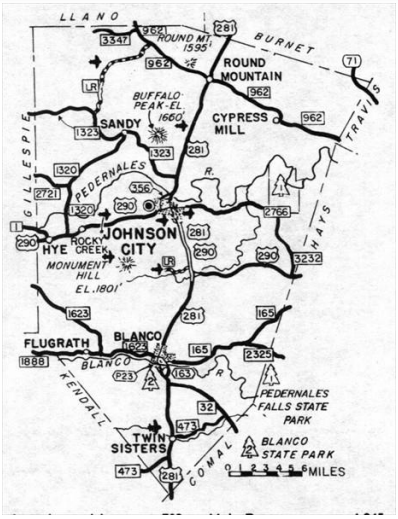


HAZARD MITIGATION PLAN

Blanco County **2024**

ROJAS

STATE OF TEXAS
BLANCO COUNTY

LANGFORD
COMMUNITY MANAGEMENT SERVICES
EST. 1983

SECTION 1: INTRODUCTION

Background

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

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

Participation and Scope

The Blanco County Hazard Mitigation Plan is a multi-jurisdictional plan covering one (1) County, two (2) cities, two (2) independent school districts, and one (1) water district. The prior hazard mitigation plan for the area was the 2016 Blanco County Hazard Mitigation Plan. This plan update includes the Cities of Blanco and Johnson City, Johnson City Independent School District, Blanco Independent School District, and the Blanco Pedernales Water District as participating jurisdictions. Blanco Pedernales Water District is the water provider for the planning area. Additional entities were invited to participate but chose to do so as stakeholders, rather than jurisdictions. These are listed in Section Two under Public and Stakeholder involvement. Below is an example of outreach efforts to inform the public about the upcoming Hazard Mitigation Action Plan (HMAP) development process.

Notice of mitigation planning efforts on county and city websites and the local newspaper, Winter 2023

> *"The hazard mitigation focus for FEMA is to look at a broad set of threats and how those pair up to community vulnerabilities. We will be considering everything from flood events to hurricanes, tropical storms, severe storms, tornados, hail, lightning, drought, wildfire, wildfire, extreme heat, and winter storms," Rojas said.*
>
> *The required plan includes a Core Planning team of Blanco County and its participating jurisdictions along with local teams to develop specific mitigation strategies unique to each community. Once the Core and local teams are both established, Rojas said that they will conduct an on-line community survey to understand residents' top concerns, along with several public hearings. The survey will also be accessible to the public in public facilities such as libraries, city halls, and the county courthouse.*

The 2016 hazard mitigation plan included Blanco County and the City of Johnson City. The updated plan will expand upon the 2016 plan with new capabilities, risk assessments, and mitigation actions contained therein, but will also provide a more nuanced view of two counties that share similar characteristics regarding history, landscape, risk, economy, transportation, and other factors.

The 2024 plan scope is to develop a detailed understanding of the planning area regarding existing capabilities, historical data, and future development patterns. Next, the vulnerability of the area to different hazards will be studied through a detailed hazard risk assessment that will assist the planning team in identifying and ranking mitigation activities based on their likelihood to reduce overall risk.

Purpose

The Mission Statement of the Plan is, ***Protect the people, property, economy, and quality of life in Blanco County from hazards and disasters.***

The Plan was prepared by Blanco County, including participating jurisdictions, and in cooperation with Langford Community Management Services and Rojas Planning, LLC. The purpose of the Plan is to minimize or eliminate long-term risks to human life and property from known hazards and to break the cycle of high-cost disaster response and recovery throughout Blanco County. In order to accomplish this, cost-effective hazard mitigation actions within the planning area are identified along with information critical to successful implementation such as estimated cost, responsible departments, funding sources, and timelines. In addition, a FEMA-approved hazard mitigation plan is a condition for receiving certain types of non-emergency disaster assistance, including funding for mitigation programs and projects.

A successful Hazard Mitigation Plan will:

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

6. Increase education and awareness around threats, hazards, and vulnerabilities.

The Core Planning Team has identified ten natural hazards and two man-made hazards that need to be addressed in the plan. You can find more information about these hazards in Section 4, while the detailed risk assessments for each hazard are discussed in Sections 5-17. The Plan's specific goals are identified in Section 18, with mitigation actions outlined in Section 19. Section 20 discusses the ongoing maintenance of the Plan, including how it will be incorporated into existing plans and funding mechanisms, monitoring and evaluation, annual and 5-year updates, and a commitment to involve the public continuously in the Hazard Mitigation Plan.

Authority

The Texas Division of Emergency Management (TDEM) and FEMA have the authority to review and approve hazard mitigation plans through the Disaster Mitigation Act of 2000, which amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

SECTION 2: PLANNING PROCESS

Plan Preparation and Plan Development

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

Figure 1-1: Plan Development Process

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

2. Assess Risks – Next, the local government needs to identify the characteristics and potential consequences of hazards. It is important to understand what geographic areas each hazard might impact and what people, property, or other assets might be vulnerable.

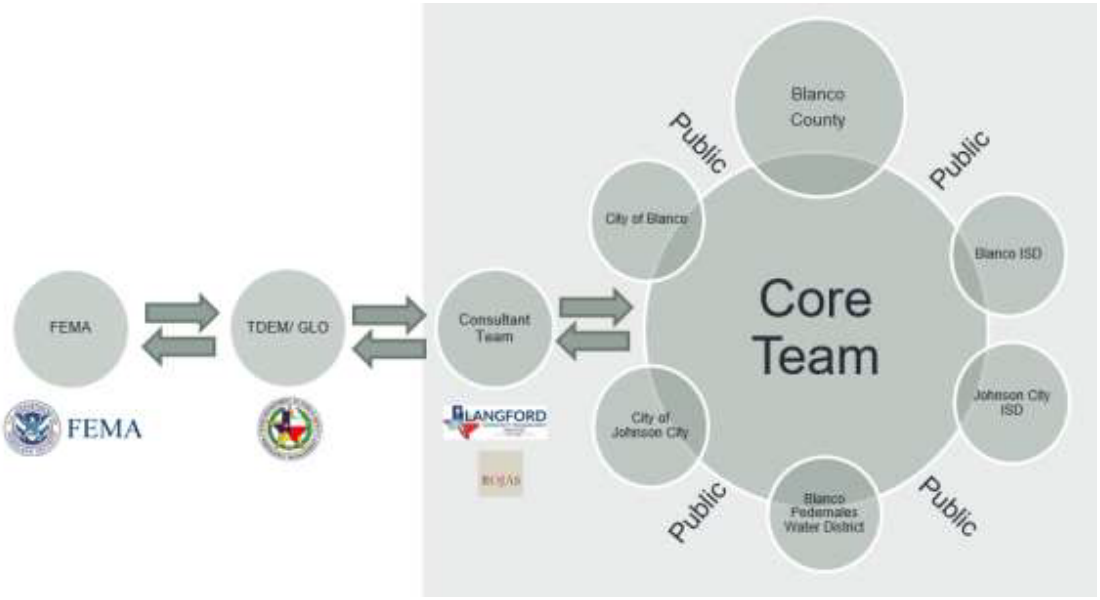
3. Develop a Mitigation Strategy – The local government then sets priorities and develops long-term strategies for avoiding or minimizing the undesired effects of disasters. The mitigation strategy addresses how the mitigation actions will be implemented and administered.

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

Planning Team

Blanco County, including participating jurisdictions, hired Langford Community Management Services and Rojas Planning to provide technical support and to oversee development of the plan. The Blanco County Multi-Jurisdictional Plan update was created using a direct representative model, where each participating jurisdiction chooses and sends a representative to represent their interests. A local planning team was also established at the jurisdictional level, which was responsible for assembling representatives to participate in the meetings and complete relevant tasks. Ultimately, this group was primarily responsible for developing, and eventually implementing the mitigation actions at the local level.

Figure 1-2: Planning Team and Process Diagram



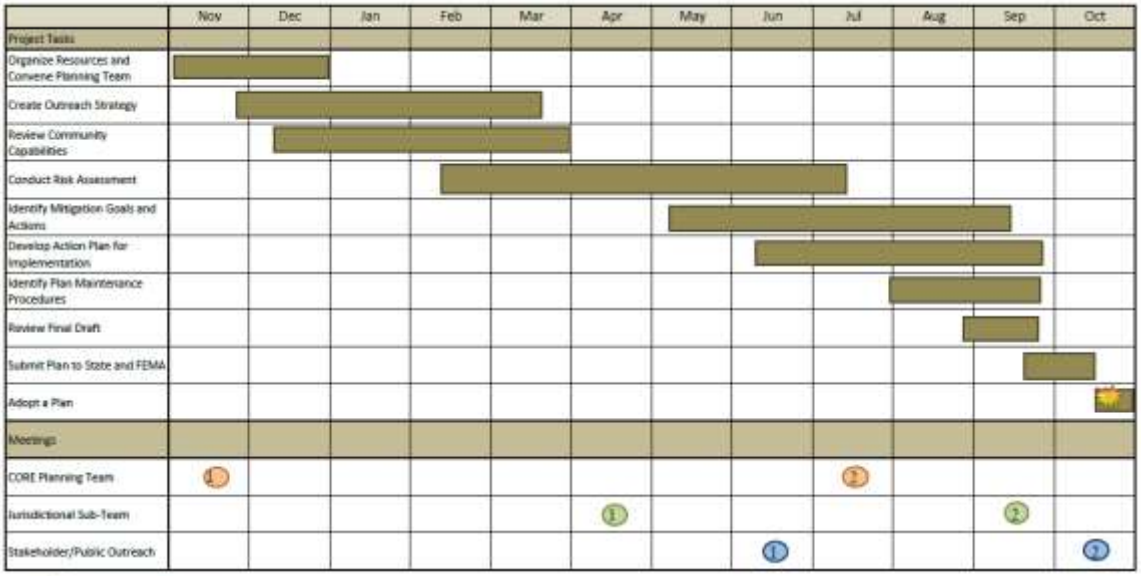
The first Core Planning Team meeting was held on Tuesday October 18, 2022, at the Blanco County Courthouse at 101 E Pecan Dr, Johnson City, TX 78636. At this meeting an overview of the planning process was discussed as well as what the responsibilities would be of each of the participating jurisdictions and their Core Team representative. Some of the responsibilities of the Core Team that were discussed include Capability Assessment Surveys, identifying critical facilities, providing a survey to the general public, providing input regarding the identification of hazards, identifying mitigation goals, developing new mitigation actions, and ranking mitigation actions.

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

Table 2-1. Core Planning Team (2020 Census)

Entity/Population	Position or Title	Department
Blanco CO 11,374	County Judge Emergency Management Coordinator	Commissioners Court Emergency Management
City of Blanco City 1,682	City Secretary Public Works Supervisor	City Hall Public Works
City of Johnson City 1,627	City Secretary	City Hall
Blanco ISD	City Secretary Police & EMC Director	Administration
Johnson City ISD	City Secretary City Manager Executive Assistant	Administration
Blanco Pedernales Water District	General Manager	Water District Officers

Project Schedule



CORE Planning Team Meetings	
1	Introductions, outreach brainstorming, process review, capabilities assessment and hazards review.
2	Survey, basemaps, outreach strategy,and Jurisdictional Sub-teams.
	Conduct local risk assessments and identify information gaps, identify mitigation goals and actions, and develop implementation plan
Jurisdictional Sub-Team	
1	Review basemaps, input on risk assessment, create an outreach strategy and complete local capability assessments.
2	Input on mitigation goals and actions, implementation and maintenance procedures, and review and adopt final plan for submission to FEMA
Stakeholder/ Public Outreach Meetings	
1	Present basemaps, capability assessments, risk assessment, and draft mitigation actions for feedback and further development.
2	Opportunity to review and comment on final draft.

Resources and Existing Plans

Resources

To conduct hazard risk assessments, various resources were used to gather and analyze data on past hazard events and their impacts on the planning area. The preliminary findings of the hazard risk assessments were presented at Core Meeting 2, and then shared in their entirety with the participants to develop mitigation actions. The information obtained from these assessments facilitated discussions that helped participants develop actions for their respective communities. Resources used for the assessments include the National Oceanic and Atmospheric Administration (NOAA, Texas Geographic Society, U.S. Geographic Society (USGS, U.S. Department of Health and Human Services, US Departments of Agriculture, FEMA, U.S. Army Corp of Engineers (USACE, Texas Water Development Board (TWDB, Texas A & M Forest Service, Texas Division of Emergency Management (TDEM, local reporting, and other sources. This Hazard Mitigation Plan aligns with and supports Blanco Pedernales Water District's revision of their Emergency Response Plan (ERP and expansion of their existing Vulnerability Assessment to meet the risk and resilience assessment. The EPA has stated that if your Community Water System (CWS) serves a population of 3,301 to 49,999, then your risk and resilience assessment certification statement is due to the EPA by June 30, 2021, and your ERP certification statement is due to the EPA within six months from that date.

Existing Plans

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

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

Blanco County Transportation and Economic Development Plan 2019-2020 - A county-based Transportation and Economic Development plan (TED Plan) is a blueprint for the future that looks at all modes of transportation, including roads, transit, aviation, rail, pedestrian, and bicycle facilities. The Blanco County Transportation and Economic Development plan identifies seven corridors for local county officials to preserve rights-of-way needed for expansion of existing facilities as well as future growth and development. The need for such a plan is driven by the continuing rapid population growth occurring in the nearby five county Austin-San Marcos-Round Rock Metropolitan Statistical Area (Greater Austin MSA. Significant development has occurred in western Travis and Williamson Counties since 2000, and continued development of the neighboring communities such as Dripping Springs, Marble Falls and Fredericksburg will have a more direct impact on Blanco County in the future.

Region 11 Guadalupe Regional Flood Planning Group (RFPG - Senate Bill 8, 86th Texas Legislature, created a state flood planning process for Texas, through which TWDB will be administering state and regional flood plans. TWDB designated 15 planning area regions, including the Guadalupe River Basin (Region 11. The first regional flood plans are due in January 2023, which will culminate in the first statewide flood plan due September 1, 2024.

Each self-governed regional flood planning group is responsible for identifying and assessing specific flood risks, as well as setting flood risk reduction goals, identifying and recommending flood management evaluations and strategies, and flood mitigation projects to reduce flood risk in their regions. Additionally, the groups will focus on reducing existing flood risks to life and property and on floodplain management in general to avoid increasing flood risk in the future by keeping future populations out of the way of flood flows.

281 Corridor Plan in Blanco, Atlas/K Friese - The Texas Department of Public Safety (TxDOT is developing preliminary plans to improve 19 miles of US 281 from US 290 to the Comal County line in Blanco County, Texas, including the US 281/US 290 interchange. This study excludes any improvements to the existing four-lane segment of US 281 through the city of Blanco and excludes the study of a relief route around the city of Blanco, which is being studied as part of a separate project. The purpose of the proposed project is to enhance safety, improve connectivity and improve mobility by providing additional roadway capacity to meet current and future traffic demands due to population growth and increased traffic volumes. Throughout the project limits, the existing roadway is two-lanes with Super-2 passing lanes. Current study limits contain the last section of two-lane US 281 roadway within the Austin District. The preliminary plans would expand the roadway to a four-lane divided highway similar to the adjacent section of US 281 to the south. This is consistent with TxDOT's statewide plan to upgrade rural highways to four-lane divided roadways as part of the Texas Trunk System and consistent with the recommendations from a previously conducted statewide US 281 feasibility study.

Blanco City Comprehensive Plan – The key to this plan is that it is based on a foundation of public involvement. It was not created by outsiders working in a vacuum; rather it utilizes the concerns of Blanco residents to identify what they feel is most critical to Blanco's prosperity. The Implementation Guide is the most important section of the entire plan. This is where the specifics for making things happen is found. The implementation guide lays out the goals, objectives, and detailed actions for addressing the issues from the plan. It also identifies timelines for when things should happen, who is responsible, and stakeholders to consider. This is the section that should be required reading for all City Council members, and given to new Council members as they are elected. This will allow them to determine how city resources should be spent to meet the priorities of the citizens of Blanco.

Blanco City Comprehensive Development Plan and CIP - The Capital Improvement and Asset Management Advisory Committee is responsible for the annual refresh/update of the Comprehensive Development Plan (CDP), Asset Management Plan (AMP) and Capital Improvement Plan (CIP), ensuring alignment of the Comprehensive Development Plan, Asset Management Plan, Capital Improvement Plan, and the City's annual budget, and developing annual budget recommendations based on city revenues.

Johnson City ISD 2023 Bond Election – Coordinate bond items such as the following with implementation of this Hazard Mitigation Plan.

- Expand PE facility at High School, expand nurse's office at Elementary School, replace 85 HVAC units, plus safety and security upgrades.

Johnson City ISD District Improvement Plan 2022-2025 – Coordinate with strategies such as the following during implementation of this Hazard Mitigation Plan.

- Conduct a District Facility Study to develop a short- and long-term plan for buildings and maintenance.

Johnson City ISD District Strategic Plan 2022-2023 – Coordinate with priorities such as the following during implementation of this Hazard Mitigation Plan.

- Facilities & Operations; improvements to structures and operational priorities
- Meet capacity needs for current and future enrollment trends.

City of Johnson City (COJC) Capital Improvements Plan and Impact Fee Study 2022 Update - This study was performed to update the City of Johnson City's water and wastewater system impact fees in accordance with the Texas Local Government Code Chapter 395. The population growth over the next 20-years was projected, water and wastewater system analyses were completed, and the City's Land Use Plan and Capital Improvements Plans were updated per the requirements of Texas Local Government Code Chapter 395.

City of Johnson City Comprehensive Plan 2016 and 2020 update - The Comprehensive Plan establishes the overall framework to guide development patterns in Johnson City. Additional regulations, such as zoning, rely upon the land use plan for guidance and consistency. The development of land in a municipality should be done in a comprehensive manner to achieve an overarching vision for the future. The plan designates areas for particular land uses, based on land planning principles as well as input from local citizens and city officials. It is important to recognize that a comprehensive plan is a policy document, not a zoning ordinance. The

recommendations in the plan should be followed when making decisions about the city's growth and development.

City of Johnson City Design Standards and Specifications Manual - The Design Standards and Specifications Manual is designed to implement the provisions of the Subdivision Ordinance and to provide for the orderly, safe, healthy, and uniform development of the area within the corporate city limits. This also applies to the area surrounding the city, such as the extraterritorial jurisdiction (ETJ).

City of Johnson City Strategic Work Plan 2022+ - Align goals and objectives from the COJC Strategic Work Plan, such as the following, with the implementation of this Hazard Mitigation Plan.

- Goal 3: Improve Code Enforcement
- Goal 4: Improve Streetscaping and Signage
- Goal 5: Improve Fire Safety
- Goal 6: Improve Streets

City of Johnson City Thoroughfare Plan – The Future Thoroughfare Plan developed in 2022 describes planned roadway widths and extensions as well as activity nodes. The types of roadways covered in the plan include collector roads, arterial roads, and highways. https://storage.googleapis.com/proudcity/johnsoncitytx/uploads/2022/11/Johnson-City-with-zoning8.2Model.pdf

Public and Stakeholder Involvement

The process of hazard mitigation planning presents an opportunity for Blanco County, along with the participating jurisdictions, water utility, stakeholders and the general public, to assess and develop effective actions to mitigate the risk of loss of life and property damage that may result from a disaster occurring within or around the planning area. Public participation and stakeholder involvement in the Plan are critical to ensure that the components of the Plan are accurate and relevant to the needs of the community. The Planning Team develops a greater understanding of local concerns and legacy knowledge with input from individual citizens and the community as a whole. If citizens and stakeholders are involved it also imparts more credibility on the final Plan and increases the likelihood of successfully implemented mitigation actions.

Table 2-2. Plan Stakeholders

Chamber of Commerce	Mayor/ Chief Admin. Officer	City Council
City of Blanco Capital Improvement and Asset Management Advisory Committee	County Commissioners	Appraisal District
Historical Commission	Pedernales Electric Cooperative	TDEM – Robbie Barerra, District coordinator
Public Works	United Methodist Church	Red Cross
Texas Fire Marshal's Office	BPGCD/TWDB	TCEQ
GLO	Blanco-Pedernales Groundwater Conservation District	TxDOT – District Representative

Bureau Veritas	JCVFD/ North Blanco ESD #1, NBC, EMS, RMVFD*	Blanco County ESD #2, Fire, & EMS
EDGE Engineering – Travis Kaatz, PE	Brightview Landscaping Services	Quiddity Engineering
COJC & City of Blanco PD	Elleson Legal Services	Hill Country Waste Solutions
Capital Area Council of Governments (CAPCOG)		

*Johnson City Volunteer Fire Department/North Blanco ESD #1, North Blanco County, Emergency Management Services, Round Mountain Volunteer Fire Department

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

The first tier is the Core Planning Team, which constitutes at least one representative from every participating jurisdiction, including the Blanco Pedernales Water District. Their responsibilities and participation rates are the highest because they are required to attend every meeting in the project schedule. This includes Core Team Meetings, Jurisdictional Sub-Team Meetings, and Public Meetings. Two Core Planning Team Meetings were held throughout the development of this plan with action items and tasks for each member.

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The second tier was the Jurisdictional Sub-Teams comprised of a greater number of members from each participating jurisdiction with the representative Core Team Member leading the meetings and ensuring that tasks were completed. Jurisdictional Sub-Teams are comprised of a diverse group of local officials that have day to day responsibilities for emergency response

and preparedness, development review and regulations, and departmental or legislative decision-making authority. This second tier had responsibilities associated with the specific tasks assigned to each of the two meetings scheduled for this group. The first Jurisdictional Sub-Team meeting was held virtually on March 22, 2023 and consisted of a morning session for Blanco County and afternoon sessions for the City of Blanco, Blanco ISD, City of Johnson City, and Johnson City ISD. The second Jurisdictional Sub-Team meetings were held virtually on October 25, 2023. This meeting included a final review of the mitigation action plan for each community, a priority exercise for the actions in the plan, and development of plan maintenance and implementation strategies.

Table 2-3. Jurisdictional Sub-Teams

Entity	Position or Title	Department
Blanco County	Blanco County EMC	Emergency Management
Blanco County	County Judge	Commissioner's Court
Blanco County	ESD #2 Fire Chief and County Fire Inspector	Administration
Blanco County	ESD #1 Manager	Administration
Blanco City ISD	Superintendent	Administration
Blanco City	Police Chief	Police Department
Johnson City ISD	Superintendent	Administration
Johnson City	Mayor	City Council
Johnson City	Chief Administrative Officer	Administration
Blanco Pedernales Water District	Manager	Administration

Figure 1-4: Public Meeting at the Hoppe Room in the County Courthouse Annex in Johnson City, June 13, 2023 6 pm to 8 pm.

Two public workshops were held to gather input from local officials and the public for hazard mitigation. The first workshop was held on June 13, 2023, in Johnson City and the second workshop was held on July 13, 2023, in the City of Blanco. The results of the survey were released in coordination with the first workshop to develop the final list of hazards to be studied. The workshops were designed to enable communities to examine critical facilities and vulnerable populations, as well as to provide feedback on general and specific vulnerabilities, and areas that are prone to natural hazards. Neighboring communities, as well as local and regional stakeholders, were invited via email and phone. They were given an overview of the planning process and briefed on how they can collaborate with participating jurisdictions to apply for future project funding for implementing mitigation projects that are relevant to their specific hazard risks.

Figure 1-5: 2nd Core Team Meeting, July 13, 2023, Blanco County Courthouse Annex

The following are a summary of findings from the public survey that was opened on June 13, 2023, and closed on August 13, 2023. The survey was first announced at the first public meeting in Johnson City and was advertised on flyers, QR code leaflets, the county website, city websites, social media, and by word of mouth by Core team members.

Summary of Findings from the Survey:

1. 11 total surveys, 0 manually entered.
2. Unincorporated Blanco County represents nearly 55% of respondents and City of Johnson City a little over 36% of respondents.
3. Wildfire was identified as the highest threat with over 27% of all responses, followed closely by drought, floods, and severe winter storms all tied at just over 18%.
4. Severe Winter Storms, Drought, Extreme Heat, and Floods are the more prominent responses in the hazards that had been experienced or hazards expected to be experienced.
5. 100% of respondents are not located in a floodplain, with more than 81% identified as not having flood insurance.
6. Vast majority of respondents are somewhat concerned about being impacted by a disaster at nearly 55%. A little over 18% are extremely concerned and a little over 27% are not concerned.
7. Majority have taken steps to make home, business, or community more hazard resistant; nearly 73% and 100% of respondents would like to know more about how to increase protection.
8. Internet was identified as the most effective way for citizens to receive information regarding how to make their home, business, or community more resistant to hazards.
9. Contact by text or e-mail was identified as the best single way to alert the public to an imminent disaster. All of the above, including TV, internet, text, or social media were identified by the majority of the respondents to alert the public to an imminent disaster.

10. The top mitigation activities identified were replacing inadequate or vulnerable bridges and roads, providing better information about hazard risk and high-hazard areas, and retrofitting infrastructure, such as elevating roadways and improving drainage systems. Hazard prevention through building regulations and natural resource protections were identified as overall very important. Public education and Emergency services were identified as extremely important.

SECTION 3: PLANNING AREA PROFILE

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

Blanco County

Blanco County is in the Hill Country of south-central Texas, bordered on the west by Gillespie County, on the north by Burnet and Llano Counties, on the east by Hays and Travis Counties, and on the south by Kendall and Comal Counties. Johnson City, the county seat, is four miles north of the center of the county, forty miles west of Austin and sixty miles northwest of San Antonio. The City of Blanco is the largest city in the county and other communities include Round Mountain and Hye. Blanco County comprises 714 square miles of the eastern edge of the Edwards Plateau and has an elevation range of 800 to 1,850 feet above sea level. The terrain is generally hilly to mountainous, and along some streambeds the landscape has a "stairstep" appearance due to limestone benches and steep slopes. The vegetation consists mainly of stands of Live Oak and Ashe Juniper, with mesquite and grasses. The soils are generally dark, calcareous, stony, clay loams with rock outcrops. Mineral resources include limestone, lead, oil, gas, industrial sand, and dolomite. Most of the county is best suited for rangeland and wildlife habitat.

Figure 3-1: Map of Blanco County

A courthouse was first erected in 1860 in the Blanco town square. The Old Blanco County Courthouse on today's Blanco Square was completed in 1885. The Blanco County Courthouse of 1916 was the first permanent courthouse built after the county seat moved to Johnson City in 1890.

Figure 3-2: Blanco County Courthouse, Johnson City

Population 2020 Census	11,374[1]
Change from 2010	+7.7%
Area (sq. mi.)	714
Altitude (ft.)	800-1,850
Rainfall (in.)	34.39
Jan. avg. min. (F°)	34
July avg. max. (F°)	96

The northern and central part, about two-thirds of the total area, drains into the Colorado River in Travis County through Miller and Cypress Creeks and the Pedernales River. The southern third of the county drains into the Guadalupe River through the Blanco and Little Blanco Rivers. Most of the county is best suited for rangeland and wildlife habitat. The temperatures range from an average high of 96° F in July to an average low of 34° in January, the rainfall averages 34.39 inches per year, and the growing season extends an average of 234 days.[2]

Economy

Blanco County

In the early twenty-first century tourism, agribusinesses, livestock-trailer manufacturing, ranch supplies, and hunting and fishing are important elements of the local economy. Tourism has been an important part of the local economy since the 1960s, as many visitors are attracted to Blanco State Recreation Area just south of Blanco, to Pedernales Falls State Park in the northern part of the county, and to the Lyndon Baines Johnson Birthplace, Boyhood Home, and Ranch.

Blanco, Texas

The City of Blanco is a small community located in the southern portion of Blanco County. Austin is located 45 minutes east and San Antonio is 45 minutes south. With its low cost of living and variety of activities, Blanco is an ideal place for people looking for a laidback lifestyle in beautiful Hill Country scenery. This area is known for its rolling hills, creeks, and beautiful landscapes. Blanco's downtown is a tremendous opportunity for the community. It offers a connection with the past as well as an asset for the future. Downtown can serve local needs as well as attract visitors to the community, driving the local economy. Blanco evokes memories of the past with its historic old courthouse on the town square, historic homes,

[1] https://txcip.org/tac/census/profile.php?FIPS=48031
[2] Handbook of Texas online

small town charm, and the Blanco River meandering through town. Blanco has many well-known local businesses like Texas Hill Country Olive Company and Blanco Bowling Center & Arcade as well as many other smaller companies that make up this small yet vibrant community. There are also several local businesses such as Kimbrough Cleaners and Cowboy Storage. The city hosts a classic car show in May and is the proud home of the Real Ale Brewery. The community is tight-knit, always ready to help each other, and also welcoming to visitors. The volunteer spirit is alive with active involvement in many community organizations.

Figure 3-2: Old Blanco County Courthouse, City of Blanco

The retention and expansion of existing local business and the recruitment of new business are important factors in the creation, retention, and reinvestment of wealth for Blanco. Sustaining quality wage jobs helps contribute to the tax base for Blanco and helps relieve the tax burden on residents. The goal is to have a healthy balance of residential, retail, commercial, and industrial contributions to the tax rolls. Projects include recruiting grocery and retail, create and promote youth recreational opportunities, promote historical tourism and agri-tourism, grow and strengthen the chamber of commerce, and attract a retirement village. These are five particular methods of economic development that Blanco should explore; partly because the residents say they are, and partly because the leaders and citizens are capable of coming together to achieve these goals. Bear in mind that none of these initiatives will come to fruition without sincere cooperation and citizen steering. Folks must work together to overcome barriers during the development process. Making a community better by planning for the economic development future is always a daunting task, and rarely a quick one. These forward-thinking goals can be achieved with widespread support, hard work, and a positive optimistic attitude throughout the community.[3]

Electricity is served by the Pedernales Electric Co-op, water and wastewater are served by the City of Blanco.

Johnson City, Texas

Johnson City is a rural community located in the Northern and Central portions of Blanco County. It is located approximately 45 minutes West of Austin, and San Antonio is about 1 hour south. Johnson City holds an important place in the history of Texas and the United

[3] 2004 Comprehensive Plan, https://blanco.municipalimpact.com/economic-development-1

States. It possesses significant historical assets, including a National Park containing Lyndon B Johnson's boyhood home and other historical sites. The downtown area of Johnson City offers many opportunities to build Its tourism industry. Communities all over the nation have attempted to replicate the idyllic Courthouse Square which Johnson City naturally possesses. It is the heart of the city and its unique atmosphere invites residents and visitors to spend their time and money in the Hill Country.

The City of Johnson City's vision is a well-planned community that ensures small town values and considers its own rich history. This results in an improved quality of life for all Johnson City citizens and its visitors. Economic Development is a priority for Johnson City. Residents desire local opportunities for employment and they understand the benefits of a thriving local economy. Johnson City is well positioned with a sustainable locally economy. Between 2019 and 2020, employment grew at a rate of 6.23%. The most common employment industries in Johnson City are Hospitality and Food Service, Manufacturing, and Construction.

Electricity is served by Pedernales Electric Cooperative and Water and Wastewater are provided by the City of Johnson City.

Population and Demographics

The 2020 Census count for Blanco County is 11,374, of which 1,682 were residents of Blanco City and 1,627 were residents of Johnson City.

Table 3-1: Population of Blanco County and participating jurisdictions

Jurisdiction	2020 Census Population	2022 Population Estimate[4]	Estimated Vulnerable or Sensitive Populations[5]		
			Youth (Under 5)	Elderly (Over 65)	Below Poverty Level
Blanco County[6]	11,374	12,418	414	2,809	1,182
Blanco City	1,682	1,883	97	345	226
Johnson City	1,627	1,826	109	253	345

ISD Population

Blanco ISD is a Pre-K thru Grade 12 public school that serves students from the community of Blanco and surrounding areas. There are three campuses, one elementary school, one middle school, and one high school. The vision is to inspire excellence and empower all for success. The mission statement is as follows, "In collaboration with our community, Blanco ISD cultivates open communication and individual growth. We maintain a safe and supportive learning environment. We provide challenging, innovative, and inclusive learning experiences. We empower students to reach their full potential, exemplify our community values, and prepare for life-long success."

Johnson City ISD is a Pre-K thru Grade 12 public school that serves students from the community of Johnson City and surrounding areas. There are three campuses, one elementary

4 U.S. Census Bureau population estimates (Vintage 2022)
5 The Estimated Vulnerable or Sensitive Populations are based off of the 2021 American Community Survey
6 County Totals include jurisdictional totals

school, one middle school, and one high school. Johnson City ISD is committed to ensuring an outstanding educational and social emotional experience for all our students. The mission statement of the Johnson City Independent School District is to promote citizenship and develop responsible students by providing the knowledge, skills, and life experiences necessary for learners to recognize and capitalize on their full potential.

Table 3-2 below provides the population of employees, students, and vulnerable populations for each school district

Table 3-2: ISD Population

ISD	Employees	Students	Children (under 5)	Staff with Outdoor Jobs
Blanco ISD	178	1,096	37	5
Johnson ISD	130	720	26	12*

*Includes bus drivers and maintenance workers

Population Growth

The Census 2010 population for Blanco County is 10,497 of which 1,739 were residents of Blanco City and 1,656 were residents of Johnson City. The 2022 population for Blanco County is estimated to be 12,418, of which 1,777 were residents of Blanco City and 1,627 were residents of Johnson City. This estimate is produced by the U.S. Census Bureau using updated housing unit estimates to distribute county household population to the subcounty area based on housing unit change. Overall, Blanco County and all participating jurisdictions experienced an increase in population between 2010 and 2022. The Census counts 2010 and 2020, however both show a population decrease for the City of Blanco and Johnson City. Blanco County had an 8.4% increase over that same time period suggesting that much of the growth was in the unincorporated county. Table 3-2 provides historic and projected population change rates in Blanco County and all participating jurisdictions.

Table 3-2: Population Change

Jurisdiction	2010 Census	2020 Census	2022 Estimate	Pop Change (2010-2020)	% Change (2010-2020)	Pop Change (2010-2022)	% Change (2010-2022)	Pop Change (2020-2022)	% Change (2020-2022)
Blanco County	10,497	11,374	12,418	877	8.4%	1,921	18.3%	1,044	9.2%
Blanco City	1,739	1,682	1,883	-57	-3.3%	144	8.3%	201	12.0%
Johnson City	1,656	1,627	1,826	-29	-1.6%	170	10.3%	199	12.2%

Population Projections

Population projections are a useful tool to understand how future growth and development may affect vulnerability to hazards. Planning and growth management efforts will guide city infrastructure investment away from hazard prone areas as both occupied and vacant areas are considered for future development. Population projections from 2030 to 2080 are listed in Table 3-3 and are based on Texas Water Development Board (TWDB) demand projections used for the 2027 State Water Plan. Population projections are based on county-level 1.0 migration scenario projections from the Texas Demographic Center (TDC), which used migration rates between the 2010 and the 2020 decennial Census to project future growth. The population projections show a decrease in population for the Blanco County Planning Area of 847 persons over the 50-year period, or 7.1%. However, with the recent uptick in growth between 2020-2022, the 50-year projections may tell a different story once 2030

decennial Census is taken into account. As is evident from the last 2-3 years in particular, Blanco and the surrounding counties are growing rapidly with the expansion of Austin and San Antonio. The TDC does maintain population projections for the Town of Round Mountain.

Table 3-3: TWDB Population Projections

Jurisdiction	P2030	P2040	P2050	P2060	P2070	P2080
Blanco County	11,851	11,951	11,731	11,518	11,277	11,004
Blanco City	1,522	1,535	1,507	1,480	1,450	1,414
Johnson City	1,631	1,645	1,616	1,589	1,559	1,524

Existing and Future Land Use and Development Trends

It is expected that residential growth will increase along the transportation corridors leading to Blanco County from Comal, Hays and Burnet Counties as they are upgraded, and within the city limits and extra-territorial jurisdictions (ETJ) of the cities of Blanco and Johnson City.

City of Blanco

The City of Blanco undertook a comprehensive plan update process in 2020. Blanco's land use has evolved organically due to the lack of land use regulations. The city did adopt a zoning ordinance; however, it was only in place for a limited time. Because of the lack of regulation, development occurred almost entirely due to market demand. This focused the commercial and industrial growth on the areas with the best transportation access on Hwy 281 and FM 165. Retail growth also centered on Hwy 281 and in the downtown. Homes were developed around these areas and on feeder roads off of Hwy 281, particularly the large developments being built outside of town. Current land use features primarily single-family residential zoning near the center of town (intersection of Route 163 and 281), with retail and commercial development focused along the major thoroughfares. There is currently a notable amount of land that is vacant within the city limits as well approximately 291 acres.

Johnson City

Johnson City's land use is characterized by a mix of residential, commercial and public uses centered on the axis of its two main arterials, US 290 and US 281. Agricultural uses generally extend from the city limits to the extraterritorial jurisdiction.

Growth is expected to occur over the next several years, especially along Main Street/US Highway 290 and US Highway 281. The city desires quality development which preserves the town's unique characteristics. Over the course of the planning periods and beyond, Johnson City's development patterns are expected to be as follows:[7]

- Semi-developed lots will be utilized for infill development throughout the city limits, and will be characterized by several land use types, including commercial, single-family, and multi-family.

[7] https://storage.googleapis.com/proudcity/johnsoncitytx/uploads/2021/09/Johnson-City-Comprehensive-Land-Plan-Update-2016-with-Maps-02-16-16.pdf

- The County Courthouse Square will continue to thrive as a destination for both tourists and residents alike. Land uses in the area will contain a mix that complement the existing character of the area.
- The US 281 and US 290 corridors will be main centers of economic growth through additional commercial and/or industrial development in appropriate locations.
- Existing parks and valuable open space will be preserved for generations to come.
- Land located in the FEMA-designated flood hazard areas will be left undeveloped, if possible.

Future land use plans in both Blanco and Johnson City anticipate balanced growth with a mix of land uses.

TxDOT Area Transportation Improvements

US 281 from US 290 to the Comal County Line

TxDOT is currently in the process of developing preliminary plans to improve a 19-mile stretch of US 281, from the Comal County line in Blanco County, Texas to US 290. The project aims to enhance safety, improve connectivity, and improve mobility by providing additional roadway capacity to meet current and future traffic demands due to population growth and increased traffic volumes. The existing roadway is currently a two-lane road with Super-2 passing lanes, and the preliminary plan is to expand it to a four-lane divided highway, similar to the adjacent section of US 281 to the south. This is in line with TxDOT's statewide plan to upgrade rural highways to four-lane divided roadways as part of the Texas Trunk System, and is based on recommendations from a previously conducted statewide US 281 feasibility study. However, it's worth noting that the study excludes any improvements to the existing four-lane segment of US 281 through the city of Blanco, and excludes the study of a relief route around the city of Blanco, which is being studied as part of a separate project. The current segment of two-lane US 281 roadway within the Austin District is also contained within the study limits.

Proposed improvements

- Widening the roadway to create a four-lane divided roadway within a typical right of way of 450 feet. The four-lane roadway will include two lanes in each direction and shoulders.
- Separating travel lanes by adding a grassy median to improve safety and provide a transportation corridor to accommodate future improvements.
- Adding median crossovers with acceleration and deceleration lanes at regular intervals.
- Adding right-turn lanes at various intersections.
- Designing roadway transitions north and south of the city of Blanco to tie into existing four-lane sections.
- Upgrading the US 281/US 290 interchange.

US 281 Blanco Relief Route Feasibility Study

At the request of the City of Blanco and Blanco County, TxDOT is initiating the US 281 Blanco Relief Route Feasibility Study to develop and evaluate preliminary relief route options to enhance safety and improve mobility along US 281 in the city of Blanco. The purpose of

this study, with the collaboration of local stakeholders and the public, is to arrive at a locally recommended relief route option. Further project development, including schematic design, environmental review, and funding would depend on the outcome of the feasibility study. This study is anticipated to be complete at the end of 2024.[8]

Critical Facilities and Assets

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

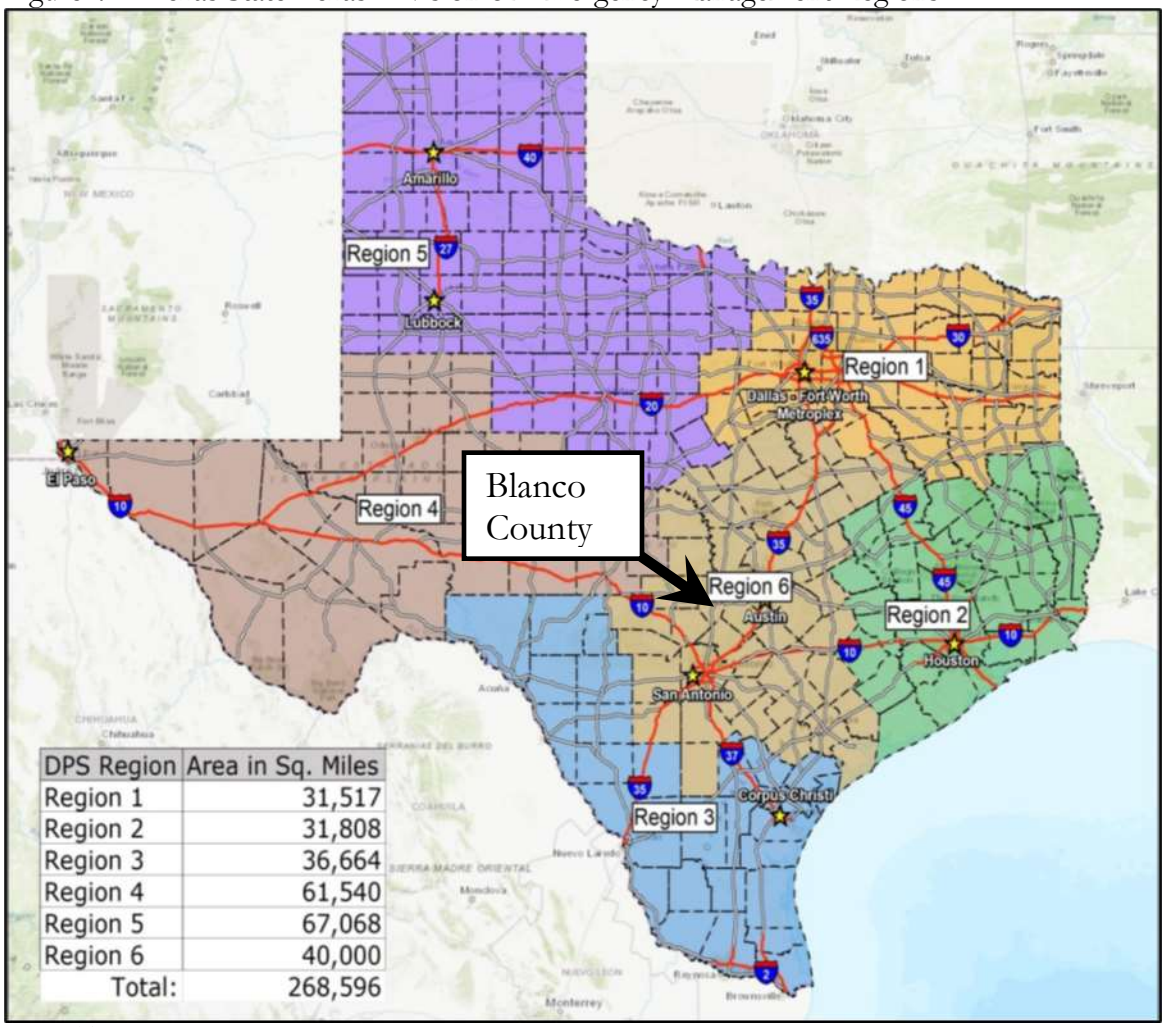
[8] https://cityofblancotx.gov/highway-281-task-force

SECTION 4: HAZARDS AND RISK

Based upon a full review of the range of hazards suggested under FEMA planning guidance and input from Blanco County Core Team members, 12 hazards have been identified as important to be addressed in the Blanco County Hazard Mitigation Plan Update. These were chosen based upon a review of the State Hazard Mitigation Plan, a review of the historical record of disaster declarations for the Blanco County planning area, historical incidents contained in the National Centers for Environmental Information (NCEI), and local records and accounts of magnitude and damages from different and distinct hazard events.

According to the State Hazard Mitigation Plan, Blanco County is located within the western portion of Texas Division of Emergency Management Region 6 where floods, wildfire, and drought can be expected to dominate the hazard profile. This is a rapidly developing area located in the geographic region known as "flash flood alley." It is also one of the areas in Texas that is losing the most working lands such as farms, ranches, and forests. Increasing urbanization in an already flash flood prone area makes this region particularly vulnerable to riverine flooding.

Figure 4-1: Texas State Texas Division of Emergency Management Regions



DPS Region	Area in Sq. Miles
Region 1	31,517
Region 2	31,808
Region 3	36,664
Region 4	61,540
Region 5	67,068
Region 6	40,000
Total:	268,596

Source: Texas Division of Emergency Management

The increased risk for these specific hazards in the planning area is confirmed in the table below. Disaster declarations are made at the county level and are not specific to any one city

or sub-area, however, it is illustrative for local emergency planners to understand the type and frequency of the hazards impacting the larger region. Keep in mind that the incidents listed are only those that had a level of impact sufficient to necessitate a disaster declaration and that hazards have affected the area more frequently than what the table may initially suggest. Statewide disaster declarations are not included in this list.

Table 4-1: Disaster Declarations in Blanco County

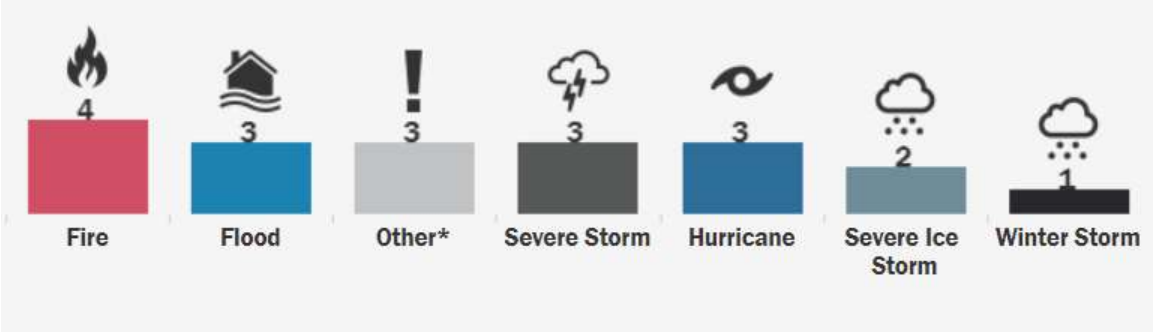
Disaster Number	Year	Title
828	1989	Severe Storm
3113	1993	Drought
1179	1997	Flood
1239	1998	Severe Storm
1257	1998	Flood
3142	1999	Fire
1425	2002	Flood
3216	2005	Hurricane
1606	2005	Hurricane
3261	2005	Hurricane
1624	2006	Fire
3284	2008	Fire
1999	2011	Fire
4223	2015	Severe Storm
3458	2020	Biological
4485	2020	Biological
3554	2021	Severe Ice Storm
4586	2021	Severe Ice Storm
4705	2023	Winter Storm

Source: www.FEMA.gov

Since the US Federal Government began issuing disaster declarations in 1953, Blanco County has had 19 disaster declarations where individual and/or public assistance has been approved. Based on Table 4-1 above, 13 of the 19 disaster declarations have been issued in the past 20 years (since 2002). The infographics below provide a summary of the type of hazard, year, and time of year in which it occurred.

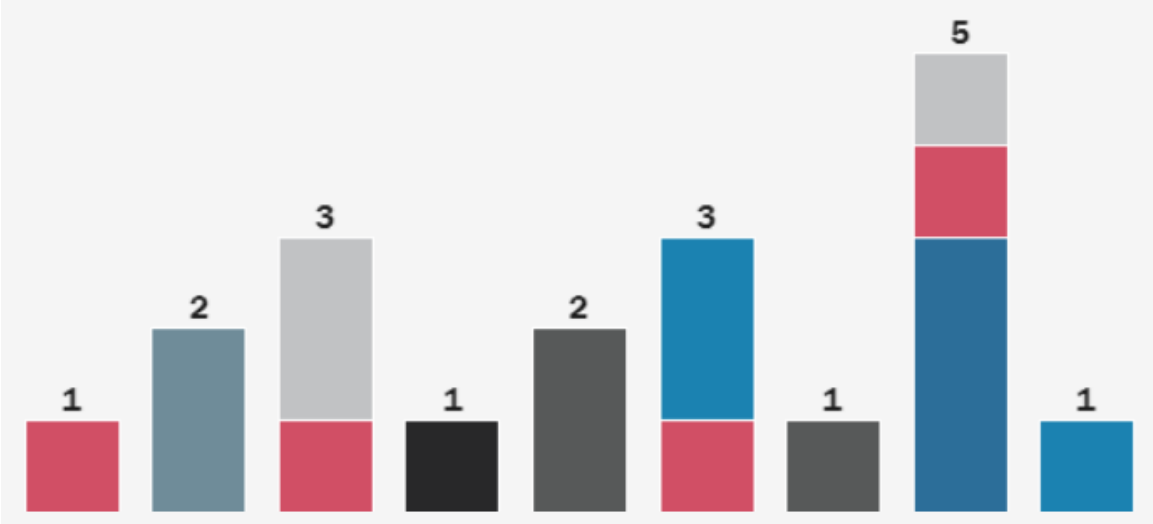
The types of hazards that have had disaster declarations for the Blanco County planning area since 1953 are shown in Figure 4-2 below.

Figure 4-2: Blanco County Disaster Declarations Since 1953 by Type



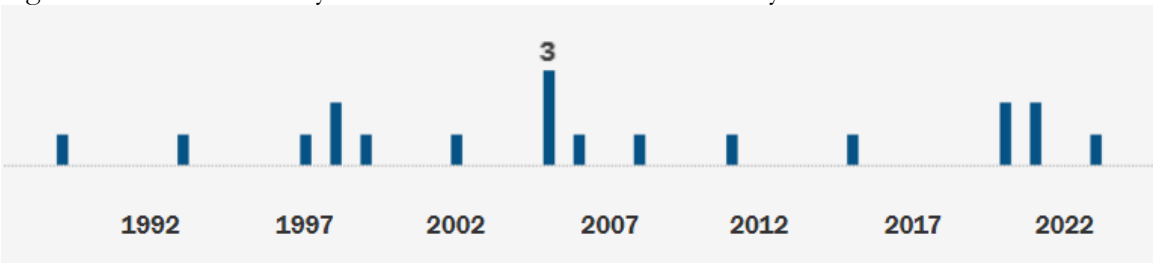
The months during which disasters have been declared in the planning area are shown in Figure 4-3 below.

Figure 4-3: Blanco County Disaster Declarations Since 1953 by Month of Occurrence



The years in which disasters have been declared in the planning area are shown in Figure 4-4 below. Table 4-1 on the previous page can be used as a reference.

Figure 4-4: Blanco County Disaster Declarations Since 1953 by Year of Occurrence



Hazard Descriptions

The following 12 hazards are included in the State of Texas Hazard Mitigation Plan and are determined to be a risk to the planning area. Severe Coastal Flooding and coastal erosion were left off of this list due to the distance of the planning area from the Texas coast and no history of impact.

HAZARD	DESCRIPTION
HYDROLOGIC	
Drought	A deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.
Floods	Flooding is a general or temporary condition of partial or complete inundation of water, usually floodplains. The floodplain is an area of land susceptible to being inundated by floodwater from any source.
ATMOSPHERIC	
Extreme Heat	Extreme Heat is a condition when temperatures hover above local excessive heat criteria combined with high humidity levels.

Hailstorm	Hail is showery precipitation in the form of irregular pellets or balls of ice more than 5 mm in diameter.
Hurricanes, Tropical Storms, and Depressions	A hurricane is a large rotating storm with high-speed winds that forms over warm waters in tropical areas. Hurricanes have sustained winds of at least 74 miles per hour and an area of low air pressure in the center called the eye. Hurricanes, tropical storms, and depressions are associated with heavy rainfall and inland flooding, storm surge, and high winds.
Lightning	These are sudden charges of electricity that develop from storms or excessive heat.
Severe Winter Storms	A condition when temperatures hover below freezing and can include ice, snow, and sleet.
Tornado	A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground.
Windstorms	Severe wind storms can occur alone, or when accompanied by severe thunderstorms. Flying debris can cause major damage to utilities, infrastructure, and property.
OTHER	
Earthquake	Any sudden shaking of the ground caused by the passage of seismic waves through Earth's rocks. Seismic waves are produced when some form of energy stored in Earth's crust is suddenly released, usually when masses of rock straining against one another suddenly fracture and "slip."
Wildfire	Wildfires are an unplanned, unwanted fire burning in a natural area, like a forest, grassland, or prairie. Buildings and human development that are susceptible for wildfires are considered the wildland urban interface.
TECHNOLOGICAL	
Dam Failure	Dam Failure can occur with little warning from intense storms, flash flooding, or engineering failures. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and severe property damage if development exists downstream.

Expansive soils and land subsidence were considered by the Core Planning Team but presented such a low risk based on the recorded history of impacts that future impacts are not expected, and therefore they are not necessary to include in the hazard assessment. Based on tabular data from the NID (National Inventory of Dams), 2 dams have a high hazard potential in the Blanco County planning area.

Natural Hazards and Climate Change

Climate change describes the rapid and relatively recent increase in global average temperatures that has helped drive a fivefold increase in the number of weather-related disasters in the last 50 years. Climate change means disasters are happening simultaneously, too.

With increasing global surface temperatures, the possibility of more droughts and increased intensity of storms will likely occur. As more water vapor is evaporated into the atmosphere it becomes fuel for more powerful storms to develop. More heat in the atmosphere and warmer ocean surface temperatures can lead to increased wind speeds in tropical storms.

Rising sea levels expose higher locations not usually subjected to the power of the sea and to the erosive forces of waves and currents.

Texas is considered one of the more vulnerable states in the U.S. to abrupt climate changes and to the impact of gradual climate changes to the natural and built environments. Megadroughts can trigger abrupt changes to regional ecosystems and the water cycle, drastically increase extreme summer temperature and fire risk, and reduce availability of water resources, as Texas experienced during 2011-2012. Adapting to climate change through efforts like flood control measures or drought-resistant crops partially reduces climate change risks, although some limits to adaptation have already been reached.

Overview of Hazard Analysis

The hazard risk analysis methodology involves reviewing historical data and conducting statistical analysis on the impact of hazards in the planning area. To gather this information, we retrieved records from the National Centers for Environmental Information (NCEI) and the National Oceanic and Atmospheric Administration (NOAA) that were reported for Blanco County. We also evaluated other local records whenever they were available. Additionally, we used geographic information system (GIS) mapping software to identify and assess the risks for Blanco County and other participating jurisdictions by evaluating community critical facilities and their vulnerability to hazards.

The Risk Assessment includes general parameters for each hazard, such as the location in the planning area, the expected extent or magnitude of the hazard, the frequency of its occurrence based on the number of historical events over the study period, the approximate annualized losses, a description of general vulnerability, and a statement of the hazard's impact. Frequency of return statements are defined in Table 4-3 below.

Table 4-3. Frequency of Return Statements

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

Impact statements with their associated potential severity are defined in Table 4-4 below.

Table 4-4. Impact Statements

Impact	Severity
High	High classifications and the event is likely/highly likely to occur with severe strength over a significant to extensive portion of the planning area.
Medium	Middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating.
Low	Two or more of the criteria fall in lower classifications or the event has minimal impacts on the planning area.

Table 4-5 summarizes deaths, injuries, property damage, crop damage, frequency of occurrence, and potential severity of all studied hazard events from 1997-2022 for the Blanco County Planning area.

Table 4-2: Blanco County Hazard Impact Summary (1997-2022)

Hazard	Deaths	Injuries	Property Damage	Crop Damage	Frequency	Potential Severity
Drought	0	0	$0	$0	Likely	Low
Floods	5	10	$21,627,000	$190,000	Highly Likely	High
Earthquake	0	0	$0	$0	Unlikely	Low
Extreme Heat	0	0	$0	$0	Highly Likely	Medium
Hailstorm	0	0	$0	$0	Likely	Low
Hurricanes, Tropical Storms, and Depressions	0	0	$0	$0	Unlikely	Low
Lightning	0	0	$0	$0	Highly Likely	Low
Severe Winter Storms	0	0	$5,000	$0	Likely	Medium
Tornado	0	2	$1,203,000	$0	Unlikely	Low
Windstorms	0	0	$400,000	$0	Likely	Low
Wildfire	0	0	$100,000	$0	Highly Likely	Medium
Dam Failure	0	0	$0	$0	Unlikely	Low/High

Source: NCEI Storm Events Database 1997 to 2022.

The 25-year hazard profile shows that floods have had an outsized impact on the planning area. Floods are the leading cause of property damage and crop damage and five deaths and 10 injuries, at a minimum, have been attributed to floods. The second highest number of damages and injuries can be attributed to Tornadoes. The total of all other hazard damages is 7.8% of the flood total. Based on the historical impact summary, flooding is the priority hazard from which to protect people and property in the Blanco County planning area. This is followed by tornadoes, windstorms, hail, severe winter storms, and wildfire. All other hazards included in this analysis present a lower mitigation priority based on the historical severity of impact.

SECTION 5: HURRICANE

Description

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

The information in this section covers historical damage within Blanco County associated with hurricanes, tropical storms, and depressions associated with severe winds. Tornadoes and flooding, other hazards associated with this hazard event, are addressed in Chapters 6 and 11, respectively. Severe winds pose a threat to lives, property, and vital utilities primarily due to the effects of flying debris or downed trees and power lines. Severe winds typically cause the greatest damage to structures of light construction, particularly manufactured homes.

Location

Hurricanes and tropical storms can occur throughout the planning area and are not confined to any geographic area; however, the likelihood of impact decreases the further a location is from the Texas coast. Blanco County is approximately 170 miles away from the Gulf of Mexico at its closest point. The table below lists hurricanes or tropical storm events with a storm track (center of the storm) that crossed the planning area, listed in order of the reported event date. Storm tracks are categorized according to the Saffir-Simpson wind intensity scale with the category assigned as the "peak magnitude" of the storm at some time during its lifespan and not necessarily when the storm track crossed the planning area.

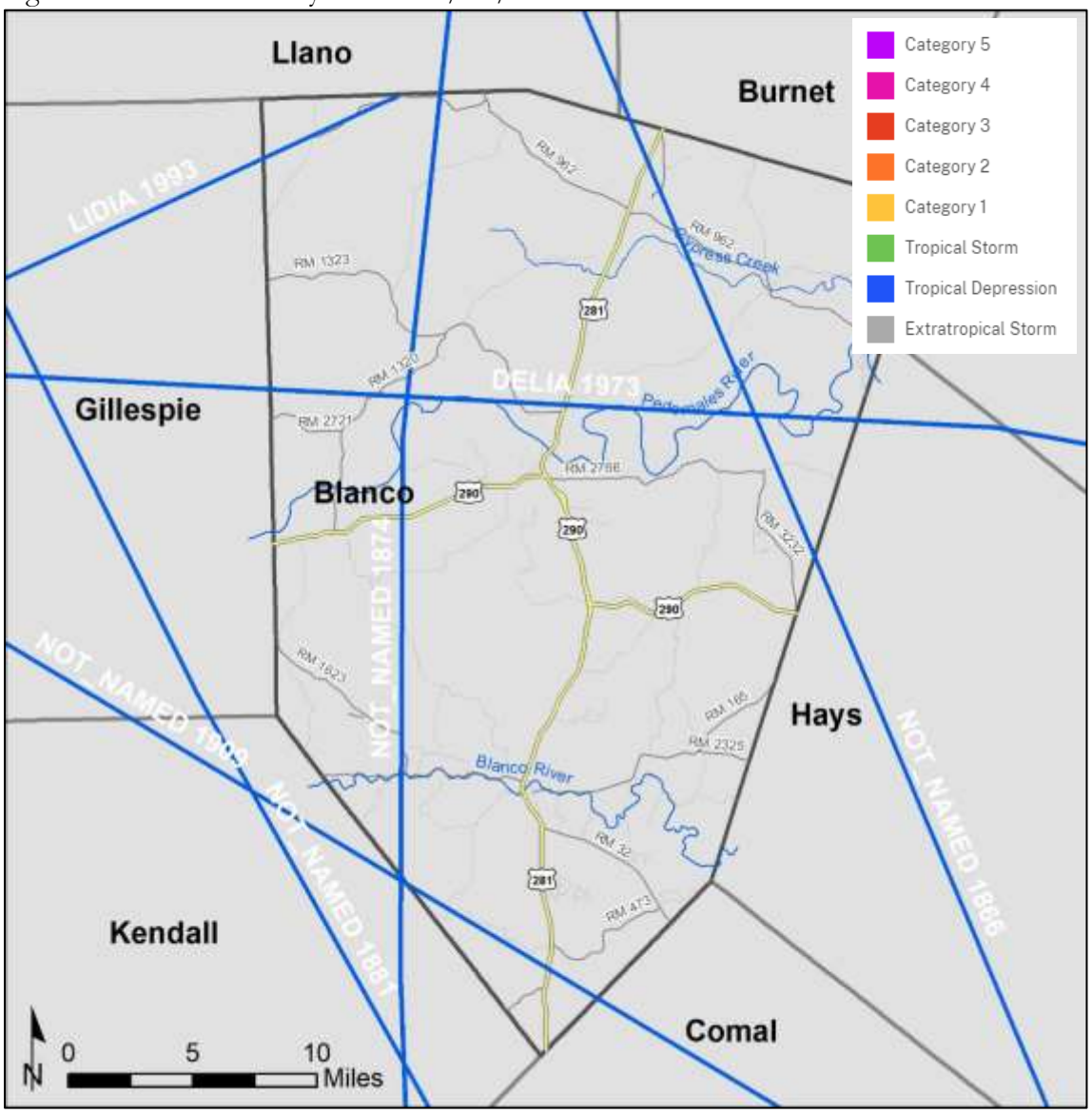
Table 5-1: Hurricane/TS/D Storm Track Events Table

Storm Name	Year	Dates	Category
Unnamed	1866	Jul 16	Tropical Storm (TS)
Unnamed	1874	Sep 6	Tropical Storm (TS)
Unnamed	1881	Jul 14	Tropical Storm (TS)
Unnamed	1909	Jul 22	Tropical Storm (TS)
Delia	1973	Sep 6	Tropical Storm (TS)
Lidia	1993	Sep 14	Tropical Storm (TS)

WWW.NOAA.ORG

The map below shows the historical tracks of hurricanes through the planning area from 1842 to 2022. The category assigned to each storm on the map is its magnitude at the time it crossed into Blanco County. Based on data provided by NOAA's National Climatic Data Center (NCDC) and the FEMA National Risk Index, Blanco County's hurricane risk is very low when compared to areas closer to the Gulf and Atlantic coasts of Texas and the United States.

Figure 5-1: Blanco County Hurricane/TS/D Storm Tracks



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

Extent

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

Table 5-2: Saffir Simpson Scale

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

According to the FEMA Wind Zones Map used to determine building standards, Blanco County is not located in a hurricane-prone region. Based on the location and the historical storm tracks for hurricanes and tropical storms in the Blanco County planning area, tropical storms are the key event to be mitigated.

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

Historical Occurrences

Hurricanes and Tropical Storms that had a direct path through the Blanco County planning area, as well as tracks that went through adjacent counties yet still impacted the Blanco County planning area, are identified in this section. Based on historical storm data provided by NOAA's National Climatic Data Center (NCDC), only six (6) tropical storm events have occurred in the planning area since 1842. Table 5-3 below lists the storms that have impacted the planning area. There have not been any events recorded past the listed dates.

Table 5-3: Historical Hurricane/TS/D Impact Events Table, 1997-2022

Events	Magnitude	Injuries	Fatalities	Property Damage	Crop Damage
6	Tropical Storm	0	0	$0	$0

Source: *NOAA NCEI Storm Events Database*

Significant Events

There have been no significant hurricane, tropical depression, or tropical storm events in the planning area since record keeping began in 1842.

Probability of Future Events

The probability of future events relies on measuring the number of previous occurrences of a hurricane or tropical storm event over the 180-year reporting period. Based on six occurrences of a hurricane or tropical storm in the planning area during this time, it is forecast that such a storm event will happen approximately once every 30 years. This frequency provides an unlikely probability that a hurricane or tropical storm will impact some portion of the planning area.

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

Vulnerability and Impact

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

Historic Hurricane Impacts

There have been no recorded property damage or crop damage impacts to the planning area.

The Blanco County planning area features mobile and manufactured home parks which are more vulnerable to hurricane winds than site-built structures. In addition, manufactured and temporary housing is located sporadically throughout rural portions of the planning area which are also vulnerable to the hurricane hazard, but more prone to being isolated from essential needs and emergency services in the event of a disaster. Based on 2021 American Community Survey (ACS) estimates, there are 4,749 housing units in Blanco County of which 16%, or 762 units, are mobile or manufactured homes. In addition, 1,456 (31%) of the housing units in the overall planning area were built before 1980. These structures are likely to have been built to less stringent standards than newer construction; therefore, they may be more susceptible to damage during significant events.

Table 8-3. Structures at Greater Risk by Jurisdiction

Jurisdiction	Total Housing Units	Mobile Homes	Housing units built prior to 1980
Blanco County*	4,749	762 (16%)	1,456 (31%)
City of Blanco	861	94 (11%)	462 (54%)
City of Johnson City	682	152(22%)	226 (33%)
Town of Round Mountain	55	8 (15%)	35 (64%)

*County totals include all jurisdictions, ISDs, ESDs, and BPWD in addition to unincorporated areas.
Source: 2021 American Community Survey 5-year estimate, selected housing characteristics

Based on the ACS 2021 data, the City of Blanco is at higher risk of damage from hurricanes when considering age of residential structures and the higher standard of building codes enacted after 1980. Johnson City is at a higher risk of damage from hurricanes when considering number and ratio of manufactured homes.

SECTION 6: FLOOD

Description

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

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

Location

The Digital Flood Insurance Rate Map (DFIRM) data provided by FEMA for Blanco County delineates the Special Flood Hazard Areas (SFHAs) as those at highest risk of flooding. Flood areas or zones from the most recent DFIRMs from FEMA for Blanco County, and all participating jurisdictions, are illustrated in Figures 6-1 to 6-3.

Figure 6-1: Blanco County Floodplain Map

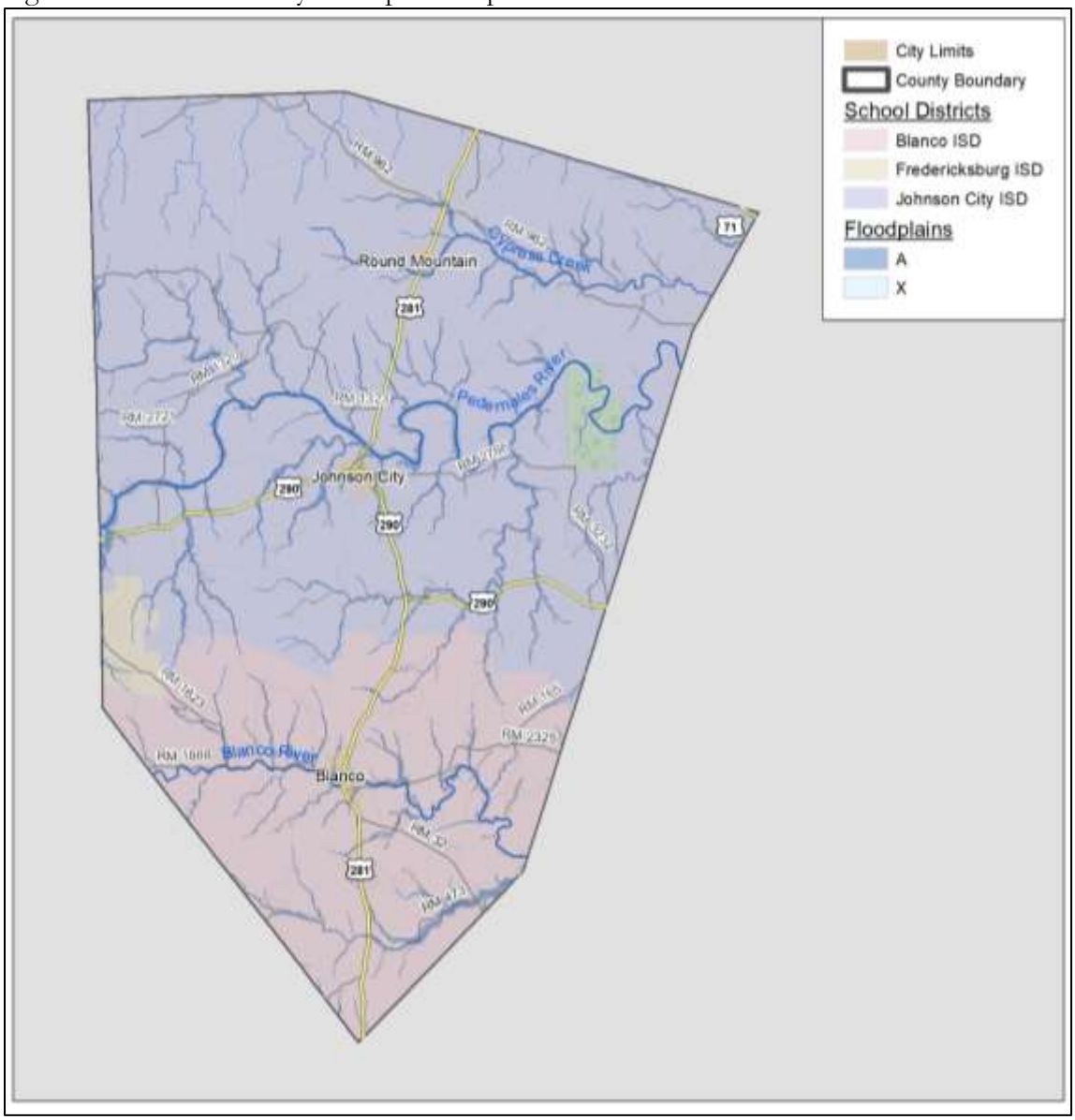


Figure 6-2: City of Johnson City Floodplain Map

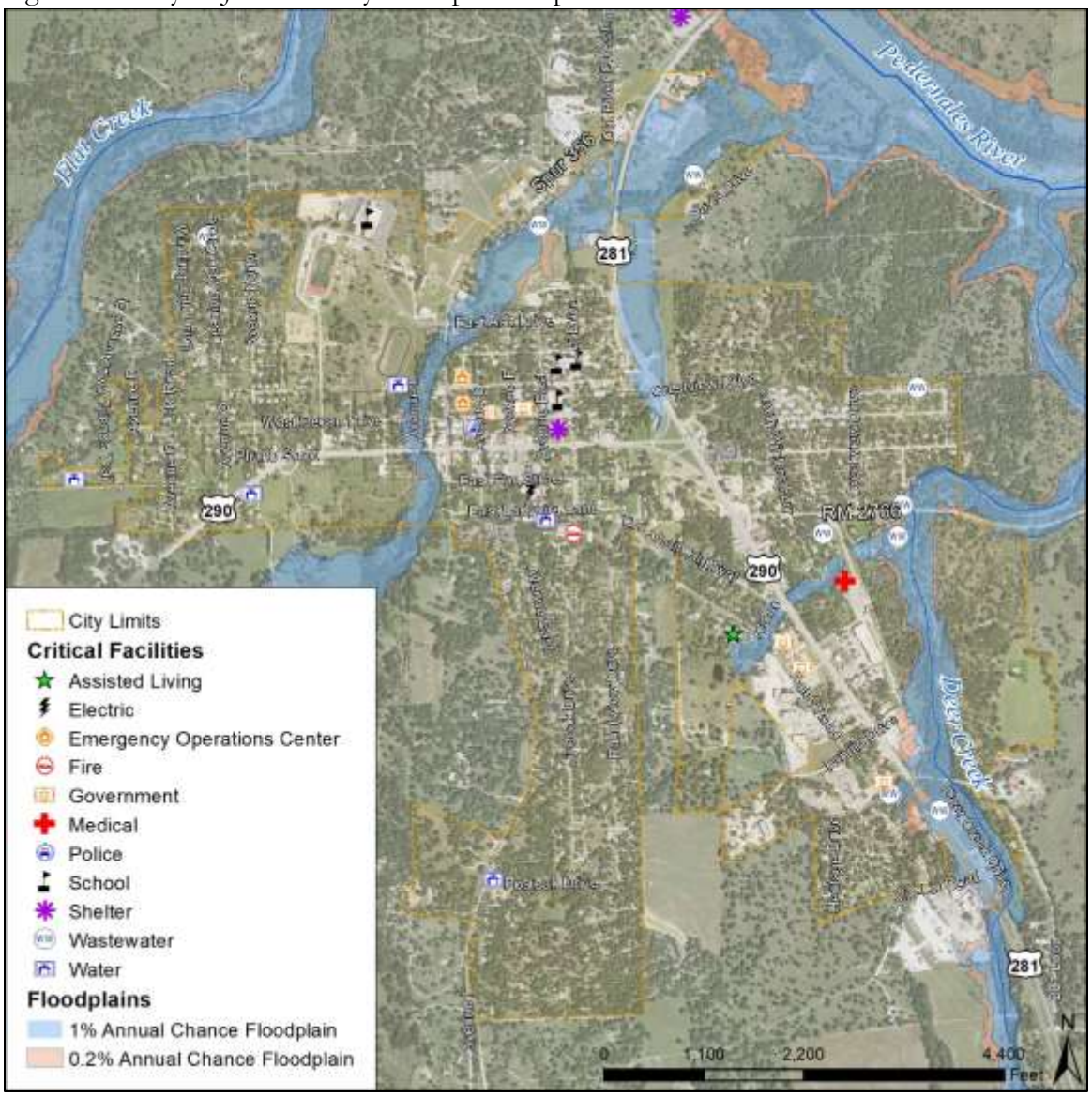
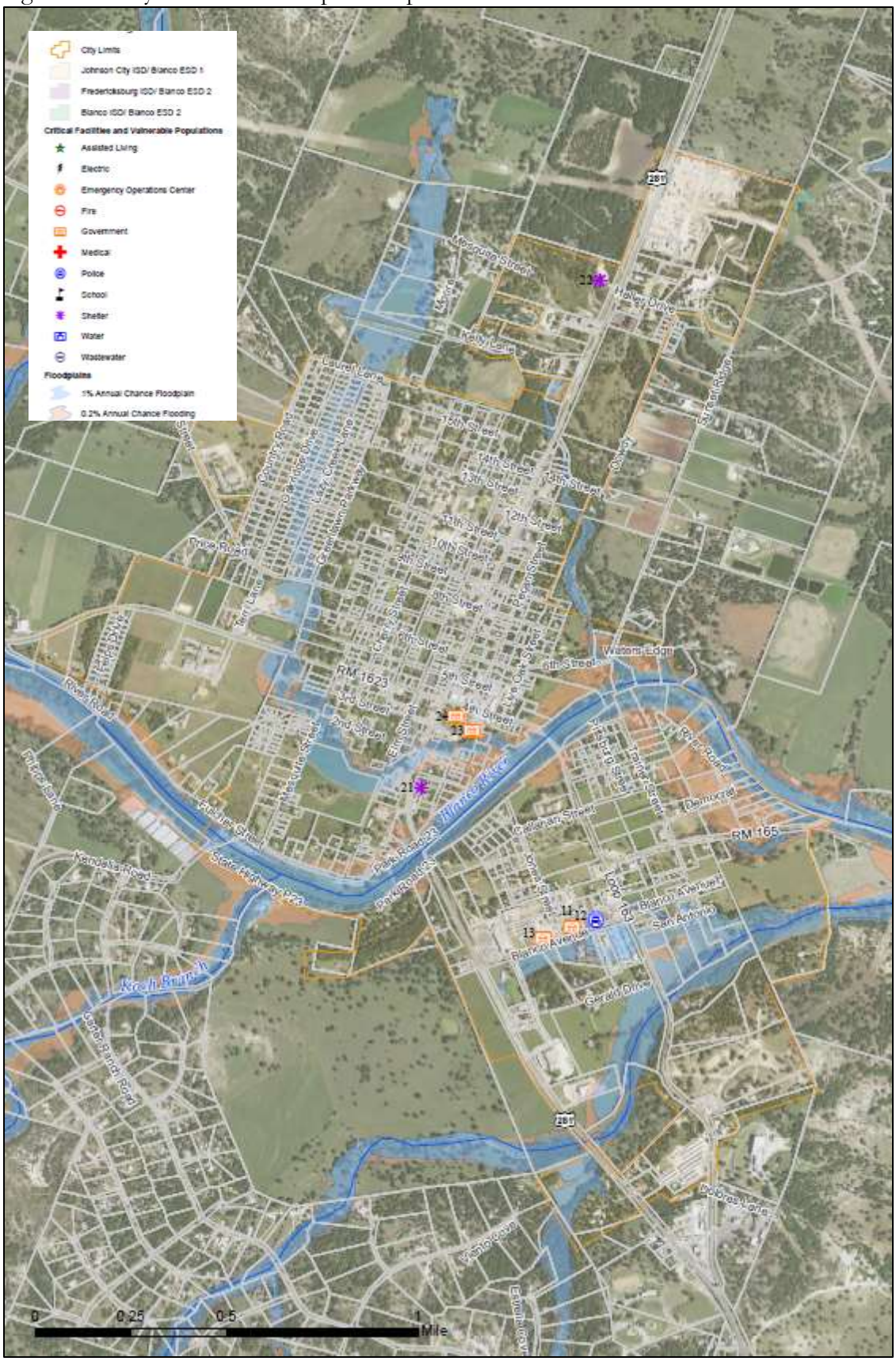


Figure 6-3: City of Blanco Floodplain Map



Extent

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

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

Table 6-1: FEMA Flood Zone Categories

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

Historical Occurrence

Historical evidence indicates that areas within the planning area are susceptible to flooding, especially in the form of flash flooding. It is important to note that only reported flood events have been factored into this risk assessment, therefore it is likely that additional flood occurrences have gone unreported before and during the recording period. Table 6-2 identifies historical flood events that resulted in damages, injuries, or fatalities within the planning area. Historical Data is provided by the Storm Prediction Center (NOAA), NCEI database for Blanco County. There have not been any events recorded past the listed dates.

Table 6-2: Historical Flood Events, 1997-2022

Location	Date	Time	Deaths	Injuries	Property Damage	Crop Damage
Countywide	4/4/97	7:00 AM	0	0	$8,000	$0
Countywide	4/25/97	10:30 AM	0	0	$3,000	$0
Countywide	5/19/97	9:15 PM	0	0	$10,000	$0
Countywide	5/27/97	7:30 PM	0	0	$10,000	$0
Countywide	6/6/97	2:30 PM	0	0	$5,000	$0
Countywide	6/8/97	10:30 PM	0	0	$100,000	$20,000
Countywide	6/9/97	7:30 AM	0	0	$3,000	$0
Countywide	6/21/97	10:30 AM	0	0	$10,000	$0
Countywide	6/22/97	1:30 AM	0	0	$1,000,000	$100,000
Countywide	3/16/98	1:30 AM	0	0	$15,000	$0
Countywide	7/4/98	12:30 AM	0	0	$10,000	$0
West Portion	7/4/98	2:00 PM	0	0	$3,000	$0
Countywide	10/17/98	7:00 AM	0	0	$50,000	$50,000
South Portion	11/2/00	7:00 PM	0	0	$10,000	$0
North Portion	11/3/00	12:00 PM	0	0	$5,000	$0
South Portion	8/31/01	7:30 PM	0	0	$20,000	$20,000
Countywide	9/5/01	5:00 PM	0	0	$20,000	$0
Countywide	11/15/01	7:30 AM	1	10	$100,000	$0
Countywide	6/30/02	6:00 AM	0	0	$30,000	$0
Countywide	2/20/03	8:00 AM	0	0	$5,000	$0
Countywide	2/21/03	5:00 AM	0	0	$5,000	$0
South Portion	6/13/03	6:30 PM	0	0	$5,000	$0
Johnson City	5/2/07	10:00 PM	1	0	$0	$0
Cypress Mill	6/27/07	2:00 AM	0	0	$100,000	$0

Twin Sisters	8/16/07	5:30 PM	0	0	$100,000	$0
Blanco	5/23/15	5:17 PM	1	0	$20,000,000	$0
Twin Sisters	5/24/15	5:17 PM	1	0	$0	$0
Blanco	5/3/19	6:07 PM	1	0	$0	$0

*Only recorded events with fatalities, injuries, and/or damages are listed, 77 total events from 1997-2022.
*Values are in 2022 dollars.

Significant Events

May 23, 2015

Thunderstorms produced heavy rain and isolated severe weather which led to a historic flash flood on the Blanco River late Saturday night and into Sunday. Hundreds of homes were destroyed along the river from the City of Blanco down into Wimberley and San Marcos. The flood crest continued downstream for days affecting residents and homes along the San Marcos and Guadalupe Rivers and several people lost their lives due to flash flooding. A large tornado outbreak occurred on Saturday night producing numerous small brief tornadoes.

Locally, thunderstorms produced heavy rain that caused closings on FM 1623 along the Blanco River. A 42-year-old man died in his vehicle along the Blanco River near downtown Blanco. Flooding along the Blanco River in the town of Blanco was substantial. Water came up to the bottom of the Highway 281 bridge in Blanco. Water overtopped the Loop 163 bridge east of Blanco. The Blanco River overtopped County Road 165 and destroyed that bridge. Portions of the Blanco State Park were heavily damaged with cabins flooded. A total of 22 homes were either destroyed or heavily damaged.

June 22, 1997

The heavy rain Friday night into Saturday afternoon had left South Central Texas soils saturated. The situation worsened Saturday evening into Sunday as heavy rain associated with the upper low-pressure system redeveloped over the western Texas Hill Country. Very heavy rains over the Texas Hill Country Saturday night and Sunday morning caused widespread flooding as well as flash flooding across numerous counties. The heavy rains moved into San Antonio Sunday morning and into the Austin area later in the morning. By Sunday afternoon and evening, areas of showers and thunderstorms had diminished over South Central Texas as the upper low moved into North Texas. Late Sunday evening, they again developed over the Texas Hill Country, producing additional severe flooding and flash flooding late Sunday night into Monday morning.

A brief burst of between 6 and 12 inches of rain in the Pedernales River headwaters early Sunday morning above Harper sent near record flooding downstream. The Pedernales River at Fredericksburg crested early Sunday morning, with the flood damage not serious until the wave reached LBJ National Park, near Stonewall. A 22-foot rise was reported downstream at the higher bridge. Inside the park, several concrete and steel signs were damaged, and there was also significant damage to roads. At Johnson City, the crest was well below the 1952 flood of record and there was no significant damage in this area.

Probability of Future Events

FEMA states that flooding is the most common natural disaster in the United States, affecting every region and every state. Based on recorded historical occurrences and extent within the Blanco planning area, 77 recorded flooding events in the 25-year reporting period provides a

probability of occurrence of at least 1 event per year. This frequency supports a highly likely probability of future events, meaning that an event is probable in the next year.

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

Vulnerability and Impact

The flood hazard areas throughout Blanco County are subject to periodic inundation, which may result in loss of life and property, reduction in health and safety hazards, disruption of commerce and governmental services, and extraordinary public expenditures for flood protection and relief, all of which adversely affect public safety. Riverine Flooding has killed and injured more people than any other weather-related hazard and the greatest number of deaths is due to people driving into water going over roads. For this study, the location and proximity to the floodplain or SFHA determines a property's vulnerability to a flood. Structures that lie along banks of a waterway are the most vulnerable and are often repetitive loss structures. Future development is encouraged to be outside of the floodplain, although there are some critical facilities, homes, and businesses already located in the floodplain due to their development before current floodplain regulations.

Table 6-3: Critical Facilities in the 1% or 0.2% Annual Chance Floodplain by Jurisdiction

Jurisdiction	Critical Facilities
Blanco County	1 Pedernales River Dam
City of Blanco	1 County Maintenance Facility, 1 Police Department,
City of Johnson City	1 EMS, 1 Nursing Home, 3 Lift Stations, 1 Wastewater Treatment Plant
Town of Round Mountain	None
Blanco City ISD	None
Johnson City ISD	None
North Blanco Co ESD 1	Located in Fire/EMS facility
South Blanco Co ESD 2	Located in Fire/EMS Facility
Blanco Pedernales Water District	Pipeline Infrastructure

Flood losses are exacerbated by the cumulative effect of obstructions in floodplains. Occupancy of flood hazard areas is especially hazardous when development is inadequately elevated, flood-proofed, or otherwise protected from flood damage. Moreover, increased development in floodplain can increase flood heights and velocities making flooding more intense and widespread then predicted. Mitigation actions are included to address flood maintenance issues as well (Section 15), such as routinely clearing debris from roadside ditches and bridges. Expanding drainage culverts and storm water structures to more adequately convey flood waters is critical to flood mitigation as well. Table 6-4 below shows Blanco County dollar losses from January 1997 through December 2022.

Table 6-3: Blanco County Impact from Flooding

Time Period	Deaths	Injuries	Property Damage	Crop Damage
Loss Summary, Blanco County				
24-year Total	5	10	$21,627,000	$190,000
Per Year	0	0	$50,648	$32,069
Per Capita Dollar Losses (2020 Pop.)				
24-year Total	0	0	$24	$15
Per Year	0	0	$1	$1

Source: NCEI Storm Events Database 1997 to 2022 subset for Texas

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

Table 6-4: Flood Losses by Jurisdiction 1997-2022

Jurisdiction	Est. Prop. Losses	Est. Crop Losses	Total Est. Losses
Blanco County	$15,143,083	$133,037	$15,276,120
City of Blanco	$3,198,225	$28,097	$3,226,323
City of Johnson City	$3,093,646	$27,179	$3,120,825
Town of Round Mountain	$192,046	$1,687	$193,733
Blanco ISD	$0	$0	$0
Johnson City ISD	$0	$0	$0
Round Mountain ISD	$0	$0	$0
North Blanco County ESD 1	$0	$0	$0
South Blanco County ESD 2	$0	$0	$0
Blanco Pedernales Water	$0	$0	$0
Total Losses	$21,627,000	$190,000	$21,817,000

*Blanco Pedernales Water losses are included in County Totals

National Flood Insurance Program (NFIP) Participation

In addition to all eligible participating jurisdictions, Blanco County is part of the National Flood Insurance Program (NFIP). Blanco ISD, Johnson City ISD, and Round Mountain ISD, Blanco County ESDs 1 and 2, and Blanco Pedernales Water District do not participate in the NFIP since they are not eligible to do so. The NFIP protects businesses and homeowners from devastating losses in the event of a flood hazard. As an additional indicator of floodplain management responsibility, communities may choose to participate in FEMA's Community Rating System (CRS). This is an incentive-based program that allows communities to undertake flood mitigation activities that go beyond NFIP requirements. Currently, none of the communities in Blanco County participate in CRS. It is the purpose of all NFIP jurisdictions participating in the Hazard Mitigation plan to continue to promote the public health, safety, and general welfare by minimizing public and private losses due to flood conditions in specific areas. These communities are guided by their local Floodplain Management Ordinance and will continue to comply with NFIP requirements through their local permitting, inspection, and record-keeping requirements for new and substantially developed construction. The NFIP participating jurisdictions each have a floodplain manager;

the city manager serves this role for the cities, and the emergency management coordinator serves this role for the counties.

Table 6-5: Repetitive Loss and Severe Repetitive Loss Properties

Jurisdiction	Number of Structures	Number of Losses
Blanco County	1	2
City of Blanco	0	0
City of Johnson City	0	0
Blanco ISD*	0	0
Johnson City ISD*	0	0
Blanco Pedernales Water*	0	0
Total	1	2

*These are not NFIP eligible plan participants

There is one repetitive loss structure and zero severe repetitive loss properties as defined by the NFIP within the Blanco County planning area.

SECTION 7: DROUGHT

Description

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

Location

Droughts vary greatly in their intensity and duration and can occur regularly throughout Blanco County, including all participating jurisdictions, equally. Drought is monitored nationwide by the National Drought Mitigation Center (NDMC) which provides the Drought Monitor map in Figure 7.1 showing the entirety of the planning area currently experiencing extreme drought (D3) conditions or exceptional drought (D4). The planning area has experienced exceptional drought conditions within the last fifteen years, particularly during the drought of summer 2011 where the entire state of Texas was in some level of drought (Figure 7.2).

Figure 7.1: US Drought Monitor, January 17, 2023

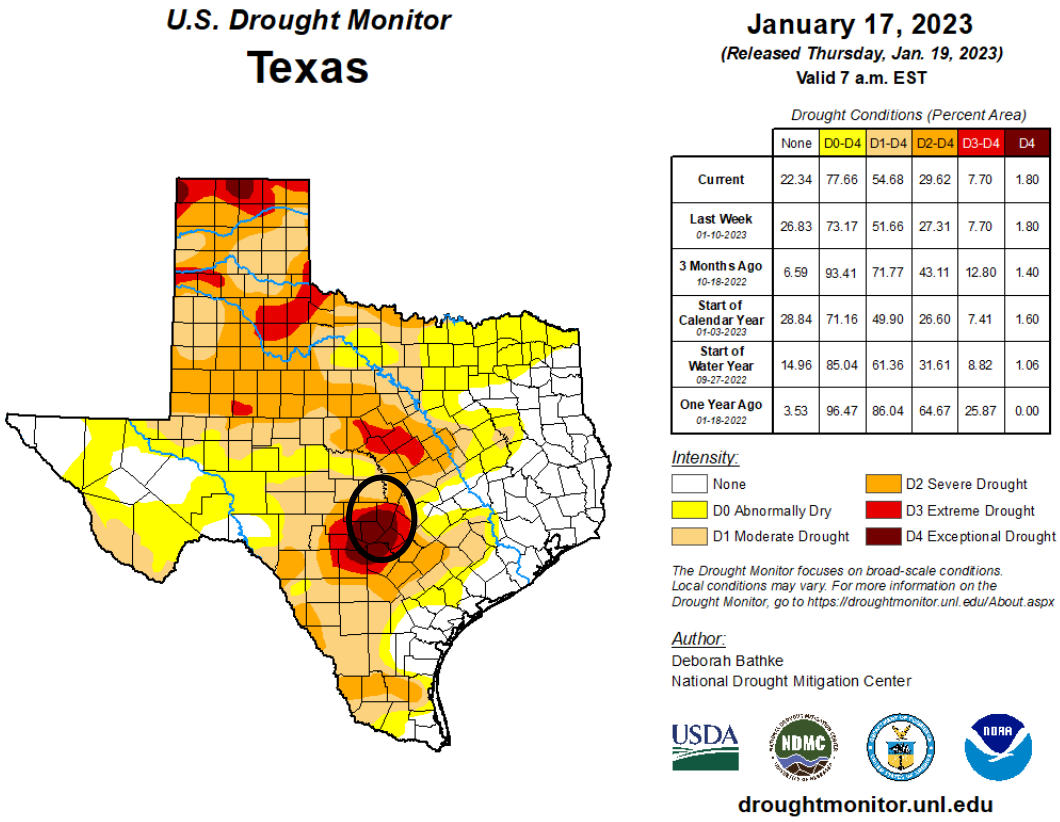
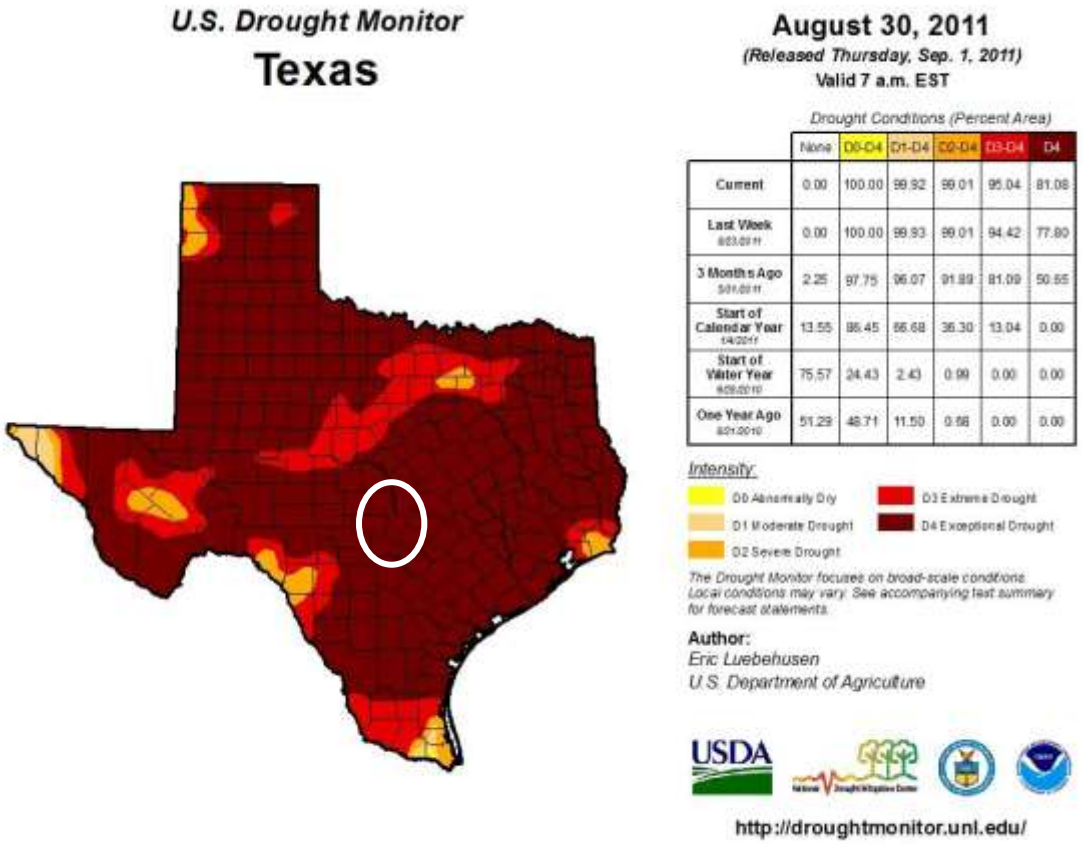


Figure 7.2: US Drought Monitor, August 30, 2011



Extent

The Palmer Drought Severity Index (PDSI) is based on precipitation and temperature and is used to measure the extent of drought. The index measures the moisture supply of the environment. The PDSI classifications vary roughly between -4.0 and +4.0 ranging from extremely dry to extremely wet periods. NOAA's United States Drought Monitor (USDM) Categories range from D0 to D4 according to the intensity of drought and are based on a number of indicators, including the PDSI, and used to describe broad scale drought conditions across the United State. Table 7.1 describes the basic PDSI classification descriptions and Table 7.1 depicts the magnitude of drought with descriptions of possible impacts.

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

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

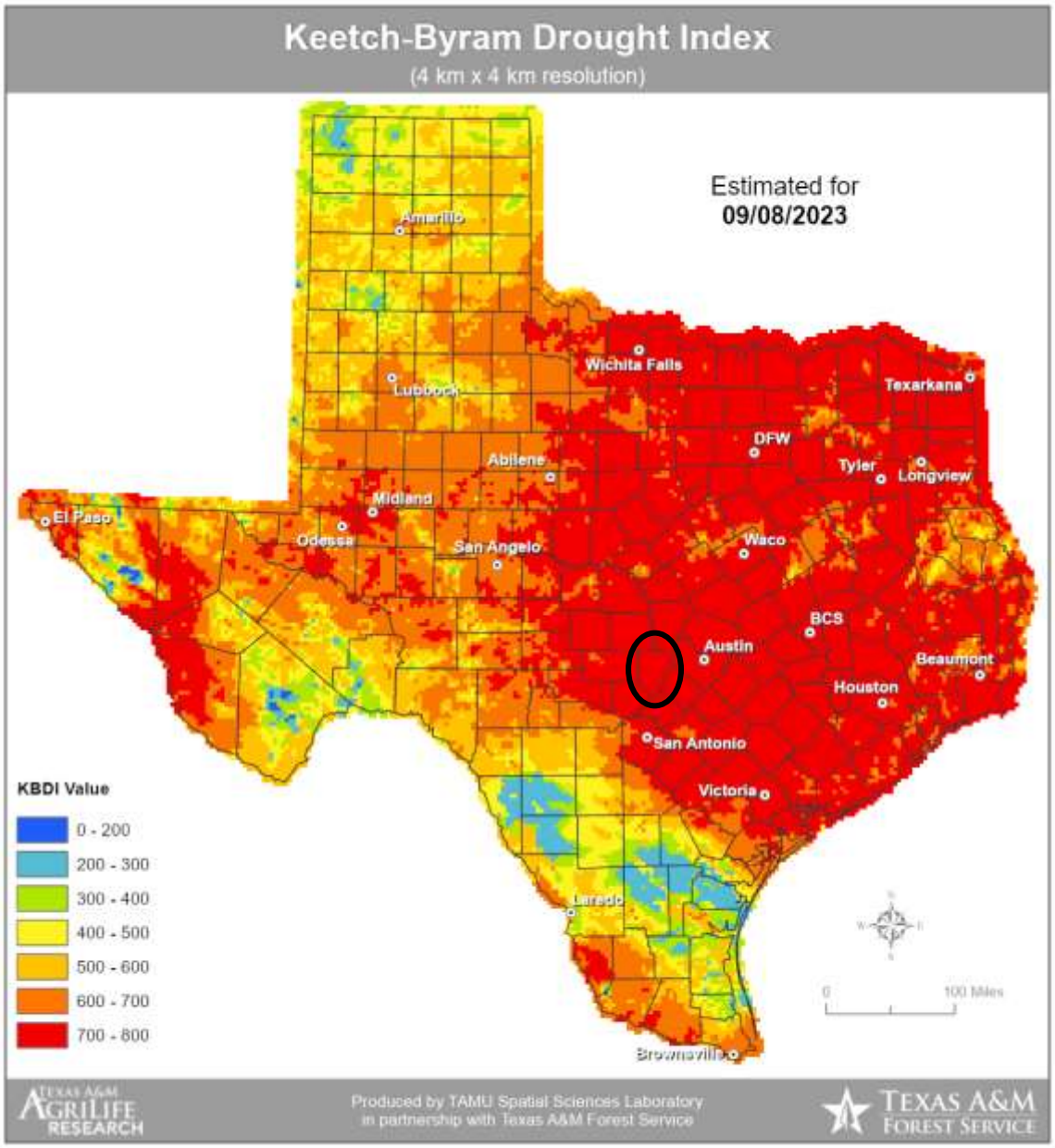
Table 7-1: Drought Severity Classification

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

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

The Keetch-Byram Drought Index is used by the Texas Forest Service to determine the fire potential based on daily water balance, precipitation, and soil moisture. Figure 7-3 shows the Keetch-Byram Drought Index rating classification for all of Texas and color coded by County with a scale of 0 to 800 (low risk to high risk). Blanco County is in the 700-800 risk category at the time this report was written. The Keetch-Byram Drought Index is also discussed in relation to wildfires in section 13.

Figure 7-3: Keetch-Byram Drought Index



Historical Occurrences

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

Significant Events

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

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

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

May 2011 – March 2012, Statewide
The drought of 2011 in South Central Texas was the most severe one-year drought ever for Texas. Agricultural losses in the state due to the 2011 drought reached a record $7.62 billion, making it the costliest drought in history, according to totals by Texas AgriLife Extension Service economists. "2011 was the driest year on record and certainly an infamous year of distinction for the state's farmers and ranchers," said Dr. David Anderson, AgriLife Extension livestock economist. "The $7.62 billion mark for 2011 is more than $3.5 billion higher than the 2006 drought loss estimates, which previously was the costliest drought on record."[9] Drought conditions began in May and were exacerbated by a La Niña event causing below normal rainfall. Conditions began to improve in the spring of 2012 when the La Niña event weakened and most of South-Central Texas saw above normal rainfall.

The data used to assess the historical experience with drought for the planning area came from the NOAA's NCEI National Storms Database. This database contains extensive and authoritative information for weather related event in the country from 1997 thru 2022 (a 24-year period). Agricultural producers such as farmers and ranchers purchase crop insurance to protect their yield in the event of a natural disaster such as drought, hail, or flood. Historical crop damages are typically not found in the public record and likely much higher than quantified by NCEI data due to agricultural losses being a transaction between the agricultural land owner and insurance policy holder. Furthermore, the extent of crop loss due to drought is difficult to quantify because a drought during a growing season can impact the next two years of crop production. Table 7-2 lists historical events that have occurred in Blanco County as reported in the NCEI. There have not been any events recorded past the listed dates.

Table 7-2: Historical Occurrences of Drought in Blanco County

Date Range	Direct Injuries	Direct Fatalities	Property Damage	Crop Damage
June - September, 2000	0	0	0	0
May, 2011 - April, 2012	0	0	0	0
June, 2012	0	0	0	0

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

December, 2012	0	0	0	0
February - April, 2013	0	0	0	0
June – August, 2013	0	0	0	0
April - May, 2014	0	0	0	0
July - November, 2014	0	0	0	0
August - October, 2015	0	0	0	0
July - September, 2018	0	0	0	0
October, 2019 - February, 2020	0	0	0	0
November, 2020 - January, 2021	0	0	0	0
January, 2022 - Present	0	0	0	0

Data provided the by NOAA drought monitor also provides a perspective of historical occurrences of drought in the planning area by summarizing the percent of area in each drought category by county on a weekly basis. The table below provides a summary of the number of weeks in each drought category or the magnitude of the drought that describes the drought condition for the majority of the county for each weekly period from 1/4/2000 to 1/17/2023. This nearly 28-year window of drought data provides a clear picture as to how often the occurrence of different drought categories can be expected in the future.

Table 7-3: Historical Drought Magnitude

Drought Category	Description	Blanco County	
None	Normal to Wet Conditions	483	10%
D0	Abnormally Dry	123	19%
D1	Moderate Drought	226	13%
D2	Severe Drought	159	11%
D3	Extreme Drought	129	7%
D4	Exceptional Drought	82	40%
	Total	1,202	100%

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

Probability of Future Events

Based on available records of historic events from NCEI, there have been thirteen (13) time periods of drought within a 24-year reporting period. This provides a probability of occurrence of one event every one to two years. Based on the drought monitor data for a 24-year reporting period, the planning area is in severe to exceptional drought approximately 58% of the time. This frequency supports a **likely** probability of future events occurring within the Blanco County planning area which means that an event is probable in the next 3 years.

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

Vulnerability and Impact

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

The entire population of Blanco County is vulnerable to water supply shortages which present widespread health risks since people can only survive a few days without water. Potable water is used for many essential functions such as drinking, bathing, heating and cooling systems, and some electricity production. This affects vulnerable populations more acutely such as children, older adults, and people with illnesses or fragile health conditions. Also, vulnerable populations that do not have adequate air conditioning units in their homes are more at risk for injury or fatalities.

The planning area has a total population of 11,313 according to the 2021 ACS population estimate. Those over the age of 65 represent 24.9% (2,809) of the total population and children under the age of 5 represent 3.7% (414) of the total population. The total population of the county that is estimated to be below the poverty level is 10.4% (1,182). Table 7-4 presents the 2021 American Community Survey population and age cohort estimates below.

Table 7-4: Populations at Greater Risk by Jurisdiction

Jurisdiction	Population 65 and Older	Population Under 5	Population Below Poverty Level
Blanco County	2,809	414	1,182
City of Blanco	345	97	226
City of Johnson City	253	109	345
Town of Round Mountain	30	0	0
Blanco ISD		37	
Johnson City ISD		26	
Blanco Pedernales			

Source: 2021 American Community Survey (Note: County totals include both incorporated and unincorporated areas)
*Blanco Pedernales Water population counts for the planning area are included in the County total.

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

Water is central to the ability of people to inhabit and transact commerce in a region and the economic impacts of drought can be significant, especially during prolonged drought. The ability to produce goods and provide services is dependent on direct and indirect access to clean water. Due to the interconnected nature of supply and production chains, the negative effects of droughts can have ripple effects on many industries and sectors of the economy. The overall impact of damages caused by periods of drought is dependent on its extent and

duration. It is rare that drought alone leads to a direct risk to the health and safety of people in the Blanco County planning area, however severe water shortages could lead to a direct risk to the health and safety of the population. The severity of the impact of a drought event can be mitigated by preparedness and planning by the community comprised of government, businesses, and citizens.

The National Drought Mitigation Center (NDMC) at the University of Nebraska-Lincoln developed the drought impact reporter to provide a national database of drought impacts by county. The number of impacts in ten distinct impact categories from 1997-2022 are provided below. Table 7-5 lists the drought impacts in Blanco County based on reports received by the Drought Impact Reporter. These reports are predominantly provided by the media, but can also come from NWS, other agencies, CoCoRaHS, legacy reports, and user reports.

Table 7-5: Drought Impacts, 1997-2022

Blanco County	
Agriculture	305
Business & Industry	2
Energy	3
Fire	174
General Awareness	79
Plants & Wildlife	243
Relief, Response & Restrictions	222
Society & Public Health	17
Tourism & Recreation	9
Water Supply & Quality	263
County Impact Reports	450

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

Based on 25 years of data from the NCEI, the direct impacts of droughts in the Blanco County planning area have resulted in no known property or crop losses and no known injuries and fatalities. The impact to the planning area from drought has been limited and negligible based on data reported to the NCEI from 1997-2022. Drought impact reports like those presented above, however, come from a number of different sources and provide a different perspective of the impact that drought can have on communities beyond direct monetary property or crop damages that typically aren't reported publicly. It is important to consider that crop damage information is rarely publicly reported and water availability issues are not easily quantified so the impact is likely much more pronounced than the direct losses attributed to this hazard.

Historic Drought Impacts

No injuries, fatalities, property or crop damages were reported in the 24-year period of analysis. Based on historical records, annual loss impacts and estimates are considered to be negligible.

Drought Impacts Forecast

No injuries, fatalities, property or crop damages were reported in the 24-year period of analysis. Based on historical records, forecast impact estimates are considered to be negligible.

SECTION 8: WINDSTORMS

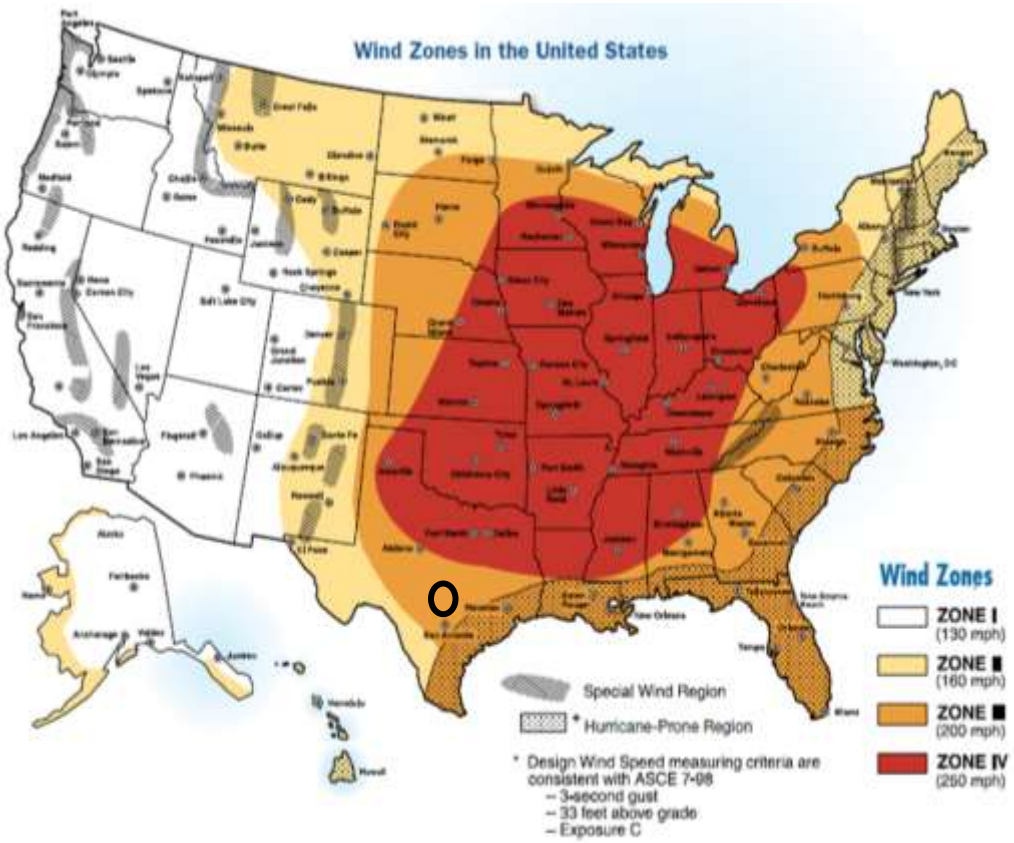
Description

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

Location

Thunderstorms are unpredictable and can occur anywhere in the planning area. Blanco County, along with all participating jurisdictions, is equally at risk of thunderstorm winds. According to FEMA's Wind Zones map of the United States (Figure 8-1), the planning area falls under Wind Zone II, which is associated with winds that can reach up to 160 mph. This area is also situated near the coast, making it vulnerable to hurricanes.

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



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

Extent

The extent or magnitude of a specific thunderstorm wind event is measured by the Beaufort Wind Scale, developed in 1805. Table 8-1 describes the Beaufort Wind Scale, with different intensities of wind events in terms of speed and effect, from calm to violent and destructive. Based on historical occurrences, the planning area is expected to experience a windstorm with a maximum magnitude of 78 Knots.

Table 8-1: Beaufort Wind Scale

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

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

Historical Occurrences

Historical occurrences of thunderstorm wind events with resulting damages that have impacted the Blanco County planning area are shown below in Table 8-2. Only high wind

events associated with thunderstorm wind are considered in this section. Wind damage associated with other hazards, such as tornados or hurricanes, are accounted for in other sections. From 1997-2023, there have been 48 thunderstorm wind events recorded in the NCEI storm events database that have impacted the Blanco County planning area. The NCEI, organized under the National Oceanic and Atmospheric Administration, is the largest archive available for climate data, however, it is important to note that only incidents and damages reported to the NCEI have been factored into this risk assessment. Some occurrences seem to appear multiple times which is due to reports from various locations throughout the planning area. There have not been any events recorded past the listed dates.

Table 8-2: Historical Thunderstorm-Wind Events, 1997-2027

Jurisdiction	Year	Month	Magnitude	Injuries	Fatalities	Property Damage	Crop Damage
Countywide	1997	May		0	0	$5,000	
Round Mountain	1998	February		0	0	$50,000	
Countywide	1998	April		0	0	$30,000	
Blanco	1999	March		0	0	$30,000	
Twin Sisters	2000	March		0	0	$20,000	
Johnson City	2003	July	60	0	0	$50,000	
Johnson City	2005	July	60	0	0		
Blanco	2007	June	70	0	0	$200,000	
Shovel Mtn Comm	2014	June	57	0	0		
Blanco	2015	May	50	0	0		
Blanco	2016	March	52	0	0		
Round Mtn	2016	April	52	0	0		
Blanco	2016	April	52	0	0		
Blanco	2017	January	52	0	0		
Twin Sisters	2017	April	65	0	0	$5,000	
Johnson City	2017	July	61	0	0		
Blanco	2018	May	78	0	0	$10,000	
Blanco	2018	May	52	0	0		

Source: NCEI Storm Events Database

Significant Events

June 3, 2007 – Blanco County

Thunderstorms developed over the northwest Hill Country on the evening of June 3, and moved southeastward across the north and central sections of South-Central Texas through the late evening. Winds from these severe thunderstorms blew trees down and damaged power lines between Blanco and Johnson City. Power was out to both cities for several hours. The storms also caused damage to roofs in Johnson City, with considerable damage to the roof of the Blanco County Jail.

May 15, 2018 – Blanco County

Thunderstorms developed along a prefrontal trough in North Central Texas and moved southward into South Central Texas. Some of these storms produced large hail and damaging wind gusts. One of these thunderstorms produced wind gusts estimated at 90 mph that tore part of the roof off a house north of the City of Blanco.

Probability of Future Events

Windstorms are most likely to strike during the spring in the months of March, April, and May. There is also a brief period in September when the likelihood of windstorm hazards increases. The Blanco County planning area has experienced, on average, approximately 1 thunderstorm wind events every one to two years. Wind events categorized as Forces 10-12 on the Beaufort scale with hurricane force winds have routinely impacted the area and is the level of windstorm hazard the area should mitigate for in the future. The probability of future events is **likely**, meaning that an event is probable within the next three years for the planning area.

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

Vulnerability and Impact

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

The Blanco County planning area features mobile and manufactured home parks which are more vulnerable to thunderstorm winds than site-built structures. These types of homes are also located in rural areas throughout the county, which could result in limited access to essential services and emergency aid in the event of a disaster. Based on 2021 American Community Survey estimates, there are 4,749 housing units in Blanco County of which 16%, or 762 units, are mobile or manufactured homes. In addition, 1,456 (31%) of the housing units in the overall planning area were built before 1980. These structures are likely to have been built to less stringent construction standards than newer construction and could be more susceptible to damages during significant events.

Table 8-3. Structures at Greater Risk by Jurisdiction

Jurisdiction	Total Housing Units	Mobile Homes	Housing units built prior to 1980
Blanco County*	4,749	762 (16%)	1,456 (31%)
City of Blanco	861	94 (11%)	462 (54%)
City of Johnson City	682	152(22%)	226 (33%)
Town of Round Mountain	55	8 (15%)	35 (64%)

*County totals include all jurisdictions, ISDs, ESDs, and BPWD in addition to unincorporated areas.

Source: 2021 American Community Survey 5-year estimate, selected housing characteristics

Based on the ACS 2021 data, the City of Blanco is at higher risk of damage from thunderstorm winds when considering age of residential structures and the higher standard of building codes enacted after 1980. Johnson City is at a higher risk of damage from thunderstorm winds when considering number and ratio of manufactured homes.

Historic Windstorm Impacts

Below is the summary table, 8-4, for Blanco County that shows the 24-year column totals and the average annual (Per Year) losses in these categories. The bottom half of each table shows per capita dollar loss rates for the total and average annual losses. These rates are important measures for comparing losses between different areas. The average annual loss estimate of property and crop is $0 Blanco County.

Table 8-4: Blanco County Loss Summary

Time Period	Fatalities	Injuries	Property Damage	Crop Damage
Loss Summary, Blanco County				
24-year Total	0	0	$0	$0
Per Year	0	0	$0	$0
Per Capita Dollar Losses (2020 Census Pop)				
24-year Total	0	0	$0	$0
Per Year	0	0	$0	$0

SECTION 9: EXTREME HEAT

Description

Extreme heat is a condition where temperatures exceed local average high temperatures by ten degrees or more for an extended period of time and is also characterized by high humidity levels. Extreme heat is a common occurrence in Texas during the summer months. Extended periods of extreme heat are called heat waves and can lead to illness and death, particularly among vulnerable populations. In fact, heat waves have been the top cause of U.S. weather fatalities, on average, over the past 30 years.[10] Texas had a particularly deadly year in 2011, when 203 heat-related deaths were reported. The major human risks associated with severe summer heat include heat cramps, sunburn, dehydration, fatigue, heat exhaustion, and heat stroke. Extreme heat can lead to power outages as heavy demands for air conditioning strain the power grid and prolonged exposure to excessive temperatures can damage crops and injure or kill livestock. As the Earth's climate warms overall heat waves are expected to become more frequent, longer, and more intense.[11]

Location

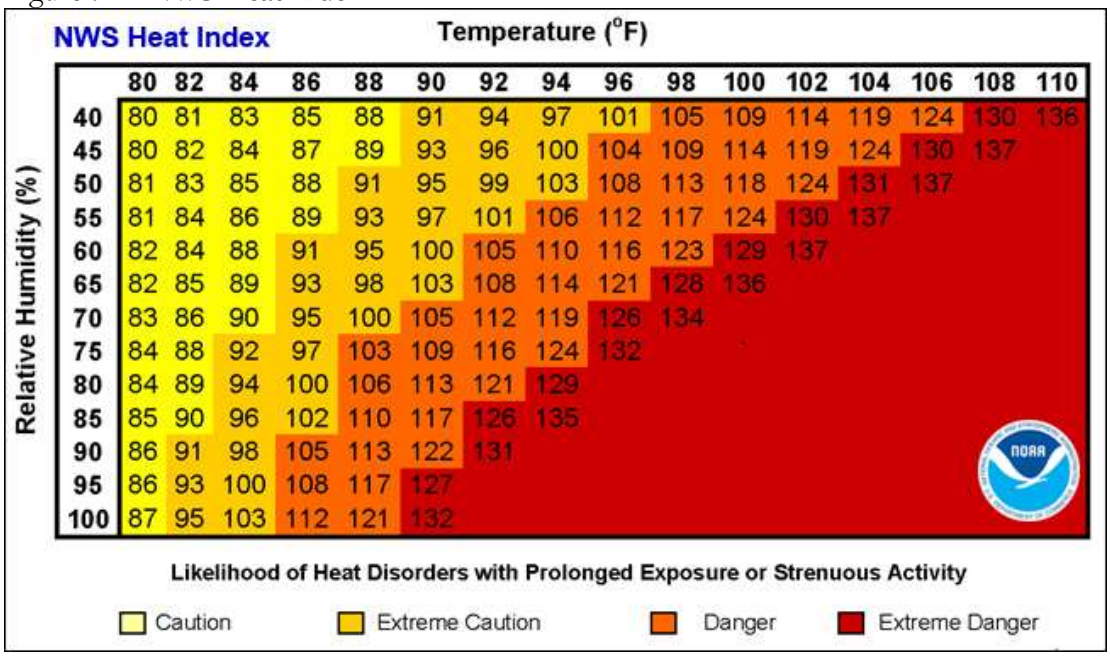
Extreme heat is not confined to any specific geographic area and can occur anywhere within the planning area. City residents can face a heightened risk to extreme heat because of warmer temperatures in cities from the urban heat island effect. The urban heat island effect is caused by large amounts of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

Extent

The "Heat Index" is the relationship between temperature and relative humidity established by the National Oceanic Atmospheric Administration (NOAA) to measure magnitude or intensity of an extreme heat event. This index combines the effect of high temperatures with high humidity to determine how hot it feels outside. Figure 9.1 below describes the heat index as it relates to the likelihood of heat disorders due to prolonged exposure or strenuous activity. As an example, if the air temperature is 98°F and the relative humidity is 65%, the heat index, or how hot it feels, is 128°F. The red area indicates extreme danger and the example above would fall into this category. Also, exposure to full sunshine can increase heat index values by up to 15°F since the heat index values in the chart below were devised for shady light wind conditions.

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

Figure 9-1: NWS Heat Index



Source: NOAA

The likelihood of health disorders associated with ranges of heat index values are displayed below. The classifications of "Caution," "Extreme Caution," "Danger," and "Extreme Danger" are associated with increasingly harmful effects on the body. Effects on the body depend on the magnitude or intensity of the event with the shaded rows in the table below (Table 9.1) corresponding to the colors in the chart above (Figure 9.1). The National Weather Service will initiate alert procedures when the Heat Index is expected to exceed 105°-110°F, depending on local climate, for at least 2 consecutive days.

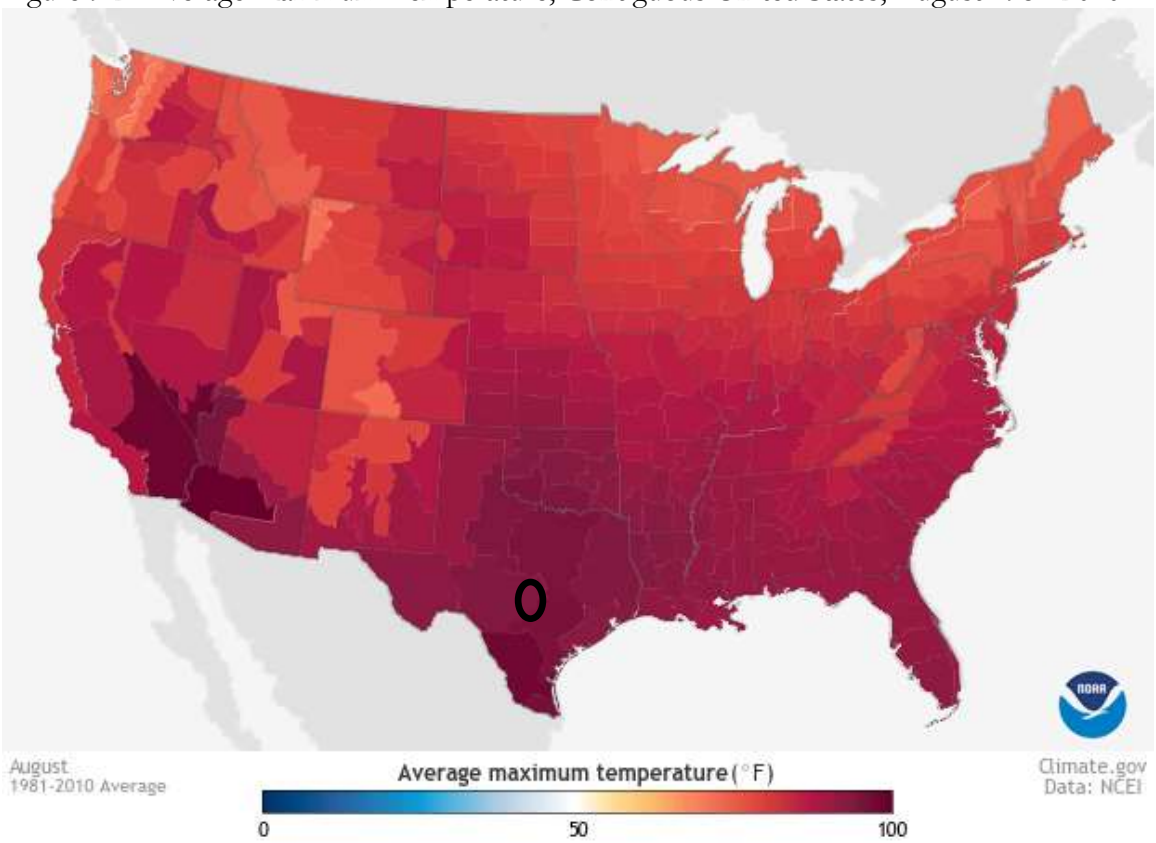
Table 9-1: Heat Index and Warnings

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

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

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

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



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

Based on the average maximum temperature (90-100°F) and the average relative humidity (65°F) in the Blanco County planning area, extreme heat events to the extent of "Danger" and "Extreme Danger" should be mitigated to reduce threats to humans, livestock, and pets. When the heat index reaches a "Danger" classification, effects can include sunstroke, muscle cramps, heat exhaustion, and prolonged exposure can bring on heatstroke. When the heat index reaches an "Extreme Danger" classification, effects on the body can include all of the above in addition to increasing the risk of heat stroke and even death.

Historical Occurrences

There are two historical occurrences of extreme heat found in the NCEI database for the Blanco County Planning Area for time period from 1997-2022. This doesn't necessarily indicate that the area has rarely experienced an extreme heat event that impacts people, property, and agriculture. The lack of many historical occurrences in the NCEI record simply reflects that injury, fatalities, property losses, or crop losses were not directly attributed to any particular extreme heat event at the time. There have not been any events recorded past the listed dates.

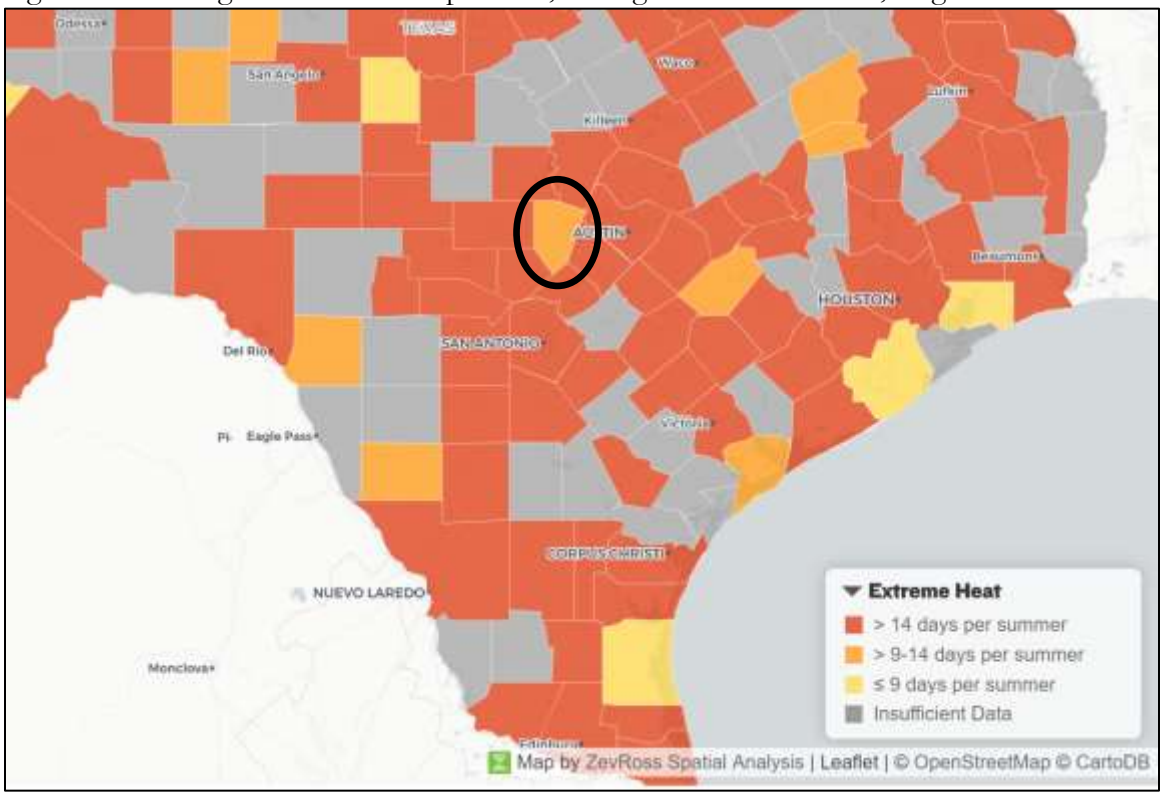
Table 9-2: Historical Excessive Heat Events Table, 1997-2022

Jurisdiction	Year	Month	Day	Injuries	Fatalities	Property Damage	Crop Damage
Blanco	2018	July	19	0	0	$0	$0
Blanco	2018	July	22	0	0	$0	$0

Source: *NOAA NCEI Storm Events Database*

The map below provides an analysis of extreme heat events based on weather station records from the Global Historical Climatology Network (GHCN), formerly the National Climatic Data Center. With this analysis from the NRDC, "extreme heat days" are defined as those days from June 1 to August 31 in the years 2007 to 2016 on which the maximum temperature exceeded the 90th-percentile value. The June to August daily maximum temperatures from the 1961 to 1990 were used as a reference period for the same monitoring station to calculate the 90th percentile. The 90th percentile value is among the more common ways to define extreme heat and the map below is indicative of how the number of extreme heat days per summer periods are changing over time.

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

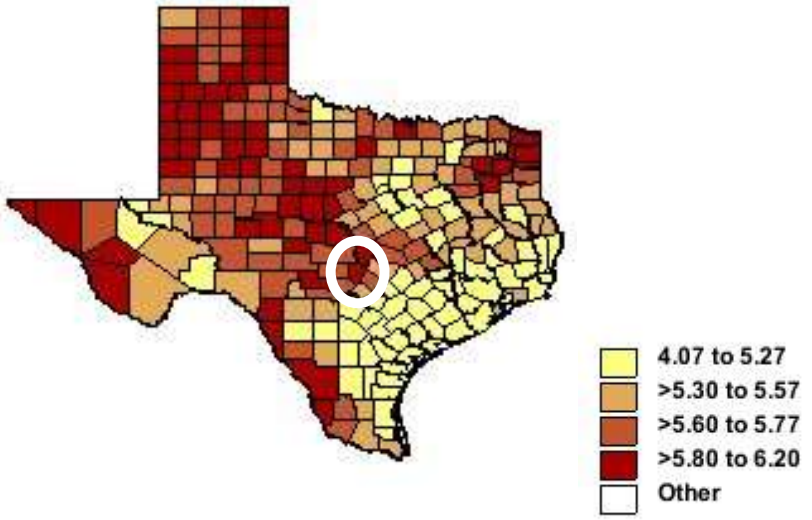


https://www.nrdc.org/climate-change-and-health-extreme-heat#/map/detail/TX

Based on historical monitoring station data from 1961-1990, areas with more than 9 days of extreme heat per summer in the map above are experiencing more days of extreme heat than they did in the past. The map above depicts Blanco County as having 9-14 days of extreme heat per summer. This analysis shows that the Blanco County planning area is experiencing more heat days during the summer than it did past.

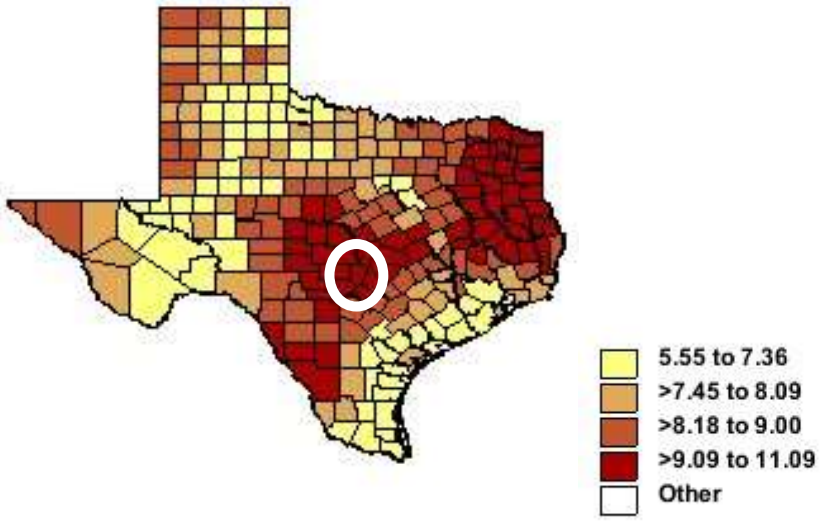
Data from CDC can also help tell a story of how the number of extreme heat days to be expected each summer are increasing. The two maps below depict a 29-year period from 1981-2010 and a 10-year period from 2000-2010. The Blanco County planning area is depicted within the white circle in Central Texas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

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



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

Figure 9-5: 2000-2010 Average heat wave days based on daily maximum heat index for Texas



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

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

Probability of Future Events

The planning area can expect 9-14 extreme heat days and at least one extreme heat event, or heat wave, each summer due to the warm, sunny, and humid subtropical climate in the Blanco County planning area. The probability of the area experiencing at least one extreme heat event in the next year is **highly likely**.

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

The probability that the number of extreme heat days will continue to increase in the future is also highly likely. According to NOAA, the top 10 warmest years on record (1880-2022) across the globe have all occurred within the past 12 years. The table below ranks the warmest years on record with land and ocean annually averaged measurements compiled from 1880-2017.

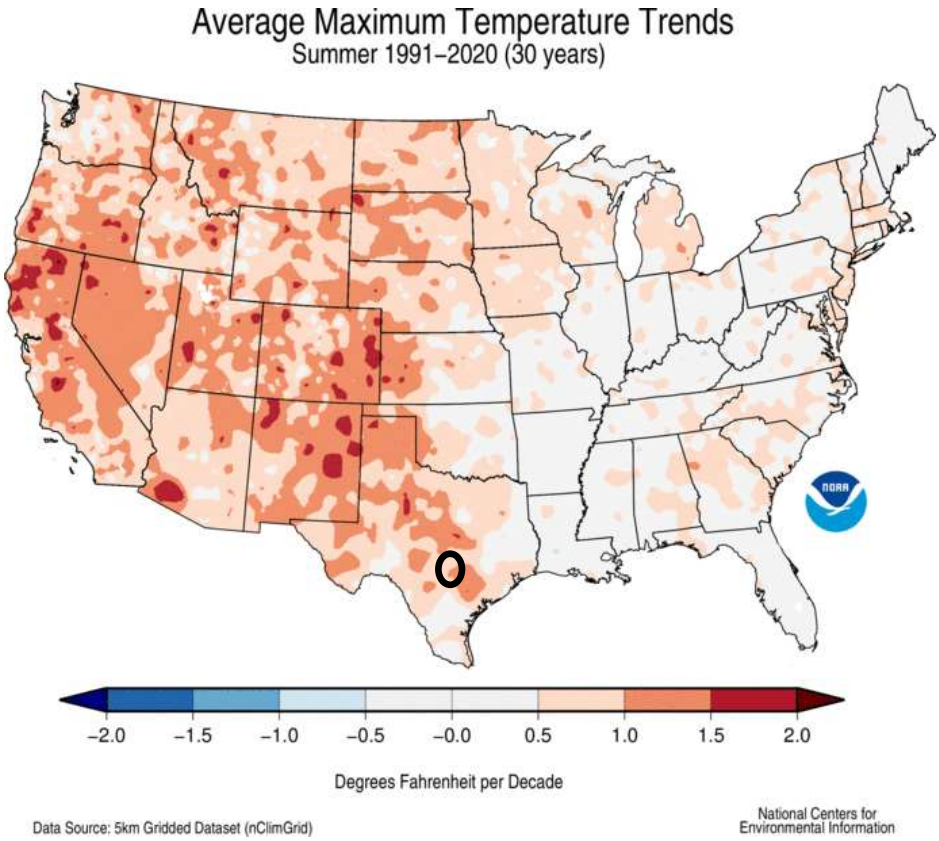
Table 9-2: Top 10 warmest years, globally (NOAA, 1880-2022)

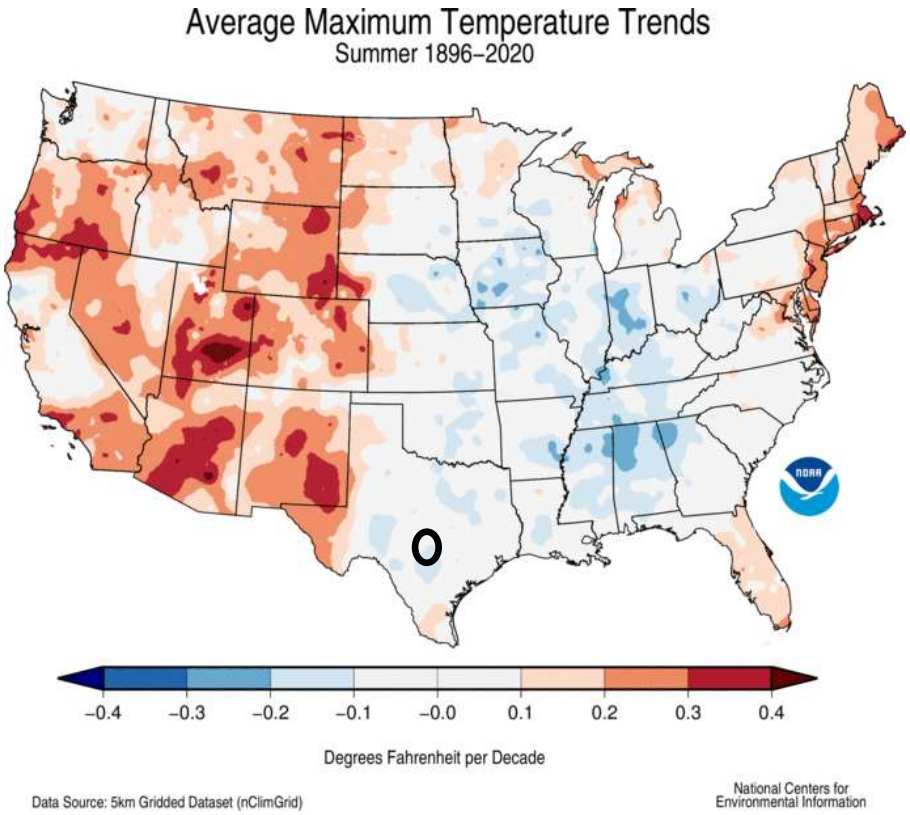
Rank	Year
1	2016
2	2020
3	2019
4	2015
5	2017
6	2022
7	2021
8	2018
9	2014
10	2010

"Global Climate Report – Annual 2022". NOAA. Retrieved 26 January 2023.

The average maximum temperature maps in Figure 9-6 on the following page are produced by the U.S. National Climatic Data Center and depict trends for the most recent complete 30-year period as well as the trend when looking at all recorded temperatures since 1896. The maps show average maximum temperature trends across the United States during the summer periods from 1991-2020 and 1896-2020 which show how trends from which forecasts are made can change drastically when looking at different periods of time. The Blanco County planning area is in an area that can expect an increase of 0.5-1.5ºF in average maximum summer temperatures over the next century.

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





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

Vulnerability and Impacts

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

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

Figure 9-7: NOAA Heat safety tips

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

Higher heat index values (which combine temperature and humidity to describe perceived temperature) are expected to increase discomfort and aggravate health issues. Conversely, cold spells are expected to decrease. In most locations, scientists expect daily minimum temperatures—which typically occur at night—to become warmer at a faster rate than daily maximum temperatures.[12] This change will provide less opportunity to cool off and recover from daytime heat. As the region continues to warm overall, it will be important to educate the public about strategies to stay cool during extreme heat events and how to recognize and respond to heat-related illnesses.

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

SECTION 10: LIGHTNING

Description

Lightening is sudden charges of electricity that develop from storms or excessive heat. This massive electrostatic discharge can occur between electrically charged regions within clouds, or between a cloud and the Earth's surface. A bolt of lightning, or the visible sparks, can cause air temperatures surrounding the bolt to approach 50,000^{0}F causing rapid air expansion leading to thunder, which often accompanies lightning strikes. Lightning is most often affiliated with severe thunderstorms, and often strikes outside of heavy rain and can occur as far as 10 miles away from any rainfall.

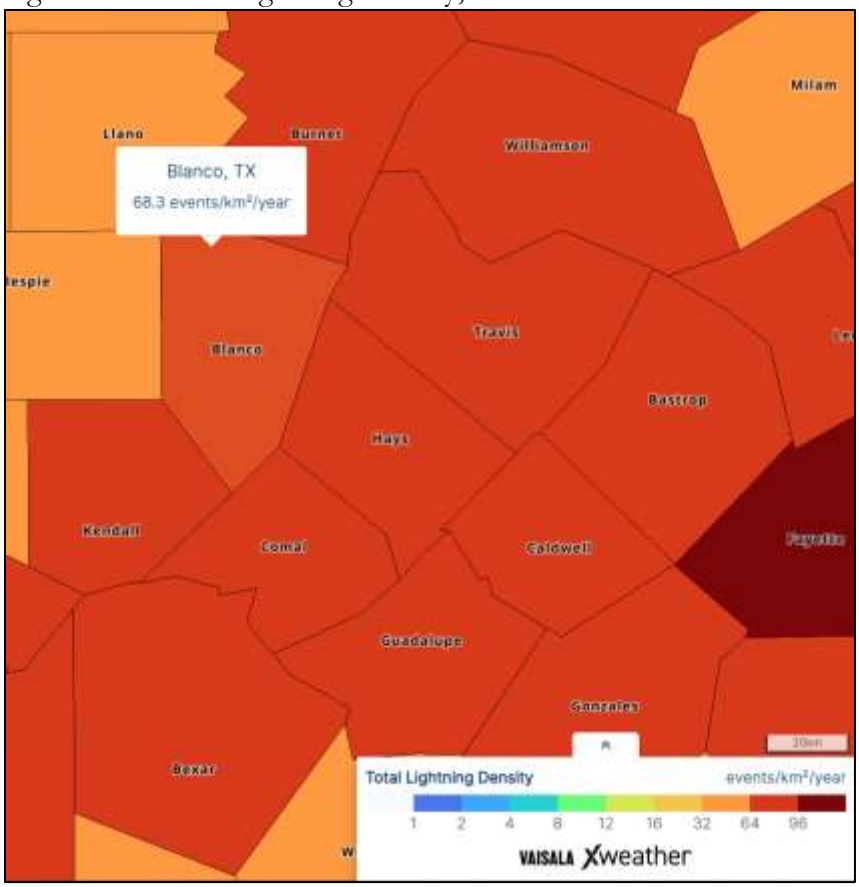
Location

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

Extent

Lightning extents is defined in terms of the frequency of lightning strikes within a defined geographic area and a set time period. The Vaisala's U.S. National Lightning Detection Network lightning flash density map, Figure 10-1, shows the average number of lightning events per km2 per year. According the map below, the Blanco County planning area has a total lightning density of 68.3 events/km^2/year for the planning area from 2016-2022.

Figure 10-1. Total Lightning Density, 2016-2022



Source: https://interactive-lightning-map.vaisala.com/

A total lightning density of more than 64 events/km2/year in an area is considered to be a major severity and a total lightning density of more than 96 events/km2/year in an area is considered to be an extreme severity. Any lightning strike that causes death or property damage is likewise considered a major severity. The lightning hazard is considered to be a major severity for the planning area.

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

Table 10-1: Lightning Activity Levels

LAL	Cloud & Storm Development	Lightning Strikes/15 min
1	No thunderstorms.	0
2	Cumulus clouds are common but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent.	1-8
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground, and lightning is infrequent.	9-15
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common and lightning is frequent.	16-25
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent and intense.	>25
6	Similar to LAL 3 except thunderstorms are dry.	

The Blanco County planning area can generally experience all lightning activity levels based on the extent and location of thunderstorm conditions and all areas are vulnerable to a LAL of 5, the most severe threat of lightning.

Historical Occurrences

While lightning occurs quite frequently in the planning area, the only lightning data contained within NOAA Storm Data are lightning events that result in fatality, injury and/or property and crop damage. There were no lightning events reported for the planning area according to the NOAA National Centers for Environmental Information (NCEI) data. Structural damages

resulting from lighting events are considered severe with risk of injury or death representing the greatest risk. There have not been any events recorded past the listed dates.

Table 10-2: Historical Lightning Events, NCEI 1997-2022

Location	Date	Fatalities	Injuries	Property Damage	Crop Damage	
Blanco County	-	0	0	$0	0	

Significant Events

No significant lightning events have been recorded for the Blanco County planning area.

Texas A&M Forest Service (Wildfires Caused by Lightning)

Lightning occurrences and damages are not well documented in the NCEI data but other sources and accounts from the Core planning team members indicate that lightning strikes occur frequently in the planning area. The Texas A&M Forest Service maintains a wildfire occurrence database based on state and local reports. The local reports are based on a voluntary online fire department reporting system that is used by both paid and volunteer fire departments. Table 10-3 lists wildfires caused by lightning strikes recorded by the Texas Forest Service from 2005-2021 within the planning area.

Table 10-3: Texas A&M Forest Service (TFS), Wildfire Ignition History 2005-2021

Location	Date	Name	Responder	Area Burned (Acres)
Blanco	8/18/2006	133 Chimney Valley Road	Blanco VFD	5
Blanco	7/18/2009	Guess	North	300
Blanco	7/23/2009	Red Rock Ranch Fire	Central	40
Blanco	7/22/2011	RR 1323	Willow City	40
Blanco	9/19/2011	Grape Creek Fire	Central	33
Blanco	9/26/2011	Telephone Pole	Marble Falls VFD	0.5
Blanco	9/27/2011	Crabapple Rd.	Willow City	0.5
Blanco	9/27/2011	Jacoby	Willow City	0.25
Blanco	9/29/2011	Trainer West	Sisterdale VFD	0
Blanco	10/1/2011	Blanco Co.	Willow City	1.5
Blanco	4/14/2014	Lightning Strike	Round Mountain VFD	3
Blanco	9/10/2015	Jack Road Fire	Round Mountain VFD	1.5
Blanco	6/4/2018	Lightning Strike	Round Mountain VFD	1
Blanco	7/7/2020	1386	Henly VFD	0.01
Blanco	8/25/2020	Comanche Creek	Central	406

Source: Texas Wildfire Risk Assessment Portal (TWRAP)

Probability of Future Events

With limited reported incidents in the planning area, the team utilized the most current lightning flash density estimate developed by Vaisala, Figure 10-1, for the risk assessment. The most current lightning flash density estimate indicates a probability of occurrence of approximately 68.3 lightning events per square kilometer per year. Blanco County is 713 square miles or 1,846.66 square kilometers. The Vaisala flash density estimate combined with the total area produces an estimate of approximately 126,127 flashes per year. A **highly likely** probability of occurrence for future lightning events in the Blanco County planning area is supported by this frequency. This means that an event is probable in the next year.

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

Vulnerability and Impact

Lighting strikes are random making all property and people within the Blanco County planning area vulnerable to the impact of lightning. Lightning can also be responsible for damage to buildings, electrical systems, forest and/or wildfires, and damage to infrastructure such as power transmission lines and communication towers. Lightning is attracted to tall metal structures making water towers, electric power stations, and power poles particularly vulnerable to strikes. Lightning strikes can disrupt communication systems, including telephone and internet services, which can impact emergency response times and communication between businesses and customers. Lightning strikes can cause power outages that can affect large areas and cause disruption to businesses, transportation, and other essential services. The damage caused by lightning strikes can have a significant economic impact on cities, particularly in areas where businesses and tourism are major industries. Damage to buildings and electrical equipment can result in costly repairs and downtime. Lightning strikes can cause fires that can spread quickly and cause extensive damage to buildings and surrounding areas and are a cause of wildfires making agricultural land vulnerable as well. Agricultural losses from this hazard can be extensive.

Lightning strikes can also pose a risk to public safety, particularly in outdoor areas such as parks, sports fields, and other public spaces. The peak lightning season in the State of Texas is from June to August; however, the most fatalities occur in July as fatalities occur most often when people are outdoors, working or participating in some form of recreation. Moving inside will decrease a person's vulnerability to injury or death due to lightning strike.

Communities can take steps to mitigate the impact of lightning strikes by implementing lightning protection systems, maintaining electrical infrastructure, and educating the public on lightning safety measures. Doing so can minimize the risks associated with lightning strikes and ensure the safety and well-being of their residents and visitors.

SECTION 11: TORNADO

Description

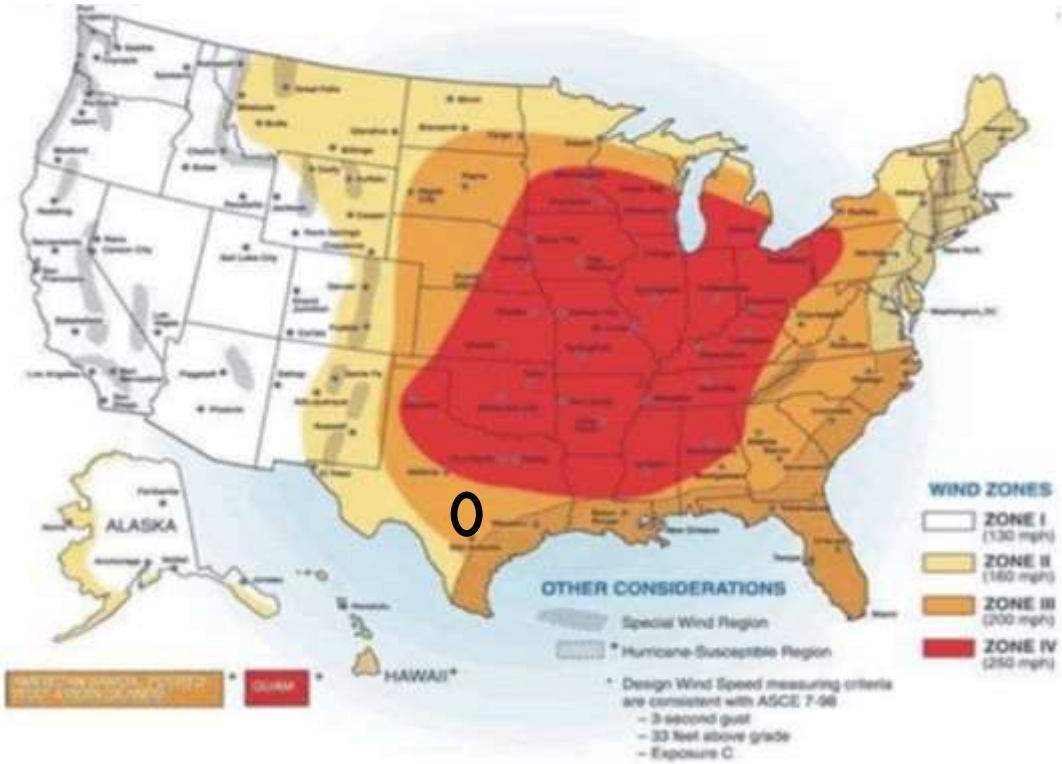
A tornado is a narrow, violently rotating column of air that extends from the base of a cumulonimbus cloud to the ground. Tornadoes, among the most violent storms on the planet, are capable of tremendous destruction with wind speeds that can reach as high as 250-300mph. Typically, the vortex of air will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

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

Location

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

Figure 11-1: United States Wind Zones

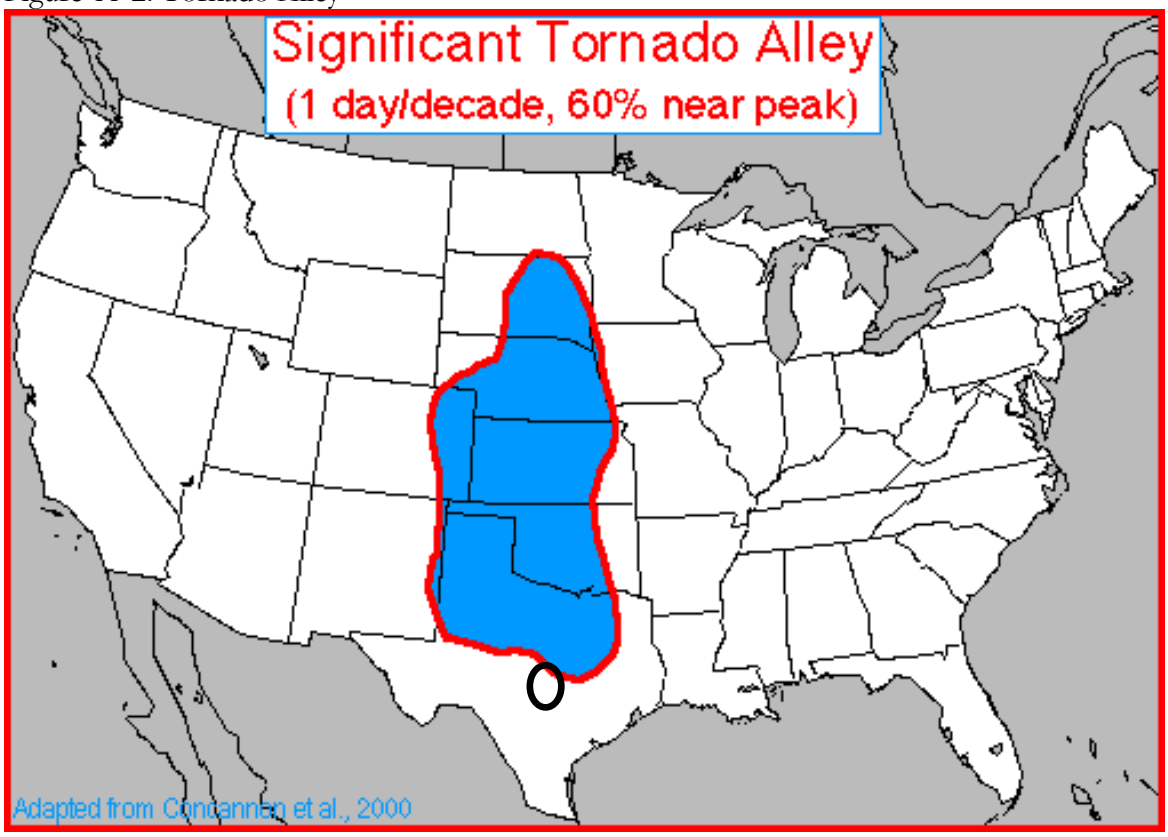


www.fema.gov/plan/prevent/saferoom/tsfs02_wind_zones.shtm

Tornado Alley refers to an area in the southern plains of the central United States that experiences a higher-than-normal frequency of tornadoes each year due to weather patterns and geography. This area extends from central Texas to northern Iowa, and from central

Kansas and Nebraska east to Western Ohio (Figure 11-2). Tornadoes in this region typically occur in late spring and occasionally in the early fall. The Blanco County planning area is 50-100 miles south of the southern border of Tornado Alley.

Figure 11-2: Tornado Alley



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

Extent

Tornado events prior to 2007 follow the original Fujita scale, Table 11-1 on the following page. The current measure of the extent of tornado damage is the enhanced Fujita scale and it took effect on February 1st, 2007. The scale ranges from EF0, generally weak tornadoes with the ability to do minor damage, to EF5, tornadoes with winds in excess of 200mph and the ability to do devastating damage to areas they come in contact with. Tornados can range from weak to violent and typically cause the greatest damage to structures of light construction, such as single-family, manufactured, and mobile homes.

Table 11-1: The Fujita Tornado Scale

Scale	Wind speed estimate (mph)	Potential damage	Example of damage
F0	40-72	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.	
F1	73-112	Moderate damage. The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving vehicles pushed off the roads; attached garages may be destroyed.	
F2	113-157	Significant damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; high-rise windows broken and blown in; light-object missiles generated.	
F3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forests uprooted; heavy cars lifted off the ground and thrown.	
F4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.	
F5	261-318	Incredible damage. Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile-sized missiles fly through the air farther than 100 meters (110 yards); trees debarked; steel-reinforced concrete structures badly damaged and skyscrapers toppled	

Source: https://www.spc.noaa.gov/faq/tornado/f-scale.html

Table 11-2: The Enhance Fujita Tornado Scale

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

Source: https://www.spc.noaa.gov/efscale/ef-scale.html

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

Table 11-3: Degrees of Damage Scale

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

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

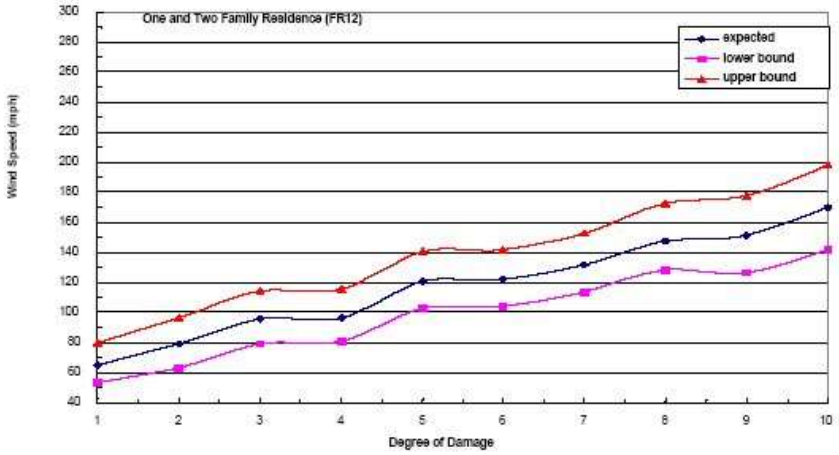
2. ONE-AND TWO-FAMILY RESIDENCES (FR12)
(1000 – 5000 sq. ft.)

Typical Construction

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

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

* Degree of Damage



The tornadic events in the Blanco County planning area have been between EF0 to an EF1 (Table 11-4). However, because Blanco County is in Wind Zone III, the planning area could experience anywhere from an EF0 to an EF4. Therefore, the range of intensity that the planning area would be expected to mitigate is a tornado event that would be a low to severe risk, an EF0 to EF3.

Historical Occurrences

Table 11-4 lists historical tornado events in the planning area from 1997-2022 that were reported to the NCEI or NOAA. The impact of the tornado events in Blanco County are listed by date with additional impact information related to the specific jurisdiction of touchdown, magnitude of event, total dollar-losses related to crop and property damage, injuries, and fatalities. There have not been any events recorded past the listed dates.

Table 11-4: Historical Tornado Events by Jurisdiction, 1997 – 2022

Jurisdiction	Year	Month	Extent: Fujita Scale (pre-2007), Enhanced Fujita Scale (post-2007)	Fatalities	Injuries	Property Damage	Crop Damage
Blanco	2001	Nov	F0	0	0	$3,000	0
Johnson City	2004	Nov	F0	0	0	0	0
Johnson City	2004	Nov	F1	0	0	0	0
Hye	2006	Apr	F1	0	0	$50,000	0
Johnson City	2006	Apr	F1	0	0	$150,000	0
Sandy	2015	May	EF0	0	0	0	0
Twin Sisters	2015	May	EF0	0	0	0	0
Round Mountain	2020	Apr	EF1	0	2	$1,000,000	0

Source: NCEI Storm Events Database

Table 11-5: Historical Tornado Events Magnitude Summary, 1997 - 2006

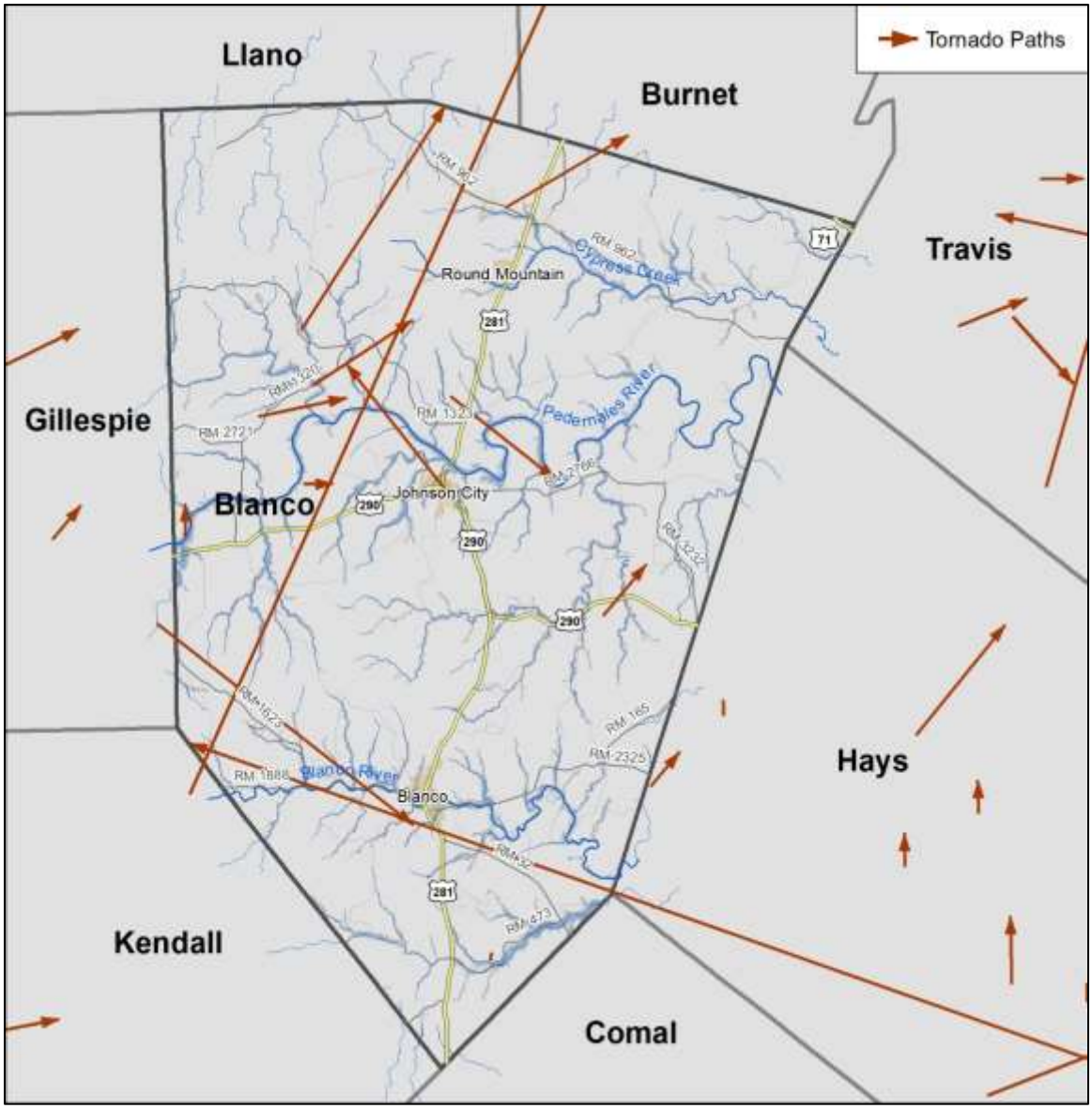
Number of Events	Magnitude (Fujita Scale)						
	N/A	F0	F1	F2	F3	F4	F5
5		2	3	0	0	0	0

Table 11-6: Historical Tornado Events Magnitude Summary, 2007-2020**ES**

Number of Events	Magnitude (Enhanced Fujita Scale)						
	N/A	EF0	EF1	EF2	EF3	EF4	EF5
3	0	2	1	0	0	0	0

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

Figure 11-4: Historic Tornado Tracks 1950-2021, Distance Travelled, Magnitude and Direction



Significant Events

April 20, 2006 – Johnson City

A small tornado was spotted by the public as it touched down east of Hye. The tornado destroyed a barn, then lifted back up into the parent thunderstorm. No other damage was indicated. A second tornado touched down west of Johnson City very close to the time of the first tornado. This tornado was on the ground for three-quarters of a mile and destroyed 3 barns as it moved east.

April 12, 2020 – Round Mountain

A small tornado touched down near Round Mountain in northern Blanco County. It first appeared to touch down near RR 962 then moved northeast by Coyote Trail before impacting two RV parks on Hwy 281 and Hof Brau. Estimates from Blanco County Emergency Management show that approximately 60 residences were impacted with at least 11 being completely destroyed and eight more sustaining major damage. There were two minor injuries.

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

According to historical records, there were 8 events in a 24-year reporting period in the planning area. This provides a probability of occurrence of approximately once every three years for the Blanco County planning area. This frequency supports a **likely** probability of future events for the planning area, including all participating jurisdictions, meaning that an event is probable in the next five years.

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

Vulnerability and Impact

All existing and future buildings, facilities and populations in the Blanco County planning area are considered to be vulnerable to tornados and could potentially be impacted. High wind velocity, wind-blown debris, lightning, and large hail are typically the cause of damage done by a tornado. The high winds and flying debris can cause roofs to collapse, windows to shatter, and walls to crumble. Tornadoes can also cause significant damage to buildings, roads, bridges, and other infrastructure in cities. First responders and those needing to evacuate an area may encounter blocked roads as a result of the debris rendering some areas inaccessible or inescapable. Tornadoes can have a significant impact on the local economy as well, causing damage to businesses and homes, as well as disrupting transportation and causing productivity losses. The psychological trauma of experiencing a tornado, losing property or loved ones, or being displaced from one's home can have lasting effects on mental health.

Tornadoes pose a severe threat to communities as they often result in power outages, which could cause health and safety risks to vulnerable populations who rely on electricity for medical necessities, as well as patients in hospitals. Power outages can also disrupt electricity supply to neighborhoods and even entire cities, causing problems with heating, cooling, lighting, and communication. Anyone in the path of a tornado can incur serious injuries or even fatalities. Falling trees, branches, utility lines, poles, and flying debris pose safety risks, and people caught in the open or unable to take adequate cover are at the highest risk of injury or death. Certain buildings and structures are more prone to damage than others from the high wind velocity associated with tornado events. The three most susceptible types of structures to tornado damage are:

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

The Blanco County planning area features mobile and manufactured home parks. Because manufactured and temporary housing is located sporadically throughout rural portions of the planning area, they are not only vulnerable to the tornado hazard, but more prone to being isolated from essential needs and emergency services in the event of a disaster. Additionally, any structures built prior to 1980 are likely to have been built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant events.

Table 11-8: Structures at Greater Risk by Jurisdiction

Jurisdiction	Total Housing Units	Mobile Homes	Housing units built prior to 1980
Blanco County*	4,749	762 (16%)	1,456 (31%)
City of Blanco	861	94 (11%)	462 (54%)
City of Johnson City	682	152(22%)	226 (33%)
Town of Round Mountain	55	8 (15%)	35 (64%)

*County totals include all jurisdictions, ISDs, ESDs, and BPWD in addition to unincorporated areas.
Source: 2021 American Community Survey 5-year estimate, selected housing characteristics

Based on the ACS 2021 data, the City of Blanco is at higher risk of damage from tornadoes when considering age of residential structures and the higher standard of building codes enacted after 1980. Johnson City is at a higher risk of damage from tornadoes when considering number and ratio of manufactured homes. To mitigate the risks associated with the impacts of tornadoes, it's important to have early warning systems in place, build structures that can withstand high winds, and establish emergency response plans to quickly respond to disasters.

Historic Tornado Impacts

The summary table on the following page, 11-9, shows the 25-year property and crop damage totals as well as the average annual (Per Year) losses summarizing historic tornado impacts. The bottom half of the table shows per capita dollar loss rates for the total and average annual losses. These rates are important measures for comparing losses between different hazards and areas. The average annual loss estimate of property and crop is $48,120 for Blanco County.

Table 11-9, Blanco County Loss Summary

Time Period	Fatalities	Injuries	Property Damage	Crop Damage
Loss Summary, Blanco County				
25-year Total	0	0	$1,203,00.00	$0
Per Year	0	0	$48,120.00	$0
Per Capita Dollar Losses				
25-year Total	0	0	$106.00	$0
Per Year	0	0	$4.24	$0

Since weather varies year-to year, forecasts of specific years are less likely to be true (less reliable) than these totals and averages for the period. The second summary table shows per capita dollar loss rates based on 2020 Census population counts. This is an important measure for comparing historical losses between different hazards and areas. Table 11-10 below displays the tornado losses by jurisdictions within the planning area.

Table 11-10: Tornado Losses by Jurisdiction 1997-2022

Jurisdiction	Est. Prop. Losses	Est. Crop Losses	Total Est. Losses
Blanco Co.	$842,333	$0	$130,786
City of Blanco	$177,901	$0	$4,887
City of Johnson City	$172,084	$0	$1,114
Town of Round Mountain	$10,683	$0	$11,028

*Blanco Pedernales Water, ISD, and ESD losses are included in County Totals

SECTION 12: HAILSTORMS

Description

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

Location

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

Extent

The NCEI Intensity Scale, depicted in Table 12-1, shows how the intensity category of a hailstorm depends on hail size and the potential damage it could cause. The intensity scale ranges from H0 to H10, with increments of intensity or damage potential in relation to hail size (distribution and maximum), texture, fall speed, speed of storm translation, and strength of the accompanying wind. The National Weather Service (NWS) classifies a storm as "severe" if there is hail one inch in diameter (approximately the size of a quarter) or greater, based on radar intensity or as seen by observers. Based on historical data, hail of up to 2.5 inches can be expected in the planning area.

Table 12-1: Hail Intensity and Magnitude

Size Code	Intensity Category	Size (Diameter Inches)	Descriptive Term	Typical Damage
H0	Hard Hail	Up to 0.33	Pea	No damage
H1	Potentially Damaging	0.33 - 0.60	Marble	Slight damage to plants and crops
H2	Potentially Damaging	0.60 - 0.80	Dime	Significant damage to plants and crops
H3	Severe	0.80 - 1.2	Nickel	Severe damage to plants and crops
H4	Severe	1.2 - 1.6	Quarter	Widespread glass and auto damage
H5	Destructive	1.6 - 2.0	Half Dollar	Widespread destruction of glass, roofs, and risk of injuries
H6	Destructive	2.0 - 2.4	Ping Pong Ball	Aircraft bodywork dented and brick walls pitted
H7	Very Destructive	2.4 - 3.0	Golf Ball	Severe roof damage and risk of serious injuries
H8	Very Destructive	3.0 - 3.5	Hen Egg	Severe damage to all structures

H9	Super Hailstorms	3.5 - 4.0	Tennis Ball	Extensive structural damage, could cause fatal injuries
H10	Super Hailstorms	4.0 +	Baseball	Extensive structural damage, could cause fatal injuries

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

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

Historical Occurrences

Historical evidence for Blanco County suggests that the entire planning area is vulnerable to hail events. Historical events with reported damage, injuries or fatalities are shown in Table 12-2 below. A total of 58 reported historical hail events impacted Blanco County during the 25-year period from 1997 through 2022. These reported events may not represent all hail events to have occurred during this time since they were only the events reported to NCEI and NOAA databases. There have not been any events recorded past the listed dates.

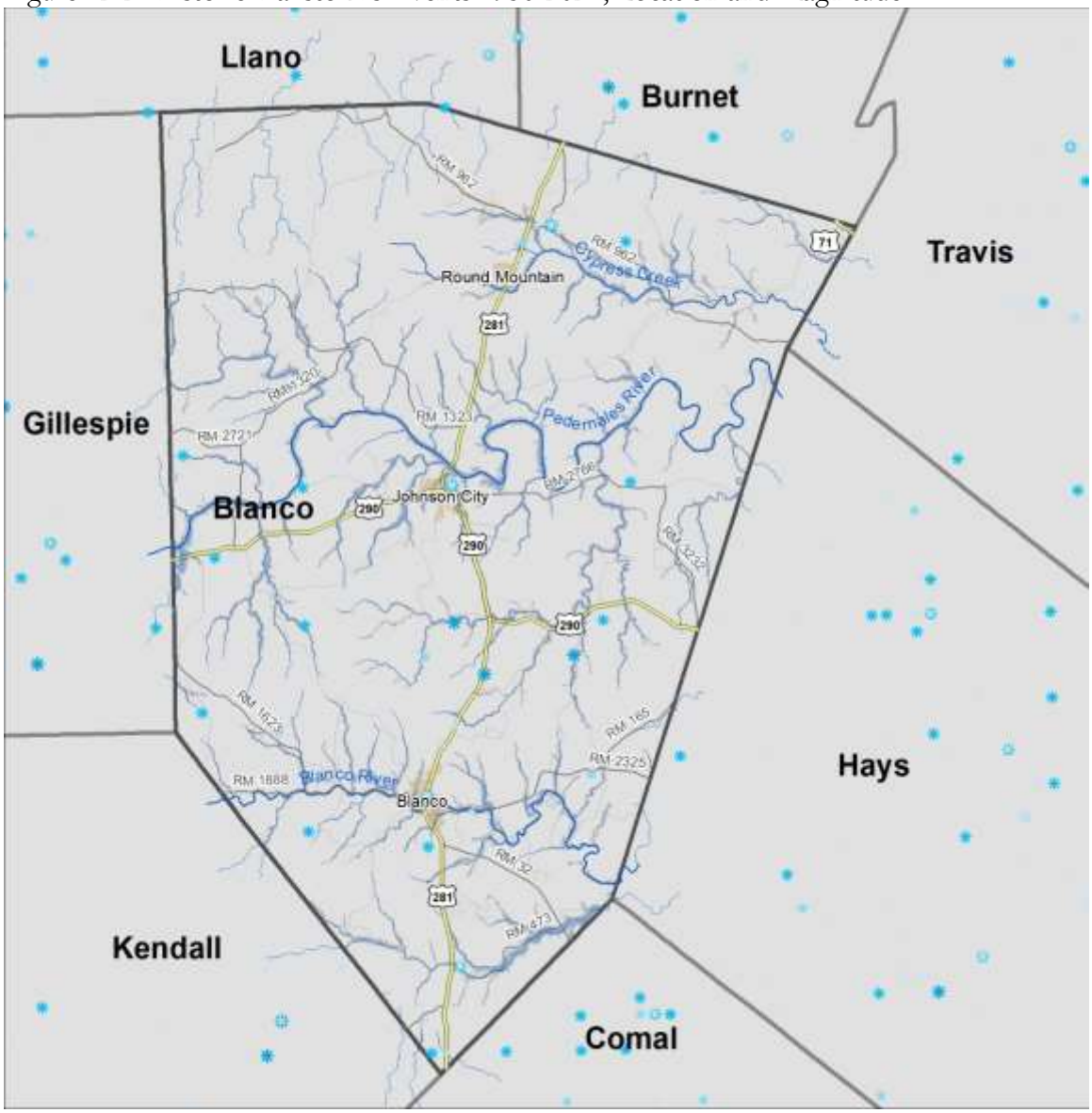
Table 12-2: Historical Hail Events

Jurisdiction	Year	Month	Magnitude (Diameter, inches)	Injuries	Fatalities	Property Damage	Crop Damage
Twin Sisters	1997	April	0.75	0	0		
Hye	1997	October	0.88	0	0		
Blanco	1998	February	0.75	0	0		
Round Mtn	1998	March	0.75	0	0		
Johnson City	1998	March	0.75	0	0		
Johnson City	1998	April	0.75	0	0		
Blanco	1998	April	0.75	0	0		
Johnson City	1998	June	0.75	0	0		
Twin Sisters	1998	June	1.5	0	0		
Blanco	2000	March	2.5	0	0		
Blanco	2000	March	1.75	0	0		
Johnson City	2000	March	1.25	0	0		
Johnson City	2000	April	0.75	0	0		
Blanco	2004	May	0.75	0	0		
Johnson City	2004	October	0.88	0	0		
Blanco	2004	October	1.75	0	0		
Round Mtn	2005	March	2.5	0	0		
Blanco	2006	April	0.75	0	0		
Johnson City	2006	April	1.75	0	0		
Twin Sisters	2006	April	1.75	0	0		
Johnson City	2006	April	1.75	0	0		
Johnson City	2006	May	1	0	0		
Round Mtn	2007	March	1	0	0		

Round Mtn	2009	February	1	0	0
Cypress Mill	2009	April	0.75	0	0
Cypress Mill	2011	March	1	0	0
Hye	2011	April	0.75	0	0
Blanco	2013	April	0.75	0	0
Hye	2013	May	1.75	0	0
Blanco	2013	May	1.75	0	0
Blanco	2013	May	0.75	0	0
Johnson City	2014	April	0.75	0	0
Blanco	2014	April	0.88	0	0
Blanco	2014	April	1.5	0	0
Blanco	2014	April	1.75	0	0
Blanco	2015	April	1	0	0
Round Mtn Arpt	2015	April	1	0	0
Cypress Mill	2015	April	1	0	0
Round Mtn	2016	March	1.5	0	0
Round Mtn	2016	March	1	0	0
Twin Sisters	2017	May	1	0	0
Blanco	2017	May	0.75	0	0
Cypress Mill	2017	July	0.75	0	0
Blanco	2018	May	1	0	0
Blanco	2018	May	1	0	0
Hye	2019	May	1	0	0
Blanco	2020	January	1	0	0
Blanco	2020	January	1	0	0
Round Mtn	2020	May	0.75	0	0
Round Mtn	2020	May	1.5	0	0
Twin Sisters	2021	March	1.75	0	0
Hye	2021	May	1.75	0	0
Johnson City	2021	May	0.75	0	0
Hye	2021	May	1	0	0
Blanco	2022	March	1	0	0
Johnson City	2022	May	2	0	0
Johnson City	2022	May	1	0	0
Johnson City	2022	May	2	0	0

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

Figure 12-2: Historic Hailstorms Events 1950-2021, Location and Magnitude



Significant Events

May 26, 2020 – Round Mountain

An upper-level shortwave trough rotated around a slow moving upper low across the Southern Plains and helped to drive isolated convection along a sagging cold front. Some of these storms produced large hail. Locally, the thunderstorm produced ping pong ball size hail in Round Mountain with hail piles covering the ground.

May 21, 2022 – Blanco

A warm front brought a warm, moist airmass over South Central Texas early in the day. A dryline moved into this area from the west and generated thunderstorms. Some of these storms produced tornadoes, large hail, and damaging wind gusts. Locally, the thunderstorm produced quarter size hail in Blanco.

May 5, 2022 – Johnson City
An upper-level trough moved across the southern Plains pushing a cold front into South Central Texas. Thunderstorms developed along the front and some of these storms produced large hail. Locally, thunderstorm produced two-inch diameter hail near Johnson City and near Hwy 290 just east of Hye.

Probability of Future Events

Based on available records of historic events there were 58 events in a 25-year reporting period for the Blanco County planning area. This provides a probability of at least one event every year. This frequency supports a **highly likely** probability of future events meaning that an event is probable somewhere in the planning area in the next year.

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

Vulnerability and Impact

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

The Blanco County planning area features mobile and manufactured home parks which are more vulnerable to hailstorms than site-built structures. In addition, manufactured and temporary housing is located sporadically throughout rural portions of the planning area which are also vulnerable to the hailstorm hazard and more prone to being isolated from essential needs and emergency services in the event of a disaster. Also, structures built prior to 1980 are likely to have been built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant events.

Table 12-3: Structures at Greater Risk by Jurisdiction

Jurisdiction	Total Housing Units	Mobile Homes	Housing units built prior to 1980
Blanco County*	4,749	762 (16%)	1,456 (31%)
City of Blanco	861	94 (11%)	462 (54%)
City of Johnson City	682	152(22%)	226 (33%)
Town of Round Mountain	55	8 (15%)	35 (64%)

*County totals include all jurisdictions, ISDs, ESDs, and BPWD in addition to unincorporated areas.
Source: 2021 American Community Survey 5-year estimate, selected housing characteristics

Based on the ACS 2021 data, the City of Blanco is at higher risk of damage from hailstorms when considering age of residential structures and the higher standard of building codes enacted after 1980. Johnson City is at a higher risk of damage from hailstorms when considering number and ratio of manufactured homes. To mitigate the risks associated with

the impacts of hailstorms, it's important to have early warning systems in place, build structures that can withstand high velocity impacts from hail, and establish emergency response plans to quickly respond to disasters.

Historic Hailstorm Impacts

The summary table below, 12-4, shows the 25-year property and crop damage totals as well as the average annual (Per Year) losses summarizing historic hailstorm impacts. The bottom half of the table shows per capita dollar loss rates for the total and average annual losses. These rates are important measures for comparing losses between different hazards and areas. The average annual loss estimate of property and crop is $0 for Blanco County.

Table 12-4, Blanco County Loss Summary

Time Period	Fatalities	Injuries	Property Damage	Crop Damage
Loss Summary, Blanco County				
25-year Total	0	0	$0	$0
Per Year	0	0	$0	$0
Per Capita Dollar Losses				
25-year Total	0	0	$0	$0
Per Year	0	0	$0	$0

Since weather varies year-to year, forecasts of specific years are less likely to be true (less reliable) than these totals and averages for the period. The second summary table shows per capita dollar loss rates based on 2020 Census population counts. This is an important measure for comparing historical losses between different hazards and areas. Table 12-5 below displays the hailstorm losses by jurisdictions within the planning area.

Table 12-5: Hailstorm Losses by Jurisdiction 1997-2022

Jurisdiction	Est. Prop. Losses	Est. Crop Losses	Total Est. Losses
Blanco Co.	$0	$0	$0
City of Blanco	$0	$0	$0
City of Johnson City	$0	$0	$0
Town of Round Mountain	$0	$0	$0

*Blanco Pedernales Water, ISD, and ESD losses are included in County Totals

SECTION 13: WILDFIRE

Description

Source: http://texasforestservice.tamu.edu

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

Location

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

Extent

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

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

KBDI Score Range	Description
0-200	Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. Typical of early spring following winter precipitation.
200-400	Fuels are beginning to dry and contribute to wildfire intensity. Heavier fuels will still not readily ignite and burn. This is often seen in late spring or early summer.
400-600	Lower litter and duff layers contribute to fire intensity and will burn actively. Wildfire intensity begins to increase significantly. Larger fuels could burn or smolder for several days. This is often seen in late summer and early fall.
600-800	Often associated with more severe drought with increased wildfire occurrence. Intense, deep-burning fires with extreme intensities can be expected. Live fuels can also be expected to burn actively at these levels.

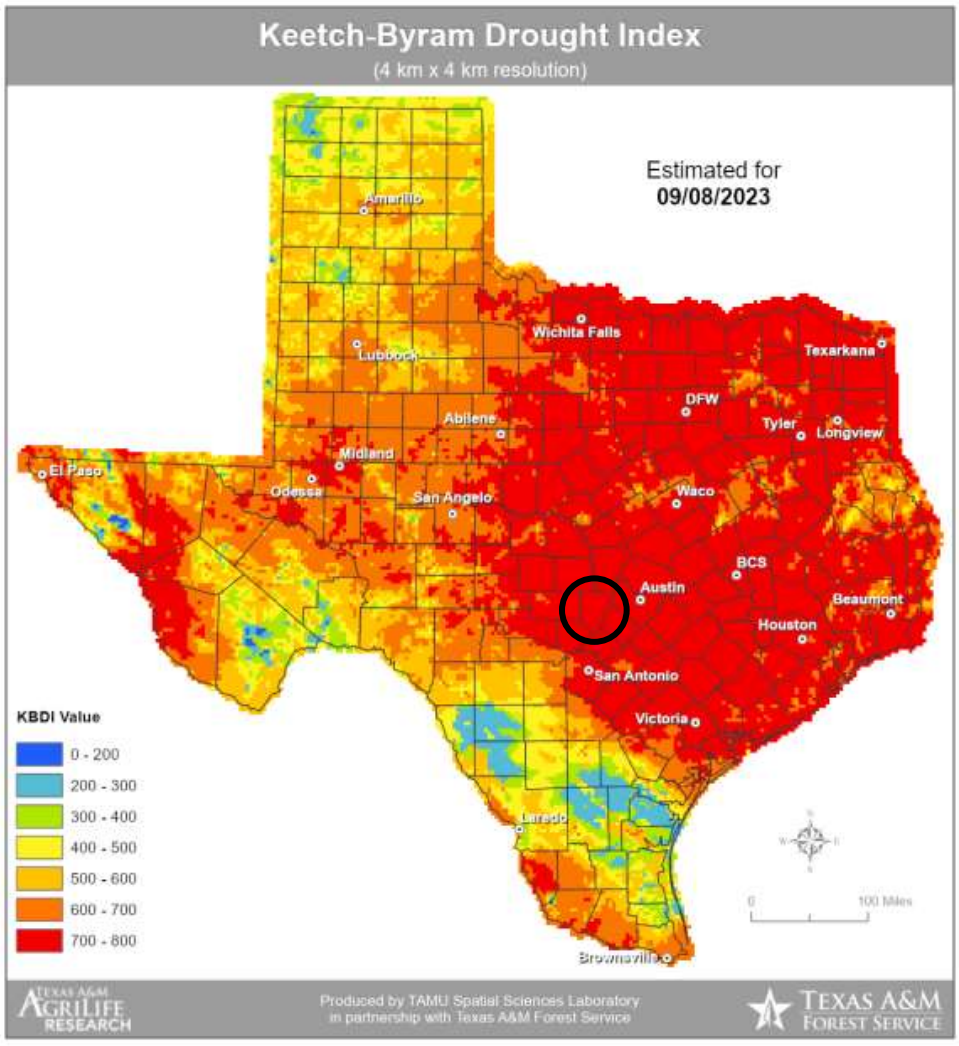
Table 13-2, Blanco County Planning Area KBDI Values

	KBDI Mean	KBDI Maximum	KDBI Minimum
Blanco	766	778	745

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

The average KBDI values for the planning area is approximately 445 and is the average extent to be mitigated (Table 13-2). Based on figure 13-1 below, the Blanco County planning area exhibits values in the 700-800 range throughout its entirety as of the time of this report. At these levels, often associated with more severe drought, fire intensity and occurrence increases significantly and fires readily burn in all directions. The KBDI is a good measure of the readiness of fuels to ignite in the event of a wildfire. Drought or extreme weather conditions have the ability to greatly influence the KDBI in a short period of time so current KBDI should always be monitored to more accurately assess risk. The figure and data below are provided by the Texas Weather Service at Texas A&M Department of Ecosystem Science and Management and the following website can be regularly checked for updated information.

Figure 13-1, KBDI for the State of Texas on 9/8/2023



https://twc.tamu.edu/kbdi

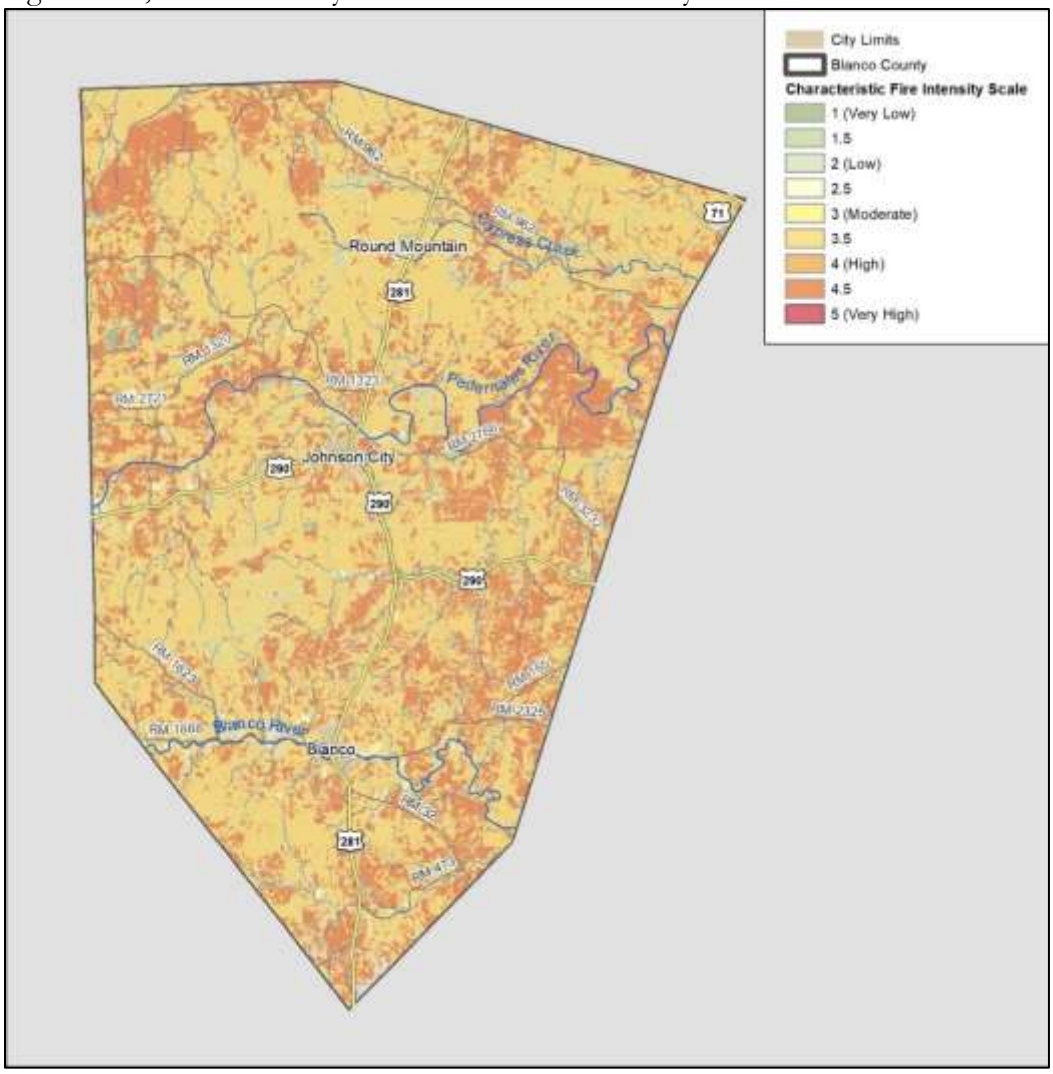
The Texas Wildfire Risk Assessment Portal (TXWRAP) is the primary mechanism for the Texas A&M Forest Service to deploy risk information and create awareness about wildfire issues across the state. www.TexasWildfireRisk.com The tool uses the Fire Intensity Scale (FIS) layer to determine the potential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

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

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

The Fire Intensity Scale evaluates the potential fire behavior for an area, regardless if any fires have occurred there in the past. This additional information allows local officials and mitigation planners to quickly identify areas where dangerous fire behavior potential exists in relationship to nearby homes or other valued assets. **The wildfire risk for the Blanco County planning area is moderate to high based on the characteristic wildfire intensity scale.**

Figure 13-2, Blanco County Characteristic Fire Intensity Scale



Source: https://wrap.texaswildfirerisk.com/Map/Pro/#project-areas

Historical Occurrences

The NCEI storm events database carries limited information on wildfire occurrence information with damage estimates of impacts, injuries, or fatalities in the planning area from 1997-2022. There have not been any events recorded past the listed dates.

Jurisdiction	Name	Year	Month	Injuries	Fatalities	Property Damage	Crop Damage
Blanco	Smith-West Wildfire	2018	July	0	0	$0	$0
East of Johnson City	Lost Oak Wildfire	2020	August	0	0	$100,000	$0
Blanco	Commanche Creek Wildfire	2020	August	0	0	$0	$0
NW of Johnson City	Buddy Wildfire	2022	March	0	0	$0	$0
Blanco County	Cypress Mill Wildfire	2022	June	0	0	$0	$0
Blanco County	Archer Wildfire	2022	June	0	0	$0	$0

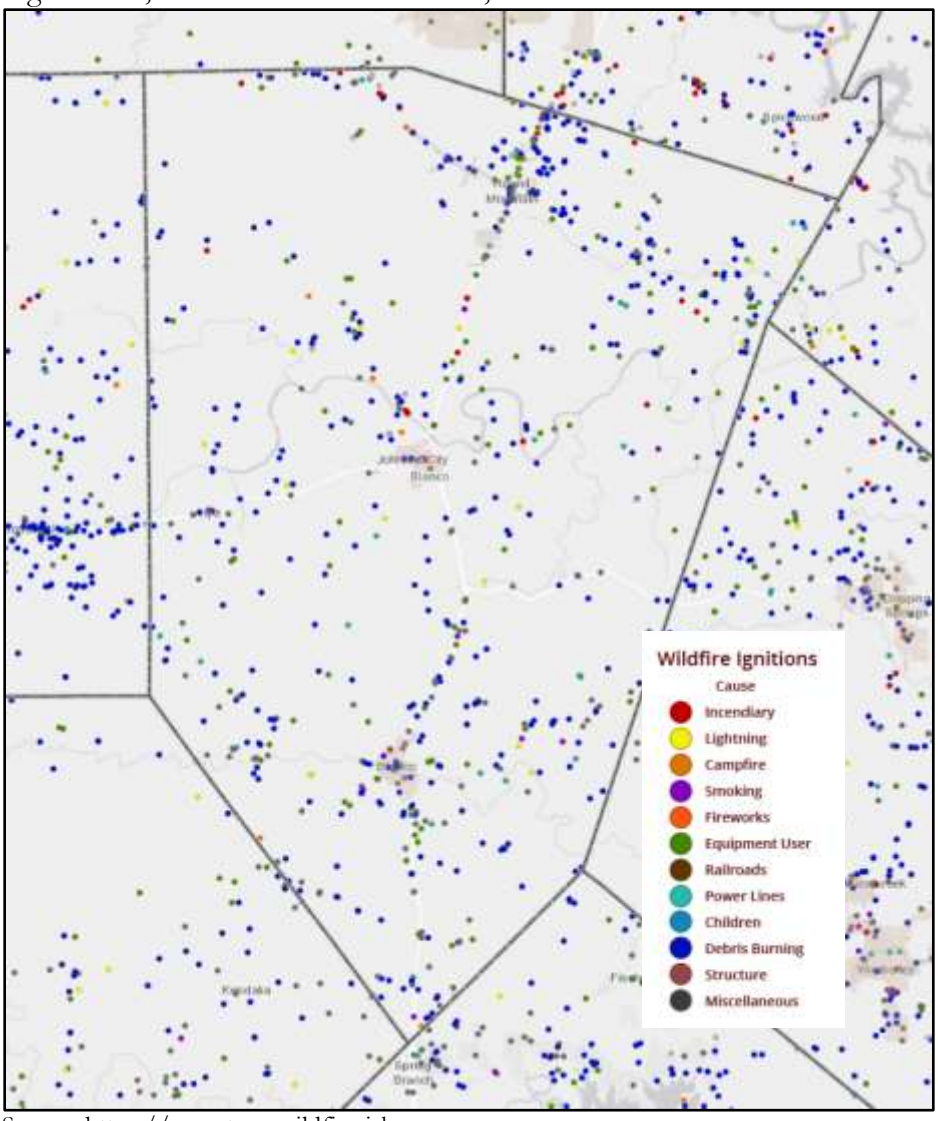
Significant Events

July 19, 2020 – Near Johnson City, Blanco County

The Lost Oak Wildfire started around 3 pm on August 19, 11 miles east of Johnson City in Blanco County. At the time the fire started temperatures were in the middle 90s, the relative humidity was in the middle 10s percent, and the winds were less than 5 mph. The fire burned until August 21, and consumed 375 acres. Approximately 20 homes were threatened and saved. Multiple outbuildings were destroyed.

The Texas Forest Service (TFS), started collecting wildfire data in 1985 and volunteer fire departments started reporting events in 2005. This data does not have estimated impact information, but it does provide a snapshot of historical wildfire occurrence to estimate a future frequency of events. The Texas Forest Service reported 2,013 wildfire events in the Blanco County planning area between 2005 and 2021. Due to a lack of recorded data for wildfire events prior to 2005, frequency calculations are based on the sixteen-year period from 2005 to 2021. The map below shows approximate locations of wildfires in Blanco County and the cause of ignitions.

Figure 13-4, Historical Wildfire Events, 2005 – 2021



Source: https://wrap.texaswildfirerisk.com

Table 13-3 below lists the ignition causes for all wildfires in the planning area between 2005-2021, the number of times of each unique ignition cause, and the percent of total ignitions.

Table 13-3, Wildfire ignition causes from 2005-2021

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

Source: Texas Wildfire Risk Assessment Portal (TxWRAP)

Probability of Future Events

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

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

Vulnerability and Impact

Populations and structures that are most susceptible to wildfire risk are located in the wildland urban interface and/or intermix (WUI). WUI fires occur in areas where the built environment, structures and other improvements, meet undeveloped wildland or vegetative fuels. Natural vegetation provides the fuel for wildfires in natural uninhabited areas, while WUI fires consume both vegetation and materials from the built environment. Since the WUI for the City of Blanco and Johnson City encompasses nearly all the land area within the city limits, nearly all critical facilities located within both cities are within the Wildland Urban Interface. Blanco Pedernales Water will implement a mitigation action to electronically document and map assets in their service area.

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

burned, and the number of resulting injuries and fatalities. The vulnerability of the jurisdictions in the planning area to wildfire events is increased where critical facilities are in the WUI as they are more likely to sustain damage from the hazard event.

Figure 13-6: Wildland Urban Interface, City of Blanco

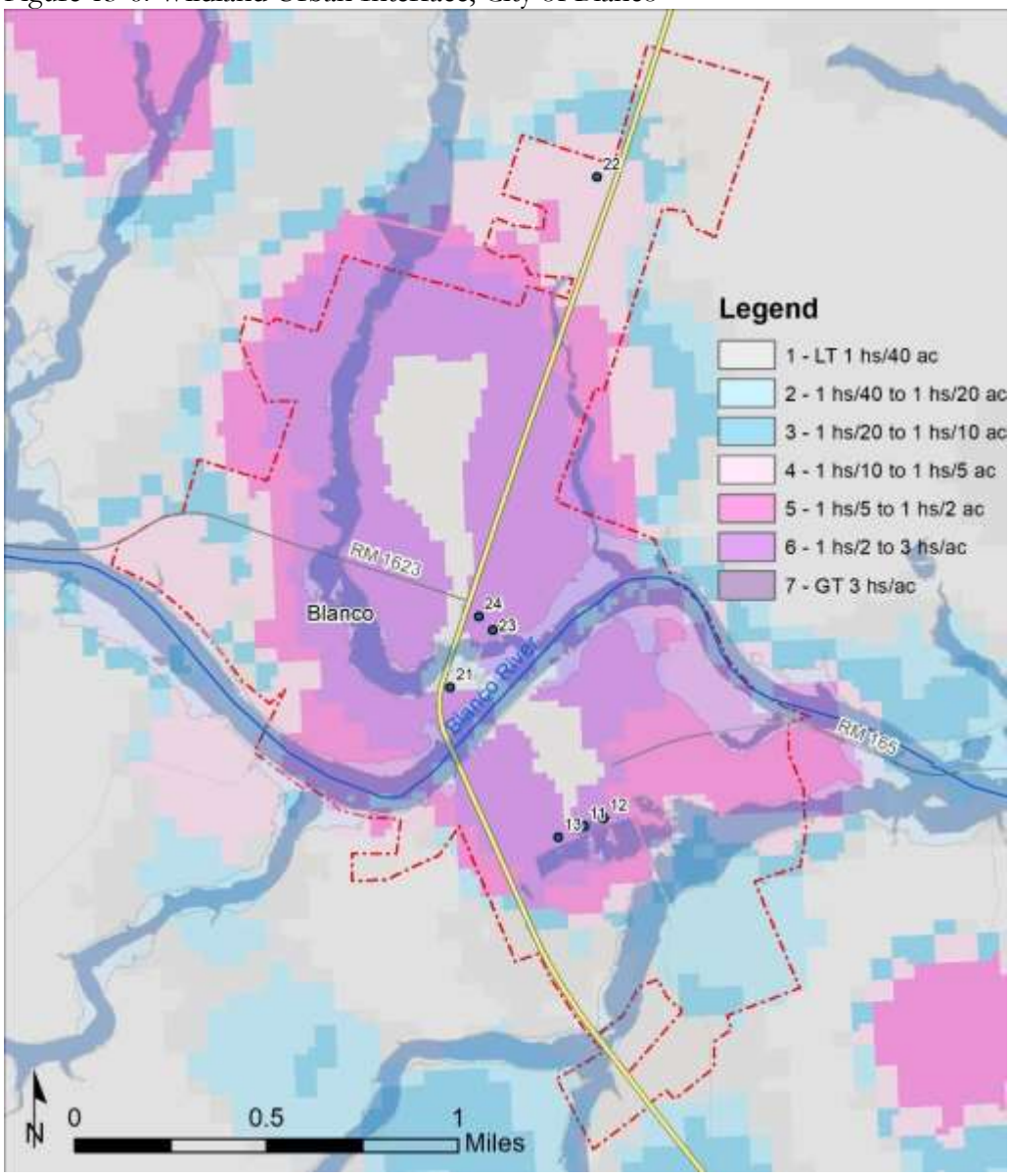
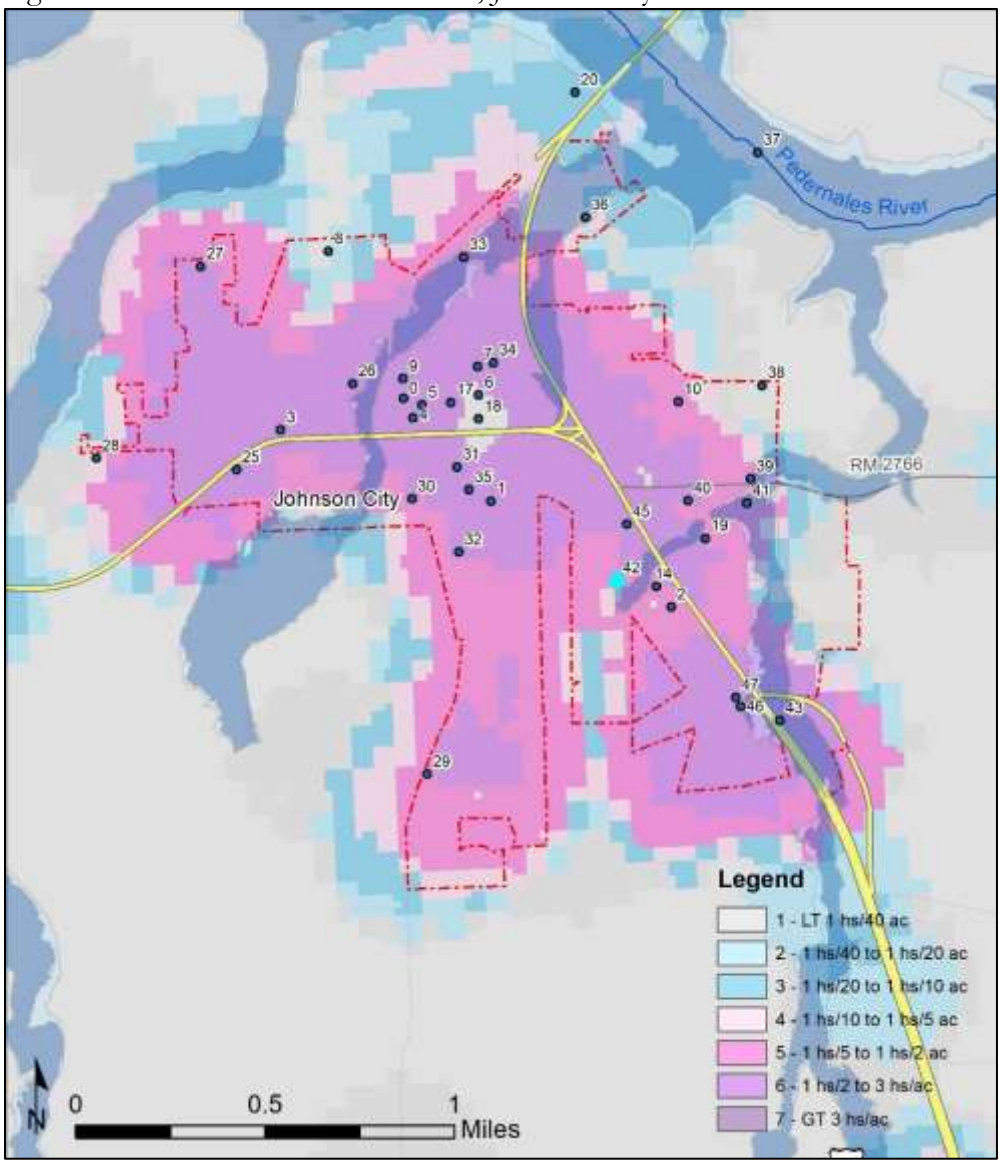
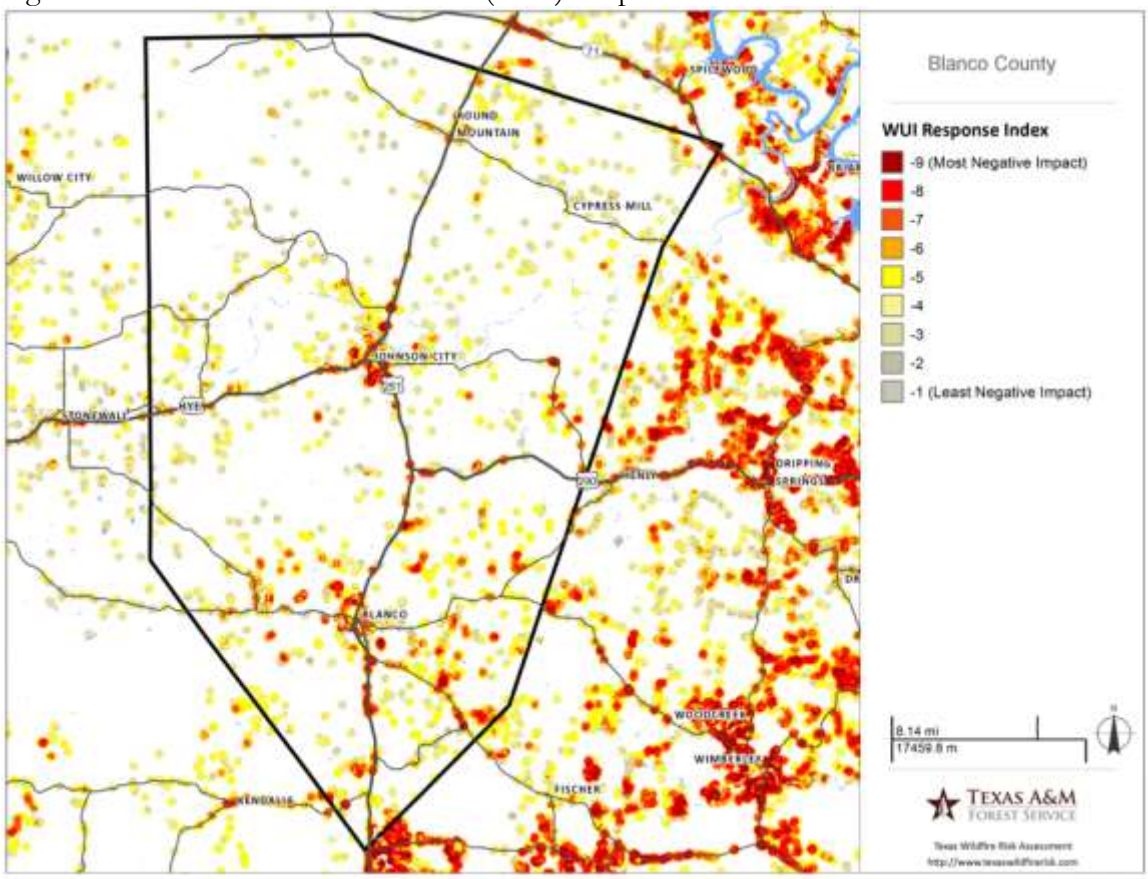


Figure 13-7: Wildland Urban Interface, Johnson City



The Wildland Urban Interface (WUI) Response Index layer is a rating of the potential impact of a wildfire on people and their homes. The key input, WUI, reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the Wildland Urban Interface and rural areas is key information for defining potential wildfire impacts to people and homes. Figure 13-8 on the following page shows Blanco County and the threat of wildfire across the planning area based on this response function modeling approach. The most negative impacts can be seen affecting the fringe of the more populated areas within the county such as the cities of Blanco and Johnson City.

Figure 13-8: Wildland Urban Interface (WUI) Response



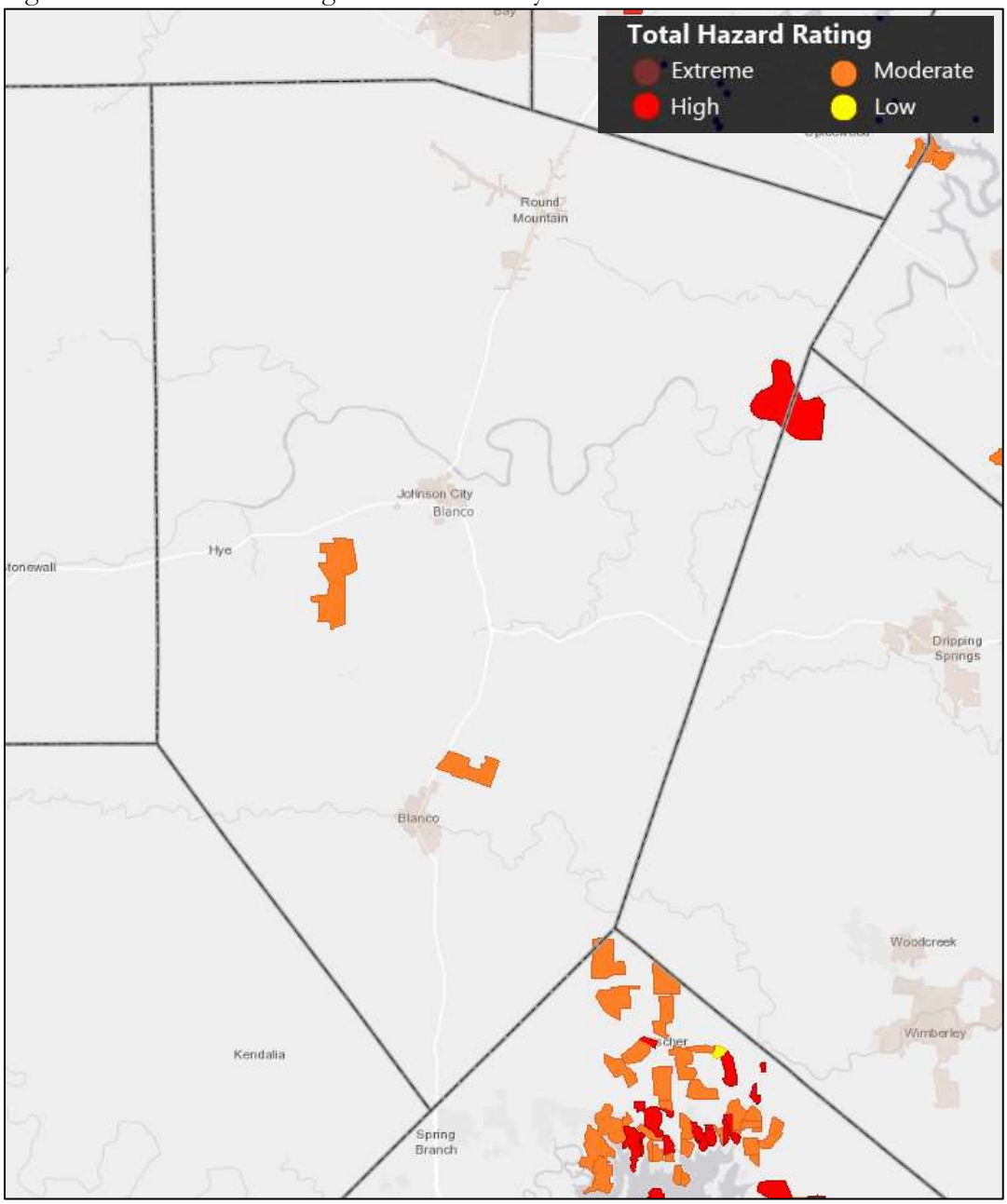
Source: https://wrap.texaswildfirerisk.com

The Community Risk Assessment layer is a tool that helps to evaluate the potential risk of home loss caused by wildfires. This assessment considers several factors, such as the home construction and the surrounding environment. The communities are classified into four hazard ratings: Low, Moderate, High, or Extreme, based on their level of vulnerability. The map legend in the upper right corner provides information about the symbols associated with each hazard ranking, which reveals that Blanco County has areas with a Moderate to High total hazard ranking.

The rating is assigned based on NFPA 1144 Standards for Reducing Structure Ignition Hazards from Wildland Fire. Each community is visited by a fire professional and rated using a standardized form to have a consistent measure of risk across the state. Each risk assessment rates a community on characteristics of predominant vegetation, defensible space, possible structure to structure ignition, slope, topography, history of wildfire occurrence, exposure to southern plains wildfire outbreak, roofing materials, debris on roof, ventilation and soffits, gutters, building construction, wooden attachments, windows, and utilities. The risk assessment looks at the chances of a home surviving a wildfire without fire department intervention, this is because during large wildfire incidents fire departments can be overwhelmed and not able to place a fire engine on every home to protect it.

The Community Risk Assessment Layer provides fire planners with an "on the ground" review of communities within the wildland urban interface. This can help them prioritize mitigation efforts and target outreach opportunities.

Figure 13-6: Hazard Ranking in Blanco County



Source: https://wrap.texaswildfirerisk.com

The impacts from a wildfire to the Blanco County planning area would be severe based on the overall moderate to high-risk rating. Includes would be air quality degradation due to the wildfire producing large amounts of smoke and other pollutants. This situation can cause health problems for residents, especially those with respiratory issues. If the wildfire is severe enough, or close enough to populated areas, it can result in the need for evacuations. Evacuating can be a traumatic experience for many people, especially if they must leave their homes and possessions behind, including pets. Wildfires often harm or destroy homes, businesses, and other buildings, leading to significant property damage. They can cause power outages, which can disrupt normal life and can cause economic impacts, especially to places

that depend on tourism or agriculture. The loss of power and disruption to normal life can result in financial losses for businesses and individuals.

To reduce these vulnerabilities and impacts, cities can take steps to prepare for wildfires, such as creating evacuation plans, conducting regular fire drills, implementing building codes and other regulations to reduce fire risk, and working with fire departments to improve fire suppression and response capabilities.

SECTION 14: SEVERE WINTER STORMS

Description

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

Table 14-1: Extent Scale – Winter Weather Alerts

Winter weather advisory	This alert may be issued for a variety of severe conditions. Weather advisories may be announced for snow, blowing or drifting snow, freezing drizzle, freezing rain, or a combination of weather events.
Winter storm watch	Severe winter weather conditions may affect your area (freezing rain, sleet or heavy snow may occur separately or in combination).
Winter storm warning	Severe winter weather conditions are imminent.
Freezing rain or freezing drizzle	Rain or drizzle is likely to freeze upon impact, resulting in a coating of ice glaze on roads and all other exposed objects.
Sleet	Small particles of ice usually mixed with rain. If enough sleet accumulates on the ground, it makes travel hazardous.
Blizzard warning	Sustained wind speeds of at least 35 mph are accompanied by considerable falling or blowing snow. This alert is the most perilous winter storm with visibility dangerously restricted.
Frost/freeze warning	Below freezing temperatures are expected and may cause significant damage to plants, crops and fruit trees.
Wind chill	A strong wind combined with a temperature slightly below freezing can have the same chilling effect as a temperature nearly 50 degrees lower in a calm atmosphere. The combined cooling power of the wind and temperature on exposed flesh is called the wind−chill factor.

Location

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

Extent

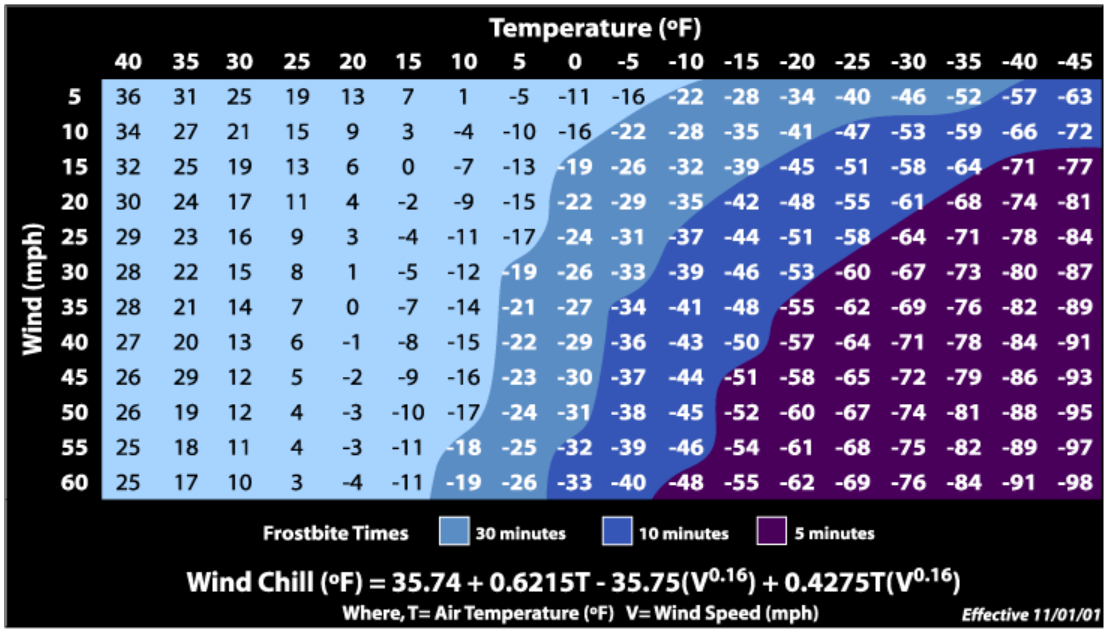
The extent or magnitude of a severe winter storm is measured by on an intensity scale from "Mild" to "Severe" based on temperature ranges and snow accumulation levels. Table 14-1, Magnitude of Severe Winter Storms, is an index developed by the National Weather Service (NWS). This table should be referenced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

Table 14-2: Magnitude of Severe Winter Storms

Intensity	Temperature Range (Fahrenheit)	Extent Description
Mild	40˚-50˚	Winds less than 10 mph and freezing rain or light snow falling for short durations with little or no accumulations
Moderate	30˚-40˚	Winds 10 – 15 mph and sleet and/or snow up to 4 inches
Significant	25˚-30˚	Intense snow showers accompanied with strong gusty winds, between 15 and 20 mph with significant accumulation
Extreme	20˚-25˚	Wind driven snow that reduces visibility, heavy winds (between 20 to 30 mph), and sleet or ice up to 5 millimeters in diameter
Severe	Below 20˚	Winds of 35 mph or more and snow and sleet greater than 4 inches

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

Figure 14-1: Wind Chill Chart



Source: National Weather Service

Historical Occurrences

Based on NCEI data, from 1997 through August 2023 the Blanco County planning area experienced 15 severe winter events in the form of winter storms, winter weather, and heavy snow. No injuries or fatalities were reported for the following severe winter events.

Table 14-3: Historical Occurrences of Severe Winter Weather Events

Year	Month	Day	Injuries	Fatalities	Property Damage	Crop Damage
1997	January	7	0	0		
1997	January	11	0	0		
1998	December	23	0	0		
2000	December	12	0	0		
2001	November	28	0	0		
2003	February	24	0	0		
2007	January	15	0	0		
2009	January	27	0	0		
2011	February	3	0	0		
2018	January	16	0	0		
2021	January	10	0	0		
2021	February	11	0	0	$5,000	
2021	February	13	0	0		
2022	February	22	0	0		
2023	January	30	0	0		

Significant Events

February 11, 2021 – Blanco County

A series of weather systems brought several rounds of winter weather to South Central Texas from February 11 through February 18. The first episode of winter weather started when a cold front moved through South Central Texas on February 10 and stalled over South Texas. This brought cold air to the region and once it was in place, a combination of isentropic flow over the frontal boundary and an upper-level shortwave trough produced sufficient lift to produce precipitation. With warm air above the boundary layer and sub-freezing air near the surface, the precipitation fell as freezing rain. Locally, the Blanco County emergency manager reported limbs and trees down due to ice accumulation of 1/4 and some light glazing on the roadway of CR 3347.

Probability of Future Events

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

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

Vulnerability and Impact

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

Populations of people and animals are subject to direct health risks from extended exposure to cold air and precipitation. Animals, such as pets and livestock, typically cannot survive the effects of direct exposure to severe winter weather and should be provided shelter. In addition, House fires can occur more frequently during winter storm events due to increased and improper use of alternative heating sources which can cause injury or deaths. Moreover, house fires during winter storms present a greater danger because some areas may not be easily accessible due to icy roads and water supplies may freeze and impede firefighting efforts. The people most at risk to the effects of severe winter storms are children younger than 5 and older adults over 65. Vulnerable populations are at greater risk of death from hypothermia during these events, especially in the rural areas of the county where populations are sparse, icy roads may impede travel, and there are fewer neighbors to check in on the elderly.

The planning area has a total population of 11,313 according to the 2021 ACS population estimate. Those over the age of 65 represent 24.9% (2,809) of the total population and children under the age of 5 represent 3.7% (414) of the total population. The total population of the county that is estimated to be below the poverty level is 10.4% (1,182). Table 7-4 presents the 2021 American Community Survey population and age cohort estimates below.

Table 14-4: Populations at Greater Risk by Jurisdiction

Jurisdiction	Population 65 and Older	Population Under 5	Population Below Poverty Level
Blanco County	2,809	414	1,182
City of Blanco	345	97	226
City of Johnson City	253	109	345
Town of Round Mountain	30	0	4
Blanco ISD		37	
Johnson City ISD		26	

Source: 2021 American Community Survey (Note: County totals include both incorporated and unincorporated areas)
*Blanco Pedernales Water population counts for the planning area are included in the County total.

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

Historic Severe Winter Storm Impacts

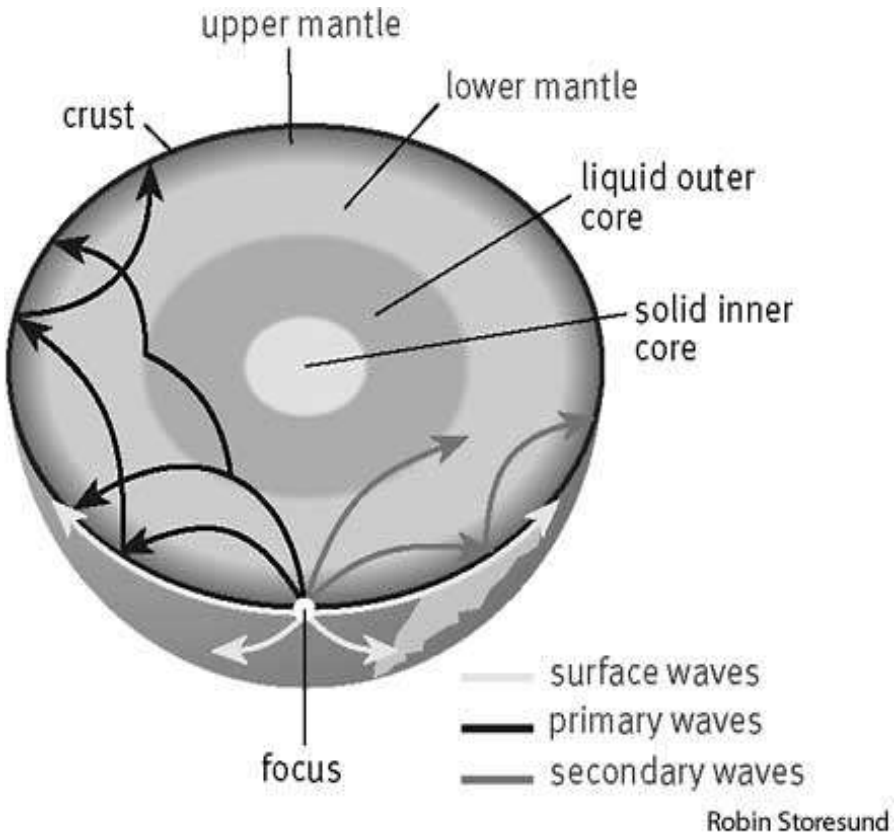
A total of $5,000 of property damage was reported over the 24-year period of analysis. Based on historical records, annual loss impacts and estimates are considered to be negligible.

SECTION 15: EARTHQUAKES

Description

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

Figure 15-1: Energy Waves Caused by Earthquakes



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

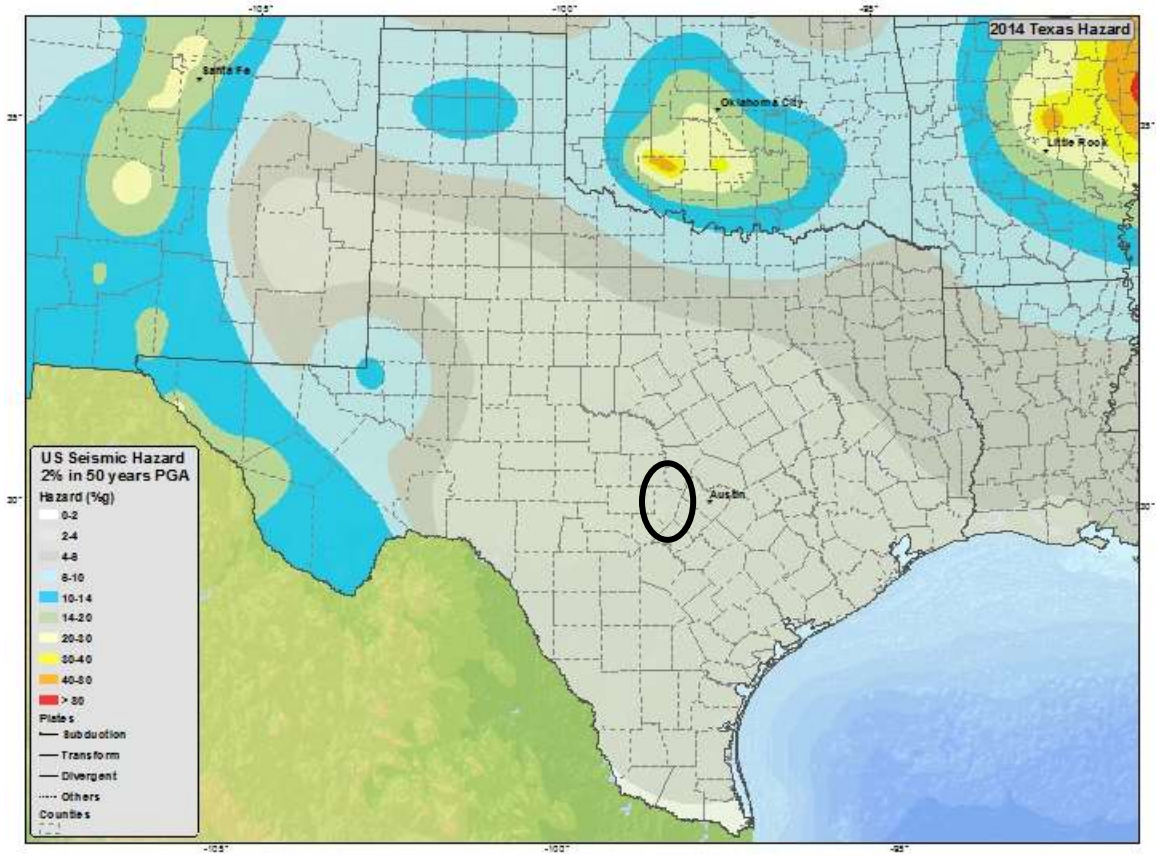
Primary (P) waves have a push-pull type of vibration. Secondary (S) waves have a side-to-side type of vibration. Both P and S waves travel deep into Earth, reflecting off the surfaces of its various layers. S waves cannot travel through the liquid outer core. Surface (L) waves—named after the nineteenth-century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

Location

Locations in West Texas and the Panhandle experience the highest frequency of earthquakes in the state. Figure 15-2 below shows locations of earthquake hazard with 2% variations in the

probability for Peak Ground Acceleration of various intensities over 50 years in Texas. The map illustrates the generally low risk of earthquakes in Texas with most of the state having less than a 4-8% probability of having a very weak ground shaking event over 50 years. The planning area encompassed by Blanco County shares the same probability of 4-8% likelihood of an earthquake over 50 years. Core Planning Team Members have indicated that this frequency is consistent with what they have experienced.

Figure 15-2. USGS Seismic Hazard Risk Map



Source: https://www.usgs.gov/programs/earthquake-hazards

Extent

The magnitude or extent of an earthquake is measured on the Richter Scale. An earthquake's magnitude is determined by the amount of ground motion measured on a seismograph. This measurement is then corrected to compensate for the distance from the epicenter. The scale is a logarithmic or a 'power of ten' scale. For example, if a magnitude 4.8 earthquake caused ground motion of 1 inch at a particular location, a 5.8 would cause ground motion of 10 inches at the same epicenter. Earthquakes above 7 on the Richter scale are considered severe. Table 15-1 provides examples of the effects of earthquakes at different magnitudes. Based on historical evidence, a 4.1 magnitude earthquake is the highest that can be expected in the planning area.

Table 15-1: Earthquake magnitude and corresponding effects

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

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

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

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

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

XII	Virtually total destruction. Waves are seen on the ground surface. Objects are thrown into the air.

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

Historical Occurrences

Based on United States Geographical Services (USGS) Earthquake Catalog of events, from 1923 through 2023 the Blanco County planning area did not experience any earthquakes. This is consistent with accounts by Core Planning Team Members that earthquakes have not occurred in the past.

Table 15-3 below provides details for each earthquake in or around the planning area with date, locational, and specific magnitude information. There have been no seismic events of sufficient size recorded in the planning area, however, there was one event to the south in Comal County which was recorded in 1982.

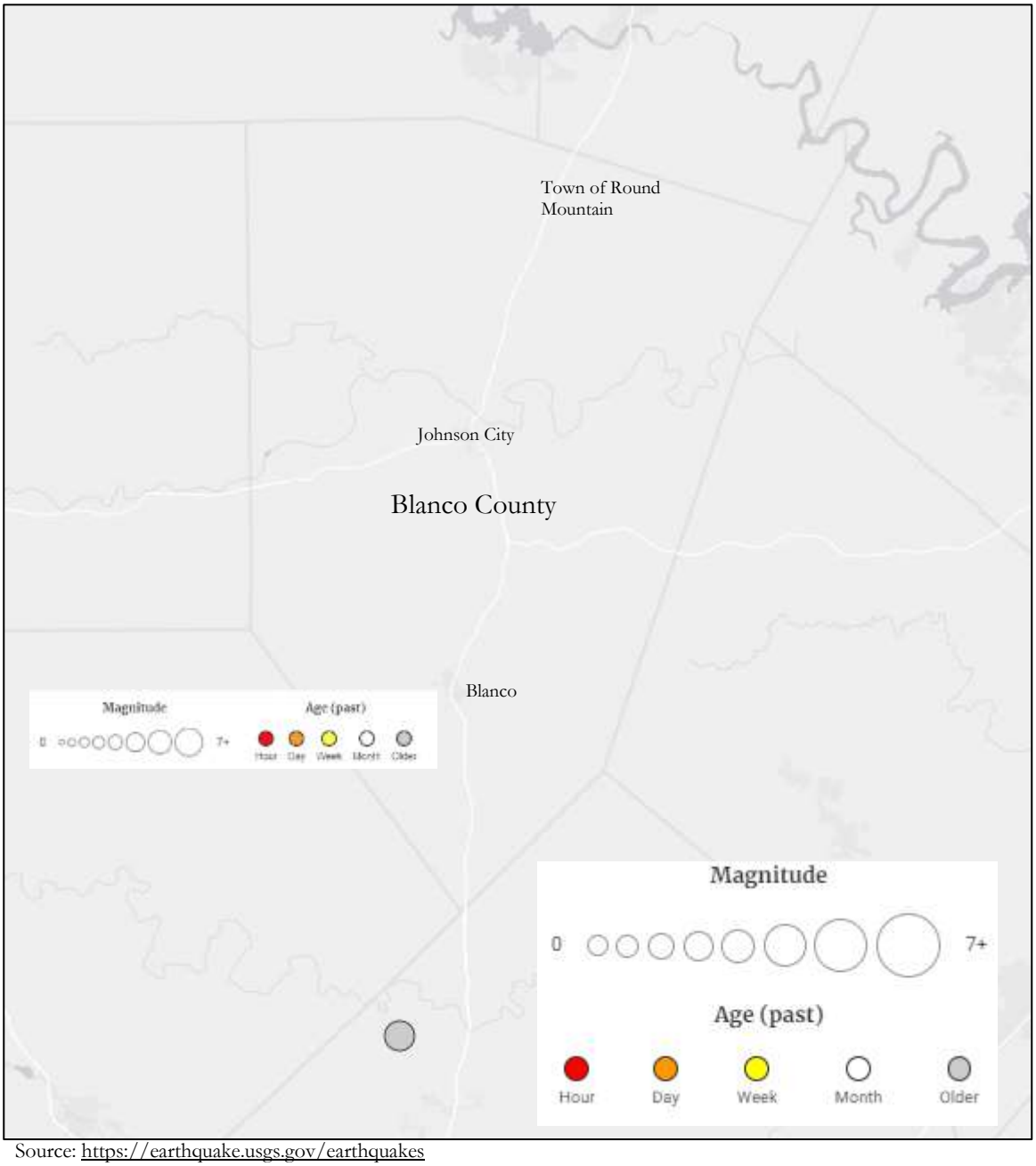
Table 15-3: Historical Occurrences of Earthquakes in and around the planning area

Date	Location	Magnitude
3/28/1982	11 kilometers north of Bulverde (Comal Co)	3.0

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

The USGS earthquake map, Figure 15-4, shows the location and magnitude of the earthquakes that have occurred in and around the Blanco County planning area.

Figure 15-4: USGS Earthquake Map with Location and Magnitude



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

Significant Events

March 28, 1982 – Comal County

At 6:00 AM on March 28, 1982, a magnitude 3.0 earthquake had its epicenter 11 kilometers North of Bulverde and a depth of 5 kilometers.

Probability of Future Events

Based on the USGS estimates in the seismic hazard risk map provided at the beginning of this section, the planning area has a 4-8% chance of experiencing an earthquake over the next 50 years. Over the 100year period of USGS data there have been no occurrences of earthquakes in the Blanco County planning area. Based on most recent data, the probability of an earthquake occurring somewhere in the planning area in the next year is **unlikely**.

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

Vulnerability and Impact

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

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

SECTION 16: DAMS

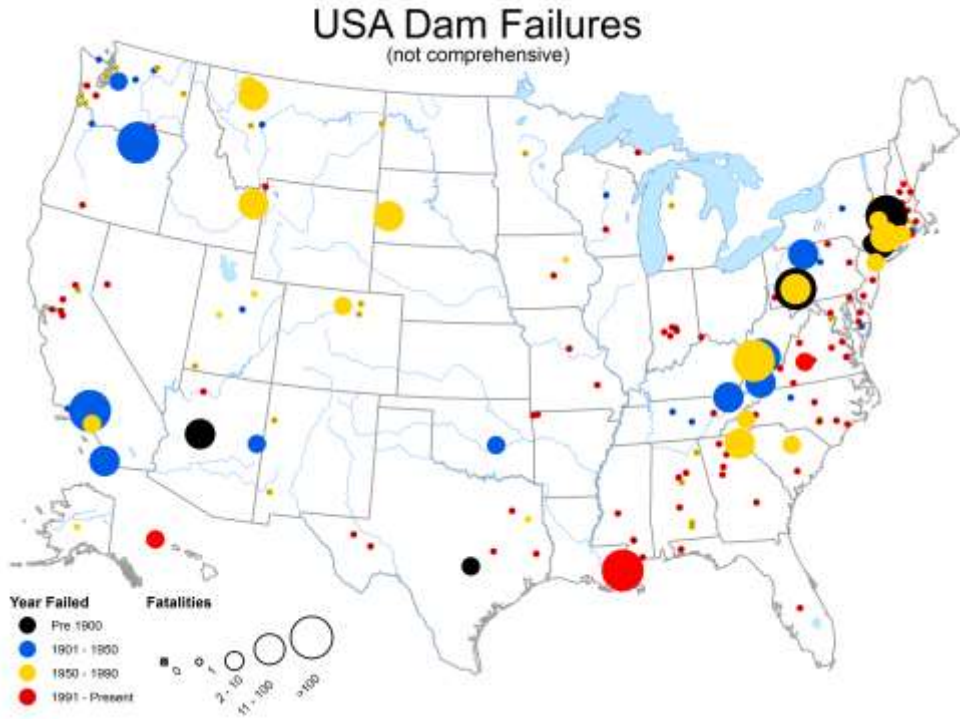
Description

Dams are water storage, control, or diversion structures that impound water upstream in reservoirs. Benefits provided by dams include water supplies for drinking, irrigation, and industrial uses. Dams also provide flood control, hydroelectric power, recreation, and navigation. At the same time, dams also represent a risk to public safety. Dams require ongoing maintenance, monitoring, safety inspections, and sometimes even rehabilitation to continue safe service.

Figure 16-1 Lake Johnson City Dam

Dam failure can take several forms, including a collapse of or breach in the structure. Hundreds of dam failures have occurred throughout U.S. history. These failures have caused immense property and environmental damages and have taken thousands of lives. As the nation's dams age and population increases, the potential for deadly dam failures grows. No one knows precisely how many dam failures have occurred in the U.S., but they have been documented in every state. From January 2005 through June 2013, state dam safety programs reported 173 dam failures and 587 "incidents" - episodes that, without intervention, would likely have resulted in dam failure. The graphic below depicts the history of dam failures throughout the United States.

Figure 16-2: USA Dam Failures



Source: damsafety.org/dam-failures

In the event of a dam failure, the energy of the water stored behind the dam is capable of causing rapid and unexpected flooding downstream, resulting in loss of life and substantial property damage. A devastating effect on water supply and power generation could be expected as well. The causes of dam failures are many but they are most likely to happen for one of five reasons.

1. **Overtopping** caused by water spilling over the top of a dam. Overtopping of a dam is often a precursor of dam failure. National statistics show that overtopping due to inadequate spillway design, debris blockage of spillways, or settlement of the dam crest account for approximately 34% of all U.S. dam failures. Overtopping can happen after periods of prolonged rainfall and flooding for which the dam was not designed or failure of upstream dams in the same drainage basin.
2. **Foundation Defects**, including settlement and slope instability, cause about 30% of all dam failures.
3. **Cracking** caused by movements like the natural settling of a dam.
4. **Inadequate maintenance and upkeep.**
5. **Piping** is when seepage through a dam is not properly filtered and soil particles continue to progress and form sink holes in the dam. [See an animation of a piping failure.] Another 20% of U.S. dam failures have been caused by piping (internal erosion caused by seepage). Seepage often occurs around hydraulic structures, such as pipes and spillways; through animal burrows; around roots of woody vegetation; and through cracks in dams, dam appurtenances, and dam foundations.

Location

Figures 15-3 and 15-4, provide a summary and illustrate general locations for each dam in the planning area. Currently, there are seven dams located in the Blanco County planning area:

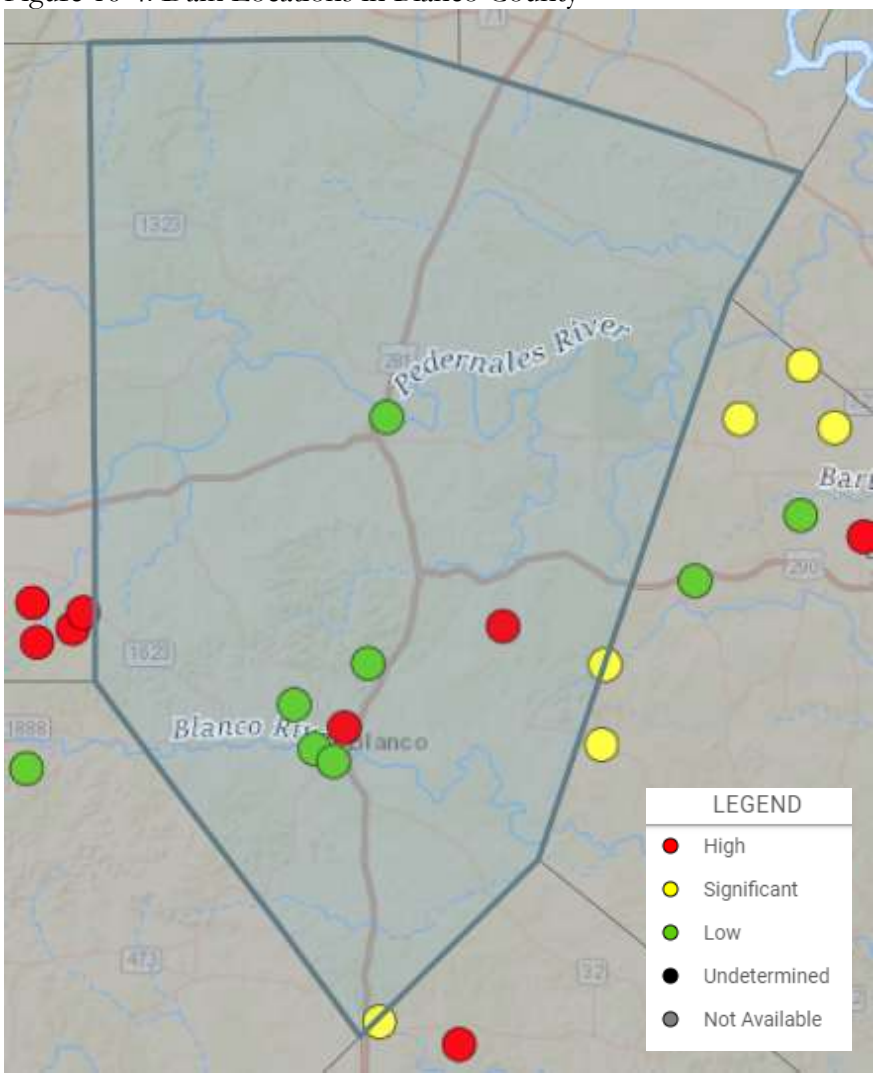
two are classified as "high-hazard", zero as "significant-hazard", five as "low-hazard" dams, zero as "undetermined," and zero as "not available."

Figure 16-3: Dam Summary for Blanco County, Texas

7 Total Dams	**54 years** Average Dam Age	**50%** High Hazard Potential Dams with an EAP	**0%** Federally Regulated Dams
		0% Dams with Hydropower	**71%** State-Regulated Dams

Source: https://nid.sec.usace.army.mil

Figure 16-4: Dam Locations in Blanco County



Source: https://nid.sec.usace.army.mil, NID

The survey of dams within the Blanco County planning area is presented in Table 16-1 below. The survey provides the dam name, the year built, height of dam, normal storage in acre feet of the impoundment, max storage, and the hazard potential.

Table 16-1: Blanco County Dam Survey

Dam Name	Year Completed	Height (Ft.)	Normal Storage (Acre Ft.)	Max Storage (Acre Ft.)	Hazard Potential
Byrams Dam	1979	45	182	584	High
Scarbrough Lake Dam	1976	31	36	54	Low

Town Creek WS SCS Site 1 Dam	1970	30	16	347	High
Tatum Lake Dam	1967	20	125	250	Low
Lake Johnson City Dam	1967	15	345	345	Low
Wayne Smith Dam	1966	14	100	100	Low
Blanco City Dam 1	1957	12	69	69	Low

Source: https://nid.sec.usace.army.mil, NID

All census blocks within five miles of a dam with a maximum storage capacity of 100,000 acre-feet or more are considered at risk of potential dam failure hazards. For dams with a maximum storage capacity between 10,000- and 100,000-acre feet, all census blocks within three miles are considered to be at risk to potential dam failure hazards. For dams with a maximum storage capacity of less than 10,000 acre-feet, all census blocks within one mile are considered to be at risk from potential dam failure hazards.

With residential and commercial developments located downstream of the dams, all populations are considered to be at if/when a dam failure occurs. The number of census blocks at risk as they relate to dam size is to be used only as a rough guide. Inundation maps based on hydraulic and hydrologic modeling can be used to provide precise risk from dam failure. The owners of both high hazard dams in Blanco County are in possession of this extremely sensitive data for the high hazard dam in the planning area, Town Creek WS SCS Site 1 Dam.

Extent

The extent or magnitude of a dam failure event is described in terms of the classification of damages that could result from a dam's failure; not the probability of failure. The National Interagency Committee on Dam Safety defines high hazard dams as those where failure or mis-operation would cause loss of human life. Low hazard potential dams are those at which failure or mis-operation probably would not result in loss of human life but would cause limited economic and/or environmental losses. Losses would be limited mainly to the owner's property. Classifications for dam failure extent are found in Table 16-2 below.

Table 16-2: Extent Classifications

Hazard Potential Classification	Loss of Human Life	Dam Storage Capacity
Low	None Expected	Less than 10,000 acre-feet
Significant	Probable (1 to 6)	Between 10,000 and 100,000 acre-feet
High	Loss of Life Expected (7 or More)	100,000 acre-feet or more

Table 16-3 represents the extent or magnitude of a dam failure event that could be expected for the Blanco County planning area as well as participating jurisdictions. The 'Extent Classification' column was determined by assessing max volume storage capacity, elevation, history of failure, classification information, condition, and potential severity based on population downstream.

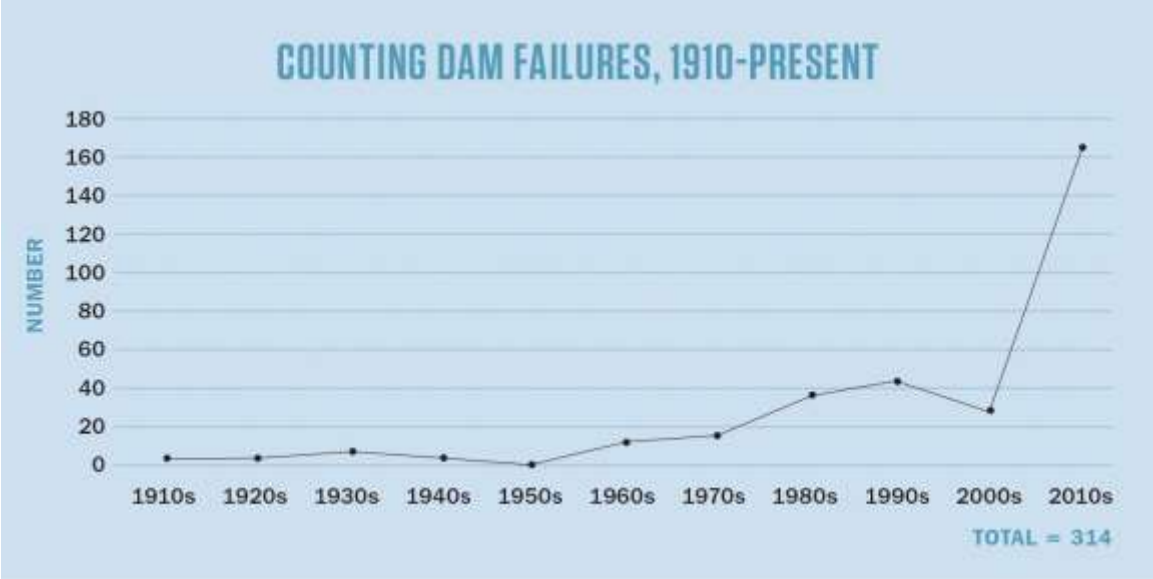
Table 16-3: Extent for Blanco County and Participating Jurisdictions

Jurisdiction	Dams and Classification	Extent Classification	Level of Intensity to Mitigate
City of Johnson City	1 - Low	Low	Dam failure presents a low threat due to low number of dams in the area, distance from population center and relatively small water storage area.
City of Blanco	1 - High	High	Dam failure presents a high threat for Blanco as Town Creek WS SCS Site 1 Dam represents a large impoundment just upstream of developed area. Loss of life is expected and economic loss is significant in the event of a catastrophic dam failure

Historical Occurrences

Texas dams earn a "D" grade from the American Society of Civil Engineers. Of the approximately 300 dam failures in Texas since 1910, half have occurred in the last nine years.

Figure 16-5: Texas Dam Failures, 1910-Present



Source: Texas Observer

Many of the dams in the planning area are classified as small dams and their failure has the capacity to cause physical and economic harm. A federal study found that from 1960-1998 dam failures accounted for 300 fatalities that occurred nationally and more than 85 percent were caused by dams less than 50 feet in height. In Texas, almost half of all dams are considered too small to regulate, and they are exempt from inspections and oversight.

Based on an investigation by the Texas Observer,

> "This investigation found that the vast majority of failures in Texas involve dams that impound less than 1,000 acre-feet. Despite their size, many small dams are ticking time bombs, according to safety experts. Big dams are usually owned by government agencies such as river authorities, which have money for upgrades and are regulated by TCEQ.

Small dams are typically owned by individuals, homeowners' associations and cash-strapped counties that can't afford expensive improvements." [13]

Significant Events

There have been no significant dam failure events in the Blanco County planning area.

Table 16-4: Dam Inspections, Condition Assessments, and EAP Revisions

Dam Name	Last Inspection Date	Condition Assessment	Condition Assessment Date	Date of Last EAP Revision
Byrams Dam	10/30/2020	Fair	06/02/2021	N/A
Scarbrough Lake Dam	N/A	Not Rated	06/18/2014	N/A
Town Creek WS SCS Site 1 Dam	1/25/2018	Not Rated	1/25/2023	4/17/2018
Tatum Lake Dam	N/A	Not Rated	06/18/2014	N/A
Lake Johnson City Dam	03/25/2021	Satisfactory	07/30/2021	N/A
Wayne Smith Dam	04/04/1979	Not Rated	06/18/2014	N/A
Blanco City Dam 1	04/04/1979	Not Rated	06/18/2014	N/A

Probability of Future Events

According to historical records, from 1997-2022 the Blanco County planning area has experienced 0 dam failures. The probability of a dam failure event occurring in the planning area is **unlikely**, with a dam failure event probable in the next 10 years.

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

Vulnerability and Impact

All areas that are directly downstream of one of the seven dams in the planning area are vulnerable to a breach. The impact of dam failure to the majority of the Blanco County planning area is **"Low,"** however, the City of Blanco receives an impact of **"High"** due to the unique location downstream of a high hazard potential dam. The extent of the impact is dependent on the severity of the dam failure, the size of the storage area, dam height, rain/flood conditions, and a host of other factors. Five of the dams in the planning area are considered low hazard dams based on their size, but as discussed in this section, low hazard dam failures have caused extensive loss of life and significant economic impact in the past. If a dam failure is extensive, a large amount of water would enter the downstream waterways forcing them out of their banks. There may be significant environmental effects, resulting in flooding that could disperse debris and hazardous materials downstream that can damage local ecosystems. If the event is severe, debris carried downstream can block traffic flow, cause power outages, disrupt local utilities, such as water and wastewater, and could result in school closures.

Town Creek Dam is the only high hazard dam in the planning area based on size. A failure could have a high impact on the downstream community of Blanco, its infrastructure, riverine

[13] Sadasivam, Naveena. *Dammed to Fail.* The Texas Observer. **April, 1 2019.**

systems, and even downstream dams. Areas directly downstream and within the City of Blanco would be need to be immediately evacuated in the event of Town Creek Dam's failure or if failure were imminent. Annualized loss-estimates for dam failure are not available nor is there a breakdown of potential dollar losses for critical facilities, infrastructure and lifelines, or hazardous materials facilities. For the dams that are regulated, the State of Texas assigns a rating based on the condition of the dam during the last inspection.

Any individual dam has a very specific area that will be impacted by a catastrophic failure. The seven dams identified can directly threaten the lives of people and animals in the inundation zone below the dam. The impact from any catastrophic failure would be like that of a flash flood with loss of life possible and injuries from debris carried by the flood. As the size of the dam increases and the proximity to the public and/or critical infrastructure increases, the probability of damage to the economy increases as well. For these reasons, creating mitigation actions to remove or protect people and structures from the path of destruction is necessary in order to minimize impact from dam failure.

The following is an excerpt from the American Society of Civil Engineers' 2017 Infrastructure Report Card detailing the importance of public safety and proper maintenance:

"In order to improve public safety and resilience, the risk and consequences of dam failure must be lowered. Progress requires better planning for mitigating the effects of failures; increased regulatory oversight of the safety of dams; improving coordination and communication across governing agencies; and the development of tools, training, and technology. Dam failures not only risk public safety, they also can cost our economy millions of dollars in damages. Failure is not just limited to damage to the dam itself. It can result in the impairment of many other infrastructure systems, such as roads, bridges, and water systems. When a dam fails, resources must be devoted to the prevention and treatment of public health risks as well as the resulting structural consequences."

Dam safety inspections fall to the Dam Safety Program managed by the Texas Commission on Environmental Quality (TCEQ). The Commission currently focuses its inspection program of existing dams primarily on high and significant hazard dams as required by rule in 30 TAC §299.42(a)(2). According to the rule, high and significant hazard dams and large, low hazard dams are scheduled to be inspected every five years, while small and intermediate dams, and low hazard dams, are only to be inspected at the request of an owner, as a result of a complaint, at the request of someone other than the owner, following an emergency such as a flooding event, or, for determining the hazard classification.

SECTION 17: MITIGATION STRATEGY

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

Because the State Hazard Mitigation Plan (SHMP) provides the State's overall strategy for reducing risk and allocating resources, the team chose to align the plan's goals to the State plan's vision, objectives and plan goal to better integrate the two. An excerpt from the 2018 State of Texas Hazard Mitigation states that,

> The successful implementation of the Texas Hazard Mitigation Strategy requires a strong partnership between many partners at all levels of government, public, private-sector, and non-governmental organizations. Effective hazard mitigation begins with individual citizens who are ultimately responsible for making risk-informed decisions regarding their personal safety and the safety of their family and home. Local governments work to identify hazards and understand the vulnerabilities and risk associated with these hazards. This work by local governments informs the citizenry and local officials so that they may develop effective strategies and policies to reduce or eliminate the long-term risk these hazards present to their communities. The state must also work to identify hazards and understand the collective vulnerability and risk these hazards present to Texas communities in order to craft effective strategies, public policy, and programs that support local government in risk management. Ultimately, the state's success at implementing an effective hazard mitigation program that reduces the long-term risk for natural hazards in Texas depends on the success of local government, as this is where the impacts of hazards are most acutely experienced. Therefore, helping local governments achieve success with their mitigation strategies is the primary focus of the Texas Hazard Mitigation Program.[14]

The following objectives and plan goal from the Texas State Hazard Mitigation Plan were also considered.

Objectives

- Implement an effective comprehensive statewide hazard mitigation plan
- Support local and regional mitigation projects and priorities
- Increase public and private sector awareness to increase support for hazard mitigation in Texas
- Support mitigation initiatives and policies that protect the state's cultural, economic, and natural resources

Plan Goal

The objective of SHMP is to establish a framework for the state of Texas to administer an effective mitigation program to prevent catastrophic impact to people and property from natural hazards.

The Planning Team mitigation strategy also included a review of the goals and objectives from the 2016 Blanco County Hazard Mitigation Action Plan Update. This was an opportunity to evaluate the previous goals and reaffirm or change them based on current conditions and priorities in each community. Two Mitigation Workshops were held for the 2023 Blanco County Mitigation Action Plan Update. The first was held during the second Core Planning Team at the City Blanco Courthouse Annex and the second was held virtually with each of the participating jurisdictional sub-teams. The goals and objectives from the 2016 Blanco County Hazard Mitigation Action Plan Update were reviewed and found to be still applicable for this plan update. The motion to adopt the following goals and objectives passed by unanimous consent at these workshops.

Mitigation Goals

Hazard mitigation goals and objectives for the Blanco County Hazard Mitigation Action Plan update are presented below.

[14] State of Texas Hazard Mitigation Plan 2018, Texas Division of Emergency Management (TDEM)

Goal #1: Protect public health and safety.

- Objective 1.1 - Advise the public about health and safety precautions to guard against injury and loss of life from hazards.
- Objective 1.2 - Maximize the utilization of the latest technology to provide adequate warning, communication, and mitigation of hazard events.
- Objective 1.3 – Reduce the damage to, and enhance protection of, dangerous areas during hazard events.
- Objective 1.4 - Protect critical facilities and services.

Goal #2: Protect existing and new properties.

- Objective 2.1 - Reduce repetitive losses to the National Flood Insurance Program.
- Objective 2.2 - Enact and enforce regulatory measures to ensure that development will not put people in harm's way or increase threats to existing properties.

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

- Objective 3.1 - Heighten public awareness of the full range of natural hazards they face.
- Objective 3.2 - Educate the public on actions they can take to prevent or reduce the loss of life or property from natural hazards.
- Objective 3.3 - Publicize and encourage the adoption of appropriate hazard mitigation measures.

Goal #4: Build and support local capacity and commitment to continuously become less vulnerable to hazards.

- Objective 4.1 – Build and support local partnerships to continuously become less vulnerable to hazards.
- Objective 4.2 – Build hazard mitigation concerns into planning and budgeting processes.

Goal #5: Promote growth in a sustainable manner.

- Objective 5.1 – Incorporate hazard mitigation into the long-range planning and development activities.
- Objective 5.2 – Promote beneficial uses of hazardous areas while expanding open space and recreational opportunities.
- Objective 5.3 – Utilize regulatory approaches to prevent creation of future hazards to life and property.

Goal #6: Maximize the resources for investment in hazard mitigation.

- Objective 6.1 - Maximize the use of outside sources of funding.
- Objective 6.2 - Maximize participation of property owners in protecting their properties.
- Objective 6.3 - Prioritize mitigation projects, based on cost-effectiveness and starting with those sites facing the greatest threat to life, health, and property.

SECTION 18: MITIGATION ACTIONS

The mitigation actions developed by Core Team, Jurisdictional sub-teams, and community stakeholders are presented in this section for Blanco County and all participating jurisdictions. Core Team members and Jurisdictional sub-team members met for two mitigation workshops in July 2023 and September 2023 to develop mitigation actions for each of the natural hazards described in the Plan; Sections 5-16.

This began with a review of mitigation actions from the prior 2016 Blanco County Hazard Mitigation Plan to assess whether they had been completed and if not, whether they were still relevant. The Action items with a "N" in the New Action column are those that have been carried over from the previous plan. New actions were developed with unique insight from planning team members, community and regional plans, capital improvement plans, and mitigation ideas developed by FEMA and the Texas Department of Emergency Management (TDEM).

Based on local input, the following action items from the previous 2016 plan were completed and those that were not carried forward from that plan were discarded due to lack of continued relevance. The actions below were listed in the prior 2016 Blanco County Hazard Mitigation Plan and are listed as completed. On-going actions or those that have not been completed but that have been considered applicable to this current planning effort are listed in the tables in the following pages and included with any new actions adopted for this hazard mitigation planning effort.

Blanco County	
ACTION: Install Reverse 911	
Action Completed	iPAWS upgrade, a call is placed to all registered phones when severe weather is in the area.
ACTION: Purchase NOAA All-hazard radios	
Action No Longer Applicable	NCAA channels have been added to all public safety radios.
ACTION: Update and maintain Emergency Management Plan	
Action Completed	Monthly meeting of county emergency personnel. Desktop exercises and drills along with reviewing plan action progress.
ACTION: Work with extension agent to develop a soil conservation plan	
Action No Longer Applicable	This action is no longer applicable.
ACTION: Review County's Floodplain Ordinance	
Action Completed	Updated county's floodplain ordinance above minimum requirement. Will be implemented by action of Commissioner's Court.
City of Johnson City	
ACTION: Update Building Codes	
Action Completed	Updated from the 2009 IBC and 2009 IRC to the 2016 IBC and 2016 IRC
ACTION: Purchase NOAA all-hazard radios	
Action No Longer Applicable	
ACTION: Provide proper design criteria for tornado safe room	
Action No Longer Applicable	
ACTION: Bring City into compliance with the requirements of the NWS Storm Ready Program	
Action No Longer Applicable	
ACTION: Undertake a review of the City's floodplain management ordinance.	
Action Completed	Review and adoption of enhanced flood protection standards achieved.
ACTION: Drought Action Plan	

Action Completed	Created and implemented water conservation stages to be used in times of drought and extreme heat in the city.
ACTION: Extreme Heat Action Plan	
Action Completed	Public alerts now on city website, notifications on water bills, and Town Hall meetings of the dangers of extreme heat on people and animal health.
ACTION: Tree Pruning Program	
Action Completed	Prune trees from out of the city ROW, utilities, and drainage paths.

The Core Planning Team then took the draft mitigation actions back to their respective departments to get feedback and develop them further with input from local staff and officials responsible for their implementation. The goals listed in Section 17 were used as guidance while considering such factors as existing and future growth, the hazard risk assessments, individual community priorities, critical facilities, and unique community vulnerabilities. Mitigation action types include *Local plans and regulations, Structural projects, Natural systems protection, and Education programs.* Additional information provided for each mitigation action includes the jurisdictional department responsible for implementation, estimated cost, potential funding sources, timeline for implementation, and benefit to the community based on the cost and resources to implement the action.

An action that is ranked as "High" indicates that it will be implemented as soon as funding is made available from both local budgets and through grants. A "Medium" action is one that may not be implemented right away depending on the cost and how well or how many community members are served. A "Low" action is one whose benefit is hard to quantify in relation to the cost but is still considered of value to the community and is to be implemented when funds and resources are available.

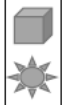
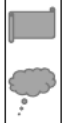
Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Blanco County											
1	Maintain a program for clearing debris	Implement a program for clearing debris from drains and culverts and enact driveway permits. Periodic checks by road crews to ascertain that drains are open.	Hurricane, Flood, Dam Failure		G1	N	Public Works	$50,000	Local	24	Medium
2	Installation of emergency power generators at critical infrastructure/key resource locations	Install emergency generators at critical facilities to provide back-up power from hazard events. The courthouse annex and emergency shelters are a priority for this item.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G4	N	Emergency Management	$250,000	Local	36	High
3	Review and update the POD plan	Coordinate efforts with the local health authority (EMS and Medical Director) to review and modify, if necessary, the Point of Distribution plan	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G4	Y	Emergency Management	$25,000	Local, PDM, HMGP	36	Low
4	Update the county wide emergency action plan annually	Update the emergency action plan that addresses Critical Infrastructure and Key Resources (CIKR) failure, interruption, Potable water supply failure/ contamination, and water treatment plant failure	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G4	Y	Emergency Management	$50,000	Local, Homeland Security	24	Medium
5	Ensure computer systems have a robust malware and virus detection and elimination software.	Ensure that the cybersecurity threat is mitigated by having a robust malware and virus detection and elimination program so that all systems will be operational during a possibly concurrent natural hazard event.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G4	Y	City Information Technology	$20,000	Local, Homeland Security	36	Medium
6	Upgrade the 4 most critical low water crossings in Precint 1	Conduct a study of low water crossings and develop and assess alternatives for flood mitigation of critical transportation routes at Crabapple Rd @ Blanco River & RR 1888, Old Kendalia Rd @ Hunter Hill, Trainer-Wuest Rd @ Blassingame Creek, Trainer-Wuest Rd @ Blanco River & FM 1623.	Hurricane, Flood, Dam Failure		G1, G2, G6	Y	Engineering, Road and Bridge	$500,000	Local, PDM, HMGP	24	Medium

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Blanco County											
7	Upgrade the 4 most critical low water crossings in Precint 2	Conduct a study of low water crossings and develop and assess alternatives for flood mitigation of critical transportation routes at Tow Head Valley Rd @ Tow Head Valley Creek, Klett Ranch Rd @ Tow Head Creek, Klett Ranch Rd @ Tow Head Creek Tributary, County Rd 201 ("Park Rd") @ Flat Creek.	Hurricane, Flood, Dam Failure		G1, G2, G6	Y	Engineering, Road and Bridge	$500,000	Local, PDM, HMGP	24	Medium
8	Upgrade the 4 most critical low water crossings in Precint 3	Conduct a study of low water crossings and develop and assess alternatives for flood mitigation of critical transportation routes at Old Spicewood Rd @ Fall Creek, Old Spicewood Rd @ Wallace Branch Creek, Old Marble Falls Rd near north end of Rd. (Watershed area)	Hurricane, Flood, Dam Failure		G1, G2, G6	Y	Engineering, Road and Bridge	$500,000	Local, PDM, HMGP	24	Medium
9	Upgrade the 4 most critical low water crossings in Precint 4	Conduct a study of low water crossings and develop and assess alternatives for flood mitigation of critical transportation routes at Tejas Trail Rd @ Blanco River, Cox Rd @ Blanco River, Chimney Valley Rd @ Blanco River, Chimney Valley Rd @ Blanco River.	Hurricane, Flood, Dam Failure		G1, G2, G6	Y	Engineering, Road and Bridge	$500,000	Local, PDM, HMGP	24	Medium
10	Post burn ban signs	Post burn ban signs on roads and articles in local newspapers.	Drought, Extreme Heat, Wildfire		G1, G3	N	Emergency Management	<$10,000	Local: Road and Bridge, PDM, HMGP	24	Medium
11	Use the application of calcium soil stabilizers in road construction	Specify the use of calcium soil stabilizer as part of the County Engineer protocol for pavement subgrade work on county roads. This will make a durable permanent roadway layer.	Hurricane, Flood, Drought, Extreme Heat, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1	N	Road and Bridge Division	<$10,000	Local	24	Low
12	Study shelter needs and upgrade to serve community and withstand hazards.	1 Shelter in Blanco County. (Location?) Study existing shelter capacity and needs. Harden against hazards and ensure they can function as heating/cooling centers.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G6	Y	Emergency Management	$200,000	Local, PDM, HMGP	48	Medium

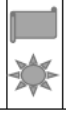
Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Blanco County											
13	Educated homeowners on mitigating their homes from hazards	Use the county website and additional outreach methods to educate homeowners about how to mitigate damage to their homes from natural hazards.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3	N	Emergency Management, Fire Department	<$10,000	Local, FEMA	24	Low
14	Develop redundant IT systems where feasible	Buy a new server to create backup systems in the case of failure due to power outages and lightining strikes.	Hurricane, Flood, Windstorms, Lightining, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes		G1	Y	City Manager	$50,000	Local, Homeland Security	36	Medium

Legend:

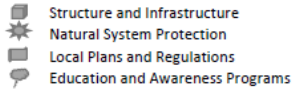
- Structure and Infrastructure
- Natural System Protection
- Local Plans and Regulations
- Education and Awareness Programs

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Blanco											
1	Build Community Center	Build a central community center to function as a shelter that is central to the City of Blanco.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G4, G5	Y	City Manager, Planning and Development	$500,000	Local, PDM, HMGP	36	Medium
2	Safe Routes to School	Safe Routes to School programs aim to make it safer for students to walk and bike to school and encourage more walking and biking where safety is not a barrier.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G5	Y	ISD and Public Works	$100,000	Local, PDM, HMGP, CDBG	24	Low
3	Town Creek Clearing of Brush and Debris	Periodically and consistently clear brush and debris from town creek to allow for the maximum conveyance of floodwaters	Hurricane, Flood, Drought, Extreme Heat, Lightning, Wildfire, Severe Winter Storms, Dam Failure		G1, G5, G6	Y	Public Works	$50,000	Local, PDM, HMGP	12	High
4	Parkland dedication	Amend development code to require parkland dedication during subdivision (comp plan)	Hurricane, Flood, Extreme Heat, Dam Failure		G1, G2, G4, G5	Y	Planning and Development	<$10,000	Local	12	High
5	Develop a signage plan for downtown	Signage helps both locals and visitors find their way, particularly during emergency situations and hazardous conditions	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G2, G3	Y	Planning and Development	$25,000	Local	24	Medium
6	Explore New Water Supply Sources in Blanco	Study whether to upgrade existing water supply infastructure to Canyon Lake or to use local strategies such as impoundment or acquifer storage.	Drought, Exttreme Heat, Lightning, Wildfire, Dam Failure		G1, G4,G5, G6	Y	Engineering	$300,000	Local, PDM, HMGP, TWDB	36	High
7	Relocate critical infrastructure outside of dam inundation zone	Relcate critical infrastructure or critical functions outside of the dam failure inundation zone, elevate above anticipated flood levels, and protect	Hurricane, Flood, Dam Failure		G2, G5, G6	Y	Engineering	$150,000	Local, PDM, HMGP, TWDB	48	High
8	Amend city ordinances	Amend city zoning and subdivision ordinances to encourage new development in desired development areas that are not prone to hazards	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G2, G3	Y	Planning and Development	$15,000	Local	24	Medium

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Blanco											
9	Study Blanco Dam	Study the Blanco dam to understand the impact of a dam failure in terms of the dam inundation zone and velocity of floodwaters released.	Hurricane, Flood, Dam Failure		G2, G3, G6	Y	Engineering	$200,000	Local, PDM, HMGP, TWDB	36	High
10	Develop/Update Emergency Operations Plan that includes Dam Failure	Prepare an EOP or continuity of operations plan to protect building tenants and minimize business disruptions.	Hurricane, Flood, Dam Failure		G1, G2, G4, G5	Y	City Manager	$50,000	Local, PDM, HMGP, TWDB, Homeland Security	36	High
11	Structural hardening of critical facilities	Analyze, prioritize and harden critical facilities to withstand impacts from hazard events such as earthquakes forces and movements, high winds, hailstorm and lightening strikes.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G5, G6	Y	Public Works	$200,000	Local, PDM, HMGP	48	Medium
12	Install a generators at critical facitilites	Install a generator at the EOC, Fired Department, Police Station, and EMS to provide backup power in the event of an emergency	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G6	Y	Public Works	$125,000	Local, PDM, HMGP, ISD	36	High
13	Ensure stormwater retention and remediation is designed in all new developments	Amend Development code to require stormwater detention and retention requirements where necessary (Review recent code revisions to make sure isn't adopted already)	Hurricane, Flood, Dam Failure		G2, G5	Y	Planning Department	$5,000	Local	24	Medium
14	Plant drought tolerant trees along public sidewalks, parking lots, and streets	Xeriscaping is a type of landscaping that uses little water by only using plants that are native to the area. Trees along sidewalks and parking lots provide shade from the heat and sun while preserving potable water supplies for drinking and fire suppression. (Downtown Plan)	Drought, Extreme Heat, Wildfire		G1, G2	Y	Public Works	$50,000	Local, HMGP, PDM, Texas Forest Service, TPRD	24	Low
15	Wildfire Prevention Education	Develop a wildfire prevention program to inform citizens and visitors of what to do during incidents that threaten life and property. Educate on how to create a defensible space around homes and how to implement firewise sites principles at the neighborhood level that is tailored to specific community needs.	Drought, Extreme Heat, Wildfire		G1, G2, G3, G4	Y	Emergency Management, Fire Department	$50,000	Local, HMGP, Texas A&M Forest Service, ISD	24	High

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
City of Blanco											
16	Develop Critical Wildfire Protection Plan	A well-prepared, collaboratively developed CWPP or similar plan should address issues such as wildfire response, hazard mitigation, community preparedness (which includes smoke readiness), structure protection, or a combination of these issues, and will greatly assist a local government body in planning and prioritizing project work.	Extreme Heat, Drought, Wildfire		G1, G2, G3, G4, G5	Y	Emergency Management	$40,000	Local, PDM, HMGP, Texas Forest Service, US Department of Forestry	24	High
17	Public education for homeowners on hazard mitigation	Educate homeowners about mitigating hazards for theirs homes and empower residents about the importance of having an emergency preparedness kit. Use ready.gov as a resource.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G2, G3	N	Emergency Management	$10,000	Local, PDM, HMGP	36	Medium
18	Buyout residential and commercial property	Propose a voluntary buyout using Floodplain ordinance, FEMA resources, etc. as each property is substantially damaged in 100-year flooplain if no flood improvement projects are planned or in progress for the area.	Hurricane, Flood, Dam Failure		G1, G2, G5, G6	N	City Manager	$500,000	Local, PDM, HMGP, TWDB	60	Medium

Legend:



Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Johnson City											
1	Install lightning protection devices	Install lightning protection devices at all critical city locations in order to mitigate lighting strike damage to buildings.	Lightning		G1, G2, G4	N	Utility Department	$50,000	Local, PDM, HMGP	36	High
2	Continue to develop and promote hazard awareness campaigns	Create emergency preparedness page on the City website to provide the latest information on best practices for hazard mitigation and preparation.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G2, G3, G4	Y	Emergency Management	$5,000	Local	24	Low
3	Upgrade and maintain fire safety infrastructure	Evaluate and rectify deficiencies in the City's current fire safety infrastructure.	Extreme Heat, Drought, Wildfire		G1, G2, G4, G5, G6	Y	Utility Department	$350,000	Local, TDA, Texas Forest Service	24	Medium
4	Install generators, where required, to assure uninterupptible power	Install generators at West Wells and Danz Wells and sewer lift stations.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G2, G4, G6	Y	Utility Department	>$250,000	Local, PDM, HMGP	24	High
5	Update and implement City drainage plan	Secure funding and engage engineer specializing in drainage planning.	Hurricane, Flood, Dam Failure		G1, G2, G3, G4, G5, G6	N	City Engineer/ Floodplain Administrator	>$250,000	Local, TWDB	36	Medium
6	Streamline City's Fire Code Review and Approval	Streamline the City's International Fire Code Review and approval of commercial and residential subdivision developments.	Extreme Heat, Drought, Wildfire		G1, G2, G3, G5	Y	Planning and Development	$35,000	Local	36	Low
7	Develop Critical Wildfire Protection Plan	A well-prepared, collaboratively developed CWPP or similar plan should address issues such as wildfire response, hazard mitigation, community preparedness (which includes smoke readiness), structure protection, or a combination of these issues, and will greatly assist a local government body in planning and prioritizing project work.	Extreme Heat, Drought, Wildfire		G1, G2, G3, G4, G5	Y	Emergency Management	$40,000	Local, PDM, HMGP, Texas Forest Service, US Department of Forestry	24	High

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Johnson City											
8	Wildfire Prevention Education	Develop a wildfire prevention program to inform citizens and visitors of what to do during incidents that threaten life and property. Educate on how to create a defensible space around homes and how to implement firewise sites principles at the neighborhood level that is tailored to specific community needs.	Drought, Extreme Heat, Wildfire		G1, G2, G3, G4	Y	Emergency Management, Fire Department	$50,000	Local, HMGP, Texas A&M Forest Service, ISD	24	High
9	S-14: SCADA Improvements at LSs & WWTP (CIP)	The City needs to expand its wastewater system capacity to meet existing and future demand.	Drought, Extreme Heat, Severe Winter Storms		G1, G5	Y	Engineering	$199,900	Local, PDM, HMGP, TWDB	60	High
10	Safe Routes to School	Safe Routes to School programs aim to make it safer for students to walk and bike to school and encourage more walking and biking where safety is not a barrier. Providing these options reduces risk for all populations in the event of natural hazards by allowing more safe routes of passage.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G5	Y	ISD and City Planning	$100,000	Local, PDM, HMGP, CDBG	24	Low
11	S-2b: WWTP Expansion (CIP)	The City needs to expand its wastewater system capacity to meet existing and future demand.	Drought, Extreme Heat, Severe Winter Storms		G1, G3	Y	Engineering	$14,000,000	Local, PDM, HMGP, TWDB	60	High
12	Develop new/updated floodplain maps	Secure funding and engage engineer specliazing in floodplain mapping.	Hurricane, Flood, Dam Failure		G1, G2, G3, G4, G5, G6	N	City Engineer/ Floodplain Administrator	>$250,000	Local, PDM, HMGP, TWDB	36	High
13	W-6: Remote Water Well and 0.1 MG EST (CIP)	The City needs to expand its water system capacity to meet existing and future demand.	Drought, Extreme Heat, Severe Winter Storms		G1, G6	Y	Engineering	$5,230,000	Local, PDM, HMGP, TWDB	60	High
14	W-12: Water Plant No. 3 (Well, GST, BPs) (CIP)	The City needs to expand its water system capacity to meet existing and future demand.	Drought, Extreme Heat, Severe Winter Storms		G1, G6	Y	Engineering	$4,175,000	Local, PDM, HMGP, TWDB	60	High
15	Reduce the number of unoccupied and uninhabitable structures in the floodplain and dam inundation areas	Demolish and remove structures by notifying property owners, purchasing properties and adopting/enforcing codes.	Hurricane, Flood, Dam Failure		G1, G2, G3, G4, G5, G6	N	Floodplain Administrator	>$100,000	Local, PDM, HMGP	60	High

Legend:

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

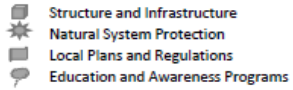
Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Blanco ISD											
1	Implement Education and Awareness Program	Implement education and awareness program utilizing classrooms, social media, bulletins, flyers, etc. to educate students, parents and area residents of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G4, G5	Y	Curriculum Developer, Superintendent	$5,000	Local, PDM, HMGP	36	High
2	Safe Routes to School	Safe Routes to School programs aim to make it safer for students to walk and bike to school and encourage more walking and biking where safety is not a barrier.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G5	Y	City, ISD and Public Works	>$100,000	Local, PDM, HMGP, CDBG	24	Low
3	Acquire and install generators at all critical facilities	Aquire and install generators with hard wired quick connections at all critical facilities	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G2, G6	Y	Facilities Department	>$100,000	Local, PDM, HMGP, CDBG	36	Medium
4	Emergency alert system	Implement emergency alert system for Johnson ISD staff, students and parents.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3	Y	ISD Emergency Manager	$5,000/ year	Local	12	High
5	Update EOP	Update and Implement emergency operations plan for all Johnson City ISD campuses and the administrative building.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G4	Y	ISD Emergency Manager	$35,000	Local (staff time), State and Local grants	36	Medium
6	Create, Fund and Staff a School Resource Officer Position	The School Resource Officer (SRO) is a sworn law enforcement officer responsible for providing security and police services to a school or group of schools. The SRO is a visible presence in the school community and works to build relationships with students, staff, and families.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G6	Y	School Board	$80,000/year	Johnson City, ISD, State and Local Grants	12	High

Legend:

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

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Johnson City ISD											
1	Implement Education and Awareness Program	Implement education and awareness program utilizing classrooms, social media, bulletins, flyers, etc. to educate students, parents and area residents of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G4, G5	Y	Curriculum Developer, Superintendent	$5,000	Local, PDM, HMGP	36	High
2	Safe Routes to School	Safe Routes to School programs aim to make it safer for students to walk and bike to school and encourage more walking and biking where safety is not a barrier.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G5	Y	City, ISD and Public Works	>$100,000	Local, PDM, HMGP, CDBG	24	Low
3	Acquire and install generators at all critical facilities	Aquire and install generators with hard wired quick connections at all critical facilities	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G2, G6	Y	Facilities Department	>$100,000	Local, PDM, HMGP, CDBG	36	Medium
4	Emergency alert system	Implement emergency alert system for Johnson ISD staff, students and parents.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3	Y	ISD Emergency Manager	$5,000/ year	Local	12	High
5	Update EOP	Update and Implement emergency operations plan for all Johnson City ISD campuses and the administrative building.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G4	Y	ISD Emergency Manager	$35,000	Local (staff time), State and Local grants	36	Medium
6	Create, Fund and Staff a School Resource Officer Position	The School Resource Officer (SRO) is a sworn law enforcement officer responsible for providing security and police services to a school or group of schools. The SRO is a visible presence in the school community and works to build relationships with students, staff, and families.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G6	Y	School Board	$80,000/year	Johnson City, ISD, State and Local Grants	12	High

Legend:



Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Blanco Pedernales Water District											
1	Acquire and install generators at all critical facilities	Aquire and install generators with hard wired quick connections at all critical facilities	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G2, G6	Y	BPWD	>$100,000	Local, PDM, HMGP	36	High
2	Harden facilities against hazards	Upgrade maintenance facilities and offices to include drought mitigation measures such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains.	Drought, Extreme Heat, Wildfire		G1, G2, G6	Y	BPWD	>$50,000	Local, PDM, HMGP	24	Medium
3	Hazard education and awareness program	Implement education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages within the district.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3, G4	Y	BPWD	$50,000	Local, PDM, HMGP	24	High

Legend:

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

Mitigation Action Plan

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

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

SECTION 19: PLAN MAINTENANCE

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

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

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

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

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

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

Table 20-1: Team Members Responsible for Plan Maintenance

Jurisdiction/Entity	Title
Blanco County	**Emergency Management Coordinator**
City of Blanco	Public Works Director
City of Johnson City	City Manager
Blanco ISD	Superintendent
Johnson City ISD	Superintendent
Blanco Pedernales Water District	General Manager

Incorporation

Following adoption and approval of the Plan, Blanco County, including participating jurisdictions and Blanco Pedernales Water District, will implement actions they have developed and prioritized in the plan based on funding availability and continuing public input. A timeline is provided with each action and is used to assess whether actions are being completed on time based on the date of plan adoption. Potential funding sources are also listed for each action in Section 18, and described in more detail below. Additional funding sources can include federal disaster declarations and other non-federal grant sources.

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

BRIC: The Building Resilient Infrastructure and Communities (BRIC) grant program supports states, local communities, tribes, and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. The program's guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large infrastructure projects; maintaining flexibility; and providing consistency.

CWDG: The Community Wildfire Defense Grant Program, or CWDG, is intended to help at-risk local communities and Tribes plan for and reduce the risk of wildfire. This program, which was authorized by the Bipartisan Infrastructure Law, prioritizes at-risk communities in an area identified as having high or very high wildfire hazard potential, are low-income, or have been impacted by a severe disaster that affects the risk of wildfire. More details on these three priorities can be found in the Notices of Funding Opportunity (NOFOs) below. The program provides funding to communities for two primary purposes:

- Develop and revise Community Wildfire Protection Plans (CWPP).
- Implement projects described in a Community Wildfire Protection Plan that is less than ten years old.

The CWDG Grant Program also helps communities in the wildland urban interface (WUI) implement the three goals of the National Cohesive Wildland Fire Management Strategy.

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

PDM: The Pre-Disaster Mitigation Grant Program is designed to provide technical and financial assistants to States and local governments for cost-effective pre-disaster hazard mitigation activities that complement a comprehensive mitigation program. The goal is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. This program awards planning and project grants and provides opportunities for raising public awareness about reducing future losses before disaster strikes. Mitigation planning is a key process used to break the cycle of disaster damage, reconstruction, and repeated damage.

Methods of Incorporation of the Plan

Once per year at a minimum, participating Core team members will conduct a review of plans and policies in place and analyze the need for amendments based on the approved plan. Team members will incorporate any mitigation policies and actions into these plans and policies as appropriate, then seek approval from Commissioners Court and/or City Councils, as appropriate. The plans and policies that will require review include emergency operations or management plans, capital improvement plans, comprehensive land use and future growth plans, transportation plans, annual budgeting, and any building codes that guide and control development in a way that will contribute to the goals of this mitigation plan to reduce long-term risk to life and property from all hazards.

A list of regulatory and planning capabilities currently available to the jurisdictions can be found in **Appendix A**. In the process of integrating the mitigation actions into new and existing planning mechanisms, the participating jurisdictions will do the following:

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

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

Periodic annual tracking of the Plan is required to ensure that the mitigation actions are implemented over the 5-year cycle and that the Plan is kept current based on the latest information about hazards and their impacts. The team members designated by department and jurisdiction in Table 18-1 are responsible for monitoring, evaluating, and updating the Plan for their participating jurisdiction. The planning team will convene on an annual basis or when other plans are being developed, reviewed or updated. In addition to annual monitoring, the Plan will be similarly reviewed immediately after extreme weather events including but not limited to state and federally declared disasters.

Monitoring

The Plan in its entirety, will be monitored, including but not limited to continued public participation, plan evaluation method, plan update methods, action prioritization, administration of identified mitigation actions, risk assessment, and incorporation into other planning mechanisms. Responsibilities of annual monitoring include working with various city and county departments to ensure that the identified mitigation actions get incorporated into existing plans and policies and that mitigations actions that are funded by City Councils and the County Commissioners' Court get implemented. These mitigation action status updates will include a feasibility assessment for implementation and funding for the remaining time left in the 5-year mitigation action planning cycle.

Planning team meetings for *monitoring* the plan will include a **sign-in sheet** to record attendance and a **brief report** that identifies policies and actions in the plan that have been successfully implemented since its adoption. The report will also document the steps to be

followed to develop action items into a policy or project that have not yet been completed and how the plan has been incorporated into other planning mechanisms.

Evaluation

As part of the annual tracking of the Plan, Core Planning Team members will evaluate changes in risk and hazard data associated with the planning area to determine if there are any needed changes to mitigation action timelines, prioritization, or if any action needs to be amended, added, or deleted. This is an opportunity to detect if there are any new obstacles to the implementation of actions such as funding, political, legal, or coordination within departments such as changes in departmental programs and goals that may affect mitigation priorities.

The Plan evaluation is also an opportunity to review the effectiveness of public participation and outreach efforts and to update or expand upon those efforts. The effectiveness of public participation can be measured with surveys, number of website hits, number of people in attendance, and number of materials printed. The annual evaluation process is necessary to make any necessary amendments to the plan to keep the plan relevant and most effective in mitigating the identified hazards in the Plan. Team meetings for *evaluating* the plan will include a **sign-in sheet** to record attendance and a **brief report** that identifies any changes to the Plan or to the local jurisdiction's implementation process needed for continued success.

Updating

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

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

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

Five Year Review and Update

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

The 5-year Plan review allows for evaluating successful and unsuccessful mitigation actions, documenting losses avoided, and considering factors affecting the Plan. Necessary revisions will be summarized and integrated into the existing plan or reserved for the 5-year plan update. The revised or new Plan will be submitted to TDEM and FEMA for final review and approval.

Continued Public Involvement

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

The Planning team may also develop a voluntary citizen/stakeholder advisory group comprised of members from throughout the planning area to provide feedback on an annual basis. It is vital that the public and stakeholders maintain a vested interest in the Plan in order to keep the Plan relevant as it relates to the broader community's sustained health, safety, and welfare. Media such as websites, social media, local newspaper, and radio stations will be used to notify the public of any maintenance or periodic review activities taking place.

Public participation is critical to creating a plan that is enduring and one that has meaning to the community. The direct involvement of local officials and the public has been and will continue to be sought during the development, implementation, and maintenance phases of this Blanco County Hazard Mitigation Plan Update.

APPENDIX A: CAPABILITY ASSESSMENT

Community Capabilities

	Capabilities	Blanco County	City of Blanco	City of Johnson City	Blanco ISD	Johnson City ISD	Blanco / Perdanales Water District
Planning and Regulatory	Comprehensive Plan	X	X	X			X
	Capital Improvement Program		X	X			
	Economic Development Plan	X		X			
	Transportation Plans	X	X	X			
	Emergency Operation Plans	X	X	X	X	X	X
	Continuity of Operations Plan	X					
	Stormwater Management Plan		X	X			
	Wildfire Ordinance						
	Zoning ordinances		X	X			
	Building Codes		X	X			
	Subdivision Ordinance	X	X	X			
	Floodplain Ordinance		X	X			
Administrative and Technical*	Engineers		X	X			X
	Planner		X	X			
	GIS Analysts			X			X
	Building inspectors	X	X	X			X
	Emergency managers	X	X				
	Grant writers	X	X	X			
	Chief Building Official			X			X
	Floodplain Administrator	X	X	X			
Financial**	Operating budgets	X		X	X	X	X
	Stormwater utility fees						
	Development impact fees			X			
Education and Outreach***	School programs			X			X
	Firewise communities	X					
	Storm Ready communities						
	Hazard awareness campaigns			X			
	Public Information Officer	X	X	X			
	Community newsletter	X					X
Other	Hydrologic/ Hydraulic Studies						
	Warning Systems/ Services						X

* **Administrative and Techinal** - This refers to staff, skills, and tools a community has. So provide staff numbers and any credentials or certificate trainings in reference to hazard mitigation

** **Financial** - Resources that a jurisdiction has access to or is eligible to use to fund mitigation efforts

*** **Education and Outreach** - Programs and methods already in place that could be used to implement mitigation

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

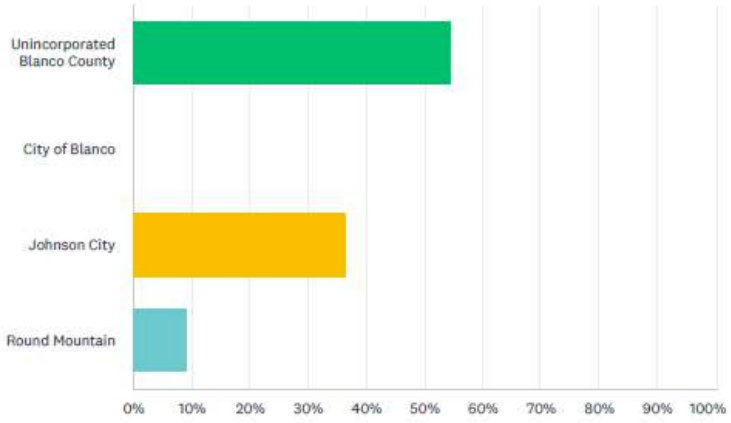
APPENDIX B: PUBLIC SURVEY

Q1

Customize Save as

Please tell us where you live

Answered: 11 Skipped: 0



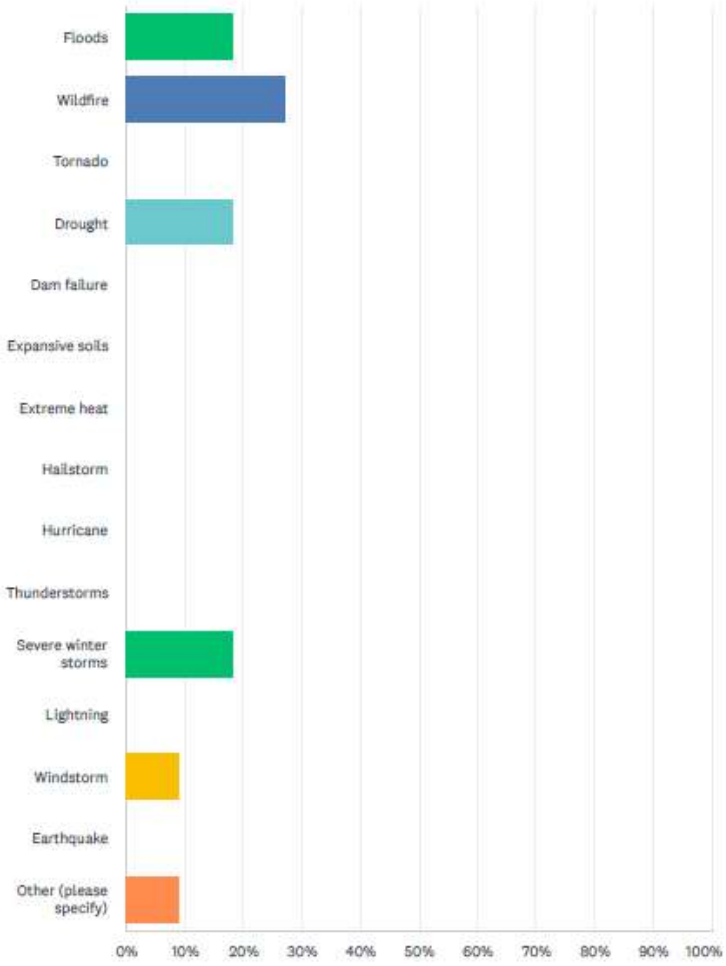
ANSWER CHOICES	RESPONSES	
Unincorporated Blanco County	54.55%	6
City of Blanco	0.00%	0
Johnson City	36.36%	4
Round Mountain	9.09%	1
TOTAL		11

Comments (2)

Q2

Customize Save as

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



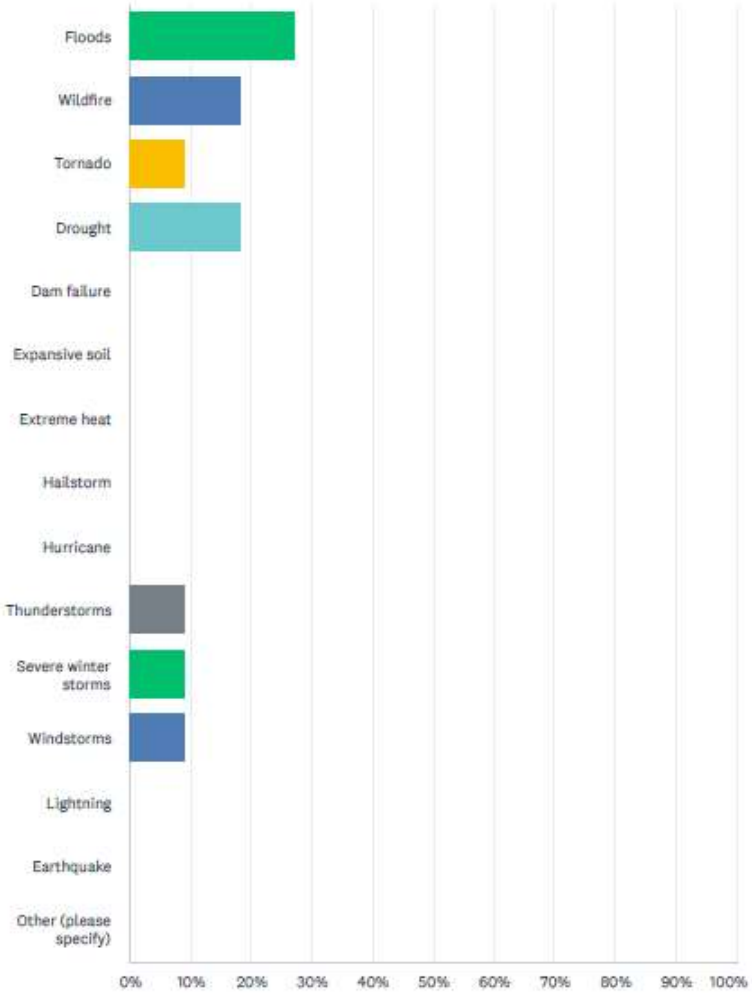
ANSWER CHOICES		RESPONSES	
Floods		18.18%	2
Wildfire		27.27%	3
Tornado		0.00%	0
Drought		18.18%	2
Dam failure		0.00%	0
Expansive soils		0.00%	0
Extreme heat		0.00%	0
Hailstorm		0.00%	0
Hurricane		0.00%	0
Thunderstorms		0.00%	0
Severe winter storms		18.18%	2
Lightning		0.00%	0
Windstorm		9.09%	1
Earthquake		0.00%	0
Other (please specify)	Responses	9.09%	1
TOTAL			11

Q3

Customize Save as

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

Answered: 11 Skipped: 0



ANSWER CHOICES	RESPONSES	
Floods	27.27%	3
Wildfire	18.18%	2
Tornado	9.09%	1
Drought	18.18%	2
Dam failure	0.00%	0
Expansive soil	0.00%	0
Extreme heat	0.00%	0
Hailstorm	0.00%	0
TOTAL		11

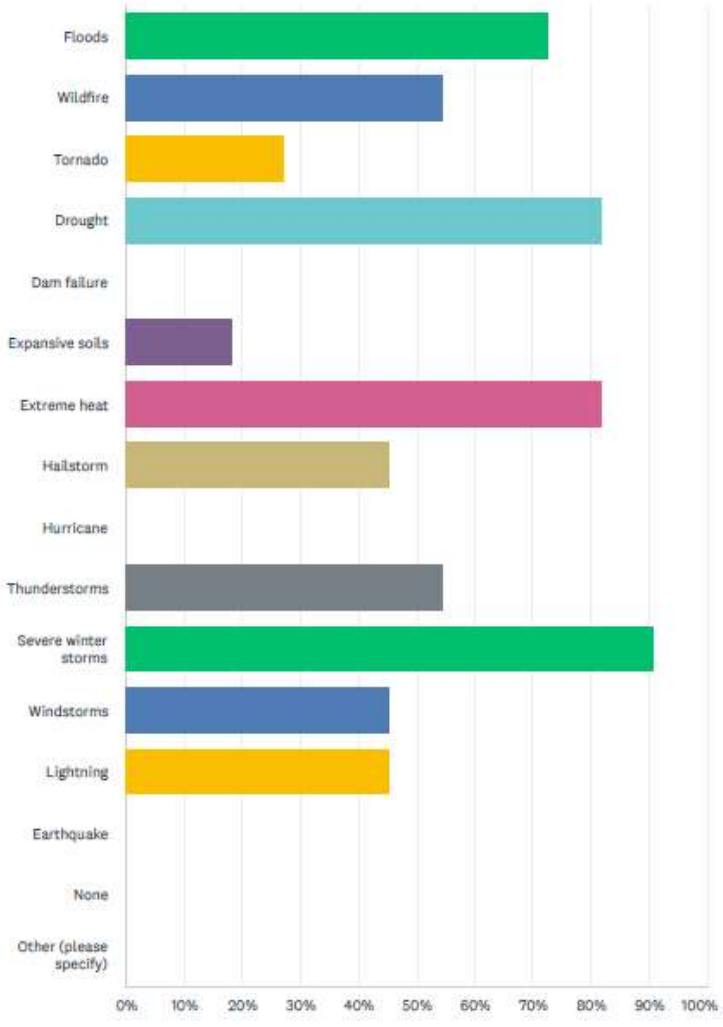
ANSWER CHOICES		RESPONSES	
Hurricane		0.00%	0
Thunderstorms		9.09%	1
Severe winter storms		9.09%	1
Windstorms		9.09%	1
Lightning		0.00%	0
Earthquake		0.00%	0
Other (please specify)	Responses	0.00%	0
TOTAL			11

Q4

Customize Save as

While living here in Blanco County, have you experienced a disaster? (please check all that apply)

Answered: 11 Skipped: 0



ANSWER CHOICES		RESPONSES	
Floods		72.73%	8
Wildfire		54.55%	6
Tornado		27.27%	3
Drought		81.82%	9
Dam failure		0.00%	0
Expansive soils		18.18%	2
Extreme heat		81.82%	9
Hailstorm		45.45%	5
Hurricane		0.00%	0
Thunderstorms		54.55%	6
Severe winter storms		90.91%	10
Windstorms		45.45%	5
Lightning		45.45%	5
Earthquake		0.00%	0
None		0.00%	0
Other (please specify)	Responses	0.00%	0

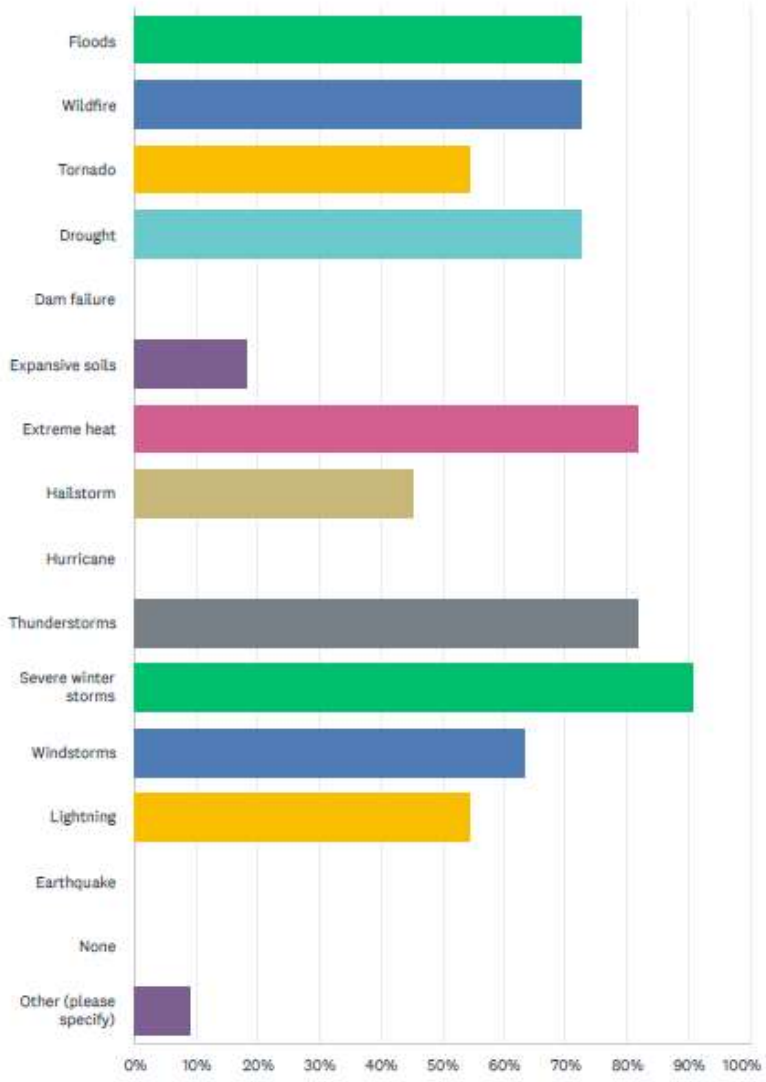
Total Respondents: 11

Q5

Customize Save as

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

Answered: 11 Skipped: 0



ANSWER CHOICES	RESPONSES	
Floods	72.73%	8
Wildfire	72.73%	8
Tornado	54.55%	6
Drought	72.73%	8
Dam failure	0.00%	0
Expansive soils	18.18%	2
Extreme heat	81.82%	9
Hailstorm	45.45%	5
Hurricane	0.00%	0
Thunderstorms	81.82%	9
Severe winter storms	90.91%	10
Windstorms	63.64%	7
Lightning	54.55%	6
Earthquake	0.00%	0
None	0.00%	0

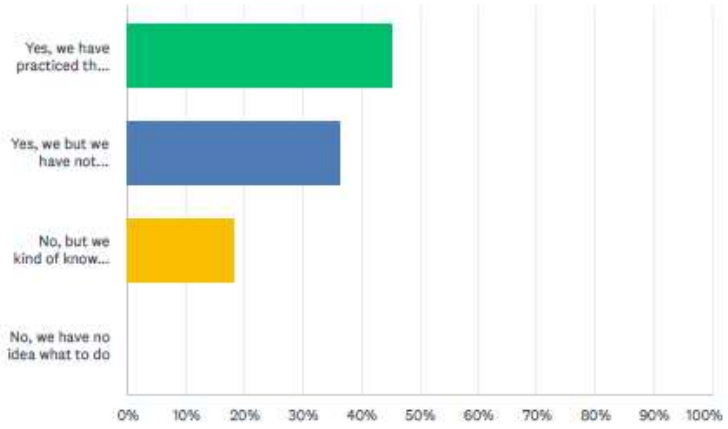
Total Respondents: 11

Q6

Customize Save as

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

Answered: 11 Skipped: 0



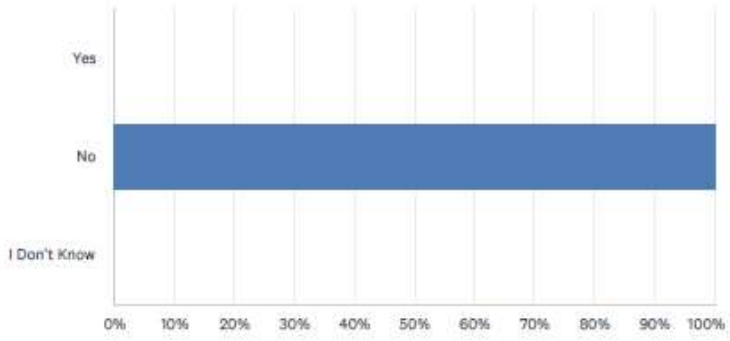
ANSWER CHOICES	RESPONSES	
Yes, we have practiced the plan	45.45%	5
Yes, we but we have not practiced the plan	36.36%	4
No, but we kind of know what to do	18.18%	2
No, we have no idea what to do	0.00%	0
TOTAL		11

Q7

Customize Save as

Is your home located in a floodplain?

Answered: 11 Skipped: 0



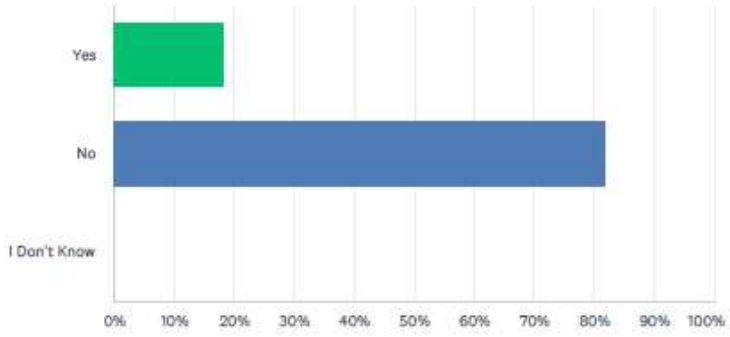
ANSWER CHOICES	RESPONSES	
Yes	0.00%	0
No	100.00%	11
I Don't Know	0.00%	0
TOTAL		11

Q8

Customize Save as

Do you have flood insurance?

Answered: 11 Skipped: 0



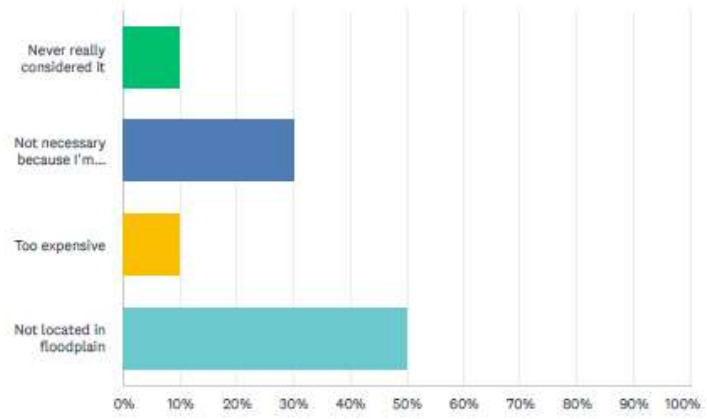
ANSWER CHOICES	RESPONSES	
Yes	18.18%	2
No	81.82%	9
I Don't Know	0.00%	0
TOTAL		11

Q9

Customize Save as

If you do not have flood insurance, why not?

Answered: 10 Skipped: 1



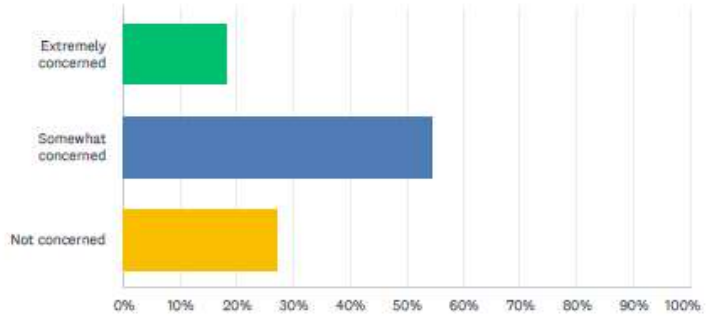
ANSWER CHOICES	RESPONSES	
Never really considered it	10.00%	1
Not necessary because I'm elevated or otherwise protected	30.00%	3
Too expensive	10.00%	1
Not located in floodplain	50.00%	5
TOTAL		10

Q10

Customize Save as

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

Answered: 11 Skipped: 0



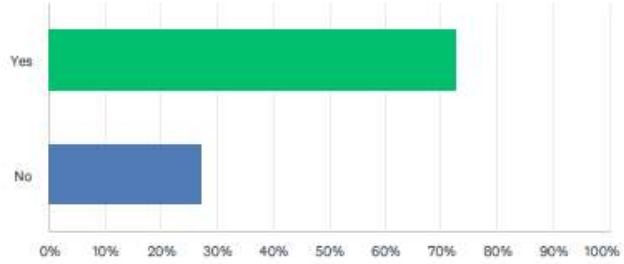
ANSWER CHOICES	RESPONSES	
Extremely concerned	18.18%	2
Somewhat concerned	54.55%	6
Not concerned	27.27%	3
TOTAL		11

Q11

Customize Save as

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

Answered: 11 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	72.73%	8
No	27.27%	3
TOTAL		11

Q12

Save as

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

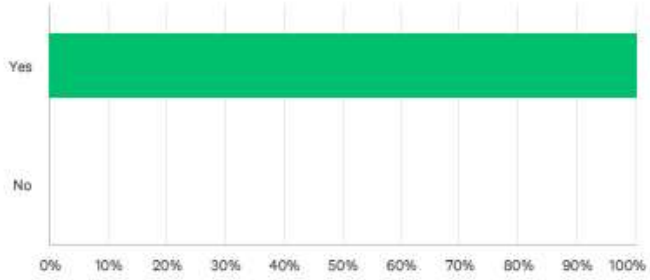
Answered: 8 Skipped: 3

Q13

Customize Save as

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

Answered: 11 Skipped: 0



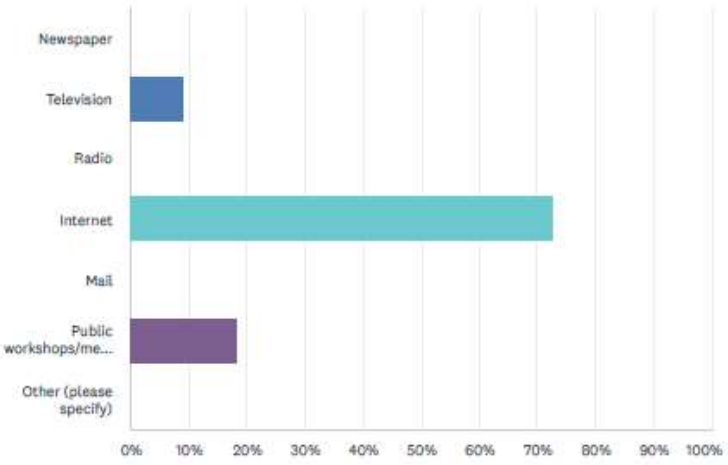
ANSWER CHOICES	RESPONSES	
Yes	100.00%	11
No	0.00%	0
TOTAL		11

Q14

Customize Save as

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

Answered: 11 Skipped: 0



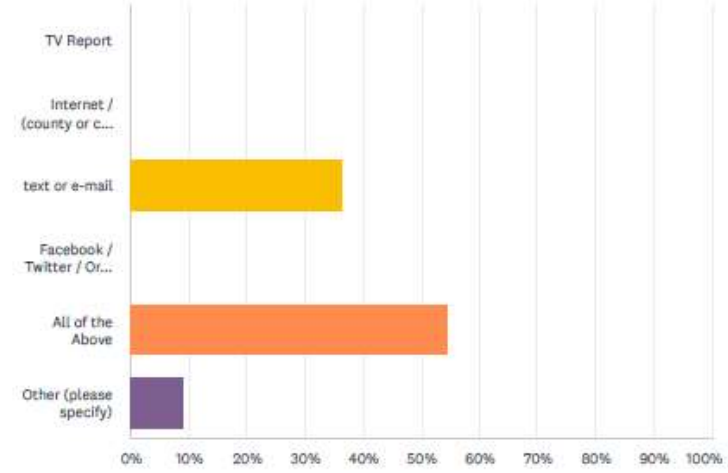
ANSWER CHOICES		RESPONSES	
Newspaper		0.00%	0
Television		9.09%	1
Radio		0.00%	0
Internet		72.73%	8
Mail		0.00%	0
Public workshops/meetings		18.18%	2
Other (please specify)	Responses	0.00%	0
TOTAL			11

Q15

Customize Save as

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

Answered: 11 Skipped: 0



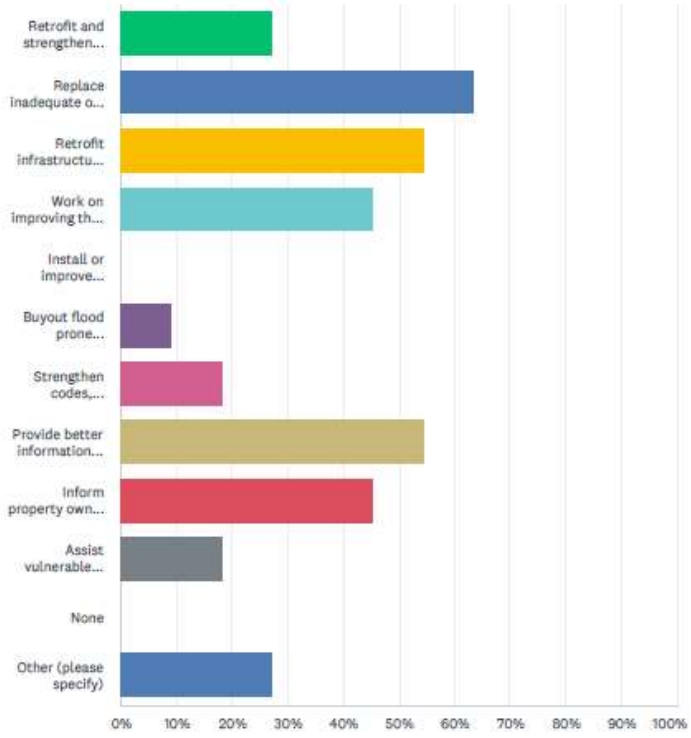
ANSWER CHOICES		RESPONSES	
TV Report		0.00%	0
Internet / (county or city website)		0.00%	0
text or e-mail		36.36%	4
Facebook / Twitter / Or other social media		0.00%	0
All of the Above		54.55%	6
Other (please specify)	Responses	9.09%	1
TOTAL			11

Q16

Customize Save as

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

Answered: 11 Skipped: 0



ANSWER CHOICES		RESPONSES	
Retrofit and strengthen essential facilities such as police, fire, emergency medical services, hospitals, schools, etc.		27.27%	3
Replace inadequate or vulnerable bridges and roads.		63.64%	7
Total Respondents: 11			

ANSWER CHOICES		RESPONSES	
Retrofit infrastructure, such as elevating roadways and improving drainage systems.		54.55%	6
Work on improving the damage resistance of utilities (electricity, communications, water / wastewater facilities, etc.).		45.45%	5
Install or improve protective structures, such as floodwalls and levees or individual/community saferooms.		0.00%	0
Buyout flood prone properties and maintain as open-space.		9.09%	1
Strengthen codes, ordinances, and plans to require higher hazard risk management standards.		18.18%	2
Provide better information about hazard risk and high-hazard areas.		54.55%	6
Inform property owners of ways they can mitigate damage to their properties.		45.45%	5
Assist vulnerable property owners with securing funding to mitigate impacts to their property(s).		18.18%	2
None		0.00%	0
Other (please specify)	Responses	27.27%	3

Total Respondents: 11

Q17

Save as

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

Answered: 6 Skipped: 5

RESPONSES (6) WORD CLOUD TAGS (0) Sentiments: OFF

New!

Introducing Sentiment Analysis

Detect the feeling and sentiment behind written responses.

Watch a demo

Try it!

Search Responses

Filter: by tag

Showing 6 responses

medical care - urgent care; rainwater harvesting to minimize effects of drought

6/28/2023 07:00 PM View respondent's answers Add tags

No

6/14/2023 06:24 AM View respondent's answers Add tags

None at this time

6/13/2023 07:31 AM View respondent's answers Add tags

After Sction reviews to Zoe continuous improvdment

6/8/2023 01:12 PM View respondent's answers Add tags

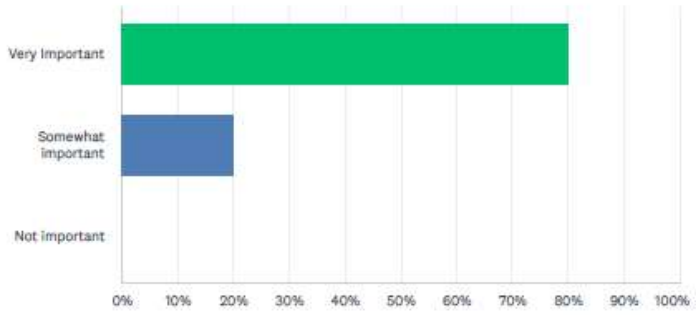
Oak wilt is a serious concern. It's in ranchers Estes in Johnson city and some residents are not removing oak trees. Threes trees

Q18

Customize Save as

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

Answered: 10 Skipped: 1



ANSWER CHOICES	RESPONSES	
Very Important	80.00%	8
Somewhat important	20.00%	2
Not important	0.00%	0
TOTAL		10

APPENDIX C: PRIORITY RANKING FORMS

Blanco County

Blanco County Hazard Mitigation Plan
Prioritization Excercise

STAPLEE Ranking - Jurisdiction: Blanco County

Timeframe Values:
Within next 2 years -> Immediate (I)
2-5 years -> Near (N)
5-10 years -> Short (S)
More than 5 years -> Long (L)

ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	BONUS (5 pts): Addresses Multiple Hazards	BONUS (5 pts): Complements Another Entity's Efforts	TOTAL SCORE	TIMEFRAME
1	Educate homeowners on mitigating their homes from hazards	5	3	3	5	5	5	5			31	N
2	Post flood risk signs	5	5	3	5	5	5	5			32	N
3	Maintain a program for clearing debris	5	5	5	5	5	5	5			35	N
4	Installation of emergency power generators at critical infrastructure/key resources locations	5	5	5	5	5	5	5			35	N
5	Upgrade and raise low water crossing in various locations in the county	5	5	4	4	5	5	5			33	S
6	Use the application of minimum soil stabilizers in road construction	5	4	4	5	5	4	5			32	S
7	Post condition report on social media and push NWS alerts to local media	5	5	5	5	5	5	5		NOTE - SOCIAL MEDIA POSTS OCCUR NOW	35	N
8	Monitor/ward prone roads and bridges	5	5	6	5	5	5	5		ONGOING NOW	35	N
9	Develop ordinance to restrict where landfills	5	3	3	5	5	4	5			30	N
10	Install generators where required to ensure uninterruptible power	DELETE - INCLUDED IN # 4, ABOVE										
11	Review and update the POD plan	5	5	5	5	5	5	5			35	N
12	Ensure "fail-over" public safety radio system support	DELETE - PROJECT COMPLETED										
13	Develop/update the county wide emergency action plan	5	5	5	5	5	5	5		PLAN IS ROUTINELY UP-DATED ANNUALLY	35	N
14	Study shelter needs and upgrade to serve community and wildland hazards	5	3	3	5	5	3	5			32	N
15	Ensure computer systems have a robust software and virus detection and elimination software	5	5	5	5	5	5	5			35	I
16	Purchase need spreaders for roads	DELETE - THIS EQUIPMENT WAS PURCHASED WITH COUNTY FUNDS										

Blanco County Hazard Mitigation Plan
Prioritization Excercise

STAPLEE Ranking - Jurisdiction: Blanco County

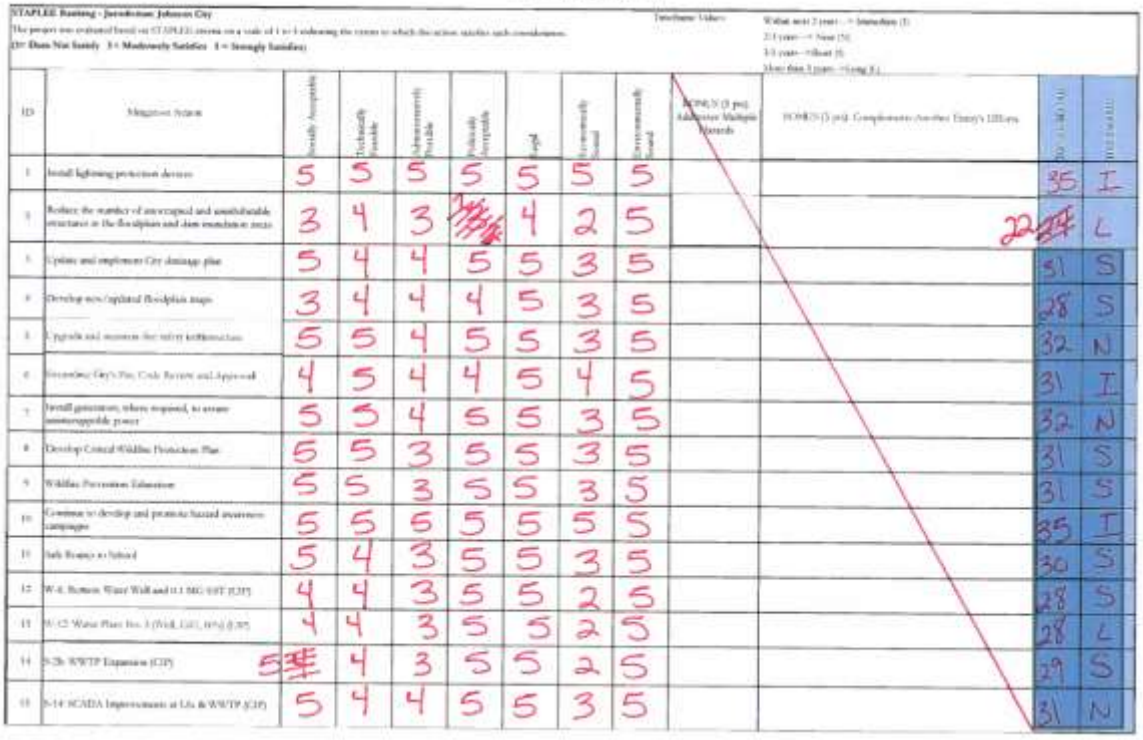
Timeframe Values:
Within next 2 years -> Immediate (I)
2-5 years -> Near (N)
5-10 years -> Short (S)
More than 5 years -> Long (L)

ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	BONUS (5 pts): Addresses Multiple Hazards	BONUS (5 pts): Complements Another Entity's Efforts	TOTAL SCORE	TIMEFRAME
17	Upgrade the 4 most critical low water crossings in Precinct 1	5	5	5	5	5	5	5		EACH COMMISSIONER WILL PRIORITIZE HIS PROJECTS & BUDGET FOR WORK ANNUALLY	35	S
18	Upgrade the 4 most critical low water crossings in Precinct 2	5	5	6	5	5	5	5			35	S
19	Upgrade the 4 most critical low water crossings in Precinct 3	5	5	5	5	5	5	5			35	S
20	Upgrade the 4 most critical low water crossings in Precinct 4	5	5	5	5	5	5	5			35	S

City of Blanco

City of Johnson City

Blanco County Hazard Mitigation Plan
Prioritization Exercise



ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Environmentally Sound	Environmentally Sound	BONUS (If any) Addresses Multiple Hazards	BONUS (If any) Complements Another Entity's Efforts		
1	Install lightning protection devices	5	5	5	5	5	5	5			35	I
2	Reduce the number of unoccupied and uninhabitable structures in the floodplain and dam inundation areas	3	4	3	4	4	2	5			22	L
3	Update and implement City damage plan	5	4	4	5	5	3	5			31	S
4	Develop new/updated floodplain maps	3	4	4	4	5	3	5			28	S
5	Upgrade and maintain fire safety infrastructure	5	5	4	5	5	3	5			32	N
6	Streamline City's Plat, Code Review and Approval	4	5	4	4	5	4	5			31	I
7	Install generators, where required, to ensure uninterruptible power	5	5	4	5	5	3	5			32	N
8	Develop Critical Wildlife Protection Plan	5	5	3	5	5	3	5			31	S
9	Wildfire Prevention Education	5	5	3	5	5	3	5			31	S
10	Continue to develop and promote hazard awareness campaigns	5	5	5	5	5	5	5			35	I
11	Safe Rooms in School	5	4	3	5	5	3	5			30	S
12	W-4: Remote Water Well and 0.1 MG GST (CIP)	4	4	3	5	5	2	5			28	S
13	W-12: Water Plant No. 3 (Well, GST, WPS) (CIP)	4	4	3	5	5	2	5			28	L
14	S-2b: WWTP Expansion (CIP)	5	4	3	5	5	2	5			29	S
15	S-14: SCADA Improvements at Lift & WWTP (CIP)	5	4	4	5	5	3	5			31	N

Johnson City ISD

Blanco ISD

Blanco Pedernales Water District

APPENDIX D: CRITICAL FACILITIES

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

Blanco County
1 County Courthouse, 1 Emergency Operations Center, 1 JP Office,3 VFDs, 4 Electrical Substations, 2 Pharmacies, 1 water storage, 1 helipad, 1 kidney dialysis center
Johnson City
1 City Hall, 1 VFD, 1 Police Station, 1 Jail Facility, 2 Emergency Shelters, 5 lift stations, 1 water tower, 2 water wells, 1 Hospital, 3 clinics, 1 High School, 1 Middle School, 1 Elementary School, 2 County Commissioner's Office,
City of Blanco
1 City Hall, 1 VFD, 1 Sheriff's Facility, 2 Schools, 1 Water Tower, 2 County Commissioner's Office, 2 Shelters
Town of Round Mountain
1 VFD

APPENDIX E: MEETING DOCUMENTATION

12 JOHNSON CITY

BLANCO COUNTY JUDGE
PO BOX 471
JOHNSON CITY TX

HAPPY Thanksgiving

BLANCO COUNTY NEWS

"Dedicated to the City of Blanco and the Surrounding Area"

USPS 057-960 Vol. 142, No. 47 Blanco, Texas www.blanconews.com November 23, 2022 $1

VETERANS DAY CONTEST WINNERS

Blanco County hazard mitigation plan to be updated

By Tricia Hartmann

Blanco County has begun the process of updating its hazard mitigation plan.

The updated plan is necessary to receive federal funds for projects to reduce risk and minimize impacts in the event of a disaster, according to Michael J. Megna, grants coordinator and deputy emergency management coordinator.

The hazard mitigation plan will include the cities of Blanco, Johnson City and Round Mountain, in addition to Blanco County. Blanco ISD and Johnson City ISD will be asked to participate in the plan development, as will Blanco County ESDs 1 and 2, the water district and other identified stakeholders.

"In addition to the governmental entities we also need input from citizens, and therefore are reaching out to the community. Blanco County was successful in obtaining a General Land Office Local Hazard Mitigation Plans Program assistance grant to update our Blanco County Hazard Mitigation Plan," said Megna.

"The multi-jurisdictional plan will offer practical approaches and examples so that Blanco communities may engage in effective planning to reduce long-term risk from natural hazards and disasters," said Blanco County Judge Brett Bray.

The possible effects of a natural disaster could affect every aspect of the community with devastating consequences to its economic, social and environmental well-being. According to FEMA, "Mitigation is an investment in the community's future safety and sustainability. The critical importance requires protecting public safety and preventing loss of life, reducing harm to existing and future development, and aids to prevent damage to a community's unique economic, culture and environmental assets."

The project is funded by the GLO, but will be submitted to FEMA for final approval.

Langford Community Management Services was hired by the county to help guide the process through submission of the plan to FEMA, Megna said. Planning consultant Gabe Rojas, of Rojas Planning LLC, said the plan will be built on FEMA's standards.

Rojas said FEMA looks at a broad set of threats and how those are linked to community vulnerabilities. All factors will be considered, including flood events, hurricanes, tropical storms, severe storms, tornadoes, hail, lightning, drought, wildfire, extreme heat, and winter storms.

According to Rojas, the required plan includes a core planning team with Blanco County and its participating jurisdictions, along with local teams to develop specific mitigation strategies unique to each community. After establishment of the core and local teams, the teams will conduct an online community survey to understand the top concerns of county residents.

The survey will also be accessible to the public in public facilities such as libraries, city halls and the Blanco County Courthouse. Three public meetings will be held during to the planning process in order to received public comments and input.

"Both the core and local planning teams will be reviewing the communities' capabilities, conducting a risk assessment, and identifying mitigation goals and actions, while gaining public input.

Once the plan is compiled, the third and final public meeting will be held to gain final public insight. The plan will be submitted for FEMA's final approval, then final adoption by all the participating jurisdictions," said Megna.

Once the jurisdictions adopt the approved plan, they will have procedures and guidelines in place for emergencies. They will also be able to seek funding from FEMA through hazard mitigation assistance to mitigate some of the risks when funding is available.

Bray hopes that residents will become engaged in the planning process, offer feedback about the plan, and consider what their households would do in a wildfire, tornado or other emergency situation.

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

CAR-RT LOT**B 008
BLANCO COUNTY
PO BOX 471

netown Newspaper of President Lyndon Baines Johnson

Johnson City Record Courier

51 *Wednesday, November 23, 2022*

rdcourier.com Vol. 142 No. 47 Johnson City's Hometown Newspaper Since 1881

l Lights Spectacular opening weekend events

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Saturday Nov. 26

12 pm – 10 pm Johnson City Chamber of Commerce Christmas Market

5 pm - 10 pm Non-Profit Food Court at the Courthouse

5 pm – 10 pm - Wine and Beer Cantina at the Courthouse

5:30 pm Clickety Cloggers perform in front of the Courthouse

6 pm - Lights come on

6:30 pm Lighted Hooves and Wheels Parade

7 pm - Santa arrives at Memorial Park

The Science Mill will be open from 10am - 6pm with a special "Spectacular Science of Light" display.

Friday and Saturday night the Antique Tractor Club will be providing hay rides by donation.

Carriage rides will be provided by the Buggy Barn and available at the Courthouse on Friday and Saturday night.

December 10th Lights Spectacular will have a **Chili Cook Off** as a fundraiser for the scholarship foundation. Anyone interested in participating can find all the information on the website.

Anyone interested in entering the **Christmas Lighting Contest** can also find the registration information on the website. This year there

When all is turned in, Community Church of the Hills will have set a new record in shoe boxes stuffed with presents and sent to Operation Christmas Child, a benevolent program that sends gifts and the Gospel to Third World Nations. Pictured are some of the volunteers who helped with the mission. (Contributed photo)

to get into the holiday spirit early can visit PEC's Headquarters in Johnson City and take a stroll under the oak trees adorned with more than 1.3 million sparkling lights. PEC's holiday lights will turn on at 6 p.m. and run until midnight daily, starting Nov. 25 through Jan. 8, as part of Johnson City's Lights Spectacular. The event is free and open to the public.

In the spirit of giving, PEC is also raising awareness about the co-op's Power of Change Program that helps support area nonprofits. Visitors to the lights can make a one-time donation to the program that funds community grants for nonprofits and supports local education foundations in the cooperative's service territory. PEC members can also enroll in the program to have their electric

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The possible effects of a natural disaster could affect every aspect of the

ESD-1 hosts Novembe

By Tricia Hartmann

NBCESD-1 (ESD1) held a Regular meeting on November 21, 2022. There were no Citizens Comments.

JCVFD Progress on ESD Recommendations

As per the JCVFD contract reinstatement, ESD1 President David O'Bannon reviewed the status of ESD1 recommendations to the JCVFD.

O'Bannon asked if there were any JCVFD Bylaws updates, and there were none since the last Bylaws changes were adopted on September 28. JCVFD President Ray Bible said that new department Secretary Belinda Basse is a non-affiliated Board member, and that the department is looking for two more members.

O'Bannon asked about the status of adding an ESD Commissioner as a JCVFD Board member, and Bible said that Commissioner

ESD-1 from front page 1

community with devastating consequences to its economic, social and environmental well-being. According to FEMA, "Mitigation is an investment in the community's future safety and sustainability. The critical importance requires protecting public safety and preventing loss of life, reducing harm to existing and future development, and aids to prevent damage to a community's unique economic, culture and environmental assets."

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Food pantry hosting food drive

Johnson City Christian Food Pantry is having a food drive through the end of the year. They are requesting assistance with the following items:

Condiments - Ketchup, mayo, mustard, salad dressings, pickles, olives, etc.

Dried Goods - Pasta, boxed potatoes, cereal, oatmeal, anything in a box

Baking Goods - Small bottles of cooking oil, small bags of flour & sugar, muffin/brownie packets, cake mix and icing, etc.

Miscellaneous Items - Jelly, pasta sauce, dish soap, etc.

The drop off location is at our Blanco County Community Resource Center, 206 S. Hwy 281, Johnson City, TX 78636. You can drop off anytime Monday through Friday between 8:30 a.m. and 4 p.m. If you have any questions, please call 830-868-0208.

Thank you for Coming

Please Sign In

10-18-2022

Name	Representing	Email	Phone
Scott Berry	JCISD	sberry@jcisd.tred.net	830-868-7410
Whitney Winston	City of Johnson City	WWinston@johnsoncitytx.org	830-868-7114
Jessica Dudas	LCMS	Jessica@lcmsinc.com	512-952-6452
Scott Reis	City of Blanco PD	thechiefreis@blancotx.gov	830 833 4335
Warren Escamilla	city of Blanco	cityadmin@cityofblanco.gov	830-833-4406
Matt Mercer	Blanco ESD 2	mattmercer@bcesd2.com	830-330-1972
Ben Cooley	Blanco County ESD #2	bcooley@bcesd2.com	830-833-4406
Charles Reagan	Langford	Charles@LCMSINC.com	512-452-0432
Gabe Rojas	Rojas Planning	greitz@gmail.com	512-468-4465
Swellen Reagan	Langford	swellen@LCMSINC.com	512-452-0432
Mike Meyna	Blanco County	mmeyna@co.blanco.tx.us	409-771-1340
David Bruner	Blanco ESD 1	dobruner@cityofblanco.gov	830-865-2070
		VBCESD1@gmail.com	

From: Charles Reagan
To: mayor@cityofblanco.com; rstell@johnsoncitytx.org; wsm@tstar.net; clay.rosenbaum@blancoisd.org; rkolek@jcisd.txed.net; nbcesd1@gmail.com; contact@bcesd2.com; manager@blancogw.org
Cc: Mike Megna; Connie Harrison; Suellen Jordan; Jennifer Boyd; Gabe Rojas
Subject: Blanco County Hazard Mitigation Plan Meeting
Date: Friday, October 7, 2022 9:57:26 AM
Attachments: image001.png

In January 2022, Blanco County began the process of updating the Blanco County Multi-jurisdictional Hazard Mitigation Action Plan (HMAP), that is required every five years by the Texas Division of Emergency Management (TDEM) and FEMA for the ability to apply for Hazard Mitigation Assistance grant funding. Blanco County has contracted with Langford Community Management Services (LCMS) to assist the Blanco County Department of Emergency Management in completing this task.

Eight cities, ISD's, ESD's and the Blanco Pedernales Water District agreed to participate in the Plan Update process by signing Participation Letters.

The entire Plan Update has been funded at 100% by the Texas General Land Office. There will be no Local Matching Funds required by the plan participants.

On behalf of Blanco County Judge Brett Bray, Langford Community Management invites you or a representative to attend a Plan Update "kickoff" meeting scheduled at the Blanco County Courthouse at 10:00 AM on Tuesday, October 18, 2022. Langford Planner Gabriel Rojas will outline the planning process including hazard identification, upcoming meetings and your input required.

Please RSVP Charles Reagan, Langford Community Management at charles@lcmsinc.com to confirm your attendance.

Best regards,

Charles Reagan
Grant Coordinator

LANGFORD COMMUNITY MANAGEMENT SERVICES EST. 1983

9017 W. Hwy 29, Suite 206 Liberty Hills, TX 78642
Cell: 512.796.1887 Office: 512.452.0432
LCMSinc.com / Facebook / LinkedIn

BLANCO COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE

Kickoff Meeting

Including incorporated Communities with ISDs, ESD 1, and Blanco Pedernales Water District

Blanco County Courthouse

Tuesday, October 18, 2022, 10:00am-11:45am

Blanco County Multi-jurisdictional Hazard Mitigation Plan Update Core Meeting #1 – Kickoff Meeting October 17, 2022 10:00 – 11:30am

Agenda

- Introductions
- Overview of the Hazard Mitigation Planning Process
- Review of goals and objectives from prior plan
- Actions completed from prior plan
- Hazards review from prior plan
- Community Capabilities Survey
- Next Steps
- Adjourn

AFFIDAVIT OF PUBLICATION

THE STATE OF TEXAS
COUNTY OF BLANCO

Before me, the undersigned authority, on this day personally appeared Joan A Brock-Hill, who being by me duly sworn, deposes and says that (s)he is a bona fide representative of the Johnson City Record Courier; that said newspaper is regularly published in Blanco County and generally circulated in Blanco County, Texas, and that the attached public notice was published in said newspaper on the following date(s), to wit: May 31, 2023, and that the attached is a true copy of said notice.

Joan A Brock-Hill
Newspaper Representative's Signature

Subscribed and sworn to me this 31 day of May, 2023; to certify which witness my hand and seal of office.

MICHELE LYDIA ISRAELSON
My Notary ID # 130734525
Expires July 12, 2024

MIsraelson
Notary Public in and for the State of Texas

Michele Israelson
Print or Type Name of Notary Public

My Commission Expires: July 12, 2024

Johnson City Record Courier

May 31, 2023 • Page 5

LETTER TO THE EDITOR POLICY

The following letters to the editor policy went into effect with the Sept. 1, 2021, issue of the Johnson City Record Courier.

All letters to the editor must be signed and include a telephone number for verification.

Letters should focus on the point to be made and should be no longer than 350 words. Letter writers are encouraged to speak out on issues and ideas and to refrain from personal attacks. Personal attacks on businesses or individuals will not be published. No endorsements of candidates or calls to vote for political parties will be published. Letters from any one single writer will only be published twice a month.

The Johnson City Record Courier reserves the right to accept or reject any letter. Letters are published on a space available basis at the discretion of the editor.

Send letters to jcrecordcourier@gmail.com with contact information.

Call 830-868-7181

PUBLIC NOTICE

COUNTY HAZARD MITIGATION PLAN PUBLIC MEETING SCHEDULED

Blanco County and all participating jurisdictions seek feedback as they review and update the Hazard Mitigation Plan. Public input will help the Local Planning Teams to identify and analyze potential hazards affecting residents and recommend possible actions to reduce their impact throughout the Blanco County planning area.

A Community Open House will be held on Tuesday, June 13, from 6 pm – 8 pm at the Hoppe Room in the County Courthouse Annex, 101 E Cypress St, Johnson City, TX 78636. An online survey is also available at http://tiny.cc/blancohmp, where stakeholders have an additional opportunity to offer their feedback.

The County's consultants, Gabe Rojas with Rojas Planning and Patty Swords with Langford Community Management Services, will be present to answer questions.

Under the Disaster Mitigation Act of 2000, the Federal Emergency Management Agency (FEMA) requires communities to develop a mitigation plan to minimize or eliminate the long-term risk to human life and property from known hazards. Communities with a FEMA-approved plan are eligible for specific grant funding under the Hazard Mitigation Assistance (HMA) Program and your feedback will help ensure that a plan is developed that will best prepare the area and its residents for future hazards.

JOHNSON CITY BUSINESS DIRECTORY • Advertise your services here. Call 830.868.7181

Johnson City Record Courier

CLASSIFIEDS

PUBLIC NOTICE

COUNTY HAZARD MITIGATION PLAN PUBLIC MEETING SCHEDULED

Blanco County and all participating jurisdictions seek feedback as they review and update the County Hazard Mitigation Plan. Public input will help the Local Planning Teams identify and analyze potential hazards affecting residents and recommend possible actions to reduce their impact throughout the Blanco County planning area.

A Community Open House will be held on Thursday, July 13, from 2 pm – 4 pm at the Blanco County Courthouse Annex, 402 Blanco Avenue, Blanco TX 78606. An online survey is also available at http://tiny.cc/blancohmp, where stakeholders have an additional opportunity to offer their feedback.

The County's consultants, Gabe Rojas with Rojas Planning and Patty Swords with Langford Community Management Services, will be present to answer questions.

Under the Disaster Mitigation Act of 2000, the Federal Emergency Management Agency (FEMA) requires communities to develop a mitigation plan to minimize or eliminate the long-term risk to human life and property from known hazards. Communities with a FEMA-approved plan are eligible for specific grant funding under the Hazard Mitigation Assistance (HMA) Program and your feedback will help ensure that a plan is developed that will best prepare the area and its residents for future hazards.

Page 1

BLANCO COUNTY HAZARD MITIGATION PUBLIC MEETING, JUNE 13, 2023			
NAME	ADDRESS OR ORGANIZATION	EMAIL ADDRESS	TELEPHONE NUMBER
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Patty Sebrcds	Langford	Patty@lcmsinc.org	979-480-4949
Stephanie Fisher	City of Johnson City	sfisher@johnsoncitytx.org	830-330-0181
Richard Kolek	JC	RKOLEK@JCISD.TXED.NET	830-868-7410
Donald Stephens	100 Easy Casey Baron LBJ National Park	donald_stephens@nps.gov	830 385 1561

Page 2

BLANCO COUNTY HAZARD MITIGATION PUBLIC MEETING, JUNE 13, 2023			
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APPENDIX F: ADOPTION RESOLUTION