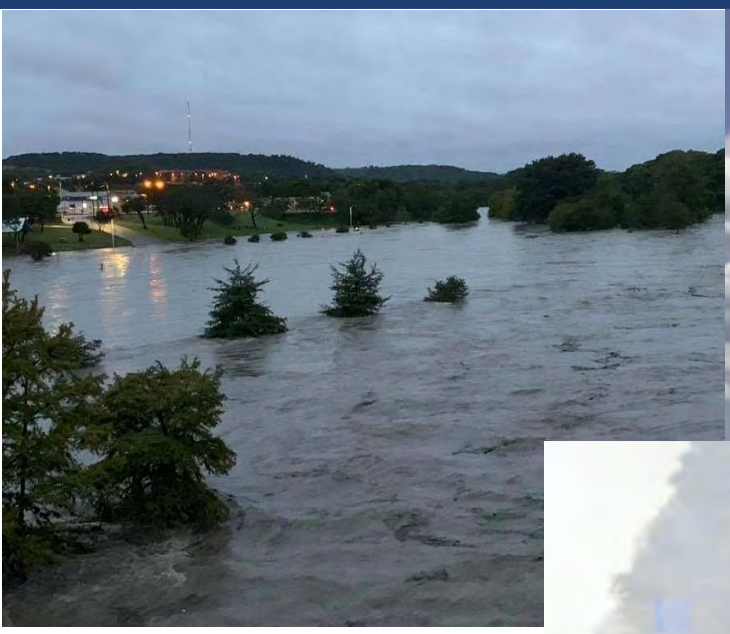
Colorado County

Hazard Mitigation Plan 2025 Update



THE STATE OF TEXAS
COLORADO COUNTY

SECTION 1: INTRODUCTION

Background

Colorado County is located in Central Texas near the Gulf Coast and southwest of Harris County, home to Houston which is the 4th largest city in the United States. While large portions of the County remain rural in nature, the regional population and economic growth to the east is being felt in the area and underscores the need to plan for the mitigation of future hazards to protect people and property. Colorado 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 Colorado 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 Colorado County Hazard Mitigation Plan is a multi-jurisdictional plan covering one (1) County, three (3) cities, three (3) independent school districts, and one (1) water district. The prior hazard mitigation plan for the area was the 2016 Colorado County Hazard Mitigation Plan. This plan update includes the City of Columbus, City of Eagle Lake, City of Weimar, Columbus Independent School District, Rice Consolidated Independent School District, Weimar Independent School District, and the Colorado Water Control and Improvement District #2 as participating jurisdictions. 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 thunderstorms, tornados, hail, lightning, drought, wildfire, extreme heat, and winter storms," Rojas said.*
>
> *The required plan includes a Core Planning team of Colorado 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 Colorado County and the Cities of Columbus and Eagle Lake. 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 the county 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 Colorado County from hazards and disasters.***

The Plan was prepared by Colorado 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 Colorado 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. More information can be found 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

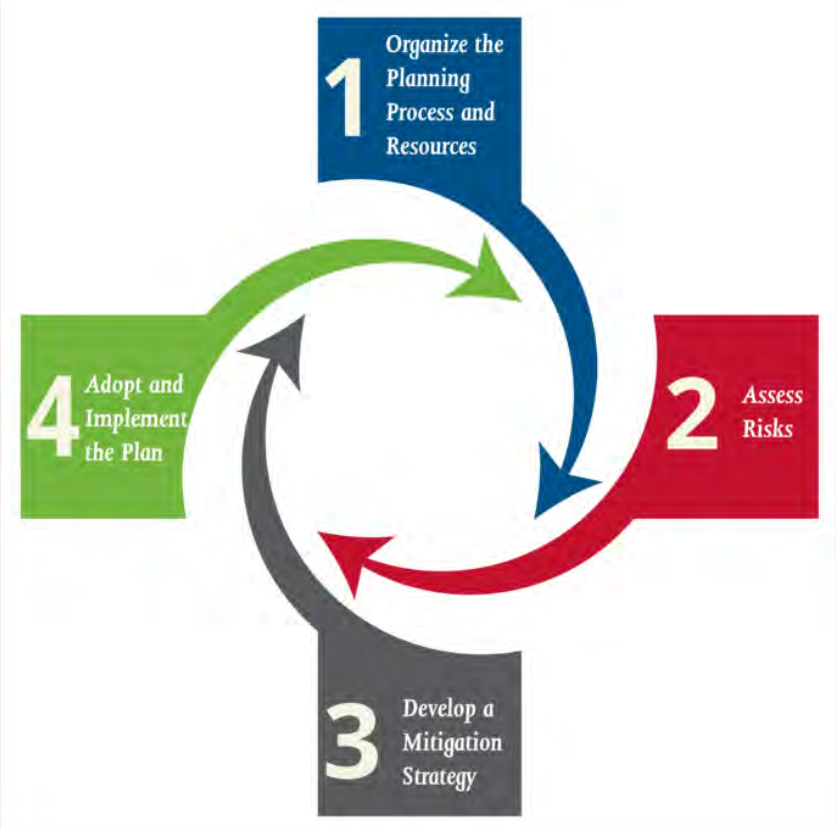
The Texas Division of Emergency Management (TDEM) and FEMA have the authority to review and approve hazard mitigation plans through the Disaster Mitigation Act of 2000, which amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

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



- **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.

- **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.

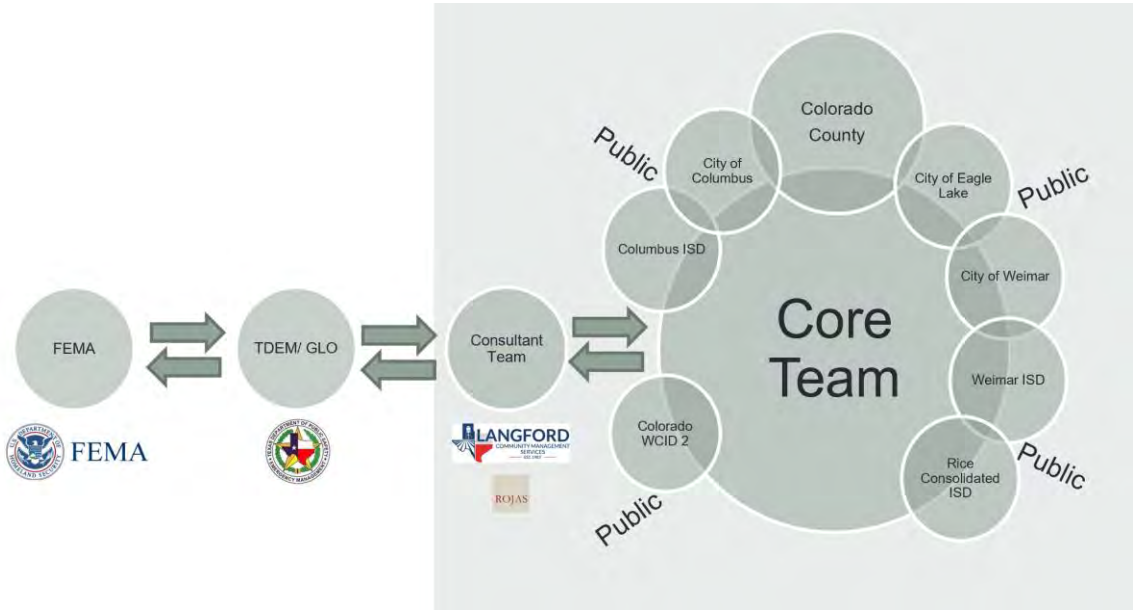
3. Develop a Mitigation Strategy – The local government then sets priorities and develops long-term strategies for avoiding or minimizing the undesired effects of disasters. The mitigation strategy addresses how the mitigation actions will be implemented and administered.

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

Colorado County, including participating jurisdictions, hired Langford Community Management Services and Rojas Planning to provide technical support and to oversee development of the plan. The Colorado 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 Wednesday April 5, 2023, at the Colorado County Services Facility at 395 Radio Lane, Columbus, TX 78934. 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

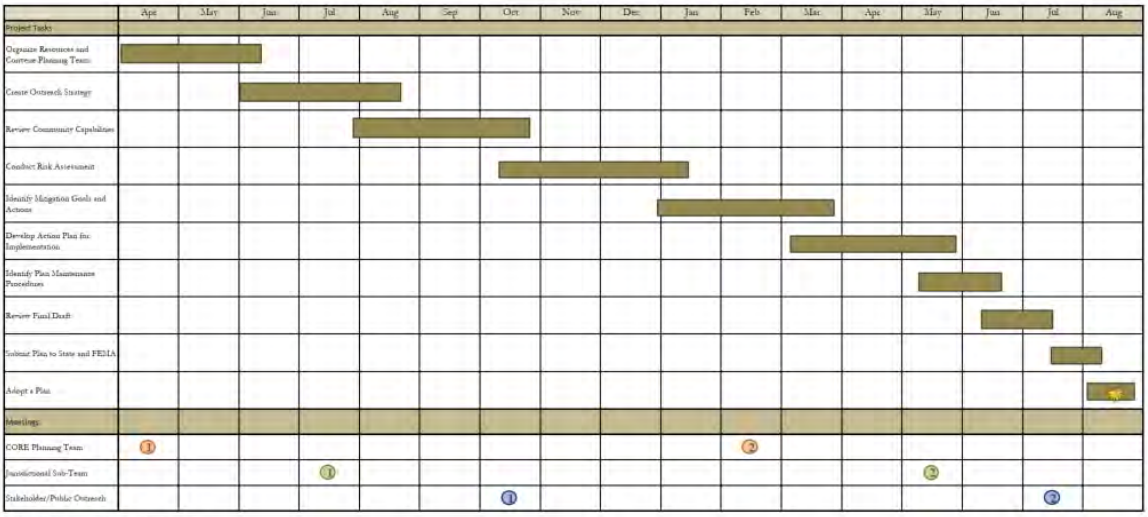
regarding the identification of hazards, identifying mitigation goals, developing new mitigation actions, and ranking mitigation actions.

At least one member from each participating jurisdiction and the 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 (2022 American Community Survey)

Entity/Population	Position or Title	Department
Colorado CO 20,582	County Judge Emergency Management Coordinator	Commissioners Court Emergency Management
City of Columbus 3,686	City Manager Public Works Supervisor	City Hall Public Works
City of Eagle Lake 3,443	City Secretary City Manager	City Hall
City of Weimar 2,771	City Secretary City Manager	City hall
Columbus ISD	Superintendent	Administration
Weimar ISD	Superintendent	Administration
Rice Consolidated ISD	Superintendent	Administration
Colorado WCID #2	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 Colorado Water Control and Improvement 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 a CWS serves a population of 3,301 to 49,999, then their risk and resilience assessment certification statement was first due to the EPA by June 30, 2021, and their ERP certification statement was first 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.

Colorado County Emergency Management Plan (2012) - This Basic Plan outlines our approach to emergency operations, and is applicable to Colorado County and the cities of Columbus, Eagle Lake, and Weimar. It provides general guidance for emergency management activities and an overview of our methods of mitigation, preparedness, response, and recovery. The plan describes our emergency response organization and assigns responsibilities for various emergency tasks. This plan is intended to provide a framework for more specific functional annexes that describe in more detail who does what, when, and how. This plan applies to all local officials, departments, and agencies. The primary audience for the document includes our chief elected official and other elected officials, the emergency management staff, department and agency heads and their senior staff members, leaders of local volunteer organizations that support emergency operations, and others who may participate in our mitigation, preparedness, response, and recovery efforts. Some examples of hazard pre-emergency phase actions contained in the plan include the following:

Fires:

1. Enforce fire codes.
2. Conduct fire safety education programs for the public.
3. Recommend fire prevention activities such as brush clearance, outdoor burning restrictions, and use of fireworks when conditions warrant.
4. Maintain current information on the types and quantities of hazardous materials present in local businesses and industrial facilities.
5. Maintain current information on known fire hazards present in facilities such as refineries, factories, power plants, and other commercial businesses.

Hurricanes:

1. Conduct public education and distribute preparedness materials highlighting local hurricane risk areas, precautionary actions, and protective actions.
2. In coordination with the EMC, maintain a set of pre-scripted warning and public instructions messages ready for use. See Annex A to the Basic Plan.
3. Coordinate with school authorities/PIOs on policies/procedures for announcing school closures.
4. Review local Hazard Analysis and Annex E to EM Plan, to identify potential hurricane risk areas and evacuation routes.
5. Disseminate information on the availability of facilities for evacuated pets and large animals.
6. Coordinate with PIOs from local response agencies and volunteer groups and develop an effective PIO-to-PIO communication system.
7. Disseminate information emphasizing the need for ride sharing during an evacuation.

Texas Community Development Program Planning Study (2007-2027) - The City of Columbus initiated these Planning Studies and received funding in 2005. It has worked with engineering and planning consultants to complete this effort. This planning endeavor was

financed in part through provisions of the Office of Rural Community Affairs, in conjunction with the U.S. Department of Housing and Urban Development. The text, tables, charts, and figures contained in these Planning Studies provide an inventory, description, and analysis of Columbus's current physical, economic, and social conditions. Goals, objectives, and actions in the form of policy recommendations provide the direction Columbus might take during the coming years to become the place its citizens desire. This executive summary emphasizes the conclusions and final recommendation of the planning efforts described in detail in the body of this report

City of Columbus Comprehensive Plan (2024) – The City of Columbus is currently undertaking a corridor future land use plan that will be completed in 2024. The hazard mitigation actions in this plan will be integrated with that planning effort.

City of Weimar Comprehensive Plan (Updated 2008) - In June, 2008 a Town Hall meeting was held to review the City of Weimar's 2004 Comprehensive Plan Update. The purpose was to celebrate the many accomplishments from that plan and to identify any new opportunities that have arisen since the adoption of that plan.

These are new opportunities for the community to build on the success of the 2004 plan and continue to improve the quality of life in Weimar. The comments gathered ranged from city wide recycling to more amenities at city parks, to more activities in the evening. Not all of these are areas where City government can take a lead role, it will take a community wide effort to address them, Issues were prioritized resulting in the following list of six issues to be addressed:

- Evening Activities
- Anti-Vandalism Campaign
- Citywide Recycling
- Traffic Safety
- Improvements to City Park
- Tourism Development

City of Weimar Economic Development Plan (2023) – The goals from the plan that are incorporated into the hazard mitigation planning effort are to develop an annexation plan and update the zoning map. These goals are in the context of economic development but will be considered from a hazard mitigation lens as well when they are implemented. The broader economic development goals are presented in Section 3 under the Economy heading. The Economic Development Plan also states that City of Weimar will continue to implement the Comprehensive Plan and its updates.

Lower Colorado-Lavaca Regional Flood Plan (2023) - In 2019, the Texas Legislature enacted Senate Bill 8 directing the creation of the first-ever State Flood Plan to be prepared by the Texas Water Development Board (TWDB) and to follow a similar regional "bottom-up" approach that has been used for water supply planning in Texas for more than 20 years. As outlined by the Texas Water Code, the purpose of the regional and state flood plans is to:

- provide for orderly preparation for and response to flood conditions to protect against the loss of life and property
- guide state and local flood control policy
- contribute to water development, where possible

Recommendations for the area were to update the outdated National Flood Hazard area with new hydrologic and hydraulic models using Atlas 14 rainfall data.

Public and Stakeholder Involvement

The process of hazard mitigation planning presents an opportunity for Colorado 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

Chambers of Commerce	Mayors/ Chief Admin. Officer	City Councils
City of Columbus Industrial Development Corporation	County Commissioners	Appraisal District
Public Works	TxDOT – District Representative	TDEM
TCEQ	TWDB	Red Cross
Texas Fire Marshal's Office		
GLO	Colorado County Groundwater Conservation District	City EMS
City Police Department	City Fire Department	Hill Country Waste Solutions

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 Colorado WCID. 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.

Figure 1-3: First Jurisdiction Sub-Team Meeting at the Colorado County Courthouse, September 7, 2023 from 2-3:30 PM

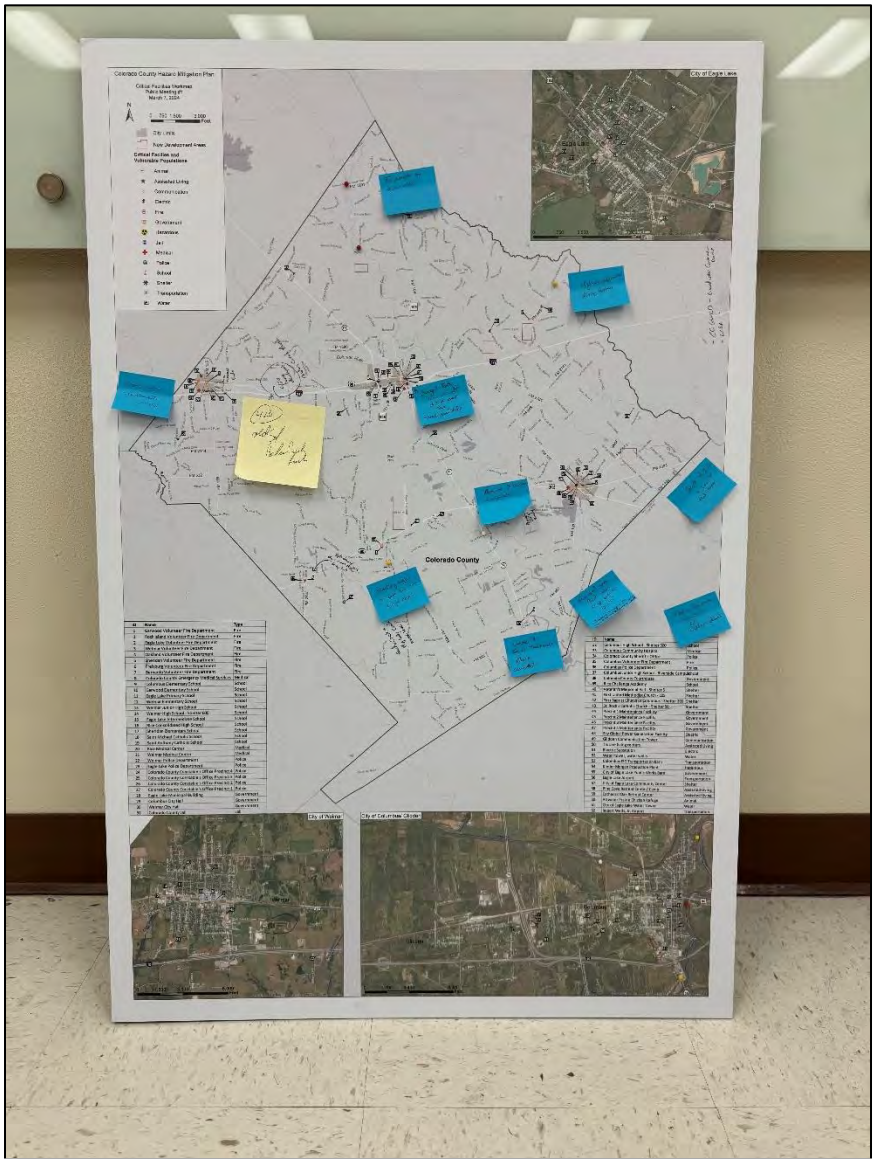
The second tier was the Jurisdictional Sub-Teams comprised of a greater number of members from each participating jurisdiction with the representative Core Team Member leading the meetings and ensuring that tasks were completed. Jurisdictional Sub-Teams are comprised of a diverse group of local officials 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 at the Colorado County Courthouse on September 7, 2023. The second Jurisdictional Sub-Team meeting was held virtually on June 5, 2024. 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
Colorado County	Colorado County EMC	Emergency Management
Colorado County	County Judge	Commissioner's Court
Columbus ISD	Superintendent	Administration
Columbus City	Police Chief	Police Department
Eagle Lake ISD	Superintendent	Administration
Eagle Lake	Mayor	City Council
Weimar	Chief Administrative Officer	Administration

Colorado WCID 2	Manager	Administration

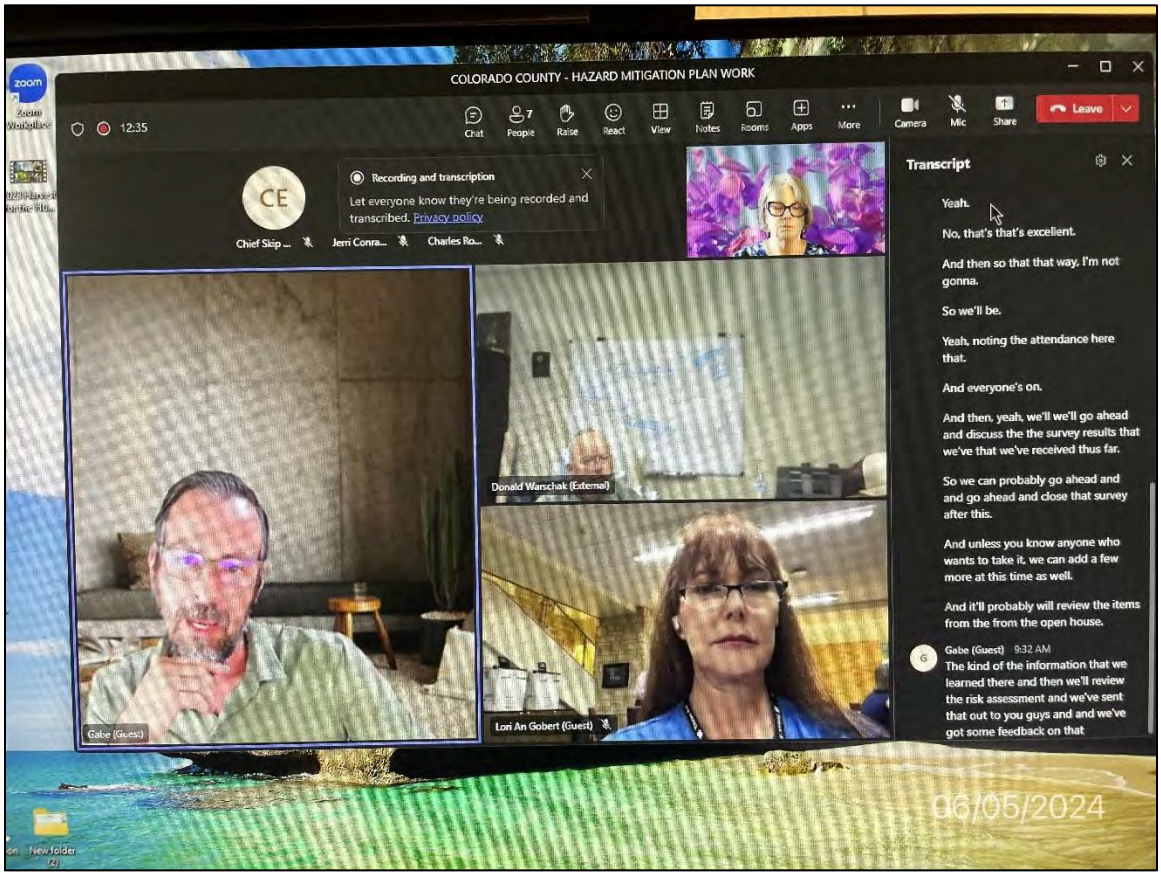
Figure 1-4: Public Meeting at the EMS training room in the City of Columbus, March 7, 2024, 6 pm to 8 pm.



A public workshop was held to gather input from local officials and the public for hazard mitigation. The workshop was held on March 7, 2024 in the City of Columbus at the EMS training room at 305 Radio Lane. 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.

In an effort to reach the widest audience possible, particularly underserved communities and vulnerable populations, Colorado County as well as participating jurisdictions offered paper surveys at public facilities including public libraries and city hall buildings, as well as other locations, in addition to the online forms. The survey announcement as well as all meetings were advertised in English and Spanish on county and city websites as well as social media accounts and published in local newspapers with Spanish translation services available for all meetings. In addition, all in-person meetings were held in handicap accessible locations. No specific feedback was received from attendees self-identifying as a member of an underserved community or vulnerable population.

Figure 1-5: 2nd Core Team Meeting, June 5, 2021, Virtual Meeting



The following are a summary of findings from the public survey that was opened on March 7, 2024, and closed on June 7, 2024. The survey was first announced at the first public meeting in the City of Columbus 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. 9 total surveys, 0 manually entered.
2. Approximately 33% of respondents were in the unincorporated areas of Colorado County, another 33% of the respondents stated that they were inside the city limits of Columbus, 22% were from the City of Eagle Lake, and 11% were from the City of Weimar.
3. Hurricane was identified as the highest threat with 44% of all responses, followed by extreme heat, floods, tornados, and drought, and windstorms.

4. Severe Winter Storms, Floods, Hurricanes, Extreme heat, Severe Winter Storms, Hailstorms, Wildfire, Tornados, Drought, and Lightning are the more prominent responses in the hazards that had been experienced or hazards expected to be experienced.
5. 100% of respondents self-report that they are not located in a floodplain, with just more than 22% identified as having flood insurance.
6. 44% of respondents are extremely concerned, 44% of respondents are somewhat concerned about being impacted by a disaster and 11% of respondents are not concerned.
7. The majority, 78%, have taken steps to make home, business, or community more resistant to hazards with 89% of respondents that would like to know more about how to.
8. Internet and social media were identified as the most effective ways to receive information about how to make home, business, or community more resistant to hazards at 67% combined.
9. Contact by text or e-mail or Code Red were identified as the best two methods to alert public to an imminent disaster at 44% each. An "other" approach was identified at 11%
10. The mitigation activities that received the highest responses were to work on improving the damage resistance of utilities (electricity, communications, water / wastewater facilities, etc.), Retrofit and strengthen essential facilities such as police, fire, emergency medical services, hospitals, schools, etc., Retrofit infrastructure, such as elevating roadways and improving drainage systems, and Inform property owners of ways they can mitigate damage to their properties.
11. Hazard prevention through building regulations, emergency services actions, natural resource protection, property protection and public education were identified as very important. *Structural projects* was the only answer that was identified overall as somewhat important.

Qualitative Answers:

Question 12: Have you taken any actions to make your home, business and/or community more resistant to hazards? If "Yes", please described the action you have taken:

RESPONSES
Studied the situation. Have emergency supplies on hand.
Defensible space against fore
Preventive drainage
Monitor Construction within the flood plain and areas with drainage concerns.
New facing and better windows
We make sure the yard is will-kempt so there is less debris to catch on fire. Tree limbs are manage yet we do not cut down the large trees so we can have shade from the heat. It is cooler under a tree than under a carport in the summer heat.
Purchased flood insurance. Preparation with emergency supplies at all times.

Question 17: Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important?

RESPONSES
No
.
We need updated flood studies to revise flood mapping within the cities and areas within the county.
I'm not sure

SECTION 3: PLANNING AREA PROFILE

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

Colorado County

Population 2020	20,390
Change from 2010	-1.5%
Area (sq. mi.)	974
Altitude (ft.)	150-425
Rainfall (in.)	41.0
Jan. avg. min. (F°)	41
July avg. max. (F°)	96

Colorado County, located about sixty miles above the Gulf of Mexico in south central Texas, is bounded on the northeast by Austin County, on the southeast by Wharton County, on the south by Jackson County, on the southwest by Lavaca County, and on the northwest by Fayette County. It is roughly rectangular in shape except for a small strip extending to the southwest. The center point of the county is at 29°38' north latitude and 96°32' west longitude. The county was named for the Colorado River, which bisects it northwest to southeast. Columbus is the county seat. Colorado County is crossed by Interstate Highway 10, U.S. highways 90 and 90A, and State Highway 71, as well as by the Union Pacific railroad. The county includes 964 square miles of level to rolling land with elevations that range from 150 to 425 feet above sea level. The annual rainfall is forty-one inches. The average minimum temperature in January is 41° F, and the average maximum in July is 96°. The growing season lasts 280 days. From 11 to 20 percent of the land is considered prime farmland. Colorado County has several different soil sections: light-colored soils with clayey subsoils predominate in the southwest and northeast; poorly drained soils with cracking, clayey subsoils are found along the Colorado River; and loamy soils with cracking, clayey subsoils characterize the center. The northwest part of the county, in the Blackland Prairie area, supports elm, oak, pecan, and mesquite trees along streams. The remainder is a post oak savanna, where post oak, blackjack oak, and elm grow, with walnuts and pecans along streams.[1]

[1] www.tshaonline.org

Figure 3-1: Map of Colorado County

The Colorado County Courthouse, built in 1890, is a historic government building located at 400 Spring Street in Columbus, Colorado County, Texas. Colorado County's fourth courthouse, it originally had a central bell tower which was replaced before 1939 by a central domed Tiffany-style skylight. On July 12, 1976, it was added to the National Register of Historic Places. It was renovated in 2013, when historic colors were restored. It is still in use today as a courthouse.[2]

Figure 3-2: Colorado County Courthouse (skylight shown on the right), City of Columbus

[2] Wikipedia.org

Economy

Colorado County

In the early twenty-first century agribusiness, oil-field services, and oil-field equipment manufacturing were key elements of the area's economy. In 2002 the county had 1,770 farms and ranches covering 538,635 acres, 49 percent of which were devoted to pasture and 39 percent to crops. In that year local farmers and ranchers in the area earned $41,586,000, with crop sales accounting for $22,940,000 of that total. Rice, cattle, corn, nursery plants, poultry, hay, and sorghum were the chief agricultural products. The county is well supplied with recreational facilities and tourist sites. With neighboring Washington, Fayette, and Austin counties, it forms part of the Texas Pioneer Trail. Columbus is rich in Victorian-era homes, a number of which are open to the public during the Magnolia Homes Tours the third weekend in May. The Attwater Prairie Chicken National Wildlife Refuge hosts a festival every October. Incorporated communities in Colorado County include Columbus (population, 3,842), the seat of government; Weimar (2,223); and Eagle Lake (3,868). Weimar hosts a "Gedenke" (Remember) celebration on Mother's Day. Other unincorporated communities in the county include Sheridan, Garwood, Altair, Bernardo, Oakland, Glidden, Rock Island, Frelsburg, Borden, Chesterville, Nada, Mathews, Mentz, and Alleyton.

City of Columbus, Texas

Located 70 miles west of Houston, 125 miles east of San Antonio, and 87 miles south of Austin, Columbus is a relaxing small town with a rich and wild history, full of Southern charm. The annual Colorado County fair happens in Columbus and has been held for 40 years with 3 days of carnival rides, eats, live music, rodeo excitement, and more.

Large deposits of sand and gravel in and around Columbus helped give birth to a major local industry around the turn of the 20th century. Gravel pits were first dug by the Galveston, Harrisburg and San Antonio Railway just west of Glidden in 1906. By 1910 Columbus was virtually surrounded by gravel pits. Four additional companies were formed in that year alone. Gravel production has continued to be a major source of economic prosperity over the years, with only moderate declines during the Great Depression. In addition to its economic contribution, the prevalence of an inexpensive source of local gravel has also contributed to affordable road construction.

Columbus grew steadily after World War II, as the local economy became increasingly focused on recreational activities. For Columbus this focus centered on historic buildings and a down-home atmosphere. In 1961 a group of civic leaders organized the Magnolia Homes Tour, a nonprofit organization established to preserve the unique local culture, traditions, and heritage of Columbus as embodied in its historic buildings. Tours are conducted on the first and third Thursdays of each month and include the Stafford Opera House, the Senftenberg-Brandon House Museum, the Alley Log Cabin Museum, the Dilue Rose Harris House Museum, and the Mary Elizabeth Youens Hopkins Santa Claus Museum. Other historic buildings in the area include the Confederate Memorial Museum, in the brick-based Water Tower (1883), the Brunson Building (1891), the Raumonda house (1887), the Gant house (ca. 1870), and the Colorado County Courthouse (1891).

The Columbus Community Industrial Development Corporation (CCIDC) administers the City of Columbus' half-cent 4-B sales tax revenues – approved by voters in 1995 – for economic and community development. Eligible activities for receipt of these funds are outlined in the proposition section of City Ordinance No. 12-95. The Corporation manages

the Texas Crossroads Business Park and administers a community grants program. The Corporation is managed by a Board of Directors appointed by the Columbus City Council. The Corporation maintains a contract for administrative services with the City of Columbus.

Electricity is served by the BEC, water and wastewater are served by the City of Columbus.

City of Eagle Lake, Texas

Eagle Lake is on Highway 90A east of the Colorado River and fifty miles southwest of Houston in southeast Colorado County. The town is beside a lake of some 1,400 acres, also known as Eagle Lake. Below the lake is the Lower Lake. Both lakes are privately owned and are leased for hunting and fishing.

Capt. William Dunovant introduced the cultivation of rice irrigated by lake water in 1896. John Linderholm of Chesterville expanded the rice industry, irrigated by wells, to the prairie north of Eagle Lake. Rice mills were also established in Eagle Lake. In the 1980s the mills were gone, though rice culture was still one of the major local industries. Huge sand and gravel deposits were mined west of the lake, leaving stretches of water for fishing and waterskiing and bringing the manufacture of concrete products to Eagle Lake. Numerous bones of ancient animals were found in the gravel mines. Production of both oil and natural gas in the area also contributed to the economy. In the 1960s Eagle Lake became a recreational center for hunting geese and ducks that wintered on the prairies in the rice stubble and around the lake. In the 1980s the planting and harvesting of hundreds of acres of wildflowers brought new interest to Eagle Lake.

Eagle Lake is a rural community located in southeast Colorado County, on U.S. Highway 90A, about 60 miles west of Houston, 140 east of San Antonio and 100 miles southeast of Austin. Highways serving the community are U.S. 90A, and Texas FM 102, FM 3013 and FM 1093, and 12 miles to the north is Interstate 10. The population is an estimated 3,739, the land area is approximately 2.79 square miles with six acres of it water. Rice is the major crop; however, cotton, grains, and cattle production are also important to the economy. Hunting & Ecotourism is also important to the local economy. About 10,000 commercial trucks drive through Eagle Lake daily and sand/gravel mines around Eagle Lake supply the materials for construction to a large part of Southeast Texas. There are dozens Historical Markers in Eagle Lake with the Eagle Lake Commercial District is on the National Register[3]

Electricity is served by BEC, Water and Wastewater are provided by the City of Eagle Lake.

City of Weimar, Texas

Weimar is on U.S. Highway 90 and Interstate Highway 10, eighty-seven miles west of Houston in western Colorado County. It was founded in 1873 in anticipation that the Galveston, Harrisburg and San Antonio Railway was going to build through the site. The community was first called Jackson, after D. W. Jackson, a native Georgian and area landowner who donated land for the railroad right-of-way and the townsite. The populace subsequently chose the name Weimar; an early record states that Thomas W. Peirce, who authorized Jackson to sell lots at the site, had visited Weimar, Germany, and was favorably impressed. The Weimar post office was established in 1873. The town was incorporated in 1875. Local industries include meat processing, tooling and sheet-metal works, and

[3] https://www.coeltx.net/community

manufacturing of gaskets. Agriculture continues to play an important role, as Weimar continues to trade in feed grain, poultry, corn, pecans, and beef. The former GH&SA railroad remains in service today as part of the Southern Pacific system.

City of Weimar Economic Development Plan (March 2023)
Using information gathered from townhall meetings, the Economic Development Steering Committee met to identify more specific opportunities. This group focused on the strong and weak points of living and doing business in Weimar. The biggest challenge identified for businesses was the lack of workforce. Business leaders stated that it is a challenge to find new employees because unemployment is low. Another challenge is retail convenience, services, and housing options in Weimar, this slows business development because businesses want to locate in communities where their employees can find housing and services. The group identified many positives to doing business in Weimar including the small-town atmosphere, customer loyalty, quality employees, safety, and low traffic.

Individual interviews were conducted with business leaders to allow them the opportunity to offer their insight in a confidential manner. There were common themes throughout the community. In general, most employers were very satisfied with their business and were complimentary of city leadership. They felt that city leaders were responsive to area businesses and supported them well. Some areas identified for improvement included workforce development, increased coordination between the City and Chamber of Commerce, marketing and the development of an incentive policy.

Based on the public input, three comprehensive goals were established for economic development. These are business recruitment, workforce development, and developing an incentive policy.

The following plan lays out the specific objectives and action steps to achieve economic success and sustainability in Weimar.

Weimar's Economic Development Goals

1. Business Recruitment Objectives
    - Create jobs
    - Enhance the tax base
    - Diversify the economic base
    - Improve the quality of life
2. Workforce Development Objectives
    - Retain and attract jobs
    - Increase wages
    - Improve quality of life
3. Incentive Policy Objectives
    - Lower the cost of business investment
    - Improve the attractiveness of Weimar (business front facades and town cleanliness and beautification)
    - Economic development tools
    - Diversify the economic base
    - Improve the quality of life
4. Housing Objectives

- Promote the preservation, rehabilitation, and investment in existing housing
- Promote new housing investment
- Encourage a range of affordable rental housing options
- Promote education and support to encourage appropriate landlord accountability
- Promote education and support to encourage appropriate tenant accountability
- Reduce abandoned housing in our neighborhoods through code compliance
- Support community-oriented policing and develop crime prevention strategies
- Provide housing opportunities for homeownership for low to moderate income households

The City of Weimar will need to continue to implement the Comprehensive Plan and its updates.

Electricity, Water and Wastewater are provided by the City of Weimar, Gas is provided by Centerpoint, and communications are provided by Colorado Valley Fiber.

Population and Demographics

The 2020 Census count for Colorado County is 20,557, of which 3,699 were residents of City of Columbus, 3,442 were residents of City of Eagle Lake, and 2,076 were residents of City of Weimar.

Table 3-1: Population of Colorado 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
Colorado County[6]	20,557	20,582	1,247	4,584	1,490
City of Columbus	3,699	3,686	229	1,084	395
City of Eagle Lake	3,442	3,443	247	425	329
City of Weimar	2,076	2,771	136	556	185

School Population

Columbus Independent School District, Rice Consolidated Independent School District, and Weimar Independent School District are located within Colorado County and are participating jurisdictions in this plan. The county has a combined student enrollment of over 3,500 students and an average four-year graduation rate of nearly 90 percent. The districts each offer experienced educators and small teacher/student ratios, as well as career, technical, and vocational opportunities, audio/visual and healthcare classes, athletics, fine arts, and more. Garwood Elementary School, located in Rice ISD, was awarded the prestigious title of a National Blue Ribbon School in 2019.

Colorado County also has two private Catholic Schools for students grades Kindergarten through eighth: St. Antony Catholic School of Columbus, and St. Michael Catholic School of

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

Weimar. Additionally, Clear Leadership Academy is a private learning center for grades 3k through 12.[7]

Table 3-2: ISD Population

ISD	Employees	Students	Children (under5)	Staff with Outdoor Jobs*
Columbus ISD	237	1,645	65	9
Weimar ISD				
Rice Consolidated ISD	228	1,306	49	8

*Includes bus drivers and maintenance workers

Population Growth

The Census 2010 population for Colorado County was 20,874 of which 3,655 were residents of the City of Columbus, 3,639 were residents of the City of Eagle Lake, and 2,151 were residents of the City of Weimar. The 2022 population for Colorado County is estimated to be 20,582, of which 3,686 were residents of the City of Columbus, 3,443 were residents of the City of Eagle Lake, and 2,771 were residents of the City of Weimar. 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, Colorado County experienced a decrease in population between 2010 and 2022. The City of Eagle Lake also experience a population decrease during this time period while the Cities of Columbus and Weimar experiencing an increase. The Census counts between 2010 and 2020, however both show a population decrease for all jurisdictions except for the City of Columbus. Colorado County had a -317 person decrease over that time period with Eagle Lake and Weimar holding a -272 share of the total figure suggesting that much of the decline was in the incorporated areas. Table 3-2 provides historic and projected population change rates in Colorado County and all participating jurisdictions.

Table 3-2: Population Change for Colorado County and Participating Jurisdictions

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)
Colorado County	20,874	20,557	20,582	-317	-1.5%	-292	-1.4%	25	0.1%
Columbus	3,655	3,699	3,686	44	1.2%	31	0.8%	-13	-0.4%
Eagle Lake	3,639	3,442	3,443	-197	-5.4%	-196	-5.4%	1	0.0%
Weimar	2,151	2,076	2,771	-75	-3.5%	620	28.8%	695	33.5%

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

[7] Columbus Chamber of Commerce, Visitor Guide and Member Directory

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 Colorado County Planning Area of 1,697 persons over the 50-year period, or 14.7%. 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, the surrounding counties are growing rapidly with the expansion of the Houston metro area. The changes in population are not anticipated to change the impacts of hazards on vulnerable assets in the area due to low and negative growth projections over the 50-year outlook.

Table 3-3: TWDB Population Projections

Jurisdiction	P2030	P2040	P2050	P2060	P2070	P2080
Colorado County	11,480	11,216	10,899	10,571	10,200	9,783
Columbus	3,369	3,424	3,460	3,470	3,469	3,454
Eagle Lake	3,002	2,696	2,401	2,196	1,969	1,719
Weimar	1,849	1,801	1,746	1,693	1,634	1,567

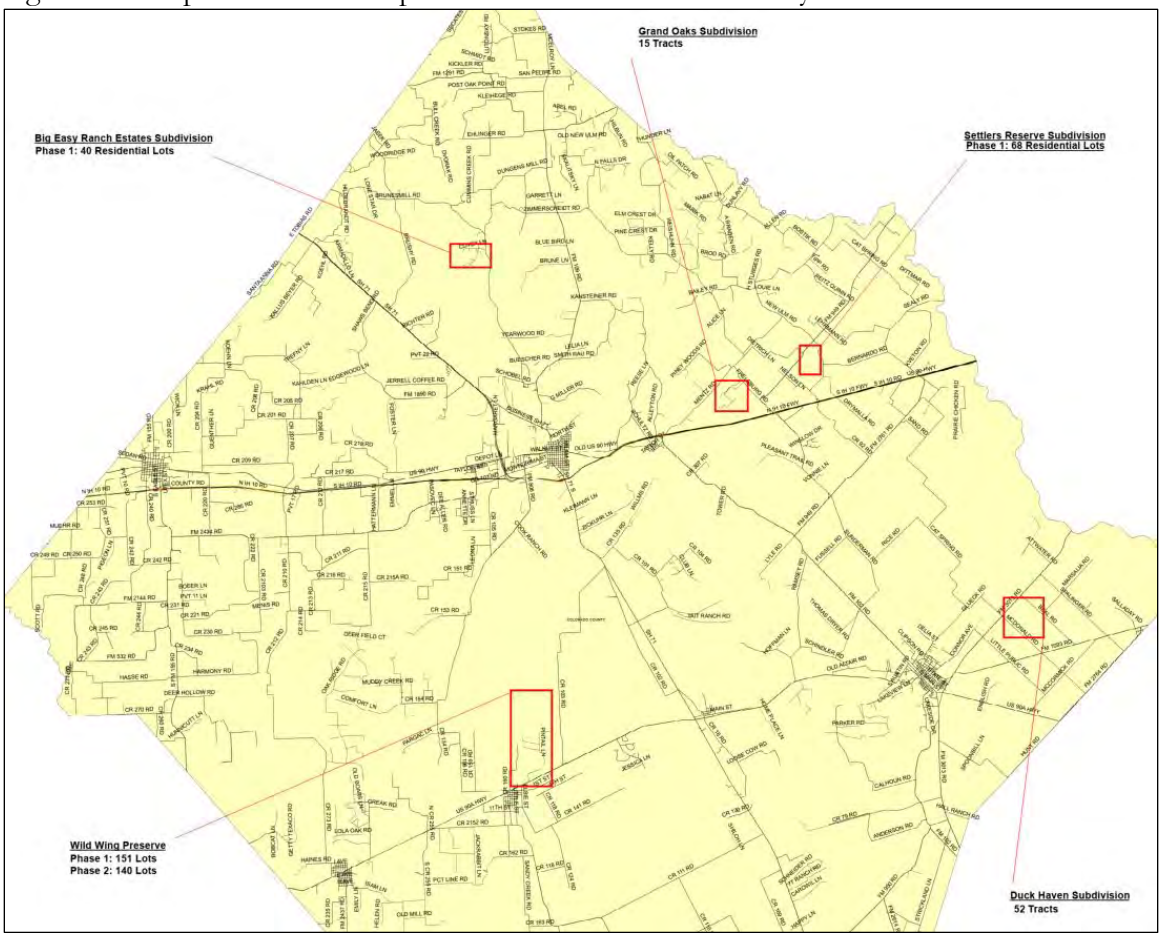
Capabilities Assessment

Each municipality's laws, programs, documents, and departments were reviewed to identify the plans, regulations, personnel, and funding mechanisms available to the county and planning partners to impact and mitigate the effects of natural hazards. The county and cities have the capacity to expand their hazard mitigation capabilities through the training of existing staff, cross-training staff across program areas, and hiring of additional staff, as well as acquiring additional funding through the attainment of grand funds, raising of taxes, and levying of new taxes. The complete table of the existing capabilities of each community and a discussion of how each participant can expand on and improve the capabilities described can be found in **Appendix A**.

Existing and Future Land Use and Development Trends

It is expected that residential growth will slowly increase along the transportation corridors leading to Colorado County from surrounding counties as they are upgraded, and within the city limits and extra-territorial jurisdictions (ETJ) of the cities of Columbus, Eagle Lake and Weimar.

Figure 3-3: Map of New Development Areas in Colorado County



City of Columbus

The City of Columbus's land use is characterized by a mix of residential, commercial and public uses centered on the axis of its two main arterials, US 90 and I-10. Agricultural uses generally extend from the city limits to the extraterritorial jurisdiction.

City of Eagle Lake

The City of Eagle Lake's land use is characterized by a mix of residential, commercial and public uses centered on the axis of its two main arterials, US Alt 90 and FM 102. Agricultural uses generally extend from the city limits to the extraterritorial jurisdiction.

City of Weimar

The City of Weimar updated their comprehensive plan in 2008. This was an update to the 2004 comprehensive plan. Some of the priorities related to hazard mitigation include improved lighting and sidewalks in the downtown area, continue code enforcement in the downtown area, intersection improvements, and hiring a grant writer.

Future land use plans in Columbus, Eagle Lake, and Weimar anticipate balanced growth with a mix of land uses. As these changes in land use are realized, the impacts from hazards are expected to be diminished due to better understanding, modeling, and regulatory control of areas that are at higher risk of being affected by hazards such as floodplains and the wildland urban interface. New methods of road design and construction will also increase the

resilience of and access to transportation infrastructure in the event of hazardous conditions or evacuation requirements.

Critical Facilities and Assets

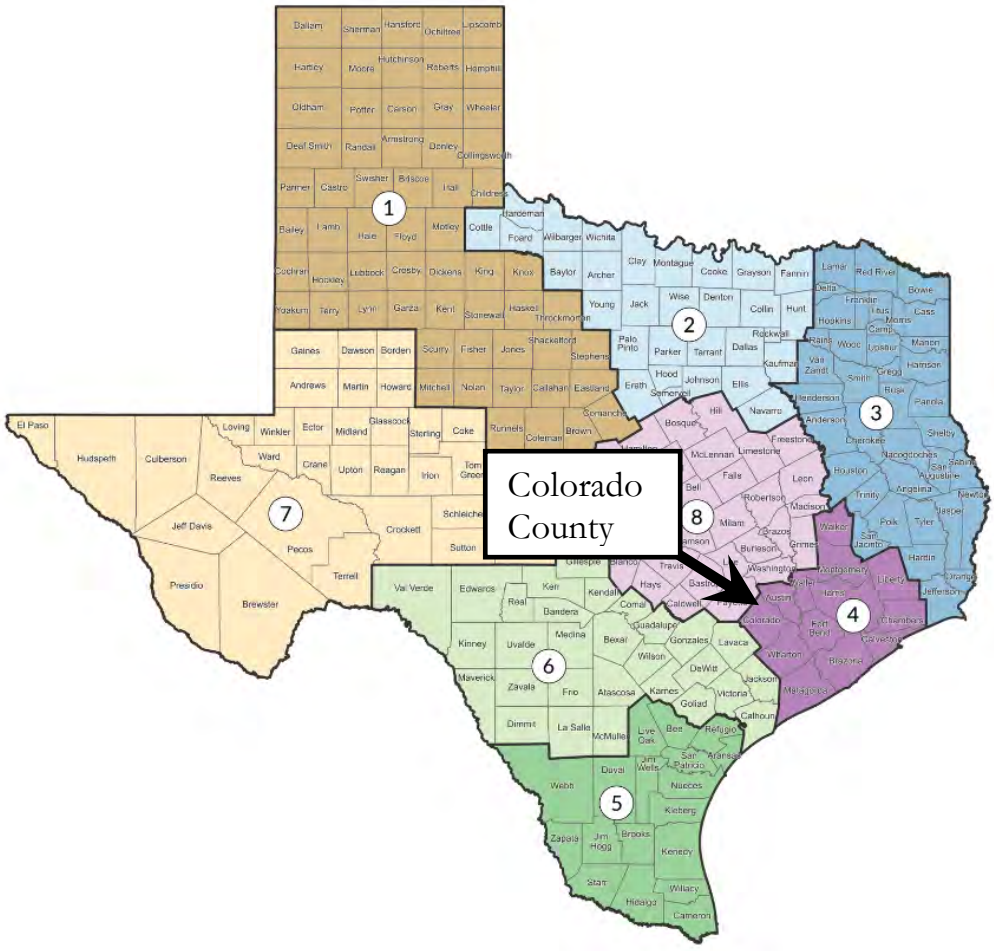
For certain activities and facilities, even a slight risk from a hazard event is too great a threat. FEMA defines these types of places as critical facilities; hospitals, fire stations, police stations, courthouse, communications, public schools, utility infrastructure and similar facilities where essential 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.**

SECTION 4: HAZARDS AND RISK

Based upon a full review of the range of hazards suggested under FEMA planning guidance and input from Colorado County Core Team members, 12 hazards have been identified as important to be addressed in the Colorado 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 Colorado 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, Colorado County is located within the western portion of Texas Division of Emergency Management Region 4 where floods, hurricanes, and drought can be expected to dominate the hazard profile. This area is located directly west and inland of the rapidly developing Houston area. Increasing urbanization in an already flood prone area makes this region particularly vulnerable to riverine and coastal flooding.

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



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 Colorado County

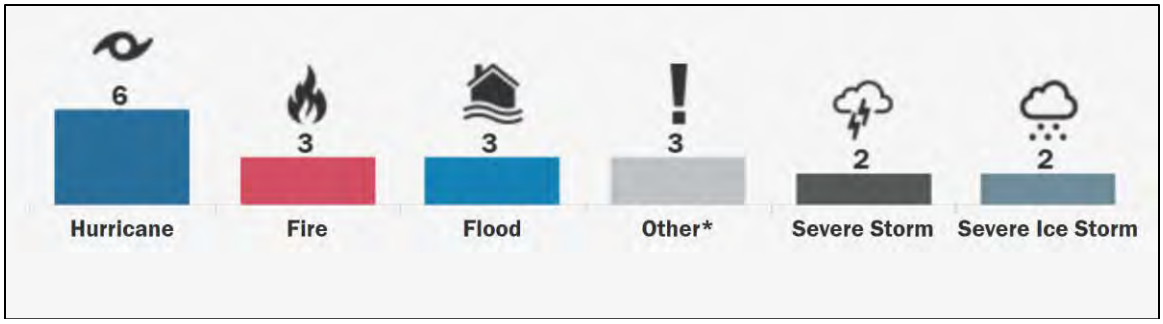
Disaster Number	Year	Title
3113	1993	Drought
1041	1994	Flood
1239	1998	Severe Storm
1257	1998	Flood
3142	1999	Fire
3216	2005	Hurricane
3261	2005	Hurricane
1606	2005	Hurricane
1624	2006	Fire
3290	2008	Hurricane
3294	2008	Hurricane
4029	2011	Fire
4223	2015	Severe Storm
4269	2016	Flood
4332	2017	Hurricane
3458	2020	Biological
4485	2020	Biological
3554	2021	Severe Ice Storm
4586	2021	Severe Ice Storm

Source: www.FEMA.gov

Since the US Federal Government began issuing disaster declarations in 1953, Colorado County has had 19 disaster declarations where individual and/or public assistance has been approved. Based on Table 4-1 above, 17 of the 19 disaster declarations have been issued in the past 25 years (since 1997). The infographics below provide a summary of the type of hazard, year, and time of year in which it occurred.

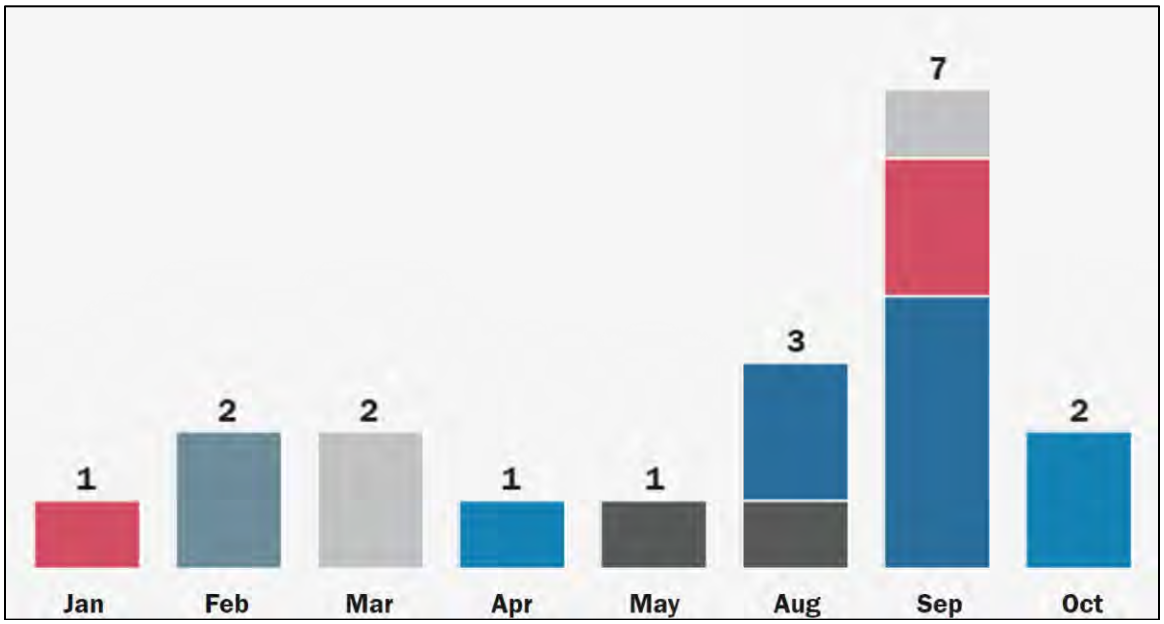
The types of hazards that have had disaster declarations for the Colorado County planning area since 1953 are shown in Figure 4-2 below and color-coded for use in Figure 4-3 on the following page.

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



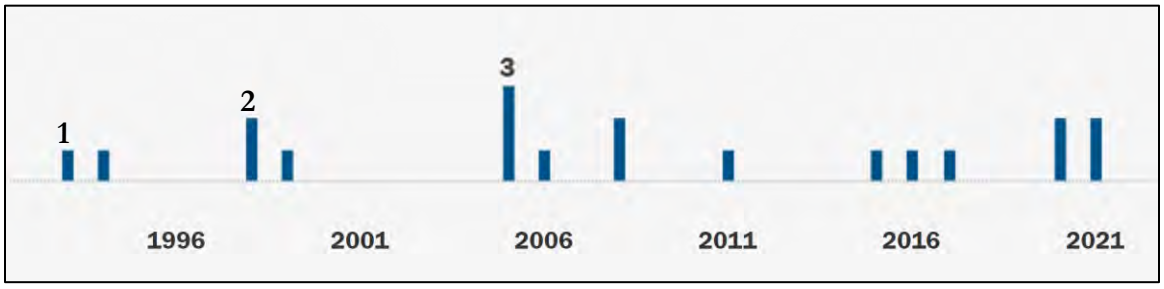
The months during which disasters have been declared in the planning area are shown in Figure 4-3 below with the number of declarations shown at the top of each bar.

Figure 4-3: Colorado 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: Colorado County Disaster Declarations Since 1953 by Year of Occurrence



Hazard Descriptions

The following 12 hazards listed in Table 4-2 are included in the State of Texas Hazard Mitigation Plan and it was determined by the Core Planning Team that they present 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.

Table 4-2: Hazards Studied

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), 1 dam has a high hazard potential in the Colorado 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. This increases the likelihood and magnitude of future occurrences of hazards such as floods, extreme heat hailstorm, hurricanes, lightning, severe winter storms, tornado, windstorms, wildfire, and dam failures. The impacts from each of these hazards on the vulnerable assets of Blanco County and participating jurisdictions are expected to increase in the future as a result of climate change. These critical facilities and vulnerable populations are located in Appendix Earthquakes are not considered to have any measurable impact due to climate change in the area.

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 Colorado 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 Colorado 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 1997-2023 for the Colorado County Planning area.

Table 4-5: Colorado County Hazard Impact Summary (1997-2023)

Hazard	Deaths	Injuries	Property Damage	Crop Damage	Frequency	Potential Severity
Drought	0	0	$1,000,000	$14,566,260	Occasional	High
Floods	0	0	$2,767,000	$37,685,179	Highly Likely	High
Earthquake	0	0	$0	$0	Unlikely	Low
Extreme Heat	0	0	$0	$2,529,225	Highly Likely	Low
Hailstorm	0	0	$497,500	$302,458	Highly Likely	Medium
Hurricanes, Tropical Storms, and Depressions	2	0	$25,000	$3,966,932	Unlikely	Low
Lightning	0	0	$75,000	$0	Highly Likely	Low
Severe Winter Storms	0	0	$358,000	$400,491	Likely	Medium
Tornado	0	8	$668,000	$0	Likely	Medium

Windstorms	0	0	$1,258,500	$1,158,462	Likely	High
Wildfire	0	0	$0	$266	Likely	Low
Dam Failure	0	0	$0	$0	Unlikely	Low

Source: NCEI Storm Events Database 1997 to 2023

The 25-year hazard profile shows that drought and floods have had an outsized impact on the planning area. Floods, Windstorms, and Drought are the leading cause of property damage and crop damage. The next highest number of damages and the highest number of injuries can be attributed to Tornadoes. Hailstorms and Severe Winter Storms are the next greatest contributing events to property damages in the Colorado County planning area. Based on the historical impact summary, droughts and flooding are the priority hazards to consider when developing measures to mitigate the most damaging effects from these events to people, property and the environment. This is followed by windstorms, tornadoes, hail, and severe winter storms. 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 Colorado 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. Colorado County is approximately 50 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.

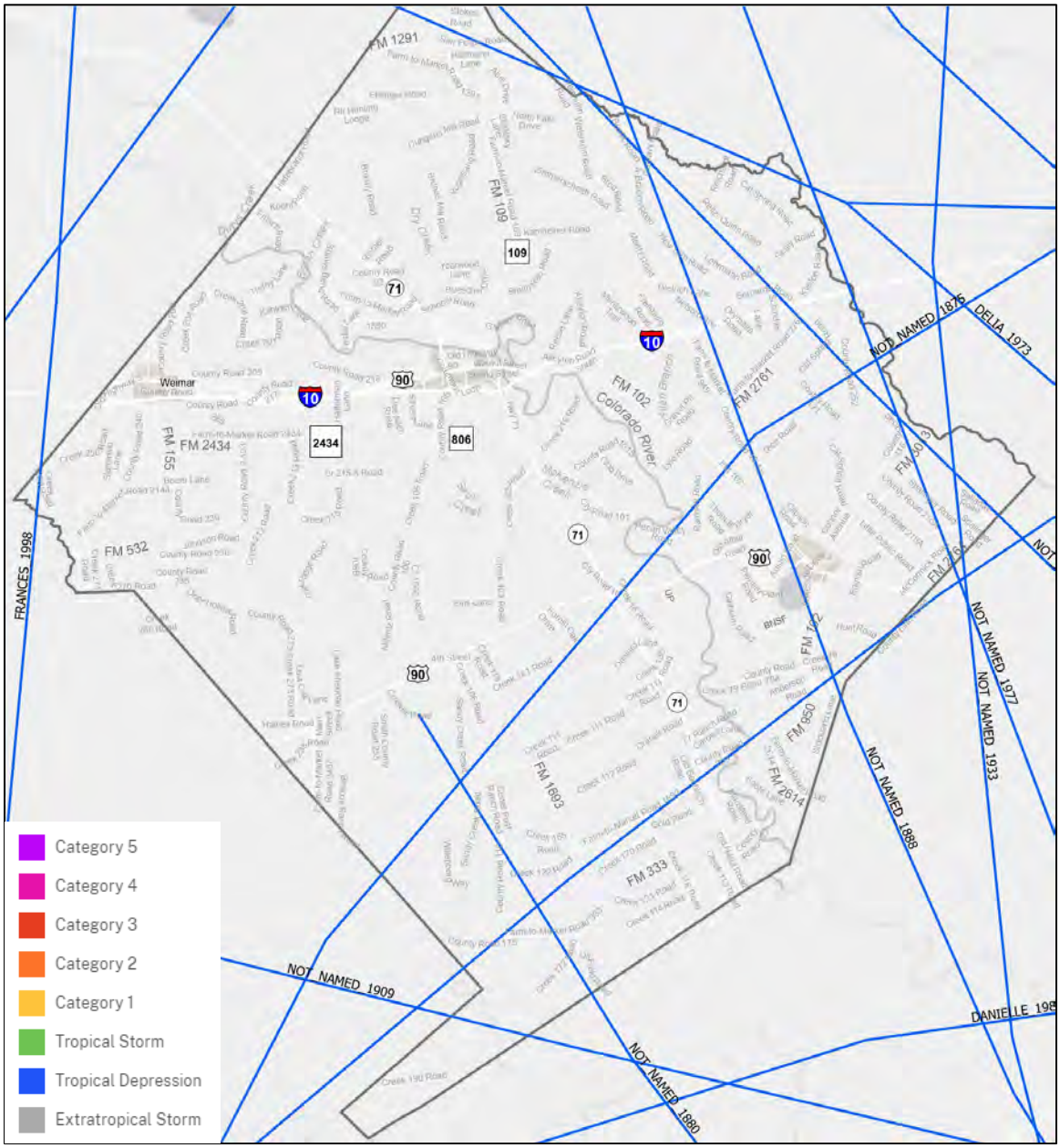
Table 5-1: Hurricane/TS/D Storm Track Events Table in Colorado County

Storm Name	Year	Dates	Category
Unnamed	1998	Sept 7	Tropical Storm (TS)
Unnamed	2015	Jun 15	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 Colorado County. Based on data provided by NOAA's National Climatic Data Center (NCDC) and the FEMA National Risk Index, Colorado County's hurricane risk is moderate when compared to areas closer to the Gulf and Atlantic coasts of Texas and the United States.

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



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

Extent

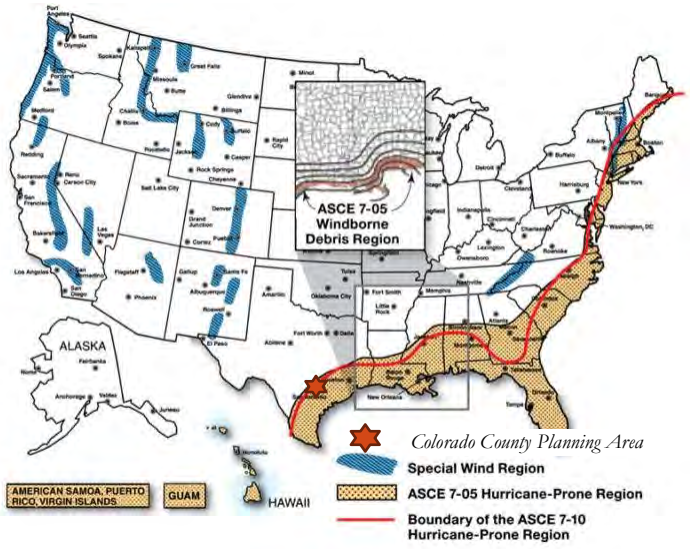
For Hurricanes, extent can be expressed separately for flood, wind, and surge. Flooding will be examined in the next section, but surge is not an issue for Colorado County since it is located a moderate distance inland from the coast. For hurricane wind extent, the Saffir-Simpson Hurricane Wind Scale (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, Colorado 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 Colorado 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 Colorado County planning area, as well as tracks that went through adjacent counties yet still impacted the Colorado County planning area, are identified in this section. Based on historical storm data provided by NOAA's National Climatic Data Center (NCDC), only two (2) 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 Events in Colorado County, 1997-2023

Date	Magnitude	Injuries	Fatalities	Property Damage	Crop Damage
9/7/1998	Tropical Storm	0	0	$25,000	$0
6/15/2015	Tropical Storm	0	2	$0	$0

Source: *NOAA NCEI Storm Events Database*

Table 5-4: Historical Hurricane/TS/D Events in Colorado County (USDA Data), 1997-2023

Location	Dates	Deaths	Injuries	Property Damage	Crop Damage
Countywide	1997-2023	0	0	$0	$3,966,932

Significant Events

August 7, 1998

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 two 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 Colorado County to the Texas Coast makes this area moderately 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

Below is the summary table for Colorado County that shows the 25-year column totals and the average annual (Per Year) losses from hurricane events. 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 $1,000 for Colorado County.

Table 5-5: Colorado County Loss Summary

Time Period	Fatalities	Injuries	Property Damage	Crop Damage
Loss Summary, Colorado County				
25-year Total	0	0	$25,000	$0
Per Year	0	0	$1,000	$0
Per Capita Dollar Losses (2022 ACS Population – 20,582)				
25-year Total	0	0	$1.21	$0
Per Year	0	0	$0.05	$0

The Colorado 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 2022 American Community Survey (ACS) estimates, there are 7,376 occupied housing units in Colorado County of which 17%, or 1,279 units, are mobile or manufactured homes. In addition, 3,562 (48%) 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 5-6. Structures at Greater Risk by Jurisdiction

Jurisdiction	Occupied Housing Units	Mobile Homes	Housing units built prior to 1980
Colorado County*	7,376	1,279 (17%)	3,562 (48%)
City of Columbus	1,443	146 (10%)	1,044 (72%)
City of Eagle Lake	902	114(13%)	502 (56%)
City of Weimar	1,074	129 (12%)	685 (64%)

*County totals include all jurisdictions, ISDs, ESDs, and the Water District in addition to unincorporated areas.
Source: 2022 American Community Survey 5-year estimate, selected housing characteristics

Based on the ACS 2022 data, the City of Columbus is at higher risk of damage from hurricanes when considering age of residential structures and the higher standard of building codes enacted after 1980. Unincorporated Colorado County is at a higher risk of damage from hurricanes when considering number and ratio of manufactured homes.

SECTION 6: FLOOD

Description

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

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

Location

The Digital Flood Insurance Rate Map (DFIRM) data provided by FEMA for Colorado 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 Colorado County, and all participating jurisdictions, are illustrated in Figures 6-1 to 6-5. A key that describes the specific critical facilities that are numbered on the maps on the following pages can be found in **Appendix E.**

Figure 6-1: Colorado County Floodplain Map

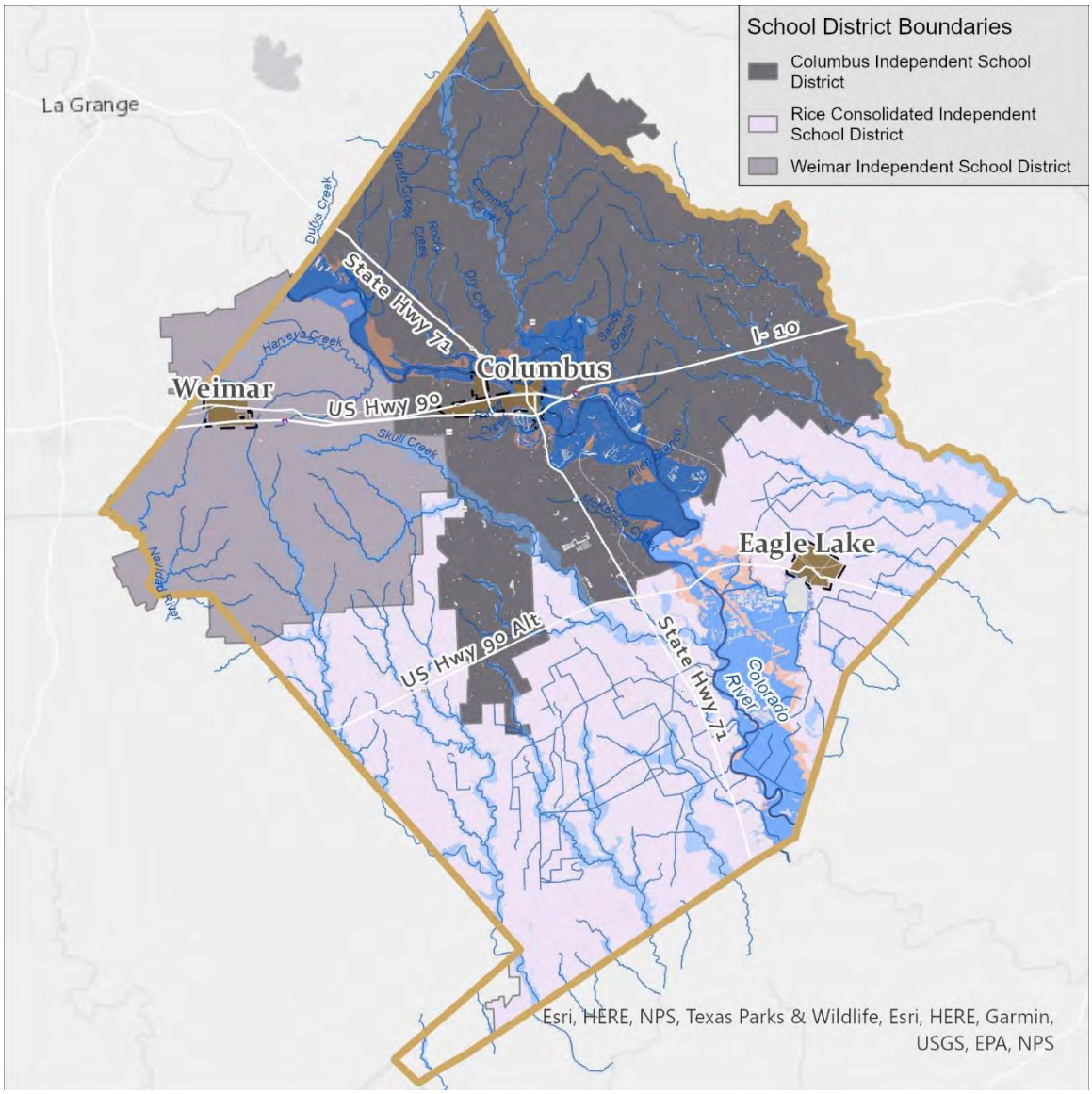
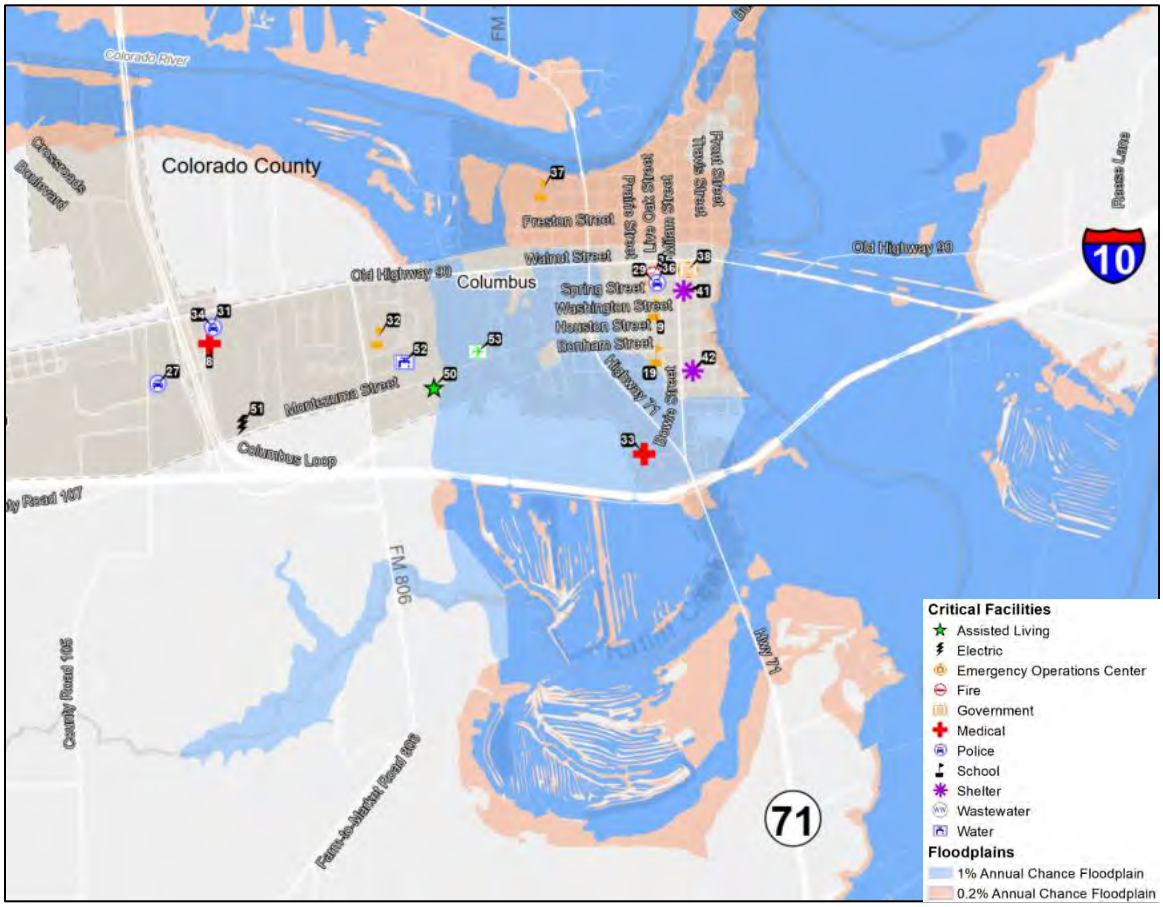
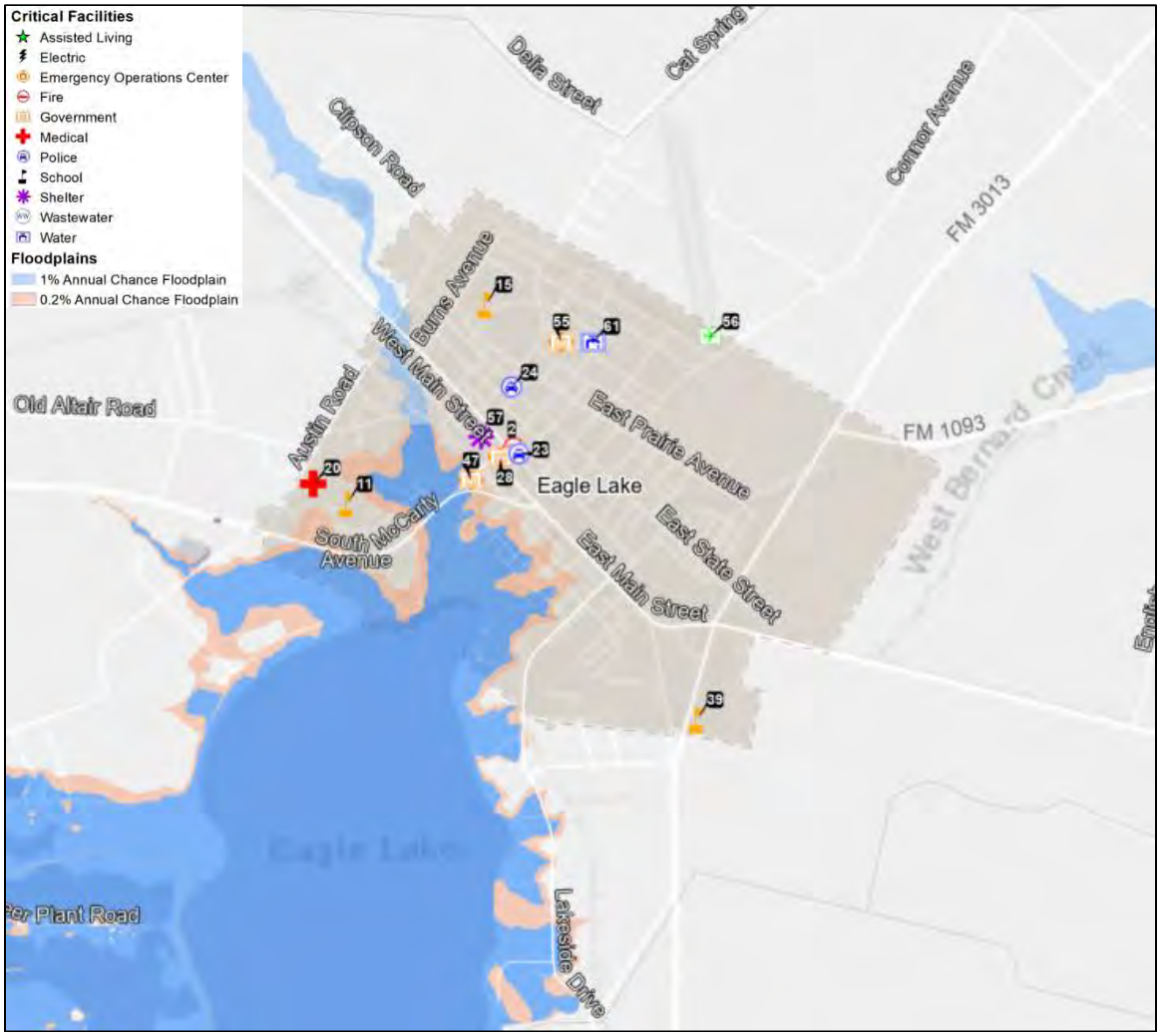


Figure 6-2: City of Columbus Floodplain Map



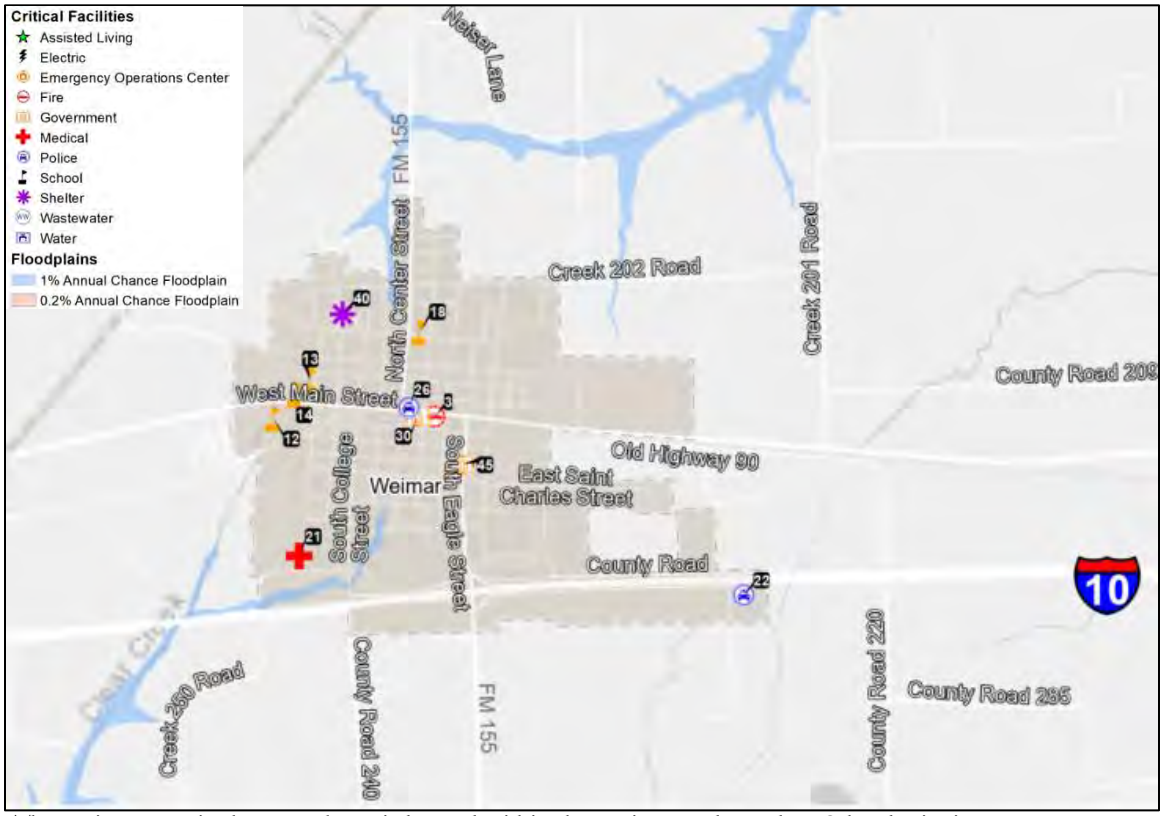
*The entire extent in the map above is located within the Colombus Independent School District

Figure 6-3: City of Eagle Lake Floodplain Map



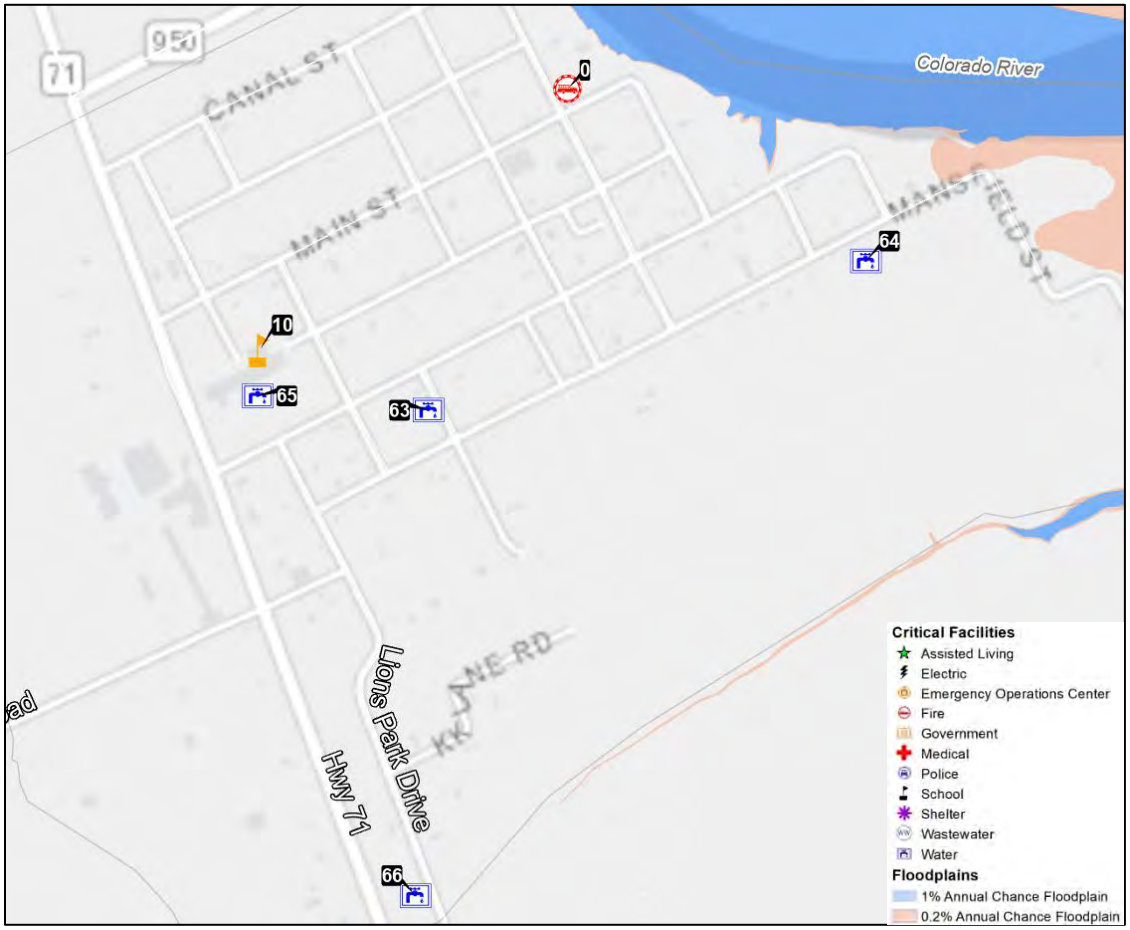
*The entire extent in the map above is located within the Rice Consolidated Independent School District

Figure 6-4: City of Weimar Floodplain Map



*The entire extent in the map above is located within the Weimar Independent School District

Figure 6-5: Garwood (Census Designated Place) Floodplain Map showing CCWID #2 Facilities



*The entire extent in the map above is located within the Weimar Independent School District

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.

Figure 6-6: Hurricane Harvey, August 2017

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 Colorado County. There have not been any events recorded past the listed dates.

Table 6-2: Historical Flood Events in Colorado County (NCEI Data), 1997-2023

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Countywide	2/20/1997	0	0	$5,000	$0
Garwood	3/12/1997	0	0	$2,000	$0
Eagle Lake	6/6/1997	0	0	$10,000	$0
North Portion	10/13/1997	0	0	$5,000	$0
	10/17/1998	0	0	$0	$0
East Portion	10/17/1998	0	0	$25,000	$0
Countywide	10/18/1998	0	0	$15,000	$0
Countywide	10/18/1998	0	0	$0	$0
	11/12/1998	0	0	$0	$0
Countywide	11/12/1998	0	0	$5,000	$0
Countywide	11/13/1998	0	0	$5,000	$0
Countywide	11/14/1998	0	0	$5,000	$0
West Portion	9/9/2001	0	0	$35,000	$0
Countywide	11/4/2002	0	0	$20,000	$0
Countywide	11/22/2004	0	0	$0	$0
Bernardo	1/13/2007	0	0	$0	$0
Sheridan	4/30/2007	0	0	$10,000	$0
Weimar	5/26/2007	0	0	$0	$0
Weimar	5/28/2007	0	0	$70,000	$0
Frelsburg	4/17/2009	0	0	$5,000	$0
Glidden	5/13/2014	0	0	$0	$0
Columbus	5/18/2015	0	0	$0	$0
Weimar	5/25/2015	0	0	$0	$0
Weimar	4/18/2016	0	0	$2,500,000	$0
Alleyton	8/27/2017	0	0	$0	$0
Eagle Lake	5/7/2019	0	0	$50,000	$0

Garwood	6/25/2020	0	0	$0	$0
Noda	6/25/2020	0	0	$0	$0
Bernardo	5/19/2021	0	0	$0	$0
Bernardo	8/24/2022	0	0	$0	$0

Table 6-3: Historical Flood Events in Colorado County (USDA Data), 1997-2023

Location	Dates	Deaths	Injuries	Property Damage	Crop Damage
Countywide	1997-2023	0	0	$0	$37,685,179

Significant Events

April 18, 2016

A slow moving upper low over the Southwestern U.S. combined with near record level moisture aided in producing extremely heavy rainfall and devastating flooding over portions of Harris, Waller and Fort Bend Counties. Northwest to southeast orientated bands of precipitation commenced during the early evening hours of April 17th across extreme southwestern and western Harris County as well as north and west into Grimes, Waller, Fort Bend, Austin and Colorado Counties. Between 8:00 p.m. and 9:00 p.m. thunderstorms began to greatly intensify and slow their northward movement over Waller County and, by late evening, had stalled and began shifting eastward into western Harris County. Excessive rainfall spread across northwestern Harris County during the late evening hours of April 17th and into the early morning hours of April 18th. Slow thunderstorm movement and rain rates over 4 inches per hour resulted in a large portion of northwest Harris and Waller Counties receiving between 10 and 20 inches of rainfall over mainly a 12-hour period. A few CoCoRaHS gauges in Waller County measured over 20 inches. The flooding resulted in 8 direct fatalities over the region, all drownings in vehicles. Six of these were in Harris County with 1 in Waller County and another in Austin County. An estimated 40000 cars and trucks were flooded. Several bayous and creeks were flooded. The Addicks Barker Reservoir was severely impacted. At least 10,000 homes were flooded. Damage was estimated from Damage Survey Reports to be near $60 million. Numerous roads and bridges were closed, and water rescues were performed due to flooding across northern portions of the county. The FM 109 bridge over Cummings Creek, just north of Brunes Mill Road north of Columbus, was completely washed out.

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 Colorado planning area, 30 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 Colorado 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. The central portion of the City of Columbus is surrounded in 100-year floodplain.

Table 6-4: Critical Facilities in the 1% or 0.2% Annual Chance Floodplain by Jurisdiction

Jurisdiction	Critical Facilities
Colorado County	1 Nursing Home, 1 Water Treatment Plant
City of Columbus	1 Hospital, 1 Junior High School, 1 Columbus ISD Bus Barn
City of Eagle Lake	1 Maintenance Facility
City of Weimar	

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 Colorado County dollar losses from January 1997 through December 2023.

Table 6-5: Colorado County Impact from Flooding

Time Period	Deaths	Injuries	Property Damage	Crop Damage
Loss Summary, Colorado County				
25-year Total	0	0	$2,767,000	$0
Per Year	0	0	$110,680	$0
Per Capita Dollar Losses (2022 Population - 20,582)				
25-year Total	0	0	$134.44	$0
Per Year	0	0	$5.38	$0

Source: NCEI Storm Events Database 1997 to 2023 subset for Texas

Table 6-5 on the following page distributes the countywide impacts presented previously in tables 6-3 amongst the various participating jurisdictions based on location information, where available.

Table 6-6: Flood Losses by Jurisdiction 1997-2023

Jurisdiction	Total Property Losses	Total Crop Losses
Colorado County	$137,000	$0
City of Columbus	$0	$0
City of Eagle Lake	$60,000	$0
City of Weimar	$2,570,000	$0
Total Losses	$2,767,000	$0

National Flood Insurance Program (NFIP) Participation

Colorado County, in addition to all eligible participating jurisdictions, are part of the National Flood Insurance Program (NFIP). Columbus ISD, Rice Consolidated ISD, and Weimar ISD 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 Colorado 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 6-7: Repetitive Loss and Severe Repetitive Loss Properties

Jurisdiction	Number of RL Properties	Number of Total Losses
Colorado County*	2	5
City Columbus	1	2
City of Eagle Lake	1	3
City of Weimar	0	0
Colorado County WCID#2	0	0
Total	2	5

*County totals include Jurisdictional RL and SRL counts

As defined by the NFIP, there are 2 Repetitive Loss (RL) properties total in Colorado County, 1 located in the City of Columbus and the other located in the City of Eagle Lake. There have been 5 total losses attributed to the 2 properties and there are no Severe Repetitive Loss (SRL) properties located withing the Colorado County planning area. The 2 repetitive loss properties are both residential structures that are slab on grade.

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 Colorado 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 no drought. 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, March 12, 2024

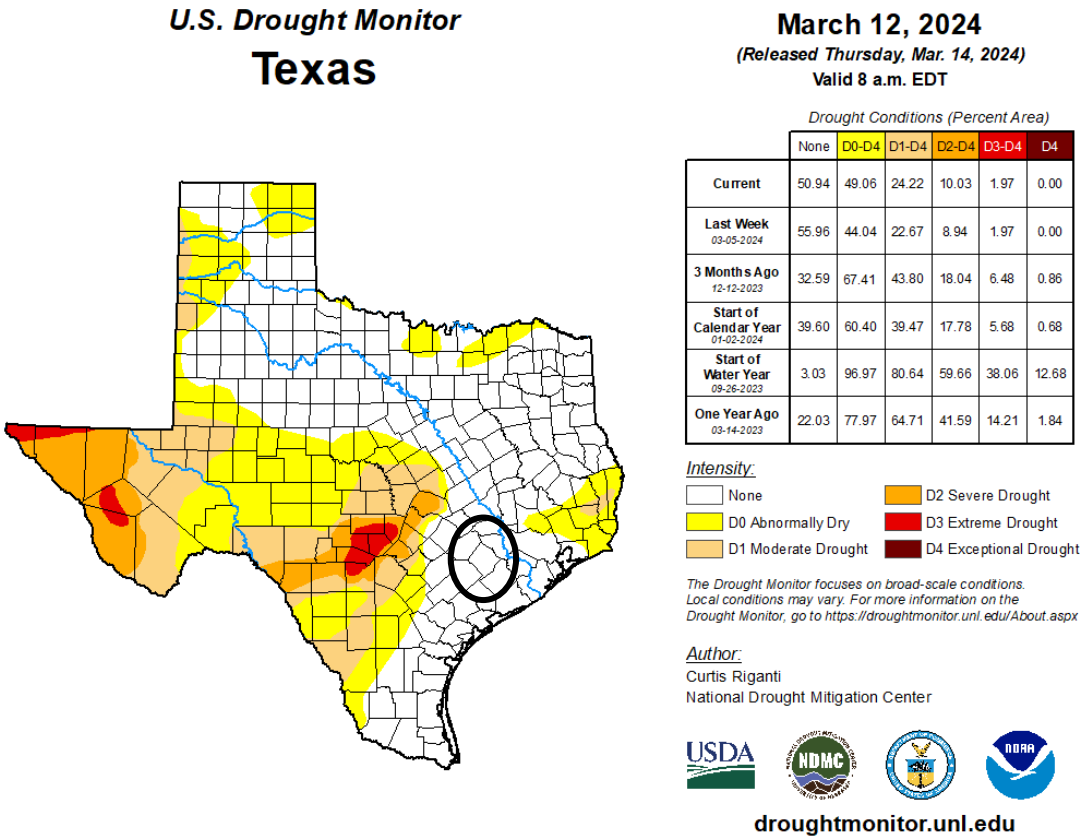
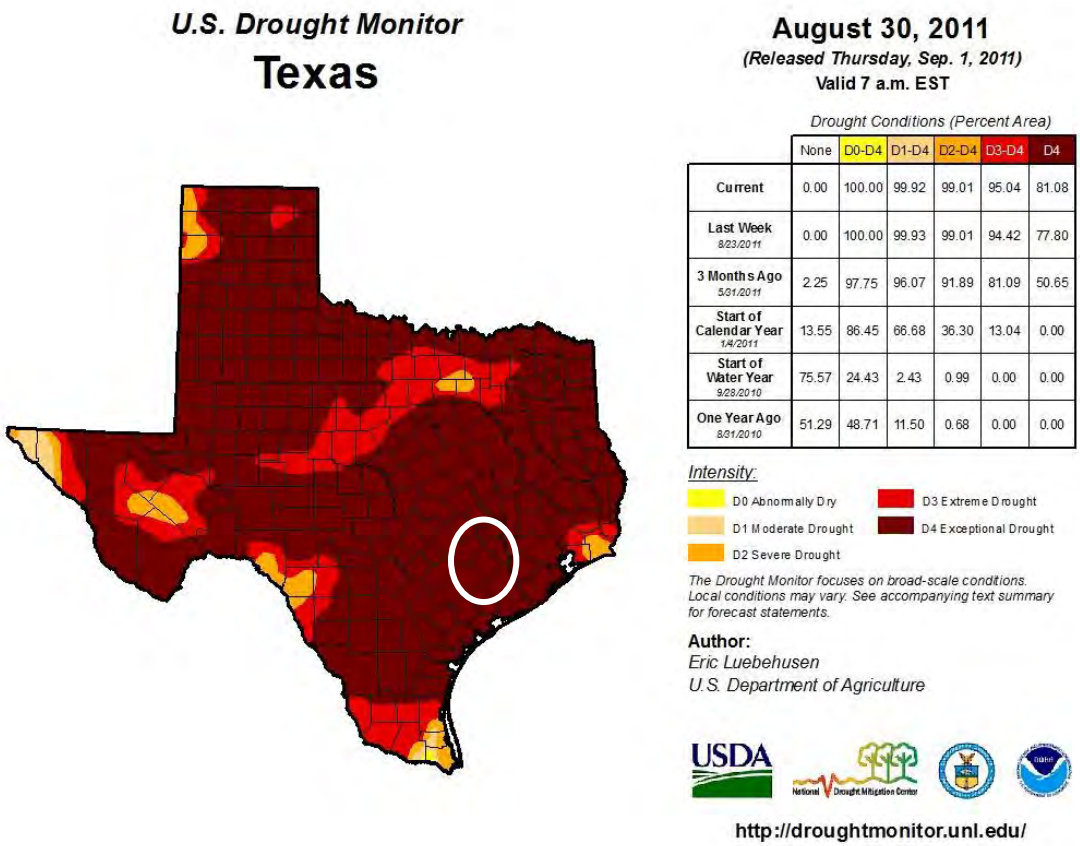


Figure 7.2: US Drought Monitor, August 30, 2011



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

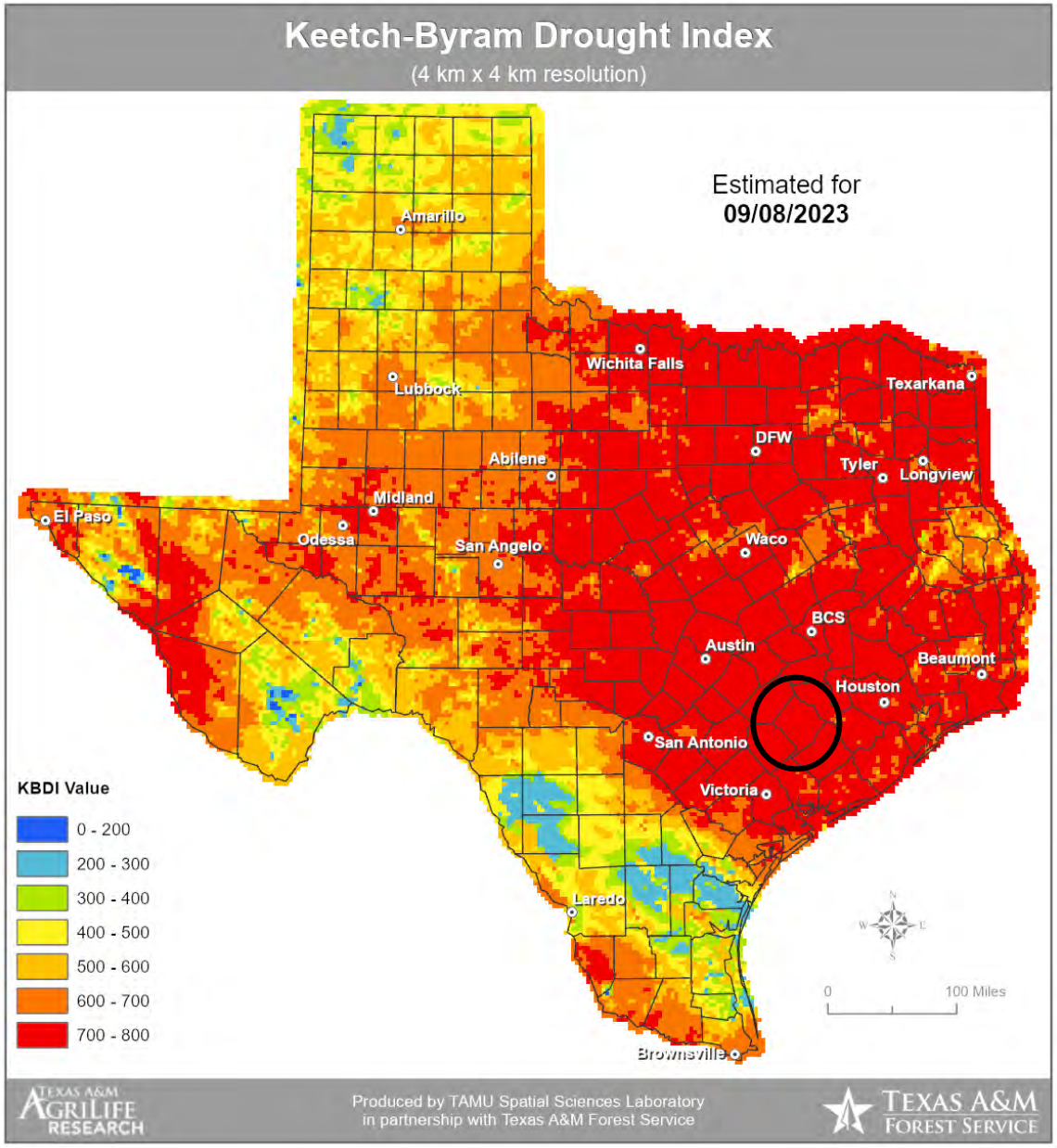
Table 7-1: Drought Severity Classification

			Ranges				
Category	Description	Possible Impacts		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 Colorado 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). Colorado County was in the 700-800 risk category on September 8, 2023. The Keetch-Byram Drought Index is also discussed in relation to wildfires in section 13.

Figure 7-3: Keetch-Byram Drought Index



Historical Occurrences

Colorado 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 Texas was the most severe one-year drought ever for the State. 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."[8] 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 2023 (a 25-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 Colorado 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 Colorado County

Date Range	Direct Injuries	Direct Fatalities	Property Damage	Crop Damage
May - August, 1998	0	0	$1,000,000	$7,300,000
August - September, 2000	0	0	0	0

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

May - August, 2022	0	0	0	0
September - December, 2023	0	0	0	0

Table 7-3: Historical Drought Events in Colorado County (USDA Data), 1997-2023

Location	Dates	Deaths	Injuries	Property Damage	Crop Damage
Countywide	1997-2023	0	0	$0	$14,566,260

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 6/17/2023. This 23-year window of drought data provides a clear picture as to how often the occurrence of different drought categories can be expected in the future.

Table 7-4: Historical Drought Magnitude

Drought Category	Description	Colorado 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 four (4) time periods of drought within a 25-year reporting period. This provides a probability of occurrence of one event every 6-7 years. Based on the drought monitor data for a 25-year reporting period, the planning area is in severe to exceptional drought approximately 58% of the time. This frequency supports an **Occasional** probability of future events occurring within the Colorado County planning area which means that an event is probable in the next 5 years.

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

Vulnerability and Impact

Drought affects large areas creating vulnerability for people, animals, property, agriculture, and the environment. Over the entirety of the planning area the biggest impacts of drought are dead crops and grazing land, edible plants for animals, and even trees. This primarily affects farming and wildlife, but people can be directly impacted as well due to shortages of

potable water supply. Communities will also ration the use of water during prolonged drought, particularly for lawn care, 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 Colorado 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 20,582 according to the 2022 ACS population estimate. Those over the age of 65 represent 22.3% (4,584) of the total population and children under the age of 5 represent 6.1% (1,247) of the total population. The total population of the county that is estimated to be below the poverty level is 7.2% (1,490). Table 7-5 presents the 2022 American Community Survey population and age cohort estimates below.

Table 7-5: Populations at Greater Risk by Jurisdiction

Jurisdiction	Population Estimate (ACS 2022)	Population Under 5	Population 65 and Older	Population Below Poverty Level
Colorado County	20,582	1,247	4,584	1,490
City of Columbus	3,686	229	1,084	395
City of Eagle Lake	3,443	247	425	329
City of Weimar	2,771	136	556	185

Source: 2022 American Community Survey (Note: County totals include both incorporated and unincorporated areas)

The environment of the Colorado 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 Colorado 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 1997-2023 are provided below. Table 7-6 lists the drought impacts in Colorado 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 7-6: Drought Impacts, 1997-2023

Colorado County	
Agriculture	1
Business & Industry	0
Energy	0
Fire	0
General Awareness	0
Plants & Wildlife	0
Relief, Response & Restrictions	1
Society & Public Health	0
Tourism & Recreation	0
Water Supply & Quality	1
County Impact Reports	3

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

Based on 25 years of data from the NCEI, the direct impacts of droughts in the Colorado County planning area have resulted in property or crop losses from one drought event in 1998. 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

Below is the summary table for Colorado County that shows the 25-year column totals and the average annual (Per Year) losses from drought events. 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 $332,000 for Colorado County.

Table 7-7: Colorado County Loss Summary

Time Period	Fatalities	Injuries	Property Damage	Crop Damage
Loss Summary, Colorado County				
25-year Total	0	0	$1,000,000	$7,300,000
Per Year	0	0	$40,000	$292,000
Per Capita Dollar Losses (2022 ACS Population – 20,582)				
25-year Total	0	0	$48.59	$354.68
Per Year	0	0	$1.94	$14.19

SECTION 8: WINDSTORMS

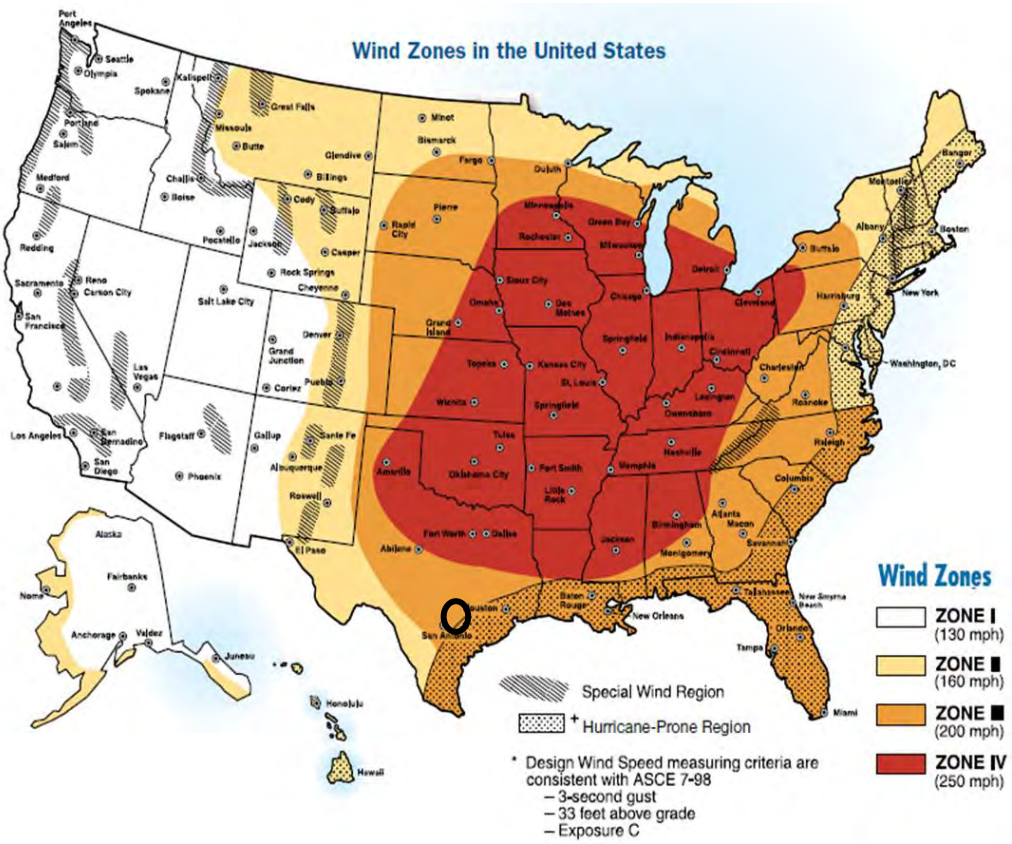
Description

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. Colorado County, along with all participating jurisdictions, are 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 III, which is associated with winds that can reach up to 200 mph. This area is also located near the Gulf 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 80 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 Colorado 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 61 thunderstorm wind events recorded in the NCEI storm events database that have impacted the Colorado 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 in Colorado County, 1997-2023

Jurisdiction	Date	Magnitude	Fatalities	Injuries	Property Damage	Crop Damage
Columbus	6/17/97		0	0	$5,000	$0
Weimar	12/23/97	52	0	0	$2,000	$0
Weimar	12/23/97		0	0	$10,000	$0
Sheridan	2/10/98		0	0	$21,500	$0
Columbus	2/10/98		0	0	$21,500	$0
Garwood	2/10/98	65	0	0	$21,500	$0
Matthews	2/10/98		0	0	$10,000	$0
Weimar	6/5/98		0	0	$2,000	$0
Frelsburg	7/14/98		0	0	$3,000	$0
Columbus	7/14/98	80	0	4	$100,000	$0
Columbus	7/14/98		0	0	$10,000	$0
Weimar	8/3/98		0	0	$3,000	$0
Columbus	5/30/99		0	0	$50,000	$0
Columbus	7/19/99		0	0	$15,000	$0
Eagle Lake	4/2/00		0	0	$100,000	$0
Weimar	5/2/00		0	0	$25,000	$0
Columbus	7/23/00		0	0	$15,000	$0
Weimar	7/31/00		0	0	$15,000	$0
Eagle Lake	11/5/00		0	0	$15,000	$0
Weimar	5/5/01		0	0	$7,000	$0
Columbus	5/26/01		0	0	$5,000	$0
Eagle Lake	8/6/01		0	0	$10,000	$0
Eagle Lake	3/30/02	65	0	0	$25,000	$0
Weimar	4/7/02		0	0	$30,000	$0
Eagle Lake	7/8/02		0	0	$5,000	$0
Columbus	8/3/02		0	0	$20,000	$0

Eagle Lake	10/19/02		0	0	$215,000	$0
Columbus	12/23/02	52	0	0	$10,000	$0
Columbus	8/8/03	62	0	0	$10,000	$0
Bernardo	8/9/03	58	0	0	$9,000	$0
Countywide	6/4/04	50	0	0	$150,000	$0
Columbus	4/21/06	50	0	0	$7,000	$0
Oakland	12/21/06	50	0	0	$5,000	$0
Weimar	3/12/07	52	0	0	$60,000	$0
Rock Is	3/31/07	57	0	0	$3,000	$0
Weimar	6/3/07	65	0	0	$10,000	$0
Columbus	6/3/07	65	0	0	$0	$0
Eagle Lake	9/3/09	53	0	0	$5,000	$0
Borden	8/23/10	58	0	0	$10,000	$0
Columbus	8/23/10	56	0	0	$6,000	$0
Columbus	5/12/11	50	0	0	$0	$0
Weimar	3/20/12	52	0	0	$5,000	$0
Columbus	6/26/12	56	0	0	$5,000	$0
Weimar	6/10/14	55	0	0	$0	$0
Weimar	6/10/14	55	0	0	$0	$0
Glidden	4/16/15	52	0	0	$0	$0
Frelsburg	5/25/15	55	0	0	$0	$0
Bernardo	5/25/15	60	0	0	$0	$0
Weimar	4/12/16	50	0	0	$0	$0
Weimar	4/12/16	50	0	0	$0	$0
Bernardo	4/12/16	50	0	0	$0	$0
Calhoun	3/24/17	54	0	0	$9,000	$2,000
Frelsburg	5/23/17	52	0	0	$0	$0
Altair	5/3/19	55	0	0	$30,000	$0
Columbus	6/6/19	53	0	0	$0	$5,000
Alleyton	6/6/19	60	0	0	$50,000	$0
Eagle Lake	1/10/20	58	0	0	$13,000	$0
Oakland	5/18/21	50	0	0	$0	$0
Rock Is	5/18/21	50	0	0	$0	$0
Matthews	3/22/22	50	0	0	$0	$0
Eagle Lake	1/24/23	56	0	0	$100,000	$0

Source: NCEI Storm Events Database

Table 8-3: Historical Windstorm Events in Colorado County (USDA Data), 1997-2023

Location	Dates	Deaths	Injuries	Property Damage	Crop Damage
Countywide	1997-2023	0	0	$0	$1,158,462

Significant Events

July 14, 1998 – City of Columbus

Walmart sign blown down on several cars. Three 18-wheelers blown over on several parked cars on I-10. While DPS investigated the accident, 90 mph winds blew a 9000 lb/27-foot-long culvert 1/2 mile across I-10.

January 24, 2023 – City of Eagle Lake

Damage on NW side of Eagle Lake surveyed by emergency manager. Several areas of tree and metal roof damage found along a fairly broad path. Damage and radar consistent with straight line wind damage.

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 Colorado 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 Colorado 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 Colorado County planning area features mobile and manufactured home parks which are more vulnerable to thunderstorm winds than site-built structures. In addition, manufactured and temporary housing is located sporadically throughout rural portions of the

planning area which are also vulnerable to the thunderstorm wind hazard, but more prone to being isolated from essential needs and emergency services in the event of a disaster. Based on 2022 American Community Survey (ACS) estimates, there are 7,376 occupied housing units in Colorado County of which 17%, or 1,279 units, are mobile or manufactured homes. In addition, 3,562 (48%) 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 and could be more susceptible to damage during significant events.

Table 8-4. Structures at Greater Risk by Jurisdiction

Jurisdiction	Occupied Housing Units	Mobile Homes	Housing units built prior to 1980
Colorado County*	7,376	1,279 (17%)	3,562 (48%)
City of Columbus	1,443	146 (10%)	1,044 (72%)
City of Eagle Lake	902	114(13%)	502 (56%)
City of Weimar	1,074	129 (12%)	685 (64%)

*County totals include all jurisdictions, ISDs, ESDs, and the Water District in addition to unincorporated areas.
Source: 2022 American Community Survey 5-year estimate, selected housing characteristics

Based on the ACS 2022 data, the City of Columbus 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. Unincorporated Colorado County 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 for Colorado County that shows the 25-year column totals and the average annual (Per Year) losses from windstorm events. 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 $50,620 for Colorado County.

Table 8-5: Colorado County Loss Summary

Time Period	Fatalities	Injuries	Property Damage	Crop Damage
Loss Summary, Colorado County				
25-year Total	0	4	$1,258,500	$7,000
Per Year	0	<1	$50,340	$280
Per Capita Dollar Losses (2022 ACS Population – 20,582)				
25-year Total	0	<1	$61.15	$0
Per Year	0	<1	$2.45	$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.[9] 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.[10]

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 Colorado 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.

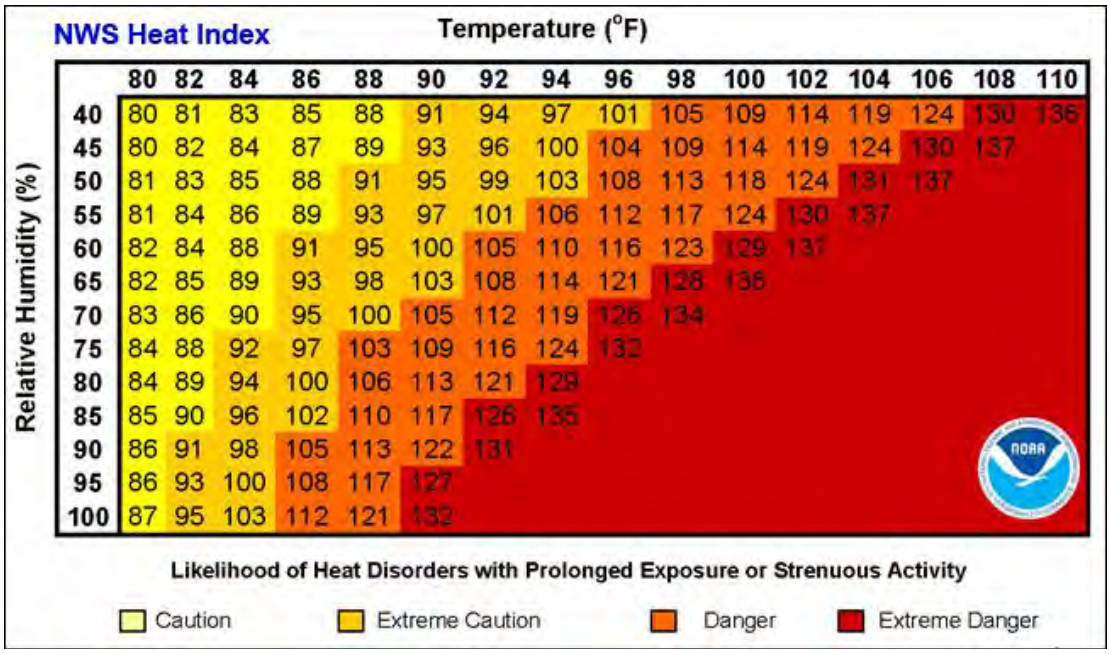
Extent

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.

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

[10] 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.

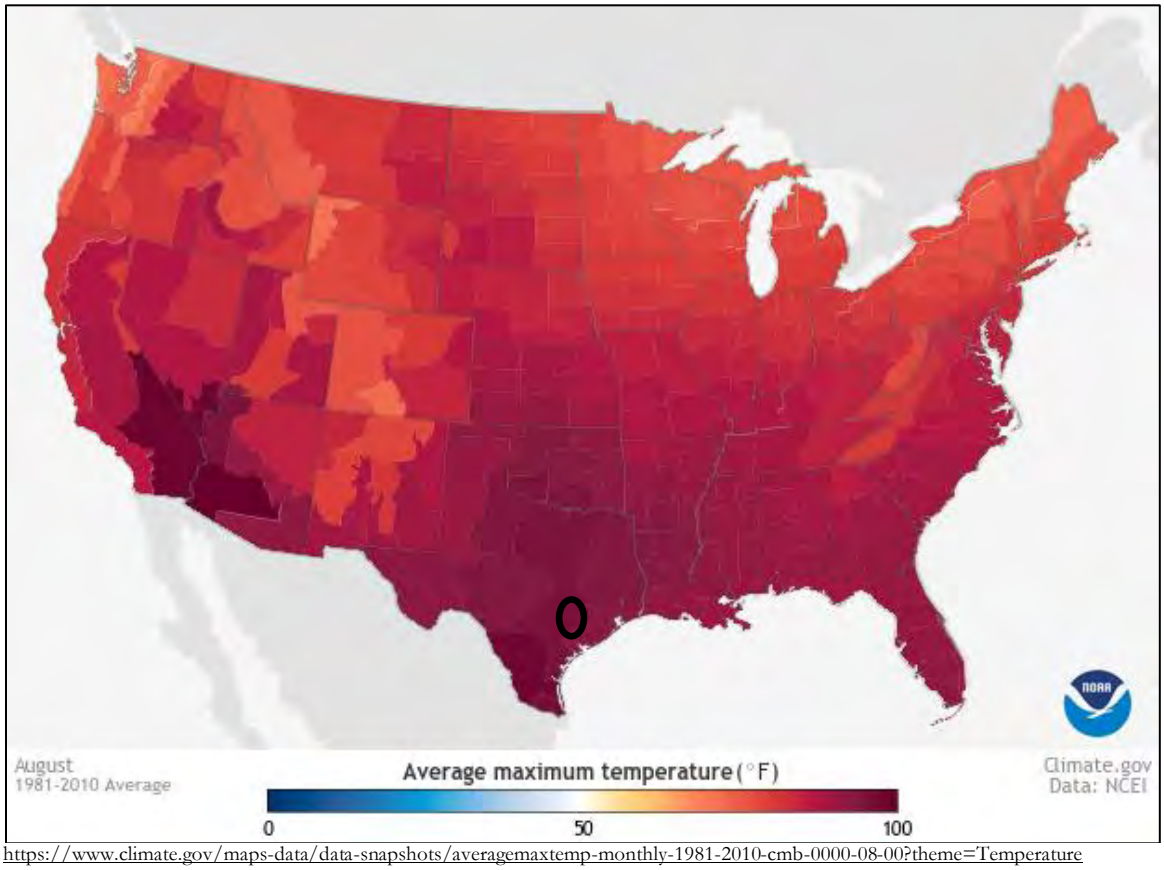
Table 9-1: Heat Index and Warnings

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 Colorado 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 Colorado 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 twelve (12) historical occurrences of extreme heat found in the NCEI database for the Colorado County Planning Area for time period from 1997-2023. 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, 1997-2023

Jurisdiction	Year	Injuries	Fatalities	Property Damage	Crop Damage
Countywide	6/26/99	0	0	$0	$0
Countywide	8/1/99	0	0	$0	$0
Countywide	7/6/00	0	0	$0	$0

Countywide	8/29/00	0	0	$0	$0
Countywide	9/1/00	0	0	$0	$0
Countywide	6/24/09	0	0	$0	$0
Countywide	6/16/23	0	0	$0	$0
Countywide	6/25/23	0	0	$0	$0
Countywide	7/12/23	0	0	$0	$0
Countywide	8/5/23	0	0	$0	$0
Countywide	8/23/23	0	0	$0	$0
Countywide	9/5/23	0	0	$0	$0

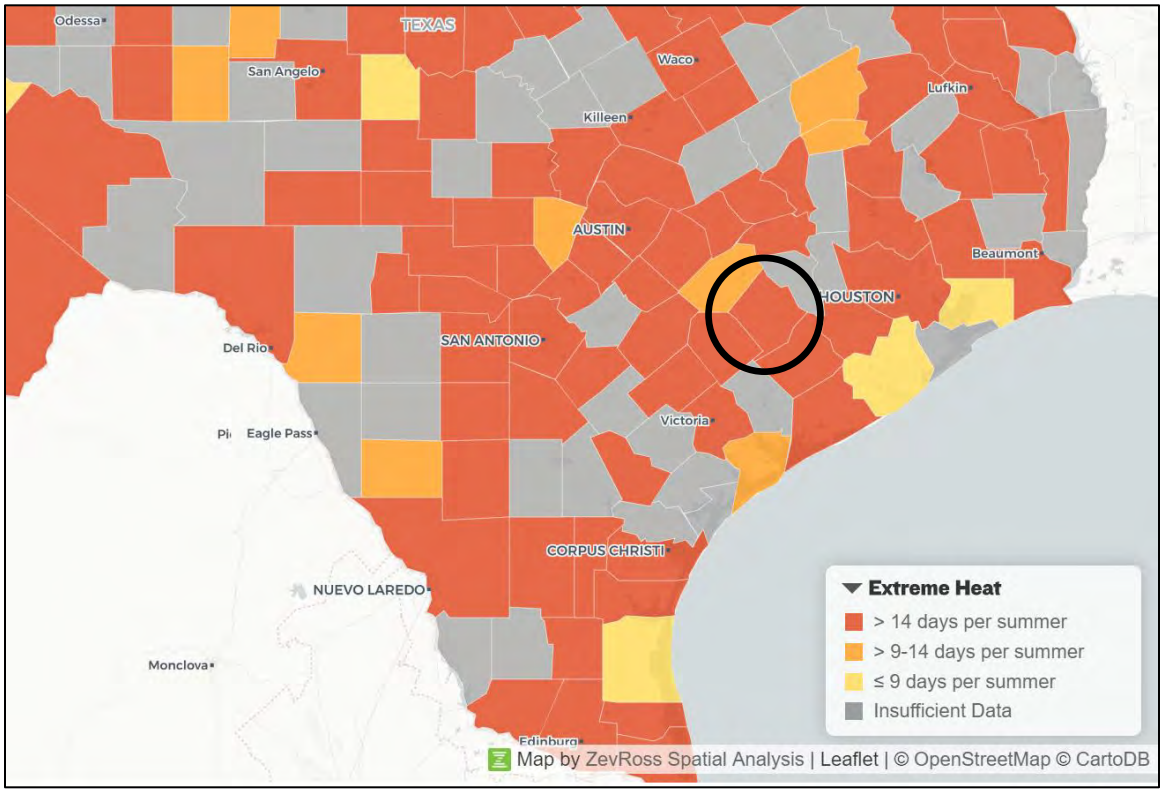
Source: *NOAA NCEI Storm Events Database*

Table 9-3: Historical Extreme Heat Events in Colorado County (USDA Data), 1997-2023

Location	Dates	Deaths	Injuries	Property Damage	Crop Damage
Countywide	1997-2023	0	0	$0	$2,529,225

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

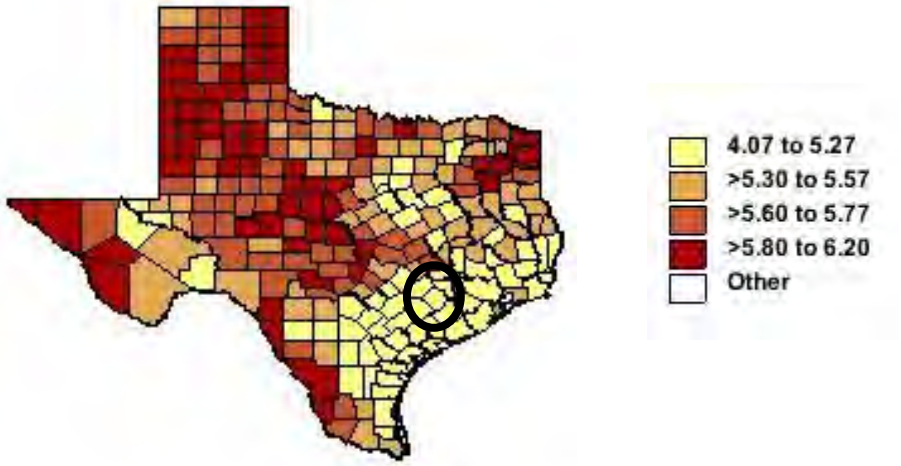


https://www.nrdc.org/climate-change-and-health-extreme-heat#/map/detail/TX

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 Colorado County as having greater than 14 days of extreme heat per summer. This analysis shows that the Colorado County planning area is experiencing more heat days during the summer than it did past.

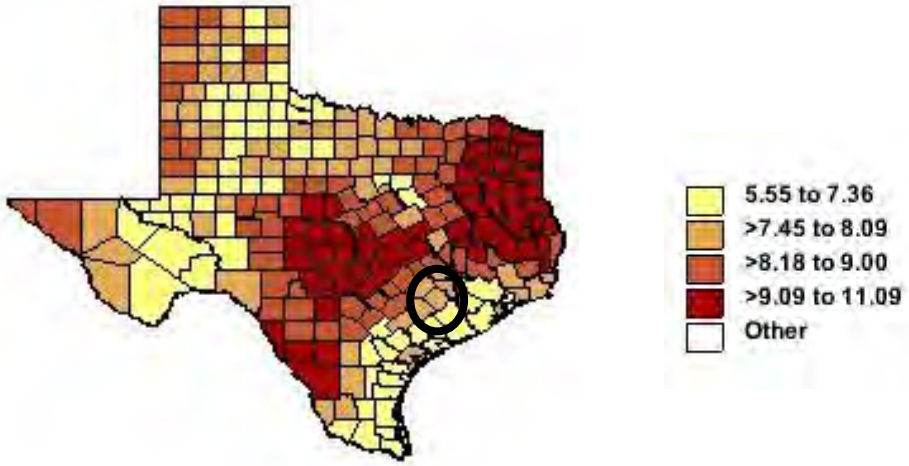
Data from CDC can also help tell a story of how the number of extreme heat days to be expected each summer are increasing. The two maps below depict a 29-year period from 1981-2010 and a 10-year period from 2000-2010. The Colorado County planning area is depicted within the black circle in East Central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

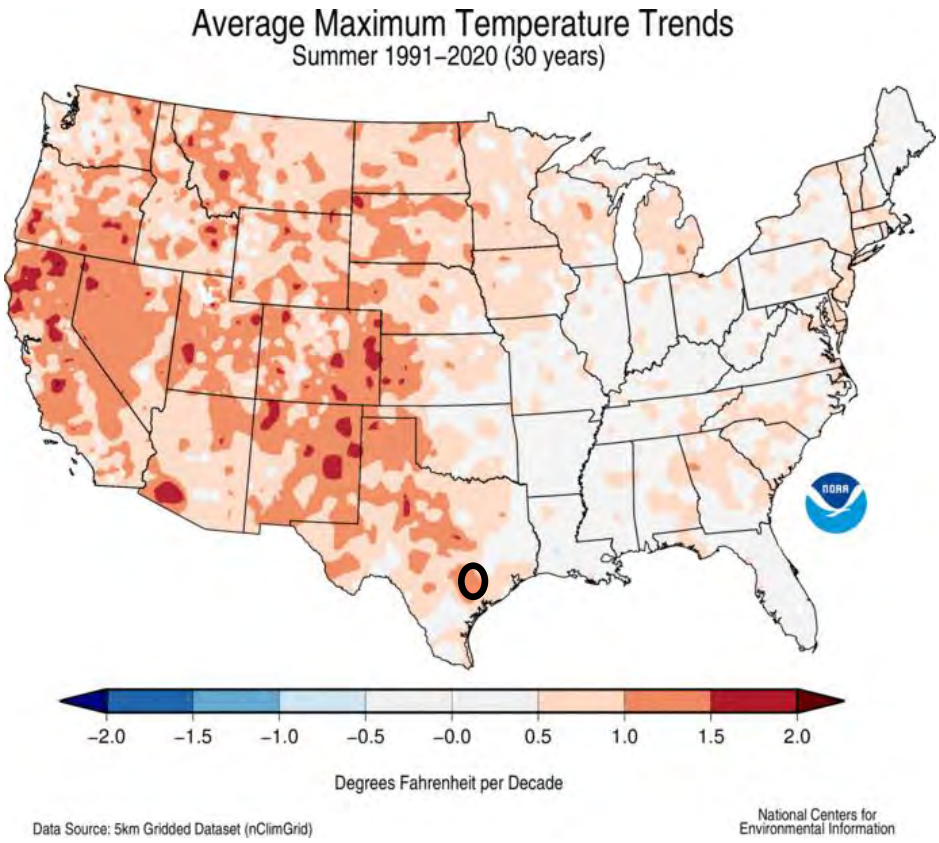
Table 9-4: Top 10 warmest years, globally (NOAA, 1880-2023)

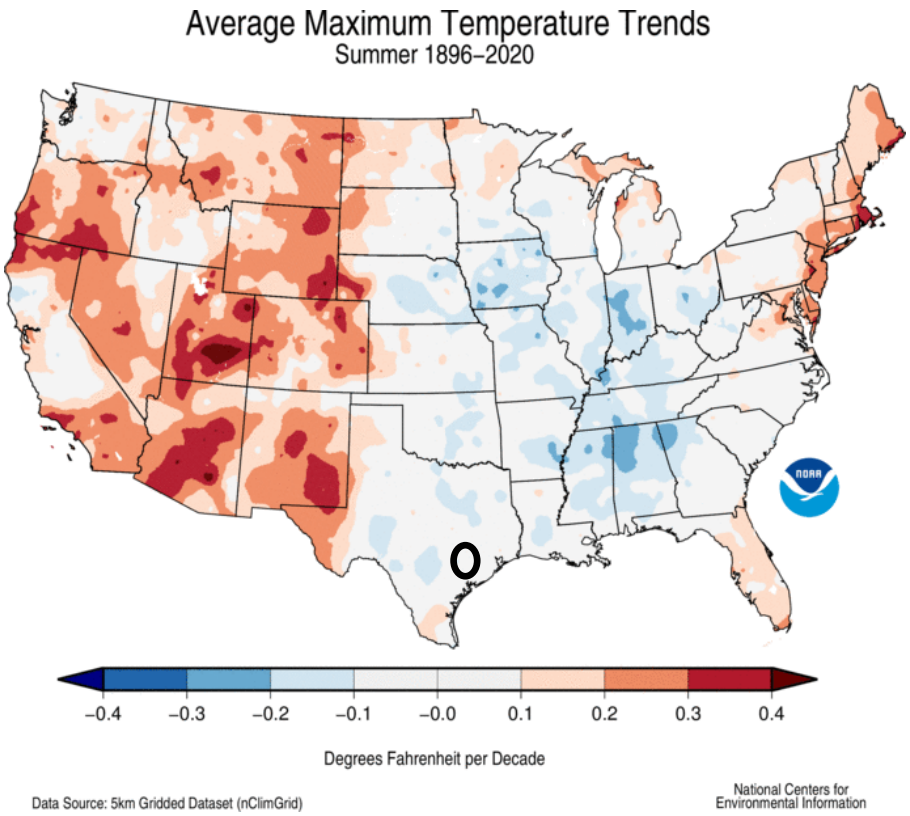
Rank	Year
1	2023
2	2016
3	2020
4	2019
5	2015
6	2017
7	2022
8	2021
9	2018
10	2014

"Global Climate Report – Annual 2022". NOAA. Retrieved 18 March 2024.

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 Colorado County planning area is in an area that can expect an increase of 0.5-1.5^{0F} in average maximum summer temperatures over the next century.

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





Source: 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.[11] 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.

[11] 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°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.

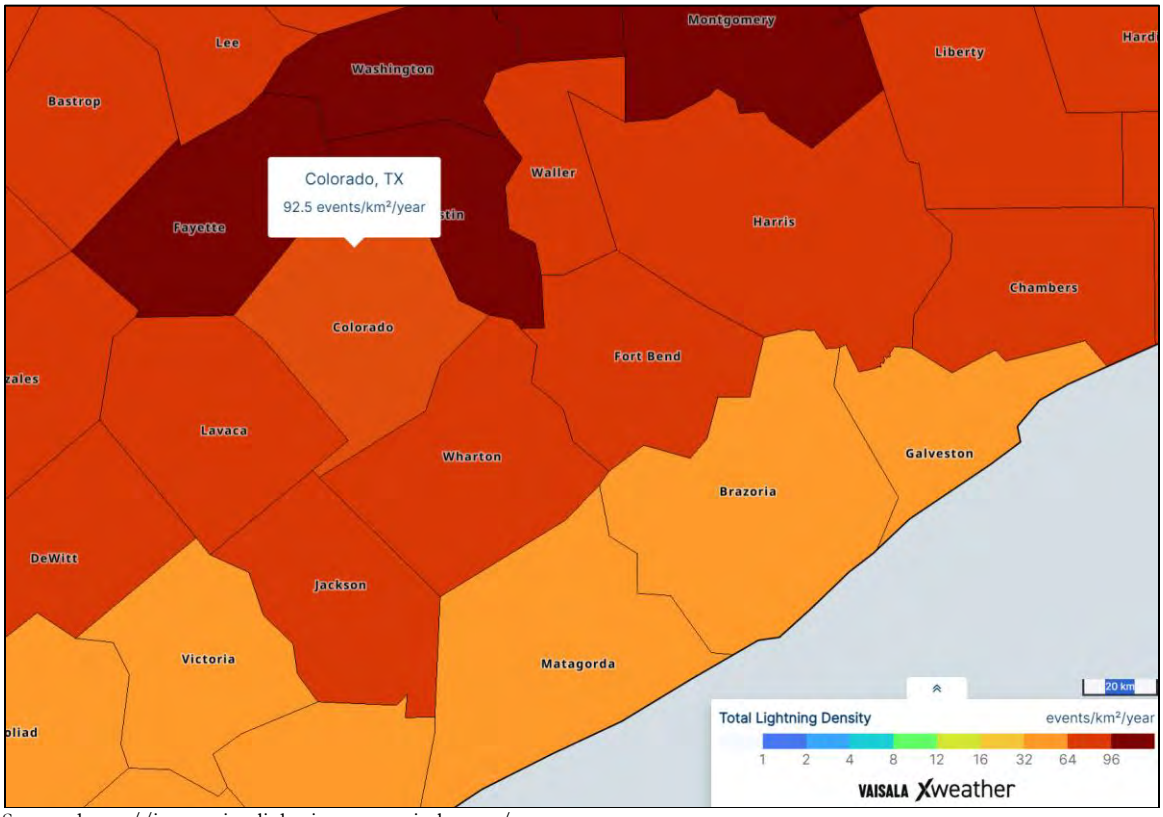
Location

The Colorado 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 Colorado 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 km^2 per year. According the map below, the Colorado County planning area has a total lightning density of 92.5 events/km^2/year for the planning area from 2017-2023.

Figure 10-1. Total Lightning Density, 2017-2023



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.

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 10-1: Historical Lightning Events, NCEI 1997-2023

Location	Date	Fatalities	Injuries	Property Damage	Crop Damage
Columbus	7/14/98	0	0	$75,000	$0

Significant Events

July 14, 1998 – City of Columbus
A lightning induced fire destroyed Po' Boy's restaurant.

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. According to the Texas A&M Forest Service, there were no wildfires caused by lightning strikes from 2005-2022 within the Colorado planning area.

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 92.5 lightning flashes per square kilometer per year. The Colorado County planning area is 974 square miles or 2,520 square kilometers. The Vaisala flash density estimate combined with the total area produces an estimate of approximately 233,100 flashes per year. With total thunderstorm days for that area at 2-3 events per year, this gives a *flash density of approximately 93,240 per event.* A **highly likely** probability of occurrence for future lightning events in the Colorado County planning area is supported by this frequency which 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 Colorado 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.

The summary table below, 10-3, shows the 25-year property and crop damage totals as well as the average annual (Per Year) losses summarizing historic lightning strike impacts. The bottom half of the table shows per capita (ACS 2022) 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 damage is $3,000 for Colorado County.

Table 10-2, Colorado County Loss Summary

Time Period	Fatalities	Injuries	Property Damage	Crop Damage
Loss Summary, Colorado County				
25-year Total	0	8	$75,000	$0
Per Year	0	<1	$3,000	$0
Per Capita Dollar Losses (20,582, ACS 2022 Population)				
25-year Total	0	<1	$0.37	$0
Per Year	0	<1	$0.02	$0

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 250-300 mph. 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

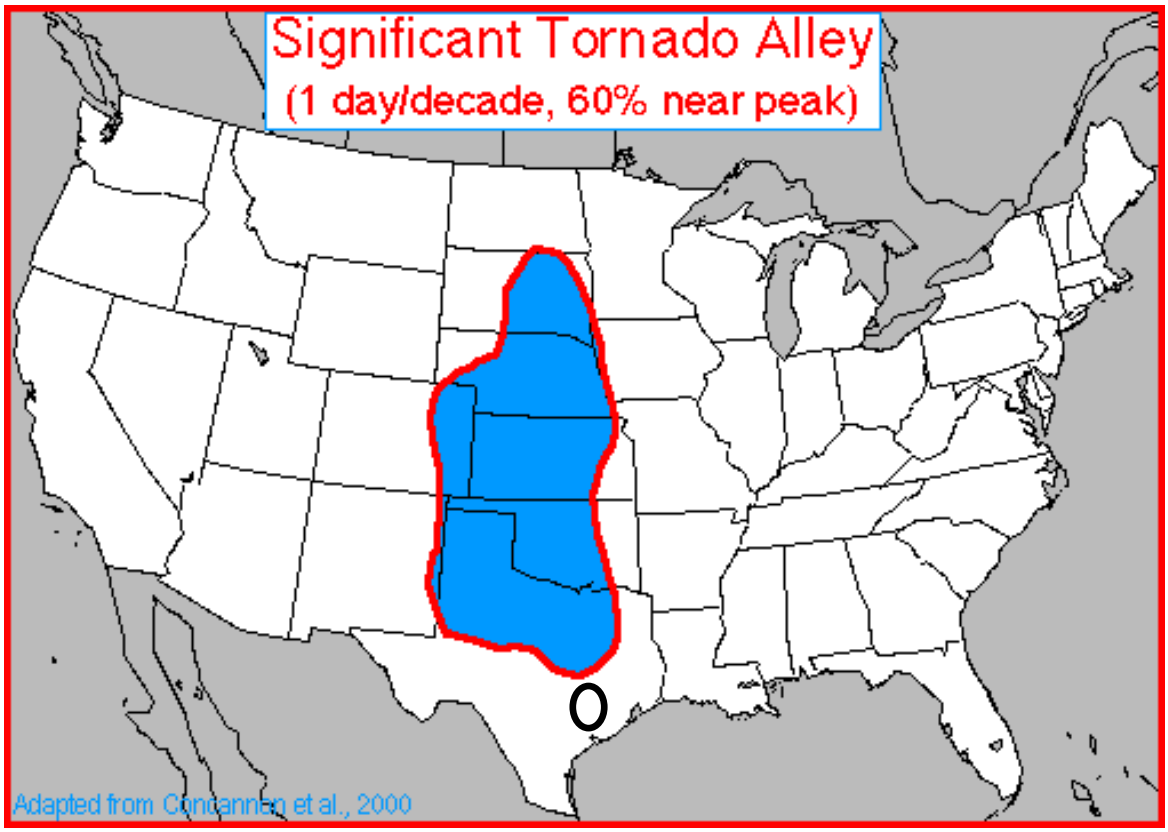
Tornadoes do not have any specific geographic boundary and can occur uniformly throughout the planning area. The Colorado County planning area is located in Wind Zone III along the Texas gulf coast (Figure 11-1), where tornado winds can be as high as 200 mph. It is also partially located within the hurricane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

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 Colorado County planning area is approximately 75 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.[12]

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

[12] http://www.spc.noaa.gov/faq/tornado/ef-scale.html

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

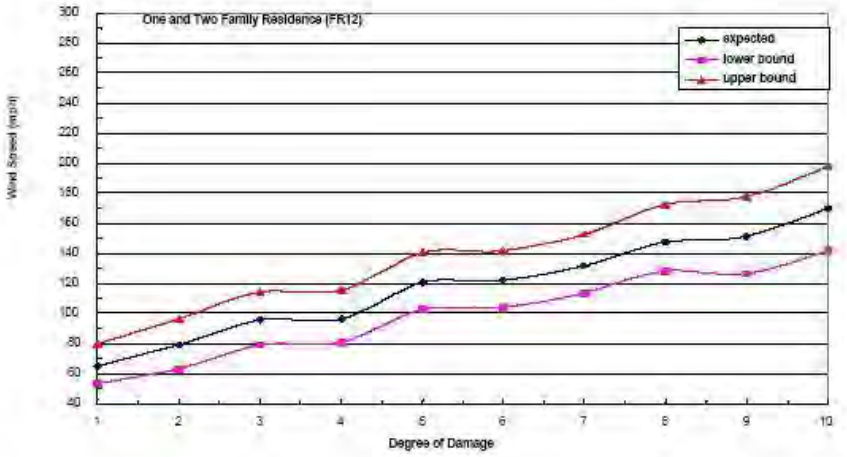
2. ONE-AND TWO-FAMILY RESIDENCES (FR12)
(1000 – 5000 sq. ft.)

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 Colorado County planning area have been between EF0 and EF2 (Table 11-4). However, because Colorado 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 EF4.

Historical Occurrences

Table 11-4 lists historical tornado events in the planning area from 1997-2023 that were reported to the NCEI or NOAA. The impact of the tornado events in Colorado 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 in Colorado County by Jurisdiction, 1997 – 2023

Jurisdiction	Date	Extent: Fujita Scale (pre-2007), Enhanced Fujita Scale (post-2007)	Fatalities	Injuries	Property Damage	Crop Damage
Sheridan	5/21/97	F0	0	0	$25,000	0
Eagle Lake	8/29/99	F0	0	0	$100,000	0
Borden	11/12/00	F0	0	0	$25,000	0
Weimar	12/23/02	F0	0	0	$18,000	0
Weimar	5/10/12	EF2	0	8	$500,000	0
Rayner Jct	10/31/18	EF0	0	0	0	0
Calhoun	5/3/19	EF0	0	0	0	0

Source: NCEI Storm Events Database

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

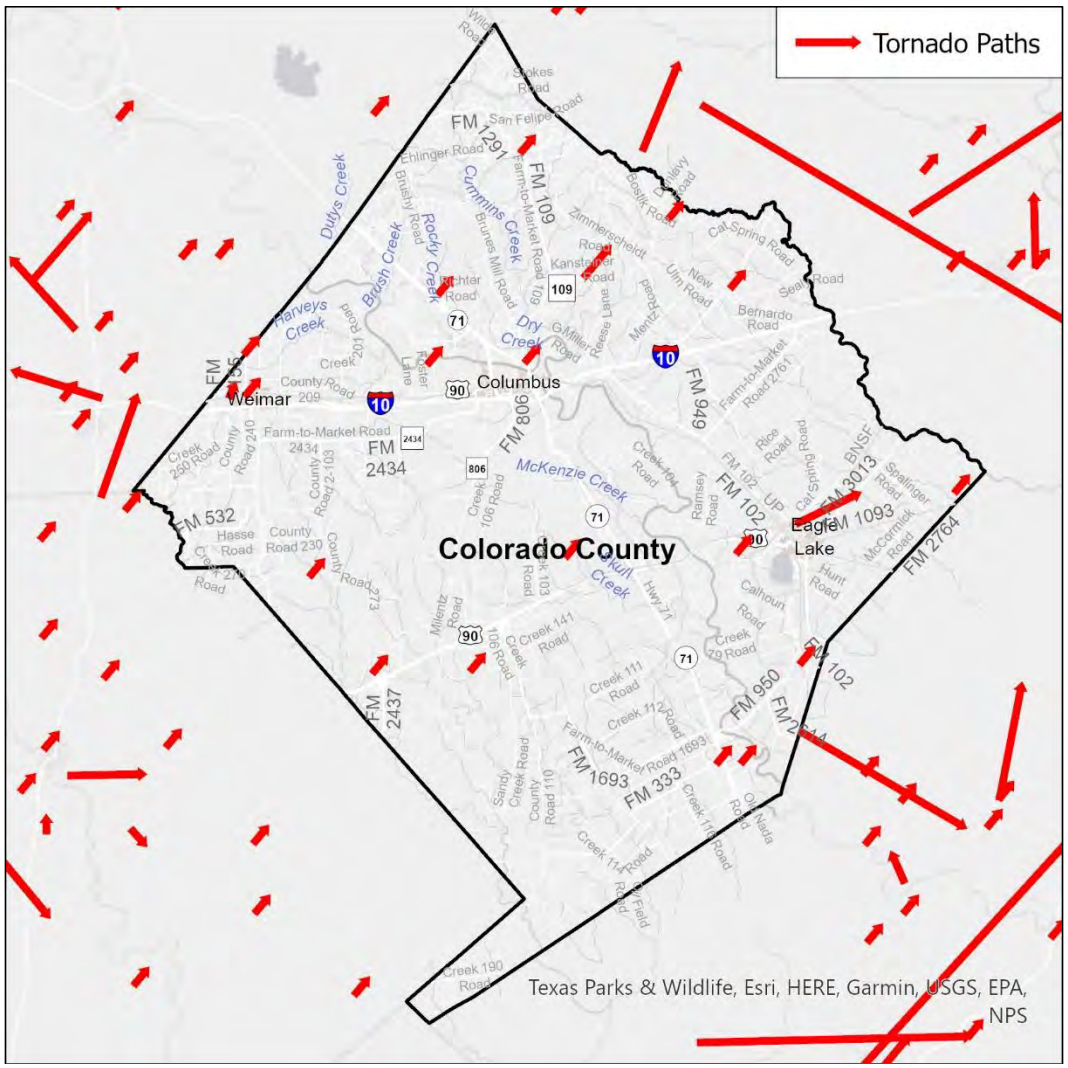
Number of Events	Magnitude (Fujita Scale)						
	N/A	F0	F1	F2	F3	F4	F5
4		4	0	0	0	0	0

Table 11-6: Historical Tornado Events Magnitude Summary, 2007-2023

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

The locations of previous occurrences from 1950 through 2022 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 72 years.

Figure 11-4: Historic Tornado Tracks 1950-2022, Distance Travelled, Magnitude and Direction



Significant Events

August 29, 1999 – Eagle Lake

Four cars and other structures near golf course damaged and three large trees downed. Dime sized hail also reported.

May 10, 2012 – Weimar

The tornado touched down near a railroad track producing a small area of EF-2 damage when boxcars of a parked train were overturned. The tornado tracked toward the north northeast across a cemetery. Extensive tree damage occurred with numerous large trees snapped and debris deposited in different directions. The tornado then continued onto the grounds of Weimar High School where the press box of the football field was destroyed, stadium light poles were snapped, and a metal storage building was damaged. Eight injuries were reported, most of them occurring when a food service truck was overturned in the school parking lot.

Probability of Future Events

Tornadic storms are typically more common in the spring months during the late afternoon and evening hours but can occur at any time of year and at any time of day. A smaller, high frequency period can also emerge in the fall during the brief transition between the warm and cold seasons. Table 11-7 provides a general overview of tornado severity, probability, fatality impacts, and defining characteristics.

Table 11-7: Tornado Severity and Probability

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

According to historical records, there were 7 events in a 25-year reporting period in the planning area. This provides a probability of occurrence of approximately once every 3-4 years for the Colorado 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 Colorado 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. Tornados 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. Tornados 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.

Tornados 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 Colorado County planning area features mobile and manufactured home parks which are more vulnerable to tornados than site-built structures. In addition, manufactured and temporary housing is located sporadically throughout rural portions of the planning area which are also vulnerable to the tornado hazard, but more prone to being isolated from essential needs and emergency services in the event of a disaster. Based on 2022 American Community Survey (ACS) estimates, there are 7,376 occupied housing units in Colorado County of which 1,279 (17%) are mobile or manufactured homes. In addition, 3,562 (48%) 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 11-8. Structures at Greater Risk by Jurisdiction

Jurisdiction	Occupied Housing Units	Mobile Homes	Housing units built prior to 1980
Colorado County*	7,376	1,279 (17%)	3,562 (48%)
City of Columbus	1,443	146 (10%)	1,044 (72%)
City of Eagle Lake	902	114(13%)	502 (56%)
City of Weimar	1,074	129 (12%)	685 (64%)

*County totals include all jurisdictions, ISDs, ESDs, and the Water District in addition to unincorporated areas.
Source: 2022 American Community Survey 5-year estimate, selected housing characteristics

Based on the ACS 2022 data, the City of Columbus is at higher risk of damage from tornados when considering age of residential structures and the higher standard of building codes enacted after 1980. Unincorporated Colorado County is at a higher risk of damage from tornados when considering number and ratio of manufactured homes.

Historic Tornado Impacts

The summary table below, 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 (ACS 2022) 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 damage is $26,720 for Colorado County.

Table 11-9, Colorado County Loss Summary

Time Period	Fatalities	Injuries	Property Damage	Crop Damage
Loss Summary, Colorado County				
25-year Total	0	8	$668,000	$0
Per Year	0	<1	$26,720	$0
Per Capita Dollar Losses (20,582, ACS 2022 Population)				
25-year Total	0	<1	$ 32.46	$0
Per Year	0	<1	$1.30	$0

Table 11-10 below displays the injuries, fatalities, property losses and crop losses by jurisdiction within the planning area.

Table 11-10: Tornado Losses by Jurisdiction 1997-2023

Jurisdiction	Fatalities	Injuries	Est. Prop. Losses	Est. Crop Losses
Colorado County	0	0	$50,000	$0
City of Columbus	0	0	$0	$0
City of Eagle Lake	0	0	$100,000	$0
City of Weimar	0	8	$518,000	$0

*County totals include all non-participating jurisdictions, ISDs, ESDs, and the Water District in addition to unincorporated areas.

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 Colorado 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 Colorado 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 Colorado 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 52 reported historical hail events impacted Colorado County during the 25-year period from 1997 through 2023. 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 in Colorado County

Location	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Sheridan	5/21/97	0.75	0	0	$5,000	$0
Frelsburg	6/17/97	0.88	0	0	$5,000	$0
Eagle Lake	1/21/98	1.25	0	0	$5,000	$0
Weimar	2/10/98	0.75	0	0	$3,000	$0
Frelsburg	2/16/98	0.88	0	0	$3,000	$0
Weimar	6/5/98	0.75	0	0	$3,000	$0
Columbus	6/5/98	0.75	0	0	$3,000	$0
Frelsburg	2/27/99	1.75	0	0	$15,000	$0
Columbus	2/27/99	1	0	0	$10,000	$0
Columbus	5/30/99	1.75	0	0	$40,000	$0
Glidden	5/30/99	1.75	0	0	$40,000	$0
Sheridan	5/30/99	2.75	0	0	$100,000	$0
Frelsburg	5/4/00	1.75	0	0	$25,000	$0
Frelsburg	5/26/01	0.75	0	0	$2,000	$0
Columbus	3/30/02	0.75	0	0	$5,000	$0
Columbus	4/7/02	2.75	0	0	$75,000	$0
Eagle Lake	10/19/02	1.75	0	0	$7,000	$0
Columbus	12/23/02	0.75	0	0	$7,000	$0
Frelsburg	4/24/03	1.75	0	0	$3,000	$0
Columbus	4/24/03	2.75	0	0	$10,000	$0

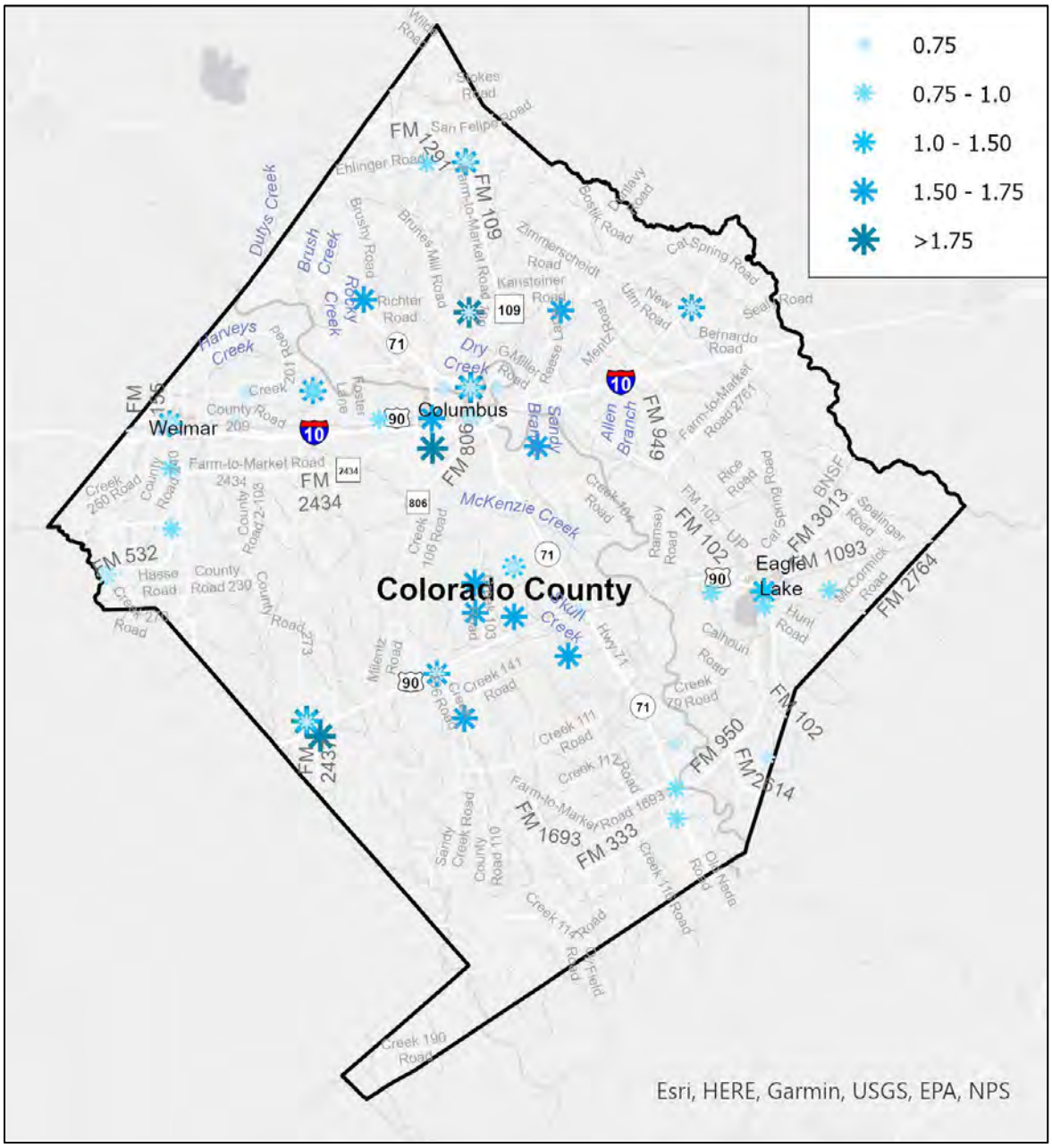
Columbus	4/24/03	2.75	0	0	$8,000	$0
Columbus	4/10/04	1.75	0	0	$20,000	$0
Columbus	4/10/04	1.75	0	0	$20,000	$0
Weimar	3/7/05	0.88	0	0	$2,500	$0
Weimar	3/7/05	0.88	0	0	$2,500	$0
Columbus	3/7/05	0.75	0	0	$4,000	$0
Garwood	3/7/05	0.75	0	0	$2,500	$0
Eagle Lake	5/29/05	1	0	0	$8,000	$0
Rock Is	5/29/05	1.75	0	0	$10,000	$0
Columbus	5/29/05	1.75	0	0	$15,000	$0
Columbus	5/29/05	1	0	0	$7,000	$0
Glidden	5/29/05	1.75	0	0	$12,000	$0
Eagle Lake	5/29/05	1	0	0	$6,000	$0
Oakland	12/21/06	0.75	0	0	$3,000	$0
Columbus	12/21/06	0.75	0	0	$3,000	$0
Weimar	4/2/09	0.75	0	0	$0	$0
Weimar	4/17/09	0.75	0	0	$0	$0
Columbus	5/25/11	1	0	0	$0	$0
Altair	5/25/11	1.75	0	0	$0	$0
Rock Is	5/25/11	1.75	0	0	$0	$0
Weimar	5/25/11	1	0	0	$1,000	$0
Sheridan	5/25/11	2.75	0	0	$7,000	$0
Rock Is	4/2/13	1.75	0	0	$0	$0
Columbus	4/16/15	0.75	0	0	$0	$0
Glidden	4/16/15	1	0	0	$0	$0
Altair	4/16/15	1.75	0	0	$0	$0
Rock Is	4/19/15	1.75	0	0	$0	$0
Columbus	4/19/15	1	0	0	$0	$0
Weimar	4/19/15	1	0	0	$0	$0
Oakland	5/9/19	1	0	0	$0	$0
Eagle Lake Arpt	4/5/23	1	0	0	$0	$0
Columbus Arpt	9/14/23	1	0	0	$0	$0

Table 12-3: Historical Hail Events in Colorado County (USDA Data), 1997-2023

Location	Dates	Deaths	Injuries	Property Damage	Crop Damage
Countywide	1997-2023	0	0	$0	$302,458

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

Figure 12-2: Historic Hailstorms Events 1950-2022, Location and Magnitude



Significant Events

May 30, 1999 – Sheridan

Numerous reports of baseball-sized hail between Sheridan and Columbus.

May 29, 2005 – Glidden

Golf ball size hail 5 miles west of Columbus.

Probability of Future Events

Based on available records of historic events there were 52 events in a 25-year reporting period for the Colorado 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 Colorado County planning area features mobile and manufactured home parks which are more vulnerable to tornados than site-built structures. In addition, manufactured and temporary housing is located sporadically throughout rural portions of the planning area which are also vulnerable to the hailstorm hazard, but more prone to being isolated from essential needs and emergency services in the event of a disaster. Based on 2022 American Community Survey (ACS) estimates, there are 7,376 occupied housing units in Colorado County of which 1,279 (17%) are mobile or manufactured homes. In addition, 3,562 (48%) 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 12-4. Structures at Greater Risk by Jurisdiction

Jurisdiction	Occupied Housing Units	Mobile Homes	Housing units built prior to 1980
Colorado County*	7,376	1,279 (17%)	3,562 (48%)
City of Columbus	1,443	146 (10%)	1,044 (72%)
City of Eagle Lake	902	114(13%)	502 (56%)
City of Weimar	1,074	129 (12%)	685 (64%)

*County totals include all jurisdictions, ISDs, ESDs, and the Water District in addition to unincorporated areas.
Source: 2022 American Community Survey 5-year estimate, selected housing characteristics

Based on the ACS 2022 data, the City of Columbus is at higher risk of damage from hailstorms when considering age of residential structures and the higher standard of building codes enacted after 1980. Unincorporated Colorado County 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, 12-5, 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 $19,900 for Colorado County.

Table 12-5, Colorado County Loss Summary

Time Period	Fatalities	Injuries	Property Damage	Crop Damage
Loss Summary, Colorado County				
25-year Total	0	0	$497,500	$0
Per Year	0	0	$19,900	$0
Per Capita Dollar Losses				
25-year Total	0	0	$24.17	$0
Per Year	0	0	$0.97	$0

Table 12-6 below displays the hailstorm losses by jurisdictions within the planning area where location data is available.

Table 12-6: Hailstorm Losses by Jurisdiction 1997-2023

Jurisdiction	Property Losses	Crop Losses
Colorado County	$232,500	$0
City of Columbus	$227,000	$0
City of Eagle Lake	$26,000	$0
City of Weimar	$12,000	$0

*County totals include all non-participating jurisdictions, ISDs, ESDs, and the Water District in addition to unincorporated areas.

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 Colorado 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 Colorado 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.

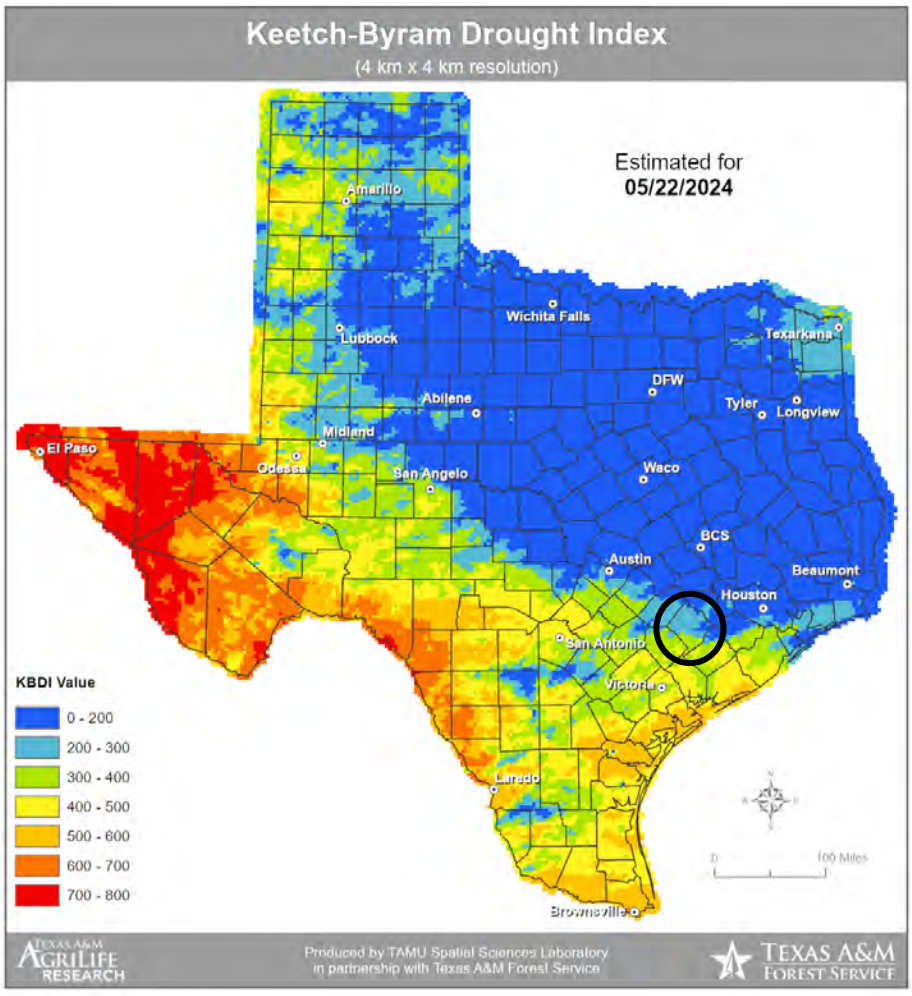
Table 13-2, Colorado County Planning Area KBDI Values

	KBDI Mean	KBDI Maximum	KDBI Minimum
Colorado	256	410	136

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 Colorado County planning area exhibits values in the 0-400 range as of the writing of this report. While Spring 2024 has had more rainfall than is normal, the Colorado County planning area consistently experiences KBDI values in the 700-800 range throughout the summer months and into the Fall. 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 KBDI 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 5/22/2024



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

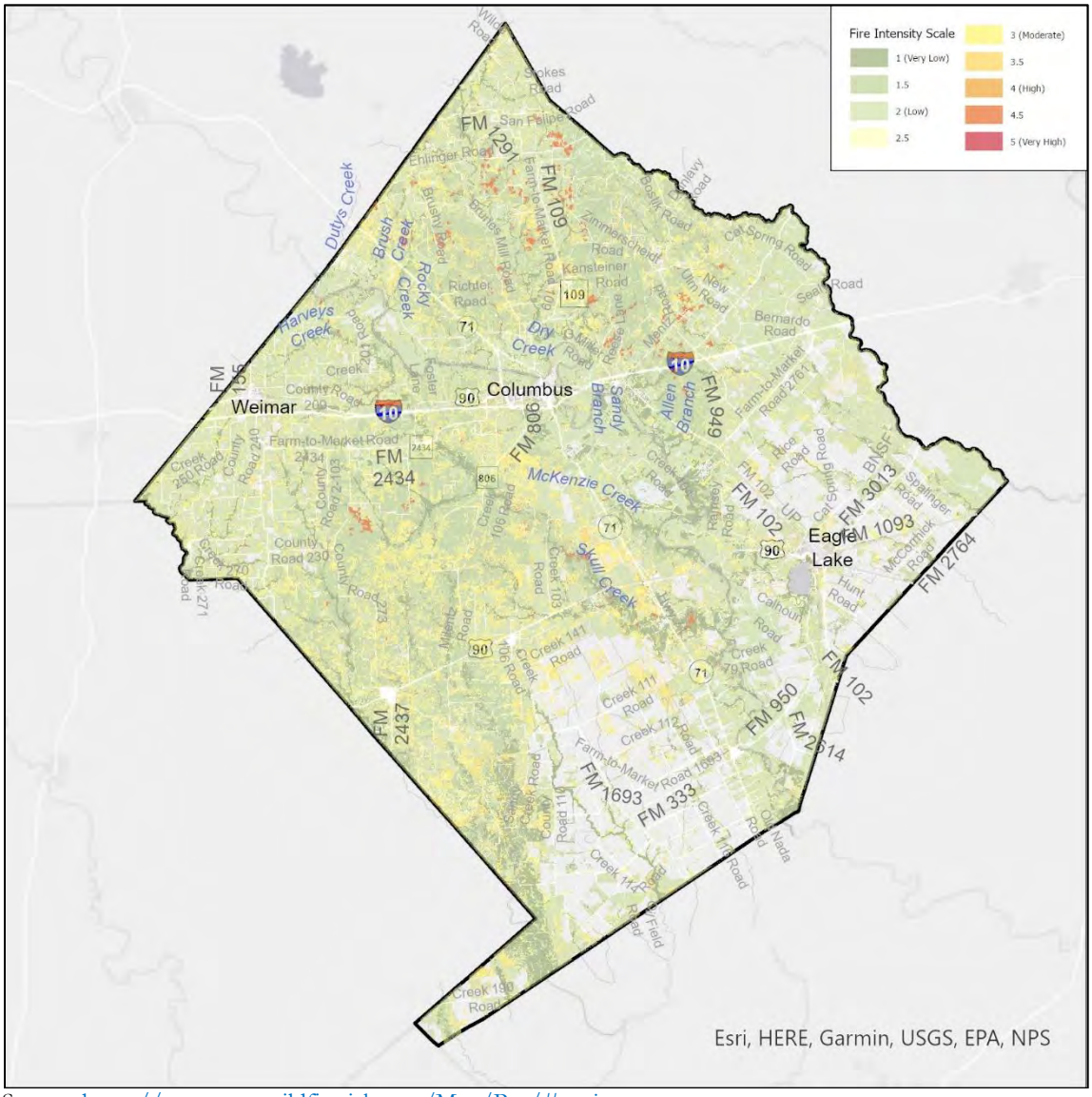
The Texas Wildfire Risk Assessment Portal (TXWRAP) is the primary mechanism for the Texas A&M Forest Service to deploy risk information and create awareness about wildfire issues across the state. www.TexasWildfireRisk.com The tool uses the Fire Intensity Scale (FIS) layer to determine the potential 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 Colorado County planning area is low based on the characteristic wildfire intensity scale.**

Figure 13-2, Colorado 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 1997-2023. There have not been any wildfire events recorded in the NCEI for the Colorado County planning area.

Table 5-4: Historical Wildfire Events in Colorado County (USDA Data), 1997-2023

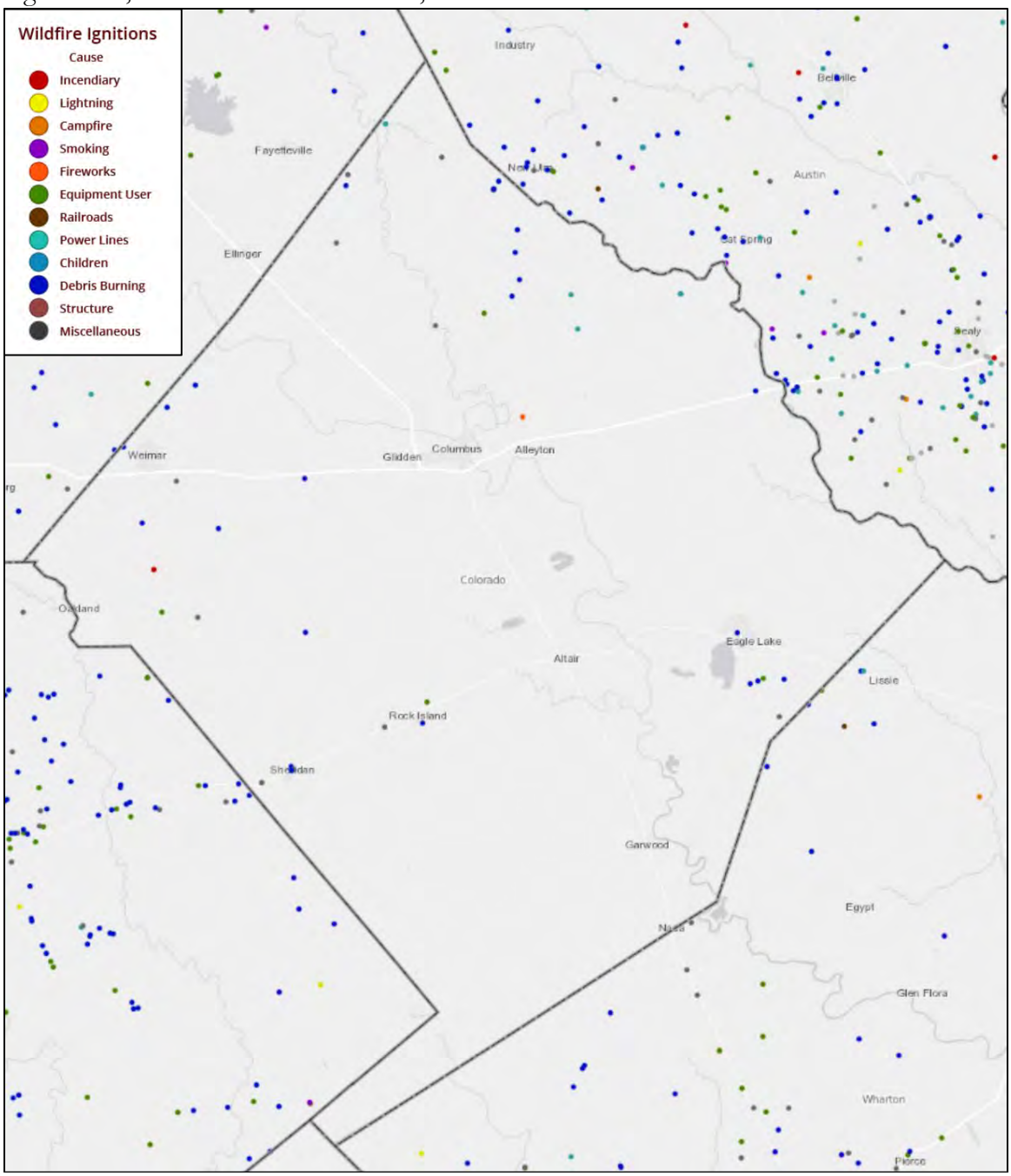
Location	Dates	Deaths	Injuries	Property Damage	Crop Damage
Countywide	1997-2023	0	0	$0	$266

Significant Events

There have not been any significant recorded wildfire events with estimated impact data in the past 25 years.

The Texas A&M Forest Service, 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 A&M Forest Service reported 2,013 wildfire events in the Colorado County planning area between 2005 and 2022. 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 2022. The map below shows approximate locations of wildfires in Colorado County and the cause of ignitions.

Figure 13-3, Historical Wildfire Events, 2005 – 2022



Source: https://wrap.texaswildfirerisk.com

Table 13-3 on the following page lists the ignition causes for all wildfires in the planning area between 2005-2022, the number of times of each unique ignition cause, and the percent of total ignitions.

Table 13-3, Wildfire ignition causes from 2005-2022

Ignition Cause	Count	% of Total
Debris burning	26	45%
Equipment use	6	10%
Fireworks	1	2%
Incendiary	1	2%
Miscellaneous	15	26%
Power Lines	9	15%
Grand Total	58	100%

Source: Texas Wildfire Risk Assessment Portal (TxWRAP)

Probability of Future Events

Based on reported historical occurrences of wildfire, 58 wildfire events occurred in a 17-year reporting period for Colorado County. This data establishes an approximate probability of occurrence of 3-4 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 future development patterns extend into the wildlands.

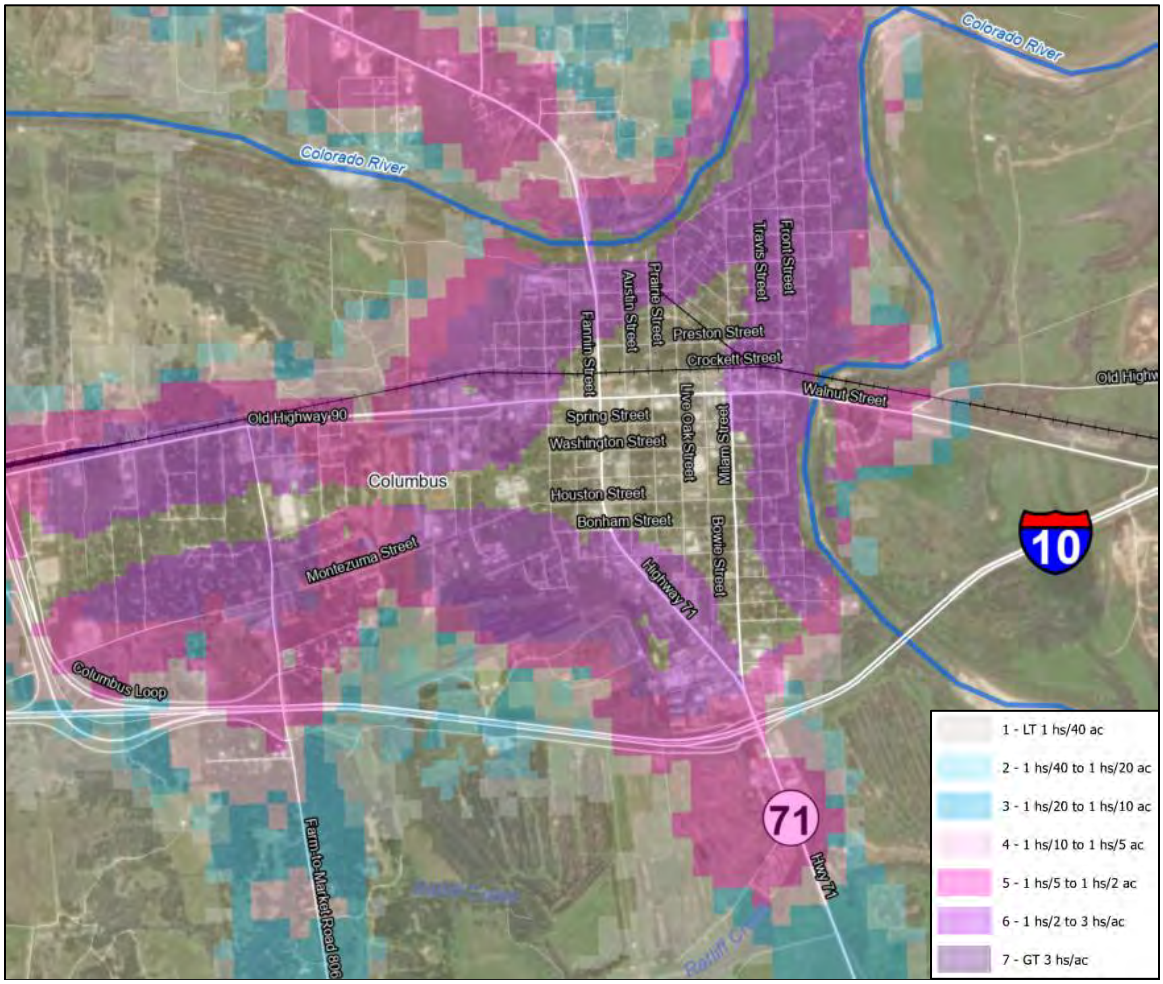
Frequency of Occurrence	
Highly likely:	Event probable in next year.
Likely:	Event probable in next 3 years.
Occasional:	Event possible in next 5 years.
Unlikely:	Event possible in next 10 years.

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 jurisdictional areas encompasses nearly all the land area within the city limits, nearly all critical facilities located within both cities are within the Wildland Urban Interface or access to them is impeded by the WUI. Colorado WCID#2 will implement a mitigation action to electronically document and map assets in their service area.

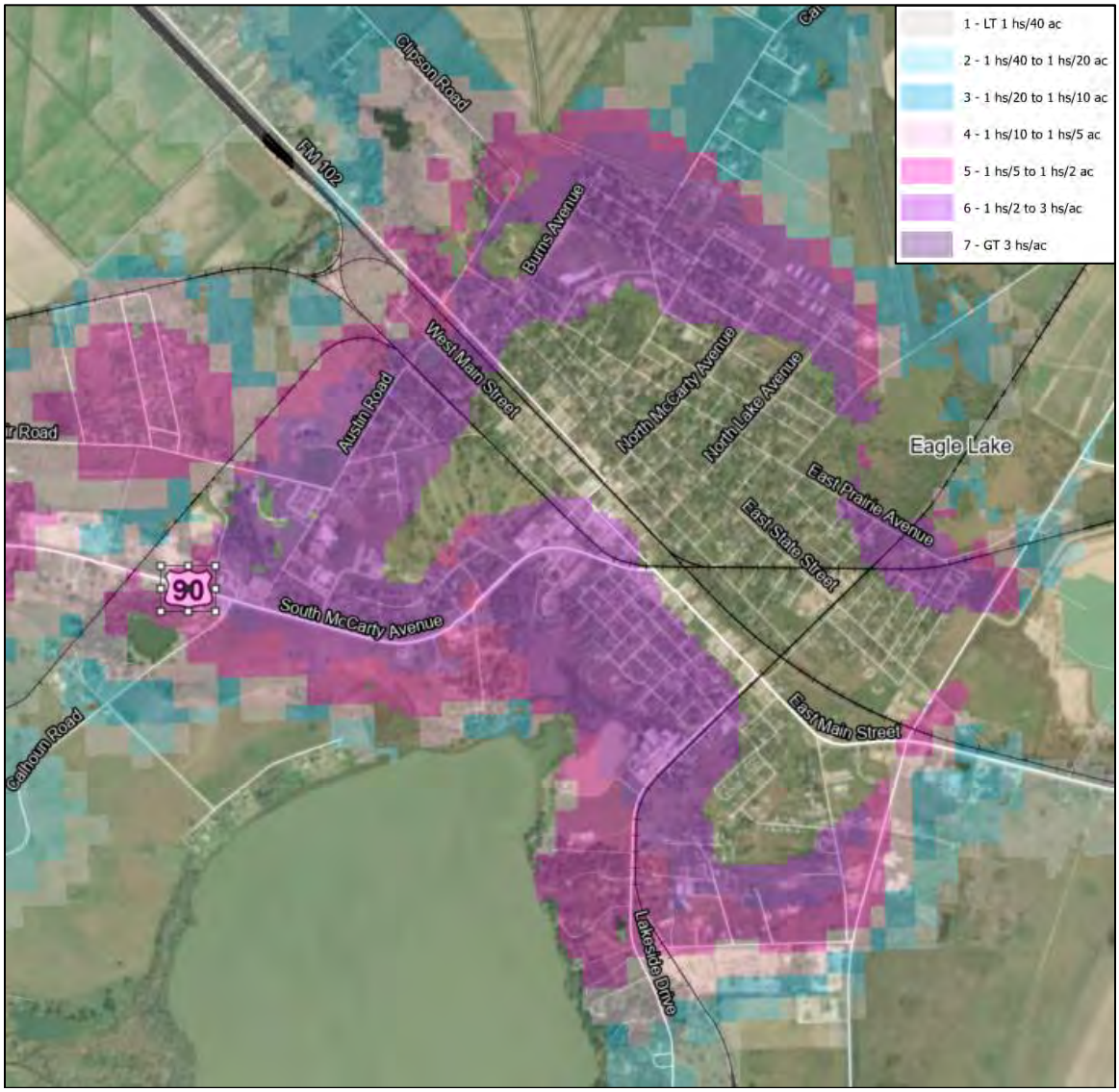
The severity of impact from major wildfire events can be substantial. Such events have caused deaths and injuries, damaged or destroyed property and critical facilities, and disrupted infrastructure and services. Severity of impact is gauged by homes and structures lost, acreage burned, and the number 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 13-4: Wildland Urban Interface, City of Columbus



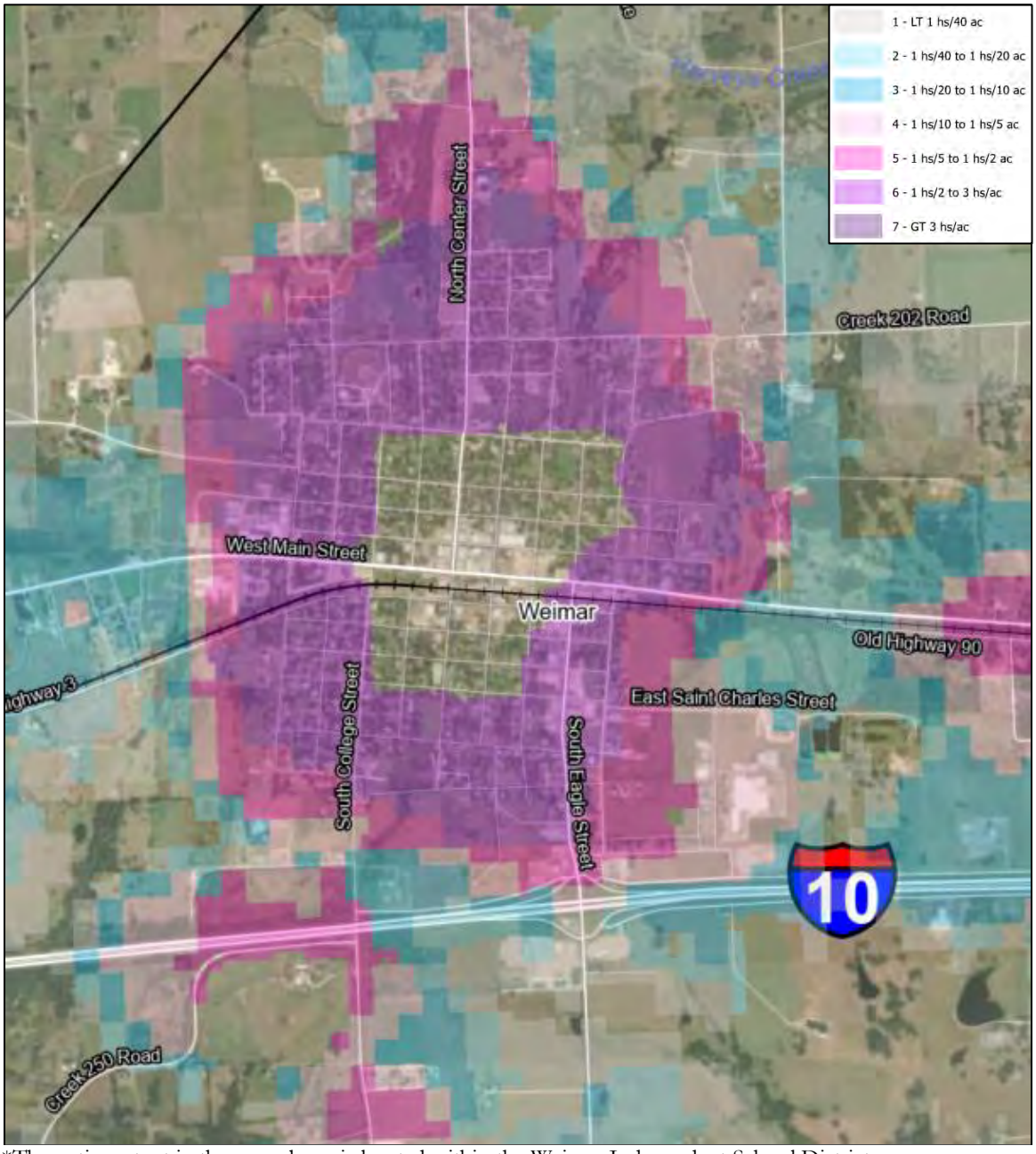
*The entire extent in the map above is located within the Colombus Independent School District

Figure 13-5: Wildland Urban Interface, City of Eagle Lake



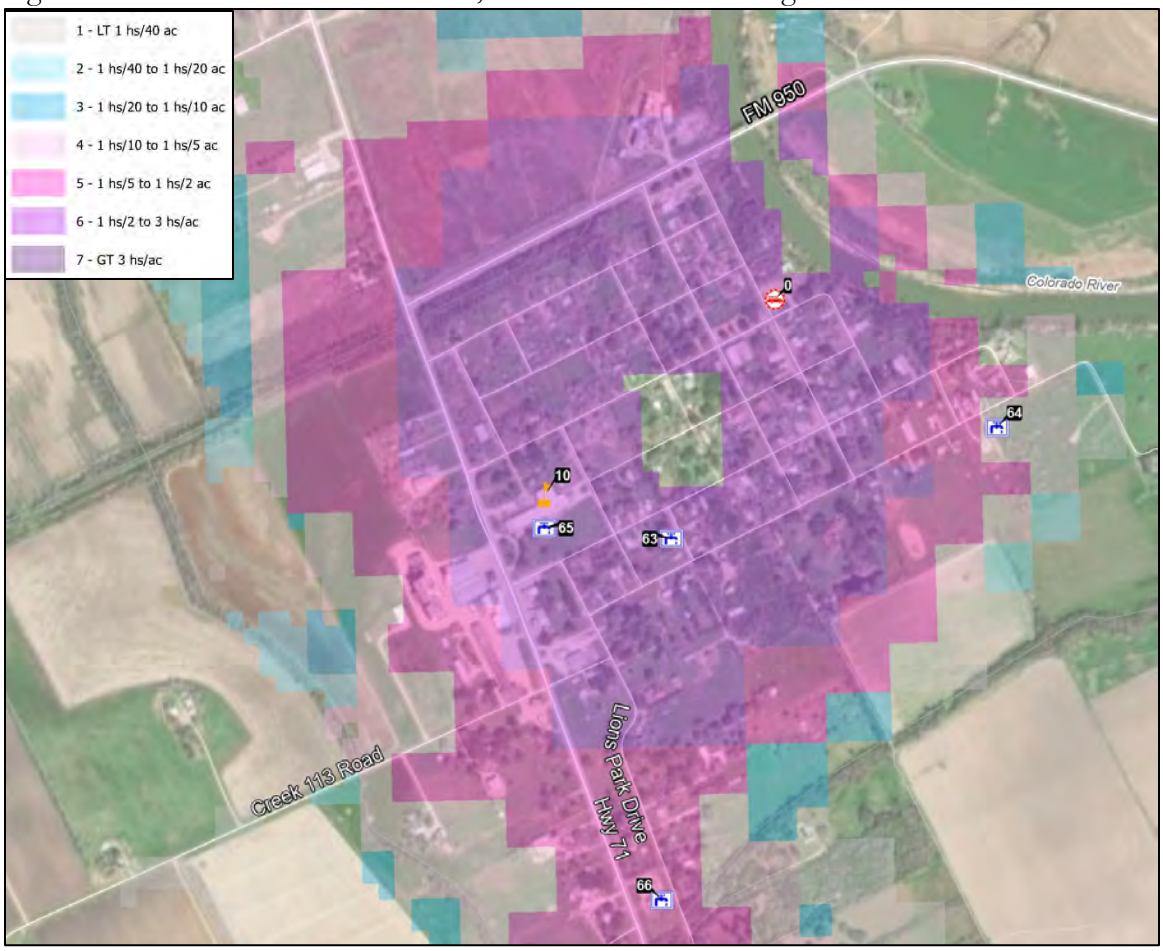
*The entire extent in the map above is located within the Rice Consolidated Independent School District

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



*The entire extent in the map above is located within the Weimar Independent School District

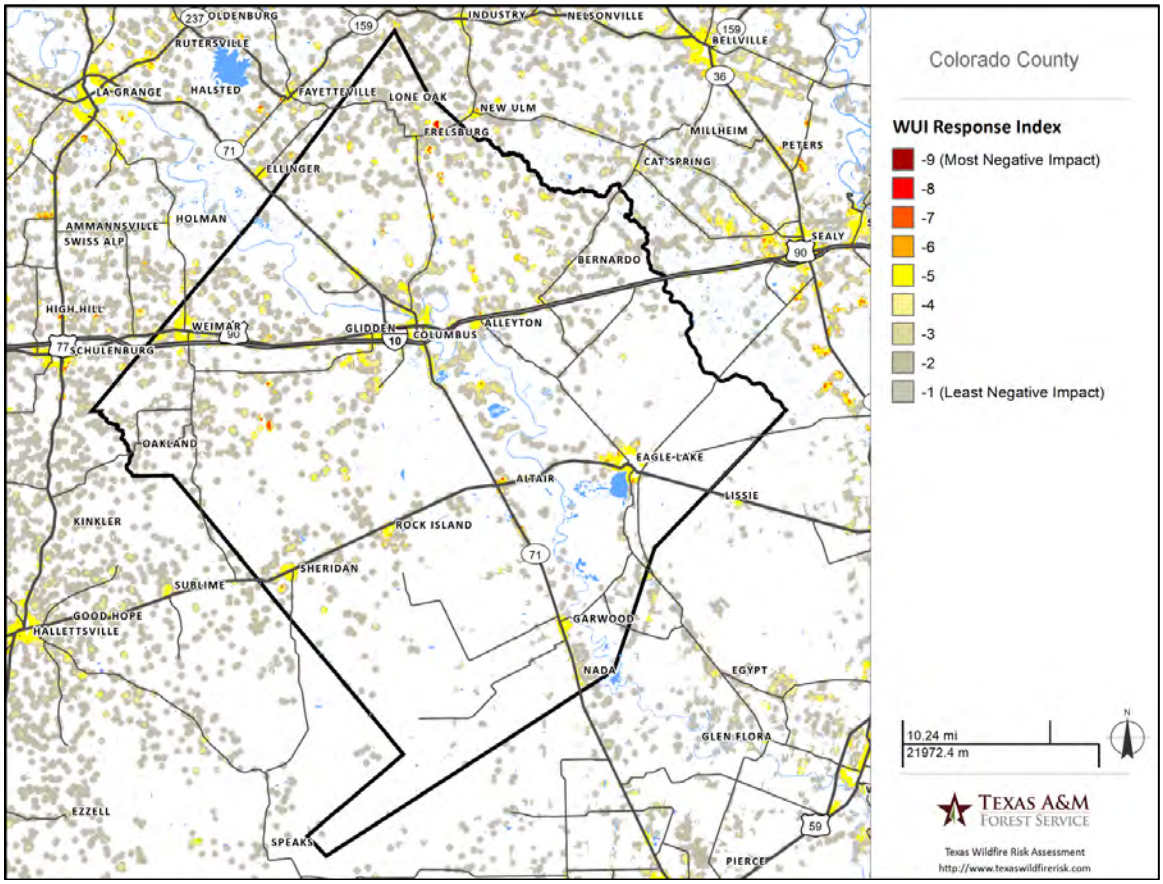
Figure 13-7: Wildland Urban Interface, Garwood CDP Showing CCWID 2 Facilities



*The entire extent in the map above is located within the Weimar Independent School District

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 Colorado 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 Columbus, Eagle Lake, and Weimar. Some of the most negative response index values also appear in isolated communities in the north and western areas of the county.

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



Source: https://wrap.texaswildfirerisk.com

The impacts from a wildfire to the Colorado County planning area would be severe if the location were near a population area even with the low wildfire risk rating. Local impacts would include 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 Colorado County planning area are considered to be uniformly exposed to a winter storm hazard and could potentially be impacted.

Extent

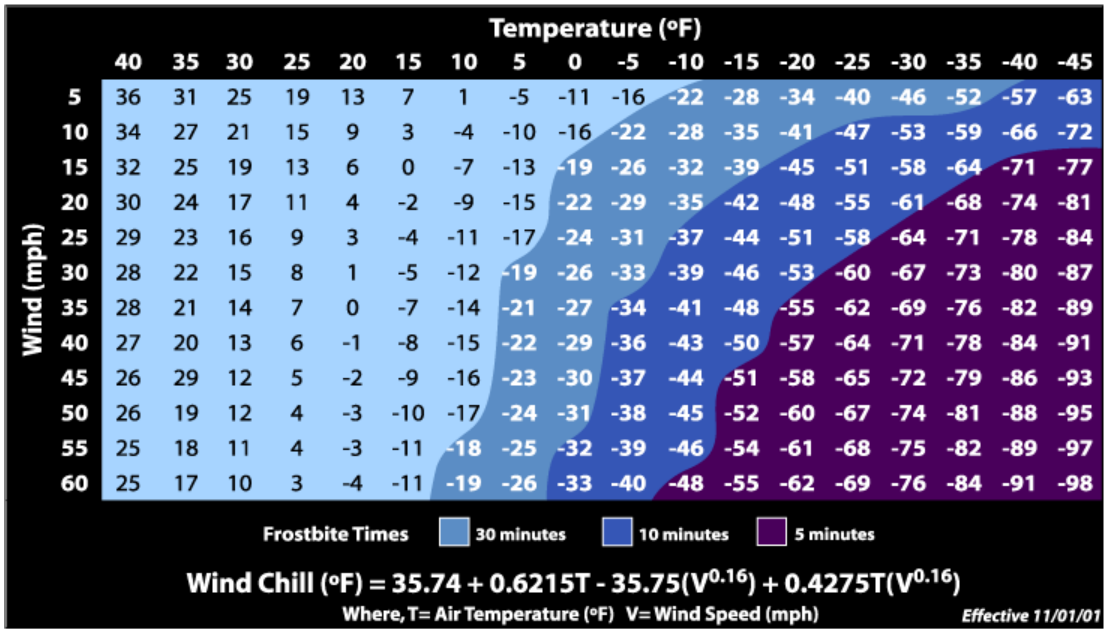
The extent or magnitude of a severe winter storm is measured by on an intensity scale from "Mild" to "Severe" based on temperature ranges and snow accumulation levels. Table 14-1, Magnitude of Severe Winter Storms, is an index developed by the National Weather Service (NWS). This table should be referenced 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 2023 the Colorado County planning area experienced 10 severe winter events in the form of extreme cold, Ice storms, winter storms and winter weather. No injuries or fatalities were reported for the following severe winter events.

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

Date	Event	Deaths	Injuries	Property Damage	Crop Damage
1/12/97	Ice Storm	0	0	$0	$0
12/13/00	Ice Storm	0	0	$50,000	$0
1/16/07	Ice Storm	0	0	$3,000	$0
2/3/11	Ice Storm	0	0	$0	$0
2/3/11	Ice Storm	0	0	$0	$0
12/7/13	Winter Weather	0	0	$0	$0
2/14/21	Winter Storm	0	0	$0	$0
2/15/21	Extreme Cold/Wind Chill	0	0	$305,000	$0
2/17/21	Ice Storm	0	0	$0	$0
2/3/22	Winter Weather	0	0	$0	$0

Table 14-4: Historical Winter Storm Events in Colorado County (USDA Data), 1997-2023

Location	Dates	Deaths	Injuries	Property Damage	Crop Damage
Countywide	1997-2023	0	0	$0	$400,491

Significant Events

February 15, 2021 – Colorado County

Record cold and windy conditions gripped Southeast Texas behind the passage of an Arctic front. The extreme cold and increased demand led to widespread power outages, loss of heat for many and led to the bursting of pipes with some losing water for many days. Numerous fatalities resulted both from hypothermia, carbon monoxide poisoning and other effects.

Probability of Future Events

According to historical records the Colorado 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 Colorado 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 20,582 according to the 2022 ACS population estimate. Those over the age of 65 represent 22.3% (4,584) of the total population and children under the age of 5 represent 6.1% (1,247) of the total population. The total population of the county that is estimated to be below the poverty level is 7.2% (1,490). Table 14-5 on the following page presents the 2022 American Community Survey population and age cohort estimates.

Table 14-5: Populations at Greater Risk by Jurisdiction

Jurisdiction	Population Under 5	Population 65 and Older	Population Below Poverty Level
Colorado County	1,247	4,584	1,490
City of Columbus	229	1,084	395
City of Eagle Lake	247	425	329
City of Weimar	136	556	185

Source: 2022 American Community Survey (Note: County totals include both incorporated and unincorporated areas)

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

Historic Severe Winter Storm Impacts

The summary table below, 14-6, shows the 25-year property and crop damage totals as well as the average annual (Per Year) losses summarizing historic severe winter storm impacts. 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 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 $497,500 for Colorado County.

Table 14-6, Colorado County Loss Summary

Time Period	Fatalities	Injuries	Property Damage	Crop Damage
Loss Summary, Colorado County				
25-year Total	0	0	$497,500	$0
Per Year	0	0	$19,900	$0
Per Capita Dollar Losses				
25-year Total	0	0	$24.17	$0
Per Year	0	0	$0.97	$0

Table 14-7 below displays the hailstorm losses by jurisdictions within the planning area where location data is available.

Table 14-7: Hailstorm Losses by Jurisdiction 1997-2023

Jurisdiction	Property Losses	Crop Losses
Colorado County	$232,500	$0
City of Columbus	$227,000	$0
City of Eagle Lake	$26,000	$0
City of Weimar	$12,000	$0

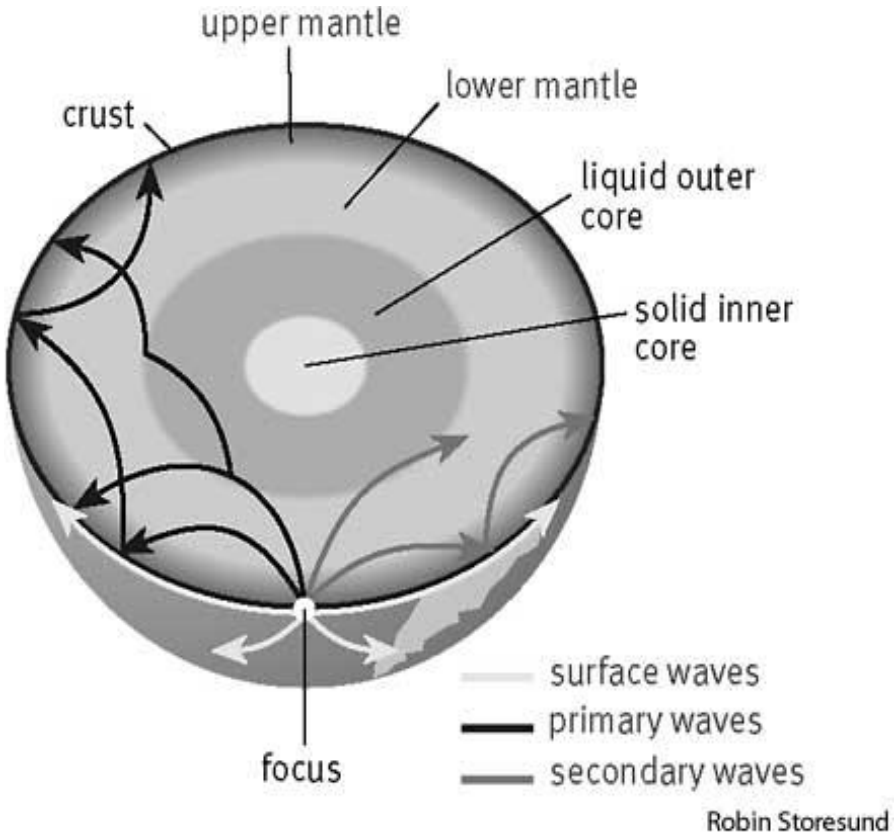
*County totals include all non-participating jurisdictions, ISDs, ESDs, and the Water District in addition to unincorporated areas.

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



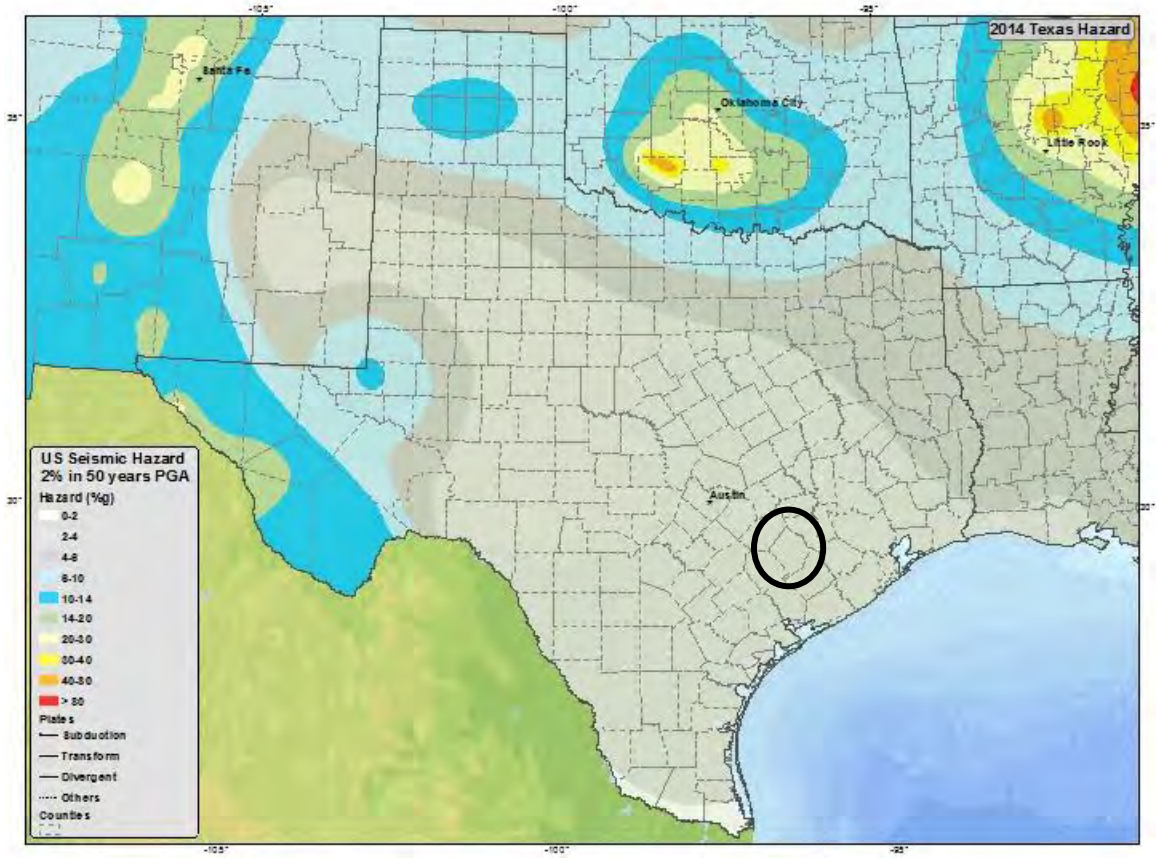
Source: *"earthquake". The American Heritage® Science Dictionary. Houghton Mifflin Company. 20 Oct. 2017. <http://www.dictionary.com/browse/earthquake>.*

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 a 2-4% probability of having a very weak ground shaking event over 50 years. The planning area encompassed by Colorado County shares the same probability of 2-4% 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 Colorado 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 were five events to the west and northwest of the Colorado County planning area.

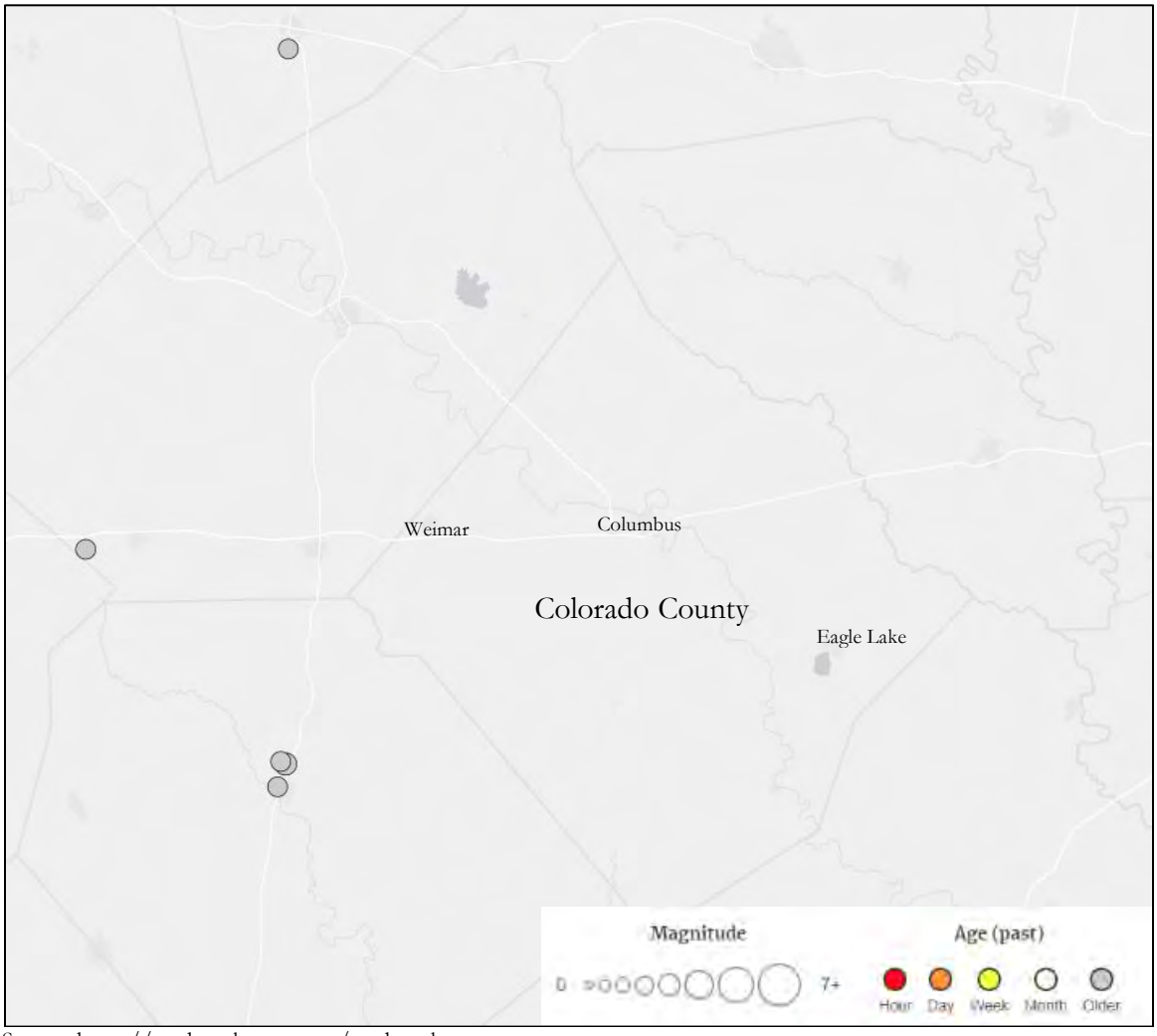
Table 15-3: Historical Occurrences of Earthquakes in and around the planning area

Id	Date	Location	Magnitude
1	4/2/2024	2 kilometers S of Giddings, Texas	2.7
2	8/24/2024	3 kilometers S of Giddings, Texas	2.7
3	10/20/2017	5 kilometers S of Giddings, Texas	2.9
4	2/19/2015	3 km N of Hallettsville, Texas	3.1
5	1/4/1995	1 km NW of Hallettsville, Texas	2.7

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

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

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



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

Significant Events

February 19, 2015 – Lavaca County

At 8:31 PM on 2/19/2015, a magnitude 3.1 earthquake had its epicenter 3 kilometers North of Hallettsville 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 2-4% chance of experiencing an earthquake over the next 50 years. Over the 100-year period of USGS data there have been no occurrences of earthquakes in the Colorado 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 Colorado County, including participating jurisdictions and Water, are vulnerable to the impacts of earthquakes.

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.

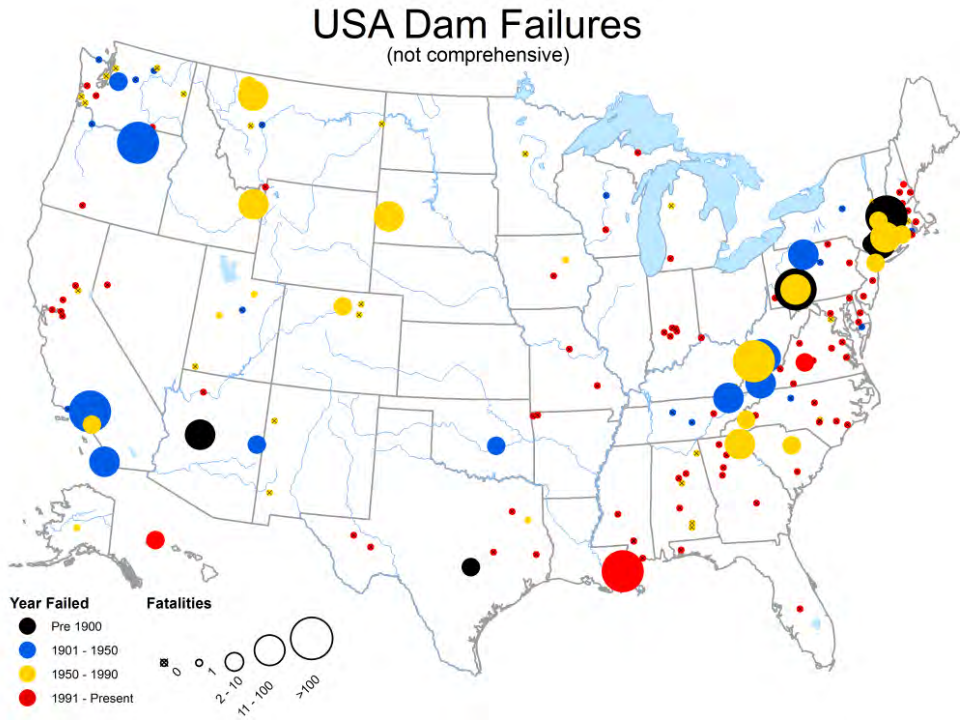
SECTION 16: DAMS

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.

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 16-1: USA Dam Failures



Source: damsafety.org/dam-failures

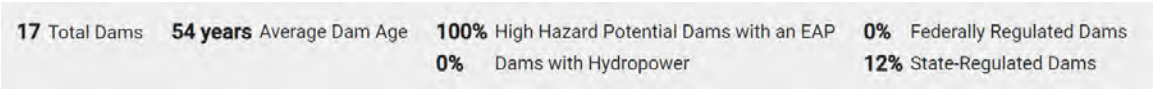
In the event of a dam failure, the energy of the water stored behind the dam is capable of causing rapid and unexpected flooding downstream, resulting in loss of life and substantial property damage. A devastating effect on water supply and power generation could be expected as well. The causes of dam 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

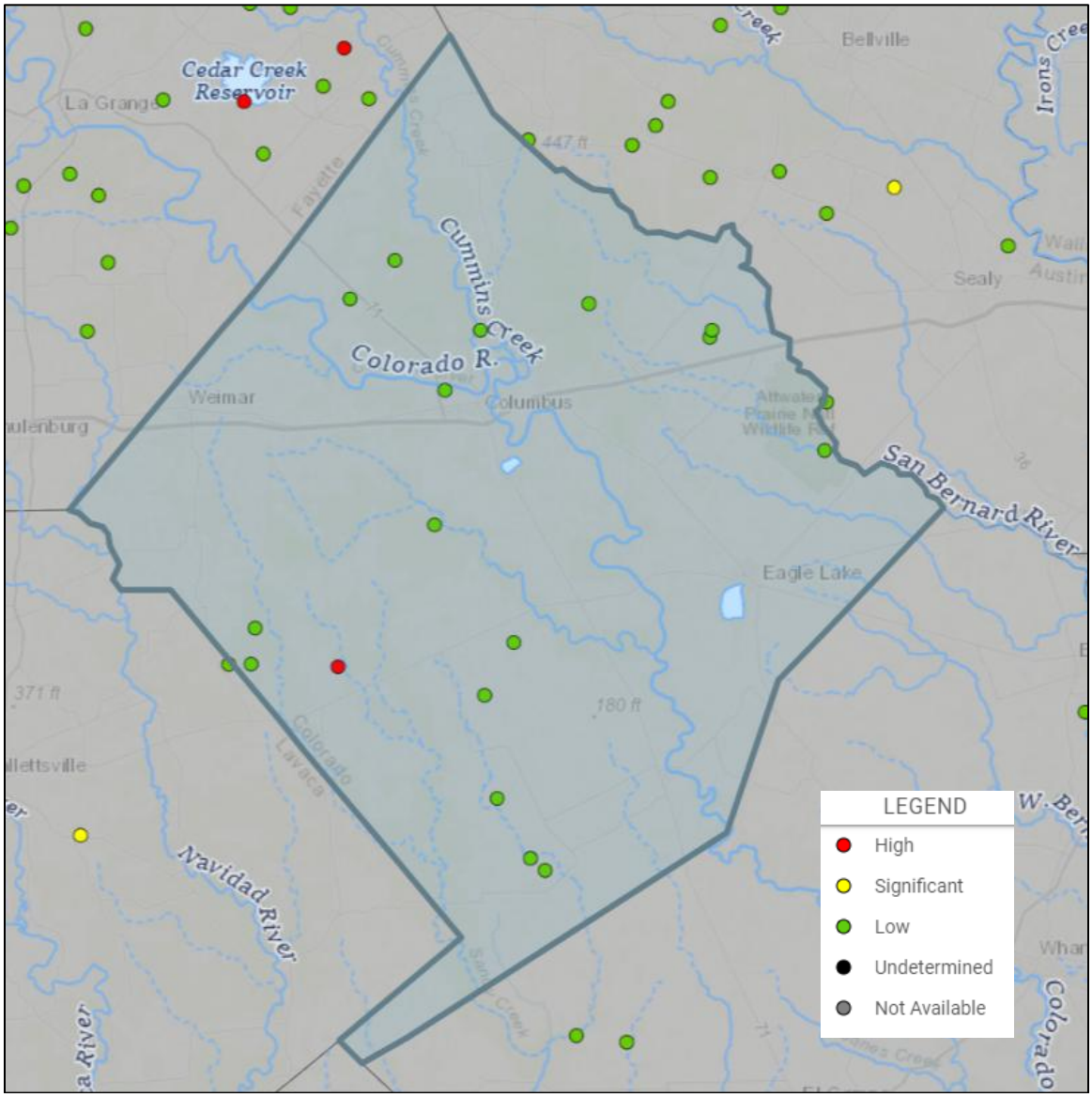
Figures 16-2 and 16-3, provide a summary and illustrate general locations for each dam in the planning area. Currently, there are seventeen dams located in the Colorado County planning area: one is classified as "high-hazard", zero as "significant-hazard", 16 as "low-hazard" dams, zero as "undetermined," and zero as "not available."

Figure 16-2: Dam Summary for Colorado County, Texas



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

Figure 16-3: Dam Locations in Colorado County



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

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

Table 16-1: Colorado County Dam Survey

Dam Name	Year Completed	Height (Ft.)	Normal Storage (Acre Ft.)	Max Storage (Acre Ft.)	Hazard Potential
Bonham Lake Dam	1978	30	30	35	Low
Schindler Lake Dam	1965	23	13.6	62.56	Low
Refuge Lake Dam	1964	15	51	480	Low

Lake Sheridan Dam	1967	30	390	1557	High
Engstrom Lake No 2 Dam	1959	8	26	120	Low
Cullen Lake Dam	1958	19	72	137	Low
Glasscock Lake Dam	1965	30	120	240	Low
Reichle Bros Pond Dam	1984	25	55	84	Low
Hugo Helmcamp Dam	1990	16	6	99	Low
Bailey Lake Dam	1958	12	42	84	Low
Scott Lake Dam	1965	17	109	250	Low
R E Smith Estate Reservoir No 2 Levee	1975	7	94	94	Low
Hervey Lake No 2 Dam	1970	18	81	115	Low
R E Smith Estate Reservoir No 3 Levee	1979	9	73	96	Low
Kallina Reservoir Dam	1965	7	217	427	Low
Engstrom Lake No 1 Dam	1965	8	23	74	Low
Hervey Lake No 1 Dam	1963	18	100	200	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. The high hazard dam within the planning area, Lake Sheridan Dam, represents a max storage capacity of 1,557-acre feet, far less than the 10,000-acre feet maximum threshold for the one-mile distance stated above suggesting that the downstream census blocks that would be at risk would be much less than a mile.

Any populations, residential and commercial developments, and evacuation routes located downstream of the dams would be considered to be at risk if 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. After County emergency management coordination with the local dam owner, Lake Sheridan Estates, it was determined that more information is needed to study the impact of dam failure to areas downstream as well as the local evacuation route of FM 275, or Lake Sheridan Road. This data deficiency is addressed in the mitigation strategy section. (pg. 133)

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 Colorado 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.

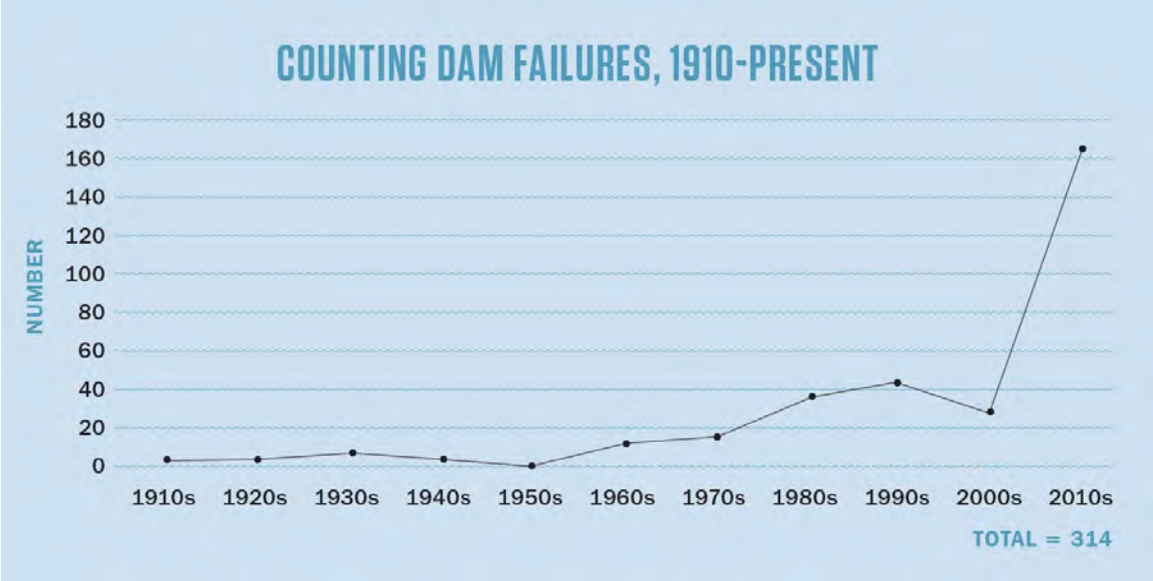
Table 16-3: Extent for Colorado County and Participating Jurisdictions

Jurisdiction	Dams and Classification	Extent Classification	Level of Intensity to Mitigate
Colorado County and all participating jurisdictions	1 – High 16- Low	Low	Dam failure presents a low threat due to the low number of significant and high hazard dams in the area and the distance from any populated areas. Lake Sheridan Dam represents a large impoundment of water and due to this it is classified as a high hazard dam but it does not represent a high risk to unincorporated Colorado County. Because the area downstream is largely undeveloped, loss of life is not expected and economic loss is not significant in the event of a catastrophic dam failure at this location. Damage to evacuation routes is a possibility and that vulnerability will require further study. Due to these contributing factors, the extent classification for this high hazard dam has been downgraded to low and this dam does not need be profiled in subsequent hazard mitigation plan updates until there is a significant increase in population density and areas of development directly downstream.

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 Colorado County planning area.

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

Dam Name	Last Inspection Date	Conditions Assessment	Condition Assessment Date	EAP Prepared	Date of Last EAP Revision
Bonham Lake Dam		Not Rated	6/18/2014	Not Required	
Schindler Lake Dam	2/11/2009	Not Rated	6/18/2014	Not Required	

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

Refuge Lake Dam		Not Rated	6/18/2014	Not Required	
Lake Sheridan Dam	3/20/2019	Fair	8/22/2019	Yes	9/16/22
Engstrom Lake No 2 Dam		Not Rated	6/18/2014	Not Required	
Cullen Lake Dam		Not Rated	6/18/2014	Not Required	
Glasscock Lake Dam		Not Rated	6/18/2014	Not Required	
Reichle Bros Pond Dam		Not Rated	6/18/2014	Not Required	
Hugo Helmcamp Dam		Not Rated	6/18/2014	Not Required	
Bailey Lake Dam		Not Rated	6/18/2014	Not Required	
Scott Lake Dam		Not Rated	6/18/2014	Not Required	
R E Smith Estate Reservoir No 2 Levee		Not Rated	6/18/2014	Not Required	
Hervey Lake No 2 Dam	2/11/2016	Not Rated	6/18/2014	Not Required	
R E Smith Estate Reservoir No 3 Levee		Not Rated	6/18/2014	Not Required	
Kallina Reservoir Dam		Not Rated	6/18/2014	Not Required	
Engstrom Lake No 1 Dam		Not Rated	6/18/2014	Not Required	
Hervey Lake No 1 Dam		Not Rated	6/18/2014	Not Required	

Probability of Future Events

According to historical records, from 1997-2022 the Colorado 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 Colorado County planning area is **"Low,"** however, the area downstream of Lake Sheridan 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. The other sixteen 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.

Lake Sheridan Dam is the only high hazard dam in the planning area based on size. A failure could have a high impact on downstream residents, infrastructure, riverine systems, and even downstream dams. Areas directly downstream would be need to be immediately evacuated in the event of Lake Sheridan 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 seventeen 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 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 Colorado 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 2024 Colorado County Mitigation Action Plan Update. The first was held during the second Core Planning Team at the Colorado County Courthouse and the second was held virtually with each of the participating jurisdictional sub-teams. The goals and objectives from the 2016 Colorado 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.

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

Mitigation Goals

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

Goal #1: Protect public health and safety.

- Objective 1.1 - Advise the public about health and safety precautions to guard against injury and loss of life from hazards.
- Objective 1.2 - Maximize the 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 – Use the most cost-effective approaches to protect existing building and public infrastructure from hazards.
- Objective 2.3 - 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 a cadre of committed volunteers to safeguard the community before, during, and after a disaster.
- 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.

SECTION 18: MITIGATION ACTIONS

The mitigation actions developed by Core Team, Jurisdictional sub-teams, and community stakeholders are presented in this section for Colorado 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 Colorado 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).

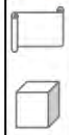
Based on local input, the following action items from the previous 2016 plan were completed and those that were not carried forward from that plan were discarded due to lack of continued relevance. The actions below were listed in the prior 2016 Colorado County Hazard Mitigation Plan and are listed as 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.

Colorado County	
ACTION: Countywide Code Red Alert Enhancements	
Action Completed	Enhancements completed with the grant from LAPC for 2-year contract
ACTION: Use the application of calcium coil stabilizers on county road projects	
Action No Longer Applicable	Soil stabilization measures already in place in county road building criteria.
ACTION: Soils hazard study and create ordinance	
Action No Longer Applicable	Expansive soils and subsidence area have presented a negligible hazard to the County
City of Columbus	
ACTION: Extreme Weather Alert (ENS)	
Action Completed	City has partnered with the county to have access to the countywide code red system.
ACTION: Update Building Codes	
Action Completed	Building Codes have been updated to IBC 2018
ACTION: Drought and Expansive Soils Contingency Plan	
City of Eagle Lake	
ACTION: Emergency Notification System	
Action Completed	The emergency notification system development has been completed.
ACTION: Bring City into compliance with the requirements of the NWS Storm Ready Program	
Action No Longer Applicable	The city is not interested in becoming a Storm-Ready community at this time.

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 *Structural projects, Natural systems protection, Local plans and regulations, Education programs, and Emergency Response*. 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
Colorado County											
1	Study existing shelter needs and secure funding and construct	The County currently uses Red Cross approved shelters as well as ISD facilities. The ability of these locations to function as short or long term shelters will be determined with the appropriate development and upgrades made.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3	Y	Emergency Management	$50,000	*Local Budget, HMGP, PDM, HMA Grants*	36	Low
2	Propane Tank Flood Zone Regulation	Applicable to structures in a documented flood zone addressing the requirements for tie-downs or other methods of securing residential propane tanks (surface or sub-surface). This will enhance responder and citizen safety by mitigating floating tanks that could become damaged and leak propane resulting in flash fires and explosions downstream.	Flood, Hurricane, Dam Failure		G1, G2	N	Floodplain Management	$10,000	*Local Budget*	12	High
3	Update regulations to control location of and standards for development, especially in high flood hazard areas	Study heightened regulatory requirements with regard to development in hazard areas, floodplain management, and RV developments.	Flood, Hurricane, Wildfire, Dam Failure		G1, G2	Y	Planning Department	$45,000	*Local Budget, HMGP, PDM, HMA Grants*	24	High
4	Sandy Oaks Event Flood Study	After securing funding, identify a qualified engineer and complete a scope of work to address the identified goals and outcomes to help enhance response to the Sandy Oaks Subdivision.	Flood, Hurricane, Dam Failure		G1, G2, G3, G5, G6	N	Floodplain Management	$100,000	*Local Budget, HMGP, PDM, HMA Grants*	24	Medium
5	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	Y	Public Works	$50,000	*Local Budget, HMGP, PDM, HMA Grants*	12	Medium

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Colorado County											
6	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.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G4	Y	Emergency Management	$250,000	*Local Budget, HMGP, PDM, HMA Grants*	12	Low
7	Prioritize and upgrade most low water crossings	Prioritize and upgrade most dangerous low water crossings throughout the county	Flood, Hurricane, Dam Failure		G1, G2, G5	Y	Floodplain Manager	$500,000	*Local Budget, HMGP, PDM, HMA Grants*	60	High
8	Colorado River Study	Work with the GBRA to develop a detailed flood and watershed study of the Colorado River in Colorado County, with an emphasis near populated areas.	Flood, Hurricane, Dam Failure		G1, G2, G5	Y	Floodplain Manager	$350,000	*Local Budget, GBRA, HMGP, PDM, HMA Grants*	24	High
9	Skull Creek Study	Conduct a hydrologic and hydraulic study of Skull Creek to determine flood mitigation alternatives and implement the projects with the greatest feasibility and highest priority.	Flood, Hurricane, Dam Failure		G1, G2, G3, G5, G6	N	Floodplain Management	$100,000	*Local Budget, HMGP, PDM, HMA Grants*	36	Medium
10	Procure, license and install a county-wide AM Radio information system	Develop a county-wide AM radio information system for residents to be aware of impending hazard events. (updated from purchase NOAA all hazard radios from prior plan)	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3	N	Sheriff's Department	$50,000	*Local Budget, HMGP, PDM, HMA Grants*	36	Medium
11	Conduct a public education campaign on all hazards	Educate and update all citizens and business owners in Colorado County of the hazards we face, how to protect yourself and mitigate damages to your property, and increase over-all situation awareness of all potential impacts and self-help measures.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3, G4, G6	N	Emergency Management	$10,000	*Local Budget, HMGP, PDM, HMA Grants, FEMA*	24	Medium
12	Update National Flood Hazard area	Update the outdated National Flood Hazard Area with new Hydrologic and Hydraulic models using Atlas 14 rainfall data.	Flood, Hurricane, Dam Failure		G1, G2, G5	Y	Floodplain Manager	$300,000	*Local Budget, HMGP, PDM, HMA Grants*	36	High
13	Obtain Storm-Ready designation for the county.	Application preparation and submission for StormReady designation from the National Weather Service that attests to the community's level of preparedness for severe storms.	Hurricane, Flood, Windstorms, Lightning, Tornado, Hailstorms, Severe Winter Storms, Dam Failure		G1, G2	Y	Emergency Management	Existing staff resources/ in-kind services	*Local Budget, FEMA, TWDB*	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
Colorado County											
14	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, G5	Y	Emergency Management	$200,000	*Local Budget, HMGP, PDM, HMA Grants, Texas Fire Service*	48	Medium
15	Study Lake Sheridan Dam	Work with the owners of Lake Sheridan Dam to study and understand the impacts of failure for this high hazard dam.	Flood, Hurricane, Dam Failure		G1, G3	Y	Emergency Management	$200,000	*Local Budget, HMGP, PDM, HMA Grants, Texas Fire Service*	48	Low

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

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 Columbus											
1	Purchase NOAA All Hazard Radios	Purchase NOAA All Hazard Radios for residents to be aware of impending hazard events.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3	N	Emergency Management	$10,000	*Local, HMGP*	48	Medium
2	Drought Contingency Plan	Create & implement a Drought Contingency Plan to address the different degrees of drought and water shortage with extreme heat.	Drought, Extreme Heat, Earthquakes		G1	N	City Administration	$10,000	*Local Funds*	24	High
3	Conduct education to homeowners on all hazards	Conduct outreach to the public to educate citizens on the full range of hazards they face and how to protect themselves, mitigate their homes and businesses from damage in disaster situations.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3, G4	N	City Administration	$10,000	*Local Funds*	24	High
4	Undertake a review of the city's floodplain management ordinance	Review current plan and update as required.	Hurricane, Flood, Dam Failure		G2	N	City Administration	$10,000	*Local Funds*	12	Medium
5	Become aStormReady community certified by the NWS	Work to complete guidelines 1 to 6 to become a certified StormReady community.	Hurricane, Flood, Dam Failure		G1, G3	N	City Administration	$10,000	*Local Funds*	36	Medium
6	Comprehensive Land Use Plan	Work in conjunction with Colorado County to develop a comprehensive land use plan.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3	N	City Administration	$50,000	*Local, CDBG, Other Grants*	48	Medium
7	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	$15,00	*Local, HMGP, Texas A&M Forest Service, ISD*	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 Columbus											
1	Purchase NOAA All Hazard Radios	Purchase NOAA All Hazard Radios for residents to be aware of impending hazard events.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3	N	Emergency Management	$10,000	*Local, HMGP*	48	Medium
2	Drought Contingency Plan	Create & implement a Drought Contingency Plan to address the different degrees of drought and water shortage with extreme heat.	Drought, Extreme Heat, Earthquakes		G1	N	City Administration	$10,000	*Local Funds*	24	High
3	Conduct education to homeowners on all hazards	Conduct outreach to the public to educate citizens on the full range of hazards they face and how to protect themselves, mitigate their homes and businesses from damage in disaster situations.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3, G4	N	City Administration	$10,000	*Local Funds*	24	High
4	Undertake a review of the city's floodplain management ordinance	Review current plan and update as required.	Hurricane, Flood, Dam Failure		G2	N	City Administration	$10,000	*Local Funds*	12	Medium
5	Become aStormReady community certified by the NWS	Work to complete guidelines 1 to 6 to become a certified StormReady community.	Hurricane, Flood, Dam Failure		G1, G3	N	City Administration	$10,000	*Local Funds*	36	Medium
6	Comprehensive Land Use Plan	Work in conjunction with Colorado County to develop a comprehensive land use plan.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3	N	City Administration	$50,000	*Local, CDBG, Other Grants*	48	Medium
7	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 communitiy needs.	Drought, Extreme Heat, Wildfire		G1, G2, G3, G4	Y	Emergency Management, Fire Department	$15,00	*Local, HMGP, Texas A&M Forest Service, ISD*	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 Columbus											
1	Purchase NOAA All Hazard Radios	Purchase NOAA All Hazard Radios for residents to be aware of impending hazard events.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3	N	Emergency Management	$10,000	*Local, HMGP*	48	Medium
2	Drought and Expansive Soils Contingency Plan	Create & implement a Drought Contingency Plan to address the different degrees of drought and water shortage with extreme heat as well as address measures to minimize expansive soils around foundations and infrastructure as groundwater is depleted from drought and extreme heat conditions.	Earthquakes		G1	N	City Administration	$10,000	*Local Funds*	24	High
3	Conduct education to homeowners on all hazards	Conduct outreach to the public to educate citizens on the full range of hazards they face and how to protect themselves, mitigate their homes and businesses from damage in disaster situations.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3, G4	N	City Administration	$10,000	*Local Funds*	24	High
4	Undertake a review of the city's floodplain management ordinance	Review current plan and update as required.	Hurricane, Flood, Dam Failure		G2	N	City Administration	$10,000	*Local Funds*	12	Medium
5	Become aStormReady community certified by the NWS	Work to complete guidelines 1 to 6 to become a certified StormReady community.	Hurricane, Flood, Dam Failure		G1, G3	N	City Administration	$10,000	*Local Funds*	36	Medium
6	Comprehensive Land Use Plan	Work in conjunction with Colorado County to develop a comprehensive land use plan.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3	N	City Administration	$50,000	*Local, CDBG, Other Grants*	48	Medium
7	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 communitiy needs.	Drought, Extreme Heat, Wildfire		G1, G2, G3, G4	Y	Emergency Management, Fire Department	$15,00	*Local, HMGP, Texas A&M Forest Service, ISD*	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 Columbus											
8	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	$150,000	*Local, PDM, HMGP, Texas Forest Service, US Department of Forestry*	24	High
9	Adopt codes to control location of development, especially in high flood hazard areas.	Study heightened regulatory requirements with regard to development in hazard areas, floodplain management, and RV developments.	Hurricane, Flood, Wildfire, Dam Failure		G1, G3	N	Planning Department	$45,000	Local Budget	24	High
10	Develop and implement low impact Development Standards for its stormwater management best management practices (BMP's).	Low impact Development Standards utilize existing natural systems, alternative pavement materials, design, and locally appropriate solutions, which are better fits than conventional practices. These natural systems could aid in improving the water quality of the watershed.	Hurricane, Flood, Wildfire, Dam Failure		G1, G2, G3, G4, G5	Y	Planning Department	$50,000	Local, PDM, HMGP	12	Medium
11	Develop Emeregency Preparedness page on city website	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	$10,000	Local, PDM, HMGP	24	Low
12	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	Y	Utility Department	$50,000	Local, PDM, HMGP	36	High

Legend:

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

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 Eagle Lake											
1	Purchase NOAA All Hazard Radios	Purchase NOAA All Hazard Radios for residents to be aware of impending hazard events.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3	N	City Administration	$10,000	*Local budget, HMGP*	48	Medium
2	Generator for community center to function as shelter, warming or cooling station	In the event of a major storm (summer or winter) the community center serves as a public shelter, or warming/cooling station in the event of extreme temperatures.	Hurricane, Flood, Windstorm, Lightning, Tornado, Severe Winter Storms, Earthquake, Dam Failure		G1, G3	Y	Public Works	$350,000	*Local Budget, TDEM*	36	Medium
3	Drainage Systems	Work together with county and TXDOT to address road and ditch drainage.	Hurricane, Flood, Dam Failure		G1, G2	N	Public Works	$100,000	*Local Budget*	36	Medium
4	Generators for lift stations	Lift station generator will be installed to provide continuous operation of wastewater drainage system when a storm causes a power outtage.	Hurricane, Flood, Windstorm, Lightning, Tornado, Severe Winter Storms, Earthquake, Dam Failure		G1, G3	Y	Water Department	$200,000	*Local Budget, TDEM, FEMA*	24	High
5	Public Education Campaign	Provide information to homeowners and commercial property owners about hardening their property to mitigate potential storm damages. The city's website, facebook, and utility bill insert will be used.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3, G4, G6	N	City Administration	$5,000	*Local Budget, TDEM, HMGP*	36	Medium
6	Retrofit the City Davitt Street Water Plant electrical system to interface to a backup generator	City would obtain generator and test regularly. Generator would be used in case of inclement weather to supply water to city residents.	Hurricane, Flood, Windstorm, Lightning, Tornado, Severe Winter Storms, Earthquake, Dam Failure		G1	N	Water Department	$50,000	*Utility fund, Grants*	24	Medium
7	Develop a plan for implementing a GIS program and internal training.	GIS capability is necessary to provide location information for mitigation planning.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G3, G4, G5	Y	City Administration	$85,000	*Local Budget, CDBG*	36	High
8	Tree Trimming Program	Coordinate with the local power company to address tree limbs near power lines to prevent burning or power outages from high winds. Coordinate with state and county agencies for assistance with additional equipment needed.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1	N	Public Works	$50,000	*Local Budget*	36	Medium

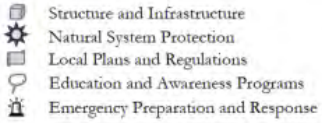
Legend:

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

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 Weimar											
1	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	$15,00	*Local, HMGP, Texas A&M Forest Service, ISD*	12	Medium
2	Water Conservation Education 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	City Manager	$50,000	*Annual budget, HMGP, PDM, HMA Grants*	12	Low
3	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	$150,000	*Local, PDM, HMGP, Texas Forest Service, US Department of Forestry*	36	High
4	Develop Annexation Plan and Update Zoning Ordinance	Hazard mitigation principles will guide the development of the annexation plan and the zoning ordinance that will be updated to foster the growth of the industrial zone of the city.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G2, G5	Y	City Manager	$50,000	*Annual budget, HMGP, PDM, HMA Grants*	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 Weimar											
5	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	Public Works	$100,000	*Annual budget, HMGP, PDM, HMA Grants*	48	High
6	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	City Manager	$100,000	*Annual budget, HMGP, PDM, HMA Grants*	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
Colorado WCID #2											
1	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	General Manager	$100,000	*Annual budget, HMGP, PDM, HMA Grants*	36	Medium
2	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
3	Water Conservation Education 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
- Emergency Preparation and Response

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Columbus ISD											
1	Develop a hazard awarenes week for implementation countywide in cooperation with the county.	This awareness campaign is linked to the National Weather Service education program, including a library section on preparedness and information on County's website with links to preparedness programs. Publish, distribute and disseminate hazard information brochures.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3, G4, G5, G6	Y	Supterintendent	$10,000	*Annual budget, HMGP, PDM, HMA Grants*	24	Moderate
2	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, G4	Y	Facilities Department	>$100,000	Local, PDM, HMGP, CDBG	36	Medium
3	Study existing shelter needs and modify and upgrade as necessary	The County currently uses Columbus ISD facilities as a shelter. The ability of this location to function as short or long term shelters will be determined with the appropriate upgrades made.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G2, G5	Y	ISD Board	$50,000	*Annual budget, HMGP, PDM, HMA Grants*	48	Low

Legend:

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

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Rice Consolidated ISD											
1	Develop a hazard awarenes week for implementation countywide in cooperation with the county.	This awareness campaign is linked to the National Weather Service education program, including a library section on preparedness and information on County's website with links to preparedness programs. Publish, distribute and disseminate hazard information brochures.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3, G4, G5, G6	Y	Supterintendent	$10,000	*Annual budget, HMGP, PDM, HMA Grants*	24	Moderate
2	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, G4	Y	Facilities Department	>$100,000	Local, PDM, HMGP, CDBG	36	Medium
3	Harden facilities and assets	Harden facilities and assets against the full range of natural hazards	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G2, G4	Y	Superintendent	$100,000	*Annual budget, HMGP, PDM, HMA Grants*	36	Moderate
4	Study existing shelter needs and modify and upgrade as necessary	The County currently uses Rice Consolidated ISD facilities as a shelter. The ability of this location to function as short or long term shelters will be determined with the appropriate upgrades made.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G2, G5	Y	ISD Board	$50,000	*Annual budget, HMGP, PDM, HMA Grants*	48	Low
5	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
- Emergency Preparation and Response

Ranking	Mitigation Action Title	Description	Hazards Mitigated	Action Type	Applicable Goals	New Action	Responsible Department	Estimated Cost	Potential Funding Sources	Timeline (Months)	Benefit
Weimar ISD											
1	Develop a hazard awarenes week for implementation countywide in cooperation with the county.	This awareness campaign is linked to the National Weather Service education program, including a library section on preparedness and information on County's website with links to preparedness programs. Publish, distribute and disseminate hazard information brochures.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G3, G4, G5, G6	Y	Superintendent	$10,000	*Annual budget, HMGP, PDM, HMA Grants*	24	Moderate
2	Acquire and install generators at all critical facilities	Aqure 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, G4	Y	Facilities Department	>$100,000	Local, PDM, HMGP, CDBG	36	Medium
3	Harden facilities and assets	Harden facilities and assets against the full range of natural hazards	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G2, G4	Y	Superintendent	$100,000	*Annual budget, HMGP, PDM, HMA Grants*	36	Moderate
4	Study existing shelter needs and modify and upgrade as necessary	The County currently uses Eagle Lake ISD facilities as a shelter. The ability of this location to function as short or long term shelters will be determined with the appropriate upgrades made.	Hurricane, Flood, Drought, Windstorms, Extreme Heat, Lightning, Tornado, Hailstorms, Wildfire, Severe Winter Storms, Earthquakes, Dam Failure		G1, G2, G5	Y	ISD Board	$50,000	*Annual budget, HMGP, PDM, HMA Grants*	48	Low
5	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	*ISD, State and Local Grants*	12	High

Legend:

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

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 Colorado 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
Colorado County	Emergency Management Coordinator
City of Columbus	City Manager
City of Eagle Lake	City Manager
City of Weimar	City Manager
Columbus ISD	Superintendent
Rice Consolidated ISD	Superintendent
Weimar ISD	Superintendent
Colorado WCID #2	General Manager

Incorporation

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

The prior hazard mitigation plan was incorporated into current planning mechanisms such as the building code updates, capital improvement plans, the County emergency operations plan, and a review of floodplain ordinances.

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:

- Colorado 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, Water District 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	Colorado 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 Colorado 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 Colorado 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.

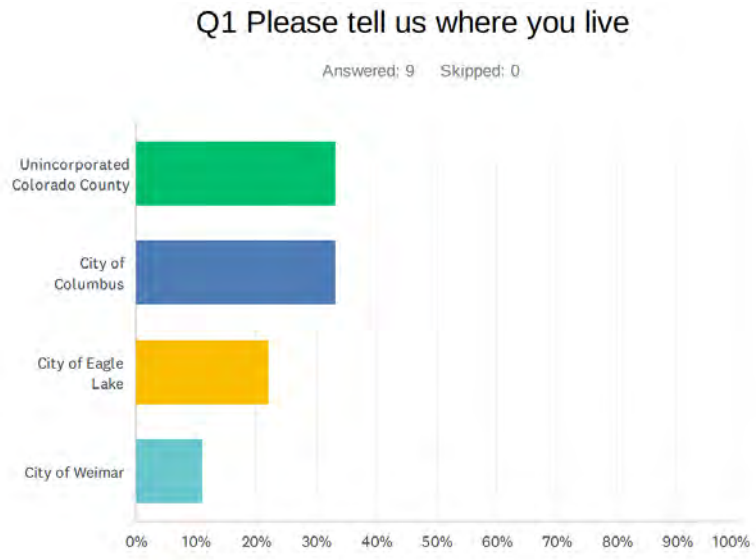
Public participation is critical to creating a plan that is enduring and one that has meaning to the community. The direct involvement of local officials and the public has been and will continue to be sought during the development, implementation, and maintenance phases of this Colorado County Hazard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

APPENDIX A: CAPABILITY ASSESSMENT

	Capabilities	Colorado County	City of Colombus	City of Eagle Lake	City of Weimar	Colorado WCID 2	Colombus ISD	Rice Consolidated ISD	Weimar ISD	
Planning and Regulatory	Comprehensive Plan		X	X	X					The planning and regulatory mechanisms that guide growth and development and emergency plans
	Economic Development Plan		X		X					
	Transportation Plans									
	Emergency Operation Plans	X	X	X	X					
	Continuity of Operations Plan			X						
	Stormwater Management Plan		X	X						
	Zoning ordinances		X	X	X					
	Building Codes		X	X	X					
	Subdivision Ordinance	X	X	X						
	Floodplain Ordinance	X	X	X	X					
Administrative and Technical	Engineers	X	X	X	X					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
	Planners	X	X		X					
	GIS Analysts		X							
	Building inspectors			X	X					
	Emergency managers	X	X	X						
	Grant writers		X	X						
	Chief Building Official		X	X	X					
	Floodplain Administrator	X	X	X	X					
Financial	CDBG	X	X	X	X					The resources that a jurisdiction has access to or is eligible to use to fund mitigation efforts
	Capital Improvement Program	X	X	X	X	X				
	Stormwater utility fees									
	Development impact fees	X	X							
Education and Outreach	School programs						X	X	X	The programs and methods already in place that could be used to implement mitigation activities
	Firewise communities									
	Storm Ready communities									
	Hazard awareness campaigns									
	Public Information Officer				X					
	Community newsletter									

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 City of Weimar with the Cities of Columbus and Eagle Lake currently working to secure comprehensive planning funding. 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.

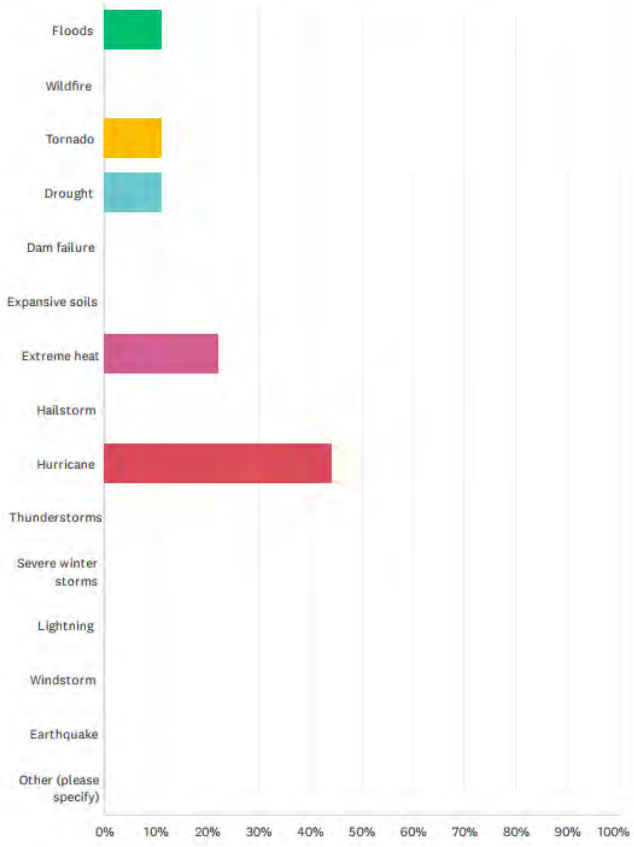
APPENDIX B: PUBLIC SURVEY



ANSWER CHOICES	RESPONSES	
Unincorporated Colorado County	33.33%	3
City of Columbus	33.33%	3
City of Eagle Lake	22.22%	2
City of Weimar	11.11%	1
TOTAL		9

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

Answered: 9 Skipped: 0



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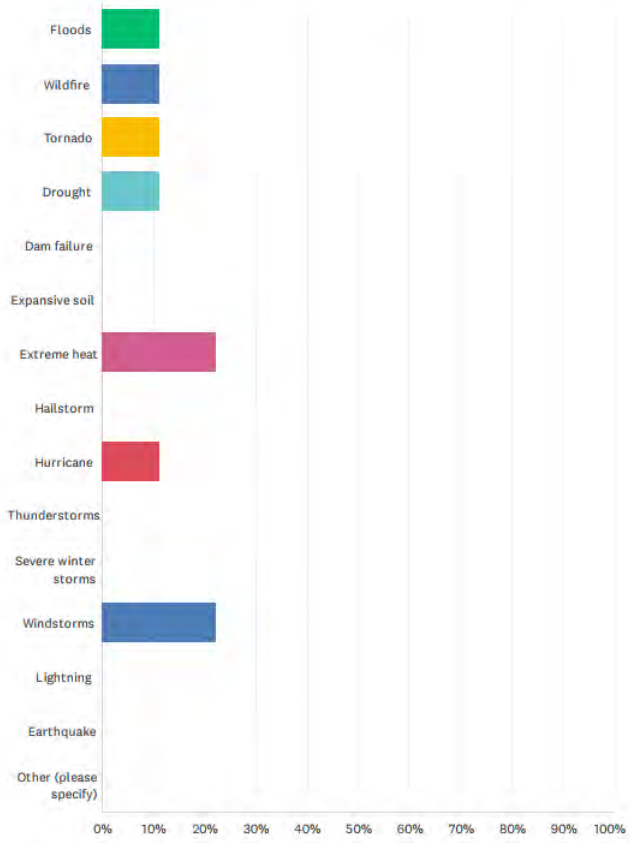
Colorado County Hazard Mitigation Plan Update

ANSWER CHOICES	RESPONSES	
Floods	11.11%	1
Wildfire	0.00%	0
Tornado	11.11%	1
Drought	11.11%	1
Dam failure	0.00%	0
Expansive soils	0.00%	0
Extreme heat	22.22%	2
Hailstorm	0.00%	0
Hurricane	44.44%	4
Thunderstorms	0.00%	0
Severe winter storms	0.00%	0
Lightning	0.00%	0
Windstorm	0.00%	0
Earthquake	0.00%	0
Other (please specify)	0.00%	0
TOTAL		9

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

Answered: 9 Skipped: 0

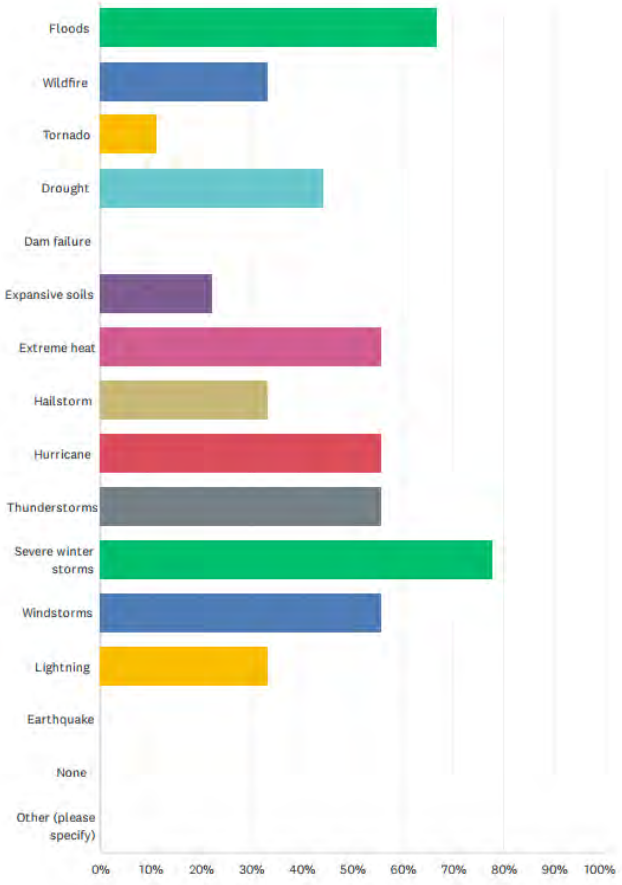


Colorado County Hazard Mitigation Plan Update

ANSWER CHOICES	RESPONSES	
Floods	11.11%	1
Wildfire	11.11%	1
Tornado	11.11%	1
Drought	11.11%	1
Dam failure	0.00%	0
Expansive soil	0.00%	0
Extreme heat	22.22%	2
Hailstorm	0.00%	0
Hurricane	11.11%	1
Thunderstorms	0.00%	0
Severe winter storms	0.00%	0
Windstorms	22.22%	2
Lightning	0.00%	0
Earthquake	0.00%	0
Other (please specify)	0.00%	0
TOTAL		9

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

Answered: 9 Skipped: 0



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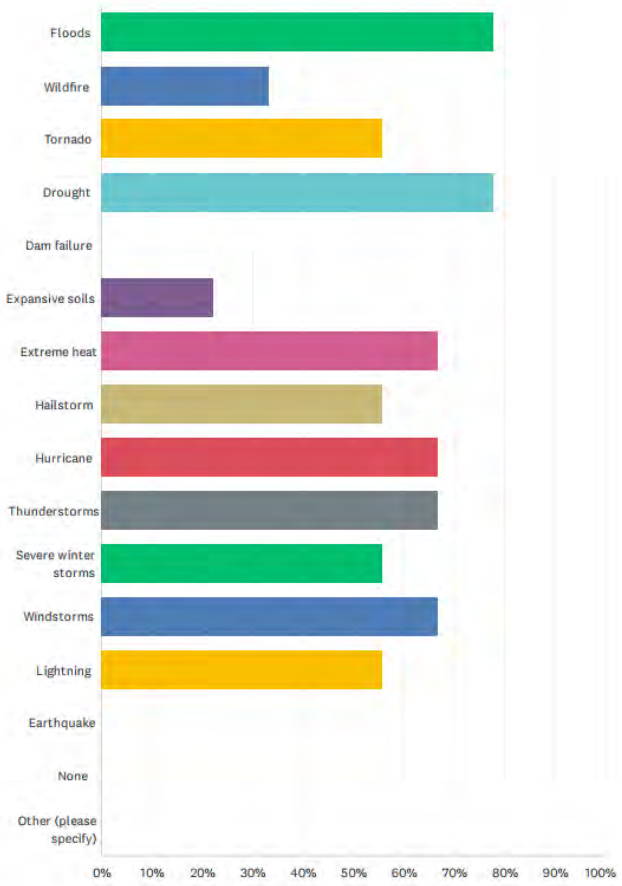
Colorado County Hazard Mitigation Plan Update

ANSWER CHOICES	RESPONSES	
Floods	66.67%	6
Wildfire	33.33%	3
Tornado	11.11%	1
Drought	44.44%	4
Dam failure	0.00%	0
Expansive soils	22.22%	2
Extreme heat	55.56%	5
Hailstorm	33.33%	3
Hurricane	55.56%	5
Thunderstorms	55.56%	5
Severe winter storms	77.78%	7
Windstorms	55.56%	5
Lightning	33.33%	3
Earthquake	0.00%	0
None	0.00%	0
Other (please specify)	0.00%	0
Total Respondents: 9		

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

Answered: 9 Skipped: 0



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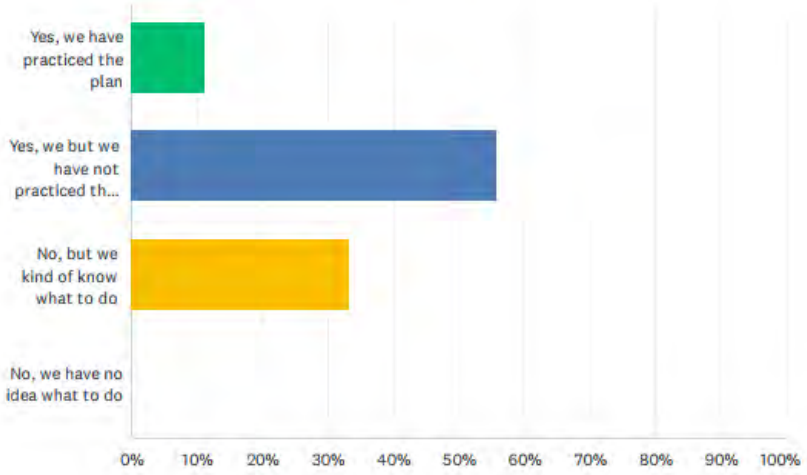
Colorado County Hazard Mitigation Plan Update

ANSWER CHOICES	RESPONSES	
Floods	77.78%	7
Wildfire	33.33%	3
Tornado	55.56%	5
Drought	77.78%	7
Dam failure	0.00%	0
Expansive soils	22.22%	2
Extreme heat	66.67%	6
Hailstorm	55.56%	5
Hurricane	66.67%	6
Thunderstorms	66.67%	6
Severe winter storms	55.56%	5
Windstorms	66.67%	6
Lightning	55.56%	5
Earthquake	0.00%	0
None	0.00%	0
Other (please specify)	0.00%	0
Total Respondents: 9		

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

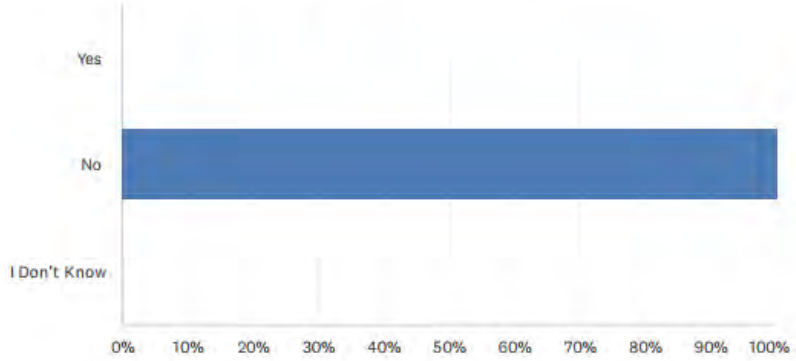
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes, we have practiced the plan	11.11%	1
Yes, we but we have not practiced the plan	55.56%	5
No, but we kind of know what to do	33.33%	3
No, we have no idea what to do	0.00%	0
TOTAL		9

Q7 Is your home located in a floodplain?

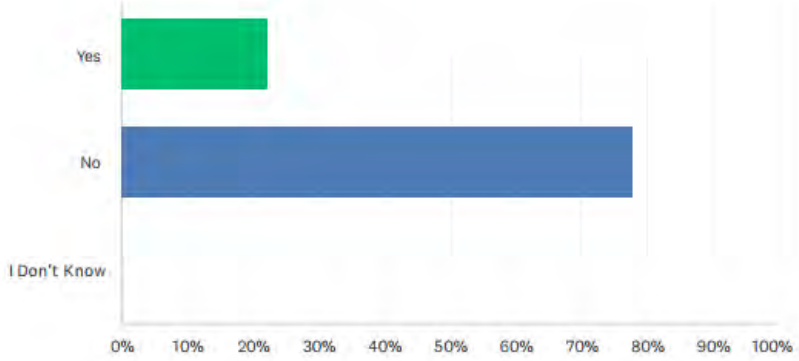
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	0.00%	0
No	100.00%	9
I Don't Know	0.00%	0
TOTAL		9

Q8 Do you have flood insurance?

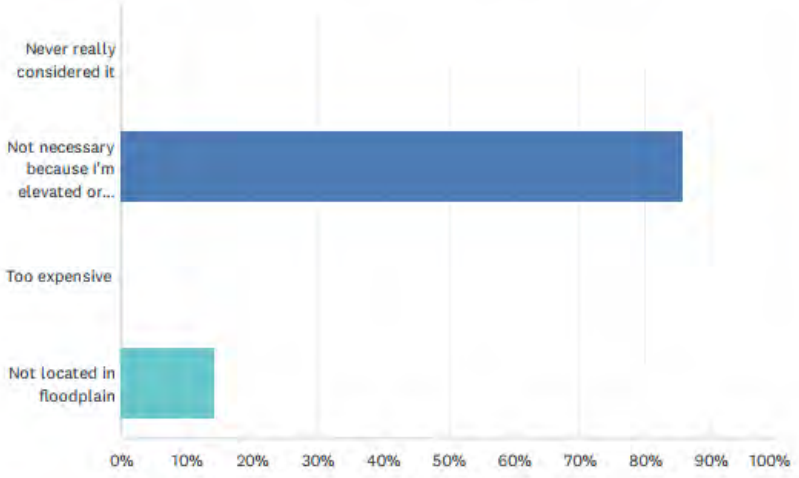
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	22.22%	2
No	77.78%	7
I Don't Know	0.00%	0
TOTAL		9

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

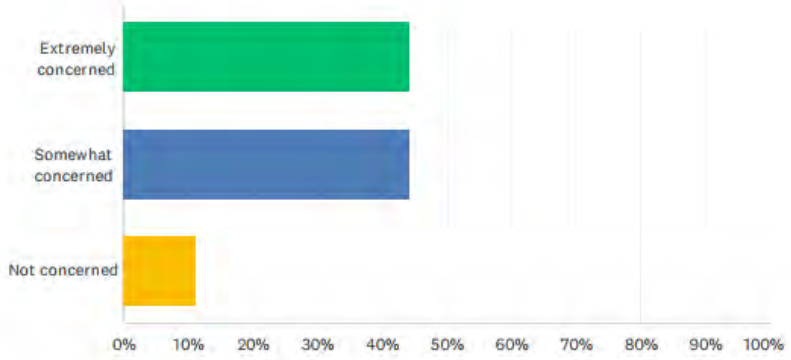
Answered: 7 Skipped: 2



ANSWER CHOICES	RESPONSES	
Never really considered it	0.00%	0
Not necessary because I'm elevated or otherwise protected	85.71%	6
Too expensive	0.00%	0
Not located in floodplain	14.29%	1
TOTAL		7

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

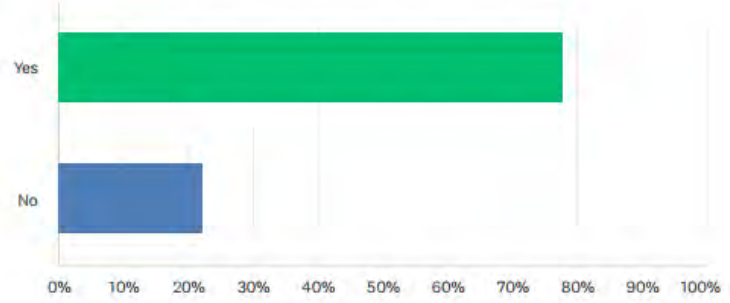
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Extremely concerned	44.44%	4
Somewhat concerned	44.44%	4
Not concerned	11.11%	1
TOTAL		9

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

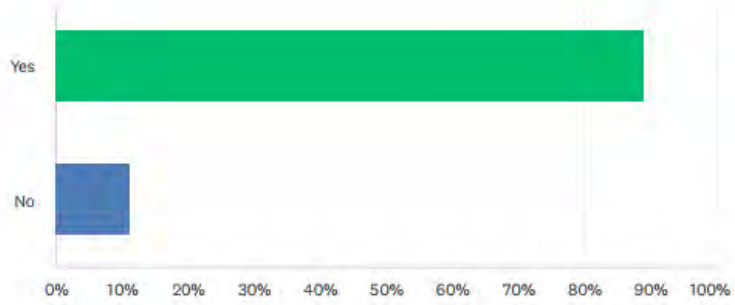
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	77.78%	7
No	22.22%	2
TOTAL		9

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

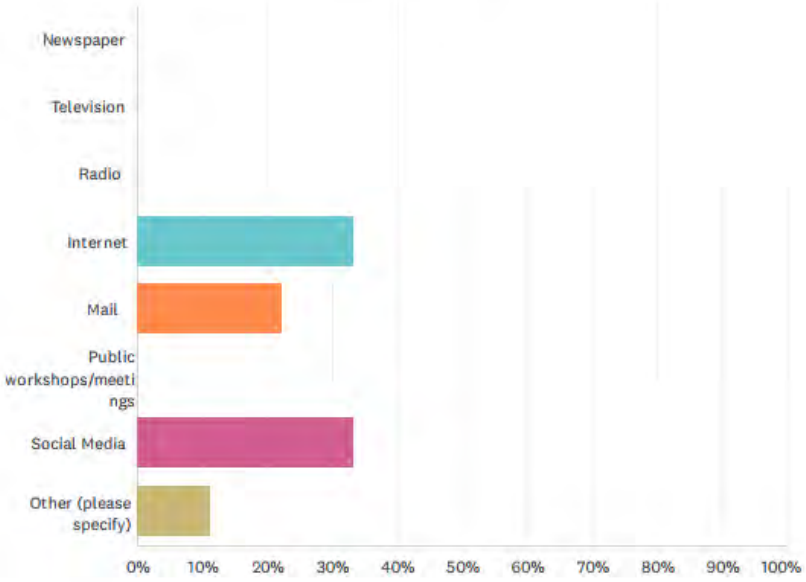
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	88.89%	8
No	11.11%	1
TOTAL		9

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

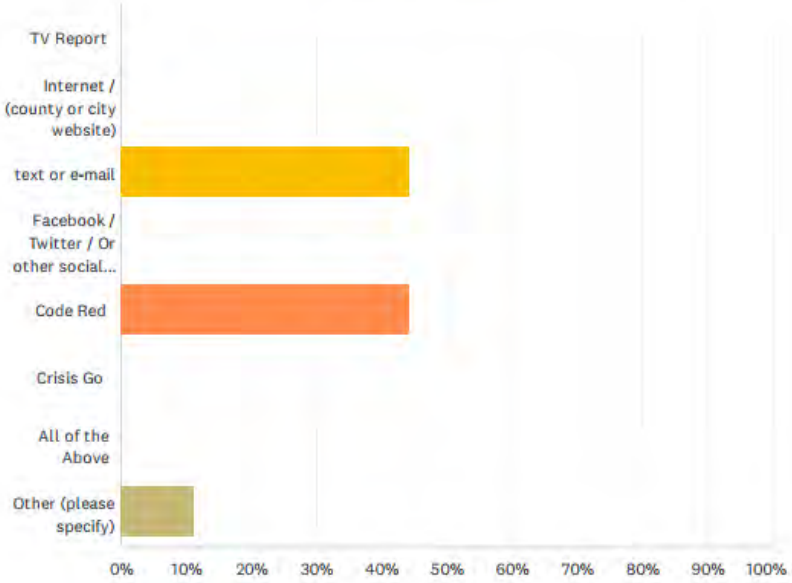
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Newspaper	0.00%	0
Television	0.00%	0
Radio	0.00%	0
Internet	33.33%	3
Mail	22.22%	2
Public workshops/meetings	0.00%	0
Social Media	33.33%	3
Other (please specify)	11.11%	1
TOTAL		9

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

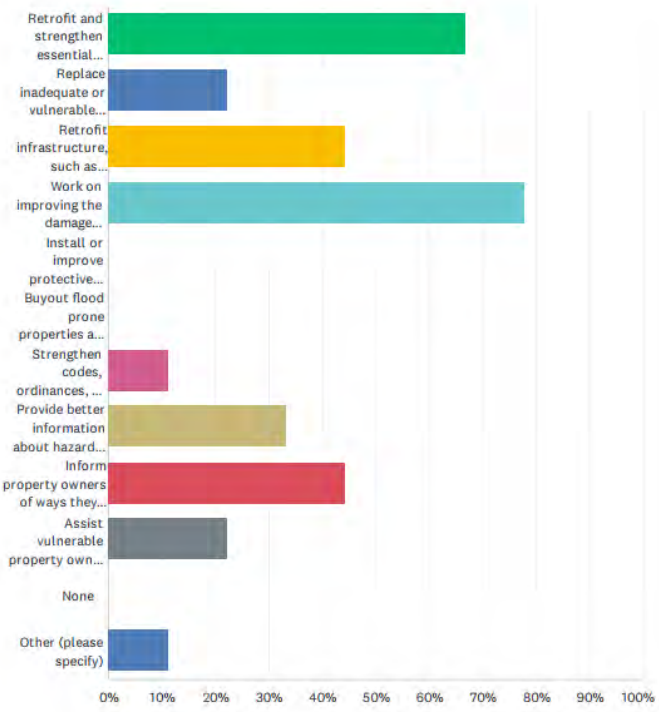
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
TV Report	0.00%	0
Internet / (county or city website)	0.00%	0
text or e-mail	44.44%	4
Facebook / Twitter / Or other social media	0.00%	0
Code Red	44.44%	4
Crisis Go	0.00%	0
All of the Above	0.00%	0
Other (please specify)	11.11%	1
TOTAL		9

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

Answered: 9 Skipped: 0



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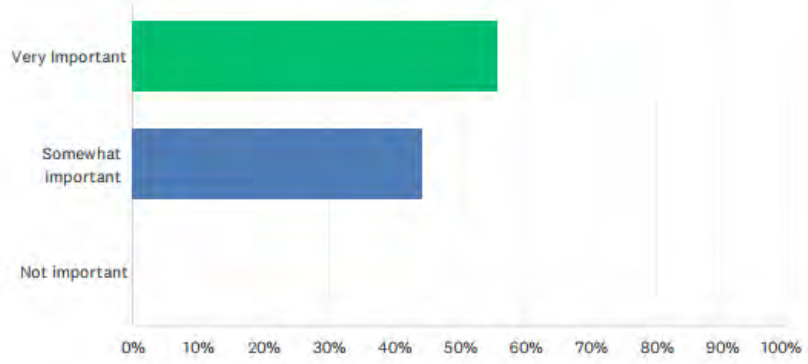
Colorado County Hazard Mitigation Plan Update

ANSWER CHOICES	RESPONSES	
Retrofit and strengthen essential facilities such as police, fire, emergency medical services, hospitals, schools, etc.	66.67%	6
Replace inadequate or vulnerable bridges and roads.	22.22%	2
Retrofit infrastructure, such as elevating roadways and improving drainage systems.	44.44%	4
Work on improving the damage resistance of utilities (electricity, communications, water / wastewater facilities, etc.).	77.78%	7
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.	0.00%	0
Strengthen codes, ordinances, and plans to require higher hazard risk management standards.	11.11%	1
Provide better information about hazard risk and high-hazard areas.	33.33%	3
Inform property owners of ways they can mitigate damage to their properties.	44.44%	4
Assist vulnerable property owners with securing funding to mitigate impacts to their property(s).	22.22%	2
None	0.00%	0
Other (please specify)	11.11%	1
Total Respondents: 9		

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

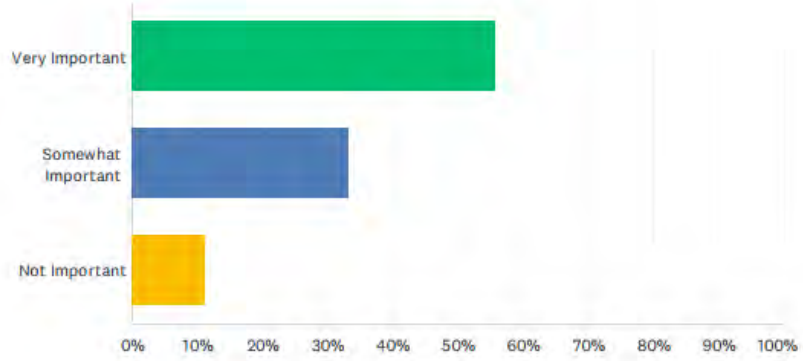
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Very Important	55.56%	5
Somewhat important	44.44%	4
Not important	0.00%	0
TOTAL		9

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

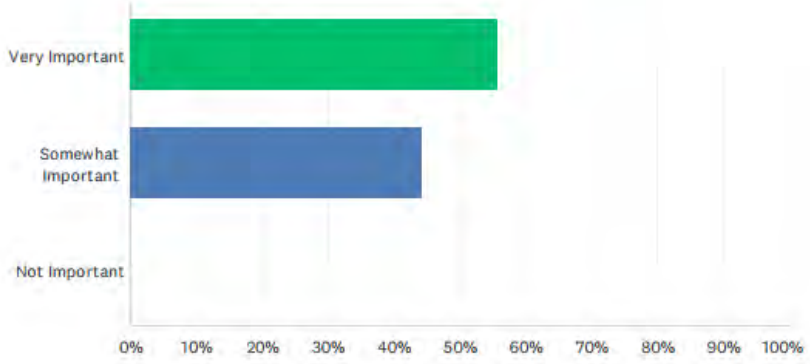
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Very Important	55.56%	5
Somewhat Important	33.33%	3
Not Important	11.11%	1
TOTAL		9

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

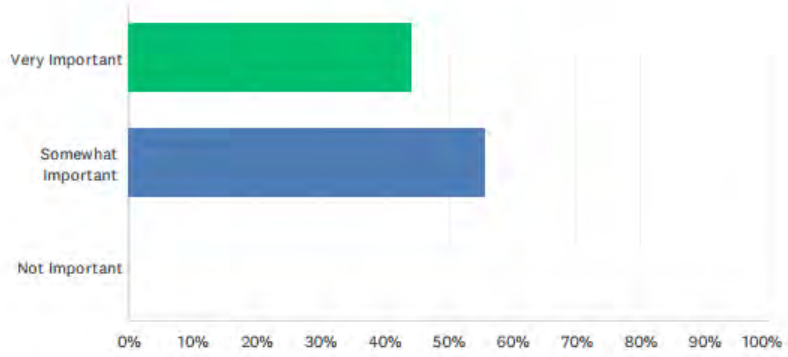
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Very Important	55.56%	5
Somewhat Important	44.44%	4
Not Important	0.00%	0
TOTAL		9

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

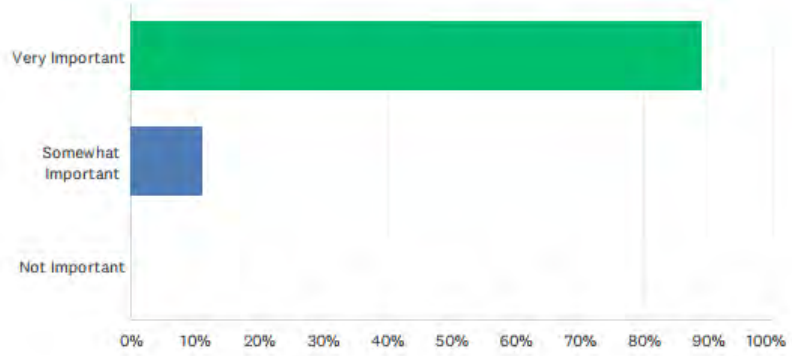
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Very Important	44.44%	4
Somewhat Important	55.56%	5
Not Important	0.00%	0
TOTAL		9

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

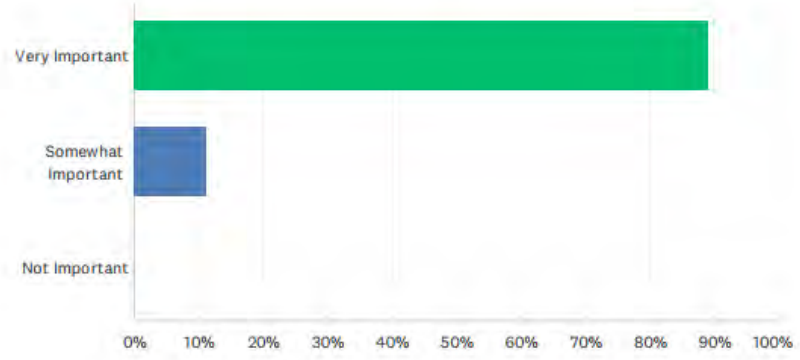
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Very Important	88.89%	8
Somewhat Important	11.11%	1
Not Important	0.00%	0
TOTAL		9

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

Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Very Important	88.89%	8
Somewhat Important	11.11%	1
Not Important	0.00%	0
TOTAL		9

APPENDIX C: PRIORITY RANKING FORMS

Colorado County

STAPLEE Ranking - Colorado County

The project was evaluated based on STAPLEE criteria on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration.

(1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

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

	ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	Notes	TOTAL SCORE	TIMEFRAME
*	1	Procure, license and install a county-wide AM Radio information radio system	4	4	5	5	5	4	4		31	S
	2	Sandy Oaks Event Flood Study	4	5	3	5	5	5	5		32	N
	3	Conduct a public education campaign on all hazards	5	5	4	4	5	3	5		31	N
	4	Propane Tank Flood Zone Regulation	4	5	5	4	5	5	5		33	I
*	5	Study existing shelter needs and secure funding and construct.	5	5	5	5	5	5	5		35	I
	6	Maintain a program for clearing debris	4	4	4	4	4	4	4		32	I
*	7	Update regulations to control location of and standards for development, especially in high flood hazard areas.	4	5	5	4	5	5	5		33	I
	8	Installation of emergency power generators at critical infrastructure/key resource locations	5	4	5	5	5	4	5		32	I
*	9	Obtain Storm-Ready designation for the county.	4	4	4	4	5	4	5		30	N
	10	Update National Flood Hazard area	4	5	3	4	5	5	5		31	N
	11	Prioritize and upgrade most low water crossings	4	4	5	4	5	5	5		32	L
	12	Colorado River Study	4	5	3	5	5	5	5		32	I
	13	Develop Critical Wildfire Protection Plan	4	5	3	5	3	4	5		29	S
*	14	Skull Creek Study	4	5	3	5	5	5	5		32	S

City of Columbus

City of Eagle Lake

STAPLEE Ranking - Jurisdiction: City of Eagle Lake

The project was evaluated based on STAPLEE criteria on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration.

(1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

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

ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	Notes	TOTAL SCORE	TIMEFRAME
1	Drainage Systems	5	4	2	4	5	2	4	# needed for ↑ projects		L
2	Tree Trimming Program	3	4	1	3	3	1	3	Not a public task		L
3	Retrofit the City Davitt Street Water Plant electrical system to interface to a backup generator	4	4	1	4	5	2	4	# Needed		L
4	Public Education Campaign	4	4	3	3	5	1	5	Always good		S
5	Purchase NOAA All Hazard Radios	5	5	2	4	5	2	5	immediate + impact		S
6	Generators for lift stations	5	4	2	4	5	2	4	$ Needed		I
7	Generator for community center to function as shelter, warming or cooling station	5	5	3	4	5	2	4	Working on grant		S
8	Develop a plan for implementing a GIS program and internal training.	3	3	3	3	5	1	4	Needed		S

City of Weimar

STAPLEE Ranking – Jurisdiction: City of Weimar

The project was evaluated based on STAPLEE criteria on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration.

(1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

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

ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	Notes	TOTAL SCORE	TIMEFRAME
1	Harden facilities against hazards	5	5	3	2	5	1	4		25	L
2	Acquire and install generators at all critical facilities	5	5	4	5	5	3	4		31	S
3	Water Conservation Education Program	5	5	4	5	5	4	5		33	I
4	Wildfire Prevention Education	5	5	4	5	5	5	5		34	I
5	Develop Critical Wildfire Protection Plan	3	5	4	3	5	3	5		28	N
6	Develop Annexation Plan and Update Zoning Ordinance	3	5	3	3	5	4	5		28	N

Columbus ISD

STAPLEE Ranking - Columbus ISD

The project was evaluated based on STAPLEE criteria on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration.

(1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

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

ID	Mitigation Action	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	Notes	TOTAL SCORE	TIMEFRAME
1	Develop a hazard awarenes week for implementation countywide in cooperation with the county.	5	5	5	5	5	5	5	THE DISTRICT WILL NEED FUNDING TO BUY CURRICULUM.	35	
2	Acquire and install generators at all critical facilities	5	5	1	5	5	1	5	FUNDING WILL BE NEEDED TO BUY GENERATORS.	27	
3	~~Harden facilities and assets~~										
4	Study existing shelter needs and modify and upgrade as necessary	5	5	1	5	5	1	4	FUNDING WILL BE NEEDED TO MAKE UPGRADES.	26	
5	Create, Fund and Staff a ~~School Resource Officer~~ Position										

Rice Consolidate ISD

Weimar ISD

Colorado Water Control and Improvement 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 Colorado 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.

Critical Facilities Summary Table

Colorado County
1 County Courthouse, 4 Constable's Office, 1 Shelter, 4 Maintenance Facilities, 1 EMS, 1 County Jail, 1 County Sheriff's Office, 1 Power Generation Facility, 1 Hazardous Materials Facility, 6 Volunteer Fire Departments
City of Columbus
1 Airport, 2 Assisted Living Facilities, 1 School, 2 Shelters, 1 Communication Tower, Electric Substation, 1 City Hall, 1 Volunteer Fire Department, 1 Police Department
City of Eagle Lake
1 Airport, 1 Animal Center, 1 Shelter, 1 Public Works Barn, 1 Municipal Building, 1 Medical Center, 1 Volunteer Fire Department, 1 Police Department
City of Weimar
1 Assisted Living, 1 City Hall, 2 Shelters, 1 Medical Center, 1 Volunteer Fire Department, 1 Police Department
Columbus ISD
3 Schools, 1 Bus Barn, 1 Administration Building
Rice Consolidated ISD
6 Schools, 1 Administration Building
Weimar ISD
3 Schools, 1 Administration Building
Colorado Water Control and Improvement District
1 Office, 1 Water Tower, 1 Lift Station, 2 Water Wells, Transmission Facilities, 1 Water Treatment Plant

Critical Facilities Map Table

Map ID	Name	Address	City
0	Garwood Volunteer Fire Department	311 Arthur Street	Garwood
1	Rock Island Volunteer Fire Department	3400 County Road 106 South	Rock Island
2	Eagle Lake Volunteer Fire Department	204 East Post Office Street	Eagle Lake
3	Weimar Volunteer Fire Department	210 East Main Street	Weimar
4	Oakland Volunteer Fire Department	1022 Washington Street	Oakland
5	Sheridan Volunteer Fire Department	5925 South Logan Park Drive	Sheridan
6	Frelsburg Volunteer Fire Department	2319 Farm To Market Road 1291	New Ulm
7	Bernardo Volunteer Fire Department	2845 Farm To Market Road 949	Cat Spring
8	Colorado County Emergency Medical Services	305 Radio Lane	Columbus
9	Columbus Elementary School	1324 Bowie Street	Columbus
10	Garwood Elementary School	7827 Highway 71 South	Garwood
11	Eagle Lake Primary School	600 Johnnie D Hutchins Drive	Eagle Lake
12	Weimar Elementary School	515 West Main Street	Weimar
13	Weimar Junior High School	101 North West Street	Weimar
14	Weimar High School - Shelter 600	506 West Main Street	Weimar
15	Eagle Lake Intermediate School	701 Tate Avenue	Eagle Lake
16	Rice Consolidated High School	1095 Raider Drive	Altair
17	Sheridan Elementary School	5526 Farm to Market Road 2437	Sheridan
18	Saint Michael Catholic School	103 East North Street	Weimar
19	Saint Anthony Catholic School	635 Bonham Street	Columbus
20	Rice Medical Center	600 South Austin Road	Eagle Lake
21	Weimar Medical Center	400 Youens Drive	Weimar
22	Weimar Police Department	1754 Interstate Highway 10	Weimar
23	Eagle Lake Police Department	200 East Post Office Street	Eagle Lake
24	Colorado County Constable's Office Precinct 4	206 West State Street	Eagle Lake
25	Colorado County Constable's Office Precinct 3	1053 Constable Lane	Cat Spring
26	Colorado County Constable's Office Precinct 2	105 East Main Street	Weimer
27	Colorado County Constable's Office Precinct 1	1051 Schulenburg Lane	Columbus
28	Eagle Lake Municipal Building	100 East Main Street	Eagle Lake
29	Columbus City Hall	605 Spring Street	Columbus
30	Weimar City Hall	106 East Main Street	Weimar
31	Colorado County Jail	2215 Walnut Street	Columbus
32	Columbus High School - Shelter 500	103 Cardinal Lane	Columbus
33	Columbus Community Hospital	110 Shult Drive	Columbus
34	Colorado County Sheriff's Office	2215 Walnut Street	Columbus
35	Columbus Volunteer Fire Department	602 Spring Street	Columbus
36	Columbus Police Department	605 Spring Street	Columbus
37	Columbus Junior High School - Riverside Cam	702 North Rampart Street	Columbus
38	Colorado County Courthouse	400 Spring Street	Columbus
39	Rice Challenge Academy	600 FM 3013 W	Eagle Lake
40	Veteran's Memorial Hall - Shelter 5	503 Park Drive	Weimar
41	First United Methodist Church - 105	1229 Milam St	Columbus
42	First Baptist Church of Columbus - Shelter 200	1700 Milam St	Columbus
43	St. Roch's Catholic Church - Shelter 50	1600 Frelsburg	Alleyton
44	Precint 1 Maintenance Faciliity	3334 CR 106	Rock Island
45	Precint 2 Maintenance Facility	404 S. Eagle	Weimar
46	Precint 3 Maintenance Facility	1501 FM 109	New Ulm
47	Precint 4 Maintenance Facility	310 S. McCarty	New Ulm
48	Sky Global Power Generation Facility	3217 US 90 Alternate	Rock Island
49	Glidden Communication Tower	1011 Rabbit Road	Columbus
50	Trucare living centers		Columbus
51	Electric Substation		Columbus
52	Water tower, water wells		Columbus
53	Colombus ISD Transportation Barn	1600 Montezuma	Columbus
54	Kinder Morgan Production Plant	1650 CR 255	Sheridan
55	City of Eagle Lake Public Works Barn	207 W. Davitt	Eagle Lake
56	Eagle Lake Airport	East Airline Avenue	Eagle Lake
57	City of Eagle Lake Community Center	100 N Walnut Avenue	Eagle Lake
58	Pine Cove Retreat Center/ Camp	1159 Armadillo Lane	Columbus
59	Cathedral Oak Retreat Center	1225 CR 248	Weimar
60	Attwater Prairie Chicken Refuge	1206 Apc Nwr Road	Eagle Lake
61	City of Eagle Lake Water Tower	805 North McCarty	Eagle Lake
62	Robert Wells, Jr. Airport	1084 CR 102	Columbus
63	WWCID 2 Office and Water Tower	604 Townsend Street	Garwood
64	WWCID 2 Sewer Treatment Plant	600 Townsend Street	Garwood
65	WWCID 2 Water Well	7827 HWY 71	Garwood
66	WWCID 2 Lift Station and Water Well	1090 Lions Park Drive	Garwood

APPENDIX E: MEETING DOCUMENTATION

Thank you for Coming

Please Sign In

COLORADO CO. - CORE MTG. #1,
APRIL 5, 2023/2:00 PM
COLORADO CO. SERVICES FACILITY

Name	Representing	Email	Phone
DAVID BRANDT	WEIMAR VFD	CHIEFWEIMARVFD@GMAIL.com	979-732-4875
Todd Jacobs	Weimar P.D.	tjacobs@weimartexas.org	979-725-8060
Caleb Tello	Colorado County	caleb.tello@cocolorado.tx.us	979-732-6380
Mike Barron	City Weimar	citymgr@weimartexas.org	979 942 7507
MILTON KOLLER	MAYOR CITY OF WEIMAR	mayor@weimartexas.org	979 966-4017
Lori Ann Gobert	City Columbus	mayor.columbus@yahoo	979-733-4813
Richard Lacourse	City of Columbus / FD	lacourser@columbustexas.net	979-733-6139
Dusty Dittmar	Columbus FD	ddittmar1401@gmail.com	979-732-7770
Kevin Kaichtinger	City of Columbus Utilities	Kevin@columbustexas.net	979-9[illegible]-0606
Brent Gorman	Columbus Fire Marshal's Office	firemarshal@columbustexas.net	979 732-4290
Scott Leopold	Columbus ISD	scott.leopold@cisdschools.org	979-732-5704
Ryan Brandt	CC Precinct 2	ryan.brandt@cocolorado.tx.us	979-743-9588
Michael Poncik	City of Columbus	poncikm@columbustexas.net	979-732-7241
John Post	Rice CISD	jp[illegible]13@riceraiders.net	979-234-3531 Ex1031
Chuck Rogers	CCOEM	ccoem@co.colorado.tx.us	979-733-0184
Donald Warschak	City of Columbus	dw[illegible]@columbustexas.net	979-732-0230
Bill Hefner	Rice CISD	bhefner@riceraiders.net	979 234 3531
Skip Edman	Columbus PD	colpdchief@columbustexas.net	979 732 2351
Patty Swords	Langford		
Gabe Rojas	Rojas Planning		

Colorado County Multi-jurisdictional Hazard Mitigation Plan Update Core Team Meeting #1 – Project Kickoff April 5, 2023 2:00 – 3:30 pm

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

Office of Emergency Management (OEM)

Charles Rogers, Coordinator

305 Radio Lane, Room 103
Columbus, Texas 78934
Office Phone: (979) 733-0184
Mobile: (979) 484-6047
Fax: (979) 733-0274
Email: cctxoem@co.colorado.tx.us

QUICKLINKS

Home
Vehicle Registration & Renewal
Court Calendar
County Holiday Schedule
Courthouse Grounds Use Policy

The Colorado County Hazard Mitigation Plan is under going review and needed changes as required every 5 years. Due to COVID and grant funding issues, we are a little behind, but moving forward. Part of the review process is getting public input concerning the plan and information that folks my have that need to be included.

Click the link below to participate in completing a survey which is a critical part of the plan's renewal process.
*** Colorado County Hazard Mitigation Plan 2023 Update Survey***

Thank you for Coming

Please Sign In

COLORADO CO. - SUB-J. #1
SEPTEMBER 7, 2023/1:00 PM
COLORADO CO. COURTHOUSE

Name	Representing	Email	Phone
OMAR CANTU	COLUMBUS ISD	OMAR.CANTU@CISDSCHOOLS.ORG	(979) 201-3118
MILTON KOLLER	WEIMAR CITY OF	MAYOR@WEIMARTEXAS.ORG	979 966 4017
Donald Warschak	City of Columbus	drw89@columbustexas.net	979-732-0280
Dolores Stoever	City of Weimar	citysec@weimartexas.org	979-725-8554
CHUCK ROGERS	COLORADO CO OEM	retxoem@co.colorado.tx.us	979-733-0184

COLORADO COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE

Jurisdictional Sub-Team Meeting #1

Including City of Columbus, City of Eagle Lake, City of Weimar, Colorado WCID 2, Columbus ISD, Rice Consolidated ISD and Weimar ISD.

Colorado County Courthouse
400 Spring Street
Columbus, Texas 78934
Thursday, September 7, 2023, 1:00pm-3:00pm

Colorado County 2023 Hazard Mitigation Plan Update

Jurisdictional Sub-Team Meeting #1

Date: September 7, 2023
Time: 1:00 – 3:00 pm
Location: Colorado County Courthouse
Purpose: Provide shared experience, capability and problem discussion related to known hazards, natural and man-made, drawing from the broader community's expertise and observation, in order to develop appropriate hazard mitigation actions.

- Attendance Noted
  - Document sub-jurisdictional teams with name, title, participating jurisdiction, and contact info for each team member.

- Create an Outreach Strategy
  - Meetings (Project Schedule)
    - 2 Jurisdictional Sub-Team Meetings
    - 2 Public Hearings
  - Discussion of On-line/Paper Citizen Survey
    - Review of draft questions by team members.
    - Who needs to be part of this discussion that isn't?
    - How do we reach vulnerable populations?
  - Other outreach methods: social media, website options, newspaper etc.
  - Review and document stakeholder engagement. Who did we talk to or who do we still need to talk to?

- Review prior plans and capabilities and update
  - Review of plans, policies, codes and ordinances that have been developed or updated since the last hazard mitigation plan.
    - How will these be incorporated into this plan update based on how they relate to hazard mitigation?
    - Look at plan and update.

- Review and Discussion of the Base Maps
  - Did we identify all critical facilities, infrastructure, and at-risk populations?
  - Where are the growth areas in each community?
  - Are facilities unique to ISDs accurately represented on the map?

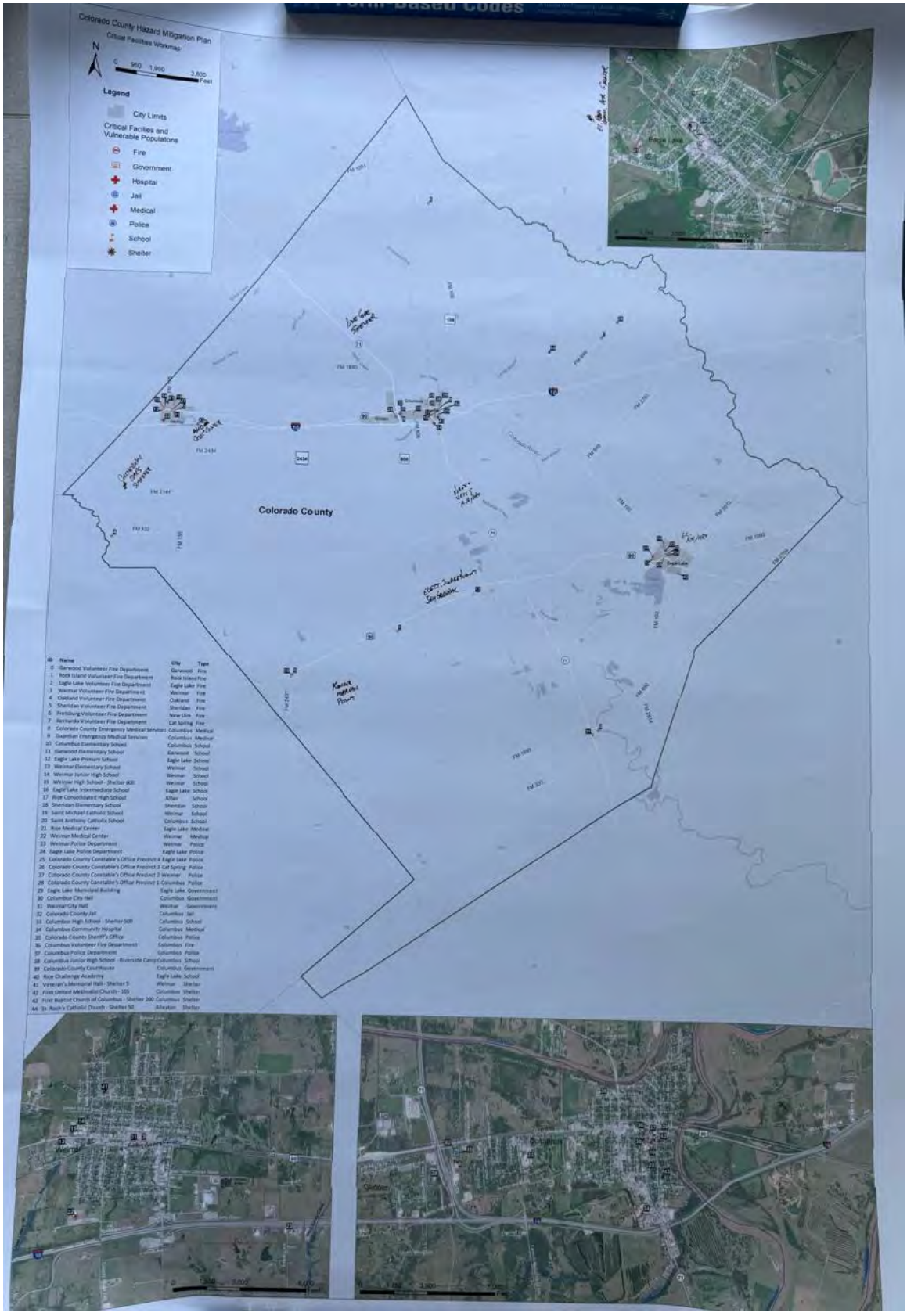
Thank you for Coming

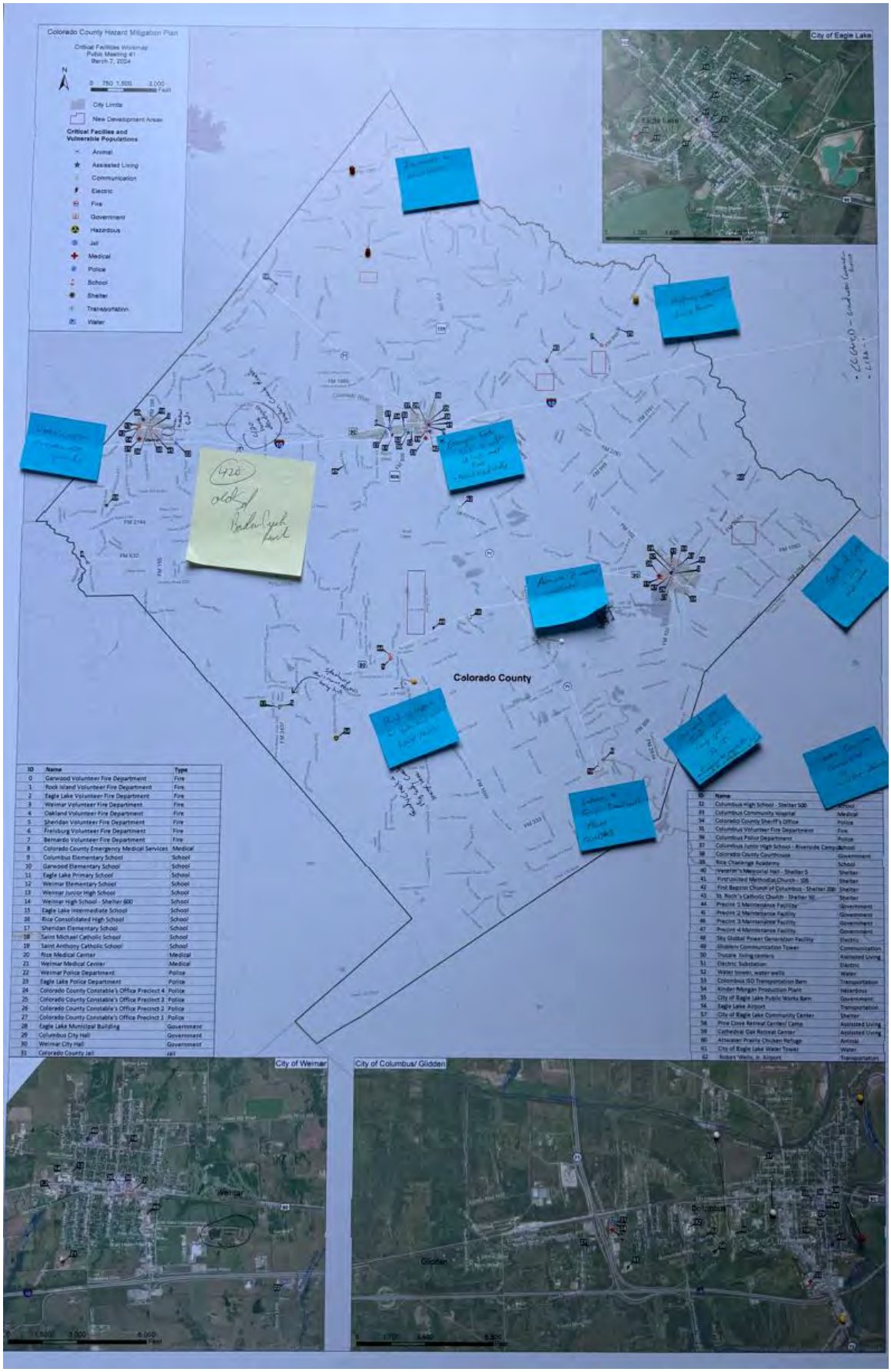
Please Sign In

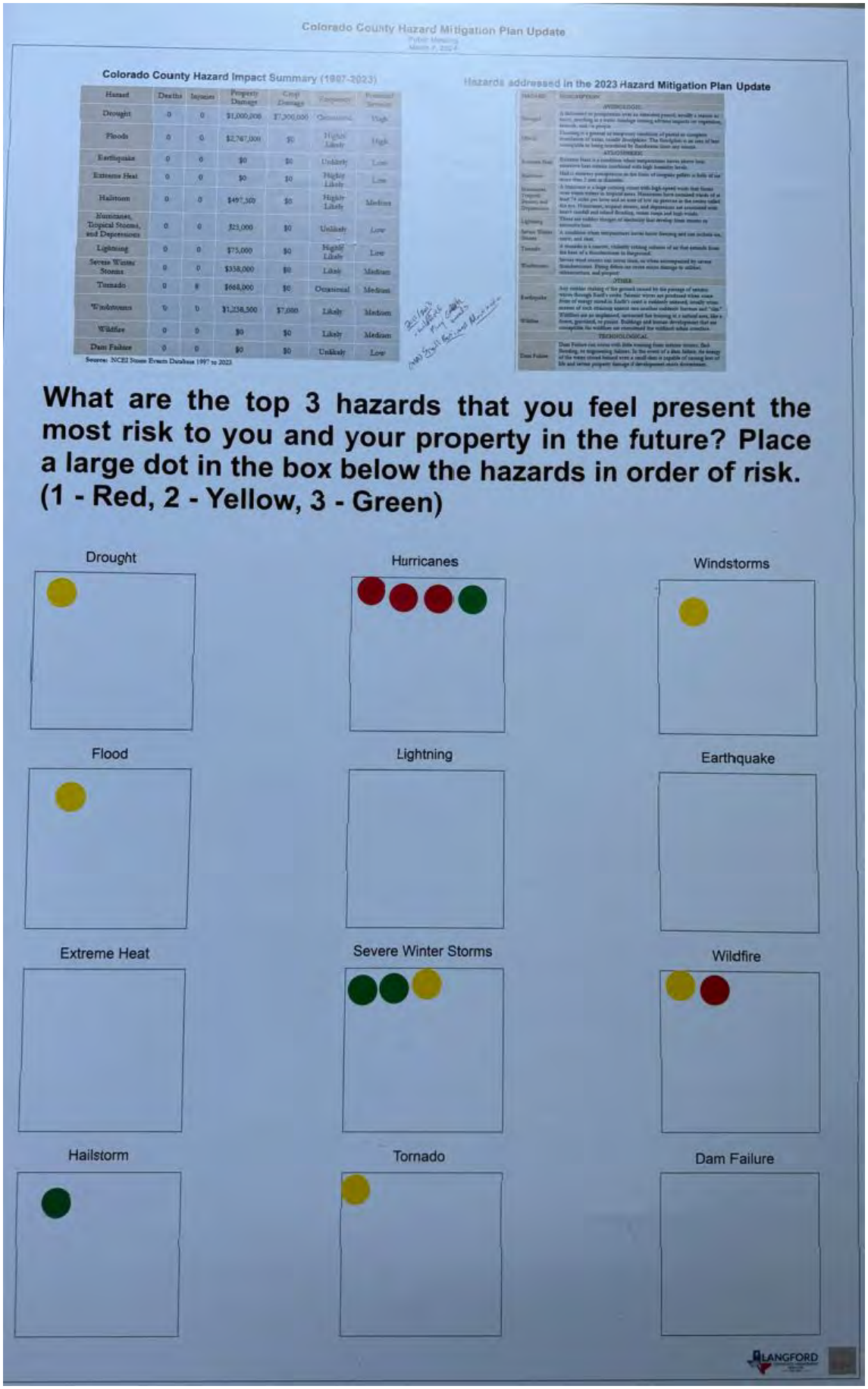
COLORADO CO. - PUBLIC OUTREACH
MARCH 7, 2024/6:00 PM - 8:00 PM
COLORADO CO. SERVICES FACILITY

Name	Representing	Email	Phone
MILTON KOLLER	CITY of WEIMAR	MAYOR@WEIMARTEXAS.ORG	979 635-1946
John Port	Rice CISD	jhp13@riceraiders.net	979-234-3531
Michelle Lowrance	COLORADO County	mlow1959@earthlink.net	8065594549
Danny Al-Batal	Texas Division of Emergency Mgmt.	danny.Al-batal@tdem.texas.gov	(979) 253-5487
Donald Werschel	City of Columbus	drw89@columbustexas.net	979-732-0280
Dolores Stoever	City of Weimar	citysec@weimartexas.org	979-637-0331
Charles L Rogers	Colorado County OEM	ccoem@co.colorado.tx.us	979-733-0184
OMAR CANTU	CISD	OMAR.CANTU@CISDSCHOOLS.ORG	979.201.3118
John Jones	Banner Press	bannereditor@sbcglobal.net ~~editor@bannerpress.net~~	979-732-6243


PUBLIC MEETING, 3.6.2024, 6-8 PM, 305 RADIO LANE, TRAINING ROOM
COLORADO COUNTY HAZARD MITIGATION PLAN UPDATE
WE WANT TO HEAR FROM YOU!
Colorado County is developing a Hazard Mitigation Plan (HMP) Update. Your participation is a vital part of this process.
OUR GOAL IS TO HELP COLORADO COUNTY AND ALL PARTICIPATING JURISDICTIONS PREPARE FOR EMERGENCIES AND PROTECT ALL RESIDENTS AND THEIR PROPERTY.
SCAN THE QR CODE OR VISIT TINY.CC/COLORADOHMP TO PARTICIPATE IN THE PUBLIC SURVEY.
HARDCOPIES CAN BE MADE AVAILABLE UPON REQUEST.


Colorado County Hazard Mitigation Plan
Critical Facilities Workmap
N
0 950 1,900 3,800 Feet
Legend
City Limits
Critical Facilies and Vulnerable Populations
Fire
Government
Hospital
Jail
Medical
Police
School
Shelter
Colorado County


Colorado County Hazard Mitigation Plan
Critical Facilities Workmap
Public Meeting #1
March 7, 2024
City Limits
New Development Areas
Critical Facilities and Vulnerable Populations
Animal
Assisted Living
Communication
Electric
Fire
Government
Hazardous
Jail
Medical
Police
School
Shelter
Transportation
Water
City of Eagle Lake
Colorado County
City of Weimar
City of Columbus/ Glidden


Colorado County Hazard Mitigation Plan Update
Colorado County Hazard Impact Summary (1997-2023)
Hazard | Deaths | Injuries | Property Damage | Crop Damage | Frequency | Potential Severity
Drought | 0 | 0 | $1,000,000 | $7,000,000 | Occasional | High
Floods | 0 | 0 | $2,767,000 | $0 | Highly Likely | High
Earthquake | 0 | 0 | $0 | $0 | Unlikely | Low
Extreme Heat | 0 | 0 | $0 | $0 | Highly Likely | Low
Hailstorm | 0 | 0 | $497,500 | $0 | Highly Likely | Medium
Hurricanes, Tropical Storms, and Depressions | 0 | 0 | $25,000 | $0 | Unlikely | Low
Lightning | 0 | 0 | $75,000 | $0 | Highly Likely | Low
Severe Winter Storms | 0 | 0 | $358,000 | $0 | Likely | Medium
Tornado | 0 | 8 | $668,000 | $0 | Occasional | Medium
Windstorms | 0 | 0 | $1,258,500 | $7,000 | Likely | Medium
Wildfire | 0 | 0 | $0 | $0 | Likely | Medium
Dam Failure | 0 | 0 | $0 | $0 | Unlikely | Low
Source: NCEI Storm Events Database 1997 to 2023
Hazards addressed in the 2023 Hazard Mitigation Plan Update
What are the top 3 hazards that you feel present the most risk to you and your property in the future? Place a large dot in the box below the hazards in order of risk. (1 - Red, 2 - Yellow, 3 - Green)
Drought
Hurricanes
Windstorms
Flood
Lightning
Earthquake
Extreme Heat
Severe Winter Storms
Wildfire
Hailstorm
Tornado
Dam Failure
LANGFORD

APPENDIX F: ADOPTION RESOLUTION

RESOLUTION
APPROVAL AND ADOPTION OF THE COLORADO COUNTY
HAZARD MITIGATION PLAN 2025 UPDATE

WHEREAS, the Federal Disaster Mitigation Act of 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), creating the framework for state, local, tribal, and territorial governments to engage in hazard mitigation planning to receive certain types of non-emergency disaster assistance; and,

WHEREAS, the Disaster Mitigation Act of 2000 was amended in May 2023 to require an Active Hazard Mitigation Plan for federal grant funding eligibility; and,

WHEREAS, a Core Team comprised of members of Colorado County, participating sub-jurisdictions, and school districts took part in the identification of Critical Facilities, Community Capabilities, Identification and Prioritization of Natural Hazard Risks, and the identification of new Hazard Mitigation Actions; and,

WHEREAS, Stakeholders and Participants also provided input; and,

WHEREAS, the County of Colorado and the Commissioners Court commit to comply with the annual Plan review as described by FEMA; and,

WHEREAS, the Plan incorporates the comments, ideas, and concerns of the communities, which this updated Plan is designed to protect, ascertained through a series of Public Outreach Meetings, newspaper coverage, publication of the draft plan for public review and comment, and other activities.

NOW THEREFORE, BE IT RESOLVED by the Commissioners Court of Colorado County, Texas that the Colorado County Hazard Mitigation Plan 2025 Update is hereby approved and adopted by Commissioners Court and resolves to execute the Actions in the Plan.

APPROVED AND ADOPTED this 14th day of April 2025.

Ty Prause, County Judge

Shannon Owers, Commissioner Precinct No. 1

Ryan Brandt, Commissioner Precinct No. 2

Keith Neuendorff, Commissioner Precinct No. 3

Darrell Gertson, Commissioner Precinct No. 4

ATTEST:

Kimberly Menke, County Clerk

COMMISSIONERS COURT COLORADO COUNTY TEXAS