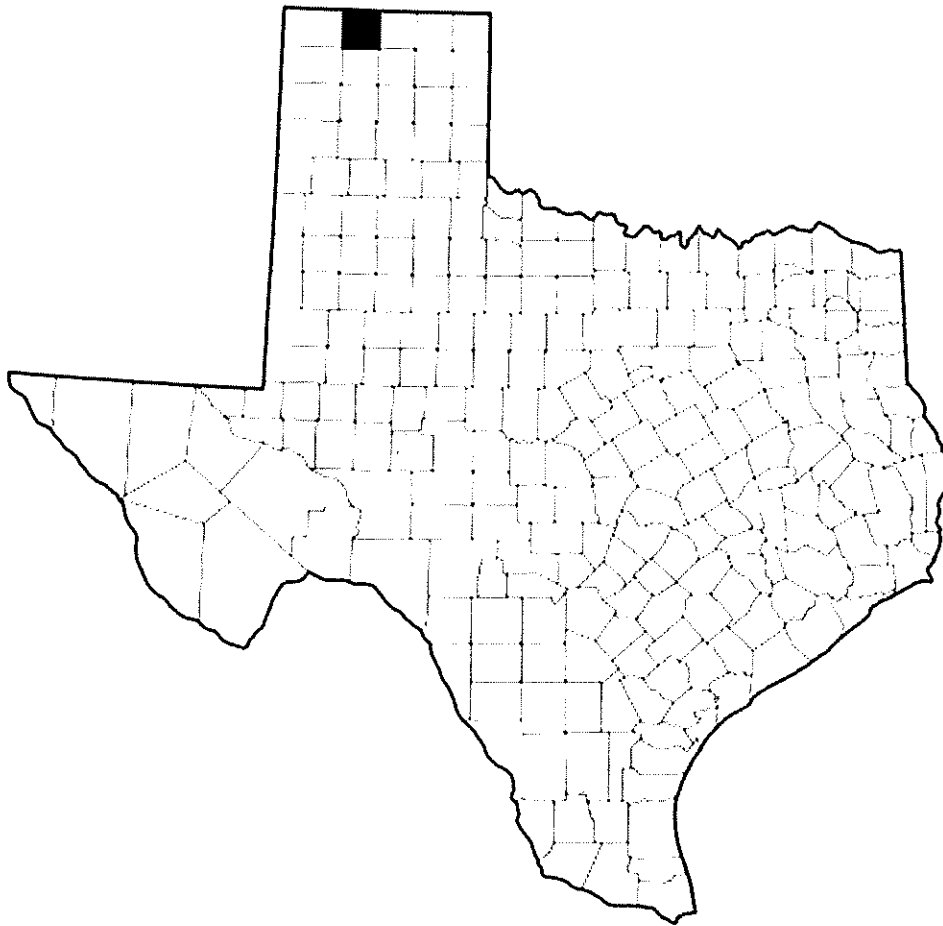


Sherman County Hazard Mitigation Plan

**Sherman County, City of Stratford, City of
Texhoma, Stratford ISD, Texhoma ISD**



**Developed by the Sherman County
Hazard Mitigation Action Team
May 2025**

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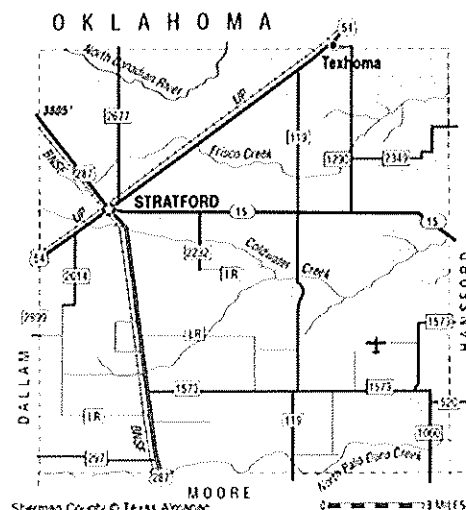
Record of Changes

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County and Demographic Overview

SHERMAN COUNTY is located in the northern Texas Panhandle, bordered by Oklahoma to the north and Dallam County to the west, Moore County to the south, and Hansford County to the east. Stratford, the county seat, is located in the northwestern part of the county, approximately 80 miles north of Amarillo.

The county occupies 923 square miles of nearly level land covered by prairie grasses, some sagebrush, and yucca; elevations range from 3,200 to 3,800 feet above sea level. The area is drained by the North Ford of the Canadian River, which cuts across the northwestern corner of the county, and the Frisco, Coldwater, and North Palo Duro creeks. The area's soils are dark and loamy, with clayey subsoils that contain hardened calcium deposits.



Temperatures vary from an average low of 31°F in January to an average high of 97°F in July. The area receives an average of 20 inches of precipitation each year; the average growing season lasts 182 days. In 1982, 98% of the county's land was in farms and ranches, 455 of the agricultural land was cultivated, and 59% of the cultivated land was irrigated. Approximately 66% of agricultural receipts were from livestock and livestock products, especially cattle and hogs. Wheat, corn, barley, sorghum, and soybeans are the main crops, and mineral resources include caliche, natural gas, and petroleum.

The county's road network includes US Highway 54, which runs across the northwestern corner of the county; U.S. Highway 287, which runs north to south in the western sections; and State Highway 15, which crosses east to west across the center of the county and terminates at Stratford. Two railroad lines, the Atchison, Topeka, and Santa Fe Railway and the Southern Pacific, pass through the county and intersect at Stratford.

Communities in the county include: Stratford (Population: 2,050) and Texhoma, which straddles the Texas-Oklahoma border (Population, Texas side: 352).¹ Stratford ISD serves the central and western portion of Sherman County and some of the eastern portion of Dallam County. It provides Pre-Kindergarten to Grade 12 education to approximately 576 students across 3 schools.² Texhoma ISD serves the northeastern portion of the county. Its located on the southern edge of Texhoma and has one elementary campus that provides Pre-Kindergarten to Grade 4 education to approximately 169 students.³

According to FEMA's National Risk Index, Sherman County's risk index is Relatively Low when compared to the rest of the U.S. This rating is derived from three components: Expected Annual Loss, Social Vulnerability, and Community Resilience. Sherman County measures as Relatively Low in Expected Annual Loss and Social Vulnerability and Very Low in Community Resilience when compared to the rest of the U.S.⁴

¹ <https://www.tshaonline.org/handbook/entries/sherman-county>

² https://nces.ed.gov/ccd/districtsearch/district_detail.asp?ID2=4841670&details=1

³ https://nces.ed.gov/ccd/districtsearch/district_detail.asp?ID2=4842540&details=2

⁴ <https://hazards.fema.gov/nri/map>

Document Organization

Provided below is a brief explanation of the layout and content of this document.

Element A – The Planning Process

This section explains how the plan was organized and the process followed in developing this document, including:

- Establishing the Mitigation Action Team – Identifies the process Sherman County, the City of Stratford, the City of Texhoma, Stratford ISD, and Texhoma ISD followed in establishing their Mitigation Action Team (MAT).
- Establishing an Open Public Process – Identifies actions that the MAT took to encourage public participation during the development of this plan.

Element B – Hazard Identification and Risk Assessment

This section identifies and analyzes the hazards that affect Sherman County and their impacts on the jurisdictions within:

- Hazard Description – Describes the hazards that impact Sherman County, the City of Stratford, the City of Texhoma, Stratford ISD, and Texhoma ISD.
- Location – Depicts the areas and jurisdictions affected by this hazard.
- Climate Change – Describes the potential impacts of climate change on each hazard
- Extent and Previous Occurrences – Provides historical and statistical data related to the specific hazards that have impacts the jurisdictions within Sherman County.
- Impact – Provides and estimates of the impact the hazard would have on the critical infrastructure located in the County and the jurisdictions within.
- Probability of Future Occurrences – Using the data from the previous occurrences section, calculations on the probability of this hazard affecting the planning area in the future.

Element C – Mitigation Strategies

This section identifies the mitigation goals, objectives, and actions that Sherman County plans to take to mitigate the hazards presented in Element B.

- Development Trends – Provides an analysis of growth trends within the County which were considered in developing the mitigation strategies discussed in Element C.
- Mitigation Goals and Objectives – Provides the framework for the development of the short-term and long-term strategies identified with the Mitigation Actions.
- Mitigation Actions – Describes the actions that each participating jurisdiction proposed to undertake in order to mitigate the impact of future hazard events.

Element D – Plan Maintenance

This section provides a description of the mitigation action plan review and evaluation process.

- Utilizing development patterns and new hazard or risk information; jurisdictions will evaluate progress on the action items and make changes based on new findings.
- Jurisdictions will update the plan and resubmit for approval within 5 years.

Element E – Plan Update

This section discusses plan revisions, considering current progress, new goals, priorities, and development trends.

Element F – Plan Adoption

Plans will be adopted by each jurisdiction through their appropriate governing body. This adoption takes place after plan draft has been approved by state and FEMA for applicable content.

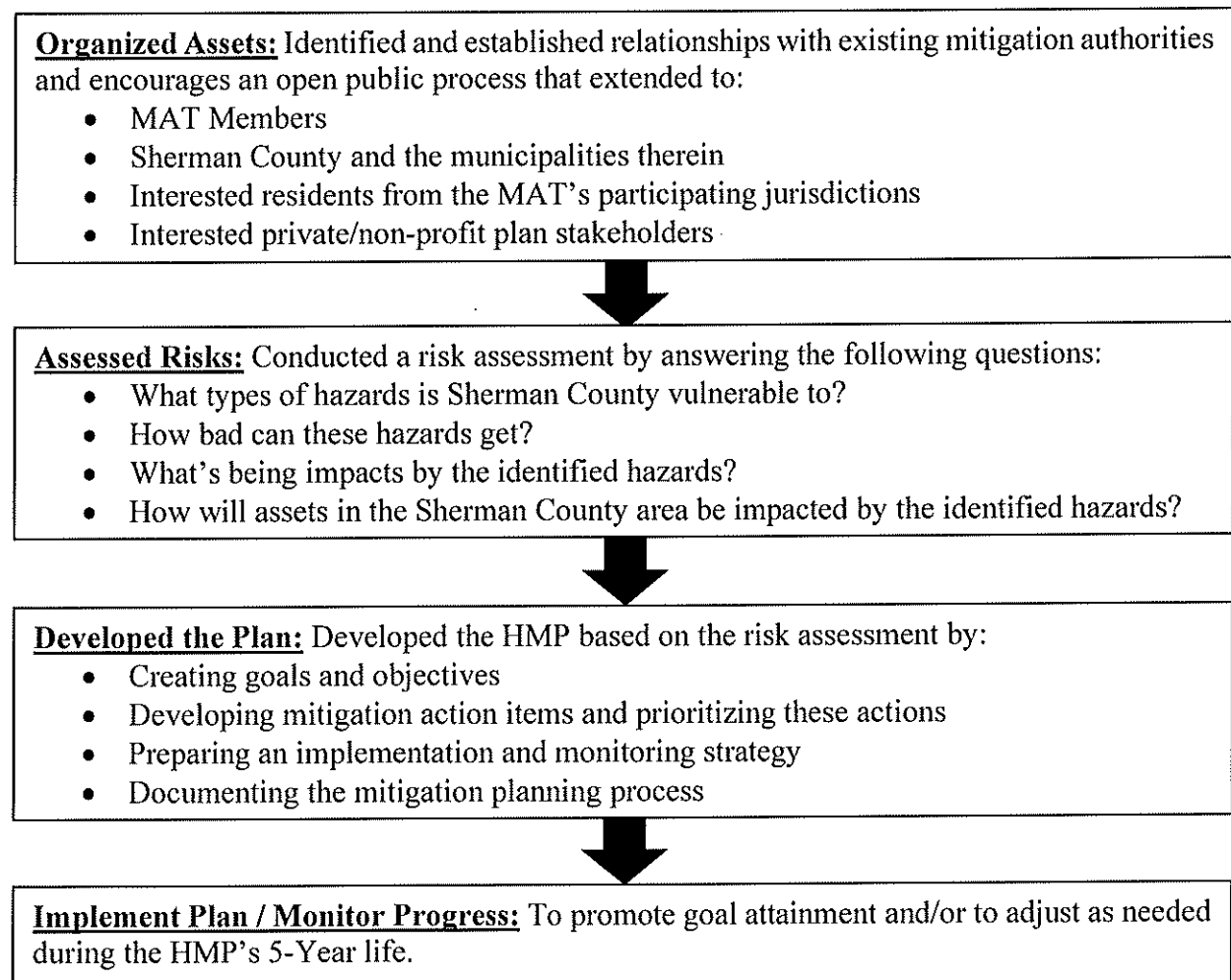
Element A – The Planning Process

Plan Preparation (A1)

This hazard mitigation plan was developed through the active participation of representatives from Sherman County, the City of Stratford, the City of Texhoma, Stratford ISD, and Texhoma ISD. Their contributions were critical in the plan development, especially with their expertise in emergency management, engineering, administrative matters, public works, and building and road maintenance. The team also included stakeholders such as: local business owners, industry representatives, neighboring jurisdictions, regional and state partners. The list of mitigation team members is located on page 11.

This graphic below illustrates the steps taken by the Sherman County MAT in developing this document.

Overview of the Sherman County Planning Process



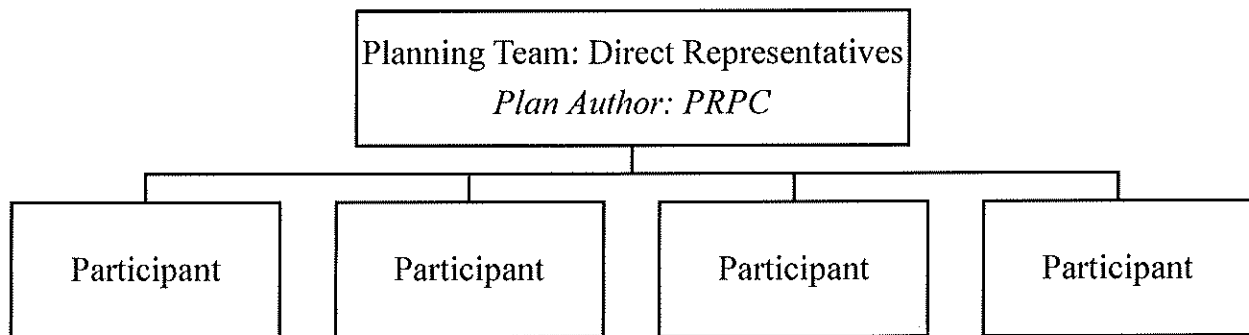
Planning Meetings

Date	Activity Description	Invites / Attendees
11/1/2022	Open meeting with MAT to review hazards, previous mitigation actions, community survey, and hazard impacts	Local government leaders, municipal department heads, ISD administration, responder group leaders, stakeholders, regional and state partners, and neighboring counties.
1/24/2023	Open meeting with MAT to discuss survey results and discuss which mitigation actions to include in the new plan	
11/20/2024	Open meeting with MAT to finalize plan details	
Each full MAT meeting was posted 72 hours in advance at the County Courthouse. Invitations were sent out via email. The public was invited to attend through County Courthouse / City Hall information boards. Sign-in sheets were utilized at both meetings.		

Establishing the Mitigation Action Team (A2)

The previous Sherman County Hazard Mitigation Plan was approved on December 12, 2017. In October 2022, the mitigation team coordinator began the process of updating the plan. This process included reviewing previous mitigation strategies and determining the status of each action. In addition, due to turnover, the chairman began to recruit new members to begin the update process.

Sherman County Mitigation Action Team Hierarchy



At the outset of the planning process, the Sherman County Emergency Management Coordinator emailed a solicitation to the other jurisdictions and plan stakeholder groups in the County; inviting their participation on the Sherman County Mitigation Action Team (MAT). In addition, the MAT meetings were all well-advertised and the meeting postings encouraged and welcomed the public's participation.

Each of the participating jurisdictions worked to elicit involvement on the MAT from the various groups within their jurisdiction and neighboring communities. Particular focus was placed on inviting participation by the local school districts and neighboring counties. Overall, the list of agencies/organizations thought to have a direct stake or interest in this HMP update process or that could somehow inform the planning process are below.

Potential Mitigation Action Team Members		
	Agency and Position	Potential Stake, Interest, or Contribution
Sherman County	Elected Officials <i>County Judge</i> <i>County Commissioners</i>	County officials have a stake in any mitigation actions undertaken by the County and would be responsible for recommending the update's adoption to the Court.
	County Road and Bridge <i>Superintendent</i>	Road and Bridge could inform the MAT on the impacts of natural hazards on the county's roads and have input on the development of mitigation actions.
	Sheriff's Office <i>County Sheriff</i>	Sheriff's Office could inform the MAT on public safety issues related to natural hazards and have input on the development of mitigation actions.
	County Appraisal District <i>Chief Appraiser</i>	The Appraisal District could inform loss value determinations made by the MAT
	Office of Emergency Mgmt. <i>County EMC</i>	The OEM could provide mitigation ideas, and presumably, would be charged with carrying out a number of the mitigation actions.
	Hospital District <i>Hospital Administration</i>	The hospital could both inform the MAT and has a direct interest in the HMP's mitigation measures, particularly those that apply to mass casualties.
	Elected Officials <i>Mayor</i>	City officials have a stake in any mitigation actions undertaken by the City and would be responsible for recommending the update's adoption to the Council.
	City Administration <i>City Manager</i>	City administration has a stake in any mitigation actions taken by the City and would be responsible for recommending the update's adoption to the Council.
Cities of Stratford and Texhoma	Public Works <i>Public Works Director</i>	Public works personnel could provide detail on how hazards and mitigation actions could impact the City utility and water treatment systems.
	Fire Department <i>Fire Chief</i>	The fire department could both inform the MAT and has a direct interest in the HMP's mitigation measures, particularly those that apply to wildfires.
	Police Department <i>Police Chief</i>	The police department could both inform the MAT and has a direct interest in the HMP's mitigation measures, particularly those that apply to public safety.
	ISD <i>Superintendent</i>	Being a stakeholder in the hazard mitigation plan, the ISD has a direct interest in the mitigation measures listed in the plan and is eligible to apply for mitigation funding.
	Economic Development <i>EDC Director</i>	The EDC could inform the MAT on future economic development trends for the County.
Local Partners and Industry	Texas AgriLife Extension <i>County Extension Agent</i>	AgriLife could inform the MAT on some of the decisions that might impact area farmers and ranchers and help promote certain mitigation actions.
	Industry	Industry in the County has a direct interest in the development of this HMP.
	The Public	The residents of the planning area have a direct interest in the outcome of this planning process.
	COG – PRPC <i>Regional Services Director</i>	Aside from assisting the MAT in writing this update, the PRPC could provide data that would inform the actions / decisions of the MAT.
	Amarillo WFO (NWS) <i>Warning Coord. Met.</i>	The NWS could provide data on past storm events and damages as well as forecasted weather treats that could inform the formation of mitigation actions.
	Texas Forest Service (TFS) <i>Regional Fire Coord.</i>	TFS resources could inform the MAT's development of wildfire mitigation actions.
Regional, State, and Federal Partners	Texas Parks and Wildlife <i>Lake Meredith Director</i>	Texas Parks and Wildlife resources could inform the MAT's development of wildfire mitigation actions.
	Army Corps of Engineers <i>SW Div., Fort Worth, TX</i>	Army Corps of Engineers resources could inform local flood control efforts with streambed/wetland data.
	Texas State Data Center (TSDC) <i>Online resources</i>	TSDC resources could provide data to forecast future population growth in the planning area.
	Texas Water Development Board <i>Online resources</i>	Texas Water Development Board resources could provide the City with severe repetitive loss data and inform actions focused on drought contingencies.

All of the participating jurisdictions/stakeholders listed above played a part in the hazard mitigation plan update process. State and federal agency participation was primarily obtained through the use of their websites. Information was collected from their sites to develop the hazard profiles found later in this document, to estimate future hazard impacts, to project future growth and development, and to identify potential actions that could be employed in mitigating the impacts of future hazard events in the planning area.

The MAT planning process was open throughout and invited the public to attend the MAT meetings. The jurisdictions encouraged the public to fill out the Household Natural Hazards Preparedness Survey, so the attitudes and opinions reflected by the residents would be considered as the mitigation actions in this HMP update. However, the survey only received one response.

In following FEMA's Local Mitigation Planning Handbook suggestions, the individuals invited to participate on the MAT brought certain skill sets or experiences to the process that helped to ensure the overall relevance of the plan. The types of MAT member contributions included:

- Emergency Managers / First Responders – Direct experience with past hazard events and existing preparedness measures, and/or had a direct line of communication with the State emergency management agency.
- Local Community Planners – Able to assist the planning team in understanding current and future community development trends, the policies or activities that affect development, and the relationship between hazards and development.
- Mapping Specialists – Able to analyze and interpret map data to support the planning process and communicate complex information, such as the locations of assets at risk in hazard-prone areas and estimates of damage for a particular disaster scenario.
- Public Works / Engineering Staff – Able to identify current or projected problems for the community's infrastructure that could be addressed through capital improvements supported by the mitigation plan.
- Elected and Executive Officials – Familiar with the total needs of their jurisdiction and were able to communicate how the mitigation plan could support other social, economic, or environmental goals locally.
- Floodplain Administrators – Able to provide information on local flood hazard maps, floodplain ordinance and actions that could be undertaken to support the goals of the national Flood Insurance Program and help reduce flood losses.
- Code Enforcement Officials – Able to help the team understand how local codes can be used in support of the Sherman County plan's mitigation goals.
- State / Federal Partners – Able to serve as a data resource; providing the MAT with relevant statistics, historical account, etc. that could be used to inform the planning process.

The table on the next page lists the current membership of the MAT and describes the contributions each member made with the development of this document.

Sherman County Mitigation Action Team and Contributions		
Title	Jurisdiction	Contribution
EMC/Team Coordinator	Sherman County City of Texhoma	<i>Emergency Manager</i> ; coordinated the meetings, obtained data to profile hazards, provided background on past mitigation actions in the county; identified potential mitigation actions
Mayor	City of Stratford	<i>Elected Official</i> ; helped the MAT in discerning the political element in the assessments of potential mitigation actions and with the development of mitigation actions
	City of Texhoma	
City Manager	City of Stratford	<i>Executive Official</i> ; helped the MAT in discerning the legal element in the assessments of potential mitigation actions and with the development of mitigation actions
	City of Texhoma	
Public Works Director	City of Stratford	<i>Public Works/Engineering</i> ; assisted in understanding some of the technical implications of proposed mitigation actions; particularly as they applied to key City infrastructure
Road and Bridge Supervisor	Sherman County	<i>Public Works/Engineering</i> ; assisted in understanding some of the technical implications of proposed mitigation actions; particularly as they applied to key County infrastructure
Police Chief	City of Stratford	<i>Law Enforcement</i> ; familiarized the MAT with the City's law enforcement prevention activities and assisted with the development of mitigation actions
Fire Chief	Stratford VFD	<i>First Responder</i> ; assisted with gathering wildfire data and identification of potential wildfire mitigation actions
	Texhoma VFD	
ISD Superintendent	Stratford ISD	<i>ISD Representative</i> ; actively participated in the MAT meetings and assisted with the development of mitigation actions for the ISD
	Texhoma ISD	
County Judge	Sherman County	<i>Elected Official</i> ; helped the MAT in discerning the political element in the assessments of potential mitigation actions and with the development of mitigation actions
County Sheriff	Sherman County	<i>Law Enforcement</i> ; familiarized the MAT with the County's law enforcement prevention activities and assisted with the development of mitigation actions
Assistant EMS Director	Stratford EMS	<i>Healthcare</i> ; actively participated in meetings and assisted with the development of mitigation actions for the county.
Executive Director	Sherman County Economic Development	<i>Local Partner</i> ; assisted the MAT with knowledge of the current economic development in the County as well as upcoming projects to help the MAT plan mitigation actions.
Executive Director	Sherman County Hospital District	<i>Local Partner</i> ; assisted the MAT with knowledge of the current economic development in the City as well as upcoming projects to help the MAT plan mitigation actions.
County Extension Agent	Texas Agri-Life Extension Office	<i>Local Industry Partner</i> ; familiarized the MAT with the local industry goals and upcoming projects
Science and Ops Officer	Amarillo WFO, NWS	<i>State/Federal Partner</i> ; providing data critical to the identification of hazards and their impacts
District Coordinator	TDEM	<i>State/Federal Partner</i> ; providing data critical to the identification of hazards and their impacts.
Emergency Planner	PRPC	<i>Local community planner</i> ; assisted the MAT Team leader with public communications; served as an interface with TDEM/FEMA as the HMP was being reviewed

Establishing an Open Public Process (A3)

As previously noted, the development of this plan followed the requirements set out by FEMA under 44 CFR §201.6. One of the foundational pieces of those requirements calls for the public to be given ample opportunity to observe, if not participate, in the planning process. §201.6(b)(1) required the County to provide, “(1) *An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;*”. To that end, whenever a MAT meeting was scheduled, postings to announce public meetings were placed at each city hall, the county courthouse, and each ISD information board, for each of the participating jurisdiction, at least 72 hours prior to the meeting. The following is a sample of the public notice:

NOTICE TO THE PUBLIC (Sample)

The Sherman County Mitigation Action Team will conduct a public meeting at the Sherman County Courthouse located at 701 N. 3rd St. Stratford, TX 79084 on (date), at (time). This plan incorporates mitigation actions intended to minimize the impacts of certain natural hazards on the residents of the County. The meeting is open to the public and members of the community are encouraged to attend. We especially encourage participation from groups that may be disproportionately affected by hazards, including but not limited to low-income families, elderly individuals, people with disabilities, and minority communities. Your insights and experiences are crucial for shaping a plan that effectively addresses the needs of all residents. For questions or comments, please contact Greg Wright with Sherman County Emergency Management or Delaney Pruett, with the PRPC, at (806) 372-3381.

The draft was made available for public comment both electronically, through PRPC, and physically at the Courthouse in Stratford, the City Halls in Stratford and Texhoma, and the Stratford ISD and Texhoma ISD administration buildings, 72 hours in advance of the governing bodies’ meetings. The final draft was discussed in open session during those meetings, with a call for public comment, before the adopting resolutions were considered and passed. These adoption meetings were preceded with a Notice to the Public that generally read as follows:

NOTICE OF A PUBLIC HEARING ON THE ADOPTION OF THE SHERMAN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN (Sample)

Sherman County Commissioner’s Court will conduct a public hearing before considering final adoption of the recently completed 2022 Sherman County Hazard Mitigation Plan Update on (date), at (time), in the (meeting room) of the Sherman County Courthouse located at 701 N. 3rd St. Stratford, TX 79084. This plan incorporates mitigation actions intended to minimize the impacts of certain natural hazards on the residents of the planning area. A copy of the plan is now available for review in the Sherman County Courthouse, during normal business hours or online at: [link]. The meeting is open to the public and interested residents are encouraged to attend to offer feedback and comment.

Each jurisdiction posted their own customized notice; giving their residents the date/time on which their governing body would consider the plan adoption along with a location at which the plan could be physically reviewed locally.

The Sherman County Hazard Mitigation Plan will remain available to the public on PARIS until it’s replaced by the next 5-year update.

Existing Documents Reviewed for Plan Development (A4)

Documents and Databases	Information Retrieved
State of Texas Hazard Mitigation Plan	Help in identifying specific hazards for the participants
Sherman County Emergency Operations Plan	Mitigation and recovery operations for the participants
Texas A&M Forest Service Fire Reports	Fire reports for the county and fire behavior maps
Google Maps	Maps identifying county and state roads
NOAA Storm Event Database	Data to populate storm history for the last 10 years
FEMA Flood Map Center	Details on the county and city's involvement in NFIP
Texas Water Development Board	Data regarding the participants existing water sources
Natural Disasters and Weather Extremes	Data to populate storm history for the last 10 years
FEMA Disaster Declarations	Data to expand on historical weather disasters
US Census American Fact Finder	Data regarding county and city census
Texas Association of Counties Profiles	Detailed information on the county's history

A capability review was completed by key departments and provided information pertaining to existing plans (see above), policies, ordinances, and regulations to be integrated into the goals and objectives of the Plan. These plans informed the mitigation action team of the jurisdictions' current operations and goals so members would be fully informed when planning for hazard mitigation.

Element B – Hazard Identification and Risk Assessment (B1, B2)

The purpose of hazard mitigation is to reduce loss of life and property by minimizing the impact of disasters. Mitigation plans are key to breaking the cycle of disaster damage and reconstruction. This mitigation plan will identify natural hazards that impact our community and identify actions to reduce losses from those hazards and establish a coordinated process to implement the plan.

Hazard Analysis

Early in the update process, the committee completed an analysis of the plan and decided that much of the contents on hazard analysis remained relevant. As with the previous plan, the committee for this update found the following natural hazards continue to be present and could have an effect to the planning area.

- Drought
- Hail Storms
- Lightning
- Winter Storms
- Tornado
- Wildfire
- Windstorms
- Flooding

The mitigation action team studied the entire list of possible natural hazards that could affect the jurisdiction and found that while some hazards could be considered, historical data did not support the need to include the following hazards. Data of the following hazards found that the possibility of a future event would have less than a 1.5% chance of occurring in the next 65 years, therefore, the risk is negligible, or that history has never recorded any such event for the jurisdiction and the event is not likely to occur in the next 5 years.

- Earthquake
- Hurricanes
- Tropical Storms
- Expansive Soils
- Land Subsidence
- Coastal Erosion

There is not any history of impacts from these hazards, therefore, the team does not anticipate any impacts from these hazards in the future. Some of these hazards are interconnected (e.g., lightning striking transformers starting wildfires) while some hazards could be characterized as elements of a broader hazard agent. For example, hail and severe winds can be produced by thunderstorms, and they may all occur during a single thunderstorm event. It should also be noted that some hazards, such as severe winter storms, may impact a larger area but cause little damage, while other hazards, such as a tornado, may impact a smaller area but cause extensive damage.

Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

Industrial / Technological / Man-Made Hazards

The authors of this plan recognize the significance of industrial, technological, and man-made hazards that pose a threat to both residents and property. Specific plans that address the recognition and response procedures of those hazards can be found in the following documents:

- Sherman County Emergency Operations Plan
- Train: BNSF Railroad Response Plan
- Pipeline Emergency Response Guidelines
- Aviation Disaster Plan/Mass Fatality Plan
- Community Emergency Response Plan
- Regional Foreign Animal Disease Plan

Industrial / Technological / Man-Made Hazards Found in the Planning Area				
Hazard	Frequency of Occurrence	Warning Time	Geographic Extent	Potential Impact
Hazardous Materials Release	Likely	None	Localized	Moderate
Pipeline Explosion	Likely	None	Localized	Moderate
Railcar Incident	Likely	None	Localized	Moderate
Potable Water Failure	Unlikely	At least 12 hours	Localized	Major
Aircraft Accident	Unlikely	None	Multi-County	Major
Foreign Animal Disease	Unlikely	6-12 hours	Regional	Major

Drought

Description

Drought is a deficiency in precipitation over an extended period. It is a part of normal climate variability in many climate zones. The duration of droughts varies widely. Drought can develop quickly and last only for a matter of weeks, exacerbated by extreme heat and/or wind, but more commonly drought can persist for months or years.

Droughts are classified as one of the following three types:

- Meteorological – based on the degree of dryness (rainfall deficit) and the length of the dry period.
- Hydrological – based on the impact of rainfall deficits on the water supply such as stream flow, reservoir, and lake levels, and ground water table decline.
- Agricultural – based on the impacts to agriculture by factors such as rainfall deficits, soil water deficits, reduced groundwater, or reservoir levels needed for irrigation.⁵

Anticipating the range of future droughts that could impact the entire planning area, the MAT then considered the effects those events might have. The table below describes the impacts each stage of drought could potentially have on the planning area.

The Drought Monitor map, a collaborative effort from the National Drought Mitigation Center (NDMC), the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Department of Agriculture (USDA), identifies areas of drought and labels them by intensity.

D1 is the least intense level and D4 the most intense. Drought is defined as a moisture deficient bad enough to have social, environmental, or economic effects. D0 areas are not in drought, but are experiencing abnormally dry conditions that could turn into drought or are recovering from drought by are not yet back to normal.

The Drought Monitor indicates whether primary physical effects are for short- or long-term drought using letters:

- **S** = Short-term, typically less than 6 months (agriculture, grasslands)
- **L** = Long-term, typically more than 6 months (hydrology, ecology)
- **SL** = Area contains both short- and long-term impacts

Short-term drought indicator blends focus on 1-3 month precipitation. Long-term blends focus on 6-60 months. Additional indices used, mainly during the growing season, include the USDA/NASS Topsoil Moisture, Keetch-Byram Drought Index (KBDI), and NOAA/NESDIS satellite Vegetation Health Indices. Indices used primarily during the snow season and in the West include snow water content, river basin precipitation, and the Surface Water Supply Index (SWSI). Other indicators include groundwater levels, reservoir storage, and pasture/range conditions.

⁵ <https://www.weather.gov/safety/drought>

Drought Severity Classification⁶

Category	Description	Possible Impacts	Ranges				
			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	<u>Going into drought:</u> short-term dryness slowing planting, growth of crops or pastures <u>Coming out of drought:</u> some lingering water deficit, 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 and 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 loss 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
	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

⁶ <https://droughtmonitor.unl.edu/About/AbouttheData/DroughtClassification.aspx>

The Drought Monitor has developed a list of impacts reported during past droughts in each state for each level of drought defined above. The impacts listed below have been historically observed in Texas during past droughts.⁷

Category	Historically Observed Impacts in Texas
D0	Producers begin supplemental feeding for livestock
	Planting is postponed; forage germination is stunted; hay cutting is reduced
	Grass fires increase
	Surface water levels decline
D1	Dryland crops are stunted
	Early cattle sales begin
	Wildfire frequency increases
	Stock tanks, creeks, streams are low; voluntary water restrictions are requested
D2	Pasture conditions are very poor
	Soil is hard, hindering planting; crop yields decrease
	Wildfire danger is severe; burn bans are implemented
	Wildfire moves into populated areas
D4	Hydroelectric power is compromised; well water use increases; mandatory water restrictions are implemented
	Soil has large cracks; soil moisture is very low; dust and sand storms occur
	Row and forage crops fail to germinate; decreased yields for irrigated crops and very large yield reduction for dryland crops are reported
	Need for supplemental feed, nutrients, protein, and water for livestock increases; herds are sold
	Increased risk of large wildfires is noted
	Many sectors experience financial burden
	Severe fish, plant, and wildlife loss reported
	Water sanitation is a concern; reservoir levels drop significantly; surface water is nearly dry; river flow is very low; salinity increases in bays and estuaries
	Exceptional and widespread crop loss is reported; rangeland is dead; producers are not planting fields
	Culling continues; producers wean calves early and liquidate herds due to importation of hay and water expenses
	Seafood, forestry, tourism, and agriculture sectors report significant financial loss
	Extreme sensitivity to fire danger; firework restrictions are implemented
	Widespread tree mortality is reported; most wildlife species' health and population are suffering
	Devastating algae blooms occur; water quality is very poor
	Exceptional water shortages are noted across surface water sources; water table is declining
	Boat ramps are closed; obstacles are exposed in water bodies; water levels are at or near historic lows

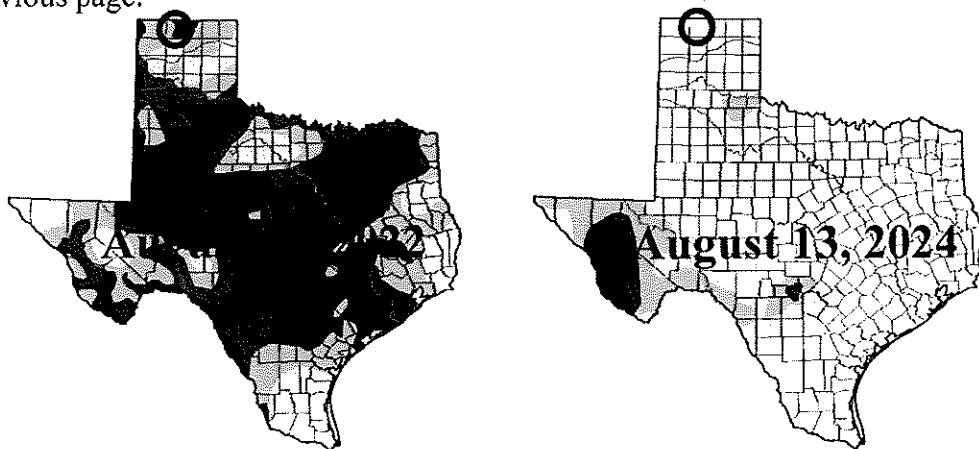
⁷ <https://droughtmonitor.unl.edu/DmData/StateImpacts.aspx>

Climate Change

Climate change and drought are related on a larger, regional level and has further altered the natural pattern of droughts, making them more frequent, longer, and more severe. Since 2000, the western United States is experiencing some of the driest conditions on record. The southwestern US, in particular, is going through an unprecedented period of extreme drought, the planning area is on the eastern edge of the region. This will have lasting impacts on the environment and those who rely on it.⁸

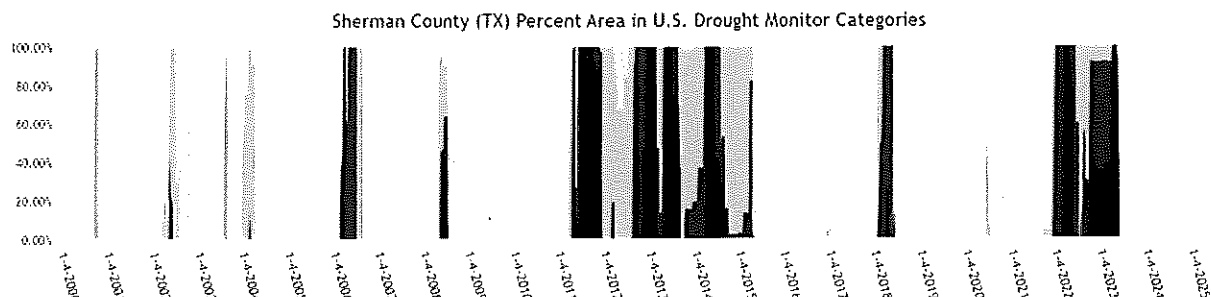
Location

Drought affects the entire region, including Sherman County and the jurisdictions within. This graphic depicts drought conditions across the State of Texas and allows you to compare recent conditions with those in 2015. Most of the Panhandle had shown significant improvement from the 2012-2014 drought, but lack of moisture has returned Sherman County to D2-D4 drought conditions.⁹ The colors on this graphic are described in the Drought Severity Classification Chart on the previous page.



Extent and Previous Occurrences

The entire planning area experienced exceptional (D4) drought conditions from 2011 to 2014, partially due to the limited amount of rainfall in 2011, 8.40 inches for the year. These drought conditions were sustained each consecutive year through April 2015 with continued below average precipitation.¹⁰ Sherman County has been experiencing cycles of drought since January 2018, with the County receiving below average rainfall in 2016, 2018, 2020, 2021, and 2022. The annual average precipitation for the County from 2000-2024 is 16.56 inches. The entire region can experience up to D4 drought conditions. The chart below depicts these instances from 2000-2024.¹¹



⁸ <https://www.usgs.gov/science/science-explorer/climate/droughts-and-climate-change>

⁹ <https://droughtmonitor.unl.edu/Maps/CompareTwoWeeks.aspx>

¹⁰ https://www.weather.gov/ama/2011_weather_review

¹¹ <https://droughtmonitor.unl.edu/DmData/TimeSeries.aspx>

Below is a list of each occurrence of drought from 2012 to 2022. Sherman County experienced at least D1 drought conditions from 2011 to 2015, but the effects were not immediately noticeable. There was a total of \$196 million in damage to crops and livestock due to these conditions. Many ranchers sold their herds because of the cost of supplemental feed and water for cattle. ¹²

Location	Date	Property Damage	Crop Damage	Damage Impact Narrative
County	10/1/2012	\$0	\$6M	A strong La Nina episode in the central Pacific Ocean significantly influenced the weather pattern across the Texas Panhandle for most of the year. Due to this, 2011 was one of the driest and hottest years on record, breaking multiple high temperature records and only receiving 7.01 inches of rain (13.35 inches below normal). In 2012, the Panhandle experienced the second warmest year on record. Precipitation was nearly double the amount received in 2011, but still 50% below normal amounts. Beneficial late-winter and early-spring rains helped most of the area see short term recovery from the ongoing drought, though a dry summer and autumn left mostly extreme (D3) to exceptional (D4) drought conditions across the Panhandles. In 2013, the planning area saw a blizzard that dumped 19.1" of snow in two days and a summer wet pattern. However, the drought still persisted and even worsened during the dry fall and winter months. The area received 15.20 inches of precipitation in 2013, which is 5.16 inches below normal. Following the dry fall and winter of 2013, by Memorial Day 2014, the entire planning area was back in exceptional (D4) drought conditions. In the spring, severe wind events caused dust storms reminiscent of the Dust Bowl years. An anticipated El Nino event never materialized before the end of 2014, but the Pacific Ocean remained in a neutral phase throughout the year. The area received 19.40 inches of precipitation in 2014, which is only 0.96 inches below normal. After 4 years of persistent and severe drought conditions, above normal precipitation returned to the whole region over the course of 2015.
County	11/1/2012	\$0	\$30M	
County	12/1/2012	\$0	\$25M	
County	1/1/2013	\$0	\$30M	
County	2/1/2013	\$0	\$10M	
County	3/1/2013	\$0	\$5M	
County	4/1/2013	\$0	\$15M	
County	5/1/2013	\$0	\$25M	
County	6/1/2013	\$0	\$25M	
County	7/1/2013	\$0	\$10M	
County	8/1/2013	\$0	\$9M	
County	9/1/2013	\$0	\$2M	
County	10/1/2013	\$0	\$2M	
County	11/1/2013	\$0	\$0	
County	12/1/2013	\$0	\$0	
County	1/1/2014	\$0	\$0	
County	2/1/2014	\$0	\$0	
County	3/1/2014	\$0	\$0	
County	4/1/2014	\$0	\$0	
County	5/1/2014	\$0	\$0	
County	6/1/2014	\$0	\$0	
County	7/1/2014	\$0	\$0	
County	8/1/2014	\$0	\$0	
County	9/1/2014	\$0	\$0	
County	10/1/2014	\$0	\$0	
County	11/1/2014	\$0	\$0	
County	12/1/2014	\$0	\$0	
County	1/1/2015	\$0	\$0	
County	3/1/2015	\$0	\$0	
County	4/1/2015	\$0	\$0	
County	6/9/2020	\$0	\$0	An area of severe drought (D2) emerged across the northern 1/3 of the County and spread south. Thunderstorms brought beneficial rain to the area in July, expelling the drought. The lightning from these storms started a 300 acre fire on July 11th.
County	7/1/2020	\$0	\$0	
County	11/16/2021	\$0	\$0	Dry conditions began in August 2021, with only a few isolated events bringing minimal precipitation to the combines Oklahoma and Texas Panhandles. Soil conditions continued to be very short on moisture. In turn, rangeland and pasture conditions in poor to very poor conditions. Wildfires continued to pop up across the planning area. As of this writing, August 2022 is the most recent drought data available on the NOAA Storm Events Database.
County	12/1/2021	\$0	\$0	
County	1/1/2022	\$0	\$0	
County	2/1/2022	\$0	\$0	
County	3/1/2022	\$0	\$0	
County	4/1/2022	\$0	\$0	
County	5/1/2022	\$0	\$0	
County	6/1/2022	\$0	\$0	
County	7/1/2022	\$0	\$0	
County	8/1/2022	\$0	\$0	
TOTAL		\$0	\$194M	

¹² <https://www.ncdc.noaa.gov/stormevents/>

Impact

Drought conditions can have many impacts in the planning area. Specific vulnerabilities for each stakeholder in the plan are listed below.

Vulnerabilities	
County	• All residents/homes/property are vulnerable to the secondary impact of drought, wildfire. In extreme drought conditions, grassland is more susceptible to catch on fire from sparks from railcars, cigarette butts, and transformer malfunctions with little to limited structures to stop the spread. • Vegetation around the Courthouse and other county-owned buildings • Crops and agricultural accounts/economy: crop damage and decreased cattle profits are likely to occur in the event of a drought.
Stratford	• Vegetation around City Hall, Fire Department, Police Department, and 7 recreation venues. • Damage to underground utilities as soil dries and recedes from underground pipes, thus allowing movement.
SISD	• Stratford ISD (3) campuses do not have drought resistant vegetation and are vulnerable to dry conditions. The impact of drought to the ISD is increased water use to maintain the existing landscape. Loss of athletic field grass.
Texhoma	• Vegetation around City Hall. • Damage to underground utilities as soil dries and recedes from underground pipes, thus allowing movement.
TISD	• Texhoma ISD (1) campus does not have drought resistant vegetation and is vulnerable to dry conditions. The impact of drought to the ISD is increased water use to maintain the existing landscape.

Probability of Future Events

Historical patterns are assumed to be a dominant factor in determining future drought events. Based upon the historical instances of drought events which have occurred in the area during the last 11 years, droughts of D1 or greater magnitude, occurring for at least two consecutive weeks have happened in 324 out of a total of 572 weeks. Based on this data, the MAT estimates the probability for a drought in the entire planning area in any given year to be 56.64%. Due to the rural nature of the planning area, changes in population patterns, land use, and development will not affect the impacts of this hazard.

Years in the Record Span 2012-2022	# of Weeks Total 2012-2022	# of Weeks in the Span in which the Event Occurred ¹³	Computation	Future Probability of at least 2 Weeks of D1 Drought
11	572	324 weeks	$(324/572) \times 100$	56.64% each year

¹³ <https://droughtmonitor.unl.edu/DmData/DataDownload/WeeksInDrought.aspx>

Flooding

Description

A flood is defined as a general and temporary condition of partial or complete inundation of two or more acres of normally dry land or of two or more properties from:

1. Overflow of inland or tidal waters; or
2. Unusual and rapid accumulation or runoff of surface waters from any source; or
3. Mudslides (i.e., mudflows)

A flood typically inundates a floodplain. There are two categories of flooding that could potentially impact the planning area:

- **Flash Floods** – A flash flood generally results from a torrential rain on a relatively small drainage area. Runoff from these intense rainfalls result in high flood waters that can destroy roads, bridges, homes, buildings, and other community developments. Discharges quickly reach a maximum and diminish almost as rapidly. Flash floods are a potential source of destruction and a threat to public safety in areas where the terrain is steep, surface runoff rates are high, streams flow in narrow canyons and gullies, or severe thunderstorms stall over an area. The historical instances of flooding that have occurred within the planning area are mostly flash flood types of events. Therefore, flash flooding will be addressed within this plan.
- **Riverine Floods** – Riverine floods are caused by precipitation over large areas and differ from flash floods in their extent and duration. Riverine floods take place in river systems whose tributaries may drain large geographic areas and encompass many independent river basins. Floods in large river systems may continue for periods ranging from a few hours to many days. Flood flows in large river systems are influenced primarily by variations in the intensity, amount, and distribution of precipitation.¹⁴

Location

During heavy rainfall events, flash flooding can impact the entire planning area. The County has not been mapped through the FEMA FIRM program, neither has either city. There are a few areas in each of the jurisdictions that are prone to flooding:

- In the unincorporated area of the County, most county roads are prone to flooding during heavy rain events, but the floodwaters usually subside naturally within a few hours.
- In the City of Stratford, flooding occurs on N. Putnam St., E. Purnell St., and the intersection of S Main St. and TX 15.
- In the City of Texhoma, there is minimal flooding. However, if the railroad underpasses are not routinely cleaned out, they can create flooding issues.
- Both ISDs are impacted by the flooding issues depicted in the County and City flooding locations. Please see the next page for maps of the schools.

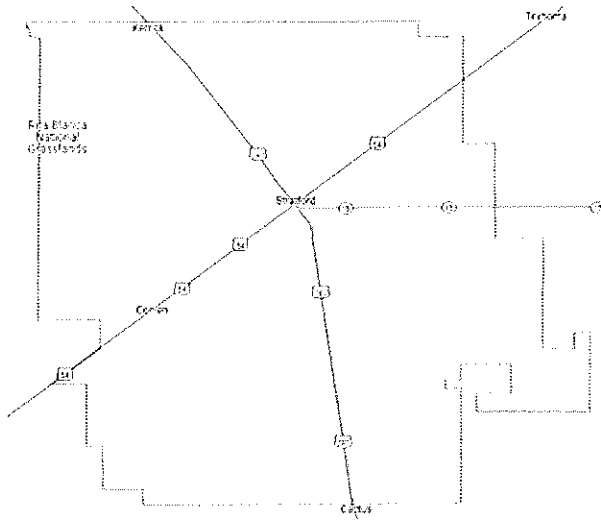
Climate Change

Climate change can affect the intensity and frequency of precipitation on a global scale. Warmer oceans increase the amount of water that evaporates into the air. When more moisture-laden air moves over land or converges into a storm system, it can produce more intense precipitation, for example heavier rain. This can lead to flooding at the local level. However, heavy precipitation does not necessarily mean the total amount of precipitation at a location has increased – just the precipitation is occurring in more intense events. The impacts of climate change on flooding at the local level is somewhat understood, but more research is needed to examine the full impact.¹⁵

¹⁴ <https://www.nssl.noaa.gov/education/svrwx101/floods/types/>

¹⁵ <https://www.epa.gov/climate-indicators/climate-change-indicators-heavy-precipitation>

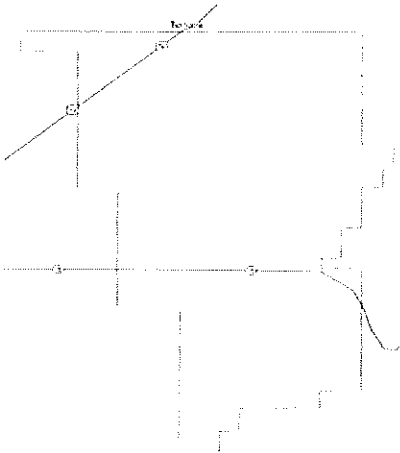
Stratford ISD Service Area



Stratford ISD Campus



Texhoma ISD Service Area



Texhoma ISD Campus



Extent and Previous Occurrences¹⁶

Flooding extent that occurs in Sherman County is approximately 1-2 feet. The severity of a flash flood depends not only on the amount of water that accumulates in a period of time, but also on the land's ability to manage the water. Below is a list of previous flooding occurrences.

Location	Date	Property Damage	Crop Damage	Damage Impact Narrative
Lautz	6/22/2018	\$0	\$0	Heavy rain allowed for water to fill over roadways
Mallett	6/19/2024	\$0	\$0	One property flooded with water up to the porch, water receded a few hours later.
TOTAL		\$0	\$0	

¹⁶ <https://www.ncdc.noaa.gov/stormevents/>

Impact

The depth of any flooding event will be dependent upon factors such as the location, intensity, and duration of the rainfall event, the affected watershed(s), the jurisdiction's Special Flood Hazard Areas (SFHAs), the local drainage system, and other meteorological conditions. Vulnerable properties and facilities could sustain repeated damage due to rainfall that exceeds the drainage system capabilities or due to runoff. Flash flooding could also be a contributing factor to accidents on vulnerable roads, resident injuries, and exposure to unsanitary flood waters.

Vulnerabilities	
County	In the unincorporated area of the County, most county roads are prone to flooding during heavy rain events, but the floodwaters usually subside naturally within a few hours.
Stratford	- City drainage system and their capabilities are vulnerable to becoming ineffective during flood events. - Flooding occurs on N. Putnam St., E. Purnell St., and the intersection of S Main St. and TX 15.
Texhoma	- City drainage system and their capabilities are vulnerable to becoming ineffective during flood events. - In the City of Texhoma, there is minimal flooding. However, if the railroad underpasses are not routinely cleaned out, they can create flooding issues.
SISD	Stratford ISD campus – Excessive water from flash flooding can impact school grounds and contributes to excess wear on school buses leading to possible accidents/injuries to staff and students.
TISD	Texhoma ISD campus – Excessive water from flash flooding can impact school grounds and contributes to excess wear on school buses leading to possible accidents/injuries to staff and students.

Probability of Future Events

Historical patterns are assumed to be a dominant factor in determining future flooding events. Based upon the historical instances of flooding events that have occurred in the area during the last 20 years, Sherman County has experienced 2 flooding events. However, due to the rural nature of the County, it is highly likely the area has experienced more flooding events that have gone unreported. Based on this data, the MAT estimates that in any given year, there is at least a 10% chance that the county will experience one or more flooding events. Due to the rural nature of the planning area, changes in population patterns, land use, and development will not affect the impacts of this hazard.

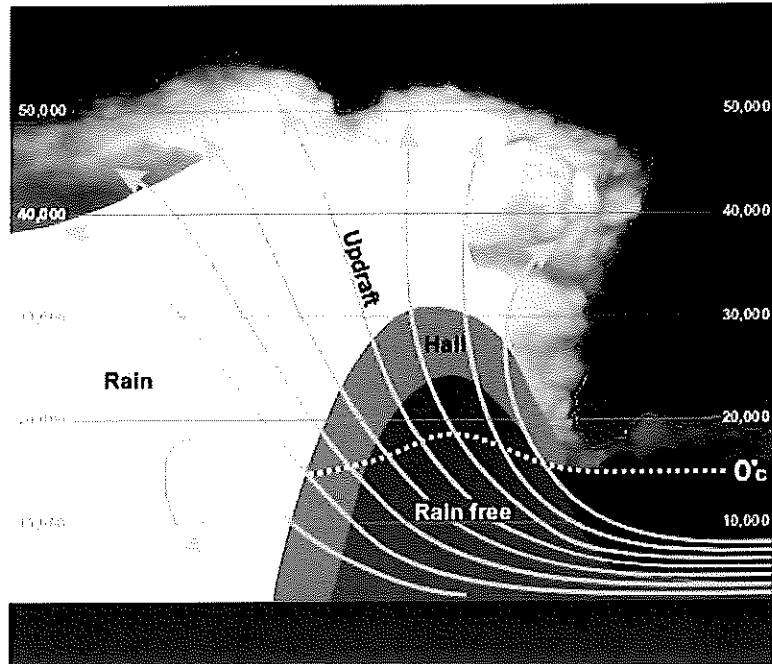
Years in the Record Span (2005-2024)	# of Flooding Events that Occurred	Computation	Future Probability of a Flooding Event
20	2	$(2/20) \times 100$	10.00% each year

Hail

Description

Hail is a form of precipitation consisting of solid ice that forms inside thunderstorm updrafts. Hail can damage aircraft, homes and cars, and can be deadly to livestock and people. Hailstones are formed when raindrops are carried upward by thunderstorm updrafts into extremely cold areas of the atmosphere and freeze. Hailstones then grow by colliding with liquid water drops that freeze onto the hailstone's surface. Hail falls when it becomes heavy enough to overcome the strength of the thunderstorm updraft and is pulled toward the earth by gravity. If the updraft is strong enough, it will

move the hailstone back into the cloud where it once again collides with water and hail and grows until the stone overcomes the updraft and falls to the ground. Wind-driven hail can tear up siding on houses, break windows and blow into houses, break windows on cars, and cause severe injury and/or death to people and animals.¹⁷



<https://www.weather.gov/jetstream/hail>

Hailstone Size	Measurement		Updraft Speed	
	in	cm	mph	km/h
BB	< 1/4	<0.64	<24	<39
Pea	1/4	0.64	24	39
Marble	1/2	1.3	35	56
Dime	7/10	1.8	38	61
Penny	3/4	1.9	40	64
Nickel	7/8	2.2	46	74
Quarter	1	2.5	49	79
Half Dollar	1 ¼	3.2	54	87
Walnut	1 ½	3.8	60	97
Golf Ball	1 ¾	4.4	64	103
Hen Egg	2	5.1	69	111
Tennis Ball	2 ½	6.4	77	124
Baseball	2 ¾	7.0	81	130
Tea Cup	3	7.6	84	135
Grapefruit	4	10.1	98	158
Softball	4 ½	11.4	103	166

Hail is often compared to general household items so that members of the community can easily report the size of the hailstones to their local weather forecasting office. Because hailstones are frozen, they typically start to melt before precise measurements can be taken. When reporting hail, estimates comparing the hail to a known object with a definite size are good, but measurements using a ruler, calipers, or a tape measure are best. To the left is a table showing the general size of the hailstone along with the diameter measurement in inches and centimeters and the estimated minimum updraft speed to keep a hailstone of that size aloft.¹⁸

¹⁷ <https://www.nssl.noaa.gov/education/svrwx101/hail/>

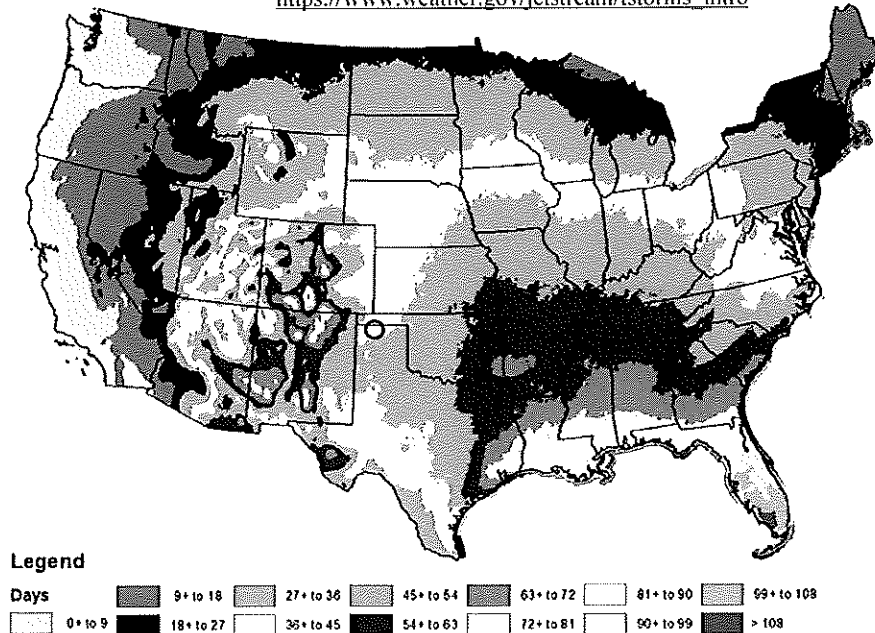
¹⁸ <https://www.weather.gov/jetstream/hail#hail>

Location

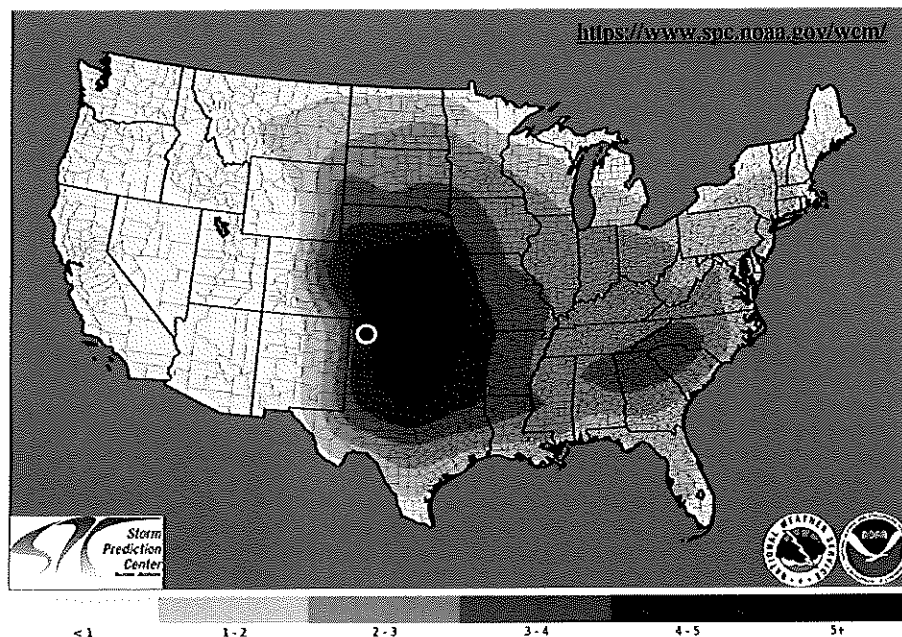
Hail is formed in the updraft of strong and severe thunderstorms that have the energy to suspend the hailstones until they become heavy enough to fall to the ground. The figure below shows the average number of thunderstorm days each year throughout the U.S. The graphic defines a day of thunderstorms as two lightning flashes within a 10 nautical mile (18.5 km) radius of a given point. Sherman County can expect to see 36-45 thunderstorm days per year.

Annual Mean Thunderstorm Days (1993-2018)

https://www.weather.gov/jetstream/tstorms_intro



The entire planning area can expect to experience hail, generally associated with severe thunderstorms, 3-4 days per year. Based on previous occurrences, the average largest hailstone in these storms is 1.58 inches in diameter, however, the entire county can experience hailstones as large as 2.75 inches in diameter. Below is a map depicting the average number of days per year the county can expect to receive hail greater than 1.00 inch in diameter based on data from 1986-2015.



Climate Change

Predictions about the effects of climate change on hail, including event frequency, spatial distribution, and intensity (e.g., hail size, kinetic energy) are limited and uncertain. Research suggests that climate change is expected to result in conditions that increase the potential for severe thunderstorms in the U.S., broadly, of which hail is a byproduct. Additionally, some research suggests that hailstorms will be less frequent, but more extreme (larger stones) when storms do occur. Overall, the impact of climate change on hail at the local level are not yet well-understood.¹⁹

Extent and Previous Occurrences²⁰

Hail is generally accompanied by other severe thunderstorm hazards, such as wind, rain, and tornadoes, making the damage that hail causes costlier. Hail is measured as the diameter of the stone in inches, and generally, the largest hailstone found is reported. The National Weather Service only records hail that measures in the severe category, meaning the diameter of the hailstone is at least 0.75 inches. Therefore, the reports of hail below should be considered severe, although no injuries or damages were reported.

Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Mallett	5/26/2012	Hail	1.00 in.	0	0	\$0	\$0
Lautz	6/12/2012	Hail	0.75 in.	0	0	\$0	\$0
Mallett	6/7/2013	Hail	0.88 in.	0	0	\$0	\$0
Mallett	7/16/2014	Hail	1.50 in.	0	0	\$0	\$0
Texhoma	5/16/2015	Hail	1.00 in.	0	0	\$0	\$0
Lautz	6/11/2015	Hail	1.75 in.	0	0	\$0	\$0
Lautz	11/16/2015	Hail	1.75 in.	0	0	\$0	\$0
Stratford	4/15/2016	Hail	2.50 in.	0	0	\$0	\$0
Texhoma	4/29/2016	Hail	1.00 in.	0	0	\$0	\$0
Mallett	5/16/2016	Hail	1.75 in.	0	0	\$0	\$0
Mallett	5/29/2016	Hail	2.75 in.	0	0	\$0	\$0
Lautz	5/10/2017	Hail	1.75 in.	0	0	\$0	\$0
Texhoma	5/15/2017	Hail	1.50 in.	0	0	\$0	\$0
Lautz	5/27/2017	Hail	2.00 in.	0	0	\$0	\$0
Lautz	8/17/2017	Hail	1.75 in.	0	0	\$0	\$0
Mallett	5/28/2018	Hail	1.75 in.	0	0	\$0	\$0
Texhoma	5/30/2018	Hail	2.00 in.	0	0	\$0	\$0
Lautz	6/22/2018	Hail	1.75 in.	0	0	\$0	\$0
Stratford	5/4/2019	Hail	2.25 in.	0	0	\$0	\$0
Lautz	5/5/2019	Hail	1.75 in.	0	0	\$0	\$0
Texhoma	6/13/2019	Hail	1.00 in.	0	0	\$0	\$0
Lautz	6/18/2019	Hail	1.50 in.	0	0	\$0	\$0
Lautz	6/22/2020	Hail	2.50 in.	0	0	\$0	\$0
Mallett	7/19/2020	Hail	1.00 in.	0	0	\$0	\$0
Mallett	8/10/2020	Hail	1.50 in.	0	0	\$0	\$0
Lautz	5/30/2021	Hail	1.75 in.	0	0	\$0	\$0
Mallett	5/1/2022	Hail	1.00 in.	0	0	\$0	\$0
Mallett	5/16/2022	Hail	0.88 in.	0	0	\$0	\$0
Mallett	4/25/2023	Hail	1.00 in.	0	0	\$0	\$0
Texhoma	5/28/2023	Hail	2.00 in.	0	0	\$0	\$0
Lautz	6/13/2023	Hail	2.50 in.	0	0	\$0	\$0
Mallett	8/5/2013	Hail	1.00 in.	0	0	\$0	\$0
Mallett	8/13/2023	Hail	1.00 in.	0	0	\$0	\$0

¹⁹ <https://yaleclimateconnections.org/2022/03/hailstorms-and-climate-change-what-to-expect/>

²⁰ <https://www.ncdc.noaa.gov/stormevents/>

Mallett	6/14/2024	Hail	0.75 in.	0	0	\$0	\$0
Mallett	6/18/2024	Hail	1.25 in.	0	0	\$0	\$0
TOTAL			35 hail events	0	0	\$0	\$0

Impact

Hail can cause considerable damage to crops and property. Additionally, injuries and deaths can occur as a direct result to both people and livestock who are not under shelter. Hail damage to vehicles and buildings can be costly and increase insurance premiums. Damage and repairs can significantly impact daily operations, especially if buildings or equipment are unusable.

Vulnerabilities	
County	- County communication systems not covered or shielded - County facilities, including: Courthouse, Sheriff's Office, Jail, County Annex, County Exhibit Barn, County Maintenance Facility, and Library - County-owned vehicles and equipment not covered or shielded - Roads and highways maintained by the County
Stratford	- City communication systems not covered or shielded - City facilities, including: City Hall, Fire Department, Police Department, 7 recreation venues, and utility infrastructure - City-owned vehicles and equipment not covered or shielded - Roads maintained by the City - Economic impact from businesses damaged in town, no tax revenue
SISD	- Stratford ISD (3) campuses, athletic facilities, bus barn, and school buses – damage to roofs, buildings, HVAC, windows, and school buses - Lost educational time from school closures, accidents, and staff or student injuries
Texhoma	- City communication systems not covered or shielded - City Hall and utility infrastructure - City-owned vehicles and equipment not covered or shielded - Roads maintained by the City - Economic impact from businesses damaged in town, no tax revenue
TISD	- Texhoma ISD (1) campus, bus barn, and school buses – damage to roofs, buildings, HVAC, windows, and school buses - Lost educational time from school closures, accidents, and staff or student injuries

Probability of Future Events

Historical patterns are assumed to be a dominant factor in determining future hail events. Based upon the historical instances of hail events which have occurred in the area during the last 12 years, the MAT estimates the probability of a hail event somewhere in the County in any given year to be 292%, meaning that on average the County will see 2.9 hail events per year. Due to the rural nature of the planning area, changes in population patterns, land use, and development will not affect the impacts of this hazard.

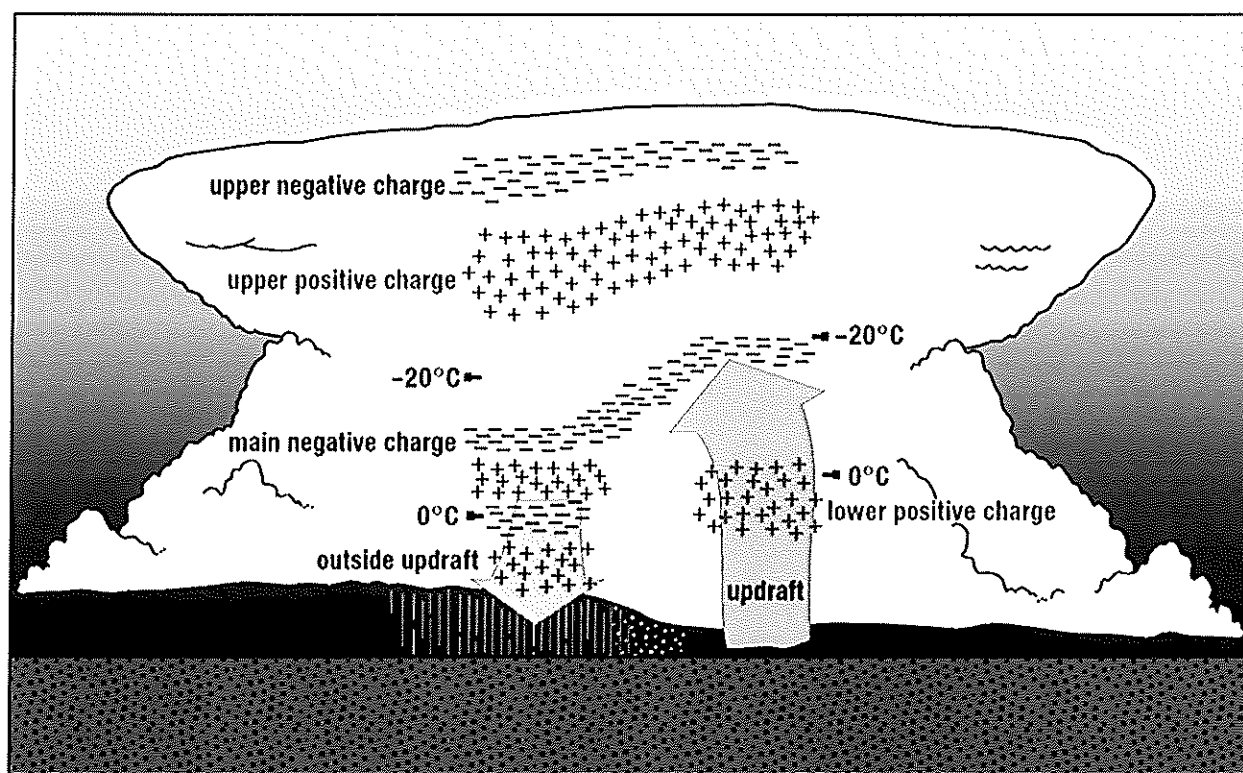
Years in the Record Span (2012-2024)	# of Hail Events that Occurred	Computation	Future Probability of a Hail Event
12 Years	35 Events	$(35/12) \times 100$	292% each year

Lightning

Description

Lightning is a giant spark of electricity in the atmosphere between clouds, the air, or the ground. In the early stages of development, air acts as an insulator between the positive and negative charges in the cloud and between the cloud and the ground. When the opposite charges build up enough, this insulating capacity of the air breaks down, and there is a rapid discharge of electricity that we know as lightning. The flash of lightning temporarily equalizes the charged regions in the atmosphere until the opposite charges build up again.

Lightning can occur between opposite charges within the thunderstorm cloud (intra-cloud lightning) or between opposite charges in the cloud and on the ground (cloud-to-ground lightning). Tall objects, such as trees and buildings, are commonly struck by lightning, but lightning can strike the ground in a field even if the tree line is close by. It all depends on where the charges accumulate. Dry lightning occurs when the thunderstorm associated with the strike produces little or no precipitation at the surface. In dry atmospheres, the precipitation produced by the thunderstorm evaporates before it can reach the ground. Because there is very little measurable rainfall, fires started by lightning are not subsequently put out by the precipitation, allowing the fire to spread. A conceptual model (below) shows the electrical charge distribution inside deep convection (thunderstorms) developed by the National Severe Storms Laboratory and university scientists. In the main updraft, (in and above the red arrow), there are four main charge regions. In the convective region but outside the updraft (in and above the blue arrow), there are more than four charge regions. These different charge regions cause lightning to occur.²¹

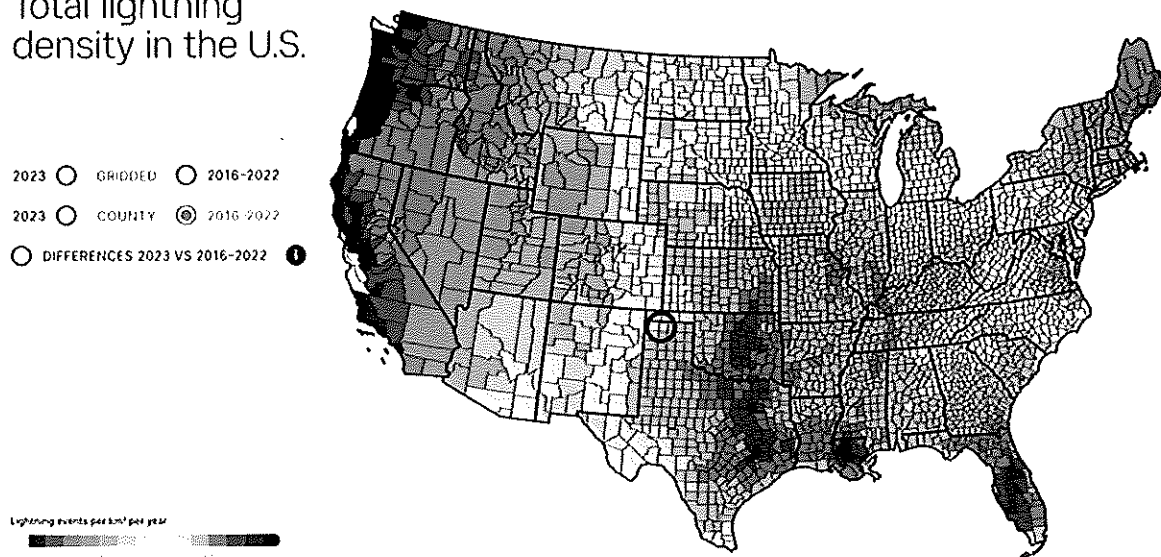


²¹ <https://www.nssl.noaa.gov/education/svrwx101/lightning/>

Location

The entire planning area can expect to experience 24-32 lightning events per year based on data from 2016-2022 available through the Vaisala Lightning Network. The map below can be found in the Vaisala 2023 Annual Lightning Report.

Total lightning density in the U.S.



<https://www.vaisala.com/en/digital-and-data-services/lightning-digital>

Climate Change

Predictions about the effects of climate change on lightning, including event frequency and spatial distribution, are limited and uncertain. Research suggests that climate change is expected to result in conditions that increase the potential for severe thunderstorms in the U.S., broadly. Lightning is a byproduct of severe thunderstorms, so an increased potential of those storms developing could transfer to an increased potential for lightning. Overall, the impact of climate change on lightning at the local level is not yet well-understood.²²

Extent and Previous Occurrences

As demonstrated in the Location section above, Sherman County receives 24-32 lightning events each year. Each strike of lightning is about 300 million volts and 30,000 amps²³, and it can heat up the air it passes through to 50,000 degrees Fahrenheit.²⁴ Lightning strikes can ignite wildfires, damage water and wastewater utility infrastructure, and disable electronic equipment. The City of Stratford has seen failures in their power grid and their warning siren due to lightning strikes. In the Wildfire section further in this document, lightning is the cause of many of the wildfires.

Impact

The impact of lightning on critical services and buildings can vary greatly depending on where the lightning strike hits. If a building takes a direct hit, all electronic equipment plugged in at the time of the strike can be damaged. A direct strike on a water utility can severely impact the ability of the system to provide water and wastewater service to the community.

²² <https://yaleclimateconnections.org/2021/07/climate-change-and-tornadoes-any-connection/>

²³ <https://www.weather.gov/safety/lightning-power>

²⁴ <https://www.weather.gov/safety/lightning-science>

Vulnerabilities	
County	• Loss of electricity and power surges for critical facilities, including: Courthouse, Sheriff's Office, Jail, County Annex, County Exhibit Barn, County Maintenance Facility, and Library • County radio towers and communication systems, including the potential disruption of 911 Emergency Communication systems • People and animals that are not sheltered during a lightning event
Stratford	• Power surges and loss of electricity for critical facilities, including: City Hall, Fire Department, Police Department, 7 recreation venues, and traffic lights • Direct strike on utility infrastructure, causing a malfunction or work stoppage • City radio towers and communication systems • People and animals that are not sheltered during a lightning event • Economic impact from businesses damaged in town, no tax revenue
SISD	• Power surges and loss of electricity for Stratford ISD (3) campuses, damage to electrical equipment and computer systems • Lost educational time from school closures, accidents, and staff or student injuries
Texhoma	• Power surges and loss of electricity for City Hall • Direct strike on utility infrastructure, causing a malfunction or work stoppage • City siren systems • People and animals that are not sheltered during a lightning event • Economic impact from businesses damaged in town, no tax revenue
TISD	• Power surges and loss of electricity for the Texhoma ISD (1) campus, damage to electrical equipment and computer systems • Lost educational time from school closures, accidents, and staff or student injuries

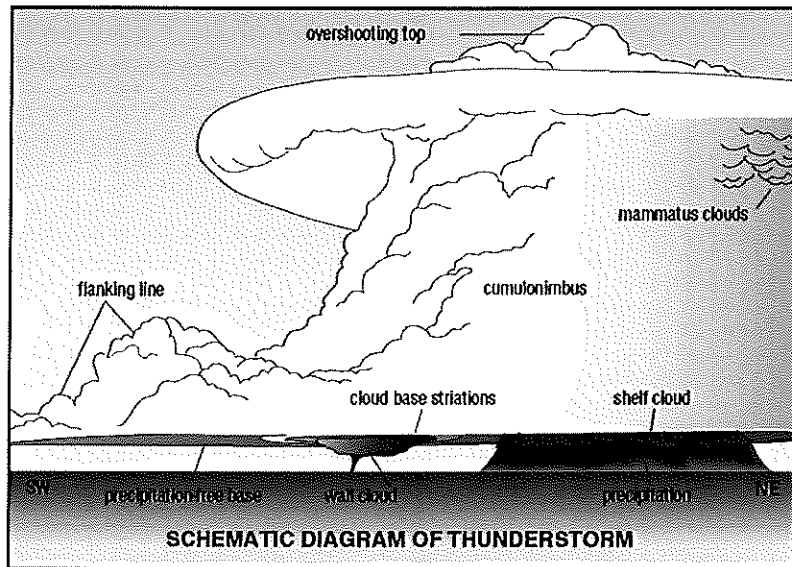
Probability of Future Events

There is a 100% probability of future lightning events within the planning area. Sherman County, along with the rest of the Texas Panhandle is vulnerable to thunderstorms and the cloud-to-ground lightning strikes associated with them. Due to the rural nature of the planning area, changes in population patterns, land use, and development will not affect the impacts of this hazard.

Tornado

Description

A tornado is a narrow, violently rotating column of air that extends from a severe thunderstorm to the ground. Because wind is invisible, it is hard to see a tornado unless it forms a condensation funnel made up of water droplets, dust, and debris. The most destructive tornadoes occur from supercells, which are rotating storms with a well-defined radar circulation called a mesocyclone. To the right is a diagram of a classic discrete, supercell thunderstorm structure.²⁵



<https://www.nssl.noaa.gov/education/svrwx101/tornadoes/>

To determine the strength of a tornado, experts examine the damage it caused. The Enhanced Fujita Scale or EF Scale is used to assign a tornado a “rating” based on estimated wind speeds and related damage. When tornado-related damage is surveyed, it is compared to a list of Damage Indicators and Degrees of Damage which help estimate better the range of wind speeds the tornado likely produced. From that, a rating (from EF-0 to EF-5) is assigned. The EF Scale was revised from the original Fujita to reflect better examinations of tornado damage surveys so as to align wind speeds more closely with associated storm damage.²⁶

EF Rating	Wind Speeds	Expected Damage ²⁷
EF-0	65-85 mph	Minor damage: shingles blown off or parts of a roof peeled off, damage to gutters/siding, branches broken off trees, shallow rooted trees toppled.
EF-1	86-110 mph	Moderate damage: more significant roof damage, windows broken, exterior doors damaged or lost, mobile homes overturned or badly damaged.
EF-2	111-135 mph	Considerable damage: roofs torn off well-constructed homes, homes shifted off their foundation, mobile homes completely destroyed, large trees snapped or uprooted, cars can be tossed.
EF-3	136-165 mph	Severe damage: entire stories of well-constructed homes destroyed, significant damage done to large buildings, homes with weak foundations can be blown away, trees begin to lose their bark.
	166-200 mph	Extreme damage: well-constructed homes are leveled, cars are thrown significant distances, top story exterior walls of masonry buildings would likely collapse.
EF-5	> 200 mph	Incredible damage: well-constructed homes are swept away, steel-reinforced concrete structures are critically damaged, high-rise buildings sustain severe structural damage, trees are usually completely debarked, stripped of branches and snapped.

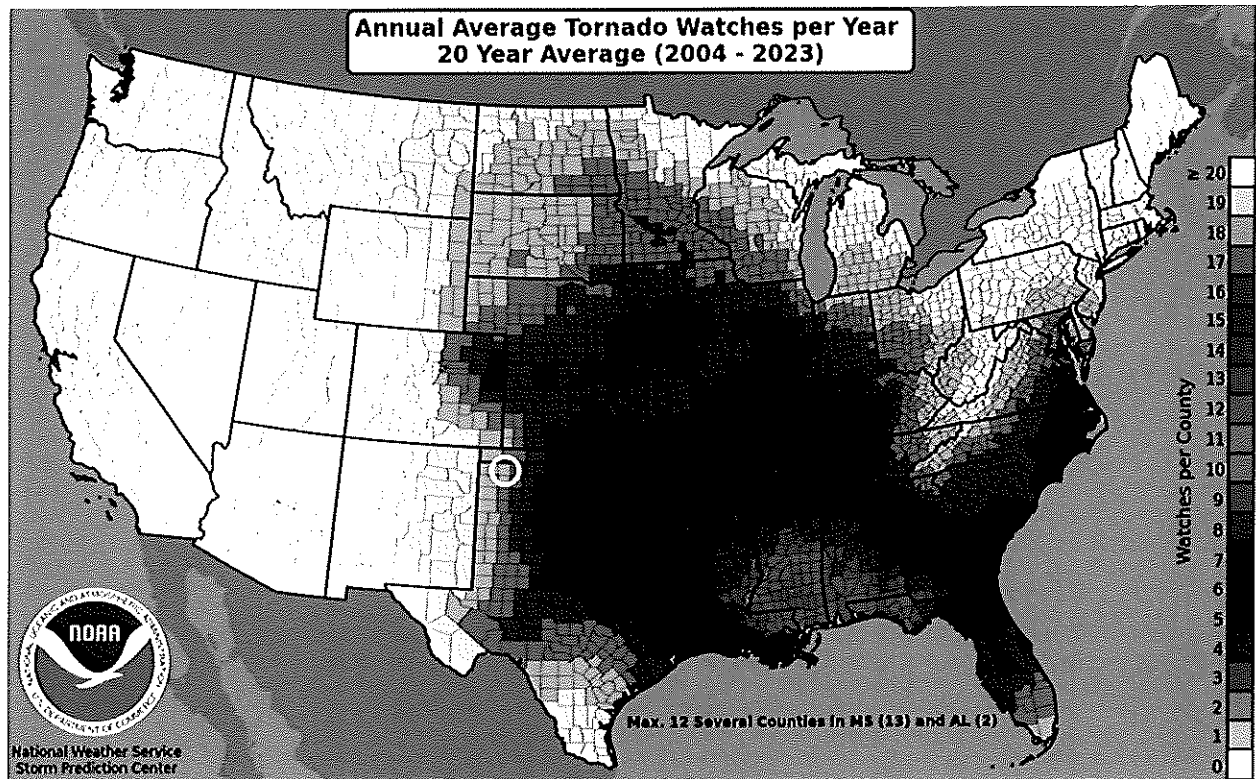
²⁵ <https://www.nssl.noaa.gov/education/svrwx101/tornadoes/>

²⁶ <https://www.weather.gov/oun/efscale>

²⁷ https://www.weather.gov/hun/efscale_explanation

Location

The entire planning area can expect to experience the threat of a tornado each year. Tornado watches are issued by the NOAA Storm Prediction Center when conditions are favorable for the development of tornadoes in and close to the watch area. Sherman County is under 2 tornado watches per year on average, meaning conditions are favorable 2 days each year on average. In recent history, Sherman County has only seen fairly weak tornadoes that measure as an EF-0 on the scale. However, the County can experience up to an EF-5 tornado if the conditions are right.



<https://www.spc.noaa.gov/wcm/>

On average, Sherman County only sees a tornado form once every year or two. To the right is a photo of a tornado that formed south of Stratford during the evening hours of July 16, 2014. This was 1 of 2 tornadoes that formed that day. In total, this tornado was rated an EF-0, as it mostly stayed over open pasture land. An outbuilding and some power lines were damaged along US 287.



<https://www.weather.gov/ama/july16storms>

Climate Change

Predictions about the effects of climate change on tornadoes, including event frequency, spatial distribution, and intensity (e.g., magnitude) are limited and uncertain. Research suggests that climate change is expected to result in conditions that increase the potential for severe thunderstorms in the U.S., broadly. Tornadoes form from severe thunderstorms, so an increased potential of those storms developing could transfer to an increased potential for tornadoes. Some research suggests that days with tornado outbreaks are becoming more frequent, while days with just a few tornadoes are becoming less frequent. Additionally, there have been studies done that show “tornado alley” shifting eastward. Overall, because of the relatively short records (only back to 1950), the impact of climate change on tornadoes at the local level is not yet well-understood.²⁸

Extent and Previous Occurrences²⁹

Tornadoes can strike anywhere in the county at any time, day or night. Generally, tornadoes impact the area during the afternoon and evening hours, but events during the morning and nighttime hours cannot be ruled out. Tornadoes are rated using the EF-scale described previously. This scale relies on estimated wind speeds and damage to provide an accurate rating of the tornado. Because of the rural nature of the County, most tornadoes occur over open land with few structures in their paths, which makes assigning a rating to them harder. Tornadoes are products of severe thunderstorms which typically have rain, lightning, high winds, and hail as well. These other hazards combined with a tornado can make the situation much more dangerous.

Location	Date	Magnitude	Deaths/ Injuries	Damage	Narrative
Texhoma	8/14/2013	EF 0	0	\$0	A weak tornado was observed 14 miles east of Stratford near TX 15. The tornado remained over open country for 3 minutes and resulted in no damage.
Stratford	7/16/2014	EF 0	0	\$0	A trained storm spotter captured a brief tornado on video near Stratford. The storm continued to move south and produced a second tornado that damaged an outbuilding and downed powerlines along US 287.
Stratford	7/16/2014	EF 0	0	\$0	
Lautz	3/30/2020	EF 0	0	\$0	Landspout touched down in a field and caused no damage.
Lautz	4/21/2020	Funnel*	0	\$0	Funnel cloud reported by the public, but no tornado.
Lautz	5/30/2021	EF U	0	\$0	The first tornado touched down and remained in an open area, causing no damage. The second tornado was large in size, but did not damage power lines as it crossed TX 15 east of Stratford. Otherwise, the tornado stayed in open grassland.
Lautz	5/30/2021	EF 0	0	\$0	
Lautz	5/28/2023	EF U	0	\$0	Tornado approximately 20 yards wide and 0.89 miles long over open country, no damage reported.
Lautz	7/7/2023	EF U	0	\$0	Tornado approximately 20 yards wide and 0.17 miles long over open country, no damage reported.
TOTAL		8 Events	0	\$0	

*Funnel clouds do not count towards total number of events

²⁸ <https://yaleclimateconnections.org/2021/07/climate-change-and-tornadoes-any-connection/>

²⁹ <https://www.ncdc.noaa.gov/stormevents/>

Impact

Tornadoes can damage and destroy homes and businesses, but more devastating can be the impact to basic services such as law enforcement, fire protection, and emergency medical services. After a tornado hits a population center, there is a great need for these basic services as residents assess injuries and damage. Some other major impacts are: loss of communication systems, loss of power, and loss of infrastructure for utility services.

Vulnerabilities	
County	- County communication systems - County facilities, including: Courthouse, Sheriff's Office, Jail, County Annex, County Exhibit Barn, County Maintenance Facility, and Library - Death and/or injury of county employees at work during the time of the event - County-owned vehicles and equipment, especially emergency response vehicles - Roads and highways maintained by the County
Stratford	- City Communication systems - City facilities, including: City Hall, Police Department, Fire Department, 7 recreation venues, and utility infrastructure - Death and/or injury of city employees at work during the time of the event - City-owned vehicles and equipment, especially emergency response vehicles - Roads maintained by the City - Economic impact from businesses damaged in town, no tax revenue
SISD	- Stratford ISD (3) campuses, athletic facilities, and school buses – damage to roofs, buildings, HVAC, windows, and school buses - Death and/or injury of students and staff at the school at the time of the event - Lost educational time from school closures, accidents, and staff or student injuries
Texhoma	- City communication systems - City facilities, including: City Hall and utility infrastructure - Death and/or injury of city employees at work during the time of the event - City-owned vehicles and equipment - Roads maintained by the City - Economic impact from businesses damaged in town, no tax revenue
TISD	- Texhoma ISD (1) campus and school buses – damage to roofs, buildings, HVAC, windows, and school buses - Death and/or injury of students and staff at the school at the time of the event - Lost educational time from school closures, accidents, and staff or student injuries

Probability of Future Events

Historical patterns are assumed to be a dominant factor in determining future hail events. Based upon the historical instances of tornadic events which have occurred in the area during the last 12 years, the MAT estimates the probability of a tornadic event somewhere in the County in any given year to be 66%. Due to the rural nature of the planning area, changes in population patterns, land use, and development will not affect the impacts of this hazard.

Years in the Record Span (2012-2024)	# of Tornadic Events that Occurred	Computation	Future Probability of a Tornadic Event
12 Years	8 Events	$(8/12) \times 100$	66.67% each year

Wildfire

Description

A wildfire is an unplanned fire that burns in a natural area such as a forest, grassland, or prairie. Wildfires are often caused by human activity or a natural phenomenon such as lightning, and they can happen at any time or anywhere. The risk of a wildfire increases in extremely dry conditions, such as drought, and during high winds. Wildfires can disrupt transportation, communications, power and gas services, and water supply. They also lead to a deterioration of the air quality, and loss of property, crops, resources, animals, and people.

Fire danger is a measure of the relative seriousness of burning conditions and threat of fire. The National Fire Danger Rating System (NFDRS) is applied to reflect the general conditions of either current or future fire situations. Conditions of wildland fuels are observed and used to calculate and predict fire potential. Fire danger ratings are generated from data collected daily at remote automated weather stations located across the state.³⁰ In the NFDRS, fire danger is expressed as different levels:

- Low – Fuels do not ignite easily from small embers, but a more intense heat source, such as lightning, may start fires in duff or dry rotten wood. Fires in open, dry grasslands may burn easily a few hours after a rain, but most wood fires will spread slowly, creeping or smoldering. Control of fires is generally easy.
- Moderate – Fires can start from most accidental causes, but the number of fire starts is usually pretty low. If a fire does start in an open, dry grassland, it will burn and spread quickly on windy days. Most wood fires will spread slowly to moderately. Average fire intensity will be moderate except in heavy concentrations of fuel, which may burn hot. Fires are still not likely to become serious and are often easy to control.
- High – Fires can start easily from most causes and small fuels (such as grasses and needles) will ignite readily. Unattended campfires and brush fires are likely to escape. Fires will spread easily, with some areas of high-intensity burning on slopes or concentrated fuels. Fires can become serious and difficult to control unless they are put out while they are still small.
- Very High – Fires will start easily from most causes. The fires will spread rapidly and have a quick increase in intensity, right after ignition. Small fires can quickly become large fires and exhibit extreme fire intensity, such as long-distance spotting and fire whirls. These fires can be difficult to control and will often become much larger and longer-lasting fires.
- Extreme – Fires of all types start quickly and burn intensely. All fires are potentially serious and can spread very quickly with intense burning. Small fires become big fires much faster than at the “very high” level. Spot fires are probable, with long-distance spotting likely. These fires are very difficult to fight and may become very dangerous and often last for several days.³¹

The Keetch-Byram Drought Index (KBDI) is another index used to determine fire potential. The drought index is based on a daily water balance, where a drought factor is balanced with precipitation and soil moisture (assumed to have a maximum storage capacity of 8 inches) and is expressed in hundredths of an inch of soil moisture depletion. The drought index ranges from 0 to 800, where a drought index of 0 represents no moisture depletion, and an index of 800 represents absolutely dry conditions. Below is a table describing the implications of a wildfire at varying degrees of soil moisture.³²

³⁰ <https://tfsweb.tamu.edu/Content/Landing.aspx?id=19717>

³¹ <https://www.fs.usda.gov/detail/cibola/landmanagement/resourcemanagement/?cid=stelprdb5368839>

³² <https://twc.tamu.edu/kbdi>

Index	Fire Danger	Description
0-200	Low	Soil and fuel moisture are high. Most fuels will not readily ignite or burn. However, with sufficient sunlight and wind, cured grasses and some light surface fuels will burn in spots and patches.
200-400	Moderate	Fires more readily burn and will carry across an area with no “gaps”. Heavier fuels will still not readily ignite and burn. Also, expect smoldering and the resulting smoke to carry into and possibly through the night.
400-600	High	Fire intensity begins to significantly increase. Fires will readily burn in all directions exposing mineral soils in some locations. Larger fuels may burn or smolder for several days creating possible smoke and control problems.
600-800	Extreme	Surface litter and most of the organic layer is consumed. 1000-hour fuels contribute to intensity. Stumps will burn to the end of the roots underground. Any dead snag will ignite. Spotting from snags is a major problem if close to line. Expect dead limbs on trees to ignite from sparks. Expect extreme intensity on all fires which makes control efforts difficult. With winds above 10 miles per hour, spotting is the rule. Expect increased need for resources for fire suppression. The direct initial attack is almost impossible. Only rapid response time to wildfire with complete mop-up and patrol will prevent a major fire situation from developing.

<https://www.dentoncounty.gov/271/Keetch-Byram-Drought-Index>

Location

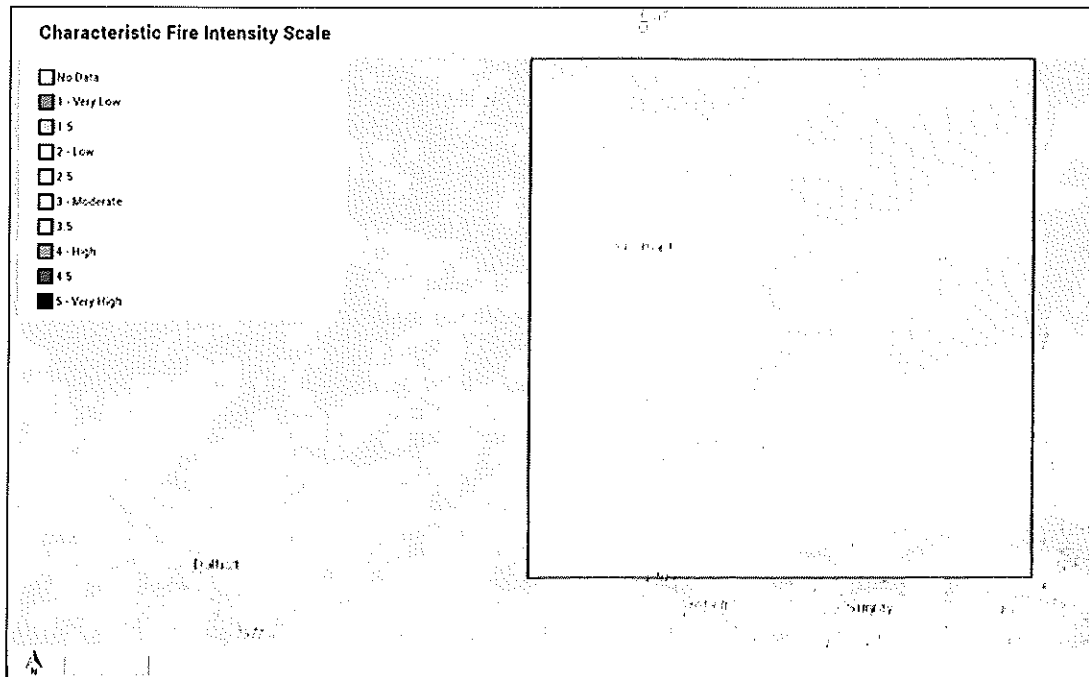
The entire planning area is vulnerable to wildfires. Below are maps depicting the Wildland Urban Interface (WUI) and Characteristic Fire Intensity Scale (CFIS) for each jurisdiction. The WUI is the zone of transition between unoccupied land and human development. It is the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.³³ CFIS specifically identifies areas where significant fuels hazards and associated dangerous fire behavior potential exist based on a weighted average of four percentile weather categories³⁴. It consists of 5 classes where the order of magnitude for each class is ten-fold:

- **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 non-specialized 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. 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 possible. 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. Great potential for harm or damage to life and property.

³³ <https://www.usfa.fema.gov/wui/what-is-the-wui.html>

³⁴ <https://wrap.texaswildfirerisk.com/map>

Sherman Co. Characteristic Fire Intensity



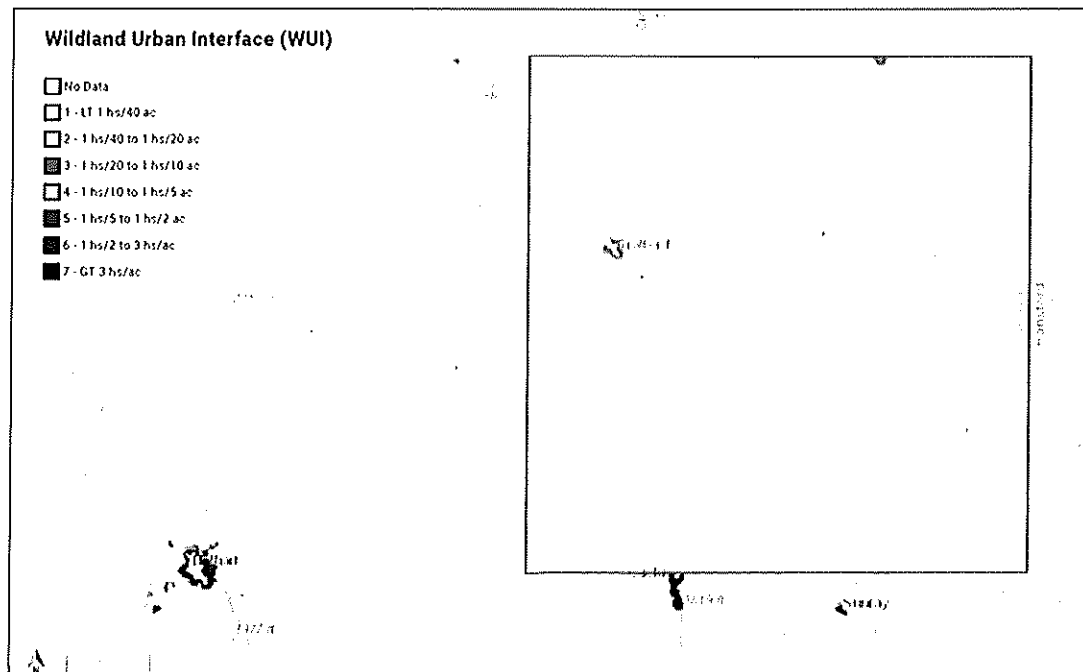
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Texas Wildfire Risk Explorer
<https://wrap.texaswildfirerisk.com>



The user assumes the entire risk related to their use of the Texas Wildfire Risk Explorer and either the published or derived products from these data, is providing these data "as is" and disclaims any and all warranties, whether expressed or implied, including (without limitation) any implied warranties of merchantability or fitness for a particular purpose. In no event will be liable to you or to any third party for any direct, indirect, incidental, consequential, special or exemplary damages or lost profit resulting from any use or misuse of these data.

Sherman Co. Wildland Urban Interface



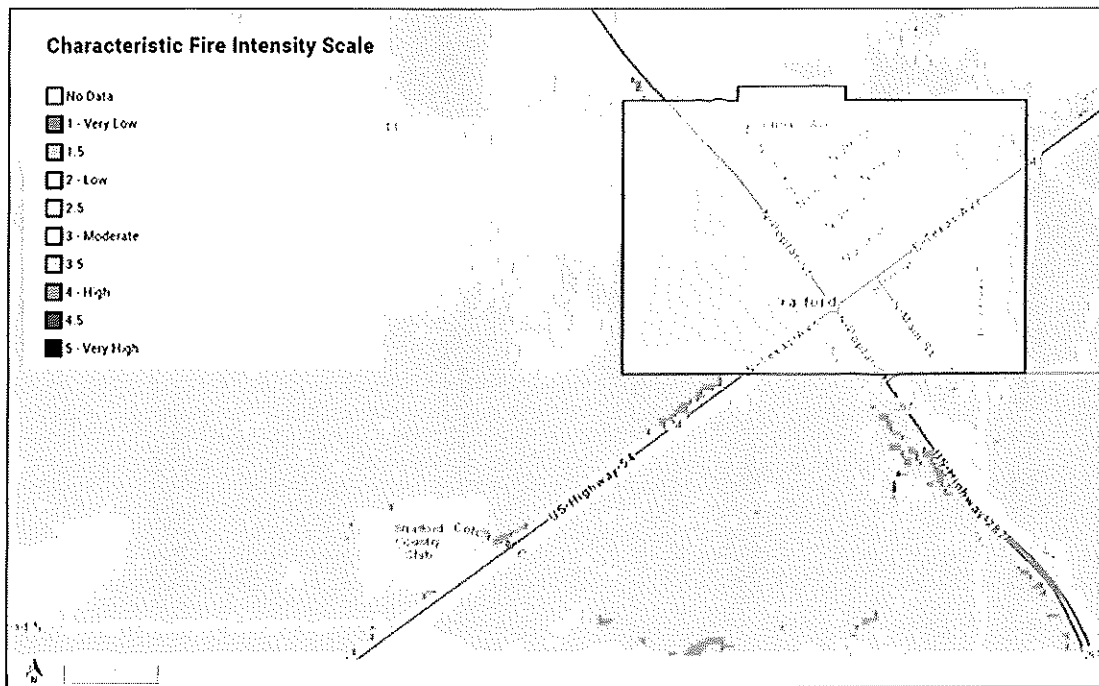
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Texas Wildfire Risk Explorer
<https://wrap.texaswildfirerisk.com>

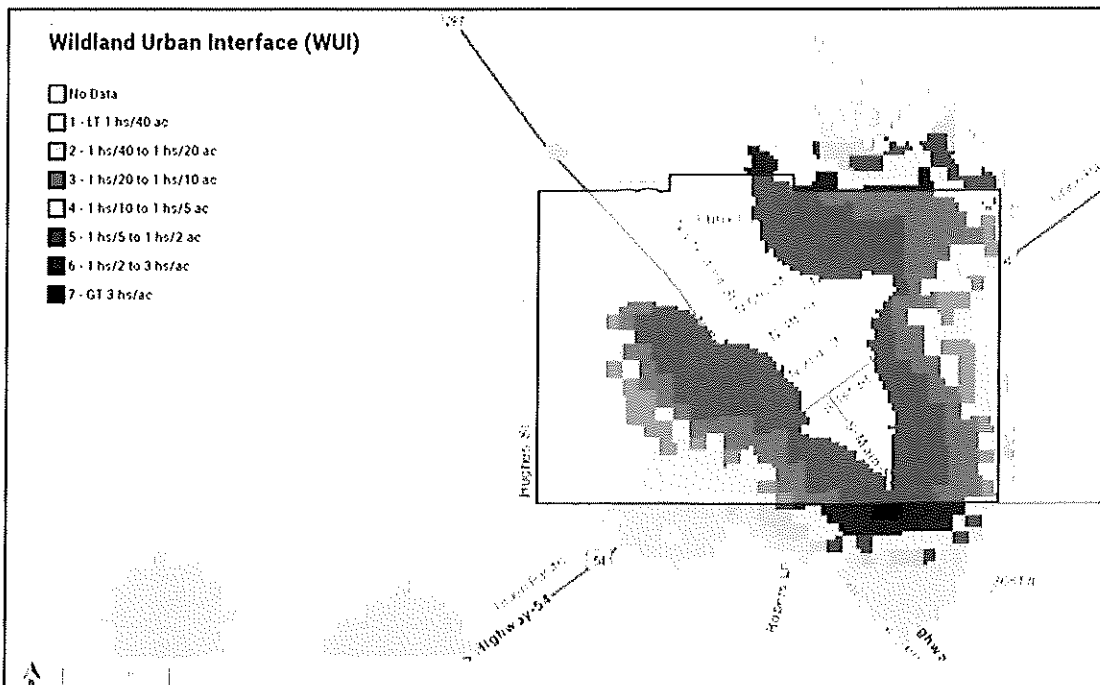


The user assumes the entire risk related to their use of the Texas Wildfire Risk Explorer and either the published or derived products from these data, is providing these data "as is" and disclaims any and all warranties, whether expressed or implied, including (without limitation) any implied warranties of merchantability or fitness for a particular purpose. In no event will be liable to you or to any third party for any direct, indirect, incidental, consequential, special or exemplary damages or lost profit resulting from any use or misuse of these data.

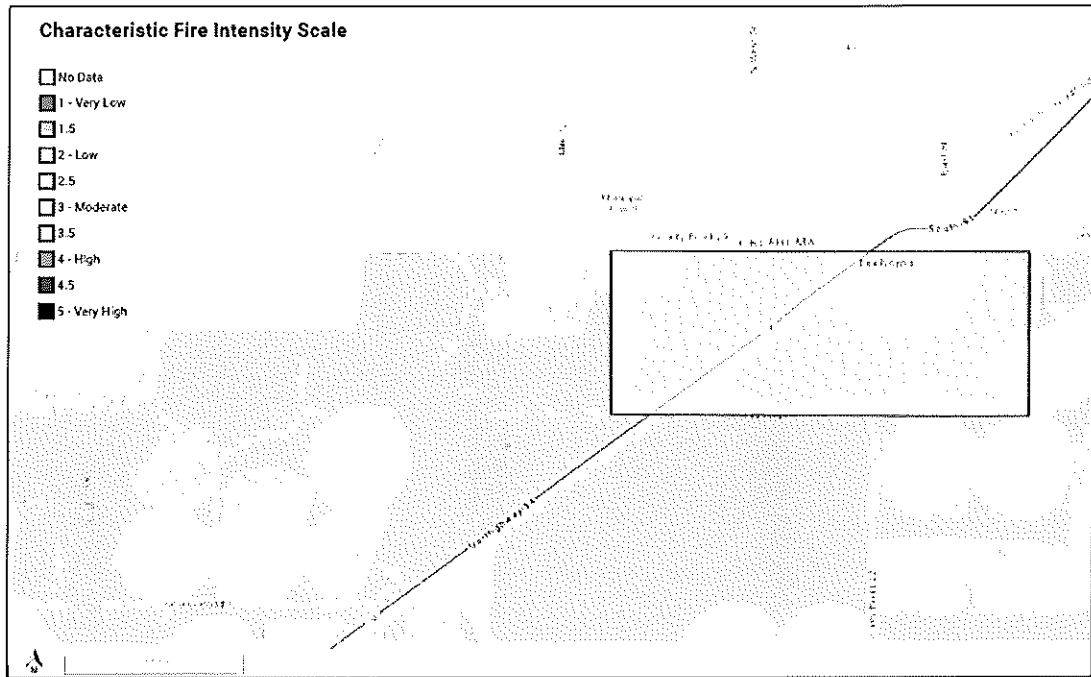
Stratford Characteristic Fire Intensity Scale



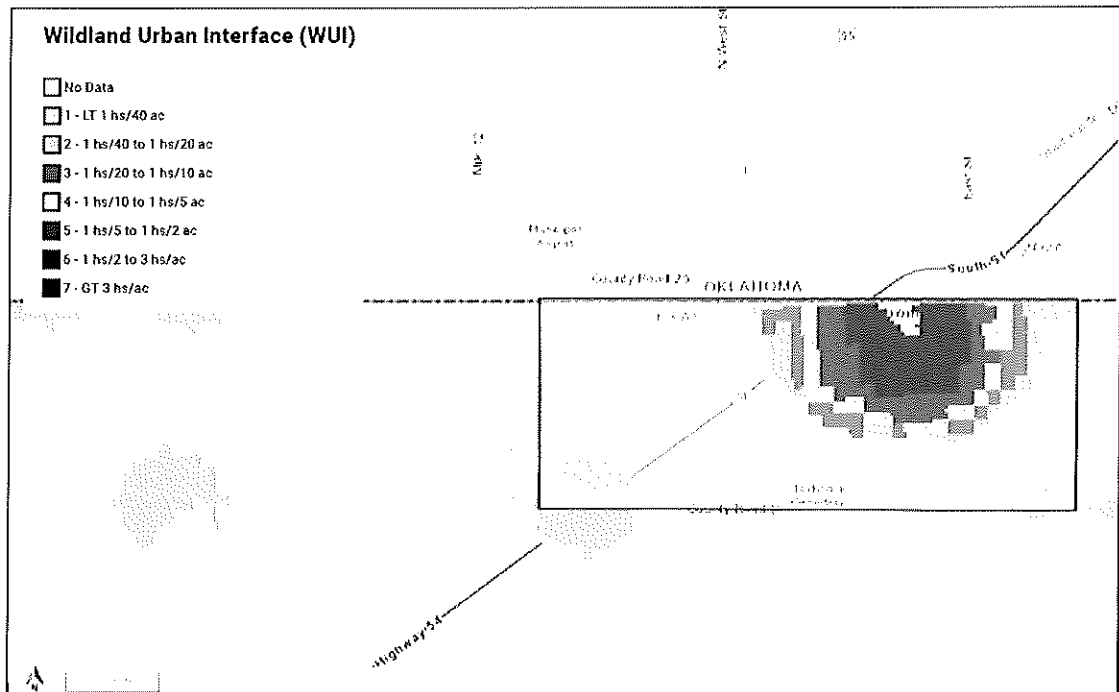
Stratford Wildland Urban Interface



Texhoma Characteristic Fire Intensity Scale



Texhoma Wildland Urban Interface



Climate Change³⁵

Climate change, including increased heat, extended drought, and a thirsty atmosphere, has been a key driver in increasing the risk and extent of wildfires in the western United States during the last two decades. Wildfires require the alignment of a number of factors, including temperature, humidity, and the lack of moisture in fuels, such as trees, shrubs, grasses, and forest debris. All these factors have strong direct or indirect ties to climate variability and climate change. A 2016 study found enhanced the drying of organic matter and doubled the number of large fires between 1984 and 2015 in the western United States. A 2021 study supported by NOAA concluded that climate change has been the main driver of the increase in fire weather in the western United States.

Extent and Previous Occurrences³⁶

Wildfires in the county have ranged from under an acre to over 1,200 acres, with a total of 13,750 acres burned since 2006. Due to the high winds and low vegetation, these fires can swiftly grow to sizes that make them very difficult to contain, even with state resources and air support. Documented response costs since 2006 total only \$8,066. One person has been injured and there have been fifteen near misses in Sherman County due to wildfires since 2006. Most of the data used to calculate these totals comes from 2006-2009. The true cost of response, injuries, and damage caused by wildfires is likely much higher than these reported totals.

Impact

The impact of a wildfire is typically directly related to the weather conditions. If wind speeds are lower and the relative humidity is higher, firefighters are more easily able to contain the wildfire. High wind speeds and low relative humidity make wildfires very difficult to control. They can become quick-moving, and even with trained firefighters and mutual aid, these fires can consume open rangeland, cattle, fencing, rural homesteads, and even entire communities. Due to similar characteristics of each participating jurisdiction, the entire county can be impacted in the following ways:

- Loss of power and communication lines
- Severe water and pressure loss due to high use of water resources
- Loss of cattle, other livestock, and fencing
- Highway dangers due to blowing smoke and fire along the shoulders
- Death and injuries of first responders and residents trying to protect their property, due to changing winds or a fast-moving fire

³⁵ <https://www.noaa.gov/noaa-wildfire/wildfire-climate-connection>

³⁶ <https://www.ncdc.noaa.gov/stormevents/4> and <https://fireconnect.tfs.tamu.edu/FireDepartments/1267>

Vulnerabilities	
County	- County communication systems - County facilities, including: Courthouse, Sheriff's Office, Jail, County Annex, County Exhibit Barn, County Maintenance Facility, and Library - County-owned vehicles and equipment, specifically damage to emergency response vehicles and public works vehicles working to contain the fire - Death and/or injury of county employees at work to contain the fire
Stratford	- City communication systems - City facilities, including: City Hall, Fire Department, Police Department, 7 recreation venues, and utility infrastructure - City-owned vehicles and equipment, specifically damage to emergency response vehicles and public works vehicles working to contain the fire - Death and/or injury of city employees at work to contain the fire
SISD	- Stratford ISD (3) campuses, athletic facilities, and school buses – damage to roofs, buildings, HVAC windows, and school buses - Lost educational time from school closures, accidents, and staff or student injuries
Texhoma	- City communication systems - City Hall and utility infrastructure - City-owned vehicles and equipment - Death and/or injury of city employees at work to contain the fire
TISD	- Texhoma ISD (1) campus and school buses – damage to roofs, buildings, HVAC windows, and school buses - Lost educational time from school closures, accidents, and staff or student injuries

Probability of Future Events

Historical patterns are assumed to be a dominant factor in determining future wildfire events. Based upon the historical instances of these events which have occurred in the area during the last 19 years, the MAT estimates the probability of a wildfire event somewhere in the County in any given year to be 358%. Due to the rural nature of the planning area, changes in population patterns, land use, and development will not affect the impacts of this hazard.

Years in the Record Span (2006-2024)	# of Wildfire Events that Occurred ³⁷	Computation	Future Probability of a Wildfire Event
19 years	68	$(68/19)*100$	358%

³⁷ <https://www.ncdc.noaa.gov/stormevents/>

Windstorm

Description

Wind is simply air in motion moving from an area of higher atmospheric pressure to an area of lower atmospheric pressure. Although we cannot actually see air moving, we can measure its motion by the force that it applies on objects. Wind vanes indicate the wind's direction and anemometers measure the wind's speed.³⁸

Damaging winds are often called "straight-line" winds to differentiate the damage they cause from tornado damage. Strong thunderstorm winds can come from a number of different processes. Most thunderstorm winds that cause damage at the ground are a result of outflow generated by a thunderstorm downdraft. Damaging winds are classified as those exceeding 50-60 mph, although damage can occur with wind speeds in the 40-mph range.³⁹

Types of Damaging Winds

- Straight-Line Wind – any thunderstorm wind that is not associated with rotation and is mainly used to differentiate from tornadic winds
- Downdraft – small-scale column of air that rapidly sinks toward the ground
- Macroburst – an outward burst of strong winds at or near the surface with horizontal dimensions larger than 2.5 miles and occurs when a strong downdraft reaches the surface, damage from a microburst can look similar to tornado damage
- Microburst – a small concentrated downburst that produces an outward burst of strong winds at or near the surface, lasting 5-10 minutes with maximum wind speeds near 100 mph
- Downburst – a general term for all localized strong wind events that are caused by a strong downdraft within a thunderstorm
- Gust Front – the leading edge of rain-cooled air that clashes with warmer thunderstorm inflow, characterized by a wind shift, temperature drop, and gusty winds out ahead of a thunderstorm
- Derecho – a widespread, long-lived wind storm that is associated with a band of rapidly moving showers or thunderstorms; by definition, if the wind damage swath extends more than 240 miles and includes wind gusts of at least 58 mph, then the event may be classified as a derecho
- Haboob – a wall of dust that is pushed out along the ground from a thunderstorm downdraft⁴⁰

High winds are often associated with other hazards, such as hail and lightning with thunderstorms. High winds combined with dry air and low humidity make wildfire ignitions a serious hazard. Once a wildfire has ignited, the high winds create volatile fire behavior that can be difficult to extinguish.

The Beaufort Wind Scale was developed in the early 1800s to help sailors estimate the winds via visual observations. Even though we now have modern methods to measure the wind speed and direction, this scale continues to be used to describe the impacts of winds at various speeds. This scale can also be used in reverse to estimate the strength of the wind based on the effects it has on the physical environment.⁴¹

³⁸ <https://www.weather.gov/jetstream/wind>

³⁹ <https://www.nssl.noaa.gov/education/svrwx101/wind/>

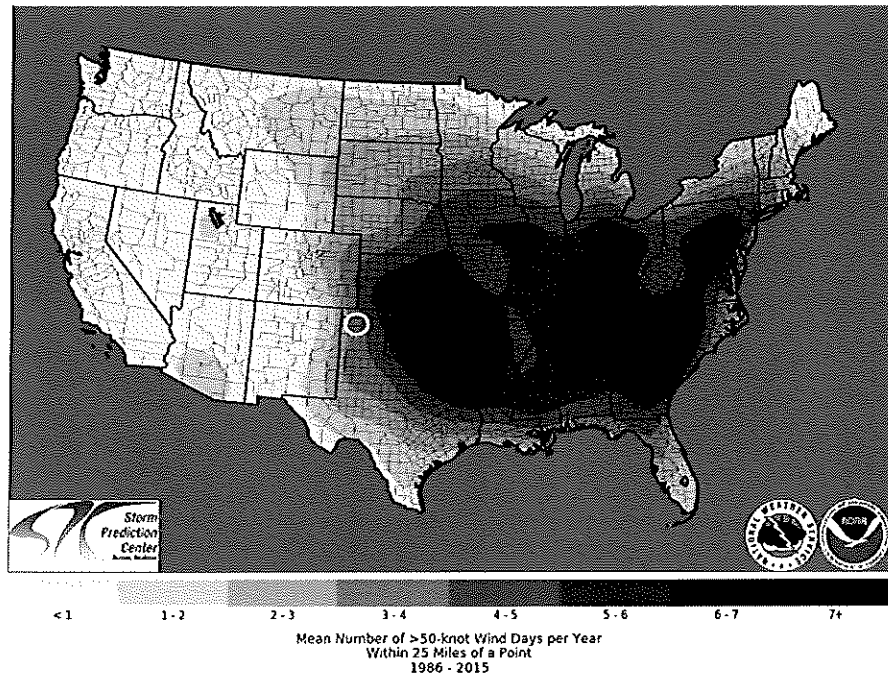
⁴⁰ <https://www.nssl.noaa.gov/education/svrwx101/wind/types/>

⁴¹ https://www.weather.gov/media/iwx/webpages/skywarn/Beaufort_Wind_Chart.pdf

Beaufort Number	MPH		Terminology	Description
	Range	Avg.		
0	0	0	Calm	Calm. Smoke rises vertically.
1	1-3	2	Light air	Wind motion visible in smoke.
2	4-7	6	Light breeze	Wind felt on exposed skin. Leaves rustle.
3	8-12	11	Gentle breeze	Leaves and smaller twigs in constant motion.
4	13-18	15	Moderate breeze	Dust and loose paper are raised. Small branches begin to move.
5	19-24	22	Fresh breeze	Smaller trees sway.
6	25-31	27	Strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult.
7	32-38	35	Near gale	Whole trees in motion. Some difficulty when walking into the wind.
8	39-46	42	Gale	Twigs broken from trees. Cars veer on road.
9	47-54	50	Severe gale	Light structure damage.
10	55-63	60	Storm	Trees uprooted. Considerable structural damage.
11	64-73	70	Violent storm	Widespread structural damage.
12	74-95	90	Hurricane	Considerable and widespread damage to structures.

Location

Sherman County is located in the northern Texas Panhandle. In general, the Panhandle sees high wind events, from both severe thunderstorms and frontal systems. Based on data from previous years, these events can happen any time of year. The map below shows the average number of days per year where the wind speed exceeds 50 knots (58 mph). Sherman County can expect at least 3-4 high wind days per year.



Climate Change

There are two main types of windstorms that impact the planning area: high winds associated with severe thunderstorms and high winds associated with dry, sunny conditions. As discussed in earlier sections, climate change can cause an increased intensity of severe thunderstorms and exacerbate drought conditions, which both lead to more severe windstorms. The impacts of climate change on local windstorm conditions is not yet thoroughly studied.

Extent and Previous Occurrences⁴²

All participating jurisdictions in the planning area can anticipate winds in excess of 40 mph several times during the year, which is an 8 or higher on the Beaufort Scale.

Location	Date	Type	Magnitude	Deaths/ Injuries	Damage	Description
County	1/22/2012	High Wind	44 mph	0	\$0	
County	2/28/2012	High Wind	48 mph	0	\$0	
Lautz	9/6/2012	Tstorm Wind	81 mph	0	\$40K	Significant damage to a center pivot system on TX 15 east of Stratford
Lautz	6/18/2013	Tstorm Wind	60 mph	0	\$0	
Lautz	8/14/2013	Tstorm Wind	60 mph	0	\$1K	Horse trailers were blown over
County	11/16/2013	High Wind	40 mph	0	\$0	High winds caused low visibility on US 287, causing a 7-vehicle pile-up S of Stratford, 7 of the 14 people involved were injured
County	11/16/2013	Dust Storm	—	7	\$0	
County	3/11/2014	High Wind	44 mph	0	\$0	
County	3/15/2014	High Wind	43 mph	0	\$0	
County	3/18/2014	Dust Storm	—	0	\$0	Less than ¼ visibility in Stratford
County	4/26/2014	High Wind	43 mph	0	\$0	
County	4/29/2014	High Wind	41 mph	0	\$0	
County	4/29/2014	Dust Storm	—	0	\$0	Less than ¼ visibility in Stratford
Lautz	7/16/2014	Tstorm Wind	70 mph	0	\$0	Down power lines on US 287, 20 ft tree and fences down in Stratford
Mallett	7/16/2014	Tstorm Wind	70 mph	0	\$0	
Lautz	8/3/2015	Tstorm Wind	60 mph	0	\$0	
County	3/23/2016	High Wind	40 mph	0	\$0	
County	12/16/2016	High Wind	41 mph	0	\$0	
County	12/25/2016	High Wind	46 mph	0	\$0	
County	2/23/2017	High Wind	40 mph	0	\$0	
County	2/28/2017	High Wind	41 mph	0	\$0	
County	3/6/2017	High Wind	43 mph	0	\$0	
County	3/24/2017	High Wind	40 mph	0	\$0	
Lautz	6/20/2017	Tstorm Wind	119 mph	0	\$0	Microburst associated with a severe tstorm caused damage to a well-built structure, downed 13 power poles, and bent a radio tower 90 degrees, along with some irrigation and farm equipment. Patio roof was blown off and also ripped the metal roof off part of the house. 5-6 power poles blown over onto FM 1573.
Lautz	6/21/2017	Tstorm Wind	70 mph	0	\$0	
Texhoma	6/21/2017	Tstorm Wind	70 mph	0	\$0	
Stratford	5/30/2018	Tstorm Wind	60 mph	0	\$0	2 semis blown over due to winds
Texhoma	6/22/2018	Tstorm Wind	60 mph	0	\$0	
County	12/13/2018	High Wind	46 mph	0	\$0	
County	2/23/2019	High Wind	43 mph	0	\$0	
County	3/13/2019	High Wind	64 mph	0	\$0	Semi overturned on US 287
Lautz	7/5/2019	Tstorm Wind	64 mph	0	\$0	Semi overturned on US 287
County	11/26/2019	High Wind	44 mph	0	\$0	
County	2/25/2020	High Wind	62 mph	0	\$0	
County	3/19/2020	High Wind	58 mph	0	\$0	
County	6/9/2020	High Wind	63 mph	0	\$0	High winds caused blowing dust, which reduced visibility to near zero. There was a 3-car accident on US 54 NE of Stratford.

⁴² <https://www.ncdc.noaa.gov/stormevents/>

County	6/9/2020	Dust Storm	—	2	\$0	Three semis collided with each other, killing the drivers of 2 of the semis. The third semi's occupants were able to escape before the vehicle was engulfed in flames.
Mallett	7/16/2020	Tstorm Wind	58 mph	0	\$0	
County	1/30/221	High Wind	55 mph	0	\$0	
County	3/17/2021	High Wind	44 mph	0	\$0	
County	4/9/2021	High Wind	45 mph	0	\$0	
Mallett	6/12/2021	Tstorm Wind	67 mph	0	\$0	
County	10/27/2021	High Wind	60 mph	0	\$0	Isolated power outages
County	12/5/2021	High Wind	58 mph	0	\$0	
County	12/10/2021	High Wind	64 mph	0	\$0	
County	12/15/2021	High Wind	90 mph	0	\$0	
County	12/24/2021	High Wind	61 mph	0	\$0	
County	12/26/2021	High Wind	60 mph	0	\$0	
County	1/14/2022	High Wind	58 mph	0	\$0	
County	3/22/2022	High Wind	58 mph	0	\$0	
County	3/29/2022	High Wind	61 mph	0	\$0	
County	4/12/2022	High Wind	61 mph	0	\$0	
Lautz	4/22/2022	Tstorm Wind	76 mph	0	\$0	
Mallett	6/3/2022	Tstorm Wind	59 mph	0	\$0	
Lautz	6/12/2022	Tstorm Wind	68 mph	0	\$0	
County	10/23/2022	High Wind	61 mph	0	\$0	
County	12/2/2022	High Wind	45 mph	0	\$0	
County	1/11/2023	High Wind	61 mph	0	\$0	
County	2/14/2023	High Wind	77 mph	0	\$0	
County	2/21/2023	High Wind	60 mph	0	\$0	
County	2/26/2023	High Wind	87 mph	0	\$0	
County	2/26/2023	Tstorm Wind	64 mph	0	\$0	
County	2/26/2023	Dust Storm	-	0	\$0	
County	4/4/2023	High Wind	67 mph	0	\$0	
Mallett	4/13/2023	Tstorm Wind	59 mph	0	\$0	
Lautz	5/28/2023	Tstorm Wind	70 mph	0	\$0	
Lautz	5/31/2023	Tstorm Wind	59 mph	0	\$0	
Mallett	6/11/2023	Tstorm Wind	60 mph	0	\$0	
Mallett	6/27/2023	Tstorm Wind	63 mph	0	\$0	
Lautz	7/7/2023	Tstorm Wind	61 mph	0	\$0	
Lautz	7/8/2023	Tstorm Wind	58 mph	0	\$0	
Mallett	8/5/2023	Tstorm Wind	78 mph	0	\$0	
Lautz	8/13/2023	Tstorm Wind	64 mph	0	\$0	
County	1/8/2024	High Wind	72 mph	0	\$0	
County	2/27/2024	High Wind	63 mph	0	\$0	
County	4/6/2024	High Wind	64 mph	0	\$0	
Lautz	5/15/2024	Tstorm Wind	79 mph	0	\$0	
Lautz	5/30/2024	Tstorm Wind	74 mph	0	\$0	
Lautz	5/31/2024	Tstorm Wind	62 mph	0	\$0	
Mallett	6/8/2024	Tstorm Wind	64 mph	0	\$0	
Lautz	6/13/2024	Tstorm Wind	58 mph	0	\$0	
Lautz	6/26/2024	Tstorm Wind	58 mph	0	\$0	
Lautz	7/16/2024	Tstorm Wind	59 mph	0	\$0	
Lautz	7/19/2024	Tstorm Wind	63 mph	0	\$0	
Mallett	9/17/2024	Tstorm Wind	68 mph	0	\$0	
TOTAL	85 Events	Average: 60.99 mph		2 deaths 7 inj.	\$41K	

Impact

High winds can cause considerable damage to people and property. Flying debris can cause injuries and deaths to both people and animals. High winds can damage homes, uproot trees, and more.

Vulnerabilities	
County	• County communication systems • County facilities, including: Courthouse, Sheriff's Office, Jail, County Annex, County Exhibit Barn, County Maintenance Facility, and Library ◦ Roof, HVAC systems, glass windows, etc. • County-owned vehicles and equipment, specifically damage to emergency response vehicles and public works vehicles required to still be out on the roads during windstorm events
Stratford	• City communication systems • City facilities, including: City Hall, Fire Department, Police Department, 7 recreation venues, and utility infrastructure ◦ Roof, HVAC systems, glass windows, etc. • City-owned vehicles and equipment, specifically damage to emergency response vehicles and public works vehicles required to still be out on the roads during windstorm events
SISD	• Stratford ISD (3) campuses, athletic facilities, and school buses – damage to roofs, buildings, HVAC windows, and school buses • Lost educational time from school closures, accidents, and staff or student injuries
Texhoma	• City communication systems • City Hall and utility infrastructure ◦ Roof, HVAC systems, glass windows, etc. • City-owned vehicles and equipment, specifically public works vehicles required to still be out on the roads during windstorm events
TISD	• Texhoma ISD (1) campus and school buses – damage to roofs, buildings, HVAC windows, and school buses • Lost educational time from school closures, accidents, and staff or student injuries

Probability of Future Events

There is a high probability that Sherman County will see a windstorm event in the future. Based on the previous occurrences, there is a 708% chance of a wind even happening in a given year. Due to the rural nature of the planning area, changes in population patterns, land use, and development will not affect the impacts of this hazard.

Years in the Record Span (2012-2024)	# of Wind Events that Occurred ⁴³	Computation	Future Probability of a Wind Event
12 Years	85 Events	$(85/12) \times 100$	708% each year

⁴³ <https://www.ncdc.noaa.gov/stormevents/>

Winter Storm

Description

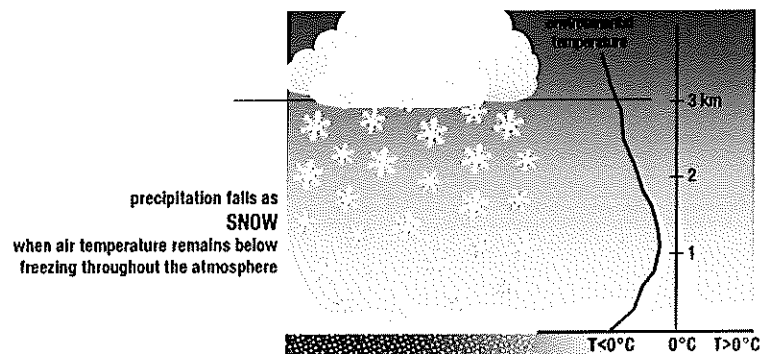
A winter storm is an event in which the main types of precipitation are snow, sleet, or freezing rain. Just like any other storm at other times of the year, the right combination of ingredients is necessary for a winter storm to develop.

There are three basic ingredients necessary to make a winter storm:

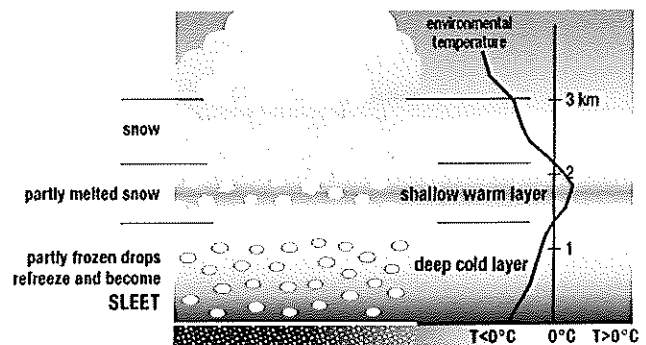
- Cold Air – Below freezing temperatures in the clouds and near the ground are necessary to make snow and/or ice.
- Lift – Something to raise the moist air to form the clouds and cause precipitation. An example of lift is warm air colliding with cold air and being forced to rise over the cold dome. The boundary between the warm and cold air masses is called a front. Another example of lift is air flowing up a mountainside.
- Moisture – To form clouds and precipitation, air blowing across a body of water, such as a large lake or the ocean, is an excellent source of moisture.

A winter storm is a combination of heavy snow, blowing snow, and/or dangerous wind chills. Blizzards are a combination of blowing snow and wind, resulting in very low visibilities. Sometimes strong winds pick up snow that has already fallen, creating a ground blizzard. An ice storm is a storm which results in the accumulation of at least 0.25 inches of ice on exposed surfaces. They create hazardous driving and walking conditions. Tree branches and power lines can easily snap under the weight of the ice.

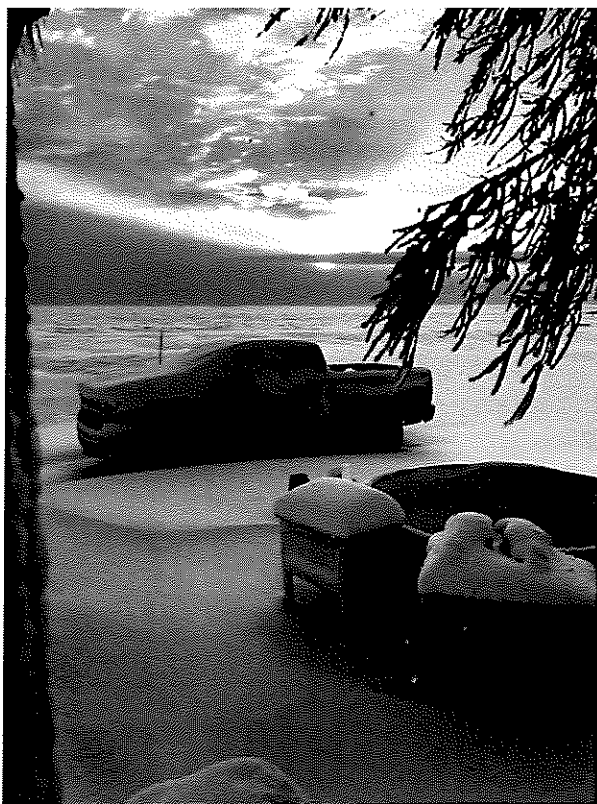
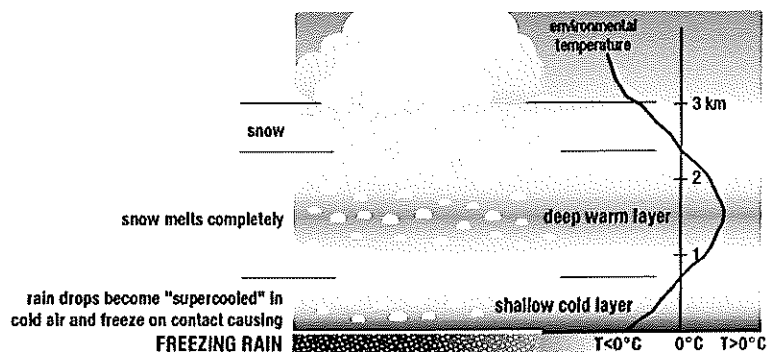
Snow – Most precipitation that forms in wintertime clouds starts out as snow because the top layer of the storm is usually cold enough to create snowflakes. Snowflakes are just collections of ice crystals that cling to each other as they fall toward the ground. Precipitation continues to fall as snow when the temperature remains at or below 32°F from the cloud base to the ground.



Sleet – Sleet occurs when snowflakes only partially melt when they fall through a shallow layer of warm air. These slushy drops refreeze as they next fall through a deep layer of freezing air above the surface, and eventually reach the ground as frozen rain drops that bounce on impact.



Freezing Rain – Freezing rain occurs when snowflakes descend into a warmer layer of air and melt completely. When these liquid water drops fall through another thin layer of freezing air just above the surface, they don't have enough time to refreeze before reaching the ground. Because they are "supercooled", they instantly refreeze upon contact with anything that is at or below 32°F, creating a glaze of ice on the ground, trees, power lines, or other objects. A significant accumulation of freezing rain lasting several hours or more is called an ice storm.⁴⁴



Location

Winter storms can affect the entire planning area often and with enough severity to be a threat to people, livestock, and property. Generally, the winter storm season runs from mid-November to mid-March, although severe winter weather has occurred as early as October and as late as April in some locations. To the left is a picture from Kristen Ediger near Texhoma that shows the 7.0 inches of snow that fell on December 27, 2018. Wind gusts caused blowing snow conditions similar to a blizzard in open areas of the county.⁴⁵

Climate Change

Some research has been done on the impacts of climate change on winter weather, although mostly at regional and global levels. Some of the key takeaways, include: Winters around the world are warming, but this warming does not necessarily mean an end to traditional winter weather in many places – at least not yet; Extreme precipitation events – including major

winter snowstorms – are becoming more common because of climate change; And warming in the Arctic may be leading to a less stable jet stream, resulting in frigidly cold air spilling into areas not accustomed to seeing such low temperatures for such long periods.⁴⁶

⁴⁴ <https://www.nssl.noaa.gov/education/svrwx101/winter/>

⁴⁵ https://www.weather.gov/ama/Dec26_27_SVR_Snow

⁴⁶ <https://www.climaterealityproject.org/blog/winter-weather-and-climate-crisis-explained>

Extent and Previous Occurrences⁴⁷

Sherman County sees several rounds of winter precipitation each year, ranging from as little as 1.0 inch of snow to 10.0 inches of snow with blizzard conditions. The County can also see wind chills down to -20°F and ice storms. Below are previous occurrences of winter weather in the County.

Location	Date	Type	Deaths/ Injuries	Damage	Description
County	12/25/2012	Winter Wx	0	\$0	2.0 inches of snow
County	12/31/2012	Winter Wx	0	\$0	1.0 inch of snow
County	1/29/2013	Winter Wx	0	\$0	1.0 inch of snow
County	2/12/2013	Winter Storm	0	\$0	7.0 inches of snow
County	2/20/2013	Winter Storm	0	\$0	6.0 inches of snow
County	2/24/2013	Blizzard	0	\$660K	Blizzard conditions, 2.0-8.0 inches across the County, damage estimated from cattle losses and repair costs
County	3/23/2013	Winter Wx	0	\$0	3.5 inches of snow
County	4/2/2013	Winter Wx	0	\$0	0.01 inches of ice
County	11/21/2013	Winter Wx	0	\$0	1.0 inch of snow/sleet
County	11/23/2013	Winter Wx	0	\$0	2.3 inches of snow
County	12/21/2013	Winter Storm	0	\$0	6.0 inches of snow
County	12/23/2013	Freezing Fog	0	\$0	¼ mile visibility at Stratford
County	1/4/2014	Winter Wx	0	\$0	1.0 inch of snow
County	2/4/2014	Winter Wx	0	\$0	1.0 inch of snow
County	2/5/2014	Winter Wx	0	\$0	1.5 inches of snow
County	2/8/2014	Freezing Fog	0	\$0	¼ mile visibility with sub-freezing temps at Stratford
County	3/1/2014	Winter Wx	0	\$0	1.0 inch of snow
County	4/13/2014	Winter Wx	0	\$0	1.0 inch of snow
County	12/26/2014	Winter Wx	0	\$0	¾ inch of snow
County	1/3/2015	Winter Wx	0	\$0	3.0 inches of snow
County	1/21/2015	Winter Storm	0	\$0	7.0 inches of snow
County	2/22/2015	Winter Wx	0	\$0	2.0 inches of snow
County	2/25/2015	Winter Wx	0	\$0	3.0 inches of snow
County	2/28/2015	Winter Wx	0	\$0	1.5 inches of snow
County	11/27/2015	Ice Storm	0	\$0	½ inch of ice, predominately freezing rain and sleet
County	12/17/2016	Wind Chill	0	\$0	-15°F or below wind chill
County	4/29/2017	Winter Storm	0	\$0	10.0 inches of snow
County	4/30/2017	Blizzard	0	\$0	Blizzard conditions for more than 3 hours,
County	11/11/2018	Winter Storm	0	\$0	6.0 inches of snow
County	12/27/2018	Winter Storm	0	\$0	7.0 inches of snow
County	10/26/2020	Heavy Snow	0	\$0	3.0-8.0 inches of snow across the county
County	2/14/2021	Wind Chill	0	\$0	-18°F or below wind chill
County	3/17/2021	Winter Storm	0	\$0	4.0-6.0 inches of snow across the county
County	2/3/2022	Wind Chill	0	\$0	-20°F or below wind chill
County	11/25/2023	Winter Wx	0	\$0	2.0 inches of snow
County	1/8/2024	Blizzard	0	\$0	All major roads through the County closed due to blizzard conditions and blowing snow
County	2/10/2024	Winter Wx	0	\$0	1-3 inches of snow
TOTAL		37 Events	0	\$660K	

⁴⁷ <https://www.ncdc.noaa.gov/stormevents/>

Impact

Winter storms can cause severe impacts across the planning area. Power outages can occur from the weight of the ice accumulation on power lines. Water and wastewater systems become vulnerable when temperatures get significantly below freezing, especially if the power is out. Roads become hazardous when icy and/or snow-packed, which leads to more accidents, and more emergency response vehicles to clear accidents, close roads, etc. Residents living in their homes without power and/or water can become a public health emergency as well.

Vulnerabilities	
County	- County facilities, including: Courthouse, Sheriff's Office, Jail, County Annex, County Exhibit Barn, County Maintenance Facility, Library, and communication systems (due to ice) - Facilities could be harmed by a power outage, frozen pipes, and/or roof damage - County-owned vehicles and equipment, specifically emergency response vehicles responding to accidents and other emergency situations during the winter storm - US Highways, State Highways, and County Roads throughout the entire County - Death and/or injury of county employees working to resolve the issues the winter storm created through vehicle accidents, public works, or other situations
Stratford	- City facilities, including: City Hall, Fire Department, Police Department, 7 recreation venues, utility infrastructure, and communication systems (due to ice) - Facilities could be harmed by a power outage, frozen pipes, and/or roof damage - City-owned vehicles and equipment, specifically emergency response vehicles responding to accident and other emergency situations during the winter storm - Death and/or injury of city employees working to resolve the issues the winter storm created through vehicle accidents, public works, or other situations
SISD	- Stratford ISD (3) campuses, athletic facilities, and school buses – damage from a power outage, from frozen pipes, to roofs and school buses - Lost educational time from school closures, accidents, and staff or student injuries
Texhoma	- City facilities, including: City Hall, utility infrastructure, and siren system (ice) - Facilities could be harmed by a power outage, frozen pipes, and/or roof damage - City-owned vehicles and equipment - Death and/or injury of city employees working to resolve the issues the winter storm created through vehicle accidents, public works, or other situations
TISD	- Texhoma ISD (1) campus and school buses – damage from a power outage, from frozen pipes, to roofs and school buses - Lost educational time from school closures, accidents, and staff or student injuries

Probability of Future Events

Historical patterns are assumed to be a dominant factor in determining future winter weather events. Based upon the historical instances of these events which have occurred in the area during the last 12 years, the MAT estimates the probability of a winter weather event somewhere in the County in any given year to be 308%. Due to the rural nature of the planning area, changes in population patterns, land use, and development will not affect the impacts of this hazard.

Years in the Record Span (2012-2024)	# of Winter Storm Events that Occurred	Computation	Future Probability of a Winter Weather Event
12 Years	37 Events	$(37/12) \times 100$	308% each year

NFIP Insured Structures and Severe Repetitive Loss (B2)

The National Flood Insurance Program (NFIP) is managed by the Federal Emergency Management Administration (FEMA). The NFIP provides flood insurance to property owners, renters and businesses, and having this coverage helps them recover faster when floodwaters recede. Flood insurance is available to anyone living in a participating NFIP community, and homes and businesses in high-risk flood areas with mortgages from government-backed lenders are required to have flood insurance.⁴⁸

A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling 10-year period, since 1978. A RL property may or may not be currently insured by the NFIP.⁴⁹

Severe Repetitive Loss (SRL) properties are defined as single or multi-family residential properties that are covered under a NFIP flood insurance policy and: that have incurred flood-related damage for which 4 or more separate claims payments have been made, with the amount of each claim (including building and contents) exceeding \$5,000 and with the cumulative amount of such claims payments exceeding \$20,000; or for which at least 2 separate claim payments (building payments only) have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the building. In both instances, at least 2 of the claims must be within 10 years of each other.

The Severe Repetitive Loss grant program, under FEMA's Hazard Mitigation Assistance Grant Program, provides federal funding to assist states and communities in implementing mitigation measures to reduce or eliminate the long-term risk of flood damage to SRL residential structures insured under the NFIP. The Texas Water Development Board administers this grant program for the State of Texas on behalf of the FEMA.⁵⁰

According to the NFIP, between 1978 and 2022, there have been a total of 0 Total Paid Losses and 0 Repetitive Loss Buildings in the planning area. Below is a table showing the breakdown of the NFIP by jurisdiction.

	CID	Policies	Total Paid Losses	Repetitive Loss Buildings
Sherman County (not participating)	481008	0	\$0.00	\$0.00
City of Stratford (not participating)	481009	0	\$0.00	\$0.00
City of Texhoma (not participating)	481128	0	\$0.00	\$0.00

⁴⁸ <https://www.fema.gov/flood-insurance>

⁴⁹ https://www.fema.gov/txt/rebuild/repetitive_loss_faqs.txt

⁵⁰ <https://www.twdb.texas.gov/publications/shells/SRL.pdf>

Element C – Mitigation Strategy

Existing Authorities, Policies, Programs, and Resources (C1)

Existing authorities, include: Robert T. Stafford Disaster Relief and Emergency Assistance Act, Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000) (P.L. 106-390), and the Bunning Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108-264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). Additionally, the Plan complies with the Interim Final Rules for the Hazard Mitigation Planning and Hazard Mitigation Grant Program (44 CFR, Part 201), which specify the criteria for approval of mitigation plans required in Section 322 of the DMA 2000 and standards found in FEMA’s “Local Mitigation Plan Review Guide” (April 2023), and the “Local Mitigation Planning Handbook” (March 2013).

The Cities of Stratford and Texhoma are General Law Type A municipalities, which mean they may only exercise those powers that are specifically granted or implied by statute for the State of Texas. Each jurisdiction has authority and capabilities that could support efforts to implement mitigation actions identified in this document. When reviewing current plans and ordinances, City/County staff will align the hazard mitigation plan’s goals with those of the jurisdiction. The hazard mitigation plan will be integrated into other planning mechanisms while considering the goals of the jurisdiction. The table below summarizes these authorities and capabilities along with common planning tools/mechanisms that FEMA suggests contribute to local mitigation activities.

	Building Code	Zoning Ordinance	Subdivision Ordinance or Regulation	Special Purpose Ordinances (floodplain management, etc.)	Growth Management Ordinance	Site Plan Review Requirements	Capital Improvement Plan	Economic Development Plan	Emergency Response Plan	Post-Disaster Recovery Plan	Post-Disaster Recovery Ordinance	Real Estate Disclosure Requirements	Other: Annual Budget Review
Sherman County							X	X	X	X			X
City of Stratford	X	X	X	X	X	X	X		X	X	X	X	X
City of Texhoma									X	X			X
Stratford ISD							X		X	X			X
Texhoma ISD							X		X	X			X

National Flood Insurance Program (NFIP) (C2)

As described earlier in this document, flooding occurs very rarely within the County, with these events being caused by heavy rainfall. When these events do occur, the impact to life and property is negligible and any floodwaters have receded within a few hours at most. Below is a table listing the details for each jurisdiction regarding the NFIP. The Texas Water Development Board maintains a current list of County and City Floodplain Administrators (FPA). This information is current as of February 2025.

CID	Jurisdiction	Status	Map Date	FPA & Title
481008	Sherman County	Not Participating	Unmapped	Judge Alicia Law
481009	City of Stratford	Not Participating	Unmapped	Tommy Bogart, City Administrator
481128	City of Texhoma	Not Participating	Unmapped	Jessica Collins, City Clerk

Goals to Reduce / Avoid Long-Term Vulnerabilities (C3)

The goals and objectives of this hazard mitigation plan reflect the goals similar to those found in the State of Texas Mitigation Plan and the National Flood Insurance Program. The Sherman County MAT began the update process for the hazard mitigation plan by agreeing to a common set of goals and objectives, flexible enough they could be used to formulate customized mitigation actions for local implementation. The goals and objectives of the planning area are provided below.

Goal 1: Protect public health and safety

Objective 1.1: Advise the public about health and safety precautions to guard against injury and loss of life from hazards.

Objective 1.2: Maximize the use of modern technology to provide adequate warning, communication, and mitigation of hazards.

Objective 1.3: Reduce the danger to, and enhance protection of, dangerous areas during hazards.

Objective 1.4: Protect critical infrastructure facilities and critical services.

Goal 2: Protect existing and new properties

Objective 2.1: Use the most cost-effective approaches to protect existing and new building and public infrastructure from hazards.

Objective 2.2: Work to develop local guidance to ensure that development will not inadvertently endanger the public or increase threats to existing and new properties.

Goal 3: Increase public understanding, support, and demand for hazard mitigation

Objective 3.1: Increase public awareness of the full range of natural and man-made hazards they face.

Objective 3.2: Educate the public on actions they can take to prevent or reduce the loss of life or property from all hazards.

Objective 3.3: Publicize and encourage the adoption of appropriate hazard mitigation measures.

Objective 3.4: Encourage public policy to promote mitigation activities among the local jurisdiction.

Goal 4: Promote growth in a sustainable manner

Objective 4.1: Incorporate hazard mitigation into the long-range planning and development activities.

Objective 4.2: Encourage developers to voluntarily use codes and standards that will help to prevent the creation of future hazards to life and property.

Goal 5: Maximize the use of outside sources of funding

Objective 5.1: Maximize the use of outside sources of funding.

Objective 5.2: Maximize participation of residents in protecting their welfare and their properties.

Objective 5.3: Maximize insurance coverage to provide financial protection against hazards.

Criteria for Prioritizing Actions (C4)

Considering detailed benefit-cost analysis for every potential mitigation activity can be time-consuming and may not always be practical. In using the criteria and scoring below, the MAT was able to consistently score each action as High, Medium, or Low.

Evaluation Worksheet		
Rank each of the criteria with a -1, 0, or 1 using the following scale 1 = Highly effective or feasible 0 = Neutral -1 = Ineffective or not feasible		
Score	Criteria	Description
	Life Safety	How effective will the action be at protecting lives and preventing injuries?
	Property Protection	How significant will the action be at eliminating or reducing damage to structures and infrastructure?
	Technical	Is the mitigation action technically feasible? Is it a long-term solution?
	Political	Is there overall public support for the mitigation action? Is there the political will to support it?
	Legal	Does the community have the authority to implement the action?
	Environmental	What are the potential environmental impacts of the action? Will it comply with environmental regulations
	Social	Will the proposed action adversely affect one segment of the population?
	Administrative	Does the community have the personnel and administrative capabilities to implement the action and maintain it?
	Local Champion	Is there a strong advocate for the action or project among local departments and agencies that will support the action's implementation?
	Other Community Objectives	Does the action advance other community objectives, such as capital improvements, economic development, environmental quality, or open space preservation?
	Total Score	
Score Key High = 6-10 Medium = 3-5 Low = < 3		

Mitigation Action Items (C4 / C5)

1	Hazards Addressed	Drought, Flooding, Hail, Lightning, Tornado, Wildfire, Windstorm, Winter Storm
Educate the public on mitigation strategies for all hazards.		
Participating Jurisdiction(s)	Sherman County, City of Stratford, City of Texhoma, Stratford ISD, Texhoma ISD	
Objective(s) Addressed	1.1, 1.2, 3.1, 3.2, 3.3, 3.4, 5.2	
Priority (High, Medium, Low)	High	
Estimated Cost	\$1,000	
Potential Funding Source(s)	Local budget, grant funds, business donations, volunteers	
Lead Agency / Dept Responsible	County Emergency Management, City Management, Fire Departments, Law Enforcement, ISD Safety Officers	
Implementation Schedule	Throughout the 5-year update period	
Cost Effectiveness: Outreach activities are very cost effective; they can be used to engage the public at-large in their own protection by educating them on the risks associated with the hazards and the actions they can take to avoid those risks.		
Discussion: Public education campaigns through social media, safety brochures, and educating school children can all help increase public awareness of hazards. The objective of this action is to make residents aware that the hazards should be taken seriously.		

2	Hazards Addressed	Flooding, Hail, Tornado, Wildfire, Windstorm, Winter Storm
Purchase public alert/warning systems for locations throughout the entire planning area.		
Participating Jurisdiction(s)	Sherman County, City of Stratford, City of Texhoma, Stratford ISD, Texhoma ISD	
Objective(s) Addressed	1.1, 1.2, 1.3, 2.1, 3.1, 5.1	
Priority (High, Medium, Low)	Medium	
Estimated Cost	\$20,000	
Potential Funding Source(s)	Local budget, Grant funds	
Lead Agency / Dept Responsible	County Emergency Management, City Management, ISD Safety Officers	
Implementation Schedule	Within 12 months of securing the necessary funding	
Cost Effectiveness: The use of NOAA All-Hazards Weather Radios provides a cost-effective method of alerting the public to specific issues with multiple hazards. Enhancement of the PARIS mass notification system and integration with IPAWS will continue to expand the planning are notification platforms.		
Discussion: Purchase public warning systems to alert residents to a potential emergencies or directions for all hazards. Systems would include: Mass Notification Systems, Social Media, and IPAWS. A NOAA weather radio transmitter was installed in 2024 to increase coverage for the cities and unincorporated areas of the county.		

3	Hazards Addressed	Hail, Tornado, Windstorm, Winter Storm
Retrofit by installing storm resistant roofing and window coverings/blinds on critical facilities and structures throughout the planning area.		
Participating Jurisdiction(s)	Sherman County, City of Stratford, City of Texhoma, Stratford ISD, Texhoma ISD	
Objective(s) Addressed	1.4, 2.1, 5.3	
Priority (High, Medium, Low)	Low	
Estimated Cost	TBD	
Potential Funding Source(s)	Local budget, Grant funds	
Lead Agency / Dept Responsible	County Commissioners, City Council, City Management, ISD Safety Officer	
Implementation Schedule	Throughout the 5-year update period	
Cost Effectiveness: The entire planning area is in a high-frequency zone for hailstorms and experiences tornadoes, windstorms, and winter storms that can cause substantial damage. Protecting critical facilities not only helps to reduce the potential for insurance claims but helps to ensure those facilities remain operable after they've endured a major event.		
Discussion: The County will explore educational opportunities for farmers and ranchers, which may include partnering with a state agency or coordinating with an expert in the private sector.		

4	Hazards Addressed	Drought
Integrate the use of water-efficient fixtures, appliances, and systems (e.g. low-flow toilets, faucet aerators, on-demand recirculation system) into new/retrofit construction projects to reduce water consumption.		
Participating Jurisdiction(s)	Sherman County, City of Stratford, City of Texhoma, Stratford ISD, Texhoma ISD	
Objective(s) Addressed	1.2, 4.1	
Priority (High, Medium, Low)	Medium	
Estimated Cost	TBD	
Potential Funding Source(s)	Local budget	
Lead Agency / Dept Responsible	County Commissioners, City Council, City Management, ISD Board, ISD Maintenance Department	
Implementation Schedule	Throughout the 5-year update period	
Cost Effectiveness: Using water-efficient equipment and smart conservation techniques will reduce the amount of water being used at jurisdiction facilities. In time, the reduction in the jurisdiction's monthly water bills will more than offset the costs of the equipment.		
Discussion: The evidence is clear that water conservation is practical and cost-effective. The installation of these devices to decrease the use of water is becoming more prevalent nationwide.		

5	Hazards Addressed	Hail, Tornado
<i>Follow building codes that require construction of safe rooms in new school campuses; and assist where possible with retrofitting existing school campuses with shelters.</i>		
Participating Jurisdiction(s)	Sherman ISD, Texhoma ISD	
Objective(s) Addressed	1.2, 1.4, 2.2, 4.2	
Priority (High, Medium, Low)	Medium	
Estimated Cost	\$300,000 per campus	
Potential Funding Source(s)	Local budget, grant funds	
Lead Agency / Dept Responsible	ISD Safety Officer, ISD Board	
Implementation Schedule	Upon approval of funds	
Cost Effectiveness: ISD can incorporate multi-purpose safe rooms into new projects so that they can be used to provide shelter as needed but also support everyday scholastic activities; in effect, the investment will return daily benefits.		
Discussion: The 2021 IBC requires that educational institutions with an aggregate occupancy of 50 or more that are located in tornado zones where the design wind speed is 250 mph must incorporate shelters into newly constructed facilities, built to hold the occupancy of the institution in accordance with ICC 500. The purpose of this action is to support the local ISDs in their efforts to meet this requirement.		

6	Hazards Addressed	Hail, Tornado, Wildfire
Expand the outdoor warning system for new development.		
Participating Jurisdiction(s)	City of Stratford, City of Texhoma	
Objective(s) Addressed	1.1, 1.2, 1.3, 1.4	
Priority (High, Medium, Low)	Medium	
Estimated Cost	\$27,500 per siren	
Potential Funding Source(s)	Local budget, Grant funds	
Lead Agency / Dept Responsible	City Management, City Public Works, City Emergency Management	
Implementation Schedule	Within 12 months of securing the necessary funding	
Cost Effectiveness: Although costly, outdoor warning systems are an essential part of the City's public alerting/warning system and are effective in warning the public. Although sirens are most commonly used to alert the population of a tornado, they are used for other hazards as well. People are accustomed to hearing sirens and seeking shelter and more information.		
Discussion: This action was carried over from the 2017 Hazard Mitigation Plan. The City of Stratford has adequate siren coverage, but will install sirens for new development. The City of Texhoma needs one more siren to complete their coverage. Adding more sirens in areas where coverage is currently lean and improving and updating aging sirens would save lives/reduce injuries in a hazard event by providing proper and easily recognizable warning to residents.		

7	Hazards Addressed	Wildfire
<i>Establish and maintain a fire-safe defensible space around critical facilities in sectors in or bordering wildland-urban interface areas.</i>		
Participating Jurisdiction(s)	Sherman County, City of Stratford, City of Texhoma, Stratford ISD, Texhoma ISD	
Objective(s) Addressed	1.3, 2.2, 4.1	
Priority (High, Medium, Low)	Medium	
Estimated Cost	\$5,000 in annual costs	
Potential Funding Source(s)	Local budget	
Lead Agency / Dept Responsible	County Maintenance Department, City Public Works, Volunteer Fire Department, ISD Maintenance Department	
Implementation Schedule	Ongoing	
Cost Effectiveness: Establishing and maintaining a fire-safe defensible space around critical facilities is an easy, low-cost way to create a buffer zone and limit the potential for wildfire damages.		
Discussion: Establishing and maintaining a fire-safe defensible space will reduce the likelihood that a critical facility, such as a fire station, will be affected by this type of hazard event. This will also reduce the potential threat of this type of hazard on people inside the facility and increase the jurisdiction's ability to adequately respond during this type of hazard. This is a continuing action.		

8	Hazards Addressed	Wildfire, Winter Storm (Ice Storm)
Establish and maintain an equipment and personnel share program within the county for fuel reduction.		
Participating Jurisdiction(s)	Sherman County, City of Stratford, City of Texhoma, Stratford ISD, Texhoma ISD	
Objective(s) Addressed	1.3, 2.2, 4.1	
Priority (High, Medium, Low)	Medium	
Estimated Cost	\$15,000 in start up cost, \$1,000 in annual cost	
Potential Funding Source(s)	Grant funds, Local budget	
Lead Agency / Dept Responsible	County EMC, City Public Works, Volunteer Fire Departments	
Implementation Schedule	Within 6 months of securing the necessary funding	
Cost Effectiveness: Establishing and maintaining a fuel reduction share program. By providing a trailer loaded with the appropriate fuel reduction equipment, the county can encourage volunteer fire departments to provide volunteer manpower to reduce fuels.		
Discussion: Establishing and maintaining fire-safe defensible spaces will reduce the likelihood that a critical facility, such as a fire station, will be affected by this type of hazard event. This will also reduce the potential threat of this type of hazard on people inside the facility and increase the County's ability to adequately respond during this type of hazard.		

9	Hazards Addressed	Wildfire
Participate in the Firewise Program through the development of a written wildfire risk assessment for the City's wildland-urban interface.		
Participating Jurisdiction(s)	Sherman County, City of Stratford, City of Texhoma	
Objective(s) Addressed	1.3, 2.2, 4.1	
Priority (High, Medium, Low)	Medium	
Estimated Cost	Minimal – the assessment can be developed by the Texas Forest Service and the Stratford VFD	
Potential Funding Source(s)	Grant funds, Local budget	
Lead Agency / Dept Responsible	County Emergency Management, Volunteer Fire Chief	
Implementation Schedule	Within 24 months of securing the necessary funding	
Cost Effectiveness: Development of the risk assessment will be used to determine if full-fledged participation in Firewise will be of benefit to the jurisdiction. If not, the findings can be used to identify more cost-effective measures that can lessen the impacts of wildfire in the wildland-urban interface.		
Discussion: The Firewise Communities Program encourages local solutions for safety by involving homeowners in taking individual responsibility for hardening their homes against wildfire.		

10	Hazards Addressed	Lightning
Protect critical facilities and infrastructure from lightning damage by installing lightning protection devices, such as lightning rods and grounding, and installing and maintaining surge protection on critical facilities' electronic equipment.		
Participating Jurisdiction(s)	Sherman County, City of Stratford, City of Texhoma, Stratford ISD, Texhoma ISD	
Objective(s) Addressed	1.1, 1.2, 1.3, 2.1, 3.1, 5.1	
Priority (High, Medium, Low)	Low	
Estimated Cost	\$35,000	
Potential Funding Source(s)	Grant funds, Local Budget, Donations	
Lead Agency / Dept Responsible	County Emergency Management, City Managers, ISD Safety Officers	
Implementation Schedule	Within 24 months of securing the necessary funding	
Cost Effectiveness: Protecting the equipment would likely be the cheaper than replacing it if it's struck by lightning, and it would ensure the critical facility remains operational.		
Discussion: If lightning strikes a critical facility, it can destroy electronic equipment. This would not only impact residents but would be costly to replace. Installing these protection devices would ensure that they remain operational at all times.		

11	Hazards Addressed	Tornado, Wildfire, Windstorm, Winter Storm
Ensure critical facilities, particularly designated mass care shelters, are adequately equipped with backup power generators.		
Participating Jurisdiction(s)	Sherman County, City of Stratford, City of Texhoma, Stratford ISD, Texhoma ISD	
Objective(s) Addressed	1.4, 2.1, 5.1	
Priority (High, Medium, Low)	High	
Estimated Cost	TBD, depends on the power needs of the facility	
Potential Funding Source(s)	Local budget, Grant funds	
Lead Agency / Dept Responsible	County Emergency Management/Commissioners, City Management, City Public Works, ISD Safety Officers	
Implementation Schedule	Within 12 months of securing the necessary funding	
Cost Effectiveness: Ensuring critical facilities have power is important to continuity of operations and preventing damage to the equipment.		
Discussion: The uninterrupted, continued operation of critical facilities is important for continuity of government, the operation of mass care shelters, and other community lifelines.		

12	Hazards Addressed	Tornado
New construction to build a storm shelter dome in a County, City of Stratford, and Stratford ISD partnership.		
Participating Jurisdiction(s)	Sherman County, City of Stratford, Stratford ISD	
Objective(s) Addressed	1.3, 1.4, 2.1, 5.1, 5.2	
Priority (High, Medium, Low)	Low	
Estimated Cost	\$800,000 per campus	
Potential Funding Source(s)	Local budget, Grant funds	
Lead Agency / Dept Responsible	County Commissioners, County Emergency Management, City Council, City Management, ISD Board, ISD Safety Officer	
Implementation Schedule	Within 6 months after securing funding	
Cost Effectiveness: ISD shelter facilities will likely have a high benefit cost ratio due the nature of the project. If it's built as a dual-purpose space, the ratio would increase even more.		
Discussion: The ISD facilities are generally built in residential areas. Building a tornado shelter at the school would provide protection to students and staff during the day, but could be opened to the surrounding residential area as a shelter.		

13	Hazards Addressed	Wildfire
Install a bigger water supply line and fire hydrant at the City's recycling/chipping site.		
Participating Jurisdiction(s)		City of Stratford
Objective(s) Addressed		1.2, 1.3, 1.4, 4.1, 5.1
Priority (High, Medium, Low)		Low
Estimated Cost		TBD
Potential Funding Source(s)		Local Funds
Lead Agency / Dept Responsible		City Public Works
Implementation Schedule		Within 6 months of securing funding
Cost Effectiveness: Residents are more likely to respond to locally broadcast advisories and warnings. Since the cost of this action is negligible, it is very cost effective.		
Discussion: This action was partially completed in the last hazard mitigation planning cycle. However, more work needs to be done to mitigate this hazard.		

14	Hazards Addressed	Tornado, Winter Storm
<i>Maintain a list of functional needs resident for law enforcement to conduct welfare checks during prolonged winter storm events and identify locations of personal underground shelters for welfare checking following a tornado.</i>		
Participating Jurisdiction(s)	Sherman County, City of Stratford, City of Texhoma, Stratford ISD, Texhoma ISD	
Objective(s) Addressed	1.3, 1.4, 5.1	
Priority (High, Medium, Low)	Medium	
Estimated Cost	Minimal	
Potential Funding Source(s)	Local budget	
Lead Agency / Dept Responsible	County Emergency Management, City Management, Law Enforcement	
Implementation Schedule	Ongoing	
Cost Effectiveness: This action was carried over from the previous plan. The cost of keeping these lists up to date is minimal.		
Discussion: There are many vulnerable residents residing within the County. The purpose of this action is to develop a mechanism to check on their well-being during winter weather events that may keep them housebound for several days. Additionally, many residents have storm shelters in their garages or near their homes. If debris is laying on top of the shelter, they may not be able to get out without assistance.		

Element D – Plan Maintenance

Continued Public Participation Process (D1)

The MAT will conduct annual public mitigation action strategy update presentations during the 5-year period. Each participating jurisdiction will host a local workshop and invite the public residing in their jurisdiction. A press release will be issued to the Sherman County Gazette, in addition to internal newsletters and email lists within the City governments, County government, and ISDs. Annual meetings held locally will ensure public participation with the focus being on their own strategies. County and City residents will be given a forum to submit any additional identified areas of concern to possibly vet out action items in the future. One year prior to the expiration; the MAT will convene to update the existing plan with actions collected from the local meetings.

The HMP will be posted on regional shared portal, which will allow the public to access the document at any time. A point of contact is provided for every plan in the portal; the PRPC will be responsible for ensuring the contact list stays current. As an alternate, the PRPC'S contact information will also be provided to ensure that public inquiries and comments are properly channeled for processing to the appropriate County or City point of contact on a timely basis.

Monitoring (D2)

MAT participants will be responsible for evaluating the plan annually for updates to jurisdictional goals, objectives, and action items. If needed, these participants will coordinate through the MAT Chairperson to integrate these updates into the Plan. A record of those changes will be maintained in the plan. The MAT Chairperson will be responsible for monitoring the overall plan for updates on an annual basis.

Monitoring and evaluation involves the ongoing process of compiling information on the outcomes from the implementation of the hazard mitigation objectives. The goal is to determine whether the planning area's vulnerability has decreased as a result of the plan. When vulnerability has decreased as a result of identified mitigation actions, the plan participants will determine why and will implement successful mitigation actions in other locations. Where vulnerability has increased, or remained constant, the plan participants will identify if other potential mitigation strategies may be more successful.

Method and Schedule for Keeping Plan Current			
	How	When	By Whom
Monitoring/Evaluate	The plan and action items will be evaluated on an annual basis to determine effectiveness of the programs.	Quarterly updates and upon completion	Responsible departments identified for each action for each jurisdiction.
	Element A: Continue to recruit members for the mitigation team members. Evaluate public satisfaction with the outreach method and level of input they were allowed to provide through an annual survey.		
	Element B: Participants will provide any new development of hazard history that may impact changes in priorities. Monitor new information from the NWS and TFS Wildfire Risk for new maps and history.		
	Element C: Existing strategies will be evaluated and priorities adjusted based on hazard history. Lead agency/departments will continually monitor action items as they are implemented. Through the Mitigation Action Item Monitoring Form, they will inform the MAT of the status of the action and target completion date.		
	Element D: Monitor the status for existing strategies. Identify how the plan was utilized to recognize new projects or to re-prioritize existing strategies. As development changes occur they will be incorporated in to the plan and strategies can be adjusted according to the increase or decrease in growth. Review of the overall goals and using the scoring criteria – will provide clear measurement of the actions.		
			Participating Jurisdictions, Responsible Departments, MAT Members

Method and Schedule for Keeping Plan Current			
	How	When	By Whom
Update	The MAT will update this plan every 5 years. However, through the annual evaluation, each participating jurisdiction will provide any changes to the existing plan to the MAT Chairmen. Two years prior to the expiration, all participating jurisdictions will begin the formal update process. The Formal process will begin with a county-wide meeting which will include all participating jurisdictions. Tasks will be established for each jurisdiction: 1) to review prior mitigation action items and 2) document hazards that have occurred in the last several years. Each participating jurisdiction will hold "jurisdictional" meetings to solicit feedback from the public during this process. Surveys will be extended to the entire county to determine changes in mitigation planning at the resident level. This process will culminate in the several meetings to review the information taken and to formally update plan. Plan will be submitted to the State and to FEMA for approval.	Every 5 years	Participating Jurisdictions, Responsible Departments, MAT Members

The MAT will conduct an annual meeting intended for all plan participants for the purpose of monitoring and evaluating the progress being made in fulfilling the HMP's goals, objectives, and Mitigation Actions. The objectives of the annual MAT review will be:

- To identify mitigation activities that are in progress, have been deferred, or been completed;
- To assess whether the HMP's current mitigation goals and objectives continue to address existing (at the time of the review) and expected conditions;
- To determine whether or not the nature and/or magnitude of each plan participant's risks have changed; and
- To determine, by plan participant, if resources are available and appropriate for implementing prioritized actions in the coming year

Any changes made during the annual review process(es) will be noted on the Record of Changes. As part of the monitoring of the mitigation actions, responsible parties will be provided the form below to update the MAT on the progress of strategies that have been implemented.

Sample Mitigation Action Item Monitoring Form

Mitigation Action Item Monitoring Form (Sample)			
Date Submitted		Dept. Responsible	
Mitigation Action		Installation of Additional Early Warning Sirens	
Objectives	Provide early warning sirens to warn citizens of approaching weather dangers.		
Target	Erect 2 multidirectional sirens within the city limits		
Progress	1 multidirectional siren has been erected and tested in SE Stratford at the corner of S. 4 th St. and S. Pearl St. The second siren is delayed due to a lack of funding source.		

Integrating the Hazard Mitigation Plan into Other Planning Mechanisms (D3, E2)

The last version of the hazard mitigation plan was not incorporated into other planning mechanisms in any significant way. The previous MAT members took the mitigation actions into consideration when developing and updating other planning mechanisms, but there was not a formal review of the hazard mitigation plan. Going forward, the MAT intends to incorporate the hazard mitigation plan as described below.

Sherman County

Sherman County can implement this hazard mitigation plan into other planning mechanisms in a variety of ways. Implementation of actions will be by presenting them to the County Commissioners for prioritization. The County Judge will implement actions as funding becomes available via the budget and the pursuit of grants. County employees, including the Road and Bridge and Emergency Management departments, will implement actions into their day-to-day activities as it's possible. Additionally, the County maintains an Emergency Operations Plan (EOP) for the County and each City within. Emergency Management will ensure that the Hazard Mitigation Plan is incorporated into the EOP.

City of Stratford

The City of Stratford will implement actions by presenting them to the City Council for prioritization. The City Administrator will implement actions as funding becomes available via the budget and the pursuit of grants. City employees, including the Public Works, Police, and Fire Departments, will implement actions into their day-to-day activities as it's possible.

City of Texhoma

The City of Texhoma will implement actions by presenting them to the City Council for prioritization. The City Secretary will implement actions as funding becomes available via the budget and the pursuit of grants. City employees will implement actions into their day-to-day activities as it's possible.

Stratford ISD

Stratford ISD employees a maintenance department for their campuses. Integration of actions will be presented to the School Board for prioritization, but the ISD has not formally incorporated the mitigation plan into other planning mechanisms. The ISD Superintendent will implement actions as funding becomes available via the budget, bond, and pursuit of grants. Student and parent education and grounds maintenance will act on actions that can be implemented in their day-to-day activities to mitigation against many of the hazards.

Texhoma ISD

Texhoma ISD employees a maintenance department for their campuses. Integration of actions will be presented to the School Board for prioritization, but the ISD has not formally incorporated the mitigation plan into other planning mechanisms. The ISD Superintendent will implement actions as funding becomes available via the budget, bond, and pursuit of grants. Student and parent education and grounds maintenance will act on actions that can be implemented in their day-to-day activities to mitigation against many of the hazards.

Element E – Plan Update (E1, E2)

The previous hazard mitigation plan was reviewed by the MAT and updated accordingly considering development trends, the status of previous mitigation actions, and how jurisdictions will be able to integrate the mitigation plan into other planning mechanisms

Development Trends (E1)

In 2017, Sherman County reported that two light industrial businesses were up and running, however, they have both closed their doors. The Corn Board left town as well as the bird seed plant. The John Deere Wind Farm that was built on HWY 54 has served its time, used up the county tax abatement, and is waiting to be dismantled. At the same time, the County has also had some growth on the retail side.

There is a small wind farm being built on the Sherman/Hansford County line. This has helped the Start of Texas RV Park because the construction workers have rented about half of the spaces in the park for many months.

Jack Oldham Oil out of Dumas built a new location on HWY 15 and provides faster service for local residents needing oil, gas, propane, or diesel.

The County bought a piece of property and will be moving the Tax Assessor/Collector Office over there. The Courthouse has been over-crowded for a while, and the new building also houses the Appraisal District so this will be a good fit to move the other Tax Office next to it.

The City of Stratford has also seen some change and growth in recent years. The Spirit Shop, a monogramming service and t-shirt shop moved on to Main Street from out on the highway which has increased their business and inventory by being more accessible.

Main Street Gym and Nutrition bought an old building on Main Street in Stratford, renovated it, and opened a successful gym and juice bar. Also, on Main Street is the Main Stay Boutique Hotel which offers travelers a relaxed western-type atmosphere to stop and spend the night.

Another locally-owned business in Stratford, the Ice Cream Shop, has homemade drinks and ice cream and offers wire transfer services to anywhere in the United States and Mexico. El Patron, the only liquor store in town, changed hands at the beginning of 2022. The new owners have seen an increase in business.

There are several retail stores that have opened in the City of Stratford and seem to be doing well.

The Lollipop Junction Daycare bought the building next to them and is remodeling in order to add a new section to the daycare. Moore's Thriftway, the only grocery store in Stratford, was sold to a family member and is going to continue the business. Also, Brown's Meat Locker recently remodeled and purchased new equipment which has increased their business.

Stratford City Hall has a new sidewalk in front of the building. A private citizen paid to have a mural done on the side of one of the buildings on Main St. The Post Office has had some updates done, inside and out, including handicap parking, new flooring, and fresh paint.

The City of Texhoma is situated on the Texas-Oklahoma border. Most of the "town" is on the Oklahoma side. The Texas side has not seen much development in the past few years.

Overall, the jurisdictions in Sherman County have seen changes and increases in development, but the communities' vulnerabilities have not significantly changed.

Mitigation Actions from 2017 (E2)

The table below lists the mitigation actions the MAT decided to incorporate into the 2017 plan. Some of these actions have been incorporated into the new mitigation actions above as ongoing or deferred projects, others have been deleted due to changes in community priorities.

Hazard	Mitigation Actions	Completed, Ongoing, Deferred, or Deleted
Hailstorm, Lightning, Winter Wx, Tornado, Wildfire, Windstorm	Educate the public on mitigation strategies for all hazards.	Completed
Hailstorm, Winter Wx, Tornado, Wildfire, Windstorm	Purchase public alert/warning systems for locations throughout the entire planning area. Work with NOAA to add a transponder for the NOAA weather radios.	Deferred
Lightning	Purchase and install lightning protection equipment in critical facilities and infrastructure to prevent lightning damage.	Completed (Stratford) Deferred (all others)
Hailstorm	Install vehicle covering/awnings at critical facilities.	Deleted
Hailstorm, Windstorm, Tornado, Winter Wx	Retrofit by installing storm resistant roofing and window coverings/blinds on critical facilities/structures.	Continuing
Hailstorm, Tornado	Follow building codes that require construction of safe rooms in new school campuses; and assist where possible, with retrofitting new/existing school campuses with shelters.	Deferred
Hailstorm, Windstorm, Tornado	New construction to build a storm shelter done in a County, City of Stratford, and Stratford ISD partnership.	Deferred
Hailstorm, Lightning, Winter Wx, Tornado, Wildfire, Windstorm	Install emergency generators at water distribution facility and city well fields.	Completed
Hailstorm, Wildfire, Windstorm, Tornado	Expand the outdoor warning system for new development.	Continuing
Winter Wx, Tornado	Develop/maintain a list of functional needs residents for first responders to conduct welfare checks during prolonged winter storm events and identify locations of personal underground shelters for welfare checks following a tornado.	Continuing
Lightning, Windstorm, Tornado, Winter Wx	Supply critical facilities with back-up power supply.	Continuing
Wildfire, Windstorm	Establish and maintain a fire-safe defensible space around critical facilities in sectors in or bordering WUI areas.	Continuing
Wildfire, Winter Wx	Establish an equipment and personnel share program within the county for fuel reduction.	Continuing
Wildfire	Participate in the Firewise Program through the development of a written wildfire risk assessment for the City's WUI.	Deferred
Wildfire	Install a bigger water supply line and fire hydrant at the City's recycling/chipping site.	Continuing

Element F – Plan Adoption (F1, F2)

This plan was formally adopted by Sherman County, both cities, and both ISDs after the document had been reviewed by the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) to ensure it met current state and federal guidelines governing local hazard mitigation plans.

The evidence of local adoption was sent to both TDEM and FEMA, essentially marking the conclusion of the planning process and the start of the plan's implementation phase. The plan was adopted as of the dates shown below.

Jurisdiction	Resolution Number	Adoption Date
Sherman County		
City of Stratford		
City of Texhoma		
Stratford ISD		
Texhoma ISD		

Sherman County Commissioners Court Adoption

NOTICE OF A PUBLIC HEARING ON THE ADOPTION OF THE SHERMAN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

The Sherman County Commissioners Court will conduct a public hearing before considering final adoption of the recently completed 2025 Sherman County Hazard Mitigation Plan Update on DATE in the Commissioners Court Chambers at the Sherman County Courthouse located at 701 N. 3rd St. Stratford, Texas. This plan incorporates mitigation actions intended to minimize the impacts of certain natural hazards on the residents of the County.

The Disaster Mitigation Act of 2000, as amended, requires that local governments develop, adopt, and update natural hazard mitigation plans in order to receive certain federal assistance. A Mitigation Action Team (MAT) comprised of representatives from Sherman County, City of Stratford, City of Texhoma, Stratford ISD, and Texhoma ISD, was convened to assess the risks from and vulnerabilities to natural hazards that are endemic to the Sherman County area, and to make recommendations on mitigating the effects of such hazards. The former hazard mitigation plan was adopted in 2017, and should be updated with FEMA at least every five (5) years.

A copy of the Sherman County plan update is now available for review in the County Judge's office, City Halls, ISD Administration Building, or it may be reviewed online at:

https://drive.google.com/drive/folders/1YZOyJR7aRKyDQIC6Bs-caF1kFsfRB_7A?usp=sharing

The meeting is open to the public and members of the community are encouraged to attend to offer feedback and comment.

RESOLUTION NO. 090425

**A RESOLUTION BY THE COMMISSIONERS COURT OF SHERMAN COUNTY,
TEXAS, ADOPTING THE 2025 SHERMAN COUNTY HAZARD MITIGATION PLAN**

WHEREAS, certain areas of Sherman County, Texas, are vulnerable and subject to a variety of natural hazards which post a potential threat to the welfare, safety, and property of the County's residents; and,

WHEREAS, to the extent practical, Sherman County intends to prepare for and mitigate against such hazards; and,

WHEREAS, under the Disaster Mitigation Act of 2000 (P.L. 106-390), as of November 1, 2004, the Federal Emergency Management Agency (FEMA) now requires that local jurisdictions maintain a FEMA-approved Hazard Mitigation Plan as a condition of receiving certain Federal mitigation grant funding; and,

WHEREAS, Sherman County participated in the updating of the Sherman County Hazard Mitigation Plan, which includes the unincorporated areas of the County.

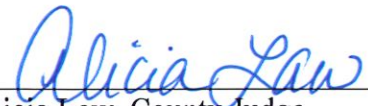
NOW, THEREFORE, BE IT RESOLVED BY THE COMMISSIONERS COURT OF SHERMAN COUNTY, TEXAS, THAT:

1. The County hereby adopts the 2025 updated Sherman County Hazard Mitigation Plan which will have a five-year lifespan from the date upon which the update is finally approved by FEMA.
2. The County's Emergency Management Coordinator is instructed to ensure the updated plan is reviewed at least annually and that any proposed revisions to the County's portion of the Sherman County Hazard Mitigation Plan are presented to the Commissioners Court for consideration of approval.
3. The County agrees to take such other official action as may be deemed reasonably necessary to carry out the goals, objectives, and mitigation actions of the updated Sherman County Hazard Mitigation Plan.

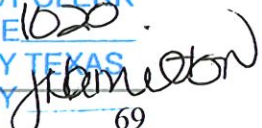
CONSIDERED AND APPROVED THIS 3 DAY OF September 2025.



Laura Rogers, County Clerk



Alicia Law, County Judge

FILED
LAURA ROGERS
COUNTY CLERK
DATE 9/15/25 TIME 10:20
SHERMAN COUNTY TEXAS
BY 

City of Stratford Council Adoption

NOTICE OF A PUBLIC HEARING ON THE ADOPTION OF THE SHERMAN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

The Stratford City Council will conduct a public hearing before considering final adoption of the recently completed 2025 Sherman County Hazard Mitigation Plan Update on DATE in the City Council Chambers at the Stratford City Hall located at 518 N. 3rd St. Stratford, Texas. This plan incorporates mitigation actions intended to minimize the impacts of certain natural hazards on the residents of the City.

The Disaster Mitigation Act of 2000, as amended, requires that local governments develop, adopt, and update natural hazard mitigation plans in order to receive certain federal assistance. A Mitigation Action Team (MAT) comprised of representatives from Sherman County, City of Stratford, City of Texhoma, Stratford ISD, and Texhoma ISD, was convened to assess the risks from and vulnerabilities to natural hazards that are endemic to the Sherman County area, and to make recommendations on mitigating the effects of such hazards. The former hazard mitigation plan was adopted in 2017, and should be updated with FEMA at least every five (5) years.

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City of Texhoma Council Adoption

NOTICE OF A PUBLIC HEARING ON THE ADOPTION OF THE SHERMAN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

The Texhoma City Council will conduct a public hearing before considering final adoption of the recently completed 2025 Sherman County Hazard Mitigation Plan Update on DATE at the Texhoma City Hall located at 1008 S. 6th St. Texhoma, Texas. This plan incorporates mitigation actions intended to minimize the impacts of certain natural hazards on the residents of the City.

The Disaster Mitigation Act of 2000, as amended, requires that local governments develop, adopt, and update natural hazard mitigation plans in order to receive certain federal assistance. A Mitigation Action Team (MAT) comprised of representatives from Sherman County, City of Stratford, City of Texhoma, Stratford ISD, and Texhoma ISD, was convened to assess the risks from and vulnerabilities to natural hazards that are endemic to the Sherman County area, and to make recommendations on mitigating the effects of such hazards. The former hazard mitigation plan was adopted in 2015, and should be updated with FEMA at least every five (5) years.

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Stratford ISD Board of Trustees Adoption

NOTICE OF A PUBLIC HEARING ON THE ADOPTION OF THE SHERMAN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

The Board of Trustees of Stratford ISD will conduct a public hearing before considering final adoption of the recently completed 2025 Sherman County Hazard Mitigation Plan Update on DATE in the High School Library located at 503 N. 8th St. Stratford, Texas. This plan includes mitigation actions intended to minimize the impacts of certain natural hazards on the residents of the County.

The Disaster Mitigation Act of 2000, as amended, requires that local governments develop, adopt, and update natural hazard mitigation plans in order to receive certain federal assistance. A Mitigation Action Team (MAT) comprised of representatives from Sherman County, City of Stratford, City of Texhoma, Stratford ISD, and Texhoma ISD, was convened to assess the risks from and vulnerabilities to natural hazards that are endemic to the Sherman County area, and to make recommendations on mitigating the effects of such hazards. The former hazard mitigation plan was adopted in 2017, and should be updated with FEMA at least every five (5) years.

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Texhoma ISD Board of Trustees Adoption

NOTICE OF A PUBLIC HEARING ON THE ADOPTION OF THE SHERMAN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

The School Board of Texhoma ISD will conduct a public hearing before considering final adoption of the recently completed 2025 Sherman County Hazard Mitigation Plan Update on DATE in the Superintendent Office located at 402 W. Denver St. Texhoma, Texas. This plan includes mitigation actions intended to minimize the impacts of certain natural hazards on the residents of the County.

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NOTICE OF PUBLIC HEARING

ON THE ADOPTION OF THE SHERMAN COUNTY MULTI-JURISDICTIONAL
HAZARD MITIGATION PLAN SEPTEMBER 3, 2025 8:30 AM

Sherman County Commissioners Court Adoption

NOTICE OF A PUBLIC HEARING ON THE ADOPTION OF THE SHERMAN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

The Sherman County Commissioners Court will conduct a public hearing before considering final adoption of the recently completed 2025 Sherman County Hazard Mitigation Plan Update on DATE in the Commissioners Court Chambers at the Sherman County Courthouse located at 701 N. 3rd St. Stratford, Texas. This plan incorporates mitigation actions intended to minimize the impacts of certain natural hazards on the residents of the County.

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The meeting is open to the public and members of the community are encouraged to attend to offer feedback and comment.

POSTED

8/19/25

