansive Soils	ASTM D-4289	0-15	10-35	20-55	35
Extreme Heat	NWS Heat Index	Caution	Extreme Caution	Danger	Extreme Danger
Hailstorm	TORRO	H0 – H2	H3 – H6	H7 – H8	H9 – H10
Severe Winter Storms	National Weather Service	Winter weather advisories, freezing rain advisories, Wind chill advisories, Lake effect snow advisory		Blizzard watches, winter storm watches, wind chill watches, lake effect snow watches	Blizzard warnings, winter storm warnings, ice storm warnings, wind chill warning, lake effect snow warnings
Windstorms	Beaufort Wind Scale	0 – 3	4 – 6	7 – 9	10 - 12
Lightning	Lightning Activity Level	1	2 – 3	4 – 5	6

Question for Group: What are we missing? Are there other hazards that we need to be planning for?

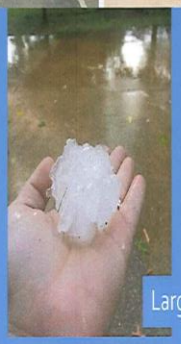
STEP 5: CONDUCT A RISK ASSESSMENT

Flood Damage



Tornados

Complex Fire



Large hail

EXAMPLES OF MITIGATION ACTIONS

- Local Plans and Regulations
  - Goal: Assess vulnerability to drought risk to better understand and access local vulnerability
    - Use public surveys to determine how the community and its water sources have been impacted by droughts in the past
  - Goal: Adopt building codes and enforce development standards that reduce risk to flooding
    - Prohibit all first floor enclosures below base flood elevation for all structures in flood hazard areas.
- Structure and Infrastructure Projects
  - Goal:
    - Implement inspection, maintenance, and enforcement programs to help ensure continued structural integrity of dams and levees
  - Goal: Protect building from hail damage
    - Encourage new construction to use measures such as structural brazing, shutters, laminated glass in window panes, and hail-resistant roof coverings or flashing in building design to minimize damage
- Natural Systems Protection
  - Goal: Implement a Fuels Management Program to reduce hazardous vegetative fuels on public lands, near essential infrastructure, or on private lands
    - Sponsor local "slash and clean-up days" to reduce fuel loads along with wildland-urban interface
  - Goal: Enhance landscape and design measures through encouraging drought-tolerant landscape designs
    - Implement ordinances that incorporate drought tolerant or xeriscape practices
- Education and Awareness Programs
  - Goal: Assist vulnerable populations from the impacts of severe winter storms
    - Organize outreach to vulnerable populations, including establishing and promoting accessible heating centers in the community
  - Goal: Conduct tornado awareness activities
    - Coordinate with ISD and local leaders to promote the use of NOAA weather radios

STEP 5: CONDUCT A RISK ASSESSMENT

Probability of Future Events	
Unlikely	Less than 1%
Occasional	1% to 10%
Likely	10% to 90%
Highly Likely	90% to 100%

Impact	
Low	Two or more of the criteria fall in lower classifications or the event has minimal impacts on the planning area.
Medium	Middle ranges of classifications and the event's impacts on the planning area are noticeable but no devastating.
High	High classifications and the event is likely/highly likely to occur with severe strength over a significant to extensive portion of the planning area

INPUT ON HAZARDS

- Where is there a problem area that we need to know about?
- Add a pin to the map
- Fill out a card

QUESTIONS, COMMENTS, ETC....

Donna Chatham
512-452-0432
donna@lcmsinc.com

Chris Stewart
512-502-8333
chris@moodyengineering.com

Suellen Jordan
512-452-0432
suellen@lcmsinc.com

Karnes-Wilson Multi-jurisdictional
Hazard Mitigation Action Plan
Core Meeting
October 11, 2017
1:30pm
Karnes County Annex

- Attendance Noted
- Discussion of building your sub-jurisdictional team and stakeholders
- Develop Outreach strategy for public participation
- Discussion of On-line Citizen Survey
- Discussion of base mapping and local data availability
- Begin discussion of Community Capabilities Assessment
- Next Steps
    - Overall project calendar
    - Discussion of Public Hearing in 2018 – set date/purpose/agenda
    - Set date for next CORE meeting
- Other items not discussed

Karnes-Wilson HAZ MAP
Planning Regional Opportunity (PRO) Team Meeting
January 16, 2018
1:30pm
Wilson County Courthouse, Annex 2
800 10th Street Bldg B Floresville, Texas 78114

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
- Presentation of Base Maps and review any comments made on maps
- Discuss Planning Area and defining the boundary
- Discuss Potential stakeholders and begin to identify Sub-Jurisdictional teams
- Create an Outreach Strategy
    - Discuss public involvement options – online citizien survey
  - Outreach methods: social media, website options, etc.
- Community Capabilites Assessment
  - Review Community capabilities from existing AACOG 2012 Hazard Mitigation Plan Update
  - Discuss latest efforts in relation to policies, programs, plans, reports, and other information
    - Local citizen groups or non-profits
    - Ongoing public education efforts (IE responsible water use, fire safety, household preparedness)
    - Natural disaster school programs
    - StormReady or Firewise certifications
    - Others?
  - Review Community Capabilities Checklist of background planning documents and delivery methods (Checklist attached to email sent with this agenda)
- Other items

Karnes-Wilson HAZ MAP
CORE Team Meeting
February 15, 2018
1:30pm
Wilson County Courthouse, Annex 2
800 10th Street Bldg B, Floresville, Texas 78114

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
- Presentation of Base Maps and review any comments made on maps
- Discuss Planning Area and defining the boundary
- Discuss Potential stakeholders and begin to identify Sub-Jurisdictional teams
- Create an Outreach Strategy
    - Discuss public involvement options – online citizien survey
  - Outreach methods: social media, website options, etc.
- Community Capabilites Assessment
  - Review Community capabilities from existing AACOG 2012 Hazard Mitigation Plan Update
  - Discuss latest efforts in relation to policies, programs, plans, reports, and other information
    - Local citizen groups or non-profits
    - Ongoing public education efforts (IE responsible water use, fire safety, household preparedness)
    - Natural disaster school programs
    - StormReady or Firewise certifications
    - Others?
  - Review Community Capabilities Checklist of background planning documents and delivery methods (Checklist attached to email sent with this agenda)
- Other items

Karnes-Wilson HAZ MAP
CORE Team Meeting #4
October 24, 2018
1:30pm-3:00pm
Floresville Event Center
600 SH 97 West, Floresville, TX 78114

Attendance Noted with a sign-in sheet.

Mr. Rojas (Rojas Planning) discussed the mitigation action worksheets, reviewed problem statements and discussed the mitigation actions that the subjurisdicitional teams had started working on that morning in the individual meetings.

.

Mr. Rojas introduced the STAPLEE form to help the teams explore the constraints and opportunities of each of their actions and then rank their projects based on the identified factors. The teams then filled out the staple worksheets based on the selected mitigation actions from their sub-jurisdictional team meetings that morning. Mr. Rojas and Ms. Chatham (Langford Community Management Services) networked around the room to help each jurisdiction with questions.

Mr. Rojas encouraged each jurisdiction to continue working on their ranking and send it to him electronically when they complete it.

There being no further business, the meeting adjoured at 3:00pm.

Karnes-Wilson Sub-Jurisdictional Team
Meetings #2
October 24, 2018
Floresville Event Center, Floresville, TX 78114
9:30am- 11:30am

Present: See attached sign-in sheet.

Gabe Rojas reviewed the researched risk assessment findings hand-out for the planning region. Mr Rojas asked as each team breaks down into sub-jurisdictional meetings that they review the data and please note if there are any gaps or inaccuracy, etc. Mr. Rojas encouraged each jurisdiction to develop two mitigation actions for each hazard with at least 2 from different categories. The categories include Local plans and regulations, natural systems protection, preparedness and response, infrastructural improvements, and education and awareness programs.

Each local jurisdiction began to develop their local mitigation actions as the Mr. Rojas and Ms. Chatham (Langford Community Management Services) rotated around to each table assisting.

Mr. Rojas dismissed the meeting at 11:30 and encouraged everyone to return to the CORE meeting at 1:30pm to review the mitigation actions, prioritize the actions with the staplee process and begin to discuss the mitigation actions and how they will be implemented and administered.

Meeting dismissed at 11:30am.

APPENDIX G: ADOPTION RESOLUTION

Resolution For Wilson County
Approval of Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan 2020

WHEREAS, natural hazards in Wilson County and historically have caused disasters with losses of life and property and natural resources damage; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a hazard mitigation action plan to be eligible for the full range of pre-disaster and post disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires communities to update Hazard Mitigation Action Plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, Wilson County has assessed their potential risks and hazards and is committed to planning for a sustainable community and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan outlines a mitigation vision, goals and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards the threaten the community.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan is approved in its entirety;
2. Wilson County will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. Wilson County vests with the County Judge the responsibility, authority and means to inform all parties of this action; assure that the Hazard Mitigation Plan will be reviewed at least annually; and that any needed adjustments will be presented to the County Commissioners for consideration; and
4. Wilson County agrees to take such other action as may be reasonably necessary to carry out the objectives of the Plan and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

ADOPTED this 10th day of February, 2020

Richard L. Jackson
County Judge, Wilson County

Attested to: Eva S. Martinez

Eva S. Martinez
County Clerk

RESOLUTION FOR Karnes County
APPROVAL OF Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan 2020

WHEREAS, natural hazards in Karnes County and historically have caused disasters with losses of life and property and natural resources damage; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a hazard mitigation action plan to be eligible for the full range of pre-disaster and post disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires communities to update Hazard Mitigation Action Plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, Karnes County has assessed their potential risks and hazards and is committed to planning for a sustainable community and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan outlines a mitigation vision, goals and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards the threaten the community.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan is approved in its entirety;
2. Karnes County will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. Karnes County vests with the County Judge the responsibility, authority and means to inform all parties of this action; assure that the Hazard Mitigation Plan will be reviewed at least annually; and that any needed adjustments will be presented to the County Commissioners for consideration; and
4. Karnes County agrees to take such other action as may be reasonably necessary to carry out the objectives of the Plan and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

ADOPTED this 11 day of FEBRUARY, 2020

Wade J. Hedtke
County Judge, Karnes County

Attested to:
Carol Swize
Carol Swize
County Clerk

RESOLUTION NO.:221-020420-01
FOR the City of Stockdale
APPROVAL OF Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan 2020

WHEREAS, natural hazards in Wilson County and the City of Stockdale Texas, historically have caused disasters with losses of life and property and natural resources damage; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a hazard mitigation action plan to be eligible for the full range of pre-disaster and post disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires communities to update Hazard Mitigation Action Plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, the City of Stockdale has assessed the community's potential risks and hazards and is committed to planning for a sustainable community and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan outlines a mitigation vision, goals and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards the threaten the community.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan is approved in its entirety;
2. The City of Stockdale will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. The City of Stockdale vests with the County Judge the responsibility, authority and means to inform all parties of this action; assure that the Hazard Mitigation Plan will be reviewed at least annually; and that any needed adjustments will be presented to the County Commissioners for consideration; and
4. The City of Stockdale agrees to take such other action as may be reasonably necessary to carry out the objectives of the Plan and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

ADOPTED this 4th day of February, 2020

Ray Wolff
Mayor, City of Stockdale

Attested to:
Thania Santos
City Secretary

RESOLUTION FOR the KARNES CITY Independent School District APPROVAL OF Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan 2020

WHEREAS, natural hazards in Karnes County and within the KARNES CITY INDEPENDENT SCHOOL DISTRICT, historically have caused disasters with losses of life and property and natural resources damage; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a hazard mitigation action plan to be eligible for the full range of pre-disaster and post disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires the communities to update Hazard Mitigation Action Plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, the KARNES CITY INDEPENDENT SCHOOL DISTRICT has assessed their potential risks and hazards and is committed to planning for a sustainable community and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Karnes County - Wilson County Multi-jurisdictional Hazard Mitigation Action Plan outlines a mitigation vision, goals and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards the threaten the community.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Karnes County - Wilson County Multi-jurisdictional Hazard Mitigation Action Plan is approved in its entirety;
2. The KARNES CITY INDEPENDENT SCHOOL DISTRICT will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. The KARNES CITY INDEPENDENT SCHOOL DISTRICT vests with the County Judge the responsibility, authority and means to inform all parties of this action; assure that the Hazard Mitigation Plan will be reviewed at least annually; and that any needed adjustments will be presented to the County Commissioners for consideration; and
4. The KARNES CITY INDEPENDENT SCHOOL DISTRICT agrees to take such other action as may be reasonably necessary to carry out the objectives of the Plan and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

ADOPTED this 10th day of February, 2020

H. Madrigal

Hector Madrigal
Superintendent,
KARNES CITY Independent School District

RESOLUTION FOR the City of Floresville
APPROVAL OF Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan 2020

WHEREAS, natural hazards in Wilson County and the City of Floresville Texas, historically have caused disasters with losses of life and property and natural resources damage; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a hazard mitigation action plan to be eligible for the full range of pre-disaster and post disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires communities to update Hazard Mitigation Action Plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, the City of Floresville has assessed the community's potential risks and hazards and is committed to planning for a sustainable community and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan outlines a mitigation vision, goals and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards the threaten the community.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan is approved in its entirety;
2. The City of Floresville will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. The City of Floresville vests with the County Judge the responsibility, authority and means to inform all parties of this action; assure that the Hazard Mitigation Plan will be reviewed at least annually; and that any needed adjustments will be presented to the County Commissioners for consideration; and
4. The City of Floresville agrees to take such other action as may be reasonably necessary to carry out the objectives of the Plan and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

ADOPTED this 13th day of February, 2020

Cecelia Gonzalez-Dippel
Mayor, City of Floresville

Attested to:
Monica Veliz
City Secretary

CITY OF FLORESVILLE
FLORESVILLE, TEXAS

RESOLUTION NO. 2020-02-01

FOR the City of Runge
APPROVAL OF Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan 2020

WHEREAS, natural hazards in Karnes County and the City of Runge Texas, historically have caused disasters with losses of life and property and natural resources damage; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a hazard mitigation action plan to be eligible for the full range of pre-disaster and post disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires communities to update Hazard Mitigation Action Plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, the City of Runge has assessed the community's potential risks and hazards and is committed to planning for a sustainable community and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan outlines a mitigation vision, goals and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards the threaten the community.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan is approved in its entirety;
2. The City of Runge will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. The City of Runge vests with the County Judge the responsibility, authority and means to inform all parties of this action; assure that the Hazard Mitigation Plan will be reviewed at least annually; and that any needed adjustments will be presented to the County Commissioners for consideration; and
4. The City of Runge agrees to take such other action as may be reasonably necessary to carry out the objectives of the Plan and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

ADOPTED this 11 day of Feb, 2020

Homer Lott, Jr.
Mayor, City of Runge

Attested to:
Esmeralda B. Castro
Esmeralda B. Castro
City Secretary

RESOLUTION FOR the City of Karnes City
APPROVAL OF Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan 2020

WHEREAS, natural hazards in Karnes County and the City of Karnes City Texas, historically have caused disasters with losses of life and property and natural resources damage; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a hazard mitigation action plan to be eligible for the full range of pre-disaster and post disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires communities to update Hazard Mitigation Action Plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, the City of Karnes City has assessed the community's potential risks and hazards and is committed to planning for a sustainable community and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan outlines a mitigation vision, goals and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards the threaten the community.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan is approved in its entirety;
2. The City of Karnes City will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. The City of Karnes City vests with the County Judge the responsibility, authority and means to inform all parties of this action; assure that the Hazard Mitigation Plan will be reviewed at least annually; and that any needed adjustments will be presented to the County Commissioners for consideration; and
4. The City of Karnes City agrees to take such other action as may be reasonably necessary to carry out the objectives of the Plan and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

ADOPTED this 13th day of February, 2020

Leroy T. Skloss
Mayor, City of Karnes City

Attested to:
Veronica Butler
Veronica Butler
City Secretary

RESOLUTION FOR the LA VERNIA Independent School District APPROVAL OF Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan 2020

WHEREAS, natural hazards in Wilson County and within the LA VERNIA INDEPENDENT SCHOOL DISTRICT, historically have caused disasters with losses of life and property and natural resources damage; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a hazard mitigation action plan to be eligible for the full range of pre-disaster and post disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires communities to update Hazard Mitigation Action Plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, the LA VERNIA INDEPENDENT SCHOOL DISTRICT has assessed their potential risks and hazards and is committed to planning for a sustainable community and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Karnes County - Wilson County Multi-jurisdictional Hazard Mitigation Action Plan outlines a mitigation vision, goals and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards the threaten the community.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Karnes County - Wilson County Multi-jurisdictional Hazard Mitigation Action Plan is approved in its entirety;
2. The LA VERNIA INDEPENDENT SCHOOL DISTRICT will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. The LA VERNIA INDEPENDENT SCHOOL DISTRICT vests with the County Judge the responsibility, authority and means to inform all parties of this action; assure that the Hazard Mitigation Plan will be reviewed at least annually; and that any needed adjustments will be presented to the County Commissioners for consideration; and
4. The LA VERNIA INDEPENDENT SCHOOL DISTRICT agrees to take such other action as may be reasonably necessary to carry out the objectives of the Plan and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

ADOPTED this 18th day of February, 2020

Dr. Toni Riester-Wood
Interim Superintendent,
LA VERNIA Independent School District

RESOLUTION FOR the City of Poth
APPROVAL OF Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan 2020

WHEREAS, natural hazards in Wilson County and the City of Poth Texas, historically have caused disasters with losses of life and property and natural resources damage; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a hazard mitigation action plan to be eligible for the full range of pre-disaster and post disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires communities to update Hazard Mitigation Action Plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, the City of Poth has assessed the community's potential risks and hazards and is committed to planning for a sustainable community and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan outlines a mitigation vision, goals and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards the threaten the community.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan is approved in its entirety;
2. The City of Poth will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. The City of Poth vests with the County Judge the responsibility, authority and means to inform all parties of this action; assure that the Hazard Mitigation Plan will be reviewed at least annually; and that any needed adjustments will be presented to the County Commissioners for consideration; and
4. The City of Poth agrees to take such other action as may be reasonably necessary to carry out the objectives of the Plan and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

ADOPTED this 24th day of February, 2020

Chrystal Eckel
Chrystal Eckel
Mayor, City of Poth

Attested to:

Rose Hurzar
City Secretary

Resolution No. 021320-03

RESOLUTION FOR the City of La Vernia
APPROVAL OF Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan 2020

WHEREAS, natural hazards in Wilson County and the City of La Vernia Texas, historically have caused disasters with losses of life and property and natural resources damage; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a hazard mitigation action plan to be eligible for the full range of pre-disaster and post disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires communities to update Hazard Mitigation Action Plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, the City of La Vernia has assessed the community's potential risks and hazards and is committed to planning for a sustainable community and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan outlines a mitigation vision, goals and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards the threaten the community.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan is approved in its entirety;
2. The City of La Vernia will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. The City of La Vernia vests with the County Judge the responsibility, authority and means to inform all parties of this action; assure that the Hazard Mitigation Plan will be reviewed at least annually; and that any needed adjustments will be presented to the County Commissioners for consideration; and
4. The City of La Vernia agrees to take such other action as may be reasonably necessary to carry out the objectives of the Plan and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

ADOPTED this 13th day of February, 2020

Robert W. Gregory
Mayor, City of La Vernia

Attested to:

Brittani Porter
City Secretary

CITY OF LA VERNIA
LA VERNIA, TEXAS

RESOLUTION 20-08
FOR the City of Kenedy
APPROVAL OF Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan 2020

WHEREAS, natural hazards in Karnes County and the City of Kenedy Texas, historically have caused disasters with losses of life and property and natural resources damage; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a hazard mitigation action plan to be eligible for the full range of pre-disaster and post disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires communities to update Hazard Mitigation Action Plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, the City of Kenedy has assessed the community's potential risks and hazards and is committed to planning for a sustainable community and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan outlines a mitigation vision, goals and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards the threaten the community.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan is approved in its entirety;
2. The City of Kenedy will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. The City of Kenedy vests with the County Judge the responsibility, authority and means to inform all parties of this action; assure that the Hazard Mitigation Plan will be reviewed at least annually; and that any needed adjustments will be presented to the County Commissioners for consideration; and
4. The City of Kenedy agrees to take such other action as may be reasonably necessary to carry out the objectives of the Plan and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

ADOPTED this 14th day of February 2020

James D Sutton
Mayor, City of Kenedy

Attested to:

Amanda Hines
Amanda M. Hines
City Secretary

RESOLUTION FOR the City of Falls City
APPROVAL OF Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan 2020

WHEREAS, natural hazards in Karnes County and the City of Falls City Texas, historically have caused disasters with losses of life and property and natural resources damage; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a hazard mitigation action plan to be eligible for the full range of pre-disaster and post disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires communities to update Hazard Mitigation Action Plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, the City of Falls City has assessed the community's potential risks and hazards and is committed to planning for a sustainable community and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan outlines a mitigation vision, goals and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards the threaten the community.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Karnes County – Wilson County Multi-jurisdictional Hazard Mitigation Action Plan is approved in its entirety;
2. The City of Falls City will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. The City of Falls City vests with the County Judge the responsibility, authority and means to inform all parties of this action; assure that the Hazard Mitigation Plan will be reviewed at least annually; and that any needed adjustments will be presented to the County Commissioners for consideration; and
4. The City of Falls City agrees to take such other action as may be reasonably necessary to carry out the objectives of the Plan and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

ADOPTED this 11 day of March, 2020

Brent Houdmann
Mayor, City of Falls City

Attested to: Lauren Sturm
Lauren Sturm
City Secretary

LANGFORD
COMMUNITY MANAGEMENT SERVICES

2901 CR 175
Leander ▪ Texas ▪ 78641

ROJAS

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