MITIGATION ACTION PLAN
Five-year Update

RED RIVER COUNTY
TEXAS
INCORPORATED AND UNINCORPORATED AREAS

July 27, 2020

SECTION I

RED RIVER COUNTY TEXAS

PURPOSE

The goal of all mitigation efforts is long-term reduction in loss of life and property from natural hazards. The emphasis on sustained actions to reduce long-term risk differentiates mitigation from preparedness and response tasks that are required to survive a disaster and from recovery tasks, which are essentially the return to pre-disaster status. Mitigation actions follow a disaster focus on making the situation safer and better than before the incident occurred. Mitigation is an essential component of emergency management. Effective mitigation actions can decrease the impact, the requirements and the expense of future hazard events. Avery, Bogata, Clarksville and Detroit have not been designated for special consideration because of minority or economically disadvantaged populations.

Hazard mitigation planning is never ending. The primary purpose of this **Five-year Update** is to ensure that the residents, visitors, and businesses in Red River County, Texas including the participating jurisdictions of **Avery, Bogata, Clarksville, and Detroit** are safe and secure from natural hazards by reducing the risk and vulnerability before disasters happen, through federal, state, and local community communication, public education, as well as research, and data analysis. This plan is intended to serve as a guide in coordinating and implementing hazard mitigation policies, programs, and projects.

The Red River County Emergency Management Plan has been developed, and the assessment level of planning preparedness is Intermediate. The Mitigation Action Plan (MAP) will only serve to enhance the county's capabilities in recognizing, planning for, responding to, and recovering from disaster. The county's history of the careful development, monitoring, and integration of emergency management and hazard mitigation planning is testament to its standing commitment to make the jurisdictions as disaster-resistant as possible.

The Plans, ordinances, maps and codes were reviewed by the Hazard Mitigation Committee and staff before mitigation action items and implementation strategies were determined. Information gathered from the Plans, ordinances, maps, permits, and codes were considered and incorporated into this Hazard Mitigation Plan. The lack of various plans and codes were considered also. This was factored in when considering the various mitigation action items and implementation strategies.

We cannot control natural phenomena such as floods, tornadoes, winter storms, wildfires and other hazardous events. Despite their destructiveness, these occurrences are part of the natural system.

While we cannot prevent natural hazards, we can reduce some of their adverse consequences. We can avoid the worst-case scenario when a hazard does occur by managing the known characteristics of the hazard.

The following objectives will be addressed in the plan:

- What hazards could occur
- Frequency of occurrence and what has changed since the last update
- Hazards impact on community and severity of impact
- Vulnerability to each hazard and has the vulnerability changed since the last update
- Hazards with greatest risks and if the risks remain the same
- Prioritized mitigation actions

PLAN ORGANIZATIONAL STRUCTURE

Organizational Structure

Ark-Tex Council of Governments (ATCOG), is an organization comprised of city and county governments, colleges, service organizations, school districts, chambers of commerce, etc., with the goal to build strength through regional cooperation. It is through this regional cooperation that ATCOG can serve its members by working to continually improve the economic, social, educational, and safety aspects of life for citizens of Red River County.

ATCOG served as the coordinating agency for the development of the plan. As the coordinator, ATCOG had many responsibilities including administration, content organization, and text development. The following is a brief summary of ATCOG 's responsibilities for the plan:

- Assign a lead planning staff member to provide technical assistance and necessary data to the Red River County Hazard Mitigation Planning Team (HMPT).
- Schedule, coordinate and facilitate community meetings with the assistance of the planning team.
- Provide any necessary materials, handouts, etc., necessary for public planning meetings.
- Work with the planning team to collect and analyze data and develop goals and implementation strategies.
- Prepare, based on community input and team direction, the first draft of the plan and provide technical writing assistance for review, editing and formatting.
- Coordinate with stakeholders within the cities and the unincorporated areas of County during plan development.
- Submit the final plan to the State of Texas and provide follow up technical assistance to the Red River County Community Mitigation Planning Team to correct any noted deficiencies subsequent to the review of the plan by the State of Texas.
- Upon approval by the State of Texas, submit the updated plan to FEMA and provide follow up technical assistance to the Red River County Community Mitigation Planning Team to address any noted deficiencies subsequent to the review of the plan by FEMA.

- ❖ Coordinate adoption and final approval process by all City and Town Councils and the Commissioners Court of the updated and approved FEMA plan.
- ❖ Submit a final plan, with adoption documentation and approval signatures for all participating jurisdictions, to the State and FEMA and ensure plan is noted as complete and approved by both agencies.
- ❖ Prepare for and attend City Council/Commissioners Court/public meetings during plan consideration and plan adoption process.
- ❖ Complete and acquire approval of all necessary forms associated with the application for Red River County's Multi-Jurisdictional Hazard Mitigation Grant.

A Multi-Jurisdictional Hazard Mitigation Planning Team (HMPT) was formed consisting of representatives appointed by local jurisdictions to work together with ATCOG in the plan development. The team's primary duties were:

- ❖ Ensure that the Red River County HMPT includes representatives from the neighborhood stakeholders' groups. Each participating city must provide at least one representative to the county team and provide active support and input. ATCOG will approve the final composition of the planning team.
- ❖ Assist ATCOG staff with identifying hazards and estimating potential losses from future hazard events.
- ❖ Assist ATCOG in developing and prioritizing mitigation actions to address the identified risks.
- ❖ Assist ATCOG in coordinating meetings to develop the plan.
- ❖ Identify the community resources available to support the planning effort.
- ❖ Assist with recruiting participants for planning meetings.
- ❖ Gain the support of neighborhood stakeholders for the recommendations resulting from the planning process.
- ❖ After adoption, appoint members to a committee to monitor and work toward plan implementation.
- ❖ After adoption, publicize the plan to neighborhood interests and ensure new community members are aware of the plan and its contents.
- ❖ Subsequent to State of Texas and FEMA approval of the plan, assume responsibility for bringing the plan to life by ensuring it remains relevant by monitoring progress, through regular maintenance and implementation projects.

THE PLANNING PROCESS

Benefits of Mitigation Planning

1. Increases public awareness and understanding of vulnerabilities as well as support for specific actions to reduce losses from future natural disasters.

2. Builds partnerships with diverse stakeholders increasing opportunities to leverage data and resources in reducing workloads as well as achieving shared community objectives.

3. Expands understanding of potential risk reduction measures to include structural and regulatory tools, where available, such as ordinances and building codes.

4. Informs development, prioritization, and implementation of mitigation projects. Benefits accrue over the life of the project as losses are avoided from each subsequent hazard event.

The Multi-Jurisdictional Planning Process.

A multi-jurisdiction plan was chosen to better prepare the communities of Red River County for Hazards. The Ark Tex Council of governments worked hand in hand with the jurisdictions within the planning area of Red River County to develop the current plan. It is through this regional cooperation that ATCOG can serve its members by working to continually improve the economic, social, educational, and safety aspects of life for citizens

Mitigation plans need to be a living document and to ensure this the plan must be monitored, evaluated, and updated on a five-year or less cycle. This includes incorporating the mitigation plan into county and local comprehensive or capital improvement plans as they are developed.

Organize Resources:

Effective planning efforts result in practical and useful plans, but written plans are only one element in the process. The planning process is as important as the plan itself. A successful planning process organizes resources by encouraging cooperation and bringing together a cross-section of government agencies, local entities, concerned citizens and other stake holders to reach consensus on how to achieve a desired outcome or resolve a community issue. Applying a community wide approach and including multiple aspects adds validity to the plan. Those involved gain a better understanding of the problem and how solutions and actions were devised. The result is a common set of community values and widespread support for directing financial, technical, and human resources to an agreed upon action.

- ✓ A comprehensive county approach was taken in developing the plan. An open public involvement process was established for the public, neighboring communities, regional agencies, businesses, academia, etc. to provide opportunities for everyone to become involved in the planning process and to make their views known. This was done by having a public meeting. Postings and Notices were

placed at the Courthouse and in two newspapers. The plan was also posted on the Red River County website.

- ✓ Each participant was given an explanation of the Hazard Mitigation Planning Process. These opportunities were also used to gather hazard information, develop mitigation strategies, and edit the plan during the writing process.

- ✓ The review and incorporation of appropriate existing plans, studies, reports, technical information, and other research was included into the plan during its drafting process

- ✓ Support and information was obtained from other government programs and agencies such as the National Flood Insurance Program (NFIP), Natural Resources Conservation Service (NRCS), US Geological Survey (USGS), NOAA Weather, etc.

Risk and Vulnerability Assessment:
The plan must be reactive to hazards that face the community. It is not sufficient to just identify the hazards. The potential consequences of these hazards must be assessed. This phase included identifying and profiling all hazards, assessing vulnerability and risk. Research into the history of Red River County to document past disasters was required. Local libraries, national weather records and the life experiences from local residents were used to assess the plan.

A general assessment included using local residents, historical data, Texas State Mitigation Plan, Local or Regional Reports, Strategic Plans, Flood Studies, and other data to establish the following:

- ♦ The type, location and extent of all hazards that can affect the jurisdiction, both historically and in the future.
- ♦ Past occurrences of hazard events in or near the community and the severity, duration, and the resulting influences on the area.
- ♦ Description of the jurisdictions vulnerability to those hazards including types and numbers of existing and future buildings, infrastructure and critical facilities in identified hazard areas.
- ♦ Probability or likelihood of hazard occurrence.
- ♦ General description of land uses and development trends for future land use decisions.

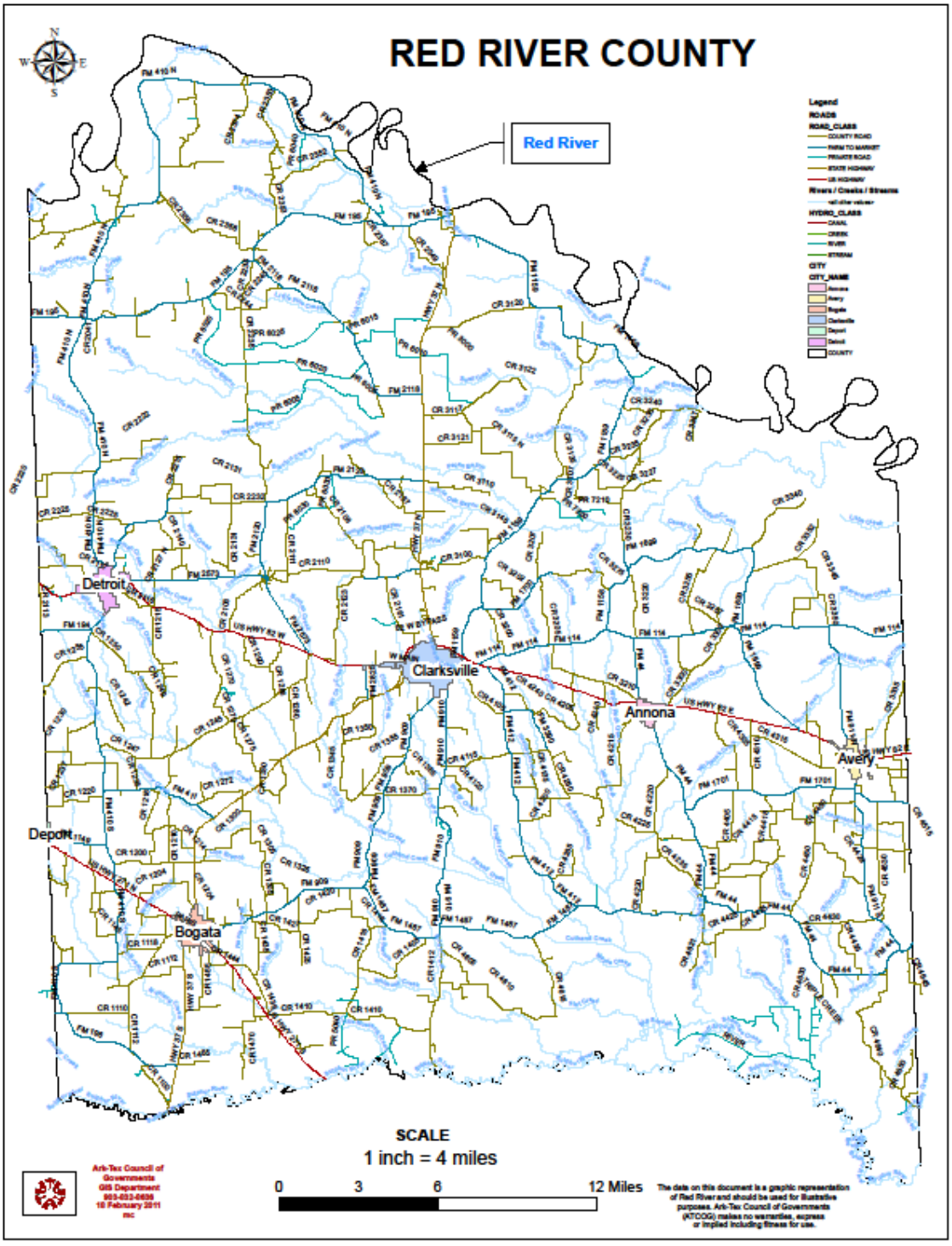
The development of a Multi-Jurisdictional Hazard Mitigation Plan involves the use of many types of information including historical data on previous disasters, information on critical infrastructures, zoning and flood plains maps, records, charts, etc., from many sources.

Develop Mitigation Strategies:
Written Strategies were developed to demonstrate how Red River County, Texas intends to reduce losses identified in the Risk Assessment. It includes goals and objectives to guide the selection of mitigation activities and reduce potential losses. This is a blueprint for reducing the potential losses identified in the risk assessment. The Mitigation Strategy also includes:

- A description of mitigation objectives meant to reduce long-term vulnerabilities. These objectives were identified by the HMPT using hazard profiles, survey assessments, etc.
- Identification and a comprehensive analysis of a range of mitigation actions and projects.
- An Action Plan describing how the mitigation actions and projects were prioritized, and how they would be implemented and administered.

Everything has to do with geography.
Judy Martz


Red River County


RED RIVER COUNTY
Red River
Detroit
Clarksville
Annona
Avery
Deport
Bogata
SCALE
1 inch = 4 miles
0
3
6
12 Miles

County Government

County government is spelled out in the Texas Constitution, which makes counties functional agents of the state. Thus, counties, unlike cities, are limited in their actions to areas of responsibility specifically spelled out in laws passed by the legislature.

At the heart of each county is the commissioner's court. Red River County has four-precinct commissioners and a county judge who serve on this court. This body conducts the general business of the county and oversees financial matters. The major elective offices found include the county judge and attorneys, county and district clerks, county treasurer, tax assessor-collector, justices of the peace, and constables. The county judge and precinct commissioners conduct the general business of the county and oversee financial matters.

Economic Considerations

Red River County and the jurisdictions of Avery, Bogata, Clarksville and Detroit have very limited budgets. Their tax base and annual budgets are low. They will have to rely on grants and volunteerism to accomplish the bulk of the projects. **Between April 1, 2010 and July 1, 2014 Red River County experienced a -3.2% growth rate. Texas has 254 counties and Red River County ranks 194 in Per Capita Income. It is ranked 67th in land area size in the state having 1,036 square miles.**

Red River County Jurisdictions Ranked by Population		
Ranking	Jurisdiction	Population
1	Red River County Unincorporated	6,494
2	Clarksville	3,191
3	Bogata	1,077
4	Detroit	722
5	Avery	450

If you want to understand geology, study earthquakes. If you want to understand the economy, study the Depression. **Ben Bernanke**

Resource Information

Resource information was obtained from the following government programs and agencies:

National Flood Insurance Program (NFIP), which provided information about flooding and actions needed to satisfy compliance with NFIP.

The US Geological Survey (USGS), provided information that was incorporated into the hazards of drought and flooding.

Natural Resources Conservation Service (NRCS), provided information about water management and climate change that are found in the identified hazard of drought.

The Texas Hazard Mitigation Plan helped to develop the common language used in the Red River Mitigation Plans.

The Emergency Management Plan of Red River County provided information regarding current emergency management preparedness. The information helped determine the most immediate needs relating to all identified mitigated hazards.

Fort Worth. Texas Mitigation Plan provided an example of action tables that was used to organize and clarify the actions.

Texas Wildfire Risk Assessment Portal (TXWRAP) provided statistical graphs and maps regarding wildfire activity in Red River County. This information is found in the wildfire section of the Plan.

NOAA Weather web site provided information regarding climate data and global warming.

The US Census Bureau provided statistics and population information found throughout the plan.

The Red River County Hazard Mitigation Plan consists of Red River County and the jurisdictions of Avery, Bogata, Clarksville, and Detroit.

The Hazard Mitigation Action Team assisted in developing plan goals and action items by using their own skills sets and knowledge to create a more comprehensive plan. A variety of backgrounds and experience were evident in the team members, thus provided an eclectic view of mitigation needs and solutions.

Team meetings, telephone calls and e-mail communication played a role in team member contact and plan completion. Important Dates are listed below:

IMPORTANT DATES		
Date	**Purpose**	**Location**
July 25, 2019	Team Meeting kick-off	Clarksville, Texas
November 5, 2019	Draft of plan posted on Red River County website for public viewing.	Clarksville, Texas and County wide
December 10, 2019	Public and Stakeholder meeting.	Clarksville Commissioners Court
	Posting Placed at the County Courthouse regarding public meeting	Clarksville Courthouse
November 28, 2019	Public Notice Clarksville Times	County wide newspaper
December 5, 2019	Public Notice Clarksville Times	County wide newspaper

RED RIVER COUNTY TEAM MEMBERS		
Name	**Title**	**Agency**
L. D. Williamson	Judge	Red River County
Alex Ackley	Mayor	City of Avery
Vincent Lum	Mayor	City of Bogata
Ann Rushing	Mayor	City of Clarksville
Jerry Hutson	Fire Chief	Bogata
Tami Nix	City Secretary	Detroit
Phyllis Stanley	Red River Fire Association	Red River County

Background and Contributions

L. D. Williamson, County Judge, Chairman of the Ark-Tex Council of Governments(ATCOG) and former ATCOG executive director: Judge Williamson heads up the Red River Team. He has been instrumental in setting up meetings, coordinating activities and participating in plan development.

Alex Ackley, Mayor City of Avery has provided valuable information regarding the mitigation needs of Avery and has helped choose mitigation actions that are meaningful to Avery. Mr. Ackley has provided all the information needed to develop the Avery portion of the plan by phone and by e-mail communication.

Vincent Lum, Mayor of Bogata: Mayor Lum coordinated getting all the requested information regarding Bogata into the plan. Telephone calls, emails and requests for data were responded to in a timely and efficient manner. Mayor Lum participated in both the original team meeting and the public meeting. Mayor Lum provided all data needed to complete the Bogata portion of the plan

Ann Rushing, Mayor of Clarksville: Mayor Rushing attended the kick-off meeting and the public meeting. She was an active participant in the planning process. She provided valuable information regarding the needs of Clarksville while keeping an eye on the fiscal requirements needed to implement selected actions. She provided information regarding current capabilities and how best to integrate the mitigation plan into existing city documents. Mayor Rushing was always available to answer questions or to make suggestions.

Jerry Hutson, Fire Chief of Bogata, reviewed the existing plan and has provided valuable information regarding Wildfires in Red River County. He has also provided estimates regarding the number of wildfires occurring within the county and the jurisdictions. Mr. Hutson attended both meetings held in the county, made contributions regarding viable actions for the county and the city of Bogata.

Phyllis Stanley, President of the Red River Fire Fighters Association: Ms. Stanley provided valuable information regarding fire protection for the county. Phyllis was instrumental in integrating data regarding fire history into the plan.

Tami Nix, City Secretary of Detroit, working in the interest of the city of Detroit provided all information needed to update the city mitigation portion of the plan. She attended all meetings and provided important update documents.

Stakeholders were selected to provide a wide variety of interested parties. Judges from neighboring counties, charity organizations, schools and city officials were invited to participate in the development of the plan. All local and regional stakeholders and neighboring communities were invited via e-mail.

Identified Area Stakeholders				
Name	**Title**	**Company**	**Location**	**Type of Contact**
Scott Lee	County Judge	Franklin County	Mt. Vernon, Texas	e-mail
Brandon Bell	County Judge	Lamar County	Paris, Texas	e-mail
Bobby Howell	County Judge	Bowie County	New Boston, Texas	e-mail
Brian Lee	County Judge	Titus County	Mt. Pleasant, Texas	e-mail
Debbie Drew	Superintendent	Avery ISD	Avery, Texas	e-mail
Kermit Ward	Superintendent	Clarksville ISD	Clarksville, Texas	e-mail
Stanley Jessee	Superintendent	Rivercrest ISD	Bogata, Texas	e-mail
Clare Francavilla	Red Cross Disaster	Red Cross	Clarksville , Texas	e-mail

Public Participation

Public participation is a key component to strategic planning processes. Citizen participation offers citizens the chance to voice their ideas, interests, and opinions. Opportunities were given to the citizens of Red River County to participate in planning and to review the plan.

On November 5, 2019 a plan draft was posted on the Red River County website. Contact information was posted on the site. Notices were posted at the courthouse in the local newspaper and on the Red River Website. A Public comment meeting was held on December 10, 2019 where a representative of Lamar County and Rivercrest ISD attended as interested stakeholders. Follow ups were made with the Rivercrest public School system. There were no public comments or suggestions offered during the plan development process.

No one from the general public attended the December 10th meeting.

SECTION II
HAZARD IDENTIFICATION AND ASSESSMENT

Extreme Weather and Climate Change

Currently, there is a strong scientific consensus that the Earth is warming and that this warming is mainly caused by human activities. This consensus is supported by various studies of scientists' opinions and by position statements of scientific organizations, many of which explicitly agree with the Intergovernmental Panel on Climate Change (IPCC) synthesis reports.

Nearly all publishing climate scientists (97–98%) support the consensus on anthropogenic climate change, and the remaining 3% of contrarian studies either cannot be replicated or contain errors.

One of the most visible consequences of a warming world is an increase in the intensity and frequency of extreme weather events. The National Climate Assessment finds that the number of heat waves, heavy downpours, and major hurricanes has increased in the United States, and the strength of these events has increased, too.

There are no national or major scientific institutions anywhere in the world that dispute the theory of anthropogenic climate change that will increase the likelihood of unstable weather patterns.

Climate models have previously shown that Earth will see more heavy rainstorms as the atmosphere warms, but a new climate model developed by NASA researchers is the first to show the difference in strength between storms that occur over land and those over the ocean and how storms strengths will change in general.

These conclusions are particularly bad news for the storm-prone portions of the central and eastern United States, where strong winds are a major source of weather-related casualties. Also, according to NASA, Global warming will make severe thunderstorms and tornadoes a more common feature of U.S. weather.

The western United States won’t catch a break either—while it is expected to get drier, the storms that do form are likely to have more lightning, which could then trigger more wildfires.

No single weather event can be directly attributed to climate change. But as the globe warms up, Americans can expect more storms bearing down on much of the United States, scientists say.

Even increased snowfall has a climate change connection. That's not because the Feb. 1 2011 storm can be linked to rising atmospheric carbon dioxide levels or increasing global temperature – again, such a connection is impossible to make – but, according to

climatologists, an increased propensity for winter storms is exactly what you'd expect in a warming world.

"There's no inconsistency at all," Michael Mann, the director of the Penn State Earth System Science Center, told LiveScience. "If anything, this is what the models project: that we see more of these very large snowfalls."

"Drier conditions near the ground combined with higher lightning flash rates per storm may end up intensifying wildfire damage," said study leader Tony Del Genio of NASA's Goddard Institute for Space Studies in New York.

"Climate is the statistics of weather over the long term," Ken Caldeira, a senior scientist at the Carnegie Institute for Science at Stanford University, told LiveScience. "No specific weather event can by itself confirm or disprove the body of scientific knowledge associated with climate change."

Regardless of individual views regarding global warming, extreme weather patterns over the last ten years are self-evident. We can easily predict that continued extremes in weather, like those mentioned above, will occur in the foreseeable future.

All of Red River County including the jurisdictions of Avery, Bogata, Clarksville and Detroit are susceptible to several possible natural hazards. The Hazard Mitigation Team with the assistance of the Ark-Tex Council of Governments Hazard Mitigation Planner conducted a comprehensive Hazard Analysis beginning in May, 2003. The hazard analysis will be reviewed annually, and up-dated as needed during the Formal Review Process.

The Hazard Mitigation Team identified the following hazards that had the potential to cause personal or property damage in the county:

- Flood
- Tornado
- Winter Storm
- Thunderstorm Winds
- Hailstorm
- Drought
- Wildfire
- Lightning
- Dam Failure

Areas of Risk: Hazards Identified	
Hazards With Distinct Area of Risk	Hazards without Distinct Area of Risk
Flood	Drought
Wildfire	Winter Storm
	Tornado
	Hailstorm
	Thunderstorm Winds
	Lightning
	Dam Failure

The process for identifying hazards included looking at historical data to determine which hazards seemed to occur in Red River County. Sources used were newspaper articles, general local knowledge of jurisdictions' staff and local residents, NOAA Satellite and Information Service National Climatic Data Center reports, and advice from FEMA Hazard Mitigation Plan reviewers and Texas Department of Emergency Management staff.

Natural Hazards Most Likely to Occur in Red River County.			
Hazard	**Type of Disaster**	**How Identified**	**Why Identified**
Floods	Natural	• Review Repetitive Flood Properties • NOAA • Newspaper accounts • Input from public • Review of FIRMS	• The County contains many creeks, streams and rivers • The County has experienced flooding in the past. • Flooding is a frequent issue
Tornado	Natural	• Public Input • National Weather Service • Past History • NCDC Data Base	• Public Concern • Past History • Frequency
Winter Storms	Natural	• Past Disasters (2000 ice storm) costliest in recent memory • Public input • NOAA • National Weather Center	• Little equipment to fight ice and snow • Heavy psychological toll on population • Population not educated about dealing with outages etc.
Thunderstorm Winds	Natural	• NOAA reports • Public Input • Newspaper Accounts	• Wind shears an ongoing problem • Severe Windstorms occur every year
Hailstorm	Natural	• Newspaper accounts • NOAA • Input from public	• Frequency • Past History • Public Concern
Drought	Natural	• History • Review of NCDC database • Public Input	• Costly to agri-business • Drought common to state and county
Wildfire	Natural	• Fire databases • Public Input • Texas Forestry • Newspaper Articles	• More wildfire occurrences than any other natural disaster • Can be common to drought and storms • Rural areas most vulnerable
Dams Dam/levee failure		• Hazard Ratings	• Multiple dams in the county • Public Input
Hail	Natural	• NOAA reports • Public Input	• Damage to autos and homes • Frequency

Lightning	Natural	• Public Input • Lightning Monitors	• Damage to property and possible deaths • Frequency
Wildfire	Natural	• Fire databases • Public Input • Texas Forestry • Newspaper Articles	• More wildfire occurrences than any other natural disaster • Can be common to drought and storms • Rural areas most vulnerable

Hazards Listed in the Texas Hazard Mitigation Plan Not Included in the Red River Plan	
Hazard	**Reason for Exclusion**
Tropical storms	Red River County is 300 miles from the coast. Tropical storms are not an issue for Red River County. The planning area has no history of Tropical Storms hazards; therefore, no impacts are expected in the future.
Coastal erosion	Red River County is 300 miles from the coast. Coastal Erosion is not an issue for Red River County. The planning area has no history of Coastal Erosion hazard; therefore, no impacts are expected in the future.
Expansive soils	There is no evidence that expansive soils are an issue for Red River County. The planning area has no history of Expansive soils hazard; therefore, no impacts are expected in the future.
Land subsidence	There is no evidence that land subsidence is an issue for Red River County. The planning area has no history of Land Subsidence hazard; therefore, no impacts are expected in the future.
Extreme Heat	There are no state records for Red River County regarding past extreme heat loss or projected loss listed in the current Texas Hazard Mitigation Plan. The planning area has no history of extreme heat hazard; therefore, no impacts are expected in the future.
Earthquake	The planning area has no history of Erosion earthquakes; therefore, no impacts are expected in the future.

Potential Severity of Impact: (45% of Priority Risk Index)	
SUBSTANTIAL Index Value = 4	• Complete shutdown of facilities for 30 days or more • More than 50 percent of property destroyed or with major damage
MAJOR Index Value - 3	• Complete shutdown of critical facilities for at least 2 weeks • More than 25 percent of property destroyed or with major damage
MINOR Index Value = 2	• Complete shutdown of critical facilities for more than 1 week • More than 10 percent of property destroyed or with major damage
LIMITED Index Value = 1	• Shutdown of critical facilities and services for 24 hours or less • Less than 10 percent of property destroyed or with major damage

Probability of Future Events is categorized as Unlikely to "Highly Likely". These terms are defined as follows:

Probability of Future Events: (30% of Priority Risk Index)	
Highly Likely Index Value = 4	Event probable in the next year. 1/1 = 1.00 (Greater than .33)
Likely Index Value = 3	Event probable in next 3 years 1/3 = .33 (Greater than 0.20, but less than or equal to 0.33)
Occasional Index Value = 2	Event probable in next 5 years 1/5 = 0.20 (Greater than 0.10, but less than or equal to 0.20)
Unlikely Index Value = 1	Event probable in next 10 years 1/10 = 0.10 90.10 or less)

Formula for probability: # events divided by the # of years on record i.e. 10 flood events in a 20-year period would give a 10/20 = .50 Value index of 4 (Highly Likely)

Warning Time: (15% of Priority Risk Index)	
Index Value = 4	Less than 6 hours
Index Value = 3	6 to 12 hours
Index Value = 2	12 to 24 hours
Index Value = 1	More than 24 hours

Duration: (10% of Priority Risk Index)	
Index Value = 4	More than a week
Index Value = 3	Less than a week
Index Value = 2	Less than 24 hours
Index Value = 1	Less than 6 hours

Priority Risk Index (PRI)	
High Risk	PRI of 3.0 or greater
Medium Risk	PRI score 2.0 to 3.0
Low Risk	PRI score less than 2.0

PRI Value = (Impact x .45%) + Probability x 30%) + (Warning Time x 15%) + (Duration x 10%)

Vulnerability is categorized as "Low" to "High". These terms are defined as follows:

Hazard Vulnerability	
LOW	Limited or no history of significant impacts to property, infrastructure and/or public safety.
MODERATE	People and facilities located in areas that have low levels of historic occurrence of impacts from hazard and/or in areas where impact is possible but not probable.
HIGH	People and facilities located in areas that have previously experienced impacts from hazards and/or in areas where impacts from hazards are possible and probable. Future damage to property and infrastructure is probable and/or a documented history of threat to public safety exists.

RED RIVER COUNTY DAMAGE ASSESSMENT

Red River County Dollars				
Structure Type	**Value***	**75%**	**50%**	**25%**
Residential	101,235,101	75,926,326	50,617,550	25,308,775
Industrial	109,962,009	82,471,507	54,981,005	27,490,502
Agriculture	1,723,172,195	1,292,379,147	861,586,098	430,793,049
totals	1,934,369,305	1,450,776,980	967,184,653	483,592,326
*Values outside county jurisdictions				

Avery Damage Assessment Dollars				
Structure Type	**Value**	**75%**	**50%**	**25%**
Residential	8,419,550	6,314,663	4,209,775	2,104,888
Commercial	1,445,227	1,083,920	722,614	361,307
Industrial	498,511	373,883	249,256	124,628
totals	10,363,288	7,772,466	5,181,645	2,590,823

Bogata Damage Assessment Dollars				
Structure Type	**Value**	**75%**	**50%**	**25%**
Residential	22,378,757	16,784,068	11,189,379	5,594,689
Commercial	2,415,369	1,811,527	1,207,685	603,842
Industrial	3,284,912	2,463,684	1,642,456	821,228
totals	28,079,038	21,059,279	14,039,520	7,019,759

Clarksville Damage Assessment Dollars				
Structure Type	**Value**	**75%**	**50%**	**25%**
Residential	45,625,895	34,219,421	22,812,948	11,406,474
Commercial	17,064,736	12,798,552	8,532,368	4,266,184
Industrial	44,935,587	33,701,690	22,467,794	11,233,897
totals	107,626,218	80,719,663	53,813,110	26,906,555

Detroit Damage Assessment Dollars				
Structure Type	**Value**	**75%**	**50%**	**25%**
Residential	11,173,394	8,380,046	5,586,697	2,793,349
Commercial	593,005	444,754	296,503	148,251
Industrial	2,530,501	1,897,876	1,265,251	632,625
totals	14,296,900	10,722,676	7,148,451	3,574,225

HAZARD ANALYSIS

Simply put, hazard analysis is an evaluation of the types of hazards (emergencies) that have occurred in the past or could occur in the future, identification of the population at risk, and an evaluation of the hazards versus the population to determine overall vulnerability.

The following steps were taken:

- Identification of the Hazards. Determination of the hazards, both natural and technical, that could affect the county.
- Profiling the Hazard Events. Determination of how bad a hazard can get.
- Inventorying Assets. Determination of where and/or to what extent the hazards can affect the assets of the county or its jurisdictions'.
- Estimating Losses. Determining how the hazards will affect the county/city.

"Of all the hazards, fear is the worst."
Sam Snead

FLOOD

Flood Types

Description
Flash Flood: The major flooding concern for Red River County is from a flash flood. A flash flood generally results from a torrential rain on a relatively small drainage area. Runoff from these rainfalls results in high floodwater that can cause destruction of homes, buildings, bridges and roads. Flash floods are a threat to public safety in areas where the terrain is steep and surface runoff rates are high.

Riverine Floods: Riverine floods are caused by precipitation over large areas and differ from flash floods in their extent and duration. Floods in large river systems may continue for periods ranging from a few hours to many days.

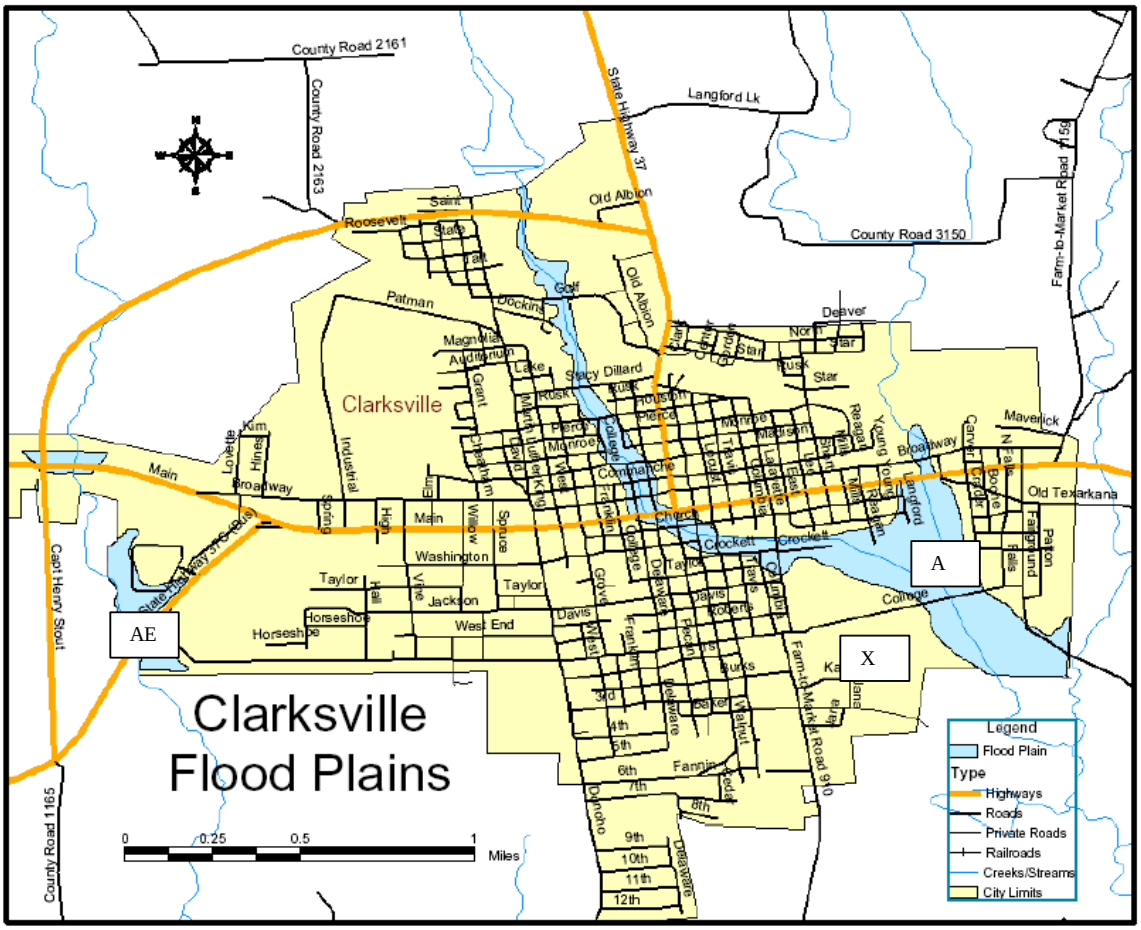
100-Year Flood: There is one chance in 100, or a 1% chance of a flood of such magnitude or greater occurring in any given year. There is no guarantee that a similar flood will not occur in the next year, or in the next month.

Floodplain: The lowland and flat areas adjoining inland and coastal waters including, at a minimum, that area subject to a one percent or greater chance of flooding in any given year.

Floodway: That portion of the floodplain which is effective in carrying flow, within which this carrying capacity must be preserved and where water depths and velocities are the greatest. It is the area along the channel that provides for the discharge of the base flood so the cumulative increase in water surface elevation is no more than one foot.

The Jurisdictions of Avery, Bogata, Clarksville and Detroit have minor issues with flooding (street flooding during heavy rains.) **There are no repetitive loss properties located in the county or participating jurisdictions.**

While Red River County is not a participant in the NFIP, Avery, Bogata, Clarksville, and Detroit participate in the program.. They have flood plain maps and a designated representative to monitor new building to prevent anyone from developing in low areas. Priority was given to each action by the HMPT. Each NFIP action was weighted regarding ultimate impacts on buildings and infrastructure. These participating jurisdictions are taking positive steps to remain in compliance such as keeping drainage areas clear of debris and providing generators to prevent wastewater overflow. Red River County will consider joining the NFIP program. Costs, citizens served and community impact were considered when prioritizing the actions.

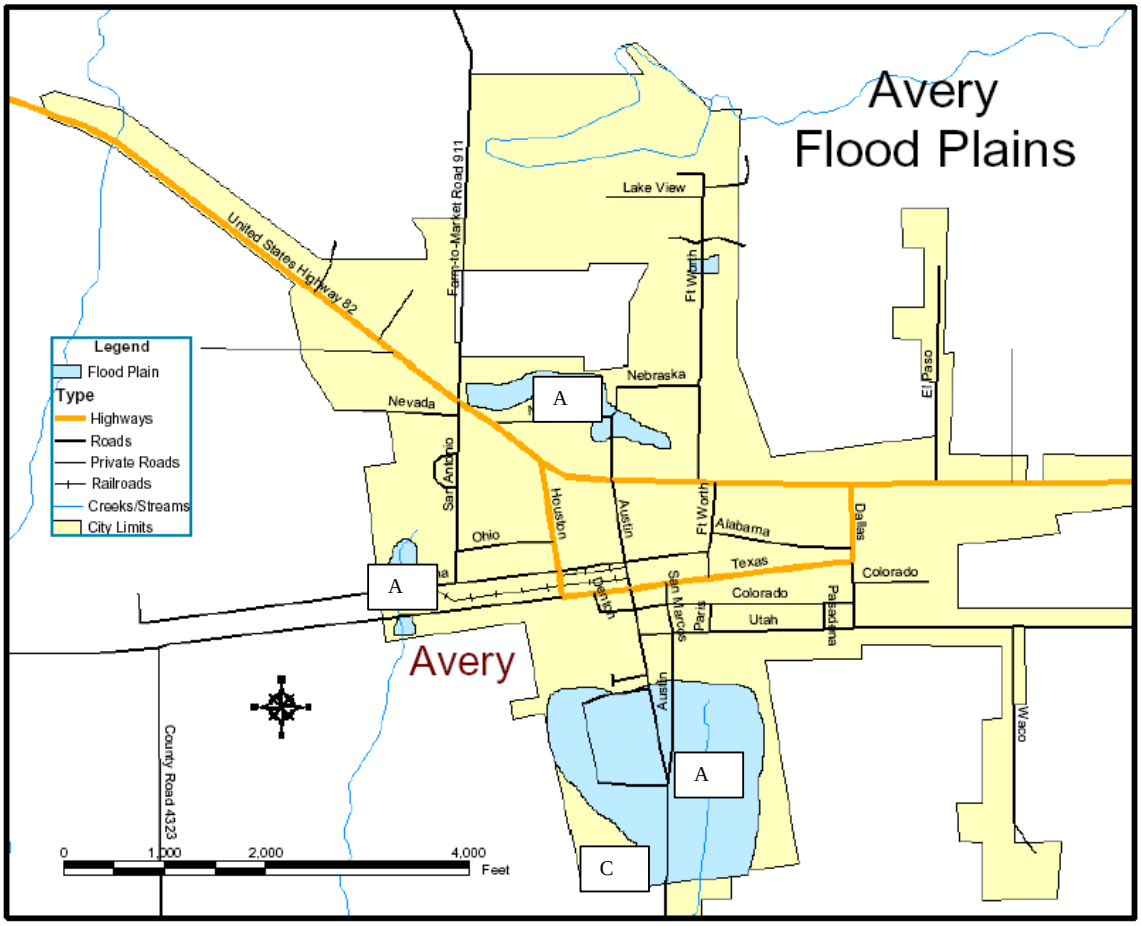


Clarksville Floodplains

The city of Clarksville has a total of 2043.52 acres inside the city limits. The 100-year flood plain covers 168.53 acres or 8% of the total acreage. The total taxable value of all property in the city is approximately 107,626,218 million dollars. Due to the location of the flood plain, a 100-year flood event would cause minimal damage. There would be minimal or no property damage, but possibly some public threat or inconvenience. There is no record of repetitive flood losses.

National Flood Insurance Program

Clarksville, Texas adopted a floodplain management ordinance on June 16, 1990. The city of Clarksville possesses floodplain maps and the city monitors for development activity in flood areas. There are no structures found in the Clarksville floodplain. A city employee monitors building activity in the floodplain.

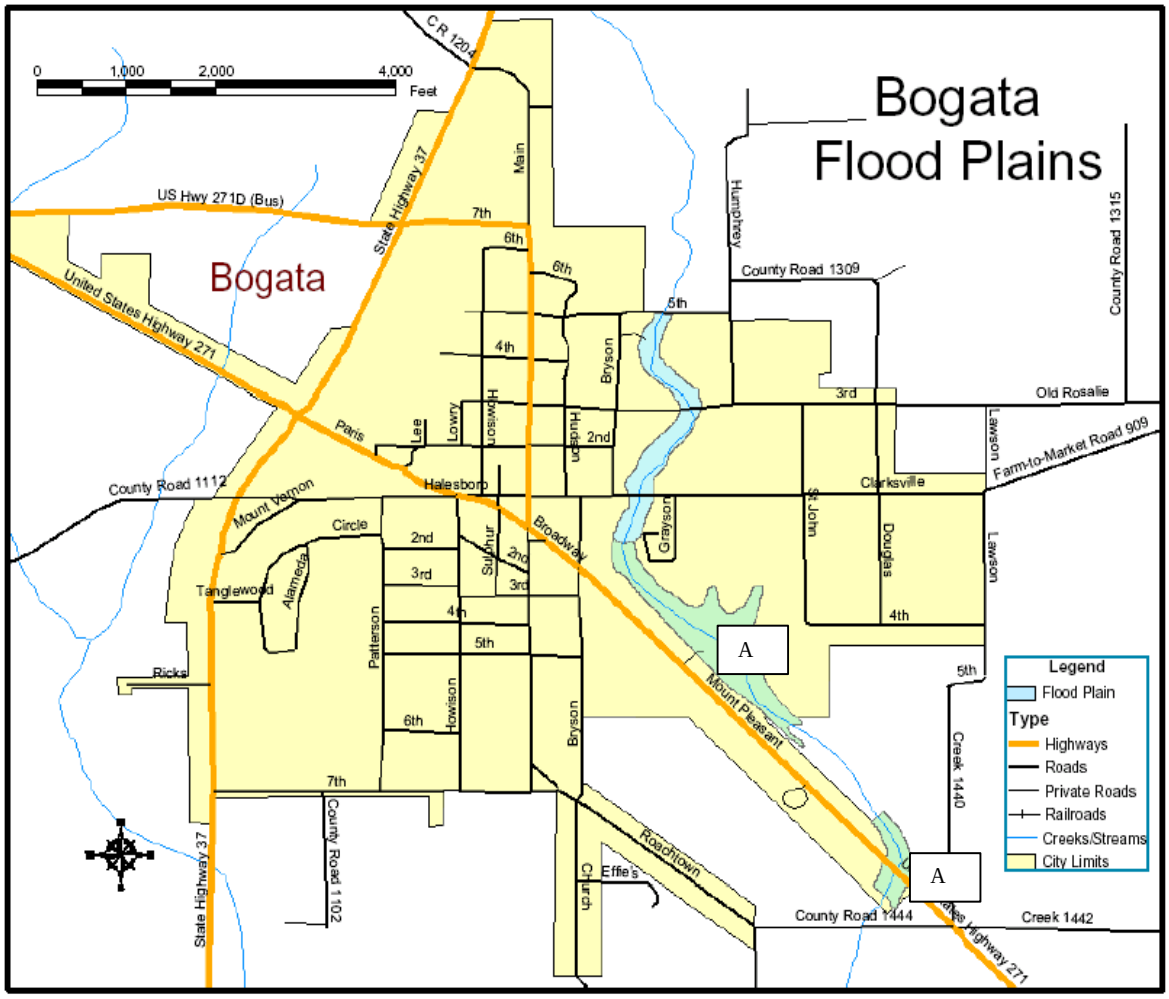


Avery Floodplain

The city of Avery has a total of 654.86 acres inside the city limits. The 100-year flood plain covers 76.43 acres or12 % of the total acreage. The total taxable value of all property in the city is approximately 10,363,288 million dollars. Due to the location of the flood plain, a 100-year flood event would cause minimal damage. There would be minimal or no property damage, but possibly some public threat or inconvenience. There is no record of repetitive flood losses.

National Flood Insurance Program

Avery, Texas is a participating member of the National Flood Insurance Program. The city of Avery possesses floodplain maps and the city monitors for development activity in flood areas. There are no structures found in the Avery floodplain. A city employee monitors building activity in the floodplain.

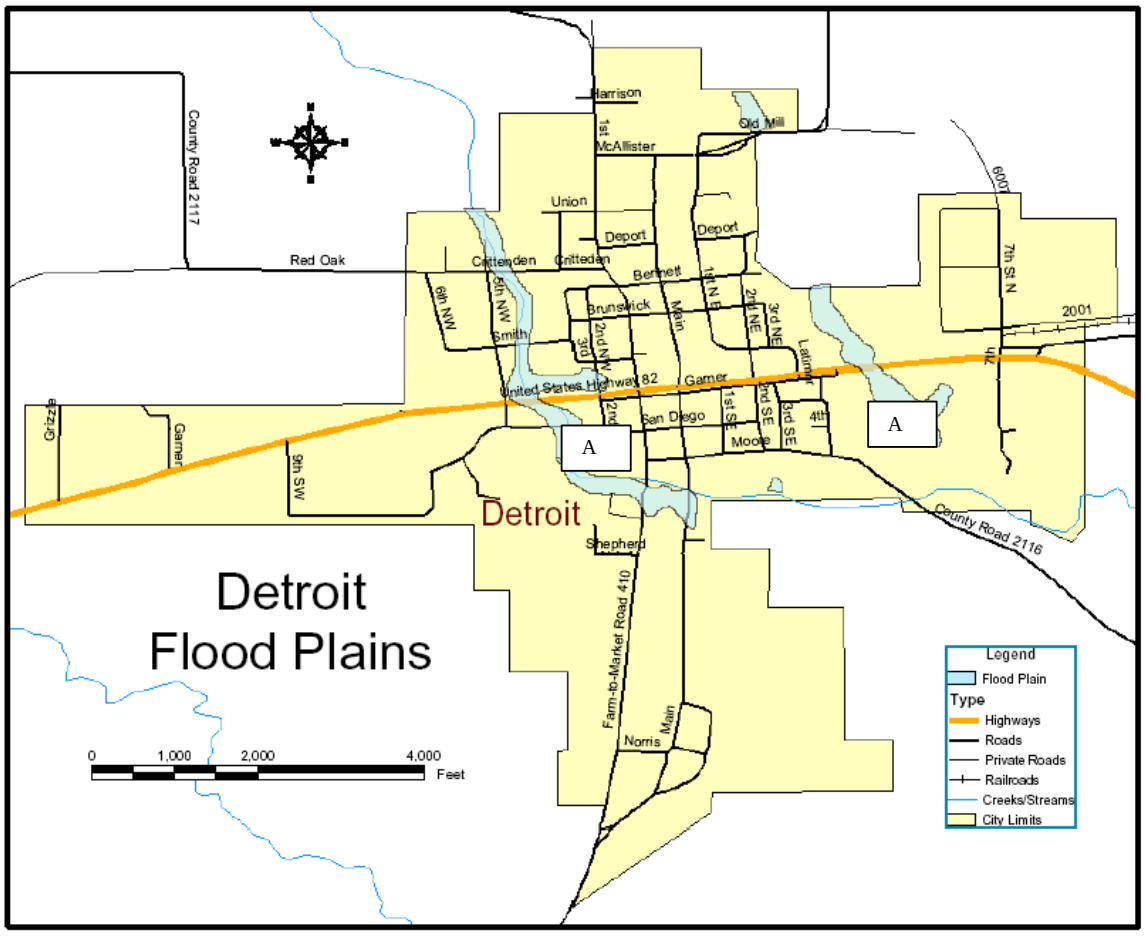


Bogata Floodplain

The city of Bogata has a total of 1059.77 acres inside the city limits. The 100-year flood plain covers 37.82 acres or 4% of the total acreage. The total taxable value of all property in the city is approximately 28,079,038 million dollars. Due to the location of the flood plain, a 100-year flood event would cause minimal damage. There would be minimal or no property damage, but possibly some public threat or inconvenience. There is no record of repetitive flood losses.

National Flood Insurance Program

Bogata, Texas is a participating member of the National Flood Insurance Program. The city of Bogata possesses floodplain maps and the city monitors for development activity in flood areas. There are no structures found in the Bogata floodplain. A city employee monitors building activity in the floodplain.

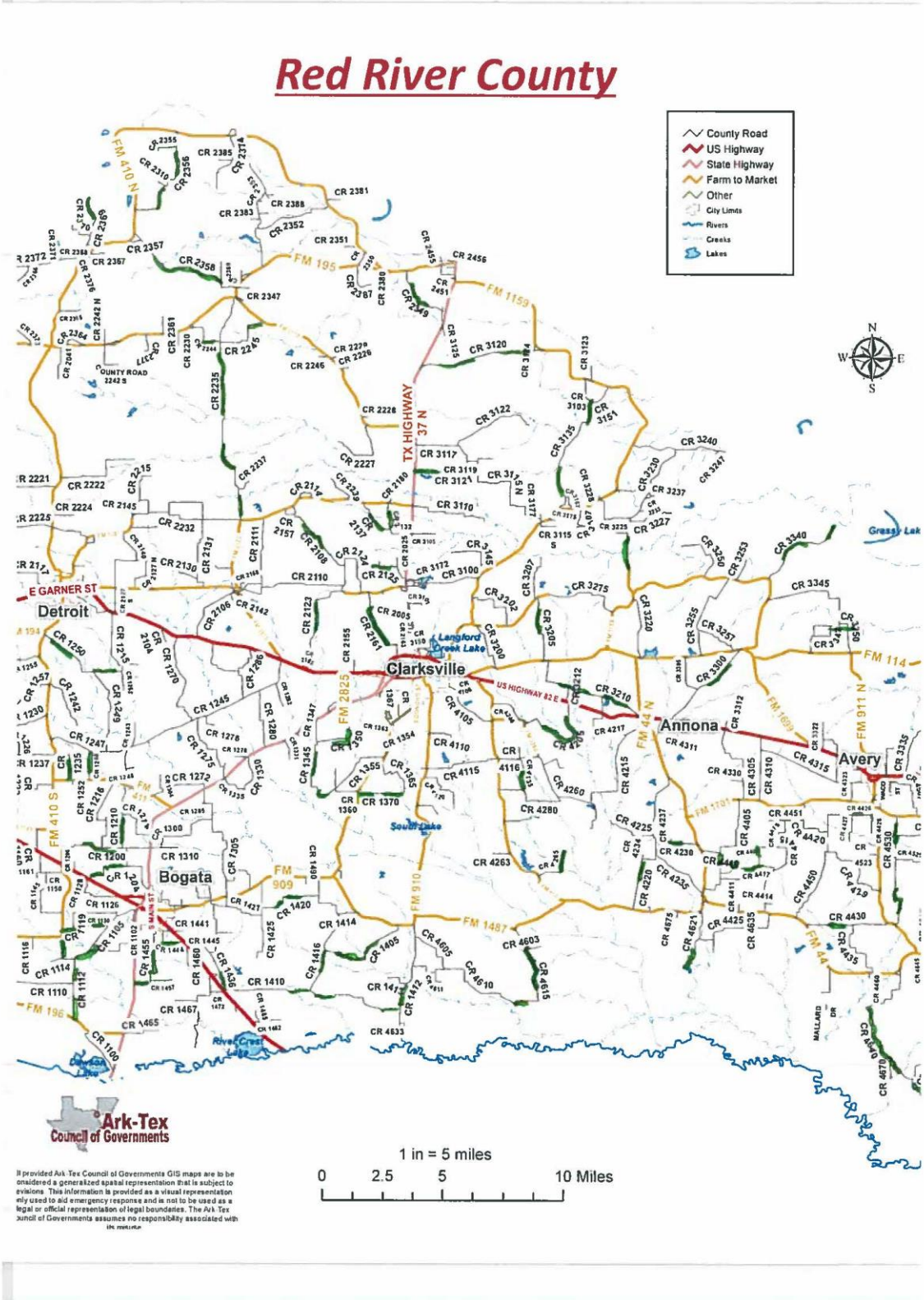


Detroit Floodplain

The city of Detroit has a total of 988.31 acres inside the city limits. The 100-year flood plain covers 32.98 acres or 3% of the total acreage. The total taxable value of all property in the city is approximately 14,296,900 million dollars. Due to the location of the flood plain, a 100-year flood event would cause minimal damage. There would be minimal or no property damage, but possibly some public threat or inconvenience. There is no record of repetitive flood losses.

National Flood Insurance Program

Detroit, Texas is a participating member of the National Flood Insurance Program. The city of Detroit possesses floodplain maps and the city monitors for development activity in flood areas. There are no structures found in the Detroit floodplain. A city employee monitors building activity in the floodplain.



The county roads highlighted in green are prone to flash flooding. After sustained heavy rains county roads may become impassable for a few hours to a few days, depending on the road and the amount of rain received. The solution to prevent flooding is raising the roadbed, which is cost prohibitive.

History of Flooding in Red River County

Flooding in the county includes March 19-20 2006 when the official rainfall for Red River County was over 7 inches. Again in May of 2009 a monthly total rainfall of a whopping 15.30 inches was recorded. The rural parts of county, outside of the city limits, have experienced hazardous road conditions due to major transportation routes flooding.

May 11, 1996

- FM Road 909 was closed 5 miles south of Clarksville due to flooding
- Eight inches of water over Hwy 271 for a distance of 350 feet closing the highway 2 miles South of Bogata.

February 20, 1997

- FM 909 was washed out by excessive rainfall closing the road and FM 410 was closed two miles north of Detroit.

November 5, 2000

Hwy 271 was closed due to high water 2 miles NNE of Bogata

November 6, 2000

Flooding over Highway 410 in Bogata

February 16, 2001

FM 911 in Avery was closed due to high water from flooding.

December 16, 2001

Highways 410, 909 and 1487 in Bogata closed due to flooding.

March 19, 2002

Highway 410 flooded and impassable in Detroit.

March 20, 2006

- Scatter Creek flooding over FM 909. Cut Hand Creek flooding over FM 1487.
- Mustang Creek flooding over FM 410. All roads were closed for a period of time. All the flooding occurred in rural areas of the county.

January 13, 2007

Heavy rainfall resulted in the flooding of Hwy 909 between the towns of Clarksville and Bogata.

May 2, 2009

Farm to Market 1487 was closed due to heavy rainfall 1 mile WSW of Cuthand and Farm to Market 412 was closed 3 miles southeast of Clarksville.

May 9, 2009
High water resulted in the closure of FM 911, 1-mile North of Avery and Hwy. 4215 southwest of Annona, was closed from extensive flash flooding.

May 10, 2009
The following roads were closed due to flash flooding:

- FM 1699 was closed from excessive heavy rainfall near the community of White Rock.
- FM 1487 near the Cuthand community was closed from flash flooding.
- FM 44 was closed 1 mile west of the community of Lydia due to heavy rainfall.
- FM 909 east of town was flooded and closed 909 1mile Northeast of Bogata.
- Cr 3117 was flooded and closed in unincorporated Red River County near the Hope Well Community.
- FM 1159 at CR 3240 near the unincorporated community of Bryarly was closed from heavy rainfall.

January 2, 2015
Bridges were flooded east of Clarksville, Texas including CR114 near English and CR 1158 near White Rock.

May 8, 2015
Farm to Market Road 195 closed 3 miles west of the unincorporated community of Manchester due to flooding.

November 27, 2015
A truck was stranded in high water on CR. 2149 near the Bagwell community. Property damage estimated at $10,000.

November 28, 2015
The following roads were closed due to flash flooding:

- Intersection of FM 909 and FM 1487 was closed south southwest of Clarksville, Texas
- FM 1487 South of Clarksville was flooded and closed
- FM 3390 southeast of Clarksville was flooded and closed.

December 12, 2015
Several County Roads were covered in high water and closed including:

- Hwy. 271 near the Bagwell community
- Hwy. 82 East near Clarksville
- CR 410 (a high water rescue was reported for a car that was swept into a creek near the Rugby community). Property damage estimated to be $5,000.
- CR 411

December 27, 2015
Widespread flooding was reported in and around the Clarksville area.

April 29, 2016

- FM 410 was closed near the intersection of CR 1255 due to flooding.
- FM 410 was closed due to flooding.

May 9, 2016

Turbulent weather with high winds and heavy rains produced flooding in the following towns:

- Two feet of water was reported over several roads in Detroit.
- Flooding over sidewalks on Main Street in downtown Clarksville
- FM 3281 was flooded and closed northeast of Detroit

July 5, 2017

- High water covered Cedar Street in Clarksville

February 21 2018

- Water covered numerous roadways across much of Red River County

February 22, 2018

- Highway 37 closed between Bogata and Hagansport due to flooding**.**
- FM 1387 closed from the Maple community to County Road 412 due to flooding.

March 1, 2018

- FM 410 near and south of County Road 1119 was closed due to flooding.
- FM 909 north of county Road 1487 was closed due to flooding

June 7, 2018

- A vehicle was flooded and stranded at the intersection of FM 910 and College Ave. in Clarksville.

A total of 28 events have been recorded by the National Weather Service (NOAA) since May 11, 1996. In the events a total of $15,000 worth of property damage was recorded.

The incorporated towns in Red River County experience street flooding after extremely heavy rains. It would be the exception in East Texas to find a town or city that does not. The flooding is minor. There are no repetitive loss properties, and no reported deaths or injuries due to flooding and minimal financial loss. All the cities are responsive to the dangers of high water and know to place warning signs out for motorists when needed.

Critical Facilities

There are no critical facilities identified as located in flood zones in Avery, Bogata, Clarksville, Detroit or Red River County.

National Flood Insurance Program

Red River County Communities Participating in the National Flood Program						
CID	Community Name	County	Init. FHBM Identified	Init. FIRM Identified	Curr. EFF Map Date	Reg-Emer Date
480983	Avery	Red River	08/13/76	09/14/82	09/14/82	09/14/80
480984	Bogata	Red River	08/06/76		08/06/76	08/25/10
481253	Clarksville	Red River	02/15/74	06/04/90	06/04/90	06/04/90
480985	Detroit	Red River	12/24/76	04/01/07	04/01/07(L)	04/01/07

Time is a kind of river, an irresistible flood sweeping up men and events and carrying them headlong, one after the other, to the great sea of being.

Marcus Aurelius

Red River County Flood Risk					
Jurisdiction	**Impact (45%)**	**Probability (30%)**	**Warning Time (15%)**	**Duration (10%)**	**Risk PRI**
Red River Co.	Limited PRI = .45	Highly Likely PRI =.120	6-12 hours PRI =.30	< 24 hrs. PRI = .20	Medium PRI = 2.15
Avery	Limited PRI =1	Highly Likely PRI = 4	Highly Likely PRI = 4	< 24 hrs. PRI = .20	Medium PRI = 2.15
Bogata	Limited PRI = 1	Highly Likely PRI = 4	Highly Likely PRI = 4	< 24 hrs. PRI = .20	Medium PRI = 2.15
Clarksville	Limited PRI =1	Highly Likely PRI = 4	Highly Likely PRI = 4	< 24 hrs. PRI = .20	Medium PRI = 2.15
Detroit	Limited PRI = 1	Highly Likely PRI = 4	Highly Likely PRI = 4	< 24 hrs. PRI = .20	Medium PRI = 2.15

EXTENT: Possible Amounts of Flooding		
Jurisdiction	**From**	**To**
Red River County	¼ inch	3 feet
Avery	¼ inch	1 foot.
Bogata	¼ inch	1 foot.
Clarksville	¼ inch	1 foot.
Detroit	¼ inch	1 foot.

Estimated Property Loss at 25 %	
Red River County	$483,592,326
Avery	$2,590,823
Bogata	$7,019,759
Clarksville	$26,906,555
Detroit	$3,574,225

Location: Historically, the entire County area has suffered from moderate flooding. If future trends occur as they have in the past, the County area will continue to have floods county-wide. The highways, FM Roads, county roads, and city streets will continue to flood. County roads, FM Roads, and state highways are depicted on the Red River County map on page 13 and 32. Red River County could see heavier rainfall as climate change impacts the region.

Extent: Many roadways in rural Red River County are known to flood during heavy rains. Farm to Market Roads are particularly susceptible to minor flooding. There are no repetitive loss properties, and no reported deaths or injuries due to flooding and minimal financial loss. However, should it rain hard enough in a short period of time, streets will flood. All the cities are responsive to the dangers of high water and know to place warning signs out for motorists when needed.

***Impact*:** The rural areas of Red River County will continue to have issues with flooding. There have been no injuries or deaths recorded. The impact of flash floods varies locally. Roads will flood in rural county areas after heavy rains. The population frequently uses those roads and could drive through the water and become stuck. endangering lives of citizens and first responders. There are no repetitive loss properties, and no reported deaths or injuries due to flooding with minimal financial loss.

In the participating jurisdictions improvements such as new culverts and the retrenching of ditches could help to minimize the problem, however, should it rain hard enough in a short period of time, streets will flood. Red River County and the jurisdictions of Avery, Bogata, Clarksville and Detroit are responsive to the dangers of high water and know to place warning signs out for motorists when needed. The Damage Assessment Tables found on page 25 demonstrate the amount of monetary damage that can be possible.

Probability: We must prepare for the increased potential of heavy rain. Flash floods are possible at any time during the storm season. These types of floods occur often during that period. According to an article published in the March 2011 issue of the prestigious science magazine *Nature*, most climate scientists agree that an increase of weather extremes has been a fundamental prediction of climate science for decades. Current data suggests that as the earth warms, precipitation extremes will become more intense, winter and summer, simply because warmer air can carry more water vapor. Weather statistics confirm that this has begun to happen. See also: https://climate.nasa.gov/evidence/

There are no national or major scientific institutions anywhere in the world that dispute the theory of anthropogenic climate change that will increase the likelihood of unstable weather patterns.

Vulnerability: The probability of a flash flood and the inability to accommodate the existing drainage on some of the FM roads can be a problem. Over 2 to 3 inches of rain per hour is considered a heavy rain in Red River County. Flooding is likely to occur in rural areas if that amount falls for several hours. There is a moderate chance of flooding if rain falls at a rate of 1-2 inches per hour and slight for anything under. The vulnerability rating for Red River County and its' jurisdictions is moderate. Multiple county roads may flood when flash floods occur. See table above: "History of Flash Flooding in Red River County" for more detail.

Summary: The jurisdictions of Avery, Bogata, Clarksville and Detroit experience flooded streets due to flash flooding. All the jurisdictions have emergency procedures in place to warn citizens about flooded streets. Barricades and cones are on hand to warn drivers of flooded areas. There are no repetitive flood properties in the jurisdictions. In Red River County, identified sections of rural roads and highways frequently flood after heavy rains. In these areas roads are well marked to warn drivers of impending danger. Educational programs like turn around, don't drown will help citizens become more informed about the dangers of flooded roadways. Alternate routes for emergency vehicles should be identified before flooding occurs.

TORNADOES

Description

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm (or sometimes as a result of a hurricane) and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado is a result of the high wind velocity and wind-blown debris. Tornado season is generally March through August, although tornadoes can occur at any time of the year. They tend to occur in the afternoons and evenings: over 80 percent of all tornadoes strike between noon and midnight.

Compared with other States, Texas ranks number one for frequency of Tornadoes, number of deaths, number of injuries and for cost of damages. When compared to other States by the frequency per square mile, Texas ranks number 10 for the frequency of tornadoes, number 16 for fatalities, number 21 for injuries per area and number 21 for costs per area.

Data on tornado events was gathered from various sources including the Hazard Mitigation Planning Team, local emergency officials, NOAA, and the Hazard Assessment Survey.

"This is not an easy business folks,….Disaster management is not a matter of reading a guide book and then showing up in the middle of a small town that has just been blown off the map by tornadoes." **Mike Brown (Former Under-Secretary of Emergency Preparedness and Response)**

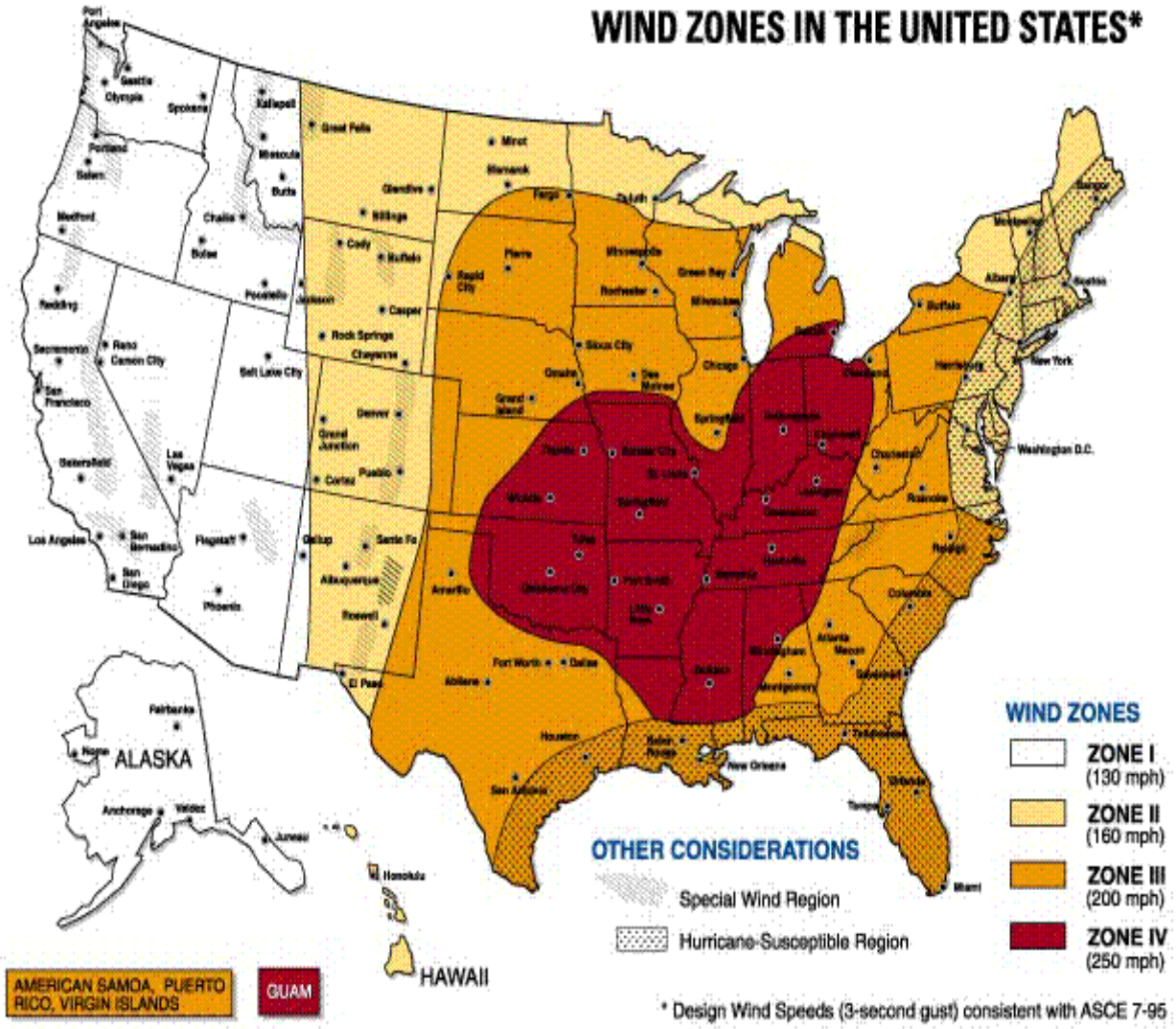


Figure I.2 Wind zones in the United States

Enhanced Fujita (EF) Scale		
Enhanced Fujita Category	**Wind Speed (mph)**	**Potential Damage**
EF0	**65-85**	**Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.**
EF1	**86-110**	**Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.**
EF2	**111-135**	**Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.**
EF3	**136-165**	**Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.**
EF4	**166-200**	**Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.**
EF5	**>200**	**Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yd); high-rise buildings have significant structural deformation; incredible phenomena will occur.**
source: http://en.wikipedia.org/wiki/Enhanced_Fujita_Scale		

The EF Scale was revised from the original Fujita Scale to reflect better examinations of tornado damage surveys to align wind speeds more closely with associated storm damage. The new scale has to do with how most structures are designed.

While the F-scale goes from F0 to F12 in theory, the EF-scale is capped at EF5, which is defined as "winds ≥200 mph (320 km/h)". In the United States, the Enhanced Fujita scale went into effect on February 2, 2007 for tornado damage assessments and the Fujita scale is no longer used.

RED River County Tornadoes				
Date	**Location**	**F SCALE**	**Description**	**Cost**
05/04/1999	This tornado moved nine miles, from Titus county into Red River County and exited into Bowie County, TX.	F3	Numerous trees were blown over or broken. A few out-buildings were severely damaged	5.00K
03/26/2000	5 miles NNE of Avery.	F1	Tornado developed on the comma head at the northern end of bow echo. A few trees were blown over or broken. A church lost part of its roof.	2.0K
04/23/2000	2 miles NE of Blakeney community.	F2	Tornado occurred across farmland and wooded areas with few structures or homes present. The tornado was described as a long tube.	0
05/14/2009	1 mile NNW of Briarley	EF0	Metal roofing material was removed from a barn, some of which landed in an adjacent tree. Additional roofing material was found in an open field, several hundred yards southeast of the barn. The tornado also snapped several trees on the edge of a thicket.	0.50K
06/10/2009	2 miles South of Detroit	EF0	Several trees were snapped south of Detroit Texas along FM 410. Numerous small and large limbs were also laying in a path approximately 1000 yards wide. Some trees were also snapped near the end of the track along Hwy. 82 east of Detroit. Maximum winds were estimated at 60-65 mph	0.00K
03/08/2011	Unincorporated Red River County	EF1	The tornado touched down approximately 8 miles west of Clarksville where it knocked down sever small trees. The tornado tracked ENE crossing northwest of Clarksville damaging trees along the road. Once the tornado reached the north side of Clarksville, it intensified and widened to its widest point. The tornado crossed through a neighborhood north of	400.00K

			Clarksville on the west side of Hwy. 37 where approximately a dozen homes sustained minor damage to their roofs, awnings or carports. Numerous trees were snapped or damaged as well. Just north of the neighborhood at a business, a FEMA trailer was completely destroyed with insulation and pieces of the trailer strewn northeast and east. On the east side of Hwy. 37, numerous power poles were snapped, a semi-tractor trailer was overturned onto a small-pick-up and a home sustained moderate damage to the roof. The tornado continued east-northeast crossing FM 1159 and CR 1700. The tornado continued east, north of CR 17oo, damaging trees before lifting east of CR 3202. The tornado was on the ground for nearly 11 miles and a total of approximately 20 minutes. Maximum winds were estimated at 80-90 mph. The maximum width of the tornado was 225 yards wide.	
05/20/2011	Unincorporated Red River County	EF0	The tornado first touched down over a wooded area east of Manchester damaging a few trees. The tornado moved northeast crossing FM 195 where a few small trees and limbs were snapped. The tornado ended north of FM 195. The maximum winds were estimated at 65-70 mph.	0
Tornadoes Occurring Since Last 5 Year Update in 2011				
04/03/2012	Unincorporated Red River County	EF0	A tornado touched down along CR 4610, where a few were uprooted. The tornado traveled north, northeast just east of CR 910 where additional trees were snapped and uprooted. This tornado continued across CR 4605, snapping large limbs off of several more trees before lifting in a heavily wooded area. The tornado was on the ground for nearly 11 miles and a total of approximately 20 minutes. Maximum winds were estimated at 80-90 mph. The maximum width of the tornado was 225 yards wide.	0
06/09/2014	Avery	EF0	Tornado began along CR.3326 where it snapped numerous trees, damaged the roof of the school gym and a dugout at the baseball field before lifting on the east side of town. Winds were estimated to be near 85 mph,	10.00K
			The tornado first touched down just west of County Road 1100. The storm moved in a north-northwest trajectory, lifting	

12/12/2015	SW of Bogata In unincorporated Red River County	EF1	near the FM 196 and CR 1112 split. Damage consisted of snapped and or uprooted trees. Structural damage included the removal of a roof from a two-story home	35.00K
12/12/2015	NW of Bogata in unincorporated Red River County.	EF1	This tornado briefly developed near the intersection of FM 411 and CR 1245. The trunks of some trees were snapped, and an outbuilding was completely destroyed before the tornado lifted.	10.00K
			All tornadoes total	**27.422M**
			Tornadoes totals since last update	**55.00K**

According to the National Climate Data Center Storm Events Database, there have been no Tornadoes recorded in Red River County since 2015. Winds can be expected from EF 0 to EF 5 on the Enhanced Fujita Scale in the county.

Tornadoes in Red River County 1961-2015

Probability/Severity		
Fujita Scale	Tornados	Percent
F0	**9**	**28.1**
F1	**10**	**31.25**
F2	**8**	**25**
F3	**4**	**12.5**
F4	**1**	**3.1**
F5		
Total	**32**	

Eleven tornadoes have been recorded in Red River County in the last 20 years. Red River County is 1,057 square miles in area. The small towns consist of a fraction of the total land surface for the county with a total of 7.7 square miles. There is a likelihood of a tornado occurring in Red River County without hitting a dense population area.

Red River County Tornado Risk					
Jurisdiction	**Impact (45%)**	**Probability (30%)**	**Warning Time (15%)**	**Duration (10%)**	**Risk PRI**
Avery	Substantial PRI=1.8	Unlikely PRI = 30	< 6 hrs. PRI=.06	< 6 hrs. PRI=.10	Medium 2.26
Bogata	Substantial PRI=1.8	Unlikely PRI = 30	< 6 hrs. PRI=.06	< 6 hrs. PRI=.10	Medium 2.26
Clarksville	Substantial PRI=1.8	Unlikely PRI = 30	< 6 hrs. PRI=.06	< 6 hrs. PRI=.10	Medium 2.26
Detroit	Substantial PRI=1.8	Unlikely PRI = 30	< 6 hrs. PRI=.06	< 6 hrs. PRI=.10	Medium 2.26
Red River County	Substantial PRI=1.8	Highly Likely PRI = 1.20	< 6 hrs. PRI=.06	< 6 hrs. PRI=.10	High 3.16

Red River County Critical Facilities					
Critical Facilities	**Avery**	**Bogata**	**Clarksville**	**Detroit**	**Red River Co.**
City Hall	1	1	1	1	
Fire Station	1	1			6
Govt. Facility			4		
Wastewater Treatment Plant	1	1	1		
Corrections Facility			1		
Maintenance Barn		1	1	1	4
Post Office	1	1	1	1	
Water Tower	1	2	2		4
Police Station		1	1		
Sheriff Office			1		
EMS			1		
Water Treatment Plant			1		
County Seat and offices			1		

Tornadoes can strike anywhere in Red River County. All critical facilities are vulnerable to the destructive forces of a tornado.

Estimated Property Loss at 50%	
Red River County	$967,184,653
Avery	$5,181,645
Bogata	$14,039,520
Clarksville	$53,813,110
Detroit	$7,148,451

Location: Tornado Alley is a term often used by the media to denote a zone in the Great Plains region of the central United States, often a north-south oriented region centered on north Texas, Oklahoma, Kansas, and Nebraska, where tornadoes are most frequent. Most maps show Red River County located on the eastern edge of tornado alley.

Probability: Tornadoes are most frequent in the months of April, May and June. While tornadoes can occur at any time during the day or night, they tend to form during the late afternoon and into the evening. Based on a historical trend over the past 40 years, Red River County can expect to receive several tornado touchdowns per year. The expected tornado size would range between 25 to 1000 yards wide, with a path from one to 10 miles long. Most tornadoes are expected to touchdown for relatively short periods of time in a bounce type pattern. The occurrence of a tornado touchdown on an annual basis is considered highly likely.

Impact: A tornado can destroy infrastructure. Power lines are often down creating power outages and the possibility of electrocution from live downed wires. Fires can occur from electrical shorts and ruptured gas lines.

Communications in the tornado hit area may be disabled, with both land telephone lines and cell service blackouts. Falling trees often block roads and cause major structural damage to houses and businesses. Depending on the severity of a tornado, businesses could lose needed revenue if their services or customer availability is disrupted. Employees might suffer from layoff or terminations. Area hospitals could be overrun with injuries and casualties.

Efficient coordination of emergency services including police, fire departments and utility company repair support would play a vital role in lessening impact and reducing injury. Alternate routes to reach schools and housing might need to be established due to debris and fallen trees.

The possibility of injury is directly correlated to the density of population and the severity of the tornado winds. A direct hit of F2 or higher could be devastating.

Extent: The **Enhanced Fujita Scale**, or **EF Scale** is the scale for rating the strength of tornadoes in the United States estimated via the damage they cause. Implemented in place of the Fujita scale, it was used starting February 1, 2007. The scale has the same basic

design as the original Fujita scale, six categories from zero to five representing increasing degrees of damage. It was revised to reflect better examinations of tornado damage surveys, to align wind speeds more closely with associated storm damage. The new scale takes into account how most structures are designed and is thought to be a much more accurate representation of the surface wind speeds in the most violent tornadoes. A strategically placed EF4 or EF5 Tornado could destroy Avery, Bogata, Clarksville and Detroit. Fortunately, a storm of that magnitude had never occurred.

Historically the severity has ranged from EF0 to EF4 on the Enhanced Fujita (EF) Scale. The entire scale presented is used to determine ranges and severity. The full range of 65 (F0) to 200 mph (F5 +) are possible in Red River County and its jurisdictions.
The full range of this scale is used to determine ***extent.*** ***(See page 41)***

Vulnerability: Due to the frequency and unpredictable pattern of tornadoes, all of Red River County is vulnerable to tornado-induced damages. The damage potential is high due to the concentrations of populated areas, number of mobile homes and manufactured housing units throughout the county. Since the costs associated with an individual event are not considered high, but the population affected may be high, the level of vulnerability is considered moderate.

Summary: The jurisdiction of Avery, Bogata, Clarksville, and Detroit could experience substantial damages from tornadoes. All the jurisdictions, with the exception of Clarksville, are less than two square miles in size. Clarksville covers 3 square miles. Many of the businesses are prefab structures and most of the housing is older, wood frame dwellings. Even EF 2 winds would cause major damages. The school systems have emergency plans in place to protect the children. There are only two nursing homes in the county, both located in Clarksville. EMS and the fire department have planned evacuation procedures if needed. It is conceivable that a targeted tornado strike could result in a 50 to 75% loss. Upgrades in building codes and safe room construction are important life savers in these rural communities. In contrast Red River County is one of Texas' largest counties covering 1,058 square miles. Damages would be less dramatic should a Tornado strike in the rural areas because the population is not as dense. See the tables on pages 25 to review estimated loss values.

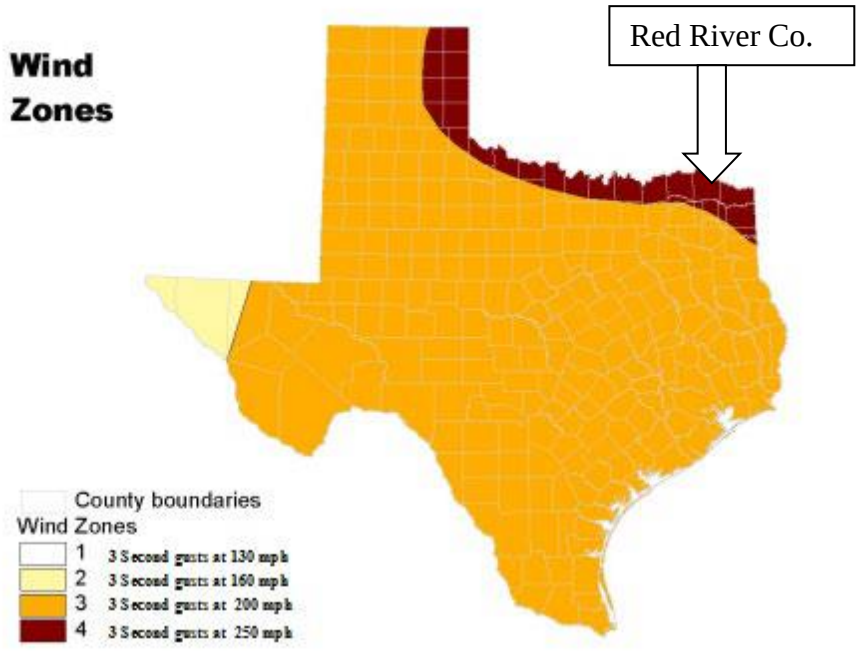
"Toto, we're not in Kansas anymore."

Dorothy from the Wizard of Oz

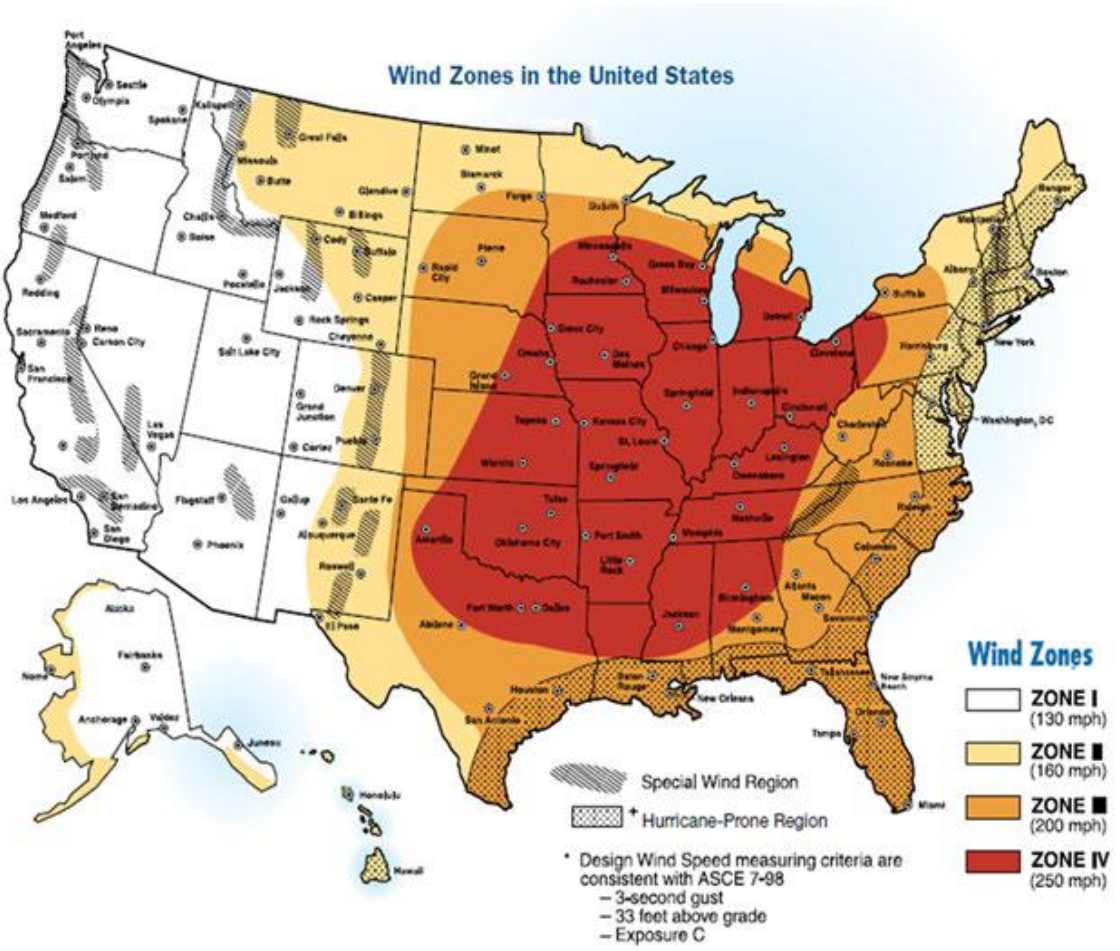
Severe Winds

Description

Severe winds such as the widespread, long-lived, straight-line wind events (derechos) can occur alone or sometimes accompany other natural hazards including hurricanes and severe thunderstorms. This section evaluates winds occur with severe thunderstorms, high winds, and strong winds. Severe winds pose a threat to lives, property, and vital utilities primarily due to the effects of flying debris, downed trees and interactions with power lines. The most damage severe winds cause is to structures of light construction (i.e., manufactured homes).



The following map illustrates the wind risk zones of the entire U.S. based on the highest expected wind speeds with the following criteria: 1) three-second gusts, and 2) thirty-three-feet above grade. The data on the map takes into account all wind hazards including severe thunderstorms, tornadoes, and hurricanes. Zones are associated with the highest wind speed for that region. The map also displays special wind hazard-prone areas. Wind speeds draw a parallel to design specifications of a shelter or safe room. Typically, Texans require a shelter/safe room to withstand 160-200 mph wind with a maximum expectance of 250 mph.



The Beaufort Scale depicted in the chart shows wind speeds and the effects of winds on land. The entire range of the scale is used to determine EXTENT in Red River County

Beaufort Scale

Beaufort number	Wind Speed (mph)	Seaman's term		Effects on Land
0	Under 1	Calm		Calm; smoke rises vertically.
1	1-3	Light Air		Smoke drift indicates wind direction; vanes do not move.
2	4-7	Light Breeze		Wind felt on face; leaves rustle; vanes begin to move.
3	8-12	Gentle Breeze		Leaves, small twigs in constant motion; light flags extended.
4	13-18	Moderate Breeze		Dust, leaves and loose paper raised up; small branches move.
5	19-24	Fresh Breeze		Small trees begin to sway.
6	25-31	Strong Breeze		Large branches of trees in motion; whistling heard in wires.
7	32-38	Moderate Gale		Whole trees in motion; resistance felt in walking against the wind.
8	39-46	Fresh Gale		Twigs and small branches broken off trees.
9	47-54	Strong Gale		Slight structural damage occurs; slate blown from roofs.
10	55-63	Whole Gale		Seldom experienced on land; trees broken; structural damage occurs.
11	64-72	Storm		Very rarely experienced on land; usually with widespread damage.
12	73 or higher	Hurricane Force		Violence and destruction.

Past Occurrences

20 Year History of Severe Winds in Red River County

77 THUNDERSTORM & HIGH WIND event(s) were reported in **Red River County, Texas** between **03/02/2000** and **11/07/2018**.

Mag: Magnitude
Dth: Deaths
Inj: Injuries
PrD: Property Damage
CrD: Crop Damage

Table 3.11

Location or County	Date	Time	Mag	Dth	Inj	PrD	CrD
1 Clarksville	03/02/2000	08:00 PM	64 kts.	0	0	0	0
2 Clarksville	03/02/2000	08:05 PM	58 kts.	0	0	0	0
3 Woodland	05/18/2000	07:20 PM	52 kts.	0	0	0	0
4 Bagwell	07/22/2000	08:00 AM	55 kts.	0	0	0	0
5 Clarksville	07/22/2000	08:10 AM	52 kts.	0	0	0	0
6 Clarksville	11/06/2000	12:15 PM	52 kts.	0	0	0	0
7Clarksville	06/14/2001	07:50 PM	62 kts.	0	0	0	0
8 Clarksville	04/07/2002	08:45 PM	70 kts.	0	0	**30K**	0
9 Clarksville	12/30/2002	04:25 PM	60 kts.	0	0	0	0
10 Bogata	05/16/2003	04:00 PM	52 kts.	0	0	0	0
11 Clarksville	06/11/2003	03:30 AM	65 kts.	0	0	0	0
12 Bogata	03/04/2004	05:00 PM	58 kts.	0	0	0	0
13 Bogata	03/04/2004	05:00 PM	58 kts.	0	0	0	0
14 Clarksville	06/02/2004	05:45 PM	60 kts.	0	0	0	0
15 Bogata	06/02/2004	06:20 PM	62 kts.	0	0	0	0
16 Clarksville	06/18/2004	03:50 PM	55 kts.	0	0	0	0
17 Avery	06/18/2004	04:10 PM	56 kts.	0	0	0	0
18 Annona	03/09/2006	06:23 AM	58 kts.	0	0	**10K**	0
19 Avery	03/09/2006	06:30 AM	57 kts.	0	0	0	0
20 Clarksville	06/06/2006	04:40 PM	58 kts.	0	0	**5K**	0
21 Clarksville	05/15/2007	13:40 PM	53 kts.	0	0	0K	0K
22 Dimple	05/30/2007	09:10 AM	55 kts.	0	0	0K	0K
23 Bagwell	09/27/2007	15:25 PM	53 kts.	0	0	0K	0K
24 Detroit	02/05/2008	15:30 PM	54 kts.	0	0	0K	0K
25 Clarksville	02/05/2008	16:14 PM	53 kts.	0	0	0K	0K

26 Detroit	04/03/2008	20:51 PM	54 kts.	0	0	0K	0K
27 Clarksville	04/10/2008	05:20 AM	54 kts.	0	0	0K	0K
28 Blakeney	06/14/2008	04:50 AM	53 kts.	0	0	**10K**	0K
29 Greenwood	06/14/2008	04:55 AM	53 kts.	0	0	0K	0K
30 Detroit	05/09/2009	01:40 AM	54 kts.	0	0	0K	0K
31 Avery	05/09/2009	12:30 PM	53 kts.	0	0	0K	0K
32 Cuthand	05/14/2009	03:30 AM	53 kts.	0	0	0K	0K
33 Lydia	05/14/2009	03:50 AM	54 kts.	0	0	0K	0K
34 Dimple	08/20/2009	20:45 PM	51 kts.	0	0	0K	0K
35 Rosalie	04/24/2010	02:20 AM	54 kts.	0	0	0K	0K
36 Clarksville	05/14/2010	16:30 PM	50 kts.	0	0	0K	0K
37 Dimple	07/17/2010	16:40 PM	51 kts.	0	0	0K	0K
38 Clarksville	04/11/2011	2:45 AM	52 kts.	0	0	0K	0. K
39 Annona	04/11/2011	2:55 AM	52 kts.	0	0	0 K	0. K
40 Bogata	06/21/2011	3:45 Am	52 kts.	0	0	0 K	0. K
41 Silver City	06/28/2011	16:40	55 kts	0	0	0.K	0.K
42 English	06/28/2011	17:00	56 kts	0	0	0.K	0.K
43 Boxelder	06/28/2011	17:25	56 kts	0	0	0.K	0.K
44 Clarksville	10/22/2011	23:10	54 kts	0	0	0.K	0.K
45 Clarksville	04/02/2012	14:30	54 kts	0	0	0.K	0.K
46 Clarksville	10/13/2012	23:45	55 kts	0	0	0.K	0.K
47 Clarksville	12/19/2012	22:45	58 kts	0	0	0.K	0.K
48 Woodland	03/31/2013	7:00	54 kts	0	0	0.K	0.K
49 Bagwell	07/14/2014	13:55	53 kts	0	0	0.K	0.K
50 Cherry	07/14/2014	13:55	53 kts	0	0	00.K	00.K
51 Clarksville	07/23/14	16:59	53 kts	0	0	00.K	00.K
52 Bogata	08/16/2014	17:05	52 kts	0	0	00.K	00.K
53 Clarksville	10/02/2014	16:50	58 kts	0	0	00.K	00.K
54 Bogata	05/25/2015	16:15	65 kts	0	0	**25.00K**	00.K
55 Clarksville	05/25/15	16:20	75 kts	0	0	00.K	00.K
56 Avery	05/25/15	16:43	65 kts	0	0	**75.00K**	00.K
57 Bogata	12/12/2015	17:04	56 kts	0	0	00.K	00.K
58 Dimple	12/12/2015	19:25	58 kts	0	0	00.K	00.K
59 Detroit	03/17/2016	08:10	56 kts	0	0	00.K	00.K

60 Bagwell	03/17/2016	08:15	70 kts	0	0	00.K	00.K
61 Clarksville	03/17/2016	08:25	70 kts	0	0	**250.00K**	00.K
62 English	03/17/16	08:35	56kts	0	0	**10.00K**	00.K
63 McCoy	03/17/16	08:40	56 kts	0	0	00.K	00.K
64 Clarksville	03/17/16	08:42	56 kts	0	0	00.K	00.K
65 Dimple	05/09/2016	19:09	74 kts	0	0	00.K	00.K
66 White Rock	05/09/2016	19:25	74 kts	0	0	00.K	00.K
67 McCoy	05/09/2016	20:08	78 kts	0	0	00.K	00.K
68 Detroit	05/09/2016	20:48	56 kts	0	0	00.K	00.K
69 Aiken Grove	03/26/2017	23:05	52 kts	0	0	00.K	00.K
70 Aiken Grove	04/29/2017	19:42	61 kts	0	0	00.K	00.K
71 McCoy	04/29/2017	19:45	61 kts	0	0	00.K	00.K
72 Manchester	04/29/2017	19:50	61 kts	0	0	00.K	00.K
73 Clarksville	06/23/2017	20:57	52 kts	0	0	00.K	00.K
74 Johntown	04/06/2018	15:52	56 kts	0	0	00.K	00.K
1075 Avery	04/13/2018	18:00	65 kts	0	0	00.K	00.K
76 Sherry	06/07/2018	16:00	52 kts	0	0	00.K	00.K
77 Dimple	11/07/2018	02:15	52 kts	0	0	00.K	00.K
					Total	**415.00K**	00.K

Red River County Critical Facilities					
Critical Facilities	**Avery**	**Bogata**	**Clarksville**	**Detroit**	**Red River Co.**
City Hall	1	1	1	1	
Fire Station	1	1			6
Govt. Facility			4		
Wastewater Treatment Plant	1	1	1		
Corrections Facility			1		
Maintenance Barn		1	1	1	4
Post Office	1	1	1	1	
Water Tower	1	2	2		4
Police Station		1	1		
Sheriff Office			1		
EMS			1		
Water Treatment Plant			1		
County Seat and offices			1		

Critical Facilities
All critical facilities located in Red River County unincorporated and the jurisdictions of Avery, Bogata, Clarksville and Detroit are vulnerable to some structural damage from high winds.

Red River County Thunderstorm Winds Risk					
COMMUNITY	**POTENTIAL IMPACT 45%**	**PROBABLITY 30%**	**Warning 15%**	**Duration 10%**	**RISK**
Red River Unincorporated	Minor PRI = 2	Highly Likely PRI = 4	> 24 hrs. PRI = 1	< a week PRI = 3	Medium 2.55
Avery	Minor PRI = 2	Highly Likely PRI = 4	> 24 hrs. PRI = 1	< a week PRI = 3	Medium 2.55
Bogata	Minor PRI = 2	Highly Likely PRI = 4	> 24 hrs. PRI = 1	< a week PRI = 3	Medium 2.55
Clarksville	Minor PRI = 2	Highly Likely PRI = 4	> 24 hrs. PRI = 1	< a week PRI = 3	Medium 2.55
Detroit	Minor PRI = 2	Highly Likely PRI = 4	> 24 hrs. PRI = 1	< a week PRI = 3	Medium 2.55

***Location*:** All of Red River County is susceptible to the damaging effects of thunderstorms and their accompanying high winds can develop quickly and in any location. Refer to the list of storms in the last ten years beginning on the preceding page.

Extent: A worst case scenario involving thunderstorms winds would be a solid or redeveloping line of severe thunderstorms that moves through the entire county. These

storms can result in heavy rains causing widespread flooding and road closures. Large economic loss to agriculture and/or major damage to buildings and other property can result if such storms are accompanied by hail and high winds. High winds can also down trees and highline poles and result in power outages capable of affecting large areas of the county. Extreme winds can cause several kinds of damage to a building. Wind speeds, even in these extreme wind events, rapidly increase and decrease. An obstruction such as a house in the path of the wind causes the wind to change direction. This change in wind direction increases pressure on parts of the house. The combination of increased pressures and fluctuating wind speeds creates stress on the house that frequently causes connections between building components to fail.

***Probability*:** Given the climate and history, high winds, particularly those accompanying thunderstorms are highly probable during the storm season. Historically there have been several severe windstorms recorded in Red River County each year.

Vulnerability: The County is susceptible to flash flooding and wind damage from severe thunderstorms. Vulnerability is high depending on magnitude of the storm. Damage potential is high in populated areas. There were 77 thunderstorm/ high wind events in Red River County between March 2000 and August November 2018. The Highest wind recorded for this time period was 78 knots. The total property damage loss was $415,000. This most expensive single event occurred on March 17, 2016 in Clarksville when roofs were blown off buildings, a couple of gas stations either lost their canopies or had their canopies collapse. A car repair shop and the county jail also had their roofs lifted by the winds resulting in $250,000 worth of damages. There were no deaths, injuries or crop damage reports during this time period.

Summary: The jurisdictions of Avery, Bogata, Clarksville and Detroit as well as Red River County can fall prey to the high winds, that often accompany thunderstorms. Although these storms are typically not as deadly as tornadoes, they can inflict serious structural damage to buildings, personal injury and death. Fires sometimes develop from the lightening, tall trees which are plentiful and their limbs, can fall on autos, homes and people. As a rule, protected populations such as schools and nursing homes are not at risk. Power outages are common during thunderstorms. All the jurisdictions could benefit from emergency backup generators for wastewater disposal and emergency equipment. See tables on page 25 that estimate costs due to damages.

Hailstorms

Hail is a form of precipitation that occurs at the beginning of thunderstorms. It is in the form of balls or lumps of ice, usually called hailstones. Hail is formed when raindrops pass through a belt of cold air on their way to earth. This belt of cold air causes the raindrops to freeze into small blocks of ice. The formation of hail requires the presence of cumulonimbus or other convective clouds with strong updrafts. The air turbulence that accompanies thunderstorms aids the formation of hailstones. The water that goes into the formation of hailstones is super-cooled water, that is to say, it is at a temperature below freezing point but still in the form of a liquid.

Hailstones start falling when they become too heavy to be supported by air currents. Hailstones are not formed of single raindrops. However, the process of formation of a hailstone does start with the freezing of a single raindrop. This may be carried by a strong current to the level where rain is still falling as drops. And as this again passes through the cold air belt, new raindrops may cling to the frozen hailstone, thus increasing its size. Hailstones grow by repeated collisions with super-cooled water. This water is suspended in the cloud through which the particle is traveling. Those single frozen raindrops that do not get carried back to the raindrop level remain as smaller hailstones.

Hailstorms are very common in middle latitudes and a heavy shower generally lasts around 15 minutes. Hailstorms generally occur during mid to late afternoon. Big hailstones falling with force are known to have caused fatal harm to human and animal life.

Combined NOAA/TORRO Hailstorm Intensity Scales

Size Code	Intensity Category	Typical Hail Diameter (in.)	Approximate Size	Damage Impacts
H0	Hard Hail	Up to 0.33	Pea	No damage
H1	Potentially Damaging	0.33-0.60	Marble	Slight damage to plants, crops
H2	Potentially Damaging	0.60-0.80	Dime	Significant damage to fruit, crops, vegetation
H3	Severe	0.80-1.20	Nickel to Quarter	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	1.2-1.6	Ping Pong Ball	Widespread glass damage, vehicle bodywork damage
H5	Destructive	1.6-2.0	Golf Ball	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	2.0-2.4	Egg	Aircraft bodywork dented, brick walls pitted
H7	Very Destructive	2.4-3.0	Tennis Ball	Severe roof damage, risk of serious injuries
H8	Very Destructive	3.0-3.5	Baseball	Severe damage to aircraft bodywork
H9	Super Hailstorms	3.5-4.0	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	4+	Softball and Up	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

HISTORY OF HAILSTORMS IN RED RIVER COUNTY

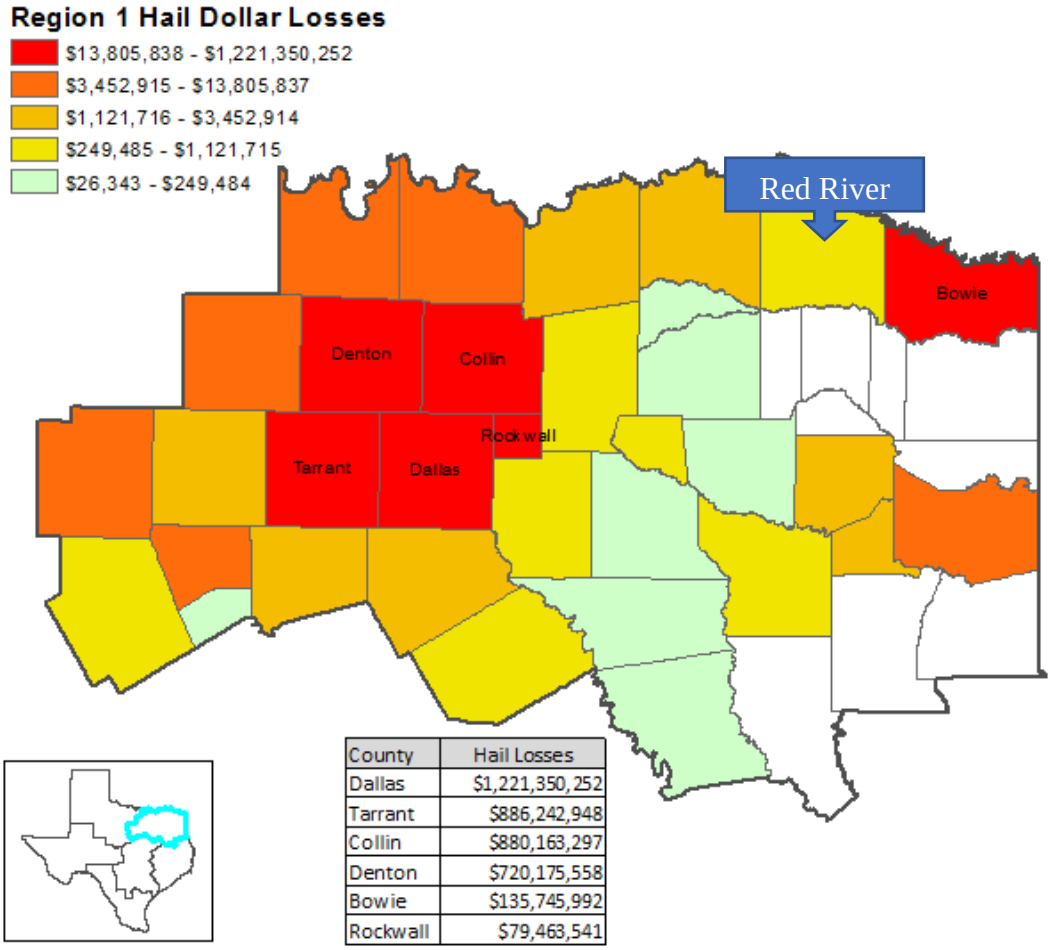
The NOAA Satellite and Information Service, National Climatic Data Center, reports that there have been 55 days with hail events reported between 1999 and 2019 in Red River County. In a few situations multiple hailstorms occurred on the same day. For this reports' purposes these were recorded as $250,000 in damage. This was the only event that reported any property damage. All of the jurisdictions have recorded multiple hail events over the last 64 years of record keeping. Ten hailstorms have occurred in the last five years in Red River County. one event. One event recorded a magnitude of 2.50 inches which is an H7 on the hailstorm intensity scale. This storm damaged numerous automobiles and broke windows recording. The possibility of hailstorms is the same over the entire Red River County planning area.

Hail can damage roofs, siding, windows, cars, and satellite dishes. Each year hailstorms cause millions of dollars of damage to crops like corn and soybeans. It can rip the leaves off trees and in extreme cases, kill small animals. Business signage can be destroyed by large hail. In Red River County, Texas the probability of a hailstorm occurring is high (100%).

In Avery, Bogata, Clarksville and Detroit there are many older, wood framed, houses that are more likely to experience structural damage from hailstorms. Roofs of homes and businesses are very susceptible to hail damage, resulting in repairs costing hundreds or even thousands of dollars to a single-family dwelling. Many newer homes may have roof-top skylights that can break or crack during periods of large hail. Water damage as well as roof repair becomes a factor when skylights break. Also, cars that are open to the elements are susceptible to hail damage, including broken windshields and dented car bodies.

Red River County Hailstorm Risk					
COMMUNITY	**POTENTIAL IMPACT 45%**	**PROBABLITY 30%**	**Warning 15%**	**Duration 10%**	**RISK**
Red River Unincorporated	Limited PRI=1	Highly Likely PRI=4	<6 hrs. PRI 4	<6 hrs. PRI 1	Medium 2.35
Avery	Limited PRI=1	Highly Likely PRI=4	<6 hrs. PRI 4	<6 hrs. PRI 1	Medium 2.35
Bogata	Limited PRI=1	Highly Likely PRI=4	<6 hrs. PRI 4	<6 hrs. PRI 1	Medium 2.35
Clarksville	Limited PRI=1	Highly Likely PRI=4	<6 hrs. PRI 4	<6 hrs. PRI 1	Medium 2.35
Detroit	Limited PRI=1	Highly Likely PRI=4	<6 hrs. PRI 4	<6 hrs. PRI 1	Medium 2..35

Historical Hailstorm Dollar Losses

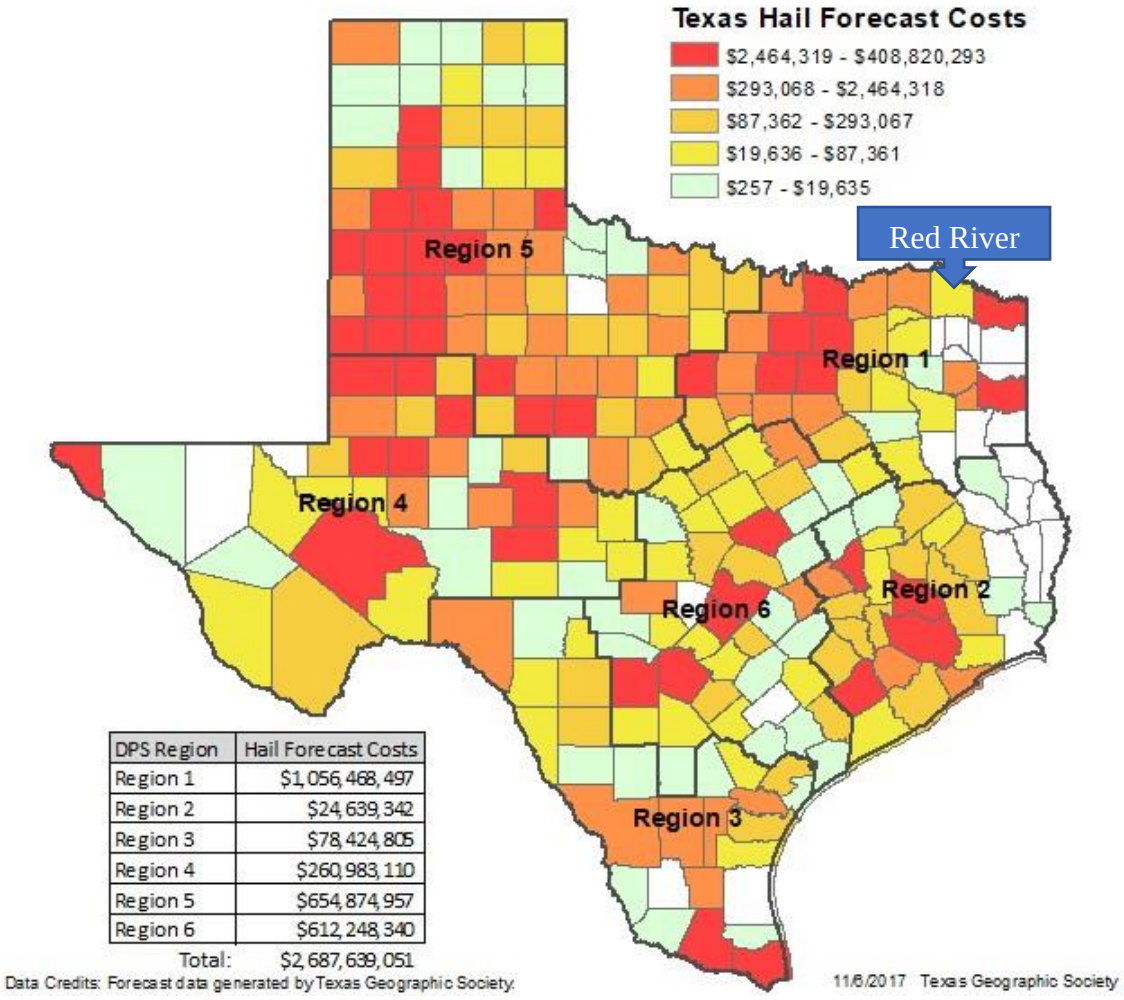


County	Hail Losses
Dallas	$1,221,350,252
Tarrant	$886,242,948
Collin	$880,163,297
Denton	$720,175,558
Bowie	$135,745,992
Rockwall	$79,463,541

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

6/26/2017 Texas Geographic Society

This map shows the results of the forecast model for 2019-2023 for hailstorm dollar losses at the county level. These are based on the locations of impacts in the base period and the likely locations of future losses.



DPS Region	Hail Forecast Costs
Region 1	$1,056,468,497
Region 2	$24,639,342
Region 3	$78,424,805
Region 4	$260,983,110
Region 5	$654,874,957
Region 6	$612,248,340

Red River County Critical Facilities					
Critical Facilities	**Avery**	**Bogata**	**Clarksville**	**Detroit**	**Red River Co.**
City Hall	1	1	1	1	
Fire Station	1	1			6
Govt. Facility			4		
Wastewater Treatment Plant	1	1	1		
Corrections Facility			1		
Maintenance Barn		1	1	1	4
Post Office	1	1	1	1	
Water Tower	1	2	2		4
Police Station		1	1		
Sheriff Office			1		
EMS			1		
Water Treatment Plant			1		
County Seat and offices			1		

Critical Facilities

All critical facilities located in unincorporated Red River County and the jurisdictions of Avery, Bogata, Clarksville and Detroit are subject to some damage from and intense hailstorm. It is hard to imagine a hailstorm severe enough to render a critical facility damaged to the point of not being able to provide the needed services or functions.

Estimated Property Loss at 2%		
Red River County	Residential	$506,175
Avery	Residential	$4,210
Bogata	Residential	$111,893
Clarksville	Residential	$228,129
Detroit	Residential	$5,586

Location: Hailstorms are unpredictable, but since they occur before thunderstorms, and thunderstorms have historically occurred throughout the County. If the trend continues, all of Red River County and the entire planning area could be affected by hailstorms.

Probability: The probability of a hailstorm occurring in Red River County is highly likely. The jurisdictions of Avery, Bogata, Clarksville and Detroit share the same probability and risk.

Vulnerability: Buildings, autos, and crops, can be damaged by hail. Hail is often part of thunderstorm activity. In rare cases hail can cause physical injury. The vulnerability rating of Red River County and the jurisdictions of Avery, Bogata, Clarksville and Detroit is high. Wooden Structures exist in all the jurisdictions in Red River County. Repainting and even replacing lumber may be necessary if the storms are severe enough. Anyone who has an uncovered automobile could experience expensive repair costs. Also, all the buildings in the jurisdictions have glass windows and many dwelling in all the jurisdictions have roofs that will be susceptible to hail damage. Public facilities like schools have open parking lots that both faculty and staff use. Windshield and auto body damage can easily occur when large hail strikes. The parking area around the Red River County Courthouse is also susceptible to hailstorms.

Extent: Hail measured at 2.75 inches has been recorded on multiple occasions in Red River County since record keeping began in 1955, but the pea size and smaller are the most common, causing no damage. All jurisdictions are affected equally. See the table on pages 25 for a more comprehensive look at possible damage values. Red River County can expect hail size up to H7 on the Hailstorm Intensity Scale. See the Combined NOAA/TORRO Hailstorm Intensity Scales Table on page 56.

Impact: The impact of a hailstorm has historically been limited; however, large size hail can cause injuries. Hail can damage autos, roofs, siding and crops. See the tables on page 25 for a more comprehensive look at possible damage values

Summary: Hailstorms are unpredictable and often associated with thunderstorm activity. Thunderstorms have historically occurred throughout the county, and if the trend continues, all of Red River County and its jurisdictions could be affected by hailstorms.

Lightning

Lightning is a massive electrostatic discharge between electrically charged regions within clouds, or between a cloud and the earth's surface. Lightning can strike communications equipment (i.e. radiocommunication and emergency response. Lightning strikes can also cause significant damage to buildings, critical facilities and infrastructure, largely by igniting a fire. Lightning can strike and kill people. It can also ignite wildfire.

The National Lightning Safety Institute (http://www.lightningsafety.com) defines the following forms of lightning:

Direct Strike - This is the most dangerous hazard, wherein the person or structure is in a direct path for lightning currents. The magnitude of the current determines its effects. A typical amperage of 2OkA acting on a ground of 10 ohms creates 200,000V. A large strike can attain l5OkA levels. More than 50 volts will drive a potentially lethal current through the body.

Side Strike - This hazard results from the breakup of the direct strike when alternate parallel paths of current flow into the ground via a person or structure. When the initial current path offers some resistance to current flow, a potential above ground current develops and the person or structure's resistance to ground becomes the alternate path of conduction.

Conducted Strike - This hazard occurs when lightning strikes a conductor which in turn introduces the current into an area some distance from the ground strike point. Unprotected connected equipment can be damaged and personnel injured if they become an indirect path in the completion of the ground circuit.

Structure Voltage Gradient - Current passing through two or more structures create momentary voltage differential. Poor interconnect bonding may cause a completed circuit potential difference. The same hazard is created, for example, by a person touching an ungrounded object while he they are grounded. The electrical circuit is completed through the person, sometimes with fatal consequences.

Induced Effects - Lightning can induce electric field and magnetic field coupling into structures and into wiring. Magnetic coupling is transformer action, and the common laws for transformers prevail.

Streamer Conductor - The streamer hazard occurs when a lightning leader influences electric behavior of objects on the Earth. Even streamers which do not become a part of the main channel can contain significant amounts of current. Streamer current exposure can affect people and sensitive electronics.

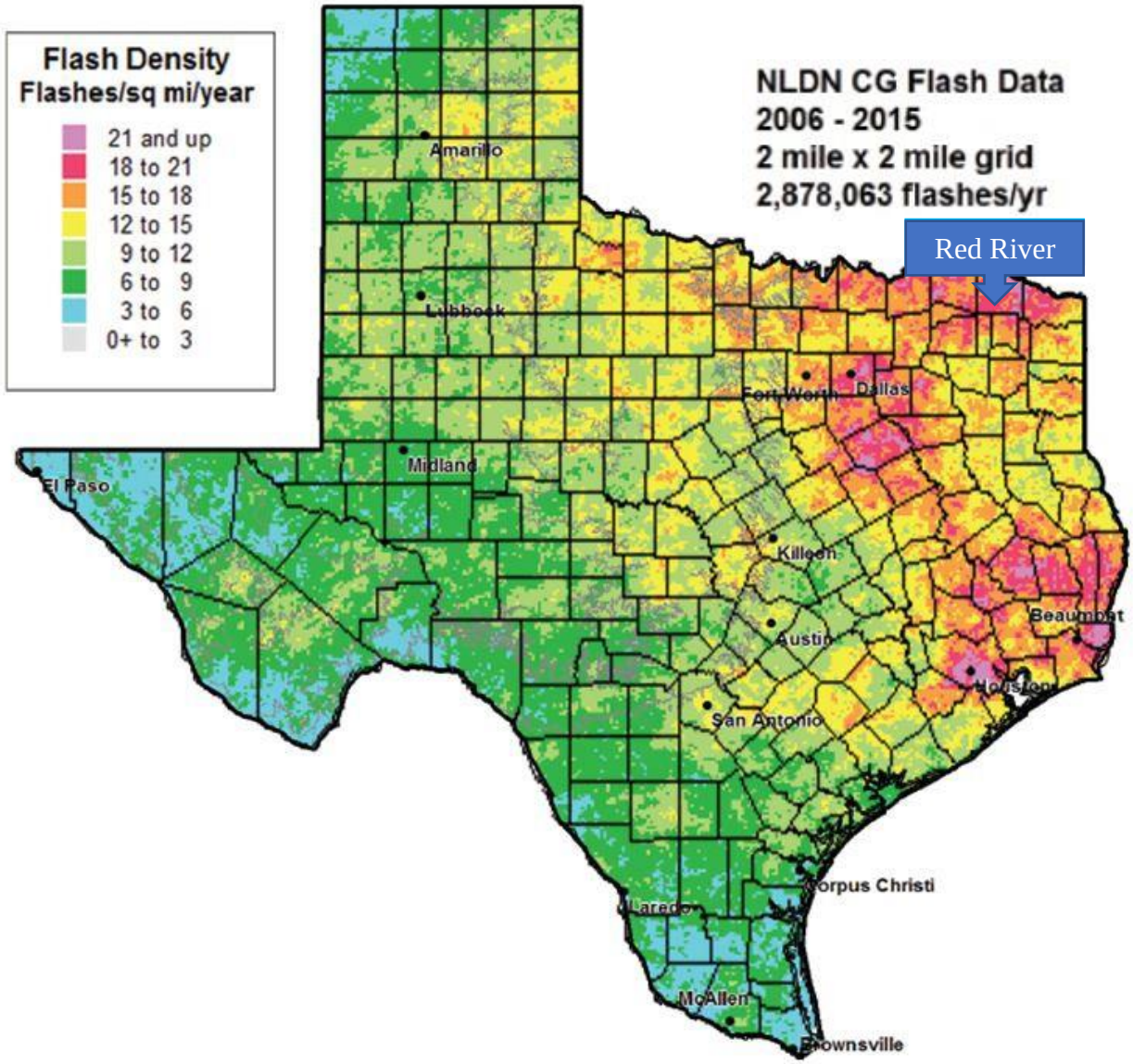
Sequelae - These secondary effects are many. Forest and grass fires, explosive steam conditions in masonry, trees and other water-bearing objects, and consequences of the thunderclap startling a person into inadvertently throw a switch are examples.

Step Voltage/Touch Voltage - This hazard occurs as a result of a lightning strike dissipating its energy through the ground. The ground current creates a voltage drop across the surface of the Earth. A person standing within several hundred feet from the lightning strike point can have several hundred volts generated between their feet. This hazard is identical to a person being grounded while touching two live wires, one with each hand.

Lightning Activity Level (LAL)	
Is a scale which describes lightning activity. Values are labeled 1-6:	
LAL 1	No thunderstorms
LAL 2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground strikes in a five minute period.
LAL 3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud to ground strikes in a 5 minute period.
LAL 4	Scattered thunderstorms. Moderate rain is commonly produced Lightning is frequent, 11 to 15 cloud to ground strikes in a 5 minute period.
LAL 5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a 5 minute period.
LAL 6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red

Lightning can happen anywhere in the state of Texas. Red River County can expect a flash density of more than 21cloud to ground strikes per square mile per year.

Lightning Incidences in Texas (2006-2015)



Red River County Critical Facilities					
Critical Facilities	**Avery**	**Bogata**	**Clarksville**	**Detroit**	**Red River Co.**
City Hall	1	1	1	1	
Fire Station	1	1			6
Govt. Facility			4		
Wastewater Treatment Plant	1	1	1		
Corrections Facility			1		
Maintenance Barn		1	1	1	4
Post Office	1	1	1	1	
Water Tower	1	2	2		4
Police Station		1	1		
Sheriff Office			1		
EMS			1		
Water Treatment Plant			1		
County Seat and offices			1		

Critical Facilities

All critical facilities located in unincorporated Red River County and in the jurisdictions of Avery, Bogata, Clarksville and Detroit are subject to damage from lightning. The major threat to a building hit by lightning is fire.

Red River County Lightning Risk					
COMMUNITY	**POTENTIAL IMPACT 45%**	**PROBABLITY 30%**	**Warning 15%**	**Duration 10%**	**RISK**
Red River Unincorporated	Major PRI=3	Unlikely PRI=1	<6 hrs. PRI 4	<6 hrs. PRI 1	Medium 2.35
Avery	Major PRI=3	Unlikely PRI=1	<6 hrs. PRI 4	<6 hrs. PRI 1	Medium 2.35
Bogata	Major PRI=3	Unlikely PRI=1	<6 hrs. PRI 4	<6 hrs. PRI 1	Medium 2.35
Clarksville	Major PRI=3	Unlikely PRI=1	<6 hrs. PRI 4	<6 hrs. PRI 1	Medium 2.35
Detroit	Major PRI=3	Unlikely PRI=1	<6 hrs. PRI 4	<6 hrs. PRI 1	Medium 2..35

Historical Occurrences: Since January 1996, there have been no recorded lightning events reported in Red River County based on the NCEI records which includes the NOAA storm events data base. It is highly likely multiple lightning occurrences have gone unreported before and during the recording period. However, the flash density for the planning area along with input from local team members indicates regular lightning occurrences that simply have not been reported to the weather service.

Location: Lightning can strike in any geographic location and is considered a common occurrence in Texas. The Red River County planning area, including the jurisdictions of Avery, Bogata, Clarksville, and Detroit are susceptible to lightning strike. Therefore, lightning could occur at any location within the entire planning area. It is assumed that the Red River County planning area is uniformly exposed to the threat of lightning.

Extent: According to the NOAA, the average number of cloud-to-ground flashes for the State of Texas between 2007 and 2016 was 11.3 flashes per square mile. The National Lightning Detection Network lightning flash density map (shows a range of eighteen to twenty-one cloud-to-ground lightning flashes per square mile per year for the entire Red river planning area.

Probability: Based on historical records and input from the planning team the probability of occurrence for future lightning events in Red River County, including the jurisdictions of Avery, Bogata, Clarksville and Detroit are considered highly likely, however, the likely hood of it damaging a building or a critical facility is unlikely. The planning team stated that lightning occurs regularly in the area.

Vulnerability: Texas leads the nation in the number of annual lightning strikes. During a thunderstorm lightning may strike anywhere in Red River County.

Impact: Although there are no recorded deaths or monetary losses due to lightning in Red River County the probability and potential of death and property loss remain palpable.

Summary: Lightning can strike anywhere in Red River County When damage occurs it is important to report the incident to NOAA to establish credible data. Actions in this plan reflect sensible measures to take to lower the risks of lightning strikes in Red River County.

WINTER WEATHER

Description

Winter Storms are a hazard that poses a threat to the entirety of the planning area. Winter Storms in the context of this document refers to Freezing Rain, Ice Storms, Blizzards, and Heavy Snow events that may occur during the winter months in Red River County. The National Weather Service (NWS) glossary defines Ice Storms, Blizzards, and Heavy Snow events as:

Freezing Rain is "rain that falls as a liquid but freezes into glaze upon contact with the ground."

Extent

"An **ice storm** is an occasion when damaging accumulations of ice are expected during freezing rain situations. Significant accumulations of ice pull down trees and utility lines resulting in loss of power and communication. These accumulations of ice make walking and driving extremely dangerous. Significant ice accumulations are usually accumulations of ¼" or greater."

"A **blizzard** means that the following conditions are expected to prevail for a period of 3 hours or longer:

- Sustained wind or frequent gusts to 35 miles an hour or greater; and
- Considerable falling and/or blowing snow (i.e., reducing visibility frequently to less than ¼ mile)."

"A **heavy snow** generally means...

- snowfall accumulating to 4" or more in depth in 12 hours or less; or
- snowfall accumulating to 6" or more in depth in 24 hours or less

In forecasts, snowfall amounts are expressed as a range of values, e.g., "8 to 12 inches." However, in heavy snow situations where there is considerable uncertainty concerning the range of values, more appropriate phrases are used, such as "...up to 12 inches..." or alternatively "...8 inches or more..."

The following National Weather Service warnings detail the potential extent of a storm.

National Weather Service WATCH: A message indicating that conditions favor the occurrence of a certain type of hazardous weather. For example, a severe winter weather watch means that a severe winter weather event is expected in the next six hours or so within an area approximately 120 to 150 miles wide and 300 to 400 miles long (36,000 to 60,000 square miles). The NWS Storm Prediction Center issues such watches. Local NWS forecast offices issue other watches 12 to 36 hours in advance of a possible hazardous-weather or flooding event. Each local forecast office usually covers a state or a portion of a state.

NWS WARNING: Indicates that a hazardous event is occurring or is imminent in about 30 minutes to an hour. Local NWS forecast offices issue warnings on a county-by-county basis.

Winter Storm WATCH: A winter storm is occurring, or will soon occur, in your area.

Winter Storm WARNING: Means sustained winds or frequent gusts to 35 miles per hour or greater and considerable falling or blowing snow (reducing visibility to less than a quarter mile) are expected to prevail for a period of three hours or longer, and dangerous wind chills are expected in the warning area.

Potential Damage/Loss Due To Ice Storms

The Christmas Day storm in the year 2000 struck counties along a 260-mile stretch of the Red River Red. River County was one of several counties declared a disaster area. Back-to-back December weather fronts slammed North Texas with ice that produced the perfect ice storm. Many electric cooperatives were sent to their knees by the fury of the storms.

December 2000 Ice Storm-Red River County	
Type of Aid	Amount of Money
Texas Department of Housing and Community Affairs (County)	$327,158
FEMA Grants (County)	$3,355,723
FEMA Grants (Clarksville)	$205,442
FEMA Grant (Clarksville)	$13,410
Total	$3,901,733

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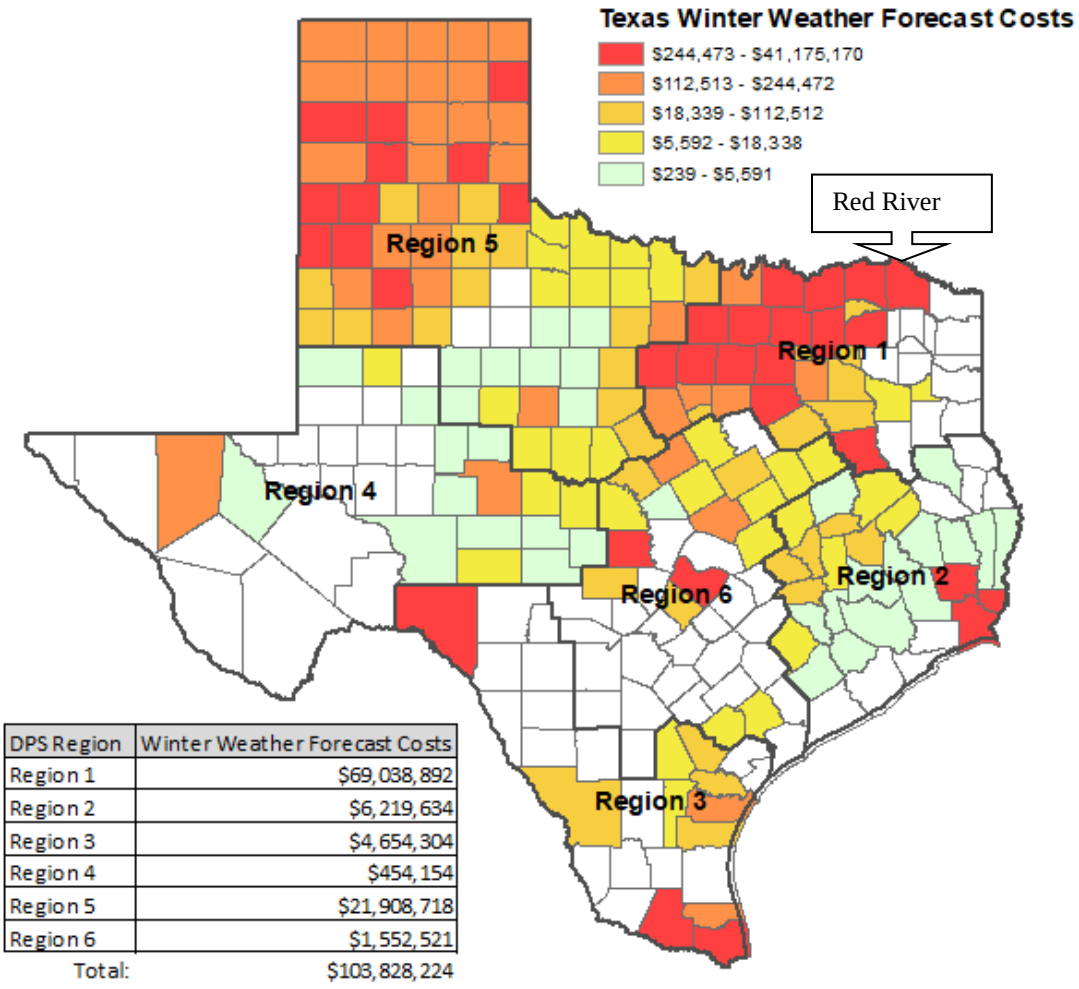
Future Risks
Results of the hazard impact forecast for winter weather are presented. Following this is a discussion and summary of risk statewide.

County Dollar Loss Forecast
Map shows the results of the forecast model for 2019-2023 for winter weather dollar losses at the county level. These are based on the locations of impacts in the base period and the likely locations of future losses.

Winter Weather Dollar Losses Forecast



DPS Region	Winter Weather Forecast Costs
Region 1	$69,038,892
Region 2	$6,219,634
Region 3	$4,654,304
Region 4	$454,154
Region 5	$21,908,718
Region 6	$1,552,521
Total:	$103,828,224

1. Data Credits: Forecast data generated by Texas Geographic Society.

The forecast is an estimate of damages that are likely to occur if similar weather events re-occur in or near previously impacted areas during the base period .

The *Wind Chill* temperature is simply a measure of how cold the wind makes real air temperature feel to the human body. Since wind can dramatically accelerate heat loss from the body, a blustery 30° day would feel just as cold as a calm day with 0° temperatures. The index was created in 1870, and on November 1, 2001, the National Weather Service released a more scientifically accurate equation, which is used today. Below is a chart for calculating wind chill. (Please note that it is not applicable in calm winds or when the temperature is over 50°.)

Wind Chill Chart

Wind (mph) \ Temperature (°F)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	29	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes | 10 minutes | 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph) *Effective 11/01/01*

Source: national Weather Service and NOAA

Ice storms most commonly develop along a line stretching from northern Texas to Newfoundland in slow-moving low-pressure systems where there is a large temperature difference between the warm Gulf air and cold Arctic air. Local accumulations of ice may be heavy if the storm stalls over a region for an extended time. Ice storms lasting 12 hours or more generally produce ice accumulations several centimeters thick. The typical ice storm swath is 30 miles wide and 300 miles long. Ice storms generally warrant major headlines only one year in three.

Ice storms typically begin with snow and strong easterly winds conditions well ahead of an approaching warm front. The snow, however, changes briefly to sleet and then to rain that freezes on impact, coating all exposed surfaces with a growing layer of ice.

Power and communication systems using overhead lines are perhaps hardest hit by ice storms. Hanging wire cables collect ice until the cable breaks or the rain stops. Animals and plants may be killed or injured by ice accumulation. Damage to trees rival disease and insects as destructive agents.

The Christmas Day storm of 2000 clobbered counties along a 260-mile stretch of the Red River. The county was one of several counties declared a disaster area. Back-to-back December weather fronts slammed North Texas with ice that produced the perfect ice storm. Many electric cooperatives were sent to their knees by the fury of the storms.

Potential Damage/Loss Due to Ice Storms

Life and Property
Slick roads and other surfaces cause traffic accidents resulting in death and injury. People shoveling snow have heart attacks. Property is at risk from flooding. Trees, power lines, telephone lines and subject to damage from accumulation of ice and snow. Trees fall on utility lines and houses. Fallen trees across roads can block access to emergency services. The ability to travel after an ice storm is a priority issue for hospitals, utilities and emergency service vehicles.

Power Lines
Falling trees are a major cause of power outages resulting in interruption of services and damaged property. Downed power lines also create the danger of electrical shock.

Water Lines
Cast iron mainlines frequently break during severe freezes. Also, residential water lines often fail.

The potential for severe winter storms is high and records indicate that the cost can be in the millions of dollars, depending on the severity of the storm.

Red River County Winter Storms

In the event of a major winter storm, all of **Red River County**, including the jurisdictions of **Avery, Bogata, Clarksville and Detroit** could be affected physically, economically and socially. Drivers face serious consequences from a winter ice storm. Stopping distances on glazed ice are ten times greater than on dry pavement, and double that on packed snow. In many instances the ice partially melts during the daylight hours only to re-freeze the following night causing patches of “black ice;” i.e., ice that is difficult to detect from a moving vehicle.

Emergency vehicles from the police and fire departments are brought to a crawl when responding to emergency situations. Ambulance service must take extra time and care responding to accidents or emergency medical situations because of the hazard of ice on the streets and highways. It is possible that emergency vehicles would have to find alternate routes into neighborhoods because of downed trees and power lines. Many yards and

streets are lined with tall trees that are subject to damage. Also communications with emergency teams can be compromised because of downed phone lines.

Public schools typically close when hazardous driving conditions exist. The cities of Red River County are not equipped to clear roads and de-ice thoroughfares efficiently. Schools may be closed as long as a week during a major ice storm.

Power failures may force families and individuals to vacate their homes and seek alternate housing such as hotels or emergency shelters. The elderly and the young are particularly susceptible to cold temperatures and both populations must take additional precautions to stay warm. Nursing homes and Hospitals located in the county would need to make sure that emergency generator power and lighting were operating properly. Utility companies do focus on facilities that are located in select power grids first.

In past winter storms, residences that were heated with gas or propane or had gas cooking appliances in the kitchen, or gas log inserts in the fireplace, fared much better than homes that were all electric. Homes with central gas heating were still left in the cold because the systems are run electrically.

Businesses would suffer due to a winter storm. In the storm of 2000 the pharmacies, gas stations and convenience stores closed due to power outages. Fuel became scarce, creating hardships for both employees and employers. This in turn, causes lost wages and income, plus profit loss due to damaged merchandise and perishables. The local veterinary clinic might find its' practice compromised because of power loss making it impossible to keep ill animals warm or to perform necessary procedures. Clients would hesitate to navigate dangerous roads in order to come to the clinic with ill or injured pets.

Red River County Winter Storms Risk					
COMMUNITY	**POTENTIAL IMPACT 45%**	**PROBABLITY 30%**	**Warning 15%**	**Duration 10%**	**RISK**
Red River Unincorporated	Minor PRI = 2	Highly Likely PRI = 4	> 24 hrs. PRI = 1	< a week PRI = 3	Medium 2.55
Avery	Minor PRI = 2	Highly Likely PRI = 4	> 24 hrs. PRI = 1	< a week PRI = 3	Medium 2.55
Bogata	Minor PRI = 2	Highly Likely PRI = 4	> 24 hrs. PRI = 1	< a week PRI = 3	Medium 2.55
Clarksville	Minor PRI = 2	Highly Likely PRI = 4	> 24 hrs. PRI = 1	< a week PRI = 3	Medium 2.55
Detroit	Minor PRI = 2	Highly Likely PRI = 4	> 24 hrs. PRI = 1	< a week PRI = 3	Medium 2.55

The National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information categorizes winter activity as winter weather, winter storm and ice storm. The three reports from their organization were combined and presented as one table below.

Winter Weather Occurrences in Red River County			
Date	Type	Description	Cost
01/06/1997	Ice Storm	2 to 4 inches of freezing rain and sleet fell across the area. Numerous accidents were reported along with power outages. Several highways were closed.	0.00 K
01/14/1997	Ice Storm	Ice accumulations of ¼ to ½ inch occurred across portions of northeast Texas. Several traffic accidents resulted.	0.00 K
12/22/1998	Ice Storm	Widespread freezing rain and sleet fell over northeast Texas. Overall ice accumulations were less than one inch. The ice accumulated mainly across exposed surfaces such as trees and powerlines as well as bridges and overpasses. A few automobile accidents and downed trees and powerlines were the worst result of the storm.	0.00K
01/26/2000	Ice Storm	Ice accumulations of one to four inches fell across most of the area with the ice and snow accumulations near 8 inches. Thousands of homes were left without power due to ice covered tree limbs falling and snapping powerlines. Also, hundreds of chicken houses were destroyed and millions of chicks were killed. Barns, carports and weak structure homes suffered collapse from the weight of the ice and snow. Traffic accidents were numerous and I-30 west of Texarkana had to be shut down when the freeway became impassable.	0.00K
12/12/2000	Ice Storm	A mixture of freezing rain, sleet and snow north of a Quitman to Linden Texas line, while further south, precipitation was in the form of freezing rain, Ice accumulations of two to 6 inches were common across the northern third of northeast Texas with accumulations of one to two inches further south. Over 235,000 people were without power from several hours to several weeks from snapped power lines. Upwards of 29 transmission lines atop "H" shaped steel towers were snapped due to the weight of the ice. Numerous traffic accidents were reported from ice covered roads and bridges. Northeast Texas was declared a disaster area.	123M
12/24/2000	Ice Storm	After trying to recover from an ice storm earlier in the month, another even more devastating ice storm struck the northern third of northeast Texas. Freezing rain resulted in ice accumulations ranging from ¼ to 3 inches, which devastated the middle RED River Valley counties of northeast Texas. Tens of thousands of trees and numerous power lines were either broken or felled from the weight of the ice, leaving vast regions of northeast Texas without power for weeks. Bowie, Cass and Red River counties were declared disaster areas	31 M
12/07/2005	Ice Storm	Light freezing rain mixed with sleet fell across portions of Franklin, Titus and Red River Counties in extreme Northeast Texas. Freezing rain accumulation of 1/8 of an inch or less did result in scattered power outages.	0.00K
02/19/2006	Winter Weather	Ice accumulations were mainly less than one quarter of an inch across most places. While road surfaces remained wet from ground warmth, most elevated bridges and overpasses saw some ice accumulation which resulted in numerous traffic accidents. Many elevated bridges and overpasses had to be closed due to ice accumulation.	0.00K
02/15/2008	Winter Weather	Icing was reported on bridges and overpasses on State Highway 82 State Highway 37 and U.S. 271. Ice was also reported on the loop in Clarksville, Texas.	0.00K
12/23/2008	Winter Weather	Drizzle and light rain became freezing drizzle and light freezing rain across portions of northeast Texas during the predawn hours. The ice froze to elevated bridges and overpasses which in turn, resulted in several vehicle accidents.	0.00K
01/28/2009	Winter Weather	Freezing rain resulted in ice accumulations near $1/10^{th}$ of an inch across area bridges and overpasses. There were a few vehicular accidents reported across the county as well.	0.00K

03/21/2010	Winter Weather	Snow totals of about 4 inches fell over Red River County. Clarksville recorded 4 inches of snow. While the event was not considered significant for most areas, there were a number of traffic accidents across the region.	0.00K
01/09/2011	Winter Storm	Generally, one quarter to one half inch of freezing rain and sleet was reported across the northern half of Northeast Texas with snow being the predominant precipitation type during the afternoon and evening of January 9th. Detroit reported 7 inches of snow while Clarksville reported 5 inches. There were numerous reports of traffic accidents across the northern half of Northeast Texas with isolated power outages as well.	0.00K
02/03/2011	Winter Storm	During the early morning hours of February 3rd snow fell across much of the area with a mixture of sleet and freezing rain in some areas. Red River County reported 5 inches of snow resulting in hazardous travel conditions.	0.00K
02/09/2011	Winter Storm	Precipitation, mostly in the form of snow fell across the northern third of Northeast Texas. Red River County reported 4 inches resulting in hazardous travel conditions.	0.00K
Occurrences Recorded After Last Five-Year Update			
12/25/2012	Winter Storm	Snow fell in Red River County on Christmas Day! This heavy wet snow resulted in several trees downed along with powerlines which cut power to many locations across Northeast Texas. Clarksville recorded 4 inches of snow while Detroit recorded 5.	0.00K
01/15/2013	Winter Weather	Precipitation developed during the morning of January 15th. With surface temperatures near or slightly below freezing, the precipitation fell as a mixture of freezing rain and sleet before changing over to light snow across the northern third of NE Texas. Some bridges and overpasses quickly became slick resulting in a few automobile accidents. In addition, there were some minor power outages from falling limbs due to the weight of the ice.	0.00K
12/06/2013	Winter Weather	Ice accumulation was mainly less than one quarter of an inch but resulted in accumulation on bridges and overpasses, trees and powerlines. Some traffic accidents were noted across Northeast Texas during the height of the winter weather along with a few power outages.	0.00K
02/07/2014	Winter Weather	Snow fell across the northern half of Northeast Texas resulting in one inch accumulations. The snow caused some slick spots across some locations, mainly across elevated bridges and overpasses causing hazardous driving conditions.	0.00K
03/02/2014	Winter Storm	Widespread sleet accumulations of one half to one inch were reported in Red River County. There were some isolated areas with total sleet accumulations near 2 inches. The freezing rain and sleet accumulations resulted in numerous automobile accidents along with power outages from falling limbs and trees throughout the northern half of Northeast Texas.	0.00K
01/11/2015	Winter Weather	After midnight on the 11th precipitation became light freezing rain. Ice accumulation was relegated to trees and elevated exposed objects including powerlines and some bridge surfaces. Ice accumulations were mostly near one tenth of an inch across the region that can cause hazardous driving conditions.	0.00K
02/23/2015	Winter Storm	Freezing rain mixed with sleet fell across Northeast Texas. Freezing rain accumulations were estimated near 1/10th of an inch while sleet accumulations ranged from ½ inch to 1 ½ inches that can cause hazardous driving conditions.	0.00K
02/25/2015	Winter Storm	Snow fell across Red River County. Clarksville recorded 4 inches while Avery recorded 5. Amounts varied across the county.	0.00K
03/04/2015	Winter Storm	Freezing rain amounts were near 1/10th of an inch with sleet accumulations mainly less than ½ inch. Snow amounts were around 3 inches. Even this small amount of precipitation can result in accidents.	0.00K

01/06/2017	Winter Weather	Light snow and ice accumulations resulted in the development of icing on bridges and overpasses across much of Northeast Texas, resulting in hazardous travel conditions.	0.00K
02/11/2018	Winter Weather	Local icing of roads and bridges	

Estimated Property Loss at 25%	
Red River County	$483,592,326
Avery	$2,590,823
Bogata	$7,019,759
Clarksville	$26,906,555
Detroit	$3,574,225

Red River County Critical Facilities					
Critical Facilities	**Avery**	**Bogata**	**Clarksville**	**Detroit**	**Red River Co.**
City Hall	1	1	1	1	
Fire Station	1	1			6
Govt. Facility			4		
Wastewater Treatment Plant	1	1	1		
Corrections Facility			1		
Maintenance Barn		1	1	1	4
Post Office	1	1	1	1	
Water Tower	1	2	2		4
Police Station		1	1		
Sheriff Office			1		
EMS			1		
Water Treatment Plant			1		
County Seat and offices			1		

Critical Facilities

Winter Storms have the potential of making access to critical facilities difficult. Power outages often associated with ice storms can shut down a pump station or wastewater treatment plan. It is important to have emergency generators in place at critical facilities that are offering services to a confined population.

Location: Winter Storms have no distinct geographic boundary. They can occur in every area of the county including the north Texas region and Red River County.

Extent: Accumulations of eight inches of ice and snow were recorded in January of 2000. The most damaging storms occurred in December of 2000 when 235,000 people in northeast Texas were left without power. In an area that is not equipped to handle wintery blasts as little as one inch of ice can cause major problems. The region was declared a disaster area at a cost of 154.5 million dollars. Red River County will continue to have ice storms and wintery weather. The extent of damage will vary, but the disaster of 2000 was an extreme event. Temperature ranges between 32 degrees f. and 10 degrees f. is the range of temperature anticipated in the county that would create conditions for winter storms. (See the wind chill chart on page 70). Snow falls of up to 1 foot can be expected in the future. Red River County and its jurisdictions can expect ice accumulations on streets, power lines and trees that will range from ¼ to ¾ of an inch.

***Probability*:** The probability of the occurrence of a freeze is high, given historical weather patterns. Twenty-five winter events have occurred between 1997 and 2015. It is highly likely that a winter weather will occur in any given year. Red River County, including the participating jurisdictions of Avery, Bogata, Clarksville and Detroit share the same likelihood of experiencing a winter storm.

Vulnerability: Red River County has a significant amount of acreage designated as conservation, public lands and agricultural land uses. The small towns and communities are always vulnerable. All jurisdictions could lose power to its sewage and water plant, power to homes and damage to city infrastructure. The elderly could suffer from lack of heat and lights during a winter storm. Small businesses could experience lost revenue due to reduced traffic during winter storm events. Falling trees and tree limbs could damage property and block roadways in all jurisdictions. Auto accidents related to travel on the icy roads increase. All of Red River County share the same vulnerability. Highway 82, U.S. Highways 37, and 271 represent the major roads in Red River County. Ice or snow accumulation could cause care accidents or run-offs which could lead to injury, loss of life, slowed resources such as fire and EMS availability and property damage. The vulnerability of unincorporated Red River County and the jurisdictions of Avery, Bogata, Clarksville and Detroit is **HIGH.**

Summary: Winter ice storms bring its own set of woes to Red River County and the jurisdictions of Avery, Bogata, Clarksville and Detroit. Tree line canopies become very vulnerable to damage when limbs snap and break from accumulated ice. Valuable landscapes can take years to recover from a severe winter storm such as the one experienced in North East Texas in 2000. Falling trees and limbs block emergency exits and roadways, electrical outages reduce comfortable living space to refrigerator temperatures that can endanger lives, particularly of the very young and the elderly. Fires are an ever-present danger, as people use unsafe means to cook or stay warm. Generators to protect wastewater pumps from malfunction, emergency havens for the public, reliable emergency equipment, highly trained volunteers, and informed citizenry become critical to avoid preventable disease, injury and death. The tables on page 25 show the estimated costs that might occur.

DROUGHT

Description

A drought is a period of abnormally dry weather that persists long enough to produce a serious hydrologic imbalance (for example crop damage, water supply shortage, etc.) The severity of the drought depends upon the degree of moisture deficiency and the duration and the size of the affected area.

There are four different ways that drought can be defined:

- Meteorological – a measure of departure of precipitation from normal. Due to climatic differences what is considered a drought in one location may not be a drought in another location.
- Agricultural – refers to a situation when the amount of moisture in the soil no longer meets the needs of a particular crop.
- Hydrological – occurs when surface and subsurface water supplies are below normal.
- Socioeconomic – refers to the situation that occurs when physical water begins to affect people.

Drought is a period of time when precipitation falls below normal levels. Drought is divided in three phases:

Defining the beginning or the end of a drought can be difficult. Some droughts may be short in duration, but more severe in their intensity. Low humidity and high temperatures usually accompany droughts, therefore, any additional moisture evaporates quickly before it has the chance to improve conditions.

Droughts not only lead to water shortages, they produce widespread crop failure and environmental stress, and in recent years have caused more than 300 Texas cities and utilities to resort to ordinances or other measures to limit water use. Droughts also contribute to increased incidents of wildfire.

Drought ends when it rains. When enough precipitation has fallen, a region's soil moisture profile will improve enough to sustain plants and crops. Once recovery continues to the extent that the water levels of lakes, rivers, wells and reservoirs have returned to normal, then a drought is considered over.

Types of Drought Impacts

Drought impacts are often grouped as economic, environmental, and social. The economic impact of droughts in North east Texas includes:

- Farmers may lose money if a drought destroys their crops or stunts the crops' growth, causing lower yields and poor crop quality. If a farmer's water supply is too low, the farmer may have to spend more money on irrigation or to find new water sources, like wells.

- Ranchers may lose livestock, or they might have to spend more money on feed and water for their animals.
- People who work in the timber industry may be affected when trees, especially young trees, die or wildfires destroy stands of timber.
- Businesses that manufacture and sell recreational equipment, like boats and fishing equipment, may not be able to sell some of their goods because drought has dried up lakes and other water sources.
- Businesses that depend on agricultural production, like tractor manufacturers and companies that process food, may lose business when drought damages crops or livestock.
- Power companies that normally rely on hydroelectric power (electricity that's created from the energy of running water) may have to spend more money on other fuel sources if drought dries up too much of the water supply. The power companies' customers would also have to pay more.
- Water companies may have to spend money on new or additional water supplies.
- Barges and ships may have difficulty navigating streams, rivers, and canals because of low water levels, which would also affect businesses that depend on water transportation for receiving or sending goods and materials.
- People may have to pay more for food.

Drought also causes *environmental* losses because of forest fires; soil erosion; damage to plants, animals, and their habitat; and air and water quality decline. Sometimes the damage is only temporary, and conditions return to normal when the drought is over. But sometimes drought's impact on the environment can last a long time, or may even become permanent if, for example, an endangered species was lost because of low stream flows. Examples of environmental impacts include:

- Losses or destruction of fish and wildlife habitat
- Lack of food and drinking water for wild animals
- Increase in disease in wild animals, because of reduced food and water supplies
- Migration of wild animals, leading to a loss of wildlife in some (drought-stricken) areas and too many wildlife in areas not affected by drought
- Increased stress on endangered species
- Lower water levels in reservoirs, lakes, and ponds
- Loss of wetlands
- More fires
- Wind and water erosion of soils, reduced soil quality

Social impacts of drought include public safety, health, conflicts that arise between people when there isn't enough water to go around, and changes in lifestyle. Many of the impacts that we consider economic and environmental also have social impacts. Examples of social impacts include:

- Mental and physical stress on people (for example, people may experience anxiety or depression about economic losses caused by drought)

- Health problems related to low water flows (for example, low water supplies and water pressure make firefighting more difficult)
- Loss of human life (from heat stress and suicides, for example)
- Threat to public safety from an increased number of forest and range fires
- Reduced incomes
- Population migrations (from rural to urban areas)
- Fewer recreational activities

All of these impacts were considered in planning for and responding to drought conditions.

According to the National Climatic Data Center

The wide variety of disciplines affected by drought, its diverse geographical and temporal distribution, and the many scales drought operates on make it difficult to develop both a definition to describe drought and an index to measure it. Many quantitative measures of drought have been developed in the United States, depending on the discipline affected, the region being considered, and the particular application. Several indices developed by Wayne Palmer, as well as the Standardized Precipitation Index, are useful for describing the many scales of drought.

The 1996, 1998 and 2000 Texas Droughts

The statewide droughts of 1996 and 1998 produced widespread crop failure, significant environmental stress and required more than 300 cities and utilities to implement some form of water demand management. Most of these demand management measures were taken because the utility could not treat and distribute water as fast as it was being used.

The drought of 1996 began with below normal precipitation in November 1995. Precipitation (meteorological drought) did not return to "normal" until August 1996, and reservoir levels (hydrological drought) generally did not begin to recover until October of that year. This 10-month drought period saw significant drops in reservoir and aquifer levels over much of Texas. Agriculture impacts as a result of the drought were estimated to be in the range of $5 billion.

Of the two droughts, the 1996 drought had more impact on water supplies. Statewide reservoir levels dropped to 68 percent of conservation storage capacity, similar to the drought of 1984 when storage capacity dropped to 66 percent.

The 1998 drought was shorter in duration. It began with an abrupt end to the much wetter conditions caused by El Nino and beginning of La Nina in March 1998. It did not end until five months later in the fall of 1998, with devastating floods in much of the state. By November 1998, crop moisture indices for the whole state had returned to adequate levels, and statewide reservoir levels had returned to 82 percent of capacity. Total losses were estimated to be more than $6 billion.

The 2000 drought caused about $595 million in crop losses and 178 counties were declared federal agricultural disaster areas. As of September, North Texas had been rainless for 77 days, surpassing the no-rain record of 59 days set in 1934 and 1950.
Drought is determined by using the Palmer Drought Index which is illustrated on page 65. It is based on precipitation and temperature data for the area. The scale ranges from 3.99, which is very wet to -4.00 or less, which is considered extreme drought. The scale is most accurate when used to determine drought over a period of months. Out of 72 drought profiles for the entire State of Texas between 1995 and 2000, approximately 41.6% were classified between -1.99 and -1.00 on the Palmer Drought Severity Index by the Texas Water Development Board. This range defines the anticipated extent of drought for all jurisdictions participating in this plan. You can see that in July of 2006 most of East Texas was experiencing drought conditions.

North East Texas is no stranger to drought and when drought occurs, it can have many far-reaching impacts. That's because water is an important part of so many of our activities. We need water for everything from human, wildlife, and plant health; to washing dishes, river rafting, and fishing; to growing food, cooling engines, and producing electricity. When we don't have enough water for these activities, there will most often be a negative impact. Fortunately, most jurisdictions in Red River County have not had water shortage issues. There is no history of water rationing even in the extreme years of 1996, 1998, or 2000.

The wide variety of disciplines affected by drought, its diverse geographical and temporal distribution, and the many scales drought operates on make it difficult to develop both a definition to describe drought and an index to measure it. Many quantitative measures of drought have been developed in the United States, depending on the discipline affected, the region being considered, and the particular application. Several indices developed by Wayne Palmer, as well as the Standardized Precipitation Index, are useful for describing the many scales of drought.

Common to all types of drought is the fact that they originate from a deficiency of precipitation resulting from an unusual weather pattern. If the weather pattern lasts a short time (say, a few weeks or a couple months), the drought is considered *short-term*. But if the weather or atmospheric circulation pattern becomes entrenched and the precipitation deficits last for several months to several years, the drought is considered to be a *long-term* drought. It is possible for a region to experience a long-term circulation pattern that produces drought, and to have short-term changes in this long-term pattern that result in short-term wet spells. Likewise, it is possible for a long-term wet circulation pattern to be interrupted by short-term weather spells that result in short-term drought.

The following description of drought measures is from NOAA's National Centers for Environmental Information article: DROUGHT: Degrees of Drought Reveal the True Picture.

The USDM's Drought Intensity Scale

D0, abnormally dry, corresponds to an area experiencing short-term dryness that is typical with the onset of drought. This type of dryness can slow crop growth and elevate fire risk to above average. This level also refers to areas coming out of drought, which have lingering water deficits and pastures or crops that have not fully recovered.

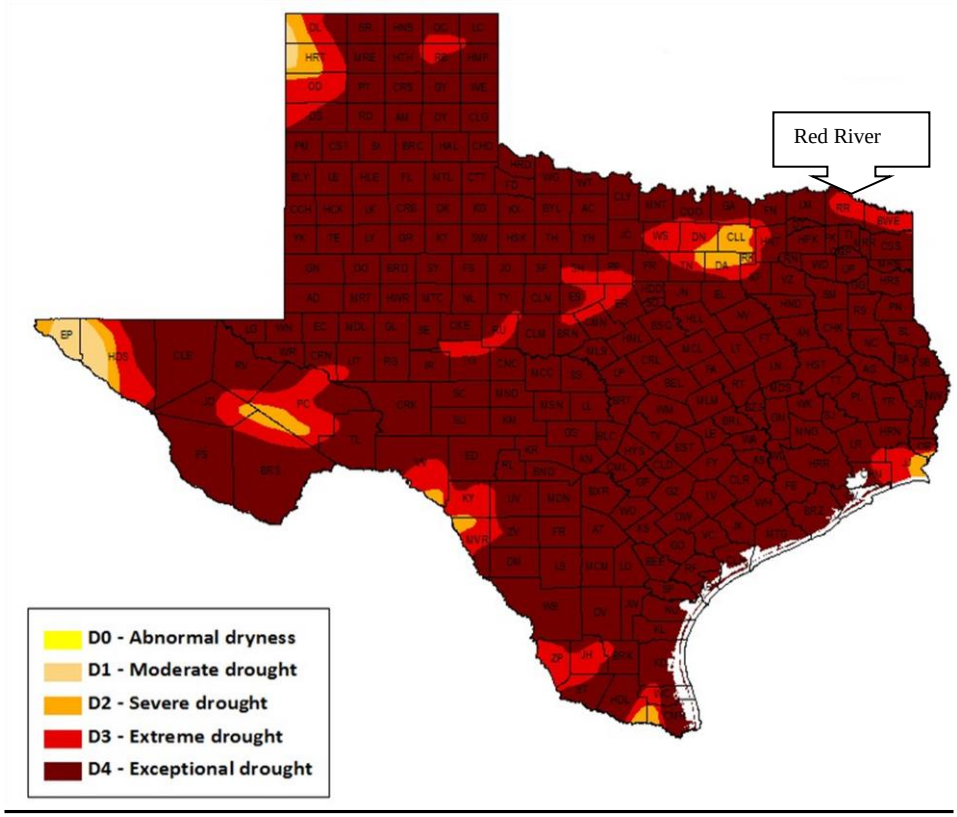
D1, moderate drought, corresponds to an area where damage to crops and pastures can be expected and where fire risk is high, while stream, reservoir, or well levels are low.

D2, severe drought, corresponds to an area where crop or pasture losses are likely, fire risk is very high, water shortages are common, and water restrictions are typically voluntary or mandated.

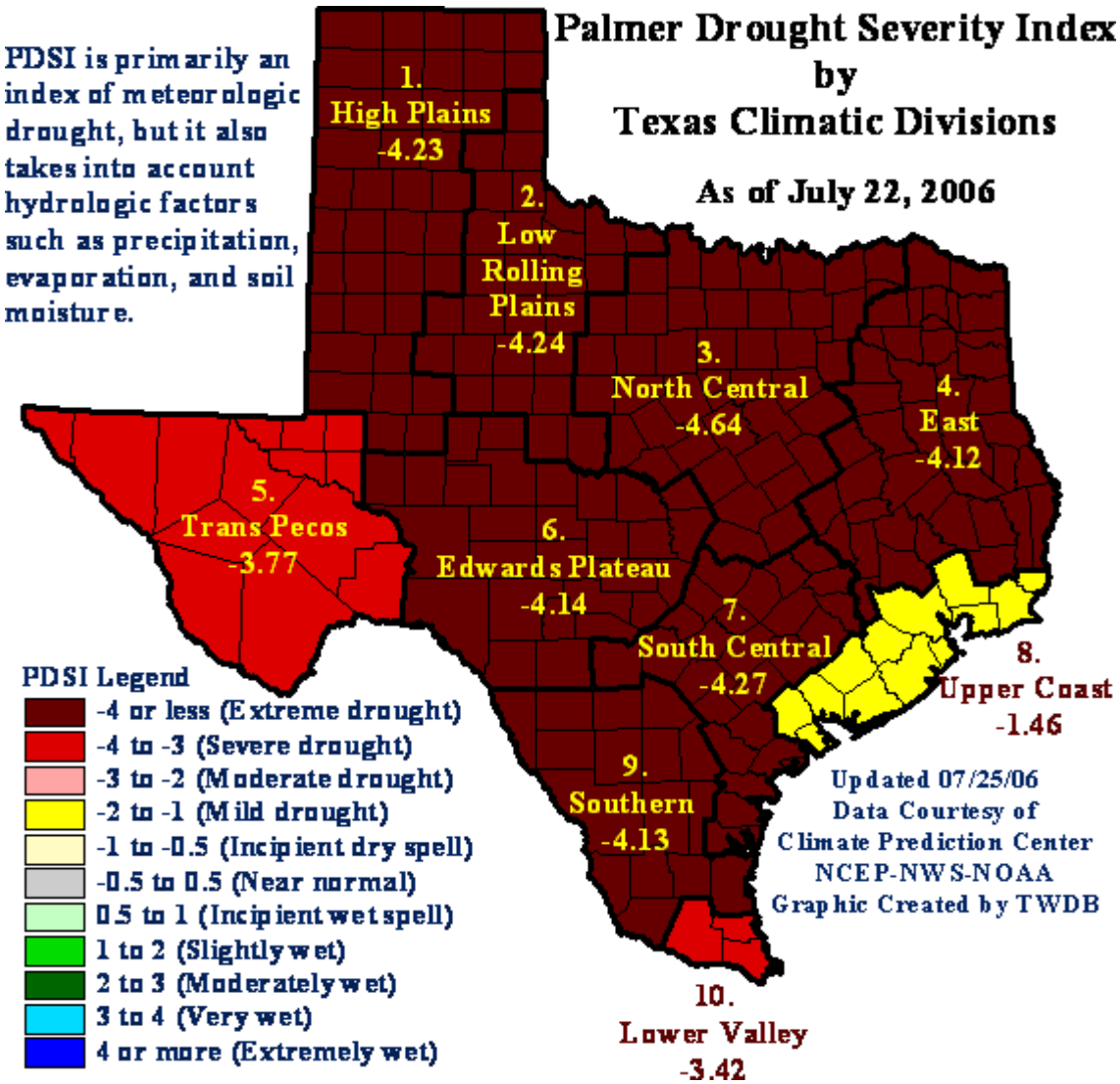
D3, extreme drought, corresponds to an area where major crop and pasture losses are common, fire risk is extreme, and widespread water shortages can be expected requiring usage restrictions.

D4, exceptional drought, corresponds to an area experiencing extraordinary and widespread crop and pasture losses, fire risk, and water shortages that result in water emergencies.

Location and Intensity of drought in Texas (October 4, 2011



Extent: Drought is determined by using the Palmer Drought Severity Index. It is based on precipitation and temperature data for the area. The scale ranges from 3.99, which is very wet to -4.00 or less, which is considered extreme drought. The scale is most accurate when used to determine drought over a period of months. See the Damage Assessment Tables on page 25. The extent of drought experienced in Red River County and its jurisdictions will range from *0 Abundantly Dry to 4 Exceptional Drought*.

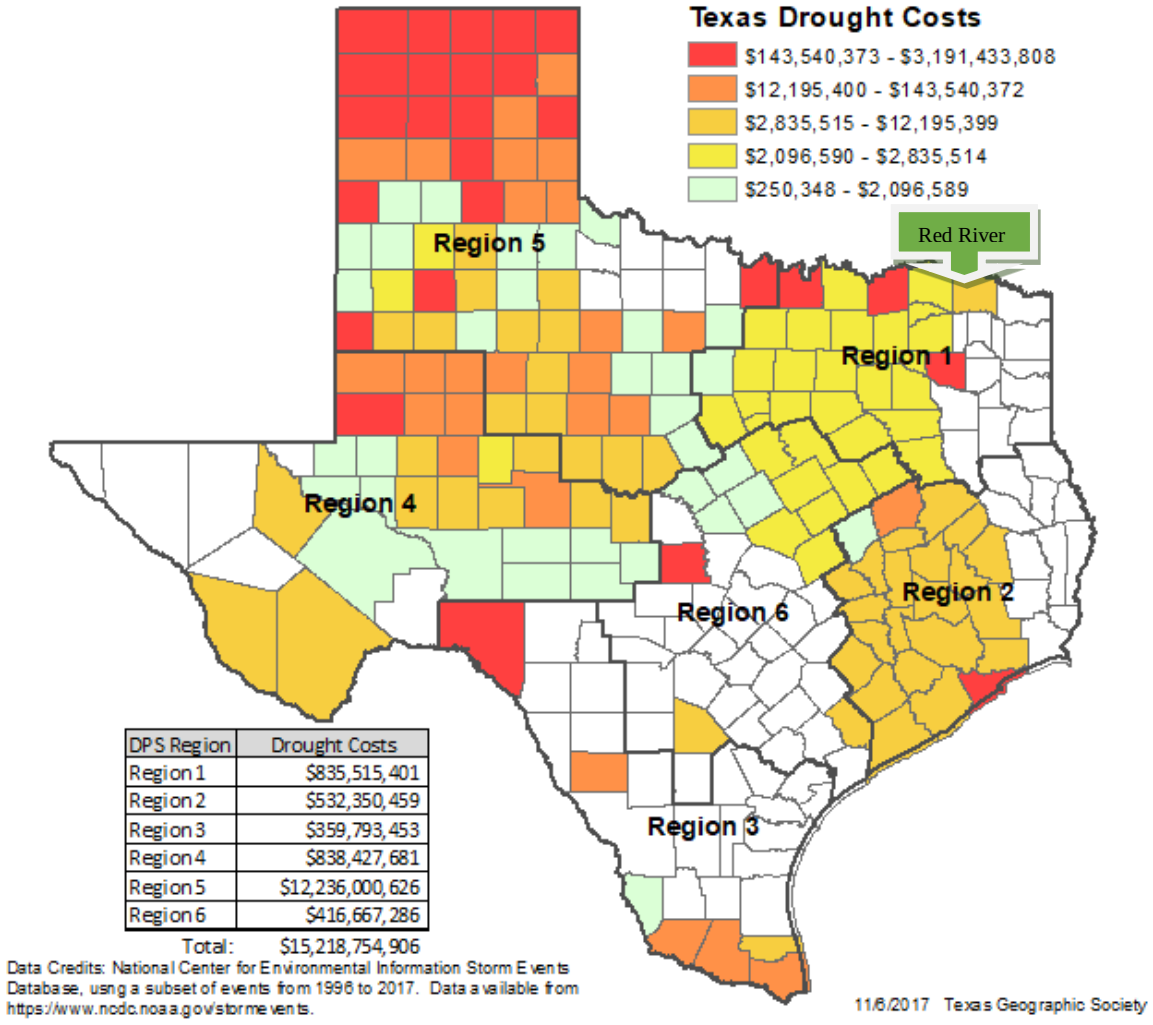


History of Drought in Red River County		
Begin Date	**Location**	**Description**
05/01/96	18 Counties	May was one of the hottest and driest on record. Over ninety percent of cooperative observers reported rainfall far below climatologic averages. Some reporting stations in northeast Texas including New Summerfield had no measurable rainfall the entire month. Numerous industries were hard hit including agricultural, timber, crop and livestock.
06///98-07-98	21 Counties	No description provided
08/01/05	13 Counties	The abnormally dry summer months of June, July and August resulted in moderate to extreme drought conditions. The lack of rainfall through the period resulted in many crops being unusable which put significant strain on the farming community.
12//05	22 Counties	The month was a continuation to a devastating drought that impacted much of the eastern half of the state throughout 2005. Many lakes and reservoirs remained near or set all-time record lows levels. .Burn bans continued as most of the region experienced rainfall deficits of some 15 to 20 inches for the year.
01/2011-03/2012	The entire state recorded drought conditions at one point	**This drought reached historical proportions creating severe drought conditions throughout the state of Texas. In September of 2011 neighboring Cass County experienced the largest forest fire ever recorded in East Texas. 16 months of drought.**
07/13/-09/13	Bowie, Red River, Titus, Franklin, Morris	D2 Severe Drought conditions developed during the early part of the month along the Red River in extreme northern Red River and Bowie Counties in Northeast Texas Conditions improved during January 20113.
08/15-10/15	12 Counties	Despite a very wet spring…flash drought conditions developed across portions of Northeast Texas by the middle of August and continued through the end of the month. These counties were classified at being under D2 – Severe Drought conditions.
10/15	All of N.E. Texas	Severe Drought developed by October 1, but The last week of October brought significant rain to the area to the extent that drought conditions were downgraded.
08/02-08/16/2016	Titus, Red River, and Franklin	Severe Drought conditions developed across these counties, but dissipated after August 16th as the region began to see some beneficial rainfall later in the month.
10/25/-12/05/2016	Red River, Franklin Upshur, Wood Titus Morris, camp, Bowie	After a wet August of 2016, September was a relatively dry month for the northern half of Northeast Texas with area rainfall amounts generally below two inches for the month. October of 2016 continued this trend with the same portions of Northeast Texas having seen less than 1 inch. Conditions began to worsen by the latter half of the month with several counties across the northern half of Northeast Texas being classified with D2 Severe Drought conditions on October 25 and continuing beyond the month of October. Sufficient rainfall began during the first week of December eventually removing Red River County from the drought category.
03/07/2017-08/	Red River and Lamar	Severe drought conditions continued for much of the month before timely rainfall fell by the final week of the month resulting in a category improvement to D1. Additional improvement would be seen through late April as additional heavy rainfall amounts of 5-7 inches fell across much of Lamar and Red River Counties.
11/22/2017-12/27/2017	Red River, Franklin, Titus Morris, Camp and Harrison	One and a half to three inches of rain fell during September-Oct. Planting of winter heat pastures were delayed or little growth had occurred and stock ponds significantly receded.
07/262018-08/15/2018	Red River, Bowie	Drought in the last week of July continued into the middle of August. Widespread stationary front remedied the impact.

Historical Dollar Losses

This map illustrates the total county losses (property plus crop losses) from drought or abnormal dryness over the period (1996-2016). The different colors on the map represent the relative losses between counties within the state; white signifies zero dollars lost. The inset table reports total dollar losses for each region over the 21-year base period.

Map: Historical Drought/Abnormal Dryness Dollar Losses



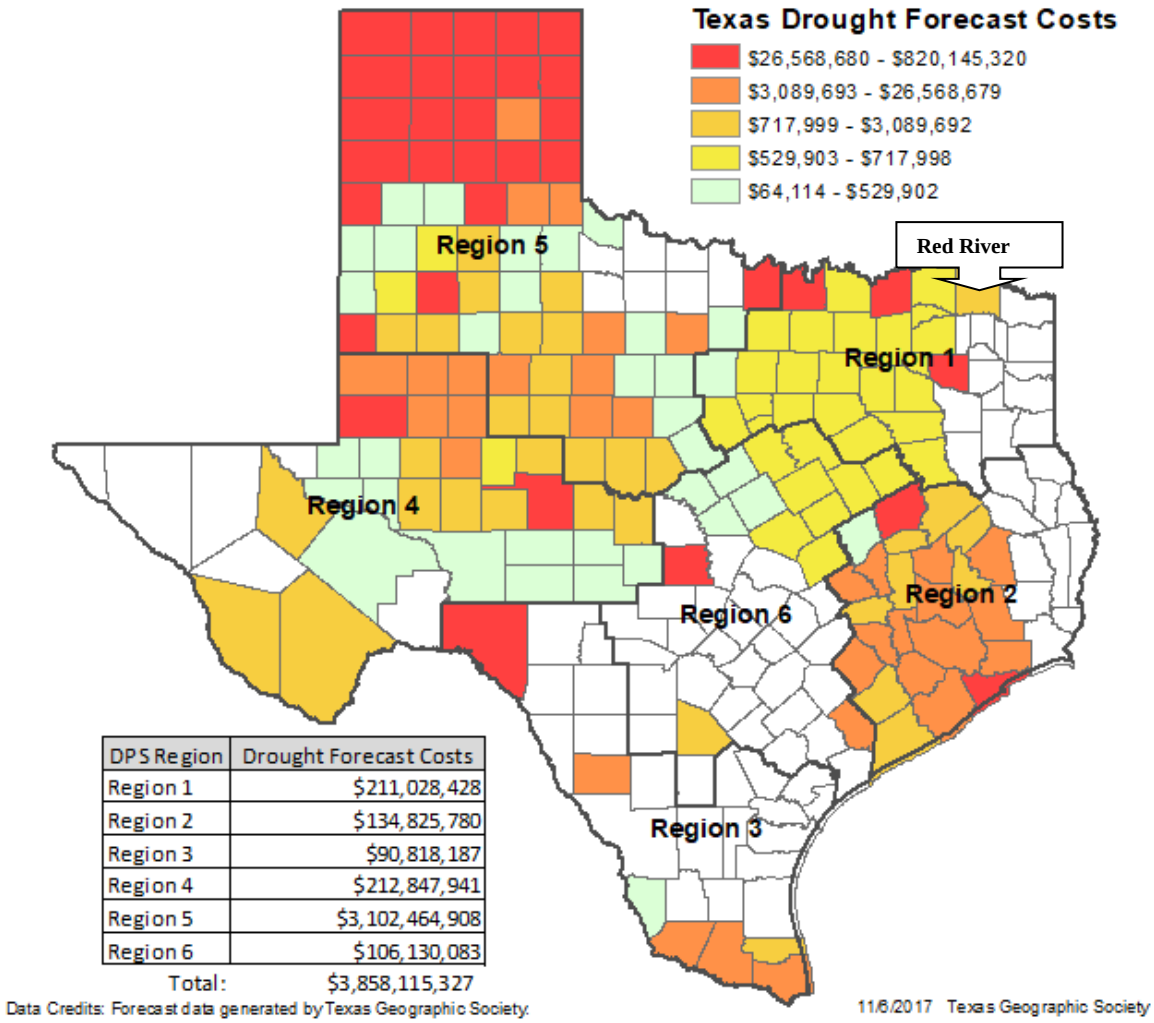
Future Risks

Results of the hazard impact forecast for drought or abnormal dryness are presented below along with a local assessment of those risks. Following this is a discussion and summary of risk statewide.

County Dollar Loss Forecast

Map3.3.2.4 shows the results of the forecast model for 2019-2023 for drought and abnormal dryness dollar losses at the county level. These are based on the locations of impacts in the base period and the likely locations of future losses.

Map: Drought/Abnormal Dryness Dollar Loss Forecast



DPS Region	Drought Forecast Costs
Region 1	$211,028,428
Region 2	$134,825,780
Region 3	$90,818,187
Region 4	$212,847,941
Region 5	$3,102,464,908
Region 6	$106,130,083
Total:	$3,858,115,327

The forecast is an estimate of damages that are likely to occur if similar weather events re-occur in or near previously impacted areas during the base period. Future drought or abnormal dryness dollar losses will not necessarily be in the same places that they were in the past, but a strong correlation is likely.

All events listed above affected Red River County and all participating jurisdictions. Information supplied by NOAA Satellite and Information Service, National Climatic Data Center According to the Texas Hazard Mitigation Plan losses for Red River County in the years 1996-2016 ranged between $2,835515 and $12,835,514. No other estimates were available. Look at the Texas plan for drought projections.

Red River County Drought Risk					
COMMUNITY	**POTENTIAL IMPACT 45%**	**PROBABLITY 30%**	**Warning 15%**	**Duration 10%**	**RISK**
Red River County	Substantial PRI 4	Highly Likely PRI 4	> than 24 hours PRI 1	>Week PRI 4	High 3.55
Avery	Substantial PRI 4	Highly Likely PRI 4	> than 24 hours PRI 1	>Week PRI 4	High 3.55
Bogata	Substantial PRI 4	Highly Likely PRI 4	> than 24 hours PRI 1	>Week PRI 4	High 3.55
Clarksville	Substantial PRI 4	Highly Likely PRI 4	> than 24 hours PRI 1	>Week PRI 4	High 3.55
Detroit	Substantial PRI 4	Highly Likely PRI 4	> than 24 hours PRI 1	>Week PRI 4	High 3.55

Estimated Property Loss at 25%	
Red River County	483,592,326
Avery	2,590,823
Bogata	7,019,759
Clarksville	26,906,555
Detroit	3,574,225

Red River County Critical Facilities					
Critical Facilities	**Avery**	**Bogata**	**Clarksville**	**Detroit**	**Red River Co.**
City Hall	1	1	1	1	
Fire Station	1	1			6
Govt. Facility			4		
Wastewater Treatment Plant	1	1	1		
Corrections Facility			1		
Maintenance Barn		1	1	1	4
Post Office	1	1	1	1	
Water Tower	1	2	2		4
Police Station		1	1		
Sheriff Office			1		
EMS			1		
Water Treatment Plant			1		
County Seat and offices			1		

Critical Facilities

Drought can impact the availability of water to citizens. Wastewater treatment plants and potable water sources may be impacted by lingering drought. Avery, Bogata, Clarksville, Detroit and unincorporated portions of Red River County are equally susceptible to drought.

***Location*:** Historically, drought has affected the all of Red River County including the jurisdictions. The agricultural areas, which include the rural parts of the County, would be affected more so than the urban areas.

***Impact**:* Drought in Red River County can have a large impact on local crops and local economies as well. Food prices increase because foods that are typically available locally have to be shipped in from areas not experiencing droughts.

Further economic impact occurs when stress is placed on automobile cooling systems, diesel trucks and railroad locomotives. This leads to an increase in mechanical failures. Train rails develop sun kinks that affect alignment. Additional impact will be felt as food prices rise due to crop loss.

Burn bans are often placed in effect because dry grass and shrubs can be susceptible to flash fires that will threaten neighborhoods

The demand for electric power during heat waves is well documented. According to the Institute for Research in the Atmosphere at Colorado State University, "In 1980, consumers paid $1.3 billion more for electric power during the summer than the previous year. The demand for electricity, 5.5% above normal outstripped the supply, causing electric companies to have rolling black outs."

Pollutants are more concentrated when water supplies are low because pollutants and bacteria become more concentrated.

During a period of drought, accompanied by a water shortage, residents are often asked to ration their water. People may be asked to rotate the days of watering yards by address on odd and even sides of the street. In areas where the soil is not stable foundation problems occur; especially with houses that are built on slab concrete.

The impact of a drought on Red River County and all the participating jurisdictions include economic problems due to high food prices, the water from municipal works can drop in quality causing illness, lawns and other plants are impacted. Public safety can be threatened by the increased likelihood of wildfires.

Probability: Droughts will continue to occur in the region when the conditions are right. It is a normal, recurrent feature of climate. It is **highly likely** a drought will affect Red River County and its participating jurisdictions. Historically a drought can last from a few days to over a year.

Vulnerability: The region is vulnerable when there is a deficiency of precipitation over an extended period of time. All of Red River County and its jurisdictions are vulnerable to drought. For Avery, Bogata, Clarksville and Detroit droughts have a social dynamic that includes affecting the elderly and young, causing depression, creating job loss, requiring residents to relocate due to economic impact and rising costs for food. Livestock, chicken houses and hay production are all affected by drought

Summary: Droughts can inflict damage to the rural areas of Red River County and to areas such as Clarksville that have an unstable water table. North East Texas is blessed with an abundance of potable water and most jurisdictions have not suffered negatively from extremely dry conditions. A major political issue exists because of metropolitan areas like Dallas and Fort Worth would love to have access to water available to the citizens of Red River and surrounding counties. Droughts can be devastating to farmers and ranchers due to crop and livestock loss. See tables on pages 25 for loss estimates at varying levels and the table of potential agricultural loss on the preceding page.

"Any party which takes credit for the ran must not be surprised it its opponents blame it for the drought."

Dwight Morrow

WILDFIRE

Description

A Wildfire is a large, destructive fire that spreads quickly over woodland or brush. Wildfires are nothing new to the State of Texas. They are a part of our natural history and have shaped many of our native Texas ecosystems. What is new is the unprecedented growth and development that is occurring in locations across the state that were once rural. It is in this area where development meets native vegetation that the greatest risk to public safety and property from wildfire exists. Wildfires typically start in woodland or prairie areas. They can occur naturally though they are often exacerbated by human activities. Wildfires can be hard to control as they threaten homes and communities located nearby. Wildfires happen in every state, and they do not respect county or state lines. The impact of fire reaches well beyond the initial flames and smoke. Even if firefighters are able to protect homes and business, the aftermath of wildfire can be just as devastating as floods.

In Texas, the greatest high-danger fire threats are forest, brush and grass fires. The East Texas Piney Woods belt of commercial timber is most susceptible to forest fires. In East Texas, the most monetary damage was caused by arson. Arsonists were responsible for 1 of every 4 fires. Debris burning is and continues to be the major cause of fires. Other causes such as control burns, construction fires and other miscellaneous fires rank second.

A HISTORY OF WILDFIRES IN TEXAS

Texas has had some significant fires in the urban wild land interface areas, where combustible homes meet combustible fuels. In 1996 the Poolville Fire burned 141 structures and 16,000 acres in Parker and Wise counties west of Fort Worth. During the 2000 fire season, 48 homes were lost to wildfires in Texas that burned more than a quarter of a million acres.

In 1996, a historical record number of fires and losses in terms of acreage lost due to fires that burned across the state during a four-month period of the traditional fire season in the state. A total of 113 homes and 170,000 acres were lost due to fire in what is undoubtedly the worst siege of fire in the history of Texas. Over three hundred- trained fire fighters were brought in from across the nation to assist and supplement the Texas Forest Service personnel in control of these fires. The Southern States Forest Fire Compact was invoked in order for Texas to receive help in terms of personnel and equipment from neighboring states.

Over the five-year period of 1991–1995, an average of 1178 fires a year burned an average of 17,022 acres with the average fire size being 14 acres. Compare this to 1996, when 2622 fires burned 76,581 acres with an average fire size of 29 acres.

The Bastrop County Complex fire occurred in September and October of 2011. Two people were killed by the fire and 1,673 homes and 34,000 acres were damaged or destroyed. The

fire caused severe damage to Bastrop State Park and the Lost Pines Forest. It is the most destructive wildfire in Texas History.

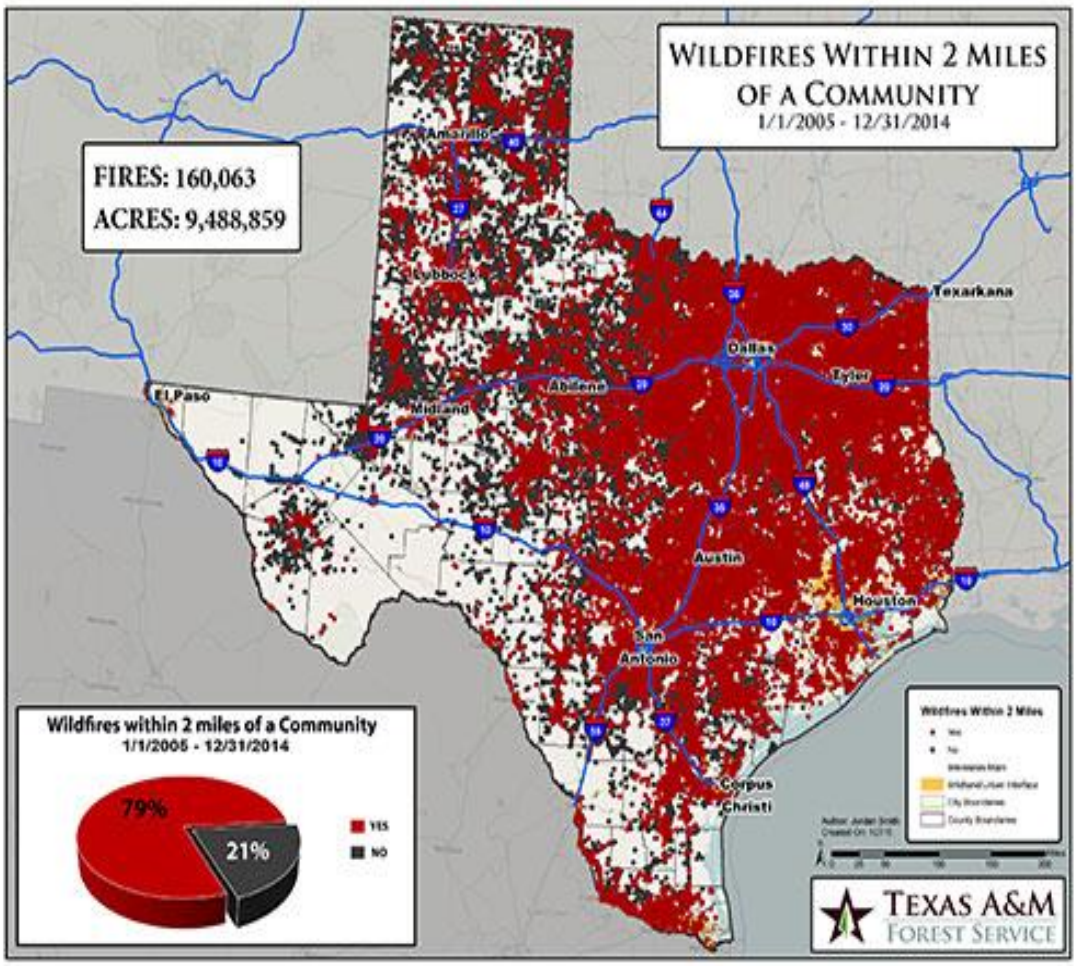
Should any part of the State of Texas experience extended periods of fair, windy weather, implementation of countywide bans on outdoor burning may be advised as a wild fire prevention tool in that area. The Texas Forest Service recommends that local governments consider a KBDI of 500 and above for imposition of burn bans. The Keetch-Byram Drought Index (KBDI) is basically a mathematical system for relating current and recent weather conditions to potential or expected fire behavior. The KBDI is the most widely used drought index system by fire managers in the south. It is also one of the only drought index systems specifically developed to equate the effects of drought with potential fire activities.

Red River County residents are served by 11 local fire departments as depicted below, which shows the square miles that each fire department in Red River County covers. Red River County is at risk of fires due to the frequency of drought situations that occur.

AREA COVERED (SQUARE MILES) BY RED RIVER COUNTY FIRE DEPARTMENTS	
FIRE DEPARTMENT	AREA (SQUARE MILES)
Avery VFD	150
Bagwell VFD	103
Bogata VFD	105
Boxelder VFD	60
Clarksville VFD	153
Cuthand VFD	102
Detroit VFD	111
Northwoods VFD	115
Pine Creek VFD	133
Rosalie VFD	18

ISO FIRE PROTECTION CLASSES FOR RED RIVER COUNTY		
Fire Protection Area	Protection Class	Primary Fire Response
Avery	9	Avery VFD
Bogata	5	Bogata VFD
Clarksville	6	Clarksville VFD
Detroit	7	Detroit VFD

Based on the map below, 79% of wildfires have occurred within 2 miles of a community in East Texas and Red River County.



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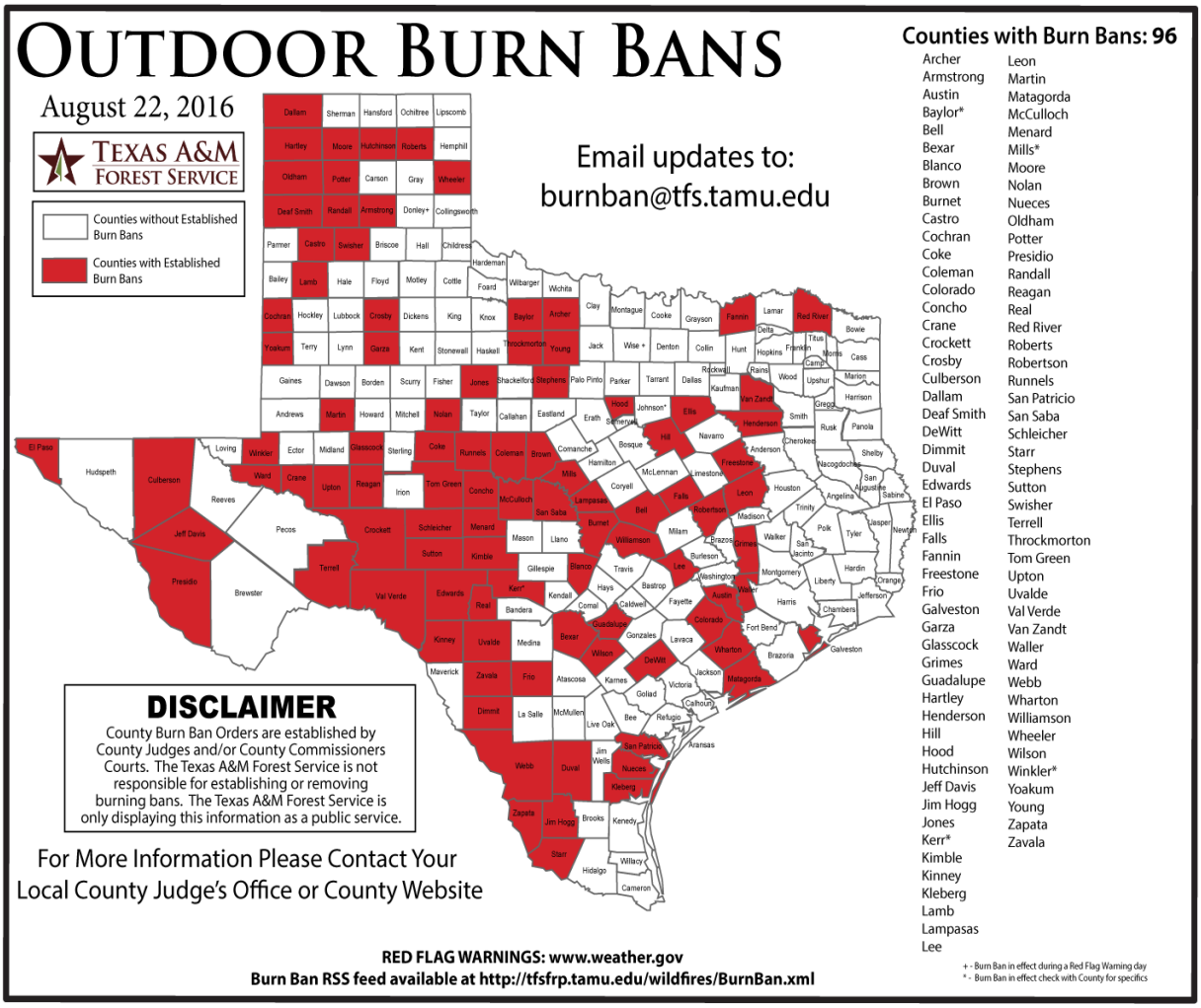
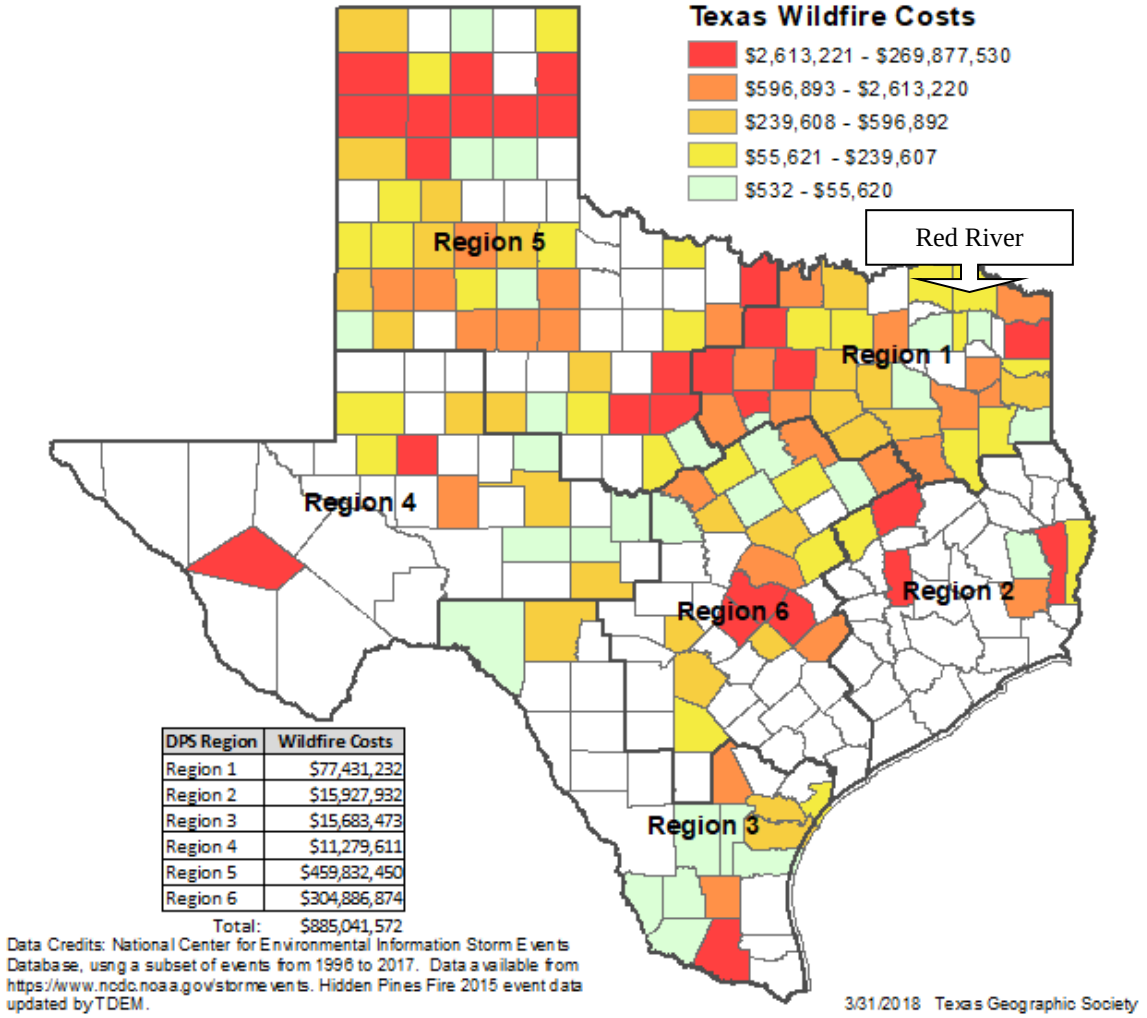


Historical Dollar Losses

The map below illustrates the total county losses (property plus crop losses) from wildfires over the 21-year base period (1996 thru 2016). The different colors on the map represent the relative losses between counties within the state; white signifies zero dollars lost. The inset table reports total dollar losses for each region over the 21-year base period.

Map Historical Dollar Losses from Wildfire



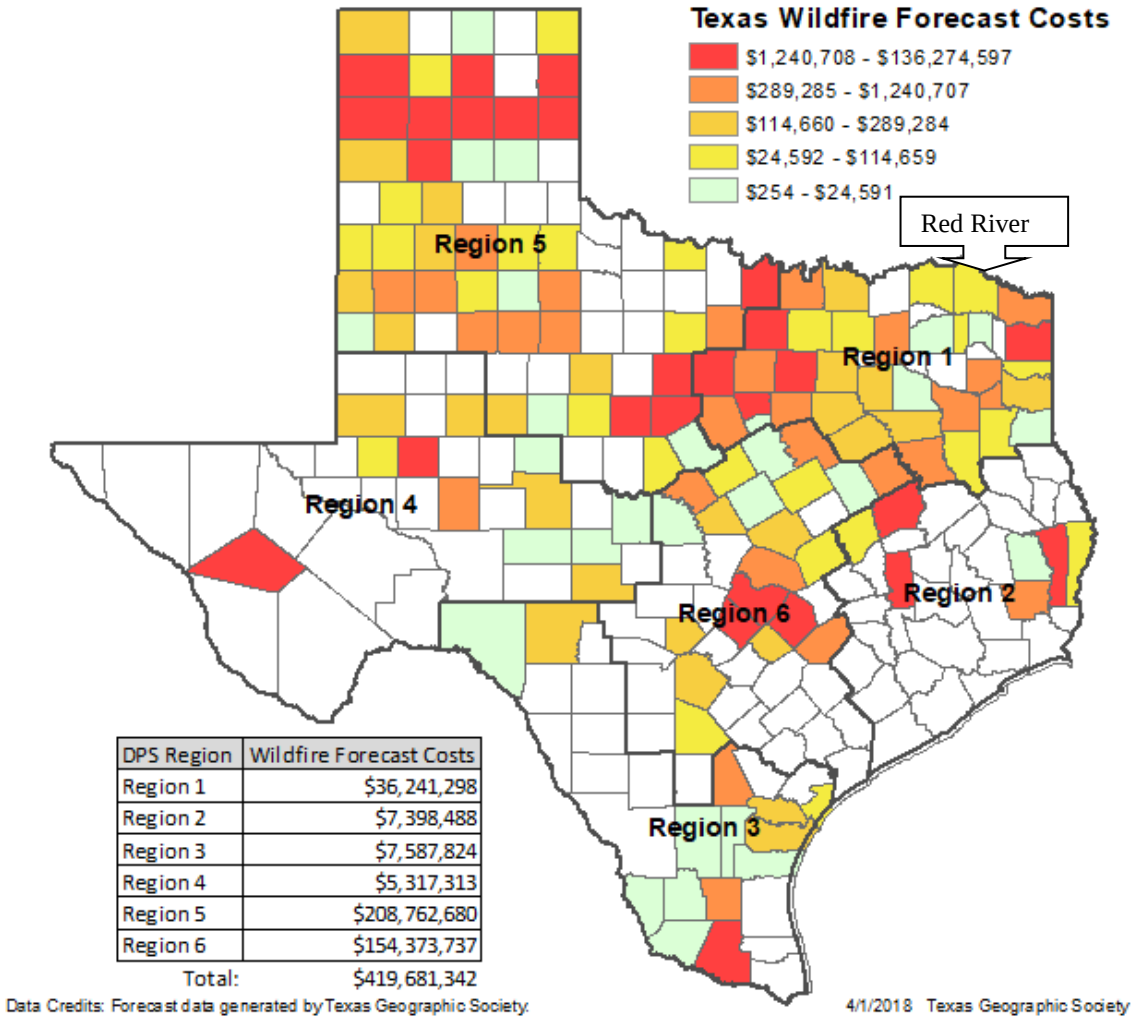
Future Risks

Results of the hazard impact forecast for wildfire are presented. Following this is a discussion and summary of risk statewide.

County Dollar Loss Forecast

Map shows the results of the forecast model for 2019-2023 for wildfire dollar losses at the county level. These are based on the locations of impacts in the base period and the likely locations of future losses.

Map: Wildfire Dollar Loss Forecast



DPS Region	Wildfire Forecast Costs
Region 1	$36,241,298
Region 2	$7,398,488
Region 3	$7,587,824
Region 4	$5,317,313
Region 5	$208,762,680
Region 6	$154,373,737
Total:	$419,681,342

Expected Fire Conditions and Varying KBDI Levels	
0 – 200 Low Fire Danger	Soil and fuel moisture is 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 Fire Danger	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 smokes to carry into and possibly through the night.
400 – 600 High Fire Danger	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 Fire Danger (600 – 800 continued)	Surface litter and most organic layers are consumed. 1000-hour fuels contribute to intensity. Stumps will burn to the end of 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 that makes control efforts difficult. With winds above 10 miles per hour, spotting is the rule. Expect increased need for resources for fire suppression. 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.

Should any part of the State of Texas experience extended periods of fair, windy weather, implementation of countywide bans on outdoor burning may be advised as a wild fire prevention tool in that area. The Texas Forest Service recommends that local governments consider a KBDI of 600 and above for imposition of burn bans. Other indicators that dictate the need for a burn ban include: 1000 HR fuel moisture, Energy Release Component and run occurrence of local fire departments. Red River County can expect ranges from 0-200 Low Fire Danger to 600-800 Extreme Fire Danger.

Outdoor Burn Bans

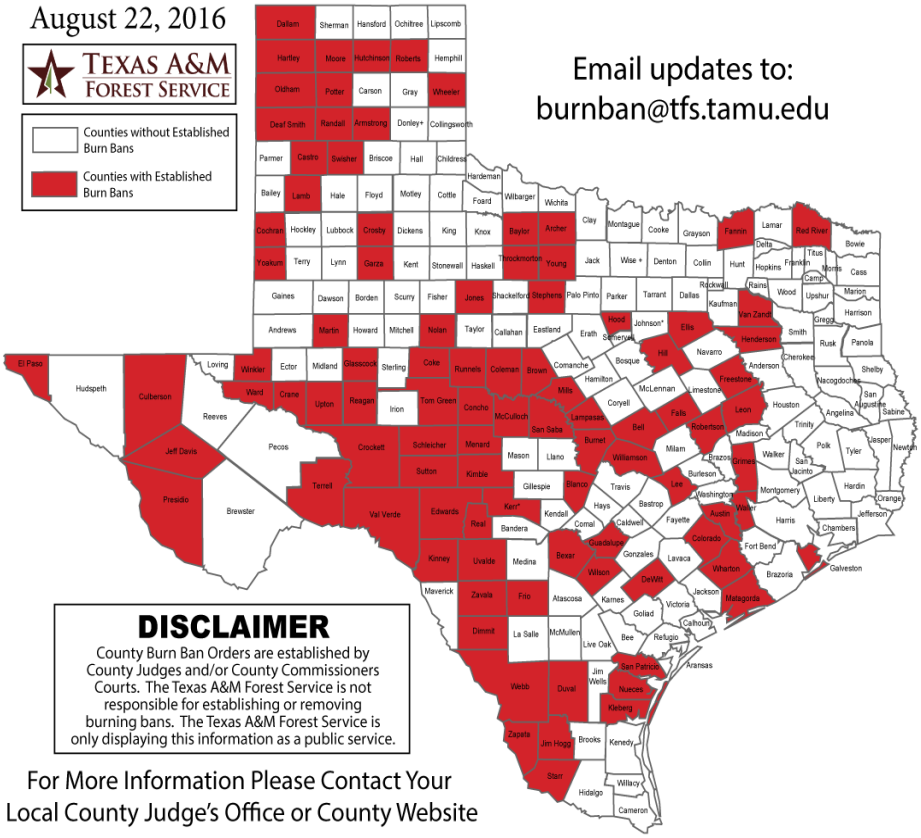
August 22, 2016

Texas A&M Forest Service

Counties without Established Burn Bans

Counties with Established Burn Bans

Email updates to:
burnban@tfs.tamu.edu



DISCLAIMER

County Burn Ban Orders are established by County Judges and/or County Commissioners Courts. The Texas A&M Forest Service is not responsible for establishing or removing burning bans. The Texas A&M Forest Service is only displaying this information as a public service.

For More Information Please Contact Your Local County Judge's Office or County Website

Counties with Burn Bans: 96

Archer
Armstrong
Austin
Baylor*
Bell
Bexar
Blanco
Brown
Burnet
Castro
Cochran
Coke
Coleman
Colorado
Concho
Crane
Crockett
Crosby
Culberson
Dallam
Deaf Smith
DeWitt
Dimmit
Duval
Edwards
El Paso
Ellis
Falls
Fannin
Freestone
Frio
Galveston
Garza
Glasscock
Grimes
Guadalupe
Hartley
Henderson
Hill
Hood
Hutchinson
Jeff Davis
Jim Hogg
Jones
Kerr*
Kimble
Kinney
Kleberg
Lamb
Lampasas
Lee
Leon
Martin
Matagorda
McCulloch
Menard
Mills*
Moore
Nolan
Nueces
Oldham
Potter
Presidio
Randall
Reagan
Real
Red River
Roberts
Robertson
Runnels
San Patricio
San Saba
Schleicher
Starr
Stephens
Sutton
Swisher
Terrell
Throckmorton
Tom Green
Upton
Uvalde
Val Verde
Van Zandt
Waller
Ward
Webb
Wharton
Williamson
Wheeler
Wilson
Winkler*
Yoakum
Young
Zapata
Zavala

+ - Burn Ban in effect during a Red Flag Warning day
* - Burn Ban in effect check with County for specifics

RED FLAG WARNINGS: www.weather.gov
Burn Ban RSS feed available at http://tfsfrp.tamu.edu/wildfires/BurnBan.xml

Wildland/Urban Interface (WUI)

The Wildland Urban Interface (WUI) reflects housing density depicting where humans and their structures meet or intermix with wildland fuels. It is the geographical area where combustible homes are mixed with combustible vegetation. The determination of specific wildfire hazard sites depends on several factors.

- Topographic location and fuels;
- Site/building construction and design;
- Defensible space;
- Accessibility;
- Fire protection response; and
- Water availability.

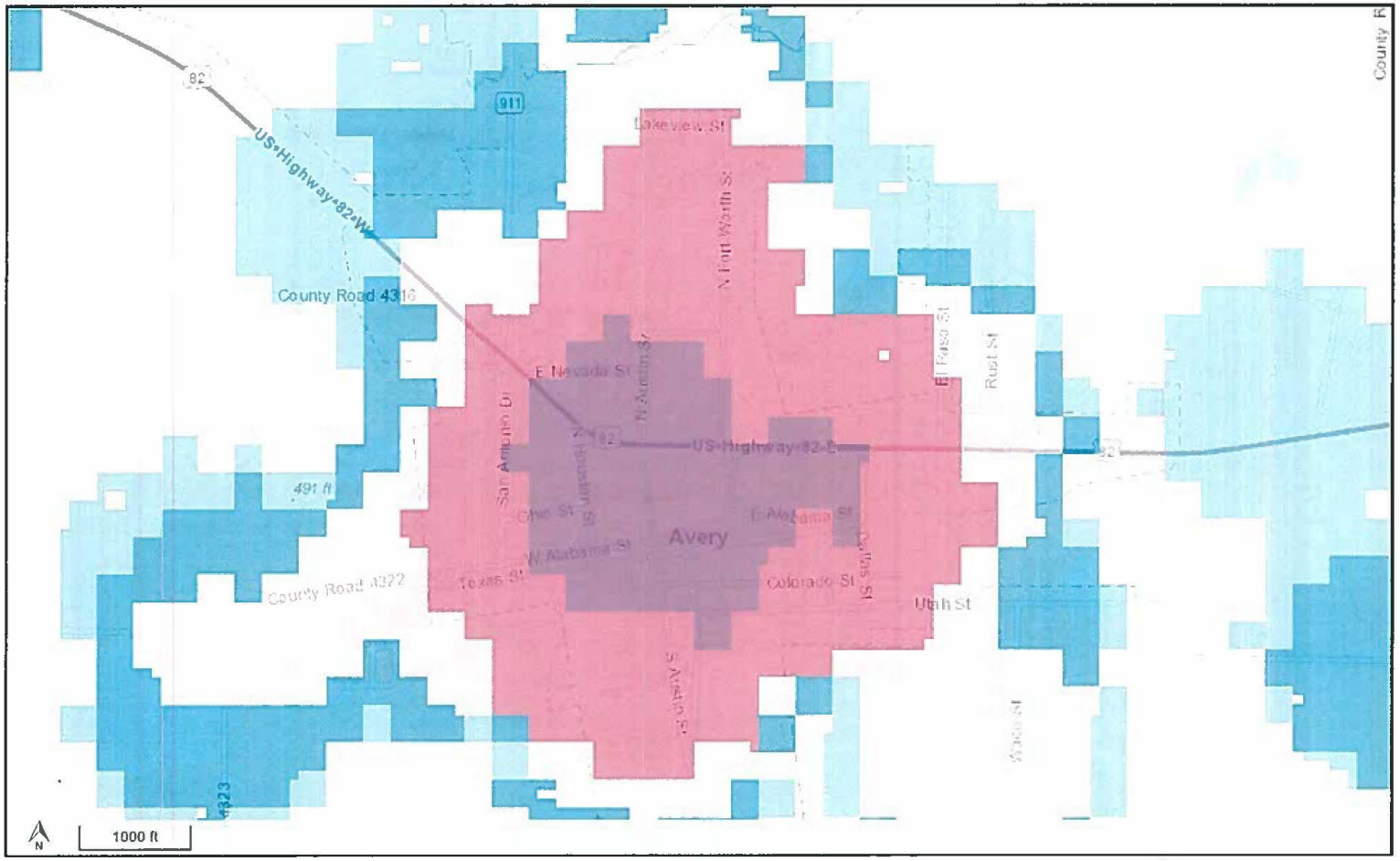
WUI housing density is categorized based on the standard Federal Register and U.S. Forest Service SILVIS data set categories. The number of housing density categories is extended to provide a better gradation of housing distribution to meet specific requirements for fire protection planning activities. While units of the data set are in houses per sq. km., which is consistent with other data such as USFS SILVIS, the data is presented as the number of houses per acre to aid with interpretation and use in Texas. The map on pages 76 reflect these data.

WUI Map Legend

	Housing Density
	LT 1hs/40ac
	1hs/40ac to 1hs/20ac
	1hs/20ac to 1hs/10ac
	1hs/10ac to 1hs/5ac
	1hs/5ac to 1hs/2ac
	1hs/2ac to 3hs/1ac
	GT 3hs/1ac
hs = houses ac = acres	

Avery, Texas

WUI



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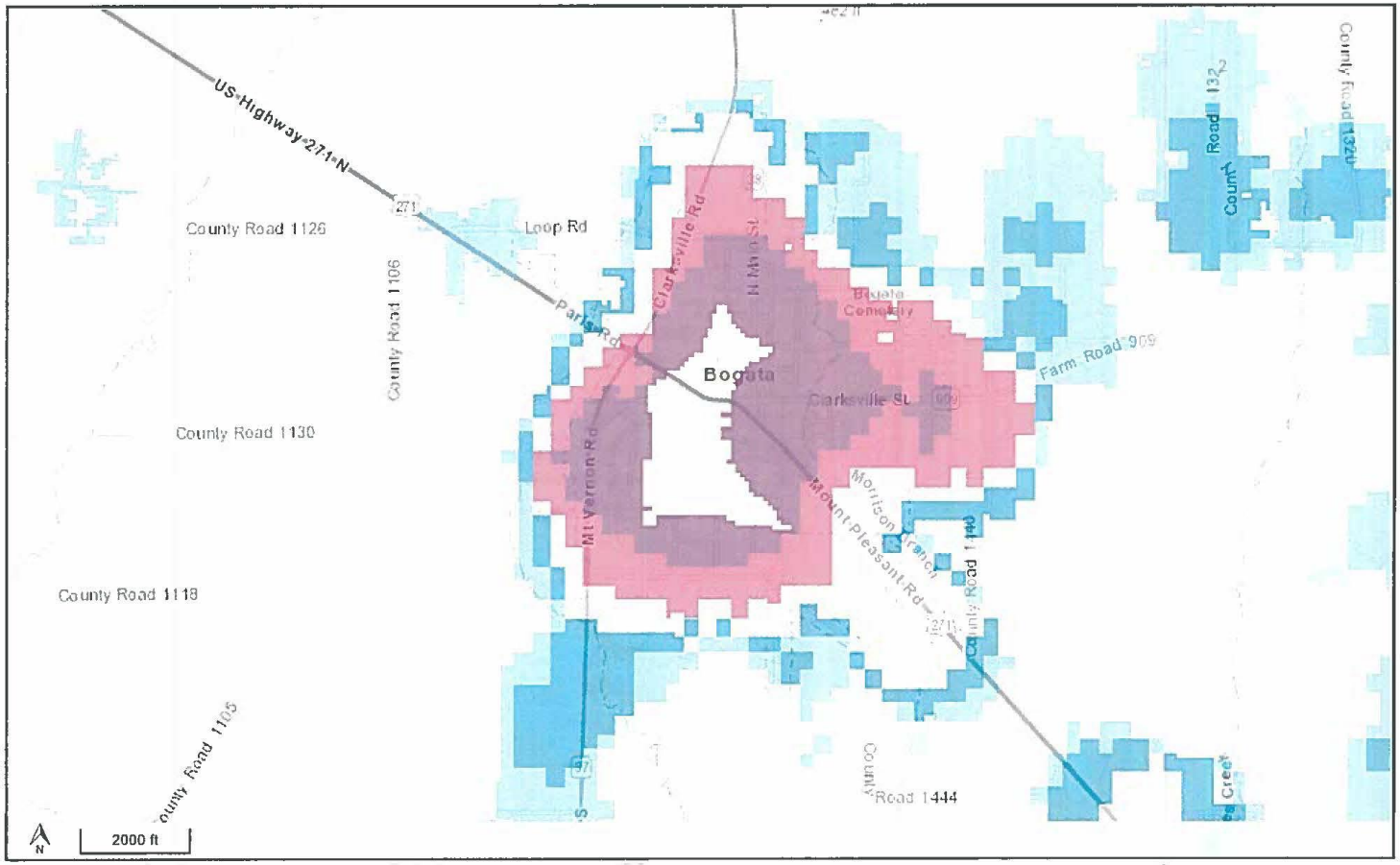
Texas Wildfire Risk Assessment Portal
http://texaswildfirerisk.com

TEXAS A&M FOREST SERVICE

Bogata Texas

WUI



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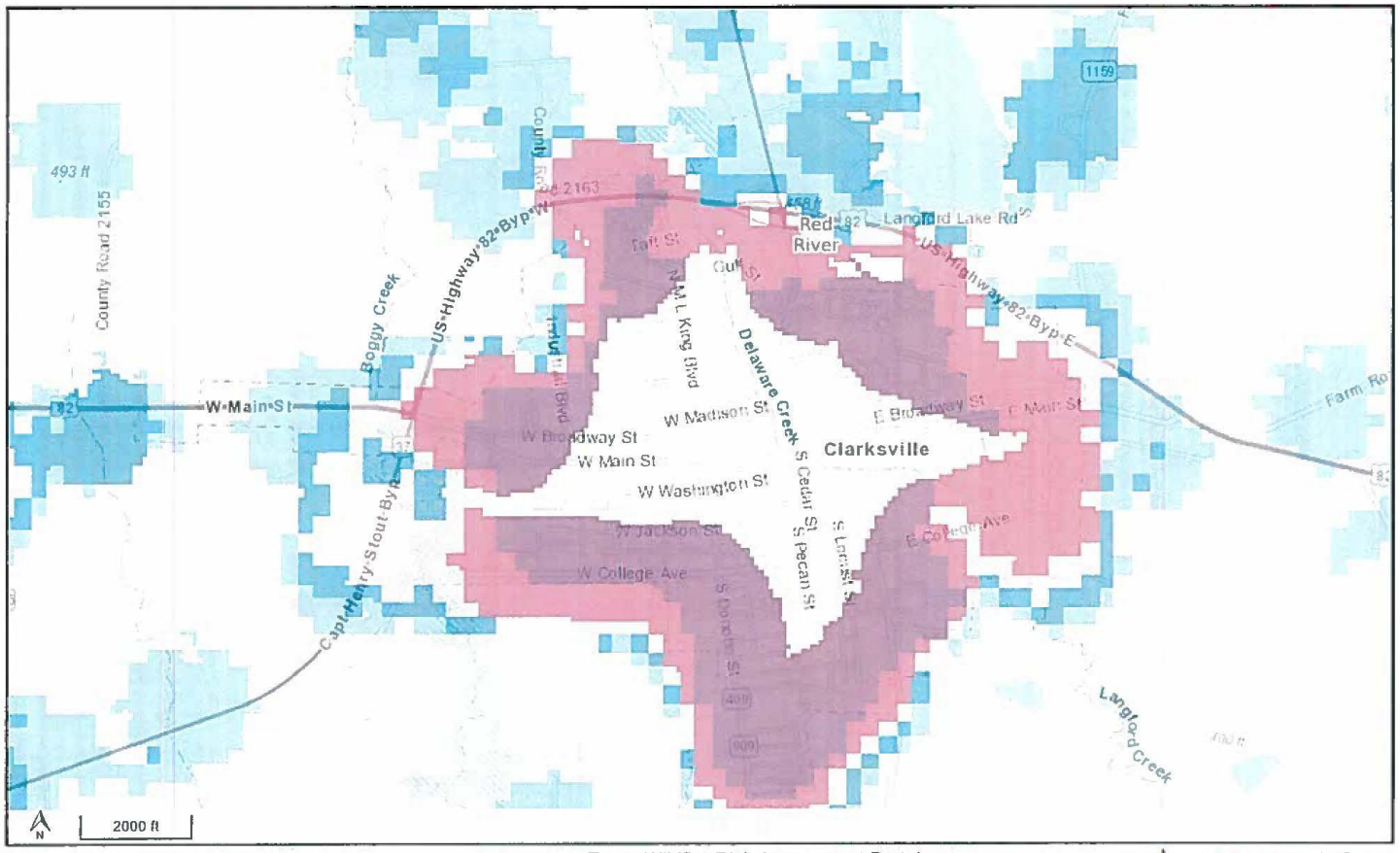
Texas Wildfire Risk Assessment Portal
http://texaswildfirerisk.com

TEXAS A&M FOREST SERVICE

Clarksville, Texas

WUI



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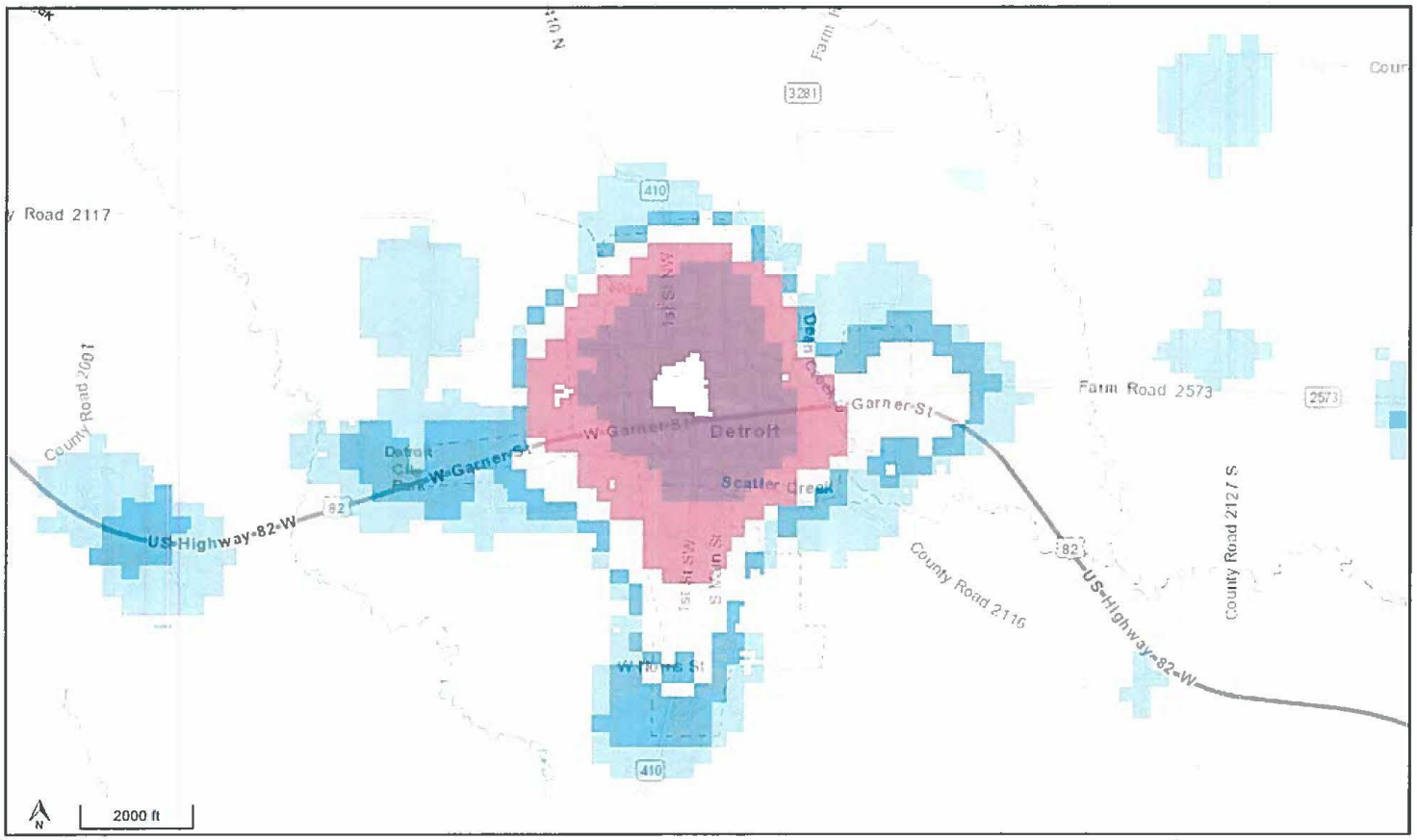
Texas Wildfire Risk Assessment Portal
http://texaswildfirerisk.com

TEXAS A&M FOREST SERVICE

Detroit, Texas

WUI



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5/15/2020 - 10:02:25 PM

Texas Wildfire Risk Assessment Portal
http://texaswildfirerisk.com

TEXAS A&M FOREST SERVICE

WILDFIRES IN RED RIVER COUNTY

Red River County, Texas is considered to be a "transitional" county from the standpoint of wildland fuels. Red River County is located at the interface of the east Texas pine forests and the "blackland" post oak forests. The pine forests frequently result in "crown" fires, especially in pine plantations, while fires in the "blackland" areas are usually in predominately grass and hardwood fuels.

Red River County Wildfire Risk					
COMMUNITY	**POTENTIAL IMPACT 45%**	**PROBABLITY 30%**	**Warning 15%**	**Duration 10%**	**RISK**
Red River Unincorporated	Substantial PRI 4	Highly Likely PRI 4	< 6 hrs. PRI 4	< Week PRI 3	High 3.9
Avery	Substantial PRI 4	Unlikely PRI 1	< 6 hrs. PRI 4	< Week PRI 3	Medium 2.85
Bogata	Substantial PRI 4	Highly Likely PRI 4	< 6 hrs. PRI 4	< Week PRI 3	High 3.9
Clarksville	Substantial PRI 4	Highly Likely PRI 4	< 6 hrs. PRI 4	< Week PRI 3	High 3.9
Detroit	Substantial PRI 4	Highly Likely PRI 4	< 6 hrs. PRI 4	< Week PRI 3	High 3.9

Estimated Property Loss at 50%	
Red River County	$967,184,653
Avery	$5,181,645
Bogata	$14,039,520
Clarksville	$53,813,110
Detroit	$7,148,451

Red River County Wildfires 2009-2018											
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Totals By Dept.
Avery	16	12	31	17	13	27	24	10	13	13	186
Annona	N/A	N/A	N/A	N/A	10	9	12	12	9	11	63
Bagwell	20	16	11	12	6	14	8	9	23	20	139
Bogata	21	20	55	21	24	15	15	27	26	35	259
Boxelder	8	5	10	2	4	8	4	10	7	6	64
Clarksville	24	20	51	15	14	22	8	22	24	26	226
Cuthand	9	8	15	18	12	10	12	13	12	10	119
Detroit											
Northwoods	7	14	15	6	8	4	9	13	15	15	106
Pine Creek	7	14	15	6	8	4	9	13	15	15	106
Rosalie	6	7	10	6	6	5	3	4	5	3	55
Totals by Year	118	116	213	103	105	118	104	133	149	164	1323

Red River County Critical Facilities					
Critical Facilities	**Avery**	**Bogata**	**Clarksville**	**Detroit**	**Red River Co.**
City Hall	1	1	1	1	
Fire Station	1	1			6
Govt. Facility			4		
Wastewater Treatment Plant	1	1	1		
Corrections Facility			1		
Maintenance Barn		1	1	1	4
Post Office	1	1	1	1	
Water Tower	1	2	2		4
Police Station		1	1		
Sheriff Office			1		
EMS			1		
Water Treatment Plant			1		
County Seat and offices			1		

Critical Facilities
Critical Facilities located near underbrush or unkept property are vulnerable to fires generated by wildfires. Critical facilities located in Avery, Bogata, Clarksville and Detroit share similar risks. Building located in the unincorporated areas of Red River County pose a higher risk of fire damage due to the proximity of wildfire fuels.

Location: Forests, thick underbrush and dry pastures put Red River County at risk for Wildfires. Due to the droughts that occur throughout the entire County, all of Red River County could possibly be affected, depending on where the wildfire started.

Extent: Data is not available to determine the extent that each fire must reach before it runs out of control. There were 164 wildfires reported to the Texas Forestry Service for Red River County in 2018. There were a total of 1,061 acres burned at a total cost of $4,598.25. The largest fire occurred on January 22, 2009 and covered 575 acres. The total cost was $1,300. None of these fires endangered a town in Red River County.

Probability: Historically weather conditions indicate that the probability of occurrence is highly likely. The threat of fires cannot be eliminated but public education and the use of prescribed burns can be used to better manage this hazard.

Vulnerability: Red River consists of heavily wooded pine, hard wood, bottom land and pasture. Crops, timber, pasture and dwellings are in danger of being destroyed by wildfires. Wildfires are contained by volunteer fire units working in coordination with

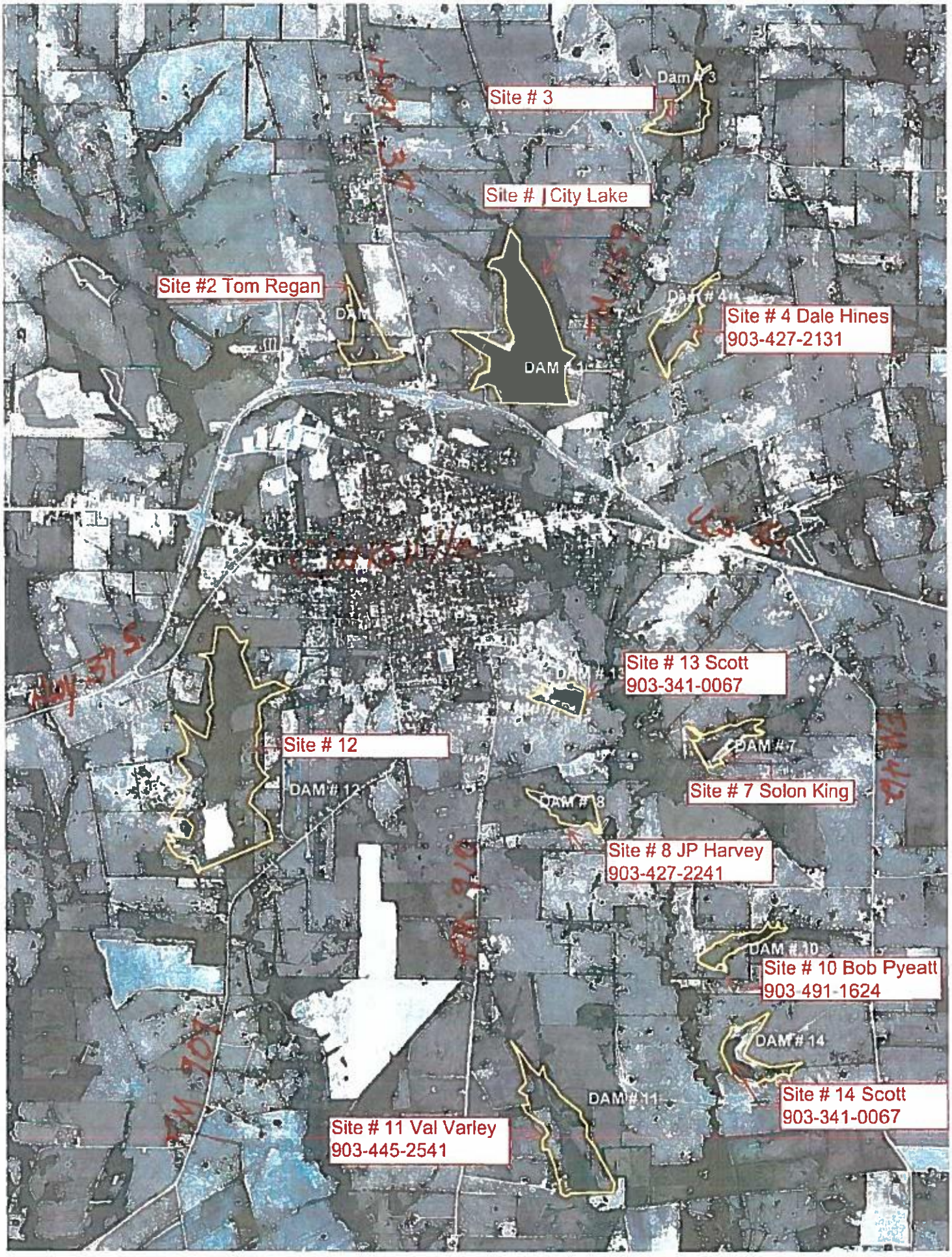
each other. The fires that have occurred in the county have been contained by the dedicated fighters.

Summary: There are no "Communities at Risk" listed in the Federal Register. The Texas register of "Communities at Risk" lists the communities of Avery, Bogata, and Detroit. The Southern Fire Risk Assessment System (SFRAS) designates the following communities as "Communities at Risk": Detroit (High Risk); Clarksville, , Avery, Deport, and Bogata (moderate risk). SFRAS designates the following communities as being within the Wildland Urban Interface criteria: Dimple, Negley, Kanawha, Boxelder, and Cuthand.

Fires can destroy property, and homes causing injury and death. Fortunately, no lives were lost in any of the fires listed in 2018. It is important that communities have up to date emergency warning, reporting, and response systems in place. Well trained cohesive VFD's play a critical role in protecting people and property. Because of the urban/wildland interface**, t**he cities of Clarksville, Bogata and Detroit experience wildfires. The rural areas of Red River County are particularly at risk; however, most of the fires are small and easily contained. Page 25 shows loss estimates

DAM FAILURE

Although there has been no history of dam failure, there are 5 known high hazard dams in Red River County (see map on following page). These dams are classified as high-hazard potential (HHP), meaning that their failure could result in loss of life. Dams can fail for a number of reasons, including overtopping caused by floods, acts of sabotage, or structural failure of materials used in dam construction. Three of the dams 3, 4 Dale Hines, and 12 are in rural areas with no possibility of inundation impacts on critical infrastructure or populations. The other 2 dams (1) City Lake and (2) Tom Regan may pose a risk, but data is lacking at this time. Inundation areas for these 2 dams are unknown, and requests for additional information from TCEQ have gone unanswered at this time – likely due to delays from the COVID-19 disaster. At this time, a data deficiency is present. A mitigation action will be added to remedy this data deficiency. The data deficiency includes location, extent, probability, vulnerability and impacts.


Site # 3
Site # 1 City Lake
Site #2 Tom Regan
Site # 4 Dale Hines
903-427-2131
Site # 13 Scott
903-341-0067
Site # 12
Site # 7 Solon King
Site # 8 JP Harvey
903-427-2241
Site # 10 Bob Pyeatt
903-491-1624
Site # 14 Scott
903-341-0067
Site # 11 Val Varley
903-445-2541

SECTION III

Mitigation Plan Update Strategy for Red River County

The previous goals and actions were never acted on and many of the old actions are no longer valid. The plan was never incorporated into other planning mechanisms as intended. Measures have been taken to ensure annual reviews. This updated plan represents the most current data available regarding actions needed to reduce loss of life and property through mitigation. The five-year update is seen as an opportunity to set actions in place that are current, valid and obtainable.

- A new way to measure risk has been introduced in the 5-year update. There are no changes noted that would impact the development of the plan.
- Added language reflects a desire to see that the Plan is acted upon in a measured fashion with at least annual meetings being held to monitor overall action priorities and progress.
- No natural event has occurred since the original plan that would alter the current plan's prioritization.
- There have been no new developments in the county or jurisdiction that would alter vulnerability. Red River County has experienced a -5.4% variation in population from April 2010-July 2018 representing a loss of 689 residents. It is ranked 233 in the state for median household income.
- There have been no changes politically or financially that would impact the plan's development.
- The prioritization of our goals and objectives have not changed in our hazard mitigation plan as compared to the last approved plan.

Red River County recognizes the importance of dedicated involvement regarding the integration of the plan into existing county and participating jurisdiction plans and budgets and codes. Red River County has initiated a proactive course of action that includes annual reviews and reports to the Red River County Commissioners Court and the city councils of Avery, Bogata, Clarksville and Detroit

The presiding Red River County Judge or his/her appointed representative will maintain a schedule to ensure that the plan is addressed and updated in a timely manner.

MITIGATION GOALS AND LONG TERM STRATEGY

GOALS

Mitigation Plan Goals

The Red River County Mitigation Action Plan goals describe the direction that Red River County agencies, organizations, and citizenry can take to minimize the impacts of natural hazards. Specific recommendations are outlined in the action items. These goals help guide direction of future activities aimed at reducing risk and preventing loss from natural hazards.

Goal #1: Protect Life and Property

1. Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to natural hazards.
2. Improve hazard assessment information to make recommendations for discouraging new development in areas vulnerable to natural hazards.

Goal #2: Public Awareness

1. Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
2. Provide information on tools, and funding resources to assist in implementing mitigation activities.

Goal #3: Natural Systems

1. Preserve, rehabilitate, and enhance natural systems to serve natural hazard mitigation functions.

Goal #4: Partnerships and Implementation

1. Encourage leadership within public and private sector organizations to prioritize and implement local, county, and regional hazard mitigation activities.

Goal #5: Emergency Services

1. Establish policy to ensure mitigation projects for critical facilities, services and infrastructure.
2. Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations and business.
3. Integrate natural hazard mitigation activities with emergency operation plans and procedures.
4. Develop plan to upgrade emergency radio communication system throughout the county.

Method of Prioritization

Red River County, the City staffs, and Hazard Mitigation Team members were involved in the selection of the above priority actions. Actions were prioritized using the STAPLE+E criteria, planning tool used to evaluate alternative actions. The actions do not adversely affect a particular segment of the population or cause relocation of lower income people. They provide long-term reduction of losses and have minimal secondary adverse impacts. They do not have adverse effects on the environment, and are consistent with the community's environmental goals, and have mitigation benefits while they are environmentally sound. **The following table explains the STAPLE+E criteria.**

S – Social	**Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the population, do not cause relocation of lower income people, and if they are compatible with the community's social and cultural values.**
T – Technical	**Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.**
A – Administrative	**Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.**
P – Political	**Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.**
L – Legal	**It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.**
E – Economic	**Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.**
E - Environmental	**Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, and that are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.**

MITIGATION ***GOALS AND ACTION PLANS***

In order to determine the following mitigation actions, several meetings were held in Red River County. These meetings have been previously mentioned and documented. Mitigation action items were presented to the committee and those in attendance. Those individuals reviewed the items presented and made the decision to select the following mitigation actions. The Red River County Community Wildfire Protection Plan was used as a tool in developing strategies. Clarksville had developed building codes and water conservation plans. The also had a downtown improvement project underway. Bogata has building ordinances that could be developed into needed building codes. Avery and Detroit did not have existing planning mechanisms identified to incorporate into the plan. Priority was given to each action by the HMPT. Costs, Citizens served and community impact were considered when prioritizing the actions.

The comprehensive range of specific mitigation actions and projects being considered along with cost estimates and funding sources are listed on the following pages. A cost benefit review was performed to help decide which action items are feasible (p.91).

"My favorite things in life don't cost any money. It's really clear that the most precious resource we all have is time."

Steve Jobs

Red River Hazard Mitigation Actions 2011 Update

No mitigation planning occurred after initial plan adoption. This is the first 5-year update since 2011.

HAZARD	ACTION	DISPOSITION	EXPLANATION
Flash Floods Red River Co.	Distribute information regarding flooding to the general public efficiently. This is done at the county fair, National Night Out, local rodeos, and school fairs.	Delete	No longer viable mitigation action
	NFIP participation: Contact the TWDB and develop county floodplain maps . The maps should show the expected frequency of flooding, the level of flooding, and the areas subject to inundation. REQUEST FIRM STUDIES BY FEMA	Completed	
Flash Floods Avery	Develop protocol for cleaning debris from ditches and drains within Avery to protect existing and new buildings.	Continued for current update	This continues to be a viable goal
	Implement Turn Around, Don't Drown Safety Program	Delete	Not needed for Avery
	Participate in NFIP	Delete	No longer viable mitigation action
Flash Floods Bogata	Maintain washed out roads with grant money	Delete	No longer viable mitigation action
	Disseminate PSA's in Newspaper Articles through local media about dangers of flooded county roads	Delete	No longer viable mitigation action.
Flash Floods Clarksville	Evaluate elevation requirements for new residential and non-residential structures	Delete	No longer viable mitigation action
	Explore raising base flood elevation on new residential construction to comply with recommendations from TWDB	Delete	No longer viable mitigation action
Flash Floods Detroit	Public works Dept. maintain ditches and culverts to keep debris from hampering drainage.	Modified and continued in new update	
	Build a community safe room, meeting FEMA standards for tornado winds	Delete	No longer viable mitigation action
	Provide generator backup for warning system.	Continued	
Red River Co. Tornadoes	Conduct a Code Red emergency notification feasibility study that will include possible funding sources.	Delete	No longer viable mitigation action

HAZARD	ACTION	DISPOSITION	EXPLANATION
	Encourage families to develop emergency communication plan in case family members are separated from one another during a tornado. Have a plan to get back together. This is done at the county fair, National Night Out, local rodeos, and school fairs.	Delete	No longer viable mitigation action
Avery Tornadoes	Encourage families to develop emergency communication plan in case family members are separated from one another during a tornado. Have a plan to get back together.	Delete	No longer a viable mitigation action.
	Install backup generators to power water and sewage as well as sirens.	Delete	No longer a viable mitigation action.
Bogata Tornadoes	Encourage families to develop emergency communication plan in case family members are separated from one another during a tornado. Have a plan to get back together.	Delete	No longer a viable mitigation action
	Build a community saferoom meeting FEMA standards for tornado winds	Delete	Not a feasible goal at this time.
Clarksville Tornadoes	Educate citizens on steps that can be taken to reduce the impact of tornadoes with the use of disaster supply kits	Delete	No longer a viable mitigation action
	Upgrade warning sirens and install remote activator.		
Detroit Tornadoes	Build a community saferoom meeting FEMA standards for tornado winds.		
	Educate citizens on steps that can be taken to reduce the impact of tornadoes with the use of disaster supply kits.	Reworded and continued	
Red River Co. Thunderstorms	Develop county wide call in program to alert county of dangerous trees and tree limbs on public property	Delete	No longer a viable mitigation action.
	Run newspaper articles, distribute information at local schools, National Night Out, county fairs and rodeos	Delete	No longer a viable mitigation action.

HAZARD	ACTION	DISPOSITION	EXPLANATION
Avery Thunderstorms	Work with utility providers and county and local public works agencies to document known hazard areas. Develop SOP to require identification of Hangers (limbs) before and after storms.	Delete	No longer a viable mitigation action.
	Study existing building codes for efficiency in protecting structures from wind damage. Adopt new International Building Codes.	Delete	No longer a viable mitigation action
Bogata Thunderstorms	Identify potentially hazardous trees in urban areas. Develop SOP for maintenance. Revision: Solicit volunteer team from residents	Delete	No longer a viable mitigation action
	Install generator power at strategic emergency and water treatment facilities.	Modified and continued in new update	
Clarksville Thunderstorms	Install generator power at strategic emergency and water treatment facilities.	Continued	
Detroit Thunderstorms	Work with utility providers and county and local public works agencies to document known hazard areas.	Delete	No longer a viable mitigation action.
	Identify potentially hazardous trees in urban areas. Develop SOP for maintenance. Develop Citizen Call-In Program.	Delete	No longer a viable mitigation action.
Red River Co. Winter Storms	Distribute educational materials to Red River County residents concerning actions they may take to protect life, property, and the environment from winter storm events at National Night Out, school events the county fair and other special events that attract the public. The city and VFD play a major role in this.	Delete	No longer a viable mitigation action
	Provide mobile generators to supply power in critical emergency situations.	Modified and continued to new update	
Avery Winter Storms	City-wide brush and debris disposal to encourage proper trimming and disposal of vegetation.	Delete	No longer a viable mitigation action

HAZARD	ACTION	DISPOSITION	EXPLANATION
Bogata Winter Storms	Citywide brush and debris disposal to encourage proper trimming and disposal of vegetation.	Delete	No longer a viable mitigation action
Clarksville Winter Storms	Distribute educational materials to Red River County residents concerning actions they may take to protect life, property, and the environment from winter storm events at National Night Out, school events and other special events that attract the public. The city and VFD play a major role in this.	Delete	No longer a viable mitigation action
Detroit Winter Storms	Distribute emergency winter storm information at city hall and community functions.	Delete	No longer a viable mitigation action.
Red River Co. Drought	Develop partnership with public utilities for information dissemination.	Delete	No longer a viable mitigation action.
	Develop a plan to route water from the upper part of the county to areas that need additional sources for growth	Delete	No longer a viable mitigation action.
Clarksville Drought	Develop a plan to establish a source of surface water to supply the city of Clarksville with water needed for additional growth	Delete	No longer a viable mitigation action.
Red River Co. Wildfire	Organize "Fire Wise" groups in identified high risk rural areas	Delete	No longer a viable mitigation action
	Develop a county call list that includes all at-risk residents in Red River County in order to contact them in case of need for evacuation.	Delete	No longer a viable mitigation action
Avery Wildfire	The Avery VFD will work with the Texas Forestry Service to establish the Fire Wise program for identified at risk areas	Delete	Not viable for the jurisdiction.
	Ensure that building codes for **new structures** help protect property	Delete	No longer a viable mitigation action.
Bogata Wildfire	Provide smoke alarms for area elderly and those living below poverty line.	Delete	No longer a viable mitigation action

HAZARD	ACTION	DISPOSITION	EXPLANATION
	Develop program of home fire safety	Delete	No longer a viable mitigation action
Clarksville Wildfire	Encourage (Educate) single-family residences to have fire plans and practice evacuation routes	Delete	No longer a viable mitigation action
	Develop Fire Wise program for identified areas in need	Delete	Not viable for the jurisdiction.
Detroit Wildfire	Update fire equipment with grant monies and fund raisers.	Delete	No longer a viable mitigation action.
	Enforce burn ban for residents activate at 600 KBDI	Reworded and continued.	

When it is obvious that the goals cannot be reached, don't adjust the goals, adjust the action steps. **Confucius**

Avery Mitigation Action Tables

NOTE: ***All Avery projects are subject to availability of federal and local funding as well as availability of local staff to administer the project.***

High 1-3 Years; Medium 3-7 Years; Low 8+ Years.

Avery Flood Actions

Avery Flood Mitigation Action #1	Purchase emergency mobile generators for critical facilities use during power outages
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	FEMA Grants, Avery Annual Budget
Estimated Cost	Medium (10k-25k)
Responsible Agency	Avery City Council/EMC
Estimated Completion Time	5 years
Effect on New Buildings	Ensuring that waste water facilities and pumps have power can help protect new buildings from flooding and water contamination.
Effect on Existing Buildings	Ensuring that waste water facilities and pumps have power can help protect existing buildings from flooding and water contamination.
Comments:	It is important during times of stress and outages that critical facilities such as waste treatment plants and water supplies remain operational.

Avery Flooding Mitigation Action # 2	Develop and implement program for cleaning debris from ditches and drains within Avery to protect existing and new buildings.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	High
Funding Source(s)	Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Mayor of Avery
Estimated Completion Time	3 years
Effect on New Buildings	By keeping ditches clear water will flow better preventing flooding.
Effect on Existing Buildings	By keeping ditches clear water will flow better preventing flooding.
Comments:	It is important to allow for proper drainage during heavy downpours.

Avery Tornado Actions

Avery Tornado Mitigation Action # 1	Develop and implement a public education program that will provide the public with understanding of their risk from Tornadoes and the mitigation methods to protect life and property.
Mitigation Goal/Objective	**Goal 1** Protect Life and Property **Goal 2** Public Awareness
Priority	High
Funding Source(s)	Avery Annual Budget
Estimated Cost	Low (0k-10k)
Responsible Agency	Avery Mayor
Estimated Completion Time	2 years
Effect on New Buildings	This could help reduce damage by implementing ideas about home and business protection from tornadic winds.
Effect on Existing Buildings	This could help reduce damage by implementing ideas about home and business protection from tornadic winds
Comments:	Educating the public is an integral part of mitigation.

Avery Tornado Mitigation Action # 2	Develop and implement the Texas Individual Tornado Safe Room Program
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	High
Funding Source(s)	FEMA Grant, Avery Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Avery Mayor
Estimated Completion Time	3 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	A safe room placed in a home or business will save lives.

Avery Thunderstorm Winds

Avery Thunderstorm Winds Mitigation Action #1	Provide a community awareness campaign concerning the risks and consequences of windstorms. By educating the public about high winds, loss of life and property may be mitigated as they take steps to secure their property and respond to warning.
Mitigation Goal/Objective	**Goal #2** Public Awareness
Priority	High
Funding Source(s)	Avery Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Mayor of. Avery
Estimated Completion Time	3 years
Effect on New Buildings	Knowledge gained from workshops can translate into actions that improve structures and their design.
Effect on Existing Buildings	Knowledge gained from workshops can translate into actions that improve structures and their design.
Comments:	Educating the Public will help protect life and property

Avery Thunder Storm Winds Mitigation Action #2	Require structures on temporary foundations to be securely anchored to permanent foundations.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	Avery Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Mayor of Avery
Estimated Completion Time	5 years
Effect on New Buildings	This would help protects new mobile homes from damage during high winds.
Effect on Existing Buildings	This would help protects existing mobile homes from damage during high winds
Comments:	

Avery Lightning Actions

Avery Lightning Mitigation Action #1	Purchase portable generators that can provide electricity to a critical facility during lightning strike power outage.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #5** Emergency Services (providing power)
Priority	Medium
Funding Source(s)	FEMA and other available grant sources
Estimated Cost	Medium (10k-25K)
Responsible Agency	Mayor
Estimated Completion Time	5 years
Effect on New Buildings	Could help protect new buildings from damage and loss due to fire or electrical surge.
Effect on Existing Buildings	Could help protect new buildings from damage and loss due to fire or electrical surge.
Comments:	Using lightning protection systems can prevent fires and electrical surges that destroy electronics.

Avery Lightning Actions

Lightning Mitigation Action #2	Provide public education regarding the dangers and protection from lightning strikes.
Mitigation Goal/Objective	Goal #2 Public Awareness
Priority	Medium
Funding Source(s)	City budget
Estimated Cost	Low (0-10k)
Responsible Agency	Mayor
Estimated Completion Time	5 years
Effect on New Buildings	Owners of new businesses and homes could learn to protect life and property
Effect on Existing Buildings	Owners of existing businesses and homes could learn to protect life and property
Comments:	Having the knowledge and tools can save lives and property. The training could be offered to the general population and to the school systems.

Avery Hail Actions

Avery Hail Mitigation Action # 11	Install hail resistant film on the windows of critical facilities.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	Avery Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Avery Mayor
Estimated Completion Time	5 years
Effect on New Buildings	Can protect new buildings from window damage from hail
Effect on Existing Buildings	Can protect existing buildings from window damage from hail
Comments:	

Avery Hail Mitigation Action #2	Purchase emergency mobile generators for critical facility use during power outages.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	FEMA Grants, Avery Annual Budget
Estimated Cost	Medium (10k-25k)
Responsible Agency	Avery City Council
Estimated Completion Time	5 years
Effect on New Buildings	This could protect new buildings from sewage flooding and water contamination.
Effect on Existing Buildings	This could protect existing buildings from sewage flooding and water contamination
Comments:	It is important during times of stress and outages that critical facilities such as waste treatment plants and water supplies remain operational.

Avery Winter Storm Actions

Avery Winter Storm Mitigation Action # 1	Purchase Emergency mobile generators to use with emergency equipment during power outages for critical facilities.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	FEMA Grant, Avery Annual Budget
Estimated Cost	Medium (10-25k)
Responsible Agency	Avery Mayor
Estimated Completion Time	5 years
Effect on New Buildings	Ensuring that waste water facilities and pumps have power can help protect new buildings from flooding and water contamination.
Effect on Existing Buildings	Ensuring that waste water facilities and pumps have power can help protect existing buildings from flooding and water contamination.
Comments:	Generators keep critical equipment operational during power outages.

Avery Winter Storm Mitigation Action # 2	Develop and implement a pre-emptive strategy for removing dead limbs and overhangs that might fall during winter storms.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #4** Partnership and Implementation
Priority	Medium
Funding Source(s)	Avery Annual Budget
Estimated Cost	Medium (10-25k)
Responsible Agency	Mayor of Avery
Estimated Completion Time	5 years
Effect on New Buildings	This can protect both homes and businesses from power loss and damage from falling limbs.
Effect on Existing Buildings	This can protect both homes and businesses from power loss and damage from falling limbs.
Comments:	

Avery Drought Actions

Avery Drought Mitigation Action #	Conduct Xeriscaping and water conservation workshops for the city.
Mitigation Goal/Objective	**Goal #2** Public Awareness **Goal #3** Natural Systems **Goal #4** Partnerships and Implementation
Priority	Medium
Funding Source(s)	Avery Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Avery Mayor
Estimated Completion Time	5 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	Using native and drought resistant plants can help curtail excessive water usage.

Avery Drought Mitigation Action # 2	Develop and implement a drought contingency plan to include water conservation, and mandatory water rationing.
Mitigation Goal/Objective	**Goal#1** Protect Life and Property **Goal #2** Natural Systems **Goal #4** Partnerships and Implementation
Priority	High
Funding Source(s)	Avery Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Avery Mayor
Estimated Completion Time	3 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	

Avery Wildfire Actions

Avery Wildfire Mitigation Action #1	Conduct a wildfire education program stressing the dangers of trash burning in order to help prevent wildfires
Mitigation Goal/Objective	**Goal #2** Public Awareness
Priority	High
Funding Source(s)	City of Avery
Estimated Cost	Low (0-10k)
Responsible Agency	Avery Fire Chief
Estimated Completion Time	3 years
Effect on New Buildings	Out of control trash burning can destroy a new building
Effect on Existing Buildings	Out of control trash burning can destroy an existing building.
Comments:	Programs such as this can empower citizens to take precautionary action.

Avery Wildfire Mitigation Action #2	Purchase emergency mobile generators for critical facility use during power outages.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	FEMA Grants
Estimated Cost	Medium (10k-25k)
Responsible Agency	Avery Annual Budget
Estimated Completion Time	5 years
Effect on New Buildings	Generators can provide power to equipment utilized in fighting fires.
Effect on Existing Buildings	Generators can provide power to equipment utilized in fighting fires.
Comments:	It is important during times of stress and outages that critical facilities such as waste treatment plants and water supplies remain operational.

Bogata Mitigation Action Tables

NOTE: ***All Bogata projects are subject to availability of federal and local funding as well as availability of local staff to administer the project.***

High 1-3 Years; Medium 3-7 Years; Low 8+ Years.

Bogata Flood Actions

Bogata Flood Mitigation Action #1	Develop and implement the Turn Around, Don't Drown Program
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	High
Funding Source(s)	State of Texas, Bogata Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Bogata Public Works Department.
Estimated Completion Time	3 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	This program is known to save lives.

Bogata Flood Mitigation Action #2	Widen and deepen ditches to allow rain water run-off to work more efficiently.
Mitigation Goal/Objective	**Goal # 1** Protect Life and Property
Priority	High
Funding Source(s)	FEMA Grant, Bogata Annual Budget
Estimated Cost	Medium (10k-25k)
Responsible Agency	Bogata Public Works
Estimated Completion Time	3 years
Effect on New Buildings	This could protect new buildings from flash flooding
Effect on Existing Buildings	This could protect existing buildings from flash flooding
Comments:	By widening ditches, especially in poor drainage areas the likelihood of flooding is decreased.

Bogata Tornado Actions

Bogata Tornado Mitigation Action #1	Develop and implement the Texas Individual Tornado Safe Room Program
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	High
Funding Source(s)	FEMA Grant
Estimated Cost	Low (0-10k)
Responsible Agency	Bogata EMC
Estimated Completion Time	3 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	A safe room placed in a home or business will save lives.

Bogata Tornado Mitigation Action #2	Develop and implement a public education program that will provide the public with understanding of their risk to Tornado events and the mitigation method to protect themselves, their family, and their property.
Mitigation Goal/Objective	**Goal #1** Public Awareness
Priority	High
Funding Source(s)	Bogata Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Bogata Fire Dept./EMC
Estimated Completion Time	3 years
Effect on New Buildings	Learning of new methods could change construction plans on new buildings.
Effect on Existing Buildings	Learning of new methods could create ideas on changes that could be made to re-enforce existing buildings.
Comments:	Public Education can create citizen action.

Bogata Tornado Mitigation Action #3	Install a reliable siren system to warn the citizens of Bogata when weather conditions regarding tornadoes require immediate action.
Mitigation Goal/Objective	**Goal #1** Public Awareness
Priority	High
Funding Source(s)	FEMA Grant Money, Bogata Annual Budget
Estimated Cost	High (25K +)
Responsible Agency	Bogata Fire Dept./EMC
Estimated Completion Time	3 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	

Bogata Thunderstorm Winds Actions

Bogata Thunderstorm Winds Mitigation Action #1	Provide public workshops and information regarding mitigating homes against windstorms.
Mitigation Goal/Objective	**Goal #1** Protects Life and Property
Priority	Medium
Funding Source(s)	Bogata Annual Budget
Estimated Cost	Low (0-10K)
Responsible Agency	Bogata Fire Department/EMC
Estimated Completion Time	5 years
Effect on New Buildings	Learning how to install wind resistant design can save money and lives.
Effect on Existing Buildings	Protecting existing structures by modification can save money and lives.
Comments:	

Bogata Thunderstorm Mitigation Action # 2	Purchase emergency mobile generators for critical facility use during power outages.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	FEMA Grants, Bogata Annual Budget
Estimated Cost	Medium (10k-25k)
Responsible Agency	Bogata Emergency Management Coordinator
Estimated Completion Time	5 years
Effect on New Buildings	Ensuring that waste water facilities and pumps have power can help protect new buildings from flooding and water contamination.
Effect on Existing Buildings	Ensuring that waste water facilities and pumps have power can help protect existing buildings from flooding and water contamination.
Comments:	It is important during times of stress and outages that critical facilities such as waste treatment plants and water supplies remain operational.

Bogata Lightning Actions

Bogata Lightning Mitigation Action #1	Install lightning protection systems in any critical facility whose function could be impacted by a lightning strike
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #4** Partnerships and Implementation
Priority	Medium
Funding Source(s)	FEMA and other available grant sources
Estimated Cost	Low (0-10k)
Responsible Agency	Bogata Mayor
Estimated Completion Time	5 years
Effect on New Buildings	Could help protect new buildings from damage and loss due to fire or electrical surge.
Effect on Existing Buildings	Could help protect new buildings from damage and loss due to fire or electrical surge.
Comments:	Using lightning protection systems can prevent fires and electrical surges that destroy electronics.

Bogata Lightning Actions

Bogata Lightning Mitigation Action #2	Purchase portable generators that can provide electricity to a critical facility during lightning strike power outage.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #5** Emergency Services (providing power)
Priority	Medium
Funding Source(s)	FEMA and other available grant sources
Estimated Cost	Medium (10k-25K)
Responsible Agency	Bogata Mayor
Estimated Completion Time	5 years
Effect on New Buildings	Could help protect new buildings from damage and loss due to fire or electrical surge.
Effect on Existing Buildings	Could help protect new buildings from damage and loss due to fire or electrical surge.
Comments:	Using lightning protection systems can prevent fires and electrical surges that destroy electronics.

Bogata Winter Storms Actions

Bogata Winter Storm Mitigation Action #1	Develop and implement a pre-emptive strategy for removing dead limbs and overhangs that might fall during winter storms.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #4**: Partnership and Implementation
Priority	Medium
Funding Source(s)	Bogata Annual Budget
Estimated Cost	Medium (10-25k)
Responsible Agency	Bogata Public works director
Estimated Completion Time	5 years
Effect on New Buildings	This can protect new homes and businesses from power loss and damage from falling limbs.
Effect on Existing Buildings	This can protect existing homes and businesses from power loss and damage from falling limbs.
Comments:	

Bogata Winter Storm Mitigation Action #2	Conduct workshops regarding how to mitigate your home from damages of winter storms.
Mitigation Goal/Objective	**Goal #2** Public Awareness
Priority	Medium
Funding Source(s)	Bogata Annual Budget
Estimated Cost	Low (0-10K)
Responsible Agency	Bogata Fire Dept./EMC
Estimated Completion Time	5 years
Effect on New Buildings	Knowledge gained from these workshops could help mitigate new homes from the damages of winter storms
Effect on Existing Buildings	Knowledge gained from these workshops could help mitigate new homes from the damages of winter storms
Comments:	Public information plays a key role in mitigation by enabling the citizens.

Bogata Hail Actions

Bogata Hail Mitigation Action #1	Conduct a workshop for residents about the prevalence of hailstorms and how to protect your home and property form hail damage.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #2** Public Awareness
Priority	High
Funding Source(s)	Bogata Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Bogata City Fire Dept./ EMC
Estimated Completion Time	3 years
Effect on New Buildings	Knowledge gained from workshops can translate into actions that improve structures and their design.
Effect on Existing Buildings	Knowledge gained from workshops can translate into actions that improve structures and their design.
Comments:	Public awareness and education can minimize loss and protect lives by giving citizens the tools needed to take action.

Bogata Hail Mitigation Action #2	Purchase emergency mobile generators for critical facility use during power outages.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	FEMA Grants, Bogata Annual Budget
Estimated Cost	Medium (10k-25k)
Responsible Agency	Bogata City Council/EMC
Estimated Completion Time	5 years
Effect on New Buildings	Ensuring that waste water facilities and pumps have power can help protect new buildings from flooding and water contamination.
Effect on Existing Buildings	Ensuring that waste water facilities and pumps have power can help protect existing buildings from flooding and water contamination.
Comments:	It is important during times of stress and outages that critical facilities such as waste treatment plants and water supplies remain operational.

Bogata Drought Actions

Bogata Drought Mitigation Action #1	Conduct workshops on conserving water, xeriscaping and managing drought impacts
Mitigation Goal/Objective	**Goal #2** Public Awareness **Goal #3** Natural Systems **Goal #4** Partnerships and Implementation
Priority	Medium
Funding Source(s)	Bogata Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Bogata Mayor
Estimated Completion Time	5 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	Using native and drought resistant plants can help curtail excessive water usage.

Bogata Drought Mitigation Action # 2	Replace municipal appliances or equipment with water saving parts as old ones wear out.
Mitigation Goal/Objective	**Goal #1** Protecting Life and Property
Priority	Low
Funding Source(s)	Bogata Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Bogata Public Works
Estimated Completion Time	5 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	This will conserve water and set examples for the residents of Bogata

Bogata Wildfire Actions

Bogata Wildfire Mitigation Action #1	Conduct a wildfire education program stressing the dangers of trash burning in order to help prevent wildfires.
Mitigation Goal/Objective	**Goal #2** Public Awareness
Priority	High
Funding Source(s)	Bogata Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Bogata Fire Chief
Estimated Completion Time	3 years
Effect on New Buildings	Out of control trash burning can destroy a new building
Effect on Existing Buildings	Out of control trash burning can destroy an existing building.
Comments:	Programs such as this can empower citizens to take precautionary action.

Bogata Wildfire Mitigation Action # 2	Purchase emergency mobile generators for critical facility use during power outages.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	FEMA Grants, Bogata Annual Budget fundraisers
Estimated Cost	Medium (10k-25k)
Responsible Agency	Bogata City Council/EMC
Estimated Completion Time	5 years
Effect on New Buildings	Ensuring that waste water facilities and pumps have power can help protect new buildings from flooding and water contamination.
Effect on Existing Buildings	Ensuring that waste water facilities and pumps have power can help protect existing buildings from flooding and water contamination.
Comments:	It is important during times of stress and outages that critical facilities such as waste treatment plants and water supplies remain operational.

Clarksville Mitigation Action Tables

NOTE: ***All Clarksville projects are subject to availability of federal and local funding as well as availability of local staff to administer the project.***

High 1-3 Years; Medium 3-7 Years; Low 8+ Years.

Clarksville Flood Actions

Clarksville Flood Mitigation Action #1	Bi-Annual storm drainage cleaning program to be implemented to keep debris from hampering drainage
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	High
Funding Source(s)	Clarksville Annual Budget
Estimated Cost	Medium (10k-25k)
Responsible Agency	Clarksville Public Works Department
Estimated Completion Time	3 years
Effect on New Buildings	This could protect new buildings from flash flooding
Effect on Existing Buildings	This could protect existing buildings from flash flooding
Comments:	

Clarksville Flood Mitigation Action #2	Purchase emergency mobile generators for critical facility use during power outages.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	FEMA Grants, fund raisers, Clarksville Annual Budget
Estimated Cost	Medium (10k-25k)
Responsible Agency	Clarksville City Council
Estimated Completion Time	5 years
Effect on New Buildings	This could protect new buildings from sewage flooding and water contamination.
Effect on Existing Buildings	This could protect existing buildings from sewage flooding and water contamination
Comments:	It is important during times of stress and outages that critical facilities such as waste treatment plants and water supplies remain operational.

Clarksville Tornado Actions

Clarksville Tornado Mitigation Action #1	Develop and implement the Texas Individual Tornado Safe Room Program
Mitigation Goal/Objective	**Goal # 1** Protect life and property
Priority	Medium
Funding Source(s)	FEMA Grant, Fund Raiser
Estimated Cost	High (25K)
Responsible Agency	Clarksville City Council
Estimated Completion Time	5 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	Safe rooms in homes save lives by protecting individuals from high winds and flying debris.

Clarksville Tornado Mitigation Action #2	Develop and implement a public education program that will provide the public with understanding of their risk to Tornado events and the mitigation methods to protect themselves, their family and their property.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property ***Goal# 2*** Public Awareness
Priority	High
Funding Source(s)	Clarksville Annual Budget
Estimated Cost	Low (0k-10k)
Responsible Agency	Clarksville Fire Chief/EMC
Estimated Completion Time	2 years
Effect on New Buildings	This could help reduce damage by implementing ideas about new home and business protection from tornadic winds.
Effect on Existing Buildings	This could help reduce damage by implementing ideas about existing home and business protection from tornadic winds
Comments:	Empowering the public through education is an integral part of mitigation.

Clarksville Thunderstorm Winds Actions

Clarksville Thunderstorm Winds Mitigation Action #1	Provide public workshops and information regarding mitigating homes against windstorms
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal # 2** Public Awareness
Priority	Medium
Funding Source(s)	Clarksville Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	City Fire Department/EMC
Estimated Completion Time	5 years
Effect on New Buildings	Actions learned and implements could help protect new buildings from high winds
Effect on Existing Buildings	Actions learned and implements could help protect new buildings from high winds
Comments:	Public awareness and education can minimize loss and protect lives by giving citizens the tools needed to take action.

Clarksville Thunderstorm Winds Mitigation Action # 2	Purchase emergency mobile generators for critical facility use during power outages.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	FEMA Grants, fundraisers, Clarksville Annual Budget
Estimated Cost	Medium (10k-25k)
Responsible Agency	Clarksville Emergency Management Coordinator
Estimated Completion Time	5 years
Effect on New Buildings	By supporting critical facility power new buildings could be protected from backed up waste water, etc.
Effect on Existing Buildings	By supporting critical facility power existing buildings could be protected from backed up waste water, etc.
Comments:	It is important during times of stress and outages that critical facilities such as waste treatment plants and water supplies remain operational.

Clarksville Lightning Actions

Clarksville Lightning Mitigation Action #1	Install lightning prediction systems in parks and playgrounds
Mitigation Goal/Objective	**Goal #1** Protect life and property **Goal #4** Partnerships and Implementation
Priority	Medium
Funding Source(s)	FEMA and other available grant sources
Estimated Cost	High (25k +)
Responsible Agency	Mayor
Estimated Completion Time	5 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	Lightning predictions systems can save lives by alerting citizens regarding potential hazardous lightning strikes.

Clarksville Lightning Actions

Clarksville Lightning Mitigation Action #2	Provide public education regarding the dangers and protection from lightning strikes.
Mitigation Goal/Objective	Goal #2 Public Awareness
Priority	Medium
Funding Source(s)	City budget
Estimated Cost	Low (0-10k)
Responsible Agency	Mayor
Estimated Completion Time	5 years
Effect on New Buildings	Owners of new businesses and homes could learn to protect life and property
Effect on Existing Buildings	Owners of existing businesses and homes could learn to protect life and property
Comments:	Having the knowledge and tools can save lives and property. The training could be offered to the general population and to the school systems.

Clarksville Winter Storm Actions

Clarksville Winter Storm mitigation Action #1	Conduct workshops regarding how to mitigate your home from damages of winter storms.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #2** Public awareness
Priority	High
Funding Source(s)	Clarksville Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Clarksville Fire Dept./ EMC
Estimated Completion Time	3 years
Effect on New Buildings	Education empowers citizens and businesses to take action.
Effect on Existing Buildings	Education empowers citizens and businesses to take action.
Comments:	

Clarksville Winter Storm Mitigation Action #2	Purchase emergency mobile generators for critical facility use during power outages.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	FEMA Grants, Clarksville Annual Budget, Fundraisers
Estimated Cost	Medium (10k-25k)
Responsible Agency	FEMA Grants, Clarksville City Budget, Fund Raisers
Estimated Completion Time	5 years
Effect on New Buildings	This could protect buildings from sewage flooding and water contamination.
Effect on Existing Buildings	This could protect buildings from sewage flooding and water contamination
Comments:	It is important during times of stress and outages that critical facilities such as waste treatment plants and water supplies remain operational.

Clarksville Hail Actions

Clarksville Hail Mitigation Action #1	Install hail resistant film on the windows of critical facilities
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	Clarksville Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Clarksville Public Works
Estimated Completion Time	5 years
Effect on New Buildings	No effect
Effect on Existing Buildings	This will strengthen existing buildings resiliency to this hazard.
Comments:	

Clarksville Hail Mitigation Action #2	Conduct a workshop for residents about the prevalence of hailstorms and how to protect your home and property form hail damage.
Mitigation Goal/Objective	Goal #1 Protect Life and Property Goal #2 Public Awareness.
Priority	High
Funding Source(s)	Clarksville Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	City Fire Dept./ EMC
Estimated Completion Time	3 years
Effect on New Buildings	Knowledge gained from workshops can translate into actions that improve structures and their design.
Effect on Existing Buildings	Knowledge gained from workshops can translate into actions that improve structures and their design.
Comments:	Public awareness and education can minimize loss and protect lives by giving citizens the tools needed to take action.

Clarksville Drought Actions

Clarksville Drought Mitigation Action #1	Conduct Xeriscaping and water conservation workshops for the city.
Mitigation Goal/Objective	**Goal #2** Public Awareness **Goal #3** Natural Systems ***Goal #4*** Partnerships and Implementation
Priority	Medium
Funding Source(s)	Clarksville Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Clarksville Mayor
Estimated Completion Time	5 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	Using native and drought resistant plants can help curtail excessive water usage.

Clarksville Drought Mitigation Action #2	Develop and implement a drought contingency plan to include water conservation, and mandatory water rationing.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #2** Natural Systems **Goal #4** Partnerships and Implementation
Priority	High
Funding Source(s)	Clarksville Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Clarksville Mayor
Estimated Completion Time	3 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	

Clarksville Wildfire Mitigation Actions

Clarksville Wildfire Mitigation Action #1	Develop and implement a building vegetation clearance program.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #4** Partnerships and Implementation
Priority	Medium
Funding Source(s)	Clarksville Annual Budget
Estimated Cost	Medium (10-25k)
Responsible Agency	Clarksville Public Works
Estimated Completion Time	5 years
Effect on New Buildings	This would protect new buildings from Wildfire/Urban Interface
Effect on Existing Buildings	This would protect existing buildings from Wildfire/Urban Interface
Comments:	Much can be accomplish when the private and public sector joins hands

Clarksville Wildfire Mitigation Action #2	Conduct a wildfire education program stressing the dangers of trash burning in order to help prevent wildfires.
Mitigation Goal/Objective	**Goal #2** Public Awareness
Priority	High
Funding Source(s)	Clarksville Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Clarksville Fire Chief
Estimated Completion Time	3 years
Effect on New Buildings	Out of control trash burning can destroy a new building
Effect on Existing Buildings	Out of control trash burning can destroy an existing building.
Comments:	Programs such as this can empower citizens to take precautionary action.

Detroit Mitigation Action Tables

High 1-3 Years; Medium 3-7 Years; Low 8+ Years.

NOTE: ***All Detroit projects are subject to availability of federal and local funding as well as availability of local staff to administer the project.***

Detroit Flood Actions

Detroit **Flood Mitigation Action #1**	Purchase emergency mobile generators for critical facility use during power outages.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	FEMA Grants
Estimated Cost	Medium (10k-25k)
Responsible Agency	Detroit City Council
Estimated Completion Time	5 years
Effect on New Buildings	This could protect buildings from sewage flooding and water contamination.
Effect on Existing Buildings	This could protect buildings from sewage flooding and water contamination
Comments:	It is important during times of stress and outages that critical facilities such as waste treatment plants and water supplies remain operational.

Detroit Flood Mitigation Action #2	Widen ditches to increase volume capacity of flash flood waters
Mitigation Goal/Objective	**Goal # 1** Protect Life and Property
Priority	High
Funding Source(s)	City and grant money
Estimated Cost	Medium (10k-25k)
Responsible Agency	Detroit Public Works Department
Estimated Completion Time	3 years
Effect on New Buildings	This could protect new buildings from flash flooding
Effect on Existing Buildings	This could protect existing buildings from flash flooding
Comments:	By widening ditches, especially in poor drainage areas the likelihood of flooding is decreased.

Detroit Tornado Actions

Detroit Tornado Mitigation Action #1	Develop and implement the Texas Individual Tornado Safe Room Rebate Program for residential property owners.
Mitigation Goal/Objective	**Goal 1** Protect life and property
Priority	Medium
Funding Source(s)	FEMA Grant monies
Estimated Cost	High (25K)
Responsible Agency	Detroit City Council
Estimated Completion Time	8 years
Effect on New Buildings	No Effect
Effect on Existing Buildings	No Effect
Comments:	Safe rooms in homes save lives by protecting individuals from high winds and flying debris.

Detroit Tornado Mitigation Action #2	Develop and implement a public education program that will provide the public with understanding of their risk to Tornado events and the mitigation methods to protect themselves, their family and their property.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #2** Public Awareness
Priority	High
Funding Source(s)	City
Estimated Cost	Low (0k-10k)
Responsible Agency	Detroit Fire Chief/EMC
Estimated Completion Time	2 years
Effect on New Buildings	This could help reduce damage by implementing ideas about home and business protection from tornadic winds.
Effect on Existing Buildings	This could help reduce damage by implementing ideas about home and business protection from tornadic winds
Comments:	Educating the public is an integral part of mitigation.

Detroit Thunderstorm Winds Actions

Detroit Thunderstorm Winds Mitigation Action #1	Purchase emergency mobile generators for critical facility use during power outages.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	FEMA Grants
Estimated Cost	Medium (10k-25k)
Responsible Agency	Detroit City Council
Estimated Completion Time	5 years
Effect on New Buildings	This could protect new buildings from flooding and raw sewage contamination.
Effect on Existing Buildings	This could protect existing buildings from flooding and raw sewage contamination
Comments:	It is important during times of stress and outages that critical facilities such as waste treatment plants and water supplies remain operational.

Detroit Thunderstorm Winds Action #2	Provide public workshops and information regarding mitigating homes against thunderstorm winds.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #2** Public Awareness
Priority	Medium
Funding Source(s)	Detroit City Council
Estimated Cost	Low (0-10k)
Responsible Agency	City Fire Department/EMC
Estimated Completion Time	5 years
Effect on New Buildings	Making mitigation changes in new buildings, particularly while they are being constructed can protect property from winter storms damage.
Effect on Existing Buildings	Reinforcing and amended existing building construction can protect property from winter storm damage.
Comments:	Public awareness and education can minimize loss and protect lives by giving citizens the tools needed to take action.

Detroit Lightning Actions

Detroit Lightning Mitigation Action #1	Install lightning protection systems in any critical facility whose function could be impacted by a lightning strike
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #4** Partnerships and Implementation
Priority	Medium
Funding Source(s)	FEMA and other available grant sources
Estimated Cost	Low (0-10k)
Responsible Agency	Detroit Mayor
Estimated Completion Time	5 years
Effect on New Buildings	Could help protect new buildings from damage and loss due to fire or electrical surge.
Effect on Existing Buildings	Could help protect new buildings from damage and loss due to fire or electrical surge.
Comments:	Using lightning protection systems can prevent fires and electrical surges that destroy electronics.

Detroit Lightning Actions

Detroit Lightning Mitigation Action #2	Provide public education regarding the dangers and protection from lightning strikes.
Mitigation Goal/Objective	Goal #2 Public Awareness
Priority	Medium
Funding Source(s)	City budget
Estimated Cost	Low (0-10k)
Responsible Agency	Detroit Mayor
Estimated Completion Time	5 years
Effect on New Buildings	Owners of new businesses and homes could learn to protect life and property
Effect on Existing Buildings	Owners of existing businesses and homes could learn to protect life and property
Comments:	Having the knowledge and tools can save lives and property. The training could be offered to the general population and to the school systems.

Detroit Winter Storms Mitigation Actions

Detroit Winter Storms Mitigation Action #1	Purchase back-up generators for water and sewage facilities.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	FEMA, Detroit annual budget
Estimated Cost	None
Responsible Agency	Detroit City Council
Estimated Completion Time	1 year and ongoing
Effect on New Buildings	During outages, generator power in critical facilities can protect new buildings from issues like flooding and raw sewage contamination
Effect on Existing Buildings	During outages, generator power in critical facilities can protect new buildings from issues like flooding and raw sewage contamination.
Comments:	

Detroit Winter Storm Mitigation Action #2	Conduct workshops regarding how to mitigate your home from damages of winter storms.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #2** Public awareness
Priority	High
Funding Source(s)	Detroit
Estimated Cost	Low (0-10k)
Responsible Agency	Detroit Fire Dept./ EMC
Estimated Completion Time	3 years
Effect on New Buildings	Making mitigation changes in new buildings, particularly while they are being constructed can protect property from winter storms damage.
Effect on Existing Buildings	Reinforcing and amended existing building construction can protect property from winter storm damage.
Comments:	Education empowers citizens and businesses to take action.

Detroit Hail Actions

Detroit Hail Mitigation Action #1	Install hail resistant film on the windows of critical facilities.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	Detroit annual budget
Estimated Cost	Low (0-10k)
Responsible Agency	Detroit Public Works Director
Estimated Completion Time	5 years
Effect on New Buildings	This action would help protect damage to sensitive equipment from outside elements such as rain, cold and heat.
Effect on Existing Buildings	This action would help protect damage to sensitive equipment from outside elements such as rain, cold and heat.
Comments:	

Detroit Hail Mitigation Action #2	Conduct a workshop for residents about the prevalence of hailstorms and how to protect their home and property from hail damage.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #2** Public Awareness
Priority	High
Funding Source(s)	City of Detroit
Estimated Cost	Low (0-10k)
Responsible Agency	Detroit City Fire Dept./ EMC
Estimated Completion Time	3 years
Effect on New Buildings	The implementation of hail resistant roofing, reinforced windows can help protect valuables from damage or destruction.
Effect on Existing Buildings	The implementation of hail resistant roofing, reinforced windows can help protect valuables from damage or destruction.
Comments:	Public awareness and education can minimize loss and protect lives by giving citizens the tools needed to take action.

Detroit Drought Actions

Detroit Drought Mitigation Action #1	Conduct workshops on conserving water, xeriscaping and managing drought impacts
Mitigation Goal/Objective	**Goal #2** Public Awareness **Goal #3:** Natural Systems
Priority	Low
Funding Source(s)	City of Detroit
Estimated Cost	Low
Responsible Agency	Detroit city administrator
Estimated Completion Time	3 years
Effect on New Buildings	No Effect
Effect on Existing Buildings	No Effect
Comments:	

Detroit Drought Action # 2	Develop and implement a drought contingency plan to include water conservation, building code requirements, and mandatory water rationing.
Mitigation Goal/Objective	**Goal #3** Natural Systems **Goal #4** Partnerships and Implementation
Priority	Low
Funding Source(s)	City of Detroit
Estimated Cost	Low
Responsible Agency	Detroit City Council
Estimated Completion Time	3 years
Effect on New Buildings	No Effect
Effect on Existing Buildings	No Effect
Comments:	Water shortage has not been a major problem in NE Texas

Detroit Wildfires Actions

Detroit Wildfire Mitigation Action #1	Develop and implement a building vegetation clearance program.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #4** Partnerships and Implementation
Priority	Medium
Funding Source(s)	City of Detroit
Estimated Cost	Medium (10-25k)
Responsible Agency	Detroit Public Works Director
Estimated Completion Time	7 years
Effect on New Buildings	This would protect new buildings from Wildfire/Urban Interface
Effect on Existing Buildings	This would protect existing buildings from Wildfire/Urban Interface
Comments:	Much can be accomplish when the private and public sector joins hands

Detroit Wildfire Mitigation Action #2	Conduct a wildfire education program stressing the dangers of trash burning in order to help prevent wildfires.
Mitigation Goal/Objective	**Goal #2** Public Awareness
Priority	High
Funding Source(s)	City of Detroit
Estimated Cost	Low (0-10k)
Responsible Agency	Detroit Fire Chief
Estimated Completion Time	3 years
Effect on New Buildings	Out of control trash burning can destroy a new building
Effect on Existing Buildings	Out of control trash burning can destroy an existing building.
Comments:	Programs such as this can empower citizens to take precautionary action.

Red River County Mitigation Actions Table

NOTE: ***All Red River County projects are subject to availability of federal and local funding as well as availability of local staff to administer the project.***

High 1-3 Years; Medium 3-7 Years; Low 8+ Years.

Red River County Flood Actions

Red River County Flood Mitigation Action #1	Develop and implement the Turn Around, Don't Drown Program
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	High
Funding Source(s)	State of Texas, Red River County Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Red River County Emergency Management
Estimated Completion Time	3 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	This program is known to save lives.

Red River County Flood Mitigation Action #2	Purchase Emergency mobile generators to use with emergency equipment during power outages for critical facilities.
Mitigation Goal/Objective	**Goal 1: Protect Life and Property** ***Goal 2:*** Public Awareness
Priority	High
Funding Source(s)	Red River County Annual Budget
Estimated Cost	Low (0k-10k)
Responsible Agency	Red River County EMC
Estimated Completion Time	2 years
Effect on New Buildings	This could protect new buildings from sewage flooding and water contamination.
Effect on Existing Buildings	This could protect existing buildings from sewage flooding and water contamination
Comments:	It is important during times of stress and outages that critical facilities such as waste treatment plants and water supplies remain operational.

Red River County Tornado Actions

Red River County Tornado Mitigation Action #1	Develop and implement a public education program that will provide the public with understanding of their risk to Tornado events and the mitigation methods to protect themselves, their family and their property.
Mitigation Goal/Objective	**Goal 1** Protect Life and Property **Goal 2** Public Awareness
Priority	High
Funding Source(s)	Red River County Annual Budget
Estimated Cost	Low (0k-10k)
Responsible Agency	Red River County EMC
Estimated Completion Time	2 years
Effect on New Buildings	This could help reduce damage by implementing ideas about home and business protection from tornadic winds.
Effect on Existing Buildings	This could help reduce damage by implementing ideas about home and business protection from tornadic winds
Comments:	Educating the public is an integral part of mitigation.

Red River County Tornado Mitigation Action #2	Purchase Emergency mobile generators to use with emergency equipment during power outages for critical facilities.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	High
Funding Source(s)	Red River County Annual Budget, fund raisers, county business leadership
Estimated Cost	Medium
Responsible Agency	Red River County EMC
Estimated Completion Time	3 years
Effect on New Buildings	Not Applicable
Effect on Existing Buildings	Not applicable
Comments:	

Red River County Thunderstorm Winds

Red River County Thunderstorm Winds Mitigation Action #1	Provide a community awareness campaign concerning the risks and consequences of windstorms. By educating the public about High winds loss of life and property may be mitigated as they take steps to secure their property and respond to warning.
Mitigation Goal/Objective	**Goal #2** Public Awareness
Priority	High
Funding Source(s)	Red River County Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Red River County EMC
Estimated Completion Time	3 years
Effect on New Buildings	Knowledge gained from workshops can translate into actions that improve structures and their design.
Effect on Existing Buildings	Knowledge gained from workshops can translate into actions that improve structures and their design.
Comments:	Educating the Public will help protect life and property

Red River County Thunderstorm Winds Mitigation Action #2	Purchase Emergency mobile generators to use with emergency equipment during power outages for critical facilities.
Mitigation Goal/Objective	**Goal # 1** Protect Life and Property **Goal# 2** Public Awareness
Priority	High
Funding Source(s)	Red River County Annual Budget
Estimated Cost	Low (0k-10k)
Responsible Agency	Red River County EMC
Estimated Completion Time	2 years
Effect on New Buildings	This could protect new buildings from sewage flooding and water contamination.
Effect on Existing Buildings	This could protect existing buildings from sewage flooding and water contamination
Comments:	It is important during times of stress and outages that critical facilities such as waste treatment plants and water supplies remain operational.

Red River County Lightning Actions

Red River County Lightning Mitigation Action #	Install lightning protection systems in any critical facility whose function could be impacted by a lightning strike
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #4** Partnerships and Implementation
Priority	Medium
Funding Source(s)	FEMA and other available grant sources
Estimated Cost	Low (0-10k)
Responsible Agency	County Judge
Estimated Completion Time	5 years
Effect on New Buildings	Could help protect new buildings from damage and loss due to fire or electrical surge.
Effect on Existing Buildings	Could help protect new buildings from damage and loss due to fire or electrical surge.
Comments:	Using lightning protection systems can prevent fires and electrical surges that destroy electronics.

Red River County Lightning Actions

Red River County Lightning Mitigation Action #	Provide public education regarding the dangers and protection from lightning strikes.
Mitigation Goal/Objective	Goal #2 Public Awareness
Priority	Medium
Funding Source(s)	City budget
Estimated Cost	Low (0-10k)
Responsible Agency	Red River EMC
Estimated Completion Time	5 years
Effect on New Buildings	Owners of new businesses and homes could learn to protect life and property
Effect on Existing Buildings	Owners of existing businesses and homes could learn to protect life and property
Comments:	Having the knowledge and tools can save lives and property. The training could be offered to the general population and to the school systems.

Red River County Winter Storm Actions

Red River County Winter Storm Mitigation Action #1	Purchase Emergency mobile generators to use with emergency equipment during power outages for critical facilities.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	FEMA Grant, Red River County Annual Budget
Estimated Cost	Medium (10-25k)
Responsible Agency	Red River County EMC
Estimated Completion Time	5 years
Effect on New Buildings	This could protect new buildings from sewage flooding and water contamination.
Effect on Existing Buildings	This could protect existing buildings from sewage flooding and water contamination
Comments:	Generators keep critical equipment operational during power outages.

Red River County Winter Storm Mitigation Action #2	Mitigate protecting power lines from the impacts of winter storms by establishing standards for all utilities regarding tree pruning around lines.
Mitigation Goal/Objective	**Goal # 1** Protect Life and Property **Goal # 3** Natural Systems
Priority	Medium
Funding Source(s)	Red River County Annual Budget
Estimated Cost	Medium (10-25k)
Responsible Agency	Red River County EMC
Estimated Completion Time	5 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	Keeping roads and ditches free of limbs and debris opens transportation, could reduce flash flooding and prevents injury.

Red River County Hail Actions

Red River County Hail Mitigation Action #1	Install hail resistant film on the windows of critical facilities.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	Red River County Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Red River County Public Works
Estimated Completion Time	5 years
Effect on New Buildings	Can protect new buildings from window damage from hail
Effect on Existing Buildings	Can protect existing buildings from window damage from hail
Comments:	

Red River County Hail Mitigation Action #2	Conduct a workshop for residents about the prevalence of hailstorms and how to protect your home and property form hail damage.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property **Goal #2** Public Awareness**.**
Priority	High
Funding Source(s)	Red River County Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Red River County EMC
Estimated Completion Time	3 years
Effect on New Buildings	Knowledge gained from workshops can translate into actions that improve structures and their design.
Effect on Existing Buildings	Knowledge gained from workshops can translate into actions that improve structures and their design.
Comments:	Public awareness and education can minimize loss and protect lives by giving citizens the tools needed to take action.

Red River County Drought Actions

Red River County Drought Mitigation Action #1	Conduct Xeriscaping and water conservation workshops for the county
Mitigation Goal/Objective	**Goal #2** Public Awareness **Goal #3** Natural Systems **Goal #4** Partnerships and Implementation
Priority	Medium
Funding Source(s)	Red River County Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Red River County EMC
Estimated Completion Time	5 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	Using native and drought resistant plants can help curtail excessive water usage.

Red River County Drought Mitigation Action #2	Replace county appliances or equipment with water saving parts as old ones wear out.
Mitigation Goal/Objective	**Goal #1** Protecting Life and Property
Priority	Low
Funding Source(s)	Red River County Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Red River County Public Works
Estimated Completion Time	5 years
Effect on New Buildings	No effect
Effect on Existing Buildings	No effect
Comments:	This will conserve water and set examples for the residents of Hooks

Red River County Wildfire Actions

Red River County Wildfire Mitigation Action #1	Conduct a wildfire education program stressing the dangers of trash burning in order to help prevent wildfires.
Mitigation Goal/Objective	**Goal #2** Public Awareness
Priority	High
Funding Source(s)	Red River County Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	Red River County EMC
Estimated Completion Time	3 years
Effect on New Buildings	Out of control trash burning can destroy a new building
Effect on Existing Buildings	Out of control trash burning can destroy an existing building.
Comments:	Programs such as this can empower citizens to take precautionary action.

Red River County Wildfire Mitigation Action #2	Purchase Emergency mobile generators to use with emergency equipment during power outages.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	Medium
Funding Source(s)	Red River County Annual Budget, FEMA Grant
Estimated Cost	Medium (10-25k)
Responsible Agency	Red River County EMC
Estimated Completion Time	5 years
Effect on New Buildings	Generators can provide power to equipment utilized in fighting fires.
Effect on Existing Buildings	Generators can provide power to equipment utilized in fighting fires.
Comments:	

Red River County Dam Failure Mitigation Action #1	Deficiency will be remedied either with inundation information from TCEQ or by and independent study to determine the risk dams pose.
Mitigation Goal/Objective	**Goal #1** Protect Life and Property
Priority	High
Funding Source(s)	Red River County Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	County Judge
Estimated Completion Time	3 years
Effect on New Buildings	Does not apply
Effect on Existing Buildings	Does not imply
Comments:	Location, extent, probability, vulnerabilities and impacts will be determined when feasible. Understanding the consequences of dam failure and proper intervention can save lives and property

Red River County Dam Failure Mitigation Action #2	Provide public education regarding the dangers associated with dam failure and new mitigation strategies.
Mitigation Goal/Objective	**Goal #1** Public Awareness
Priority	High
Funding Source(s)	Red River County Annual Budget
Estimated Cost	Low (0-10k)
Responsible Agency	County Judge
Estimated Completion Time	3 years
Effect on New Buildings	Does not apply
Effect on Existing Buildings	Does not imply
Comments:	Location, extent, probability, vulnerabilities and impacts will be determined when feasible. Understanding the consequences of dam failure and proper intervention can save lives and property

SECTION IV

Monitoring, Implementation, Evaluating, Updating and Integration

Red River County and each participating jurisdiction will be responsible for implementing its own mitigation actions contained in Section IV. Each action has been assigned to a specific person or local government office that is responsible for implementing it. Red River County and its jurisdictions have very lean budgets and staff. They rely on grants and federal funding for many of the improvements that are made within their borders. State law requires that the city council and the Commissioners' Court of Red River County approve changes to budgets, improvement plans and mitigation plans. The governing bodies of each participating jurisdiction have adopted the mitigation action plan for their jurisdictions. For implementation, monitoring and evaluating the public will be invited to participate as they have been in this current process.

The Red River County Commissioners will be responsible for adopting the Red River County Mitigation Action Plan. (All jurisdictions must officially adopt and commit to implementation of the plan to be covered by the plan. This includes all participating cities/towns). This governing body has the authority to make public policy regarding natural hazards. The Red River County Mitigation Plan will be submitted to the Texas Department of Emergency Management for review and upon their approval, TDEM will then submit the plan to the Federal Emergency Management Agency (FEMA) for review and final approval. The review will address the federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201. Once accepted by FEMA, Red River County/City will formally adopt it and gain eligibility for Hazard Mitigation Grant Program funds.

Evaluation

To prevent issues regarding meeting the goals of The Red River County Hazard Mitigation Action Plan it is agreed that the county and participating jurisdictions will evaluate the plan on an annual basis to determine the effectiveness of programs, and to reflect changes in land development or programs that may affect mitigation priorities. The evaluation process will include a definite schedule and timeline, and will identify the local agencies and organizations participating in plan evaluation. Agencies participating in the plan review will include public works, emergency management or fire department, representatives for the city councils or commissioners' court, and mayors or city managers.

Also at this meeting time the Hazard Mitigation Committee Members will monitor the progress of the plan implementation and mitigation actions for their respective communities. The County Judge or his/her designated appointee will organize the meeting. The public will be invited to attend and will be encouraged to provide feedback. Monitoring and evaluation will occur at this meeting. This will be done as it has been done previously for all participating jurisdictions.

The meeting will review the progress of the plan and each action for each community to assess if the plan and action is being completing in a timely fashion and if additional

resources need to be directed to complete the actions. Monitoring the plan's actions is important to keep accountability for all team members.

They will also review the risk assessment portion of the Plan to determine if this information should be updated or modified, given any new available data. This plan can and will pave the way for other plans, codes and programs. A written record of the annual meeting, along with any project reports, will be accomplished and kept on file in the county office. Every five years the updated plan will be submitted to the State Hazard Mitigation Officer.

Evaluating Criteria will be as follows: what action was implemented, what was the projected cost versus the actual cost, was the timeline followed, where the applicable agencies involved in the implementation, where these the appropriate agencies, were other agencies not involved that should be considered in the future; if so, what agencies and what would their role be and why. Other criteria would be determining after a hazard occurs was the action that was implemented beneficial? This can be measured is several different ways from comparing historical occurrences listed in this plan to the current event. Criteria for evaluating after an incident includes: cost of property damage previous incidents and current; was there less injury and loss of life. Also, comparing response dollars and resources allocated will also be factored. A successful mitigation action will be one that has saved lives, kept more citizens safe, lessened the impact of property damage as well as crop damage. Feedback from individual citizens will also be critical in order to determine if the impact was lessened on an individual level basis. As it has done before outreach will continue and soliciting of information concerning resilience to an event will be solicited in the future via these means.

Monitoring

The Status of the Hazard Mitigation Actions will be monitored by the designated emergency management coordinator for each jurisdiction on a quarterly basis. Preparation for the Five-year Plan Update will begin no later than 1 year prior to the plan expirations date. Monitoring is defined as tracking the implementation of the plan over time. The plan will be monitored in the following ways:

1. Step One: Review any past occurrences of hazards that have impacted the participating jurisdictions since the last plan maintenance review meeting occurred.

2. Step Two: Review the proposed implementation.

3. Step Three: Determine if any of these recent hazard occurrences resulted in

significant enough damages to require a reprioritization of the implementation timeline.

If so, the following questions should be asked:

a. Do goals/actions need revision?

b. Should actions be added or deleted?

c. What is the status of recommended actions?

4. Step Four: The planning team shall, at its discretion, direct participating jurisdiction staff to perform site visits and/or prepare progress statements on individual plan components to assist in the plan evaluation process.

5. Step Five: If certain components of the implementation plan that were scheduled for completion since the last plan maintenance review were not accomplished, the committee shall review what steps need to be taken to bring the specific aspects of the mitigation plan into compliance.

6. Step Six: The committee shall update and validate the implementation plan timeline shown in the actions and establish milestones for implementation and review during the forthcoming year.

Again, the public will be invited to attend and will be encouraged to provide feedback.

The plan in its entirety, including but not limited to planning process, public participation, risk assessment, mitigation strategy and actions will be monitored and evaluated.

Implementation

The Red River County Hazard Mitigation Committee will be responsible for coordinating implementation of the five-year plan action items and undertaking the formal review process. The county formed a Hazard Mitigation Committee that consists of members from local agencies, organizations, and citizens.

Upon formal adoption of the plan, hazard mitigation team members from each participating jurisdiction will review all comprehensive land use plans, capital improvement plans, Annual Budget Reviews, Emergency Operations or Management Plans, transportation plans, and any building codes to guide and control development. The hazard mitigation team members will work to integrate the hazard mitigation strategies into these other plans and codes. Each jurisdiction will conduct annual reviews of their comprehensive and land use plans and policies and analyze the need for any amendments in light of the approved hazard mitigation plan. Participating jurisdictions will ensure that capital improvement planning in the future will also contribute to the goals of this hazard mitigation plan to reduce the long-term risk to like and property from all hazards. Within one year of formal adoption of the hazard mitigation plan, existing planning mechanisms will be reviewed by each jurisdiction.

The Red River County HMAP will be incorporated into a variety of new and existing planning mechanisms for **Clarksville, Avery, Bogata, Detroit and Red River County government** including: grant applications, human resource manuals, ordinances, building codes and budgets. Each team member will communicate new ideas and issues found within the plan to the city boards. The county and its participating jurisdictions will consider how to best incorporate the plans together. This includes incorporating the

mitigation plan into county and local comprehensive or capital improvement plans as they are developed.
The Status of the Hazard Mitigation Actions will be monitored by the designated emergency management coordinator for each jurisdiction on a quarterly basis. Preparation for the Five-year Plan Update will begin no later than 1 year prior to the plan expirations date.

Updating

Preparation for the Five-year Plan Update will begin no later than 1 year prior to the plan expirations date. The County Judge or his/her designated appointee will organize a meeting with the Hazard Mitigation Committee Members to begin the update process. The committee member will organize all data gathered during the monitoring and evaluation meetings to assist will the plan update. The committee members will also assess the need for additional participating jurisdictions for the plans update. The public will be invited to attend and will be encouraged to provide feedback.

Copies of the Plan will be kept at the county courthouse and all city halls. The existence and location of these copies will be publicized in the appropriate local papers. The plan includes the address and the phone number of the county department responsible for keeping track of public comments on the Plan.

Red River County is committed to supporting the cities, communities and other jurisdictions in the planning area as they implement their mitigation plans. Red River County will review and revise as needed, the long-range goals and objectives in its strategic plan and budgets to ensure that they are consistent with this mitigation action plan Red River County will work with participating jurisdictions to advance the goals of the is hazard mitigation plan through its routine, ongoing, long-range planning, budgeting and work processes.

Integration

Clarksville, Red River County Seat, population 3,191. The following are the city of Clarksville's authorities, policies, programs and resources available to accomplish hazard mitigation actions and strategies. The city of Clarksville has a mayor, a city manager, a fire chief, a police department, and maintenance department. Clarksville has building codes, and zoning ordinances. Clarksville will integrate data and action recommendations into the local emergency operations plan and will consider information in the Hazard Mitigation Plan for planning and zoning. A city council member or the mayor will propose the plans integration at a city council meeting. The mayor will sign this into action after a majority vote. To improve and expand capabilities, the City of Clarksville will establish a Hazard Mitigation Team to address their Hazard Mitigation Plan. Clarksville could benefit from additional training and staff to support mitigation plan activities.

Clarksville, the county seat of Red River County, is at the junction of U.S Highway 82 and State Highway 37, Farm roads 114, 412, 909, 910 and 1159. Clarksville was

established by James Clark in 1833. Sam Houston signed the city charter. Clarksville is in the northern most part of the Piney woods region of East Texas.

Clarksville is an officially designated Main Street City and a National Main Street City, a Preserve America Community, the Wild Turkey Capital, the Gateway to Texas and is a section of the Northeast Texas Trail. The 130-mile trail from Farmersville to New Boston.

Clarksville's CEDC works to bring in industry and business and much has been done to promote the Central Business/Main Street District. Clarksville has an impressive Industrial Park, small airport, healthcare facilities, good schools and great civic organizations. Numerous events are held each year in an effort to promote tourism and the area. The biggest strength Clarksville has is the citizens who make the community their home along with a rich heritage and history and abundant hunting resources.

Avery Population 450. The following are the city of Avery's authorities, policies, programs and resources available to accomplish hazard mitigation actions and strategies. The city of Avery has a mayor and a city council. The jurisdiction of Avery will integrate data and action recommendations into the existing maintenance program the existing master plan and into the local emergency operations plan. A city council member or the mayor will propose said integrations and considerations into the city council who will vote on it at the monthly city council meeting. The mayor will sign this into action after a majority vote. To improve and expand capabilities, the City of Avery should establish a Hazard Mitigation Team to address their Hazard Mitigation Plan recommendations.

Bogata, population, 1,077. The following are the city of Bogata's authorities, policies, programs and resources available to accomplish hazard mitigation actions and strategies. The city of Bogata has a mayor, a fire chief, and a public works department as well as a police department. The city of Bogata will integrate data and actions recommendations into elements of the local emergency management plan and the zoning ordinance. A city council member or the mayor will submit proposals to the city council who will vote on it at the monthly city council meeting. The mayor will sign this into action after a majority vote. To improve and expand capabilities, the City of Bogata should establish a Hazard Mitigation Team to address their Hazard Mitigation Plan recommendations.

Detroit Population 722. The following are the city of Detroit's authorities, policies, programs and resources available to accomplish hazard mitigation actions and strategies. The city of Detroit has a mayor and a city council. The jurisdiction of Detroit will integrate data and action recommendations into the existing maintenance program the existing master plan and into the local emergency operations plan. A city council member or the mayor will propose said integrations and considerations into the city council who will vote on it at the monthly city council meeting. The mayor will sign this into action after a majority vote. To improve and expand capabilities, the City of Detroit should establish a Hazard Mitigation Team to address their Hazard Mitigation Plan recommendations.

Unincorporated Red River County population 6,494. The following are Red River County's authorities, policies, programs and resources available to accomplish hazard mitigation action and strategies. Red River County has a county judge and four commissioners. It has volunteer fire departments and a public works department. There is a county emergency management coordinator. Unincorporated Red River County will integrate data and action recommendations into the existing maintenance program. The county judge or county commissioner will propose the integration to the County which will vote on it at the monthly city council meeting. The county judge will sign this into action after a majority vote. To improve and expand capabilities, Red River County should establish a team to develop public-private initiatives addressing disaster related issues

Copies of the Plan will be kept at the county courthouse and city hall. The existence and location of these copies will be publicized in the county's newspapers. The County Judge's Office will be responsible for keeping track of public comments on the Plan.

R E S O L U T I O N

WHEREAS, the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit recognize their vulnerability and the many potential hazards shared by all residents; and

WHEREAS, the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit have each have recognized the need to prepare a Five-year Updated Mitigation Action Plan; and

WHEREAS, the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit have decided to jointly prepare one Five-year Updated Mitigation Action Plan.

THEREFORE BE IT RESOLVED that the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit hereby jointly adopt and approve said Five-year Updated Mitigation Action Plan; and

BE IT FURTHER RESOLVED that the Red River County Judge and the Mayors of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit shall mutually appoint a Hazard Mitigation Coordinator to coordinate all aspects of the Updated and Revised Mitigation Action Plan including its review and maintenance, for the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit in accordance with this resolution.

RESOLVED THIS _____ DAY OF_____, 2020.

_____

Mayor, Avery, Texas

ATTEST_____

City Secretary

R E S O L U T I O N

WHEREAS, the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit recognize their vulnerability and the many potential hazards shared by all residents; and

WHEREAS, the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit have each have recognized the need to prepare a Five-year Updated Mitigation Action Plan; and

WHEREAS, the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit have decided to jointly prepare one Five-year Updated Mitigation Action Plan.

THEREFORE BE IT RESOLVED that the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit hereby jointly adopt and approve said Five-year Updated Mitigation Action Plan; and

BE IT FURTHER RESOLVED that the Red River County Judge and the Mayors of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit shall mutually appoint a Hazard Mitigation Coordinator to coordinate all aspects of the Updated and Revised Mitigation Action Plan including its review and maintenance, for the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit in accordance with this resolution.

RESOLVED THIS _____ DAY OF_____, 2020.

_____

Mayor, Bogata, Texas

ATTEST_____

City Secretary

R E S O L U T I O N

WHEREAS, the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit recognize their vulnerability and the many potential hazards shared by all residents; and

WHEREAS, the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit have each have recognized the need to prepare a Five-year Updated Mitigation Action Plan; and

WHEREAS, the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit have decided to jointly prepare one Five-year Updated Mitigation Action Plan.

THEREFORE, BE IT RESOLVED that the County of Red River and the Cities of Bogata, Clarksville, and Detroit hereby jointly adopt and approve said Five-year Updated Mitigation Action Plan; and

BE IT FURTHER RESOLVED that the Red River County Judge and the Mayors of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit shall mutually appoint a Hazard Mitigation Coordinator to coordinate all aspects of the Updated and Revised Mitigation Action Plan including its review and maintenance, for the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit in accordance with this resolution.

RESOLVED THIS _____ DAY OF_____, 2020.

_____

Mayor, Clarksville, Texas

ATTEST_____

City Secretary

R E S O L U T I O N

WHEREAS, the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit recognize their vulnerability and the many potential hazards shared by all residents; and

WHEREAS, the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit have each have recognized the need to prepare a Five-year Updated Mitigation Action Plan; and

WHEREAS, the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit have decided to jointly prepare one Five-year Updated Mitigation Action Plan.

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RESOLVED THIS _____ DAY OF_____, 2020.

_____

Mayor, Detroit, Texas

ATTEST_____

City Secretary

R E S O L U T I O N

WHEREAS, the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit recognize their vulnerability and the many potential hazards shared by all residents; and

WHEREAS, the County of Red River and the Cities of Avery, Bogata, Clarksville, and Detroit have each have recognized the need to prepare a Five-year Updated Mitigation Action Plan; and

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RESOLVED THIS _____ DAY OF _____, 2020.

_____

County Judge, Red River County, Texas

ATTEST_____

County Clerk

APPENDIX

DATE NOVEMBER 19, 2019

Public Notice

A draft of the Red River County Hazard Mitigation Action Plan Five Year Update is currently available for review and comment on the Red River County website: http://www.co.red-river.tx.us. Hazard Mitigation is defined as any sustained action taken to reduce or eliminate the long-term risk to life and property from hazard events. It is an on-going process that occurs before, during, and after disasters and serves to break the cycle of damage and repair in hazardous areas. Simply click on the Hazard Mitigation Link for access. Red River County encourages public comment and participation in this project.

L.D. Williamson

L.D. Williamson, Judge, Red River County

Classifieds

LEGALS

CITATION BY PUBLICATION - CIVIL
STATE OF TEXAS

CV04749

BILLY W. JONES AND WIFE, NELDA ANN JONES vs. **T.M. SCOTT AKA TOM M. SCOTT AK THOMAS M. SCOTT, CAROLYN STREET SCOTT, ETAL**

To: SCOTT, T.M. AKA TOM M.SCOTT AKA THOMAS M. SCOTT, CAROLYN STREET SCOTT, ELIZABETH SCOTT DeBARGER SCRIVNER, HELEN M. SCOTT DICKSON, AND ELEANOR ANN SCOTT MUHN, & UNKOWN HEIRS

NOTICE TO DEFENDANT: YOU HAVE BEEN SUED. YOU MAY EMPLOY AN ATTORNEY. IF YOU OR YOUR ATTORNEY DO NOT FILE A WRITTEN ANSWER WITH THE CLERK WHO ISSUED THIS CITATION BY 10:00 A.M. ON THE MONDAY NEXT FOLLOWING THE EXPIRATION OF FORTY-TWO DAYS AFTER YOU WERE SERVED THIS CITATION AND PETITION, A DEFAULT JUDGMENT MAY BE TAKEN AGAINST YOU.

You are hereby commanded to appear by filing a written answer to the petition of plaintiff at or before 10 o'clock a.m. of the Monday next after the expiration of forty-two days after the date of issuance of this citation, the same being Monday, December 23, 2019, before the Honorable 102ND JUDICIAL DIST. COURT, Red River County, Texas, at the courthouse in said county, in Clarksville, Texas. Said petition was filed in said court, on the 30th day of October, 2019 in the above entitled cause.

A brief statement of the nature of this suit is a follows, to-wit: Have Judgment against the Defendants for Title to and Possession of the Property herein described; All that certain tract or parcel of land situated in Red River County, Texas about 10 miles East from the town of Clarksville; and being part of the Joseph Wagley Survey, Abstract No. 884, and being all of a called 20.2 acre tract of land described in Deed from J.M. Stiles to B.F. Edwards, dated July 21, 1931, and recorded in Volume 131, Page 313, of the Deed Records of Red River County, Texas, containing 20.944 acres.

as is more fully shown by Plaintiff's Original Petition on file in this suit.

Issued and given under my hand and seal of said court at Clarksville, Red River County, Texas this the 06th day of November, 2019.

Janice Gentry, District Clerk
400 N. Walnut
Clarksville, Texas 75426

ATTORNEY FOR PLAINTIFF:
NICK C.NEWTON
P.O. BOX 1221
625 SAM HOUSTON DR.
NEW BOSTON, TEXAS 75570-1221

By: Lucia Martinez, Deputy

Public Notice

A public comment meeting regarding the Red River County Hazard Mitigation Plan Five Year Update will be held Tuesday. December 10, 2019 at 1:00 p.m. in the Commissioners Court Room Annex 200 N. Walnut St. in Clarksville, Texas.

Mitigation Actions for Red River County and the participating jurisdictions will be reviewed at this time. Hazard Mitigation is defined as any sustained action taken to reduce or eliminate the long-term risk to life and property form hazardous events. Public input regarding the plan will be welcome at this meeting. A draft of the plan is currently available on the Red River County website: www.co.red-river.tx.us for public review

Red River Hazard Mitigation Kick-off Thursday, July 25, 2019			
Name	**Title**	**Phone**	**e-mail**
L.D. Williamson	County Judge		
Alex Ackley	Avery Mayor	702 343 4067	Desertfireguy@yahoo.com
Vincent Lum	Mayor Bogata	903-632-5315	BOGATA@VALORNET.COM
[illegible]	Mayor - Cville	903-366-9026	citymayor@suddenlinkmail.com
~~Jerry Hutson~~	~~Fire Chief Boga~~	903-427-3834 ext 260	
JERRY HUTSON	FIRE CHIEF - BOGATA	903-249-1635	bogatavfd@valornet.com
Julie Arrington	City Manager Clarksville	903 341 0004	citymanager@suddenlinkmail.com
Rocky Tolison	Fire Chief Cville	903-249-2478	RgT3582001@yahoo.com
Damien Carrasco	Code Enforcement	903-219-0418	clarksvillece@suddenlinkmail.com
MATTHEW McADOO	PUBLIC WORKS DIRECTOR	903-908-1122	mattmcadoo@hotmail.com
Tammy Quick	City Secretary-Cville	903 933 9324	citysecretary@suddenlinkmail.com
Tani Nix	City Secretary-Detroit	903-674-4573	cityofdetroit75436@gmail.com
George H English	Annona Mayor	903 697-3681	GHEnglish@gmail.comm

Red River Hazard Mitigation Public Meeting
Tuesday, December 10, 2019

Name	Title	Phone	e-mail
[illegible]	MAYOR	903-632-5315	bogata@valornet.com
Elena Crawford	EMC RRC	903 427 2679	elenacrawford@co.red-river.tx.us
[illegible]	[illegible]	903-427-2680	
Phyllis Stanley	President Red River Firefighters Assn	903-244-2210	pstan684@aol.com
[illegible]	[illegible]	903-366-9026	[illegible]
James A. Blount	Lamar Co. EMC	903 491 9577	ablount@co.lamar.tx.us
Michael Pace	RRCO Chief Deputy	903-427-3838	mike.pace@co.red-river.tx.us
Jim Caldwell	RRCO Sheriff	903-491-1173	[illegible]@co.red-river.tx.us
Rocky [illegible]	Clarksville Fire Dept	903-249-2478	RGT3582001@yahoo.com
Kim Lindsey	City Council	903-219-2078	Kim4bogata@gmail.com
[illegible]	[illegible]	[illegible]	[illegible]
JERRY HUTSON	FIRE CHIEF BOGATA FIRE	903-249-1635	bogatavfd@valornet.com
[illegible]	City Manager	903 427 3834	citymanager@[illegible].com
Lonnie Hider	Rivercrest ISD Police chief	903-249-5248	lhider@rivercrestISD.net
Donald Blasingame	Clarksville Chief of Police	903 706 1378	cvillepdchief@suddenlinkmail.com
Brian Armstrong	Dispatch Supervisor	903-427-3838	brian.armstrong@co.red-river.tx.us

Income

	Number	Percent
Households	5,816	100
Less that $10,000	902	15.5
$10,000 to $14,999	632	10.9
$15,000 to $24,999	1,146	19.7
$25,000 to $34,999	899	15.5
$35,000 to $49,999	946	16.3
$50,000 to $74,999	807	13.9
$75,000 to $99,999	245	4.2
$100,000 to $149,999	152	2.6
$150,000 to $199,999	44	0.8
$200,000 or more	43	0.7
Median household income (dollars)	27,558	X

Education

Educational attainment	Number	Percent
Population 25 years and over	9,801	100
Less than 9th grade	1310	13.4
9th to 12th grade, no diploma	2,052	20.9
High school graduate (includes equivalency)	3,301	33.7
Some college, no degree	1,887	19.3
Associate degree	373	3.8
Bachelor’s degree	518	5.3
Graduate or professional degree	360	3.7
Percent high school graduate or higher	65.7	X
Percent bachelor’s degree or higher	9.0	X

Housing

County Units	Number	Percent
Total housing units	6,916	100
Units built 1939 or earlier	743	10.8
Units built 1940 to 1949	661	9.5
Units built 1950 to 1959	866	12.5
Units built 1960 to 1969	875	12.7
Units built 1970 to 1979	1,470	21.3
Units built 1980 to 1989	1,333	19.3
Units built 1990 to 1994	377	5.4
Units built 1995 to 1998	436	6.3
Units built 1999 to March, 2000	155	2.2

Red River County Finances

Property Taxes	1999
Total County Tax Rate:	$0.630720
Total Market Value:	$584,091,020
Total Appraised Value Available for County Taxation:	$322,025,900
Total Actual Levy:	$2,008,957

Population and Number of Households by Sector
Red River County

Sector Number	Population	Households
100	2,697	1,131
200	950	346
300	1,315	477
400	1,620	658
500	4,963	1,883
600	2,772	1,128

(HAZUS)

Building Count by Sector Number – Red River County

Sector #	Residential	Commercial	Industrial	Agriculture	Religion	Government	Education	Total
100	1,319	10	3	1	0	0	1	1,334
200	463	0	0	0	0	0	0	463
300	574	1	0	0	0	0	0	575
400	647	6	1	3	1	0	1	659
500	1,959	34	9	1	3	0	2	2,008
600	1,228	8	1	1	1	0	1	1,240

(HAZUS)

Residential Square Footage Inventory for Red River County Sectors
By Sector Number and Type (1,000's of Square Feet)

Sector No.	Single Family	Mobile Home	Multi-Family	Temporary Lodging	Institutional Dormitory	Nursing Home
100	1,708.5	179	16	.8	0	0
200	610.5	56	0	0	0	0
300	828	92	53	.8	0	0
400	726	90	0	0	0	0
500	2,643	174	285	0	128	27.4
600	1,567.5	175	64	0	84	29.4

(HAZUS)

Commercial Square Footage Inventory for Red River County Sectors

By Sector Number and Type (1,000's of Square Feet)

Sector No.	Retail	Wholesale	Personal Repair	Professional	Banks	Hospitals	Med Offices	Recreation	Theaters
100	109.4	14.3	23	15.1	0	0	0	1.8	0
200	0	0	0	0	0	0	0	0	0
300	34.5	19.4	12.8	13.2	5.4	0	25.9	.7	0
400	0	6.6	8	0	0	0	0	0	0
500	256.4	33.5	71.6	110.6	22.5	0	35.1	30.7	0
600	37.4	13.7	18.3	16.8	5.2	0	29.3	7	0

(HAZUS)

Industrial/Agricultural/Religious Square Footage Inventory for Red River County Sectors

By Sector Number and Type (1,000's Square Feet)

Sector No.	Heavy Ind.	Light Ind.	Drugs/Food	Metals Processing	Hi-Tech	Construction	Agriculture	Religious
100	144.1	0	3	2.7	0	8.6	19.1	0
200	0	0	0	0	0	0	0	0
300	12.8	6.4	2.4	0	0	12.2	43.1	14.6
400	0	7.3	0	0	0	0	0	0
500	114	117.3	1.5	2.5	0	17.9	15.8	41.1
600	0	10.7	0	0	0	2.9	8.4	14.9

(HAZUS) Government/Education Square Footage Inventory for

Red River County Sectors by Sector Number and Type (1,000's Square Feet)

Sector No.	General Government	Emergency Response	Schools	Colleges
100	5.4	0	19.4	0
200	1.9	0	0	0
300	3.2	0	22.2	0
400	2.6	0	0	0
500	9.90	35.1	0	0
600	5.5	0	198.1	0

(HAZUS)

RED RIVER COUNTY PROFILE

POPULATION	
County Population	
Census 2000:	14,314
Census 1990:	14,317
Census 1950:	21,851
Population of the County Seat	
Census 2000:	3,883
Census 1990:	4,311
GENERAL INFORMATION	
County Size in Square Miles	
Land Area:	1,050
Water Area:	7
Total Area:	1,057
Population Density (per Square Mile) 2000:	13.63
INCOME	
Per Capita income, 1999 (BEA):	$17,339
Median Per Capita Income, 1999 (Census)	$27,558
Median Household Income, 1999 (Census)	$33,436
Median Family Income, 1999 (Census)	$15,058
Poverty (1999)	
Percent of Population in Poverty	22.37
Percent of Population under 18 in Poverty	31.25
COUNTY FINANCES	
Property Taxes, 2001 (Comptroller)	
Total County Tax Rate:	$0.666430
Total Market Value	$595,504,190
Total Appraised Value Available for County Taxation	$322,509,710
Total Actual Levy:	$2,149,301
Average Wage Per Job (BEA)	
2001:	$19,170
2002:	$18,733
1990:	$13,892

ROAD AND BRIDGE EXPENDITURES, 2001	
County Roads, Construction:	$0
County Roads, Maintenance:	$581,683
County Roads, Rehabilitation:	$0
County Bridges, Construction:	$0
County Bridges, Maintenance	$26,630
Right of Way Acquisition:	$0
Other Road Expenditures:	$3,315,156
TOTAL ROAD AND BRIDGE EXPENDITURES	**$3,923,469**

(The County Information Project, May 2003)

Red River County Transportation System Dollar Value ($1000's)

Description	Value
Highway Roads	1,410,800
Highway Bridges	162,000
Railway Tracks	93,150
Railway Facilities	3,000
Airport Facilities	32,000
Airport Runways	140,000

(From HAZUS)

Red River County Utility System Dollar Value ($1000's)

Description	Value
Potable Water Distribution Lines	294,755
Waste Water Distribution Lines	176,850
Oil Pipelines	1,750
Natural Gas Distribution Lines	117,900
Electric Power Facilities	500,000
Electric Distribution Lines	88,426
Communication Facilities	2,000
Communication Distribution Lines	39,302

(From HAZUS)