

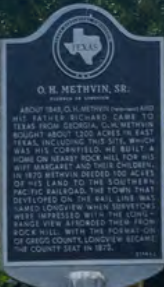
GREGG COUNTY HAZARD MITIGATION ACTION PLAN UPDATE

2024 DRAFT

Mitigating Risk for a Safe, Secure, Sustainable Future



GREGG COUNTY COURT HOUSE



For more information, visit our website at:

<https://greggcounty.texas.gov>

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BACKGROUND

Gregg County is located in northeastern Texas, with its county seat, the City of Longview, being 130 miles east of Dallas and 65 miles west of Shreveport, Louisiana. The Sabine River runs through the county from northwest to southeast, through the sloping, hilly terrain which characterizes the East Texas timberlands region in which Gregg County resides. The following counties are located around Gregg County: Upshur County to the north, Rusk County to the south, Smith County to the west, and Harrison County to the east.

Texas is prone to extremely heavy rains and flooding with half of the world record rainfall rates (48 hours or less).¹ While flooding is a well-known risk, Gregg County is susceptible to a wide range of natural hazards, including but not limited to wildfire, extreme heat, lightning, and drought. These life-threatening hazards can destroy property, disrupt the economy, and lower the overall quality of life for individuals.

While it is impossible to prevent an event from occurring, the impacts from many hazards on people and property can be lessened through mitigation. The Federal Emergency Management Agency (FEMA) defines mitigation as *sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects*.² Communities participate in hazard mitigation by developing hazard mitigation plans. The Texas Division of Emergency Management (TDEM) is required to review the plan and FEMA has the authority to review and approve hazard mitigation plans through the Disaster Mitigation Act of 2000.

The Disaster Mitigation Act requires that hazard mitigation plans be reviewed and revised every five years to maintain eligibility for Hazard Mitigation Assistance (HMA) grant funding. FEMA approved the Gregg County HMAP Update in 2018 which then expired in 2023. Therefore, the County began the process of developing a Hazard Mitigation Action Plan Update, along with incorporated jurisdictions from the previous plan, in order to regain eligibility for grant funding. The HMAP Update planning process provided an opportunity for Gregg County and participating jurisdictions to evaluate successful mitigation actions and explore opportunities to avoid future disaster loss. Gregg County selected H2O Partners, Inc. to write and develop the 2024 HMAP Update, hereinafter titled: “Gregg County Hazard Mitigation Action Plan Update 2024: Maintaining a Safe, Secure, and Sustainable Community” (Plan or Plan Update).

This is a multi-jurisdictional plan; the participating jurisdictions include: Gregg County, City of Clarksville City, City of Gladewater, City of Kilgore, City of Lakeport, City of Longview, City of Warren City, City of White Oak, and East Texas Council of Governments.

¹ Source: <http://www.floodsafety.com/texas/regional-info/san-antonio-flooding/>

² Source: <http://www.fema.gov/hazard-mitigation-planning-resources>

SECTION 1: INTRODUCTION

Hazard mitigation activities are 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. A comprehensive review of a hazard mitigation plan addresses vulnerabilities to hazards that exist today and in the foreseeable future. Therefore, it is essential that a plan identify projected patterns of how future development will increase or decrease a community's overall hazard vulnerability.

SCOPE

The focus of the Plan Update is to identify activities to mitigate hazards classified as "high" or "moderate" risk, as determined through a detailed hazard risk assessment conducted for Gregg County and the participating jurisdictions. The hazard classification enables the participating jurisdictions to prioritize mitigation actions based on hazards which can present the greatest risk to lives and property in the geographic scope.

PURPOSE

The Plan Update was prepared by Gregg County, participating jurisdictions, and H2O Partners, Inc. The purpose of the Plan Update is to protect people and structures and to minimize the costs of disaster response and recovery. The goal of the Plan Update is to minimize or eliminate long-term risks to human life, property, operations, and the environment from known hazards by identifying risks and implementing cost-effective hazard mitigation actions. The planning process is an opportunity for participating jurisdictions within Gregg County, stakeholders, and the general public to evaluate and develop successful hazard mitigation actions to reduce future risk of loss of life and damage to property resulting from a disaster in Gregg County.

The Mission Statement of the Plan Update is, *"Maintaining a secure and sustainable future through the revision and development of targeted hazard mitigation actions to protect life and property."*

Participating jurisdictions within Gregg County, and planning participants identified ten natural hazards and two human-caused hazards to be addressed by the Plan Update. The specific goals of the Plan Update are to:

- Provide a comprehensive update to the 2018 HMAP;
- Minimize disruption to participating jurisdictions within Gregg County following a disaster;
- Streamline disaster recovery by articulating actions to be taken before a disaster strikes to reduce or eliminate future damage;
- Demonstrate a firm local commitment to hazard mitigation principles;
- Serve as a basis for future funding that may become available through grants and technical assistance programs offered by the state or federal government. The Plan will enable participating jurisdictions within Gregg County to take advantage of rapidly developing mitigation grant opportunities as they arise; and
- Ensure that participating jurisdictions within Gregg County maintain eligibility for the full range of future Federal disaster relief.

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AUTHORITY



The Plan is tailored specifically for participating jurisdictions within Gregg County and plan participants including Planning Team members, stakeholders, and the general public who participated in the Plan Update development process. The Plan complies with all requirements promulgated by the Texas Division of Emergency Management (TDEM) and all applicable provisions of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000) (P.L. 106-390), and the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108-264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). Additionally, the Plan complies with the Interim Final Rules for the Hazard Mitigation Planning and Hazard Mitigation Grant Program (44 CFR, Part 201), which specify the criteria for approval of mitigation plans required in Section 322 of the DMA 2000 and standards found in FEMA’s “Local Mitigation Policy Guide” (April 2023), and the “Local Mitigation Planning Handbook” (May 2023).

SUMMARY OF SECTIONS

Sections 1 and 2 of the Plan Update outline the Plan’s purpose and development, including how Planning Team members, stakeholders, and members of the general public were involved in the planning process. Section 3 profiles Gregg County’s population and economy.

Sections 4 through 16 present a hazard overview and information on individual natural hazards in the planning area. The hazards generally appear in order of priority based on potential losses to life and property, and other community concerns. For each hazard, the Plan Update presents a description of the hazard, a list of historical hazard events, and the results of the vulnerability and risk assessment process.

Section 17 presents hazard mitigation goals and objectives. Section 18 gives an analysis for the previous actions and Section 19 presents hazard mitigation actions for Gregg County and the participating jurisdictions. Section 20 identifies Plan maintenance mechanisms.

The list of planning team members and stakeholders is located in Appendix A. Public survey results are analyzed and presented in Appendix B. Appendix C contains a detailed list of critical facilities for the area. Appendix D contains information regarding Dam locations within Gregg County. Appendix E contains information regarding workshops and meeting documentation. Capability Assessment results for participating jurisdictions within Gregg County are in Appendix F. Appendix G includes State and Federal Funding Opportunities.³

³ Information contained in some of these appendices are exempt from public release under the Freedom of Information Act (FOIA).



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PLANNING PROCESS

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PLAN PREPARATION AND DEVELOPMENT

Hazard mitigation planning involves coordination with various constituents and stakeholders to develop a more disaster-resistant community. Section 2 provides an overview of the planning process including the identification of key steps and a detailed description of how stakeholders and the public were involved.

OVERVIEW OF THE PLAN

Gregg County hired H2O Partners, Inc. (Consultant Team), to provide technical support and oversee the development of the Gregg County Hazard Mitigation Action Plan Update 2024. The Consultant Team used the FEMA “Local Mitigation Planning Policy Guide” (April 2023), and the “Local Mitigation Planning Handbook” (May 2023) to develop the Plan Update. The overall planning process is shown in Figure 2-1 below.

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Figure 2-1. Mitigation Planning Process



Gregg County, participating jurisdictions, and the Consultant Team met in October 2023 to begin organizing resources, identify Planning Team members, and conduct a Capability Assessment.

PLANNING TEAM

Key members of H2O Partners, Inc. developed the Plan Update in conjunction with the Planning Team. The Planning Team was established using a direct representation model. Some of the responsibilities of the Planning Team included: completing Capability Assessment surveys, providing input regarding the identification of hazards, identifying mitigation goals, and developing mitigation strategies. An Executive Planning Team consisting of key personnel involved in hazard mitigation activities from each of the participating jurisdictions within Gregg County, shown in Table 2-1, was formed to coordinate planning efforts and request input and participation in the planning process. Participation in this planning process is defined as being engaged in the process through attending meetings, providing data and related information, providing updates on previous actions, and reviewing and commenting on draft versions of the plan. Table 2-2 reflects the Advisory Planning Team, consisting of additional representatives from area organizations and departments from the participating jurisdictions within Gregg County that participated throughout the planning process. All Executive and Advisory Planning Team members are involved in hazard mitigation activities; those with the authority to regulate development are identified with an asterisk next to their title.

Table 2-1. Executive Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Gregg County	Assistant Emergency Management Coordinator
City of Clarksville City	City Manager*
City of Gladewater	Emergency Management Coordinator
City of Kilgore	Emergency Management Coordinator / Fire Marshal
City of Lakeport	City Secretary
City of Longview	Emergency Management Coordinator
City of Warren City	Mayor*
City of White Oak	City Coordinator

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ORGANIZATION / DEPARTMENT	TITLE
East Texas Council of Governments	Director of Public Safety

Table 2-2. Advisory Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Gregg County	Commissioner Precinct 1*
Gregg County	Commissioner Precinct 2*
Gregg County	Commissioner Precinct 3*
Gregg County	Commissioner Precinct 4*
Gregg County	County Judge
Gregg County	County Sheriff
Gregg County	Emergency Management Coordinator / Fire Marshal
Gregg County	Health Administrator
Gregg County	Lieutenant
City of Clarksville City	City Secretary
City of Clarksville City	Mayor*
City of Gladewater	Chief of Police
City of Gladewater	City Clerk
City of Gladewater	City Manager (Interim)*
City of Gladewater	Director of Public Works*
City of Kilgore	Chief of Police
City of Kilgore	City Clerk
City of Kilgore	City Manager*
City of Kilgore	Code Enforcement Officer*
City of Kilgore	Director of Parks and Recreation
City of Kilgore	Director of Planning*
City of Kilgore	Director of Public Works*
City of Kilgore	Director of Special Services

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ORGANIZATION / DEPARTMENT	TITLE
City of Kilgore	Fire Chief
City of Kilgore	Mayor*
City of Kilgore	Street and Drainage Manager*
City of Lakeport	Mayor
City of Longview	Assistant Chief of Police
City of Longview	Assistant Director of Development Services*
City of Longview	Assistant Director of Public Works*
City of Longview	Captain of Operations Support Bureau
City of Longview	Chief of Police
City of Longview	City Engineer
City of Longview	City Manager*
City of Longview	City Secretary
City of Longview	Director of Development Services*
City of Longview	Director of Public Works*
City of Longview	Fire Chief
City of Longview	Fire Chief - Training Section
City of Longview	GIS Analyst
City of Longview	Grant Writer
City of Longview	Mayor*
City of Longview	Media Developer
City of Longview	MPO Director
City of Longview	Sanitation
City of Longview	Senior Grant Analyst
City of Longview	Transportation Planner*
City of Warren City	City Secretary
City of White Oak	Chief of Police
City of White Oak	City Secretary

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ORGANIZATION / DEPARTMENT	TITLE
City of White Oak	Mayor*
East Texas Council of Governments	Director of Operations
East Texas Council of Governments	Executive Director
East Texas Council of Governments	Public Safety Manager

Additionally, a Stakeholder Group was invited via email to participate in the planning process by attending meetings, commenting on draft versions of the plan, and/or by providing data to inform the planning process. The Consultant Team, Planning Teams, and Stakeholder Group coordinated to identify mitigation goals, and develop mitigation strategies and actions for the Plan. Appendix A provides a complete listing of all participating Planning Team members and stakeholders from participating jurisdictions within Gregg County by organization and title. Stakeholder involvement is discussed further below.

Based on results of completed Capability Assessment, participating jurisdictions within Gregg County described methods for achieving future hazard mitigation measures by expanding existing capabilities. For example, each jurisdiction has an opportunity to identify opportunities for cross-training or increasing the technical expertise of staff by attending free training available through FEMA and the Texas Division of Emergency Management (TDEM) by monitoring classes and availability through preparingtexas.org. In addition, each jurisdiction can identify Planning Team members with the authority to monitor the Plan and identify grant funding opportunities for expanding staff. Other options for improving capabilities for each jurisdiction include the following:

Table 2-3. Opportunities for Improving and Expanding Existing Capabilities by Jurisdiction

JURISDICTION	OPPORTUNITIES
Gregg County	<ul style="list-style-type: none"> Develop a Capital Improvement Plan based on information in the risk assessment and identified mitigation projects within the HMAP. Review current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. Develop land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Clarksville City	<ul style="list-style-type: none"> Develop a Capital Improvement Plan based on information in the risk assessment and identified mitigation projects within the HMAP. Develop land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Gladewater	<ul style="list-style-type: none"> Develop a Capital Improvement Plan based on information in the risk assessment and identified mitigation projects within the HMAP. Review current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. Develop land use and building ordinances that will require all new developments to conform to the highest mitigation standards.

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JURISDICTION	OPPORTUNITIES
City of Kilgore	<ul style="list-style-type: none"> ● Update the City’s Capital Improvement Plan based on information in the risk assessment and identified mitigation projects within the HMAP. ● Review current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. ● Develop land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Lakeport	<ul style="list-style-type: none"> ● Develop a Capital Improvement Plan based on information in the risk assessment and identified mitigation projects within the HMAP. ● Develop land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Longview	<ul style="list-style-type: none"> ● Integrate risk information from HMAP into future updates to the City’s Comprehensive Plan and Capital Improvements Plan. ● Review current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. ● Develop land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Warren City	<ul style="list-style-type: none"> ● Develop a Capital Improvement Plan based on information in the risk assessment and identified mitigation projects within the HMAP. ● Develop land use and building ordinances that will require all new developments to conform to the highest mitigation standards
City of White Oak	<ul style="list-style-type: none"> ● Integrate risk information from HMAP into future updates to Comprehensive Plan and Capital Improvements Plan. ● Review current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. ● Develop land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
East Texas Council of Governments	<ul style="list-style-type: none"> ● Integrate information in the risk assessment and identified mitigation projects within the HMAP into the Continuity of Operations. ● Update existing GIS layers to integrate risk information from HMAP.

Sample hazard mitigation actions developed with similar hazard risk were shared at the meetings. These important discussions resulted in the development of multiple mitigation actions that are included in the Plan Update to further mitigate risk from natural hazards in the future.

The Planning Team developed hazard mitigation actions for mitigating risk from all of the identified hazards within this Plan Update, including potential wildfire, flood, drought, and extreme heat events. These actions include but are not limited to installing generators at critical facilities, developing a Community Wildfire Protection Plan (CWPP), and educating citizens to practice hazard mitigation techniques.

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PLANNING PROCESS

The process used to prepare the Plan Update followed the four major steps included at Figure 2-1. After the Planning Team was organized, a capability assessment was developed and distributed at the Kick-Off Workshop. Hazards were identified and assessed, and results associated with each of the hazards were provided at the Risk Assessment Workshop. Based on Gregg County's identified vulnerabilities, specific mitigation strategies were discussed and developed at the Mitigation Strategy Workshop. Finally, Plan maintenance and implementation procedures were developed and are included in Section 20. Participation of Planning Team members, stakeholders, and the public at each of the workshops is documented in Appendix E.

At the Plan development workshops held throughout the planning process described herein, the following factors were taken into consideration:

- The nature and magnitude of risks currently affecting the community;
- Hazard mitigation goals to address current and expected conditions;
- Whether current resources will be sufficient for implementing the Plan Update;
- Implementation problems, such as technical, political, legal, and coordination issues that may hinder development;
- Anticipated outcomes; and
- How participating jurisdictions within Gregg County, agencies, and partners will participate in implementing the Plan Update.

KICKOFF WORKSHOP

The Kickoff Workshop was held on October 30, 2023, at the Longview Convention Complex. The initial workshop informed participating officials and key department personnel about how the planning process pertained to their distinct roles and responsibilities and engaged stakeholder groups that focus on vulnerable populations and underserved communities including, but not limited to housing authorities, local medical partners, local ISDs, and surrounding counties. In addition to the kickoff presentation, participants received the following information:

- Project overview regarding the planning process;
- Public survey access information;
- Hazard Ranking form; and
- Capability Assessment survey for completion.

A risk ranking exercise was conducted at the Kickoff Workshop to get input from the Planning Team and stakeholders pertaining to various risks from a list of natural hazards affecting the planning area. Participants ranked hazards high to low in terms of perceived level of risk, frequency of occurrence, and potential impact. The assessments were also used to set priorities for hazard mitigation actions based on potential loss of lives and dollar losses. A hazard profile and vulnerability analysis for each of the hazards can be found in Sections 4 through 16.

HAZARD IDENTIFICATION

At the Kickoff Workshop, and through email and phone correspondence, the Planning Team conducted preliminary hazard identification. The Planning Team in coordination with the Consultant Team reviewed and considered a full range of natural hazards. Once identified, the teams narrowed the list to significant hazards by reviewing hazard information in the 2023 State of Texas Hazard Mitigation Plan, and initial study results from reputable sources such as federal and state agencies to identify the hazards affecting the planning area as a whole. Based on this

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initial analysis, the teams identified a total of ten natural hazards and two human-caused hazards, which pose a significant threat to the planning area.

RISK ASSESSMENT

An initial risk assessment for participating jurisdictions within Gregg County was completed in December 2023 and results were presented to Planning Team members at the Risk Assessment Workshop held on December 11, 2023, at the Longview Convention Complex. At the workshop, the characteristics and consequences of each hazard were evaluated to determine the extent to which the planning area would be affected in terms of potential danger to property and citizens.

Property and crop damages were estimated by gathering data from the National Centers for Environmental Information (NCEI) and National Oceanic and Atmospheric Administration (NOAA). The assessment also examined the impact of various hazards on the built environment, including general building stock, critical facilities, lifelines, and infrastructure. The resulting risk assessment profiled hazard events provided information on previous occurrences, estimated probability of future events, and detailed the spatial extent and magnitude of impact on people and property. Following the risk assessment workshop past event data from NCEI is provided to the planning team for their review and assistance in identifying significant events.

MITIGATION REVIEW AND DEVELOPMENT

Developing the Mitigation Strategy for the Plan involved identifying mitigation goals and new mitigation actions. A Mitigation Workshop was held jointly with the Risk Assessment Workshop, on December 11, 2023, at the Longview Convention Complex. In addition to the Planning Team, stakeholder groups were invited to attend the workshop. Regarding hazard mitigation actions, workshop participants emphasized the desire for wildfire projects. Additionally, the participating jurisdictions were proactive in identifying mitigation actions to lessen the risk of all the identified hazards included in the Plan Update.

An inclusive and structured process was used to develop and prioritize new hazard mitigation actions for the Plan Update. The prioritization method was based on FEMA's STAPLE+E criteria and included social, technical, administrative, political, legal, economic, and environmental considerations. As a result, each Planning Team Member assigned an overall priority to each hazard mitigation action. The overall priority of each action is reflected in the hazard mitigation actions found in Section 19.

Planning Team Members then developed action plans identifying proposed actions, costs and benefits, the responsible organization(s), effects on new and existing buildings, implementation schedules, priorities, and potential funding sources.

Specifically, the process involved:

- Listing optional hazard mitigation actions based on information collected from previous plan reviews, studies, and interviews with federal, state, and local officials. Workshop participants reviewed the optional mitigation actions and selected actions that were most applicable to their area of responsibility, cost-effective in reducing risk, easily implemented, and likely to receive institutional and community support.
- Workshop participants inventoried federal and state funding sources that could assist in implementing the proposed hazard mitigation actions. Information was collected, including the program name, authority, purpose of the program, types of assistance and eligible

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projects, conditions on funding, types of hazards covered, matching requirements, application deadlines, and a point of contact.

- Planning Team Members considered the benefits that would result from implementing the hazard mitigation actions compared to the cost of those projects. Although detailed cost-benefit analyses were beyond the scope of the Plan Update, Planning Team Members utilized economic evaluation as a determining factor between hazard mitigation actions.
- Planning Team Members then selected and prioritized mitigation actions.

Hazard mitigation actions identified in the process were made available to the Planning Team for review. The draft Plan Update was maintained on file by Gregg County and participating jurisdictions and was made available to the general public for review.

REVIEW AND INCORPORATION OF EXISTING PLANS

REVIEW

Background information utilized during the planning process included various studies, plans, reports, and technical information from sources such as FEMA, the United States Army Corps of Engineers (USACE), the U.S. Fire Administration, National Oceanic and Atmospheric Administration (NOAA), the Texas Water Development Board (TWDB), the Texas Commission on Environmental Quality (TCEQ), the Texas State Data Center, Texas Forest Service, the Texas Division of Emergency Management (TDEM), and local hazard assessments and plans. Section 4 and the hazard-specific sections of the Plan (Sections 5-16) summarize the relevant background information.

Specific background documents, including those from FEMA, provided information on hazard risk, hazard mitigation actions currently being implemented, and potential mitigation actions. Previous hazard events, occurrences, and descriptions were identified through NOAA's National Centers for Environmental Information (NCEI). Results of past hazard events were found through searching the NCEI Storm Events Database. The USACE studies were reviewed for their assessment of risk and potential projects in the region. Information from the State Demographer was reviewed for population and other projections and included in Section 3 of the Plan. Data from the Texas Forest Service was used to appropriately rank the wildfire hazard, and to help identify potential grant opportunities. Materials from FEMA and TDEM were reviewed for guidance on Plan Update development requirements.

INCORPORATION OF EXISTING PLANS INTO THE HMAP PROCESS

A Capability Assessment was completed by key departments from the participating jurisdictions within Gregg County which provided information pertaining to existing plans, policies, ordinances, and regulations to be integrated into the goals and objectives of the Plan Update. The relevant information was included in a master Capability Assessment, Appendix F.

Existing projects and studies were utilized as a starting point for discussing hazard mitigation actions among Planning and Consultant Team members. For example, Gregg County has completed several actions, including replacing culverts, implementing a public awareness campaign on weather watches and warnings, and establishing a new system (RAVE) to notify the public of impending natural hazards. The City of Clarksville City's completed actions include installing tornado sirens and yearly maintenance of rights-of-way and city properties to reduce fire fuels. The City of Gladewater used Nixle, Genasy's, and social media to publicize burn bans and

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other important natural hazard updates. The City began and continues to provide bottled water and ice to outdoor workers, the homeless, and others at distribution centers such as city parks. The City worked with The City of Kilgore's completed actions included clearing natural vegetation on public property to reduce wildfire risk, performing tests and maintenance on generators installed at critical facilities, and preparing dump trucks with appropriate equipment to treat icy road conditions. Additionally, the City of Gladewater has been in communication with Texas Commission on Environmental Quality (TCEQ) regarding the dam within their jurisdiction, and have shared dam inspection reports, inundation maps, EAPs, floodplain management plans, as well as more detailed studies. The City of Gladewater (local dam owner) has worked with TCEQ to complete annual inspections, update EAPs, and implement a maintenance program for the Lake Gladewater Dam. The City of Lakeport initiated and continues the use and publication of a Smart 911 system for weather warnings to the public, as well as partnering with utility companies to trim tree limbs that could fall on utility transmission lines in icy weather or windy conditions. Ongoing projects initiated by the City of Longview include improving street culverts and bridges, reviewing and exercising dam failure emergency procedures, and working with state and federal agencies to maintain updated flood maps. The City of White Oak has implemented burn bans as needed, tested, and repaired warning sirens, and maintained mutual aid agreements with surrounding departments to provide resources in the event of a major wildfire. The East Texas Council of Governments (ETCOG) has implemented several planning mechanisms including emergency plans for employees and a plan to use ETCOG GoBus resources in evacuation events. Additionally, ETCOG has completed projects including hardening ETCOG-owned buildings, inspecting and reinforcing ETCOG building roofs, and adding lightning arrestors to all ETCOG buildings.

Additionally, policies and ordinances were reviewed by several of the participating jurisdictions. The City of White Oak has included actions to develop and adopt higher building code standards. Other plans were reviewed, such as Capital Improvement Plans and Emergency Operations Plan, to identify any additional mitigation actions. Finally, the 2023 State of Texas Hazard Mitigation Plan, developed by TDEM, was discussed in the initial planning meeting in order to develop a specific group of hazards to address in the planning effort. The 2023 State Plan was also used as a guidance document, along with FEMA materials, in the development of the Gregg County Hazard Mitigation Action Plan Update 2024.

INCORPORATION OF THE HMAP INTO OTHER PLANNING MECHANISMS

Planning Team members will integrate implementation of the Plan Update with other planning mechanisms for Gregg County, such as the Emergency Operations Plan. Existing plans for participating jurisdictions will be reviewed and incorporated into the Plan Update, as appropriate. This section discusses how the Plan will be implemented by the participating jurisdictions within Gregg County. It also addresses how the Plan will be evaluated and improved over time, and how the public will continue to be involved in the hazard mitigation planning process.

Participating jurisdictions within Gregg County will be responsible for implementing hazard mitigation actions contained in Section 19. Each hazard mitigation action has been assigned to a specific County, City, or ETCOG department that is responsible for tracking and implementing the action.

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A funding source has been listed for each identified hazard mitigation action and may be utilized to implement the action. An implementation time period has also been assigned to each hazard mitigation action as an incentive and to determine whether actions are implemented on a timely basis.

Participating jurisdictions within Gregg County will integrate hazard mitigation actions contained in the Plan Update with existing planning mechanisms such as ordinances, Emergency Operations or Management Plans, and other local and area planning efforts. Gregg County will work closely with area organizations to coordinate implementation of hazard mitigation actions that benefit the planning area in terms of financial and economic impact.

Upon formal adoption of the Plan Update, Planning Team members from the participating jurisdictions will review existing plans along with building codes to guide development and ensure that hazard mitigation actions are implemented. Each of the jurisdictions will be responsible for coordinating periodic review of the Plan Update with members of the Advisory Planning Team to ensure integration of hazard mitigation strategies into these planning mechanisms and codes. The Planning Team will also conduct periodic reviews of various existing planning mechanisms and analyze the need for any revisions or updates in light of the approved Plan Update. Participating jurisdictions within Gregg County will ensure that future long-term planning objectives will contribute to the goals of the Plan to reduce the long-term risk to life and property from moderate and high-risk hazards. Within one year of formal adoption of the Plan, existing planning mechanisms will be reviewed and analyzed as they pertain to the Plan Update.

Planning Team members will review and revise, as necessary, the long-range goals and objectives in its strategic plan and budgets to ensure that they are consistent with the Plan Update.

Furthermore, Gregg County will work with neighboring jurisdictions to advance the goals of the Plan Update as it applies to ongoing, long-range planning goals and actions for mitigating risk to natural hazards throughout the planning area.

Table 2-4 identifies types of planning mechanisms and examples of methods for incorporating the Plan into other planning efforts.

Table 2-4. Examples of Methods of Incorporation

Planning Mechanism	Incorporation of Plan
Annual Budget Review	Various departments and key personnel that participated in the planning process for participating jurisdictions within Gregg County will review the Plan and mitigation actions therein when conducting their annual budget review. Allowances will be made in accordance with grant applications sought, and mitigation actions that will be undertaken, according to the implementation schedule of the specific action.
Capital Improvement Plans	The Cities of Kilgore, Longview and White Oak have a Capital Improvement Plan (CIP) in place or under development. Prior to any revisions to the CIP, City departments will review the risk assessment and mitigation strategy sections of the HMAP, as limiting

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Planning Mechanism	Incorporation of Plan
	public spending in hazardous zones is one of the most effective long-term mitigation actions available to local governments.
Comprehensive Plans	Several participating jurisdictions within Gregg County have Long-term Comprehensive Development Plans in place. Since comprehensive plans involve developing a unified vision for a community, the mitigation vision and goals of the Plan will be reviewed in the development or revision of a Comprehensive Plan.
Floodplain Management Plans	Floodplain management plans include preventative and corrective actions to address the flood hazard. Therefore, the actions for flooding and information found in Section 8 of this Plan Update discussing the people and property at risk to flood will be reviewed and revised when participating jurisdictions within Gregg County update their management plans or develops new plans.
Grant Applications	The Plan will be evaluated by participating jurisdictions within Gregg County when grant funding is sought for mitigation projects. If a project is not in the Plan Update, a Plan Revision may be necessary to include the action in the Plan.
Regulatory Plans	Currently, several participating jurisdictions within Gregg County have regulatory plans in place, such as Emergency Management Plans, Continuity of Operations Plans, Land Use Plans, and Evacuation Plans. The Plan Update will be consulted when County, City, and ETCOG departments review or revise their current regulatory planning mechanisms, or in the development of regulatory plans that are not currently in place.

Appendix F Capability Assessment provides an overview of Planning Team members’ existing planning and regulatory capabilities. These existing capabilities provide the mechanisms to implement the mitigation strategy objectives. For example, the adoption of building codes and implementation of land use regulations have been demonstrated to help communities avoid losses from natural hazard events. Currently, five participating jurisdictions have building codes in place and six have a zoning ordinance or land use regulations in place, refer to Appendix F for a complete inventory of each participating jurisdiction’s capabilities.

It should be noted for the purposes of the Plan Update that the HMAP has been used as a reference when reviewing and updating all plans and ordinances for the entire planning area, including all participating jurisdictions. The Emergency Management Plans developed for Gregg County, City of Clarksville City, City of Gladewater, City of Kilgore, City of Lakeport, City of

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Longview, City of Warren City, and City of White Oak are updated every 5 years and incorporates goals, objectives and actions identified in the mitigation plan.

PLAN REVIEW AND PLAN UPDATE

As with the development of Plan Update, participating jurisdictions within Gregg County will oversee the review and update process for relevance and if necessary, make adjustments. At the beginning of each fiscal year, Planning Team Members will meet to evaluate the Plan and review other planning mechanisms to ensure consistency with long-range planning efforts. In addition, planning participants will also meet once a year, by conference call or presentation, to re-evaluate prioritization of the hazard mitigation actions. The plan may be amended to include additional hazard mitigation actions as they are developed.

TIMELINE FOR IMPLEMENTING MITIGATION ACTIONS

Both the Executive Planning Team (Table 2-1, and Table A-1, Appendix A) and the Advisory Planning Team (Table 2-2, and Table A-2, Appendix A) will engage in discussions regarding a timeframe for how and when to implement each hazard mitigation action. Considerations include when the action will be started, how existing planning mechanisms' timelines affect implementation, and when the action should be fully implemented. Timeframes may be general, and there will be short, medium, and long-term goals for implementation based on prioritization of each action, as identified on individual Hazard Mitigation Action worksheets included in the Plan Update for participating jurisdictions within Gregg County.

Both the Executive and Advisory Planning Team will evaluate and prioritize the most suitable hazard mitigation actions for the community to implement. The timeline for implementation of actions will partially be directed by participating jurisdictions' comprehensive planning process, budgetary constraints, and community needs. Participating jurisdictions within Gregg County are committed to addressing and implementing hazard mitigation actions that may be aligned with and integrated into the Plan Update.

Overall, the Planning Team is in agreement that goals and actions of the Plan Update shall be aligned with the timeframe for implementation of hazard mitigation actions with respect to annual review and updates of existing plans and policies.

PUBLIC AND STAKEHOLDER INVOLVEMENT

An important component of hazard mitigation planning is public participation and stakeholder involvement. Input from individual citizens and the community as a whole provides the Planning Team with a greater understanding of local concerns and increases the likelihood of successfully implemented hazard mitigation actions. If citizens and stakeholders, such as local businesses, non-profits, hospitals, and schools are involved, they are more likely to gain a greater appreciation of the risks that hazards may present in their community and take steps to reduce or mitigate their impact.

The public was involved in the development of the Gregg County Hazard Mitigation Action Plan Update 2024 at different stages prior to official Plan approval and adoption. Public input was sought using three methods: (1) open public meetings; (2) survey instruments; and (3) making the draft Plan Update available for public review on participating jurisdictions' websites.

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The Planning Team worked to identify local agencies, organizations and community leaders that focus on reaching vulnerable populations and underserved communities. These organizations were included in the planning process as stakeholders and were invited to participate in the planning process via email (Tables 2-5) including the American Red Cross, housing authorities, local health and hospital partners, and area Independent School Districts. In addition, public notices were posted on public bulletin boards at public facilities. Public notices were also posted on the websites and social media accounts for several participating jurisdictions.

The draft Plan Update was made available to the general public for review and comment on participating jurisdictions’ websites. The public was notified at the public meetings that the draft Plan Update would be available for review. No feedback was received on the draft Plan Update, although it was given on the public survey, and all relevant information was incorporated into the Plan Update. Public input was utilized to assist in identifying hazards that were of most concern to the citizens of the County and what actions they felt should be included and prioritized.

The Plan Update will be advertised and posted on Gregg County and participating jurisdictions’ websites upon approval from FEMA, and a copy will be kept at the Gregg County Courthouse.

STAKEHOLDER INVOLVEMENT

Stakeholder involvement is essential to hazard mitigation planning since a wide range of stakeholders can provide input on specific topics and from various points of view. Throughout the planning process, members of community groups, local businesses, neighboring jurisdictions, schools, and hospitals were invited to participate in development of the Plan Update. The Stakeholder Group (Table A-3 in Appendix A, and Table 2-5, below), included a broad range of representatives from both the public and private sector and served as a key component in Gregg County’s outreach efforts for development of the Plan Update. Documentation of stakeholder meetings is found in Appendix E. A list of organizations invited to attend via email is found in Table 2-5. Those that participated in the public meetings are identified with a plus symbol (+) next to their stakeholder type.

Table 2-5. Stakeholder Working Group

AGENCY	TITLE	STAKEHOLDER TYPE
ABC Son Shine School	Owner	Academia / Vulnerable Populations
Alpine Chistian Academy	Director	Academia
American Red Cross, North Texas Region	Executive Director	Non-Profit Organization
Asbury House Child Enrichment Center	President	Academia / Vulnerable Populations
Christian Heritage School of Longview	President	Academia / Vulnerable Populations
Christus EMS	Chief	Healthcare Facility+
Clarksville City-Warren City VFD	Fire Chief	Community Organization
East Texas Regional Airport	Airport Director	Private Organization

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AGENCY	TITLE	STAKEHOLDER TYPE
East Texas Regional Airport FD	Fire Chief	Private Organization / Community Organization
Easton VFD	Fire Chief	Community Organization
Edlerville-Lakeport VFD	Fire Chief	Community Organization
Environmental Protection Agency (EPA)	Region 6, Director of Emergency Management Division	Federal Agency
Environmental Protection Agency (EPA)	Region 6, Regional Administrator	Federal Agency
Gladewater FD	Fire Chief	Community Organization
Gladewater Housing Authority	Executive Director	Community Organization
Gladewater Independent School District	Chief Operations Officer	Academia
Gladewater Independent School District	Superintendent	Academia
Gladewater Mirror	News Reporter	Community Organization+
Good Shepherd Medical Center	Emergency Preparedness Manager	Healthcare Facility
Happy Hippopotamus Daycare Academy	General Representative	Private Organization / Vulnerable Populations
Harrison County	Fire Marshal	Neighboring Community
Havencare Nursing & Rehabilitation Center	Administrator	Healthcare / Nursing Home
Judson Metro FD	Fire Chief	Community Organization
Kandyland Kampus Preschool	General Representative	Academia / Vulnerable Populations
KETK	New Photographer	Community Organization+
Kilgore College	Grant Writer	Academia
Kilgore FD	Fire Chief	Community Organization+
Kilgore Independent School District	Superintendent	Academia
Legend Oaks Healthcare and Rehabilitation Center	Administrator	Healthcare / Nursing Home
LeTourneau University and Belcher Center	Chief Information Officer	Academia
LeTourneau University and Belcher Center	President	Academia
Liberty City Water	General Manager	Utility Provider+

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AGENCY	TITLE	STAKEHOLDER TYPE
Liberty Danville WSC	General Representative	Utility Provider
Longview Childcare Development Center	General Representative	Academia / Vulnerable Populations
Longview EMS	Section Chief	Healthcare Facility
Longview FD	Assistant Chief	Community Organization+
Longview FD	Accounting Supervisor	Community Organization+
Longview FD	Fire Analyst	Community Organization+
Longview Independent School District	Superintendent	Academia
Longview Regional Hospital	Safety Officer	Healthcare Facility
Longview University Center - UT Tyler	Director	Academia
National Weather Service (NWS)	Assistant Administrator	Federal Agency
National Weather Service (NWS)	Deputy Administrative Assistant	Federal Agency
NOAA	Assistant Administrator for Data and Information	Federal Agency
NOAA	Deputy Administrative Assistant for Data and Information	Federal Agency
Oakland Heights CDC	Outreach Minister	Academia / Vulnerable Populations
Pine Tree Lodge Nursing Center	Administrator	Healthcare / Nursing Home
Pine Tree Independent School District	Superintendent	Academia
Rusk County	Emergency Management Coordinator / Fire Marshal	Neighboring Community
RUSK County Electric Cooperative Inc	COO	Utility Provider
Sabine VFD	Executive Assistant	Community Organization+
Sabine VFD	Fire Chief	Community Organization+
Small Steps Learning Academy	General Representative	Academia / Vulnerable Populations
Smith County	Emergency Management Coordinator	Neighboring Community
Spring Hills Independent School District	Superintendent	Academia

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AGENCY	TITLE	STAKEHOLDER TYPE
State Legislature	District House 7	State Agency
State Senate	District 1	State Agency
Texas A&M AgriLife Extension	Gregg County Representative	State Agency
Texas Commission on Environmental Quality (TCEQ)	Region 5, Executive Assistant	State Agency
Texas Department of Emergency Management (TDEM)	District Representative	State Agency
Texas Department of Emergency Management (TDEM)	Mitigation Planner	State Agency+
Texas Department of Health Services	Deputy Regional Director	State Agency
Texas Department of Health Services	Preparedness and Response Planner	State Agency
Texas Department of Housing and Community Affair	Public Relations	State Agency
Texas Department of Transportation (TXDOT)	Longview Office Representative	State Agency
Texas Department of Transportation (TXDOT)	Tyler District Engineer	State Agency
Texas Floodplain Management	District 7 Director	State Agency
Texas Forest Service	Resource Specialist	State Agency
Texas Water Development Board	Region D, Planner	State Agency
Texas Water Development Board	Region D, Team 3 Manager	State Agency
Texas Windstorm Insurance Association	Public Information Coordinator	State Agency
Trinity School of Texas	Head of School	Academia / Vulnerable Populations
Tryon Water	Administrative Assistant	Utility Provider
Upshur	Emergency Management Coordinator	Neighboring Community
U.S. Army Corps of Engineers	Southwester Division	Federal Agency
U.S. Fish and Wildlife	Austin Ecological Field Office, Field Supervisor	Federal Agency

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AGENCY	TITLE	STAKEHOLDER TYPE
U.S. Fish and Wildlife	Austin Ecological Field Office, Public Affairs Specialist	Federal Agency
U.S. Fish and Wildlife	Austin Ecological Field Office, State Coordinator for Texas	Federal Agency
West Gregg SUD	General Representative	Utility Provider
White Oak Independent School District	Superintendent	Academia
White Oak VFD	Fire Chief	Community Organization
Woodland Hills Day School	Administrative Assistant	Academia / Vulnerable Populations

Stakeholders and participants from neighboring communities that attended the Planning Team and public meetings played a key role in the planning process. For example, public education and emergency services were two of the biggest concerns to stakeholders, so participating jurisdictions included actions to promote early warning and communication, community education on mitigation efforts, and establishing partnerships to promote response efforts and extreme weather event.

PUBLIC MEETINGS

A series of public meetings were held throughout the planning area to collect public and stakeholder input. Topics of discussion included the purpose of hazard mitigation, discussion of the planning process, and types of natural hazards. Each participating jurisdiction within Gregg County released information regarding the public meetings in their area to increase public participation in the Plan Update development process, through posting on their website, on social media sources including Facebook, through the local media, and/or posting the information on bulletin boards in public facilities. A sampling of these notices can be found in Appendix E, along with the documentation on the public meetings. Representatives from area neighborhood associations and area residents were invited to participate.

Public meetings were held on the following dates:

- October 30, 2023, Longview Convention Complex
- December 11, 2023, Longview Convention Complex

PUBLIC PARTICIPATION SURVEY

In addition to public meetings, the Planning and Consultant Teams developed a public survey designed to solicit public input during the planning process from citizens and stakeholders and to obtain data regarding the identification of any potential hazard mitigation actions or problem areas. The survey was promoted by local officials and a link to the survey was posted on participating jurisdictions’ websites. A total of 28 surveys were completed online. The survey results are analyzed in Appendix B. Participating jurisdictions within Gregg County reviewed the input from the surveys and decided which information to incorporate into the Plan as hazard mitigation actions. For example, results indicate that thunderstorm wind (windstorm) and tornado

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are the hazards of highest concern for the public and retrofitting or constructing infrastructure to reduce hazard impact was among the most desired type of mitigation actions. As a result, the Planning Team has included mitigation actions related to infrastructure such as drought mitigation upgrades at critical facilities, acquiring and installing generators at critical facilities, and cleaning and upgrading major culvert areas that are prone to flooding.



SECTION 3
COUNTY PROFILE

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OVERVIEW

Gregg County comprises 276 square miles of northeastern Texas, with 273 square miles being made up of land and the rest consisting of water. The City of Longview, the county seat, sits 130 miles east of the City of Dallas and 65 miles west of Shreveport, Louisiana. Directly surrounding Gregg County are Upshur County to the north, Rusk County to the south, Smith County to the west, and Harrison County to the east. Gregg County, along with Rusk and Upshur counties, lies within the Longview metropolitan statistical area, with the City of Longview being the most densely populated location in the region.

Gregg County is within the East Texas timberlands, characterized by gently sloping to hilly terrain and well-drained to moderately well-drained loamy and gravelly soils. The region’s rolling topography ranges from elevations of 230 to 524 feet above sea level. The Sabine River runs northwest to southeast through the county, with multiple streams draining into it. Temperatures range from an average high of 96 degrees Fahrenheit (°F) in July to an average low of 38°F in January. Rainfall averages 47.18 inches per year, and the growing season extends for 247 days. Mineral resources in the county include oil and gas, sand, and gravel; the most important agricultural products grown in the region historically include cotton, corn, cattle, and hay.

Before the Civil War, the land that would become Gregg County was occupied by various Native American groups, including Caddo and Cherokee tribes. Land patents were first issued in the area in 1835 by the Republic of Mexico, and were later recognized by the Republic of Texas, leading to the development of early settlements including Camden, Peatown, Danville, Pine Tree, and Bethel.

Gregg County was officially organized in 1873 following the Civil War, with the county being carved out from portions of Harrison, Rusk, and Upshur counties. The bill creating the county originally called the new county Roanoke, but the name was changed to honor Confederate General John B. Gregg before the bill’s eventual passage through the Texas Legislature.

In the decades following Gregg County’s inception, the county’s population grew steadily, sometimes rapidly (population increased by more than 500 percent between 1930 and 1940), largely due to the East Texas oilfield discoveries in 1931 and the growth of related industries. The oil boom in the 1930s greatly increased the region’s population and led to rapid infrastructure developments including a jail, courthouse, highway, and school buildings that were all erected during the decade. Expansions in the retail and manufacturing industries also buoyed the county’s

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growth until the recession in the East Texas oil industry began impacting the region in the 1980s when growth began to slow down.¹

The oil and natural gas, manufacturing, retail, and agribusiness industries have all played a vital role in Gregg County's growth and the opportunities that are available in the area today. Other landmark establishments in the county include the Texas Eastman plant, the largest petrochemical complex in inland Texas (1950); the Schlitz Brewery (1964); and the construction of Interstate Highway 20 in 1964 which affixed the county to a major east-west transportation artery.²

Figure 3-1 shows the general location of Gregg County along with the cities that are located within the county.

Figure 3-1. Location of Gregg County

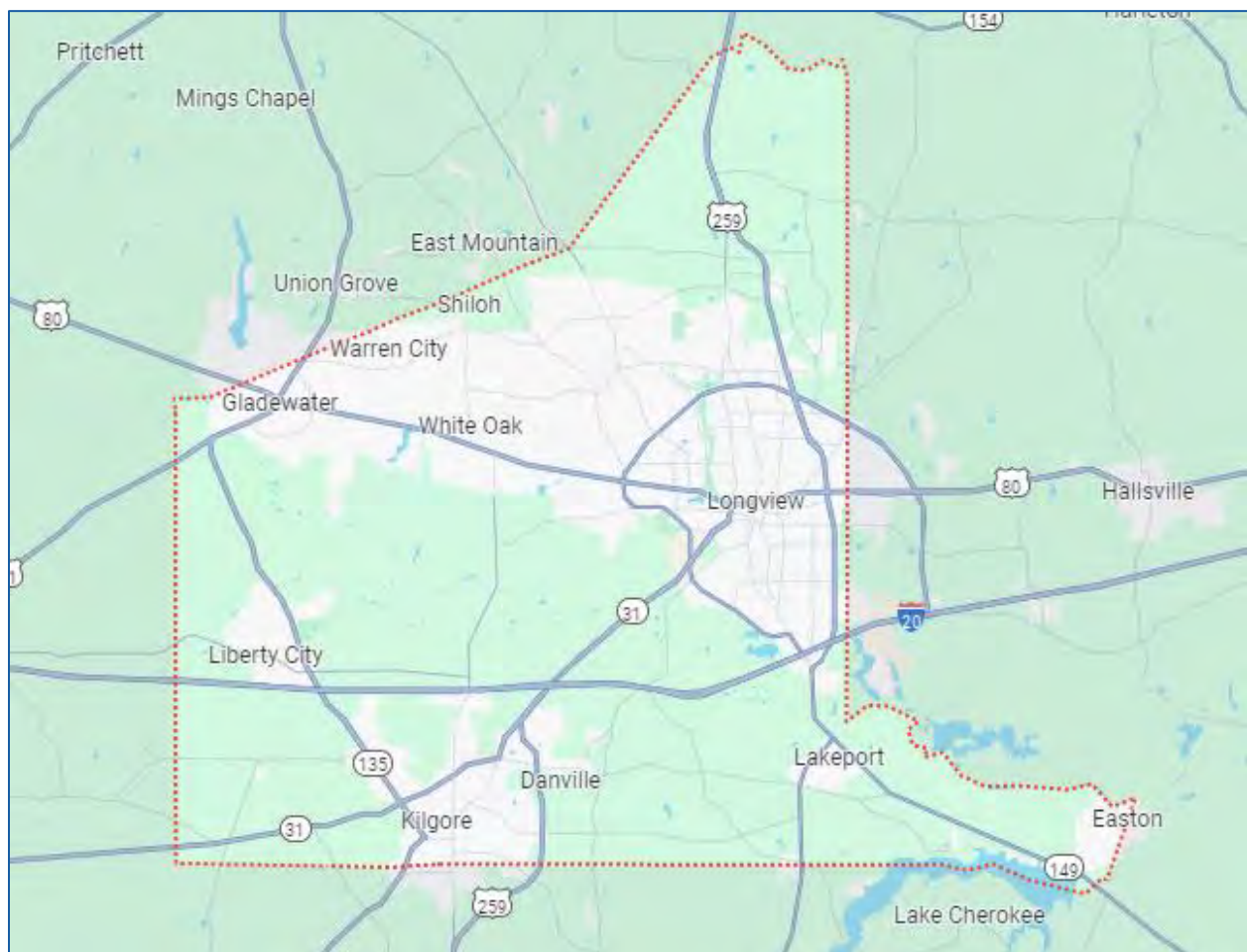


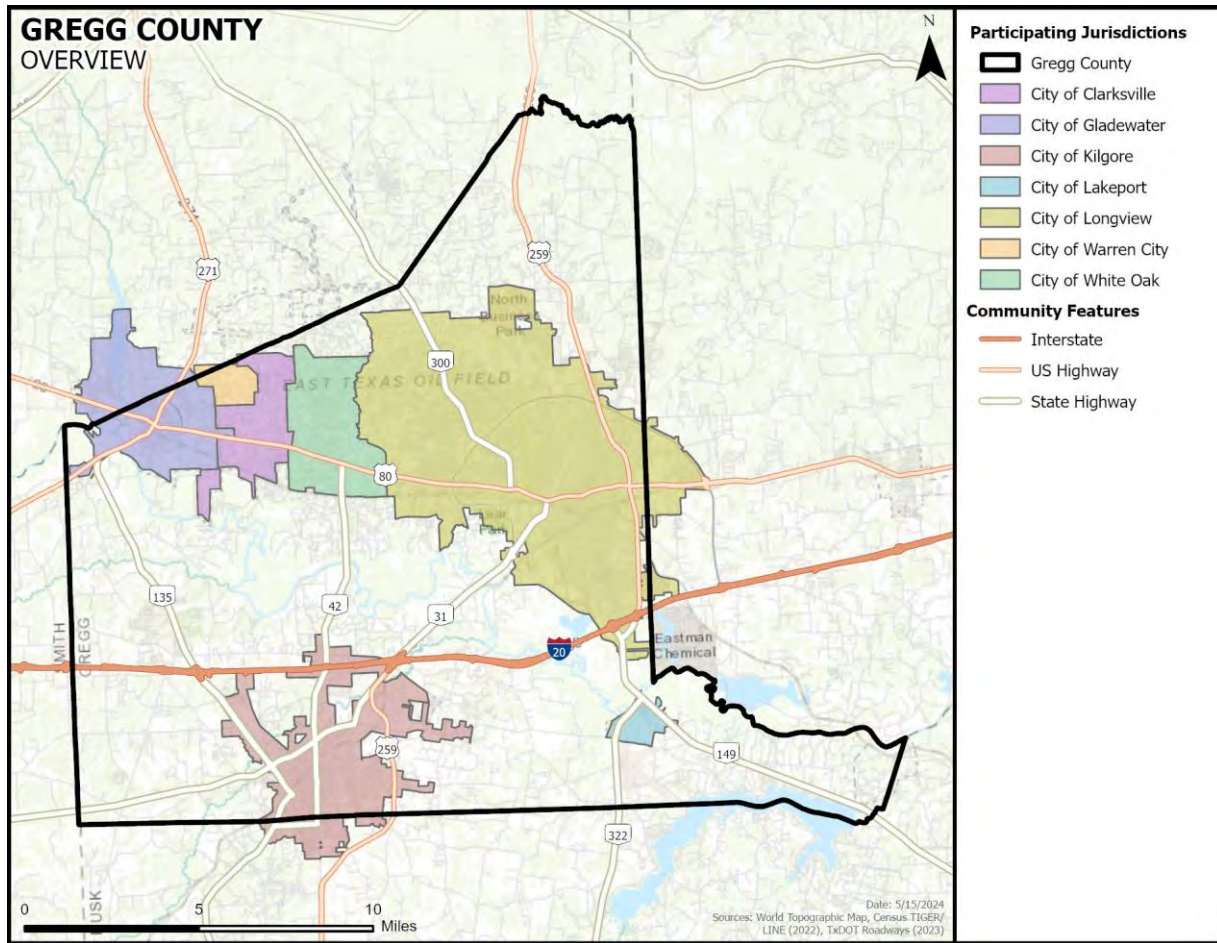
Figure 3-2 shows the participating jurisdictions within Gregg County that are covered in the risk assessment analysis of the Plan Update.

¹ Perry, Suzanne, Gregg County, Texas State Historical Association
<https://www.tshaonline.org/handbook/entries/gregg-county>

² Source: <https://www.co.gregg.tx.us/history>

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Figure 3-2. Gregg County Planning Area³



Provided in Table 3-1 below is a listing of the jurisdictions Gregg County that participated in the Gregg County Hazard Mitigation Action Plan Update 2024.

Table 3-1. Participating Jurisdictions

PARTICIPATING JURISDICTIONS	
Gregg County	
City of Clarksville City	City of Gladewater
City of Kilgore	City of Lakeport
City of Longview	City of Warren City
City of White Oak	East Texas Council of Governments

³ Note, East Texas Council of Governments' boundary includes all of Gregg County. Refer to Figure 3-3.

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POPULATION AND DEMOGRAPHICS

According to the 2020 Census population count, Gregg County has an official population of 124,239 residents, a 2 percent increase since the 2010 census. Table 3-2 summarizes recent trends in populations in Gregg County and the participating jurisdictions using data from the U.S. Census Bureau 2022 American Community Survey (ACS) five-year estimates. Note that in some cases the 2022 ACS estimates may differ from the 2020 Census counts; the ACS estimates are used throughout this section for consistency.⁴

Table 3-2. Population Distribution by Jurisdiction

JURISDICTION	TOTAL 2010 POPULATION	TOTAL 2020 POPULATION (Decennial Census)	TOTAL 2022 POPULATION (ACS 5-Year Estimates)	PERCENT CHANGE 2010-2022
City of Clarksville City	865	780	1,009	17%
City of Gladewater	6,441	6,134	6,166	-4%
City of Kilgore	12,975	13,376	13,400	3%
City of Lakeport	974	1,097	1,389	43%
City of Longview	80,455	81,638	81,967	2%
City of Warren City	307	319	378	23%
City of White Oak	6,469	6,221	6,227	-4%
Unincorporated Gregg County	13,244	14,674	13,709	4%
Gregg County	121,730	124,239	124,245	2%

Table 3-3 summarizes select characteristics of vulnerable or sensitive populations in Gregg County and the participating jurisdictions using data from the U.S. Census Bureau 2022 American Community Survey (ACS) five-year estimates.

Between official U.S. Census population counts, the estimate uses a formula based on new residential building permits and household size. It is simply an estimate and there are many variables involved in achieving an accurate estimation of people living in an area at a given time.

⁴ Source: <https://demographics.texas.gov/Data/Decennial/2010/>, <https://www.census.gov/en.html> and <https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/2021/>

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Table 3-3. Estimated Vulnerable or Sensitive Populations⁵

JURISDICTION	ELDERLY (over 65)	YOUTH (under 5)	WITH A DISABILITY	BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Clarksville City	164	66	514	126	35
City of Gladewater	858	669	998	1,955	267
City of Kilgore	2,117	894	1,788	2,211	2,669
City of Lakeport	113	112	116	232	187
City of Longview	12,786	5,296	9,987	14,016	14,867
City of Warren City	76	27	71	51	22
City of White Oak	689	410	857	623	304
Unincorporated Gregg County	2,676	758	1,606	1,518	1,429
Gregg County	19,479	8,232	15,937	20,500	19,780

POPULATION GROWTH

The official 2020 Gregg County population is 124,239. Overall, Gregg County experienced an increase in population between 1990 and 2020 of 19 percent, or an increase by 19,291 residents. Between 2010 and 2020, the cities of Clarksville City (-10%), Gladewater (-5%) and White Oak (-4%) were the only jurisdictions to experience a population decline, while the other participating jurisdictions, including Gregg County experienced varying degrees of population growth. Table 3-4 provides historic growth rates in Gregg County.

Table 3-4. Population Growth by Jurisdictions 1990-2020⁶

JURISDICTIONS	1990	2000	2010	2020	POP CHANGE 1990- 2020	PERCENT OF CHANGE	POP CHANGE 2010- 2020	PERCENT OF CHANGE
City of Clarksville City	720	806	865	780	60	8%	-85	-10%
City of Gladewater	6,027	6,078	6,441	6,134	107	2%	-307	-5%
City of Kilgore	11,066	11,301	12,975	13,376	2,310	21%	401	3%
City of Lakeport	710	861	974	1,097	387	55%	123	13%
City of Longview	70,311	73,344	80,455	81,638	11,327	16%	1,183	1%
City of Warren City	250	343	307	319	69	28%	12	4%

⁵ The Estimated Vulnerable or Sensitive Populations are based off the 2022 American Community Survey 5-Year Estimates Data Profiles.

⁶ U.S. Census Bureau

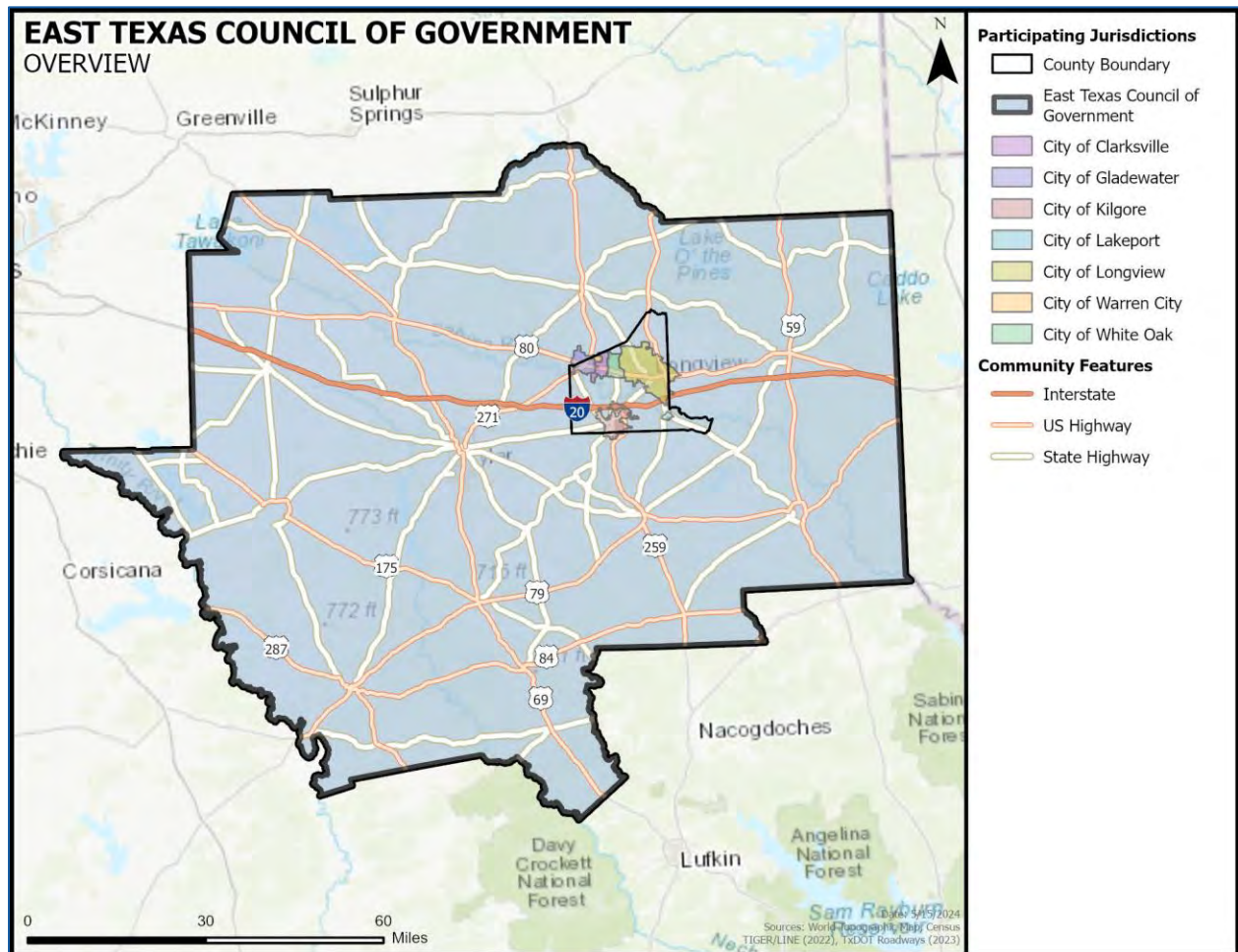
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JURISDICTIONS	1990	2000	2010	2020	POP CHANGE 1990-2020	PERCENT OF CHANGE	POP CHANGE 2010-2020	PERCENT OF CHANGE
City of White Oak	5,136	5,624	6,469	6,221	1,806	35%	-248	-4%
Unincorporated Gregg County	10,728	13,022	13,244	14,674	3,946	37%	1,430	11%
Gregg County	104,948	111,379	121,730	124,239	19,291	18%	2,509	2%

EAST TEXAS COUNCIL OF GOVERNMENTS

Figure 3-3 shows the participating special district, East Texas Council of Governments (ETCOG), that is covered in the risk assessment analysis of the Gregg County Hazard Mitigation Action Plan Update 2024.

Figure 3-3. ETCOG including the Gregg County Planning Area



ETCOG is a voluntary association of counties, cities, school districts, and special districts within the 14-county East Texas region. ETCOG assists local governments in planning for common needs, cooperating for mutual benefit and coordinating for sound regional development.

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Programs and services include those for East Texas seniors, employers, and job seekers; building 911 emergency call delivery systems; providing peace officer training and homeland security planning services; delivering rural transportation services; business finance programs; grant writing services; and environmental grant funding for the region. ETCOG’s mission is to improve the quality of life for all citizens within the region by pledging all of its resources to educate and assist its members to accomplish their goals.

In addition to Gregg County, ETCOG serves the following counties: Anderson, Camp, Cherokee, Harrison, Henderson, Marion, Panola, Rains, Rusk, Smith, Upshur, Van Zandt, and Wood.

Table 3-5 provides the number of people employed and served by ETCOG.

Table 3-5. ETCOG Population

SPECIAL DISTRICT	EMPLOYEES	POPULATION SERVED	ESTIMATED VULNERABLE OR SENSITIVE POPULATIONS
			Staff Works Outdoors
East Texas Council of Governments	149	865,047	41

ECONOMIC IMPACT

Building and maintaining infrastructure depends on the economy, and therefore, protecting infrastructure from risk due to natural hazards in the planning area is important to the participating jurisdictions within Gregg County. Whether it’s expanding culverts under a road that washes out during flash flooding, shuttering a fire station, or flood-proofing a wastewater facility, infrastructure must be mitigated from natural hazards in order to continue providing essential utility and emergency response services in a fast-growing planning area.

Based on the American Community Survey 2022 estimates, 45 percent of the population 16 years and over is employed in the labor force. The per capita income is \$49,191 and the median household income countywide is \$61,496. It is estimated that 40 percent of households have incomes below \$50,000. Families with incomes below the poverty level in 2022 made up 16 percent of all families. Of families that have children under 18 years old, 17 percent are below the poverty level.

Table 3-6 and Table 3-7 show the various occupations and industries within Gregg County, according to the 2022 estimates by the American Community Survey.

Table 3-6. Occupations of Employed Population in Gregg County⁷

OCCUPATION	ESTIMATE	PERCENT
Civilian employed population 16 years and over	56,072	-
Management, business, science, and arts occupations	16,822	30%
Sales and office occupations	12,662	22%

⁷ 2022 American Community Survey 5-Year Estimates Data Profiles

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OCCUPATION	ESTIMATE	PERCENT
Production, transportation, and material moving occupations	11,676	21%
Service occupations	9,563	17%
Natural resources, construction, and maintenance occupations	5,349	10%

Table 3-7. Industries of Employed Population in Gregg County⁸

INDUSTRY	ESTIMATE	PERCENT
Civilian employed population 16 years and over	56,072	-
Educational services, and health care and social assistance	10,812	19%
Retail trade	8,076	14%
Manufacturing	6,309	11%
Professional, scientific, and management, and administrative and waste management services	5,280	9%
Transportation and warehousing, and utilities	5,188	9%
Arts, entertainment, and recreation, and accommodation and food services	4,026	7%
Finance and insurance, and real estate and rental and leasing	3,788	7%
Construction	3,502	6%
Other services, except public administration	3,157	6%
Public administration	2,832	5%
Wholesale trade	1,275	2%
Agriculture, forestry, fishing and hunting, and mining	966	2%
Information	861	2%

NATURAL, CULTURAL, AND HISTORIC RESOURCES

Gregg County’s territory is composed of 273 square miles of land with an elevation ranging from 230 to 524 feet above sea level. Temperatures in the area range from an average high of 96°F in July to an average low of 38°F in January. Gregg County lies almost totally within the Carrizo-Wilcox aquifer. Like much of East Texas, the county falls within the Pineywoods ecoregion of Texas. The Pineywoods of Texas are part of a much larger region of pine-hardwood forest which extends into Louisiana, Arkansas, and Oklahoma. This region is characterized by rolling terrain

⁸ 2022 American Community Survey 5-Year Estimates Data Profiles

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covered with pines and oaks, as well as rich bottomlands and tall hardwoods. The soils are generally acidic and mostly pale to dark gray sands or sandy loams. Common vegetation includes pine, oak, white ash, red maple, and other plants associated with hardwood forests. Common wildlife includes bobcats, Virginia opossums, striped skunks, eastern gray squirrels, as well as white-tailed deer, which are popular game for hunting in the region.⁹

Gregg County's lies almost completely within the Sabine River Basin and its defining water resource is the Sabine River, which runs through the county from northwest to southeast. Many of the other streams found within the county drain into the Sabine River, including Prairie Creek, Moody Creek, Hawkins Creek, Bullhide Slough, and Grace Creek. Other water resources in the county include Lake Cherokee, located along the county's southern edge 12 miles southeast of the City of Longview. The lake supplies water for municipal, industrial, and recreational purposes, with the City of Longview diverting water for municipal use. The lake has a capacity of 44,475 acre-feet and a surface area of 3,749 acres.¹⁰ Numerous other bodies of water in and around the county, such as Lake Gladewater, Lear Park Pond, and Lake Devernia provide additional water resources and opportunities for recreation such as fishing.

Oil and natural gas are integral resources to the development of Gregg County, as the area's growth exploded following the discovery of oil in the area in 1931. Since that year, more than three billion barrels of oil have been produced in the area, though production has dropped steadily since 1972. In the early twenty-first century, oil, along with manufacturing, tourism, lignite mining, and agribusiness, remained a central element of the area's economy.¹¹

Natural resources are an important asset to the Gregg County planning area; the City of Longview alone oversees more than 30 parks, nature centers, trails, and sports facilities. Residents and tourists can explore the Pineywoods through the nature trails located at many of these sites, including The Green, Teague Park, Paul G. Boorman Trail, Julieanna Park, and Grace Creek Mountain Bike Trail. Other recreational opportunities abound throughout the parks system, including the Dodson Action Sports Complex at Ingram Park, as well as several splash pads, disc golf courses, and athletic complexes located throughout the Gregg County planning area.¹² Additionally, the City of Longview is currently in the process of updating their Parks Master Plan, which was last updated as a section in the 2015 Comprehensive Plan. The Parks Master Plan update will help residents and staff understand the history and current barriers to park access while setting a vision to remove those inequities and ensure parks and open spaces are providing the most benefit to communities.¹³

To further understand natural resources that may be vulnerable to a hazard event, as well as those that need consideration when implementing mitigation activities, it is important to identify at-risk species (i.e., endangered species) in the planning area. A federally endangered species is any species of fish, plant life, or wildlife that is in danger of extinction throughout all or most of its

⁹ Source: <https://tpwd.texas.gov/education/resources/texas-junior-naturalists/regions/pineywoods#:~:text=The%20East%20Texas%20region%20is,as%20elm%2C%20mesquite%20and%20ash.>

¹⁰ Source: <https://www.twdb.texas.gov/surfacewater/rivers/reservoirs/cherokee/index.asp>

¹¹ Perry, Suzanne, Gregg County, Texas State Historical Association
<https://www.tshaonline.org/handbook/entries/gregg-county>

¹² Source: <https://longviewtexas.gov/3889/Parks-Recreation>

¹³ Source: <https://longviewtexas.gov/4268/Parks-Master-Plan>

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range. A threatened species is a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Both endangered and threatened species are protected by federal law and any future hazard mitigation projects are subject to these laws. Candidate species are plants and animals that have been proposed as endangered or threatened but are not currently listed.

According to the U.S. Fish and Wildlife Service, as of March 2024, there are nine federally endangered, threatened, or candidate species in Gregg County, listed in Table 3-8. Additionally, three species are listed as being in recovery, those being the least tern, bald eagle, and Louisiana black bear. The statuses of two other species, the Kisatchie painted crayfish and western chicken turtle, are currently under review.

Table 3-8. Endangered Species in Gregg County¹⁴

TYPE of SPECIES	COMMON NAME	SCIENTIFIC NAME	SPECIES STATUS
Flowering Plants	Neches River Rose-Mallow	Hibiscus dasycalyx	Threatened
Reptiles	Alligator Snapping Turtle	Macrochelys temminckii	Proposed Threatened
Mammals	Tricolored Bat	Perimyotis subflavus	Proposed Endangered
Insects	Monarch Butterfly	Danaus plexippus	Candidate
Birds	Rufa Red Knot	Calidris canutus rufa	Threatened
Birds	Piping Plover	Charadrius melodus	Threatened
Clams	Texas Heelsplitter	Potamilus amphichaenus	Proposed Endangered
Flowering Plants	Texas Prairie Dawn-Flower	Hymenoxys texana	Endangered
Flowering Plants	No Common Name	Geocarpon minimum	Threatened

Gregg County has a rich history that is preserved through its designated historic buildings and sites. Throughout the county there are eight buildings and sites listed on the National Register of Historic Places, all of which are in the City of Longview. Historic buildings are vulnerable to natural hazards as their construction pre-dates modern building codes. There are also historic preservation considerations and requirements for historic structures when they are included in mitigation or recovery projects. A list of the names and locations of Gregg County’s historic sites is provided below in Table 3-9.

¹⁴ U.S. Fish and Wildlife Service, Environmental Conservation Online System <https://ecos.fws.gov/ecp/report/species-listings-by-current-range-county?fips=48183>

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Table 3-9. Historic Properties Listed on the National Register of Historic Places¹⁵

PROPERTY NAME	LOCATION	ADDRESS
Everett Building	City of Longview	214-216 Fredonia St.
Longview National Bank	City of Longview	213 North Fredonia St.
McWilliams Building	City of Longview	208 N. Green St.
Northcutt House	City of Longview	313 S. Fredonia St.
Nuggett Hill Historic District	City of Longview	Roughly bounded by W. Marshall, N. 6th, Padon, and Teague Sts.
Petroleum Building	City of Longview	202 E. Whaley St.
Rembert, Frank Taylor and Kate Womack, House	City of Longview	316 S. Fredonia St.
Whaley House	City of Longview	101 E. Whaley St.

EXISTING LAND USE AND DEVELOPMENT TRENDS

Zoning ordinance sets forth regulations and standards related to the extent of uses of land and structures that are allowed in certain areas. A zoning map shows the areas within a community where the various zoning districts and standards are located and gives an overall picture of what types of development are located in a community and how a community intends to continue to grow. Currently, the City of White Oak is the only participating jurisdiction with a zoning ordinance in place.

A review of building permits can also give a picture of the built environment and the number of buildings that are being constructed in the County and each jurisdiction. Table 3-10 lists the number of residential buildings and total units authorized through a permit from each jurisdiction, where data was available, between 2018 and 2022. The data includes total buildings and total units permitted. Permits are reported annually in September and the data includes that from 2018 through 2022 to demonstrate growth. Of the residential building permits issued in this period, over 96 percent (1,160 buildings) were for single-family buildings and 4 percent (50 buildings) for multi-family buildings. Housing type can also be an indication of an individual's ability to recover from a disaster.

¹⁵ National Register of Historic Places

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Table 3-10. Building Permits, By Jurisdiction, 2018-2022¹⁶

JURISDICTION	2018		2019		2020		2021		2022	
	Total Buildings	Total Units	Total Buildings	Total Units	Total Buildings	Total Units	Total Buildings	Total Units	Total Buildings	Total Units
City of Clarksville City	8	8	2	2	2	2	0	0	1	2
City of Gladewater	4	4	13	18	15	15	13	14	7	10
City of Kilgore	24	24	24	24	30	30	15	15	21	22
City of Lakeport	3	3	3	3	1	1	3	3	1	1
City of Longview	133	204	155	166	218	225	233	325	266	402
City of Warren City*	-	-	-	-	-	-	-	-	-	-
City of White Oak	0	0	1	1	1	2	3	6	10	2
Grand Total	172	243	198	214	267	275	267	363	306	447

*Data for jurisdiction was not included in the database

Certain types of housing found in the Gregg County planning area are more vulnerable than typical site-built, newly constructed residential structures. This includes mobile or manufactured homes, of which there are 4,086 (8 percent of total housing stock) in the planning area. Additionally, single-family residences (SFR) built before 1980 are typically built to lower or less stringent construction standards than newer construction, making these homes more susceptible to damage during hazard events. These older homes make up 52 percent (approximately 27,666 structures) of housing stock in the planning area. Table 3-11 includes housing inventory data for the participating jurisdictions per the American Community Survey five-year estimates.

Table 3-11. Housing Inventory and Vulnerable Structures, By Jurisdiction¹⁷

JURISDICTION	TOTAL HOUSING UNITS	BUILT PRIOR TO 1980	MOBILE HOMES
City of Clarksville City	391	184	98
City of Gladewater	2,545	1,648	27
City of Kilgore	5,289	3,609	313
City of Lakeport	441	151	56
City of Longview	20,268	20,107	1,251
City of Warren City	161	97	8

¹⁶ U.S. Census Bureau, Building Permit Survey, 1992-2022, <https://www.census.gov/construction/bps/>

¹⁷ The Housing Inventory and Vulnerable Structures are based off the 2022 American Community Survey 5-Year Estimates Data Profiles.

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JURISDICTION	TOTAL HOUSING UNITS	BUILT PRIOR TO 1980	MOBILE HOMES
City of White Oak	2,410	1,193	236
Unincorporated Gregg County	21,760	677	2,097
Gregg County	53,265	27,666	4,086

CHANGES IN VULNERABILITY

The Gregg County planning area has experienced an increase in overall population of 2 percent between 2010 and 2020. The American Community Survey estimates the 2022 total housing units for the planning area to be 53,265. The total building permits issued between 2018 and 2022 represent approximately 2.3% of the total housing units available in the planning area. The overall population increase, combined with the increase in housing units indicates a slight increase in vulnerability to all hazards in terms of populations and the built environment. Changes in vulnerability vary by jurisdiction based on each jurisdiction's trends in population and development.

FUTURE GROWTH AND DEVELOPMENT

To better understand how future growth and development in Gregg County might affect hazard vulnerability, it is useful to consider population growth, occupied and vacant land, the potential for future development in hazard areas, and current planning and growth management efforts. This section includes an analysis of the projected population change and economic impacts.

Population projections from 2010 to 2050 are listed in Table 3-12, as provided by the Office of the State Demographer, Texas State Data Center, and the Institute for Demographic and Socioeconomic Research. Population projections are based on a 0.5 scenario growth rate, which is 50 percent of the population growth rate that occurred during 2000-2010. This information is only available at the county level; however, the population projection shows an increase in population density for the county, which would mean overall growth for the county.

Table 3-12. Gregg County Population Projections¹⁸

LAND AREA (SQ MI)	2010		2020		2030		2040		2050	
	Population									
	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)
273	121,730	445.2	124,239	454.4	127,694	467.1	126,877	464.1	123,972	453.4

¹⁸ Office of the State Demographer, Texas State Data Center, and the Institute for Demographic and Socioeconomic Research

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Comprehensive Plans are guiding documents in a community that sets forth a vision, goals, policies, and guidelines to direct future physical, social and economic development that will occur within a jurisdiction. Comprehensive Plans are part of a continuous process to provide an environment for the citizens and to consider the general desire of the community to conserve, preserve, and protect the natural environment of their jurisdiction. These plans are used to guide city staff, decision-makers, and citizens in making decisions which affect the community with the understanding of the long-term effects. The following is a summary of a sample of Comprehensive Plans participating jurisdictions in Gregg County have in place. Refer to Appendix F Capability Assessment for a complete list of participating jurisdictions with Comprehensive Plans.

The City of Kilgore 2030 Comprehensive Plan, adopted in 2021, serves as a road map for the next 10-20 years and will help guide decisions related to land use, downtown, transportation, and housing. It describes the City of Kilgore's current challenges, goals, objectives, and makes policy and action recommendations to progress towards achieving those goals, including making the City of Kilgore a great location for businesses and development, emphasizing quality of life for all people, and being a vibrant city with a strong sense of place. The plan includes future projections of development and population, as well as recommended land use and housing initiatives.

The City of Longview is currently updating their previous Comprehensive Plan, which was adopted on March 12, 2015. The most recent draft of the updated plan provides goals and objectives for the City of Longview in a variety of areas, including education, business opportunities, cultural diversity, heritage, natural beauty, and safety. Additionally, the plan includes actionable strategies to accomplish these goals, as well as analyses of future land use and neighborhood and community livability.



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RISK OVERVIEW

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HAZARD DESCRIPTION

Section 4 is the first phase of the Risk Assessment, providing background information for the hazard identification process and descriptions for the hazards identified. The Risk Assessment continues with Sections 5 through 16, which include hazard descriptions and vulnerability assessments.

Upon a review of the full range of natural hazards suggested under FEMA planning guidance, participating jurisdictions within Gregg County identified ten natural hazards and two human-caused hazards that are addressed in the Hazard Mitigation Plan Update and were identified as significant, as shown in Table 4-1. The hazards were identified through input from Planning Team members and a review of the current 2023 State of Texas Hazard Mitigation Plan (State Plan). Readily available online information from reputable sources such as federal and state agencies were also evaluated and utilized to supplement information as needed.

In general, there are three main categories of natural hazards: atmospheric, hydrologic, and technological. Atmospheric hazards are events or incidents associated with weather generated phenomenon. The following have been identified as significant for the planning area include extreme heat, hail, lightning, thunderstorm wind, tornado, and winter storm (Table 4-1).

Hydrologic hazards are events or incidents associated with water-related damage and account for over 75 percent of federal disaster declarations in the United States. Hydrologic hazards identified as significant for the planning area include flood and drought.

Technological hazards refer to the origins of incidents that can arise from human activities, such as the construction and maintenance of dams. They are distinct from natural hazards primarily because they originate from human activity. The risks presented by natural hazards may be increased or decreased as a result of human activity, however they are not inherently human-induced. Therefore, dam failure is classified as a quasi-technological hazard and referred to as “technological” in Table 4-1 for purposes of description.

For the Risk Assessment, the wildfire hazard is considered “other,” since this hazard is not considered atmospheric, hydrologic, nor technological.

Human-caused hazards are events or incidents caused by human intent, human error, or as a result of failed systems. These hazards can be caused or exacerbated by either accidental or intentional human actions that result in the loss of life or property. The human-caused hazards identified as significant for the county include hazardous materials and infectious disease.

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Table 4-1. Hazard Descriptions

HAZARD	DESCRIPTION
ATMOSPHERIC	
Extreme Heat	Extreme heat is the condition whereby temperatures hover ten degrees or more above the average high temperature in a region for an extended period of time.
Hail	Hailstorms are a potentially damaging outgrowth of severe thunderstorms. Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere and subsequent cooling of the air mass.
Lightning	Lightning is a sudden electrostatic discharge that occurs during an electrical storm. This discharge occurs between electrically charged regions of a cloud, between two clouds, or between a cloud and the ground.
Thunderstorm Wind	A thunderstorm occurs when an observer hears thunder. Radar observers use the intensity of the radar echo to distinguish between rain showers and thunderstorms. Lightning detection networks routinely track cloud-to-ground flashes, and therefore thunderstorms. Thunderstorms create extreme wind events which includes straight line winds. Wind is the horizontal motion of the air past a given point, beginning with differences in air pressures.
Tornado	A tornado is a violently rotating column of air that has contact with the ground and is often visible as a funnel cloud. Its vortex rotates cyclonically with wind speeds ranging from as low as 40 mph to as high as 300 mph. The destruction caused by tornadoes ranges from light to catastrophic, depending on the location, intensity, size, and duration of the storm.
Winter Storm	Severe winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Blizzards, the most dangerous of all winter storms, combine low temperatures, heavy snowfall, and winds of at least 35 mph, reducing visibility to only a few yards. Ice storms occur when moisture falls and freezes immediately upon impact on trees, power lines, communication towers, structures, roads, and other hard surfaces. Winter storms and ice storms can down trees, cause widespread power outages, damage property, and cause fatalities and injuries to human life.
HYDROLOGIC	
Drought	A prolonged period of less than normal precipitation such that the lack of water causes a serious hydrologic imbalance. Common effects of drought include crop failure, water supply shortages, and fish and wildlife mortality.

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HAZARD	DESCRIPTION
Flood	The accumulation of water within a body of water, which results in the overflow of excess water onto adjacent lands, usually floodplains. The floodplain is the land adjoining the channel of a river, stream, ocean, lake, or other watercourse or water body that is susceptible to flooding. Most floods fall into the following three categories: riverine flooding, coastal flooding, and shallow flooding.
OTHER	
Wildfire	A wildfire is an uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase the risk for people and property located within wildfire hazard areas or along the urban/wildland interface. Wildfires are part of the natural management of forest ecosystems, but most are caused by human factors.
TECHNOLOGICAL	
Dam Failure	Dam failure is the collapse, breach, or other failure of a dam structure resulting in downstream flooding. 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 of the dam.
HUMAN-CAUSED	
Hazardous Materials	Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. A hazardous material (HAZMAT) incident involves a substance outside normal safe containment in sufficient concentration to pose a threat to life, property, or the environment.
Infectious Disease	A clinically evident disease resulting from the presence of pathogenic microbial agents. These infecting agents may be transmitted through liquids, food, bodily fluids, contaminated objects, airborne inhalation, or through vector-borne dissemination.

Hazards that were not considered significant and were not included in the Plan Update are located in Table 4-2, along with the evaluation process used for determining the significance of each of these hazards. Hazards not identified for inclusion at this time may be addressed during future evaluations and updates.

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Table 4-2. Other Hazards Deferred

HAZARD CONSIDERED	REASON FOR DETERMINATION
Coastal Erosion	The planning area is not located on the coast, therefore coastal erosion does not pose a risk.
Earthquake	According to the State Plan, an earthquake occurrence for the Gregg County planning area is considered exceedingly rare. Although a small event is possible, it would pose little to no risk for the area. There is no history of impact to critical structures, systems, populations or other community assets or vital services as a result of earthquake and none is expected in the future.
Expansive Soils	There is no history of impact to critical structures, systems, populations or other community assets or vital services as a result of expansive soils and none is expected in the future.
Hurricane Wind	The planning area is located over 150 miles from the Gulf Coast and is not subject to direct hurricane wind impacts. The remnants of tropical systems passing across the planning area may cause significant thunderstorm winds, lightning, and excessive rainfall. Impacts associated with these historical events are covered under thunderstorm wind, lightning or flood hazard profiles.
Land Subsidence	There are no historical occurrences of land subsidence for the planning area and it is located in an area where occurrences are considered rare. There is no history of impact to critical structures, systems, populations or other community assets or vital services as a result of land subsidence and none is expected in the future.

DISASTER DECLARATION HISTORY

One method of understanding hazards that pose a risk to Gregg County is to identify past hazard events that triggered federal or state disaster declarations. Federal and state declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. Table 4-3 lists state and federal disaster declarations received by Gregg County. Many of the disaster events were regional or statewide.

Between 1953 and 2023 Gregg County received 22 federal disaster declarations. Out of the 22 federally declared disasters, the highest number (6) were related to hurricane¹, followed by declarations for wildfire (4), flood (3), severe ice storm (3), severe storm (2), biological (2), tornado (1), and other (1).

In addition to the 22 federally declared disasters, there have been 19 U.S. Department of Agriculture (USDA) Secretarial disaster designations between 2012 and 2023. The Secretary of Agriculture is authorized to designate counties as disaster areas to make emergency loans available to producers suffering losses in those counties and in counties that are contiguous to a

¹ Gregg County does not experience direct impacts from hurricanes. Tropical storm and hurricane disaster declarations typically include multiple inland counties due to the excessive precipitation, thunderstorm wind, and lightning associated with the remnants of tropical systems as they track inland before dissipating.

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designated county.² Of the 19 USDA designations for Gregg County, many listed multiple factors as having caused the disaster area designation. The leading cause was drought, which was included in all 19 designations. Other factors listed include excessive heat (7 designations), high wind (7), fire/wildfire (7), and insects (7).

Table 4-3. Disaster Declaration History in Gregg County, 1953-2023

YEAR	DECLARATION TITLE	HAZARD	DECLARATION TYPE	DISASTER No.
1966	Severe Storms, Flooding	Flood	DR	DR-218
1989	Severe Storms, Flooding	Flood	DR	DR-823
1989	Severe Storms, Tornado, Flooding	Severe Storms	DR	DR-828
1996	Fire Emergency	Fire	EM	EM-3117
1998	Tropical Storm Charley	Severe Storm	DR	DR-1239
1999	Severe Storms and Tornadoes	Tornado	DR	DR-1274
1999	Extreme Fire Hazards	Fire	EM	EM-3142
2000	Texas Severe Winter Storms	Severe Ice Storms	DR	DR-1356
2003	Loss of The Space Shuttle Columbia	Other	EM	EM-3171
2005	Hurricane Katrina	Hurricane	EM	EM-3216
2005	Hurricane Rita	Hurricane	EM	EM-3261
2005	Hurricane Rita	Hurricane	DR	DR-1606
2006	Extreme Wildfire Threat	Fire	DR	DR-1624
2008	Hurricane Ike	Hurricane	EM	EM-3294
2008	Hurricane Ike	Hurricane	DR	DR-1791
2011	Wildfires	Fire	DR	DR-4029
2016	Severe Storms, Tornadoes, and Flooding	Flood	DR	DR-4266
2020	Covid-19	Biological	EM	EM-3458
2020	Covid-19 Pandemic	Biological	DR	DR-4485
2020	Tropical Storms Marco and Laura	Hurricane	EM	EM-3540
2021	Severe Winter Storms	Severe Ice Storm	EM	EM-3554
2021	Severe Winter Storms	Severe Ice Storm	DR	DR-4586

² United States Department of Agriculture https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdfiles/FactSheets/emergency_disaster_designation_declaration_process-factsheet.pdf

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NATURAL HAZARDS AND CLIMATE CHANGE

Climate change is defined as a long-term shift in temperature and weather patterns. These shifts can increase or decrease the risk of natural hazards. Global climate change is expected to exacerbate the risks of certain types of natural hazards impacted through rising sea levels, warmer ocean temperatures, higher humidity, the possibility of stronger storms, and an increase in wind and flood damages due to storm surges. Texas is considered one of the more vulnerable states in the U.S. to both abrupt climate changes and to the impact of gradual climate changes to the natural and built environments.

Climate change is expected to lead to an increase in average temperatures as well as an increase in frequency, duration, and intensity of extreme heat events. With no reductions in emissions worldwide, the state of Texas is projected to experience an additional 30 to 60 days per year above 100°F than what is experienced now.³

The State Climatologist’s *Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036* identifies ongoing and likely future trends out to the year 2036 based on analysis of historic observations of temperatures, precipitation, and extreme weather. Table 4-4 highlights future trends in extreme weather from the report.

Table 4-4. Future Trends in Extreme Weather in Texas⁴⁵

HAZARDS	EXPECTED TRENDS
Extreme Temperatures	<ul style="list-style-type: none"> ● The average annual surface temperature in 2036 is expected to be 3.0°F warmer than the 1950-1999 average and 1.8°F warmer than the 1991-2020 average. ● Nearly double the number of 100°F days by 2036 compared to 2001-2020. ● Higher frequency of 100°F days in urban areas. ● The number of nighttime temperatures below 32°F are expected to decrease. ● The number of frost days per year are expected to decrease. ● The coolest days of the summer are expected to continue becoming warmer. ● The number of heatwaves per year and number of days per year classified as heatwaves are expected to increase.

³ Kloesel, K., B. Bartush, J. Banner, D. Brown, J. Lemery, X. Lin, C. Loeffler, G. McManus, E. Mullens, J. Nielsen-Gammon, M. Shafer, C. Sorensen, S. Sperry, D. Wildcat, and J. Ziolkowska, 2018: Southern Great Plains. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 987–1035. doi: 10.7930/NCA4.2018.CH23. <https://nca2018.globalchange.gov/chapter/23/>

⁴ Gammon-Nielsen, John, Holman, Sara, Buley, Austin and Jorgensen, Savannah. Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, 2021 Update. Texas A&M University Office of the Texas State Climatologist. October 7, 2021. <https://climatexas.tamu.edu/files/ClimateReport-1900to2036-2021Update>

⁵ University of Texas at Austin, February 2023, Austin Future Climate, Climate Change Predictions for the City of Austin 2022, Technical Report.

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HAZARDS	EXPECTED TRENDS
Precipitation	<ul style="list-style-type: none"> Precipitation has increased by 10 percent or more in eastern Texas, but little trend is present in western Texas. Precipitation trends to 2036 are likely to be dominated by natural variability. Extreme precipitation is expected to increase in intensity on average statewide by 6-10 percent compared to the 1950-1999 averages and 2-3 percent relative to the 2001-2020 averages. This translates to an increase in the frequency of extreme rain of 30-50 percent relative to the climatological expected frequency in 1950-1999 and 10-15 percent relative to 2001-2020. Annual precipitation is projected to increase while the number of extreme precipitation (>2") will remain relatively consistent.
Drought	<ul style="list-style-type: none"> Increasing temperatures, rainfall variability, and other factors will on balance decrease water availability, but impact changes will vary strongly across applications. Impact trends to be highly sector-specific, with the impacts possibly smaller for agriculture than for surface water supply.
Flood	<ul style="list-style-type: none"> No long-term river flooding trend has been identified in the observations, nor is such a trend projected at this point, except perhaps for the most extreme floods and areas with normally high rainfall. Urban flooding is projected to increase, both as a simple matter of urban population increase and because of the projected increase of precipitation intensity, which drives flooding in fast-response drainages like those usually found in urban areas. The climate-driven trend in urban flood frequency should be similar to the climate-driven trend in extreme precipitation frequency: 30-50 percent in 2036 relative to 1950-1999 and 10-15 percent relative to 2001-2020. Areas already experiencing flooding are likely to see an increase in frequency and magnitude of events.
Winter Weather	<ul style="list-style-type: none"> As the climate warms, the likelihood of winter weather decreases. Both extreme cold and snowfall either become less frequent or are expected to do so. Widespread snowfall events in Texas such as the one that took place in February 2021 are extremely rare. Fewer cold spells are projected to occur per year, but the length of cold spells will be longer when they do occur.
Thunderstorms (Wind, Hail, Lightning)	<ul style="list-style-type: none"> Historical trend data is unreliable. Indirect evidence supports an increase in the number of days capable of producing severe thunderstorms and an increase in the frequency of very large hail in early springtime, but these possible trends are too uncertain to quantify.

SECTION 4: RISK OVERVIEW

HAZARDS	EXPECTED TRENDS
Wildfire	<ul style="list-style-type: none"> Weather and climate drivers of wildfire risk are projected to increase the risk of wildfires throughout the state, primarily due to increased rates of drying and increased fuel load.

OVERVIEW OF HAZARD ANALYSIS

The methodologies utilized to develop the Risk Assessment are a historical analysis and a statistical approach. Both methodologies provide an estimate of potential impact by using a common, systematic framework for evaluation.

Records retrieved from National Centers for Environmental Information (NCEI) and National Oceanic and Atmospheric Administration (NOAA) were reported for participating jurisdictions within Gregg County. Remaining records identifying the occurrence of hazard events in the planning area and the maximum recorded magnitude of each event were also evaluated.

The use of geographic information system (GIS) technology to identify and assess risks for Gregg County and evaluate community assets and their vulnerability to the hazards.

The four general parameters that are described for each hazard in the Risk Assessment include frequency of return, approximate annualized losses, a description of general vulnerability, and a statement of the hazard’s impact.

Frequency of return was calculated by dividing the number of events in the recorded time period for each hazard by the overall time period that the resource database was recording events. Frequency of return statements are defined in Table 4-5, and impact statements are defined in Table 4-6 below.

Table 4-5. Frequency of Return Statements

PROBABILITY	DESCRIPTION
Highly Likely	Event is probable in the next year.
Likely	Event is probable in the next three years.
Occasional	Event is probable in the next five years.
Unlikely	Event is probable in the next ten years.

Table 4-6. Impact Statements

POTENTIAL SEVERITY	DESCRIPTION
Substantial	Multiple deaths. Complete shutdown of facilities for 30 days or more. More than 50 percent of property destroyed or with major damage.
Major	Injuries and illnesses resulting in permanent disability. Complete shutdown of critical facilities between one and four weeks. More than 25 percent of property destroyed or with major damage.

SECTION 4: RISK OVERVIEW

POTENTIAL SEVERITY	DESCRIPTION
Minor	Injuries and illnesses do not result in permanent disability. Complete shutdown of critical facilities for up to one week. More than 10 percent of property destroyed or with major damage.
Limited	Injuries and illnesses are treatable with first aid. Shutdown of critical facilities and services for 24 hours or less. Less than 10 percent of property destroyed or with major damage.

Each of the hazard profiles includes a description of a general Vulnerability Assessment. Vulnerability is the total of assets that are subject to damages from a hazard, based on historic recorded damages. Assets in the region were inventoried and defined in hazard zones where appropriate. The total amount of damages, including property and crop damages, for each hazard is divided by the total number of assets (building value totals) in that community to determine the percentage of damage that each hazard can cause to the community. Risk and consequences will be addressed and covered within each hazard profile under the Vulnerability and Impact section as well as under the Assessment of Impact sections, where applicable.

To better understand how future growth and development in the Gregg County region might affect hazard vulnerability, it is useful to consider population growth, occupied and vacant land, the potential for future development in hazard areas, and current planning and growth management efforts. Hazard vulnerability for all participating jurisdictions within Gregg County was reviewed based on recent development changes that occurred throughout the planning area. The population of Gregg County has grown by 2 percent between 2010 and 2020, according to the U.S. Census Bureau, therefore the vulnerability to the population, infrastructure, and buildings has slightly increased for hazards that do not have a geographical boundary.

Once loss estimates and vulnerability were known, an impact statement was applied to relate the potential impact of the hazard on the assets within the area of impact.

HAZARD RANKING

During the 2024 planning process, the Planning Team conducted a risk raking exercise to get input from the Planning Team and stakeholders. Table 4-7 portrays the results of the risk assessment analysis including the frequency of occurrence and potential severity and the Planning Team’s self-assessment for hazard ranking, based on local knowledge of past hazard events and impacts for each of the identified hazards. The definitions for frequency of occurrence and potential severity can be found in Table 4-5 and Table 4-6.

Table 4-7. Hazard Risk Ranking

HAZARD	FREQUENCY OF OCCURENCE	POTENTIAL SEVERITY	RANKING
NATURAL HAZARDS			
Extreme Heat	Highly Likely	Limited	High
Drought	Highly Likely	Minor	Moderate

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HAZARD	FREQUENCY OF OCCURENCE	POTENTIAL SEVERITY	RANKING
Flood	Highly Likely	Limited	Moderate
Hail	Highly Likely	Substantial	Moderate
Lightning	Highly Likely	Substantial	Moderate
Thunderstorm Wind	Highly Likely	Substantial	Moderate
Tornado	Likely	Minor	Moderate
Wildfire	Highly Likely	Substantial	Moderate
Winter Storm	Highly Likely	Substantial	Moderate
Dam Failure	Unlikely	Limited	Low
HUMAN-CAUSED HAZARDS			
Hazardous Materials	Occasional	Limited	Moderate
Infectious Disease	Unlikely	Substantial	Low



SECTION 5
DAM FAILURE

SECTION 5: DAM FAILURE

Portions of the Gregg County Hazard Mitigation Plan are considered confidential and not for release to the public. The information in this section is covered under Privacy Act of 1974 (5 U.S.C. Section 552a).



SECTION 6
DROUGHT

SECTION 6: DROUGHT

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HAZARD DESCRIPTION

Drought is a period of time without substantial rainfall that persists from one year to the next. Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall. Drought is the consequence of anticipated natural precipitation reduction over an extended period of time, usually a season or more in length. Droughts can be classified as meteorological, hydrologic, agricultural, and socioeconomic. Table 6-1 presents definitions for these different types of droughts.

Droughts are one of the most complex of all natural hazards as it is difficult to determine their precise beginning or end. In addition, droughts can lead to other hazards such as extreme heat and wildfires. Their impact on wildlife and area farming is enormous, often killing crops, grazing land, edible plants, and even in severe cases, trees. A secondary hazard to drought is wildfire because dying vegetation serves as a prime ignition source. Therefore, a heat wave combined with a drought is a very dangerous situation.

Table 6-1. Drought Classification Definitions¹

METEOROLOGICAL DROUGHT	The degree of dryness or departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
HYDROLOGIC DROUGHT	The effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
AGRICULTURAL DROUGHT	Soil moisture deficiencies relative to water demands of plant life, usually crops.
SOCIOECONOMIC DROUGHT	The effect of demands for water exceeding the supply as a result of a weather-related supply shortfall.

LOCATION

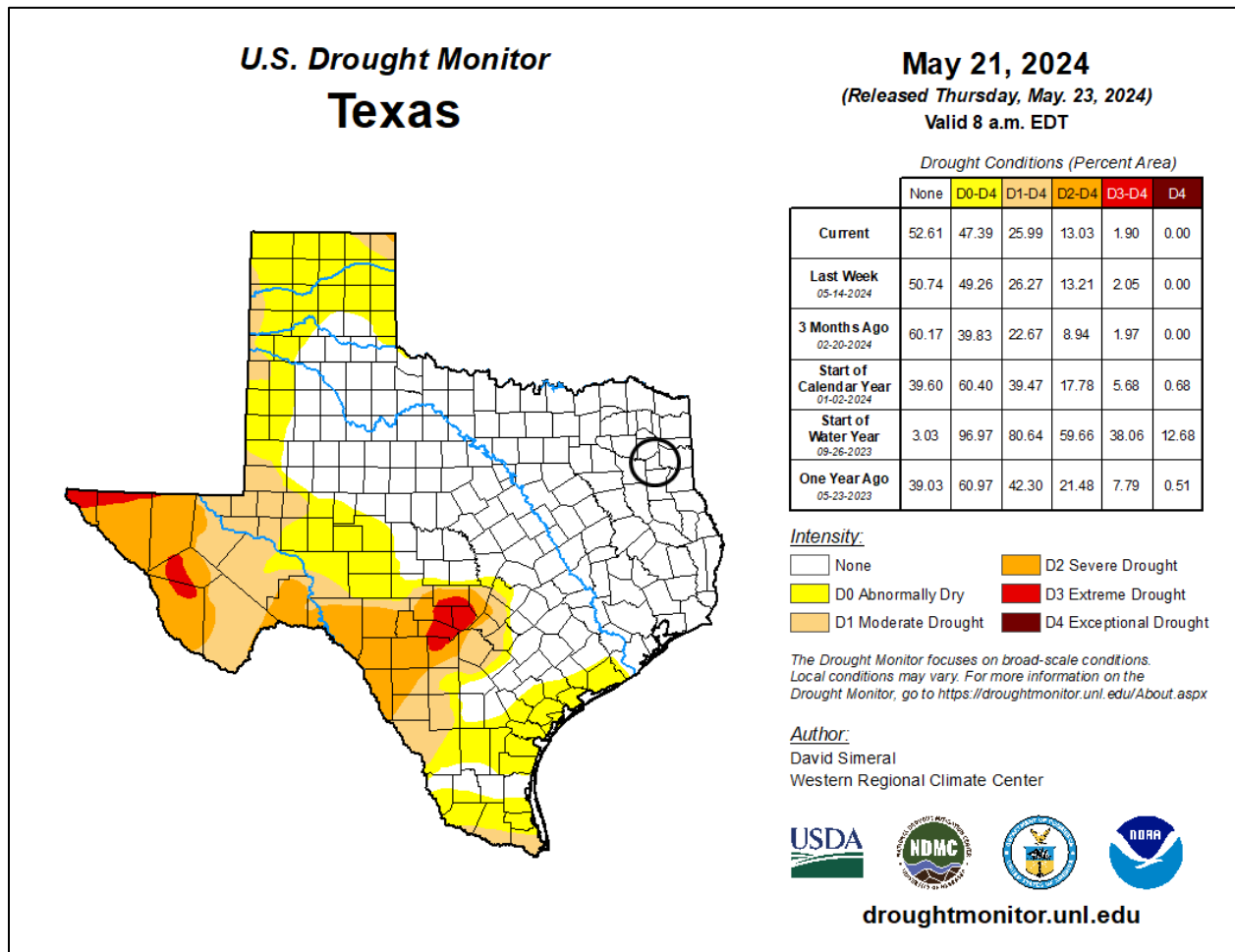
Droughts occur regularly throughout Texas and the Gregg County planning area, including all participating jurisdictions and the East Texas Council of Governments (ETCOG), and are considered a normal condition. However, they can vary greatly in their intensity and duration. The

¹ Source: Multi-Hazard Identification and Risk Assessment: A Cornerstone of the National Mitigation Strategy, FEMA

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U.S. Drought Monitor, produced through a partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, U.S. Department of Agriculture and the National Oceanic and Atmospheric Administration, shows the planning area is currently experiencing no drought conditions (Figure 6-1) but has experienced a range of conditions from none to exceptional drought conditions over the last decade (Figure 6-2). There is no distinct geographic boundary to drought; therefore, it can occur anywhere throughout the Gregg County planning area.

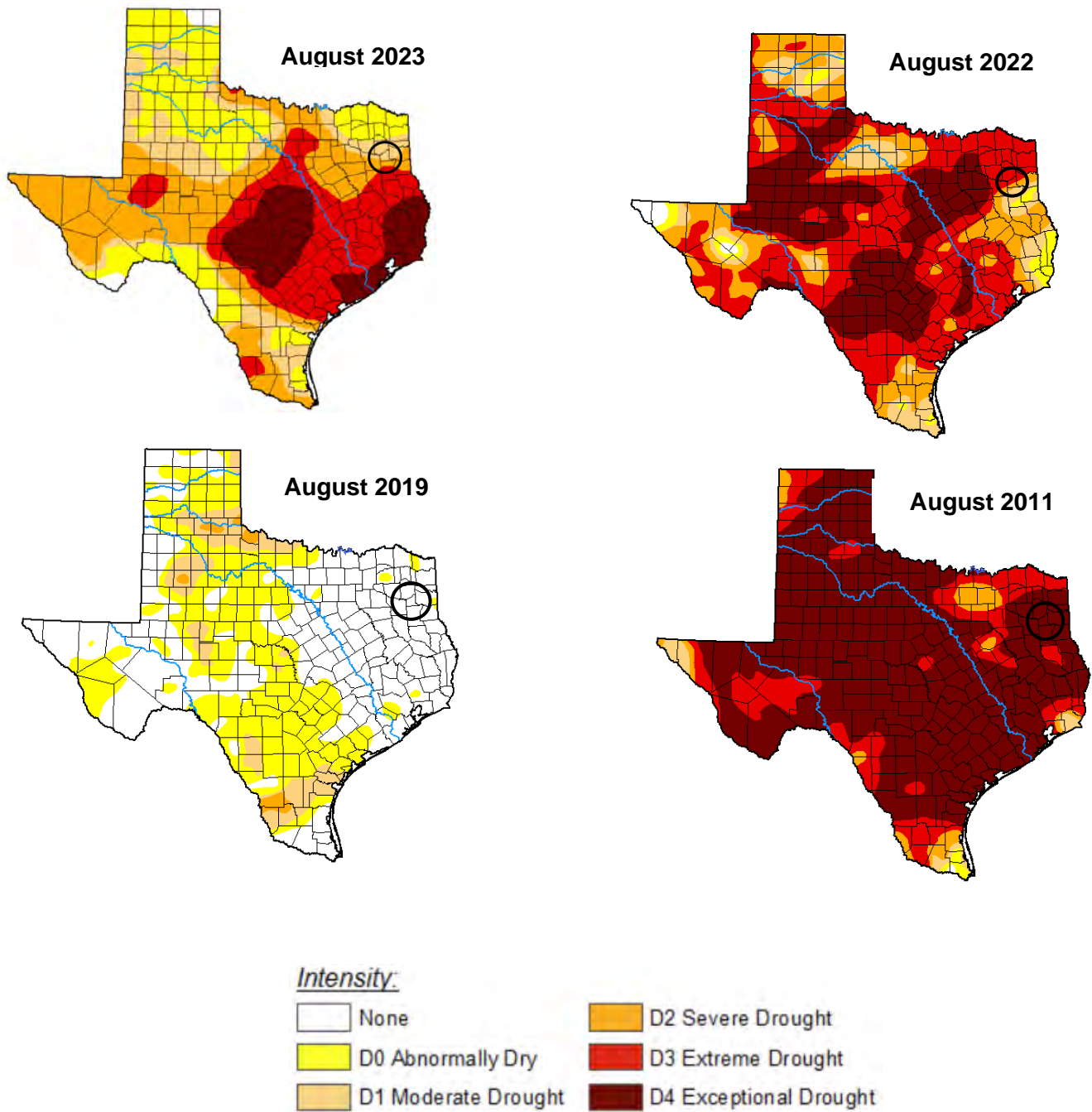
Figure 6-1. U.S. Drought Monitor, February 2024²



² Gregg County is indicated by a circle on the map.

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Figure 6-2. U.S. Drought Monitor, August 2011, August 2019, August 2022, August 2023



SECTION 6: DROUGHT

EXTENT

The Palmer Drought Index is used to measure the extent of drought by measuring the duration and intensity of long-term drought-inducing circulation patterns. Long-term drought is cumulative, with the intensity of drought during the current month dependent upon the current weather patterns plus the cumulative patterns of previous months. The hydrological impacts of drought (e.g., reservoir levels, groundwater levels, etc.) take longer to develop. Table 6-2 depicts magnitude of drought, while Table 6-3 describes the classification descriptions.

Table 6-2. Palmer Drought Index

DROUGHT INDEX	DROUGHT CONDITION CLASSIFICATIONS						
	Extreme	Severe	Moderate	Normal	Moderately Moist	Very Moist	Extremely Moist
Z Index	-2.75 and below	-2.00 to -2.74	-1.25 to -1.99	-1.24 to +.99	+1.00 to +2.49	+2.50 to +3.49	n/a
Meteorological	-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.99	+3.00 to +3.99	+4.00 and above
Hydrological	-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.99	+3.00 to +3.99	+4.00 and above

Table 6-3. Palmer Drought Category Descriptions³

CATEGORY	DESCRIPTION	POSSIBLE IMPACTS	PALMER DROUGHT INDEX
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures; fire risk above average. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.	-1.0 to -1.9
D1	Moderate Drought	Some damage to crops, pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing or imminent, voluntary water use restrictions requested.	-2.0 to -2.9
D2	Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed.	-3.0 to -3.9
D3	Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions.	-4.0 to -4.9
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells, creating water emergencies.	-5.0 or less

³ Source: National Drought Mitigation Center

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Drought is monitored nationwide by the National Drought Mitigation Center (NDMC). Indicators are used to describe broad scale drought conditions across the U.S. and correspond to the intensity of drought.

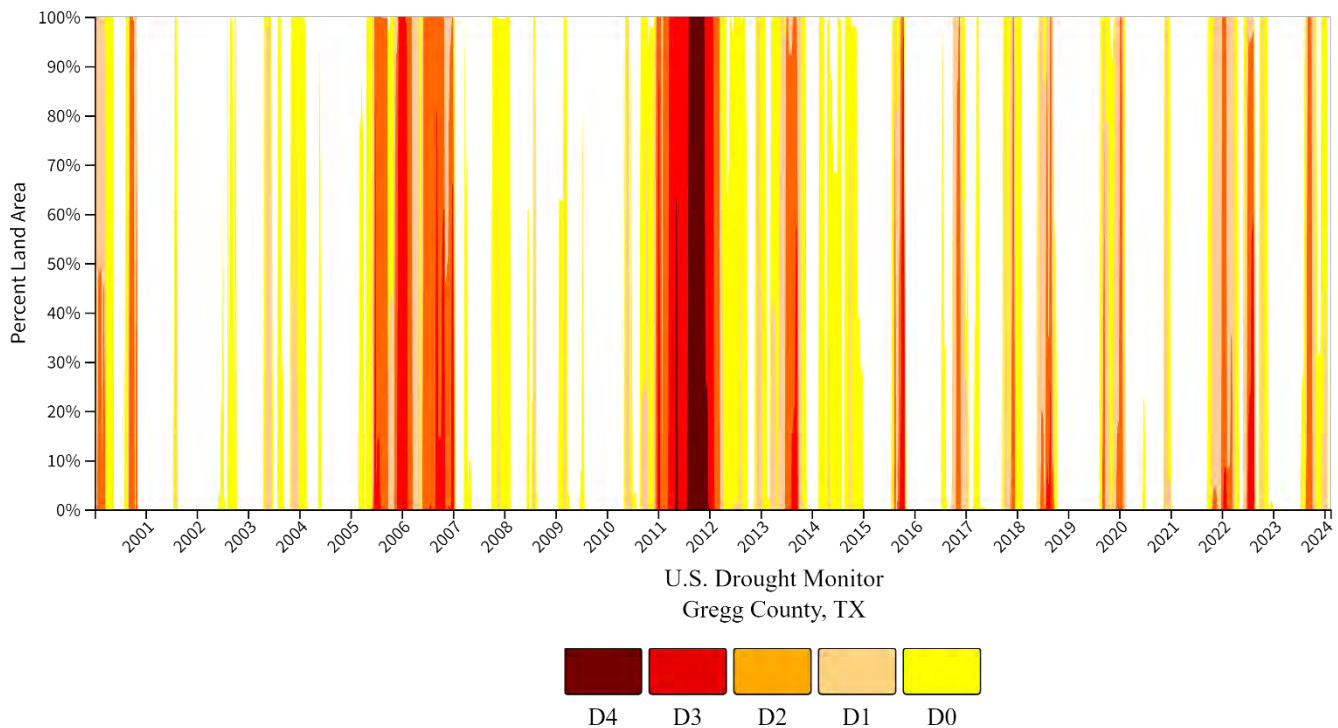
Based on the historical occurrences for drought and the location of the Gregg County planning area, including all participating jurisdictions and the ETCOG, the area can anticipate the full range of drought from abnormally dry to exceptional drought, or D0 to D4, based on the Palmer Drought Category. The entire planning area has experienced exceptional drought conditions. This is the highest level of drought severity and the most extreme drought conditions the planning area can anticipate in the future.

Gregg County does not currently have a drought contingency plan, but instead, makes decisions regarding water conservation and burn bans as needed. The City of Clarksville City, the City of Kilgore, the City of Longview, and the City of White Oak each have a drought contingency plan and/or protocol on water restrictions that is implemented during different stages of drought.

HISTORICAL OCCURRENCES

The Gregg County planning area, including all participating jurisdictions and the ETCOG, may experience an extreme drought in any given year. According to the U.S. Drought Monitor, between January 1, 2000 and January 1, 2023, the Gregg County planning area spent 621 consecutive weeks (50%) in some level of drought as defined as Abnormally Dry (D0) or worse conditions. Gregg County has received 18 USDA disaster declarations for drought from 2012 through 2023.

Figure 6-3. Gregg County Drought Intensity, 2000-2023⁴



⁴ U.S. Drought Monitor

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Table 6-5 lists historical events that have occurred in Gregg County as reported in the National Centers for Environmental Information Storm Events Database (NCEI). A total of 36 drought events were reported in the NCEI, with 28 unique drought periods impacting Gregg County between 2000 and 2023. Historical drought events reported in the NCEI database for the Gregg County planning area, including all participating jurisdictions and the ETCOG, over the 24-year reporting period has resulted in no reports of property or crop damages.

Historical drought information shows drought activity across a multi-county forecast area for each event, the appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each county impacted by the event. Historical drought data is provided on a county-wide basis per the NCEI Storm Events database.

Table 6-5. Historical Drought Events, 2000-2023

JURISDICTION	DATE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	8/1/2005	0	0	\$0	\$0
Gregg County	12/1/2005	0	0	\$0	\$0
Gregg County	12/1/2010	0	0	\$0	\$0
Gregg County	1/1/2011	0	0	\$0	\$0
Gregg County	2/1/2011	0	0	\$0	\$0
Gregg County	3/1/2011	0	0	\$0	\$0
Gregg County	4/1/2011	0	0	\$0	\$0
Gregg County	5/1/2011	0	0	\$0	\$0
Gregg County	6/1/2011	0	0	\$0	\$0
Gregg County	7/1/2011	0	0	\$0	\$0
Gregg County	8/1/2011	0	0	\$0	\$0
Gregg County	9/1/2011	0	0	\$0	\$0
Gregg County	10/1/2011	0	0	\$0	\$0
Gregg County	11/1/2011	0	0	\$0	\$0
Gregg County	12/1/2011	0	0	\$0	\$0
Gregg County	1/1/2012	0	0	\$0	\$0
Gregg County	2/1/2012	0	0	\$0	\$0
Gregg County	3/1/2012	0	0	\$0	\$0

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JURISDICTION	DATE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	7/1/2013	0	0	\$0	\$0
Gregg County	8/1/2013	0	0	\$0	\$0
Gregg County	9/1/2013	0	0	\$0	\$0
Gregg County	8/18/2015	0	0	\$0	\$0
Gregg County	9/15/2015	0	0	\$0	\$0
Gregg County	10/1/2015	0	0	\$0	\$0
Gregg County	11/1/2016	0	0	\$0	\$0
Gregg County	12/7/2017	0	0	\$0	\$0
Gregg County	8/2/2018	0	0	\$0	\$0
Gregg County	9/1/2018	0	0	\$0	\$0
Gregg County	9/17/2019	0	0	\$0	\$0
Gregg County	1/9/2020	0	0	\$0	\$0
Gregg County	1/6/2022	0	0	\$0	\$0
Gregg County	2/1/2022	0	0	\$0	\$0
Gregg County	7/7/2022	0	0	\$0	\$0
Gregg County	8/1/2022	0	0	\$0	\$0
Gregg County	9/7/2023	0	0	\$0	\$0
Gregg County	10/1/2023	0	0	\$0	\$0
TOTALS		0	0	\$0	\$0

Table 6-6. Historical Drought Events Summary, 2000-2023

JURISDICTION	DROUGHT EVENTS	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	36	0	0	\$0	\$0

Based on the historical drought events for the Gregg County planning area, including all participating jurisdictions and the ETCOG, 8 drought events were reported during 7 unique drought periods since the 2018 Plan.

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SIGNIFICANT EVENTS

January to December of 2011

The planning area experienced an extensive drought period between January and December of 2011. According to the US Drought Monitor, the county was classified anywhere from severe (D2) to exceptional drought (D4) throughout the entire year. Gregg County and many surrounding counties implemented burn bans throughout the summer months as the fire danger was very high across the region. The prolonged nature of the drought resulted in several lakes across Northeast Texas approaching or surpassing all-time record low lake levels.

July to October of 2022 (USDA S5174)

Severe (D2) to exceptional (D4) drought conditions were experienced across Gregg County during the summer and early fall months, with peak drought severity in October. Due to an exceptionally hot and dry summer, severe to extreme drought impacted much of Northeast Texas. Total rainfall amounts during much of the summer period were at 25% or less of normal rainfall amounts. This only slightly improved during the early fall season. This dryness contributed to lower-than-normal streamflow observed across area creeks, streams, and rivers through the end of October.

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, there have been 36 reported events and 28 extended time periods of drought (ranging in length from approximately 1 to 12 or more months) within a 24-year reporting period, which provides a probability of approximately one to two events every year. This frequency supports a “Highly Likely” probability of future events for the Gregg County planning area, including all participating jurisdictions and the ETCOG. The impact of climate change could produce longer, more severe droughts, exacerbating the current drought impacts. See additional information on climate change at the end of this section.

VULNERABILITY AND IMPACT

Loss estimates were based on 24 years of statistical data from the NCEI and the U.S. Drought Monitor. A drought event frequency-impact was then developed to determine an impact profile on agriculture products and estimate potential losses due to drought in the area. All existing and future buildings, facilities, and populations are exposed to this hazard and could potentially be impacted. However, drought impacts are mostly experienced in water shortages or crop and livestock losses on agricultural lands and typically have minimal impact on buildings.

The Gregg County Planning Team identified the following critical facilities as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by drought events. For a comprehensive list by participating jurisdiction, please see Appendix C.

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Table 6-7. Critical Facilities Vulnerable to Drought Events

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS, Hospitals)	<ul style="list-style-type: none"> ● Increased law enforcement activities may be required to enforce water restrictions. ● Firefighters may have limited water resources to aid in firefighting and suppression activities, increasing risk to lives and property. ● Potential for increased number of emergency calls as drought events can lead to cascading hazard events such as wildfires and flash flooding.
Airport, Academic Institutions, Community Residential Facilities, Day Care Facilities, Evacuation Centers & Shelters, Governmental Facilities	<ul style="list-style-type: none"> ● Strain on staff as drought may cause health problems related to low water flows and poor water quality. ● Operations dependent on water supply may be adversely impacted.
Commercial Suppliers (food, gas, etc.)	<ul style="list-style-type: none"> ● Operations dependent on water supply may be adversely impacted.
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> ● Potential for increased number of emergency calls as drought events can lead to cascading hazard events such as wildfires and flash flooding. ● Operations dependent on water supply may be adversely impacted.

Even with the planning area relying on multiple water utility providers and local and private services, high demand can still deplete these resources during extreme drought conditions. As resources are depleted, potable water is in short supply and overall water quality can suffer, elevating health concerns for all residents but especially vulnerable populations – typically children, the elderly, and the ill. In addition, potable water is used for drinking, sanitation, patient care, sterilization, equipment, heating and cooling systems, and many other essential functions in medical facilities.

The average person will survive only a few days without potable water, and this timeframe can be drastically shortened for those people with more fragile health – typically children, the elderly, and people with disabilities. During summer drought, or hot and dry conditions, elderly persons, small children, infants, those with disabilities, or who do not have adequate cooling units in their homes may become more vulnerable to injury and/or death. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures. The population over 65 in the Gregg County planning area is estimated at 16 percent of the total population and children under the age of 5 are estimated at 7 percent. Individuals with a disability are estimated at 13 percent of the total population. In addition, an estimated 16 percent

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of the planning area population live below the poverty level and 16 percent of the populations speaks a language other than English (Table 6-8).

Table 6-8. Populations at Greater Risk by Participating Jurisdiction

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
Gregg County	19,479	8,232	15,937	20,500	19,780
City of Clarksville City	164	66	514	126	35
City of Gladewater	858	669	998	1,954	267
City of Kilgore	2,117	894	1,788	2,211	2,669
City of Lakeport	113	112	116	232	187
City of Longview	12,786	5,296	9,987	14,016	14,867
City of Warren City	76	27	71	51	22
City of White Oak	689	410	857	623	304
ETCOG	N/A	N/A	N/A	N/A	N/A

The planning area is also vulnerable to food shortages when drought conditions exist, and potable water is in short supply. Potable water is used for drinking, sanitation, patient care, sterilization, equipment, heating and cooling systems, and many other essential functions in medical facilities. All residents in the Gregg County planning area could be adversely affected by drought conditions, which could limit water supplies and present health threats.

The economic impact of droughts can be significant as they produce a complex web of impacts that spans many sectors of the economy and reach well beyond the area experiencing physical drought. This complexity exists because water is integral to our ability to produce goods and provide services. If droughts extend over several years, the direct and indirect economic impact can be significant.

Crop production can also suffer greatly during extreme drought conditions, limiting fresh local food supplies, driving up costs, and negatively impacting the local economy. Drought conditions could adversely affect the agricultural industry throughout the Gregg County planning area.

Impacts of past droughts experienced in the Gregg County planning area, including all participating jurisdictions and the ETCOG, have not resulted injuries or fatalities, supporting a “Minor” severity of impact meaning injuries and/or illnesses do not result in permanent disability, shutdown of facilities and services for possibly more than one week, and more than 10 percent of property is impacted.

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ASSESSMENT OF IMPACTS

The Drought Impact Reporter was developed in 2005 by the University of Nebraska-Lincoln to provide a national database of drought impacts. Droughts can have an impact on agriculture, business and industry; energy; fire; plants and wildlife; relief, response, and restrictions; society and public health; tourism and recreation; and water supply and quality. The reports are submitted from individuals to Federal, State, and local agencies, as well as the general public. Table 6-9 lists the drought impacts to Gregg County from 2005 to 2023 based on reports received by the Drought Impact Reporter.

Table 6-9. Drought Impacts, 2005-2023

DROUGHT IMPACTS 2005-2023	
Agriculture	68
Business & Industry	3
Energy	1
Fire	20
Plants & Wildlife	57
Relief, Response & Restrictions	17
Society & Public Health	5
Tourism & Recreation	3
Water Supply & Quality	22

Drought has the potential to impact people in the Gregg County planning area, including the ETCOG. While it is rare that drought, in and of itself, leads to a direct risk to the health and safety of people in the U.S., severe water shortages could result in inadequate supply for human needs. The Gregg County population has increased steadily since 1980, with a 2 percent increase in population from 2010, according to the U.S. Census. Trends show that the population is projected to continue increasing and which can cause slight concern for the current water infrastructure and demand for the planning area. Severe drought conditions can be frequently associated with a variety of impacts, including:

- The number of health-related low-flow issues (e.g., diminished sewage flows, increased pollution concentrations, reduced firefighting capacity, and cross-connection contamination) will increase as the drought intensifies.
- Public safety from forest / range / wildfires will increase as water availability and/or pressure decreases.
- Respiratory ailments may increase as the air quality decreases.
- There may be an increase in disease due to wildlife concentrations (e.g., rabies, Rocky Mountain spotted fever, Lyme disease).
- Residents may disagree with the County and participating cities over water use / water rights, creating conflict.
- Political conflicts may increase between municipalities, counties, states, and regions.

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- Water management conflicts may arise between competing interests.
- Increased law enforcement activities may be required to enforce water restrictions.
- Severe water shortages could result in inadequate supply for human needs as well as lower quality of water for consumption.
- Firefighters may have limited water resources to aid in firefighting and suppression activities, increasing risk to lives and property.
- During drought there is an increased risk for wildfires and dust storms.
- The community may need increased operational costs to enforce water restriction or rationing.
- Prolonged drought can lead to increases in illness and disease related to drought.
- Utility providers can see decreases in revenue as water supplies diminish.
- Utilities providers may cut back energy generation and service to their customers to prioritize critical service needs.
- Hydroelectric power generation facilities and infrastructure would have significantly diminished generation capability. Dams simply cannot produce as much electricity from low water levels as they can from high water levels.
- Fish and wildlife food and habitat will be reduced or degraded over time during a drought and disease will increase, especially for aquatic life.
- Wildlife will move to more sustainable locations creating higher concentrations of wildlife in smaller areas, increasing vulnerability, and further depleting limited natural resources.
- There are 9 federally endangered, threatened or candidate species in Gregg County. Severe and prolonged drought can result in the reduction of a species or cause the extinction of a species altogether.
- Plant life will suffer from long-term drought. Wind and erosion will also pose a threat to plant life as soil quality will decline. The urban tree canopy, including county and city parks, are vulnerable to the impacts of prolonged drought.
- Dry and dead vegetation will increase the risk of wildfire.
- Drought poses a significant risk to annual and perennial crop production and overall crop quality leading to higher food costs.
- Drought-related declines in production may lead to an increase in unemployment.
- Drought may limit livestock grazing resulting in decreased livestock weight, potential increased livestock mortality, and increased cost for feed.
- Negatively impacted water suppliers may face increased costs resulting from the transport water or developing supplemental water resources.
- Long term drought may negatively impact future economic development.

The overall extent of damage caused by periods of drought is dependent on its extent and duration. The level of preparedness and pre-event planning done by government, businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a drought event.

CLIMATE CHANGE CONSIDERATIONS

With the range of factors influencing drought conditions, it is impossible to make quantitative statewide projections of drought trends; however, many factors point toward increased drought severity. Drought will continue to be driven largely by precipitation variability over multiple decades, with long-term precipitation trends expected to be relatively small. Other factors

SECTION 6: DROUGHT

affecting drought impacts, such as increased temperatures and improved plant water use efficiency, decrease water availability but will cause drought impact trends to be highly sector-specific, with the impacts possibly smaller for agriculture than for surface water supply.⁵

Gregg County, including all participating jurisdictions and the ETCOG, experiences an average of 16 dry spells per year, which are periods of consecutive days without precipitation. Based on the full range of projections provided by the U.S. Climate Explorer, the County may experience anywhere between 8 fewer or 10 more dry spells per year depending on climate impacts. In addition, it is projected that future changes to Gregg County will include increased temperatures, which according to the U.S. Climate Explorer, the planning area may experience a 6°F increase in the average extreme heat temperatures. Historically, extreme temperatures averaged 99°F in Gregg County, but between 2035 and 2064 the average will be 105°F, possibly increasing the severity and frequency of drought events. The U.S. Climate Explorer also shows that no significant increase in overall precipitation is likely overtime. Data regarding climate change impacts are still somewhat limited for the planning area, but the severity is dependent on overall future emissions.

⁵ Cleaveland, M. K., T. H. Votteler, D. K. Stahle, R. C. Casteel, and J. L. Banner, 2011: Extended Chronology of Drought in South Central, Southeastern and West Texas. *Texas Water Journal*, 2, 54-96, as cited in as cited in *Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036*, Texas A&M University Office of the Texas State Climatologist, 2021 update.



SECTION 7
EXTREME HEAT

SECTION 7: EXTREME HEAT

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HAZARD DESCRIPTION

Extreme heat is a prolonged period of excessively high temperatures and exceptionally humid conditions. Extreme heat during the summer months is a common occurrence throughout the State of Texas, and the Gregg County planning area, including all participating jurisdictions and the East Texas Council of Governments (ETCOG), is no exception. The planning area typically experiences extended heat waves or an extended period of extreme heat and is often accompanied by high humidity.



Although heat can damage buildings and facilities, it presents a more significant threat to the safety and welfare of citizens. The major human risks associated with extreme heat include heat cramps; sunburn; dehydration; fatigue; heat exhaustion; and even heat stroke. The most vulnerable population to heat casualties are children and the elderly or 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.

Critical infrastructure can also be damaged or impacted by extreme heat. High temperatures may cause a rise in electricity consumption as homes, schools, and businesses try to regulate the temperature. This may lead to energy shortages and possible blackouts.

LOCATION

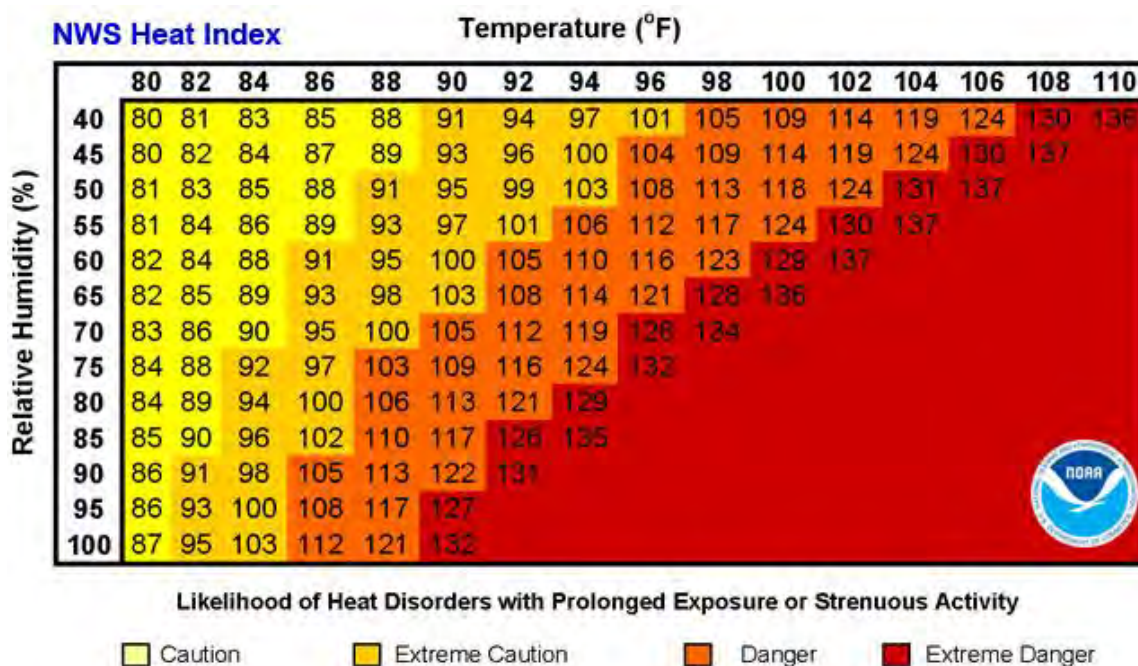
Extreme heat events can occur throughout the Gregg County planning area as there is no specific geographic scope to the extreme heat hazard. Extreme heat could occur anywhere within the Gregg County planning area, including all participating jurisdictions and the ETCOG.

EXTENT

The magnitude or intensity of an extreme heat event is measured according to temperature in relation to the percentage of humidity. According to the National Oceanic Atmospheric Administration (NOAA), this relationship is referred to as the “Heat Index” and is depicted in Figure 7-1. This index measures how hot it feels outside when humidity is combined with high temperatures.

SECTION 7: EXTREME HEAT

Figure 7-1. Extent Scale for Extreme Heat¹



The index in Figure 7-1 displays varying categories of caution depending on the relative humidity combined with the temperature. For example, when the temperature is at 90 degrees Fahrenheit (°F) or lower, caution should be exercised if the humidity level is at or above 40 percent.

The shaded zones on the chart indicate varying symptoms or disorders that could occur depending on the magnitude or intensity of the event. “Caution” is the first category of intensity, and it indicates when fatigue due to heat exposure is possible. “Extreme Caution” indicates that sunstroke, muscle cramps, or heat exhaustion are possible, and a “Danger” level means that these symptoms are likely. “Extreme Danger” indicates that heat stroke is likely. The National Weather Service (NWS) initiates alerts based on the Heat Index as shown in Table 7-1.

Table 7-1. Heat Index and Warnings

CATEGORY	HEAT INDEX	POSSIBLE HEAT DISORDERS	WARNING TYPE
Extreme Danger	125°F and higher	Heat stroke or sun stroke likely.	An Excessive Heat Warning is issued if the Heat Index rises above 105°F at least 3 hours during the day or above 80°F at night.
Danger	103 – 124°F	Sunstroke, muscle cramps, and/or heat exhaustion are likely. Heatstroke possible with prolonged exposure and/or physical activity.	An Excessive Heat Warning is issued if the Heat Index rises above 105°F at least 3 hours during the day or above 80°F at night.

¹ Source: NOAA

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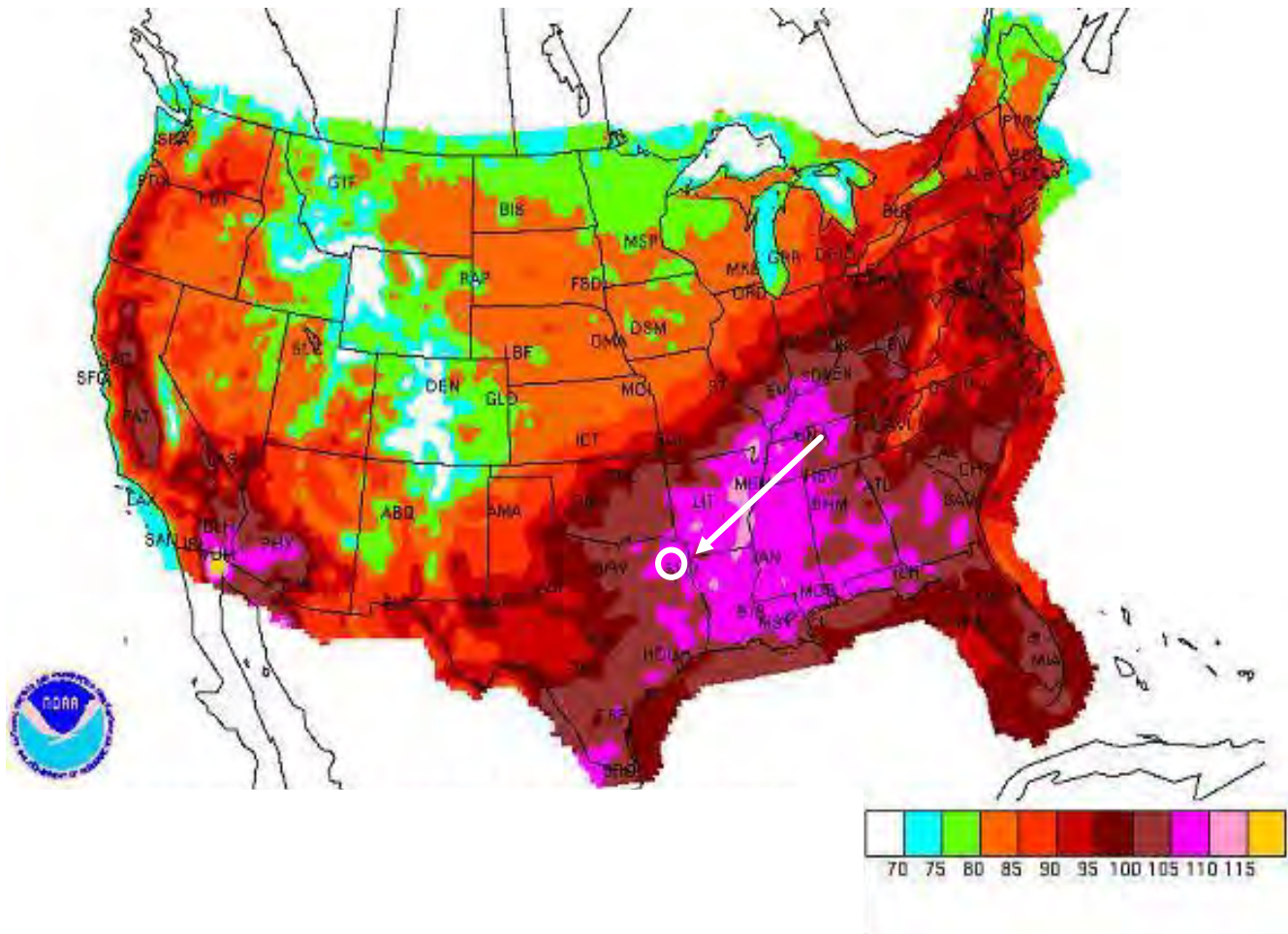
CATEGORY	HEAT INDEX	POSSIBLE HEAT DISORDERS	WARNING TYPE
Extreme Caution	90 – 103°F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.	A Heat Advisory will be issued to warn that the Heat Index may exceed 105°F.
Caution	80 – 90°F	Fatigue is possible with prolonged exposure and/or physical activity.	A Heat Advisory will be issued to warn that the Heat Index may exceed 105°F.

Gregg County lies within the East Texas timberlands region and is characterized by hilly terrain with gentle slopes and moderately well-drained loamy and gravelly soils. Due to its geography and its warm, sunny, and humid subtropical climate, the Gregg County planning area, including all participating jurisdictions and the ETCOG, can expect an extreme heat event each summer. Citizens, especially children and the elderly should exercise caution by staying out of the heat for prolonged periods when a heat advisory or excessive heat warning is issued. In addition, those working or remaining outdoors for extended periods of time are at greater risk. The ETCOG does not have any outdoor employees but there are employees that operate buses and may be subject to extreme heat temperatures.

Figure 7-2 displays the daily maximum heat index as derived from NOAA based on data compiled from 1838 to 2015. The white circle shows the Gregg County planning area. The planning area is represented in pink across the County. The pink color indicates an average daily heat index of 105°F to 110°F. Therefore, Gregg County, including all participating jurisdictions and the ETCOG, could experience dangerous heat from 105°F to 110°F and should mitigate to the extent of “Extreme Caution” and “Danger,” which can include sunstroke, muscle cramps, heat exhaustion and potential heat stroke. This is the average maximum temperature the planning area can anticipate based on historical events.

SECTION 7: EXTREME HEAT

Figure 7-2. Average Daily Maximum Heat Index Days²



HISTORICAL OCCURRENCES

The National Centers for Environmental Information (NCEI) Storm Events database is a national data source organized under the National Oceanic and Atmospheric Administration (NOAA). The NCEI is the largest archive available for historic storm events data. Previous occurrences for extreme heat are derived from the NCEI database, which identifies extreme heat events at the county level for each event. According to heat related incidents located solely within Gregg County, including all participating jurisdictions and the ETCOG, there have been 65 extreme heat events on record for the planning area (Table 7-2). Historical extreme heat information, as provided by the NCEI, shows extreme heat activity across a multi-county forecast area for each

² The white circle indicates the Gregg County planning area.

SECTION 7: EXTREME HEAT

event, the appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each county impacted by the event.

Historical extreme heat data for the Gregg County planning area are provided on a County-wide basis per the NCEI database from 1996 through 2023. No deaths, injuries, or damages were reported. Only extreme heat events that have been reported have been factored into this Risk Assessment. It is highly likely additional extreme heat occurrences have gone unreported before and during the recording period. Due to the limited number of reported events, average high temperatures have been analyzed in order to determine the probability of future events.

Table 7-2. Historical Extreme Heat Events, 1996-2023³

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	6/1/2011	0	0	\$0	\$0
Gregg County	7/1/2011	0	0	\$0	\$0
Gregg County	8/1/2011	0	0	\$0	\$0
Gregg County	9/1/2011	0	0	\$0	\$0
Gregg County	9/11/2011	0	0	\$0	\$0
Gregg County	7/13/2015	0	0	\$0	\$0
Gregg County	8/5/2015	0	0	\$0	\$0
Gregg County	7/3/2016	0	0	\$0	\$0
Gregg County	7/19/2016	0	0	\$0	\$0
Gregg County	7/22/2016	0	0	\$0	\$0
Gregg County	7/24/2016	0	0	\$0	\$0
Gregg County	8/3/2016	0	0	\$0	\$0
Gregg County	7/19/2017	0	0	\$0	\$0
Gregg County	7/26/2017	0	0	\$0	\$0
Gregg County	8/12/2017	0	0	\$0	\$0
Gregg County	8/19/2017	0	0	\$0	\$0
Gregg County	7/13/2018	0	0	\$0	\$0
Gregg County	7/19/2018	0	0	\$0	\$0
Gregg County	6/21/2019	0	0	\$0	\$0
Gregg County	7/9/2019	0	0	\$0	\$0

³ NOAA, NCEI Storm Events Database

SECTION 7: EXTREME HEAT

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	7/17/2019	0	0	\$0	\$0
Gregg County	8/7/2019	0	0	\$0	\$0
Gregg County	8/17/2019	0	0	\$0	\$0
Gregg County	8/22/2019	0	0	\$0	\$0
Gregg County	8/26/2019	0	0	\$0	\$0
Gregg County	7/10/2020	0	0	\$0	\$0
Gregg County	7/12/2020	0	0	\$0	\$0
Gregg County	7/13/2020	0	0	\$0	\$0
Gregg County	8/13/2020	0	0	\$0	\$0
Gregg County	8/15/2020	0	0	\$0	\$0
Gregg County	8/28/2020	0	0	\$0	\$0
Gregg County	8/29/2020	0	0	\$0	\$0
Gregg County	8/31/2020	0	0	\$0	\$0
Gregg County	9/1/2020	0	0	\$0	\$0
Gregg County	7/29/2021	0	0	\$0	\$0
Gregg County	8/1/2021	0	0	\$0	\$0
Gregg County	8/25/2021	0	0	\$0	\$0
Gregg County	9/1/2021	0	0	\$0	\$0
Gregg County	6/11/2022	0	0	\$0	\$0
Gregg County	6/18/2022	0	0	\$0	\$0
Gregg County	6/23/2022	0	0	\$0	\$0
Gregg County	7/4/2022	0	0	\$0	\$0
Gregg County	7/9/2022	0	0	\$0	\$0
Gregg County	7/11/2022	0	0	\$0	\$0
Gregg County	7/16/2022	0	0	\$0	\$0
Gregg County	7/19/2022	0	0	\$0	\$0
Gregg County	7/24/2022	0	0	\$0	\$0
Gregg County	8/3/2022	0	0	\$0	\$0

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JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	8/17/2022	0	0	\$0	\$0
Gregg County	6/15/2023	0	0	\$0	\$0
Gregg County	6/17/2023	0	0	\$0	\$0
Gregg County	6/24/2023	0	0	\$0	\$0
Gregg County	7/11/2023	0	0	\$0	\$0
Gregg County	7/13/2023	0	0	\$0	\$0
Gregg County	7/13/2023	0	0	\$0	\$0
Gregg County	7/18/2023	0	0	\$0	\$0
Gregg County	7/19/2023	0	0	\$0	\$0
Gregg County	7/30/2023	0	0	\$0	\$0
Gregg County	7/31/2023	0	0	\$0	\$0
Gregg County	8/1/2023	0	0	\$0	\$0
Gregg County	8/8/2023	0	0	\$0	\$0
Gregg County	8/9/2023	0	0	\$0	\$0
Gregg County	8/18/2023	0	0	\$0	\$0
Gregg County	9/5/2023	0	0	\$0	\$0
Gregg County	9/6/2023	0	0	\$0	\$0
TOTALS	65	0	0	\$0	\$0

Table 7-3. Historical Extreme Heat Events Summary, 1996-2023

JURISDICTION	NUMBER OF EVENTS	DEATH	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	65	0	0	\$0	\$0

Based on the list of historical extreme heat events for the Gregg County planning area, 47 events were reported to the NCEI since the 2018 Plan.

SIGNIFICANT EVENTS

August 2011

During the summer of 2011, the East Texas region experienced unprecedented heat waves, impacting the Gregg County planning area. The City of Longview, and neighboring jurisdictions of the City of Tyler and the City of Lufkin, set numerous records for high temperatures, as reported by the National Weather Service (NWS). The area experienced its warmest month ever recorded

SECTION 7: EXTREME HEAT

during the month of August, averaging 92.6 degrees Fahrenheit (°F), with an astounding 29 days hitting or surpassing 100°F. The City of Longview faced scorching conditions and had a recorded average August temperature of 91.6°F. The summer of 2011 was exceptionally hot across the entire region and is certainly one for the record books.

July 2023

The summer of 2023 is recorded as Texas' second hottest summer ever, right behind the summer of 2011. A relentless heatwave that covered a large part of the state from late June persisted throughout the summer, often driving daytime temperatures above 100°F with minimal cooling during the night. The peak of this heatwave occurred during July for the Gregg County planning area when a stationary boundary stretched across the southern state's region, where humidity increased, and the temperatures rose to the mid-90s to nearly 100°F in East Texas. This resulted in heat indices ranging from 110-115°F degrees across the Gregg County planning area.

PROBABILITY OF FUTURE EVENTS

According to historical records, the Gregg County planning area has experienced 65 events in a 28-year reporting period. Although there are no records of events before the year 2011 for the planning area, it is assumed that events have gone unreported due to the average daily temperatures throughout the summer. Historical records in combination with an analysis of maximum average temperatures provide a probability of more than one event every year. This frequency supports a "Highly Likely" probability of future events. See additional information on the impacts of climate change at the end of this section.

VULNERABILITY AND IMPACT

While the entirety of the Gregg County planning area, including all participating jurisdictions and the ETCOG, is exposed to extreme temperatures, existing buildings, infrastructure, and critical facilities are not likely to sustain significant damage from extreme heat events. Therefore, any estimated property losses associated with the extreme heat hazard are anticipated to be minimal across the area.

Every summer, the hazard of heat-related illness becomes a significant public health issue throughout much of the United States. Mortality rates increase during heat waves, and excessive heat is an important contributing factor to deaths from other causes, particularly among the elderly. Extreme temperatures present a significant threat to life and safety for the population of the County as a whole. Heat casualties, for example, are typically caused by a lack of adequate air-conditioning or heat exhaustion. The most vulnerable population to heat casualties are the elderly or infirmed who frequently live on 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. Children may also be more vulnerable if left unattended in vehicles. Populations living below the poverty level are often unable to run air-conditioning on a regular basis and are limited in their ability to seek medical treatment. According to the planning team, ETCOG has about 41 employees that work as Go Bus Drivers and may be subject to extreme heat temperatures.

The population over 65 in the Gregg County planning area is estimated at 16 percent of the total population and children under the age of 5 are estimated at 7 percent. The population with a disability is estimated at 13 percent of the total population. An estimated 16 percent of the planning

SECTION 7: EXTREME HEAT

area population live below the poverty level and 16 percent of the populations speaks a language other than English (Table 7-4). Vulnerable and underserved populations are disproportionately impacted by extreme heat events as they may be more susceptible to health risks. The population below the poverty level are less likely to be able to afford air conditioning during the hot summer months as well as less likely to have access to medical care. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

Table 7-4. Populations at Greater Risk by Participating Jurisdiction

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
Gregg County	19,479	8,232	15,937	20,500	19,780
City of Clarksville City	164	66	514	126	35
City of Gladewater	858	669	998	1,955	267
City of Kilgore	2,117	894	1,788	2,211	2,669
City of Lakeport	113	112	116	232	187
City of Longview	12,786	5,296	9,987	14,016	14,867
City of Warren City	76	27	71	51	22
City of White Oak	689	410	857	623	304

Table 7-5. Outdoor Operating Employees by Participating Special District

SPECIAL DISTRICT	EMPLOYEES OPERATING OUTDOORS
ETCOG	41

Extremely high temperatures can have significant secondary impacts, leading to droughts, water shortages, increased fire danger, and prompt excessive demands for energy. The possibility of rolling blackouts increases with unseasonably high temperatures in what is a normally mild month with low power demands. Typically, more than 12 hours of warning time would be given before the onset of an extreme heat event.

In terms of vulnerability to structures, the impact from extreme heat is considered negligible. It is possible that critical facilities and infrastructure could be shut down for 24 hours if cooling units are running constantly, leading to a temporary power outage (Table 7-6). Less than ten percent of residential and commercial property could be damaged if extreme heat events lead to structure fires. Based on historical records, annualized property and crop losses for the Gregg County

SECTION 7: EXTREME HEAT

planning area are negligible. The number of historical injuries and fatalities also indicate a “Limited” level of impact.

The Gregg County Planning Team identified the following critical facilities as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by extreme heat events. The following critical facilities would be vulnerable to extreme heat events in the Gregg County planning area. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 7-6. Critical Facilities Vulnerable to Extreme Heat Events

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS, Hospitals)	<ul style="list-style-type: none"> ● Emergency operations, services and response times may be significantly impacted due to power outages, and/or loss of communications. ● Exposure to heat can cause heat illnesses in first responders, especially for those in heavy equipment. ● Roads may become impassable due to excessive heat causing asphalt roads to soften and concrete roads to shift or buckle impacting response times by emergency services. ● Extended power outages due to increased usage may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.
Airport, Academic Institutions, Community Residential Facilities, Day Care Facilities, Evacuation Centers & Shelters, Governmental Facilities	<ul style="list-style-type: none"> ● Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable. ● Power outages due to increased usage could disrupt critical care. ● Backup power sources could be damaged. ● Evacuations may be necessary due to extended power outages, breaks in water main lines or other associated damage to facilities. ● Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable. ● Economic disruption due to power outages negatively impact airport services as well as area businesses reliant on airport operations.
Commercial Suppliers (food, gas, etc.)	<ul style="list-style-type: none"> ● Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable. ● Essential supplies like medicines, water, food, and equipment deliveries may be delayed.
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> ● Emergency operations, services and response times may be significantly impacted due to power outages, and/or loss of communications. ● Roads may become impassable due to excessive heat causing asphalt roads to soften and concrete roads to shift or buckle impacting response times by emergency services. ● Breaks in water main lines or other associated damage to facilities.

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ASSESSMENT OF IMPACTS

The greatest risk from extreme heat is to public health and safety. Extreme heat conditions can be frequently associated with a variety of impacts, including:

- Vulnerable populations, particularly the elderly (16 percent of total population), children under 5 (7 percent of total population), and those with a disability (13 percent of total population) can face serious or life-threatening health problems from exposure to extreme heat including hyperthermia, heat cramps, heat exhaustion, and heat stroke (or sunstroke).
- Response personnel, including utility workers, public works personnel, and any other professions where individuals are required to work outside, are more subject to extreme heat related illnesses since their exposure would typically be greater. ETCOG has 41 employees that may be working outdoors.
- High energy demand periods can outpace the supply of energy, potentially creating the need for rolling brownouts which would elevate the risk of illness to vulnerable residents.
- Highways and roads may be damaged by excessive heat causing asphalt roads to soften and concrete roads to shift or buckle.
- Vehicle engines and cooling systems typically run harder during extreme heat events resulting in increases in mechanical failures.
- Extreme heat events during times of drought can exacerbate the environmental impacts associated with drought, decreasing water and air quality and further degrading wildlife habitat.
- Extreme heat increases ground-level ozone (smog), increasing the risk of respiratory illnesses.
- Negatively impacted water suppliers may face increased costs resulting from the transport of water resources or development of supplemental water resources.
- Tourism and recreational activities at places may be negatively impacted during extreme heat events, reducing seasonal revenue.
- Outdoor activities may see an increase in school injury or illness during extreme heat events.

The economic and financial impacts of extreme heat on the community will depend on the duration of the event, demand for energy, drought associated with extreme heat, and many other factors. The level of preparedness and the amount of planning done by the community, local businesses, and citizens will impact the overall economic and financial conditions before, during, and after an extreme heat event.

CLIMATE CHANGE CONSIDERATIONS

Climate change is expected to lead to an increase in average temperatures as well as an increase in frequency, duration, and intensity of extreme heat events. With no reductions in emissions worldwide, the state of Texas is projected to experience an additional 30 to 60 days per year above 100°F than what is experienced now.⁴ In addition, it is projected that future changes to

⁴ Nielsen-Gammon, John, Holman, Sara, Buley, Austin and Jorgensen, Savannah. Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, 2021 Update. Texas A&M University Office of the Texas State Climatologist. October 7, 2021. <https://climatexas.tamu.edu/files/ClimateReport-1900to2036-2021Update>

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Gregg County will include increased temperatures, which according to the U.S. Climate Explorer, the planning area may experience a 6°F increase in the average extreme heat temperatures. Historically, extreme temperatures averaged 99°F in Gregg County, but between 2035 and 2064 the average will be 105°F, increasing the severity and frequency of extreme heat events.



SECTION 8
FLOOD

SECTION 8: FLOOD

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National Flood Insurance Program (NFIP) Participation	21
NFIP Compliance and Maintenance	22
Repetitive Loss	23

HAZARD DESCRIPTION

Floods generally result from excessive precipitation. The severity of a flood event is determined by a combination of several major factors, including stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and the degree of vegetative clearing and impervious surfaces. Typically, floods are long-term events that may last for several days.

The primary types of general flooding are inland and coastal flooding. Due to Gregg County's inland location, only inland flooding is profiled in this section. Inland or riverine flooding is a result of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Inland or riverine flooding is overbank flooding of rivers and streams, typically resulting from large-scale weather systems that generate prolonged rainfall over a wide geographic area. Therefore, it is a naturally occurring and inevitable event. Some river floods occur seasonally when winter or spring rainfalls fill river basins with too much water, too quickly. Torrential rains from decaying hurricanes or tropical systems can also produce river flooding.

The Gregg County planning area, including all participating jurisdictions and the East Texas Council of Governments (ETCOG), are subject to extreme rainfall events, often in short durations, leading to dangerous flash flooding events. Floods are a natural and recurrent event and take place every year, in all seasons.

LOCATION

The Flood Insurance Rate Maps (FIRMs) prepared by FEMA provide an overview of flood risk but can also be used to identify the areas of the County that are vulnerable to flooding. FIRMs are used to regulate new development and to control the substantial improvement and repair of substantially damaged buildings. Flood Insurance Studies (FIS) are often developed in conjunction with FIRMs. The FIS typically contains a narrative of the flood history of a community and discusses the engineering methods used to develop the FIRMs. The FIS also contains flood profiles for studying flooding sources and can be used to determine Base Flood Elevations (BFEs) for some areas.

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The FIS for Gregg County is dated September 3, 2014. This FIS investigates the existence and severity of flood hazards in the geographic area of the Gregg County planning area including the Cities of Clarksville City, Gladewater, Kilgore, Lakeport, Longview, Warren City, and White Oak, along with the unincorporated areas of Gregg County. This study indicates that the principal flood problems are due to intense rainfall, which can occur year-round. In addition, the primary flooding source identified includes several different creeks throughout the planning area. Some of the most notable include Bighead, Turkey, and Birdsong Creeks. The City of Longview is in the upper portion of the Sabine River Basin and the Grace Creek Watershed is a principal area of flooding in the city.

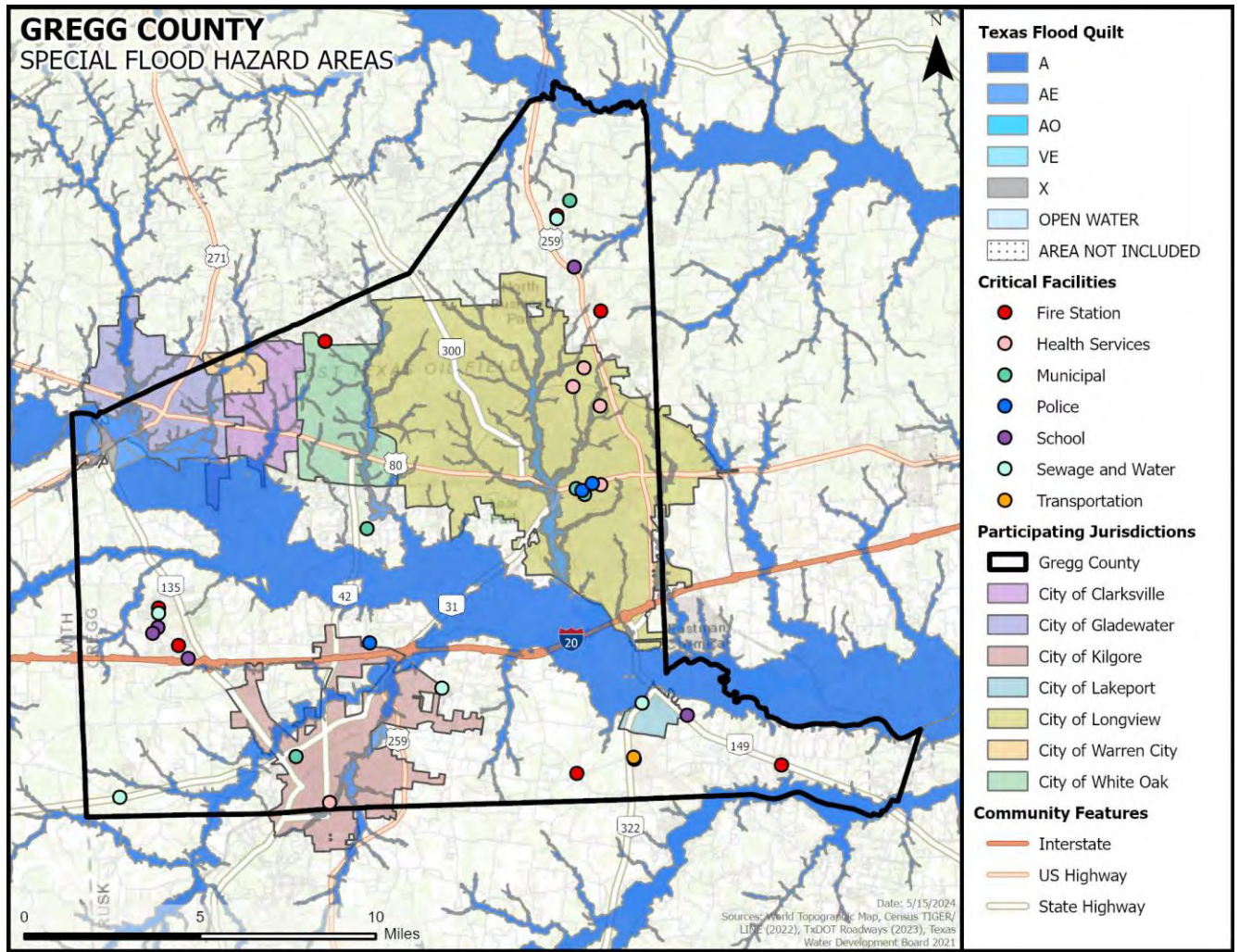
The Digital Flood Insurance Rate Map (DFIRM) data provided by FEMA for Gregg County shows the following flood hazard areas:

- Zone A: Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance requirements and floodplain management standards apply.
- Zone AE: Areas subject to inundation by 1-percent-annual-chance shallow flooding. It is the base floodplain where BFEs are provided. AE zones are now used on new format FIRMs instead of A1-30 zones.
- Zone AO: Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average flood depths derived from detailed hydraulic analyses are shown in this zone.
- Zone X: Moderate risk areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by a levee. No BFEs or base flood depths are shown within these zones.

Locations of flood zones in Gregg County based on the Digital Flood Insurance Rate Map (DFIRM) from FEMA are illustrated in Figures 8-1 to 8-8.

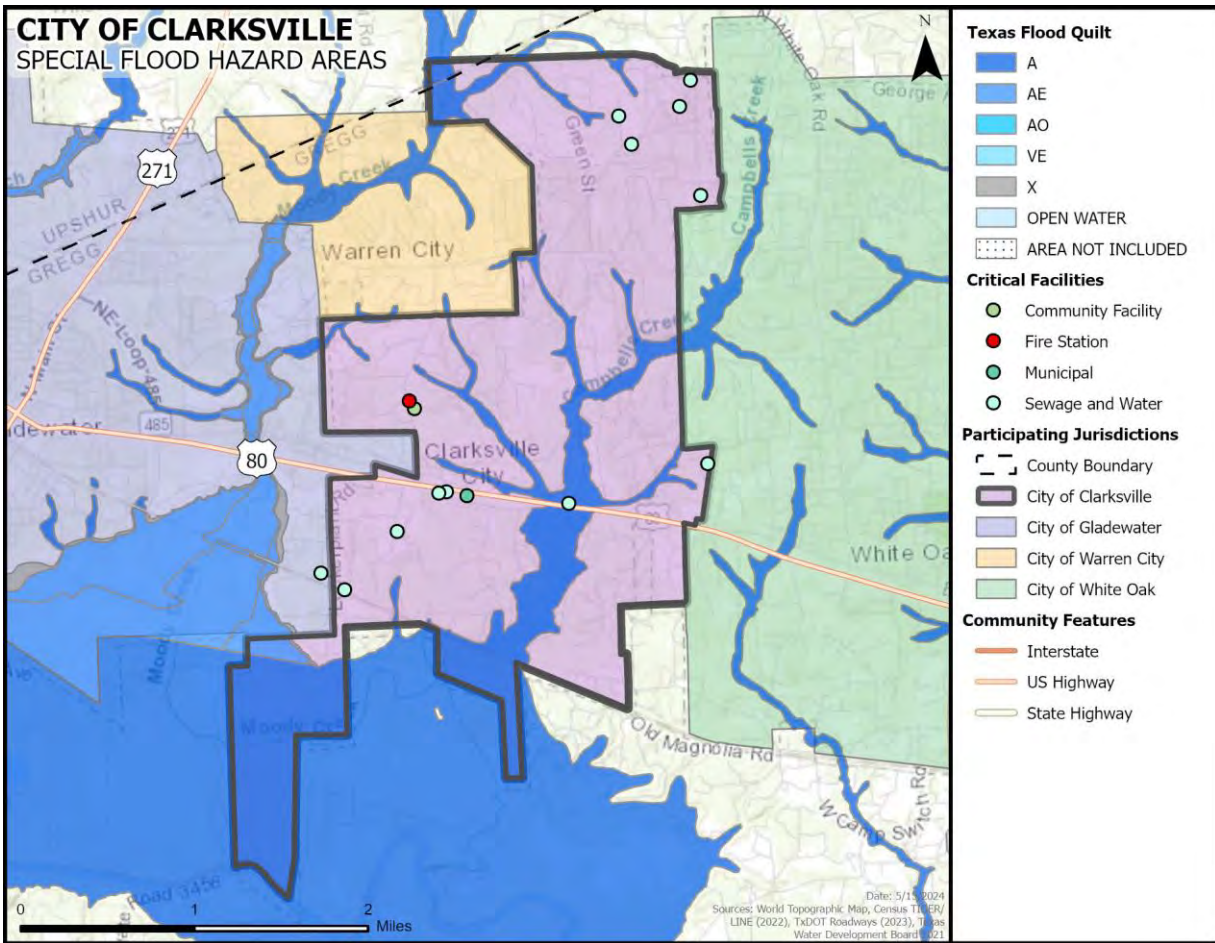
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Figure 8-1. Estimated Flood Zones in Gregg County



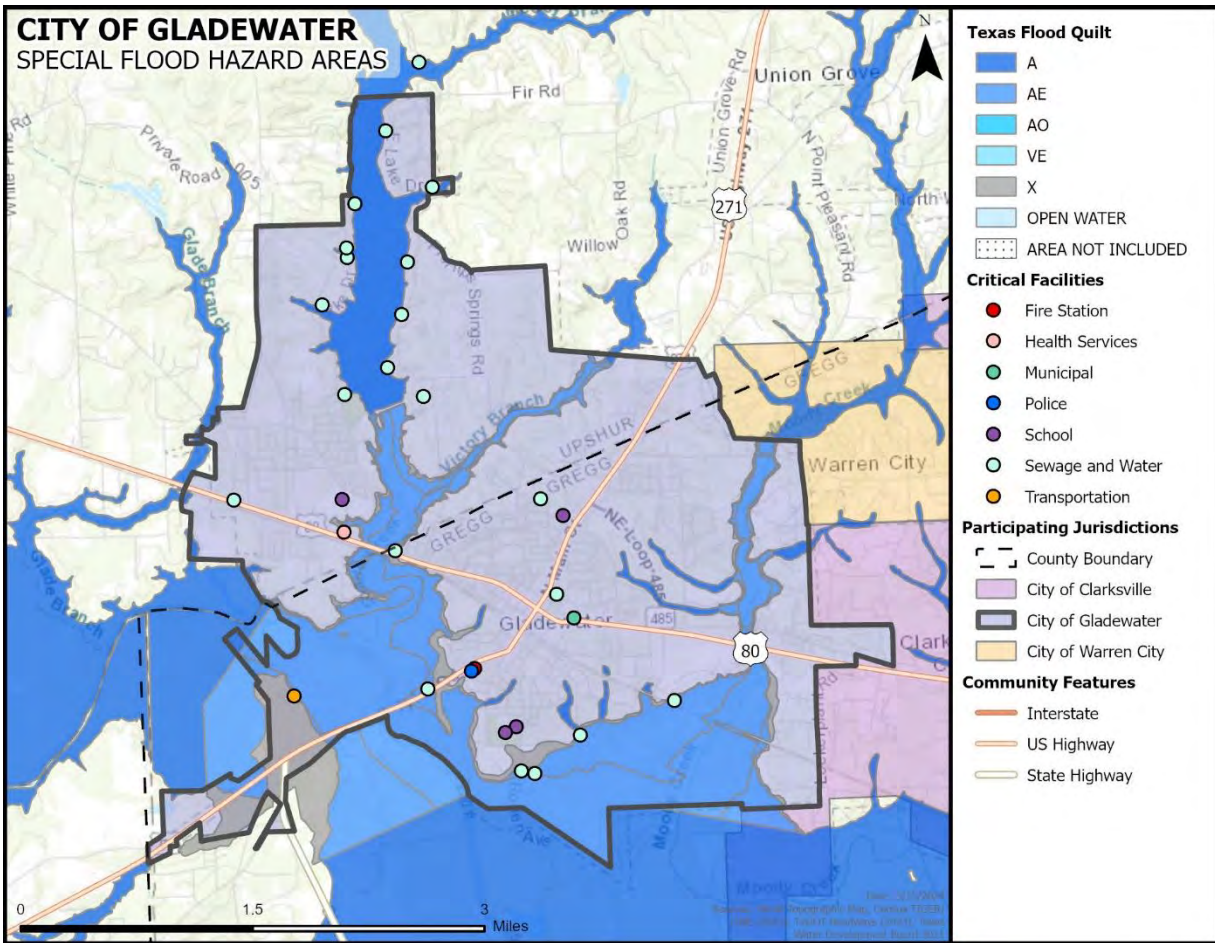
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Figure 8-2. Estimated Flood Zones in the City of Clarksville City



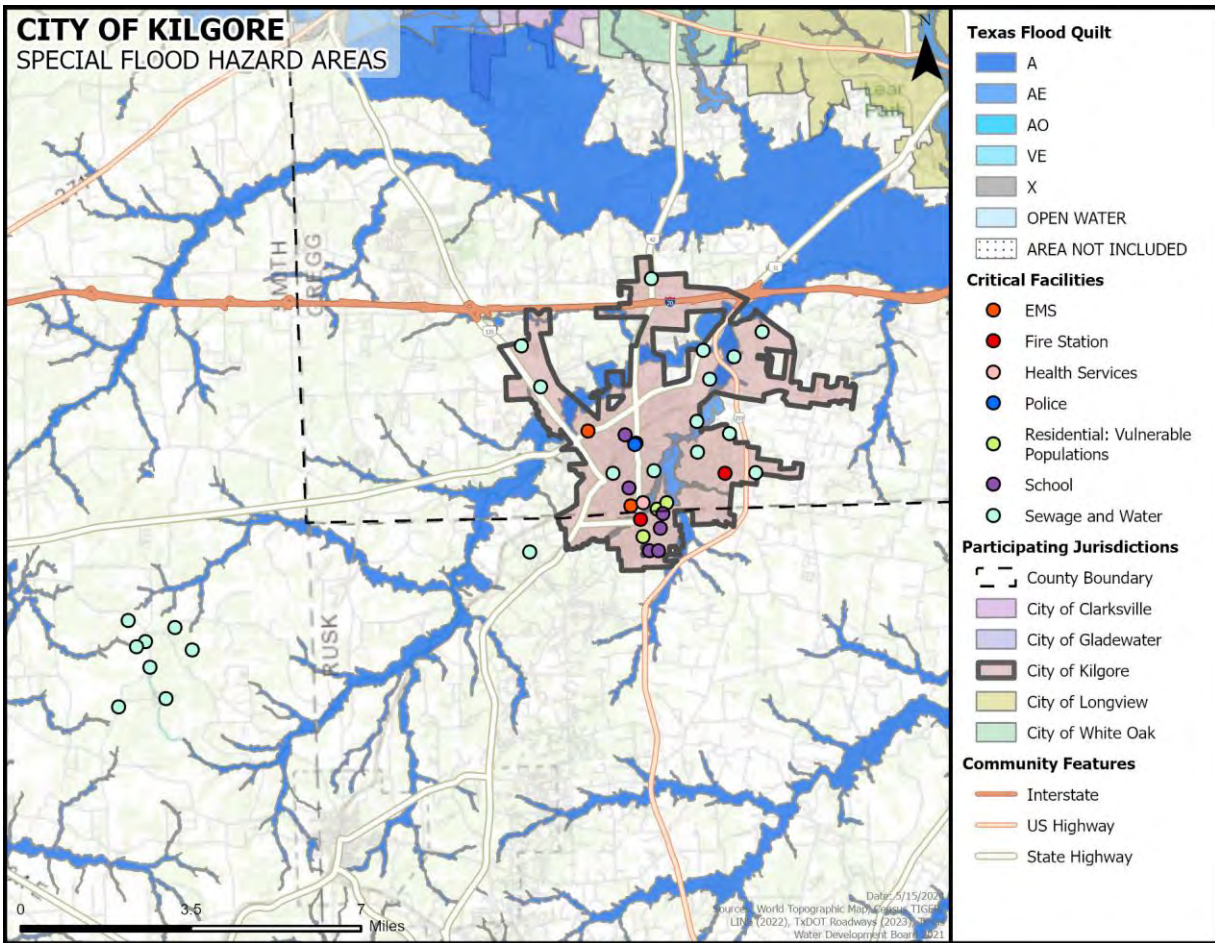
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Figure 8-3. Estimated Flood Zones in the City of Gladewater



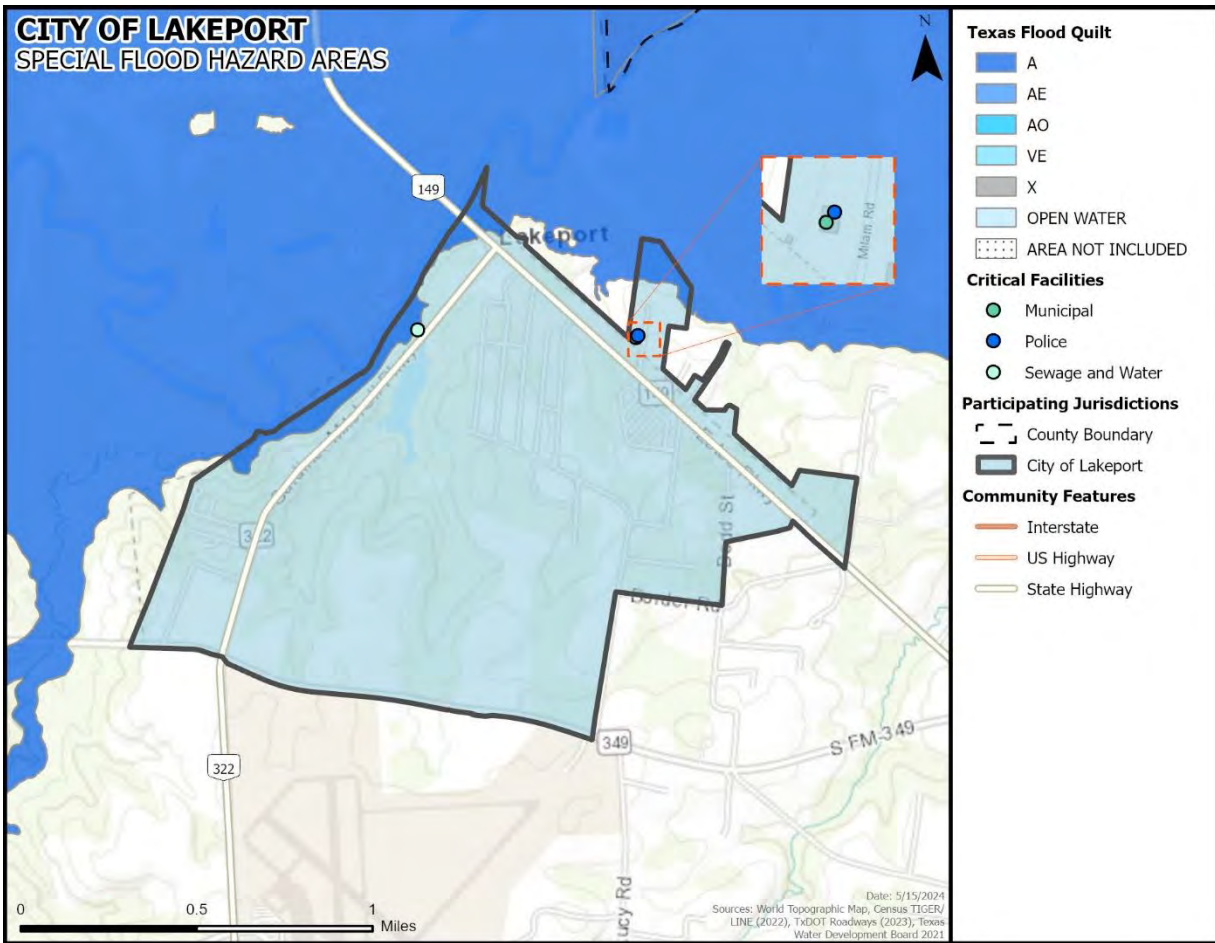
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Figure 8-4. Estimated Flood Zones in the City of Kilgore



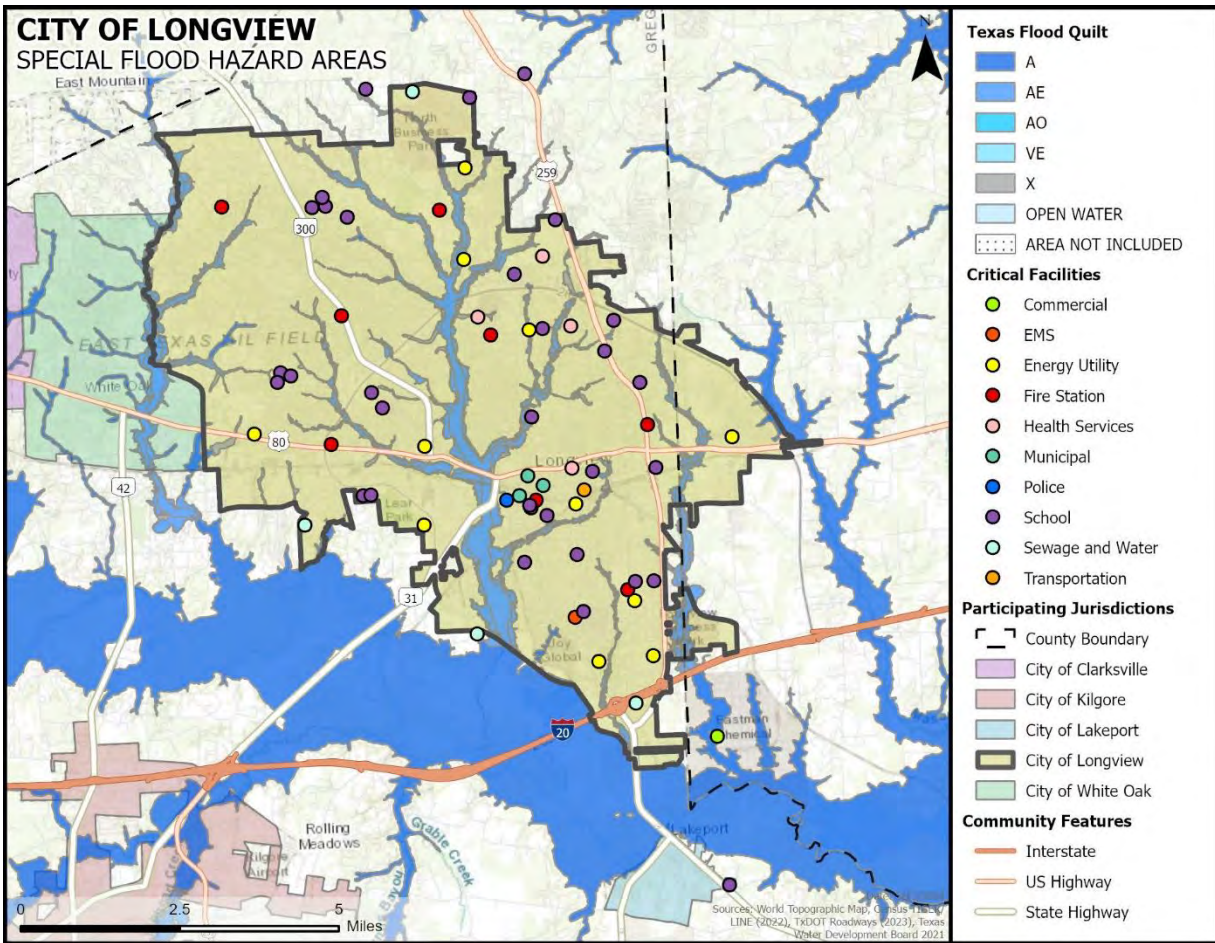
SECTION 8: FLOOD

Figure 8-5. Estimated Flood Zones in the City of Lakeport



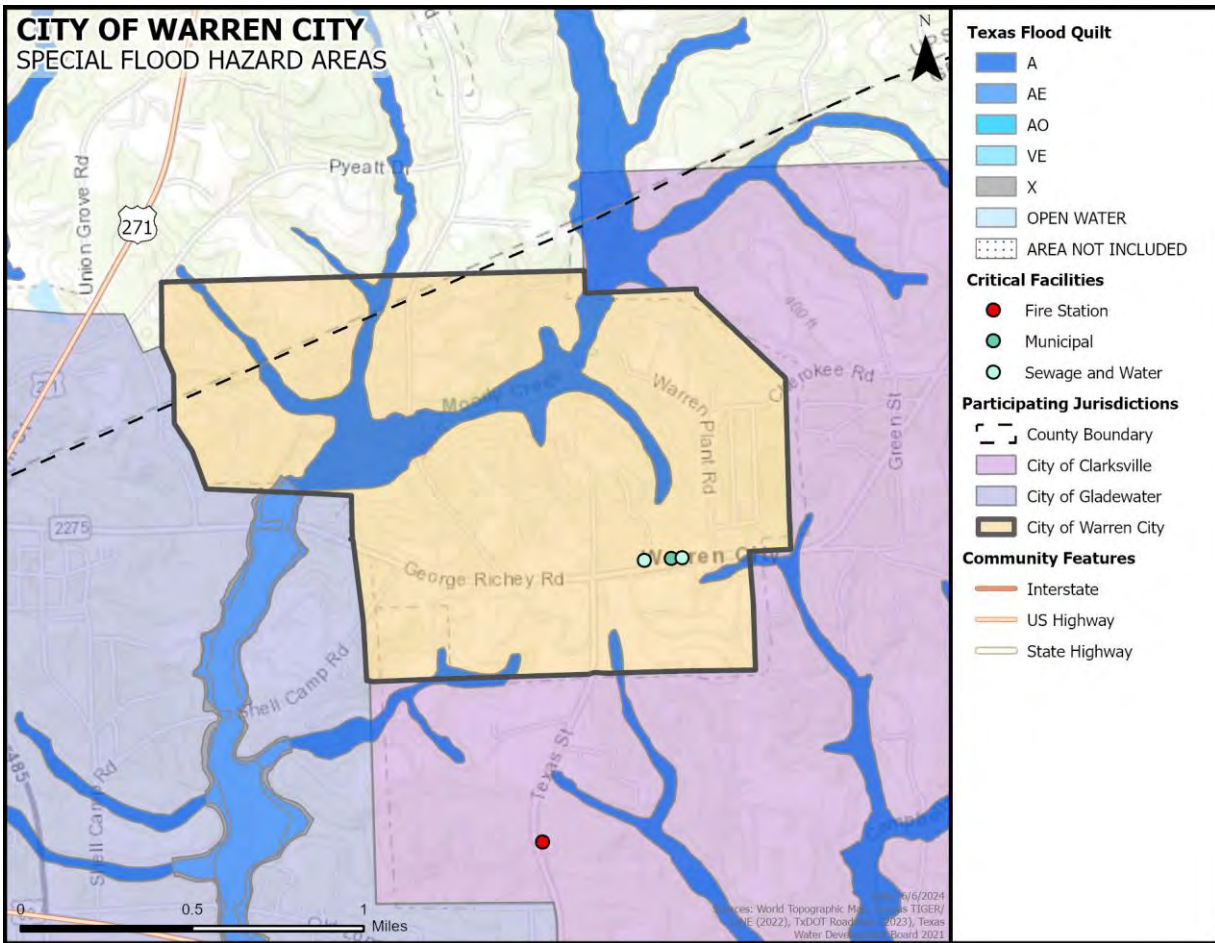
SECTION 8: FLOOD

Figure 8-6. Estimated Flood Zones in the City of Longview



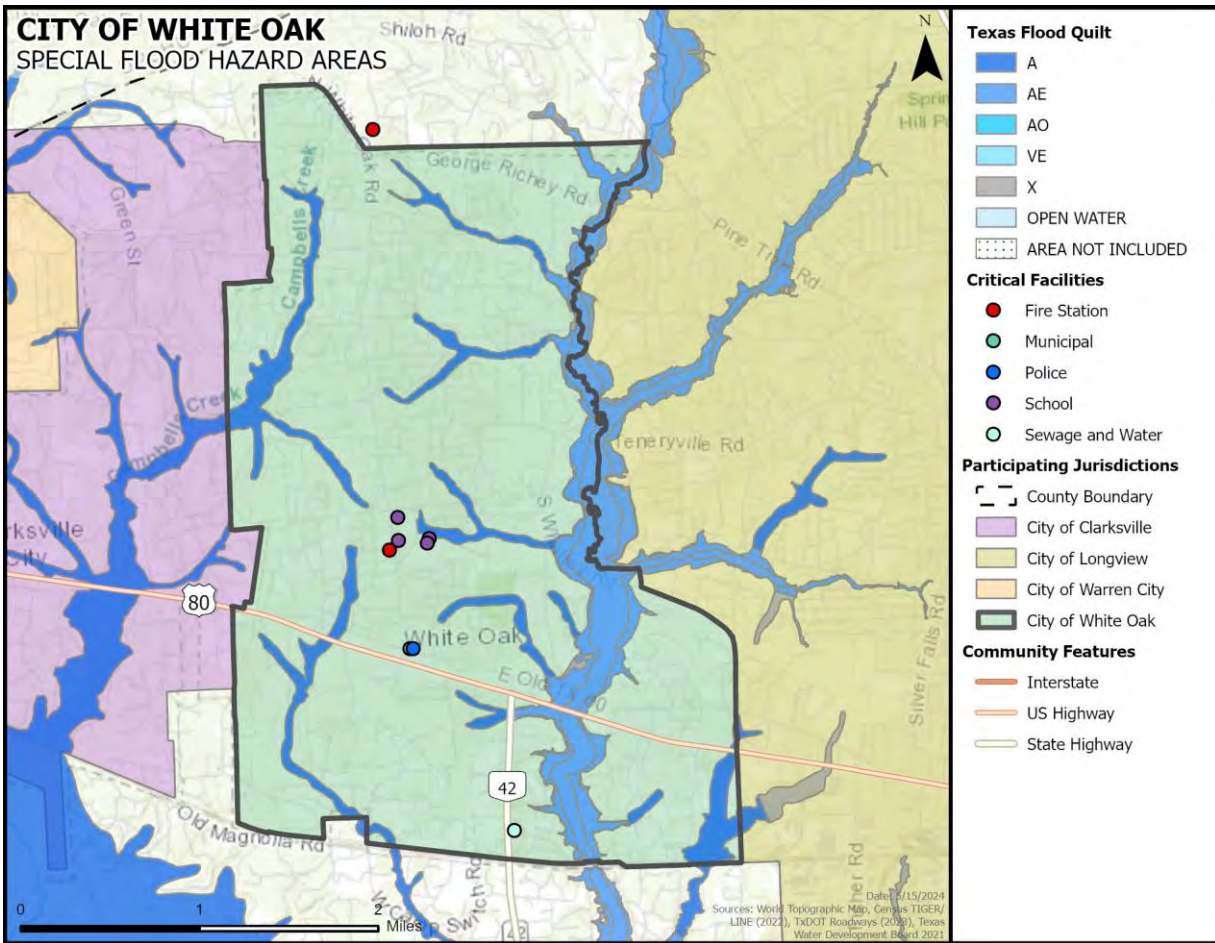
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Figure 8-7. Estimated Flood Zones in the City of Warren City



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Figure 8-8. Estimated Flood Zones in the City of White Oak



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EXTENT

The severity of a flood event is determined by a combination of several major factors, including stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and the degree of vegetative clearing and impervious surfaces. Typically, floods are long-term events that may last for several days.

Determining the intensity and magnitude of a flood event is dependent upon the flood zone and location of the flood hazard area in addition to the depths of flood waters. The extent of flood damages can be expected to be more damaging in the areas that will convey a base flood. FEMA categorizes areas on the terrain according to how the area will convey flood water. Flood zones are the categories that are mapped on FIRMs. Table 8-1 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 region. Figures 8-1 through 8-8 should be read in conjunction with the extent for flooding in Tables 8-1, 8-2, and 8-3 to determine the intensity of a potential flood event.

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Table 8-1. Flood Zones

INTENSITY	ZONE	DESCRIPTION
HIGH	ZONE A	Areas with a 1-percent-annual-chance of flooding and a 26 percent 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 A1-30	These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a Base Flood Elevation (BFE) (old format).
	ZONE AE	The base floodplain where BFEs are provided. AE Zones are now used on the new format FIRMs instead of A1-A30 Zones.
	ZONE AO	River or stream flood hazard areas and areas with a 1-percent-annual-chance or greater of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
	ZONE AH	Areas with a 1-percent-annual-chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. BFEs derived from detailed analyses are shown at selected intervals within these zones.
	ZONE A99	Areas with a 1-percent-annual-chance of flooding that will be protected by a federal flood control system where construction has reached specified legal requirements. No depths or BFEs are shown within these zones.
	ZONE AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
MODERATE to LOW	ZONE X 500	An area inundated by 500-year flooding; an area inundated by 100-year flooding with average depths of less than 1 foot or with drainage areas less than 1 square mile; or an area protected by levees from 100-year flooding.

Zone A is interchangeably referred to as the 100-year flood, the 1-percent-annual-chance flood, the Special Flood Hazard Area (SFHA), or more commonly, the base flood. This is the area that will convey the base flood and constitutes a threat to the planning area. The impact from a flood event can be more damaging in areas that will convey a base flood.

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Structures built in the SFHA are subject to damage by rising waters and floating debris. Moving flood water exerts pressure on everything in its path and causes erosion of soil and solid objects. If not elevated above Base Flood Elevation, utility systems, such as heating, ventilation, air conditioning, fuel, electrical systems, sewage maintenance systems and water systems, may also be damaged.

The intensity and magnitude of a flood event is also determined by the depth of flood water. Table 8-2 describes the stream gauge data provided by the United States Geological Survey (USGS).

Table 8-2. Extent for Gregg County¹

JURISDICTION ²	PEAK FLOOD EVENT
Gregg County ³	The Big Sandy Creek near Big Sandy in Upshur County, Texas reached an overflow elevation of 24 feet in 1945. The average peak flow for the Sabine River is 15 feet at this site.
City of Gladewater	The Prairie Creek near Gladewater in Gregg County, Texas reached an overflow elevation of 10 feet in 1968. The average peak flow for the Prairie Creek is 9 feet at this site.
City of Gladewater	The Sabine River near Gladewater in Gregg County, Texas reached an overflow elevation of 44 feet in 1945. The average peak flow for the Sabine River is 30 feet at this site.
City of Kilgore	The Rabbit Creek at Kilgore in Gregg County, Texas reached an overflow elevation of 21 feet in 2016. The average peak flow for the Sabine River is 10 feet at this site.
City of Longview	The Grace Creek Tributary near Longview in Gregg County, Texas reached an overflow elevation of 20 feet in 1974. The average peak flow for the Grace Creek Tributary is 14 feet at this site.
City of Longview	The Sabine River below Longview in Gregg County, Texas reached an overflow elevation of 37 feet in 2016. The average peak flow for the Sabine River is 27 feet at this site.

¹ Severity estimated by averaging floods at certain stage level over the history of flood events. Severity and peak events are based on USGS data.

² Severity is provided where peak data was provided throughout for the County but unavailable for individual jurisdictions.

³ County is still impacted by overflow impacts of this river and therefore requested event to be captured.

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The range of flood intensity that the planning area can experience is high, or Zone A. Based on historical occurrences, the planning area could expect to experience approximately 3 inches of rain within a 1-hour period, resulting in flash flooding.

The data described in Tables 8-1 and 8-2, together with Figures 8-1 through 8-8, and historical occurrences for the area, provides an estimated potential magnitude and severity for the Gregg County planning area, including all participating jurisdictions and the ETCOG.

HISTORICAL OCCURRENCES

Historical evidence indicates that areas within the planning area are susceptible to flooding, especially in the form of flash flooding. It is important to note that only flood events that have been reported 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 8-3 identifies historical flood events that resulted in damages, injuries, or fatalities within the Gregg County planning area. Table 8-4 provides the historical flood event summary by jurisdiction. Historical Data is provided by the Storm Prediction Center (NOAA), National Centers for Environmental Information (NCEI) database for Gregg County, and the participating jurisdictions.

There have been 94 total recorded flood events in the Gregg County planning area. Table 8-3 presents information on known historical events impacting the Gregg County planning area, resulting in damages, injuries, or fatalities. Historical flood data for the ETCOG is provided within the county or city events of the district’s boundaries, as the database does not have events reported separately for the ETCOG. The ETCOG did not report any damages to district facilities due to flooding.

Table 8-3. Historical Flood Events, 1996-2023⁴

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Longview	7/23/1996	0	0	\$943,200	\$0
City of Gladewater	9/16/1998	0	0	\$54,300	\$0
Gregg County	2/14/2001	0	0	\$235,900	\$0
City of Longview	8/7/2005	0	0	\$1,500	\$0
City of Longview	7/6/2007	0	0	\$35,500	\$0
Gregg County	3/30/2008	0	0	\$2,774,100	\$0
Gregg County	5/14/2008	0	0	\$136,700	\$0
Gregg County	7/17/2009	0	0	\$4,100	\$0
City of Longview	9/2/2013	0	0	\$19,000	\$0
Gregg County	9/20/2013	0	0	\$63,200	\$0

⁴ Values are in 2023 dollars.

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Table 8-4. Summary of Historical Flood Events, 1996-2023⁵

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	38	0	0	\$3,214,000	\$0
City of Clarksville City	0	-	-	-	-
City of Gladewater	14	0	0	\$54,300	\$0
City of Kilgore	15	0	0	\$0	\$0
City of Lakeport	0	-	-	-	-
City of Longview	22	0	0	\$999,200	\$0
City of Warren City	0	-	-	-	-
City of White Oak	5	0	0	\$0	\$0
ETCOG	0	-	-	-	-
Total Losses	94	0	0	\$4,267,500	

Based on the list of historical flood events for the Gregg County planning area, including all participating jurisdictions and the ETCOG, 19 events have occurred since the 2018 Plan.

SIGNIFICANT EVENTS

Flash Flood on July 23, 1996 – City of Longview

A storm system brought excessive rainfall to the Gregg County planning area, and it is recorded that three inches of rain fell in less than one hour, causing significant flooding within the City of Longview. A furniture store reported damage to merchandise and the building, among other damages across the city. This event caused \$943,200 in damages (2023 dollars).

Flood on February 14, 2001 – Gregg County

In the Sabine River Basin, excessive and prolonged heavy rains caused significant flooding. The Sabine River from Hawkins, Gladewater, and through Longview in Texas, crested at the highest stages since 1990. The Sabine River crested at 37 feet near the City of Gladewater, and 34 feet in the City of Longview. This event caused \$235,900 in damages (2023 dollars).

Flash Flood on May 30, 2008 – Gregg County

Widespread flooding was reported along a northward moving warm front across the lower Toledo Bend and Sam Rayburn country of Deep East Texas into the piney woods of Northeast Texas. The River Road and High Street in the City of Longview were impacted by flood waters and had to be closed. In addition, about 17 other roads in and around the City of Longview, Texas were closed due to excessive rainfall and flash flooding. The downtown area had several businesses

⁵ Participating jurisdictions with no reported events show a “-“ in table columns where damages, deaths or injuries would be otherwise reported.

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flooded with reports of two feet of standing water in them. This event caused \$2,774,100 in damages (2023 dollars) and is the costliest flood event recorded for the planning area.

PROBABILITY OF FUTURE EVENTS

Based on 94 recorded historical occurrences within a 28-year reporting period within the Gregg County planning area including the ETCOG, flooding is considered “Highly Likely,” meaning an event is probable within the next year.

VULNERABILITY AND IMPACT

A property’s vulnerability to a flood depends on its location and proximity to the floodplain. Structures that lie along banks of a waterway are the most vulnerable and are often repetitive loss structures. Gregg County and all participating jurisdictions encourage development outside of the floodplain. The impact for flood for the entire planning area would be considered “Limited”, with critical facilities and services shutdown for 24-hours or less and less than 10 percent of properties destroyed or with major damage.

Table 8-5 includes the comprehensive critical facilities identified in Appendix C that were considered the most important to the planning area and are susceptible to a range of impacts from flooding and are located in a SFHA. For a comprehensive list of identified critical facilities by participating jurisdiction, please see Appendix C.

Table 8-5. Critical Facilities in the Floodplain by Participating Jurisdiction

CRITICAL FACILITY TYPES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
Emergency Response Departments (EOC, Fire, Police, EMS), Hospitals	City of Gladewater: 1 Health Service	<ul style="list-style-type: none"> ● Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. ● Emergency vehicles can be damaged by rising flood waters. ● Flood-related rescues may be necessary at swift and low water crossings or in flooded neighborhoods where roads have become impassable, placing first responders in harm’s way. ● Evacuations may be required for entire neighborhoods because of rising floodwaters, further taxing limited response capabilities and increasing sheltering needs for displaced residents. ● Power outages could disrupt communications, delaying emergency response times. ● Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities. ● Washed out roads and bridges can impede emergency response vehicle access to areas. ● Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel.

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CRITICAL FACILITY TYPES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
		<ul style="list-style-type: none"> ● First responders are exposed to downed power lines, contaminated and unusual debris, hazardous materials, and generally unsafe conditions. ● Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.
<p>Airport, Academic Institutions, Community Residential Facilities, Day Care Facilities, Evacuation Centers & Shelters, Governmental Facilities</p>	<p>City of Gladewater: 1 Transportation</p>	<ul style="list-style-type: none"> ● Structures can be damaged by rising flood waters. ● Power outages could disrupt critical care. ● Backup power sources could be damaged, inundated or otherwise inoperable. ● Critical staff may be impacted and unable to report for duty, limiting response capabilities. ● Evacuations may be necessary due to extended power outages, gas line ruptures, or inundation of facilities. ● Additional emergency responders and critical aid workers may not be able to reach the area for days. ● Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations. ● Temporary break in operations may significantly inhibit post event evacuations. ● Damaged or destroyed highway infrastructure may substantially increase the need for airport operations.
<p>Utility Services and Infrastructure (electric, water, wastewater, communications)</p>	<p>Gregg County: 1 Sewage and Water</p> <p>City of Clarksville City: 1 Sewage and Water</p> <p>City of Gladewater: 8 Sewage and Water</p> <p>City of Kilgore: 4 Sewage and Water</p> <p>City of Lakeport: 2 Sewage and Water</p> <p>City of Longview: 1 Sewage and Water</p>	<ul style="list-style-type: none"> ● Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. ● Emergency service vehicles can be damaged by rising flood waters. ● Flood-related rescues may be necessary at swift and low water crossings or in flooded neighborhoods where roads have become impassable, placing emergency service workers in harm's way. ● Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel. ● Service responders are exposed to downed power lines, contaminated and unusual debris, hazardous materials, and generally unsafe conditions. ● Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.

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Historic loss estimates due to flood are presented in Table 8-6 below. Considering 94 flood events over a 28-year period, frequency is approximately three to four events every year.

Table 8-6. Average Annualized Losses by Jurisdiction, 1996-2023

JURISDICTION	NUMBER OF EVENTS	PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Gregg County	38	\$3,214,000	\$114,800
City of Clarksville City	0	-	-
City of Gladewater	14	\$54,300	\$1,900
City of Kilgore	15	\$0	\$0
City of Lakeport	0	-	-
City of Longview	22	\$999,200	\$35,700
City of Warren City	0	-	-
City of White Oak	5	\$0	\$0
ETCOG	0	-	-
PLANNING AREA	0	\$4,267,500	\$152,400

While all citizens are at risk of the impacts of a flood, forced relocation and disaster recovery drastically impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. In addition, due to factors like limited mobility, communication difficulties, medical needs, reliance on support services, transportation challenges, housing accessibility issues, and possible shortages in emergency shelter accommodations, the elderly, children, and people with disabilities are also disproportionately affected by flooding events. People who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

The population over 65 in the Gregg County planning area is estimated at 16 percent of the total population and children under the age of 5 are estimated at 7 percent. The population with a disability is estimated at 13 percent of the total population. An estimated 16 percent of the planning area population live below the poverty level and 16 percent of the populations speaks a language other than English.

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Table 8-7. Populations at Greatest Risk by Jurisdiction⁶

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
Gregg County	19,479	8,232	15,937	20,500	19,780
City of Clarksville City	164	66	514	126	35
City of Gladewater	858	669	998	1,954	267
City of Kilgore	2,117	894	1,788	2,211	2,669
City of Lakeport	113	112	116	232	187
City of Longview	12,786	5,296	9,987	14,016	14,867
City of Warren City	76	27	71	51	22
City of White Oak	689	410	857	623	304
ETCOG	N/A	N/A	N/A	N/A	N/A

ASSESSMENT OF IMPACTS

Flooding is the deadliest natural disaster that occurs in the U.S. each year, and it poses a constant and significant threat to the health and safety of the people in the Gregg County planning area. Impacts to the planning area can include:

- Flood-related rescues may be necessary at swift water and low water crossings or in flooded neighborhoods where roads have become impassable, placing first responders in harm’s way.
- Evacuations may be required for entire neighborhoods because of rising floodwaters, further taxing limited response capabilities and increasing sheltering needs for displaced residents.
- Health risks and threats to residents are elevated after the flood waters have receded due to contaminated flood waters (untreated sewage and hazardous chemicals) and mold growth typical in flooded buildings and homes.
- Significant flood events often result in widespread power outages, increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outages can result in an increase in structure fires and/or carbon monoxide poisoning, as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.
- Floods can destroy or make residential structures uninhabitable, requiring shelter or relocation of residents in the aftermath of the event.

⁶ U.S. Census Bureau Five-Year estimates

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- First responders are exposed to downed power lines, contaminated and potentially unstable debris, hazardous materials, and generally unsafe conditions, elevating the risk of injury to first responders and potentially diminishing emergency response capabilities.
- Emergency operations and services may be significantly impacted due to damaged facilities.
- Significant flooding can result in the inability of emergency response vehicles to access areas of the community.
- Critical staff may suffer personal losses or otherwise be impacted by a flood event and be unable to report for duty, limiting response capabilities.
- City or county departments may be flooded, delaying response and recovery efforts for the entire community.
- Private sector entities that the planning area and its residents rely on, such as utility providers, financial institutions, and medical care providers, may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Damage to infrastructure may slow economic recovery since repairs may be extensive and lengthy.
- Some businesses not directly damaged by the flood may be negatively impacted while utilities are being restored or water recedes, further slowing economic recovery.
- When the community is affected by significant property damage it is anticipated that funding would be required for infrastructure repair and restoration, temporary services and facilities, overtime pay for responders, as well as normal day-to-day operating expenses.
- Displaced residents may not be able to immediately return to work, further slowing economic recovery.
- Residential structures substantially damaged by a flood may not be rebuilt for years and uninsured or underinsured residential structures may never be rebuilt, reducing the tax base for the community.
- Large floods may result in a dramatic population fluctuation, as people are unable to return to their homes or jobs and must seek shelter and/or work outside of the affected area.
- Businesses that are uninsured or underinsured may have difficulty reopening, which results in a net loss of jobs for the community and a potential increase in the unemployment rate.
- Recreation activities may be unavailable, and tourism can be unappealing for years following a large flood event, devastating directly related local businesses and negatively impacting economic recovery.
- Flooding may cause significant disruptions of clean water and sewer services, elevating health risks and delaying recovery efforts.
- The psychosocial effects on flood victims and their families can traumatize them for long periods of time, creating long term increases in medical treatment and services.
- Extensive or repetitive flooding can lead to decreases in property value for the affected community.
- Flood poses a potential catastrophic risk to annual and perennial crop production and overall crop quality, leading to higher food costs.
- Flood related declines in production may lead to an increase in unemployment.

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- Large floods may result in loss of livestock, potential increased livestock mortality due to stress and water borne disease, and increased cost for feed.

The overall extent of damage caused by floods is dependent on the extent, depth, and duration of flooding, in addition to the velocities of flows in the flooded areas. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a flood event.

CLIMATE CHANGE CONSIDERATIONS

River flooding in Texas is projected to have no substantial change through 2036. This is in large part due to the construction of dams and reservoirs for flood management in the 20th century. There is a mixture of historical trends categorized by season, with no one clear trend to project. In addition, meteorological drivers of river flooding (increased rainfall intensity, decreased soil moisture) are projected to have competing influences. On balance, if an increasing trend is present in river flooding, it will be at the most extreme flood events or in the wettest parts of the state where there is so much rainfall that a decrease in soil moisture would have little mitigating impact.⁷

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) PARTICIPATION

Flood insurance offered through the National Flood Insurance Program (NFIP) is the best way for home and business owners to protect themselves financially against the flood hazard. Gregg County, and the cities of Clarksville City, Gladewater, Kilgore, Lakeport, Longview, Warren City, and White Oak are all participating in the NFIP and are in good standing. ETCOG is not an eligible entity for participation in the NFIP.

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 participating communities in the planning area participate in the CRS.

Gregg County and all participating jurisdictions currently have in place standard flood damage prevention ordinances which include minimum NFIP standards for new construction and substantial Improvements of structures. In addition, some of the participating jurisdictions have adopted subdivision regulations including the Cities of Clarksville City, Gladewater, Kilgore, Longview, and White Oak. Subdivision regulations ensure adequate drainage and egress (among other things) which further reduces flood risks to property and residents. All NFIP participating jurisdictions are considering adopting higher regulatory NFIP standards to limit or further regulate floodplain development.

The flood hazard areas throughout Gregg County are subject to periodic inundation, which may adversely affect public safety, resulting in loss of life and property, health and safety hazards, disruption of commerce and governmental services, and extraordinary public expenditures for flood protection and relief. Flood losses are created by the cumulative effect of obstructions in

⁷ Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, Texas A&M University Office of the Texas State Climatologist, 2021 update.

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floodplains which cause an increase in flood heights and velocities, and by the occupancy of flood hazard areas by uses vulnerable to floods and hazardous to other lands because they are inadequately elevated, flood-proofed, or otherwise protected from flood damage. Mitigation actions are included to address flood maintenance issues as well, including routinely clearing debris from roadside ditches and bridges, and expanding drainage culverts and storm water structures to convey flood water more adequately.

It is the purpose of Gregg County and the participating jurisdictions to continue to promote public health, safety, and general welfare by minimizing public and private losses due to flood conditions in specific areas. All participating communities in the planning area are guided by their local Flood Damage Prevention Ordinance. These communities will continue to comply with NFIP requirements through their local permitting, inspection, and record-keeping requirements for new and substantially developed construction. Further, the NFIP program promotes sound development in floodplain areas and includes provisions designed to:

- Protect human life and health;
- Minimize expenditure of public money for costly flood control projects;
- Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- Minimize prolonged business interruptions;
- Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets, and bridges located in floodplains;
- Help maintain a stable tax base by providing for the sound use and development of flood-prone areas in such a manner as to minimize future flood blight areas; and
- Ensure that potential buyers are notified that property is in a flood area.

In order to accomplish these tasks, Gregg County and participating NFIP jurisdictions seek to observe the following guidelines in order to achieve flood mitigation:

- Restrict or prohibit uses that are dangerous to health, safety, or property in times of flood, such as filling or dumping, that may cause excessive increases in flood heights or velocities;
- Require that uses vulnerable to floods, including facilities, which serve such uses, be protected against flood damage at the time of initial construction, as a method of reducing flood losses;
- Control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of floodwaters;
- Control filling, grading, dredging, and other development, which may increase flood damage; and
- Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

NFIP COMPLIANCE AND MAINTENANCE

All NFIP participating jurisdictions have developed mitigation actions that relate to either NFIP maintenance or compliance. Compliance and maintenance actions can be found in Section 19.

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Flooding was identified as a high-risk hazard during hazard ranking activities at the Risk Assessment Workshop by the vast majority of the planning team. As such, many of the mitigation actions were developed with flood mitigation in mind. A majority of these flood actions address compliance with the NFIP and implementing flood awareness programs. All participating jurisdictions recognize the need and are working towards adopting higher NFIP regulatory standards to further minimize flood risk in their community. In addition, each jurisdiction is focusing on public flood awareness activities. This includes promoting the availability of flood insurance by placing NFIP brochures and flyers in public libraries or public meeting places in participating jurisdictions.

Each NFIP participating jurisdiction in this planning process has a designated floodplain administrator. All floodplain administrators in the planning area will continue to maintain compliance with the NFIP, including continued floodplain administration, zoning ordinances, and development regulation. The floodplain ordinance adopted by each participating jurisdiction outlines the minimum requirements for development in Special Flood Hazard Areas.

All participating jurisdictions have a permitting process in place and each local floodplain administrator is responsible for coordinating inspections of damaged homes located in the floodplain. Following a flood event, local officials inspect damaged homes to make a substantial damage determination. Substantially damaged homes must be brought into compliance. Similarly, proposed improvements to homes located in the floodplain are reviewed by local building officials to determine if a substantial improvement is proposed. The floodplain administrator oversees permitted repairs and improvements to ensure compliance during the rebuilding or improvement process.

REPETITIVE LOSS

The Flood Mitigation Assistance (FMA) Grant Program under FEMA provides federal funding to assist states and communities in implementing mitigation measures to reduce or eliminate the long-term risk of flood damage to buildings that are insured under the National Flood Insurance Program. The Texas Water Development Board (TWDB) administers the FMA grant program for the State of Texas. One of the goals of the FMA program is to reduce the burden of repetitive loss and severe repetitive loss properties on the NFIP through mitigation activities that significantly reduce or eliminate the threat of future flood damages.

Repetitive Loss properties are defined as structures that are:

- Any insurable building for which 2 or more claims of more than \$1,000 each, paid by the National Flood Insurance Program (NFIP) within any 8-year period, since 1978;
- May or may not be currently insured under the NFIP.

Severe Repetitive Loss properties are defined as structures that are:

- Covered under the NFIP and have at least 4 flood related damage claim payments (building and contents) over \$5,000.00 each, and the cumulative amount of such claims payments exceed \$20,000; or
- At least 2 separate claim payments (building payments only) have been made, with the cumulative amount of the building portion of such claims exceeding the market value of the building.

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In either scenario, at least 2 of the referenced claims must have occurred within any 8-year period and must be greater than 10 days apart.⁸ Table 8-8 shows repetitive loss and severe repetitive loss properties for the Gregg County planning area. It should be noted that the ETCOG is not eligible to participate in the NFIP. There are no repetitive or severe repetitive loss properties reported for Gregg County or the Cities of Gladewater, Lakeport, and Warren City.

Table 8-8. Repetitive Loss and Severe Repetitive Loss Properties

JURISDICTION	BUILDING TYPE	NUMBER OF STRUCTURES	NUMBER OF LOSSES ⁹
City of Clarksville City	Single Family	1	2
City of Kilgore	Single Family	1	8*
City of Kilgore	Single Family	6	15
City of Kilgore	Non-Resident	4	20
City of Longview	Single Family	19	55
City of Longview	Single Family	2	11*
City of White Oak	Single Family	1	3

⁸ Source: Texas Water Development Board.

⁹ Asterix indicates a Severe Repetitive Loss (SRL) property. Some structures assumed to be single family residential.



SECTION 9
HAIL

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HAZARD DESCRIPTION



Hailstorm events are a potentially damaging outgrowth of severe thunderstorms. During the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere, and the subsequent cooling of the air mass. Frozen droplets gradually accumulate into ice crystals until they fall as precipitation that is round or irregularly shaped masses of ice typically greater than 0.75 inches in diameter. The size of hailstones is a direct result of the size and severity of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a by-product of heating on the Earth's surface. Higher temperature gradients above Earth's surface result in increased suspension time and hailstone size.

According to the National Insurance Crime Bureau (NICB), between 2018 and 2020 the State of Texas had the greatest number of hail loss claims in the U.S. with 605,866 loss claims (23 percent of total hail claims in the U.S.) due to hail events. In this two-year period Texas experienced a total of 584 severe hail days. Five of the top ten cities for hail loss claims between 2017 and 2019 were in Texas, three of which were in the Dallas-Fort Worth metropolitan area.¹

In 2021, 6.8 million properties in the U.S. experienced one or more damaging hail events, resulting in a total of \$16.5 billion in insured losses. Texas had the highest number of properties affected by hail with over 1.5 million properties or 17 percent of total properties in the state affected; an increase of 80,000 properties affected between 2020 and 2021. Texas hailstorms accounted for almost a quarter of total U.S. properties affected by hail in 2021.

LOCATION

Hailstorms are an extension of severe thunderstorms that could potentially cause severe damage. As a result, they are not confined to any specific geographic location and can vary greatly in size, location, intensity, and duration. Therefore, the entire Gregg County planning area, including all

¹ Manasek, Thomas, "2018-2020 United States Hail Loss Claims and Questionable Claims" (National Insurance Crime Bureau, March 15, 2021). <http://www.rmii.org/downloads/PUBLIC%202018%20-%202020%20Hail%20foreCAST-%20TJM.pdf>

SECTION 9: HAIL

participating jurisdictions and the ETCOG, is equally at risk to the hazard of hail. Refer to Figure 9-1 for the location of past hail events in the planning area.

EXTENT

The National Weather Service (NWS) classifies a storm as “severe” if there is hail three-quarters of an inch in diameter (approximately the size of a penny) or greater, based on radar intensity or as seen by observers. The intensity category of a hailstorm depends on hail size and the potential damage it could cause, as depicted in the National Centers for Environmental Information (NCEI) Intensity Scale in Table 9-1.

Table 9-1. Hail Intensity and Magnitude²

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 – 1.20	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

The intensity scale in Table 9-1 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. Based on the best available data regarding the previous occurrences for the area, the Gregg County planning area may experience

² NCEI Intensity Scale, based on the TORRO Hailstorm Intensity Scale.

SECTION 9: HAIL

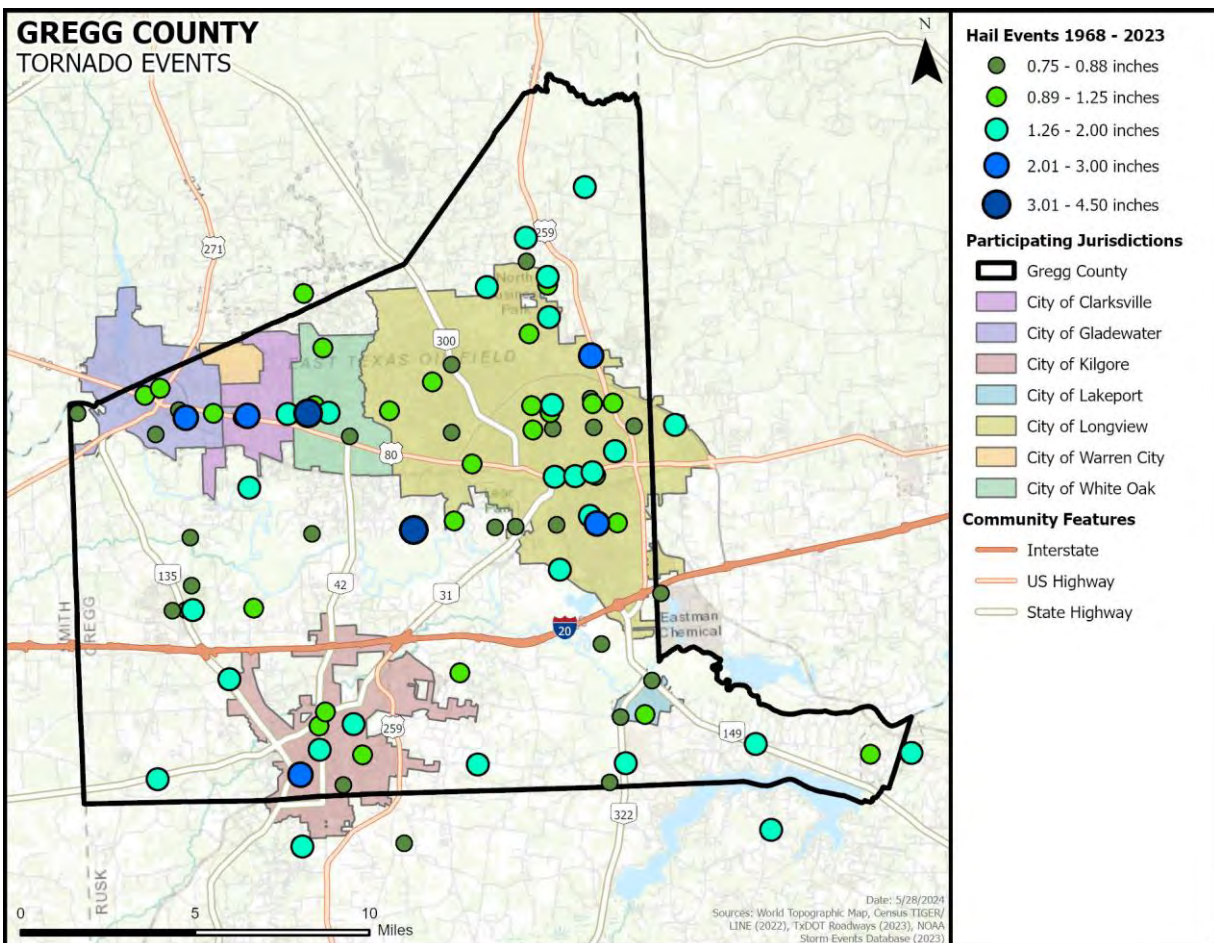
hailstorms ranging from an H0 (pea size) to an H10 (baseball size). The largest size hail to be reported was 4.5 inches in diameter, or a H10, in the City of Longview, which is considered a very destructive hailstorm that can cause severe damage to structures. Refer to the Historical Occurrences section below for more details on hailstorm events. This is likely the greatest extent the planning area can anticipate in the future.

HISTORICAL OCCURRENCES

Historical evidence shown in Figure 9-1 demonstrates that the planning area, including all participating jurisdictions and the ETCOG, is vulnerable to hail events overall. Historical events with reported damages, injuries, or fatalities are shown in Table 9-2. A total of 200 reported historical hail events impacted the Gregg County planning area from 1968 through 2023; these events were reported to NCEI and NOAA databases and may not represent all hail events to have occurred during the past 56 years. Only those events for the Gregg County planning area with latitude and longitude available were plotted (Figure 9-1).

Historical hail data for ETCOG does not have events reported separately and apart from the reported county and city events. ETCOG did not have any reports of losses due to hail.

Figure 9-1. Spatial Historical Hail Events, 1968-2023



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Table 9-2. Damaging Historical Hail Events, 1968-2023³

JURISDICTION	DATE	MAGNITUDE (Inches)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Kilgore	10/20/1993	1	0	0	\$10,200	\$0
City of Kilgore	11/20/1993	1	0	0	\$10,200	\$0
City of Longview	1/6/1998	4.5	0	0	\$1,832,700	\$0
City of Longview	1/6/1998	2.75	0	0	\$229,100	\$0
Gregg County	4/8/2008	1.75	0	1	\$0	\$0
TOTALS		(Max Extent)	0	1	\$2,082,200	\$0

Table 9-3. Historical Hail Events Summary, 1968-2023⁴

JURISDICTION	NUMBER of EVENTS	MAX MAGNITUDE (Inches)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	106	3	0	1	\$0	\$0
City of Clarksville City	0	-	-	-	-	-
City of Gladewater	20	2.75	0	0	\$0	\$0
City of Kilgore	13	2.75	0	0	\$20,400	\$0
City of Lakeport	0	-	-	-	-	-
City of Longview	47	4.5	0	0	\$2,061,800	\$0
City of Warren City	0	-	-	-	-	-
City of White Oak	14	4.5	0	0	\$0	\$0
ETCOG	0	-	-	-	-	-
TOTAL LOSSES	200	(Max Extent)	0	1	\$2,082,200	\$0

Based on the list of historical hail events for the Gregg County planning area (listed above), 14 of the events have occurred since 2018 Plan according to reports in the NCEI database. Unincorporated Gregg County has had the greatest number of events (107) over the reporting period followed by City of Longview (48). The most significant event in relation to damages occurred on January 6, 1998, in the City of Longview, with just over \$1,832,700 in damages (2023 dollars) with hail reported as large as 4.5 inches in diameter.

³ Only recorded events with damages are listed.

⁴ Participating jurisdictions with no reported events show a “-“ in table columns where damages, deaths or injuries would be otherwise reported.

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SIGNIFICANT EVENTS

January 6, 1998 – City of Longview, City of White Oak, and City of Gladewater

A severe thunderstorm that brought hail that was reported to be softball sized, at 4.5 inches in diameter to the cities of Longview and White Oak. The City of Gladewater experienced hail at 2.5 inches in diameter during the event. This is the costliest hail event for the planning area with \$1,832,700 (2023 dollars) in property damages.

April 8, 2008 – Gregg County

Severe thunderstorms developed ahead of a dry line across Northeast Texas on April 8, 2008. These thunderstorms developed with the aid of a strong upper-level low pressure system that pulled into the southern and central plains. These thunderstorms, which affected the region, produced large hail, damaging thunderstorm winds, very heavy rainfall, and an isolated tornado. The largest hailstones reported in Gregg County were 1.75 inches in diameter and caused one injury in the unincorporated community of Judson

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, 200 events in a 56-year reporting period for Gregg County provides an average annual occurrence of three to four events per year. This frequency supports a “Highly Likely” probability of future events for the Gregg County planning area, including all participating jurisdictions and the ETCOG. See additional information on climate change at the end of this section.

VULNERABILITY AND IMPACT

Much of the damage inflicted by hail is to crops. Even relatively small hail can shred plants to ribbons in a matter of minutes. Vehicles, roofs of buildings and homes, and landscaping are most damaged by hail.

Utility systems on roofs of buildings and critical facilities would be vulnerable and could be damaged. Hail could cause a significant threat to people, as they could be struck by hail and falling trees and branches. Outdoor activities and events may elevate the risk to residents and visitors when a hailstorm strikes with little warning. Portable buildings typically utilized by schools and commercial sites such as construction areas would be more vulnerable to hail events than the typical site-built structures.

The Gregg County planning area features mobile or manufactured home parks throughout the planning area. These parks are typically more vulnerable to hail events than typical site-built structures. In addition, manufactured homes are located sporadically throughout the planning area including all participating jurisdictions which would also be more vulnerable. The U.S. Census data indicates a total of 4,086 (8 percent of total housing stock) manufactured homes are located in the Gregg County planning area. In addition, 52 percent (approximately 27,666 structures) of the single family residential (SFR) structures in the entire planning area were built before 1980. The ETCOG has one manufactured building on site and two structures built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damage during significant wind events.

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Table 9-4. Structures at Greater Risk by Participating Jurisdiction

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980	MANUFACTURED HOMES
Gregg County	27,666	4,086
City of Clarksville City	184	98
City of Gladewater	1,648	27
City of Kilgore	3,609	313
City of Lakeport	151	56
City of Longview	20,107	1,251
City of Warren City	97	8
City of White Oak	1,193	236
ETCOG	2	1

While all citizens are at risk of the impacts of hail, forced relocation and disaster recovery drastically impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. An estimated 16 percent of the planning area population live below the poverty level (Table 9-5). While warning times for this type of hazard events should be substantial enough for these individuals to seek shelter, the elderly, children, and people with a disability may have trouble taking shelter due to mobility issues or a lack of awareness, making them more susceptible to injury or harm. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures. The ETCOG also has about 41 employees that work as Go Bus Drivers and may be subject to severe weather conditions.

Table 9-5. Populations at Greatest Risk by Jurisdiction⁵

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
Gregg County	19,479	8,232	15,937	20,500	19,780
City of Clarksville City	164	66	514	126	35
City of Gladewater	858	669	998	1,954	267
City of Kilgore	2,117	894	1,788	2,211	2,669

⁵ US Census Bureau 2022 data for Gregg County

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JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Lakeport	113	112	116	232	187
City of Longview	12,786	5,296	9,987	14,016	14,867
City of Warren City	76	27	71	51	22
City of White Oak	689	410	857	623	304

Table 9-6. Outdoor Operating Employees by Participating Special District

PARTICIPANT	EMPLOYEES OPERATING OUTDOORS
ETCOG	41

The Gregg County Planning Team identified the following critical facilities (Table 9-7) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by hail events. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 9-7. Critical Facilities Vulnerable to Hail

CRITICAL FACILITY TYPE	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"> Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. Emergency vehicles can be damaged by hailstones. Power outages could disrupt communications, delaying emergency response times. Accumulated hail on the streets may impede emergency response vehicle access to areas. Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"> Structures can be damaged by hailstones. Power outages could disrupt critical care. Backup power sources could be damaged. Evacuations may be necessary due to extended power outages, gas line ruptures, or structural damage to facilities. Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations. Temporary break in operations may significantly inhibit post event evacuations. Damaged or destroyed highway infrastructure may substantially increase the need for airport operations.

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CRITICAL FACILITY TYPE	POTENTIAL IMPACTS
Commercial Supplier (Food, fuel, etc.)	<ul style="list-style-type: none"> Facilities or infrastructure may be damaged, destroyed or otherwise inaccessible. Essential supplies like medicines, water, food, and equipment deliveries may be significantly delayed.
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. Power outages could disrupt communications, delaying emergency response times. Accumulated hail on the streets may impede service response vehicle access to areas. Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.

Hail has been known to cause injury to humans and occasionally has been fatal. Overall, the loss estimate of property and crops in the planning area over the reporting period was approximately \$2,082,200 with an average annualized loss of \$37,200. Generally the impacts of hail events would be considered limited, with less than 10 percent of property expected to be destroyed and critical facilities shut down for less than 24-hours. However, with one reported injury, the impact is considered “Substantial” with multiple injuries possible depending on the severity of the event.

Table 9-7. Estimated Annualized Losses by Jurisdiction

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Gregg County	\$0	\$0
City of Clarksville City	\$0	\$0
City of Gladewater	\$0	\$0
City of Kilgore	\$20,400	\$400
City of Lakeport	\$0	\$0
City of Longview	\$2,061,800	\$36,800
City of Warren City	\$0	\$0
City of White Oak	\$0	\$0
ETCOG	\$0	\$0
TOTALS	\$2,082,200	\$37,200

ASSESSMENT OF IMPACTS

Hail events have the potential to pose a significant risk to people and can create dangerous situations Hail conditions can be frequently associated with a variety of impacts, including:

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- Hail may create hazardous road conditions during and immediately following an event, potentially delaying critical staff from reporting for duty as well as delaying first responders from providing for or preserving public health and safety and.
- Individuals and first responders who are exposed to the storm may be struck by hail, falling branches, or downed trees resulting in injuries or possible fatalities.
- Large hail events will likely cause extensive roof damage to residential structures along with siding damage and broken windows, creating a spike in insurance claims and a rise in premiums, and potentially result in physical harm to occupants.
- Automobile damage may be extensive depending on the size of the hail and length of the storm.
- Hail events can result in power outages over widespread areas increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage can result in an increase in structure fires and/or carbon monoxide poisoning, as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.
- First responders are exposed to downed power lines, damaged structures, hazardous spills, and debris that often accompany hail events, elevating the risk of injury to first responders and potentially diminishing emergency response capabilities.
- Some businesses not directly damaged by the hail event may be negatively impacted while roads are cleared and utilities are being restored, further slowing economic recovery.
- Businesses that are more reliant on utility infrastructure than others may suffer greater damage without a backup power source.
- Depending on the severity and scale of damage caused by large hail events, damage to power transmission and distribution infrastructure can require days or weeks to repair.
- A significant hail event could significantly damage agricultural crops, resulting in extensive economic losses for the community and surrounding area.
- Hail events may injure or kill livestock and wildlife or destroy wildlife habitat.
- A large hail event could impact the accessibility of recreational areas and parks due to extended power outages or debris clogged access roads.
- Historical sites and properties are placed at a higher risk of impact due to materials used and the inability to change properties due to their historic status. There are eight historical sites listed on the National Register of Historic Places for Gregg County.

The economic and financial impacts of hail will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning conducted by the community, local businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of any hail event.

CLIMATE CHANGE CONSIDERATIONS

Although the impact of climate change on the frequency and severity of hail events is uncertain, some climate studies attempt to give insight on the future conditions of hailstorms. As ocean temperatures rise due to climate change, more moisture is evaporating into the atmosphere. The warm and moist air masses that fuel severe weather may become more unstable on average, which could favor the increased development of thunderstorms and hail. However, it is also

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suggested that in a warming climate, the average melting level will rise in thunderstorms, meaning small hailstones will have more of a chance to melt as they fall to the ground. Therefore, hail may become less frequent, but large hail can be expected when it does occur, leading to the possibility of increased damages.⁶

⁶ Yale Climate Connections, Hailstorms and Climate Change, March 17, 2022.



SECTION 10
LIGHTNING

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HAZARD DESCRIPTION

Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a “bolt” when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes the thunder which often accompanies lightning strikes. While most often affiliated with severe thunderstorms, lightning often strikes outside of heavy rain and might occur as far as 10 miles away from any rainfall.

According to the National Weather Service (NWS), the 10-year (2012–2021) average for fatalities is 23 people with an average of 300 injuries in the United States each year by lightning. Lightning can occur as cloud to ground flashes or as intra-cloud lightning flashes. Direct lightning strikes can cause significant damage to buildings, critical facilities, infrastructure, and communication equipment affecting emergency response. Lightning is also responsible for igniting wildfires that can result in widespread damages to property before firefighters have the ability to contain and suppress the resultant fire.

LOCATION

Lightning can strike in any geographic location and is considered a common occurrence in Texas. The Gregg County planning area is in a region of the country that is moderately susceptible to a lightning strike. Therefore, lightning could occur at any location within the entire planning area. It is assumed that the entire Gregg County planning area, including all participating jurisdictions and the ETCOG, is uniformly exposed to the threat of lightning.

EXTENT

According to the 2023 Annual Lightning Report by Vaisala, the State of Texas ranks tenth in the U.S. for lightning strike density with an average of 157.7 flashes per square mile.¹ Vaisala’s U.S. National Lightning Detection Network lightning flash density map shows an average of 134.4

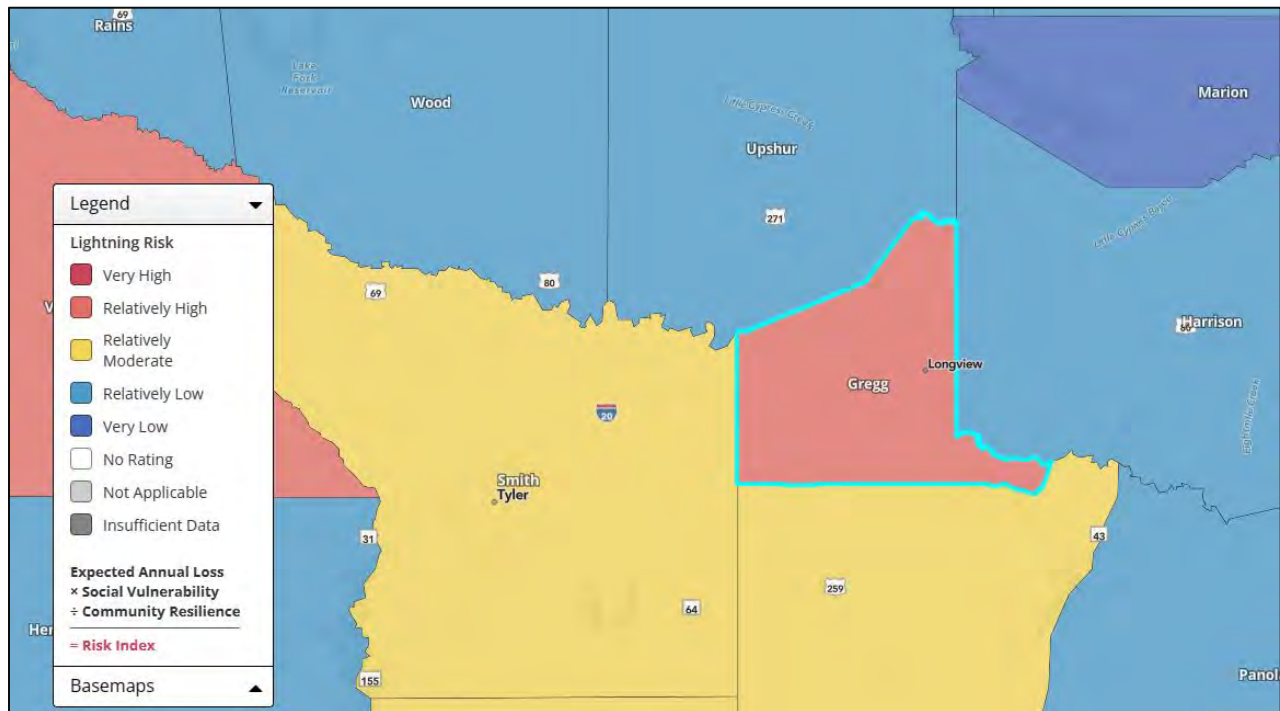
¹ Source: <https://www.xweather.com/annual-lightning-report>

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lightning events per square mile per year for the Gregg County planning area. This rate equates to approximately 36,700 flashes per year for the entire planning area.

FEMA's National Risk Index includes an analysis of the planning area's expected annual loss and the community's risk factor which incorporates social vulnerability as well as community resilience to determine the lightning risk for the area, compared to the rest of the United States. Gregg County is located in an area where the extent is classified as relatively high (Figure 10-1).

Figure 10-1. Gregg County Lightning Risk, National Risk Index, 2024²



HISTORICAL OCCURRENCES

The NCEI (National Centers for Environmental Information) database indicates 15 recorded lightning events for the Gregg County planning area. It is highly likely multiple lightning occurrences have gone unreported before and during the recording period. The NCEI is a national data source organized under the National Oceanic and Atmospheric Administration and considered a reliable resource for hazards. However, the flash density for the planning area along with input from local team members indicates regular lightning occurrences that simply have not been reported.

Historical lightning data for ETCOG does not have events reported separately and apart from the reported county and city events. ETCOG did not report any losses due to lightning.

² Source: Map | National Risk Index, <https://hazards.fema.gov/nri/map>

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Table 10-1. Historical Lightning Events, 1997-2023³

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Kilgore	7/6/1997	0	0	\$3,700	\$0
City of Kilgore	7/6/1997	0	0	\$1,800	\$0
City of Kilgore ⁴	7/6/1997	0	0	\$0	\$0
City of Longview	4/23/2003	0	0	\$0	\$0
City of Longview	8/14/2005	0	0	\$22,600	\$0
City of Longview	9/27/2007	1	0	\$0	\$0
Gregg County	6/9/2010	0	0	\$6,800	\$0
Gregg County	4/4/2011	0	0	\$26,300	\$0
Gregg County	6/30/2011	0	0	\$6,600	\$0
City of Longview	6/30/2011	0	0	\$6,600	\$0
Gregg County	6/14/2012	0	0	\$12,900	\$0
Gregg County	9/11/2013	0	0	\$37,900	\$0
Gregg County	10/13/2014	0	0	\$12,500	\$0
Gregg County	4/6/2019	0	0	\$34,800	\$0
City of Kilgore	4/6/2019	0	0	\$57,900	\$0
TOTALS		1	0	\$230,400	

Table 10-2. Historical Lightning Events Summary, 1997-2023⁵

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGES	CROP DAMAGES
Gregg County	7	0	0	\$137,800	\$0
City of Clarksville City	0	-	-	-	-
City of Gladewater	0	-	-	-	-
City of Kilgore	4	0	0	\$63,400	\$0
City of Lakeport	0	-	-	-	-
City of Longview	4	1	0	\$29,200	\$0
City of Warren City	0	-	-	-	-
City of White Oak	0	-	-	-	-

³ Values are in 2023 dollars. Database was searched for events between 2008 and 2023.

⁴ Three separate lightning events were reported on the same day at different times.

⁵ Participating jurisdictions with no reported events show a “-“ in table columns where damages, deaths or injuries would be otherwise reported.

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JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGES	CROP DAMAGES
ETCOG	0	-	-	-	-
TOTALS	15	1	0	\$230,400	\$0

Based on the list of historical lightning events for the Gregg County planning area, including all participating jurisdictions and the ETCOG, there have been two reported events since the 2018 Plan.

SIGNIFICANT EVENTS

September 27, 2007 – Gregg County

Scattered severe thunderstorms developed across portions of East Texas during the afternoon hours of September 27, 2007, producing significant tree, power line, and structural damage. The Cities of Longview and Kilgore were impacted the most, with numerous trees uprooted, power lines downed, and trees falling onto homes. A City of Longview resident was killed when lightning struck a tree they were standing near in wake of the storm.

April 6, 2019 – Gregg County

A negatively tilted upper-level storm system moved across the Northeast Texas region during the morning and afternoon hours on April 6, 2019, resulting in severe thunderstorms producing large hail, damaging winds, and lightning. The Sabine fire department in the City of Kilgore reported that a tank battery was struck by lightning on Watson Road, causing the tank to catch fire. Local officials stated that mud and high water prevented them from getting equipment close enough to extinguish the flames. The fire melted power lines hanging near the tanks. No injuries were reported, but this is the costliest lightning event in the planning area which caused \$57,900 (2023 dollars) in property damage.

PROBABILITY OF FUTURE EVENTS

Based on historical records and input from the planning team the probability of occurrence for future lightning events in the Gregg County planning area, including all participating jurisdictions and the ETCOG, is considered “Highly Likely”, or an event probable in the next year. The planning team stated that lightning occurs regularly in the area. According to the 2023 Annual Lightning Report by Vaisala, the Gregg County planning area, including participating jurisdictions, are in an area of the country that experiences approximately 134.4 lightning flashes per square mile per year (approximately 36,700 flashes per year). Given this estimated probability of events, it can be expected that future lightning events will continue to threaten life and cause property damage throughout the planning area. Impacts of climate change are not expected to increase the average frequency of lightning events but may lead to an increase in the intensity of events when they do occur. See additional information on climate change at the end of this section.

VULNERABILITY AND IMPACT

Vulnerability is difficult to evaluate since lightning events can occur at different strength levels, in random locations, and can create a broad range of damage depending on the strike location. Due to the randomness of these events, all existing and future structures and facilities in the Gregg

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County planning area, including all participating jurisdictions and the ETCOG, could potentially be impacted and remain vulnerable to possible injury and property loss from lightning strikes.

The direct and indirect losses associated with these events include injury and loss of life, damage to structures and infrastructure, agricultural losses, utility failure (power outages), and stress on community resources. The entire population of the Gregg County planning area, including participating jurisdictions, are considered exposed to the lightning hazard. The peak lightning season in the State of Texas is from June to August; however, the most fatalities occur in July. Fatalities occur most often when people are outdoors and/or participating in some form of recreation. The ETCOG has approximately 41 employees that work as Go Bus Drivers and may be subject to outdoor conditions. The population located outdoors during a lightning event is considered at risk and more vulnerable to a lightning strike compared to those inside a structure. Moving to a lower risk location will decrease a person’s vulnerability.

The entire general building stock and all infrastructure of the Gregg County planning area, are considered exposed to the lightning hazard. Lightning can be responsible for damages to buildings, cause electrical, forest and/or wildfires, and damage infrastructure such as power transmission lines and communication towers.

While all citizens are at risk to the impacts of lightning, forced relocation and disaster recovery drastically impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. People with disabilities, the elderly, and children are vulnerable during lightning events due to mobility limitations, sensory issues, and cognitive impairments. They may need additional assistance sheltering during severe weather events, making them particularly at risk of injury. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

The population over 65 in the Gregg County planning area is estimated at 16 percent of the total population and children under the age of 5 are estimated at 7 percent. Populations with a disability is estimated at 13 percent. An estimated 16 percent of the planning area population live below the poverty level and 16 percent of the populations speaks a language other than English.

Table 10-3. Populations at Greatest Risk by Jurisdiction⁶

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
Gregg County	19,479	8,232	15,937	20,500	19,780
City of Clarksville City	164	66	514	126	35
City of Gladewater	858	669	998	1,954	267
City of Kilgore	2,117	894	1,788	2,211	2,669

⁶ US Census Bureau, American Community Survey Five-Year Estimates, 2022

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JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Lakeport	113	112	116	232	187
City of Longview	12,786	5,296	9,987	14,016	14,867
City of Warren City	76	27	71	51	22
City of White Oak	689	410	857	623	304

Table 10-4. Outdoor Operating Employees by Participating Special District

PARTICIPANT	EMPLOYEES OPERATING OUTDOORS
ETCOG	41

The Gregg County Planning Team identified the following critical facilities (Table 10-5) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by lightning events. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 10-5. Critical Facilities Vulnerable to Lightning Events

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"> Emergency operations and services may be significantly impacted due to power outages, damaged facilities, fires and/or loss of communications as a result of lightning strikes. Emergency vehicles, including critical equipment, can be damaged by lightning strikes or by falling trees damaged by lightning. Power outages could disrupt communications, delaying emergency response times. Downed trees due to lightning strikes can impede emergency response vehicle access to areas. Lightning strikes can be associated with structure fires and wildfires, further straining the capacity and resources of emergency personnel. Extended power outages may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"> Structures can be damaged by falling trees damaged by lightning. Power outages could disrupt critical care. Backup power sources could be damaged. Evacuations may be necessary due to extended power outages, fires, or other associated damages to facilities.

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CRITICAL FACILITIES	POTENTIAL IMPACTS
Commercial Supplier (food, fuel, etc.)	<ul style="list-style-type: none"> Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable. Essential supplies like medicines, water, food, and equipment deliveries may be delayed. Economic disruption due to power outages and fires negatively impact airport services as well as area businesses reliant on airport operations.
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> Emergency operations and critical services may be significantly impacted due to power outages, damaged facilities, fires and/or loss of communications as a result of lightning strikes. Emergency vehicles, including critical equipment, can be damaged by lightning strikes or by falling trees damaged by lightning. Power outages could disrupt communications, delaying emergency response times. Downed trees due to lightning strikes can impede emergency response vehicle access to areas. Lightning strikes can be associated with structure fires and wildfires, further straining the capacity and resources of emergency personnel. Extended power outages may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.

There is one recorded death within the Gregg County planning area directly related to lightning. Generally the impacts of lightning events would be considered limited, with less than 10 percent of property expected to be destroyed and critical facilities shut down for less than 24-hours. However, with one fatality, the impact is considered “Substantial” with multiple injuries possible depending on the severity of the event. Overall, the total loss estimate for the planning area (in 2023 dollars) is estimated at \$230,500 with an average annualized loss of approximately \$8,200 (Table 10-6).

Table 10-6. Potential Annualized Losses by Jurisdiction⁷

JURISDICTION	TOTAL PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATE
Gregg County	\$137,800	\$4,900
City of Clarksville City	\$0	\$0
City of Gladewater	\$0	\$0
City of Kilgore	\$63,500	\$2,300
City of Lakeport	\$0	\$0

⁷ Damage values are in 2023 dollars..

SECTION 10: LIGHTNING

JURISDICTION	TOTAL PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATE
City of Longview	\$29,200	\$1,000
City of Warren City	\$0	\$0
City of White Oak	\$0	\$0
ETCOG	\$0	\$0
PLANNING AREA	\$230,500	\$8,200

ASSESSMENT OF IMPACTS

Lightning events have the potential to pose a significant risk to people and can create dangerous and difficult situations for public health and safety officials. Additional impacts to the planning area can include:

- The Gregg County planning area features developed parks and green spaces. Lightning events could impact recreational activities, placing residents and visitors in imminent danger, potentially requiring emergency services or park evacuation.
- Older structures built to less stringent building codes may suffer greater damage from a lightning strike as they are typically built with less fire-resistant materials and often lack any fire mitigation measures such as sprinkler systems. An estimated 52 percent of homes in the County were built before 1980. Similarly, historic buildings may lack fire mitigation materials or measures due to their historic status. Currently, eight sites and districts in the Gregg County planning area are listed on the National Register of Historic Places.
- Vegetation in urban parks may be destroyed by lightning caused brush fires and result in poor air quality impacting public health.
- Individuals exposed to the storm can be directly struck, posing significant health risks and potential death.
- Structures can be damaged or crushed by falling trees damaged by lightning, which can result in physical harm to the occupants.
- Lightning strikes can result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage often results in an increase in structure fires and carbon monoxide poisoning as individuals attempt to cook or heat their homes with alternate, unsafe cooking or heating devices, such as grills.
- Lightning strikes can be associated with structure fires and wildfires, creating additional risk to residents and first responders.
- Emergency operations and services may be significantly impacted due to power outages and/or loss of communications.
- County and city departments may be damaged, delaying response and recovery efforts for the entire community.
- Economic disruption due to power outages and fires negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.
- Some businesses not directly damaged by lightning events may be negatively impacted while utilities are being restored, further slowing economic recovery.

SECTION 10: LIGHTNING

- Businesses that are more reliant on utility infrastructure than others may suffer greater damage without a backup power source.

The economic and financial impacts of lightning on the area will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of any significant lightning event.

CLIMATE CHANGE CONSIDERATIONS

As CO₂ increases and the land surface warms, stronger updrafts are more likely to produce lightning. In a climate with double the amount of CO₂, we may see fewer lightning storms overall, but 25 percent stronger storms, with a 5 percent increase in lightning. Lightning damage is also likely to increase because of its role in igniting forest fires, where dry vegetation, also caused by rising temperatures, creates more 'fuel' for fires, so even a small climate change may have huge consequences. While the impact climate change will have on our weather still remains uncertain, researchers agree that implementing simple measures like lightning detection systems and installing grounding systems in buildings could go a long way in avoiding deaths and injuries.⁸

Lightning events have the potential to pose a significant risk to people and property throughout the planning area. The economic and financial impacts of lightning on the area will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. While no increase in the number of hazard events is anticipated, the impact of the hazard may see an increase in losses. As populations grow and urban development continues to rise, the overall vulnerability and impact are expected to increase in the next five years.

⁸ Environmental Journal, Nathan Neal, January 11, 2021.



SECTION 11
**THUNDERSTORM
WIND**

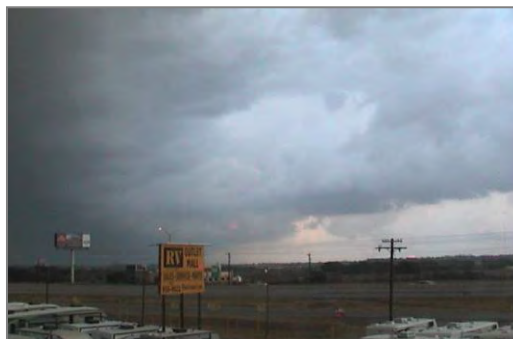
SECTION 11: THUNDERSTORM WIND

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HAZARD DESCRIPTION

Thunderstorms create extreme wind events which includes straight line winds. Wind is the horizontal motion of the air past a given point, beginning with differences in air pressures. Pressure that is higher at one place than another sets up a force pushing from high toward low pressure; the greater the difference in pressures, the stronger the force. The distance between the area of high pressure and the area of low pressure also determines how fast the moving air accelerates.

Thunderstorms are created when heat and moisture near the Earth's surface are transported to the upper levels of the atmosphere. By-products of this process are the clouds, precipitation, and wind that become the thunderstorm.



According to the National Weather Service (NWS), a thunderstorm occurs when thunder accompanies rainfall. Radar observers use the intensity of radar echoes to distinguish between rain showers and thunderstorms.

Straight line winds 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

Thunderstorm wind events can develop in any geographic location and are considered a common occurrence in Texas. Therefore, a thunderstorm wind event could occur at any location within the Gregg County planning area, including all participating jurisdictions and the ETCOG. These storms develop randomly and are not confined to any geographic area within the planning area. It is assumed that the entire Gregg County planning area is uniformly exposed to the threat of thunderstorm winds.

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EXTENT

The extent or magnitude of a thunderstorm wind event is measured by the Beaufort Wind Scale. Table 11-1 describes the different intensities of wind in terms of speed and effects, from calm to violent and destructive.

Table 11-1. Beaufort Wind Scale¹

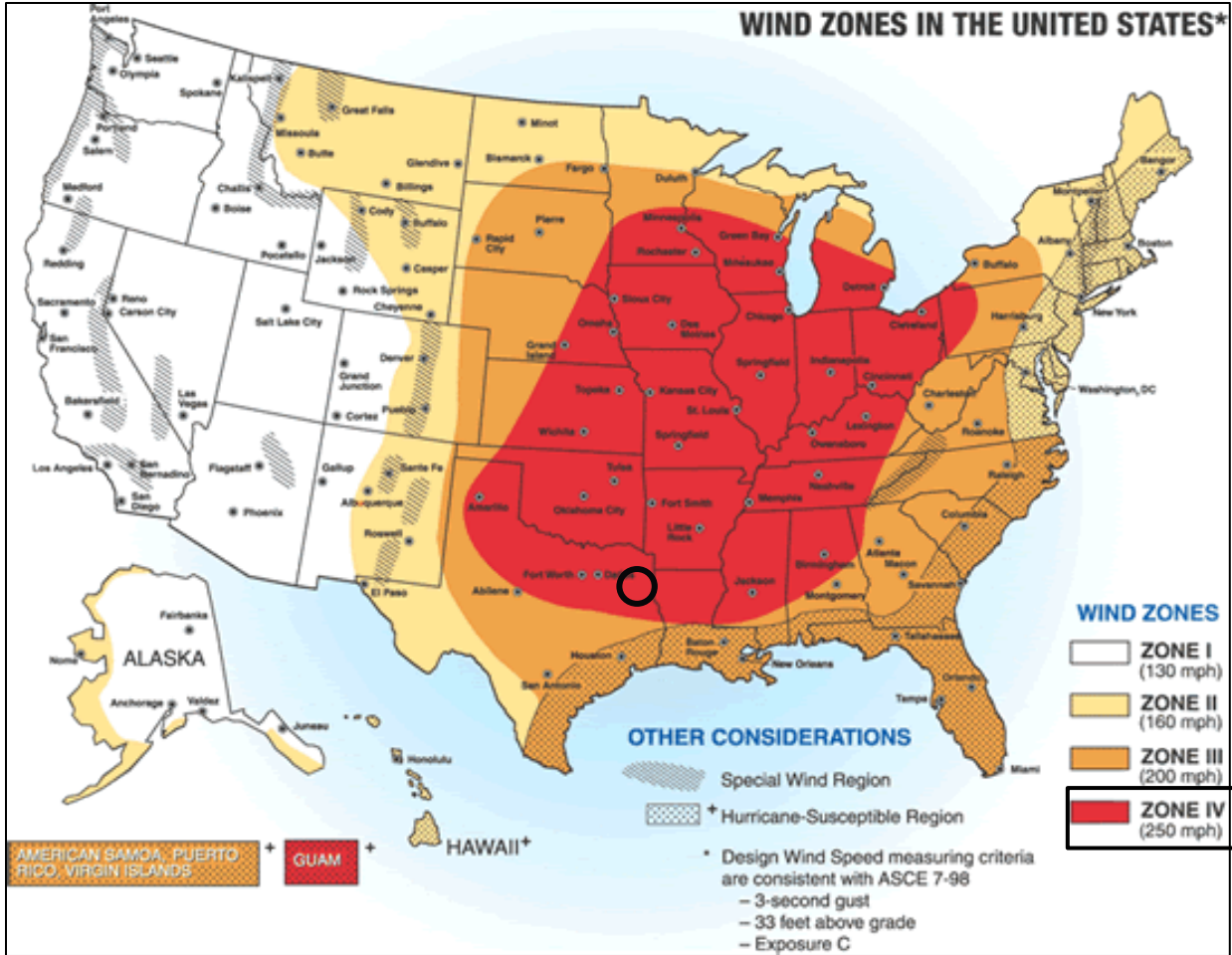
FORCE	WIND (MHP)	WIND (Knots)	WMO CLASSIFICATION	APPEARANCE OF WIND EFFECTS
0	Less than 1	Less than 1	Calm	Calm, smoke rises vertically
1	1-3	1-3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4-7	4-6	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	8-12	7-10	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	13-18	11-16	Moderate Breeze	Dust, leaves and loose paper lifted, small tree branches move
5	19-24	17-21	Fresh Breeze	Small trees in leaf begin to sway
6	25-31	22-27	Strong Breeze	Larger tree branches moving, whistling in wires
7	32-38	28-33	Near Gale	Whole trees moving, resistance felt walking against wind
8	39-46	34-40	Gale	Whole trees in motion, resistance felt walking against wind
9	47-54	41-47	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	55-63	48-55	Storm	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	64-72	56-63	Violent Storm	If experienced on land, widespread damage
12	72-83	64-71	Hurricane	Violence and destruction

Figure 11-1 displays the wind zones as derived from NOAA.

¹ Source: World Meteorological Organization

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Figure 11-1. Wind Zones in the United States²



On average, the planning area experiences three to four thunderstorm wind events every year. The Gregg County planning area is located within Wind Zone IV, meaning it can experience winds up to 250 mph. The Gregg County planning area has experienced a significant wind event, or an event with winds well above the range of “Force 12” on the Beaufort Wind Scale with winds above 72 mph. This is the worst to be anticipated for the entire planning area based on historic events.

Based on an analysis of events between 1957 through 2023, the greatest magnitude wind event that Gregg County planning area experienced was 91 knots, or 105 mph, during an event that occurred on August 5, 2022.

HISTORICAL OCCURRENCES

The National Centers for Environmental Information (NCEI) Storm Events database is a national data source organized under the National Oceanic and Atmospheric Administration. The NCEI is the largest archive available for historic storm events data; however, it is important to note that only incidents recorded in the NCEI have been factored into this risk assessment unless otherwise noted. It is likely that a high number of occurrences have gone unreported over the past 67 years.

² Gregg County planning area is indicated by the black circle.

SECTION 11: THUNDERSTORM WIND

Tables 11-2 and 11-3 depict historical occurrences of thunderstorm wind events for the Gregg County planning area according to the NCEI database.

Since 1957, 259 thunderstorm wind events are known to have occurred in the Gregg County planning area. Table 11-3 presents information on known historical events impacting the Gregg County planning area, resulting in damages, injuries, or fatalities. The strongest event reported in the planning area occurred in Gregg County in August of 2022 with reported wind speeds of 91 knots, or 105 mph, which caused one reported injury. The most damaging event in the planning area was reported in the City of Kilgore in 1999 and caused an estimated \$1,153,700 in damage (2023 dollars).

Historical thunderstorm wind data for ETCOG does not have events reported separately and apart from the reported county and city events. ETCOG did not report any losses due to thunderstorm wind.

It is important to note that high wind events associated with other hazards, such as tornadoes, are not accounted for in this section. Property damage estimates are not always available. Where an estimate has been provided in a table for losses, the dollar amounts have been modified for inflation to indicate the damage in 2023 dollars.

Table 11-2. Historical Thunderstorm Wind Speeds, 1957-2024

MAXIMUM WIND SPEED RECORDED (knots)	NUMBER OF REPORTED EVENTS
0-30	68
31-40	1
41-50	9
51-60	136
61-70	36
71-80	6
81-90	2
91-100+	1

Table 11-3. Historical Thunderstorm Wind Events, 1957-2023³

JURISDICTION	DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	11/23/1983	0	0	3	\$0	\$0
City of Kilgore	9/13/1993	62	0	0	\$102,100	\$0
City of Longview	9/13/1993	0	0	0	\$102,100	\$0

³ Only recorded events with fatalities, injuries or damages are listed. Magnitude is listed when available. Damage values are in 2023 dollars. No events after 2020 were recorded in the NCEI database for the planning area.

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JURISDICTION	DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Kilgore	10/20/1993	0	0	0	\$101,600	\$0
City of Kilgore	11/20/1993	0	0	0	\$101,600	\$0
City of Longview	5/2/1994	0	0	0	\$10,000	\$0
City of Longview	5/13/1994	0	0	0	\$100,400	\$0
City of Longview	5/13/1994	0	0	0	\$100,400	\$0
City of Longview	5/13/1994	0	0	0	\$100,400	\$0
Gregg County	10/17/1994	0	0	0	\$99,100	\$0
City of Longview	11/5/1994	0	0	0	\$9,900	\$0
City of Kilgore	8/20/1995	0	0	0	\$3,900	\$0
City of Longview	8/31/1995	0	0	0	\$5,800	\$0
Gregg County	1/18/1996	65	0	0	\$1,900	\$0
City of Longview	1/18/1996	65	0	0	\$19,200	\$0
City of Kilgore	7/7/1997	60	0	0	\$12,900	\$0
City of Gladewater	2/26/1998	65	0	0	\$1,800	\$0
City of Longview	3/30/1998	60	0	0	\$9,100	\$0
City of Gladewater	6/4/1998	61	0	0	\$90,900	\$0
City of Kilgore	1/21/1999	62	0	0	\$1,153,700	\$0
City of Longview	8/21/2000	77	0	0	\$20,600	\$0
City of White Oak	5/17/2002	62	0	0	\$65,900	\$0
City of Kilgore	8/4/2002	56	0	0	\$245,900	\$0
City of White Oak	8/27/2002	57	0	0	\$41,000	\$0
City of Longview	6/2/2004	57	0	0	\$78,100	\$0
City of Longview	7/12/2005	57	0	0	\$37,900	\$0
City of Longview	8/14/2005	55	0	0	\$15,100	\$0
City of Longview	11/27/2005	57	0	0	\$7,500	\$0
City of Kilgore	8/17/2006	56	0	0	\$1,500	\$0
City of Longview	9/27/2007	56	0	1	\$142,100	\$0
Gregg County	3/18/2008	45	0	0	\$41,600	\$0

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JURISDICTION	DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	3/29/2008	62	0	0	\$138,700	\$0
City of Kilgore	3/29/2008	57	0	0	\$69,400	\$0
City of Kilgore	3/29/2008	60	0	0	\$693,500	\$0
Gregg County	5/26/2009	52	0	0	\$13,800	\$0
City of Kilgore	6/10/2009	54	0	0	\$27,500	\$0
Gregg County	10/9/2009	55	0	0	\$274,000	\$0
Gregg County	10/9/2009	54	0	0	\$13,700	\$0
Gregg County	8/6/2010	54	0	0	\$54,300	\$0
City of Gladewater	6/4/2011	54	0	0	\$39,400	\$0
Gregg County	6/30/2011	56	0	0	\$98,400	\$0
Gregg County	4/2/2012	54	0	0	\$38,600	\$0
Gregg County	4/2/2012	52	0	0	\$25,700	\$0
City of Longview	4/2/2012	52	0	0	\$12,900	\$0
Gregg County	5/7/2012	53	0	0	\$12,900	\$0
Gregg County	8/9/2012	54	0	0	\$25,700	\$0
Gregg County	8/9/2012	54	0	0	\$64,300	\$0
City of Gladewater	8/9/2012	54	0	0	\$128,600	\$0
City of White Oak	8/9/2012	53	0	0	\$25,700	\$0
Gregg County	9/1/2013	55	0	0	\$31,600	\$0
City of Kilgore	5/12/2014	55	0	0	\$43,600	\$0
City of Gladewater	4/16/2015	54	1	1	\$25,000	\$0
Gregg County	10/22/2017	43	0	0	\$100	\$0
Gregg County	3/11/2018	56	1	0	\$59,300	\$0
City of Longview	8/5/2022	91	0	1	\$0	\$0
TOTALS		(MAX EXTENT)	2	6	\$4,740,700	\$0

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Table 11-4. Summary of Historical Events by Jurisdiction, 1957-2023⁴

JURISDICTION	NUMBER OF EVENTS	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	130	85	1	3	\$993,700	\$0
City of Clarksville City	0	-	-	-	-	-
City of Gladewater	27	83	1	1	\$285,700	\$0
City of Kilgore	46	74	0	0	\$2,557,200	\$0
City of Lakeport	0	-	-	-	-	-
City of Longview	46	91	0	2	\$771,500	\$0
City of Warren City	0	-	-	-	-	-
City of White Oak	10	62	0	0	\$132,600	\$0
ETCOG	0	-	-	-	-	-
TOTALS	259	(MAX EXTENT)	2	6	\$4,740,700	

Based on the list of historical thunderstorm wind events for the Gregg County planning area, 29 of the events have occurred since the 2018 Plan.

SIGNIFICANT EVENTS

September 27, 2007

Scattered severe thunderstorms developed across portions of East Texas producing tree, powerline, and structural damage. Strong surface instability and gust fronts developed from the storms, with several of them becoming severe. One of the longer severe thunderstorms produced widespread wind damage across the Gregg County planning area. The cities of Longview and Kilgore were hit hardest with numerous trees uprooted, power lines downed, and trees falling into homes. There is one reported injury due to a falling tree on a home.

April 6, 2015

A large complex of severe thunderstorms moved into Northeast Texas during the early evening hours of this day. These storms encountered a moderately unstable airmass with a strong deep layer shear. The result was scattered to numerous multicell thunderstorms and a few supercell thunderstorms that produced large hail and a windstorm. A large tree fell on top of an SUV in the City of Gladewater causing one death and one severe injury of the two occupants in the vehicle.

March 11, 2018

Numerous severe thunderstorms developed during the evening on March 10th, through early morning hours on March 11th, with reports of large hail and damaging winds across Northeast Texas. There is a reported fatality from this thunderstorm event when a large oak tree was

⁴ Participating jurisdictions with no reported events show a “-“ in table columns where damages, deaths or injuries would be otherwise reported.

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uprooted and fell on top of a mobile home at the Flamingo Mobile Home Park in the City of Longview.

August 5, 2022

A downburst with maximum winds estimated at 105 mph (miles per hour) resulted in numerous downed trees near the intersection of Loop 281 and Highway 80 in the City of Longview. Five buildings sustained shingle damage at the Pinehurst Apartment Complex, with the most intense damage occurring just west of the apartment complex along Pat Drive and Highway 80. Approximately 15 trees were snapped and around 30 trees were uprooted at this location. Further downstream and to the west, trees were uprooted, and large branches broken across the Longview Heights area, with the damage ending at the Memory Park Cemetery. One person was injured when a tree fell onto their vehicle in the Longview Heights area.

PROBABILITY OF FUTURE EVENTS

Most thunderstorm winds occur during the spring and fall seasons and during the months of March, April, May, and September. Based on available records of historic events, there have been a total of 259 events in a 67-year reporting period, which provides a probability of three to four events every year. Even though the intensity of thunderstorm wind events is not always damaging for the Gregg County planning area, the frequency of occurrence for a thunderstorm wind event is “Highly Likely”. This means that an event is probable within the next year for the Gregg County planning area. See additional information on climate change at the end of this section.

VULNERABILITY AND IMPACT

Vulnerability is difficult to evaluate since thunderstorm wind events can occur at different strength levels, in random locations, and can create relatively narrow paths of destruction. Due to the randomness of these events, all existing and future structures, and facilities within the Gregg County planning area, could potentially be impacted and remain vulnerable to possible injury and property loss from strong winds.

Trees, power lines and poles, signage, manufactured housing, radio towers, concrete block walls, storage barns, windows, garbage receptacles, brick facades, and vehicles, unless reinforced, are vulnerable to thunderstorm wind events. More severe damage involves windborne debris; in some instances, patio furniture and other lawn items have been reported to have been blown around by wind and, very commonly, debris from damaged structures in turn have caused damage to other buildings not directly impacted by the event. In numerous instances roofs have been reported as having been torn off of buildings. The portable buildings typically used at schools and construction sites would be more vulnerable to thunderstorm wind events than typical site-built structures and could potentially pose a greater risk for wind-blown debris.

According to the American Community Survey (ACS) five-year estimates for 2022, a total of 4,086 (8 percent of total housing stock) manufactured homes are located in the Gregg County planning area. In addition, 52 percent (approximately 27,666 structures) of the single family residential (SFR) structures in the entire planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damage during significant wind events (Table 11-5). The ETCOG has one manufactured building on site and two structures built before 1980. Based on 2022 American Community Survey (ACS) five-year estimates Gregg County and the City of Longview have the

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highest reported number of single-family residences built before 1980, indicating greater vulnerability in terms of at-risk structures.

Table 11-5. Structures at Greater Risk by Participating Jurisdiction

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980	MANUFACTURED HOMES
Gregg County	27,666	4,086
City of Clarksville City	184	98
City of Gladewater	1,648	27
City of Kilgore	3,609	313
City of Lakeport	151	56
City of Longview	20,107	1,251
City of Warren City	97	8
City of White Oak	1,193	236
ETCOG	2	1

While all citizens are vulnerable to the impacts of thunderstorm wind, forced relocation and disaster recovery drastically impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. An estimated 16 percent of the planning area population live below the poverty level (Table 11-6). While warning times for these types of hazard events should be substantial enough for these individuals to seek shelter, the elderly, children, and people with a disability may have trouble taking shelter due to mobility issues or a lack of awareness, making them more susceptible to injury or harm. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures. The ETCOG also has about 41 employees that work as Go Bus Drivers and may be subject to severe weather conditions.

Table 11-6. Populations at Greatest Risk by Jurisdiction⁵

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
Gregg County	19,479	8,232	15,937	20,500	19,780
City of Clarksville City	164	66	514	126	35
City of Gladewater	858	669	998	1,954	267

⁵ US Census Bureau 2022 data for Gregg County.

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JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Kilgore	2,117	894	1,788	2,211	2,669
City of Lakeport	113	112	116	232	187
City of Longview	12,786	5,296	9,987	14,016	14,867
City of Warren City	76	27	71	51	22
City of White Oak	689	410	857	623	304

Table 11-7. Outdoor Operating Employees by Participating Special District

PARTICIPANT	EMPLOYEES OPERATING OUTDOORS
ETCOG	41

The Gregg County Planning Team identified the following critical facilities (Table 11-8) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by thunderstorm wind events. The critical infrastructure with the greatest vulnerability to thunderstorms are power and communications facilities. Failures of these facilities can result in a loss of service and cascading impacts such as posing enormous risk to individuals dependent on electricity as a medical necessity. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 11-8. Critical Facilities Vulnerable to Thunderstorm Wind Event

CRITICAL FACILITY TYPE	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"> Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. Emergency vehicles can be damaged by falling trees or flying debris. Power outages could disrupt communications, delaying emergency response times. Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities. Debris/downed trees can impede emergency response vehicle access to areas. Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel. First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions.
Airport, Academic Institutions, Animal	<ul style="list-style-type: none"> Structures can be damaged by falling trees or flying debris. Power outages could disrupt critical care.

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CRITICAL FACILITY TYPE	POTENTIAL IMPACTS
Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"> ● Backup power sources could be damaged. ● Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities. ● Evacuations may be necessary due to extended power outages, gas line ruptures, or structural damage to facilities. ● Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations. ● Temporary break in operations may significantly inhibit post event evacuations. ● Damaged or destroyed highway infrastructure may substantially increase the need for airport operations.
Commercial Supplier (food, fuel, etc.)	<ul style="list-style-type: none"> ● Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable. ● Essential supplies like medicines, water, food, and equipment deliveries may be delayed. ● Economic disruption due to power outages and fires negatively impact airport services as well as area businesses reliant on airport operations.
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> ● Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. ● Emergency vehicles can be damaged by falling trees or flying debris. ● Power outages could disrupt communications, delaying emergency response times. ● Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities. ● Debris/downed trees can impede emergency response vehicle access to areas. ● Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel.

A thunderstorm wind event can also result in traffic disruptions, injuries and in rare cases, fatalities. The impact of thunderstorm winds experienced in the Gregg County planning area has resulted in six injuries and two fatalities. Generally the impacts of thunderstorm wind events would be considered limited, with less than 10 percent of property expected to be destroyed and critical facilities shut down for less than 24-hours. However, with six injuries, the impact is considered “Substantial” with multiple injuries possible depending on the severity of the event. Overall, in the past 67 years there has been a reported total of \$4,740,700 damages (in 2023 dollars) in the Gregg County planning area due to thunderstorm wind events. The estimated average annual loss from a thunderstorm wind event is \$70,800.

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Table 11-9. Estimated Annualized Losses by Participating Jurisdiction

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Gregg County	\$993,700	\$14,800
City of Clarksville City	\$0	\$0
City of Gladewater	\$285,700	\$4,300
City of Kilgore	\$2,557,200	\$38,200
City of Lakeport	\$0	\$0
City of Longview	\$771,500	\$11,500
City of Warren City	\$132,600	\$2,000
City of White Oak	\$0	\$0
ETCOG	\$0	\$0
TOTALS	\$4,740,700	\$70,800

ASSESSMENT OF IMPACTS

Thunderstorm wind events have the potential to pose a significant risk to people and can create dangerous and difficult situations for public health and safety officials. Thunderstorm wind conditions can be frequently associated with a variety of impacts, including:

- Individuals exposed to the storm can be struck by flying debris, falling limbs, or downed trees causing serious injury or death.
- Structures can be damaged or crushed by falling trees, which can result in physical harm to the occupants.
- Significant debris and downed trees can result in emergency response vehicles being unable to access areas of the community.
- Downed power lines may result in roadways being unsafe for use, which may prevent first responders from answering calls for assistance or rescue.
- Thunderstorm wind events often result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outage often results in an increase in structure fires and carbon monoxide poisoning, as individuals attempt to cook or heat their homes with alternate, unsafe cooking or heating devices, such as grills.
- Critical staff may be unable to report for duty, limiting response capabilities.
- Private sector entities that residents rely on, such as utility providers, financial institutions, and medical care providers may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.

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- Some businesses not directly damaged by thunderstorm wind events may be negatively impacted while roads are cleared and utilities are being restored, further slowing economic recovery.
- Older structures, specifically those built before 1980 (52 percent of the planning area), were built to less stringent building codes may suffer greater damage as they are typically more vulnerable to thunderstorm winds. In addition, the ETCOG has two buildings on site that were built before 1980.
- Recreational areas such as community parks and green spaces may be damaged or inaccessible due to downed trees or debris, causing temporary impacts to associated businesses in the area.
- Historical sites and properties are placed at a higher risk of impact due to materials used and the inability to change properties due to their historic status. There are eight historical sites listed on the National Register of Historic Places for Gregg County.

The economic and financial impacts of thunderstorm winds on the area will depend entirely on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of any thunderstorm wind event.

CLIMATE CHANGE CONSIDERATIONS

The impacts on the frequency and severity of severe thunderstorm wind events due to climate change are unclear. According to the Texas A&M 2021 Climate Report Update, changes in severe thunderstorm reports over time have been more closely linked to changes in population than changes in the hazard event. At this time there is low confidence of an ongoing trend in the overall frequency and severity of thunderstorm events, due to the lack of climate data records for severe thunderstorms. Based on climate models that are available, the environmental conditions needed for severe thunderstorms are estimated to become more likely, resulting in an overall increase in the number of days capable of producing a severe thunderstorm event.⁶

⁶ Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, Texas A&M University Office of the Texas State Climatologist, 2021 Update.



SECTION 12
TORNADO

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HAZARD DESCRIPTION



Tornadoes are among the most violent storms on the planet. A tornado is a rapidly rotating column of air extending between, and in contact with, a cloud and the surface of the earth. The most violent tornadoes are capable of tremendous destruction and have wind speeds of 250 miles per hour (mph) or more. In extreme cases, winds may approach 300 mph. Damage paths can be in excess of one mile wide and 50 miles long.

The most powerful tornadoes are produced by “Supercell Thunderstorms.” These thunderstorms are created when horizontal wind shears (winds moving in different directions at different altitudes) begin to rotate the storm. This horizontal rotation can be tilted vertically by violent updrafts, and the rotation radius can shrink, forming a vertical column of very quickly swirling air. This rotating air can eventually reach the ground, forming a tornado.

Table 12-1. Variations among Tornadoes

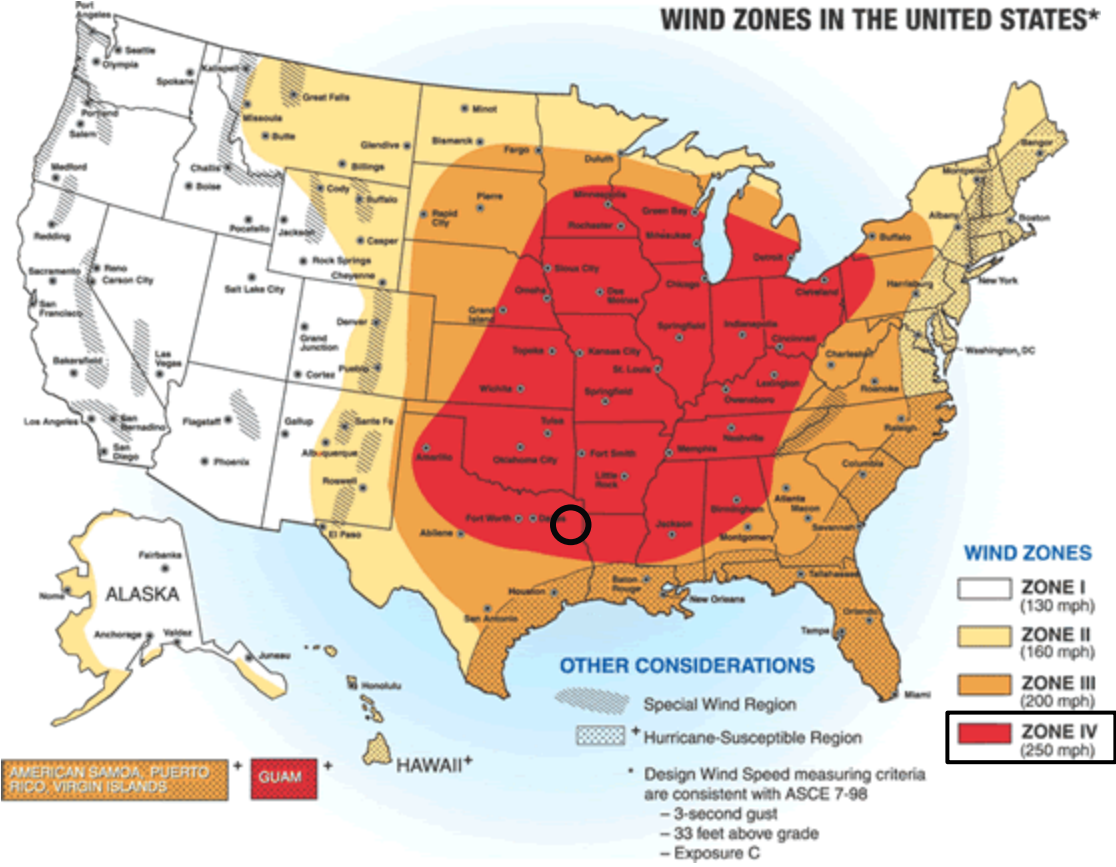
WEAK TORNADOES	STRONG TORNADOES	VIOLENT TORNADOES
<ul style="list-style-type: none"> 69% of all tornadoes Less than 5% of tornado deaths Lifetime 1-10+ minutes Winds less than 110 mph 	<ul style="list-style-type: none"> 29% of all tornadoes Nearly 30% of all tornado deaths May last 20 minutes or longer Winds 110 – 205 mph 	<ul style="list-style-type: none"> 2% of all tornadoes 70% of all tornado deaths Lifetime can exceed one hour Winds greater than 205 mph

LOCATION

Tornadoes do not have any specific geographic boundary and can occur throughout the county uniformly. It is assumed that the entire Gregg County planning area, including participating jurisdictions and the East Texas Council of Governments (ETCOG), is uniformly exposed to tornado activity. The entire Gregg County planning area is in Wind Zone IV (Figure 12-1), where tornado winds can be as high as 250 mph.

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Figure 12-1. FEMA Wind Zones in the United States¹



EXTENT

The destruction caused by tornadoes ranges from light to inconceivable, depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction, such as residential homes (particularly mobile homes).

Tornado magnitudes prior to 2007 were determined using the traditional version of the Fujita Scale, which estimated tornado wind speeds based on the damage caused by an event. Since February 2007, the Enhanced Fujita Scale has been utilized to classify tornadoes, which included improvements to the original scale. The original Fujita scale had limitations, such as a lack of damage indicators, no account for construction quality and variability, and no definitive correlation between damage and wind speed. These limitations led to some tornadoes being rated in an inconsistent manner and, in some cases, an overestimate of tornado wind speeds. The Enhanced Fujita scale retains the same basic design and six strength categories as the previous scale. The newer scale reflects more refined assessments of tornado damage surveys, standardization, and damage consideration to a wider range of structures. Table 12-2 includes both scales for reference when analyzing historical tornadoes since tornado events prior to 2007 will follow the original Fujita Scale.

¹ Gregg County is indicated by the circle

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Table 12-2. The Fujita and Enhanced Fujita Tornado Scale²

Enhanced Fujita Scale				Fujita Scale			
Category	Wind Speed	Damage Level	Damage	Category	Wind Speed	Intensity	Damage
EF0	65-85 MPH	Gale	The environment sustained minor damage: tree branches are broken, some shallow-rooted trees are uprooted, and some chimneys are damaged.	F0	45-78 MPH	Gale	Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
EF1	86-110 MPH	Weak	The environment sustained moderate damage: mobile homes are tipped over, windows are broken, roof tiles may be blown off, and some tree trunks have snapped.	F1	79-117 MPH	Moderate	Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
EF2	111-135 MPH	Strong	The environment sustained considerable damage: mobile homes are destroyed, roofs are damaged, debris flies in the air, and large trees are snapped or uprooted.	F2	118-161 MPH	Significant	Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165 MPH	Severe	The environment sustained severe damage: roofs and walls are ripped off buildings, small buildings are destroyed, and most trees are uprooted.	F3	162-209 MPH	Severe	Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
EF4	166-200 MPH	Devastating	The environment sustained devastating damage: well-built homes are destroyed, buildings are lifted off their foundations, cars are blown away, and large debris flies in the air.	F4	210-261 MPH	Devastating	Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown, and large missiles generated.
EF5	200+ MPH	Incredible	The environment sustained incredible damage: well-built homes are lifted from their foundations, reinforced concrete buildings are damaged, the bark is stripped from trees, and car-sized debris flies through the air.	F5	262-317 MPH	Incredible	Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.

² Source: <http://www.tornadoproject.com/fscale/fscale.htm>

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Both the Fujita Scale and Enhanced Fujita Scale should be referenced in reviewing previous occurrences since tornado events that occurred before 2007 will follow the original Fujita Scale. The greatest magnitude reported within the planning area is an F3 (an EF4 or EF5 when converted to the on the Enhanced Fujita Scale, depending on exact wind speed), a devastating to incredible tornado. Based on the planning area's location in Wind Zone IV, all participating jurisdictions and the ETCOG, have the potential to experience anywhere from an EF0 to an EF5 depending on the wind speed. Previous tornado events in the Gregg County planning area (converted from the Fujita Scale) have been between EF0 and EF4 (Figure 12-2).

HISTORICAL OCCURRENCES

The National Centers for Environmental Information (NCEI) Storm Events database is a national data source organized under the National Oceanic and Atmospheric Administration (NOAA). The NCEI is the largest archive available for historic storm events data; however, it is important to note that only incidents recorded in the NCEI have been factored into this risk assessment unless otherwise noted. It is likely that a number of occurrences have gone unreported over time.

Historical tornado data for ETCOG does not have events reported separate and apart from the reported county and city events. ETCOG did not report any losses as a result of tornados.

Figure 12-2 identifies the locations of previous occurrences in the Gregg County planning area from 1954 through 2023. A total of 36 events have been recorded by NOAA's Storm Prediction Center and the NCEI Storm Events databases for the Gregg County planning area. The strongest events reported in the planning area were F3 tornados in 1957, 1958, 1979, and 1988. In terms of injuries and fatalities, the most significant event occurred in Gregg County on April 1, 1988, and accounted for more than \$10,487,600 in damages (2023 dollars).

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Figure 12-2. Spatial Historical Tornado Events, 1954-2023³

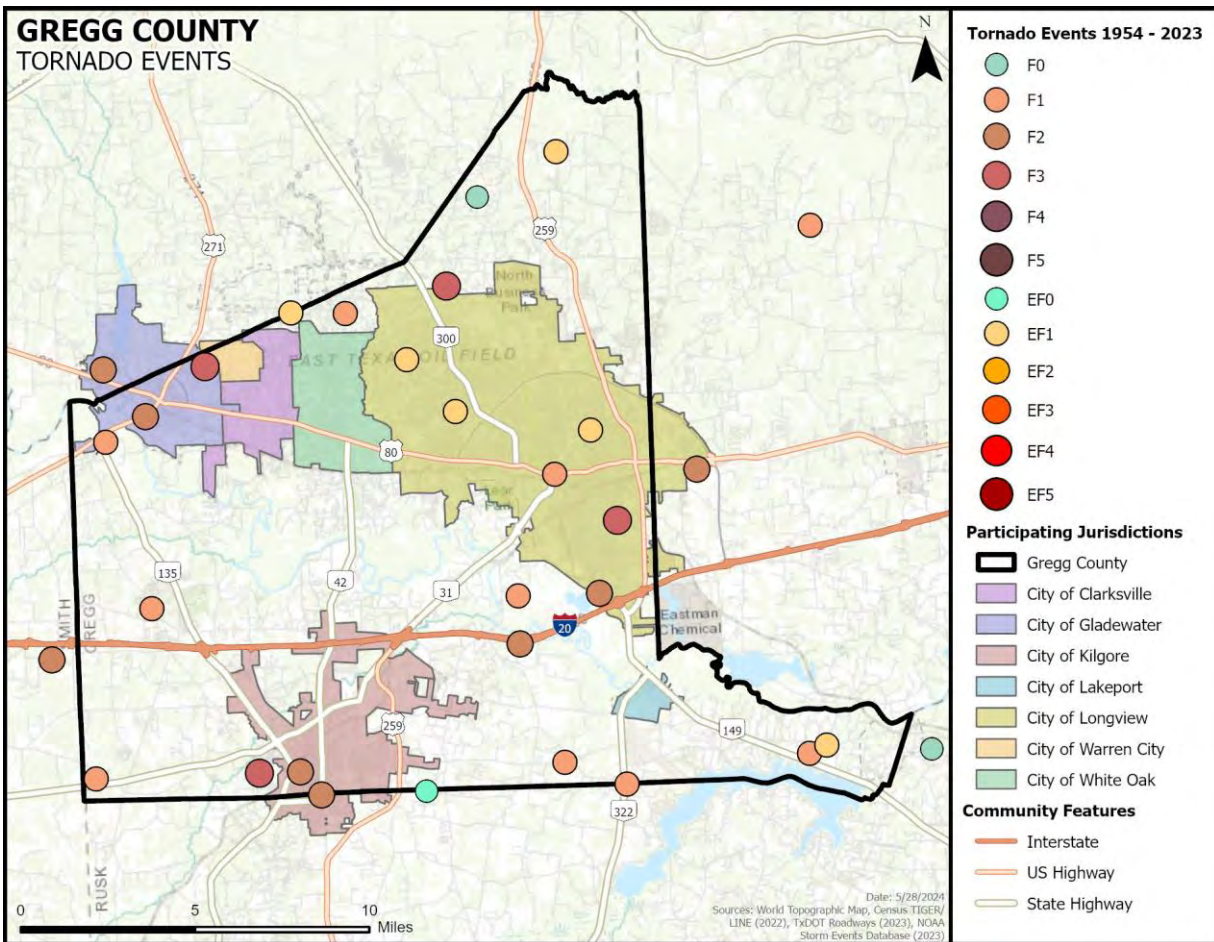


Table 12-4. Historical Tornado Events, 1954-2023⁴

JURISDICTION	DATE	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	4/26/1957	F3	0	0	\$265,400	\$0
Gregg County	4/26/1957	F3	0	0	\$365,400	\$0
Gregg County	5/3/1958	F3	0	0	\$2,562,000	\$0
Gregg County	11/2/1961	F2	0	0	\$24,700	\$0
Gregg County	11/2/1961	F1	0	0	\$2,500	\$0
Gregg County	11/22/1961	F2	0	0	\$246,800	\$0
Gregg County	12/27/1968	F1	0	0	\$208,600	\$0

³ Source: NOAA Storm Prediction Center

⁴ Only recorded events with fatalities, injuries or damages are listed. Magnitude is listed when available. Damage values are in 2023 dollars.

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JURISDICTION	DATE	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	4/19/1970	F2	0	0	\$1,923,200	\$0
Gregg County	12/14/1971	F2	0	0	\$180,200	\$0
Gregg County	11/24/1973	F1	0	0	\$16,100	\$0
Gregg County	5/11/1978	F1	0	0	\$1,147,900	\$0
Gregg County	4/1/1979	F3	0	0	\$10,487,600	\$0
Gregg County	5/9/1981	F2	0	0	\$82,500	\$0
Gregg County	4/1/1988	F3	0	0	\$6,323,000	\$0
Gregg County	5/11/1992	F1	0	0	\$5,300	\$0
City of Kilgore	5/4/1999	F2	0	2	\$33,858,300	\$0
City of Kilgore	5/4/1999	F2	0	0	\$44,600	\$0
City of Kilgore	5/4/1999	F2	0	0	\$10,692,100	\$0
City of Kilgore	3/18/2008	EF0	0	0	\$4,161,100	\$0
City of Longview	4/9/2015	EF1	0	0	\$1,251,800	\$0
Gregg County	3/29/2017	EF1	0	0	\$72,900	\$0
City of White Oak	5/11/2017	EF1	0	0	\$60,500	\$0
Gregg County	5/28/2017	EF1	0	0	\$907,600	\$0
Gregg County	5/28/2017	EF1	0	0	\$30,300	\$0
Gregg County	4/13/2018	EF1	0	0	\$7,100	\$0
TOTALS		(MAX EXTENT)	0	2	\$74,927,500	0

Table 12-5. Summary of Historical Tornado Events, 1954-2023⁵

JURISDICTION	NUMBER OF EVENTS	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	30	F3	0	0	\$24,859,100	\$0
City of Clarksville City	0	-	-	-	-	-
City of Gladewater	0	-	-	-	-	-

⁵ Participating jurisdictions with no reported events show a “-“ in table columns where damages, deaths or injuries would be otherwise reported.

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JURISDICTION	NUMBER OF EVENTS	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Kilgore	4	F2	0	2	\$48,756,100	\$0
City of Lakeport	0	-	-	-	-	-
City of Longview	1	EF1	0	0	\$1,251,800	\$0
City of White Oak	1	EF1	0	0	\$60,500	\$0
City of Warren City	0	-	-	-	-	-
ETCOG	0	-	-	-	-	-
TOTALS	36	(MAX EXTENT)	0	2	\$74,927,500	

In summary, Gregg County has experienced the greatest number of tornado events (30) based on the NCEI records, with the City of Kilgore reported the second greatest number of events (4), followed by the City of Longview (1) and City of White Oak (1). The remaining participating jurisdictions and ETCOG did not report tornado events based through the NCEI database or during the planning update process. Based on the list of historical tornado events for the Gregg County planning area, including all participating jurisdictions and the ETCOG, there have been no recorded events since the 2018 Plan.

SIGNIFICANT EVENTS

May 4, 1999 – City of Kilgore (DR-1274-TX)

The City of Kilgore reported three F2 tornado events on this day. The first one caused damage to many homes and businesses and moved into Rusk County before re-entering Gregg County, and then causing minor damage to homes and removing shingles from the roof of a school. The third tornado injured two individuals and caused \$33,858,300 (2023 dollars) in damage to homes and businesses. The Stoneridge Apartment complex lost portions of its roof and the walls collapsed leading to the complex being condemned. All three events combined led to a total of \$44,595,000 (2023 dollars) in property damage.

May 18, 2008 – Gregg County

An EF0 tornado, approximately 100 yards wide, originated in Rusk County before moving into Gregg County, where it uprooted trees in the City of Longview. The tornado persisted, causing further damage as it moved from Jean Road and High Street to Electra Street and Timpson Street, and onwards to Alpine Road and Glover Drive, leaving a trail of downed trees in its wake. The impact was widespread resulting in damage to vehicles, residences, and outbuildings across the city. Notably, Valley View Elementary School suffered structural damage as trees crashed onto its roof, puncturing holes. Additional reports indicated tree damage east of Fourth Street and south of Cotton Street, as well as at the intersection of Mobberly and Young Streets. Overall, the estimated total damages amounted to \$4,161,100 (2023 dollars).

PROBABILITY OF FUTURE EVENTS

Tornadoes can occur at any time of year and at any time of day, but they are typically more common in the spring months during the late afternoon and evening hours. A smaller, high

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frequency period can emerge in the fall during the brief transition between the warm and cold seasons. With 36 historical events over a 70-year reporting period, the Gregg County planning area, including all participating jurisdictions and the ETCOG, can anticipate a tornado touchdown approximately once every one to two years. This frequency supports an “Highly Likely” probability of future events for the Gregg County planning area.

VULNERABILITY AND IMPACT

Because tornadoes often cross jurisdictional boundaries, all existing and future buildings, facilities, and populations in the entire Gregg County planning area, including participating jurisdictions and the ETCOG, are considered to be exposed to this hazard and could potentially be impacted. The damage caused by a tornado is typically a result of high wind velocity, wind-blown debris, lightning, and large hail.

The average tornado moves from southwest to northeast, but tornadoes have been known to move in any direction. Consequently, vulnerability of humans and property is difficult to evaluate since tornadoes form at different strengths, in random locations, and create relatively narrow paths of destruction. Although tornadoes strike at random, making all buildings vulnerable, three types of structures are more likely to suffer damage:

- Manufactured Homes;
- Homes built of peer and beam construction (more susceptible to lift); and
- Buildings with large spans, such as shopping malls, gymnasiums, and factories.

Tornadoes can cause a significant threat to people as they could be struck by flying debris, falling trees/branches, utility lines, and poles. Blocked roads could prevent first responders from responding to calls. Tornadoes commonly cause power outages which could cause health and safety risks to residents and visitors, as well as to patients in hospitals.

The Gregg County planning area features mobile or manufactured home parks throughout the planning area. These parks are typically more vulnerable to tornado events than typical site-built structures. In addition, manufactured homes are located sporadically throughout the planning area, which would also be more vulnerable. The U.S. Census data indicates a total of 4,086 (8 percent of total housing stock) manufactured homes located in the Gregg County planning area. In addition, 52 percent (approximately 27,666 structures) of the single family residential (SFR) structures in the entire planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damage during significant wind events (Table 12-6). The ETCOG has one manufactured building on site and two structures built before 1980. Based on 2022 American Community Survey (ACS) five-year estimates Gregg County and the City of Longview have the highest reported number of single-family residences built before 1980, causing these jurisdictions to potentially sustain more structural damage due to a tornado event.

Table 12-6. Structures at Greater Risk by Participating Jurisdiction

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980	MANUFACTURED HOMES
Gregg County	27,666	4,086

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JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980	MANUFACTURED HOMES
City of Clarksville City	184	98
City of Gladewater	1,648	27
City of Kilgore	3,609	313
City of Lakeport	151	56
City of Longview	20,107	1,251
City of Warren City	97	8
City of White Oak	1,193	236
ETCOG	2	1

While all citizens are at risk to the impacts of a tornado, forced relocation and disaster recovery drastically impacts low-income residents who lack the financial means to travel, afford a long-term stay away from home, and to rebuild or repair their homes. The elderly, children, and people with a disability may have trouble taking shelter due to mobility issues or a lack of awareness, making them more susceptible to injury or harm. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures. The population over 65 in the Gregg County planning area is estimated at 16 percent of the total population and children under the age of 5 are estimated at 7 percent. Population with a disability is estimated at 13 percent. An estimated 16 percent of the planning area population live below the poverty level and 16 percent of the populations speaks a language other than English (Table 12-7). The ETCOG also has about 41 employees that work as Go Bus Drivers and may be subject to severe weather conditions.

Table 12-7. Populations at Greater Risk by Participating Jurisdiction⁶

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
Gregg County	19,479	8,232	15,937	20,500	19,780
City of Clarksville City	164	66	514	126	35
City of Gladewater	858	669	998	1,954	267
City of Kilgore	2,117	894	1,788	2,211	2,669
City of Lakeport	113	112	116	232	187

⁶ U.S. Census Bureau 2022 data for Gregg County

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JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Longview	12,786	5,296	9,987	14,016	14,867
City of Warren City	76	27	71	51	22
City of White Oak	689	410	857	623	304

Table 12-8. Outdoor Operating Employees by Participating Special District

PARTICIPANT	EMPLOYEES OPERATING OUTDOORS
ETCOG	41

The Gregg County Planning Team identified the following critical facilities as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by tornado events (Table 12-9). The critical infrastructure with the greatest vulnerability to tornadoes are power and communications facilities. Failures of these facilities can result in a loss of service and cascading impacts such as posing enormous risk to individuals dependent on electricity as a medical necessity. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 12-9. Critical Facilities Vulnerable to Tornado Event

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	<ul style="list-style-type: none"> Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. Emergency vehicles can be damaged by falling trees or flying debris. Power outages could disrupt communications, delaying emergency response times. Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities. Debris/downed trees can impede emergency response vehicle access to areas. Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel. First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions. Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.
Airport, Academic Institutions, Animal	<ul style="list-style-type: none"> Structures can be damaged by falling trees damaged by lightning. Power outages could disrupt critical care.

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CRITICAL FACILITIES	POTENTIAL IMPACTS
Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	<ul style="list-style-type: none"> ● Backup power sources could be damaged. ● Evacuations may be necessary due to extended power outages, fires, or other associated damage to facilities. ● Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations. ● Temporary break in operations may significantly inhibit post event evacuations. ● Damaged or destroyed highway infrastructure may substantially increase the need for airport operations.
Commercial Supplier (Food, fuel, etc.)	<ul style="list-style-type: none"> ● Facilities or infrastructure may be damaged, destroyed or otherwise inaccessible. ● Essential supplies like medicines, water, food, and equipment deliveries may be significantly delayed. ● Additional emergency responders and critical aid workers may not be able to reach the area for days.
Utility Services and Infrastructure (electric, water, wastewater, communications)	<ul style="list-style-type: none"> ● Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. ● Emergency vehicles can be damaged by falling trees or flying debris. ● Power outages could disrupt communications, delaying emergency response times. ● Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities. ● Debris/downed trees can impede emergency response vehicle access to areas. ● Increased number of structure fires due to gas line ruptures and downed power lines, further straining the capacity and resources of emergency personnel. ● First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions. ● Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.

The total loss estimate due to tornado events is \$74,927,500 (in 2023 dollars), having an approximate average annual loss estimate of \$1,070,400. Based on historic damages and best available data the impact of a tornado event on the Gregg County planning area, including all participating jurisdictions and the ETCOG, would be considered “Minor”, with injuries and illnesses that do not result in permanent disability, the complete shutdown of critical facilities for up to one week and more than 10 percent of property destroyed or with major damage.

Table 12-10. Estimated Average Annual Losses by Jurisdiction

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Gregg County	\$24,859,100	\$355,130

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JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
City of Clarksville City	\$0	\$0
City of Gladewater	\$0	\$0
City of Kilgore	\$48,756,100	\$696,516
City of Lakeport	\$0	\$0
City of Longview	\$1,251,800	\$17,883
City of Warren City	\$0	\$0
City of White Oak	\$60,500	\$864
ETCOG	\$0	\$0
Planning Area	\$74,927,500	\$1,070,400

ASSESSMENT OF IMPACTS

Tornadoes have the potential to pose a significant risk to the population and can create dangerous situations. Often, providing and preserving public health and safety is difficult. The impact of climate change could produce larger, more severe tornado events, exacerbating the current tornado impacts. More destructive tornado conditions can be frequently associated with a variety of impacts, including:

- Individuals exposed to the storm can be struck by flying debris, falling limbs, or downed trees causing serious injury or death.
- Structures can be damaged or crushed by falling trees, which can result in physical harm to the occupants.
- Manufactured homes (8 percent of total housing stock) may suffer substantial damage as they would be more vulnerable than typical site-built structures. The ETCOG also has one manufactured structure on site.
- Portable classrooms may also suffer substantial damage as they would be more vulnerable than other classroom structures.
- Significant debris and downed trees can result in emergency response vehicles being unable to access areas of the community.
- Downed power lines may result in roadways being unsafe for use, which may prevent first responders from answering calls for assistance or rescue.
- Tornadoes often result in widespread power outages increasing the risk to more vulnerable portions of the population who rely on power for health and/or life safety.
- Extended power outages can result in an increase in structure fires and/or carbon monoxide poisoning as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.
- Tornadoes can destroy or make residential structures uninhabitable, requiring shelter or relocation of residents in the aftermath of the event.
- First responders must enter the damage area shortly after the tornado passes to begin rescue operations and to organize cleanup and assessments efforts, therefore they are

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exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions, elevating the risk of injury to first responders and potentially diminishing emergency response capabilities.

- Emergency operations and services may be significantly impacted due to damaged facilities, loss of communications, and damaged emergency vehicles and equipment.
- Private sector entities such as utility providers, financial institutions, and medical care providers may not be fully operational and may require assistance from neighboring communities until full services can be restored.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue, especially if damage is sustained to major employers within the planning area.
- Damage to infrastructure may slow economic recovery since repairs may be extensive and lengthy.
- When the community is affected by significant property damage it is anticipated that funding would be required for infrastructure repair and restoration, temporary services and facilities, overtime pay for responders, and normal day-to-day operating expenses.
- Displaced residents may not be able to immediately return to work, further slowing economic recovery.
- Residential structures destroyed by a tornado may not be rebuilt for years, reducing the tax base for the community.
- Large or intense tornadoes may result in a dramatic population fluctuation, as people are unable to return to their homes or jobs and must seek shelter and/or work outside of the affected area.
- Businesses that are uninsured or underinsured may have difficulty reopening, which results in a net loss of jobs for the community and a potential increase in the unemployment rate.
- Recreation activities may be unavailable, and tourism can be unappealing for years following a large tornado, devastating directly related local businesses.
- Tornadoes may destroy or degrade endangered species habitat.
- Historical sites and properties are placed at a higher risk of impact due to materials used and the inability to change properties due to their historic status. The Gregg County planning area has 8 historical properties.

The economic and financial impacts of a tornado event on the community will depend on the scale of the event, what is damaged, costs of repair or replacement, lost business days in impacted areas, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a tornado event.

CLIMATE CHANGE CONSIDERATIONS

The impacts on the frequency and severity of tornado events due to climate change are unclear. According to the Texas A&M 2021 Climate Report Update, the most robust trend in tornado activity in Texas is a likelihood for a greater number of tornadoes in large outbreaks, although the factors contributing to this trend are not expected to continue. Tornadoes spawn from less than 10 percent of thunderstorms, usually supercell thunderstorms that are in a wind shear

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environment that promotes rotation.⁷ Based on climate models that are available, the environmental conditions needed for severe thunderstorm events are estimated to become more likely, resulting in an overall increase in the number of days capable of producing a severe thunderstorm event and potential tornadoes to develop from these storms.⁸

⁷ Treisman, Rachel. *The exact link between tornadoes and climate change is hard to draw. Here's why*. NPR. December 13, 2021. <https://www.npr.org/2021/12/13/1063676832/the-exact-link-between-tornadoes-and-climate-change-is-hard-to-draw-heres-why>

⁸ Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, Texas A&M University Office of the Texas State Climatologist, 2021 update.



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HAZARD DESCRIPTION

Wildfire is an unplanned fire burning in natural or wildland areas such as forests, shrub lands, grasslands, or prairies.¹ Texas is one of the fastest growing states in the Nation, with much of this growth occurring adjacent to metropolitan areas. This increase in population across the state will impact counties and communities that are located within the Wildland Urban Interface (WUI). The WUI is described as the area where structures and other human improvements meet and intermingle with undeveloped wildland or vegetative fuels. Population growth within the WUI substantially increases the risk from wildfire. In Texas nearly 85 percent of wildfires occur within two miles of a community. The Gregg County planning area has an estimated 56 percent of the total planning area population that live within the WUI.²

Wildfires have the potential to spread quickly given the right environmental conditions, particularly within the wildland urban interface and intermix. Most ignition sources for wildfires are a result of human activities, such as an electrical line sparking dry grasses, an improperly discarded cigarette, burning debris, or arson.

Development has increased drastically in central Texas, resulting in more populated areas within the wildland interface/intermix. Additionally, the area is experiencing hotter, drier climatic conditions. These factors combine to make central Texas at risk from wildfires. While the planning area is continually at some risk for wildfires, that risk is elevated during two periods each year: the winter wildfire season (February through April) and the summer wildfire season (August through October).³

The Gregg County population is expected to increase overtime following population trends over the last few decades. Continued housing development in the WUI will put more people at a greater risk of catastrophic wildfire and put more pressure on land managers and fire department personnel to mitigate fire risk.

¹ Source: FEMA: <https://hazards.fema.gov/nri/wildfire>

² Source: Texas A&M Forest Service, Texas Wildfire Risk Assessment Summary Report, Gregg County: <https://texaswildfirerisk.com/>

³ Austin American Statesman, "Winter wildfire risk is rising in Central Texas. Here's what you should know." January 2023: <https://www.statesman.com/story/news/environment/2023/01/30/wildfire-risk-is-rising-in-central-texas-what-you-should-know/69845234007/>

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Wildfires spread based on the type and quantity of fuel that surrounds it. Fuel can include everything from trees, underbrush and dry grassy fields to homes. The amount of flammable material that surrounds a fire is referred to as the fuel load. Conditions in the weather and environment, such as drought, winds and extreme heat, can cause a fire to spread more quickly.⁴ A wildfire event often begins unnoticed and spreads quickly, lighting brush, trees, and homes on fire. For example, a wildfire may be started by a campfire that was not doused properly, a tossed cigarette, burning debris, or arson.

Texas has seen a significant increase in the number of wildfires in the past 30 years, which included wildland, urban interface, or intermix fires. Wildland fires are fueled almost exclusively by natural vegetation, while interface or intermix fires are urban/wildland fires in which vegetation and the built environment provide the fuel.

LOCATION

A wildfire incident can face devastating consequences due to human activities, drought conditions, lightning, or wind event, if the conditions allow. Wildfires can vary greatly in terms of size, location, intensity, and duration. While wildfires are not confined to any specific geographic location, they are most likely to occur in open grasslands.

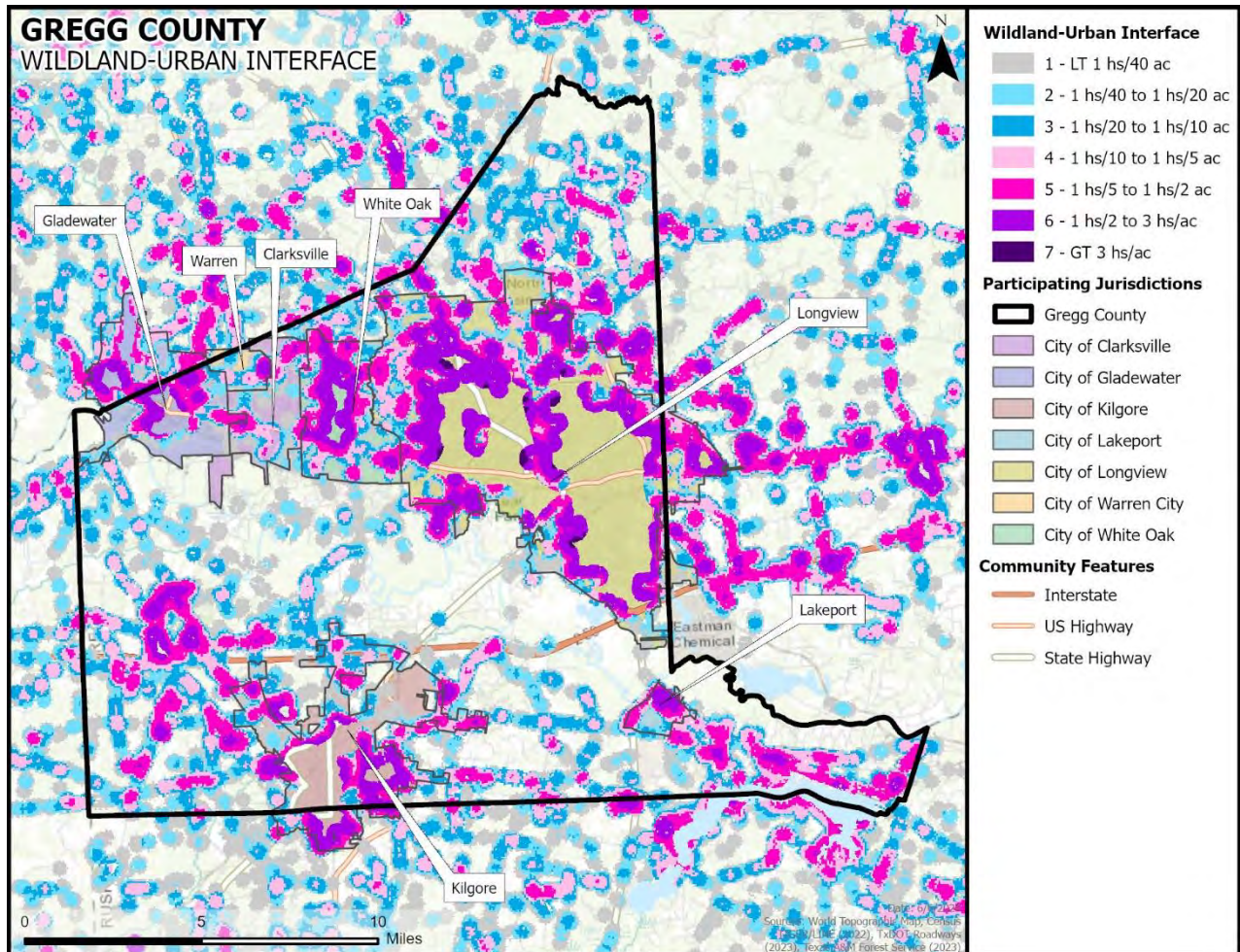
The Texas A&M Forest Service Wildfire Risk Assessment Portal (TxWRAP) provides historical wildfire data for Texas counties along with mapping resources that includes data layers on the WUI, ignition density, and fire intensity scales for communities throughout the Gregg County planning area, along with multiple tips, recommendations and mitigation solutions for communities and residents. The TxWRAP portal was utilized to produce the maps found in this profile.

The threat to people and property from a wildfire event is greater in the fringe areas where developed areas meet open grass lands, such as the Wildland Urban Interface (WUI) (Figures 13-1 through 13-9). It is estimated that 56 percent of the total population in the Gregg County planning area live within the WUI. However, the entire planning area is at some risk for wildfires.

⁴ NOAA Weather Forecasting: <https://scijinks.gov/wildfires/>

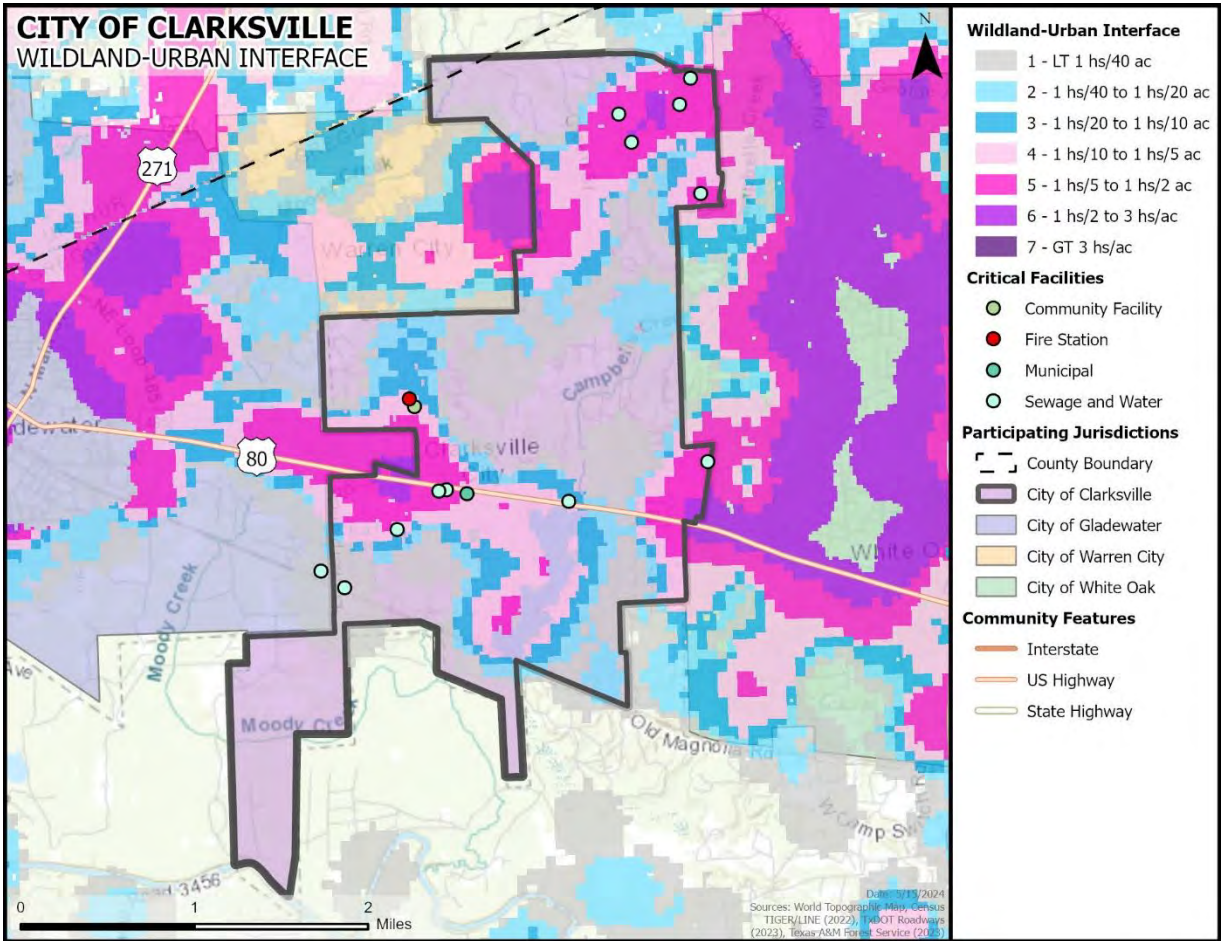
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Figure 13-1. Wildland Urban Interface Map – Gregg County



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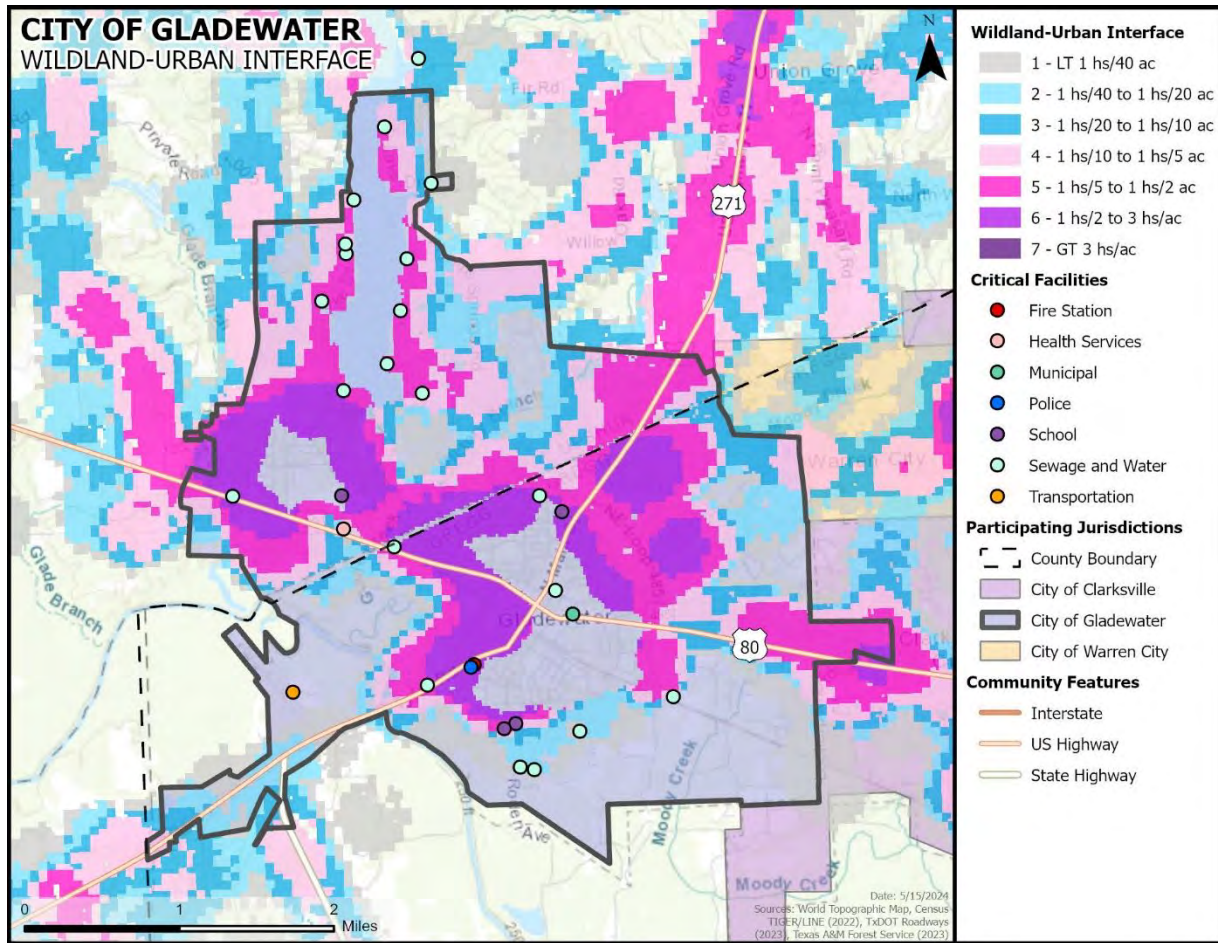
Figure 13-2. Wildland Urban Interface Map – City of Clarksville City



It is estimated that 97 percent of the total population in the City of Clarksville City live within the WUI. This means that the entire City is at risk of wildfires.

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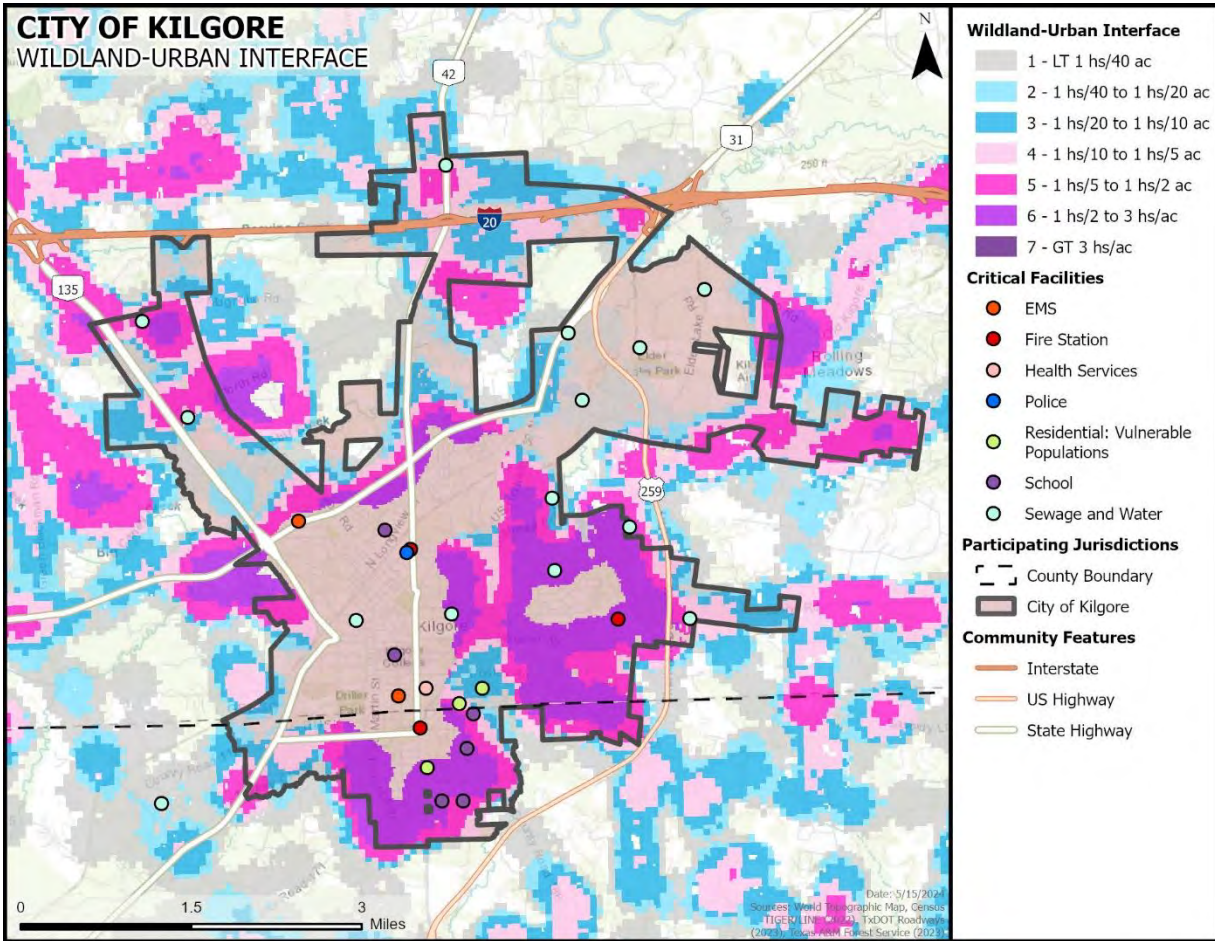
Figure 13-3. Wildland Urban Interface Map – City of Gladewater



It is estimated that 69 percent of the total population in the City of Gladewater live within the WUI. However, the entire City is at some risk for wildfires.

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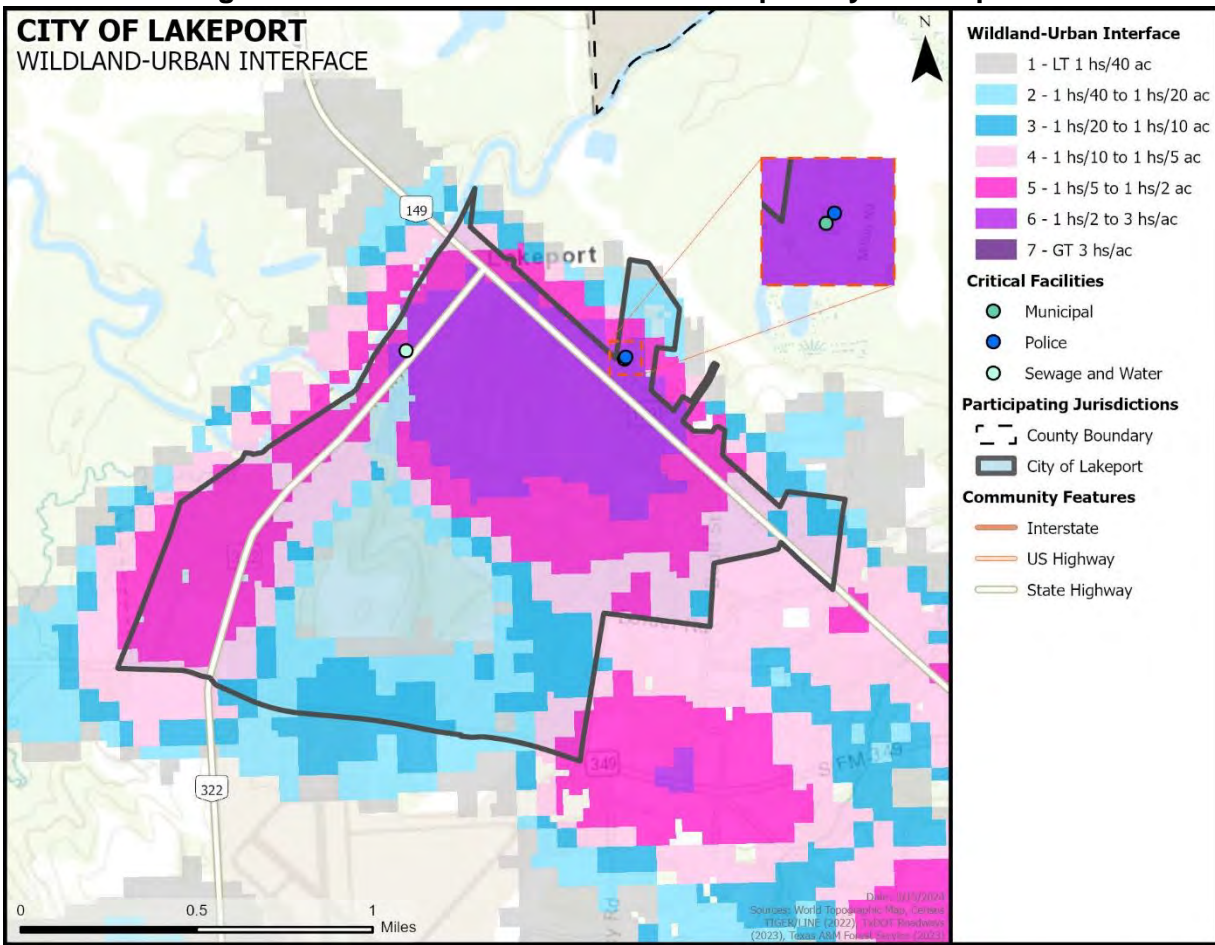
Figure 13-4. Wildland Urban Interface Map – City of Kilgore



It is estimated that 51 percent of the total population in the City of Kilgore live within the WUI. However, the entire City is at some risk for wildfires.

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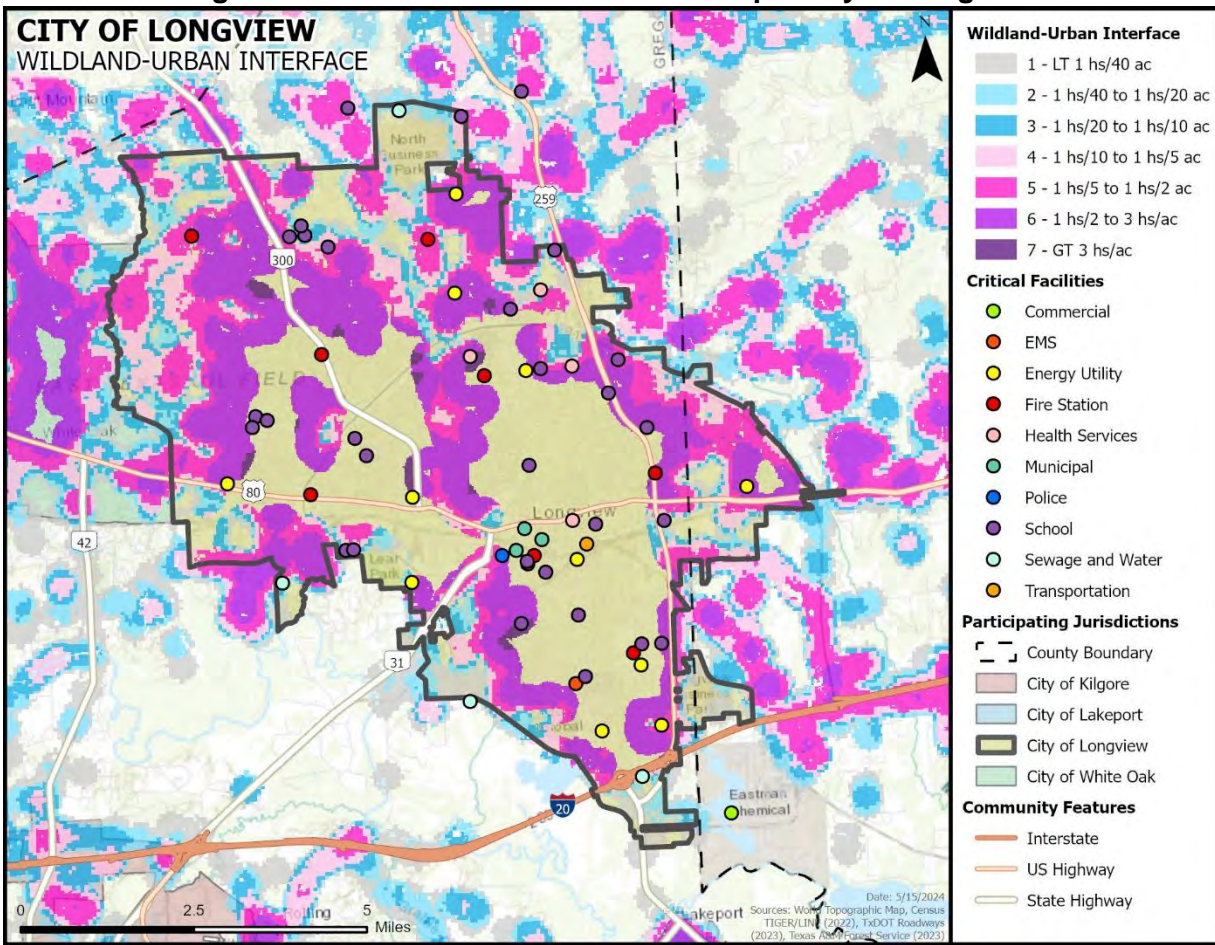
Figure 13-5. Wildland Urban Interface Map – City of Lakeport



It is estimated that 99 percent of the total population in the City of Lakeport live within the WUI. However, the entire City is at some risk for wildfires.

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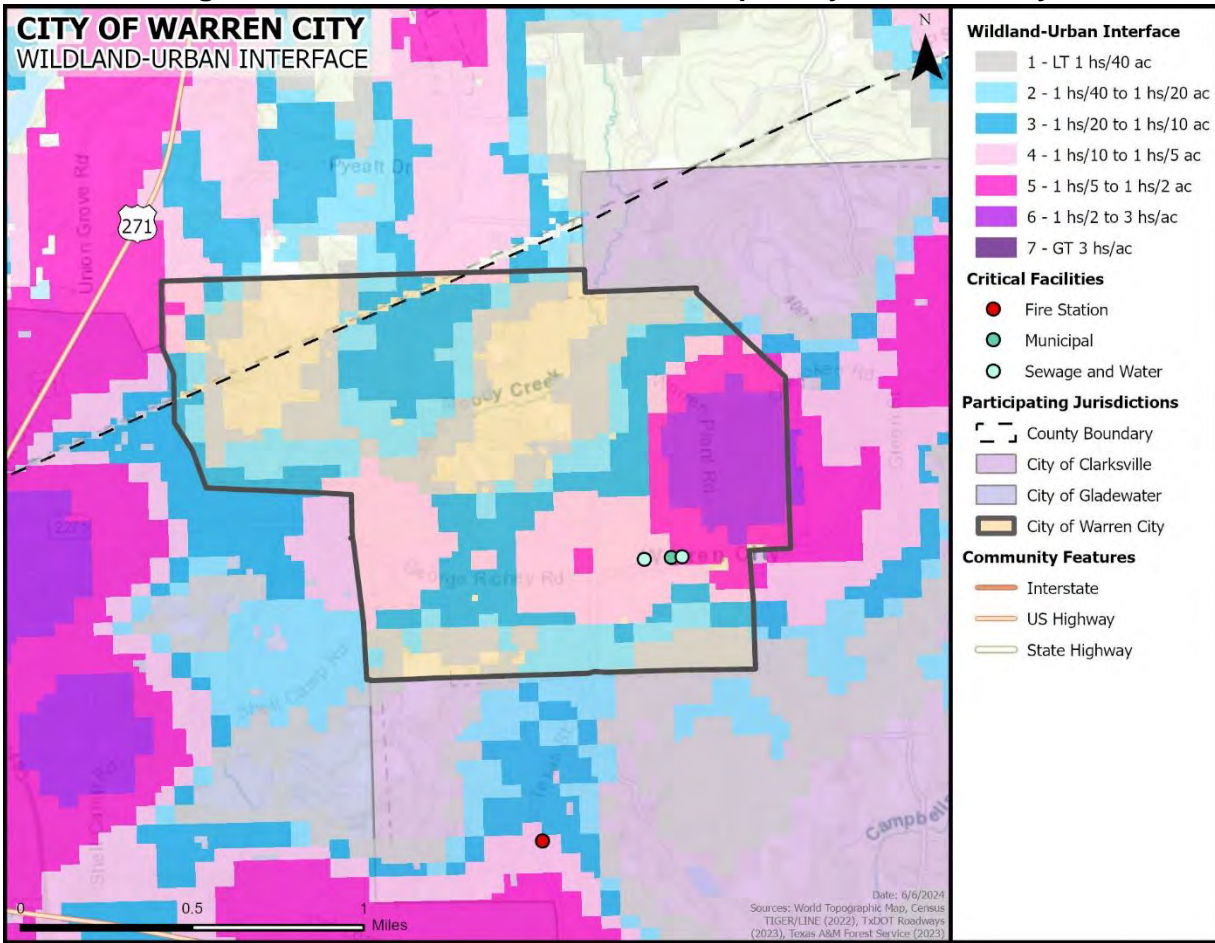
Figure 13-6. Wildland Urban Interface Map – City of Longview



It is estimated that 44 percent of the total population in the City of Longview live within the WUI. However, the entire City is at some risk for wildfires.

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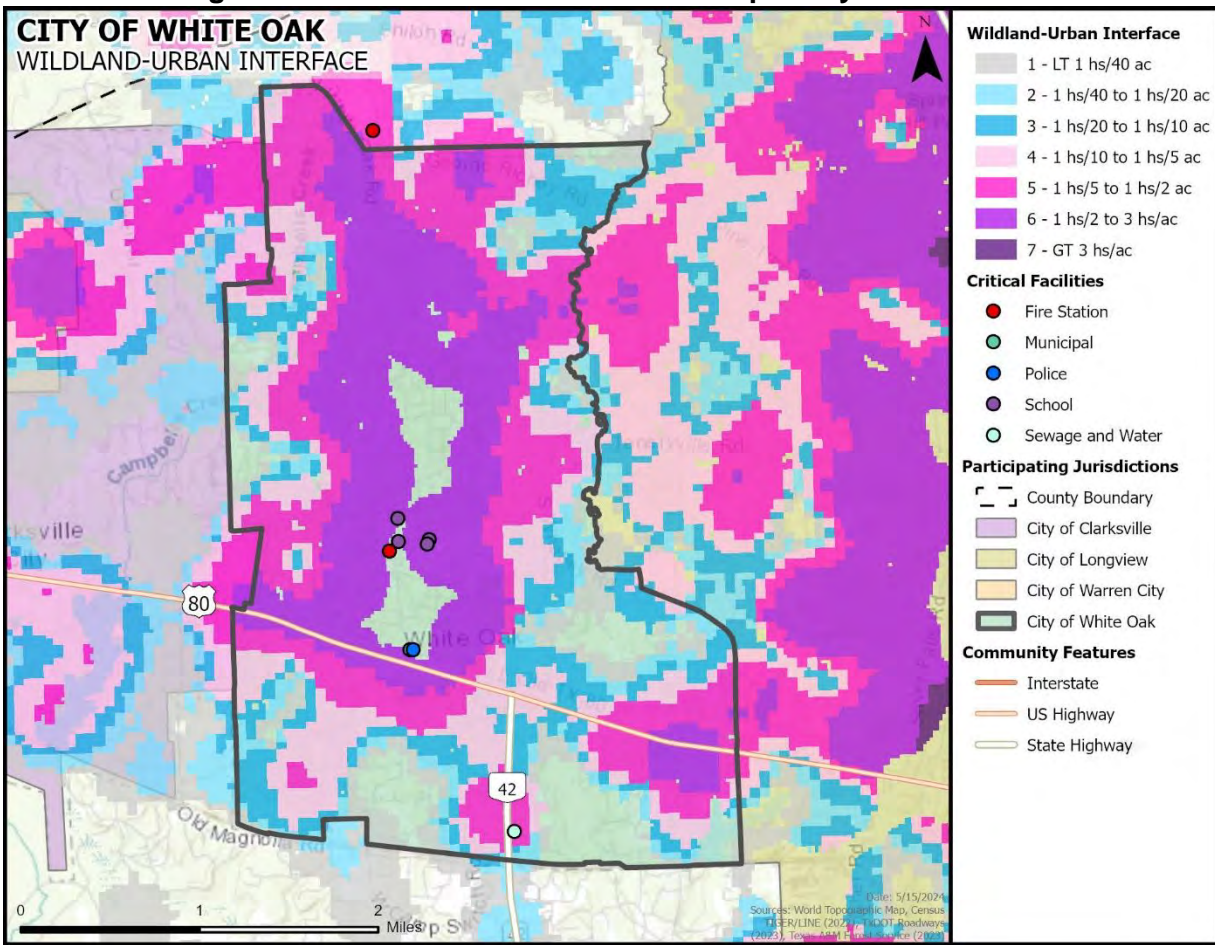
Figure 13-7. Wildland Urban Interface Map – City of Warren City



It is estimated that 100 percent of the total population in the City of Warren City live within the WUI. The entire City is at some risk for wildfires.

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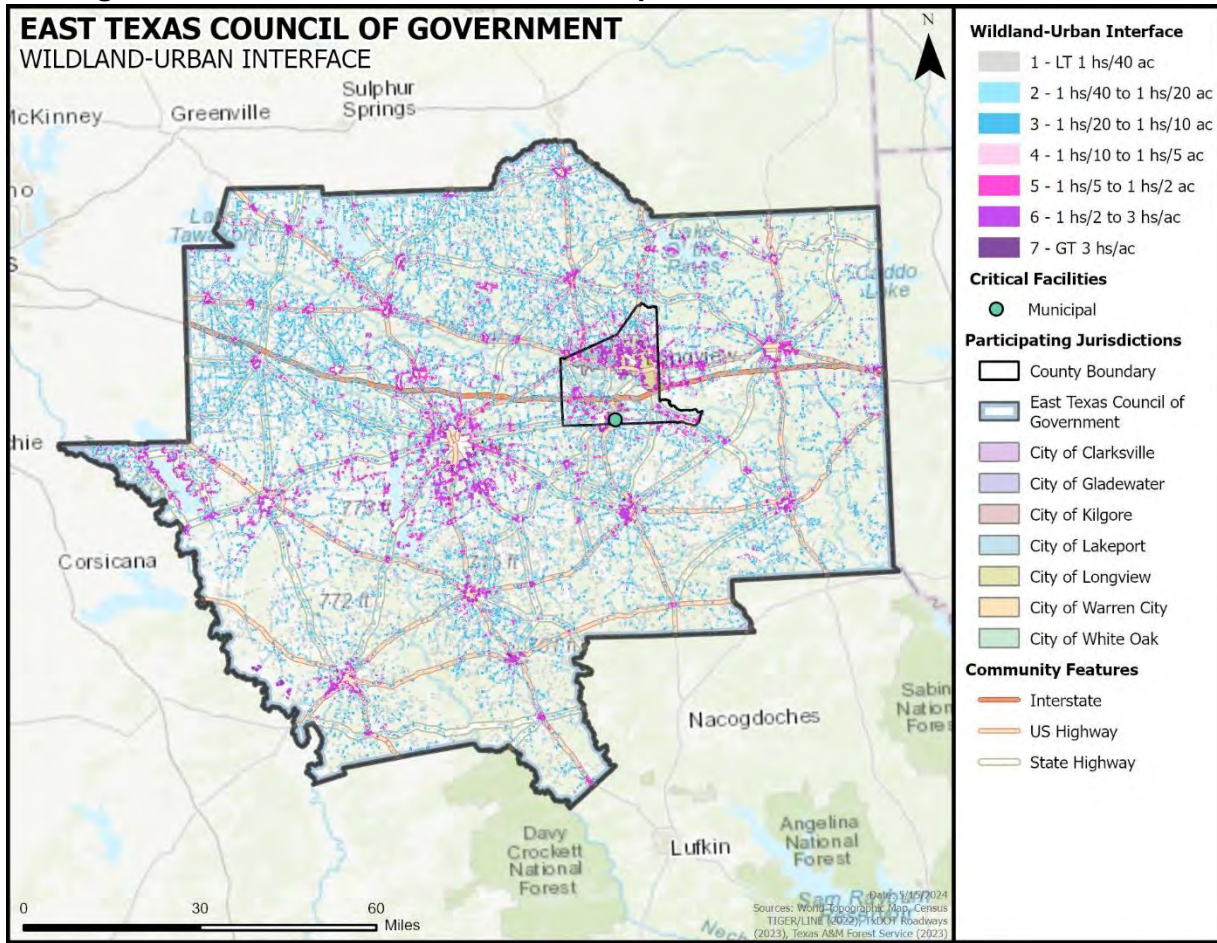
Figure 13-8. Wildland Urban Interface Map – City of White Oak



It is estimated that 85 percent of the total population in the City of White Oak live within the WUI. However, the entire City is at some risk for wildfires.

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Figure 13-9. Wildland Urban Interface Map – East Texas Council of Governments



All of the East Texas Council of Governments (ETCOG) facilities are located / partially located within the WUI areas.

EXTENT

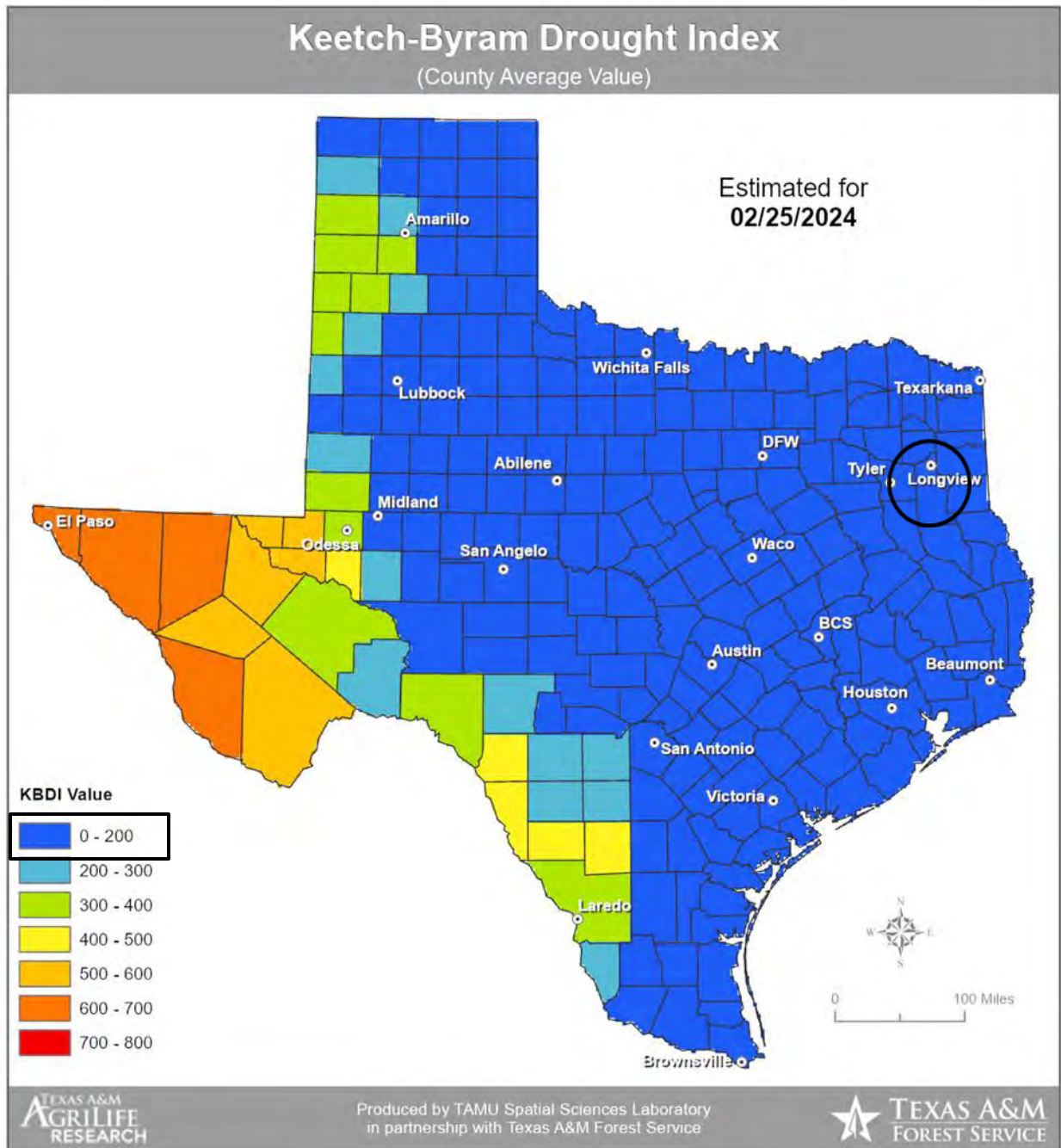


Risk for a wildfire event is measured in terms of magnitude and intensity using the Keetch Byram Drought Index (KBDI), a mathematical system for relating current and recent weather conditions to potential or expected fire behavior. The KBDI determines forest fire potential based on a daily water balance, derived by balancing a drought factor with precipitation and soil moisture (assumed to have a maximum storage capacity of eight inches), and is expressed in hundredths of an inch of soil moisture depletion.

Each color in Figure 13-10 and 13-11 represents the drought index at that location, by date. The drought index ranges from 0 to 800. A drought index of 0 represents no moisture depletion, and a drought index of 800 represents absolutely dry conditions.

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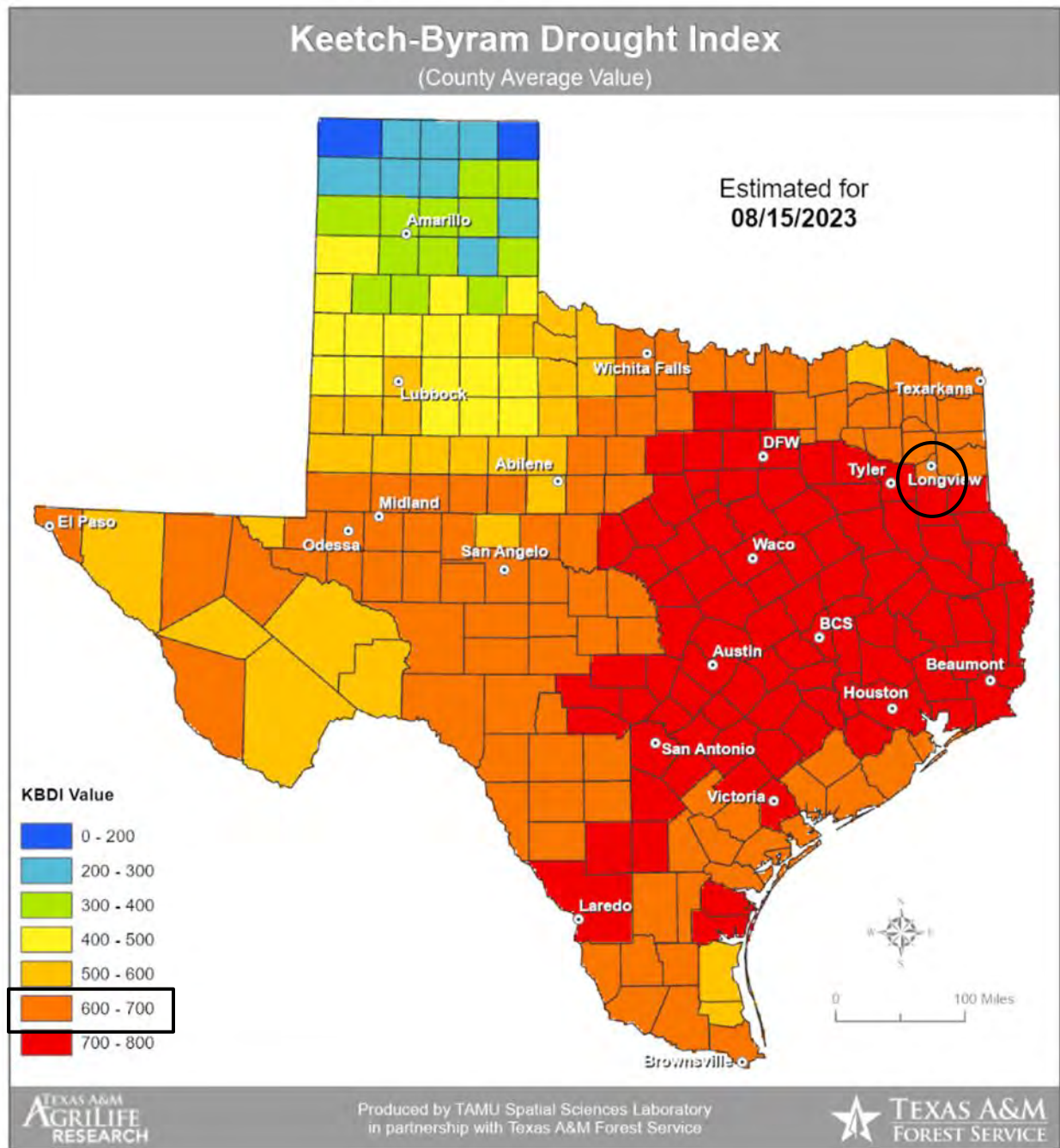
Figure 13-10. Keetch-Byram Drought Index (KBDI) for the State of Texas, 2/15/2023⁵



⁵ Gregg County planning area is located within the black circle.

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Figure 13-11. Keetch-Byram Drought Index (KBDI) for the State of Texas, 2023



Fire behavior can be categorized at four distinct levels on the KBDI:

- **0 -200:** Soil and fuel moisture are high. Most fuels will not readily ignite or burn. However, with sufficient sunlight and wind, cured grasses and some light surface fuels will burn in spots and patches.
- **200 -400:** Fires more readily burn and will carry across an area with no gaps. Heavier fuels will not readily ignite and burn. Expect smoldering and the resulting smoke to carry into and possibly through the night.

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- **400 -600:** Fires intensity begins to significantly increase. Fires will readily burn in all directions exposing mineral soils in some locations. Larger fuels may burn or smolder for several days creating possible smoke and control problems.
- **600 -800:** Fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn through the night and heavier fuels will actively burn and contribute to fire intensity.

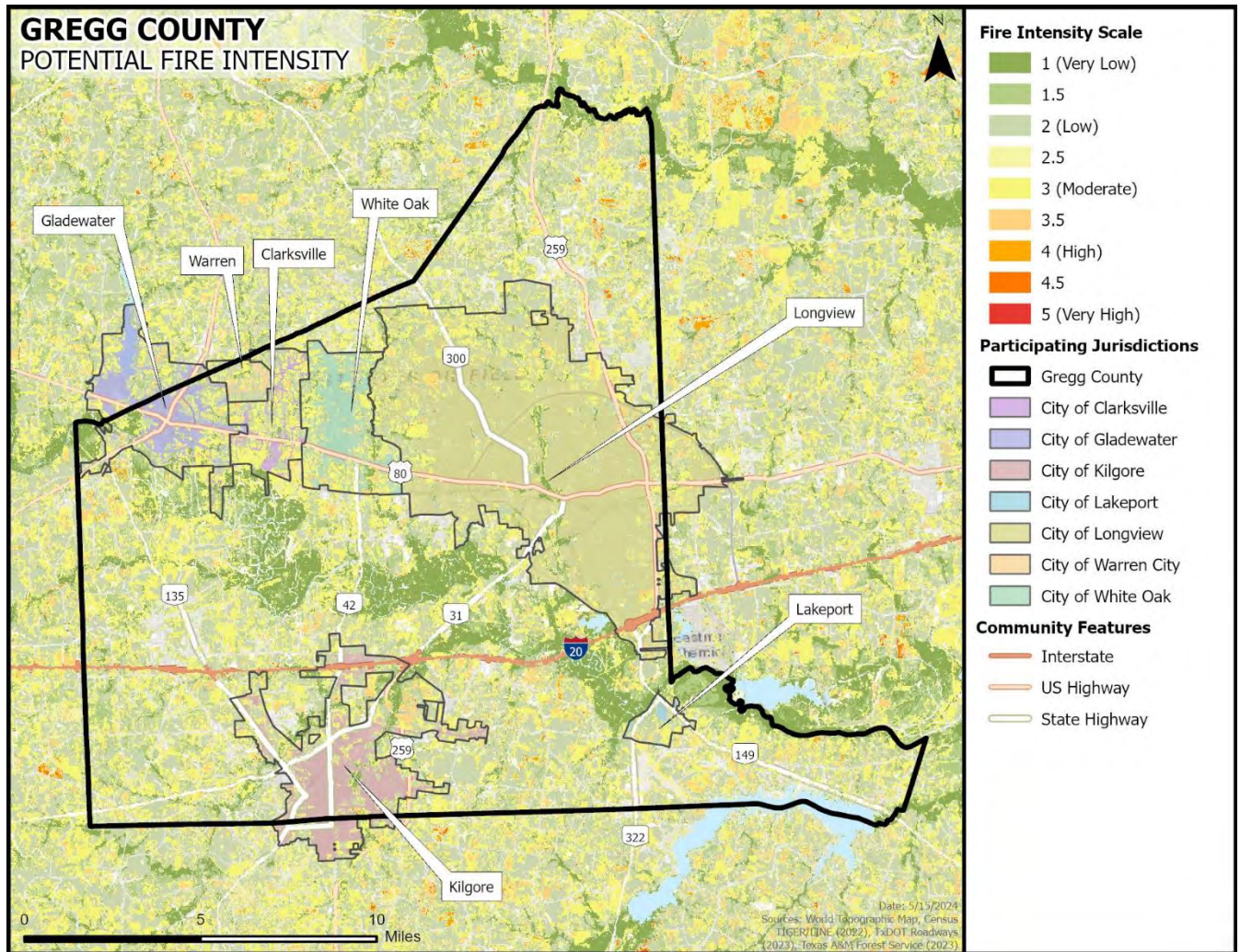
The KBDI is a good measure of the readiness of fuels for a wildfire event. It should be referenced as the area experiences changes in precipitation and soil moisture, while caution should be exercised in dryer, hotter conditions.

The range of intensity for the Gregg County planning area, including all participating jurisdictions and the ETCOG, in a wildfire event, is within 700 to 800. The average extent to be mitigated for the planning area is a KBDI of 450. Based on historical occurrences and readily available fuel, the planning area can anticipate a KBDI range from 0 to 800. At the high end of this range fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn through the night and heavier fuels will actively burn and contribute to fire intensity.

The Texas Forest Service's Fire Intensity Scale identifies areas where significant fuel hazards and associated dangerous fire behavior potential exist based on weighted average of four percentile weather categories. The Gregg County planning area has a potential for a full range of wildfire intensities. Figure 13-12 through 13-20 identifies the wildfire intensity for the planning area, including all participating jurisdictions and the ETCOG.

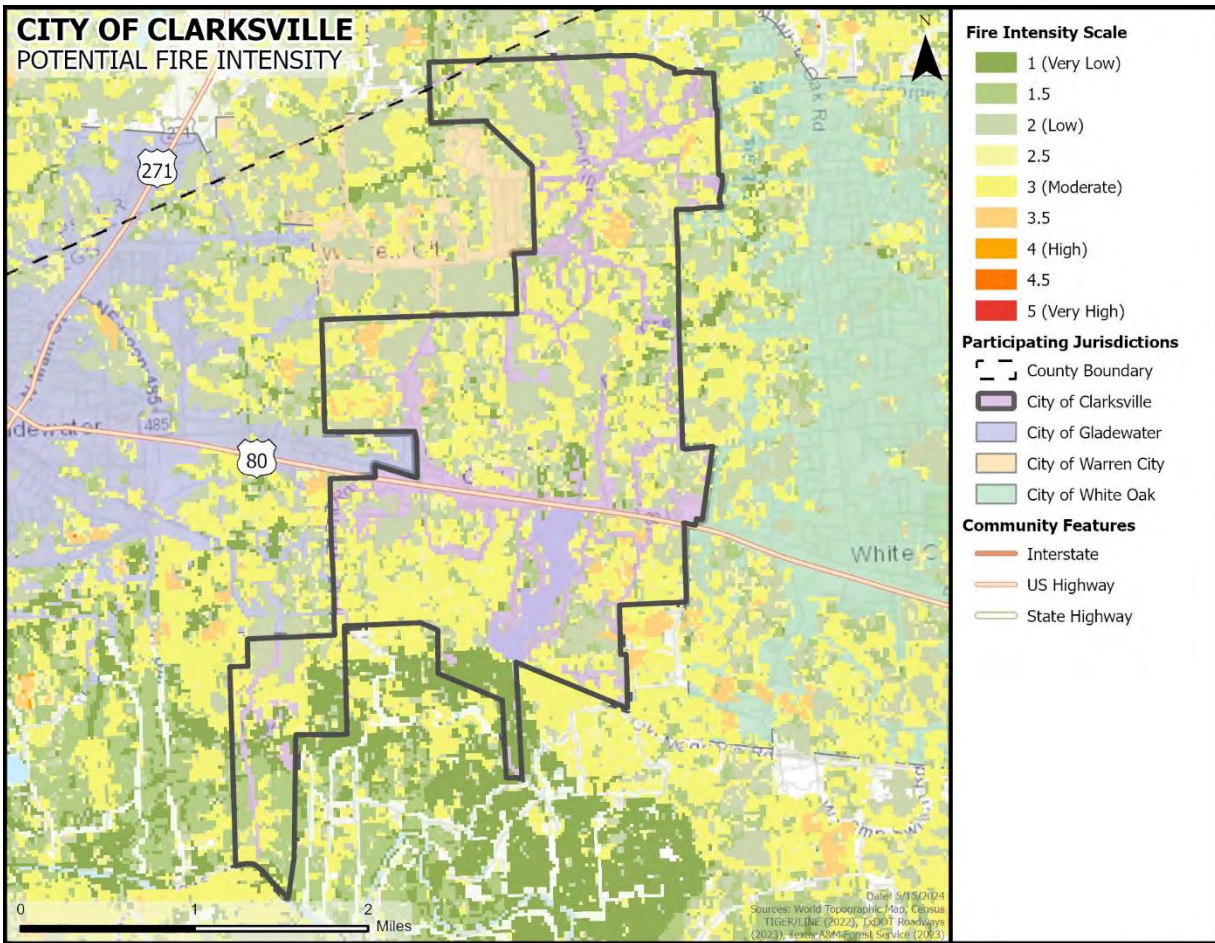
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Figure 13-12. Fire Intensity Scale Map – Gregg County



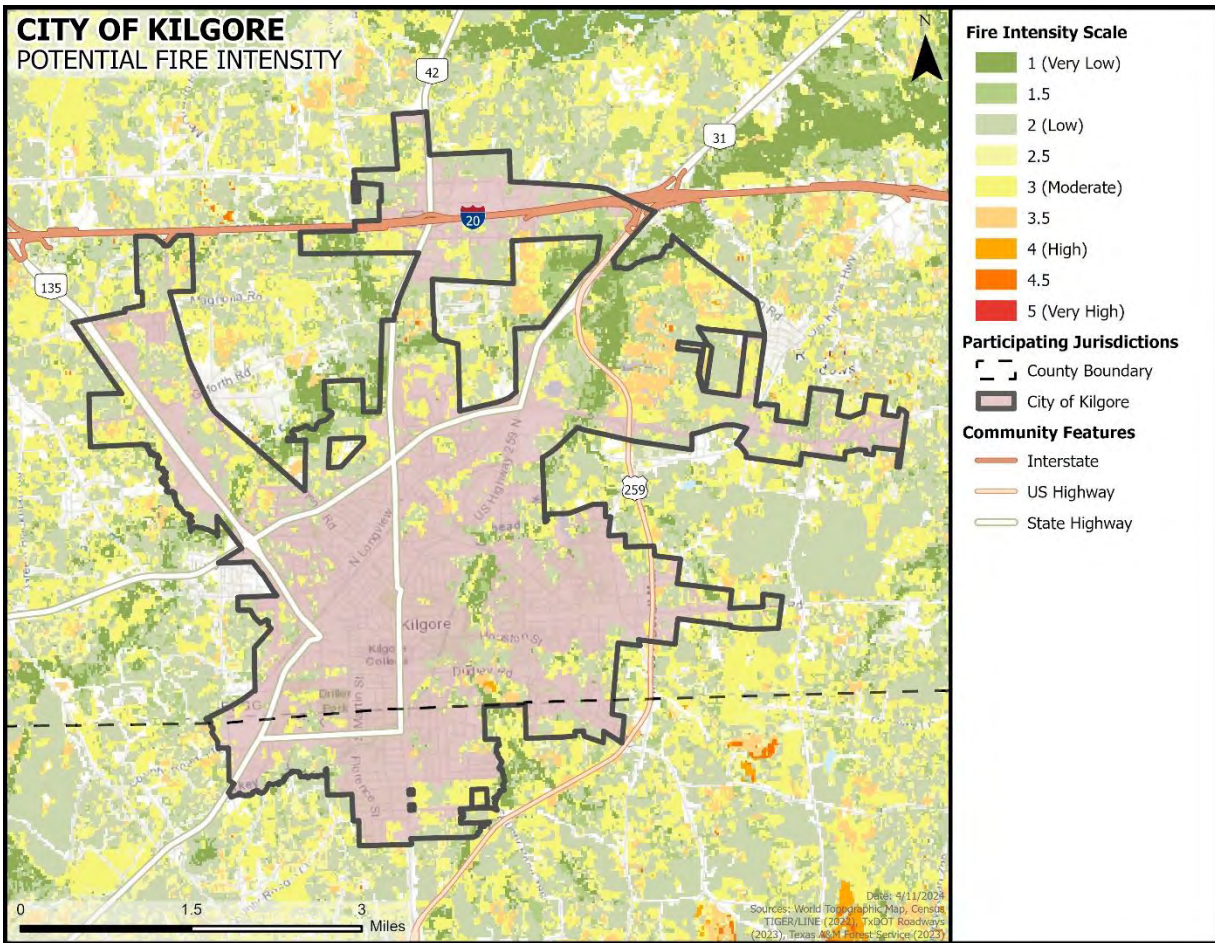
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Figure 13-13. Fire Intensity Scale Map – City of Clarksville City



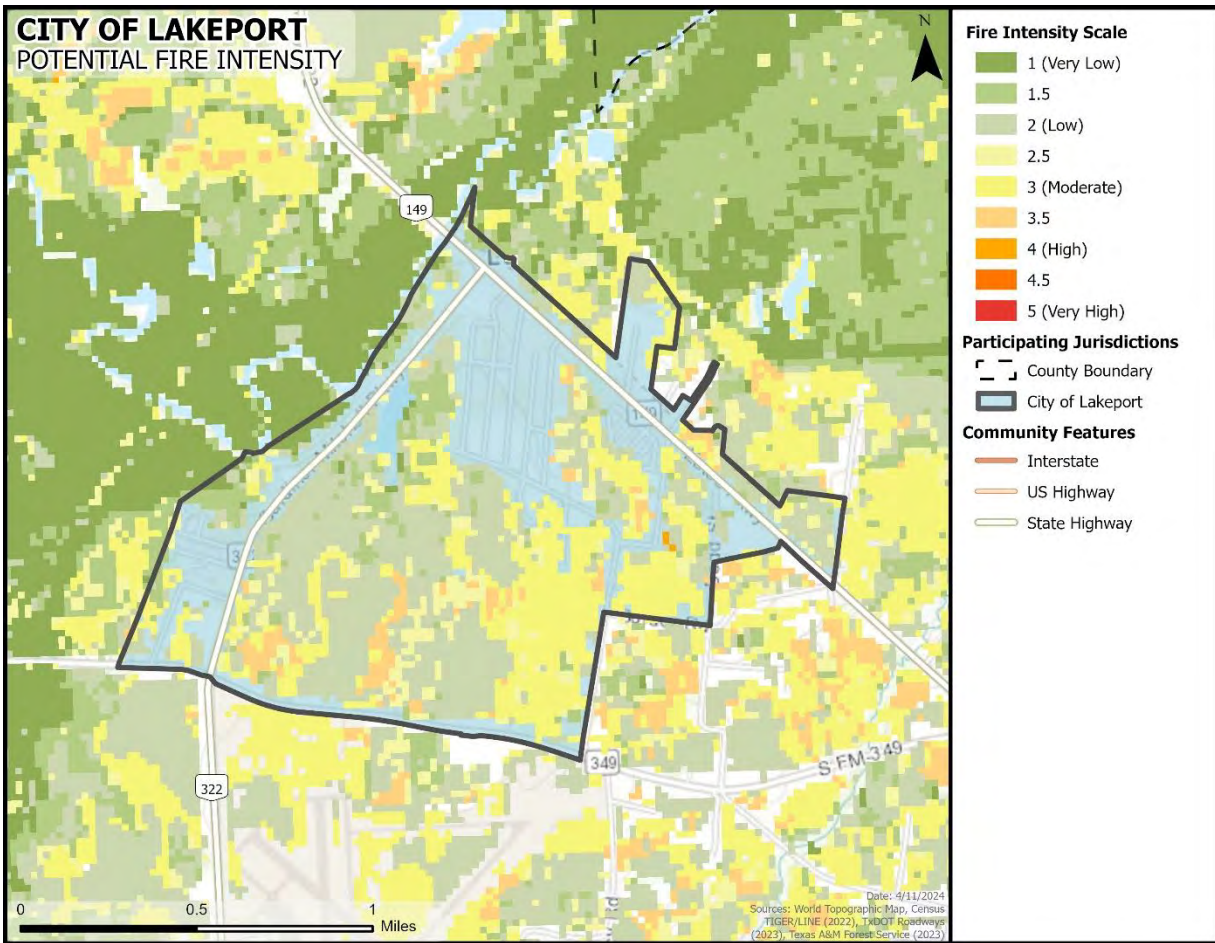
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Figure 13-15. Fire Intensity Scale Map – City of Kilgore



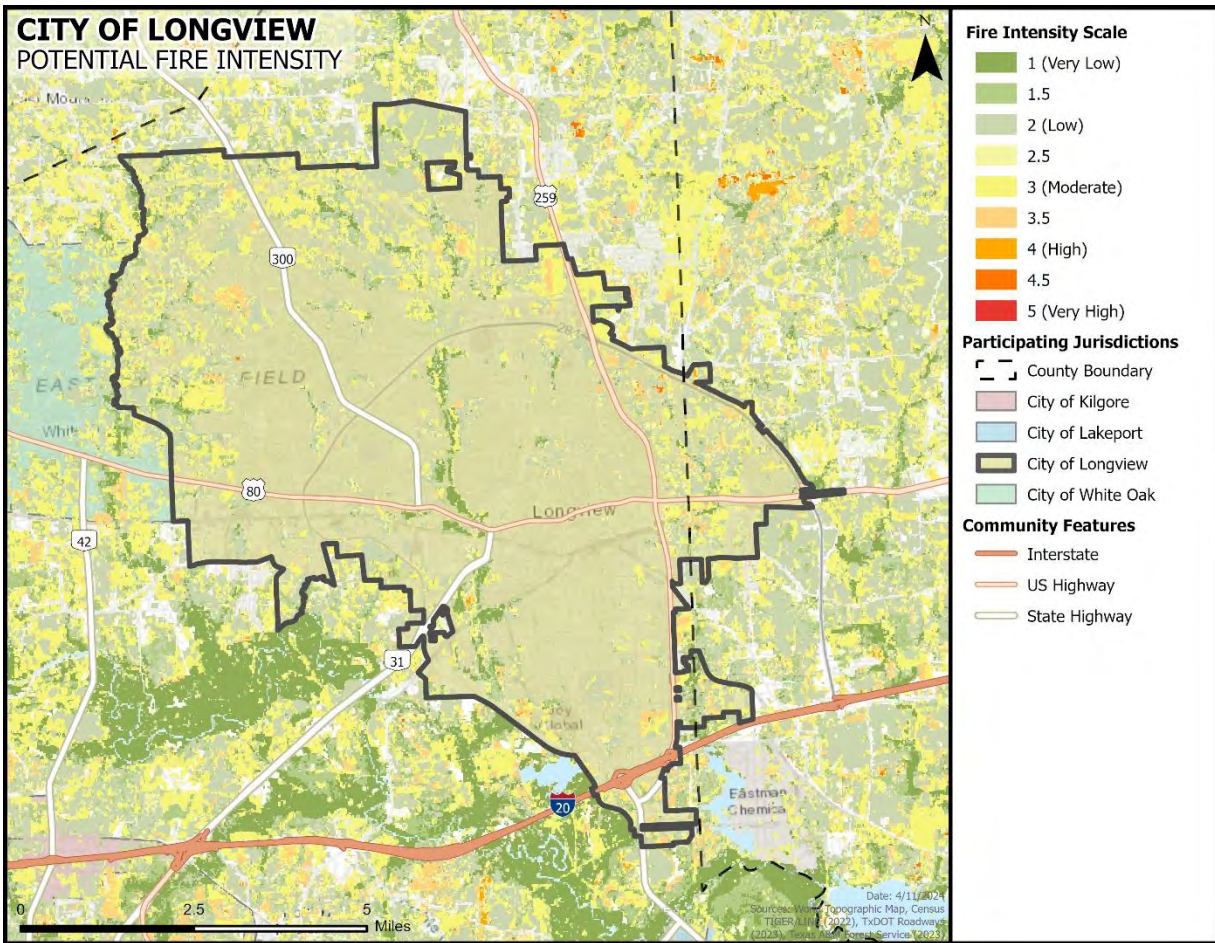
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Figure 13-16. Fire Intensity Scale Map – City of Lakeport



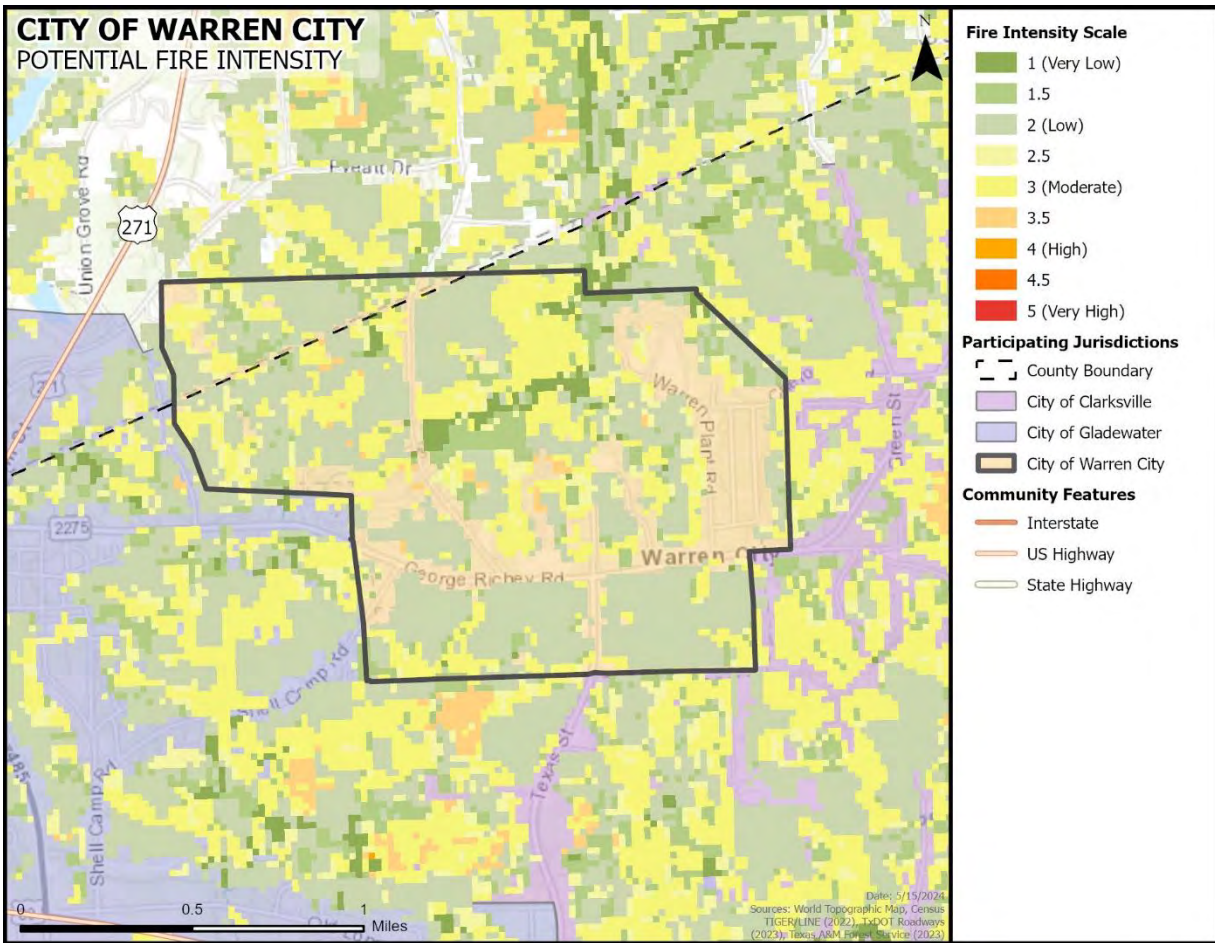
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Figure 13-17. Fire Intensity Scale Map – City of Longview



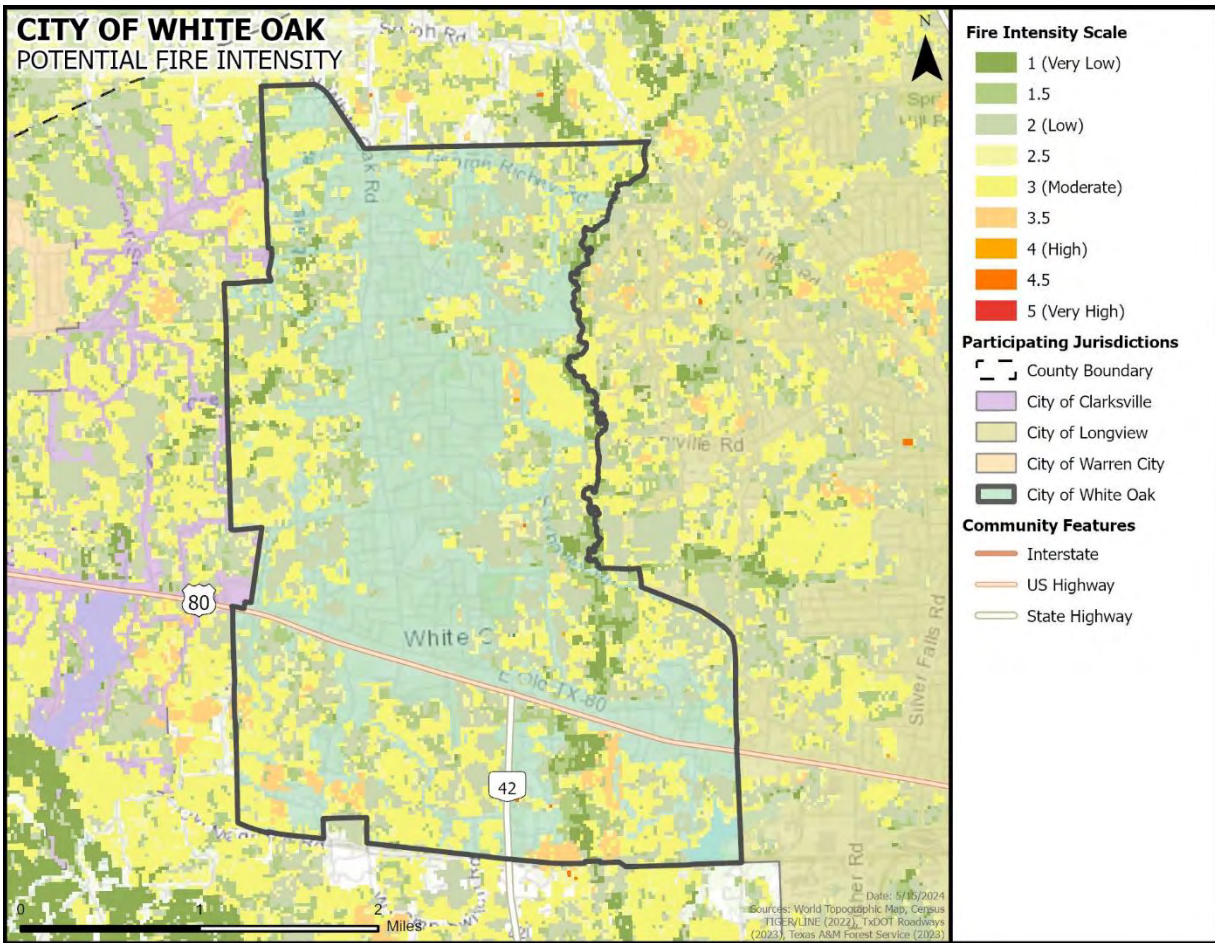
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Figure 13-18. Fire Intensity Scale Map – City of Warren City



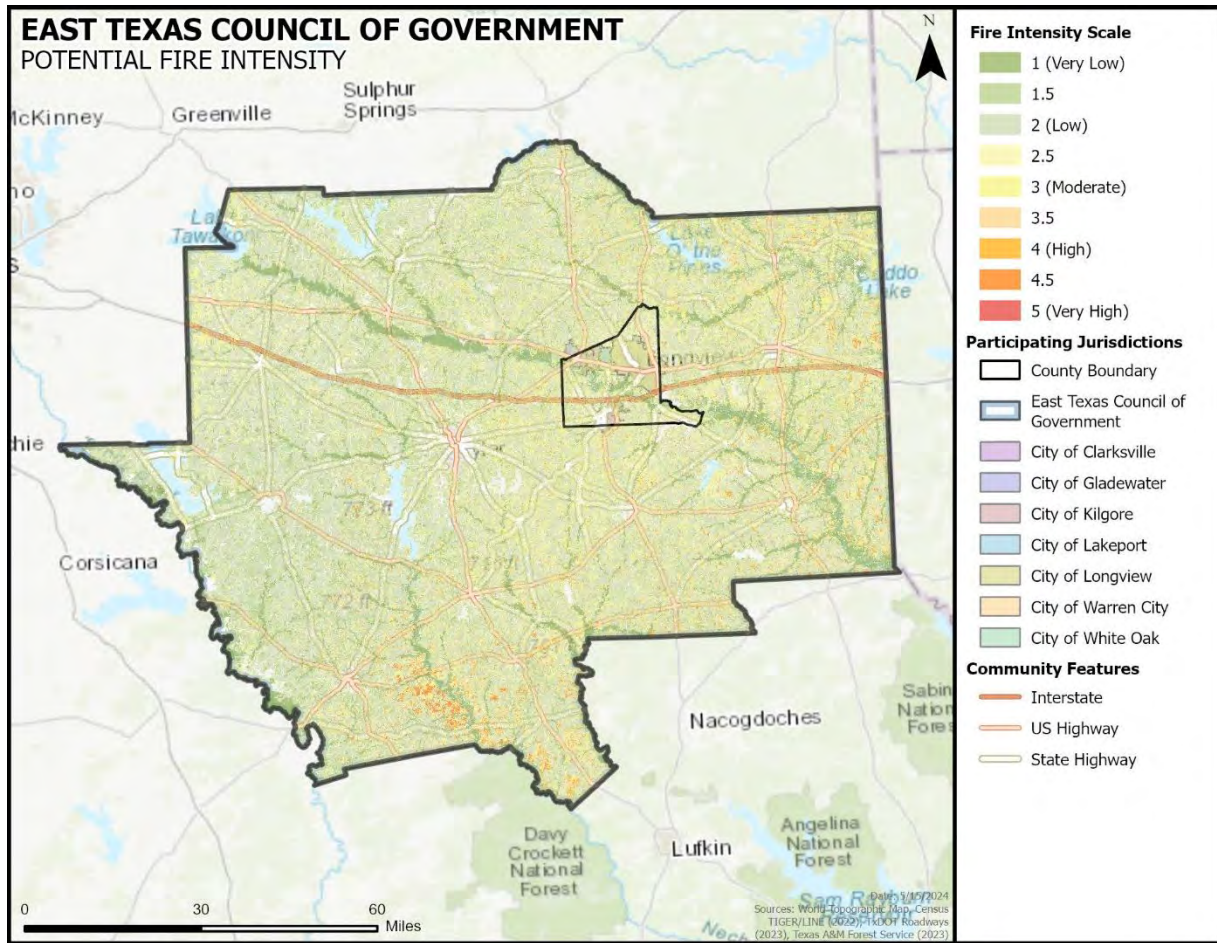
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Figure 13-19. Fire Intensity Scale Map – City of White Oak



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Figure 13-20. Fire Intensity Scale Map – East Texas Council of Governments



HISTORICAL OCCURRENCES

The Texas Forest Service reported 2,529 wildfire events for the Gregg County planning area between 2005 and 2021. The NCEI Storm Events Database includes two records of wildfire events from 1996 through 2023. Both of these events took place in 2011 and resulted in two deaths, two injuries, and an estimated \$3,100,200 in damages. The Texas A&M Forest Service (TFS) started collecting wildfire reported by volunteer fire departments in 2005. Due to a lack of recorded data for wildfire events prior to 2005 and after 2021, frequency calculations are based on a 17-year reporting period, using only data from recorded years. The map below shows approximate locations of wildfires, which can be grass or brushfires of any size (Figure 13-21). Tables 13-1 through 13-3 identify the number of wildfires and total acreage burned each year within the county boundaries.

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Figure 13-21. Location and Historic Wildfire Events in Gregg County

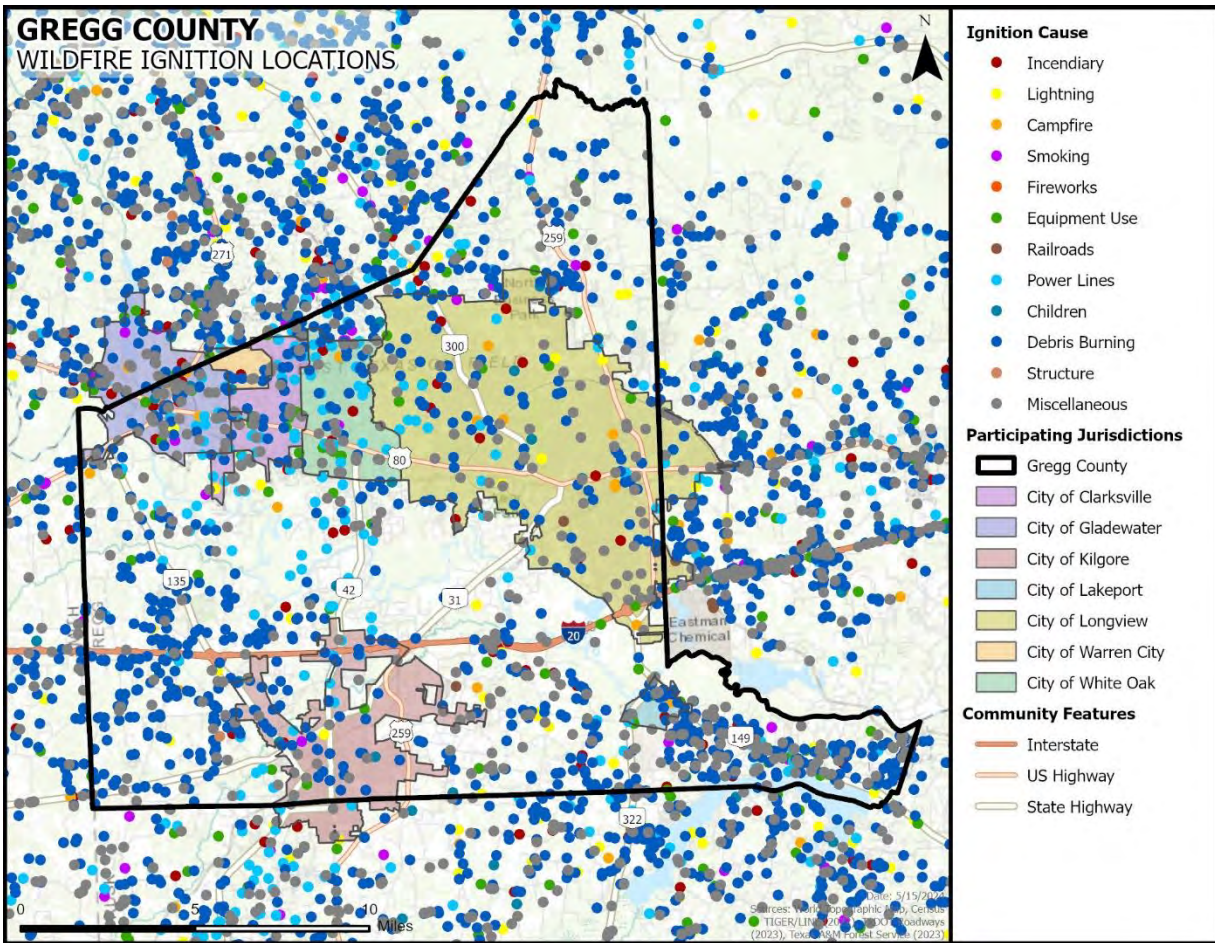


Table 13-1. Historical Wildfire Events Summary, 2005 - 2021⁶

JURISDICTION	NUMBER OF EVENTS	ACRES BURNED
Gregg County	1,801	10,219
City of Clarksville City	67	196
City of Gladewater	176	277
City of Kilgore	129	172
City of Lakeport	30	43
City of Longview	229	367
City of Warren City	16	33
City of White Oak	81	400
ETCOG ⁷	N/A	N/A

⁶ Source: Texas A&M Forest Service

⁷ It is noted that data is not provided for the ETCOG, however, these events overlap with county and city data provided for the same area. All ETCOG facilities are located within the City of Kilgore.

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Table 13-2. Historical Wildfire Events by Year

JURISDICTION	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gregg County	67	200	71	53	85	116	269	115	201	138	109	107	102	80	43	23	22
City of Clarksville City	2	9	1	0	0	7	10	2	14	2	1	6	10	1	2	0	0
City of Gladewater	1	33	17	5	8	11	35	6	23	10	12	4	6	2	3	0	0
City of Kilgore	1	1	0	0	2	13	29	23	22	7	8	16	4	0	1	0	2
City of Lakeport	2	5	0	2	2	2	2	0	2	2	2	3	3	1	1	1	0
City of Longview	13	27	2	0	3	9	8	5	16	37	25	16	15	24	11	11	7
City of Warren City	0	3	0	0	0	3	0	1	4	0	0	1	1	3	0	0	0
City of White Oak	5	16	0	1	0	2	19	1	0	0	0	12	16	7	2	0	0
ETCOG	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	91	294	91	61	100	163	372	153	282	196	157	165	157	118	63	35	31

Based on the list of historical wildfire events for the Gregg County planning area (listed above), 129 events have occurred since the 2018 plan.

Table 13-3. Acreage of Suppressed Wildfire by Year

JURISDICTION	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gregg County	423	641	246	331	394	207	6,773	118	223	165	200	110	120	108	69	8	83
City of Clarksville City	3	23	0	0	0	12	111	0	15	0	6	17	5	0	4	0	0
City of Gladewater	0	67	54	3	6	6	34	4	12	25	51	3	9	1	2	0	0
City of Kilgore	3	20	0	0	2	12	39	9	14	7	10	20	6	0	0	0	30
City of Lakeport	21	4	0	1	1	4	4	0	2	1	3	1	1	0	0	0	0
City of Longview	104	57	6	0	5	44	28	12	11	19	10	20	13	23	8	3	4
City of Warren City	0	2	0	0	0	0	0	0	1	0	0	0	0	30	0	0	0
City of White Oak	34	55	0	5	0	2	252	1	0	0	0	13	24	8	6	0	0

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JURISDICTION	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
ETCOG	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	588	869	306	340	408	287	7,241	144	278	217	280	184	178	170	89	11	117

SIGNIFICANT EVENTS

There have been 4 declared disasters related to wildfire in Gregg County between 1953 and 2024 (Table 13-4). Additional details on certain wildfire events are described below.

Table 13-4. Disaster Declarations for Wildfire, 1953-2024

YEAR	DECLARATION TITLE	DECLARATION TYPE	DISASTER NO.
1996	Texas Fire Emergency	EM	EM-3117-TX
1999	Texas Extreme Fire Hazards	EM	EM-3142-TX
2006	Extreme Wildfire Threat in Texas	DR	DR-1624-TX
2011	Wildfires in Texas	DR	DR-4029-TX

September 4, 2011 – Gregg County (DR-4029-TX)

Strong sustained winds and wind gusts, from Tropical Storm Lee which made landfall across the South Central and Southeast Louisiana gulf coast, moved across Northeast Texas on September 4, 2011. These winds, along with very low humidity values and exceptional drought conditions across Northeast Texas, resulted in a critical wildfire threat across the region. A wildfire, which became known as the Moore Fire, began 4 miles southwest of the City of Gladewater and then consumed 1,556 acres of timberland and grassland near Highway 135. It is reported that 20 homes were destroyed along with 15 outbuildings. There are reports of two deaths within the planning area due to a housefire caused by the wildfire. Additionally, two other injuries were reported from one person who escaped a housefire with minor burns, and one from a responding firefighter. The fire was not contained until September 13th. This event caused an estimated \$3,100,200 (2023 dollars) in property damages.

PROBABILITY OF FUTURE EVENTS

Wildfires can occur at any time of the year. As Gregg County communities move into wildland, the potential area of occurrence of wildfire increases. With 2,529 events in a 17-year period, an event within the Gregg County planning area is “Highly Likely”, meaning an event is probable within the next year. According to NOAA, research shows that changes in climate create warmer, drier conditions, leading to longer and more active fire seasons, indicating an increase in the frequency and severity of events in the planning area going forward. See additional information on climate change at the end of this section.

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VULNERABILITY AND IMPACT

Periods of drought, dry conditions, high temperatures, and low humidity are factors that contribute to the occurrence of a wildfire event. Less developed areas, such as along interstates or in more remote areas where fuels are more prevalent have an increased risk of being affected by wildfire.

The more heavily populated areas of the planning area are not highly likely to experience large, sweeping fires. Unoccupied buildings and open spaces that have not been maintained have the greatest vulnerability to wildfire. The overall level of concern for wildfires is located across the county where wildland and urban areas interface. Figure 13-22 through 13-30⁸ illustrates the areas that are the most vulnerable to wildfire throughout the Gregg County planning area, including all participating jurisdictions and the ETCOG.

The Gregg County Planning Team identified the following critical facilities (Table 13-5) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by wildfire events. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 13-5. Critical Facilities/Critical Services Vulnerable to Wildfire Events

CRITICAL FACILITIES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	Gregg County: 1 Police, 7 Fire Stations, 2 Health Services	<ul style="list-style-type: none"> Emergency services may be disrupted during a wildfire if facilities are impacted, roadways are inaccessible, or personnel are unable to report for duty. First responders are at greater risk of injury when in close proximity to the hazard while extinguishing flames, protecting property, or evacuating residents in the area.
	City of Clarksville City: 1 Fire Station	
	City of Gladewater: 1 Health Service, 1 Police Station, 1 Fire Station	<ul style="list-style-type: none"> Critical city departments may not be able to function and provide necessary services depending on the location of the fire and the structures or personnel impacted. Roadways in or near the WUI could be damaged or closed due to smoke and limited visibility, slowing or preventing access for emergency response vehicles. Fire suppression costs can be substantial, exhausting the financial resources of the community. First responders can experience heart disease, respiratory problems, and other long-term related illnesses from prolonged exposure to smoke, chemicals, and heat.
	City of Lakeport: 1 Police	
	City of Longview: 3 Fire Stations, 3 Health Services, 1 Police Station	
City of Warren City: 1 Fire Station	<ul style="list-style-type: none"> Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications. 	

⁸ Source: TxWRAP portal at the following site: <https://texaswildfirerisk.com/>

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CRITICAL FACILITIES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
	<p>City of Whiteoak: 1 Police Station, 2 Fire stations</p>	<ul style="list-style-type: none"> ● Power outages could disrupt communications, delaying emergency response times. ● Structures can be damaged or destroyed in the path of the wildfire. ● Power outages could disrupt critical care. ● Backup power sources could be damaged or destroyed. ● Critical staff may be injured or otherwise unable to report for duty, limiting response capabilities.
<p>Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities</p>	<p>Gregg County: 2 Municipal, 1 Transportation, 6 Schools</p> <p>City of Clarksville City: 1 Municipal, 1 Community Facility</p> <p>City of Gladewater: 4 Schools: 1 Municipal, 1 Transportation</p> <p>City of Lakeport: 1 Municipal</p> <p>City of Longview: 15 Schools</p> <p>City of Warren City: 1 Municipal</p> <p>City of Whiteoak: 4 Schools, 1 Municipal</p> <p>ETCOG: 1 Municipal</p>	<ul style="list-style-type: none"> ● Facilities or infrastructure may be damaged, destroyed or otherwise inaccessible. ● Essential supplies like medicines, water, food, and equipment deliveries may be significantly delayed. ● Additional emergency responders and critical aid workers may not be able to reach the area for days. ● Power outages and infrastructure damage may prevent larger airports from acting as temporary command centers for logistics, communications, and emergency operations.
<p>Utility Services and Infrastructure (electric, water, wastewater, communications)</p>	<p>Gregg County: 5 Sewage and Water</p> <p>City of Clarksville City: 13 Sewage and Water</p> <p>City of Gladewater: 16 Sewage and Water</p>	<ul style="list-style-type: none"> ● Wastewater and drinking water facilities and infrastructure may be damaged or destroyed resulting in service disruption or outage for multiple days or weeks. ● Disruptions and outages impact public welfare as safe drinking water is critical. ● A break in essential and effective wastewater collection and treatment is a health concern, potentially spreading disease. ● Exposure to untreated wastewater is harmful to people and the environment.

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CRITICAL FACILITIES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
	City of Kilgore: 9 Sewage and Water City of Lakeport: 2 Sewage and Water City of Longview: 6 Energy Utility, 3 Sewage and Water City of Warren City: 2 Sewage and Water City of Whiteoak: 1 Sewage and Water	<ul style="list-style-type: none"> Any service disruptions can negatively impact or delay emergency management operations. Power losses

Within the Gregg County planning area, a total of 2,529 fire events were reported from 2005 through 2021 by Texas A&M Forest Service. All events were suspected wildfires. Historic loss and annualized estimates of acres burned due to wildfires are presented in Table 13-6 below. The average frequency is approximately 158 events every year.

Table 13-6. Average Annualized Acreage Losses⁹

JURISDICTION	TOTAL ACRES BURNED	AVERAGE ANNUAL ACRE LOSSES
Gregg County	10,219	639
City of Clarksville City	196	12
City of Gladewater	277	17
City of Kilgore	172	11
City of Lakeport	43	3
City of Longview	367	23
City of Warren City	33	2
City of White Oak	400	25
ETCOG ¹⁰	0	0
TOTAL	11,707	732

⁹ Events divided by 17 years of data.

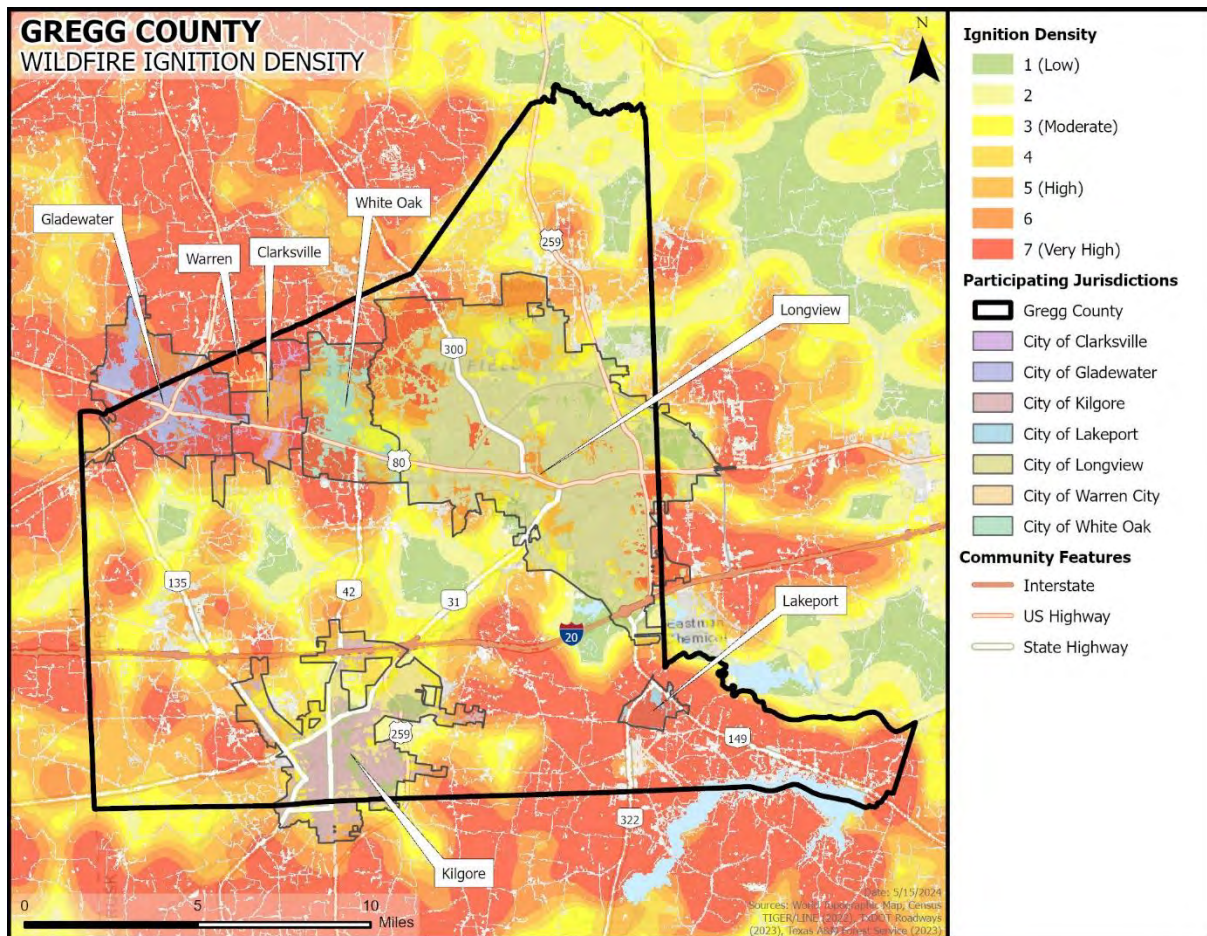
¹⁰ It is noted that data is not provided for the ETCOG, however, these events overlap with county and city data provided for the same area. All ETCOG facilities are located within the City of Kilgore.

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Wildfire Ignition Density shows the likelihood of a wildfire starting based on historical ignition patterns. Occurrence is derived by modeling historic wildfire ignition locations to create an average ignition rate map. The ignition rate is measured in the number of fires per year per 1,000 acres. Wildfire Ignition Density is a key input into the calculation of the Wildfire Threat output. With most Texas fires being human caused, there is a repeatable spatial pattern of fire ignitions over time. This pattern identifies areas where wildfires are most likely to ignite, and prevention efforts can be planned accordingly.¹¹

Figures 13-22 through 13-30 show the threat of wildfire to the Gregg County planning area.

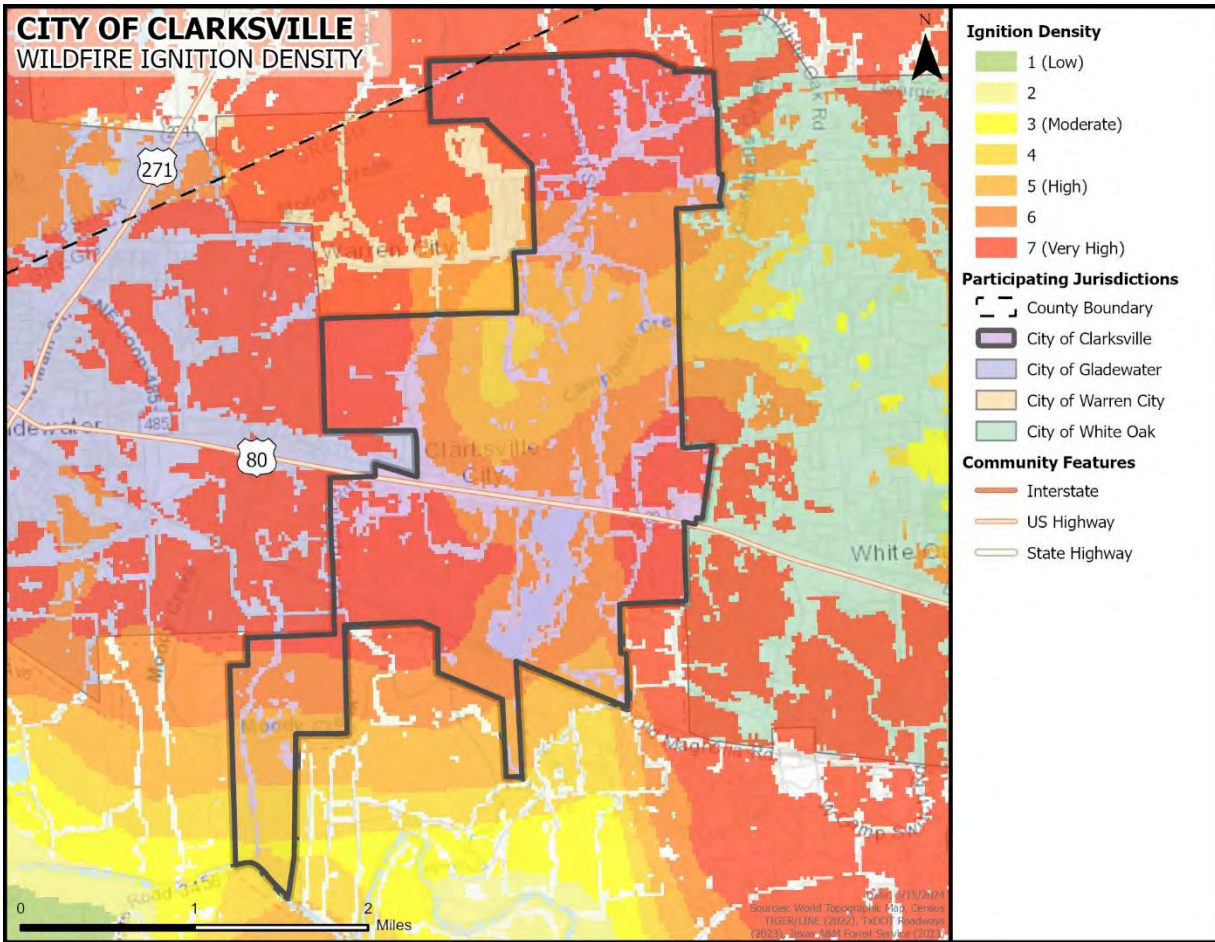
Figure 13-22. Wildfire Ignition Density – Gregg County



¹¹ Source: TxWRAP portal at the following site: <https://texaswildfirerisk.com/>

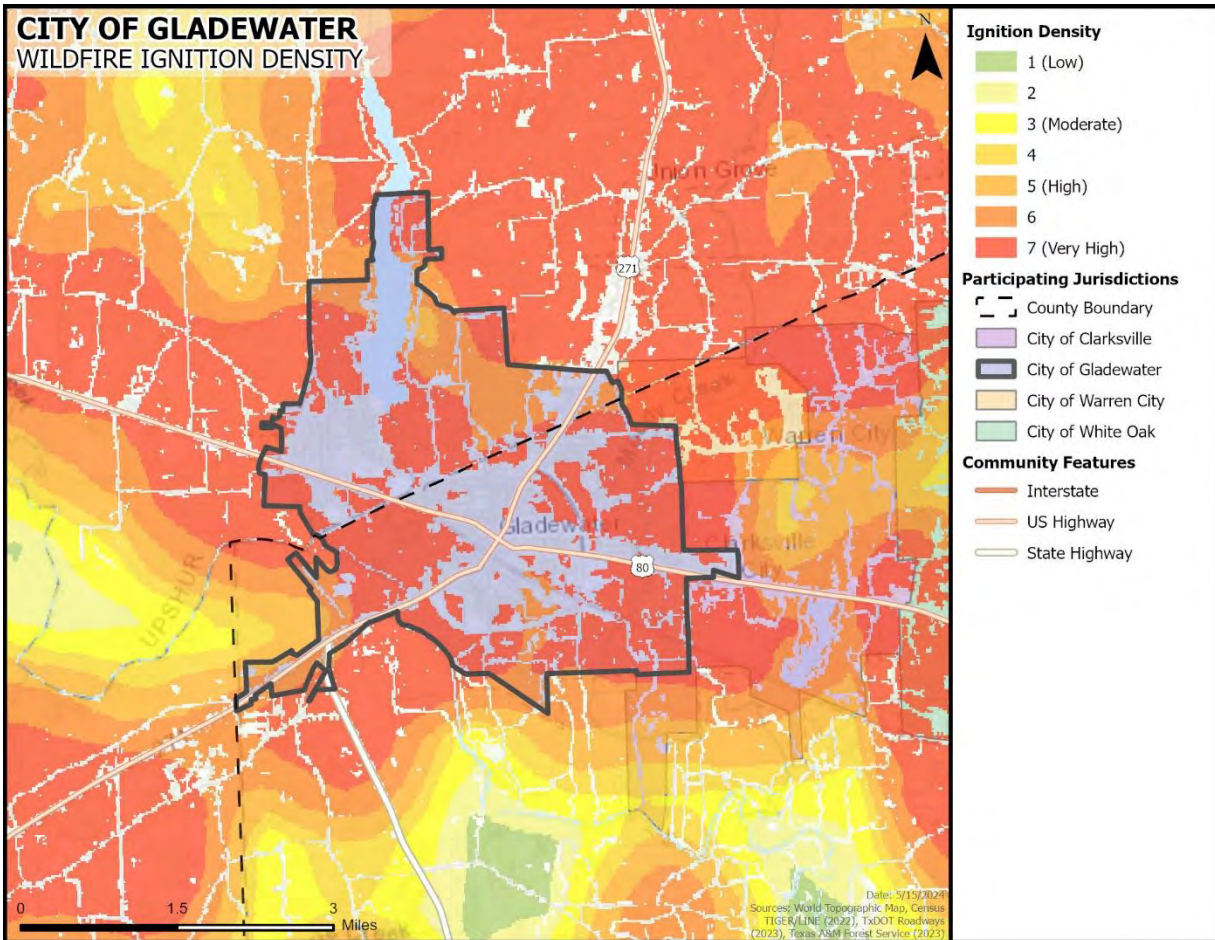
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Figure 13-23. Wildfire Ignition Density – City of Clarksville City



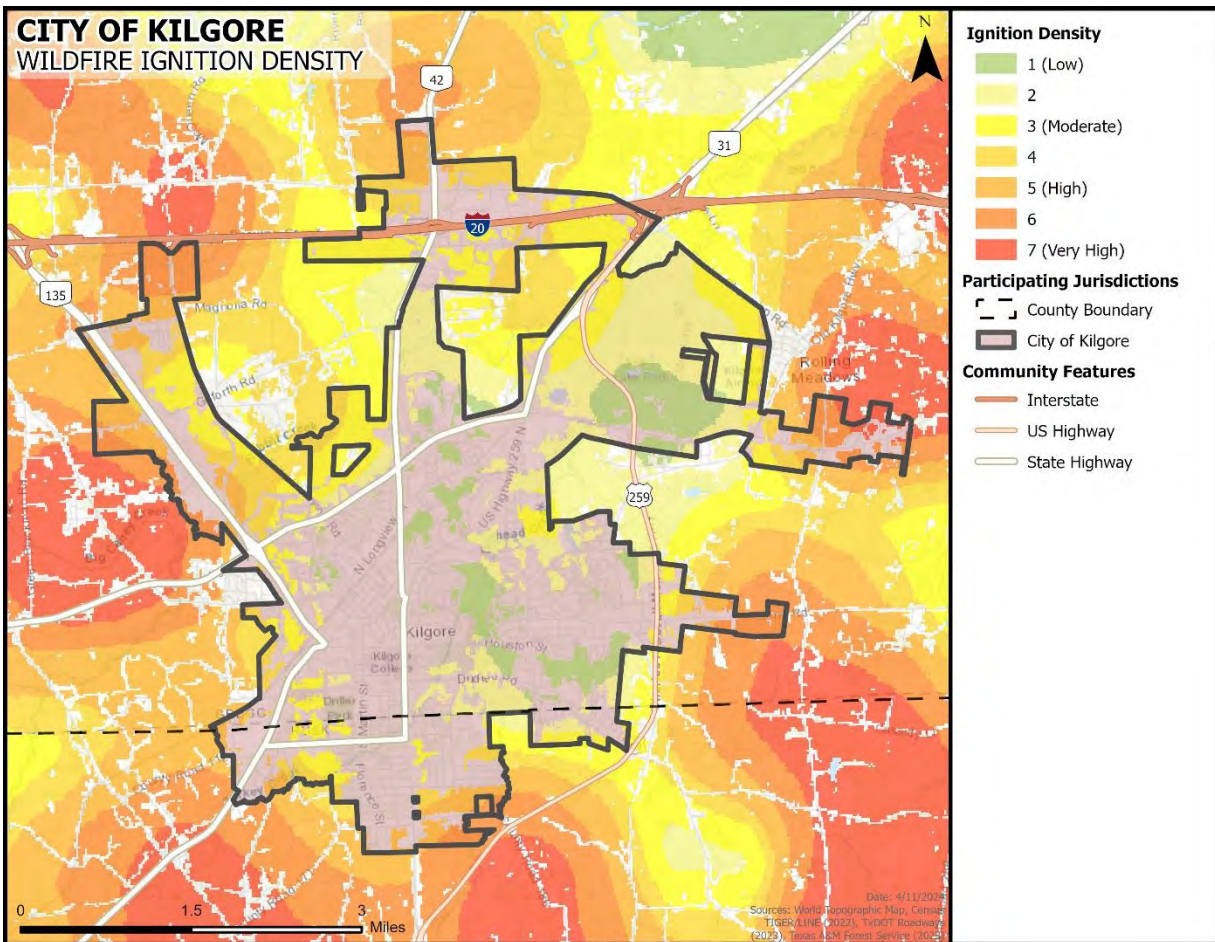
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Figure 13-24. Wildfire Ignition Density – City of Gladewater



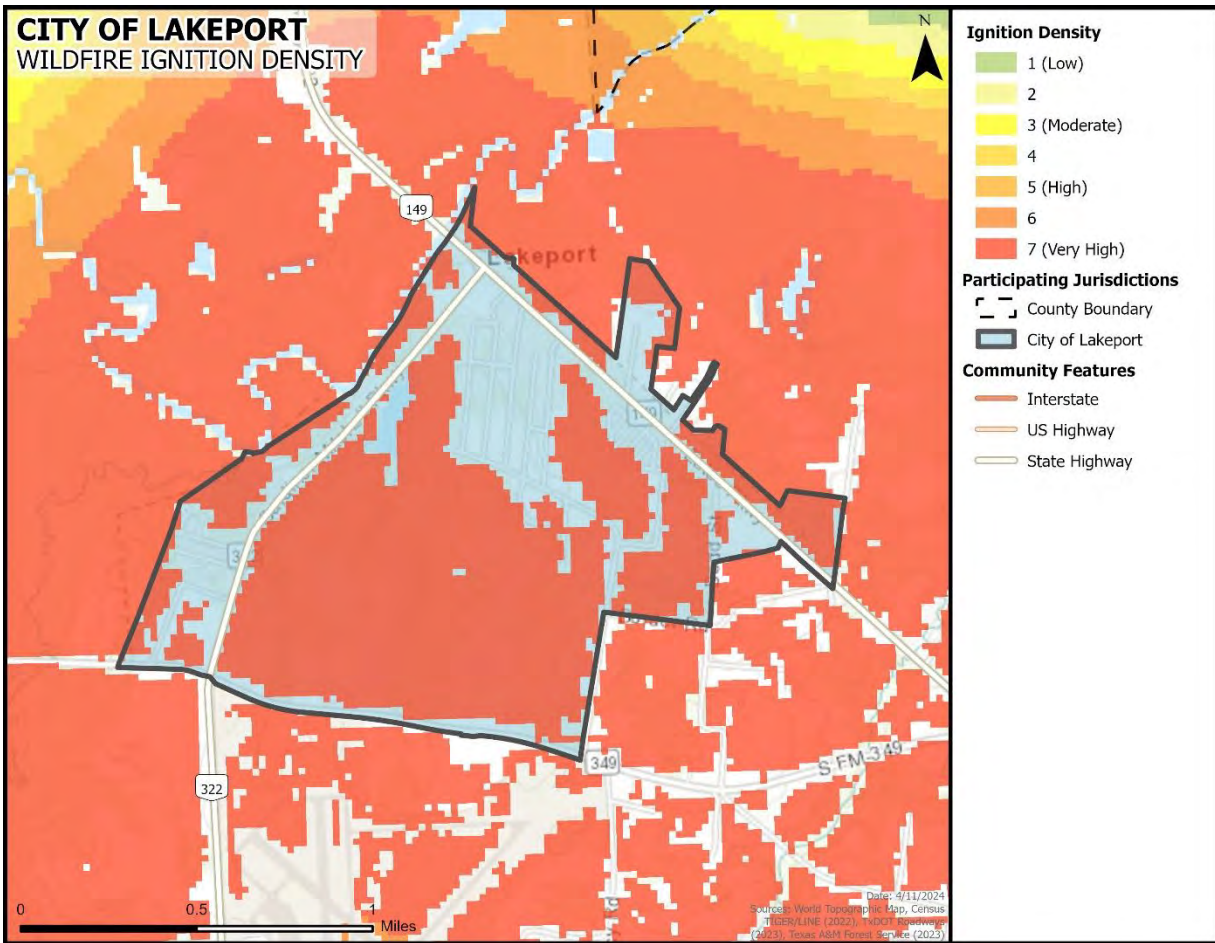
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Figure 13-25. Wildfire Ignition Density – City of Kilgore



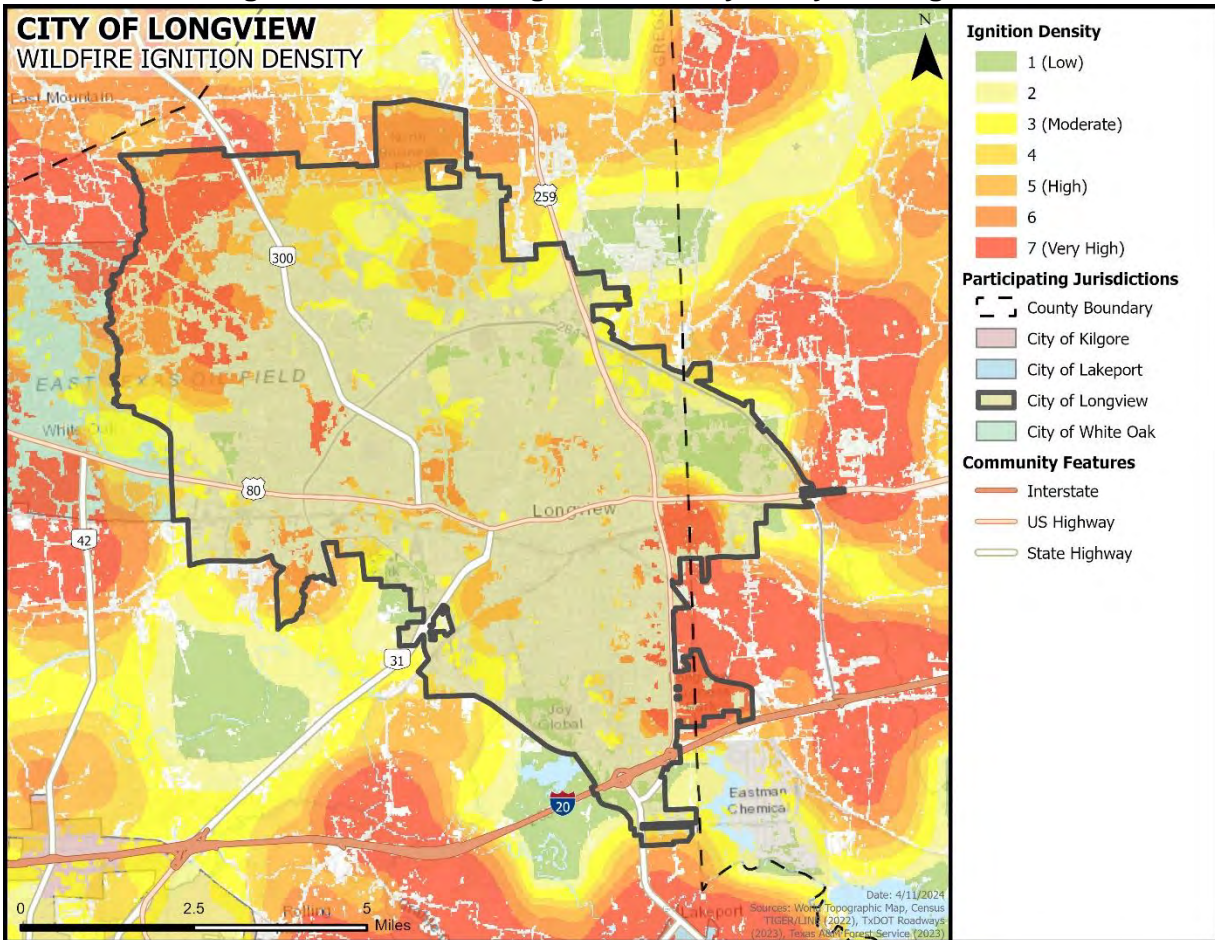
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Figure 13-26. Wildfire Ignition Density – City of Lakeport



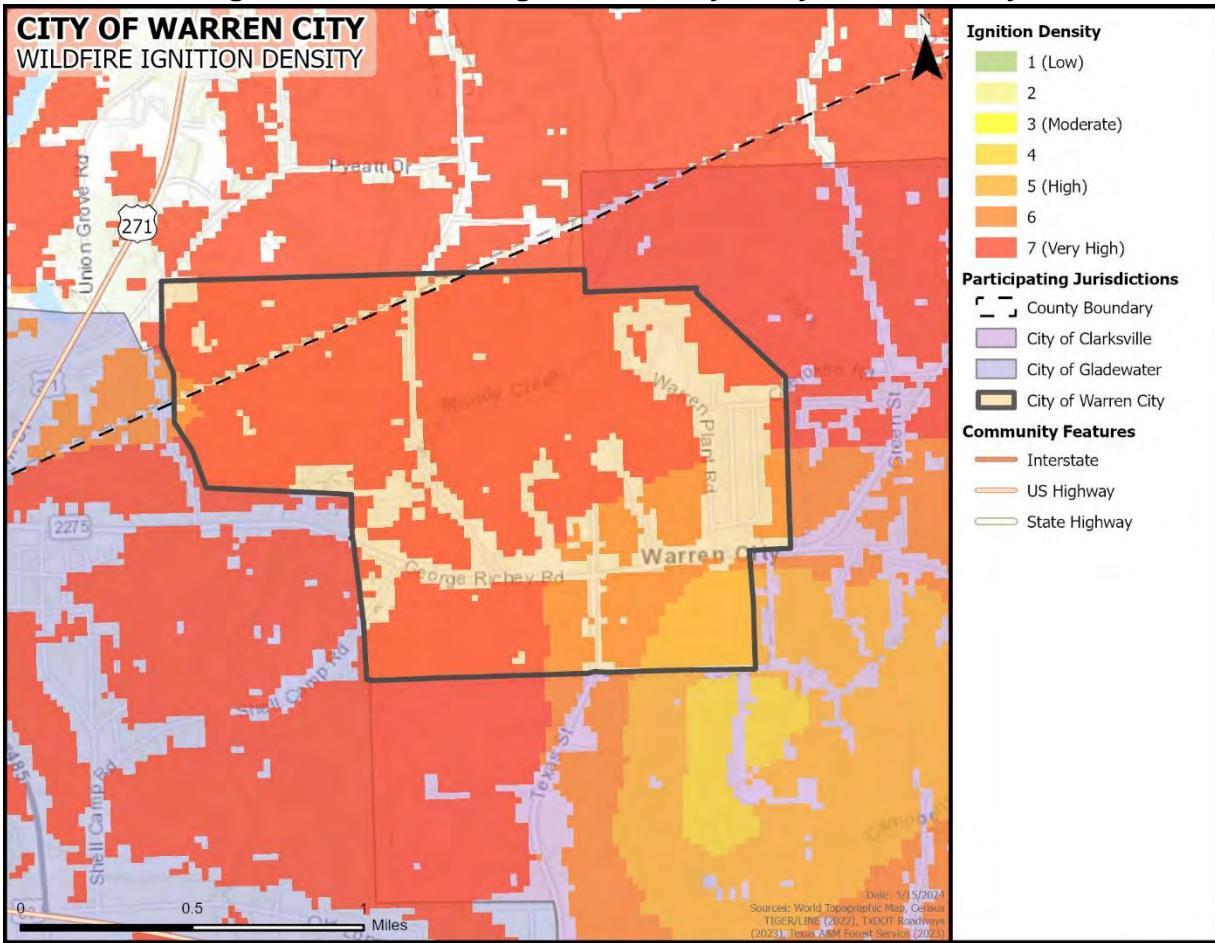
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Figure 13-27. Wildfire Ignition Density – City of Longview



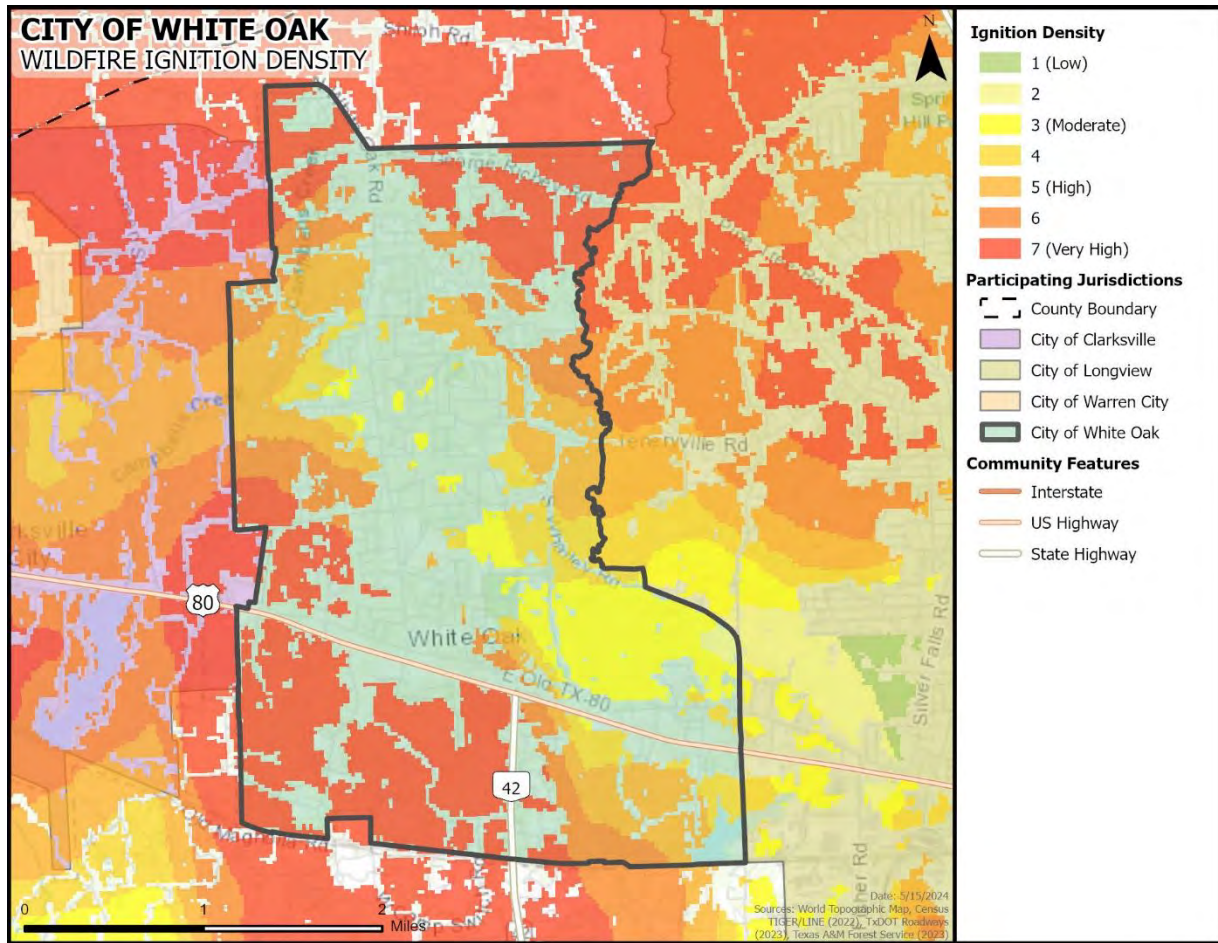
SECTION 13: WILDFIRE

Figure 13-28. Wildfire Ignition Density – City of Warren City



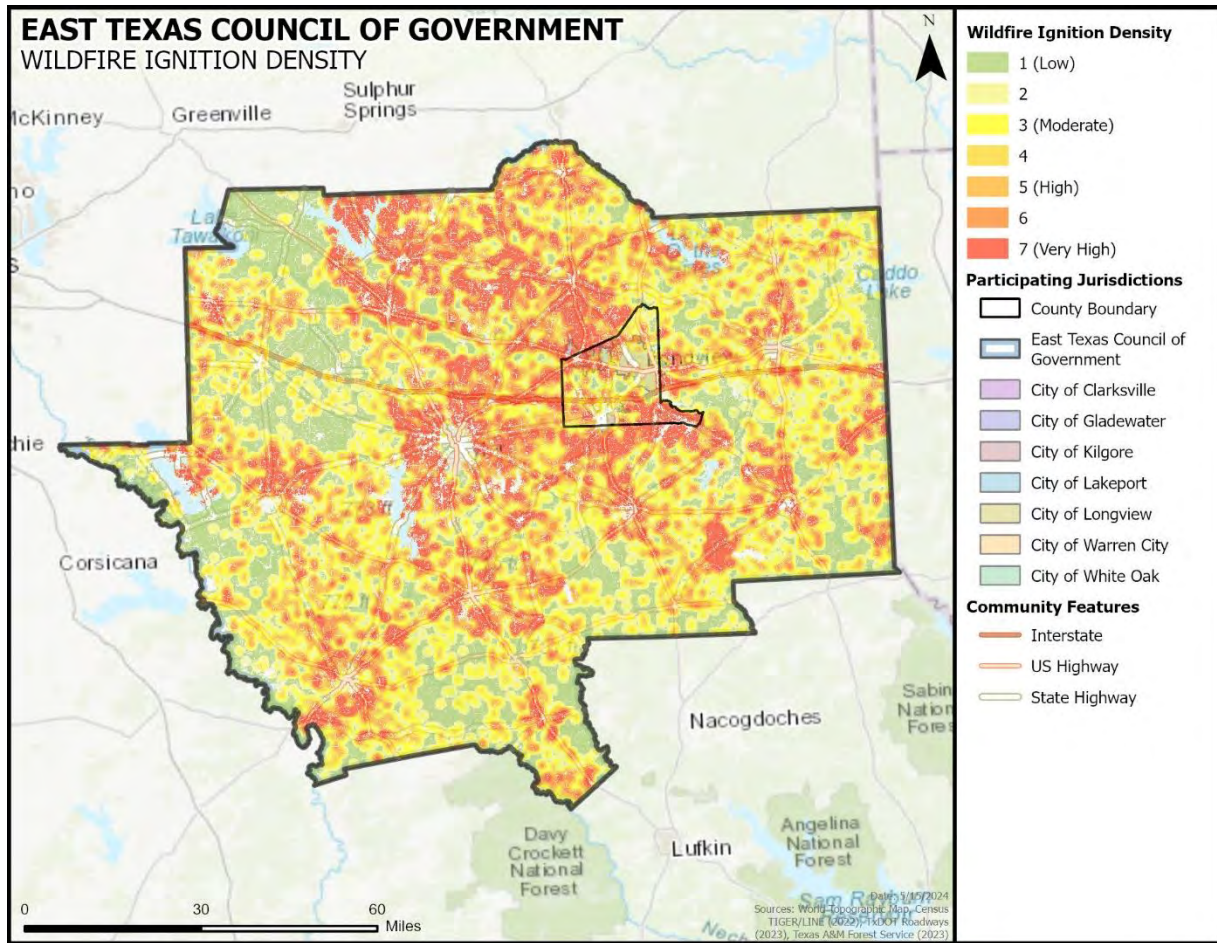
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Figure 13-29. Wildfire Ignition Density – City of White Oak



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Figure 13-30. Wildfire Ignition Density – ETCOG



Diminished air quality is an environmental impact that can result from a wildfire event and pose a potential health risk. The smoke plumes from wildfires can contain potentially inhalable carcinogenic matter. Fine particles of invisible soot and ash that are too small for the respiratory system to filter can cause immediate and possibly long-term health effects. The elderly or those individuals with compromised respiratory systems may be more vulnerable to the effects of diminished air quality after a wildfire event.

Climatic conditions such as severe freezes and drought can significantly increase the intensity of wildfires since these conditions kill vegetation, creating a prime fuel source for wildfires. The intensity and rate at which wildfires spread are directly related to wind speed, temperature, and relative humidity.

The severity of impact from major wildfire events can be substantial. Such events can cause multiple deaths, shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. Severity of impact is gauged by acreage burned, homes and structures lost, and the number of resulting injuries and fatalities.

For the Gregg County planning area, including all participating jurisdictions and the ETCOG, the impact from a wildfire event would be considered minor, meaning injuries and/or illnesses do not result in permanent disability, complete shutdown of facilities and services for more than one

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week and more than 10 percent of property is destroyed or with major damage. However, with the reported injuries and fatalities, the impact is considered “Substantial, with multiple injuries and fatalities possible depending on the size of the event. The severity of impact is gauged by acreage burned, homes and structures lost, injuries and fatalities.

Table 13-7. Impact for Gregg County

JURISDICTION	IMPACT	DESCRIPTION
Gregg County	Substantial	Gregg County has an estimated 67,402 people or 56% of the total population that live within the Wildland Urban Interface (WUI). The housing density is most commonly 3 houses per 1 acre. County residents may suffer injuries that result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
City of Clarksville City	Minor	Within the City of Clarksville City, it is estimated 791 people or 97% of the total population that live within the Wildland Urban Interface (WUI). Average housing density is most commonly 1 house per 2 acres. City residents may suffer injuries that result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
City of Gladewater	Minor	Within the City of Gladewater, it is estimated 4,371 people or 69% of the total population that live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
City of Kilgore	Minor	Within the City of Kilgore, it is estimated 6,007 people or 51% of the total population that live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
City of Lakeport	Minor	Within the City of Lakeport, it is estimated 963 people or 99% of the total population that live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that result in permanent disability.

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JURISDICTION	IMPACT	DESCRIPTION
		Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
City of Longview	Minor	Within the City of Longview, it is estimated 34,692 people or 44% of the total population that live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
City of Warren City	Minor	Within the City of Warren City, it is estimated 331 people or 100.0% of the total population that live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
City of White Oak	Minor	Within the City of White Oak, it is estimated 5,143 people or 85% of the total population that live within the Wildland Urban Interface (WUI). Average housing density is most commonly 3 houses per 1 acre. City residents may suffer injuries that result in permanent disability. Critical facilities could be shut down for more than one week, and more than 10 percent of total property could be damaged.
ETCOG	Minor	ETCOG facilities have a low to moderate risk of wildfire. Employees and residents within the district boundaries could be injured or suffer illnesses, but not permanent disability. Critical facilities could be shut down for a week, and 10 percent or more of total property could be damaged.

ASSESSMENT OF IMPACTS

A Wildfire event poses a potentially significant risk to public health and safety, particularly if the wildfire is initially unnoticed and spreads quickly. The impacts associated with a wildfire are not limited to direct damage. Significant wildfire events can be frequently associated with a variety of impacts, including:

- The Gregg County planning area contains numerous open space areas. Wildfire may adversely affect or destroy endangered species habitat, reduce air quality, increase erosion and risk of flash flooding, contribute to increased local temperatures, and disrupt other ecological functions.

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- Recreation activities throughout county and city parks may be unavailable and tourism can be unappealing for years following a large wildfire event, devastating directly related local businesses and negatively impacting economic recovery.
- Persons, pets, and wildlife in the area at the time of the fire are at risk for injury or death from burns and/or smoke inhalation. First responders are at greater risk of physical injury when in close proximity to the hazard while extinguishing flames, protecting property, or evacuating residents in the area.
- First responders can experience heart disease, respiratory problems, and other long-term related illnesses from prolonged exposure to smoke, chemicals, and heat.
- Emergency services may be disrupted during a wildfire if facilities are impacted, roadways are inaccessible, or personnel are unable to report for duty.
- Critical county and city departments may not be able to function and provide necessary services depending on the location of the fire and the structures or personnel impacted.
- Non-critical businesses may be directly damaged, suffer loss of utility services, or be otherwise inaccessible, delaying normal operations and slowing the recovery process.
- Displaced residents may not be able to immediately return to work, slowing economic recovery.
- Roadways in or near the WUI could be damaged or closed due to smoke and limited visibility.
- Older homes are generally exempt from modern building code requirements, which may require fire suppression equipment in the structure. An estimated 52 percent (approximately 27,666 structures) of homes in the planning area were built before 1980. The ETCOG has two facilities built before 1980. Similarly, historic buildings may lack fire mitigation materials or measures due to their historic status. There are eight historical sites listed on the National Register of Historic Places for Gregg County.
- Some high-density neighborhoods feature small lots with structures close together, increasing the potential for fire to spread rapidly.
- Air pollution from smoke may exacerbate respiratory problems of vulnerable residents.
- Charred ground after a wildfire cannot easily absorb rainwater, increasing the risk of flooding and potential mudflows.
- Wildlife may be displaced or destroyed.
- Historical or cultural resources may be damaged or destroyed.
- Tourism can be significantly disrupted, further delaying economic recovery for the area.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.
- Fire suppression costs can be substantial, exhausting the financial resources of the community.
- Residential structures lost in a wildfire may not be rebuilt for years, reducing the tax base for the community.
- Direct impacts to municipal water supply may occur through contamination of ash and debris during the fire, destruction of aboveground delivery lines, and soil erosion or debris deposits into waterways after the fire.

The economic and financial impacts of a wildfire event on local government will depend on the scale of the event, what is damaged, costs of repair or replacement, lost business days in impacted areas, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local

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businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a wildfire event.

CLIMATE CHANGE CONSIDERATIONS

Wildfires require the alignment of a number of factors, including temperature, humidity, and the lack of moisture in fuels, such as trees, shrubs, grasses, and forest debris. All these factors have strong direct or indirect ties to climate variability and climate change. Research shows that changes in climate create warmer, drier conditions, leading to longer and more active fire seasons. Increases in temperatures and the thirst of the atmosphere due to human--caused climate change have increased aridity of forest fuels during the fire season.¹²

Vapor pressure deficit, an indicator of the ability of moisture to evaporate, is projected to increase as temperatures rise and carbon dioxide fertilization reduces transpiration, leading to both lower humidity and increased surface dryness. Overall, increased dryness should extend the wildfire season in places where the fire season is presently constrained by low levels of aridity, such as eastern Texas.¹³

Additionally, it is projected that future changes to the Gregg County planning area will include increased temperatures, which according to the U.S. Climate Explorer, the planning area may experience a 6°F increase in the average extreme heat temperatures. Historically, extreme temperatures averaged 199°F in Gregg County, but between 2035 and 2064 the average will be 105°F, increasing the severity and frequency of extreme heat events, contributing to favorable wildfire conditions.

Extreme heat and extended periods of drought contribute to wildfire risk in the planning area. Extreme temperatures and periods of drought destroy vegetation in the area, contributing to available fuels that spread wildfires. Additional climate change impacts from drought and extreme heat are discussed in Sections 6 and 7 of this Plan. The projected increases in favorable wildfire conditions, including drought and extreme heat, indicate an increase in favorable wildfire conditions. Additional information and studies are needed to determine the degree and rate of any increased wildfire risk.

¹² NOAA Wildfire Climate Connection, August 2022: wildfire-climate-connection.

¹³ Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, Texas A&M University Office of the Texas State Climatologist, 2021 update.



SECTION 14
WINTER STORM

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HAZARD DESCRIPTION



A severe winter storm event is identified as a storm with snow, ice, or freezing rain. This type of storm can cause significant problems for area residents. Winter storms are associated with freezing or frozen precipitation such as freezing rain, sleet, snow, and the combined effects of winter precipitation and strong winds. Wind chill is a function of temperature and wind. Low wind chill is a product of high winds and freezing temperatures.

Winter storms that threaten the Gregg County planning area usually begin as powerful cold fronts that push south from central Canada. Although the county is at risk of ice hazards, extremely cold temperatures, and snow, the effects and frequencies of winter storm events are generally mild and short-lived.

As indicated in Figure 14-1, the Gregg County planning area, including all participating jurisdictions and the ETCOG, is located in USDA Hardiness Zone 8b, with annual extreme minimum temperatures between 15°F and 20°F. During times of ice and snow accumulation, response times will increase until public works road crews are able to make major roads passable. Table 14-1 describes the types of winter weather possible to occur in the Gregg County planning area.

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Figure 14-1. Annual Minimum Temperature¹

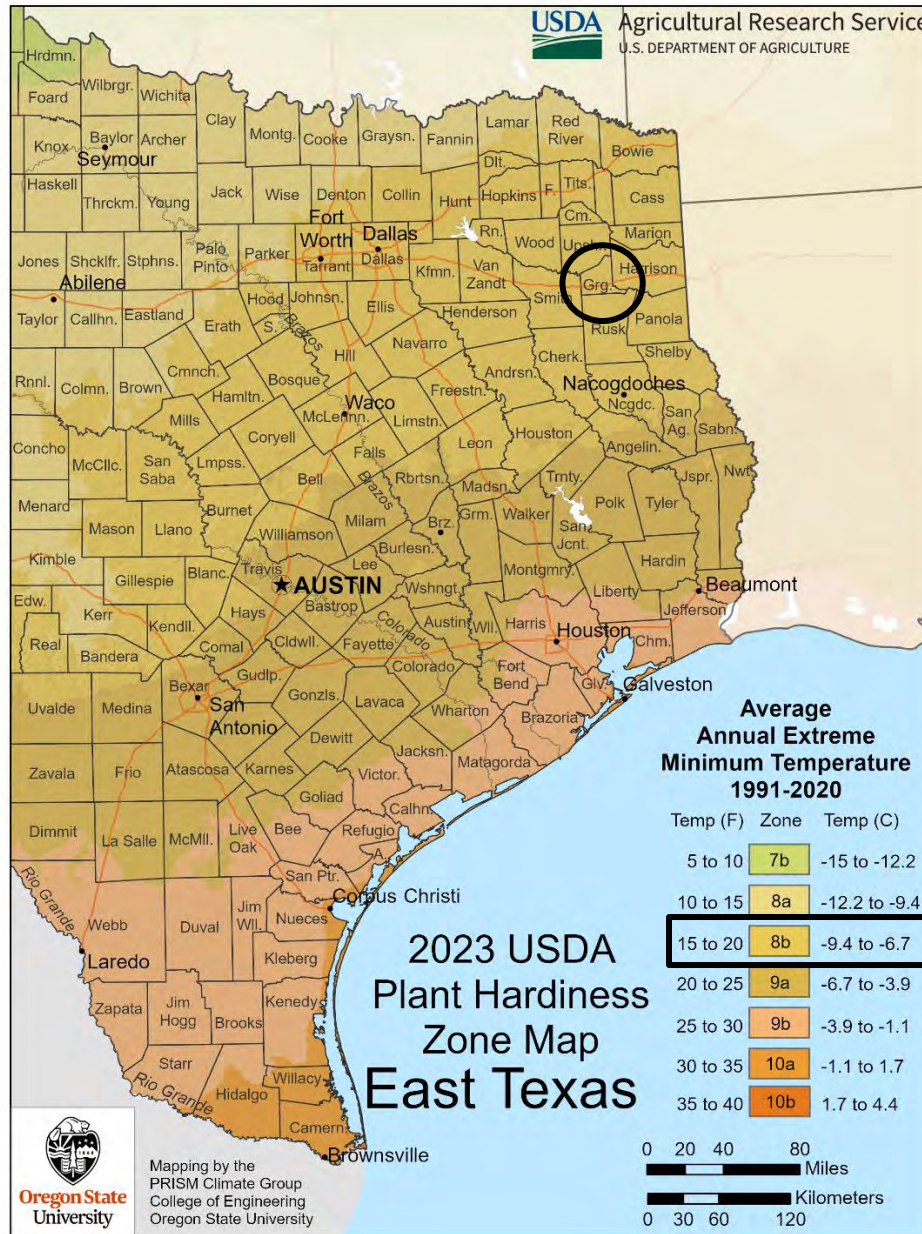


Table 14-1. Types of Winter Weather

TYPE OF WINTER WEATHER	DESCRIPTION
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.

¹ USDA

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TYPE OF WINTER WEATHER	DESCRIPTION
Blizzard	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	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

Winter storm events are not confined to specific geographic boundaries. Therefore, all existing and future buildings, facilities, and populations in the Gregg County planning, including all participating jurisdictions and the ETCOG, area are vulnerable to a winter storm hazard and could potentially be impacted.

EXTENT

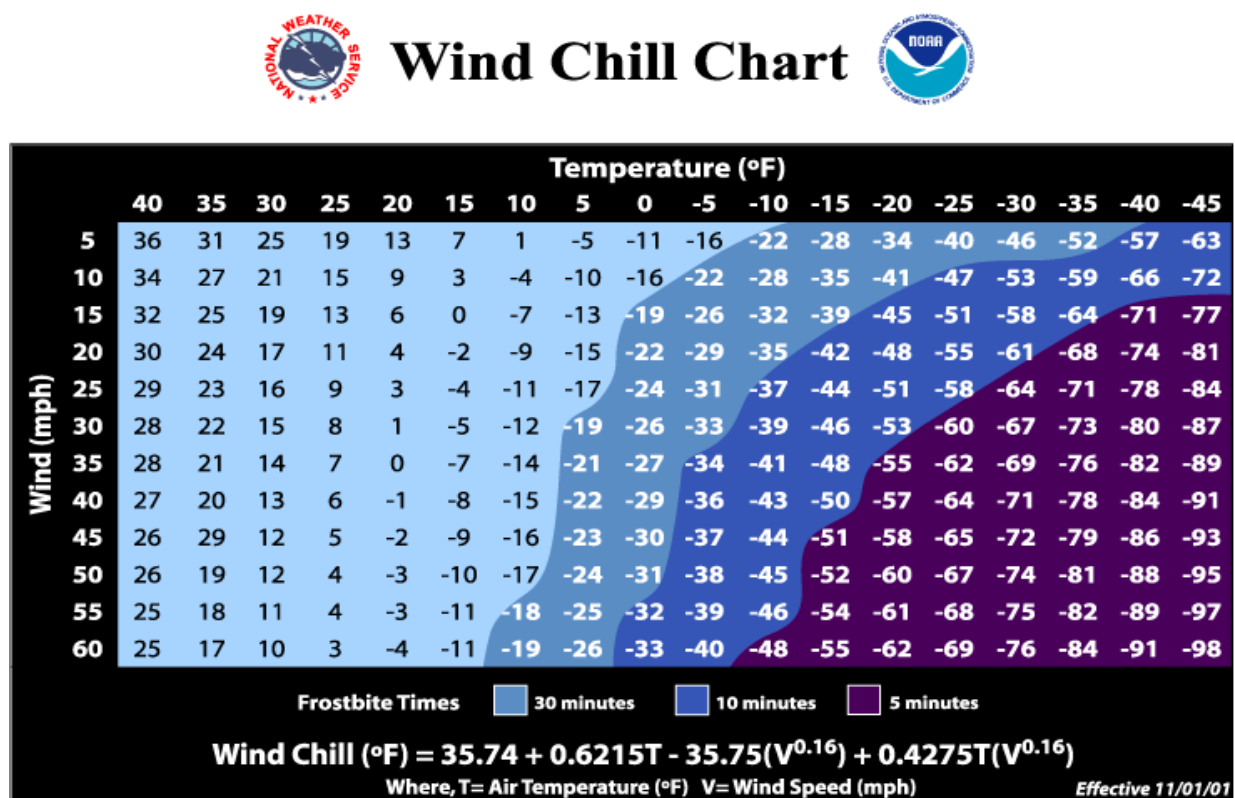
The extent or magnitude of a severe winter storm is measured in intensity based on the temperature and level of accumulations as shown in Table 14-2. Table 14-2 should be read in conjunction with the wind-chill factor described in Figure 14-2 to determine the intensity of a winter storm. The chart is not applicable when temperatures are over 50°F or winds are calm. This is an index developed by the National Weather Service.

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

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Figure 14-2. Wind Chill Chart



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 blustery 30°F day would feel just as cold as a calm day with 0°F temperatures. The Gregg County planning area has 29 previous occurrences recorded from 1996 through 2023 in the National Centers for Environmental Information (NCEI) Storm Events Database. The planning area has never experienced a blizzard, but it has been subject to ice storm, sleet, and winter storms.

The average number of cold days is similar for the entire planning area. Therefore, the intensity or extent of a winter storm event to be mitigated for the area ranges from mild to severe according to the definitions at Table 14-2. The Gregg County planning area, including all participating jurisdictions and the ETCOG, can expect anywhere between 0 to 4 inches of ice and snow during a winter storm event, and temperatures between 15°F and 20°F with winds of 35 mph or more.

The National Weather Service issues a winter storm watch, advisory or warning in advance of an event in order to give people enough time to prepare for an event. Gregg County could be under any of these warning types in advance of a winter storm event. Table 14-3 describes when each warning type would be issued.

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Table 14-3. Winter Storm Watch, Advisory, Warning Descriptions

TYPE OF WINTER WEATHER	DESCRIPTION
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.

HISTORICAL OCCURRENCES

According to historical records and the best available data there have been 29 recorded winter storm events in Gregg County planning area, including all participating jurisdictions and the ETCOG. Historical winter storm information, as provided by the NCEI, identifies winter storm activity across a multi-county forecast area for each event. The appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each county impacted by the event, when appropriate. Historical winter storm data for the planning area is provided on a County-wide basis per the NCEI database. Table 14-4 shows historical incident information for the planning area.

Table 14-4. Historical Winter Storm Events, 1996-2023²

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	2/4/1996	1	1	\$38,200	\$0
Gregg County	1/6/1997	0	0	\$0	\$0
Gregg County	1/12/1997	0	0	\$0	\$0
Gregg County	12/22/1998	0	0	\$0	\$0
Gregg County	1/26/2000	0	0	\$0	\$0
Gregg County	12/12/2000	0	0	\$0	\$0
Gregg County	2/19/2006	0	0	\$0	\$0
Gregg County	3/7/2008	0	0	\$0	\$0
Gregg County	2/11/2010	0	0	\$0	\$0
Gregg County	3/21/2010	0	0	\$0	\$0
Gregg County	2/3/2011	0	0	\$0	\$0
Gregg County	2/9/2011	0	0	\$0	\$0
Gregg County	12/25/2012	0	0	\$0	\$0
Gregg County	1/14/2013	0	0	\$0	\$0

² Values are in 2023 dollars.

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JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Gregg County	1/15/2013	0	0	\$0	\$0
Gregg County	11/24/2013	0	0	\$0	\$0
Gregg County	2/11/2014	0	0	\$0	\$0
Gregg County	3/2/2014	0	0	\$0	\$0
Gregg County	2/23/2015	0	0	\$0	\$0
Gregg County	2/25/2015	0	0	\$0	\$0
Gregg County	3/4/2015	0	0	\$0	\$0
Gregg County	1/15/2018	0	0	\$0	\$0
Gregg County	2/11/2018	0	0	\$0	\$0
Gregg County	2/8/2019	0	0	\$0	\$0
Gregg County	1/10/2021	0	0	\$0	\$0
Gregg County	2/14/2021	0	0	\$0	\$0
Gregg County	2/16/2021	0	0	\$465,100	\$0
Gregg County	1/15/2022	0	0	\$0	\$0
Gregg County	2/3/2022	0	0	\$0	\$0
TOTALS		1	1	\$503,300	

Table 14-5. Historical Winter Storm Events Summary, 1996-2023

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGES	CROP DAMAGES
Gregg County	29	1	1	\$503,300	\$0

Based on the list of historical winter storm events for the Gregg County planning area, six of the events have occurred since the 2018 Plan.

SIGNIFICANT EVENTS

February 4, 1996 - Gregg County

A winter storm system in Northeast Texas brought freezing rain, sleet, and snow with ice accumulations reported between one to two inches. The ice was particularly dangerous and caused numerous automobile accidents. A City of Longview resident lost control of their vehicle and collided head-on with another vehicle. This accident left one dead and one injured. Overall, this event caused \$38,200 (2023 dollars) in property damages.

February 10-16, 2021 – Winter Storm Uri – Gregg County (DR-4586)

Winter Storm Uri was one of the most impactful winter events in the state’s history. The winter storm event lasted a week and brought snow, sleet, and freezing rain to the region. The presence of the storm began on February 10, 2021, when a cold front brought a surge of cold air to the area. On February 13th, the winter storm hit the region, including Gregg County, and many areas were placed under a Winter Storm Warning.

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Fatalities across the state were attributed to hypothermia, vehicle accidents, carbon monoxide poisoning, and chronic medical conditions complicated by a lack of electricity over several days. Statewide, more than 69 percent of households lost power at some point during the event, with average disruptions lasting 42 hours, 21 of which were consecutive. Water service was also disrupted, with 49 percent of households losing running water with an average disruption of 52 hours.³

On the heels of the first winter storm and historically cold temperatures, a second significant winter storm developed from February 16-18, 2021, with areas of snow, sleet, and freezing rain (some heavy) falling across much of East Texas. The snow and sleet totals that were recorded at various locations across Gregg County include 7 inches in the City of White Oak and 3 inches in the City of Longview. These totals crippled the planning area, making driving nearly impossible, with rolling blackouts further aggravated by the additional power outages the snow and ice were responsible for. This event resulted in \$465,100 in property damages, according to the NCEI Storm Events Database, though significant damages went unreported according to the planning team.

PROBABILITY OF FUTURE EVENTS

According to historical records, the Gregg County planning area is expected to experience approximately one winter storm event each year. The probability of a future winter storm event affecting the Gregg County planning area, including all participating jurisdictions and the ETCOG, is considered “Highly Likely”, with a winter storm likely to occur within the next year. The end of this section addresses climate change and its impacts on future winter storms in the planning area.

VULNERABILITY AND IMPACT

During periods of extreme cold and freezing temperatures, water pipes can freeze and crack, and ice can build up on power lines, causing them to break under the weight or causing tree limbs to fall on the lines. These events can disrupt electric service for long periods.

An economic impact may occur due to increased consumption of heating fuel, which can lead to energy shortages and higher prices. House fires and resulting deaths tend to occur more frequently from increased and improper use of alternate heating sources. Fires during winter storms also present a greater danger because water supplies may freeze and impede firefighting efforts.

The Gregg County Planning Team identified the following critical facilities (Table 14-6) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by winter storm events. For a comprehensive list by participating jurisdiction, please see Appendix C.

³ Donald, Jess. “Winter Storm Uri. The Economic Impact of the Storm”. October 2021. Fiscal Notes. Texas Comptroller of Public Accounts. <https://comptroller.texas.gov/economy/fiscal-notes/2021/oct/winter-storm-impact.php>

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Table 14-6. Critical Facilities Vulnerable to Winter Storm Events

CRITICAL FACILITIES	POTENTIAL IMPACTS
<p>Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers</p>	<ul style="list-style-type: none"> ● Emergency operations, services and response times may be significantly impacted due to power outages, and/or loss of communications. ● Exposure to extreme cold can cause illnesses in first responders if exposed for a period of time. ● Roads may become impassable due to snow and/or ice impacting response times by emergency services. ● Extended power outages due to increased usage may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.
<p>Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities</p>	<ul style="list-style-type: none"> ● Power outages due to increased usage could disrupt critical care. ● Backup power sources could be damaged. ● Increased number of patients due to exposure to cold temperatures could lead to a strain on staff. ● Water pipes can freeze and burst leading to flooding within facilities. ● Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable. ● Essential supplies like medicines, water, food, and equipment deliveries may be delayed. ● Economic disruption due to power outages negatively impact airport services as well as area businesses reliant on airport operations. ● Exposure risks to outdoor workers.
<p>Commercial Supplier (food, fuel, etc.)</p>	<ul style="list-style-type: none"> ● Facilities, infrastructure, or critical equipment including communications may be damaged, destroyed or otherwise inoperable. ● Essential supplies like medicines, water, food, and equipment deliveries may be delayed.
<p>Utility Services and Infrastructure (electric, water, wastewater, communications)</p>	<ul style="list-style-type: none"> ● Emergency operations, services and response times may be significantly impacted due to power outages, and/or loss of communications. ● Roads may become impassable due to snow and/or ice impacting response times by emergency services. ● Power outages due to increased usage could disrupt critical care. ● Backup power sources could be damaged. ● Water pipes can freeze and burst leading to flooding within facilities.

People and animals are subject to health risks from extended exposure to cold air (Table 14-7). Elderly people are at greater risk of death from hypothermia during these events, especially in the neighborhoods with older housing stock. According to the U.S. Center for Disease Control, every year hypothermia kills about 600 Americans, half of whom are 65 years of age or older.

SECTION 14: WINTER STORM

Due to factors like limited mobility, communication difficulties, medical needs, sensitivity to cold temperatures, reliance on support services, transportation challenges, housing accessibility issues, and possible shortages in emergency shelter accommodations, people with disabilities are particularly vulnerable to winter storms. Inclusive measures are crucial to address these vulnerabilities and ensure their safety during severe weather events.

Populations living below the poverty level may not be able to afford to run heat on a regular basis or extend period of time. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as weather-related warnings and instructions regarding safety measures.

The population over 65 in the Gregg County planning area is estimated at 16 percent of the total population and children under the age of 5 are estimated at 7 percent. The population with a disability is estimated at 13 percent. An estimated 16 percent of the planning area population live below the poverty level and 16 percent of the populations speaks a language other than English.⁴ The ETCOG also has about 41 employees that work as Go Bus Drivers and may be subject to severe weather conditions.

Older homes tend to be more vulnerable to the impacts of winter storm events. Approximately, 52 percent (an estimated 27,666 structures) of the housing units in the planning area were built before 1980 (Table 14-9).

Table 14-7. Populations at Greater Risk of Winter Storm Events

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
Gregg County	19,479	8,232	15,937	20,500	19,780
City of Clarksville City	164	66	514	126	35
City of Gladewater	858	669	998	1,954	267
City of Kilgore	2,117	894	1,788	2,211	2,669
City of Lakeport	113	112	116	232	187
City of Longview	12,786	5,296	9,987	14,016	14,867
City of Warren City	76	27	71	51	22
City of White Oak	689	410	857	623	304

⁴ US Census Bureau, American Community Survey Five-Year Estimates

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Table 14-8. Outdoor Operating Employees by Participating Special District

SPECIAL DISTRICT	EMPLOYEES OPERATING OUTDOORS
ETCOG	41

Table 14-9. Structures at Greater Risk of Winter Storm Events

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980
Gregg County	27,666
City of Clarksville City	184
City of Gladewater	1,648
City of Kilgore	3,609
City of Lakeport	151
City of Longview	20,107
City of Warren City	97
City of White Oak	1,193
ETCOG	2

Winter Storms have been known to cause injury to humans and occasionally have been fatal. Overall, the total loss estimate of property and crops in the planning area is approximately \$503,300 with an estimated average annualized loss of \$18,000. Generally the impacts of winter storm events would be considered limited, meaning minor quality of life lost, critical facilities and services shut down for 24 hours or less, and less than 10 percent of property destroyed or with major damage. However, with one injury and one fatality, the impact is considered “Substantial” with multiple injuries possible depending on the severity of the event.

Table 14-10. Winter Storm Event Damage Totals, 1996-2023

JURISDICTION	PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Gregg County	\$503,300	\$18,000

ASSESSMENT OF IMPACTS

The greatest risk from a winter storm hazard is to public health and safety. The impact of climate change could produce longer, more intense winter storm events, exacerbating the current winter storm impacts. Worsening winter storm conditions can be frequently associated with a variety of impacts, including:

- Vulnerable populations, particularly the elderly (16 percent of total population), children under 5 (7 percent of total population), and those with a disability (13 percent of total

SECTION 14: WINTER STORM

population), can face serious or life-threatening health problems from exposure to extreme cold including hypothermia and frostbite.

- Loss of electric power or other heat source can result in increased potential for fire injuries or hazardous gas inhalation because residents burn candles for light or use fires or generators to stay warm.
- Response personnel, including utility workers, public works personnel, debris removal staff, tow truck operators, and other first responders, are subject to injury or illness resulting from exposure to extreme cold temperatures.
- Response personnel would be required to travel in potentially hazardous conditions, elevating the life safety risk due to accidents and potential contact with downed power lines.
- Operations or service delivery may experience impacts from electricity blackouts due to winter storms.
- Power outages are possible throughout the planning area due to downed trees and power lines and/or rolling blackouts.
- Critical facilities without emergency backup power may not be operational during power outages.
- Emergency response and service operations may be impacted by limitations on access and mobility if roadways are closed, unsafe, or obstructed.
- Hazardous road conditions will likely lead to increases in automobile accidents, further straining emergency response capabilities.
- Depending on the severity and scale of damage caused by ice and snow events, damage to power transmission and distribution infrastructure can require days or weeks to repair.
- Winter storms can reduce the efficacy of shaded fuel breaks for wildfire mitigation as treated areas were more likely to have downed trees and limbs than untreated areas.
- Winter storms can result in damage to endangered species habitat and increased fuel loads within forested habitats.
- Older structures built to less stringent building codes may suffer greater damage as they are typically more vulnerable to impacts of winter storm events. Approximately 52 percent of homes in the County were built before 1980. Similarly, historic buildings and sites are placed at a higher risk of impact due to materials used and the inability to change properties due to their historic status. There are eight historical sites listed on the National Register of Historic Places for Gregg County.
- Schools may be forced to shut early due to treacherous driving conditions.
- Exposed water pipes may be damaged by severe or late season winter storms at both residential and commercial structures, causing significant damages.

The economic and financial impacts of winter weather on the community will depend on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of a winter storm event.

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CLIMATE CHANGE CONSIDERATIONS

Climate change is expected to reduce the number of extreme cold events statewide but increase in the variability of events.⁵ Extreme cold events will continue to be possible but overall winters are becoming milder, and the frequency of extreme winter weather events are decreasing due to the warming of the Arctic and less extreme cold air coming from that region.⁶ A trend that is expected to continue with winter extremes estimated to be milder by 2036 compared to extremes in the historic record.⁷

⁵ Fourth National Climate Assessment. Chapter 23 Southern Great Plains. U.S. Global Change Program. 2018.

⁶ Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, Texas A&M University Office of the Texas State Climatologist, 2021 update.

⁷ Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036, Texas A&M University Office of the Texas State Climatologist, 2021 update.



SECTION 15
**HAZARDOUS
MATERIALS**

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HAZARD DESCRIPTION



Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. A hazardous material (HAZMAT) incident involves a substance outside normal safe containment in sufficient concentration to pose a threat to life, property, or the environment.

Chemicals are found everywhere. They purify drinking water, increase crop production, and simplify household chores. But chemicals also can be hazardous to humans or the environment if used or released improperly. Hazards can occur during production, storage, transportation, use, or disposal. You and your community are at risk if a chemical is used unsafely or released in harmful amounts into the environment where you live, work, or play.

In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. This profile focuses on fixed sites. Weather conditions will directly affect how the hazard develops.

The Toxics Release Inventory (TRI) is a publicly available database from the federal Environmental Protection Agency (EPA) which contains information on toxic chemical releases and other waste management activities that are reported annually by certain covered industry groups federal facilities. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and expanded by the Pollution Prevention Act of 1990. Each year, facilities that meet certain activity thresholds must report their releases and other waste management activities for listed toxic chemicals to the EPA and their state or tribal entity. A facility must report if it meets the following three criteria:

- The facility falls within one of the following industrial categories: manufacturing; metal mining; coal mining; electric generating facilities that combust coal and/or oil; chemical wholesale distributors; petroleum terminals and bulk storage facilities; Resource Conservation and Recovery Act (RCRA) Subtitle C Treatment, Storage and Disposal (TSD) facilities; and solvent recovery services.
- Have ten or more full-time employee equivalents.

SECTION 15: HAZARDOUS MATERIALS

- Manufactures or processes more than 25,000 pounds or otherwise uses more than 10,000 pounds of any listed chemical during the calendar year. Persistent, Bio-accumulative and Toxic (PBT) chemicals are subject to different thresholds of ten pounds, 100 pounds or 0.1 grams depending on the chemical.

Submission of a Tier II form is required under Section 312 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). Under EPCRA, all facilities which store significant quantities of hazardous chemicals must share this information with state and local emergency responders and planners. Facilities in Texas share this information by filing annual hazardous chemical inventories with the Texas Department of State Health Services (DSHS), Local Emergency Planning Committees (LEPCs), and local fire departments. The Texas Tier II Report contains facility identification information and detailed chemical data about hazardous chemicals stored at the facility.

A facility must report if it meets the following criteria:

- Any company using chemicals that could present a physical or health hazard must report them if the quantities of those chemicals exceed Tier II threshold limits.
- If an industry has an Occupational Safety and Health Administration (OSHA) deemed hazardous chemical that exceeds the appropriate threshold at a certain point in time, then the chemical must be reported. These chemicals may be on the list of 355 Extremely Hazardous Substances (EHS) or could be one of the 650,000 reportable hazardous substances (not on the EHS list). This reporting format is for a "snapshot in time." EHS chemicals must be reported if the quantity is greater than 500 pounds or the Threshold Planning Quantity (TPQ) amount, if the TPQ is less than 500 pounds. Chemicals not considered to be EHS must be reported if their quantity is 10,000 pounds or greater.

LOCATION

A hazardous material spill occurring along railroad tracks and major highways near populated areas in the Gregg County planning area is of concern to the planning team. Trains and trucks can carry a variety of materials that would, in large quantity, threaten the health and safety of people and the natural environment in the vicinity of a spill.

All major highways, railroads, and the surrounding areas are at risk of a HAZMAT incident. In the Gregg County planning area, Interstate 20 and the U.S. Highway 80 are of particular concern, as it runs through the middle and southern portions of the county and experiences very high traffic.

The City of Longview may be particularly vulnerable to hazardous materials incidents, as it is one of the most densely populated areas of the county and sits at the convergence of U.S. Highway 80, U.S Highway 259, and a major railroad.

The National Hazardous Materials Route Registry (NHMRR) lists, as reported by States and Tribal governments, all designated and restricted roads and preferred highway routes for transportation of highway route-controlled quantities of Class 7 radioactive materials and non-radioactive hazardous materials. According to NHMRR data, no routes for the transportation of these hazardous materials are located in or near the Gregg County planning area.¹

¹ Source: <https://www.fmcsa.dot.gov/regulations/hazardous-materials/national-hazardous-materials-route-registry-state>

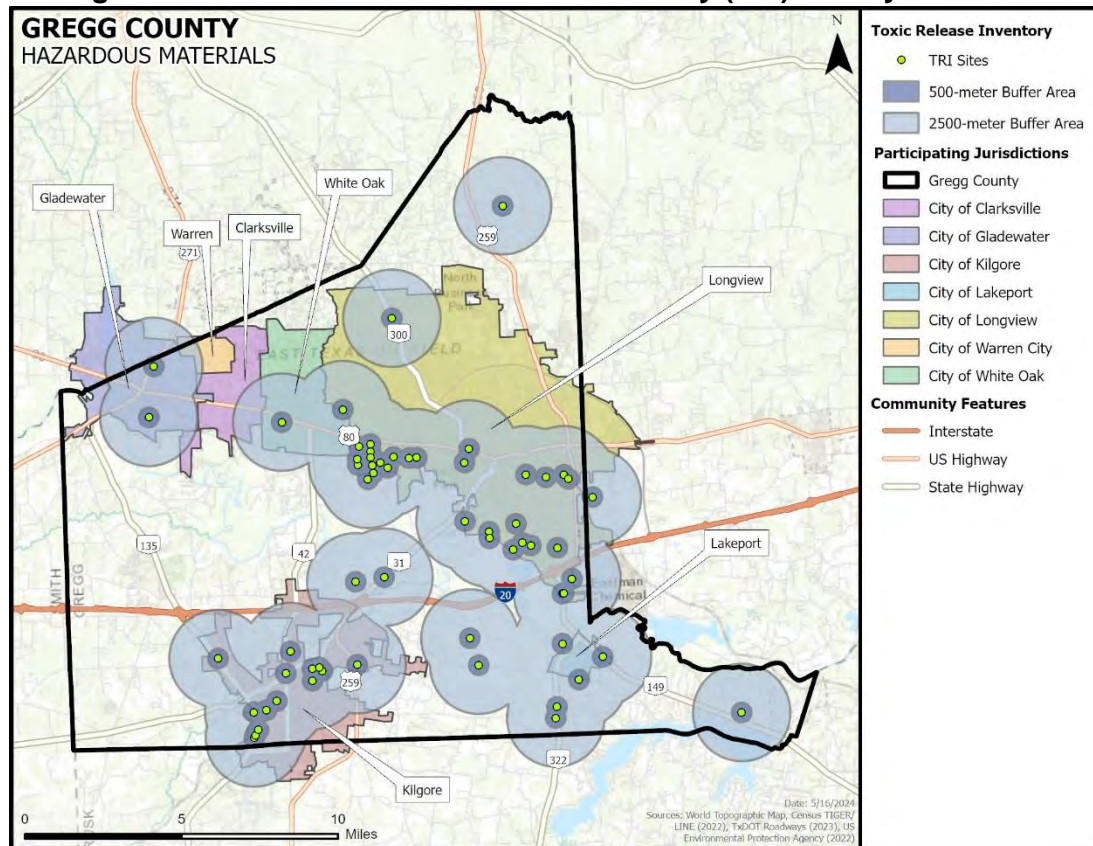
SECTION 15: HAZARDOUS MATERIALS

Under the Community Right-to-Know program laws upheld at the state and federal level, all facilities which store significant quantities of hazardous chemicals must share this information with state and local emergency responders and planners. Facilities in Texas share this information by filing annual hazardous chemical inventories with the state, with Local Emergency Planning Committees (LEPCs), and with local fire departments.

Figure 15-1 shows the locations of available georeferenced TRI toxic sites in and around the Gregg County planning area. Only toxic sites that have georeferenced data available were analyzed; 500-meter and 2500-meter circle buffers are also drawn around each hazardous material site.

Table 15-1 lists the names, locations, and hazardous chemicals associated of available TRI toxic sites in and around the Gregg County planning area. There are 20 sites total and only ten sites had reporting available for chemicals released into the planning area in 2022. Skeeter Products Incorporated in the City of Kilgore accounted for the most amount of chemicals (171,354 lbs.) released into the planning area in 2022, according to TRI data. Styrene was the most released chemical reported.

Figure 15-1. EPA 2022 Toxic Release Inventory (TRI) Facility Locations



SECTION 15: HAZARDOUS MATERIALS

Table 15-1. EPA 2022 Toxic Release Inventory (TRI) for Gregg County²

TRI FACILITY NAME	LOCATION	ASSOCIATED CHEMICALS
Skeeter Products Inc.	City of Kilgore	Styrene, Methyl, Diisocyanatos
Alpha Omega Recycling Inc.	City of Longview	Nitrate, Copper, Zinc, Nickel
Lone Star Casting & Machine Partners	City of Kilgore	Copper, Nickel
Southwest Steel Casting Co. LLC	City of Longview	Manganese, Chromium
Trinity Tank Car Inc.	City of Longview	Manganese, Nickel, Chromium
Nucor Steel Longview LLC	City of Longview	Manganese, Zinc, Chromium
Multi-Chem Group Longview TX Facility	City of Longview	Menthol, Certain glycol ethers
Norris Cylinder Co.	City of Longview	n-Butyl alcohol
Gillespie Coatings Inc.	City of Longview	Xylene, Ethylbenzene, Toluene
Joy Global Longview Operations LLC	City of Longview	Manganese, Zinc, Nickel, Chromium

EXTENT

The extent of a hazardous material release will depend on whether it is from a mobile or fixed site and the size of impact. The range of intensity will vary greatly depending on the circumstances. These factors and conditions include the material, toxicity, duration of the release, and environmental conditions such as the wind and precipitation.

Hazardous materials or toxic releases can have substantial impact on communities. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions would directly affect how the hazard develops. The micro-meteorological effects on buildings and terrain can alter travel patterns and duration of agents. Shielding in the form of permanent shelter can protect people from harmful effects. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features can substantially increase damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

HISTORICAL OCCURRENCES

Hazardous materials are substances that if released or misused can cause death, serious injury, long-lasting health effects, and damage to infrastructure and the environment. Many products

² Only TRI sites with reported chemical releases for 2022 are listed. Source: <https://www.epa.gov/toxics-release-inventory-tri-program>

SECTION 15: HAZARDOUS MATERIALS

containing hazardous chemicals are used and stored in homes routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines.

A total of 141 spill incidents have been reported in Gregg County between 2003 and 2023 according to the Texas Commission on Environmental Quality (TCEQ) Emergency Response Spills database.³ This includes chemical spills reported to and investigated by TCEQ. Damages, injuries, and fatalities are not reported in this database, and a spill's inclusion in this dataset does not necessarily indicate significant damage to public health, property, or the natural environment occurred. However, the frequency of these events does indicate a significant level of risk for the planning area.

SIGNIFICANT EVENTS

August 9, 2023 - Gregg County

A hazmat team successfully contained a chemical spill into Little Caney Creek in Gregg County caused by a crash involving an 18-wheeler on Interstate 20. The incident occurred when the truck, experiencing a tire blowout, struck a guardrail and caught fire. Authorities expressed concerns about potential chemical contamination in the creek, but hazmat crews confirmed containment the next day. Cleanup efforts included the removal of fuel and hydraulic fluid residues, as reported by local news.

PROBABILITY OF FUTURE EVENTS

Hazardous material spills are usually the result of human error and/or accidents, which cannot be predicted. However, given the amount of traffic through the planning area and its large network of transportation, it is probable that an incident will occur in any given year. Most spills will not lead to negative health or safety impacts and will not cause substantial negative impacts on the air, soil, or groundwater. The probability of a spill threatening the health of thousands and of having long-term negative environmental consequences is, based on previous experience, low.

Based on the historic incident records and team input, the frequency of occurrence for typical hazardous material incidents would be considered highly likely. However, many of the previous spill incidents were minor and related to vehicle accidents resulting in fuel and oil spills. Based on the best available data the frequency of occurrence for more significant hazardous material incidents is considered "Occasional", meaning an event is probable in the next five years for the Gregg County planning area.

VULNERABILITY AND IMPACT

Based on the prevalence and geographic proximity of hazardous materials transportation routes, most of the Gregg County planning area, including all participating jurisdictions and the ETCOG, is minimally vulnerable to the impacts of a HAZMAT incident. The City of Longview is the most vulnerable region of the planning area, due to its dense population, proximity to major roadways and rail lines, and with many of the TRI facilities being located within its boundary. In addition, the City of Kilgore is also close to major a roadway and has two TRI facilities within its boundary.

³ Source: https://data.texas.gov/dataset/Texas-Commission-on-Environmental-Quality-Emergenc/xagr-a3x2/about_data

SECTION 15: HAZARDOUS MATERIALS

Public health and environmental impacts are the most common effects of a hazardous materials incident. The release of toxic chemicals can pose immediate health effects including respiratory problems, chemical burns, poisoning, and long-term illnesses such as cancer. Vulnerable populations including children and the elderly may be more susceptible to health impacts. The population over 65 in the Gregg County planning area is estimated at 16 percent of the total population.

In extreme cases, an evacuation may be ordered to remove people from the hazardous area. Evacuating areas affected by HAZMAT incidents can be difficult, especially for those who live below the poverty level and lack transportation and financial resources. An estimated 16 percent of the planning area population live below the poverty level. In addition, people who speak a language other than English may face increased vulnerability due to language barriers that limit their access to important information such as emergency warnings and instructions regarding safety measures. An estimated 16 percent of the planning area speaks a language other than English. People with disabilities may require additional assistance during an evacuation or emergency and an estimated 13 percent of the planning area has a disability.

Table 15-2. Populations at Greater Risk of HAZMAT Incidents⁴

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
Gregg County	19,479	8,232	15,937	20,500	19,780
City of Clarksville City	164	66	514	126	35
City of Gladewater	858	669	998	1,954	267
City of Kilgore	2,117	894	1,788	2,211	2,669
City of Lakeport	113	112	116	232	187
City of Longview	12,786	5,296	9,987	14,016	14,867
City of Warren City	76	27	71	51	22
City of White Oak	689	410	857	623	304

Hazardous materials can have significant and long-term environmental impacts due to the release of toxic chemicals into the environment. Spills or leaks of chemicals may contaminate the soil, making it unsuitable for agriculture, which is a significant industry in the Gregg County planning area. Hazardous material incidents can also cause water pollution. The toxic substances can be carried by rainwater or runoff into nearby water bodies, which can harm aquatic life, disrupt ecosystems, and pose a public health risk if contamination occurs to drinking water sources. Gaseous releases can lead to air pollution, which can become widespread. HAZMAT incidents

⁴ U.S. Census Bureau, American Community Survey, 2022

SECTION 15: HAZARDOUS MATERIALS

can also disrupt the local ecosystem, harming animals, and insects, leading to the displacement of native species.

While the best available data does not provide historical dollar loss amounts, hazardous material incidents can also be costly and impact the local economy. Emergency containment, clean up, and disposal may strain local resources and budgets. HAZMAT incidents can also lead to property damage, most commonly to industrial facilities and transportation networks. Based on best available data, the impact of hazardous materials incidents in Gregg County planning area is considered “Limited” meaning injuries and/or illnesses are treatable with first aid, shutdown of facilities and services for 24 hours or less, and less than 10% of property is destroyed or with major damage.

Critical facilities in the planning area are vulnerable to a range of direct and indirect impacts caused by HAZMAT incidents. Many of the impacts to critical facilities identified by the Gregg County Planning Team are similar to the impacts listed in Sections 5 through 16. For a comprehensive list by participating jurisdiction, please see Appendix C.

ASSESSMENT OF IMPACTS

HAZMAT incidents have the potential to pose a significant risk to people and can create dangerous and difficult situations for public health and safety officials. HAZMAT incidents can be frequently associated with a variety of impacts, including:

- Vulnerable populations, particularly the elderly (16 percent of total population) and children under 5 (7 percent of total population), can face serious or life-threatening health problems from exposure to toxic chemicals.
- Transportation disruptions and road closures can result in emergency response vehicles being unable to access areas of the community.
- First responders are exposed to toxic chemicals, hazardous materials, and generally unsafe conditions, which could result in sickness and long-term health impacts.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.
- Evacuations, shelter in place orders, or the closure of transportation routes can lead to the disruption of critical facilities, businesses, and schools.
- The environment may experience significant damage leading to air and water contamination, loss of wildfire, agriculture, and tourism.

The economic and financial impacts of hazardous material incidents on the area will depend entirely on the scale of the event, where the event occurs, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of any HAZMAT incident.

CLIMATE CHANGE CONSIDERATIONS

As a non-natural hazard, climate change has no direct impact on the future occurrences of hazardous material incidents. However, climate change is associated with an increase in severe weather. Severe weather events may cause damage to the storage of hazardous materials and can lead to an increase in chemical spills, leaks, or fires. Research and data regarding the impact of climate change on non-natural events is minimal and limited.

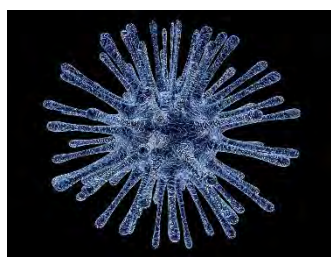


SECTION 16
**INFECTIOUS
DISEASE**

SECTION 16: INFECTIOUS DISEASE

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HAZARD DESCRIPTION



An infectious disease is a clinically evident disease resulting from germs, such as bacteria, viruses, and fungi, that enter the body, multiply, and cause infection. Some infectious diseases are contagious, or communicable, meaning they can spread from one person to another. Other infectious diseases can be spread by germs carried in air, water, food, or soil. They can also be spread by vectors, like biting insects, or by animals to humans.¹

There are three classifications commonly used to identify disease impacts: endemic, epidemic, and pandemic. An endemic is the baseline level of disease, or the normal amount of a particular disease expected in the community. An epidemic is the sudden rise or increase in the number of reported diseases, usually above what is normally expected within a specific population or area. A pandemic is an epidemic that has spread over several countries or continents, affecting a large number of people.²

According to FEMA, infectious diseases are a major threat around the world, killing millions globally each year. Concerns of pandemics have risen because the globalized economy and growing population foster large scale international travel and trade. Growing populations increase the vulnerability of all areas to disease because a denser population increases the risk of exposure to an infectious disease and advances the spread of infection.

The United States Centers for Disease Control and Prevention (CDC) monitors and reports infectious disease outbreaks across the region. These outbreaks are published on the CDC website (<https://www.cdc.gov/outbreaks/index.html>). The CDC also manages the Nationally Notifiable Disease List. A notifiable disease is one that, when diagnosed, requires health providers by law to report to state or local public health officials. Notifiable diseases must be reported due to their contagiousness, severity, or frequency. The list is compiled through collaborative efforts among state health departments and the CDC, therefore, diseases that are considered notifiable vary from state to state. Internationally notifiable diseases (i.e., cholera, plague, and yellow fever) are also reportable in compliance with the World Health Organization's International Health

¹ Source: Centers for Disease Control and Prevention (CDC), <https://www.cdc.gov/ncezid/who-we-are/index.html#:~:text=Infectious%20diseases%20are%20illnesses%20caused,from%20one%20person%20to%20another>.

² Source: Centers for Disease Control and Prevention (CDC), <https://www.cdc.gov/scienceambassador/nerdacademy/glossary.html>

SECTION 16: INFECTIOUS DISEASE

Regulations. The Texas Department of State and Health Services (DSHS) manages the state's list of notifiable conditions, which includes but is not limited to, the following:

- Coronavirus
- Diphtheria
- Hepatitis A and B
- Human Immunodeficiency Virus (HIV)
- Influenza
- Measles
- Plague
- Human Rabies
- Smallpox
- Cholera
- Viral Hemorrhagic Fever (Including Ebola)
- Yellow Fever

LOCATION

Pandemics cannot be predicted and only a few happen every century. The impacts from an infectious disease event can affect all areas of the world, therefore all areas are vulnerable, as evidenced by the COVID-19 pandemic. Since air travel and worldwide shipping have increased, it has become increasingly difficult to contain localized outbreaks as infected or exposed people travel across the globe in a matter of hours. Third world countries have fewer resources to fight disease and may be more vulnerable than more industrialized nations. In the United States, the U.S. public health system works at the federal, state, and local level to monitor diseases, plan, and prepare for outbreaks, and prevent epidemics where possible.

There is no distinct geographic boundary to infectious disease, therefore, it can occur throughout the entire Gregg County planning area, including all participating jurisdictions and the ETCOG.

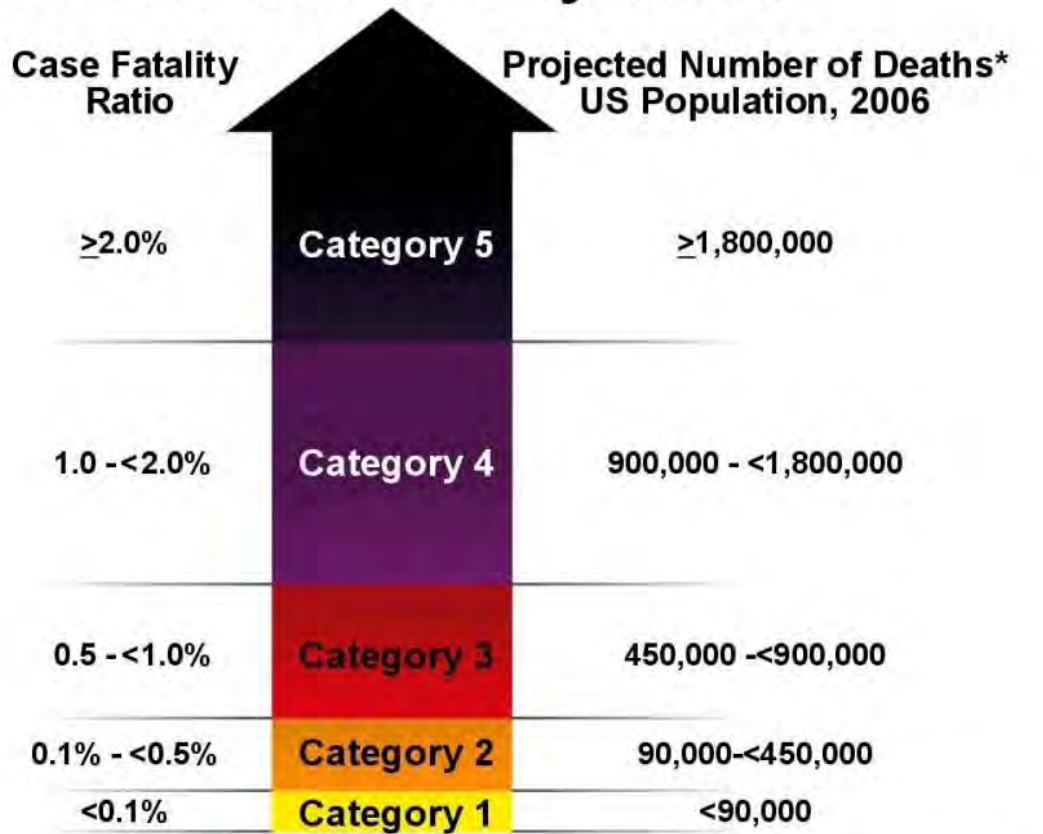
EXTENT

In terms of extent, an outbreak can range from a local endemic to a worldwide pandemic. The severity of a pandemic virus can be evaluated by using the Case Fatality Ratio (CFR) method. The CFR is the proportion of the number of deaths divided by the number of confirmed patients of a disease, which is then used to assess and compare the severity of the endemic, epidemic, or pandemic. It also can be used to evaluate the effect of new treatments, with measures decreasing as treatments improve. As depicted in Figure 16-1 through 16-3, the higher the CFR, the more severe the infectious disease outbreak, and the greater the extent. The Gregg County planning area, including all participating jurisdictions and the ETCOG, are subject to the full range of extent in an infectious disease event.

SECTION 16: INFECTIOUS DISEASE

Figure 16-1. Case-Fatality Rate for Severity³

Pandemic Severity Index



* Assumes 30% Illness Rate

³ Source: Centers for Disease Control and Prevention (CDC): <https://www.cdc.gov/media/pdf/mitigation/slides.pdf>

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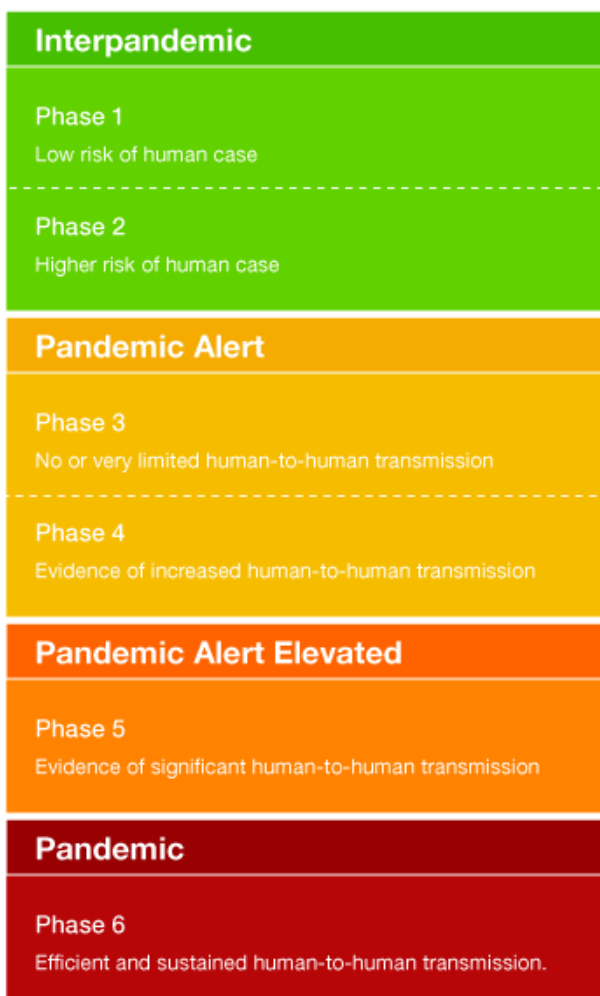
Figure 16-3. Pandemic Severity Index Interventions

Interventions by Setting	Pandemic Severity Index		
	1	2 and 3	4 and 5
Workplace/Community Adult social distancing –decrease number of social contacts (e.g., encourage teleconferences, alternatives to face-to-face meetings) –increase distance between persons (e.g., reduce density in public transit, workplace) –modify, postpone, or cancel selected public gatherings to promote social distance (e.g., stadium events, theater performances) –modify workplace schedules and practices (e.g., telework, staggered shifts)	Generally not recommended	Consider	Recommend
	Generally not recommended	Consider	Recommend
	Generally not recommended	Consider	Recommend
	Generally not recommended	Consider	Recommend

In addition, the World Health Organization (WHO) established various warning levels for pandemic events, as depicted in Figure 16-4. During the COVID-19 pandemic, the planning area was in Phase 6.

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Figure 16-4. Risk levels for Pandemic (World Health Organization)



HISTORICAL OCCURRENCES

Occurrences of infectious disease events are fairly common and have the ability to affect entire regions at one time. Texas has experienced numerous outbreaks beginning in the early 1800s to now. The Gregg County planning area has also been impacted by other nation-wide and global outbreaks including the epidemics and pandemics provided in the table below.

Table 16-1. Historical Infectious Disease Outbreaks in Texas

YEAR	INFECTIOUS DISEASE OUTBREAK
1918	An influenza (flu) pandemic occurred and caused 20 million deaths worldwide.
1933	Cholera appeared in Texas causing many deaths. It appeared again in 1849. ⁴

⁴ Source: Texas State Historical Association, <https://www.tshaonline.org/handbook/entries/epidemic-diseases>

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YEAR	INFECTIOUS DISEASE OUTBREAK
2009	A novel strain of H1N1, or “Swine Flu” was detected in Mexico and the United States which caused approximately 60.8 million cases, 274,304 hospitalizations and more than 12,000 deaths. ⁵
2012	While the Zika virus was around much sooner, Texas suffered a severe outbreak in 2012, with 1,868 reported cases.
2020	Texas identified its first case of COVID-19 in 2020, which quickly became a pandemic, impacting millions of people worldwide. As of 2024, more than 9,000,000 cases of COVID-19 have been reported in Texas, alone. ⁶ As of March in 2023, the Gregg County planning area reported more than 22,000 cases of the virus.

Some infectious diseases, such as the influenza, occur annually, like during “flu season.” Other viruses such as the human immunodeficiency virus (HIV), which has impacted millions of people worldwide, are an ongoing issue. Other infectious diseases are very dangerous, and outbreaks may be localized. For example, in 2014, the first case of Ebola was diagnosed in the United States in a person who had traveled to Dallas, Texas from Liberia. Later, a nurse previously involved in direct care of the first patient was confirmed to have Ebola, and another case was reported in Ohio at the same time. The “Dallas Ebola cluster” highlighted the importance of locally planning for infectious disease outbreaks.⁷

PROBABILITY OF FUTURE EVENTS

Epidemics and pandemics have occurred in human and animal populations for thousands of years. As humans began to gather and congregate in urban areas, the potential for pandemics and epidemics increased. As trade routes became established and contact with other cities became more frequent, the potential for transmission of illnesses increased. In modern society, the ease of global travel has created a situation where viruses and bacteria can spread quickly from one continent to another.

Historical evidence shows that the population of Gregg County, including all participating jurisdictions and the ETCOG, is vulnerable to disease outbreak, and the probability of future infectious disease or pandemic events is possible, however, it is considered “Unlikely” due to the frequency of such outbreaks. Federal, state, and local public health officials maintain surveillance in hopes of identifying disease prominence and containing potential threats before they become epidemics.

VULNERABILITY AND IMPACT

Estimated potential losses to the built environment are difficult to calculate because infectious disease causes little damage to the built environment and generally losses are experienced through public health response and medical costs, and lost wages of patients. Therefore, it is

⁵ Carrat, F. et al. Timelines of Infection and Disease in Human Influenza: A Review of Volunteer Challenge Studies. *American Journal of Epidemiology*, 2008, 167: 775–785.

⁶ Source: Texas Health and Human Services: <https://www.dshs.texas.gov/covid-19-coronavirus-disease/texas-covid-19-surveillance>

⁷ Source: CDC, <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm63e1114a5.htm>

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assumed that all buildings and facilities are exposed to disease but would experience negligible damage in the occurrence of an outbreak event. For example, upkeep and maintenance of buildings and facilities would fall behind due to the high absenteeism of employees or the closing of facilities.

Critical infrastructure services, such as emergency services, utility services, water services and telecommunications can be limited by an infectious disease event. As seen during the COVID-19 pandemic, many jurisdictions, including Gregg County, executed a mandatory shutdown of non-essential businesses. The gradual re-opening of businesses and restaurants was completed in incremental stages to try and limit the spread of the infection and protect consumers while restarting the economy. Larger gatherings of people were limited to 50 and below and at times to 10 and below. Area school districts closed all campuses and implemented remote learning. Similar impacts are expected during future infectious disease outbreaks.

People and populations most vulnerable to infectious disease outbreaks include the elderly, children, people with disabilities, and those with pre-existing medical conditions. In addition, people living in poverty may not have the means to purchase personal protection equipment (PPE), medicine, and may have limited access to healthcare resources. Those who speak a language other than English may also become isolated and not have the same access to medical resources during an endemic, epidemic, or pandemic.

The population over 65 in the Gregg County planning area is estimated at 16 percent of the total population and children under the age of 5 are estimated at 7 percent. Populations with a disability is estimated at 13 percent. An estimated 16 percent of the planning area population live below the poverty level and 16 percent of the populations speaks a language other than English.

Table 16-2. Populations at Greater Risk of Winter Storm Events

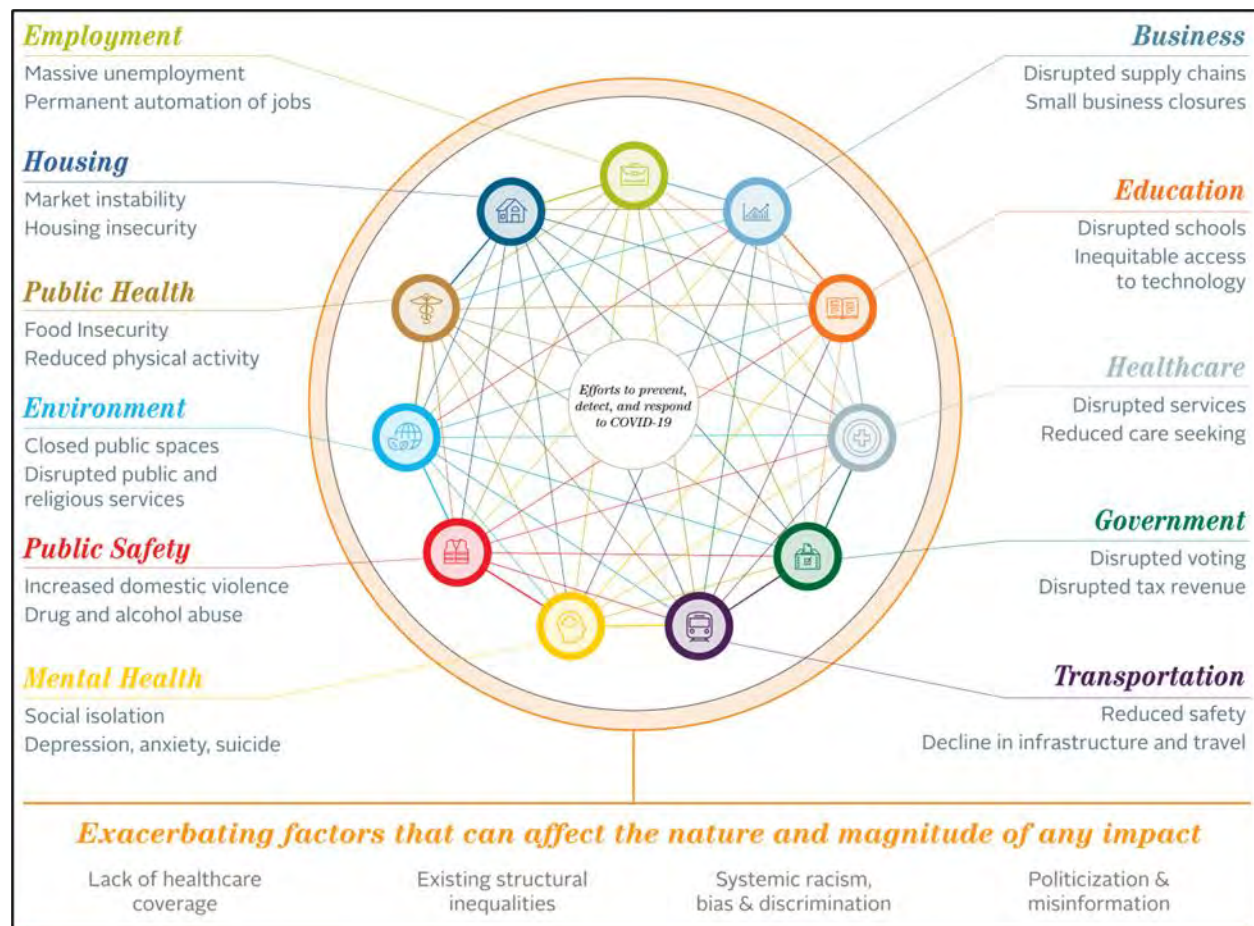
JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION WITH A DISABILITY	POPULATION BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
Gregg County	19,479	8,232	15,937	20,500	19,780
City of Clarksville City	164	66	514	126	35
City of Gladewater	858	669	998	1,954	267
City of Kilgore	2,117	894	1,788	2,211	2,669
City of Lakeport	113	112	116	232	187
City of Longview	12,786	5,296	9,987	14,016	14,867
City of Warren City	76	27	71	51	22
City of White Oak	689	410	857	623	304

The recent COVID-19 pandemic demonstrated that the response costs to the public health sector for an outbreak, the economic impact, and the impact to health for the Gregg County planning area, is “Substantial.” Multiple deaths can be expected, and the Gregg County planning area

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facilities could be shut down for 30 days or more. Other, unexpected, secondary impacts may also occur, as learned during the COVID-19 pandemic. Figure 16-3 provides an overview of secondary impacts of COVID-19 in the United States, which can be expected in the future.

Figure 16-5. Secondary Impacts of the COVID-19 Pandemic in the United States⁸



ASSESSMENT OF IMPACTS

Disease impacts are larger than normal segments of the population, and few sectors of the population are left untouched by infectious disease. The impact of an infectious disease event will be measured by the number of fatalities, how the community is affected, and to what extent. The physical problems associated with infectious diseases may be short term or may lead to long-term physical maladies and can be frequently associated with a variety of impacts, including:

- Absenteeism in the workplace can have negative impacts on the overall functioning of society, particularly if it is prolonged.
- The risks to public health and safety include first responders and others with increased exposure to the disease. Response personnel likely to experience the greatest impact

⁸ Degrees, Model shows intersecting secondary impacts of COVID-19 in the US, August 6, 2020, website: <https://degrees.fhi360.org/2020/08/model-shows-intersecting-secondary-impacts-of-covid-19-in-the-united-states/>

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would be those with medical responsibilities, such as fire fighters, ambulance workers, and clinic and hospital personnel.

- If county or city staff stay home due to illness, someone in their home is ill, or because they fear becoming ill, the ability of local government to maintain operations and deliver services could be seriously limited or compromised.
- A pandemic event may result in heightened stress for responders, health care providers, public health workers, individuals, and communities.
- The public will require information on how to recognize and cope with the short- and long-term risks of sustained stress during mass vaccinations, for those debilitated by an illness, and their caregivers.
- There is the possibility of indirect damage to structures resulting from staff absenteeism and lack of routine operations and maintenance.
- Human infectious diseases do not normally pose a risk to the natural environment. Infectious diseases tend to be specific to humans, and therefore pose little threat to the natural environment or non-mammalian species. However, certain exceptions exist including the avian flu, which can affect both birds and humans.
- Infectious disease outbreaks can be costly. Seasonal flu occurs annually and is estimated to cost the U.S. economy between \$71 million and \$167 million per year.⁹ Severe pandemics have been predicted to cause more than \$700 billion in economic losses, and to result in a 5.5% decrease in U.S. Gross Domestic Product (GDP).¹⁰
- If the normal movement of the epidemic within society needs to be curtailed, a process known as “social distancing,” then a greater impact to the local economy could occur.
- Depending on the situation, examples of cancellations and building closures might include cancellation of public events, such as concerts, sports events, movies, plays; and closure of recreational facilities, such as community swimming pools, youth clubs, gymnasiums.
- When clear communication to the public fails, it can result in a loss of credibility, and can result in a loss of public confidence in leadership.
- Public dissatisfaction with government response will typically increase as the number of cases rises and public fear increases.
- Perceptions of inequality in medical care, particularly if those inequalities are based on socioeconomic status, ethnicity, age, gender, or seniority, can lead to increased dissatisfaction with government and leadership, and may result in a weakening of social order or hostility towards those in leadership or medical roles.
- Required rationing of supplies or vaccinations may be necessary.
- There could be significant public resistance to a decision to quarantine those who are ill or exposed, to restrict travel, or to implement social distancing.

The economic and financial impacts of infectious diseases on the community will depend on the severity of the disease, how many people are impacted, and how quickly the disease can be contained. The level of preparedness and pre-event planning done by the community, local

⁹ Source: World Health Organization

¹⁰ Source: Federal Reserve Bank of St. Louis

SECTION 16: INFECTIOUS DISEASE

businesses and citizens will also contribute to the overall economic and financial conditions in the aftermath of a infectious disease event.

CLIMATE CHANGE CONSIDERATIONS

According to the CDC and other climate change specialists, climate change does increase the risk of health threats. Mild winters, early springs, and warmer temperatures are giving mosquitoes and ticks more time to reproduce, spread diseases, and expand their habitats throughout the United States. Between 2004 and 2018, the number of reported illnesses from mosquito, tick, and flea bites more than doubled, with more than 760,000 cases reported in the United States. Nine new germs spread by mosquitoes and ticks were discovered or introduced into the United States during this period. A major concern with this shift is the potential spread of Lyme disease, the West Nile virus, and even the Zika virus.

Climate change has forced some animal species into new habitats as their natural habitats disappear, and it has expanded the habitats of other animals. This movement of animals into new areas increases opportunities for contact between humans and animals and the potential spread of zoonotic diseases, for example, wildlife carrying the rabies virus are expanding to new geographic areas of the country. In addition, as global temperatures rise, deadly diseases that are a threat in other countries, like Ebola, Lassa, Rift Valley fever, and monkeypox, will increase along with the risk of them being imported into the United States.¹¹

¹¹ Source: CDC, <https://www.cdc.gov/ncezid/what-we-do/climate-change-and-infectious-diseases/index.html>



SECTION 17
**MITIGATION
STRATEGY**

SECTION 17: MITIGATION STRATEGY

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MITIGATION GOALS

Based on the results of the risk and capability assessments, the Planning Team developed and prioritized the mitigation strategy. This involved utilizing the results of both assessments and reviewing the goals and objectives that were included in the previous 2018 Plan. At the Mitigation Workshop in December 2023, Planning Team members reviewed the mitigation strategy from the previous 2018 Plan. The consensus among all members present was that the strategy developed for the 2018 Plan did not require significant changes, as it identified overall improvements to be sought in the Plan Update. However, a new goal (7) related to equity and vulnerable populations was added and the order and priority of the goals and objectives were reorganized.

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 utilization of the latest technology to provide adequate warning, communication, and mitigation of hazard events.

OBJECTIVE 1.3

Reduce the danger to, and enhance protection of, high risk areas during hazard events.

OBJECTIVE 1.4

Protect critical facilities and services.

OBJECTIVE 1.5

Reduce the long-term vulnerabilities to and from high hazard potential dams that pose an unacceptable risk to the public.

GOAL 2

Build and support local capacity and commitment to continuously become less vulnerable to hazards.

OBJECTIVE 2.1

Build and support local partnerships to continuously become less vulnerable to hazards.

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OBJECTIVE 2.2

Build a cadre of committed volunteers to safeguard the community before, during, and after a disaster.

OBJECTIVE 2.3

Build hazard mitigation concerns into county, city and special district planning and budgeting processes.

GOAL 3

Increase public understanding, support, and demand for hazard mitigation.

OBJECTIVE 3.1

Heighten public awareness regarding the full range of natural and man-made hazards the public may face.

OBJECTIVE 3.2

Educate the public on actions they can take to prevent or reduce the loss of life or property from all hazards and increase individual efforts to respond to potential hazards.

OBJECTIVE 3.3

Publicize and encourage the adoption of appropriate hazard mitigation measures.

GOAL 4

Protect new and existing properties.

OBJECTIVE 4.1

Reduce repetitive losses to the National Flood Insurance Program (NFIP).

OBJECTIVE 4.2

Use the most cost-effective approach to protect existing buildings and public infrastructure from hazards.

OBJECTIVE 4.3

Enact and enforce regulatory measures to ensure that future development will not put people in harm's way or increase threats to existing properties.

GOAL 5

Maximize the resources for investment in hazard mitigation.

OBJECTIVE 5.1

Maximize the use of outside sources of funding.

OBJECTIVE 5.2

Maximize participation of property owners in protecting their properties.

OBJECTIVE 5.3

Maximize insurance coverage to provide financial protection against hazard events.

OBJECTIVE 5.4

Prioritize mitigation projects, based on cost-effectiveness and sites facing the greatest threat to life, health, and property.

GOAL 6

Promote growth in a sustainable manner.

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OBJECTIVE 6.1

Incorporate hazard mitigation activities into long-range planning and development activities.

OBJECTIVE 6.2

Promote beneficial uses of hazardous areas while expanding open space and recreational opportunities.

OBJECTIVE 6.3

Utilize regulatory approaches to prevent the creation of future hazards to life and property.

GOAL 7

Promote equity and protect vulnerable populations and underserved communities through hazard mitigation activities.

OBJECTIVE 7.1

Allocate resources and funding to implement hazard mitigation activities that directly benefit vulnerable and underserved communities.

OBJECTIVE 7.2

Build and support local partnerships to leverage resources and expertise in addressing hazard related equity concerns.

OBJECTIVE 7.3

Establish internal decision-making processes that integrate equity into project selection.

OBJECTIVE 7.4

Monitor and evaluate the effectiveness of mitigation activities to ensure equitable outcomes and protection of vulnerable populations.



SECTION 18
PREVIOUS ACTIONS

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SUMMARY

This section includes analysis from the 2018 Gregg County Hazard Mitigation Action Plan. Planning Team members were given copies of the previous mitigation actions submitted in the 2018 Gregg County Plan at the mitigation workshop. Each participating entity reviewed the previous actions and provided an analysis as to whether the action had been completed, should be deferred as an ongoing activity, or be deleted from the Plan Update. The actions from the 2018 Plans are included in this section as they were written in 2018, with the exception of the “2024 Analysis” section. The following participating jurisdictions did not previously participate in a plan; therefore, they have no previous actions: City of Warren City.

SECTION 18: PREVIOUS ACTIONS

GREGG COUNTY

Gregg County – Previous Action #1	
Proposed Action	Issue, publicize and enforce burn bans in times of drought.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	A-5 (High)
Estimated Cost:	No Added Cost, Work into existing programs.
Lead Agency/Department Responsible:	Administration, EMC
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed. Gregg County issued burn bans when necessary due to drought conditions. All burn bans were well publicized.

Gregg County – Previous Action #2	
Proposed Action	Work with the Texas A&M Forest Service to attain “Firewise Communities” status.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	B-2 (Moderate)
Estimated Cost:	No Added Costs, work into existing programs
Lead Agency/Department Responsible:	Administration, EMC
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Defer to Plan Update. This action was discussed but put on hold due to the COVID-19 pandemic. Now that the COVID-19 emergency is over, Gregg County has begun having conversations with the Texas Forest Service and the City of Longview on developing Firewise Communities and a CWPP.

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Gregg County – Previous Action #3	
Proposed Action	Implement a new and expanded program to partner with utility companies to keep right-of-way clear and to trim tree limbs that may fall on electric or telephone lines.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Severe Winter Storm, Wind Storm
Priority (High, Moderate, Low):	A-6 (High)
Estimated Cost:	No Added Costs; work into existing programs
Lead Agency/Department Responsible:	EMC, County Road and Bridge
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed and Defer to Plan Update. On-going. Gregg County has spoken with AEP-Swepco about the issues and AEP has recently been clearing power line right-of-ways after a severe weather event in June 2023 caused widespread outages and extreme damage to the power system.

Gregg County – Previous Action #4	
Proposed Action	Clean and upgrade major culvert areas which are prone to flooding (about 12 locations planned for the next 5 years)
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	C-1 (Low)
Estimated Cost:	\$467,000
Lead Agency/Department Responsible:	County Road & Bridge
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Completed and Defer to Plan Update. On-going. Gregg County Road & Bridge has been replacing culverts as funding has allowed.

SECTION 18: PREVIOUS ACTIONS

Gregg County – Previous Action #5	
Proposed Action	Partner with ETCOG to seek FEMA grant funding to offer individual family Safe Room rebate program. Once the program is operational, Gregg County will publicize the program to its citizens and work with ETCOG to encourage residents to apply.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado & Wind Storm
Priority (High, Moderate, Low):	B-1 (Moderate)
Estimated Cost:	No Added Costs
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Completed. The action was completed, however very few citizens took advantage of the program due to the upfront cost required to build the safe room.

Gregg County – Previous Action #6	
Proposed Action	Partner with the National Weather Service & local meteorologist to plan and implement a public awareness campaign to alert the public to the meaning of NWS “watch” and “warning” and how to respond.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Windstorm, Hail Storm, Lightning, Severe Winter Storm
Priority (High, Moderate, Low):	B-3 (Moderate)
Estimated Cost:	No Added costs; work into existing programs
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Completed. Gregg County has worked with NWS-Shreveport and regional partners to implement a public awareness campaign in the East Texas region to ensure the public has a better understanding of weather watches and warnings. NWS-Shreveport has also enhanced its communications and advanced publication of possible upcoming weather events.

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Gregg County – Previous Action #7	
Proposed Action	Sponsor “Storm Spotter” classes quarterly in partnership with the National Weather Service and Longview Fire Department.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wind Storm, Hail Storm, Lightning, Severe Winter Storm
Priority (High, Moderate, Low):	A-4 (High)
Estimated Cost:	No added costs; work into existing programs
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update. This action was unable to be completed due to the COVID-19 emergency and the limited ability of the NWS-Shreveport to teach quarterly classes. NWS-Shreveport does teach at least one storm spotter class in Gregg County every year and many times teaches a class in both the spring and fall.

Gregg County – Previous Action #8	
Proposed Action	Encourage residents to sign up for Code Red emergency warning notification system. Post notices in public places and on public websites, Facebook pages, and other social media outlets.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wind Storm, Hail Storm, Lightning, Severe Winter Storm
Priority (High, Moderate, Low):	A-2 (High)
Estimated Cost:	No added costs; work into existing programs.
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed. Gregg County no longer uses CodeRed and has replaced the system with RAVE emergency alerts. An extensive public campaign was implemented to get residents to sign up for RAVE notifications.

SECTION 18: PREVIOUS ACTIONS

Gregg County – Previous Action #9	
Proposed Action	Use Code Red and social media to warn residents and the public of impending natural hazard events.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wind Storm, Hail Storm, Lightning, Severe Winter Storm
Priority (High, Moderate, Low):	A-3 (High)
Estimated Cost:	No added costs; work into existing programs.
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed. The action is complete, and the new RAVE system is used to notify the public of all impending natural hazards.

Gregg County – Previous Action #10	
Proposed Action	Develop and implement a public education campaign to inform residents of the dangers of natural hazards and suggested mitigation actions for individuals and families.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wind Storm, Hail Storm, Lightning, Severe Winter Storm
Priority (High, Moderate, Low):	A-1 (High)
Estimated Cost:	No added costs; work into existing programs.
Lead Agency/Department Responsible:	EMC Public information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update. This action was difficult to complete due to the COVID-19 emergency. This may need to be an action item in the 2024 revision.

SECTION 18: PREVIOUS ACTIONS

CITY OF CLARKSVILLE CITY

City of Clarksville City – Previous Action #1	
Proposed Action	Provide public education regarding actions which may be taken to mitigate the impact of these natural hazards.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning, Hail Storm, Wind Storm, Tornado, Drought, Wildfire, Flood
Priority (High, Moderate, Low):	A-4 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update. Update to include coordination with Gregg County Emergency Management.

City of Clarksville City – Previous Action #2	
Proposed Action	Provide covered parking to protect municipal vehicles and equipment.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail Storm
Priority (High, Moderate, Low):	C-3 (Low)
Estimated Cost:	\$8,000
Lead Agency/Department Responsible:	Administration, Public Works
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Delete Action. City has no intention to implement project in Plan Update.

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City of Clarksville City – Previous Action #3	
Proposed Action	Harden public buildings to protect against wind storms.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wind Storm
Priority (High, Moderate, Low):	C-4 (Low)
Estimated Cost:	\$15,000
Lead Agency/Department Responsible:	Administration, Public Works, Maintenance
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Defer to Plan Update. Update action to include suggestions from expert on how to protect the city's properties from windstorms.

City of Clarksville City – Previous Action #4	
Proposed Action	Partner with ETCOG to seek FEMA grant funding to offer individual family Safe Room rebate program. Once the program is operational, City of Clarksville City will publicize the program to its citizens and work with ETCOG to encourage residents to apply.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wind Storm, Tornado
Priority (High, Moderate, Low):	A-1 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update. Update to reflect assistance from ETCOG and FEMA on funding and rebate program.

SECTION 18: PREVIOUS ACTIONS

City of Clarksville City – Previous Action #5	
Proposed Action	Improve early warning systems to notify citizens of tornado warnings. This could include Facebook notifications, Clarksville – Warren City VFD web page, and the improved use of the Code Red warning system.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Priority (High, Moderate, Low):	A-3 (High)
Estimated Cost:	No added cost; work into existing program
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed. City has implemented tornado sirens and use of Gregg County Nixle alerts.

City of Clarksville City – Previous Action #6	
Proposed Action	Review drought contingency plan and revise if needed; work with surrounding water systems to ensure all area citizens are appropriately supplied with drinking water during extreme drought.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Priority (High, Moderate, Low):	B-1 (Moderate)
Estimated Cost:	No added costs; work into existing program
Lead Agency/Department Responsible:	Administration
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Completed. The plan is up to date as of 2023 and submitted to TCEQ.

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City of Clarksville City – Previous Action #7	
Proposed Action	Implement program to remove debris and fuels that increase the risk of wildfire
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	C-1 (Low)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Completed and Defer to Plan Update. On-going as City completes yearly maintenance of right of ways and city properties to reduce fire fuels.

City of Clarksville City – Previous Action #8	
Proposed Action	Monitor flood-prone areas and remove debris from drainage culverts when needed to alleviate potential flooding hazards.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	A-2 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed and Defer to Plan Update. On-going as City completes yearly maintenance of drainage culverts and any low aet crossing areas. Amend action to expand opportunity to assess for potential upgrades to system.

City of Clarksville City – Previous Action #9	
Proposed Action	Install lightning arrestors on all municipal buildings.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Priority (High, Moderate, Low):	C-2 (Moderate)
Estimated Cost:	Grant Funds or local funds
Lead Agency/Department Responsible:	Administration, Maintenance
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Defer to Plan Update. Funding has not been available to implement project.

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CITY OF GLADEWATER

City of Gladewater – Previous Action #1	
Proposed Action	Partner with ETCOG to seek FEMA grant funding to offer individual family Safe Room rebate program. Once the program is operational, Gladewater will publicize the program to its citizens and work with ETCOG to encourage residents to apply.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wind Storm
Priority (High, Moderate, Low):	A-1 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Delete Action. This project was not pursued and to the City’s knowledge no shelters were ever produced.

City of Gladewater – Previous Action #2	
Proposed Action	Develop, implement and promote a public education campaign to encourage the public to register for the Nixle warning system; put link on city websites and Facebook pages.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wind Storm, Flood, Hail Storm
Priority (High, Moderate, Low):	A-2 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC, Public Information, Information Technology
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed. Nixle was implemented and was later changed to Genasy’s. The City uses Facebook and the city website along with utility billing to notify citizens of the program and is still being utilized.

SECTION 18: PREVIOUS ACTIONS

City of Gladewater – Previous Action #3	
Proposed Action	Develop and implement a public education campaign to inform the public about mitigation actions they can take to make their family and home safer. Put information and links to outside resources on city websites and Facebook pages.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wind Storm, Flood, Extreme Heat, Wildfire, Hail Storm
Priority (High, Moderate, Low):	A-3 (High)
Estimated Cost:	No added cost; work into existing program
Lead Agency/Department Responsible:	EMC, Public Information, Information Technology
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Delete Action. To my knowledge this project was not pursued and can be removed.

City of Gladewater – Previous Action #4	
Proposed Action	Use Nixle and social media to warn residents and the public of impending natural hazard events. Note: The City of Gladewater has replaced Code Red with Nixle for the Emergency Messaging Service.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wind Storm, Flood, Extreme Heat, Wildfire, Hail Storm, Severe Winter Storm, Lightning, Drought
Priority (High, Moderate, Low):	A-4 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC, Public Information, Information Technology
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed. This program was initiated and now it is Genasy's and is still being utilized.

SECTION 18: PREVIOUS ACTIONS

City of Gladewater – Previous Action #5	
Proposed Action	Publicize and enforce county-wide burn bans in times of drought; place notices on city websites and social media.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Drought
Priority (High, Moderate, Low):	A-5 (High)
Estimated Cost:	No added cost, work into existing program
Lead Agency/Department Responsible:	Administration, EMC, Public Information, Information Technology, Police Dept., Fire Dept.
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed.

City of Gladewater – Previous Action #6	
Proposed Action	Work with the Texas A&M Forest Service to attain “Fire-Wise Community” status
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	B-1 (Moderate)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Administration, EMC, Fire Dept.
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Defer to Plan Update.

SECTION 18: PREVIOUS ACTIONS

City of Gladewater – Previous Action #7	
Proposed Action	Implement a new program to partner with utility companies to keep right-of-way clear and to trim tree limbs that may fall on electric or telephone lines.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Severe Winter Storm, Wind Storm
Priority (High, Moderate, Low):	A-6 (High)
Estimated Cost:	No added cost, work into existing programs
Lead Agency/Department Responsible:	EMC, Public Works
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed and Defer to Plan Update. The city continuously trims and cuts trees to prevent issues with utilities along with the utility companies.

City of Gladewater – Previous Action #8	
Proposed Action	Participate in the “Turn Around Don’t Drown” campaign.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	A-7 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC, Police Dept, Fire Dept.
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update.

SECTION 18: PREVIOUS ACTIONS

City of Gladewater – Previous Action #9	
Proposed Action	Provide bottled water and ice to outdoor workers, the homeless, and others at city parks and other distribution centers. Coordinate donations from businesses and individuals and distribute as needed.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Priority (High, Moderate, Low):	A-8 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Administration, Police Dept., Fire Dept., Public Works
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed and Defer to Plan Update. On-going.

City of Gladewater – Previous Action #10	
Proposed Action	Partner with local charities and churches to conduct a “fan drive” to aid low-income individuals and families by providing fans and window air conditioners to the needy during times of extreme heat.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Priority (High, Moderate, Low):	A-9 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update.

SECTION 18: PREVIOUS ACTIONS

City of Gladewater – Previous Action #11	
Proposed Action	Implement program to remove debris from drainage culverts when needed to alleviate potential flooding hazards.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	A-10 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed and Defer to Plan Update. This was initiated and is still on-going by the City's public works department.

City of Gladewater – Previous Action #12	
Proposed Action	Install lightning arrestors on all municipal buildings.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Priority (High, Moderate, Low):	C-1 (Low)
Estimated Cost:	\$1,000 per building
Lead Agency/Department Responsible:	Administration, Maintenance
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Delete Action. This did not occur due to cost and can be removed.

City of Gladewater – Previous Action #13	
Proposed Action	Provide covered parking to protect municipal vehicles and equipment.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail Storm
Priority (High, Moderate, Low):	C-2 (Low)
Estimated Cost:	\$25,000
Lead Agency/Department Responsible:	Administration, Public Works
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Delete Action. This did not occur due to cost and can be removed.

SECTION 18: PREVIOUS ACTIONS

CITY OF KILGORE

City of Kilgore – Previous Action #1	
Proposed Action	Install new warning sirens.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Priority (High, Moderate, Low):	C-1 (Low)
Estimated Cost:	\$50,000
Lead Agency/Department Responsible:	Kilgore Police Department
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Defer to Plan Update. New radios have been ordered and are scheduled for replacement in 2024.

City of Kilgore – Previous Action #2	
Proposed Action	Fund and expand subscriber database of Code Red weather warning product.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Priority (High, Moderate, Low):	A-2 (High)
Estimated Cost:	\$5,000
Lead Agency/Department Responsible:	Kilgore Police Department
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update.

City of Kilgore – Previous Action #3	
Proposed Action	Establish direct link with the National Weather Service during expected severe weather and post updated, pertinent weather information on social media.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Priority (High, Moderate, Low):	A-3 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Kilgore Police Department
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed.

SECTION 18: PREVIOUS ACTIONS

City of Kilgore – Previous Action #4	
Proposed Action	Partner with ETCOG to seek FEMA grant funding to offer individual family Safe Room rebate program. Once the program is operational, Kilgore will publicize the program to its citizens and work with ETCOG to encourage residents to apply.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Priority (High, Moderate, Low):	A-1 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update.

City of Kilgore – Previous Action #5	
Proposed Action	Obtain awareness materials from Texas Floodplain Management Association for distribution to the public. Post public awareness content on social media platforms prior to and during flooding.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	A-4 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Kilgore Police Dept and Fire Dept
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update.

SECTION 18: PREVIOUS ACTIONS

City of Kilgore – Previous Action #6	
Proposed Action	Seek master drainage study and plan to evaluate future drainage enhancement projects.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	C-2 (Low)
Estimated Cost:	\$25,000
Lead Agency/Department Responsible:	City of Kilgore Public Works
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Defer to Plan Update.

City of Kilgore – Previous Action #7	
Proposed Action	Seek funding for purchase of previously identified repetitive loss properties. Re-purpose repetitive loss properties into green space and incorporate into city park system.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	C-3 (Low)
Estimated Cost:	\$3,20,000
Lead Agency/Department Responsible:	City of Kilgore Administration
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Defer to Plan Update.

City of Kilgore – Previous Action #8	
Proposed Action	Partner with power utility (SWEPCO) to implement an expanded tree trimming program and identify areas where additional tree trimming is needed.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wind Storm, Severe Winter Storm
Priority (High, Moderate, Low):	B-1 (Moderate)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	City of Kilgore Public Works
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Defer to Plan Update.

SECTION 18: PREVIOUS ACTIONS

City of Kilgore – Previous Action #9	
Proposed Action	Place mitigation tips on city website and through social media to prevent or reduce property damage from high winds. Post updated, pertinent weather information on social media.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wind Storm
Priority (High, Moderate, Low):	A-5 (High)
Estimated Cost:	No added cost, work into existing programs
Lead Agency/Department Responsible:	City of Kilgore Police Dept./Fire Dept.
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed.

City of Kilgore – Previous Action #10	
Proposed Action	Perform tests and maintenance on generators installed at critical infrastructure locations to ensure consistent performance during a loss of electrical service.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wind Storm
Priority (High, Moderate, Low):	A-6 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	City of Kilgore Building Maintenance
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed.

City of Kilgore – Previous Action #11	
Proposed Action	Post information to social media announcing county burn bans, "red flag" advisories from the National Weather Service, and tips to conserve water.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Priority (High, Moderate, Low):	A-7 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Kilgore Police Dept/Fire Dept.
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed.

SECTION 18: PREVIOUS ACTIONS

City of Kilgore – Previous Action #12	
Proposed Action	Implement water use restrictions during extreme drought conditions threatening the water supply.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Priority (High, Moderate, Low):	A-8 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	City of Kilgore Water Utilities
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed.

City of Kilgore – Previous Action #13	
Proposed Action	Street Department will prepare dump trucks with appropriate road salt mix and spreading equipment to treat major bridges during icy conditions.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Severe Winter Storm
Priority (High, Moderate, Low):	B-2 (Moderate)
Estimated Cost:	\$20,000
Lead Agency/Department Responsible:	City of Kilgore Street Department
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Completed.

City of Kilgore – Previous Action #14	
Proposed Action	Prior to winter storm season, perform tests and maintenance on generators installed at critical infrastructure locations to ensure consistent performance during a loss of electrical service.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Severe Winter Storm
Priority (High, Moderate, Low):	A-9 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	City of Kilgore Building Maintenance
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed.

SECTION 18: PREVIOUS ACTIONS

City of Kilgore – Previous Action #15	
Proposed Action	Perform survey of public buildings and critical infrastructure for lightning rods and arresting equipment. Purchase and install lightning rods and arresting equipment where the need is identified.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Priority (High, Moderate, Low):	B-3 (Moderate)
Estimated Cost:	\$10,000
Lead Agency/Department Responsible:	City of Kilgore Maintenance
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Defer to Plan Update.

City of Kilgore – Previous Action #16	
Proposed Action	Post public education information on social media regarding lightning safety tips and how to mitigate lightning damage.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Priority (High, Moderate, Low):	A-10 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Kilgore Police Dept/Fire Dept.
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update.

SECTION 18: PREVIOUS ACTIONS

City of Kilgore – Previous Action #17	
Proposed Action	Develop, implement and publicize a new program to enforce code ordinances relating to natural vegetation restrictions on private property, including mowing abandoned properties and properties in non-compliance.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	A-11 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	City of Kilgore Code Enforcement
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed.

City of Kilgore – Previous Action #18	
Proposed Action	The Parks Department will mow and clear natural vegetation on public property throughout the city, to reduce the risk of wildfire extension.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	A-12 (High)
Estimated Cost:	\$10,000
Lead Agency/Department Responsible:	City of Kilgore Parks Department
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed.

SECTION 18: PREVIOUS ACTIONS

City of Kilgore – Previous Action #19	
Proposed Action	Create a public education campaign to promote the use of roofing materials that better resist hail damage. Include mitigation tips to prevent damage to valuable property during hail storms.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail Storm
Priority (High, Moderate, Low):	A-13 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Kilgore Police Dept/Fire Dept
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update.

City of Kilgore – Previous Action #20	
Proposed Action	Provide covered parking to protect municipal vehicles and equipment.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail Storm
Priority (High, Moderate, Low):	C-4 (Low)
Estimated Cost:	\$25,000
Lead Agency/Department Responsible:	Administration, Public Works
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Defer to Plan Update. In-progress.

SECTION 18: PREVIOUS ACTIONS

City of Kilgore – Previous Action #21	
Proposed Action	Provide bottled water and ice to outdoor workers, the homeless, and others at city parks and other distribution centers. Coordinate donations from businesses and individuals, and distribute as needed.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Priority (High, Moderate, Low):	A-14 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Administration, Police Dept, Fire Dept, Public Works
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed.

City of Kilgore – Previous Action #22	
Proposed Action	Partner with local charities and churches to conduct a “fan drive” to aid low-income individuals and families by providing fans and window air conditioners to the needy during times of extreme heat.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Priority (High, Moderate, Low):	A-14 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Administration, Police Dept, Fire Dept, Public Works
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update.

SECTION 18: PREVIOUS ACTIONS

City of Kilgore – Previous Action #23	
Proposed Action	Partner with local charities and churches to conduct a “fan drive” to aid low-income individuals and families by providing fans and window air conditioners to the needy during times of extreme heat.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Priority (High, Moderate, Low):	A-15 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	Within 1 year
2024 ANALYSIS:	
Delete Action. Duplicate to Action #22.	

SECTION 18: PREVIOUS ACTIONS

CITY OF LAKEPORT

City of Lakeport – Previous Action #1	
Proposed Action	Improve early warning systems to notify citizens of tornado warnings and other emergencies. This could include Facebook notifications, creation and use of a city web page, and the improved use of the Code Red warning system. The City of Lakeport also wants to apply for a FEMA grant to purchase and install 4 warning sirens; this is a high priority.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Severe Winter Weather, Flood, Wind Storm
Priority (High, Moderate, Low):	A-1 (High)
Estimated Cost:	\$82,000
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update.

City of Lakeport – Previous Action #2	
Proposed Action	Encourage residents to sign up for Code Red emergency warning notification system. Post notices in public places and on public websites, Facebook pages, and other social media outlets.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Severe Winter Storm, Flood, Wind Storm
Priority (High, Moderate, Low):	A-3 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC, Public Information, Information Technology
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed and Defer to Plan Update. The City utilizes their website to indicate where resident can register for weather warning through Smart 911.

SECTION 18: PREVIOUS ACTIONS

City of Lakeport – Previous Action #3	
Proposed Action	Partner with ETCOG to seek FEMA grant funding to offer individual family Safe Room rebate program. Once the program is operational, Lakeport will publicize the program to its citizens and work with ETCOG to encourage residents to apply.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wind Storm
Priority (High, Moderate, Low):	A-2 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update.

City of Lakeport – Previous Action #4	
Proposed Action	Provide public education regarding actions which may be taken to mitigate the impact of these natural hazards. Partner with Elderville – Lakeport Volunteer Fire Department to put mitigation information on their web page at www.elvfd.com
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Severe Winter Storm, Flood, Wind Storm
Priority (High, Moderate, Low):	A-4 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update.

SECTION 18: PREVIOUS ACTIONS

City of Lakeport – Previous Action #5	
Proposed Action	Partner with utility companies to develop and implement a program to trim tree limbs that could fall on utility transmission lines in icy weather or high wind conditions.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Severe Winter Storm, Wind Storm
Priority (High, Moderate, Low):	A-5 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed and Defer to Plan Update. On-going. The City notifies the utility company when there is a need.

City of Lakeport – Previous Action #6	
Proposed Action	Replace or upgrade generators for wastewater treatment & lift stations to prevent interruption of service.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Severe Winter Storm, Flood, Wind Storm
Priority (High, Moderate, Low):	C-1 (Low)
Estimated Cost:	\$8,000
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Defer to Plan Update. In-progress.

SECTION 18: PREVIOUS ACTIONS

CITY OF LONGVIEW

City of Longview – Previous Action #1	
Proposed Action	Check the location and condition of warning sirens; if repairs or additional units are needed, determine cost and make recommendation to governing body.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wind Storm, Tornado, Flood, Dam Failure
Priority (High, Moderate, Low):	A-1 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed and Defer to Plan Update. On-going. Completed on an annual basis.

City of Longview – Previous Action #2	
Proposed Action	Enhance emergency services to increase the efficiency of wildfire response and recovery activities.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	A-2 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed and Defer to Plan Update. On-going. Completed on an annual basis.

SECTION 18: PREVIOUS ACTIONS

City of Longview – Previous Action #3	
Proposed Action	Seek training opportunities, and publicize them to all emergency responders
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	A-3 (High)
Estimated Cost:	Overtime Cost not to exceed \$5,000
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed and Defer to Plan Update. On-going.

City of Longview – Previous Action #4	
Proposed Action	Promote the “Turn Around Don’t Drown” campaign, in partnership with DPS.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	A-4 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update. The City is working at the local level to have Public Works install additional signage at 4-5 common areas of roadway flooding during significant rainfall.

SECTION 18: PREVIOUS ACTIONS

City of Longview – Previous Action #5	
Proposed Action	Create and implement an education campaign to inform the public of the dangers of natural hazards and teach mitigation techniques to reduce the impact of these hazards. Public officials will include hazard mitigation messages in their newsletters, web pages, and speeches, as appropriate. The EMC will accept opportunities to speak to service clubs and school groups about hazard mitigation, and will encourage other emergency management professionals to do the same.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wind Storm, Flood, Lightning, Hail Storm, Tornado, Wildfire, Dam Failure, Extreme Heat
Priority (High, Moderate, Low):	B-1 (Moderate)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Completed and Defer to Plan Update. EMC meets annually with local leadership/stakeholders/service groups/clubs to promotes community awareness and collaboration.

City of Longview – Previous Action #6	
Proposed Action	Ensure that critical facilities owned by the jurisdiction are protected from flood. Inspect all critical facilities and consider the flood risk of each. Consult FEMA publications, and ask an expert for additional suggestions in floodproofing, if needed. Consider cost and potential benefits and make recommendation to governing body.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	B-2 (Moderate)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Defer to Plan Update. In-progress.

SECTION 18: PREVIOUS ACTIONS

City of Longview – Previous Action #7	
Proposed Action	Work with the Texas A&M Forest Service to identify Wildland-Urban Interface areas; develop and implement a plan to reduce risk.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	B-3 (Moderate)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Defer to Plan Update. In-progress and will be on-going. Currently the City is exploring further action with the development of a CWPP in conjunction with Gregg County.

City of Longview – Previous Action #8	
Proposed Action	Coordinate with the Texas A&M Forest Service to schedule educational events and obtain literature for public distribution.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	B-3 (Moderate)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Completed and Defer to Plan Update. On-going. Last event was “Sow-a-Seed” held at the Green in September/October of 2023.

SECTION 18: PREVIOUS ACTIONS

City of Longview – Previous Action #9	
Proposed Action	Install lightning arrestors on all public buildings; check existing units to ensure that they are properly installed and working correctly.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Priority (High, Moderate, Low):	B-4 (Moderate)
Estimated Cost:	\$2,500 each
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Defer to Plan Update.

City of Longview – Previous Action #10	
Proposed Action	Sponsor a booth at local events, to hand out free literature about the dangers of wildfire and what mitigation actions people can take to reduce the risk of fire damage to their homes and businesses.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	B-5 (Moderate)
Estimated Cost:	Not to exceed \$1,000
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Completed and Defer to Plan Update. On-going. Last event was “Sow-a-Seed” held at the Green in September/October of 2023.

SECTION 18: PREVIOUS ACTIONS

City of Longview – Previous Action #11	
Proposed Action	Seek state and FEMA sponsored training in flood mitigation for key personnel.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	B-6 (Moderate)
Estimated Cost:	\$2,000 per year
Lead Agency/Department Responsible:	Public Works/Development Services
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Defer to Plan Update. On-going through the Public Engineer's Office.

City of Longview – Previous Action #12	
Proposed Action	Improve the long-range management and use of flood-prone areas by the adoption and enforcement of local ordinances to regulate new development within the floodplain. Review and revise ordinances, when needed.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	B-7 (Moderate)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Development Services
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Defer to Plan Update. On-going with Public Works and Development Services.

SECTION 18: PREVIOUS ACTIONS

City of Longview – Previous Action #13	
Proposed Action	Place links on local websites to free FEMA training for independent study via the internet, such as 15-271 “Anticipating Hazardous Weather and Community Risk.”
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	B-8 (Moderate)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Media Development
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Defer to Plan Update.

City of Longview – Previous Action #14	
Proposed Action	Conduct public information campaign to remind citizens to hydrate and avoid direct exposure to the sun between the peak UV hours of 1 p.m. to 4 p.m., to prevent heat stroke.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Priority (High, Moderate, Low):	A-5 (High)
Estimated Cost:	No added costs; work into existing programs
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed and Defer to Plan Update. The City initiates during seasonal times of extreme heat impact with recurring messages shared via city’s communication platforms and twice-monthly through Public Safety updates presented by the EMC.

SECTION 18: PREVIOUS ACTIONS

City of Longview – Previous Action #15	
Proposed Action	Increase local training opportunities for citizens, to encourage their involvement in mitigation efforts. Partner with ETCOG, TDEM, Texas A&M Forestry Service, TEEX, FEMA, and others, to bring free and low-cost mitigation training to Longview. Send PSAs to media to publicize these training opportunities.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wind Storm, Flood, Lightning, Hail Storm, Tornado, Wildfire, Dam Failure, Extreme Heat
Priority (High, Moderate, Low):	C-1 (Low)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	Within 4 years or more
2024 ANALYSIS:	
Defer to Plan Update.	

City of Longview – Previous Action #16	
Proposed Action	Develop public and private partnerships with businesses, service organizations, and other community groups to work together on local mitigation projects, mitigation planning, and cooperative mitigation actions.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wind Storm, Flood, Lightning, Hail Storm, Tornado, Wildfire, Dam Failure, Extreme Heat
Priority (High, Moderate, Low):	C-2 (Low)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC
Implementation Schedule:	Within 4 years or more
2024 ANALYSIS:	
Completed and Defer to Plan Update. On-going. The City completed improvements to the R&K Dam in collaboration with the Wildwood HOA; CWPP or the Lake Lamond Dam are the next opportunities for this type of collaboration.	

SECTION 18: PREVIOUS ACTIONS

City of Longview – Previous Action #17	
Proposed Action	Work with state and federal agencies to maintain current flood maps.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	C-3 (Low)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Public Works, Development Services
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Completed and Defer to Plan Update. On-going.

City of Longview – Previous Action #18	
Proposed Action	Implement all available measures to reduce the potential magnitude of a wildfire event on public-owned property. Schedule regular mowing of grass, trimming of trees and shrubs; consider plowing a firebreak in hazard areas.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	C-4 (Low)
Estimated Cost:	\$562,739.60
Lead Agency/Department Responsible:	Environmental Health, Public Works
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Defer to Plan Update. The City is looking to pursue CWPP prior.

SECTION 18: PREVIOUS ACTIONS

City of Longview – Previous Action #19	
Proposed Action	Partner with ETCOG to seek FEMA grant funding to offer individual family Safe Room rebate program. Once the program is operational, Longview will publicize the program and encourage residents to apply.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wind Storm, Tornado
Priority (High, Moderate, Low):	C-5 (Low)
Estimated Cost:	No added cost
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Defer to Plan Update.

City of Longview – Previous Action #20	
Proposed Action	Provide shelter for supplies and equipment at critical facilities.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail Storm
Priority (High, Moderate, Low):	C-6 (Low)
Estimated Cost:	\$2,500 per facility
Lead Agency/Department Responsible:	Facility Services
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Defer to Plan Update. On-going. The City in coordination with Public Works and CVB are exploring the shipping container storage currently at the Fairground Activity Complex for emergency sheltering supplies.

SECTION 18: PREVIOUS ACTIONS

City of Longview – Previous Action #21	
Proposed Action	As new structures are planned, built, harden public structures to protect the building and its contents, and to provide a safe place for humans during a storm.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wind Storm, Tornado
Priority (High, Moderate, Low):	C-7 (Low)
Estimated Cost:	Based on available funding
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Defer to Plan Update. On-going. The City is attempting to seek out funding to improve the construction for the new Fire Station #7.

City of Longview – Previous Action #22	
Proposed Action	Purchase properties in floodplain areas to reserve them from development.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	C-8 (Low)
Estimated Cost:	\$15,600,000
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more (scheduling based on funding)

2024 ANALYSIS:
Defer to Plan Update. On-going via CIP as flood maps changes.

SECTION 18: PREVIOUS ACTIONS

City of Longview – Previous Action #23	
Proposed Action	Improve emergency procedures to efficiently respond and avoid unnecessary risk to human Life, should a nearby dam fail.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Priority (High, Moderate, Low):	C-9 (Low)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Completed and Defer to Plan Update. On-going. The City annually reviews the dams located in the City as well as recurring table-top exercises with the Army Corps of Engineers for Lake o' the Pines.

City of Longview – Previous Action #24	
Proposed Action	Promote FEMA-recommended construction methods for any new dam development. Provide educational materials in public offices, such as the floodplain manager's office, EMC's office, tax office, inspector's office, permit office, etc.; and offer links to FEMA publications on the local website.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Priority (High, Moderate, Low):	C-10 (Low)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Defer to Plan Update.

SECTION 18: PREVIOUS ACTIONS

City of Longview – Previous Action #25	
Proposed Action	Severe Loss-Repetitive loss HMP Home purchases in flood plain: participate with FEMA's program.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	C-11 (Low)
Estimated Cost:	\$1,200,000
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Defer to Plan Update. On-going via CIP process.

City of Longview – Previous Action #26	
Proposed Action	Improve residential properties with a history of flooding through the City's Master Drainage program.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	C-12 (Low)
Estimated Cost:	\$1,000,000
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Completed and Defer to Plan Update. On-going via CIP process. The City has made improvements to Airline Dr. near Hollybrook.

City of Longview – Previous Action #27	
Proposed Action	Improve street culverts and bridges that are undersized or have reached their design life per City's Master Drainage program.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	C-13 (Low)
Estimated Cost:	\$2,500,000
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Completed and Defer to Plan Update. On-going via CIP process. The City has made improvements to Airline Dr. near Hollybrook.

SECTION 18: PREVIOUS ACTIONS

City of Longview – Previous Action #28	
Proposed Action	Provide bottled water and ice to outdoor workers, the homeless, and others at city parks and other distribution centers. Coordinate donations from businesses and individuals, and distribute as needed.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Priority (High, Moderate, Low):	A-6 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Administration, Police Dept., Fire Dept., Public Works
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed and Defer to Plan Update. The City initiates as needed in coordination with local shelters/missions.

City of Longview – Previous Action #29	
Proposed Action	Partner with local charities and churches to conduct a “fan drive” to aid low-income individuals and families by providing fans and window air conditioners to the needy during times of extreme heat.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Priority (High, Moderate, Low):	A-7 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC, Public Works
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed and Defer to Plan Update. The City conducts as needed.

SECTION 18: PREVIOUS ACTIONS

CITY OF WHITE OAK

City of White Oak – Previous Action #1	
Proposed Action	Partner with ETCOG to seek FEMA grant funding to offer individual family Safe Room rebate program. Once the program is operational, White Oak will publicize the program to its citizens and work with ETCOG to encourage residents to apply.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Priority (High, Moderate, Low):	A-1 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update. On-going.

City of White Oak – Previous Action #2	
Proposed Action	Check condition and test warning sirens; repair if needed.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Priority (High, Moderate, Low):	A-2 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed and Defer to Plan Update. The City completes this annually.

SECTION 18: PREVIOUS ACTIONS

City of White Oak – Previous Action #3	
Proposed Action	Create an action plan for city employees outlining response activities for the aftermath of a tornado.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Priority (High, Moderate, Low):	A-3 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Administration, EMC
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update. This City is planning to meet with department heads from the Fire Dept., Police Dept., and Public Works to implement an action plan for response activities in the aftermath of a tornado or other natural disaster.

City of White Oak – Previous Action #4	
Proposed Action	Create and implement a public education plan informing the public about tornado mitigation actions.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Priority (High, Moderate, Low):	A-4 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Administration, EMC, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update.

City of White Oak – Previous Action #5	
Proposed Action	Conduct first aid classes for the public to provide knowledge in life saving skills.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Priority (High, Moderate, Low):	A-5 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC, Fire Department, Red Cross
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update. The City will coordinate with local EMS services to look at implementing first aid and life-saving skills classes.

SECTION 18: PREVIOUS ACTIONS

City of White Oak – Previous Action #6	
Proposed Action	Create or locate local shelters for victims of tornadoes to be utilized before and after a tornado disaster.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Priority (High, Moderate, Low):	C-1 (Low)
Estimated Cost:	\$60,000
Lead Agency/Department Responsible:	Administration, EMC
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Defer to Plan Update.

City of White Oak – Previous Action #7	
Proposed Action	Regulate and/or ban outdoor burning during drought conditions for prevent accidental fires from spreading
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	A-6 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Administration, EMC
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed. Fire Marshal currently implements burn bans when necessary for the city as well as implements burn bans with the county.

City of White Oak – Previous Action #8	
Proposed Action	Publicize information to citizens on the mitigation of wildfires.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	A-7 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Defer to Plan Update.

SECTION 18: PREVIOUS ACTIONS

City of White Oak – Previous Action #9	
Proposed Action	Create a list of resources to be used during a major wildfire situation. This should include equipment, water trucks, additional manpower and contact information for those surrounding departments with which White Oak has interlocal agreements.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	A-8 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC, Fire Dept.
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed. The City currently has mutual aid agreements with several surrounding departments that can provide manpower and equipment, including water tankers. Our dispatch center at the White Oak Police Department has contact information for all surrounding departments as well as the Texas A&M Forest Service in Gilmer, TX which is approximately 21 minutes away and can also provide aircraft support during a wildfire if needed.

City of White Oak – Previous Action #10	
Proposed Action	Develop training classes in conjunction with the Texas Forest Service to provide knowledge to citizens on mitigation of wildfires.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Priority (High, Moderate, Low):	B-1 (Moderate)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	EMC
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Defer to Plan Update. The Fire Department will look to coordinate with Texas Forest Service to jointly provide information and classes if possible, to provide better knowledge of wildfire mitigation to the citizens.

SECTION 18: PREVIOUS ACTIONS

EAST TEXAS COUNCIL OF GOVERNMENTS (ETCOG)

East Texas Council of Governments – Previous Action #1	
Proposed Action	Develop and implement a public education campaign to inform individuals and families of the dangers of natural hazards and ways in which they can protect themselves, their loved ones and their property. Place mitigation information on the ETCOG website.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wind Storm, Flood, Extreme Heat, Hail Storm, Lightning, Drought
Priority (High, Moderate, Low):	A-4 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Public Safety, Public Information
Implementation Schedule:	Within 1 year
2024 ANALYSIS:	
Delete Action. ETCOG no longer deems action a priority.	

East Texas Council of Governments – Previous Action #2	
Proposed Action	Schedule and hold public meetings to discuss hazard mitigation topics; invite community leaders, emergency responders and members of the public to suggest ways to improve local emergency response and to brainstorm about new mitigation actions for ETCOG and its member jurisdictions.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wind Storm, Flood, Extreme Heat, Hail Storm, Lightning, Drought
Priority (High, Moderate, Low):	A-5 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Public Safety, Public Information
Implementation Schedule:	Within 1 year
2024 ANALYSIS:	
Defer to Plan Update.	

SECTION 18: PREVIOUS ACTIONS

East Texas Council of Governments – Previous Action #3	
Proposed Action	Apply for NOAA's Storm Ready Communities designation and encourage all ETCOG member jurisdictions to participate (http://www.stormready.noaa.gov v/howto.htm).
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wind Storm, Flood, Extreme Heat, Hail Storm, Lightning, Drought
Priority (High, Moderate, Low):	B-5 (Moderate)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Public Safety
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Defer to Plan Update.

East Texas Council of Governments – Previous Action #4	
Proposed Action	Develop and implement a public education campaign to encourage people to register for CODE RED emergency notification system
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Wind Storm, Flood
Priority (High, Moderate, Low):	A-3 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Public Safety and Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed. ETCOG is conducted annually.

East Texas Council of Governments – Previous Action #5	
Proposed Action	Apply annually for grant funding to provide CODE RED emergency notification services for the 14-county region, including all member cities.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Windstorm, Flood
Priority (High, Moderate, Low):	A-2 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Public Safety
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed. ETCOG is conducted annually.

SECTION 18: PREVIOUS ACTIONS

East Texas Council of Governments – Previous Action #6	
Proposed Action	Seek FEMA grant funding to offer and administer an individual family Storm Shelter rebate program throughout the ETCOG region. This program has been planned and is ready for immediate implementation, when funding is obtained.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Windstorm
Priority (High, Moderate, Low):	A-1 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Public Safety, Aging
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Delete Action. ETCOG has been able to implement program.

East Texas Council of Governments – Previous Action #7	
Proposed Action	Create and implement an emergency plan for ETCOG that outlines evacuation, sheltering location and logistics for employees in the event of threatening weather events.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Windstorm
Priority (High, Moderate, Low):	A-6 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Public Safety
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Completed.

SECTION 18: PREVIOUS ACTIONS

East Texas Council of Governments – Previous Action #8	
Proposed Action	Develop and implement a plan to efficiently use ETCOG GoBus resources in the event of an emergency evacuation anywhere in the ETCOG region.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	B-4 (Moderate)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Transportation
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Completed. GoBus planning is conducted annually.

East Texas Council of Governments – Previous Action #9	
Proposed Action	Train GIS mapping personnel to use HAZUS software to estimate potential losses from floods and to visualize the effects of such hazards; share results with all jurisdictions. There is a data deficiency for flood maps, and this action would mitigate the data deficiency by training personnel to use HAZUS.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	B-3 (Moderate)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	GIS Mapping
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Defer to Plan Update. Update action to reflect: ETCOG GIS mapping personnel to provide mapping services to help with estimating potential losses from floods and to visualize the effects of such hazards; share results with all jurisdictions.

SECTION 18: PREVIOUS ACTIONS

East Texas Council of Governments – Previous Action #10	
Proposed Action	Add lightning arrestors to all ETCOG buildings.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Priority (High, Moderate, Low):	B-1 (Moderate)
Estimated Cost:	\$2,500 per building
Lead Agency/Department Responsible:	Operations
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Completed.

East Texas Council of Governments – Previous Action #11	
Proposed Action	Develop and implement a rebate program to assist low-income families to purchase fans.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Priority (High, Moderate, Low):	A-7 (High)
Estimated Cost:	\$25.00 per fan
Lead Agency/Department Responsible:	Executive Director, Operations, Public Information
Implementation Schedule:	Within 1 year

2024 ANALYSIS:
Delete Action. ETCOG indicated the project will not continue.

East Texas Council of Governments – Previous Action #12	
Proposed Action	Inspect the roof on each ETCOG building. Replace or reinforce any roof which is vulnerable to hail damage.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail Storm
Priority (High, Moderate, Low):	B-2 (Moderate)
Estimated Cost:	\$125 per building/\$3,000 for hardening per building
Lead Agency/Department Responsible:	Administration and Operations
Implementation Schedule:	Within 2-3 years

2024 ANALYSIS:
Completed.

SECTION 18: PREVIOUS ACTIONS

East Texas Council of Governments – Previous Action #13	
Proposed Action	Increase public awareness of ways to conserve water, prevent loss of valuable topsoil, and reduce the effects of drought. Coordinate this effort with local agriculture agents; local Farm Bureau staff members; agricultural science, earth science, and natural science teachers at local schools, and other interested parties.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Priority (High, Moderate, Low):	A-8 (High)
Estimated Cost:	No added cost; work into existing programs
Lead Agency/Department Responsible:	Public Safety, Public Information
Implementation Schedule:	Within 1 year
2024 ANALYSIS:	
Delete Action. ETCOG no longer deems action applicable.	

East Texas Council of Governments – Previous Action #14	
Proposed Action	Replace toilets with low-flow fixtures
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Priority (High, Moderate, Low):	C-1 (Low)
Estimated Cost:	\$200 each
Lead Agency/Department Responsible:	Maintenance
Implementation Schedule:	Within 4 years or more
2024 ANALYSIS:	
Completed.	

SECTION 18: PREVIOUS ACTIONS

East Texas Council of Governments – Previous Action #15	
Proposed Action	Create drainage ditches at lower ends of parking areas, to remove standing water.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Priority (High, Moderate, Low):	C-2 (Low)
Estimated Cost:	\$1,200 per parking area
Lead Agency/Department Responsible:	Administration and Operations
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Defer to Plan Update.

East Texas Council of Governments – Previous Action #16	
Proposed Action	Harden COG-owned buildings to better resist wind storms.
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wind Storm
Priority (High, Moderate, Low):	C-3 (Low)
Estimated Cost:	\$10,000 per building
Lead Agency/Department Responsible:	Administration and Operations
Implementation Schedule:	Within 4 years or more

2024 ANALYSIS:
Completed.



SECTION 19
**MITIGATION
ACTIONS**

SECTION 19: MITIGATION ACTIONS

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SUMMARY

As discussed in Section 2, at the mitigation workshop the planning team and stakeholders met to develop mitigation actions for each of the natural hazards included in the Plan Update. Each of the actions in this section were prioritized based on FEMA’s Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) criteria necessary for the implementation of each action.

As part of the economic evaluation of the STAPLEE analysis, jurisdictions analyzed each action in terms of the overall costs, measuring whether the potential benefit to be gained from the action outweighed costs associated with it. As a result of this exercise, priority was assigned to each mitigation action by marking them as High (H), Moderate (M), or Low (L). An action that is ranked as “High” indicates that the action will be implemented as soon as funding is received. A “Moderate” action is one that may not be implemented right away depending on the cost and number of citizens served by the action. Actions ranked as “Low” indicate that they will not be implemented without first seeking grant funding and after “High” and “Moderate” actions have been completed. This process was also used to prioritize actions related to High Hazard Potential Dams (HHPDs).

Within each mitigation action worksheet, the Planning Team considered all potential funding sources that could be utilized to implement the proposed project. To ensure all potential funding resources are considered and are not limited to those sources identified within the action worksheet, please see Appendix G for a list of all available State and Federal grant programs as of 2024. The Planning Team will continue to seek out other available funding sources during the 5-year cycle as notices of funding opportunity (NOFO) are released.

All mitigation actions created by Planning Team members are presented in this section in the form of Mitigation Action Worksheets. More than one hazard is sometimes listed for an action, if appropriate. Actions presented in this section represent a comprehensive range of mitigation actions per current State and FEMA Guidelines, including one action, per hazard, and at least two different types for each participating jurisdiction. The term county-wide action refers to Gregg County, City of Clarksville City, City of Gladewater, City of Kilgore, City of Lakeport, City of

SECTION 19: MITIGATION ACTIONS

Longview, City of Warren City, and the City of White Oak. County-wide actions do not apply to ETCOG.

Table 19-1. Gregg County Mitigation Action Matrix

TYPE OF ACTION	
Action #1 – Plans/Regulations (Blue)	Action #3 – Natural Systems Protections (Green)
Action #2 – Education/Awareness (Red)	Action #4 – Structural (Orange)

JURISDICTION	Dam Failure	Drought	Extreme Heat	Flood	Hail	Lightning	Thunderstorm Wind	Tornado	Wildfire	Winter Storm	Hazardous Materials	Infectious Disease
Gregg County	●●	●●	●●	●●	●●	●●	●●	●●	●●●	●●	●●	●
City of Clarksville City	N/A	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●	●
City of Gladewater	●●	●●	●●	●●	●●	●●	●●	●●	●●●	●●	●●	●
City of Kilgore	N/A	●●	●●	●●	●●	●●	●●	●●	●●●	●●	●●	●
City of Lakeport	N/A	●●	●●	●●	●●	●●	●●	●●	●●●	●●	●●	●
City of Longview	●●●	●●	●●	●●●●	●●	●●	●●	●●	●●●	●●	●●	●
City of Warren City	N/A	●●	●●	●●	●●	●●	●●	●●	●●●	●●	●●	●
City of White Oak	N/A	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●●	●●●	●●	●
East Texas Council of Governments	N/A	●●	●●	●●	●●	●●	●●	●●	●●●	●●	●	●

SECTION 19: MITIGATION ACTIONS

GREGG COUNTY-WIDE ACTIONS

Gregg County-wide – Action #1	
Proposed Action:	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.
BACKGROUND INFORMATION	
Site and Location:	County-wide including all participating jurisdictions
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure (where applicable), Drought, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm, Hazardous Materials, Infectious Disease
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County and Local Emergency Managers / Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

Gregg County-wide – Action #2	
Proposed Action:	Upgrade critical facilities 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 where high plasticity soils are indicated.
BACKGROUND INFORMATION	
Site and Location:	County-wide critical facilities including all participating jurisdictions
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce impact on ground water. Reduce rainfall runoff volume and risk of flooding. Reduce risk and spread of wildfire.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 per structure
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County and Local Emergency Managers / Administration
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Local Plans and Ordinances; Land, Water, & Transportation Plan (LWTP)

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Gregg County-wide – Action #3	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	County-wide and City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure (where applicable), Drought, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County and Local Emergency Managers / Administration
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

Gregg County-wide – Action #4	
Proposed Action:	Harden/retrofit critical facilities to hazard-resistant levels.
BACKGROUND INFORMATION	
Site and Location:	County-wide and City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure (where applicable), Drought, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm, Hazardous Materials
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County and Local Emergency Managers / Administration
Implementation Schedule:	Within 12 - 24 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan; Land, Water, & Transportation Plan (LWTP)

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

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Gregg County-wide – Action #5	
Proposed Action:	Develop a Community Wildfire Protection Plan (CWPP).
BACKGROUND INFORMATION	
Site and Location:	Participating jurisdictions that do not have an active CWPP: Gregg County, Clarksville City, City of Gladewater, City of Kilgore, City of Lakeport, City of Longview, City of White Oak
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk and spread of wildfires. Reduce risk of damages, and injuries.
Type of Action: (Safety/Security, Food, Water Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County and Local Emergency Managers / Administration, County/Local Fire Department/VFD
Implementation Schedule:	Within 12 - 36 months, pending plan adoption and available funding
Incorporation into Existing Plans:	Hazard Mitigation Plan Updates

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Gregg County-wide – Action #6	
Proposed Action:	Continue planning for and improving dam breach data, state and local partnerships, community engagement, and maximizing funding capabilities to improve local mitigation, planning, and development practices regarding all dams in the planning area.
BACKGROUND INFORMATION	
Site and Location:	County-wide (participating jurisdictions)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce vulnerabilities to and from high hazard potential dams; Address deficiencies in capabilities; Reduce risk of dam failure.
Type of Action: (Safety/Security, Food, Water Shelter, Health/Medical, Energy (Power/Fuel), Communication, Transportation, Hazardous Materials, Water Systems)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Water Systems
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County and Local Emergency Managers, Local dam owners
Implementation Schedule:	Within 60 months of plan adoptions
Incorporation into Existing Plans:	HHPD Emergency Action Plans

COMMENTS:

SECTION 19: MITIGATION ACTIONS

GREGG COUNTY

Gregg County – Action #1	
Proposed Action:	Work with the Texas A&M Forest Service to attain “Firewise Communities” status.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce wildfire risk and build resiliency
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	County Budget, Staff Time
Lead Agency/Department Responsible:	Administration, EMC
Implementation Schedule:	Within 2-3 years
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Gregg County – Action #2	
Proposed Action:	Implement a new and expanded program to partner with utility companies to keep right-of-way clear and to trim tree limbs that may fall on electric or telephone lines.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Winter Storm, Thunderstorm Wind
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	County Budget, Staff Time
Lead Agency/Department Responsible:	Administration, EMC
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Gregg County – Action #3	
Proposed Action:	Clean and upgrade major culvert areas that are prone to flooding (about 12 locations planned for the next 5 years).
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages or injuries through flood mitigation at high-risk structures; Reduce the need for emergency response in high-risk areas; Reduce repetitive flood losses/claims; Reduce community recovery efforts and costs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$467,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	County Road & Bridge
Implementation Schedule:	On-going, as funding becomes available
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

Gregg County – Action #4	
Proposed Action:	Sponsor “Storm Spotter” classes quarterly in partnership with the National Weather Service and Longview Fire Department.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Lightning, Winter Storm, Thunderstorm Wind, Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	County Budget, Staff Time
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

Gregg County – Action #5	
Proposed Action:	Develop and implement a public education campaign to inform residents of the dangers of natural hazards and suggested mitigation actions for individuals and families.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	County Budget, Staff Time
Lead Agency/Department Responsible:	EMC, Public information
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

CITY OF CLARKSVILLE CITY

City of Clarksville City – Action #1	
Proposed Action:	Provide alternative source of communication such as radios in order for city personnel to coordinate during extreme weather events.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Ensure continuity of critical services. Reduces risk to critical personnel through improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 2 years
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

City of Clarksville City – Action #2	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	City Hall and the Volunteer Fire Department.
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration, Utilities, Volunteer Fire Department
Implementation Schedule:	Within 2 years
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

City of Clarksville City – Action #3	
Proposed Action:	Coordinate with the City of Gladewater, the City of White Oak, and other neighboring communities to establish joint mitigation programs such as tree trimming and alternative water sourcing.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce recovery efforts for the community after an event; Build resiliency within the community; Reduce risk of damages through improved maintenance; Reduce risk of water shortage; Ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Water Systems
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration, in coordination with the Cities of Gladewater and White Oak
Implementation Schedule:	Within 2 years
Incorporation into Existing Plans:	Existing MOU's and Mutual Aid Agreements

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Clarksville City – Action #4	
Proposed Action:	Provide public education in coordination with Gregg County Emergency Management regarding actions which may be taken to mitigate the impact of these natural hazards.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff Time
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Clarksville City – Action #5	
Proposed Action:	Consult and assess critical and public facilities to identify a plan harden facilities to protect against hazard events. Some projects may include, but are not limited to, installing storm shutters, installing high impact glass, reinforcing doors with long hinge attachments, installing impact resistant shingles on roofs, removing rotting trees and limbs, and anchoring outdoor objects and utilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical and public facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$15,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, Public Works, Maintenance
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Clarksville City – Action #6	
Proposed Action:	Partner with ETCOG to seek FEMA grant funding to offer individual family Safe Room rebate program. Once the program is operational, City of Clarksville City will publicize the program to its citizens and work with ETCOG to encourage residents to apply.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to citizens by providing in-home safe rooms in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000 per safe room
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	Local Building Codes/Ordinances

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Clarksville City – Action #7	
Proposed Action:	Implement program to remove debris and fuels that increase the risk of wildfire.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to structures; Ensure continuity of critical services; Reduce risk of injuries to critical service employees.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$10,000 (Annually)
Potential Funding Sources:	City Budget
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Clarksville City – Action #8	
Proposed Action:	Continue annual maintenance of flood-prone areas, remove debris from drainage culverts when needed to alleviate potential flooding hazards, and assess system for potential upgrades and improvements to maximize mitigation efforts.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages caused by flooding by maintaining or restoring drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000 (Annually)
Potential Funding Sources:	City Budget
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Annually
Incorporation into Existing Plans:	Stormwater Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Clarksville City – Action #9	
Proposed Action:	Install lightning arrestors on all municipal buildings.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to structures through improved construction techniques; Reduce recovery efforts for the community after an event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, Maintenance
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

CITY OF GLADEWATER

City of Gladewater – Action # 1	
Proposed Action:	Partner with TCEQ and engineers to improve the Gladewater Lake Dam based on the dam action plan and annual inspection reports including constructing a new spillway, flattening the slopes of the dam, and raising the dam elevation.
BACKGROUND INFORMATION	
Site and Location:	Gladewater Lake 1601 Lakeshore Dr. Gladewater, Texas 75647
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to structures; Ensure continuity of critical services; Reduce risk of injuries to critical service employees; Reduce risk of dam failure and flooding.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	250,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Gladewater Fire/Emergency Management in conjunction with TCEQ
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	N/A

COMMENTS:
The City of Gladewater is working on a Dam Plan with TCEQ to determine vulnerabilities and solutions to address current issues identified.

SECTION 19: MITIGATION ACTIONS

City of Gladewater – Action #2	
Proposed Action:	Obtain permanent generators for City Hall and Library.
BACKGROUND INFORMATION	
Site and Location:	519 E. Broadway (City Hall) and 312 W. Pacific (Lee Public Library)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce loss of stored information; Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Projects

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$200,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	N/A

COMMENTS:
The City of Gladewater utilizes the Library as an alternative community center during severe weather events.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

City of Gladewater – Action # 3	
Proposed Action:	Obtain a mobile generator for public works for lift station emergencies.
BACKGROUND INFORMATION	
Site and Location:	City-wide (17 lift stations)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of flood water contamination; Reduce risk of surface water infiltration and sewage backup; Ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Projects

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$60,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Gladewater Public Works
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

City of Gladewater – Action #4	
Proposed Action:	Work with the Texas A&M Forest Service to attain “Firewise Communities” status.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce wildfire risk and build resiliency
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff Time
Lead Agency/Department Responsible:	Administration, EMC, Fire Dept.
Implementation Schedule:	Within 2-3 years
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Gladewater – Action #5	
Proposed Action:	Implement a new program to partner with utility companies to keep right-of-way clear and to trim tree limbs that may fall on electric or telephone lines.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Winter Storm, Thunderstorm Wind
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff Time
Lead Agency/Department Responsible:	EMC, Public Works, in conjunction with local utility providers
Implementation Schedule:	On-going
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Gladewater – Action #6	
Proposed Action:	Participate in the “Turn Around Don’t Drown” campaign.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood risk and build resiliency through educating the public.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff Time
Lead Agency/Department Responsible:	EMC, Public Works, Fire Dept.
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Gladewater – Action #7	
Proposed Action:	Provide bottled water and ice to outdoor workers, the homeless, and others at city parks and other distribution centers. Coordinate donations from businesses and individuals and distribute as needed.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injury or illness to residents.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget
Lead Agency/Department Responsible:	Administration, Police Dept., Fire Dept., Public Works
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Gladewater – Action #8	
Proposed Action:	Partner with local charities and churches to conduct a “fan drive” to aid low-income individuals and families by providing fans and window air conditioners to the needy during times of extreme heat.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injury or illness to residents.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Gladewater – Action #9	
Proposed Action:	Implement program to remove debris from drainage culverts when needed to alleviate potential flooding hazards.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages caused by flooding by maintaining or restoring drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000 (annually)
Potential Funding Sources:	City Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Stormwater Management Plan/Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

CITY OF KILGORE

City of Kilgore – Action #1	
Proposed Action:	Install new warning sirens.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to citizens through improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communications
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000
Potential Funding Sources:	City Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Kilgore Police Department
Implementation Schedule:	2024
Incorporation into Existing Plans:	N/A

COMMENTS:
New radios have been ordered and are scheduled for replacement in 2024.

SECTION 19: MITIGATION ACTIONS

City of Kilgore – Action #2	
Proposed Action:	Fund and expand subscriber database of Code Red weather warning product.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to citizens through improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communications
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	City Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Kilgore Police Department
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	Emergency Management Action Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Kilgore – Action #3	
Proposed Action:	Partner with ETCOG to seek FEMA grant funding to offer individual family Safe Room rebate program. Once the program is operational, Kilgore will publicize the program to its citizens and work with ETCOG to encourage residents to apply.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to citizens by providing in-home safe rooms in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000 per safe room
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	Local Building Codes/Ordinances

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Kilgore – Action #4	
Proposed Action:	Obtain awareness materials from Texas Floodplain Management Association for distribution to the public. Post public awareness content on social media platforms prior to and during flooding.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communications
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget
Lead Agency/Department Responsible:	Kilgore Police Dept and Fire Dept
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	Emergency Management Action Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Kilgore – Action #5	
Proposed Action:	Seek master drainage study and plan to evaluate future drainage enhancement projects.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve risk assessment; Reduce risk of damages or injuries through drainage improvements; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication, Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$25,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Kilgore Public Works
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	Comprehensive/Master Plan, Land Use Plan, Capital Improvements Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Kilgore – Action #6	
Proposed Action:	Seek funding for purchase of previously identified repetitive loss properties. Re-purpose repetitive loss properties into green space and incorporate into city park system.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Eliminate risk of flood damages to high-risk structures and prevent future losses in high-risk flood hazard areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Kilgore Police Dept and Fire Dept
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	Comprehensive/Master Plan, Land Use Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Kilgore – Action #7	
Proposed Action:	Partner with power utility (SWEPCO) to implement an expanded tree trimming program and identify areas where additional tree trimming is needed.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with power outages; Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Energy (Power/Fuel)
Effect on New/Existing Buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$100,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Kilgore Public Works
Implementation Schedule:	Within 2-3 years
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Kilgore – Action #8	
Proposed Action:	Perform survey of public buildings and critical infrastructure for lightning rods and arresting equipment. Purchase and install lightning rods and arresting equipment where the need is identified.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Kilgore Maintenance
Implementation Schedule:	Within 2-3 years
Incorporation into Existing Plans:	Capital Improvements Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Kilgore – Action #9	
Proposed Action:	Post public education information on social media regarding lightning safety tips and how to mitigate lightning damage.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Kilgore Police Dept/Fire Dept.
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Kilgore – Action #10	
Proposed Action:	Create a public education campaign to promote the use of roofing materials that better resist hail damage. Include mitigation tips to prevent damage to valuable property during hailstorms.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Kilgore Police Dept/Fire Dept.
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Kilgore – Action #11	
Proposed Action:	Provide covered parking to protect municipal vehicles and equipment.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$25,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, Public Works
Implementation Schedule:	Within 4 years or more; In-progress
Incorporation into Existing Plans:	Capital Improvements Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Kilgore – Action #12	
Proposed Action:	Partner with local charities and churches to conduct a “fan drive” to aid low-income individuals and families by providing fans and window air conditioners to the needy during times of extreme heat.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injury or illness to residents.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, Police Dept, Fire Dept, Public Works
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

CITY OF LAKEPORT

City of Lakeport – Action #1	
Proposed Action:	Improve early warning systems to notify citizens of tornado warnings and other emergencies. This could include Facebook notifications, creation and use of a city web page, and the improved use of the Code Red warning system. The City of Lakeport also wants to apply for a FEMA grant to purchase and install 4 warning sirens; this is a high priority.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to citizens through improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Winter Storm, Thunderstorm Wind, Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$82,000
Potential Funding Sources:	City Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	Emergency Management Action Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Lakeport – Action #2	
Proposed Action:	Encourage residents to sign up for Code Red / Smart 911 emergency warning notification system. Post notices in public places and on public websites, Facebook pages, and other social media outlets.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to citizens through improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Lightning, Winter Storm, Thunderstorm Wind, Tornado, Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	EMC, Public Information, Information Technology
Implementation Schedule:	On-going
Incorporation into Existing Plans:	Emergency Management Action Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Lakeport – Action #3	
Proposed Action:	Partner with ETCOG to seek FEMA grant funding to offer individual family Safe Room rebate program. Once the program is operational, Lakeport will publicize the program to its citizens and work with ETCOG to encourage residents to apply.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to citizens by providing in-home safe rooms in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000 per safe room
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	Local Building Codes/Ordinances

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Lakeport – Action #4	
Proposed Action:	Provide public education regarding actions which may be taken to mitigate the impact of these natural hazards. Partner with Elderville – Lakeport Volunteer Fire Department to put mitigation information on their web page at www.elvfd.com
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff Time
Lead Agency/Department Responsible:	Administration, Public Information in conjunction with Edlerville-Lakeport VFD
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	Emergency Management Action Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Lakeport – Action #5	
Proposed Action:	Partner with utility companies to develop and implement a program to trim tree limbs that could fall on utility transmission lines in icy weather or high wind conditions.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000 (Annually)
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	EMC, in conjunction with local utility providers
Implementation Schedule:	On-going
Incorporation into Existing Plans:	N/A

COMMENTS:
The City will continue to be vigilant in maintaining communication with power utility companies by informing them of tree limbs obstructing power lines, for public safety and for their linemen's safety.

SECTION 19: MITIGATION ACTIONS

City of Lakeport – Action #6	
Proposed Action:	Replace or upgrade generators for wastewater treatment & lift stations to prevent interruption of service.
BACKGROUND INFORMATION	
Site and Location:	Wastewater Treatment Plant and Lift Stations
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$8,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

CITY OF LONGVIEW

City of Longview – Action #1	
Proposed Action:	Upgrade critical facilities to include drought mitigation measures and expansive soils protection such as greywater reuse systems, drought tolerant landscaping, installation of a sprinkler system with regular watering schedule and installation of French drains where high plasticity soils are indicated; use of alternative water sources (complete rain catchment system, etc.)
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of water shortages to residents
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security; Health/Medical
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	Unknown
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Longview (City Administration)
Implementation Schedule:	Within 2 years or more
Incorporation into Existing Plans:	Capital Improvements Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Reduce costs of reparation from NFIP; Prevents injury to residents

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #2	
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	Any critical facilities within the City of Longview or owned by the City of Longview (including the water treatment intake facilities at Lake O' the Pines, Lake Cherokee, and Sabine River and associated pump stations outside the city limits)
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Continue essential utility services during severe weather event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Power/Fuel
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$250,000 minimum
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Longview (City Administration)
Implementation Schedule:	Within 2 years or more
Incorporation into Existing Plans:	Capital Improvements Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #3	
Proposed Action:	Implement mitigation measures to reduce the impacts of flooding on transportation infrastructure including, but not limited to, elevating roads and railways in flood prone areas and constructing roads and parking lots with permeable pavement to store more water.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of flooding; Reduce damages caused by flooding; Ensure continuity of transportation infrastructure during a flood event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Transportation, Water Systems
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Longview (City Administration)
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #4	
Proposed Action:	Implement repairs or upgrades to high hazard dams in poor condition to mitigate dam failure, improve stability, increase water storage capacity, and reduce erosion.
BACKGROUND INFORMATION	
Site and Location:	City-wide, including Lake Lamond Dam
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to structures and infrastructure; Reduce risk of injuries or fatalities; Reduce risk of flood and water contamination.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT, TCEQ; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City of Longview (City Administration)
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #5	
Proposed Action:	Check the location and condition of warning sirens. If repairs or additional units are needed, determine cost and make recommendation to governing body.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to citizens through improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	EMC
Implementation Schedule:	Annually
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #6	
Proposed Action:	Enhance emergency services to increase the efficiency of wildfire response and recovery activities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Annually
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #7	
Proposed Action:	Seek training opportunities and publicize them to all emergency responders.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to structures; Ensure continuity of critical services; Reduce risk of injuries to critical service employees.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	City Budget
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 1 year; On-going
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #8	
Proposed Action:	Promote the “Turn Around Don’t Drown” campaign, in partnership with DPS.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood risk and build resiliency through educating the public.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff Time
Lead Agency/Department Responsible:	EMC
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #9	
Proposed Action:	Create and implement an education campaign to inform the public of the dangers of natural hazards and teach mitigation techniques to reduce the impact of these hazards. Public officials will include hazard mitigation messages in their newsletters, web pages, and speeches, as appropriate. The EMC will accept opportunities to speak to service clubs and school groups about hazard mitigation.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	Within 2-3 years
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #10	
Proposed Action:	Ensure that critical facilities owned by the jurisdiction are protected from flood. Inspect all critical facilities and consider the flood risk of each. Consult FEMA publications, and ask an expert for additional suggestions in floodproofing, if needed. Consider cost and potential benefits and make recommendation to governing body.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing and new structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 2-3 years
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #11	
Proposed Action:	Work with the Texas A&M Forest Service to identify Wildland-Urban Interface areas; develop and implement a plan to reduce risk.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of wildfire; Increase understanding of wildfire risk in community.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$200,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	In-progress
Incorporation into Existing Plans:	Hazard Mitigation Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #12	
Proposed Action:	Coordinate with the Texas A&M Forest Service to schedule educational events and obtain literature for public distribution.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	On-going
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #13	
Proposed Action:	Install lightning arrestors on all public buildings; check existing units to ensure that they are properly installed and working correctly.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to structures through improved construction techniques; Reduce recovery efforts for the community after an event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Lightning
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$2,500 (each)
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 2-3 years
Incorporation into Existing Plans:	Capital Improvements Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #14	
Proposed Action:	Sponsor a booth at local events, to hand out free literature about the dangers of wildfire and what mitigation actions people can take to reduce the risk of fire damage to their homes and businesses.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	On-going
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #15	
Proposed Action:	Seek state and FEMA sponsored training in flood mitigation for key personnel.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and reduce flood risk.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works/Development Services
Implementation Schedule:	Within 2-3 years
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #16	
Proposed Action:	Improve the long-range management and use of flood-prone areas by the adoption and enforcement of local ordinances to regulate new development within the floodplain. Review and revise ordinances, when needed.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to public structures by locating buildings outside of known hazard areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,500
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Development Services
Implementation Schedule:	Within 2-3 years
Incorporation into Existing Plans:	Local Building Codes/Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #17	
Proposed Action:	Place links on local websites to free FEMA training for independent study via the internet, such as 15-271 “Anticipating Hazardous Weather and Community Risk.”
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and reduce flood risk.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,500
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Media Development
Implementation Schedule:	Within 2-3 years
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #18	
Proposed Action:	Conduct public information campaign to remind citizens to hydrate and avoid direct exposure to the sun between the peak UV hours of 1 p.m. to 4 p.m., to prevent heat stroke.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	On-going
Incorporation into Existing Plans:	N/A

COMMENTS:
The City of Longview initiates during seasonal times of extreme heat impact with recurring messages shared via city’s communication platforms and twice-monthly through Public Safety updates presented by the EMC.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #19	
Proposed Action:	Increase local training opportunities for citizens, to encourage their involvement in mitigation efforts. Partner with ETCOG, TDEM, Texas A&M Forestry Service, TEEX, FEMA, and others, to bring free and low-cost mitigation training to Longview. Send PSAs to media to publicize these training opportunities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #20	
Proposed Action:	Develop public and private partnerships with businesses, service organizations, and other community groups to work together on local mitigation projects, mitigation planning, and cooperative mitigation actions.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect the community from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	EMC
Implementation Schedule:	On-going
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #21	
Proposed Action:	Work with state and federal agencies to maintain current flood maps.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve risk assessment; reduce risk of damages or injuries from flooding.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication, Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds
Lead Agency/Department Responsible:	Public Works, Development Services
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #22	
Proposed Action:	Implement all available measures to reduce the potential magnitude of a wildfire event on public-owned property. Schedule regular mowing of grass, trimming of trees and shrubs; consider plowing a firebreak in hazard areas.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with wildfire; Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$600,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Environmental Health, Public Works
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #23	
Proposed Action:	Partner with ETCOG to seek FEMA grant funding to offer individual family Safe Room rebate program. Once the program is operational, Longview will publicize the program and encourage residents to apply.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to citizens by providing in-home safe rooms in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000 per safe room
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	Local Building Codes/Ordinances

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #24	
Proposed Action:	Provide shelter for supplies and equipment at critical facilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages at critical facilities; Ensure continuity of critical services during and after event.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Extreme Heat, Flood, Hail, Lighting, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$2,500 per facility
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Facility Services
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	N/A

COMMENTS:
The City of Longview in coordination with Public Works and CVB are exploring the shipping container storage currently at the Fairground Activity Complex for emergency sheltering supplies.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #25	
Proposed Action:	As new structures are planned, built, harden public structures to protect the building and its contents, and to provide a safe place for humans during a storm.
BACKGROUND INFORMATION	
Site and Location:	City-wide, including Fire Station #7
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to structures; Ensure continuity of critical services; Reduce risk of injuries to critical service employees; Reduce risk of injuries to citizens.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Extreme Heat, Flood, Hail, Lighting, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #26	
Proposed Action:	Purchase properties in floodplain areas to reserve them from development.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages or injuries through flood mitigation at high-risk structures; Reduce the need for emergency response in high-risk areas; Reduce repetitive flood losses/claims; Reduce community recovery efforts and costs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$15,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #27	
Proposed Action:	Improve emergency procedures to efficiently respond and avoid unnecessary risk to human life, should a nearby dam fail.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget (Staff Time)
Lead Agency/Department Responsible:	EMC
Implementation Schedule:	Annually
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:
The City of Longview annually reviews the dams located in the City as well as recurring table-top exercises with the Army Corps of Engineers for Lake o' the Pines.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #28	
Proposed Action:	Promote FEMA-recommended construction methods for any new dam development. Provide educational materials in public offices, such as the floodplain manager’s office, EMC’s office, tax office, inspector’s office, permit office, etc. and offer links to FEMA publications on the local website.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Increase hazard awareness.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Water Systems
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget (Staff Time)
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #29	
Proposed Action:	Severe Loss-Repetitive loss HMP Home purchases in flood plain: participate with FEMA's program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages or injuries through flood mitigation at high-risk structures; Reduce the need for emergency response in high-risk areas; Reduce repetitive flood losses/claims; Reduce community recovery efforts and costs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$1,200,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #30	
Proposed Action:	Improve residential properties with a history of flooding through the City's Master Drainage program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages or injuries through flood mitigation at high-risk structures; Reduce the need for emergency response in high-risk areas; Reduce community recovery efforts and costs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	Master Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #31	
Proposed Action:	Improve street culverts and bridges that are undersized or have reached their design life per City's Master Drainage program.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages or injuries through flood mitigation at high-risk structures; Reduce the need for emergency response in high-risk areas; Reduce community recovery efforts and costs.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$2,500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Public Works
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	Master Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #32	
Proposed Action:	Provide bottled water and ice to outdoor workers, the homeless, and others at city parks and other distribution centers. Coordinate donations from businesses and individuals, and distribute as needed.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injury or illness to residents.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget
Lead Agency/Department Responsible:	Administration, Police Dept., Fire Dept., Public Works, in coordination with local shelters/mission
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Longview – Action #33	
Proposed Action:	Partner with local charities and churches to conduct a “fan drive” to aid low-income individuals and families by providing fans and window air conditioners to the needy during times of extreme heat.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injury or illness to residents.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	EMC, Public Works
Implementation Schedule:	As needed
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

CITY OF WARREN CITY

City of Warren City – Action #1	
Proposed Action:	Work with the Texas A&M Forest Service to attain “Firewise Communities” status.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce wildfire risk and build resiliency
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff Time
Lead Agency/Department Responsible:	Administration, EMC
Implementation Schedule:	Within 2-3 years
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Warren City – Action #2	
Proposed Action:	Implement a new program to partner with utility companies to keep right-of-way clear and to trim tree limbs that may fall on electric or telephone lines.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Winter Storm, Thunderstorm Wind
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff Time
Lead Agency/Department Responsible:	Administration
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Warren City – Action #3	
Proposed Action:	Implement program to remove debris from drainage culverts when needed to alleviate potential flooding hazards.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages caused by flooding by maintaining or restoring drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$50,000 (annually)
Potential Funding Sources:	City Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	Stormwater Management Plan/Ordinance

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of Warren City – Action #4	
Proposed Action:	Promote the “Turn Around Don’t Drown” campaign.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood risk and build resiliency through educating the public.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff Time
Lead Agency/Department Responsible:	Administration
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of Warren City – Action #5	
Proposed Action:	Partner with local charities and churches to conduct a “fan drive” to aid low-income individuals and families by providing fans and window air conditioners to the needy during times of extreme heat.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injury or illness to residents.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of Warren City – Action #6	
Proposed Action:	Develop and implement a public education campaign to inform residents of the dangers of natural hazards and suggested mitigation actions for individuals and families.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff Time
Lead Agency/Department Responsible:	Administration with assistance from County Office of Emergency Management
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

CITY OF WHITE OAK

City of White Oak – Action #1	
Proposed Action:	Assess the need for generators across the City and install generators with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Provide power for critical facilities during power outages and ensure continuity of critical services.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	City Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, EMC
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

SECTION 19: MITIGATION ACTIONS

City of White Oak – Action #2	
Proposed Action:	Adopt and implement a program for clearing debris from bridges, drains, ditches, and culverts and continually assess program for potential upgrades and improvements to maximize mitigation efforts.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages caused by flooding by maintaining or restoring drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 (Annually)
Potential Funding Sources:	City Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, EMC
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes/Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of White Oak – Action #3	
Proposed Action:	Create a defensible space program to reduce the risk of wildfire to critical facilities. Strategies may include, but are not limited to, performing maintenance such as pruning and clearing dead vegetation, selective logging, cutting high grass, planting fire-resistant vegetation, and creating fuel/fire breaks.
BACKGROUND INFORMATION	
Site and Location:	County-wide or City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk and spread of wildfires; Reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	\$500,000
Potential Funding Sources:	City Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, EMC, Fire Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of White Oak – Action #4	
Proposed Action:	Develop and enforce building codes throughout the community that make structures and homes hazard resistant. Consider acquiring and demolishing high risk structures in hazard prone areas.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to structures and infrastructure; Reduce risk of injuries or fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure Projects

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$1,000,000
Potential Funding Sources:	City Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, EMC
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes/Ordinances

COMMENTS:
The City is currently assessing the housing and structure inventory to determine which buildings need to reach code to be hazard resistant and/or which structures can be demolished to eliminate risk.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

SECTION 19: MITIGATION ACTIONS

City of White Oak – Action #5	
Proposed Action:	Adopt and implement a routine tree trimming program that clears tree limbs near power lines and/or hanging in right-of-way and drainage systems on a scheduled basis.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; Ensure continuity of services during and after event; Reduce damages associated with power outages;
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security, Energy (Power/Fuel)
Effect on New/Existing Buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	\$100,000 (Annually)
Potential Funding Sources:	City Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, EMC
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes/Ordinances

COMMENTS:
Currently, the fire department responds to many reports of downed tree limbs after a severe storm or incident.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 19: MITIGATION ACTIONS

City of White Oak – Action #6	
Proposed Action:	Partner with ETCOG to seek FEMA grant funding to offer individual family Safe Room rebate program. Once the program is operational, White Oak will publicize the program to its citizens and work with ETCOG to encourage residents to apply.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to citizens by providing in-home safe rooms in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000 per safe room
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, Public Information
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	Local Building Codes/Ordinances

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of White Oak – Action #7	
Proposed Action:	Check conditions and test warning sirens; repair if needed.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to citizens through improved communications and early warning.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	EMC
Implementation Schedule:	Annually
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of White Oak – Action #8	
Proposed Action:	Create an action plan for city employees outlining response activities for the aftermath of natural hazard events.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff Time
Lead Agency/Department Responsible:	Administration, EMC
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

City of White Oak – Action #9	
Proposed Action:	Create and implement a public education plan informing the public about tornado mitigation actions.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff Time
Lead Agency/Department Responsible:	Administration, EMC, Public Information
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of White Oak – Action #10	
Proposed Action:	Conduct first aid classes for the public to provide knowledge in life saving skills.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,000
Potential Funding Sources:	City Budget, Staff Time
Lead Agency/Department Responsible:	EMC, Fire Department, Red Cross, in coordination with local EMS
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of White Oak – Action #11	
Proposed Action:	Create or locate local shelters for victims of tornadoes to be utilized before and after a tornado disaster.
BACKGROUND INFORMATION	
Site and Location:	City-wide including vulnerable structures such as manufactured home parks
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to citizens by providing shelter in high-risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$500,000
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration, EMC
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	Emergency Management Plan, Capital Improvement Plan

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of White Oak – Action #12	
Proposed Action:	Publicize information to citizens on the mitigation of wildfires.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time), State and Federal Grants
Lead Agency/Department Responsible:	EMC, Public Information
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

City of White Oak – Action #13	
Proposed Action:	Develop training classes in conjunction with the Texas Forest Service to provide knowledge to citizens on mitigation of wildfires.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time), State and Federal Grants
Lead Agency/Department Responsible:	EMC and Fire Department
Implementation Schedule:	Within 2-3 years
Incorporation into Existing Plans:	N/A

COMMENTS:

SECTION 19: MITIGATION ACTIONS

EAST TEXAS COUNCIL OF GOVERNMENTS (ETCOG)

ETCOG – Action #1	
Proposed Action:	Schedule and hold public meetings to discuss hazard mitigation topics; invite community leaders, emergency responders and members of the public to suggest ways to improve local emergency response and to brainstorm about new mitigation actions for ETCOG and its member jurisdictions.
BACKGROUND INFORMATION	
Site and Location:	ETCOG district area
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm, Hazardous Materials, Infectious Disease
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Public Safety, Public Information
Implementation Schedule:	Within 1 year
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

ETCOG – Action #2	
Proposed Action:	Apply for NOAA’s Storm Ready Communities designation and encourage all ETCOG member jurisdictions to participate (http://www.stormready.noaa.gov v/howto.htm).
BACKGROUND INFORMATION	
Site and Location:	ETCOG district area critical facilities
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to citizens by educating the public on how to prepare for hazards and disasters.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Lightning, Tornado, Thunderstorm Wind, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Communication
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Public Safety
Implementation Schedule:	Within 2-3 years
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

ETCOG – Action #3	
Proposed Action:	ETCOG GIS mapping personnel to provide mapping services to help with estimating potential losses from floods and to visualize the effects of such hazards; share results with all jurisdictions.
BACKGROUND INFORMATION	
Site and Location:	ETCOG district area
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve risk assessment; reduce risk of damages and injuries.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	GIS Mapping
Implementation Schedule:	Within 2-3 years
Incorporation into Existing Plans:	Hazard Mitigation Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

SECTION 19: MITIGATION ACTIONS

ETCOG – Action #4	
Proposed Action:	Create drainage ditches at lower ends of parking areas, to remove standing water.
BACKGROUND INFORMATION	
Site and Location:	ETCOG district area
Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood risk through improved drainage capacity; Reduce risk of damages and injuries; Reduce emergency response demands.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	\$1,200 per parking area
Potential Funding Sources:	Local Department Budget, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	Administration and Operations
Implementation Schedule:	Within 4 years or more
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.



SECTION 20
**PLAN
MAINTENANCE**

SECTION 20: PLAN MAINTENANCE

- Hazard Description 1
- Incorporation..... 1
 - Process of Incorporation..... 1
- Monitoring and Evaluation..... 4
 - Monitoring..... 5
 - Evaluation..... 5
- Updating 6
 - Plan Revisions..... 6
 - Five (5) Year Review 6
- Continued Public Involvement..... 6

HAZARD DESCRIPTION

The following is an explanation of how the participating jurisdictions within Gregg County, and the general public will be involved in implementing, evaluating, and enhancing the Plan over time. When the plan is discussed in all maintenance procedures it includes mitigation actions and hazard assessments. The sustained hazard mitigation planning process consists of four main parts:

- Incorporation
- Monitoring and Evaluation
- Updating
- Continued Public Involvement

INCORPORATION

Participating jurisdictions within Gregg County will be responsible for further development and implementation of mitigation actions. Each action has been assigned to a specific department within the participating jurisdictions. The following describes the process by which participating jurisdictions will incorporate elements of the mitigation plan into other planning mechanisms.

PROCESS OF INCORPORATION

Once the Plan Update is adopted, participating jurisdictions within Gregg County will implement actions based on priority and the availability of funding. The planning area currently implements policies and programs to reduce loss to life and property from hazards. The mitigation actions developed for this Plan Update enhance this ongoing effort and will be implemented through other program mechanisms where possible.

The potential funding sources listed for each identified action may be used when the jurisdiction seeks funds to implement actions. An implementation time period or a specific implementation date has been assigned to each action as an incentive for completing each task and gauging whether actions are implemented in a timely manner.

Participating jurisdictions within Gregg County will integrate implementation of their mitigation actions with other plans and policies such as construction standards and emergency management plans, and ensure that these actions, or proposed projects, are reflected in other planning efforts.

SECTION 20: PLAN MAINTENANCE

Coordinating and integrating components of other plans and policies into goals and objectives of the Plan Update will further maximize funding and provide possible cost-sharing of key projects, thereby reducing loss of lives and property and mitigating hazards affecting the area.

Upon formal adoption of the Plan Update, planning team members from each participating jurisdiction will work to integrate the hazard mitigation strategies into other plans and codes as they are developed. Participating team members will conduct periodic reviews of plans and policies, once per year at a minimum, and analyze the need for revisions in light of the approved Plan. The planning team will review all comprehensive land use plans (applicable jurisdictions only), capital improvement plans (applicable jurisdictions only), annual budget reviews, emergency operations or management plans (applicable jurisdictions only), and transportation plans (applicable jurisdictions only) to guide and control development. Participating jurisdictions will ensure that capital improvement planning (applicable jurisdictions only) in the future will also contribute to the goals of this hazard mitigation Plan Update to reduce the long-term risk to life and property from all hazards. Within one year of formal adoption of the Plan Update, existing planning mechanisms will be reviewed by each jurisdiction.

Gregg County is committed to supporting the participating jurisdictions as they implement their mitigation actions. Planning team members will review and revise, as necessary, the long-range goals and objectives in strategic plan and budgets to ensure that they are consistent with this mitigation action plan. Additionally, the planning area will work to advance the goals of this hazard mitigation plan through its routine, ongoing, long-range planning, budgeting, and work processes.

Table 20-1 identifies types of planning mechanisms and examples of methods for incorporating the Plan Update into other planning efforts. The team members, listed in Table 20-2 below, will be responsible for the review of these planning mechanisms and their incorporation of the plan, with the exception of the Floodplain Management Plans; the jurisdictions who have a Floodplain Administrator on staff will be responsible for incorporating the plan when floodplain management plans are updated, or new plans are developed.

Table 20-1. Methods of Incorporation of the Plan

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
Annual Budget Review	Gregg County: Assistant Emergency Management Coordinator City of Clarksville City: City Manager City of Gladewater: Emergency Management Coordinator City of Kilgore: Emergency Management Coordinator/Fire Marshall City of Lakeport: City Secretary City of Longview: Emergency Management Coordinator City of Warren City: Mayor City of White Oak: City Coordinator East Texas Council of Governments: Director of Public Safety	Various departments and key personnel that participated in the planning process for participating jurisdictions within Gregg County will review the Plan and mitigation actions therein when conducting their annual budget review. Allowances will be made in accordance with grant applications sought, and mitigation actions that will be undertaken, according to the implementation schedule of the specific action.

SECTION 20: PLAN MAINTENANCE

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
Capital Improvement Plans	City of Kilgore: Emergency Management Coordinator/Fire Marshall City of Longview: Emergency Management Coordinator City of White Oak: City Coordinator	The Cities of Kilgore, Longview and White Oak have a Capital Improvement Plan (CIP) in place or under development. Prior to any revisions to the CIP, City departments will review the risk assessment and mitigation strategy sections of the HMAP, as limiting public spending in hazardous zones is one of the most effective long-term mitigation actions available to local governments.
Comprehensive Plans	City of Clarksville City: City Manager City of Kilgore: Emergency Management Coordinator/Fire Marshall City of Longview: Emergency Management Coordinator City of White Oak: City Coordinator	Several participating jurisdictions within Gregg County have Long-term Comprehensive Development Plans in place. Since comprehensive plans involve developing a unified vision for a community, the mitigation vision and goals of the Plan will be reviewed in the development or revision of a Comprehensive Plan.
Floodplain Management Plans	Gregg County: Floodplain Administrator City of Gladewater: Floodplain Administrator City of Kilgore: Floodplain Administrator City of Longview: Floodplain Administrator City of White Oak: Floodplain Administrator	Floodplain management plans include preventative and corrective actions to address the flood hazard. Therefore, the actions for flooding and information found in Section 8 of this Plan Update discussing the people and property at risk to flood will be reviewed and revised when participating jurisdictions within Gregg County update their management plans or develops new plans.
Grant Applications	Gregg County: Assistant Emergency Management Coordinator City of Clarksville City: City Manager City of Gladewater: Emergency Management Coordinator City of Kilgore: Emergency Management Coordinator/Fire Marshall City of Lakeport: City Secretary City of Longview: Emergency Management Coordinator	The Plan will be evaluated by participating jurisdictions within Gregg County when grant funding is sought for mitigation projects. If a project is not in the Plan Update, a Plan Revision may be necessary to include the action in the Plan.

SECTION 20: PLAN MAINTENANCE

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
	City of Warren City: Mayor City of White Oak: City Coordinator East Texas Council of Governments: Director of Public Safety	
Regulatory Plans	Gregg County: Assistant Emergency Management Coordinator City of Clarksville City: City Manager City of Gladewater: Emergency Management Coordinator City of Kilgore: Emergency Management Coordinator/Fire Marshall City of Lakeport: City Secretary City of Longview: Emergency Management Coordinator City of Warren City: Mayor City of White Oak: City Coordinator East Texas Council of Governments: Director of Public Safety	Currently, several participating jurisdictions within Gregg County have regulatory plans in place, such as Emergency Management Plans, Continuity of Operations Plans, Land Use Plans, and Evacuation Plans. The Plan Update will be consulted when County, City, and ETCOG departments review or revise their current regulatory planning mechanisms, or in the development of regulatory plans that are not currently in place.

MONITORING AND EVALUATION

Periodic revisions of the Plan are required to ensure that goals, objectives, and mitigation actions are kept current. When the plan is discussed in these sections it includes the risk assessment and mitigation actions as a part of the monitoring, evaluating, updating and review process. Revisions may be required to ensure the Plan is in compliance with federal and state statutes and regulations. This section outlines the procedures for completing Plan revisions, updates, and review. Table 20-2 indicates the department and title of the party responsible for Plan monitoring, evaluating, updating, and review of the Plan.

Table 20-2. Team Members Responsible for Plan Monitoring, Evaluating, Updating, and Review of the Plan

JURISDICTION	TITLE
Gregg County	Assistant Emergency Management Coordinator
City of Clarksville City	City Manager
City of Gladewater	Emergency Management Coordinator
City of Kilgore	Emergency Management Coordinator / Fire Marshal
City of Lakeport	City Secretary
City of Longview	Emergency Management Coordinator

SECTION 20: PLAN MAINTENANCE

JURISDICTION	TITLE
City of Warren City	Mayor
City of White Oak	City Coordinator
East Texas Council of Governments	Director of Public Safety

MONITORING

Designated Planning Team members are responsible for monitoring, evaluating, updating, and reviewing the Plan, as shown in Table 20-2. Individuals holding the title listed in Table 20-2 will be responsible for monitoring the Plan on an annual basis. Plan monitoring includes reviewing and incorporating into the Plan other existing planning mechanisms that relate or support goals and objectives of the Plan; monitoring the incorporation of the Plan into future updates of other existing planning mechanisms as appropriate; reviewing mitigation actions submitted and coordinating with various County, City, and ETCOG departments to determine if mitigation actions need to be re-evaluated and updated; evaluating and updating the Plan as necessary; and monitoring plan maintenance to ensure that the process described is being followed, on an annual basis, throughout the planning process. The Planning Team will develop a brief report that identifies policies and actions in the plan that have been successfully implemented and any changes in the implementation process needed for continued success. A summary of meeting notes will report the particulars involved in developing an action into a project. In addition to the annual monitoring, the Plan will be similarly reviewed immediately after extreme weather events include but not limited to state and federally declared disasters.

EVALUATION

As part of the evaluation process, the Planning Team will assess changes in risk; determine whether the implementation of mitigation actions is on schedule; determine whether there are any implementation problems, such as technical, political, legal, or coordination issues; and identify changes in land development or programs that affect mitigation priorities for each respective department or organization.

The Planning Team will meet on an annual basis to evaluate the Plan and identify any needed changes and assess the effectiveness of the plan achieving its stated purpose and goals. The team will evaluate the number of mitigation actions implemented along with the loss-reduction associated with each action. Actions that have not been implemented will be evaluated to determine if any social, political, or financial barriers are impeding implementation and if any changes are necessary to improve the viability of an action. The team will evaluate changes in land development and/or programs that affect mitigation priorities in their respective jurisdictions. The annual evaluation process will help to determine if any changes are necessary. In addition, the Plan will be similarly evaluated immediately after extreme weather events including but not limited to state and federally declared disasters.

SECTION 20: PLAN MAINTENANCE

UPDATING

PLAN REVISIONS

At any time, minor technical changes may be made to update the Gregg County Hazard Mitigation Action Plan Update 2024. Material changes to mitigation actions or major changes in the overall direction of the Plan or the policies contained within it, must be subject to formal adoption by the participating jurisdictions.

The participating jurisdictions within Gregg County will review proposed revisions and vote to accept, reject, or amend the proposed change. Upon ratification, the revision will be transmitted to TDEM.

In determining whether to recommend approval or denial of a Plan Revision request, participating jurisdictions will consider the following factors:

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

FIVE (5) YEAR REVIEW

The Plan will be thoroughly reviewed by the Planning Team at the end of three years from the approval date, to determine whether there have been significant changes in the planning area that necessitate changes in the types of mitigation actions proposed. Factors that may affect the content of the Plan include new development in identified hazard areas, increased exposure to hazards, disaster declarations, increase or decrease in capability to address hazards, and changes to federal or state legislation.

The Plan review process provides the participating jurisdictions within Gregg County an opportunity to evaluate mitigation actions that have been successful, identify losses avoided due to the implementation of specific mitigation measures, and address mitigation actions that may not have been successfully implemented as assigned.

It is recommended that the full Executive and Advisory Planning Team (Section 2, Tables 2-1 and 2-2) meet to review the Plan at the end of three years because grant funds may be necessary for the development of a five-year update. Reviewing planning grant options in advance of the five-year Plan update deadline is recommended considering the timelines for grant and planning cycles can be in excess of a year.

Following the Plan review, any revisions deemed necessary will be summarized and implemented according to the reporting procedures and Plan Revision process outlined herein. Upon completion of the review, update, and revision process the revised Plan will be submitted to TDEM for final review and approval in coordination with FEMA.

CONTINUED PUBLIC INVOLVEMENT

Public input was an integral part of the preparation of this Plan and will continue to be essential for Plan updates. The Public will be directly involved in the annual evaluation, monitoring, reviews and cyclical updates. Changes or suggestions to improve or update the Plan will provide opportunities for additional public input.

SECTION 20: PLAN MAINTENANCE

The public can review the Plan on the participating jurisdictions' websites, where officials and the public are invited to provide ongoing feedback, via email.

The Planning Team may also designate voluntary citizens from the planning area or willing stakeholder members from the private sector businesses that were involved in the Plan's development to provide feedback on an annual basis. It is important that stakeholders and the immediate community maintain a vested interest in preserving the functionality of the planning area as it pertains to the overall goals of the mitigation plan. The Planning Team is responsible for notifying stakeholders and community members on an annual basis and maintaining the Plan.

Media, including local newspaper and radio stations, will be used to notify the public of any maintenance or periodic review activities during the implementation, monitoring, and evaluation phases. Additionally, local news media will be contacted to cover information regarding Plan updates, status of grant applications, and project implementation. Local and social media outlets, such as Facebook and X (formerly Twitter), will keep the public and stakeholders apprised of potential opportunities to fund and implement mitigation projects identified in the Plan.



APPENDIX A
PLANNING TEAM

APPENDIX A: PLANNING TEAM

Planning Team Members 1
 Stakeholders 3

PLANNING TEAM MEMBERS

The Gregg County Hazard Mitigation Action Plan Update 2024 was organized using a direct representative model. An Executive Planning Team from the participating jurisdictions, shown in Table A-1, was formed to coordinate planning efforts and request input and participation in the planning process. Table A-2 reflects the Advisory Planning Team, consisting of area organizations and departments that participated throughout the planning process. Table A-3 is comprised of stakeholders who were invited to provide Plan input. Public outreach efforts and meeting documentation is provided in Appendix E.

Table A-1. Executive Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Gregg County	Assistant Emergency Management Coordinator
City of Clarksville City	City Manager
City of Gladewater	Emergency Management Coordinator
City of Kilgore	Emergency Management Coordinator / Fire Marshal
City of Lakeport	City Secretary
City of Longview	Emergency Management Coordinator
City of Warren City	Mayor
City of White Oak	City Coordinator
East Texas Council of Governments	Director of Public Safety

Table A-2. Advisory Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Gregg County	Commissioner Precinct 1
Gregg County	Commissioner Precinct 2
Gregg County	Commissioner Precinct 3
Gregg County	Commissioner Precinct 4
Gregg County	County Judge
Gregg County	County Sheriff

APPENDIX A: PLANNING TEAM

ORGANIZATION / DEPARTMENT	TITLE
Gregg County	Emergency Management Coordinator / Fire Marshal
Gregg County	Health Administrator
Gregg County	Lieutenant
City of Clarksville City	City Secretary
City of Clarksville City	Mayor
City of Gladewater	Chief of Police
City of Gladewater	City Clerk
City of Gladewater	City Manager (Interim)
City of Gladewater	Director of Public Works
City of Kilgore	Chief of Police
City of Kilgore	City Clerk
City of Kilgore	City Manager
City of Kilgore	Code Enforcement Officer
City of Kilgore	Director of Parks and Recreation
City of Kilgore	Director of Planning
City of Kilgore	Director of Public Works
City of Kilgore	Director of Special Services
City of Kilgore	Fire Chief
City of Kilgore	Mayor
City of Kilgore	Street and Drainage Manager
City of Lakeport	Mayor
City of Longview	Assistant Chief of Police
City of Longview	Assistant Director of Development Services
City of Longview	Assistant Director of Public Works
City of Longview	Captain of Operations Support Bureau
City of Longview	Chief of Police
City of Longview	City Engineer

APPENDIX A: PLANNING TEAM

ORGANIZATION / DEPARTMENT	TITLE
City of Longview	City Manager
City of Longview	City Secretary
City of Longview	Director of Development Services
City of Longview	Director of Public Works
City of Longview	Fire Chief
City of Longview	Fire Chief - Training Section
City of Longview	GIS Analyst
City of Longview	Grant Writer
City of Longview	Mayor
City of Longview	Media Developer
City of Longview	MPO Director
City of Longview	Sanitation
City of Longview	Senior Grant Analyst
City of Longview	Transportation Planner
City of Warren City	City Secretary
City of White Oak	Chief of Police
City of White Oak	City Secretary
City of White Oak	Mayor
East Texas Council of Governments	Director of Operations
East Texas Council of Governments	Executive Director
East Texas Council of Governments	Public Safety Manager

STAKEHOLDERS

The following groups listed in Table A-3 represent a list of organizations invited to stakeholder meetings, public meetings, and workshops throughout the planning process and include members of community groups, non-profit organizations, private businesses, utility providers, neighboring counties, school and universities, state and federal agencies, and legislators. The public were also invited to participate via email throughout the planning process. Many of the invited

APPENDIX A: PLANNING TEAM

organizations and stakeholders participated and were integral to providing comments and data for the Plan. For a list of attendees at meetings, please see Appendix E¹.

Table A-3. Stakeholders

AGENCY	TITLE	STAKEHOLDER TYPE
ABC Son Shine School	Owner	Academia / Vulnerable Populations
Alpine Chistian Academy	Director	Academia
American Red Cross, North Texas Region	Executive Director	Non-Profit Organization
Asbury House Child Enrichment Center	President	Academia / Vulnerable Populations
Christian Heritage School of Longview	President	Academia / Vulnerable Populations
Christus EMS	Chief	Healthcare Facility
Clarksville City-Warren City VFD	Fire Chief	Community Organization
East Texas Regional Airport	Airport Director	Private Organization
East Texas Regional Airport FD	Fire Chief	Private Organization / Community Organization
Easton VFD	Fire Chief	Community Organization
Edlerville-Lakeport VFD	Fire Chief	Community Organization
Environmental Protection Agency (EPA)	Region 6, Director of Emergency Management Division	Federal Agency
Environmental Protection Agency (EPA)	Region 6, Regional Administrator	Federal Agency
Gladewater FD	Fire Chief	Community Organization
Gladewater Housing Authority	Executive Director	Community Organization
Gladewater Independent School District	Chief Operations Officer	Academia
Gladewater Independent School District	Superintendent	Academia
Gladewater Mirror	News Reporter	Community Organization
Good Shepherd Medical Center	Emergency Preparedness Manager	Healthcare Facility
Happy Hippopotamus Daycare Academy	General Representative	Private Organization / Vulnerable Populations

¹ Information contained in Appendix E is exempt from public release under the Freedom of Information Act (FOIA).

APPENDIX A: PLANNING TEAM

AGENCY	TITLE	STAKEHOLDER TYPE
Harrison County	Fire Marshal	Neighboring Community
Havencare Nursing & Rehabilitation Center	Administrator	Healthcare / Nursing Home
Judson Metro FD	Fire Chief	Community Organization
Kandyland Kampus Preschool	General Representative	Academia / Vulnerable Populations
KETK	New Photographer	Community Organization
Kilgore College	Grant Writer	Academia
Kilgore FD	Fire Chief	Community Organization
Kilgore Independent School District	Superintendent	Academia
Legend Oaks Healthcare and Rehabilitation Center	Administrator	Healthcare / Nursing Home
LeTourneau University and Belcher Center	Chief Information Officer	Academia
LeTourneau University and Belcher Center	President	Academia
Liberty City Water	General Manager	Utility Provider
Liberty Danville WSC	General Representative	Utility Provider
Longview Childcare Development Center	General Representative	Academia / Vulnerable Populations
Longview EMS	Section Chief	Healthcare Facility
Longview FD	Assistant Chief	Community Organization
Longview FD	Accounting Supervisor	Community Organization
Longview FD	Fire Analyst	Community Organization
Longview Independent School District	Superintendent	Academia
Longview Regional Hospital	Safety Officer	Healthcare Facility
Longview University Center - UT Tyler	Director	Academia
National Weather Service (NWS)	Assistant Administrator	Federal Agency
National Weather Service (NWS)	Deputy Administrative Assistant	Federal Agency
NOAA	Assistant Administrator for Data and Information	Federal Agency

APPENDIX A: PLANNING TEAM

AGENCY	TITLE	STAKEHOLDER TYPE
NOAA	Deputy Administrative Assistant for Data and Information	Federal Agency
Oakland Heights CDC	Outreach Minister	Academia / Vulnerable Populations
Pine Tree Lodge Nursing Center	Administrator	Healthcare / Nursing Home
Pine Tree Independent School District	Superintendent	Academia
Rusk County	Emergency Management Coordinator / Fire Marshal	Neighboring Community
RUSK County Electric Cooperative Inc	COO	Utility Provider
Sabine VFD	Executive Assistant	Community Organization
Sabine VFD	Fire Chief	Community Organization
Small Steps Learning Academy	General Representative	Academia / Vulnerable Populations
Smith County	Emergency Management Coordinator	Neighboring Community
Spring Hills Independent School District	Superintendent	Academia
State Legislature	District House 7	State Agency
State Senate	District 1	State Agency
Texas A&M AgriLife Extension	Gregg County Representative	State Agency
Texas Commission on Environmental Quality (TCEQ)	Region 5, Executive Assistant	State Agency
Texas Department of Emergency Management (TDEM)	District Representative	State Agency
Texas Department of Emergency Management (TDEM)	Mitigation Planner	State Agency
Texas Department of Health Services	Deputy Regional Director	State Agency
Texas Department of Health Services	Preparedness and Response Planner	State Agency
Texas Department of Housing and Community Affair	Public Relations	State Agency

APPENDIX A: PLANNING TEAM

AGENCY	TITLE	STAKEHOLDER TYPE
Texas Department of Transportation (TXDOT)	Longview Office Representative	State Agency
Texas Department of Transportation (TXDOT)	Tyler District Engineer	State Agency
Texas Floodplain Management	District 7 Director	State Agency
Texas Forest Service	Resource Specialist	State Agency
Texas Water Development Board	Region D, Planner	State Agency
Texas Water Development Board	Region D, Team 3 Manager	State Agency
Texas Windstorm Insurance Association	Public Information Coordinator	State Agency
Trinity School of Texas	Head of School	Academia / Vulnerable Populations
Tryon Water	Administrative Assistant	Utility Provider
Upshur	Emergency Management Coordinator	Neighboring Community
U.S. Army Corps of Engineers	Southwester Division	Federal Agency
U.S. Fish and Wildlife	Austin Ecological Field Office, Field Supervisor	Federal Agency
U.S. Fish and Wildlife	Austin Ecological Field Office, Public Affairs Specialist	Federal Agency
U.S. Fish and Wildlife	Austin Ecological Field Office, State Coordinator for Texas	Federal Agency
West Gregg SUD	General Representative	Utility Provider
White Oak Independent School District	Superintendent	Academia
White Oak VFD	Fire Chief	Community Organization
Woodland Hills Day School	Administrative Assistant	Academia / Vulnerable Populations



APPENDIX B
**PUBLIC SURVEY
RESULTS**

APPENDIX B: PUBLIC SURVEY RESULTS

Overview 1
Public Survey Results 2

OVERVIEW

Gregg County prepared a public survey that requested public opinion on a wide range of questions relating to natural hazards. The survey was made available via the County’s and participating jurisdictions’ websites. This survey link was also distributed at public meetings and stakeholder events throughout the planning process.

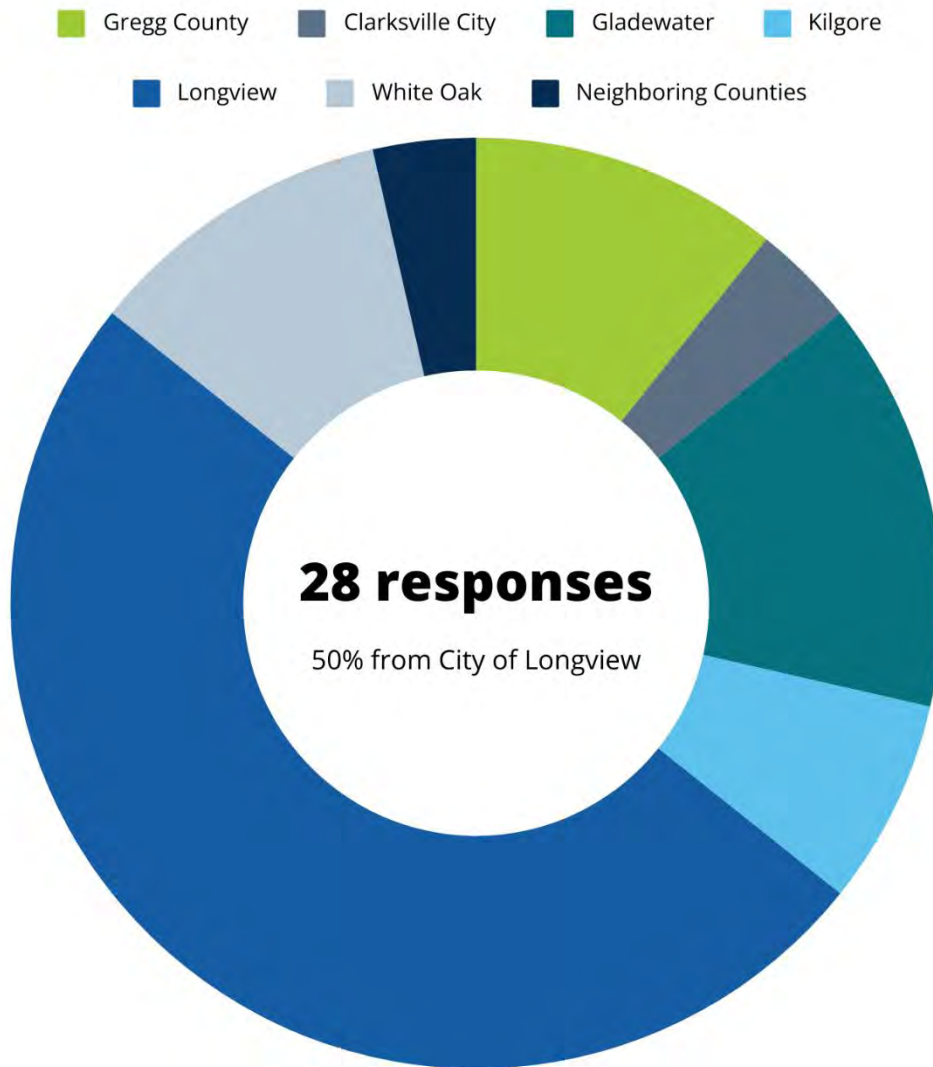
A total of 28 surveys were collected, the results of which are analyzed in Appendix B. The purpose of the survey was twofold: 1) to solicit public input during the planning process, and 2) to help the jurisdictions identify any potential actions or problem areas.

All public survey results were discussed and shared with the Planning Team during the Mitigation Strategy Workshop. These results are also provided below. The survey results provide information regarding the public’s experience with natural hazards, their perceived hazards of concern, recommended mitigation actions, and additional valuable insights. Overall, this survey enhances the mitigation planning process by ensuring the plan properly represents the community, is informed through local knowledge, and by promoting equity.

APPENDIX B: PUBLIC SURVEY RESULTS

PUBLIC SURVEY RESULTS

Responses by Gregg County:



APPENDIX B: PUBLIC SURVEY RESULTS

Have you ever experienced or been impacted by a disaster?



53.57%
Responded
'Yes'

Personal experiences shared in survey responses included:

"I've had storms knock down tree limbs in my yard and leave me without power — for several days a couple of times. In 2021, I was impacted by Winter Storm Uri."

"Loss of power for multiple days summer 2023"

"A storm knocked one of our trees down which hit a neighbor's mobile home."

"Winter Storm Uri caused power and water issues."

"Trapped in freeze, week long power outage during heat wave"

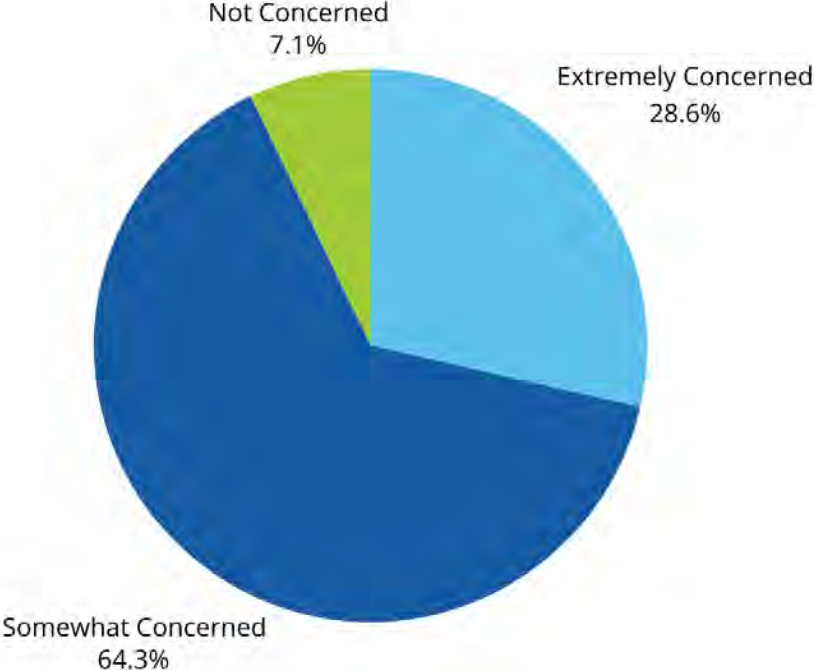
"Our location had tree damage from straight line winds this year."

50% of those who have been impacted by a disaster mentioned winter storms in their explanations.



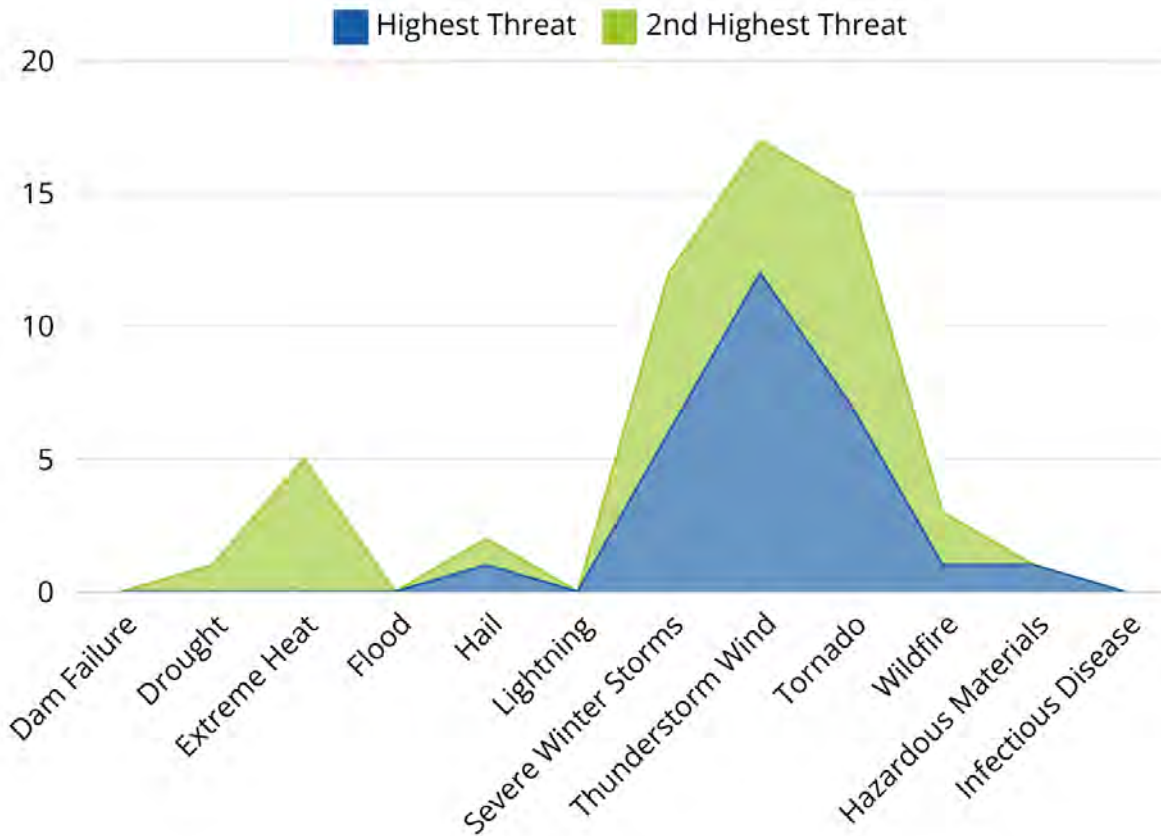
APPENDIX B: PUBLIC SURVEY RESULTS

Concern level for the possibility of their community being impacted by a disaster.



APPENDIX B: PUBLIC SURVEY RESULTS

Hazards that pose the highest perceived threat level:



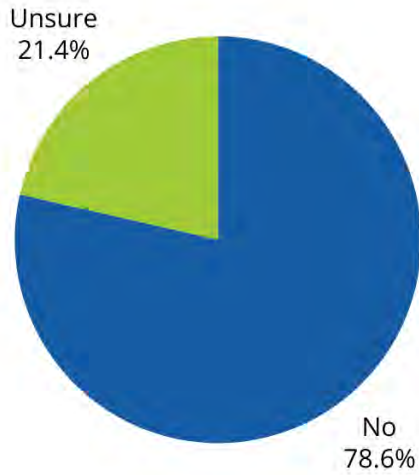
Hazards not profiled in the Hazard Mitigation Plan update that are of concern included:

Heavy Rain and **Downed Trees/Debris**

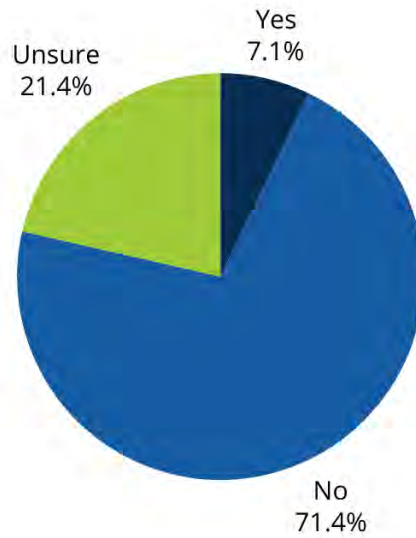
Heavy Rain
Downed Trees
Debris

APPENDIX B: PUBLIC SURVEY RESULTS

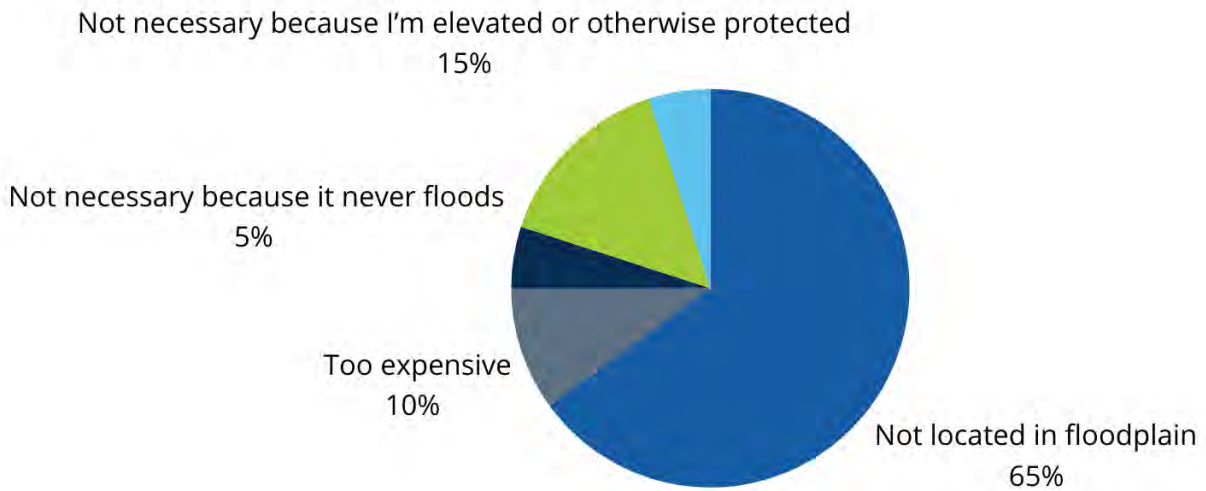
Is your home located in a floodplain?



Do you have flood insurance?



If you do not have flood insurance, why not?



APPENDIX B: PUBLIC SURVEY RESULTS

Have you taken any actions to make your home or neighborhood more resistant to hazards?



32.14%
Responded
'Yes'

58% of those who have taken action through tree removal/fuel reduction



75% of survey responders are interested in making their homes or neighborhoods more resistant to hazards.



Actions taken included:

Purchased small generator to minimize food loss

A storm knocked one of our trees down which hit a neighbor's mobile home.

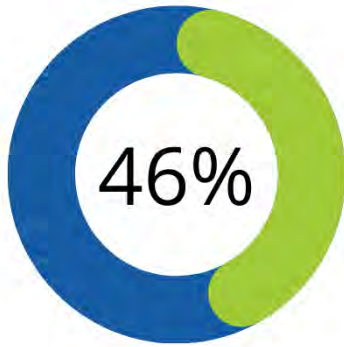
Removing large trees close to the house. Installing erosion control and routing of rainfall runoff through bioswales. Buying a generator. Installing rain barrels.

Drainage in our yard to reduce flooding during heavy rainfall

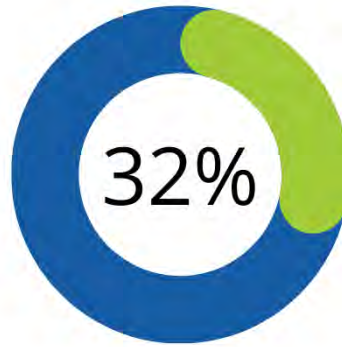
Removed dead and overgrown brush and trees that would be fuel in a fire, and dead limbs from trees to control/avoid damage to property

APPENDIX B: PUBLIC SURVEY RESULTS

Effectiveness of communication methods for receiving information about how to make your home and neighborhood more resistant to hazards



Internet



Mail

Additional communication methods recommended:



Social Media



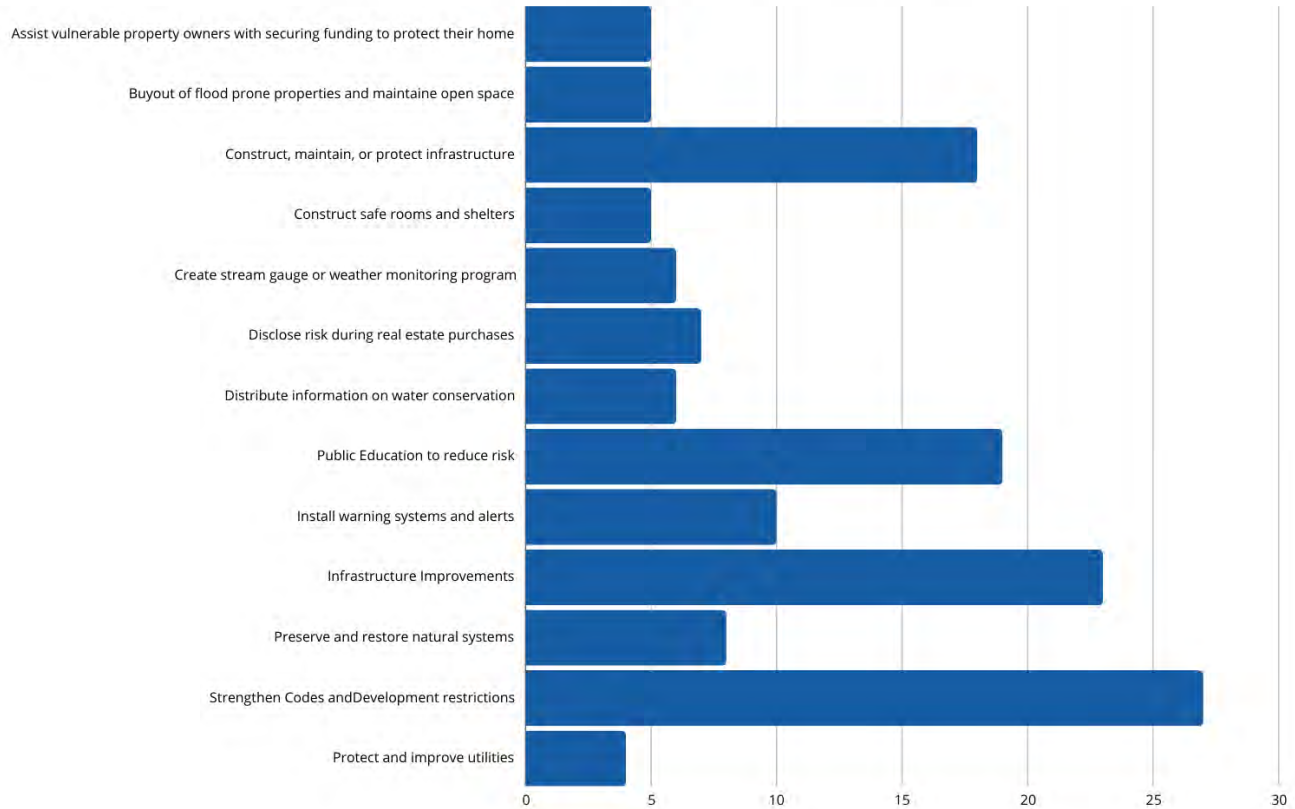
Alerts



Texts

APPENDIX B: PUBLIC SURVEY RESULTS

Steps local government should prioritize to reduce or eliminate the risk of future hazard damages in your neighborhood.

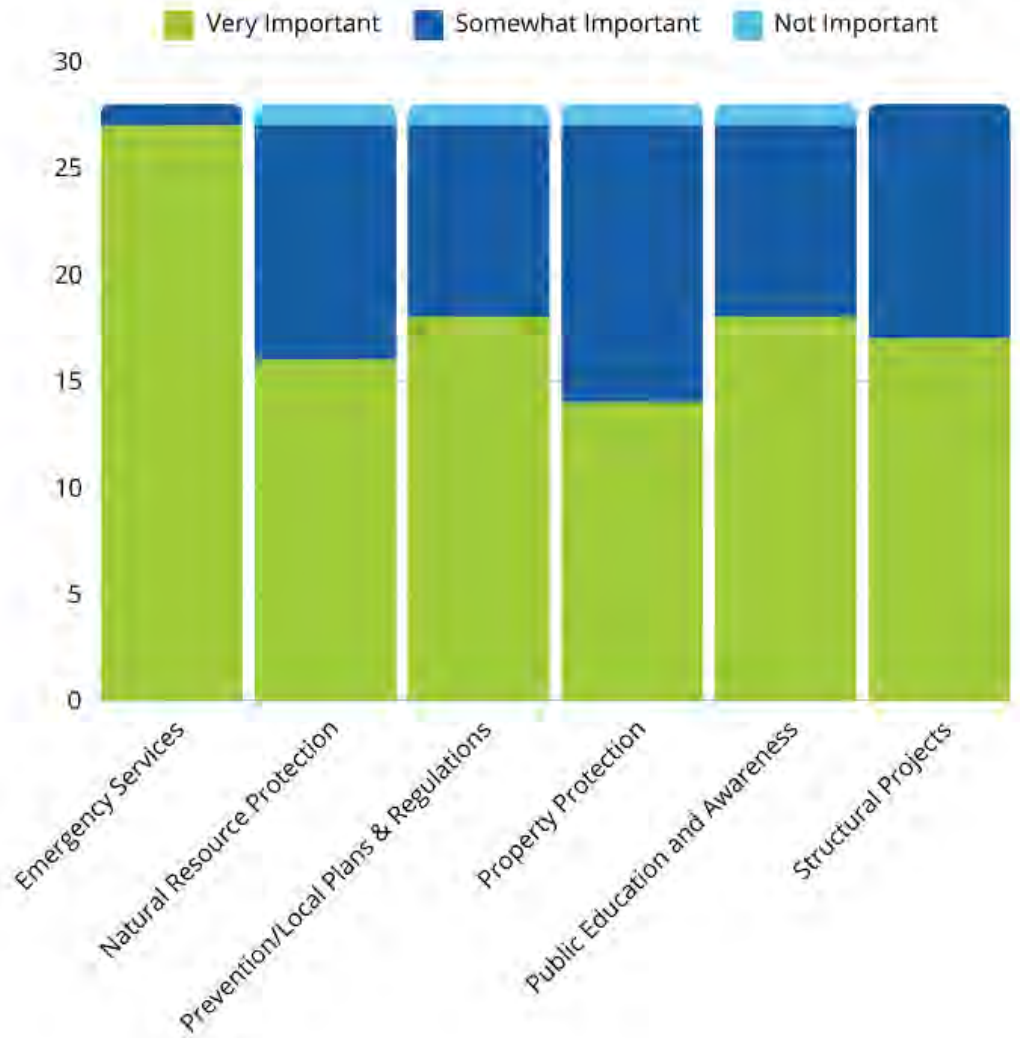


Common priority projects included:

- Prevent / restrict development in hazard-prone areas
- Construct, maintain, or retrofit infrastructure to reduce hazard
- Protect and strengthen critical facilities (e.g. transportation, hospitals, fire stations, schools)
- Install indoor / outdoor warning systems throughout county
- Protect and improve reliability of utilities

APPENDIX B: PUBLIC SURVEY RESULTS

A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important you think each one is for your community to consider pursuing.



Emergency Services - Actions that protect people and property during and immediately after a hazard event. Examples include warning systems, evacuation planning, emergency response training, and protection of critical facilities or systems.

Natural Resource Protection - Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples include floodplain protection, habitat preservation, slope stabilization, riparian buffers, and forest management.

Prevention / Local Plans & Regulations - Administrative or regulatory actions that influence the way land is developed and buildings are built. Examples include planning and zoning, building codes, open space preservation, and floodplain regulations.

APPENDIX B: PUBLIC SURVEY RESULTS

Property Protection - Actions that involve the modification of existing buildings to protect them from a hazard or removal from the hazard area. Examples include acquisition, relocation, elevation, structural retrofits, and storm shutters.

Public Education and Awareness - Actions to inform citizens about hazards and techniques they can use to protect themselves and their property. Examples include outreach projects, school education programs, library materials, and demonstration events.

Structural Projects - Actions 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 modification, retaining walls, and storm sewers.



APPENDIX C
CRITICAL FACILITIES

APPENDIX C: CRITICAL FACILITIES

Appendix C is For **Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).



APPENDIX D
DAM LOCATIONS

APPENDIX D: DAM LOCATIONS

Appendix D is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).



APPENDIX E
**MEETING
DOCUMENTATION**

APPENDIX E: MEETING DOCUMENTATION

Appendix E is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).



APPENDIX F
**CAPABILITY
ASSESSMENT**

APPENDIX F: CAPABILITY ASSESSMENT

Appendix F is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).



APPENDIX G
**STATE AND
FEDERAL FUNDING
OPPORTUNITIES**

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

Overview..... 1

OVERVIEW

Texas utilizes state funds to improve statewide hazard mitigation capabilities and advance their hazard mitigation goals to help identify, understand, and manage various risks associated with natural hazards. State funds also provide funding for state facility and infrastructure upgrades, hazard mapping, mitigation planning, and other mitigation programmatic activities. Table G-1 describes a variety of loan and grant programs offered by state agencies for which mitigation activities may be eligible.

Table G-1. Summary of State Funded Mitigation Programs

AGENCY	FUNDING PROGRAM
Texas A&M Forest Service (TAMFS)	<ul style="list-style-type: none"> ● Community Fire Protection Program ● Community Wildfire Defense Grant ● Fire-Adapted Communities Program (FAC) ● Firewise USA Program ● Mitigation Project Support Fund ● Forest Land Enhancement Program ● Forest Legacy Program ● Prescribed Fire Grants ● Resilient Landscapes Program ● Rural Fire Assistance Grant ● State Fire Assistance for Mitigation (SFAM) - Mechanical Fuels Grants ● SFAM Vegetative Fuel Break Grant ● Texas Longleaf Conservation Assistance Program ● Urban Tree Canopy Project (UTC)
Texas Commission on Environmental Quality (TCEQ)	<ul style="list-style-type: none"> ● Clean Water Act Section 319 Grants ● Nonpoint Source Grant Program ● High Hazard Potential Dam Program (HHPD) ● U.S.-Mexico Border Water Infrastructure Program
Texas Department of Agriculture (TDA)	<ul style="list-style-type: none"> ● Agricultural Management Assistance (AMA) ● Agricultural Water Enhancement Program (AWEP) ● Community Development Block Grant ● Community Development Block Grant for Rural Texas ● Conservation Innovation Grants (CIG) ● Environmental Quality Incentives Program (EQUIP)
Texas Department of Housing and Community Affairs (TDHCA)	<ul style="list-style-type: none"> ● Texas HOME Disaster Relief
Texas Department of State Health Services (TXDSHS)	<ul style="list-style-type: none"> ● Hospital Preparedness Program (HPP) Cooperative Agreement ● Public Health Emergency Preparedness (PHEP) Cooperative Agreement

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

AGENCY	FUNDING PROGRAM
Texas Department of Transportation (TXDOT)	<ul style="list-style-type: none"> ● Bridge Preventative Maintenance Program ● Emergency Relief (ER) Program ● Highway Bridge Replacement and Rehabilitation Program ● Safe Rest Stops Program ● Transportation Enhancement Program
Texas Division of Emergency Management (TDEM)	<ul style="list-style-type: none"> ● Building Resilient Infrastructure & Communities (BRIC) ● Emergency Management Performance Grant (EMPG) ● Fire Management Assistance Grants (FMAG) ● Hazard Mitigation Planning Grants Program (HMGP) ● Homeland Security Grant Program (HSGP) ● Individual Assistance (IA) ● National Earthquake Hazard Reduction Program (NEHRP) ● Public Assistance (PA) Section 406 Funds ● Fire Management Assistance Grants (FMAG)
Texas Economic Development & Tourism (EDT)	<ul style="list-style-type: none"> ● Economic Development Administration Grants and Investments
Texas General Land Office (TXGLO)	<ul style="list-style-type: none"> ● Beach Grants ● Beach Maintenance Reimbursement Fund ● Coastal Erosion Planning and Response Act (CEPRA) ● Coastal and Estuarine Land Conservation Program (CELCP) ● Coastal Management Program (CMP) ● Community Development Block Grant – Disaster Recovery (CDBG-DR) ● Community Development Block Grant – Mitigation (CDBG-MIT) ● Gulf of Mexico Energy Security Act (GOMESA) ● Hazard Mitigation Grant Program Supplemental -LHMPP
Texas Parks and Wildlife Department (TPWD)	<ul style="list-style-type: none"> ● Nation Resources Damage Assessment (NRDA) ● National Wildlife Wetland Refuge System ● North American Wetland Conservation Fund ● Partners for Fish and Wildlife ● Texas Farm and Ranch Lands Conservation Program (TFRLCP) ● Wildlife Habitat Incentive Program (WHIP)
Texas State Soil and Water Conservation Board (TSSWCB)	<ul style="list-style-type: none"> ● Clean Water Act Section 319 Grants ● Nonpoint Source Grant Program
Texas Water Development Board (TWDB)	<ul style="list-style-type: none"> ● Agricultural Water Conservation Grants ● Agricultural Water Conservation Loans ● Clean Water State Revolving Fund (SWSRF) ● Community Assistance Program (CAP) ● Drinking Water State Revolving Fund (DWSRF) ● Economically Distressed Areas Program ● Emergency Community Water Assistance Grants ● Flood Infrastructure Fund (FIF)

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

AGENCY	FUNDING PROGRAM
<p>TWDB (continued)</p>	<ul style="list-style-type: none"> ● Flood Mitigation Assistance (FMA) Program ● Flood Protection Planning Program ● Groundwater Conservation District Loan Program ● Planning Assistance to States ● Regional Facility Planning Grant Program ● Regional Water Planning Group Grants ● Research and Planning Fund and Fund Development program ● Risk MAP Program ● Rural Development Grants ● Rural Water Assistance Fund ● Silver Jackets ● Small Flood Control Projects (USACE Section 205) ● State Participation Program – Regional Water and Wastewater Facilities ● State Water Implementation Fund for Texas (SWIFT) ● State Water Resources Research Act Program ● Texas Infrastructure Resiliency Fund (TIRF) ● Water Research Grant Program ● Water SMART - Drought Response Program ● Texas Water Development Fund (DFund)

In addition to State funded programs, many local jurisdictions benefit from federal mitigation funding opportunities. FEMA’S Hazard Mitigation Assistance is a primary source for the implementation of mitigation projects throughout the Nation. Table G-2 described additional Federal, State, Local, and Non-Profit mitigation funding sources specifically within the State of Texas.

Table G-2. Federal, State, Local and Non-Profit Mitigation Funding Sources in Texas

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
<p>Agricultural Management Assistance (AMA)</p>	Federal	USDA, NRCS	TDA	Provides financial and technical assistance to agricultural producers to voluntarily address issues such as water management, water quality, and erosion control by incorporating conservation methods into their farming operations.
<p>Agricultural Water Enhancement Program (AWEP)</p>	Federal	USDA, NRCS	TDA	Voluntary conservation initiative that provides financial and technical assistance to agricultural producers to implement water enhancement activities on agricultural land to conserve surface and ground water and improve water quality.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Agricultural Water Conservation Grants	State	TWDB	TWDB	Provided to state agencies and political subdivisions for projects that support the implementation of conservation of water management strategies identified in state and regional water plans. Yearly applications. Up to \$1.2 million available annually. Grant categories vary from year to year.
Agricultural Water Conservation Loans	State	TWDB	TWDB	Agricultural water conservation loans to use either for improvements on facilities or as loan to individuals. Low-interest, fixed rates. Up to 10-year repayment terms. U.S. Iron and Steel requirements apply to certain projects. Eligible Loan applicants include political subdivisions.
AmeriCorps - Corporation for National & Community Service (CNCS)	Federal	AmeriCorps	N/A	Provides funding for volunteers to serve communities, including disaster prevention. AmeriCorps/Vista has assisted local communities with wildfire mitigation projects.
American Recovery and Reinvestment Act (ARRA)	Federal	DOT Federal Transit Administration	TDA	Nicknamed the Recovery Act was a stimulus package enacted by the 111th U.S. Congress and signed into law by President Barack Obama in February 2009. Developed in response to the Great Recession, the primary objective of this federal statute was to save existing jobs and create new ones as soon as possible. Other objectives were to provide temporary relief programs for those most affected by the recession and invest in infrastructure, education, health, and renewable energy.
Assistance to Firefighters program - Fire Prevention & Safety (FP&S) Grants	Federal	FEMA, AFG		Fire Prevention & Safety (FP&S) Grants support projects that enhance the safety of the public and firefighters from fire and related hazards.
Beach Grants	Federal	EPA	TXGLO	EPA awards grants under authority of the BEACH Act to eligible states, territories, and tribes with beaches on ocean and Great Lakes coasts to develop and implement programs to monitor their beaches and notify the public when it is not safe to swim.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Beach Maintenance Reimbursement Fund	State	GLO	TXGLO	Allocates approximately \$750,000 per year to help communities keep their beaches maintained. Applications are distributed to eligible participants in early fall and are due within a specified amount of time, no less than 30 days. Contracts are renewable annually.
Bridge Preventative Maintenance Program	State	TXDOT	TXDOT	A planned, cost-effective treatment that preserves, improves, or delays future deterioration of the condition of a bridge. To be eligible for the BMIP a bridge must have a condition rating of 5 or 6 for at least one of the following: deck, superstructure, substructure, culvert, or channel. Safety and improvement to the physical conditions of the State's on-system bridges are TxDOT's main goals in the prioritization of the bridges using BMIP funds. The Bridge Division develops an initial list each FY of eligible bridges in each district and distribute to the districts for the annual program call.
Building Resilient Infrastructure & Communities (BRIC)	Federal	FEMA	TDEM	Pre-disaster/annual cycle addressing all natural hazards, emphasis on infrastructure & lifelines.
Clean Water Act Section 319 Grants	Federal	EPA	TCEQ and TSSWCB	Provides grants for a wide variety of activities related to non-point source pollution runoff mitigation.
Clean Water State Revolving Fund (CWSRF)	Federal	EPA	TWDB	Providing low-cost financing for a wide range of wastewater, stormwater, reuse, and other pollution control projects.
Coastal Erosion Planning and Response Act (CEPRA)	State	GLO	TXGLO	Since 2000, the Texas General Land Office's Coastal Erosion Planning and Response Program has received more than \$62 million in state funding and more than \$62 million in matching funds, completing more than 200 coastal erosion projects and studies. The application process for non-emergency project funding requests opens every even year in February and closes in early June of that same year.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Coastal and Estuarine Land Conservation Program (CELCP)	Federal	NOAA	TXGLO	When NOAA provides funding for CELCP, the GLO provides coastal communities an opportunity to apply for up to three projects per year, with federal grants for any single project not to exceed \$3 million.
Coastal Management Program (CMP)	Federal	NOAA	TXGLO	Texas receives approximately \$2 million annually in grants from National Oceanic and Atmospheric Administration (NOAA) and 90% of the funds are passed through to local governments and entities to address environmental needs and promote sustainable economic development along the coast. Projects must improve the management of the state's coastal resources and ensure long-term ecological and economic productivity. Section 306 administrative funds can be used for non- construction, coastal planning and education, and research. Section 306A improvement funds can be utilized for construction and land acquisition projects and preservation and restoration. CMP funding categories include Coastal Natural Hazards Response, Critical Areas Enhancement, Public Access, Water/Sediment Quantity and Quality Improvements, Waterfront Revitalization and Ecotourism Development, Permit Streamlining/ Assistance, Governmental Coordination and Local Government Planning Assistance.
Community Assistance Program (CAP)	Federal	FEMA, NFIP	TWDB	Product-oriented financial assistance program directly related to the flood loss reduction objectives of the NFIP.
Community Development Block Grant	Federal	HUD	TDA	The primary objective is to develop viable communities by providing decent housing and suitable living environments and expanding economic opportunities principally for persons of low- to moderate- income. Eligible applicants are non-entitlement cities under 50,000 in population and non-entitlement counties that have a non-metropolitan population under 200,000 and are not eligible for direct CDBG funding from HUD may apply for funding through any of the Texas CDBG programs.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Community Development Block Grant for Rural Texas	State	TDA	TDA	TDA administers the Community Development Block Grant for Rural Texas. The primary objective of the CDBG is to develop viable communities by providing decent housing and suitable living environments and expanding economic opportunities principally for persons of low- to moderate-income. Eligible applicants are non-entitlement cities under 50,000 in population and non-entitlement counties that have a non-metropolitan population under 200,000 and are not eligible for direct CDBG funding from HUD may apply for funding through any of the Texas CDBG programs.
Community Development Block Grant – Disaster Recovery (CDBG-DR)	Federal	HUD	TXGLO	Often following a disaster, the state may receive a CDBG-DR Supplement intended for mitigation and disaster recovery projects in the affected areas. Funding can be used to acquire properties in hazard prone areas. Since CDBG funds lose their federal identify they can also be used to supplement state or local match requirements on other funds such as FEMA HMA grants. Funding also supports public facilities including water and wastewater.
Community Development Block Grant – Mitigation (CDBG-MIT)	Federal	HUD	TXGLO	Eligible grantees to use this assistance in areas impacted by recent disasters to carry out strategic and high-impact activities to mitigate disaster risks and reduce future losses. In February of 2018, Congress appropriated \$12 billion dollars in Community Development Block Grant (CDBG) funds specifically for mitigation activities for qualifying disasters in 2015, 2016, and 2017. HUD was able to allocate an additional \$3.9 billion, bringing the amount available for mitigation to nearly \$16 billion.
Community Fire Protection Program	Federal	USDA	TAMFS	Mitigation delivered via USDA Forest Service and Private Forestry Coop Fire Program.
Community Wildfire Defense Grant	Federal	USFS	TAMFS	Offers financial assistance to at-risk local communities with planning for and mitigating against the risk of catastrophic wildfire. This program is authorized in Public Law 117-58, the Infrastructure Investment and Jobs Act.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Community Wildfire Defense Grant (continued)				Two primary objectives: The development and revision of Community Wildfire Protection Plans (CWPP), and the implementation of projects described in a CWPP that is less than ten years old. Prioritizes at-risk communities that are in an area identified as having high or very high wildfire hazard potential, are low-income, and/or have been impacted by a severe disaster. No minimum federal funding limit for projects.
Conservation Innovation Grants (CIG)	Federal	USDA, NRCS	TDA	Voluntary program intended to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging federal investment in environmental enhancement and protection, in conjunction with agricultural production.
Drinking Water State Revolving Fund (DWSRF)	Federal	EPA	TWDB	Makes funds available to drinking water systems to finance infrastructure improvements. The program also emphasizes providing funds to small and disadvantaged communities and to programs that encourage pollution prevention as a tool for ensuring safe drinking water.
Economic Development Administration Grants and Investments	Federal	U.S. DOC, EDA	EDT	Invests and provides grants for community construction projects, including mitigation activities.
Economically Distressed Areas Program	State	TWDB	TWDB	Provides financial assistance for projects serving economically distressed areas where water or sewer services do not exist, or systems do not meet minimum state standards. Eligible EDAP applicants include cities, counties, water districts, nonprofit water supply corporations, and all other political subdivisions. The city or county where the project is located must adopt and enforce Model Subdivision Rules for the regulation of subdivisions prior to application for financial assistance. Projects must also be in an economically distressed area where the median household income is not greater than 75 percent of the median state household income.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Emergency Community Water Assistance Grants	Federal	USDA	TWDB	\$150,000 to \$500,000 available to rural communities with populations over 10,000 people with a median household income less than \$65,900. Aids communities who have experienced a decline in quantity or quality of drinking water as a result of an emergency including drought.
Emergency Management Performance Grant (EMPG)	Federal	FEMA	TDEM	The EMPG program provides a yearly allocation of funding to support state and local emergency management programs. This has included providing some funding for local mitigation plans, mitigation-oriented studies, and related activities.
Emergency Relief (ER) Program	Federal	US DOT - FHWA	TXDOT	Provides funds for roads and bridges on Federal-aid highways that are damaged as a direct result of a natural disaster or catastrophic failure from an external cause.
Emergency Watershed Protection (EWP)	Federal	USDA, NRCS	TWDB	Provides funding and technical assistance for emergency measures such as floodplain easements in impaired watersheds. Funding available through the Simplified Acquisition Procedures (SAP) ranges from \$25K to \$100K. Funded through contracts between project sponsors and the NRCS. There are no grants. The NRCS pays 75% of the costs.
Environmental Quality Incentives Program (EQUIP)	Federal	USDA, NRCS	TDA	Provides funding and technical assistance to farmers and ranchers to promote agricultural production and environmental quality as compatible goals.
Fire-Adapted Communities Program (FAC)	Federal	FEMA, USFA	TAMFS	Collaborates to identify its wildfire risk and works collectively on actionable steps to reduce its risk of loss. This work protects property and increases the safety of firefighters and residents.
Fire Management Assistance Grants (FMAG)	Federal	FEMA	TDEM	Provides fire suppression support to states when loss of life and property are imminent. Wildfire mitigation is also eligible under emergency protection if life is in imminent danger.
Firewise USA Program	Federal	USDA, DOI, NASFF, NFPA	TAMFS	The national Firewise USA® recognition program provides a collaborative framework to help neighbors in a geographic area get organized, find direction, and take action to increase the ignition resistance of their homes and community and to reduce wildfire risks at the local level.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Flood Infrastructure Fund (FIF)	State	TWDB	TWDB	Enacted through Senate Bill 7 to address needs identified following the flood disasters of 2015, 2016, and 2017. Senate Bill 500 appropriated \$793 million. The purpose is to provide loans and grants for flood activities and projects. Once the State Flood Plan is adopted, the account may only be used for projects included in the plan. The SWIFT Advisory Committee is the oversight entity.
Flood Mitigation Assistance Program (FMA)	Federal	FEMA	TWDB	Repetitive flood loss property reduction and projects that mitigate losses to NFIP insured properties.
Flood Protection Planning Program	State	TWDB	TWDB	Developed to evaluate solutions to flooding problems in the state of Texas. Planning activities eligible for this program may include:
Forest Land Enhancement Program	Federal	USDA, NRCS	TAMFS	Provides educational, technical, and financial assistance to help landowners implement sustainable forestry management objectives.
Forest Legacy Program	Federal	USFS	TAMFS	Program providing funding to protect private forest lands that are environmentally, economically, and socially critical. This program reduces development in the wildland-urban interface.
Hazard Mitigation Grant Program (HMGP)	Federal	FEMA	TDEM	Post-disaster multi-hazard mitigation funding for federally declared disasters. HMGP Post Fire funds are available for FMAG declarations.
Hazard Mitigation Grant Program Supplemental – Local Hazard Mitigation Plan Program (LHMPP)	Federal	FEMA	TXGLO	Local Hazard Mitigation Plan Program (LHMPP) assists eligible entities by providing grants to develop or update local hazard mitigation plans, or to provide cost share for hazard mitigation planning activities funded through other federal sources. Community Development Block Grant Mitigation (CDBG-MIT) funds allocated by the United States Department of Housing and Urban Development (HUD) and administered by the Texas General Land Office (GLO) fund these planning activities, and the Hazard Mitigation Plan development and approval oversight is administered by the Federal Emergency Management Agency (FEMA) and administered by the Texas Division of Emergency Management (TDEM Grant awards will range from \$20,000 – \$100,000.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
High Hazard Potential Dam Program (HHPD)	Federal	FEMA	TCEQ	Pre-disaster/annual cycle, for non-federal high hazard dams rated Unsatisfactory. Local match is 35% for each of the four grant periods.
Highway Bridge Replacement and Rehabilitation Program	Federal	FHWA	TXDOT	Provides funding to enable states to improve the condition of highway bridges through replacement, rehabilitation, and systematic preventive maintenance. Also includes the National Historic Covered Bridge Preservation Program.
Homeland Security Grant Program (HSGP)	Federal	DHS	TDEM	Homeland security activities identified in the state and local strategic plans. Funding supports threat & hazard and risk identification for natural, technological, and human-caused hazards. Some prevention activities may be considered mitigation.
Hospital Preparedness Program (HPP) Cooperative Agreement	Federal	HHS	TXDSHS	HPP is the primary source of federal funding for health care system preparedness and response and, in collaboration with public health, prepares health care delivery systems to save lives through the development of health care coalitions (HCCs). Under the direction of the HPP providers, the HCCs develop plans and provide training, and coordinate regional exercises.
Hydrologic Research Grants	Federal	NOAA		Up to \$125,000 to conduct joint research and development on pressing surface water hydrology issues common to national, regional, local operational offices. Eligible applicants are federally recognized agencies of state or local governments, quasi-public institutions such as water supply or power companies, hydrologic consultants and companies involved in using and developing hydrologic forecasts.
Groundwater Conservation District Loan Program	State	TWDB	TWDB	Provides short-term loans to finance the start-up costs of Groundwater Conservation Districts. Funding is available for any Groundwater District or Authority with the authority to regulate the spacing of water wells, the production from water wells, or both. The program is authorized under Texas Water Code Chap. 36, Subchapter. L, and governed by TWDB rules in 31 Tex. Admin. Code Chap. 363, Subchapter. H.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Gulf of Mexico Energy Security Act (GOMESA)	Federal	DOI	TXGLO	GOMESA significantly enhances oil and gas leasing activities and creates revenue sharing provisions for the oil- and gas-producing states of Alabama, Louisiana, Mississippi, and Texas, and their coastal political subdivisions (CPSs). GOMESA funds are used for coastal conservation, restoration, and hurricane protection. The second phase of GOMESA revenue sharing began in Fiscal Year 2017 and expands the definition of qualified Outer Continental Shelf revenues to include receipts from Gulf of Mexico leases subject to withdrawal or moratoria restrictions. A revenue-sharing cap of \$500 million per year for the four Gulf producing states, their CPSs and the Land and Water Conservation Fund applies from fiscal years 2016 through 2055.
Individual Assistance (IA)	Federal	FEMA	TDEM	Following a disaster, funds can be used to mitigate hazards when repairing individual and family homes.
In-Lieu Fee Program Mitigation Projects	Federal	USACE	Community Applicants	Restoration, establishment, enhancement, and/or preservation of aquatic resources through funds paid to a governmental or non-profit natural resources management entity to satisfy compensatory mitigation requirements for Department of the Army permits.
Mitigation Banks	Federal	USACE	Community Applicants	Mitigation Banks are sites approved by the Corps to sell compensatory mitigation credits for projects resulting in unavoidable impacts to waters of the U.S. When a permit is issued that requires compensatory mitigation, the permit will specify how many credits are required to be purchased at an approved mitigation bank.
National Earthquake Hazards Reduction Program (NEHRP)	Federal	FEMA	TDEM	Provides money to support enhanced earthquake risk assessments in local hazard mitigation plans and other earthquake hazard mitigation and preparedness activities.
Natural Resources Damage Assessment (NRDA)	Federal	EPA	TPWD	ERAs evaluate the likelihood that adverse ecological effects are occurring or may occur as a result of exposure to physical stressors (e.g., cleanup activities) or chemical stressors (e.g., release of hazardous substances) at a site.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
National Weather Service (NWS)	Federal	NOAA - NWS		NWS offers storm spotter training, along with weather and flooding safety guides. They can also sometimes provide funding to support severe weather signage in parks or other public places.
National Wildlife Wetland Refuge System	Federal	USFWS	TPWD	Provides funding for the acquisition of lands into the federal wildlife refuge system.
Nonpoint Source Grant Program	Federal	EPA	TCEQ, TSSWCB	The federal Clean Water Act (CWA) requires States to develop a program to protect the quality of water resources from the adverse effects of nonpoint source (NPS) water pollution. TCEQ and TSSWCB administer federal grants for activities that prevent or reduce nonpoint source pollution (NPS).
North American Wetland Conservation Fund	Federal	USFWS	TPWD	Provides funding for wetland conservation projects.
NRCS Conservation Programs	Federal	USDA, NRCS	Community Applicants	Provides funding through several programs for the conservation of natural resources.
Partners for Fish and Wildlife	Federal	USFWS	TPWD	Provides financial and technical assistance to landowners for wetland restoration projects in “Focus Areas” of the state.
Planning Assistance to States	Federal	USACE	TWDB	Aids states in planning for the development, utilization, and conservation of water and related land resources.
Pre-Disaster Mitigation Loan Program	Federal	SBA		Provides low-interest loans to small businesses for mitigation projects.
Prescribed Fire Grants	State	TAMFS	TAMFS	<p>TAMFS’s Mitigation & Prevention Department annually implements four prescribed fire grants intended to protect local communities and restore ecosystems.</p> <p>(1) SFAM Plains Prescribed Fire Grant – aids communities that have been or may be threatened by wildland fire by funding prescribed burning to reduce hazardous fuels in or around communities. Treatment areas will be located adjacent to priority communities in</p>

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NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
<p>Prescribed Fire Grants (continued)</p>				<p>Texas that are at the highest risk for loss during a Southern Plains Wildfire Outbreak event.</p> <p>(2) The Community Protection Program Grant aids reducing the hazard of high-risk fuels on private lands through the use of prescribed burning. The treatment area will be within 10 miles of a National Forest boundary. The grant’s goal is to protect high-risk communities and associated forest resources by reducing the risk of catastrophic wildfire on private and public lands.</p> <p>(3) The State Fire Assistance for Mitigation Central & East Texas Grant provides assistance to communities that have been or may be threatened by wildfire by funding prescribed burning to reduce hazardous fuels in and around communities. Treatment areas will be private property in the 43 Counties in Central and East Texas that have a Community Wildfire Protection Plan within the county. The goal is to protect high-risk communities and aid in ecosystem restoration by utilizing prescribed fire to consume excess vegetation before it contributes to catastrophic wildfire. Priority will be given to treatments sites that are within a CWPP, located near a Firewise community, located near homes based on Texas Wildfire Risk Assessment Portal and contain ecosystems that will benefit from prescribed fire.</p> <p>(4) Neches River and Cypress Basin Watershed Restoration Program - Prescribed Fire Grant provides assistance to landowners in utilizing prescribed fire for ecological improvement to the Neches River and Cypress Basin watersheds. This program will benefit the public and natural resources through improvement of water quality and quantity, control of invasive species and enhancement of wildlife habitat. Treatment areas will be private property in the Neches River and Cypress Basin Watersheds. Priority will be given to prescribed burn treatments that promote native ecosystem restoration, are in priority watershed protection zones and near public land.</p>

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Public Assistance (PA) Section 406 Funds	Federal	FEMA	TDEM	Following a disaster, funds can be used to mitigate hazards when repairing damages to a public structure or infrastructure. Wildfire mitigation is also eligible under emergency protection if life is in imminent danger.
Public Health Emergency Preparedness (PHEP) Cooperative Agreement	Federal	CDC	TXDSHS	Helps health departments build and strengthen their abilities to effectively respond to a range of public health threats, including infectious diseases, natural disasters, and biological, chemical, nuclear, and radiological events. Preparedness activities funded by the PHEP cooperative agreement specifically target the development of emergency-ready public health departments that are flexible and adaptable.
Regional Facility Planning Grant Program	State	TWDB	TWDB	TWDB grants to political subdivisions of the State of Texas for studies and analyses to evaluate and determine the most feasible alternatives to meet regional water supply and wastewater facility needs, estimate the costs associated with implementing feasible regional water supply and wastewater facility alternatives, and identify institutional arrangements to provide regional water supply and wastewater services for areas in Texas.
Regional Water Planning Group Grants	State	TWDB	TWDB	Developed to guide and support planning of the state's water resources by administering and assisting in the development of the regional and state water plans. The department strives to improve the planning process each cycle by developing clear guidance for the program's stakeholders and utilizing best-available data, methodologies, and technical innovations.
Research and Planning Fund and Fund Development Program	State	TWDB	TWDB	Offers grants to eligible applicants for the development or revision of regional water plans. The proposed planning must be a plan, an amendment to an approved regional water plan developed by the regional water planning group for a regional water planning area pursuant to the Texas Water Code, §16.053 and Chapter 357, or other special studies approved by the TWDB which will enhance water planning efforts in the region. Activities eligible for funding are those related to the development, revision, or improvement of regional water plans including public meetings, hearings, and special studies.

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Resilient Landscapes Program	Federal	USDA, USFS	TAMFS	The USFS is working with partners to restore healthy, resilient, fire-adapted ecosystems. Restoring ecosystems includes thinning crowded forests and using prescribed fire on two to three million acres each year, which can help prevent the buildup of flammable vegetation that feeds extreme wildfires.
Risk MAP Program	Federal	FEMA, NFIP	TWDB	Establishes or updates floodplain mapping and multi-hazard risk products.
Rural Development Grants	Federal	USDA-Rural Development	TWDB	Provides grants and loans for infrastructure and public safety development and enhancement in rural areas. Provides \$100,000 or 75% of the total project, whichever is less.
Rural Fire Assistance Grant	Federal	NIFC	TAMFS	Funds fire mitigation activities in rural communities.
Rural Utilities Service (RUS)	Federal	USDA-Rural Development		RUS administers programs that provide much-needed infrastructure or infrastructure improvements to rural communities. These include water and waste treatment, electric power, and telecommunications services.
Rural Water Assistance Fund	State	TWDB	TWDB	Designed to assist small rural utilities to obtain low-cost financing for water and wastewater projects. The RWAF offers tax-exempt equivalent interest rate loans with long-term finance options.
Safe Rest Stops Program	State	TXDOT	TXDOT	Texas has 21 major highways that serve as long distance travel corridors. Along each of these roadways, rest areas are an essential safety feature to reduce accidents caused by driver fatigue. These facilities give travelers a break from driving, and then return them to the road rested, refreshed and alert.
State Fire Assistance for Mitigation (SFAM) - Mechanical Fuels Grants	State	TAMFS	TAMFS	Provides financial assistance to reduce the hazard of high-risk fuels on private lands using hazardous fuel reduction. The grant's goal is protected high risk communities within the 32 high risk counties in Central Texas identified by Texas A&M Forest Service Mitigation and Prevention Department. Priority will be given to landowners that live with in the 32 high risk counties, are in a county or city that has an active Community Wildfire Protection plan or live with in a Firewise USA Site.

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SFAM Vegetative Fuel Break Grant	State	TAMFS	TAMFS	Provides financial assistance for the creation of vegetative fuel breaks on private lands in Texas. Vegetative fuel breaks are trees and shrubs systematically planted adjacent to fields, homesteads, or feedlots to reduce or redirect the wind. Projects will be in the Texas High Plains. The goal of the grant is to protect high-risk communities by reducing the risk of catastrophic wildfire on private and public lands. Grant recipients will be reimbursed up to \$2,500 for actual costs associated with creating a green, vegetative fuel break, consisting of a minimum of 3 rows of trees and 400 feet in length.
Silver Jackets	Federal	USACE	TWDB	Can provide funding for flood related studies, public awareness, risk analysis, and flood response plans. Construction of small flood control projects.
Small Flood Control Projects (USACE Section 205)	Federal	USACE	TWDB	Authorizes use of USACE to do feasibility and construction of small flood control projects.
State Participation Program – Regional Water and Wastewater Facilities	State	TWDB	TWDB	The State Participation Program enables the TWDB to provide funding and assume a temporary ownership interest in a regional water, wastewater, or flood control project when the local sponsors are unable to assume debt for an optimally sized facility. The program is intended to encourage the optimum regional development of projects by funding excess capacity for future use where the benefits can be documented, and where such development is unaffordable without state participation. The goal is to allow for the "right sizing" of projects in consideration of future needs.
State Water Implementation Fund for Texas (SWIFT)	State	TWDB	TWDB	Passed by the Legislature and approved by Texas voters through a constitutional amendment, the SWIFT program helps communities develop and optimize water supplies at cost-effective rates. The program provides low-interest loans, extended repayment terms, deferral of loan repayments, and incremental repurchase terms for projects with state ownership aspects.

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State Water Resources Research Act Program	Federal	USGS	TWDB	USGS in cooperation with the National Institutes for Water Resources supports an annual call for proposals to focus on water problems and issues that are of a regional or interstate nature or relate to a specific program priority identified by the Secretary of the Interior and the Institutes.
Texas Farm and Ranch Lands Conservation Program (TFRLCP)	State	TPWD	TPWD	<p>Maintains and enhances the ecological and agricultural productivity of these lands through Agricultural Conservation Easements. The TFRLCP supports responsible stewardship and conservation of working lands, water, fish and wildlife, and agricultural production through:</p> <ul style="list-style-type: none"> ● Generating interest and awareness in easement programs and other options for conserving working lands. ● Leveraging available monies to fund as many high-quality projects as possible. <p>Highlighting the ecological and economic value of working lands and the opportunities to conserve working lands for the future.</p>
Texas HOME Disaster Relief	Federal	TDHCA	TDHCA	<p>The Texas HOME Disaster Relief Program is a long-term housing program designed to help eligible organizations serve income eligible households impacted by disasters. Funds are available to assist with federal or state declared disasters, or other natural or man-made disasters that may occur. The Department's practice is to maintain a HOME Disaster Relief Fund balance of \$1 million whenever possible. These funds can be accessed to support impacted households not located in communities that receive HOME funds directly from the U.S. Department of Housing and Urban Development (HUD).</p>
Texas Longleaf Conservation Assistance Program	Federal	National Fish and Wildlife Foundation (NFWF)	TAMFS	<p>Provides eligible landowners with financial and technical assistance for establishing, enhancing, and managing longleaf pine. Landowners with property within ten East Texas counties which include Angelina, Hardin, Jasper, Nacogdoches, Newton, Polk, San Augustine, Sabine, San Jacinto, Trinity, and Tyler are eligible to apply. Approved participants may receive up to 50% payment not to exceed a standard cap rate for implementing approved conservation practices. Approved conservation practices include prescribed burning, reforestation, site preparation, and forest stand improvement.</p>

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Texas Infrastructure Resiliency Fund (TIRF)	State	TWDB	TWDB	Enacted through Senate Bill 7 to address needs identified following the flood disasters of 2015, 2016, and 2017. Senate Bill 500 appropriated \$685 million. Purpose is to provide loans, grants, and matching funds for flood projects through four separate accounts. Each account has different purposes. The oversight entity is the TIRF Advisory Board (SWIFT Advisory Committee and TDEM Director as non-voting member).
Texas Water Development Fund (DFund)	State	TWDB	TWDB	State funded loan program The DFund enables the Board to fund multiple eligible components in one loan to our borrowers, e.g., an application for funding of water and wastewater components can be processed in a single loan. Provide financial assistance for water supply projects, wastewater projects, and flood control projects (including structural and nonstructural flood protection improvements).
Transportation Enhancement Program	Federal	FHWA	TXDOT	Provides opportunities for non-traditional transportation related activities. Projects should go above and beyond standard transportation activities and be integrated into the surrounding environment in a sensitive and creative manner that contributes to the livelihood of the communities, promotes the quality of our environment, and enhances the aesthetics of our roadways. Projects undertaken with enhancement funds are eligible for reimbursement of up to 80 percent of allowable costs.
United States Geological Survey (USGS)	Federal	USGS		USGS issues competitive grants and cooperative agreements to support research in earthquake hazards, the physics of earthquakes, earthquake occurrence, and earthquake safety policy.
Urban Tree Canopy Project (UTC)	Federal	USDA, USFS	TAMFS	Urban tree canopy (UTC) is the layer of leaves, branches, and stems of trees that cover the ground when viewed from above. In urban areas, the UTC provides an important stormwater management function by intercepting rainfall that would otherwise run off of paved surfaces and be transported into local waters through the storm drainage system, picking up various pollutants along the way. UTC also reduces the urban heat island effect, reduces heating/cooling costs, lowers air temperatures, reduces air pollution, increases property values, provides wildlife habitat, and provides aesthetic and community benefits such as improved quality of life.

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U.S.-Mexico Border Water Infrastructure Program	Federal	EPA	TCEQ	Provides grant assistance to U.S. and Mexican communities located within 60 miles of the border for the development and construction of high-priority drinking water and wastewater facilities. The program furthers EPA's mission of protecting human health and the environment by providing critical resources for what is often an area's first drinking water and basic sanitation services.
Water Research Grant Program	State	TWDB	TWDB	TWDB funds a variety of water planning and water research studies and projects intended to assist and support regional water planning efforts or to answer regional water planning questions.
Water Conservation Field Services Program	Federal	HUD	Texas A&M AgriLife	Provides several grants related to safe housing initiatives.
Water2025 Challenge Grant Program for Western States	Federal	Bureau of Reclamation	TWDB	Up to \$25,000 for projects that improve water use efficiency and improve water management practices.
Watershed Processes and Water Resources	Federal	Bureau of Reclamation	TWDB	Up to \$250,000 for projects that can be completed within 24 months and that reduce conflicts through water conservation, efficiency, and markets.
Watershed Processes and Water Resources – National Research Initiative Standard Research (Part T)	Federal	USDA	TWDB	\$100,000 available. Sponsors research that addresses two areas: (1) understanding fundamental watershed processes; and (2) developing appropriate technology and management practices for improving the effective use of water (consumptive and non-consumptive) and protecting or improving water quality for agriculture and forestry production.
WaterSMART – Drought Response Program	Federal	USDA	TWDB	\$500,000 available. Innovative research in understanding fundamental processes that affect the quality and quantity of water resources at diverse spatial and temporal scales, ways on improving water resource management in agriculture, forested, and rangeland watersheds, and developing appropriate technology to reach those goals.

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Wildlife Habitat Incentive Program (WHIP)	Federal	USDA, NRCS	TPWD	Voluntary program for conservation-minded landowners who want to develop and improve wildlife habitat on agricultural land, nonindustrial private forest land, and tribal land.