HAMILTON COUNTY
HAZARD MITIGATION ACTION PLAN UPDATE

UPDATE 2024

December 4, 2024 - December 3, 2029

Mitigating Risk for a Safe, Secure, Sustainable Future



CTCOG
central texas council of governments

H2O PARTNERS

For more information, visit our website at:

https://www.co.hamilton.tx.us/

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FEMA

December 4, 2024

Jennifer Charlton-Faia, Deputy State Hazard Mitigation Officer
Texas Division of Emergency Management
P.O. Box 285
Del Valle, TX 78617-9998

RE: Approval of the Hamilton County, Texas Multi-Jurisdiction Hazard Mitigation Plan
Funding Source: HMGP; DR-4485 #0194

Dear Jennifer Charlton-Faia:

This office has concluded its review of the referenced plan and we are pleased to provide our approval of this plan in meeting the criteria set forth by 44 CFR § 201.6. By receiving this approval, eligibility for the Hazard Mitigation Assistance Grants will be ensured for five years from the date of this letter, expiring on December 3, 2029.

This approval does not demonstrate approval of projects contained in the plan. This office has provided the enclosed Local Hazard Mitigation Planning Tool with reviewer's comments, to further assist the community in refining the plan going forward. Please advise the referenced community of this approval.

If you have any questions, please contact David Freeborn, HM Community Planner, at (940) 898-5323.

Sincerely,

Ronald C. Wanhanen
Chief, Risk Analysis Branch

Enclosure: Approved Participants

cc: Anne Lehnick

Approved Participants

Attached is the list of approved participating governments included in the December 4, 2024 review of the referenced Hazard Mitigation plan.

	Community Name
1)	Hamilton city
2)	Hamilton County
3)	Hico city

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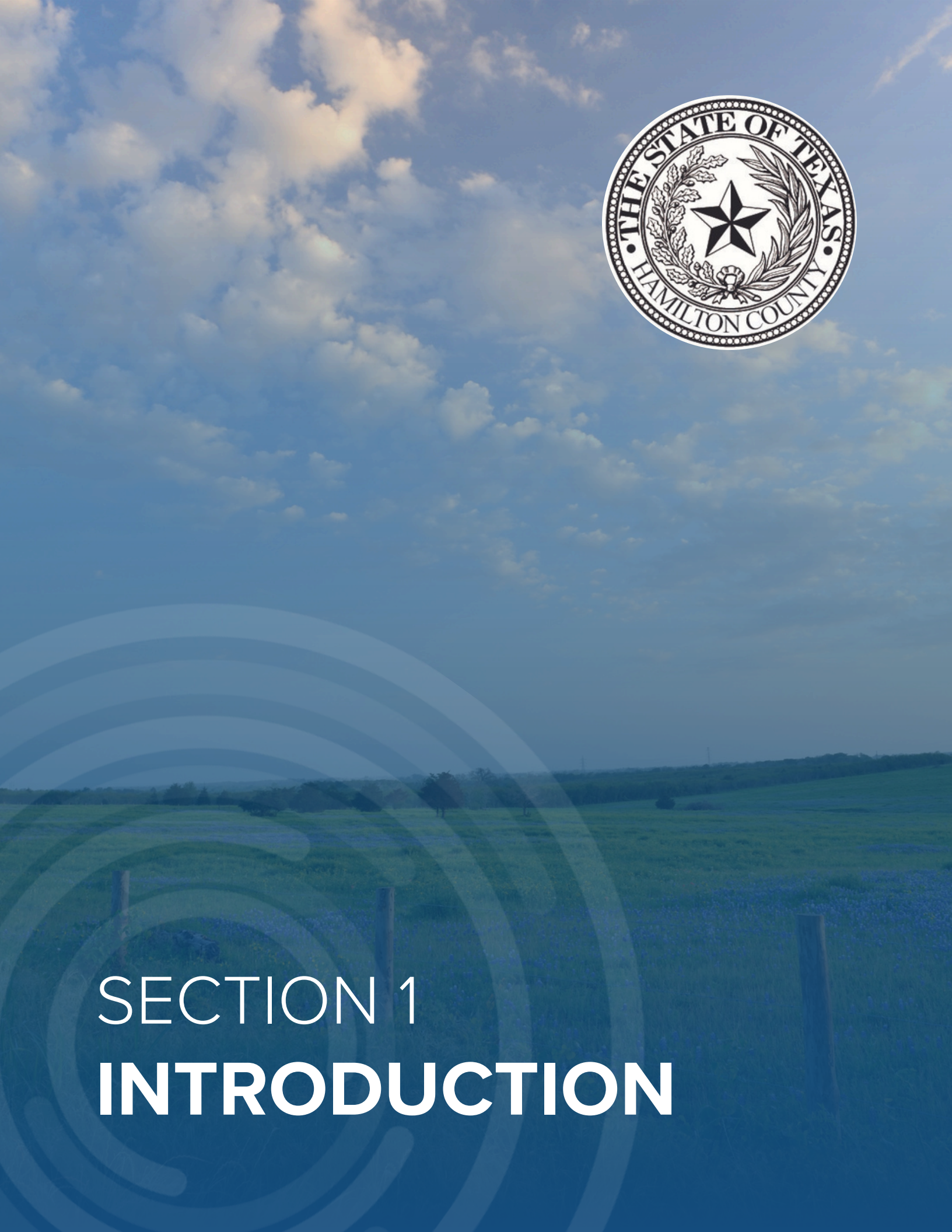
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SECTION 1

INTRODUCTION

SECTION 1: INTRODUCTION

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BACKGROUND

Hamilton County is located in Central Texas roughly 110 miles north of the City of Austin and 55 miles west of the City of Waco. Hamilton County was named for James Hamilton, a South Carolina governor who helped finance Texas's struggle for independence from Mexico. Today, the county covers 836 square miles and is characterized by rolling prairies and many streams, such as the Leon, Lampasas, and Bosque rivers. The county is bounded by Comanche and Erath counties to the north; Bosque County to the east; Mills County to the west; and Lampasas and Coryell counties to the south.[1]

Texas is prone to extremely heavy rains and flooding with half of the world record rainfall rates (48 hours or less).[2] While flooding is a well-known risk, Hamilton 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.*[3] 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 2018 Hamilton County Hazard Mitigation Action Plan (HMAP) Update, which expired in 2023, therefore the County began the process of developing a Hazard Mitigation Action Plan Update, along with incorporated jurisdictions from that plan in order to regain eligibility for grant funding. The HMAP Update planning process provided an opportunity for Hamilton County and participating jurisdictions to evaluate successful mitigation actions and explore opportunities to avoid future disaster loss. The Central Texas Council of Governments (CTCOG) coordinated among Bell County, Mills County, Hamilton County, and Lampasas County to update each of their HMAPs and selected H2O Partners, Inc. to write and develop the 2024 CTCOG Regional HMAP Updates, hereinafter titled: "Hamilton County Hazard Mitigation Action Plan Update 2024: Maintaining a Safe, Secure, and Sustainable Community" (Plan or Plan Update).

[1] Source: https://www.tshaonline.org/handbook/entries/hamilton-county
[2] Source: http://www.floodsafety.com/texas/regional-info/san-antonio-flooding/
[3] Source: http://www.fema.gov/hazard-mitigation-planning-resources

SECTION 1: INTRODUCTION

This is a multi-jurisdictional plan; the participating jurisdictions include: Hamilton County, City of Hamilton, and City of Hico.

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 Hamilton 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 Hamilton 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 Hamilton 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 Hamilton 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 Hamilton County, and planning participants identified 13 natural hazards and 3 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 Hamilton 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 Hamilton County to take advantage of rapidly developing mitigation grant opportunities as they arise; and
- Ensure that participating jurisdictions within Hamilton County maintain eligibility for the full range of future federal disaster relief.

AUTHORITY

The Plan is tailored specifically for participating jurisdictions within Hamilton 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 Planning Policy Guide" (April 2023), and the "Local Mitigation Planning Handbook" (May 2023).

SUMMARY OF SECTIONS

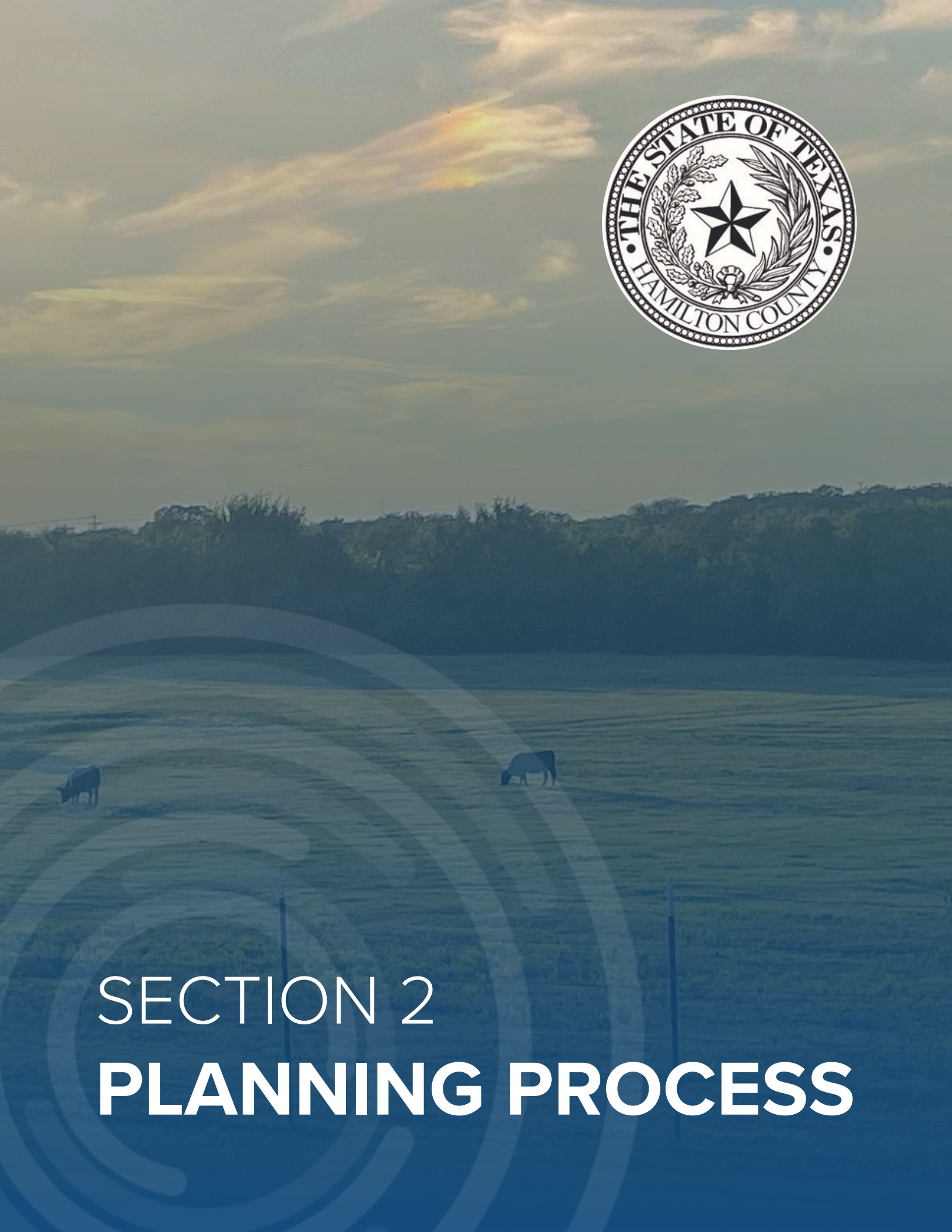
Sections 1 and 2 of the Plan Update outline the Plan's purpose and development, including how Planning Team members, stakeholders, and members of the general public were involved in the planning process. Section 3 profiles Hamilton County's population and economy.

Sections 4 through 20 present a hazard overview and information on individual natural and human-caused hazards in the planning area. 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 21 presents hazard mitigation goals and objectives. Section 22 gives an analysis for the previous actions and Section 23 presents hazard mitigation actions for Hamilton County and the participating jurisdictions. Section 24 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 Hamilton County. Appendix E contains information regarding workshops and meeting documentation. Capability Assessment results for participating jurisdictions within Hamilton County are in Appendix F. Appendix G includes State and Federal Funding Opportunities.[4]

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



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SECTION 2: PLANNING PROCESS

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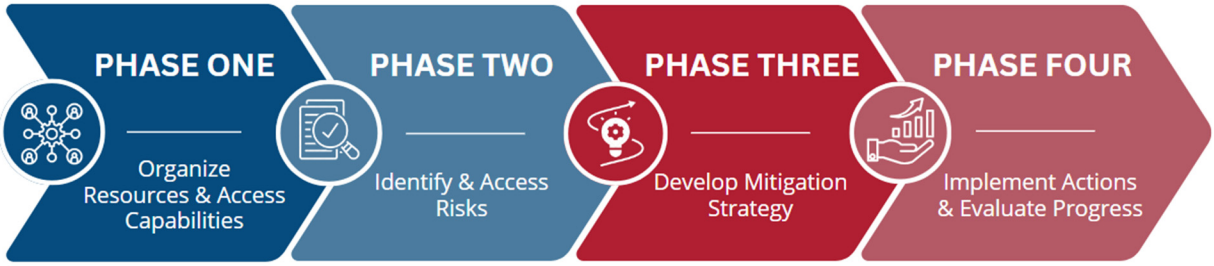
PLAN PREPARATION AND DEVELOPMENT

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

The Central Texas Council of Governments (CTCOG) hired H2O Partners, Inc. (Consultant Team), to provide technical support and oversee the development of the Hamilton 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.

Figure 2-1. Mitigation Planning Process



Hamilton County, participating jurisdictions, and the Consultant Team met in June 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 Hamilton 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 Hamilton 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
Central Texas Council of Governments	Emergency Services Program Manager
Central Texas Council of Governments	Planning & Regional Service Director
Central Texas Council of Governments	Special Projects Coordinator
Hamilton County	Emergency Management Coordinator & Communications Administrator
City of Hamilton	City Administrator*
City of Hico	City Administrator*

Table 2-2. Advisory Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Hamilton County	County Auditor / Administrative Assistant
Hamilton County	County Judge
Hamilton County	County Sheriff
Hamilton County	Facilities Maintenance Manager
Hamilton County	Precinct 1 Commissioner*
Hamilton County	Precinct 2 Commissioner*
Hamilton County	Precinct 3 Commissioner*
Hamilton County	Precinct 4 Commissioner*
City of Hamilton	Building & Planning / Code Enforcement*
City of Hamilton	Chief of Police
City of Hamilton	City Secretary
City of Hamilton	Executive Director of Economic Development Corporation
City of Hamilton	Mayor*
City of Hico	Chief of Police
City of Hico	City Secretary
City of Hico	Mayor*

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 Hamilton County by organization, title, and stakeholder type. Stakeholder involvement is discussed further below.

Based on results of completed Capability Assessment, participating jurisdictions within Hamilton 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
Hamilton County	• Develop a Capital Improvement Plan based on information in the risk assessment and identified mitigation projects within the HMAP. • Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Hamilton	• Develop a Capital Improvement Plan based on information in the risk assessment and identified mitigation projects within the HMAP. • Integrate risk information from HMAP into future updates to Comprehensive Plan. • Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. • Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.
City of Hico	• Integrate risk information from HMAP into future updates to Comprehensive Plan. • Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes. • Developing land use and building ordinances that will require all new developments to conform to the highest mitigation standards.

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, extreme heat, lightning, and drought 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.

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 Hamilton 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 24. Participation of Planning Team members, stakeholders, and the public at each of the workshops is documented in Appendix E. The City of Hico was unable to attend a workshop. The Consultant Team followed up with the City of Hico community officials through emails and phone calls to review information discussed and gather documents that were collected during the workshop.

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 Hamilton County, agencies, and partners will participate in implementing the Plan Update.

KICKOFF WORKSHOP

The Kickoff Workshop was held on August 10, 2023, at the Hamilton County Annex. 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 utility providers, 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 20.

HAZARD IDENTIFICATION

At the Kickoff Workshop, and through e-mail 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 hazards affecting the area, the 2023 State of Texas Hazard Mitigation Plan, and initial study results from reputable sources such as federal and state agencies. Based on this initial analysis, the teams identified a total of 13 natural hazards, and 3 human-caused hazards, which pose a significant threat to the planning area.

RISK ASSESSMENT

An initial risk assessment for participating jurisdictions within Hamilton County was completed in September 2023 and results were presented to Planning Team members at the Risk Assessment Workshop held on September 27, 2023, at the Hamilton County Annex. 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 on December 6, 2023, at the Hamilton County Annex. In addition to the Planning Team, stakeholder groups were invited to attend the workshop. 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 23.

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 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 CTCOG, Hamilton 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 5-20) 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. 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 Hamilton 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 Team members. For example, the City of Hico has completed a project in which drought-tolerant landscaping was installed at all public buildings. The City of Hamilton has completed several actions as well, including adopting and maintaining a Drought Contingency Plan, adopting citywide building codes, and implementing a bulk trash transfer station to regulate and minimize dumping in streams.

Additionally, policies and ordinances were reviewed by several of the participating jurisdictions; Hamilton County has included an action 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 Hamilton 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 Hamilton 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 Hamilton 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 Hamilton County will be responsible for implementing hazard mitigation actions contained in Section 23. Each hazard mitigation action has been assigned to a specific county or city department that is responsible for tracking and implementing the action.

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 Hamilton 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. Hamilton 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 Hamilton 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, Hamilton 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 Hamilton 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	One participating jurisdiction within Hamilton County, City of Hico, has a Capital Improvement Plan (CIP)

Planning Mechanism	Incorporation of Plan
	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	The cities of Hamilton and Hico have Long-term Comprehensive 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 10 of this Plan Update discussing the people and property at risk to flood will be reviewed and revised when participating jurisdictions within Hamilton County update their management plans or develops new plans.
Grant Applications	The Plan will be evaluated by participating jurisdictions within Hamilton 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, all participating jurisdictions within Hamilton County have regulatory plans in place, such as Emergency Operations Plans, Continuity of Operations Plans, Land Use Plans, and Evacuation Plans. The Plan Update will be consulted when county or city 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, the cities of Hamilton and Hico have building codes in place, as well as zoning ordinances and land use restrictions that regulate where future development can take place. Please 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 Operations Plans developed for Hamilton County and City of Hico are updated every 5 years and incorporate goals, objectives and actions identified in the mitigation plan.

PLAN REVIEW AND PLAN UPDATE

As with the development of Plan Update, participating jurisdictions within Hamilton 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 Hamilton 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 Hamilton 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 Hamilton 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.

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 Hamilton County and participating jurisdictions' websites upon approval from FEMA, and a copy will be kept at the CTCOG Office and Hamilton County Office of Emergency Management.

UNDERSERVED COMMUNITIES/VULNERABLE POPULATIONS

A goal of the Planning Team was building equity into the planning process. Including organizations that aid underserved communities and socially vulnerable populations to participate in the plan helps ensure equitable access to the planning process and the meaningful participation of all residents. In addition, these groups can make sure that the interests of vulnerable populations are accurately represented and act as a valuable resource to share information with those vulnerable populations.

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. These agencies were encouraged to post public planning meetings as well as solicit feedback via the public survey.

The CTCOG regional plan includes a four-county area including Mills County, Lampasas County, Bell County and Hamilton County. All stakeholders and planning team members were invited to participate in each of the four county plans developed during this process, including all public meetings, and surveys. All stakeholders are listed in Table 2-5. Some stakeholders have been detailed below along with the agency's mission, including:

- Central Texas Foodbank – work with food donors across the country, financial supporters and volunteers to fill unmet needs in Central Texas; to nourish hungry people and lead the community in the fight against hunger.
- Area Agency on Aging of Central Texas (AACT) - Serving individuals 60 years of age and older and their families residing in Bell, Coryell, Hamilton, Lampasas, Milam, Mills, and San Saba counties. AAACT helps seniors and their caregivers navigate through a variety of issues including income security, housing and care options, health care options, entitlements and benefits, and long-term care.
- American Veterans Mission – devoted to supporting veterans, military families, and select individuals in Bell County and neighboring areas.
- Bring Everyone In the Zone – provide peer support in a myriad of ways to Service Members, Veterans, and their Families (SMVF), especially those suffering from post-traumatic stress, traumatic brain injury, military sexual trauma and other traumatic events in their lives.
- Citizens for Progress (advocacy program for low income) – empower citizens to move out of poverty and create opportunities for them to build a better life through advocacy for those

without a voice, involvement in community programs, and projects that build a better community

In addition, public notices were posted on public bulletin boards at the Hamilton County Courthouse and City of Hamilton City Hall, as well as included in The Hamilton Herald News newspaper. Public notices were also posted on the websites and social media accounts for several participating jurisdictions. For a sample of these postings, please see Appendix E. 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 input and feedback on the mitigation plan. For each form of engagement, all efforts were made to reach Hamilton County's underserved communities and vulnerable populations throughout the planning process. Additional survey information is provided at the end of this section.

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 Hamilton 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
Advent Health Central Texas	Bell County - Killeen	Health Care Facility
Advent Health Central Texas	Safety Officer	Health Care Facility
Amateru Radio Races	Radio Broadcaster	Community Organization+
American Red Cross	Community Preparedness	Non-Profit / Community Organization
American Veterans Mission	General Representative	Community Organization
Area Agency on Aging of Central Texas	Supervisor	Community Organization
Bartlett ISD	Superintendent	Academia
Baylor, Scott & White Hospital	Regional Director of Emergency Management	Health Care Facility
Bell County Animal Shelter	General Representative	Community Organization
Bell County Public Health	Emergency Preparedness Representative	Community Organization

AGENCY	TITLE	STAKEHOLDER TYPE
Bell County WCID #1	General Representative	Utility Provider
Bell County WCID #3	General Representative	Utility Provider
Bell County Storm Water Management	Engineering Tech	Utility Provider
Belton Economic Development	Executive Director	Community Organization
Belton Fire Corporation	Office Manager	Community Organization
Belton Fire Corporation	President	Community Organization
Belton ISD	Coordinator of Emergency Management	Academia
Bosque County	Emergency Management Coordinator	Neighboring Community
Bring Everyone in the Zone	Executive Director	Non-Profit / Community Organization
BSWH-Faith Community Health	Director	Health Care Facility
Burleson County	Emergency Management Coordinator	Neighboring Community
Burnet County	Emergency Management Coordinator	Neighboring Community
Carl R Darnall Army Medical Center	Bell County – Fort Cavazos	Health Care Facility
Central Texas 4C	Executive Director	Non-Profit / Community Organization
Central Texas College	Chancellor	Academia
Central Texas Food Bank	Communications Representative	Community Organization
Citizens for Progress	President	Community Organization
Clearwater Underground Water Conservation District	General Manager	Utility Provider
Comanche County	Emergency Management Coordinator	Neighboring Community
Communities in Schools – Greater Central Texas	CEO	Community Organizations
Department of Homeland Security	Media Representative	Federal Agency
Eagle Waste Disposal – Salado	General Representative	Utility Provider
Environmental Protection Agency	General Representative	Federal Agency

AGENCY	TITLE	STAKEHOLDER TYPE
Erath County	Emergency Management Coordinator	Neighboring Community
Falls County	Emergency Management Coordinator	Neighboring Community
Food Care Center	General Representative	Non-Profit / Community Organization
Fort Cavazos	Director, Public Affairs	Army Base
Fort Cavazos	Chief Community Relations	Army Base
Fort Cavazos	Chief Media Relations	Army Base
Gause ISD	Superintendent	Academia
Grand Central Texas	Economic Development – Belton	Regional Agency
Grand Central Texas	Economic Development - Temple	Regional Agency
Goldthwaite Eagle	Reporter	Community Organization+
Goldthwaite Municipal Airport	General Representative	Community Organization
Hamilton County Hospital District	Director of EMS & Emergency Management	Health Care Facility
Hamilton Hearld News	Editor	Community Organization+
Hamilton ISD	Superintendent	Academia
Hispanic American Chamber of Commerce of Central Texas	General Representative	Community Organization
Holland ISD	Superintendent	Academia
HOME / Community Development	Director	Community Organization
HOP/Hill Country Transit District	Chief Safety and Security Officer	Community Organization
Innovation Black Chamber of Commerce	General Representative	Community Organization
Kempner Family Community Development	Director	Community Organization
Killeen-Fort Hood Regional Airport	General Representative	Community Organization
Killeen ISD	Superintendent	Academia
Killeen Water and Sewer	Director of Water and Sewer Facilities	Utility Provider

AGENCY	TITLE	STAKEHOLDER TYPE
Lampasas County Chamber of Commerce	General Representative	Community Organization
Lampasas Dispatch Record	News Reporter	Community Organization+
Lampasas ISD	Superintendent	Academia
Lee County	Emergency Management Coordinator	Neighboring Community
Lometa ISD	Superintendent	Academia
McLennan County	Emergency Management Coordinator	Neighboring Community
Mills County Ministerial Association	Representative	Community Organization
Milam County	Emergency Management Coordinator/Homeland Security	Neighboring Community
NOAA	General Representative	Federal Agency
Rehab Warriors	President of Business Development & Government Affairs	Community Organization+
Robertson County	Emergency Management Coordinator	Neighboring Community
Rogers ISD	Superintendent	Academia
Office of Rural and Community Affairs	Executive Director	State Agency
Olin E. Teague Veteran's Medical Center	Office of Public Information	Health Care Facility
Salado ESD/VFD	Fire Chief	Community Organization
Salado ISD	Superintendent	Academia
Salado Water Supply Corporation	General Manager	Utility Provider
Salvation Army	Director of Social Services for Bell County	Non-Profit / Community Organization
Salvation Army	General Representative for Lampasas County	Non-Profit / Community Organization
San Saba County	Emergency Management Coordinator	Neighboring Community
Seton Medical Center	Vice President Operations	Health Care Facility
Somervell County	Emergency Management Coordinator/County Judge	Neighboring Community

AGENCY	TITLE	STAKEHOLDER TYPE
Sutron Environmental & Hydrological	General Representative	Private Organization
SVFD	Communications Representative	Community Organization+
Teex TAMU	Regional Training Manager	Community Organization+
Temple College	Associate Vice President / Chief of Operations	Academia
Temple College	University Police Department	Academia
Temple ISD	Superintendent	Academia
Texas A&M AgriLife Extension	Bell County Representative	State Agency
Texas A&M AgriLife Extension	Hamilton County Representative	State Agency+
Texas A&M AgriLife Extension	Lampasas County Representative	State Agency
Texas A&M AgriLife Extension	Mills County Representative	State Agency
Texas A&M Central Texas	Safety & Risk Management Officer	Academia
Texas A&M Forest Service	City of Hamilton General Representative	State Agency
Texas A&M Forest Service	City of Temple General Representative	State Agency
Texas Department of Transportation	Safety Coordinator for Coryell, Bell and Miliam	State Agency
Texas Division of Emergency Management	District Coordinator	State Agency
Texas Division of Emergency Management	Regional Representative for Mills and Hamilton County	State Agency+
Texas State Legislature	Representative District 59	State Agency
Texas State Legislature	Representative District 54	State Agency
Texas State Legislature	Representative District 55	State Agency
Texas State Senate	Senator District 24	State Agency
Texas State Soil & Water	Field Representative	State Agency
Texas State Soil & Water	Field Representative for Hamilton-Coryell SWCID #506	State Agency

AGENCY	TITLE	STAKEHOLDER TYPE
Texas State Soil & Water	Field Representative for Mills County SWCID #554	State Agency
Texas Water Development Board	Communications Representative	State Agency
Texas Windstorm Association	General Representative	State Agency
Troy ISD	Superintendent	Academia
University of Mary Hardin-Baylor	Senior Vice President of Administration & Chief Operating Officer	Academia
University of Mary Hardin-Baylor	University Police Department	Academia
University of Mary Hardin-Baylor	Vice President for Policy and Risk Management	Academia
U.S. Fish & Wildlife	Southwest Regional Representative	Federal Agency
U.S. Army Corps of Engineers	Southwest Regional Representative	Federal Agency
Veteran Services	Director of Bell County	Community Organization
Veteran Services	Lampasas County VSO	Community Organization
Veteran Services	Mills County VSO	Community Organization
Williamson County	Emergency Management Coordinator	Neighboring Community
Workforce Solutions of Central Texas	Supervisor	Community Organization

Stakeholders and participants from neighboring communities that attended the Planning Team and public meetings played a key role in the planning process. For example, communication and hazard preparedness 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 other proactive mitigation efforts such as programs for cleaning debris from bridges, drains, and culverts, as well as installing generators at critical facilities.

PUBLIC MEETINGS

A series of public meetings were held throughout the four counties participating in the CTCOG Regional Hazard Mitigation Action Plan Updates 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 Hamilton 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

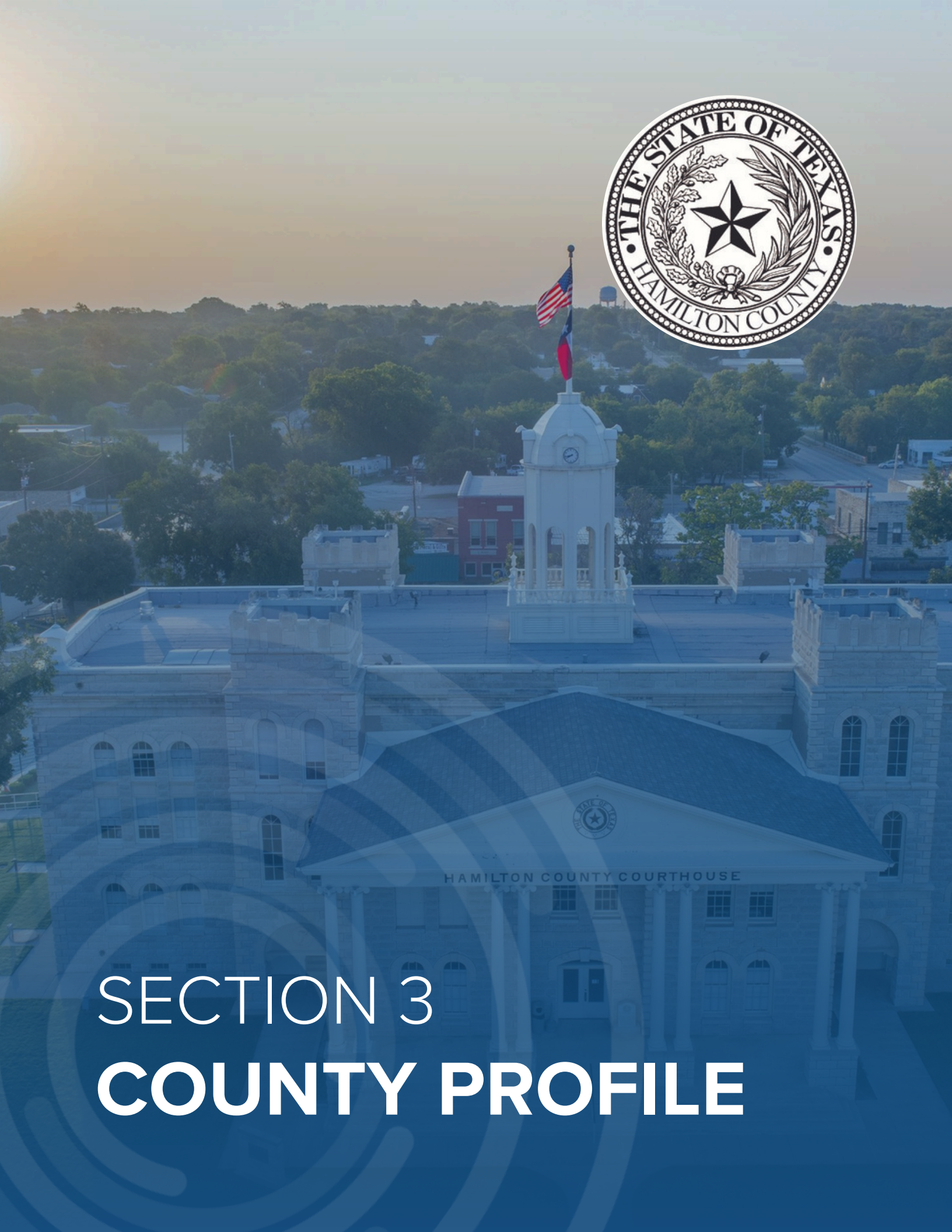
on the public meetings. Representatives from area neighborhood associations and area residents were invited to participate.

Public meetings were held on the following dates:

- September 27, 2023, Lampasas County Building, Office of Emergency Management
- October 11, 2023, Central Texas Council of Governments
- December 6, 2023, Hamilton County Annex
- December 7, 2023, Mills County Sheriff's Office

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 597 responses were completed online by members of the public in all four counties participating in the CTCOG Regional Hazard Mitigation Action Plan Updates. The survey results are analyzed in Appendix B. Participating jurisdictions within Hamilton 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 wildfire and winter storm are the hazards of highest concern for the public and community education and preparedness as well as implementing burn bans were actions indicated that the local government should take to mitigate risk to these hazards. As a result, the Planning Team has included mitigation actions related to public education around severe weather, developing a Community Wildfire Protection Plan (CWPP) for those participating jurisdictions without one, as well as installing high water signage and flood gates in high-risk areas.



SECTION 3

COUNTY PROFILE

SECTION 3: COUNTY PROFILE

Overview 1
Population and Demographics 3
Population Growth 4
Economic Impact 5
Natural, Cultural, and Historic Resources 6
Existing Land Use and Development Trends 8
Changes in Vulnerability 9
Future Growth and Development 9

OVERVIEW

Hamilton County is located in Central Texas, roughly 110 miles north of the City of Austin and 55 miles west of the City of Waco. The county covers roughly 836 square miles of the Cross Timbers ecoregion of Texas, with all but roughly half a square mile of that being comprised of land and the rest water. Hamilton was incorporated as a county in 1856, with the City of Hamilton being named the county seat in 1858. The county is bounded by Comanche and Erath counties to the north; Bosque County to the east; Mills County to the west; and Lampasas and Coryell counties to the south.

Hamilton County's topography is characterized by rolling prairies marked by numerous flat-topped buttes that rise abruptly to stand on the divides between the county's many streams. Of those, the primary streams draining the county are the Leon, Lampasas, and Bosque rivers. Many of the region's deep, wide stream valleys are bordered by limestone cliffs that abut the intervening flat divides. Elevations in the county range from 900 and 1,600 feet above sea level. Average temperatures range from a low of 34°F in January to a high of 96°F in July. Average annual rainfall experienced in Hamilton County is 29.61 inches.

Although the extent of prehistoric settlement in the area that is now Hamilton County is unclear, at least five Native American burial mounds have been found on the banks of Cowhouse Creek. The first recorded permanent white settlers in the area arrived in 1854 and 1855, establishing what would develop into the City of Hamilton. Population grew rapidly, and a petition to form a new county was circulated in 1856 and approved by the Texas legislature that same year. Land previously assigned to Comanche, Bosque, and Lampasas counties was carved out to create the new county, which was named after James Hamilton, a South Carolina governor who invested $216,000 in gold to finance the Texas struggle for independence from Mexico.

After its incorporation, Hamilton County's agriculture industry grew rapidly, going from 75 ranches and farms in 1870 to 949 in 1880, and continuing to grow to 1,872 ranches and farms by 1900. Primary crops and livestock produced in the region include cotton, grain, sheep, and cattle; cotton production in particular was a driving force of Hamilton County's growth.

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

Figure 3-1. Location of Hamilton County

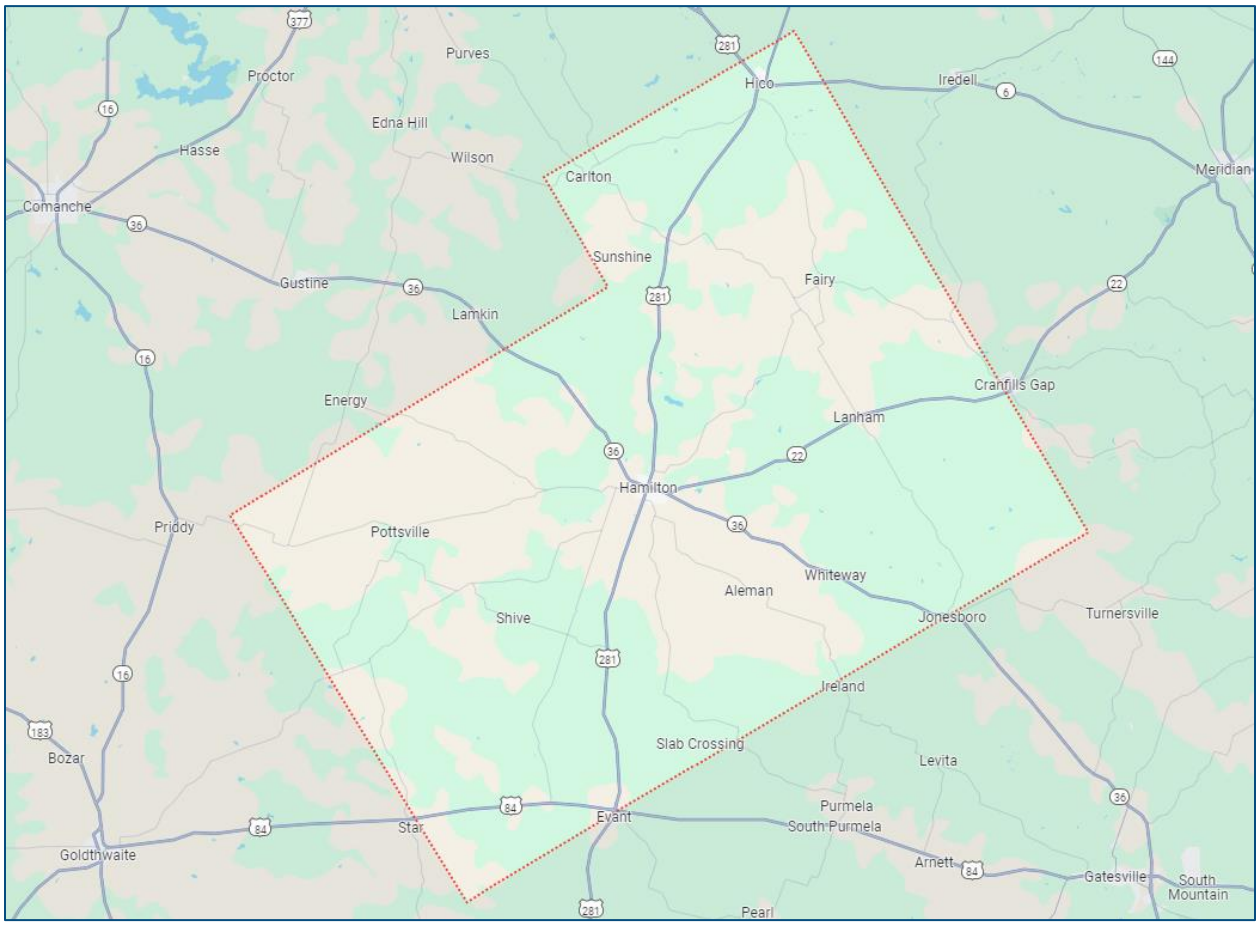
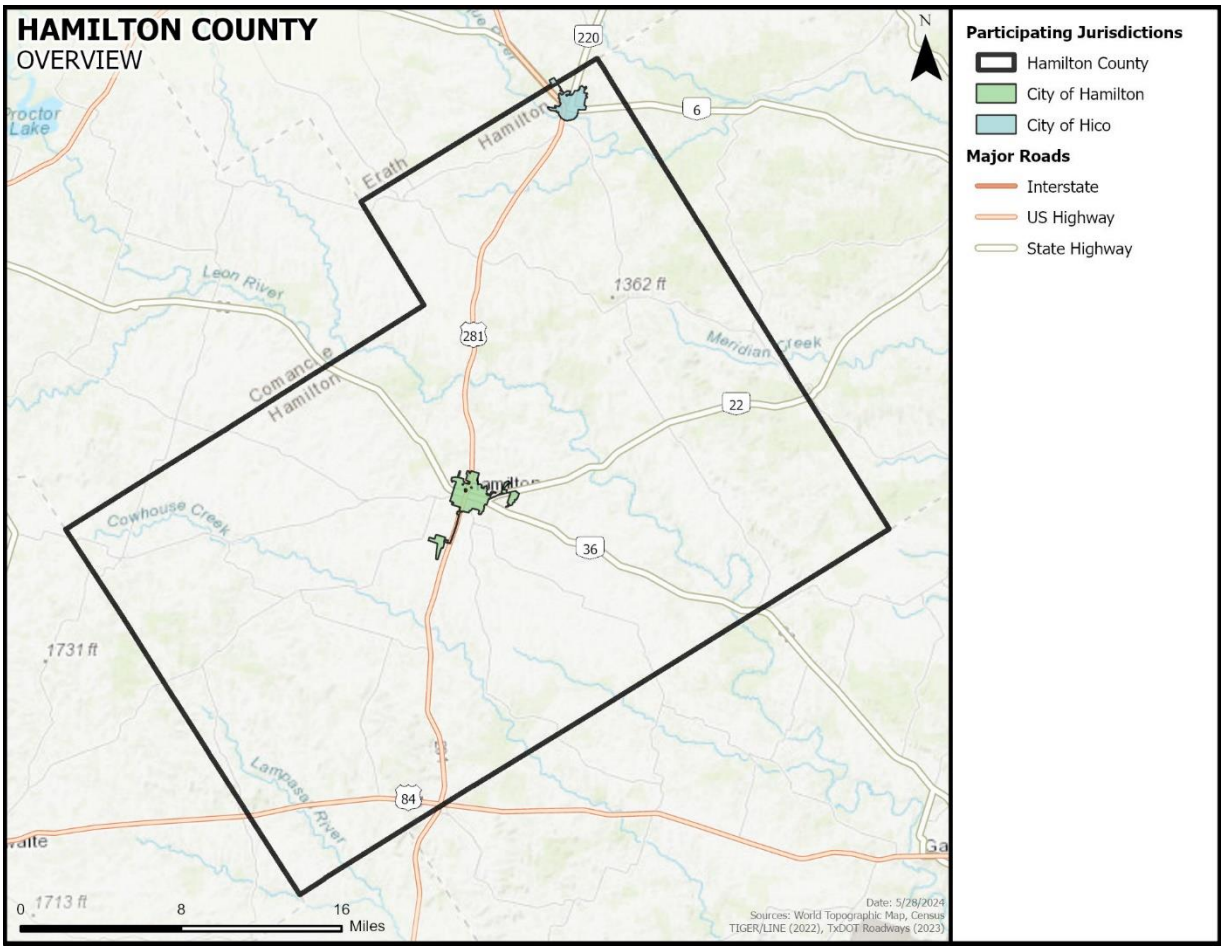


Figure 3-2 shows the participating jurisdictions within Hamilton County that are covered in the risk assessment analysis of the Plan Update.

Figure 3-2. Hamilton County Planning Area



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

Table 3-1. Participating Jurisdictions

PARTICIPATING JURISDICTIONS	
Hamilton County	
City of Hamilton	City of Hico

POPULATION AND DEMOGRAPHICS

According to the 2020 Census population count, Hamilton County has an official population of 8,222 residents, a 3 percent decrease since the 2010 census. Table 3-2 show the population distribution in Hamilton County and the participating jurisdictions in 2010, 2020 (Census population count), and 2022 (2022 American Community Survey (ACS) five-year estimates). Note

that in some cases the 2022 ACS estimates may differ from the 2020 Census count; the ACS estimates are used throughout this section for consistency.[1]

Table 3-2. Population Distribution by Jurisdiction

JURISDICTION	TOTAL 2010 POPULATION	TOTAL 2020 POPULATION (Census)	TOTAL 2022 POPULATION (ACS Estimates)	PERCENT CHANGE 2010-2022
City of Hamilton	3,095	2,895	2,898	-6%
City of Hico	1,379	1,335	1,627	18%
Unincorporated Hamilton County	4,043	3,992	3,719	-8%
Hamilton County	**8,517**	**8,222**	**8,244**	**-3%**

Table 3-3 summarizes select characteristics of vulnerable or sensitive populations in Hamilton 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 a given area at a given time.

Table 3-3. Estimated Vulnerable or Sensitive Populations[2]

JURISDICTION	ELDERLY (over 65)	YOUTH (under 5)	WITH A DISABILITY	BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Hamilton	631	105	632	438	433
City of Hico	375	201	422	137	74
Unincorporated Hamilton County	1,117	113	553	835	396
Hamilton County	**2,123**	**419**	**1,607**	**1,410**	**903**

POPULATION GROWTH

The official 2020 Hamilton County population is 8,222. Overall, Hamilton County experienced an increase in population between 1990 and 2020 of 6 percent, or an increase of 489 residents. Between 2010 and 2020, Hamilton County (-3%) and all participating jurisdictions experienced a slight population decline. Table 3-4 provides historic growth rates in Hamilton County.

[1] 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/2022/

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

Table 3-4. Population Growth by Jurisdictions 1990-2020[3]

JURISDICTIONS	1990	2000	2010	2020	POP CHANGE 1990-2020	PERCENT OF CHANGE	POP CHANGE 2010-2020	PERCENT OF CHANGE
City of Hamilton	2,937	2,977	3,095	2,895	-42	-1%	-200	-6%
City of Hico	1,342	1,341	1,379	1,335	-7	-1%	-44	-3%
Unincorporated Hamilton County	3,454	3,911	4,043	3,992	538	16%	-51	-1%
Hamilton County	**7,733**	**8,229**	**8,517**	**8,222**	**489**	**6%**	**-295**	**-3%**

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 Hamilton 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, 52 percent of the population 16 years and over is employed in the labor force. The per capita income is $37,335 and the median household income countywide is $54,890. It is estimated that 48 percent of households have incomes below $50,000. Families with incomes below the poverty level in 2022 made up 17 percent of all families. Of families that have children under 18 years old, 18 percent are below the poverty level.

Table 3-5 and Table 3-6 show the various occupations and industries within Hamilton County, according to the 2022 estimates by the American Community Survey.

Table 3-5. Occupations of Employed Population in Hamilton County[4]

OCCUPATION	ESTIMATE	PERCENT
Civilian employed population 16 years and over	3,194	-
Management, business, science, and arts occupations	879	28%
Service occupations	766	24%
Sales and office occupations	585	18%
Production, transportation, and material moving occupations	521	16%

[3] U.S. Census Bureau
[4] 2022 American Community Survey 5-Year Estimates Data Profiles.

OCCUPATION	ESTIMATE	PERCENT
Natural resources, construction, and maintenance occupations	443	14%

Table 3-6. Industries of Employed Population in Hamilton County[5]

INDUSTRY	ESTIMATE	PERCENT
Civilian employed population 16 years and over	3,194	-
Educational services, and health care and social assistance	745	23%
Retail trade	454	14%
Arts, entertainment, and recreation, and accommodation and food services	373	12%
Construction	317	10%
Agriculture, forestry, fishing and hunting, and mining	248	8%
Transportation and warehousing, and utilities	200	6%
Finance and insurance, and real estate and rental and leasing	181	6%
Other services, except public administration	179	6%
Public administration	159	5%
Manufacturing	157	5%
Professional, scientific, and management, and administrative and waste management services	88	3%
Wholesale trade	65	2%
Information	28	1%

NATURAL, CULTURAL, AND HISTORIC RESOURCES

Hamilton County's territory is composed of 836 square miles, with roughly half a square mile being water and the rest being land. The county sits along the region where the Edwards Plateau and Cross Timbers ecoregions of Texas meet, characterized by rolling prairies and wooded areas. Soils range from sandy loams and sands as well as the dark, limy, crumbly clays of the prairie, to the rich alluvial bottoms of the river valleys. Beyond the Leon, Lampasas, and Bosque rivers, Hamilton County is home to a number of streams, such as Cowhouse Creek, Pecan Creek, Meridian Creek, Honey Creek, and Bear Creek.

Foliage in the wooded regions of Hamilton County include pecan, live oak, elm, cedar, and post oak trees. The region is also home to a diverse array of wildlife, including birds such as the Yellow-

[5] 2022 American Community Survey 5-Year Estimates Data Profiles.

rumped Warblers, Western Kingbird, Woodpeckers, and waterfowl that make it an attractive destination for birdwatching.[6] The county's habitat also makes it a destination for hunting each year, with abundant populations of white-tailed deer, turkey, dove, quail, and hogs.

Hamilton County's climate and landscape also aided in developing a large agriculture industry in the region, which earns roughly $31 million annually, 90 percent of which derives from cattle, hogs, sheep, goats, and poultry. In addition to livestock, common crops grown in the county include sorghums, small grains, cotton, hay, and pecans.[7]

Many recreational activities are available throughout Hamilton County beyond hunting and wildlife activities, particularly in the City of Hamilton. Hamilton Fair Park offers a multitude of indoor and outdoor event spaces, where private and community events such as livestock sales, rodeos, concerts, and other parties and events are held. Other draws to the County include the Historic Downtown Square in the City of Hamilton, wineries, art galleries, museums, and City Lake.[8]

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 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 April 2024, there are four federally endangered, threatened, or candidate species in Hamilton County, listed in Table 3-7. Additionally, three species found in Hamilton County are listed as being resolved or in recovery: the plains spotted skunk, bald eagle, and black-capped vireo.

Table 3-7. Endangered Species in Hamilton County[9]

TYPE of SPECIES	COMMON NAME	SCIENTIFIC NAME	SPECIES STATUS
Bird	Whooping crane	Grus americana	Endangered
Bird	Golden-cheeked warbler	Setophaga chrysoparia	Endangered
Bird	Rufa red knot	Calidris canutus rufa	Threatened
Insect	Monarch butterfly	Danaus plexippus	Candidate

Hamilton County has a rich history that is preserved through its designated historic buildings and sites. Currently, there is one building in Hamilton County listed on the National Register of Historic Places, the Hamilton County Courthouse. Historic buildings are vulnerable to natural hazards as

[6] Source: https://tpwd.texas.gov/huntwild/wildlife/wildlife-trails/ppww/pecan-creek-loop
[7] Source: https://www.tshaonline.org/handbook/entries/hamilton-county
[8] Source: https://hamiltontexas.com/31/Living-Visiting
[9] U.S. Fish and Wildlife Service, Environmental Conservation Online System https://ecos.fws.gov/ecp/report/species-listings-by-current-range-county?fips=48193

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.

Table 3-8. Historic Properties Listed on the National Register of Historic Places[10]

PROPERTY NAME	LOCATION	ADDRESS
Hamilton County Courthouse	City of Hamilton	102 N. Rice Street

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. The cities of Hamilton and Hico have 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 3-9 lists the number of residential buildings and total units authorized through a permit from each jurisdiction, where data was available, between 2019 and 2023. The data includes total buildings and total units permitted. Permits are reported annually in September and the data includes that from 2019 through 2023 to demonstrate growth. Of the residential building permits issued in this period, 90 percent were for single-family buildings and 10 percent for multi-family buildings. Housing type can also be an indication of an individual's ability to recover from a disaster.

Table 3-9. Building Permits, By Jurisdiction, 2019-2023[11]

JURISDICTION	2019		2020		2021		2022		2023	
	Total Buildings	Total Units	Total Buildings	Total Units	Total Buildings	Total Units	Total Buildings	Total Units	Total Buildings	Total Units
Hamilton County*	-	-	-	-	-	-	-	-	-	-
City of Hamilton	0	0	1	1	6	6	4	6	4	6
City of Hico	3	3	12	12	14	15	15	16	14	15
PLANNING AREA	**41**	**42**	**33**	**34**	**49**	**49**	**48**	**50**	**36**	**36**

*Data for jurisdiction was not included in the database

Certain types of housing found in the Hamilton County planning area are more vulnerable than typical site-built, newly constructed residential structures. This includes mobile or manufactured homes, of which there are 304 (7 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

[10] National Register of Historic Places
[11] U.S. Census Bureau, Building Permit Survey, 1992-2023, https://www.census.gov/construction/bps/

construction standards than newer construction, making these homes more susceptible to damage during hazard events. These older homes make up 69 percent (approximately 3,003 structures) of housing stock in the planning area. Table 3-10 includes housing inventory data for the participating jurisdictions per the American Community Survey five-year estimates.

Table 3-10. Housing Inventory and Vulnerable Structures, By Jurisdiction[12]

JURISDICTION	TOTAL HOUSING UNITS	BUILT PRIOR TO 1980	MOBILE HOMES
City of Hamilton	1,292	1,024	84
City of Hico	728	625	38
Unincorporated Hamilton County	2,332	1,354	182
Hamilton County	**4,352**	**3,003**	**304**

CHANGES IN VULNERABILITY

The Hamilton County planning area has experienced a decrease in overall population of 3 percent between 2010 and 2020. Each participating jurisdiction also experienced population decreases individually between 2010 and 2020. The American Community survey estimates the 2022 total housing units for the planning area to be 4,352. The total building permits issued between 2019 and 2023 represent approximately 4.8 percent of the total housing units available in the planning area. The declining trend in population for the planning area along with the slight increase in recent development or housing units indicates no notable increase in vulnerability to all hazards in terms of populations and the built environment.

FUTURE GROWTH AND DEVELOPMENT

To better understand how future growth and development in Hamilton 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 3-11, 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 a slight decrease in population for the county, which would also result in a slight decrease in population density in Hamilton County.

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

Table 3-11. Hamilton County Population Projections[13]

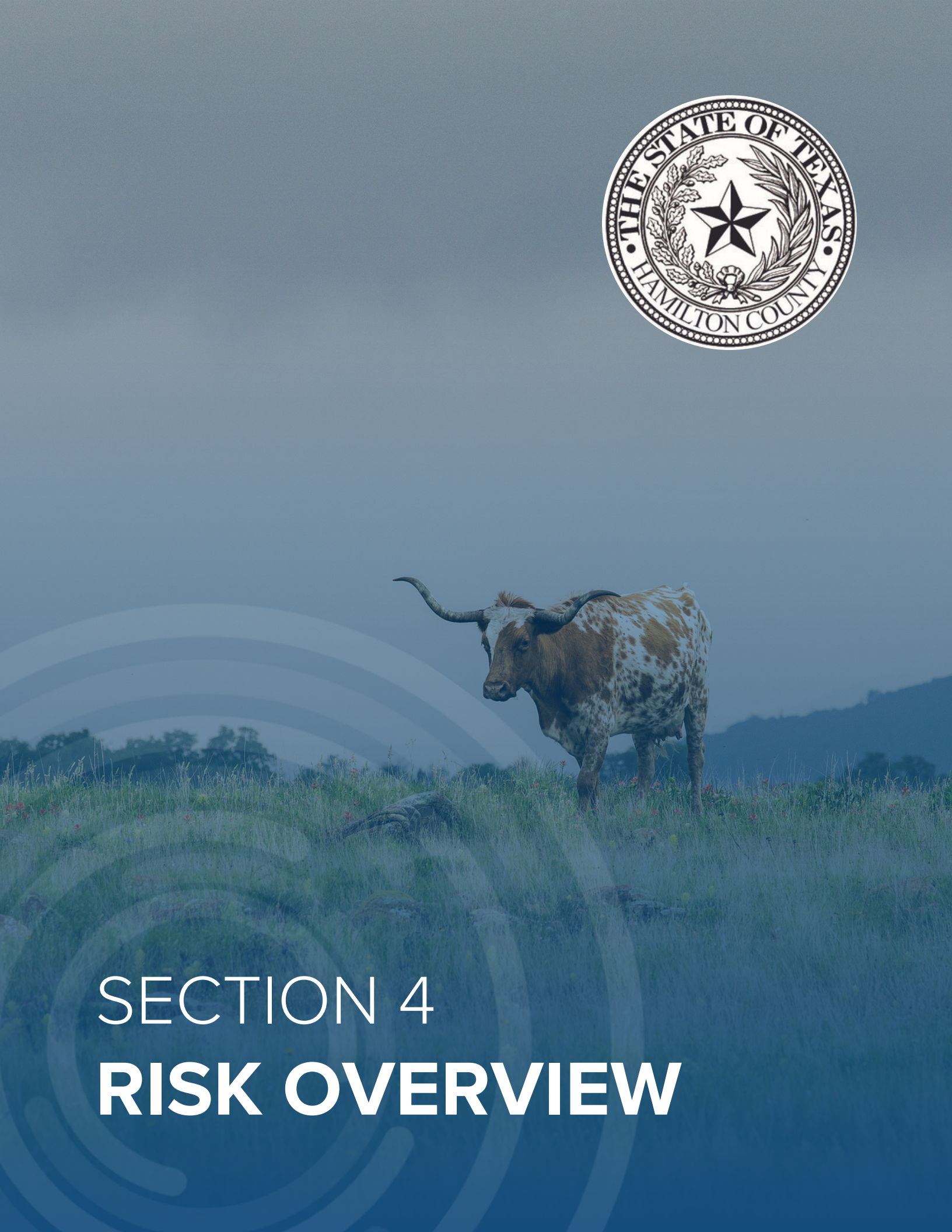
LAND AREA (SQ MI)	2010		2020		2030		2040		2050	
	Population									
	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)	Total Number	Density (Land Area, SQ MI)
835.92	8,517	10.18	8,220	9.83	8,143	9.74	8,116	9.71	8,176	9.78

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 staff, decision-makers, and citizens in making decisions which affect the community with the understanding of the long-term effects.

Of the participating jurisdictions within the planning area, several have an adopted Comprehensive Plan currently in place. For example, the City of Hamilton 2018 Comprehensive Plan details a vision, distinct goals, and recommended actions for the City through 2028. The plan's aim is to see the City of Hamilton have a local economy that supports a variety of businesses; a well-maintained park system for youth, adult, and senior entertainment; water and sewer systems that provide good service at low cost to taxpayers; and diverse housing opportunities affordable to and serving the needs of all segments of the population. The plan contains recommendations on topics such as storm drainage systems, recreation and open spaces, land use, housing, capital improvements, and other areas which are vital to quality of life in the City of Hamilton.[14]

[13] Office of the State Demographer, Texas State Data Center, and the Institute for Demographic and Socioeconomic Research

[14] Source: https://hamiltontexas.com/176/Planning-Capacity



SECTION 4
RISK OVERVIEW

SECTION 4: RISK OVERVIEW

Hazard Description 1
Disaster Declaration History 4
Natural Hazards and Climate Change 5
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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 20, 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 Hamilton County identified 13 natural hazards and 3 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, hurricane / tropical storm, 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 earthquake, wildfire, and expansive soils hazards are considered “other,” since these hazards are 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 cyber attack, hazardous materials, and terrorism.

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.
Hurricane / Tropical Storm	A hurricane is an intense tropical weather system of strong thunderstorms with a well-defined surface circulation and maximum sustained winds of 74 mph or higher.
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.
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.

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	
Earthquake	An earthquake is the sudden, rapid, shaking of the earth, caused by the breaking and shifting of subterranean rock as it releases strain that has accumulated over a long time. Initial mild shaking may strengthen and become extremely violent within seconds.
Expansive Soils	Expansive soils are soils and soft rock that tend to swell or shrink due to changes in moisture content. Changes in soils volume present a hazard primarily to structures built on top of expansive soils.
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	
Cyber Attack	A cyber-attack is any type of offensive maneuver employed by individuals or whole organizations that targets computer information systems, infrastructures, computer networks, and/or personal computer devices by various means of malicious acts usually originating from an anonymous source that either steals, alters, or destroys a specified target by hacking into a susceptible system.
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.

HAZARD	DESCRIPTION
Terrorism	Terrorism is the unlawful use of violence and intimidation, especially against civilians, in the pursuit of political aims. Terrorism can be classified as either domestic, which involves groups or individuals without foreign direction, or international terrorism, those whose actions are foreign-based and/or directed. Terrorist incidents can be of many types, including biological or chemical weapons, the use of firearms or explosives, cyber-attacks, or various other means that post a threat to civilians, property, and the environment.

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.

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.
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 Hamilton 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 Hamilton County. Many of the disaster events were regional or statewide.

Between 1953 and 2023 Hamilton County received 16 federal disaster declarations. Out of the 16 federally declared disasters, the largest share (4) was related to wildfire, followed by declarations for hurricane (3), severe storms (3), biological (2), severe ice storms (2), drought (1), and flood (1).

In addition to the 16 federally declared disaster there have been 26 U.S. Department of Agriculture (USDA) Secretarial disaster designations between 2012 and April 2024. 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

designated county.[1] Of the 26 USDA designations for Hamilton County, many listed multiple factors as having caused the disaster area designation. The leading factor was drought, which was included in 23 designations. Other factors listed include excessive heat (included in 14 designations), high wind (12), fire / wildfire (11), insects (11), and winter storm (1).

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

YEAR	DECLARATION TITLE	HAZARD	DECLARATION TYPE	DISASTER No.
1990	Flooding, Severe Storm, Tornado	Severe Storm	DR	DR-863
1991	Severe Storm, Thunderstorms	Flood	DR	DR-930
1993	Extreme Fire Hazard	Drought	EM	EM-3113
1998	Tropical Storm Charley	Severe Storm	DR	DR-1239
1999	Extreme Fire Hazards	Fire	EM	EM-3142
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
2007	Severe Storms, Tornadoes, and Flooding	Severe Storm	DR	DR-1709
2008	Wildfires	Fire	EM	EM-3284
2009	Texas 617 Fire	Fire	FM	FM-2815
2020	Covid-19	Biological	EM	EM-3458
2020	Covid-19 Pandemic	Biological	DR	DR-4485
2021	Severe Winter Storm	Severe Ice Storm	EM	EM-3554
2021	Severe Winter Storms	Severe Ice Storm	DR	DR-4586

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

[1] United States Department of Agriculture https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/emergency_disaster_designation_declaration_process-factsheet.pdf

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.[2]

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 Texas[3][4]

HAZARDS	EXPECTED TRENDS
Extreme Temperatures	• 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.
Precipitation	• 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.

[2] 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/

[3] 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

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

HAZARDS	EXPECTED TRENDS
	• 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	• 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	• 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	• 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)	• 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.
Wildfire	• 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 Hamilton County. Remaining records identifying the occurrence of hazard events in the planning area and the maximum recorded magnitude of each event were also evaluated.

Geographic information system (GIS) technology was used to identify and assess risks for Hamilton 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.
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 Hamilton 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 Hamilton County was reviewed based on recent development changes that occurred throughout the planning area. The population of Hamilton County has declined by 3 percent between 2010 and 2020, according to the U.S. Census Bureau, therefore the vulnerability to the population, infrastructure, and buildings has remained essentially unchanged for hazards addressed in the plan.

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

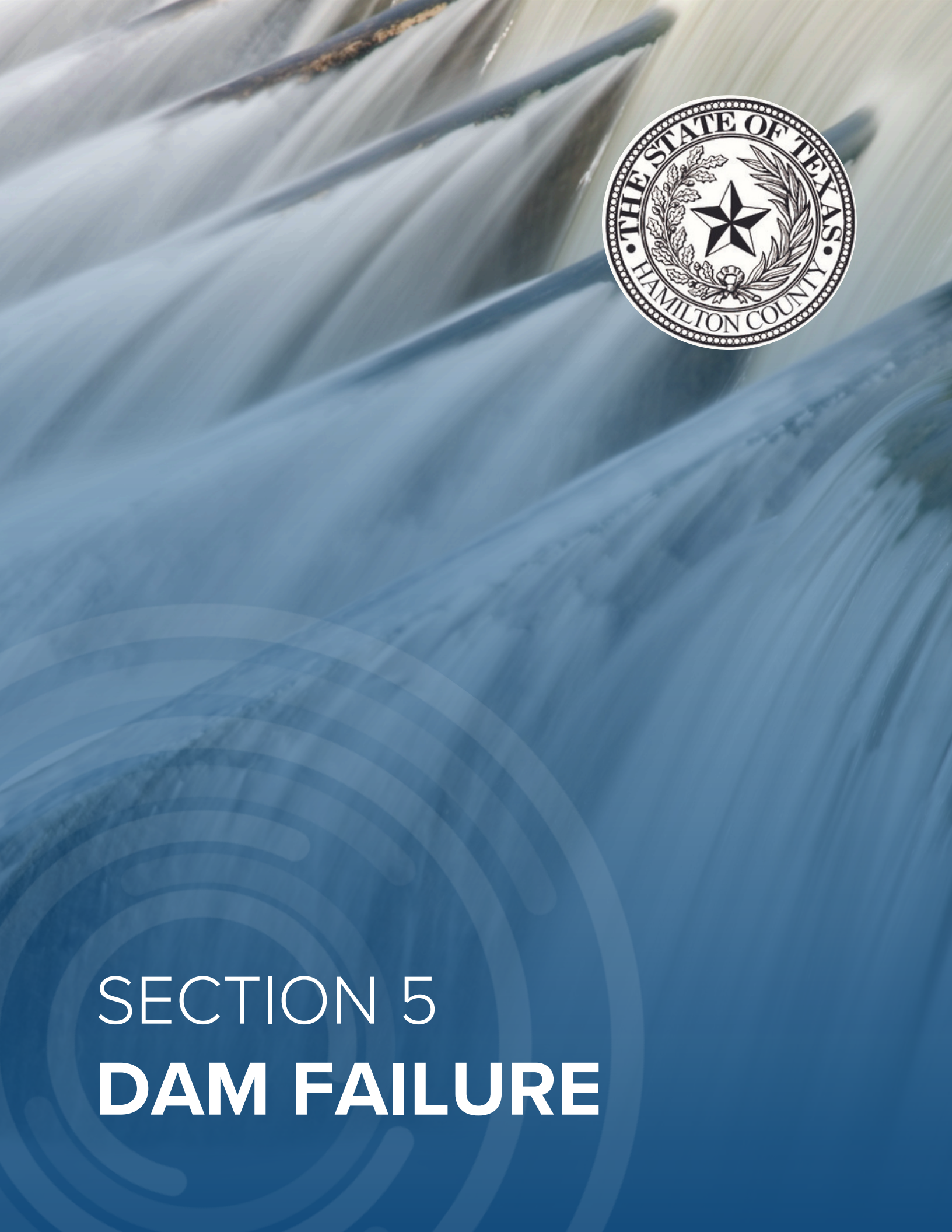
During the 2023 / 2024 planning process, the Planning Team conducted a risk ranking exercise to get input from the Planning Team and stakeholders. Table 4-7 portrays the results of the risk assessment analysis including the frequency of occurrence and potential severity and the Planning Team's self-assessment 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			
Drought	Highly Likely	Minor	High
Extreme Heat	Highly Likely	Limited	High
Wildfire	Highly Likely	Minor	High
Winter Storm	Highly Likely	Limited	High
Flood	Highly Likely	Limited	Moderate
Hail	Highly Likely	Limited	Moderate
Lightning	Highly Likely	Limited	Moderate
Thunderstorm Wind	Highly Likely	Minor	Moderate
Tornado	Likely	Major	Moderate

SECTION 4: RISK OVERVIEW

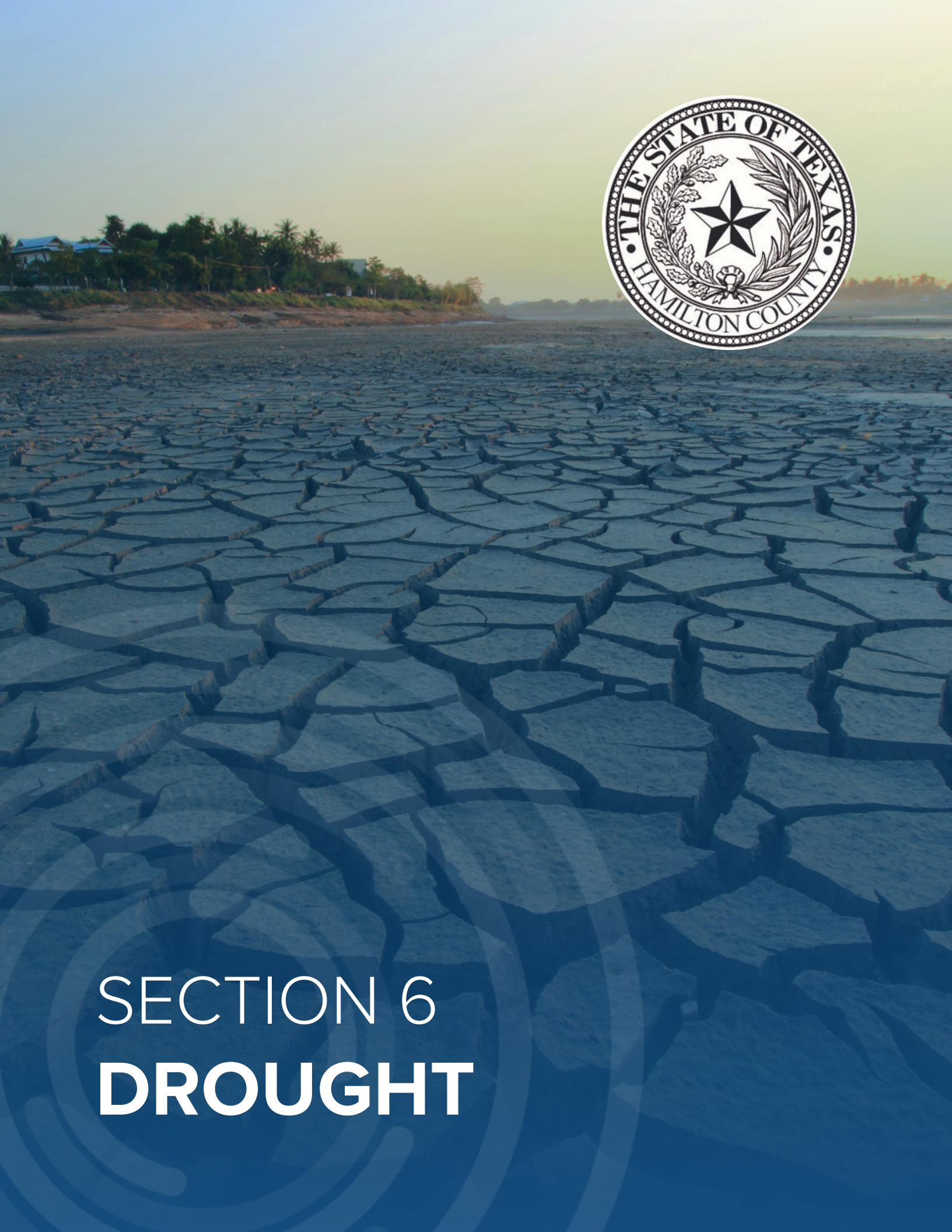
HAZARD	FREQUENCY OF OCCURENCE	POTENTIAL SEVERITY	RANKING
Dam Failure	Unlikely	Limited	Low
Earthquake	Unlikely	Limited	Low
Expansive Soils	Unlikely	Limited	Low
Hurricane / Tropical Storm	Unlikely	Limited	Low



SECTION 5
DAM FAILURE

SECTION 5: DAM FAILURE

Portions of the Hamilton 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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Location 1
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Climate Change Considerations 13

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 Definitions[1]

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 Hamilton County planning area, including participating jurisdictions, and are considered a normal condition. However, they can vary greatly in their intensity and duration. The U.S. Drought Monitor, produced through a partnership between

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

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 abnormally dry to moderate drought conditions (Figure 6-1) but has experienced a range of conditions from abnormally dry 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 Hamilton County planning area.

Figure 6-1. U.S. Drought Monitor, January 2024

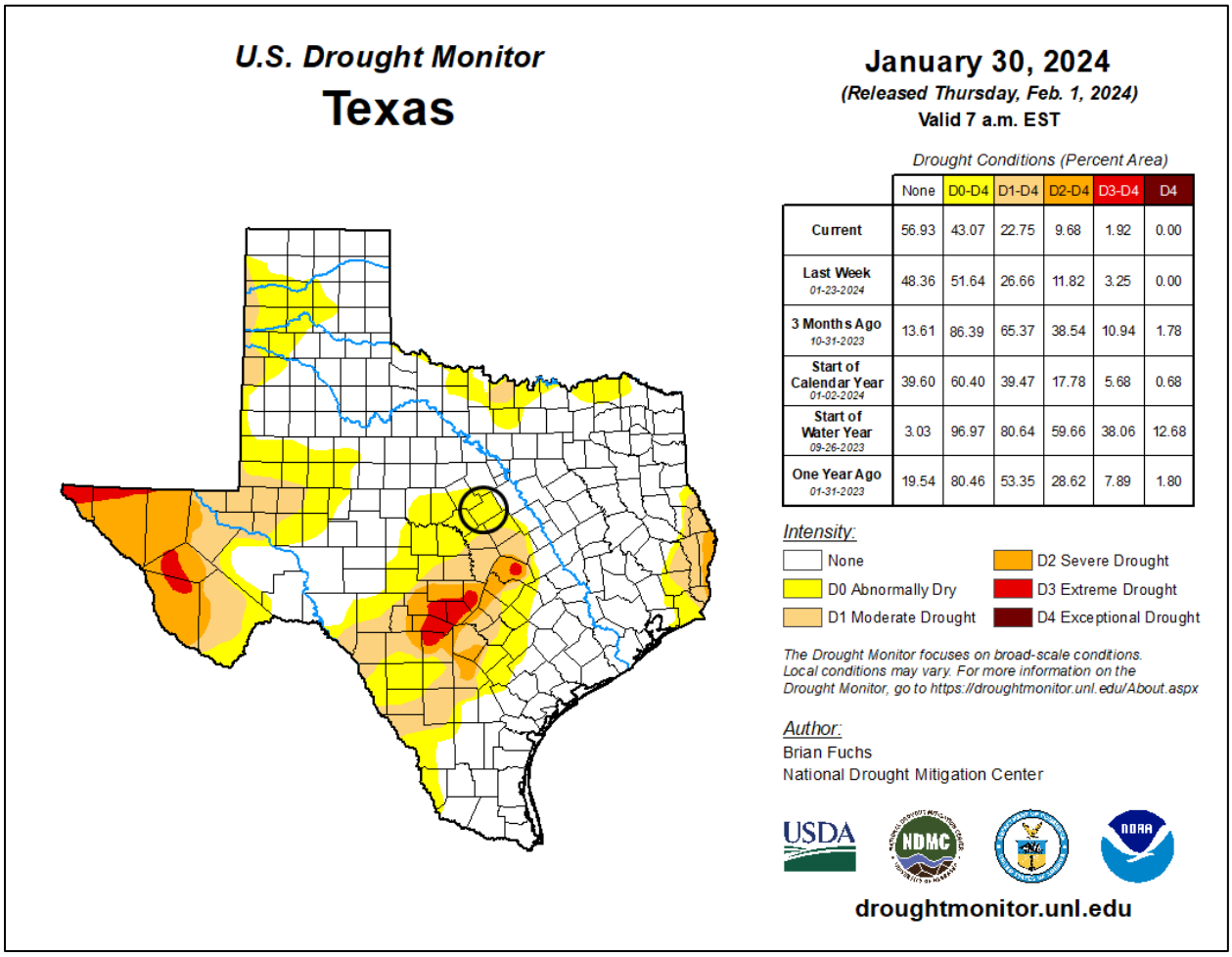
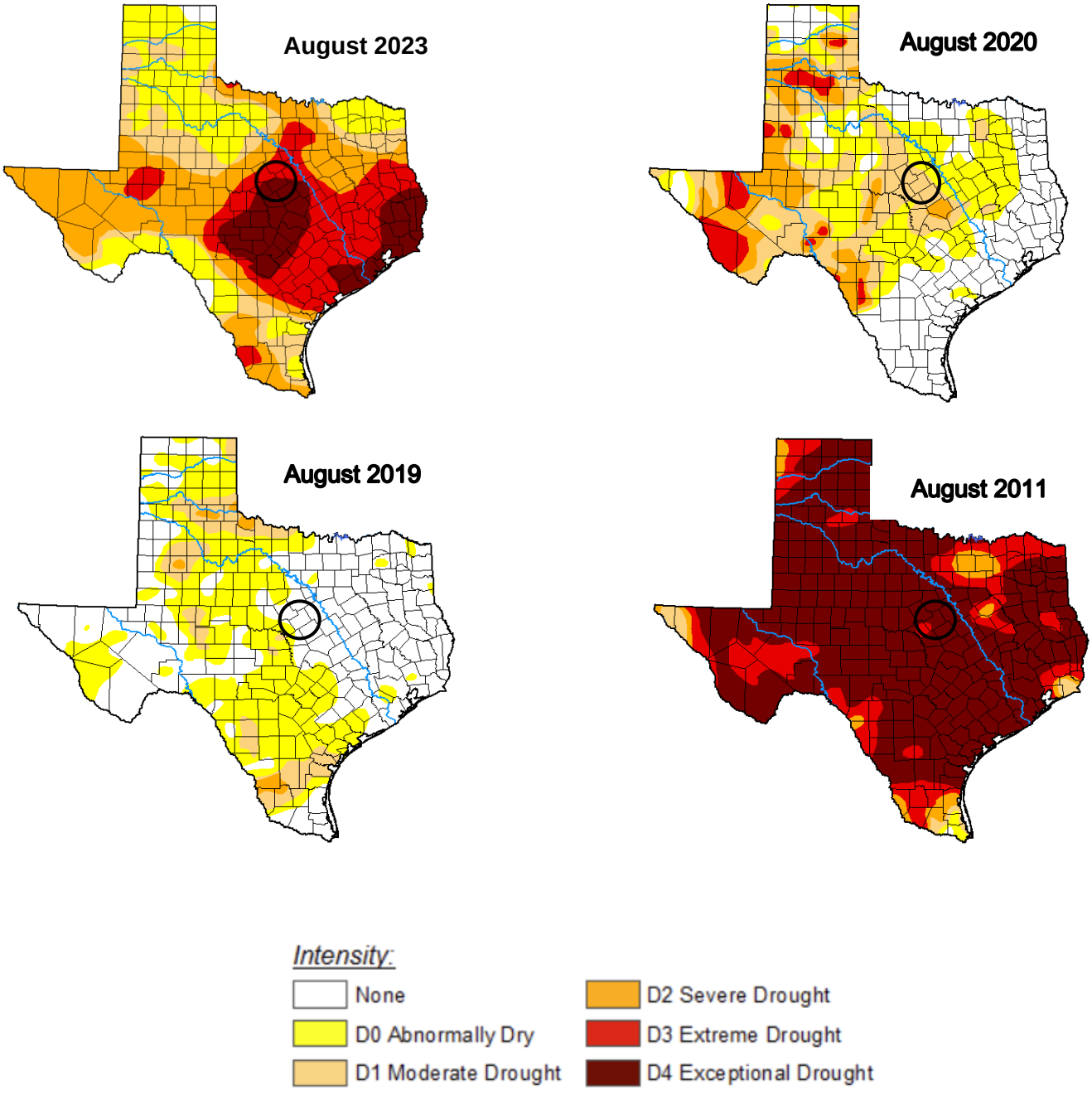


Figure 6-2. U.S. Drought Monitor, August 2011, August 2019, August 2022, August 2023



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 Descriptions[2]

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

[2] Source: National Drought Mitigation Center

SECTION 6: DROUGHT

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 Hamilton County planning area, 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, based on historical records.

Hamilton County has four municipal water systems including the City of Hamilton, City of Hico, Multi-County Water Supply Company, and the Coryell City Water Supply District. A Drought Contingency Plan was developed for the City of Hamilton. The remaining participating jurisdictions have temporary emergency drought response options outlined in the 2021 Brazos G Regional Water Plan.[3]

HISTORICAL OCCURRENCES

The Hamilton County planning area may experience an extreme drought in any given year. According to the U.S. Drought Monitor, between January 2000 and 2023, the Hamilton County planning area spent a total of 760 (60.7%) weeks in some level of drought as defined as Abnormally Dry (D0) or worse conditions. The longest consecutive drought period was 240 weeks long. Hamilton County has received 26 USDA disaster declarations for drought from 2012 through 2023.

[3] Texas Water Development Board. Hamilton County Water Supply Planning. https://www.twdb.texas.gov/waterplanning/rwp/outreach/doc/hamilton.pdf

Figure 6-3. Hamilton County Drought Intensity, 2000-2023[4]

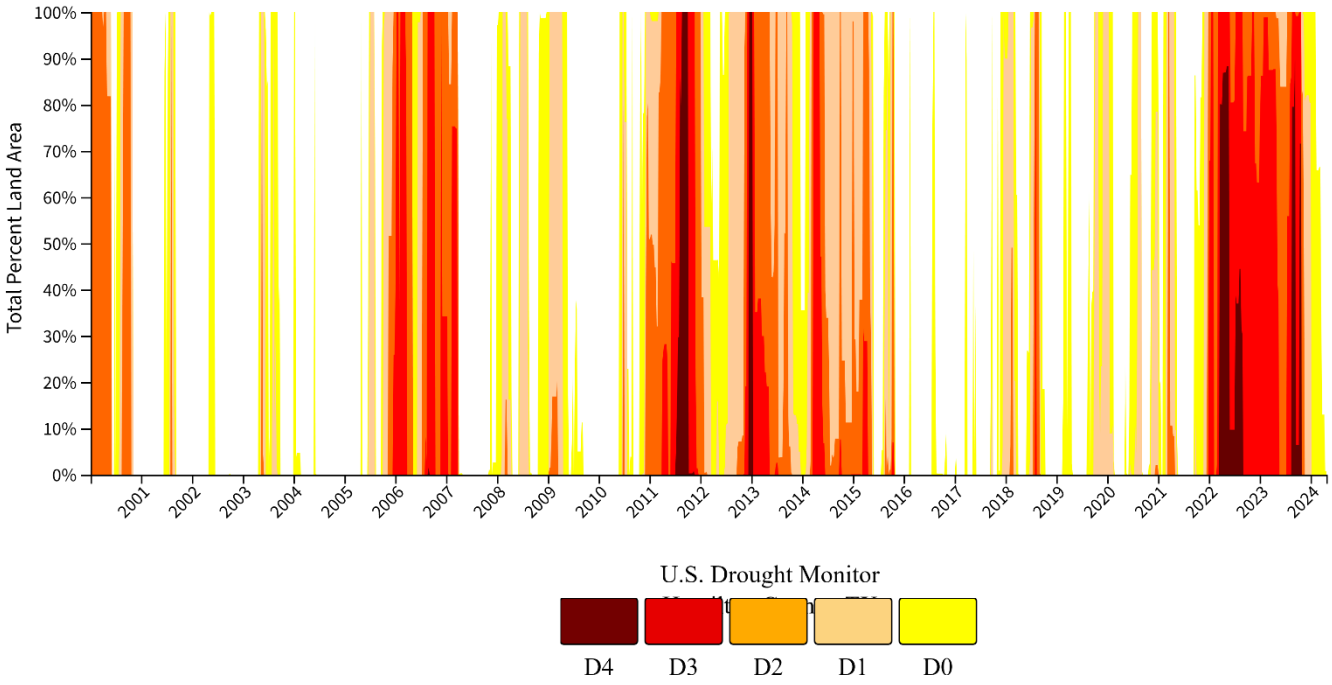


Table 6-5 lists historical events that have resulted in damages, injuries, or fatalities as reported in the National Centers for Environmental Information Storm Events Database (NCEI). A total of 84 drought events were reported in the NCEI over 25 unique drought periods impacting Hamilton County from 2000 through 2023. Historical drought impacts reported in the NCEI database for the Hamilton County planning area, including all participating jurisdictions, over the 24-year reporting period has resulted in more than $1.6 million (2023 dollars) in property and 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[5]

JURISDICTION	DATE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	11/1/2006	0	0	$0	$1,175,900
Hamilton County	12/1/2006	0	0	$36,700	$36,700
Hamilton County	1/1/2007	0	0	$0	$43,900

[4] U.S. Drought Monitor
[5] Only those events with reported injuries, fatalities, or damages were included in the table.

JURISDICTION	DATE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	2/1/2007	0	0	$0	$43,700
Hamilton County	12/5/2010	0	0	$0	$13,500
Hamilton County	1/1/2011	0	0	$0	$4,000
Hamilton County	2/1/2011	0	0	$0	$8,000
Hamilton County	3/1/2011	0	0	$0	$5,300
Hamilton County	4/1/2011	0	0	$0	$32,900
Hamilton County	5/1/2011	0	0	$0	$26,200
Hamilton County	6/1/2011	0	0	$0	$30,200
Hamilton County	7/1/2011	0	0	$0	$26,200
Hamilton County	8/1/2011	0	0	$0	$65,400
Hamilton County	9/1/2011	0	0	$0	$39,200
Hamilton County	10/1/2011	0	0	$0	$13,100
Hamilton County	11/1/2011	0	0	$0	$6,500
Hamilton County	12/1/2011	0	0	$0	$6,600
Hamilton County	1/1/2012	0	0	$0	$5,200
Hamilton County	11/13/2012	0	0	$0	$2,600
Hamilton County	12/1/2012	0	0	$0	$6,500
Hamilton County	1/1/2013	0	0	$0	$6,400
Hamilton County	2/1/2013	0	0	$0	$2,600
Hamilton County	3/1/2013	0	0	$2,500	$0
Hamilton County	4/1/2013	0	0	$0	$3,800
Hamilton County	5/1/2013	0	0	$0	$2,500
Hamilton County	6/1/2013	0	0	$0	$2,500
Hamilton County	7/1/2013	0	0	$0	$1,300
Hamilton County	8/27/2013	0	0	$0	$2,500
Hamilton County	9/1/2013	0	0	$0	$3,800

JURISDICTION	DATE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	3/11/2014	0	0	$0	$5,000
Hamilton County	4/1/2014	0	0	$0	$5,000
Hamilton County	5/1/2014	0	0	$0	$2,500
Hamilton County	6/1/2014	0	0	$0	$1,200
Hamilton County	10/1/2014	0	0	$0	$1,200
Hamilton County	1/1/2015	0	0	$0	$600
Hamilton County	2/1/2015	0	0	$0	$1,300
Hamilton County	3/1/2015	0	0	$0	$1,300
Hamilton County	4/1/2015	0	0	$0	$2,500
Hamilton County	10/13/2015	0	0	$1,200	$0
Hamilton County	8/1/2018	0	0	$0	$2,300
TOTALS		**0**	**0**	**$40,400**	**$1,639,900**

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

JURISDICTION	DROUGHT EVENTS	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	84	0	0	$40,400	$1,639,900

Based on the historical drought events for the Hamilton County planning area, 27 drought events were reported across 3 drought periods since the 2018 Plan.

SIGNIFICANT EVENTS

January – December 2011

The 2011 drought was one of the most intense droughts in state history. The dry, parched conditions caused over $7 billion in crop and livestock losses, sparked wildfires, pushed power grids to the limit, and reduced reservoirs to dangerously low levels. The planning area was not spared from these drought conditions and remained at some level of drought (including abnormally dry or D0) the entire year.

Abnormally dry conditions started in the Hamilton County planning area in December of 2010 and moved into the new year. By March of 2011 the conditions for the planning area were upgraded to a significant drought category (D2) and further escalated to exceptional drought (D4) conditions just three months later (June 2011), despite beneficial rainfall at the end of May. Extreme heat during the summer months of 2011 only exacerbated the drought conditions. In July 2011, burn bans were in place for the county. Area lakes continued to suffer and water levels continued to drop well below conservation levels. The agriculture community also experienced detrimental

loss. Hay production was nearly halted with most farmers only producing a small fraction of what is produced in a normal season. Many cattle farmers had to sell their cows early because of the scarcity of grass and hay. Corn farmers also witnessed poor corn production and had to try to grow other crops to salvage their growing season. The Hamilton County planning area reported crop losses every month of 2011, and even into 2012. Drought conditions improved between October and December of 2011 with rainfall, however, the impacts of this drought were long lasting.

January – December 2022
Exceptional (D4) to severe (D2) drought conditions affected the entire Hamilton County planning area from January to December of 2022. This was the second worst drought for the planning area, right behind the 2011 drought. Despite a few instances of soaking rains, drought continued to plague much of the region as precipitation was low. According to reports in the NCEI database, the drought prompted a significant spike in cattle sales across North and Central Texas, as both hay and water were low in supply. There are no reported damages for this drought event.

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, there have been 84 reported drought impacts in the NCEI over 25 drought periods (ranging in length from approximately 6 weeks to just over 5 years) within a 24-year reporting period, which provides a probability of approximately one event every year. This frequency supports a “Highly Likely” probability of future events for the Hamilton County planning area. 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, breaks in water lines, or crop and livestock losses on agricultural lands and typically have minimal impact on buildings.

The Hamilton 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.

Table 6-8. Critical Facilities Vulnerable to Drought Events

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS, Hospitals)	• 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	• Strain on staff as drought may cause health problems related to low water flows and poor water quality. • Water main breaks due to soil shrinking and swelling cycles could lead to facility closures. • Building foundations may crack due to soil shrinking and swelling cycles. • Operations dependent on water supply may be adversely impacted. • Economic disruptions due to cracked foundations and infrastructure damages as a result of soil shrinking and swelling cycles.
Commercial Suppliers (food, gas, etc.)	• Operations dependent on water supply may be adversely impacted. • Economic disruptions due to cracked foundations and infrastructure damages as a result of soil shrinking and swelling cycles.
Utility Services and Infrastructure (electric, water, wastewater, communications)	• Potential for increased number of emergency calls as drought events can lead to cascading hazard events such as wildfires and flash flooding. • Water main breaks due to soil shrinking and swelling cycles could lead to facility closures. • Operations dependent on water supply may be adversely impacted.

Even with the planning area relying on multiple water utility providers as well as local and private service, 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 Hamilton County planning area is estimated at 26 percent of the total population and children under the age of 5 are estimated at 5 percent, and the population with a disability is estimated at 19 percent of the total population. In addition, an estimated 17 percent of the planning area population live below the poverty level and 11 percent of the populations speaks a language other than English (Table 6-9).

Table 6-9. Populations at Greater Risk by Participating Jurisdiction

JURISDICTION	ELDERLY (over 65)	YOUTH (under 5)	WITH A DISABILITY	BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Hamilton	631	105	632	438	433
City of Hico	375	201	422	137	74
Unincorporated Hamilton County	1,117	113	553	835	396
Hamilton County	**2,123**	**419**	**1,607**	**1,410**	**903**

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 Hamilton 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 Hamilton County planning area.

Impacts of past droughts experienced in the Hamilton County planning area, including participating jurisdictions, 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. The annualized estimated losses due to drought over the 24-year reporting period in the Hamilton County planning area are significant with an annualized loss estimate of $70,000. Table 6-10 shows annualized exposure.

Table 6-10. Estimated Annualized Losses for Hamilton County

JURISDICTION	TOTAL PROPERTY & CROP LOSS (2023 dollars)	ANNUAL LOSS ESTIMATES (2023 dollars)
Hamilton County	$1,680,300	$70,000

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 6-11 lists the drought impacts to Hamilton County from 2005 to 2023 based on reports received by the Drought Impact Reporter.

Table 6-11. Drought Impacts, 2005-2023

DROUGHT IMPACTS 2005-2023	
Agriculture	81
Business & Industry	2
Energy	0
Fire	12
Plants & Wildlife	64
Relief, Response & Restrictions	16
Society & Public Health	3
Tourism & Recreation	1
Water Supply & Quality	35

Drought has the potential to impact people in the Hamilton County planning area. 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. Severe drought conditions can also be associated with a variety of impacts, including:

- Dry clay soil can lead to water main lines shifting and breaking. Often repair to water lines includes shutting off water to multiple homes at one time.
- 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.
- 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 4 federally endangered, threatened or candidate species in Hamilton 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 develop 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 the community, local businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a drought event.

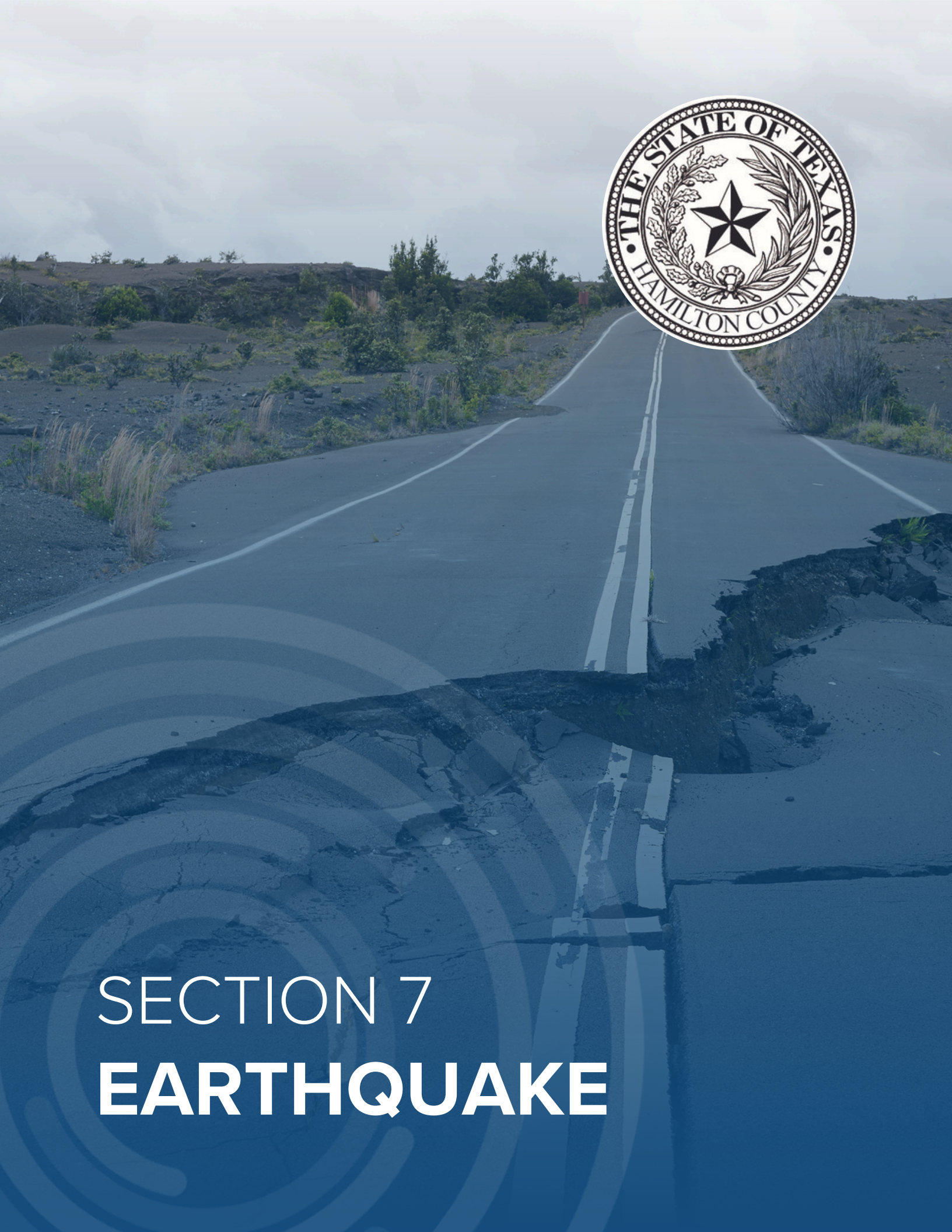
CLIMATE CHANGE CONSIDERATIONS

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

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.[6]

The Hamilton County planning area can anticipate an increased likelihood of droughts in the future due to an estimated increase in the number of dry days in the Hamilton County area. In addition, it is projected that future changes to Hamilton 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 100°F in Hamilton County, but between 2035 and 2064 the average will be 106°F, increasing the severity and frequency of drought events.

[6] 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
EARTHQUAKE

SECTION 7: EARTHQUAKE

Hazard Description 1
Location 2
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Historical Occurrences 7
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Vulnerability and Impact 7
Climate Change Considerations 8

HAZARD DESCRIPTION

An earthquake is the sudden movement of the Earth's surface caused by the release of stress accumulated within or along the edge of the Earth's tectonic plates, volcanic eruption, or by a manmade explosion. The majority of earthquakes occur along faults; however, earthquakes can occur within plate interiors. Over geologic time, plates move and plate boundaries change, pushing weakened boundary regions to the interior part of the plates. These areas of weakness within the continents can cause earthquakes in response to stresses that originate at the edges of the plate or in the deeper crust.

Earthquake locations are described by the focal depth and geographic position of the epicenter. The focal depth of an earthquake is the depth from the Earth's surface to the region where an earthquake's energy originates (the focus or hypocenter). The epicenter is the point on the Earth's surface directly above the hypocenter. Earthquakes usually occur without warning, with their effects impacting great distances away from the epicenter.

According to the U.S. Geological Society (USGS) Earthquake Hazards Program, an earthquake hazard is anything associated with an earthquake that may influence an individual's normal activities. Table 7-1 describes definition of examples.

Table 7-1. Definitions of Earthquake Hazards[1]

HAZARD	DESCRIPTION
Surface Faulting	Displacement that reaches the earth's surface during slip along a fault. Commonly occurs with shallow earthquakes, those with an epicenter less than 20 kilometers.
Ground Motion (shaking)	The movement of the earth's surface from earthquakes or explosions. Ground motion or shaking is produced by waves that are generated by sudden slip on a fault or sudden pressure at the explosive source and travel through the earth and along its surface.
Landslide	A movement of surface material down a slope.

[1] Source: USGS, 2012

HAZARD	DESCRIPTION
Liquefaction	A process by which water-saturated sediment temporarily loses strength and acts as a fluid, like when you wiggle your toes in the wet sand near the water at the beach. This effect can be caused by earthquake shaking.
Tectonic Deformation	A change in the original shape of a material due to stress and strain.
Tsunami	A sea wave of local or distant origin that results from large-scale seafloor displacements associated with large earthquakes, major submarine slides, or exploding volcanic islands.
Seiche	The sloshing of a closed body of water from earthquake shaking.

LOCATION

Earthquake hazard areas are mapped by the USGS's National Seismic Hazard Model (NSHM). Figure 7-1 shows the most recent 2023 iteration of this USGS model. The NSHM defines the potential for earthquake ground shaking for various probability levels across the United States. The 2023 NSHM is an update to the previous 2018 version, and compiles data and findings from a number of sources including earthquake catalogs, geodetic- and geologic-based fault and deformation models, and ground motion models (GMMs), among others.[2] The map shows the percent chance that a given area will experience a category VI (or stronger) earthquake in 100 years, as defined by the Modified Mercalli Intensity (MMI) Scale (Table 7-3). The likelihood of a significant earthquake event is signified by the color-coding on the map. Densely populated areas are also highlighted on the map (purple and black dotting) to indicate areas of elevated vulnerability in relation to higher seismic risk. The Hamilton County planning area, as identified in Figure 7-1, is located in a low hazard area, with less than five percent chance of experiencing a strong earthquake every 100 years.

[2] A comprehensive overview of the modelling process can be found at the USGS website, https://www.usgs.gov/programs/earthquake-hazards/science/2023-50-state-long-term-national-seismic-hazard-model-0#overview

Figure 7-1. U.S. Map of Peak Ground Acceleration[3]

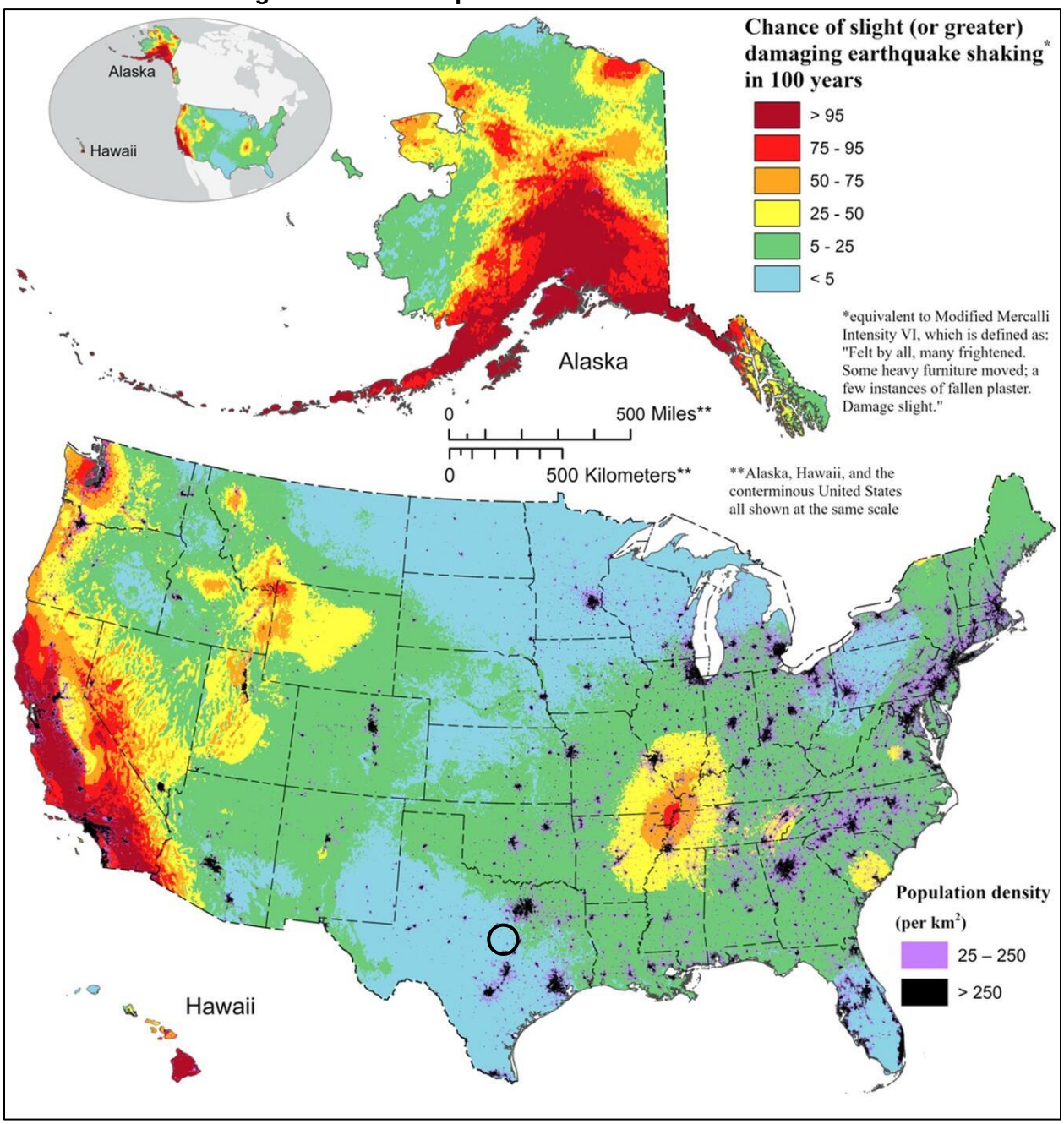
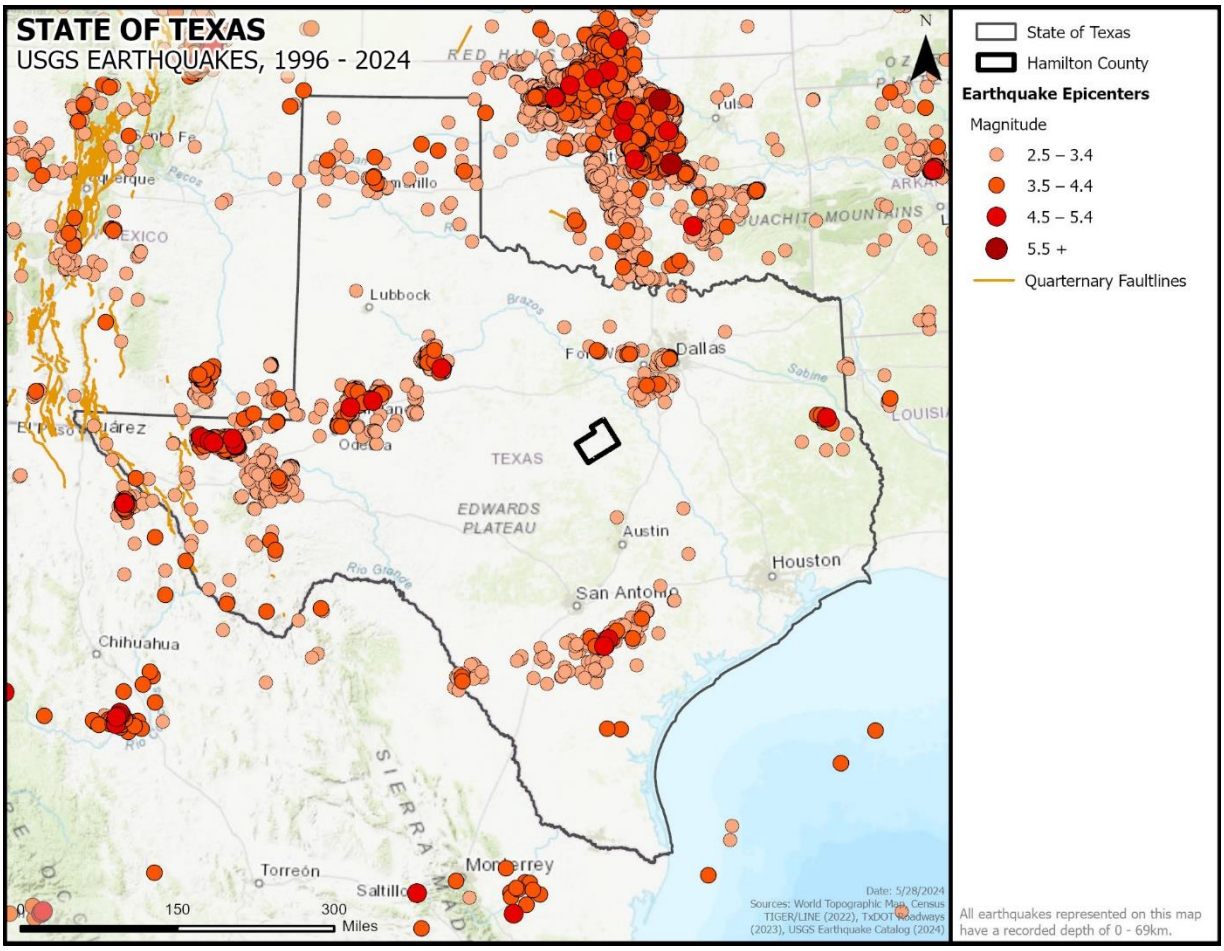


Figure 7-2 maps historic earthquake epicenters across Texas between 1996 and 2024.

[3] Hamilton County is indicated by the black circle.

Figure 7-2. Historic Earthquake Epicenters in Texas, 1996-2024[4]



EXTENT

Earthquakes are measured in terms of magnitude and intensity. The prevalent magnitude measurement in use today is based on the Moment Magnitude Scale (MMS). MMS measures the movement of rock along the fault. It accurately measures larger earthquakes, which can last for minutes, affect a much larger area, and cause more damage. Magnitudes are based on a logarithmic scale (base 10), meaning that for each whole number you go up on the magnitude scale, the amplitude of the ground motion recorded by a seismograph goes up ten times. Using this scale, a magnitude 5 earthquake would result in ten times the level of ground shaking as a magnitude 4 earthquake (and about 32 times as much energy would be released).[5] The USGS reports earthquake magnitudes above 4.0 as “moment magnitude,” often described in the press as "Richter” magnitude. Table 7-2 shows the magnitude levels for the current Richter/Moment Magnitude scale.

[4] Hamilton County is indicated by the black polygon.

[5] (n.d.). How Do We Measure Earthquake Magnitude? Michigan Tech. https://www.mtu.edu/geo/community/seismology/learn/earthquake-measure/#:~:text=The%20moment%20magnitude%20scale%20is,the%20earthquake%20at%20multiple%20stations.

Table 7-2. Richter / Moment Magnitude Scale[6]

MAGNITUDE	CATEGORY	DESCRIPTION OF EFFECTS	EVENTS PER YEAR
< 3.0	Micro	Usually not felt, but can be recorded by seismograph	+100,000
3.0 – 3.9	Minor	Often felt, but causes no damage	12,000 - 100,000
4.0 – 4.9	Light	Felt by all, minor breakage of objects	2,000 - 12,000
5.0 – 5.9	Moderate	Some damage to weak structures	200 – 2,000
6.0 – 6.9	Strong	Moderate damage in populated areas	20 – 200
7.0 – 7.9	Major	Serious damage over large areas with loss of life expected	3 – 20
> 7.9	Great	Severe destruction and loss of life over large areas	Less than 3

Earthquake Intensity measurement is an on-the-ground description. The measurement qualitatively explains the severity of earthquake shaking and its effects on people and their environment. Intensity measurements will differ depending on each location's proximity to the epicenter or point on the surface of the earth directly above the focus where the earthquake started. The intensity scale consists of a series of certain key responses such as people awakening, movement of furniture, damage to chimneys, and total destruction. There can be multiple intensity measurements associated with an earthquake as opposed to one magnitude measurement.[7] The Modified Mercalli Intensity value assigned to a specific site after an earthquake has a more meaningful measure of severity to the nonscientist than the magnitude because intensity refers to the effects actually experienced at a specific location. The scale provides the intensity of the earthquake in values ranging from I to X. Table 7-3 describes the typical effects and Intensities associated with earthquakes of various magnitudes. The intensity and effects depend on multiple factors (earthquake depth, epicenter location, site geology, population density, to name a few) and can vary widely.

[6] (n.d.). Earthquakes. Britannica. https://www.britannica.com/science/earthquake-geology

[7] Wood, H. O., and Neumann, Frank (1931). Modified Mercalli Intensity Scale of 1931: Seismological Society of America Bulletin, v. 21, no. 4, p. 277-283.

Table 7-3. Magnitude and Modified Mercalli Intensity (MMI) Scale[8]

INTENSITY	CATEGORY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER MAGNITUDE
I	Not Felt	Not felt except by a very few under especially favorable conditions	< 2.0
I	Not Felt	Felt only by a few persons at rest, especially on upper floors of buildings.	2.0 – 2.9
II – III	Weak	Felt quite noticeably by persons indoors, with shaking of indoor objects. Rarely causes damages.	3.0 – 3.9
IV – V	Light to Moderate	Noticeable shaking of indoor objects and rattling noises. Felt by most people in the affected area. Generally, no to minimal damage	4.0 – 4.9
VI – VII	Strong to Very Strong	Significant damages to poorly constructed buildings. Limited to moderate damages to well-built structures.	5.0 – 5.9
VIII – IX	Severe to Violent	Damage slight in specially designed structures; considerable damage in ordinary buildings with partial collapse. Damage great in poorly built structures.	6.0 – 6.9
VIII +	Severe to Extreme	Damage considerable in specially designed structures. Damage substantial to most buildings, with partial or complete collapse. Felt across great distances with major damage mostly limited to 250 km from Epicenter.	7.0 – 7.9
VIII – IX	Severe to Violent	Major damage to buildings, structures likely to be destroyed; will cause moderate to heavy damage to sturdy or earthquake-resistant buildings; damaging in large areas; felt in extremely large regions.	8.0 – 8.9
VIII +	Severe to Extreme	At or near total destruction. Severe damage or collapse to all buildings; heavy damage and shaking extends to distant locations and permanent changes in ground topography.	9.0+

[8] Source: USGS

Taking into consideration the possible extent of an earthquake for the area, by reviewing Tables 7-2 and 7-3 in conjunction with no significant previous occurrences, as depicted in Figure 7-2, the Hamilton County planning area experiences on average less than 3.0 magnitude or Levels II-III (weak impact) on the Modified Mercalli intensity scale. This is the greatest extent the entire planning area can anticipate in the future, based on historic records.

HISTORICAL OCCURRENCES

According to USGS, and the National Geophysical Data Center (NGDC), there are no "significant" earthquakes on record for the State of Texas and the entire Hamilton County planning area from 2150 B.C. to present. A significant earthquake, as defined by NGDC, is one that has caused at least moderate damage (approximately $1 million or more), has resulted in 10 or more deaths, has registered as a magnitude 7.5 or greater, has registered as Modified Mercalli Intensity (MMI) Scale X or greater, or generated a tsunami. None of these criteria have been met by any seismic activity known to have impacted the planning area.

PROBABILITY OF FUTURE EVENTS

Earthquake Hazard Maps show the distribution of earthquake shaking levels that have a certain probability of occurring over a given period. According to the USGS, the entire Hamilton County planning area has less than a five percent chance of a slightly damaging (or greater) earthquake within 100 years. Based on historical records, the probability of an earthquake affecting the planning area is "Unlikely", meaning that an event is probable in the next 10 years.

VULNERABILITY AND IMPACT

Little warning is usually associated with earthquakes and can impact areas a great distance away from the epicenter. The amount of damage depends on the density of population and buildings, and infrastructure construction in the affected area. Some places may be more vulnerable than others based on soil type, building age, and building codes in the Hamilton County planning area.

The Hamilton 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 earthquake events. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 7-5. Critical Facilities Vulnerable to an Earthquake

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	• Emergency operations and services may be significantly impacted due to power outages, damaged facilities, fires and/or loss of communications. Impact can impede emergency response vehicle access to areas. • Power outages could disrupt communications, delaying emergency response times. • Extended power outages may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.

CRITICAL FACILITIES	POTENTIAL IMPACTS
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	• Power outages could disrupt critical care. • Backup power sources could be damaged. • Evacuations may be necessary due to extended power outages or other associated damages to facilities. • Economic disruption due to power outages negatively impact airport services as well as area businesses reliant on airport operations.
Commercial Supplier (food, fuel, etc.)	• 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)	• Emergency operations and critical services may be significantly impacted due to power outages, damaged facilities, and/or loss of communications. Impact can impede emergency service vehicle access to areas. • Power outages could disrupt communications, delaying emergency response times further straining the capacity and resources of emergency service personnel.

With no historical events recorded, neither annualized loss-estimates or a breakdown of potential dollar losses of critical facilities and infrastructure from earthquakes are available. The potential severity of impact from an earthquake for the entire Hamilton County planning area is classified as “Limited”, meaning that less than 10 percent of infrastructure would be damaged with critical facilities being shut down for less than 24 hours.

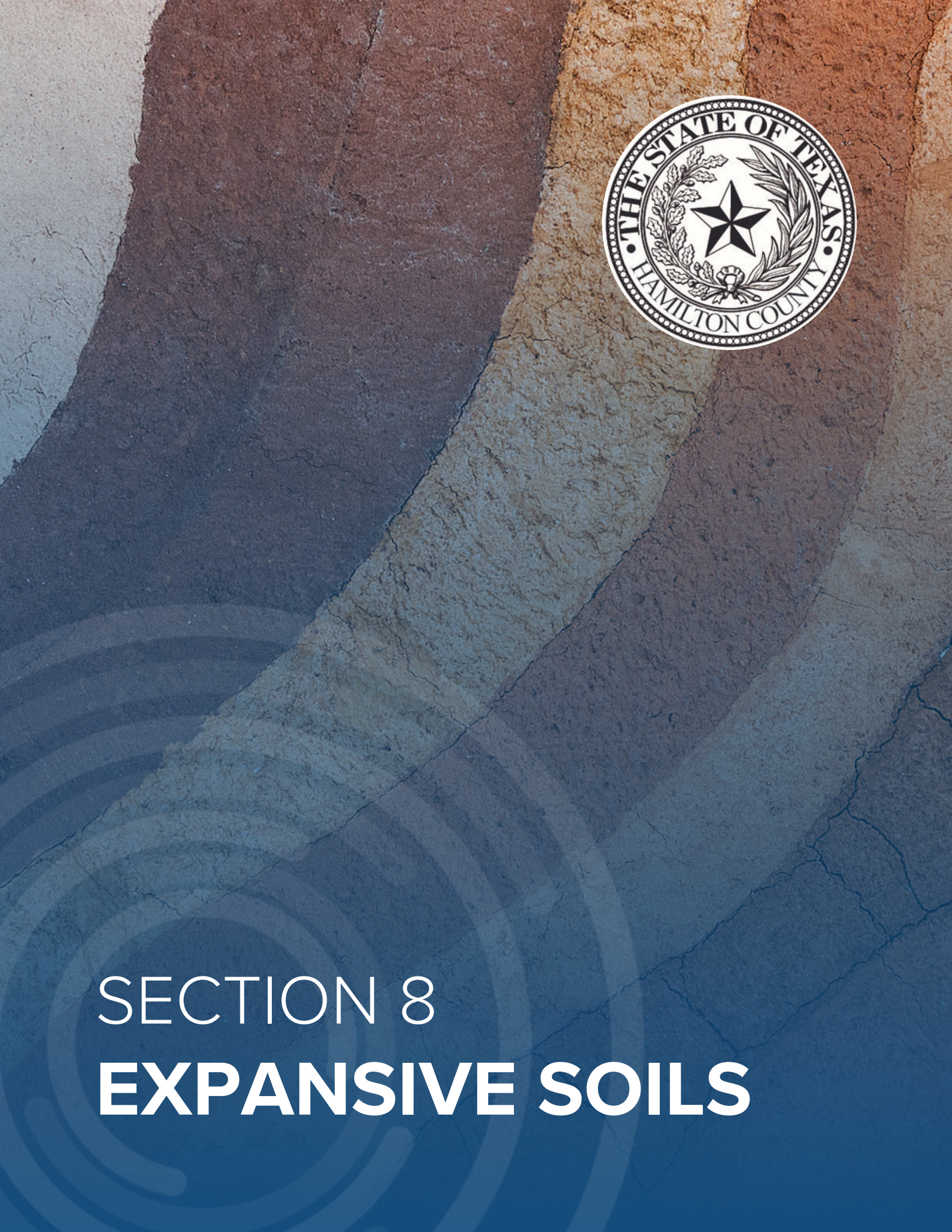
CLIMATE CHANGE CONSIDERATIONS

Damaging earthquakes are rare within the State of Texas, including the Hamilton County planning area. Changing conditions of weather patterns and climate change has not been established as having a direct impact on earthquake intensity or frequency.

According to the USGS, statistically there is an approximately equal distribution of earthquakes in all cold weather, hot weather, rainy weather, etc. Very large low-pressure changes associated with major storm systems, like typhoons and hurricanes, are known to trigger episodes of fault slip or slow earthquakes in the Earth’s crust and may also play a role in triggering some damaging earthquakes. However, the numbers are small and are not statistically significant.[9]

The Hamilton County planning area is located outside of any known earthquake hazard areas and is not located on or near any fault lines. Climate change is assumed to have no impact on the probability or intensity of potential earthquakes in the planning area.

[9] (n.d.). *Natural Hazards*. United Stated Geological Survey. https://www.usgs.gov/faqs/there-earthquake-weather



SECTION 8
EXPANSIVE SOILS

SECTION 8: EXPANSIVE SOILS

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HAZARD DESCRIPTION

Expansive soils are soils and soft rocks with a relatively high percentage of clay minerals that are subject to changes in volume as they swell and shrink with changing moisture conditions. Expansive soils contain minerals such as smectite clays that are capable of absorbing water. When these clays absorb water, they increase in volume and expand. The change in soil volume and resulting expansion can exert enough force on a building or other structure to cause damage.



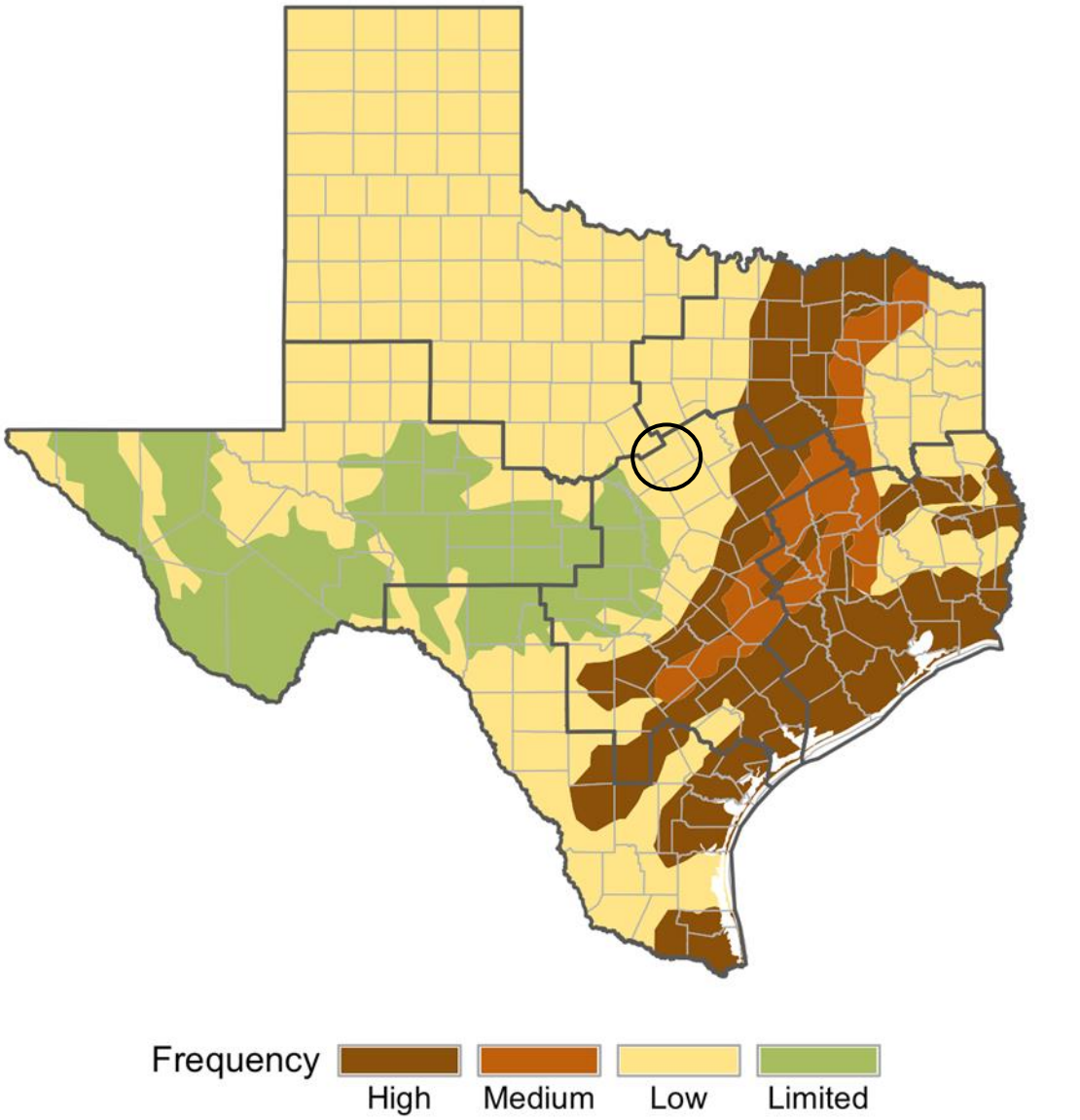
Expansive soils will also lose volume and shrink when they dry. Drought conditions can cause soils to contract in response to a loss of soil moisture. A reduction in soil volume can affect the support to buildings or other structures and result in damage. Fissures in the soil can also develop and facilitate the deep penetration of water when moist conditions or runoff occurs. This produces a cycle of shrinkage and swelling that place repetitive stress on structures. The effect of expansive soil is most prevalent in regions prone to prolonged periods of drought followed by periods of moderate to high precipitation.

LOCATION

In Texas, the most expansive soils are in a band 200 miles west from the coastline, stretching approximately from Beaumont down to Brownsville. These areas receive the most moisture and are also vulnerable to droughts, which can cause the soil to contract. In the Hamilton County planning area, the problems associated with expansive soil typically occur during drought periods. Expansive soils (bentonite, smectite, or other reactive clays) expand when the soil particles attract water and can shrink when the clay dries.

Figure 8-1 shows areas of expansive soil in Texas. Hamilton County falls completely within the low-risk area, indicated in yellow. Figure 8-2 depicts the types of land resources in the State of Texas due to their soil types.

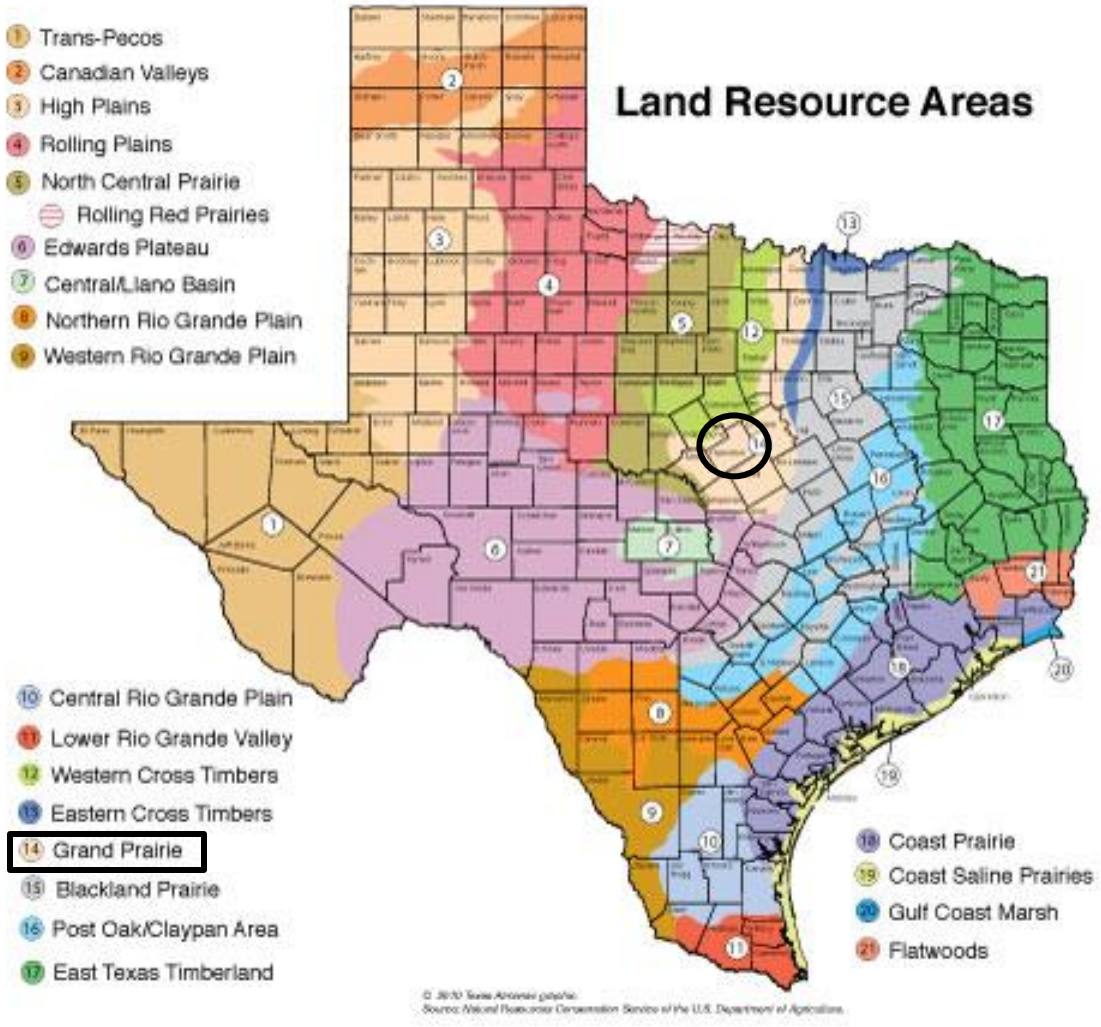
Figure 8-1. Location of Expansive Soils in Texas[1]



Source: Tavakoli, E. (2016). Laboratory Evaluation of TX-PROCHEM as an Ionic Liquid Soil Stabilizer. [Master's Thesis].

[1] Tavakoli, E. (2016). Laboratory Evaluation of TX-PROCHEM as an Ionic Liquid Soil Stabilizer. [Master's Thesis].

Figure 8-2. Texas Geological Survey[2]



The Hamilton County planning area, including all participating jurisdictions, is located within the Grand Prairie, as identified within the black circle in Figure 8-2. The entire planning area is in an area minimally affected by expansive soils.

Grand Prairie: The Grand Prairie comprises about 6.3 million acres in North Central Texas. It extends from the Red River to about the Colorado River. It lies between the Eastern and Western Cross Timbers in the northern part and just west of the Blackland Prairie in the southern part. The landscape is undulating to hilly and is dissected by many streams including the Red, Trinity, and Brazos rivers. Surface drainage is rapid.

Upland soils are mostly dark-gray, alkaline clays; some are shallow over limestone and some are stony. Some areas have light-colored loamy soils over chalky limestone. Bottomland soils along

[2] Source: USDA, http://www.nrcs.usda.gov

the Red and Brazos rivers are reddish silt loams and clays. Other bottomlands have dark-gray loams and clays.

Land use is a mixture of rangeland, pastureland, and cropland. The area is mainly used for growing beef cattle. Some small grain, grain sorghums, corn, and hay are grown. Brush control and water erosion are the major management concerns.[3]

EXTENT

Expansive soils risk is measured by the degree to which soils may shrink or swell. Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent, moderate if 3 to 6 percent, high if 6 to 9 percent, and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures.[4]

Figure 8-3. NRCS Soil Linear Extensibility Risk Categories

Potential Category	Linear Extensibility %	Clay %
Low	< 3%	< 25%
Moderate	3% - 6%	25% - 35%
High	6% - 9%	35% - 45%
Very High	> 9%	> 45%

The Soil Survey was developed by the USDA Soils Conservation Service and contains information that can be applied in determining the suitability of soils in the planning area when selecting sites for roads, structures, and infrastructure. Based on Soil Survey data, roughly 55 percent of the Hamilton County planning area is subject to low (<3%) linear extensibility and low frequency of expansive soils (Figure 8-1). The next most common linear extensibility category is high (6-9%) found in 24 percent of the planning area, followed by roughly 14 percent subject to moderate (3-6%) linear extensibility. Nearly 8 percent of the planning area falls within the very high (>9%) linear extensibility category.[5]

HISTORICAL OCCURRENCES

Expansive soil is a condition that is native to Texas soil characteristics and cannot be documented as a time-specific event, except when it leads to structural and infrastructure damage. Extreme conditions can damage roads, structures, and infrastructure, including projects still under construction. Damages from expansive soils are typically associated with droughts, previous

[3] Source: https://www.texasalmanac.com/articles/soils-of-texas#:~:text=The%2022.7%20million%20acres%20of,cedar%20brakes%20in%20this%20area.
[4] (2009). *Soil Reports*. Natural Resources Conservation Service. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs141p2_016186.pdf
[5] Source: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

occurrences for expansive soils can be correlated with previous occurrences of drought, which are typically negligible. Hamilton County has no known recorded events of damaging expansive soils. Refer to the Drought profile (Section 6) of this plan for more information on the impacts of past drought events.

PROBABILITY OF FUTURE EVENTS

The Texas Department of Licensing and Regulation requires structures built after 2005 to include soil tests to be conducted for the likelihood of soil expansion, compression, or shifting. In such cases, top or subsoils are required to be removed and remaining soils stabilized. Builders must ensure that water drains away from the structure on all sides and building owners notified of the potential for damage if changes in drainage flow occur. These measures significantly reduce the probability of expansive soil impacts on newer and future development. It is considered “Unlikely” that the high-risk areas in the Hamilton County planning area will experience expansive soil impacts such as problems with foundations, roadways, sidewalks and other structures and infrastructure in the future, especially during times of drought. Older structures will be impacted with greater frequency due to the soil testing and stabilization requirements for newer structures. See additional information on climate change at the end of this section.

VULNERABILITY AND IMPACT



The effects of expansive soils are most prevalent when periods of moderate to high precipitation are followed by drought and then again by periods of rainfall. Other cases of damage result from increases in moisture volume from such sources as broken or leaking water and sewer lines. Dry clays are capable of absorbing water and will increase in volume in an amount proportional to the amount of water absorbed. Soils capable of changes in volume present a hazard to structures built over them and to the pipelines buried in them. Houses and one-story commercial buildings are more apt to be damaged by the expansion of swelling clays than are multi-story buildings, which are usually heavy enough to counter swelling pressures. However, if constructed on wet clay, multi-story buildings may also be damaged by clay shrinkage when moisture levels are substantially reduced.

Cracked foundations and floors, jammed windows and doors, and ruptured pipelines are typical types of damage resulting from swelling soils. Damage to the upper floors of larger buildings can occur when motion in the structure is significant. While all infrastructure within the planning area is minimally vulnerable, slab on grade structures are more likely to suffer damages from expansive soils. In addition, older structures built to less stringent building codes may also be more susceptible to damage than new construction.

While the number of slabs on grade structures is not available, the U.S. Census data indicates approximately 3,003 of the housing units (69 percent of all housing units) in the planning area were built before 1980 and may be more susceptible to damages.

Table 8-3. Residential Structures at Greatest Risk

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980
City of Hamilton	1,024
City of Hico	625
Unincorporated Hamilton County	1,354
Hamilton County	**3,003**

The Hamilton County Planning Team identified the following critical facilities (Table 8-4) as assets that are considered the most important to the planning area and are susceptible to a range of impacts caused by expansive soils. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 8-4. Critical Facilities Vulnerable to Expansive Soils

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	• Uneven settling and shifting cause cracks in building foundations impacting the integrity of critical facility structures and lead to doors being unable to open or close properly. • Damages and cracks in streets and highway infrastructure may lead to emergency vehicles being unable to access areas increasing the need for emergency operations. • Ruptured water pipes can lead to loss of function or water pressure impacting drinking water availability and firefighting capabilities.
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	• Uneven settling and shifting cause cracks in building foundations impacting the integrity of critical facility structures and lead to doors being unable to open or close properly. • Damages and cracks in streets and highway infrastructure may lead to emergency vehicles being unable to access areas increasing the need for emergency operations.
Commercial Supplier (food, fuel, etc.)	• Essential supplies like medicines, water, food, and equipment deliveries may be delayed.
Utility Services and Infrastructure (electric, water, wastewater, communications)	• Wastewater and drinking water facilities and infrastructure may be damaged or destroyed resulting in services disruption or outage for multiple days or weeks. • Disruptions and outrages 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.

SECTION 8: EXPANSIVE SOILS

ASSESSMENT OF IMPACTS

Expansive soils are generally influenced by how wet or dry reactive clay types of soils become, so the climate of an area, and more specifically the seasonal precipitation-drought cycle associated with arid or semi-arid regions, influences the occurrence and severity of these hazards. Problems associated with expansive soils in Hamilton County typically occur during extended periods of drought.

Expansive soils present a hazard to lightweight buildings and other infrastructure. Uneven settling and shifting in such structures may occur, causing cracks in foundations, walls, streets, driveways, and sidewalks; ruptured pipes; and windows and doors that do not open and close properly. Special provisions are necessary in the construction of footings and slabs resting on expansive soils to minimize damages due to the expansiveness. Homeowners and public agencies that assume they cannot afford preventative measures such as more costly foundations and floor systems, often incur the largest percentage of damage and costly repairs from expanding soil. No figures are available for the total damage to homes in the planning area from expansive clays. The greatest damage occurs when structures are constructed when clays are dry (such as during a drought) and then subsequent soaking rains swell the clay.

Infrastructure such as pipelines can be damaged, causing increased maintenance and repairs, replacement, or damage to the point of failure. Sewer and water lines are also affected by shrinking and swelling soils. The movement of the soil can snap water and sewer lines, producing a minimum of temporary discomfort, and a maximum of serious health and welfare risk. Field monitoring and testing should be conducted on a regular basis, especially during extended drought periods, to avoid loss of function or water pressure, which could impact drinking water and firefighting capabilities. In addition, highways (such as US Route 84, US Route 281, Texas Highway 36, and Texas Highway 22) can be affected by expansive soils and could hinder evacuations if deemed not usable during disasters.

Unlike many other environmental hazards, the effects of expansive soil are deceptive in that they are not revealed suddenly or caused by a single event, but rather become increasingly evident and destructive over time. As such, the vast majority of expansive soil impacts are relatively benign in terms of emergency management and emergency response.

Expansive soil can directly impact infrastructure and, as a result, indirectly create impacts on residents. The impact of climate change could produce more severe expansive soils events, exacerbating the current expansive soils impacts. The following are a summary of impacts frequently associated with expansive soils:

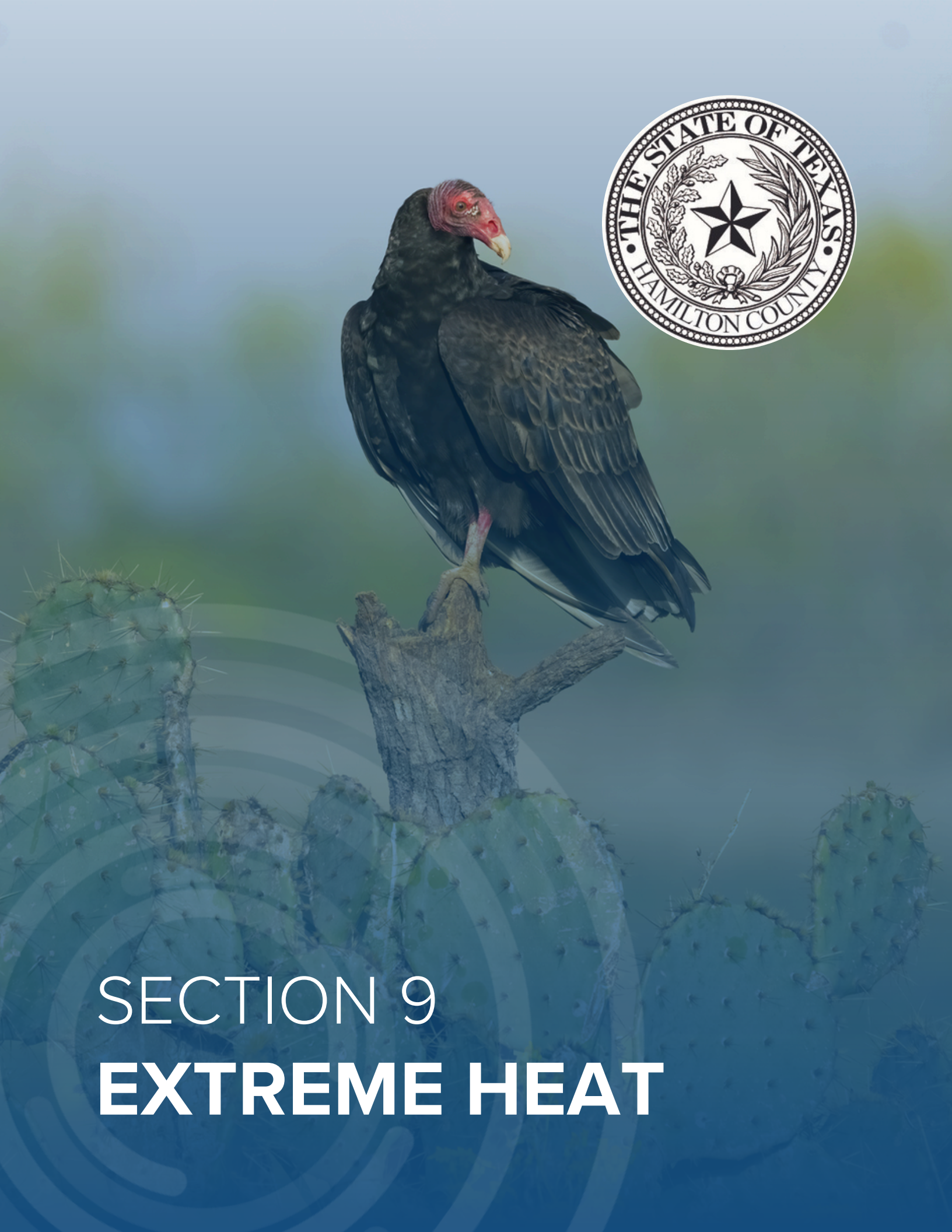
- Expansive soils are influenced by the seasonal precipitation-drought cycle. Most impacts on Hamilton County typically occur during extended periods of drought.
- Impacts to lightweight buildings and other infrastructure are most likely to occur. Impacts include uneven settling and shifting in structures; cracks in foundations, walls, streets, driveways, and sidewalks; ruptured pipes; and windows and doors that do not open and close properly.
- 69 percent of homes in Hamilton County were built before 1980 leading them to more susceptible to damages from expansive soils. One building, the Hamilton County Courthouse, is on the National Register of Historic Places and pre-dates modern building codes.

- Highways (US Route 84, US Route 281, Texas Highway 36, and Texas Highway 22) can be affected by expansive soils.
- Economic impacts are limited to uninsured damages.
- Impacts on people are indirect, with impacts related to disruption in county and city services such as water and sewer.
- As population grows and development increases in the county, the potential risk to expansive soils will also increase.
- Limited impact is anticipated to the natural environment other than changes in soil characteristics.

The impact of expansive soils experienced in Hamilton County has resulted in no injuries and fatalities, supporting a “Limited” severity of impact meaning injuries and illnesses are treatable with first aid, shutdown of critical facilities and services for 24 hours or less, and less than 10 percent of property destroyed or with major damage.

CLIMATE CHANGE CONSIDERATIONS

Expansive soils are directly connected to drought and flood conditions as they literally swell and shrink with changing moisture conditions. Impacts of climate change on drought and flood events indicate similar changes to expansive soil frequency and impacts. Refer to Probability of Future Events section in Section 6 (Drought) and Section 10 (Flood) for more information on those hazards.



SECTION 9
EXTREME HEAT

SECTION 9: 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 Hamilton County planning area is no exception. The County 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

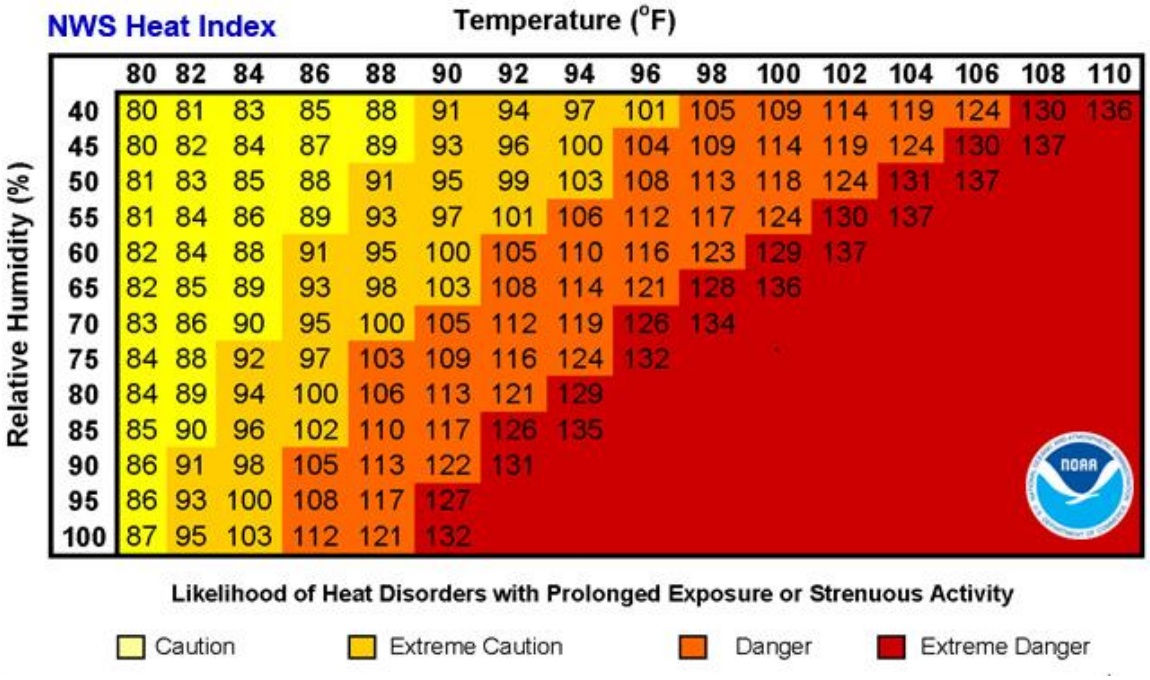
Extreme heat events can occur throughout the Hamilton County planning area as there is no specific geographic scope to the extreme heat hazard. Extreme heat could occur anywhere within the Hamilton County planning area.

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 9-1. This index measures how hot it feels outside when humidity is combined with high temperatures.

SECTION 9: EXTREME HEAT

Figure 9-1. Extent Scale for Extreme Heat[1]



The index in Figure 9-1 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 9-1.

Table 9-1. 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

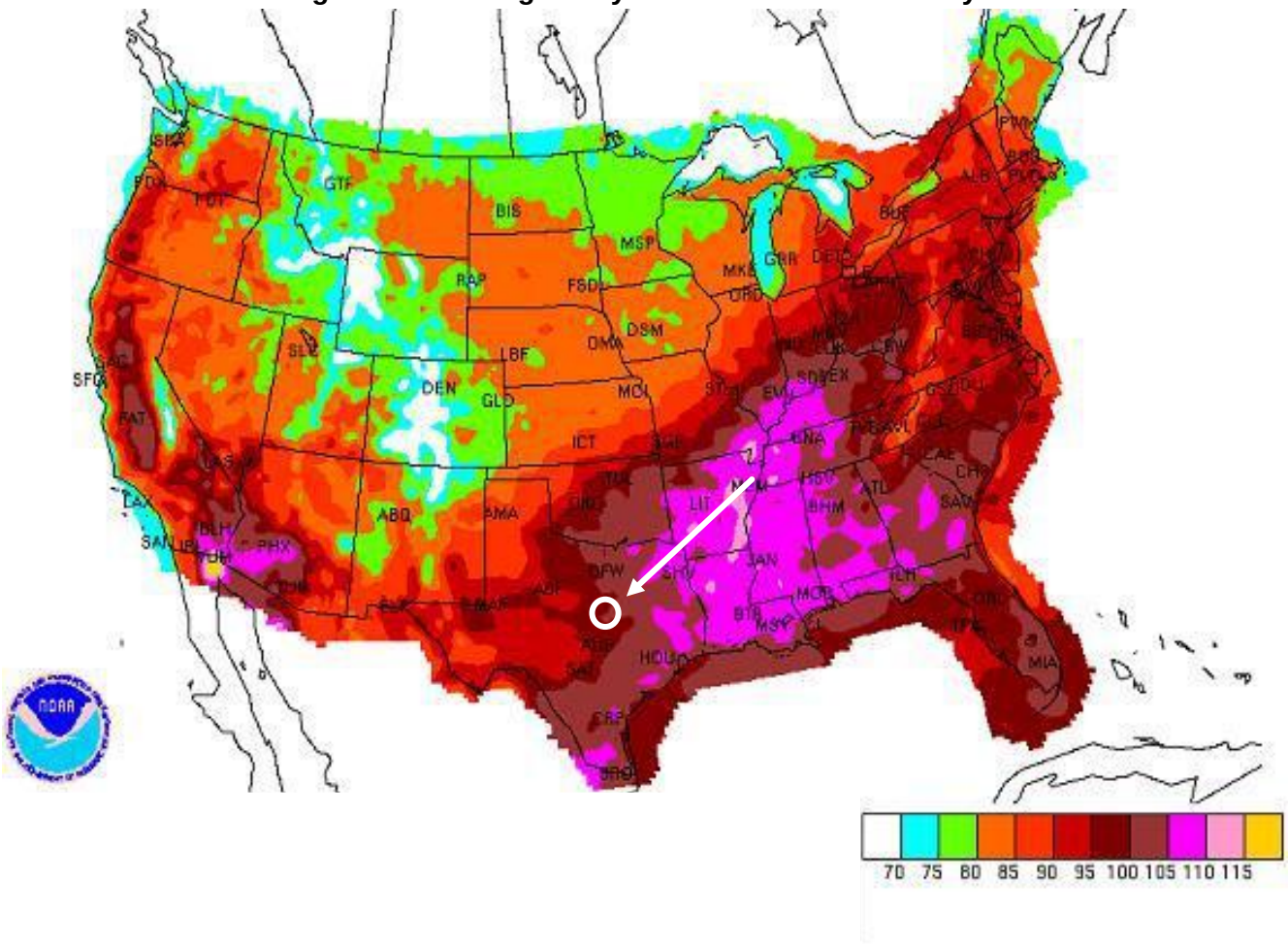
SECTION 9: EXTREME HEAT

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.

Due to Hamilton County's geography and its warm, sunny, and humid subtropical climate, the Hamilton County planning area 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.

Figure 9-2 displays the daily maximum heat index as derived from NOAA based on data compiled from 1838 to 2015. The white circle shows the Hamilton County planning area. The planning area is represented in dark red across the County. The dark red color indicates an average daily heat index of 95°F to 105°F. Therefore, Hamilton County could experience dangerous heat from 95°F to 105°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.

Figure 9-2. Average Daily Maximum Heat Index Days[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. 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 Hamilton County, there have been 36 extreme heat events on record for the planning area (Table 9-2). Historical extreme heat information, as provided by the NCEI, shows extreme heat 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.

[2] NRDC and the white circle indicates the Hamilton County planning area.

SECTION 9: EXTREME HEAT

Historical extreme heat data for the Hamilton County planning area are provided on a County-wide basis per the NCEI database from 1998 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 9-2. Historical Extreme Heat Events, 1996-2023[3]

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	7/1/1998	0	0	$0	$0
Hamilton County	8/1/1999	0	0	$0	$0
Hamilton County	7/1/2000	0	0	$0	$0
Hamilton County	8/1/2000	0	0	$0	$0
Hamilton County	9/1/2000	0	0	$0	$0
Hamilton County	6/19/2019	0	0	$0	$0
Hamilton County	7/8/2019	0	0	$0	$0
Hamilton County	8/7/2019	0	0	$0	$0
Hamilton County	8/17/2019	0	0	$0	$0
Hamilton County	8/26/2019	0	0	$0	$0
Hamilton County	7/1/2020	0	0	$0	$0
Hamilton County	7/10/2020	0	0	$0	$0
Hamilton County	8/12/2020	0	0	$0	$0
Hamilton County	8/13/2020	0	0	$0	$0
Hamilton County	8/28/2020	0	0	$0	$0
Hamilton County	7/30/2021	0	0	$0	$0
Hamilton County	6/11/2022	0	0	$0	$0
Hamilton County	6/12/2022	0	0	$0	$0
Hamilton County	6/24/2022	0	0	$0	$0
Hamilton County	7/6/2022	0	0	$0	$0
Hamilton County	7/10/2022	0	0	$0	$0

[3] NOAA, NCEI Storm Events Database

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	7/18/2022	0	0	$0	$0
Hamilton County	8/3/2022	0	0	$0	$0
Hamilton County	6/14/2023	0	0	$0	$0
Hamilton County	6/19/2023	0	0	$0	$0
Hamilton County	6/26/2023	0	0	$0	$0
Hamilton County	7/10/2023	0	0	$0	$0
Hamilton County	7/12/2023	0	0	$0	$0
Hamilton County	7/17/2023	0	0	$0	$0
Hamilton County	8/1/2023	0	0	$0	$0
Hamilton County	8/1/2023	0	0	$0	$0
Hamilton County	8/17/2023	0	0	$0	$0
Hamilton County	8/17/2023	0	0	$0	$0
Hamilton County	9/5/2023	0	0	$0	$0
Hamilton County	9/7/2023	0	0	$0	$0
Hamilton County	9/23/2023	0	0	$0	$0
TOTALS		**0**	**0**	**$0**	**$0**

Table 9-3. Historical Extreme Heat Events Summary, 1996-2023

JURISDICTION	NUMBER OF EVENTS	DEATH	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	36	0	0	$0	$0

Based on the list of historical extreme heat events for the Hamilton County planning area, 31 events were reported to the NCEI since the 2018 Plan.

SIGNIFICANT EVENTS

August 12-16, 2020

This particular week during the late summer season was the hottest period of 2020 for the Hamilton County planning area. The entire region had an extended Heat Advisory and/or Excessive Heat Warning. For Hamilton County during the Excessive Heat period, ambient temperatures peaked at 104-108°F and afternoon Heat Index Values ranged from 104°F to 110°F.

July 10, 2022

An exceptionally hot summer was in effect during the month of July as triple digit heat became normal for the planning area. Most of the region reached Heat Advisory criteria, and a good portion

of the area met or exceeded Excessive Heat criteria at some point during this July stretch of hot weather. Ambient temperatures were near or above 105°F and heat index values were near or above 110°F.

July 10, 2023
The start of what would be one of the hottest summer months on record began in July of 2023. North and Central Texas experienced above average temperatures from July 10th through the end of the month. Several prolonged Heat Advisories were in effect, and at times Excessive Heat Warnings were needed, as temperatures soared over 100°F and heat index values were recorded over 105°F. The average temperature for the month of July ranked in the Top 10 warmest for climate sites in both North and Central Texas. However, it was the month of August that really tipped the average temperature for the summer season into the Top 5, as reported by the National Weather Service.

PROBABILITY OF FUTURE EVENTS

According to historical records, the Hamilton County planning area has experienced 36 events in a 28-year reporting period. Although there are no reported events for several years of the reporting period, it can be 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 provides a probability of multiple events 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 Hamilton County planning area 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.

The population over 65 in the Hamilton County planning area is estimated at 26 percent of the total population and children under the age of 5 are estimated at 5 percent. The population with a disability is estimated at 19 percent of the total population. An estimated 17 percent of the planning area population live below the poverty level and 11 percent of the populations speaks a language other than English (Table 9-4). 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 have access to medical care. Populations 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 9-4. Populations at Greater Risk by Participating Jurisdiction

JURISDICTION	ELDERLY (over 65)	YOUTH (under 5)	WITH A DISABILITY	BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Hamilton	631	105	632	438	433
City of Hico	375	201	422	137	74
Unincorporated Hamilton County	1,117	113	553	835	396
Hamilton County	**2,123**	**419**	**1,607**	**1,410**	**903**

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 9-5). 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 Hamilton County planning area are negligible. The number of historical injuries and fatalities also indicates a “Limited” level of impact.

The Hamilton 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 Hamilton County planning area. For a comprehensive list by participating jurisdiction, please see Appendix C.

Table 9-5. Critical Facilities Vulnerable to Extreme Heat Events

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS, Hospitals)	• 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.

CRITICAL FACILITIES	POTENTIAL IMPACTS
	• 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	• 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.)	• 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)	• 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.

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 (26 percent of total population), children under 5 (5 percent of total population), and those with a disability (19 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.
- 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.

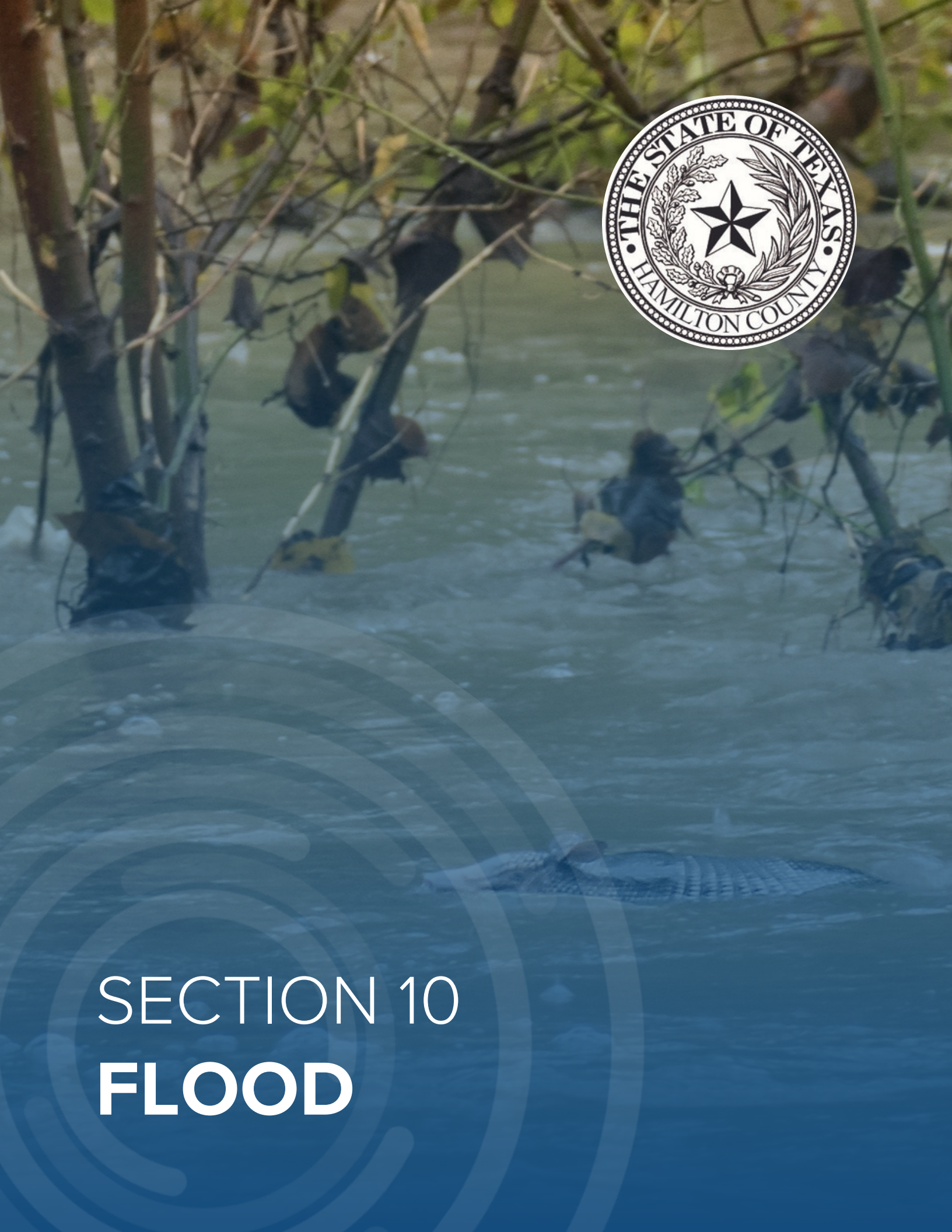
- Vehicle engines and cooling systems typically run harder during extreme heat events resulting in increases in mechanical failures.
- Extreme heat events during times of drought can exacerbate the environmental impacts associated with drought, decreasing water and air quality and further degrading wildlife 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 Hamilton 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 100°F in Hamilton County, but between 2035 and 2064 the average will be 106°F, increasing the severity and frequency of extreme heat events.

[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



SECTION 10
FLOOD

SECTION 10: FLOOD

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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 Hamilton 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 Hamilton County planning area is 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.

SECTION 10: FLOOD

The City of Hamilton is the only participating jurisdiction with an FIS in place. The FIS is dated September 4, 1991. This FIS is composed of nine volumes and compiles all previous flood information including data collected on numerous waterways. This study indicates that the principal flood problems are due to heavy rainfall, which can occur year-round. In addition, the three primary flooding sources include Pecan creek, Tributary A, and Tributary B.

The Flood Insurance Rate Map (FIRM) data provided by FEMA for the City of Hamilton and the City of Hico 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 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.

Texas Water Development Board (TWDB) created a “floodplain quilt” to serve as a starting point for flood risk analysis in areas where no flood maps currently exist. The floodplain quilt is a compilation of available flood risk data in the state. The quilt prioritizes layer types and shows the highest ranked data as the top layer[1]. The available flood quilt data in Hamilton County is comprised of approximate base level engineering (BLE) data and digitized flood hazard information from previously published FIRMs. These floodplain boundaries portray approximate A zones for the planning area where data is available. A mitigation action has been included in Section 23 to address the floodplain mapping data deficiency. Known localized flood risk areas are identified below. These descriptions were derived from NCEI event narrative from historical events as well as planning team members. General areas subject to flooding:

- Low-lying areas along near Pecan Creek
- Lampasas River bridge and Cowhouse Creek bridge at Pottsville
- Low water crossings throughout Hamilton County
- Farm-to-Market Road 218 at Indian Gap and Pottsville
- State Highway 281 south of Hico
- Farm-to-Market Road 1602 three miles east of Highway 281
- Highway 22, one mile west of Cranfils Gap
- Highway 221 near Gibson Creek
- Farm-to-Market Road 1702 from Indian Gap to the Comanche County line
- Highway 36 between Hamilton and Whiteway
- Farm-to-Market Road 219 west of Highway 281
- County Road 219 near Carlton

[1] Source: https://twdb-flood-planning-resources-twdb.hub.arcgis.com/pages/flood-quilt-pri

- Intersection of Highway 6 and Highway 220
- McCaleb Lane and Pipes Street in the City of Hamilton
- Highway 36 at Warring Creek
- Highway 84 near Evant
- County Roads 225 and 226 at Meridian Creek

Locations of flood zones in Hamilton County based on the floodplain quilt are illustrated in Figures 10-1 to 10-3.

Figure 10-1. Estimated Flood Zones in Hamilton County

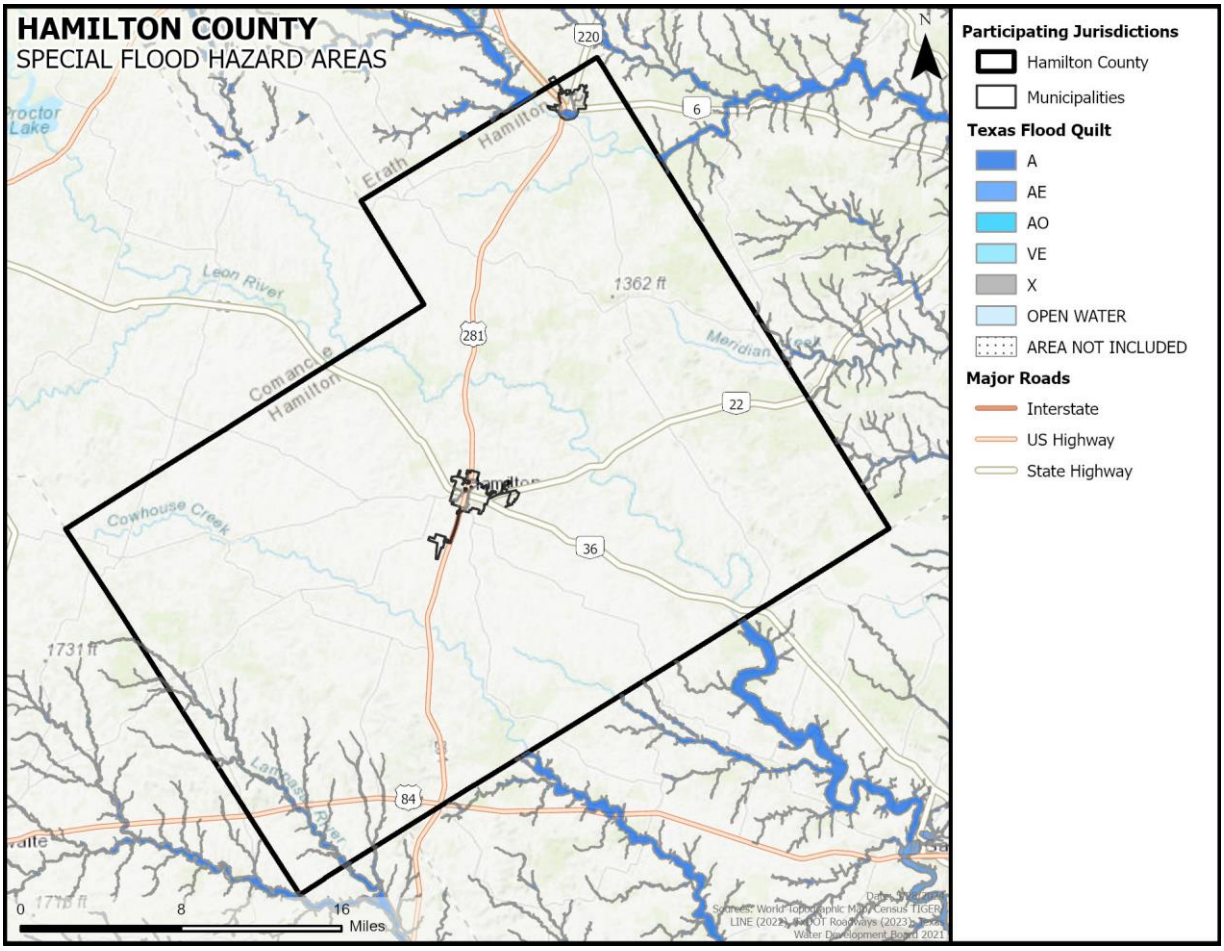


Figure 10-2. Estimated Flood Zones in the City of Hamilton

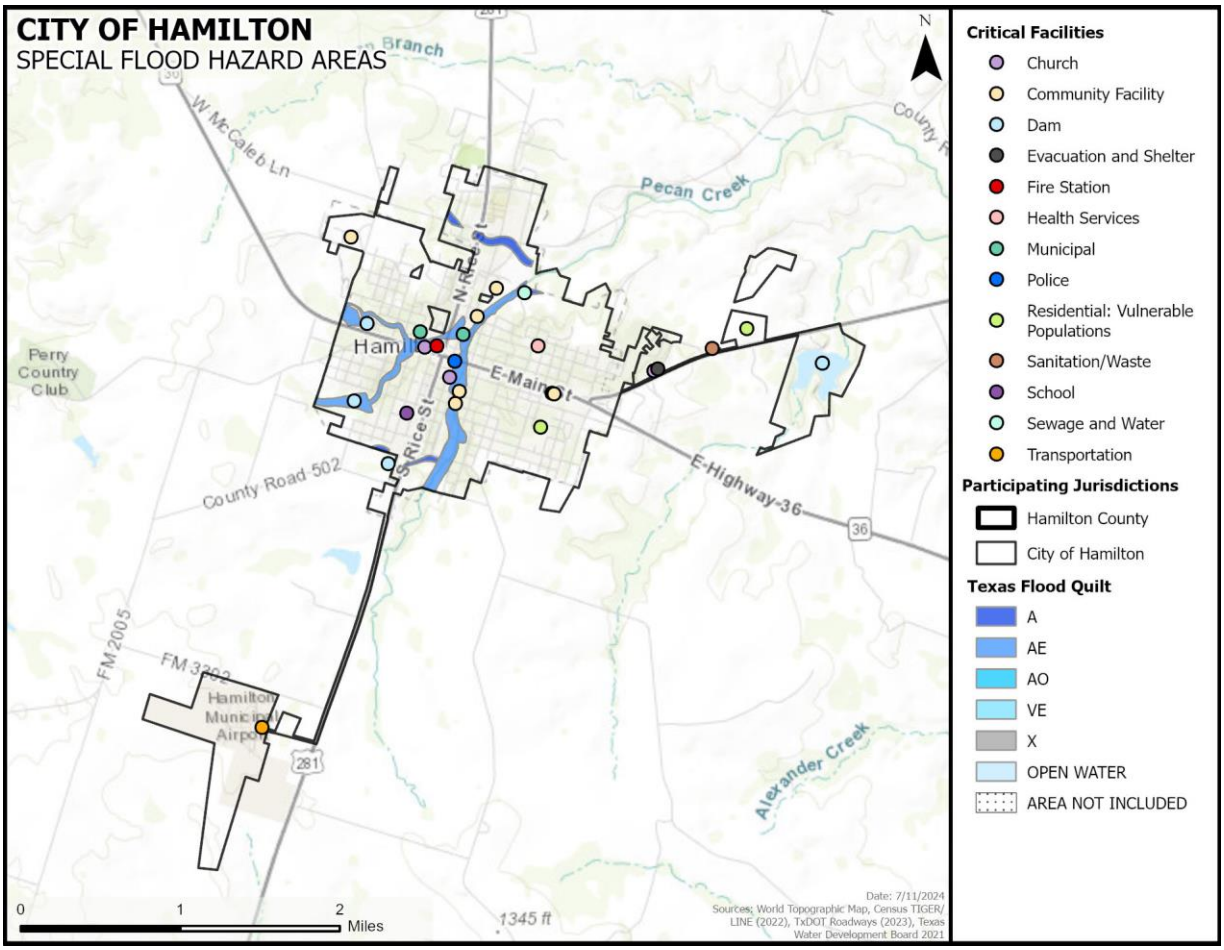
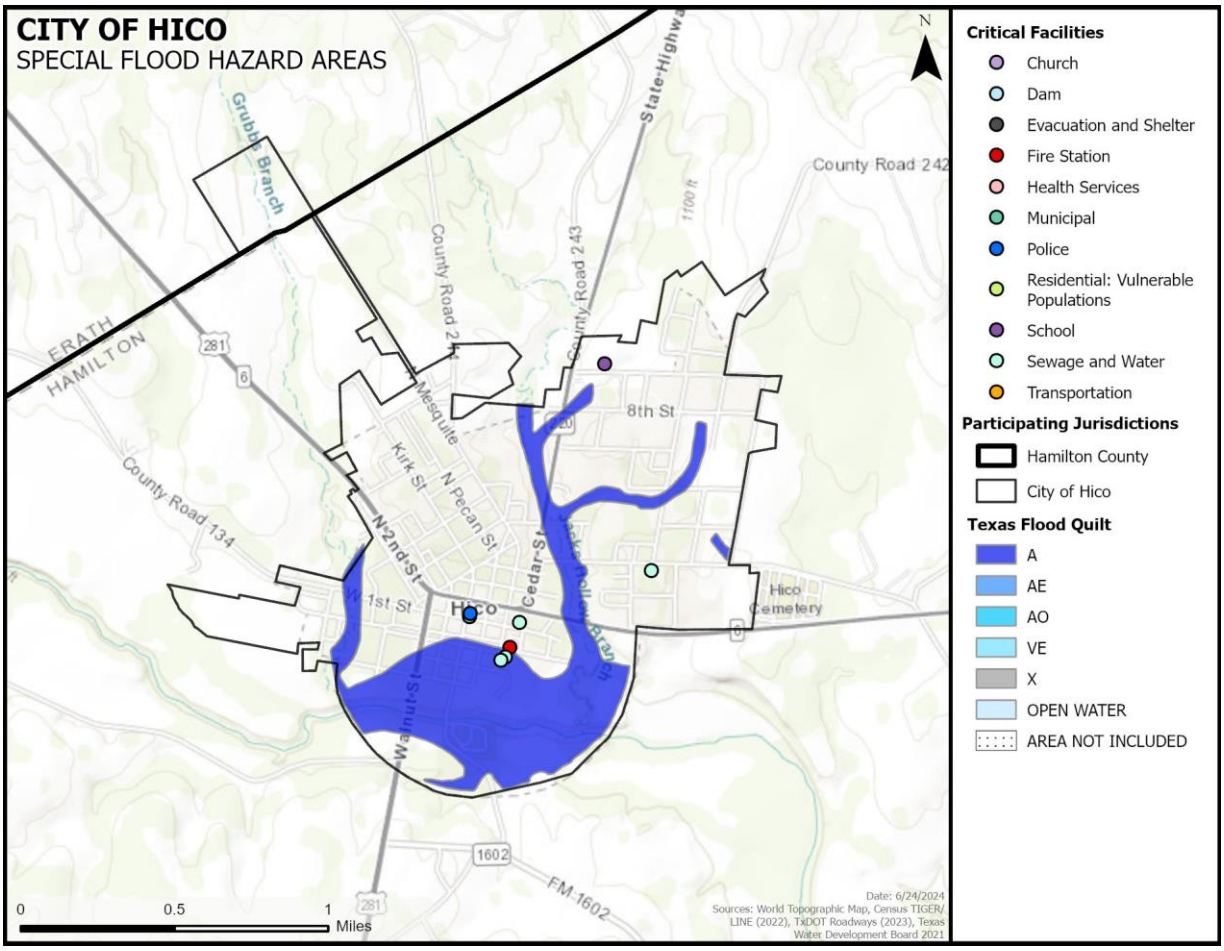


Figure 10-3. Estimated Flood Zones in the City of Hico



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 10-1 provides a description of FEMA flood zones and the flood impact in terms of severity or potential harm. Flood Zones A, AE and X are the hazard areas mapped in the region. Figures 10-1 through 10-3 should be read in conjunction with the extent for flooding in Tables 10-1, 10-2, and 10-3 to determine the intensity of a potential flood event.

Table 10-1. 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.

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 10-2 describes the stream gauge data provided by the United States Geological Survey (USGS).

Table 10-2. Extent for Hamilton County[2]

JURISDICTION[3]	PEAK FLOOD EVENT
Hamilton County	The Leon River near the City of Hamilton reached an overflow elevation of 35 feet in December of 1991. The average peak flow for the Red River at Denison Dam is 20 feet at this site.

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 from 6 to 8 inches of rain within a 4-hour period, resulting in flash flooding.

The data described in Tables 10-1 and 10-2, together with Figures 10-1 through 10-3, and historical occurrences for the area, provides an estimated potential magnitude and severity for the Hamilton County planning area.

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 10-3 identifies historical flood events that resulted in damages, injuries, or fatalities within the Hamilton County planning area. Table 10-4 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 Hamilton County, and the participating jurisdictions. There have been 38 recorded flood events in Hamilton County.

[2] Severity estimated by averaging floods at certain stage level over the history of flood events. Severity and peak events are based on USGS data.
[3] Severity is provided where peak data was provided throughout for the County but unavailable for individual jurisdictions.

Table 10-3. Historical Flood Events, 1996-2023[4]

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Hamilton	2/20/1997	0	0	$4,268,100	$0
City of Hamilton	6/3/2000	0	0	$171,800	$0
Hamilton County	4/24/2004	0	0	$3,200	$0
City of Hamilton	6/26/2007	0	0	$2,843,000	$0
City of Hico	6/26/2007	0	0	$2,843,000	$0
City of Hamilton	6/27/2007	0	0	$852,900	$0
Hamilton County	7/8/2007	0	0	$853,100	$0
Hamilton County	4/27/2009	0	0	$69,400	$0
Hamilton County	5/20/2013	0	0	$0	$7,600
Hamilton County	6/2/2016	0	0	$12,300	$0

Table 10-4. Summary of Historical Flood Events, 1996-2023

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	17	0	0	$938,000	$7,600
City of Hamilton	18	0	0	$8,135,800	$0
City of Hico	3	0	0	$2,843,000	$0
Total Losses	**38**	**0**	**0**	**$11,924,400**	

Based on the list of historical flood events for the Hamilton County planning area, no events have occurred since the 2018 Plan.

SIGNIFICANT EVENTS

Flash Flood on June 26-27, 2007

A passing upper-low level system with a moist atmosphere triggered several rounds of thunderstorms that resulted in severe storms and flash flooding. On the 26th, FM 1602 between Highway 281 and Highway 22 flooded northeast of the City of Hamilton, and Highway 218 flooded between the City of Hamilton and the City of Pottsville. On the 27th, storms continued, and flooding occurred on city streets and low water crossings in the City of Hamilton. According to the NCEI, this event caused more than $6,538,900 (2023 dollars) in property damage in the City of Hamilton and City of Hico.

[4] Values are in 2023 dollars.

Flash Flood on July 8, 2007
An upper-level low pressure storm system moved through the central Plains, triggering thunderstorms. Water was reported over CR 219 near Carlton. Flooding was widespread in the City of Hico, with FM 1602 washed out and Highway 281 north of town impassable. Flooding was worst at the intersection of Highways 6 and 220. Three high water rescues were required, two for motorists and one at a house. The Hico First National Bank, Jersey Lilly's restaurant, and the Koffee Kup restaurant sustained flood damage. This event caused nearly $853,100 (2023 dollars) in property damage.

PROBABILITY OF FUTURE EVENTS

Based on 38 recorded historical occurrences within a 28-year reporting period within the Hamilton County planning area, 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. Hamilton County encourages development outside of the floodplain, and 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 10-5 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 a variety of natural hazards, including those facilities located in the regulatory floodplain. For a comprehensive list of identified critical facilities by participating jurisdiction, please see Appendix C.

Table 10-5. 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	Hamilton County: 1 Fire Station City of Hamilton: 1 Police Station City of Hico: 1 Fire Station	• 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 FACILITY TYPES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
		• 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. • 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.
Airport, Academic Institutions, Community Residential Facilities, Day Care Facilities, Evacuation Centers & Shelters, Governmental Facilities	Hamilton County: 1 Municipal City of Hamilton: 1 Municipal, 4 Community Facility, 2 Churches	• 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.
Utility Services and Infrastructure (electric, water, wastewater, communications)	City of Hamilton: 1 Dam, 1 Sewage and Water City of Hico: 2 Sewage and Water	• 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.

CRITICAL FACILITY TYPES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
		• Extended power outages and evacuations may lead to possible looting, destruction of property, and theft, further burdening law enforcement resources.

Historic loss estimates due to flood are presented in Table 10-6 below. Considering 38 flood events over a 28-year period, frequency is approximately one to two events every year.

Table 10-6. Average Annualized Losses by Jurisdiction, 1996-2023

JURISDICTION	NUMBER OF EVENTS	PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Hamilton County	17	$945,600	$33,800
City of Hamilton	18	$8,135,800	$290,600
City of Hico	3	$2,843,000	$101,500
PLANNING AREA	**38**	**$11,924,400**	**$425,900**

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 Hamilton County planning area is estimated at 26 percent of the total population and children under the age of 5 are estimated at 5 percent. The population with a disability is estimated at 19 percent of the total population. An estimated 17 percent of the planning area population live below the poverty level and 11 percent of the populations speaks a language other than English.

Table 10-7. Populations at Greatest Risk by Jurisdiction[5]

JURISDICTION	ELDERLY (over 65)	YOUTH (under 5)	WITH A DISABILITY	BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Hamilton	631	105	632	438	433
City of Hico	375	201	422	137	74

[5] U.S. Census Bureau Five-Year estimates

JURISDICTION	ELDERLY (over 65)	YOUTH (under 5)	WITH A DISABILITY	BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
Unincorporated Hamilton County	1,117	113	553	835	396
Hamilton County	**2,123**	**419**	**1,607**	**1,410**	**903**

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 Hamilton 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.
- 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.
- 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.[6]

According to the U.S. Climate Explorer, which analyzes the top regional hazards for Hamilton County, according to the National Climate Assessment and compares projections for the middle third of this century (2035-2064) with average conditions observed from 1961-1990, the planning area may see a slight increase in precipitation events. Annual counts of intense rainstorms, those that drop two or more inches in one day, are projected to increase up to 5%. While this is a small projected increase, more intense rainfall events can lead to increased flood events.

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. The City of Hamilton and the City of Hico participate in the NFIP and are in good standing. Hamilton County is not currently mapped and does not have the capacity to administer and participate in the NFIP at this time.

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.

The City of Hamilton and the City of Hico currently have in place standard flood damage prevention ordinances which include minimum NFIP standards for new construction and substantial Improvements of structures. Both NFIP participating jurisdictions are considering adopting higher regulatory NFIP standards to limit or further regulate floodplain development.

The flood hazard areas throughout Hamilton 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 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 Hamilton 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. The City of Hamilton and the City of Hico 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

[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.

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, Hamilton 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

Both NFIP participating jurisdictions have developed mitigation actions that relate to either NFIP maintenance or compliance. Compliance and maintenance actions can be found in Section 23.

Flooding was identified as a moderate-risk hazard during hazard ranking activities at the Risk Assessment Workshop by 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. Both 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.

Both 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:

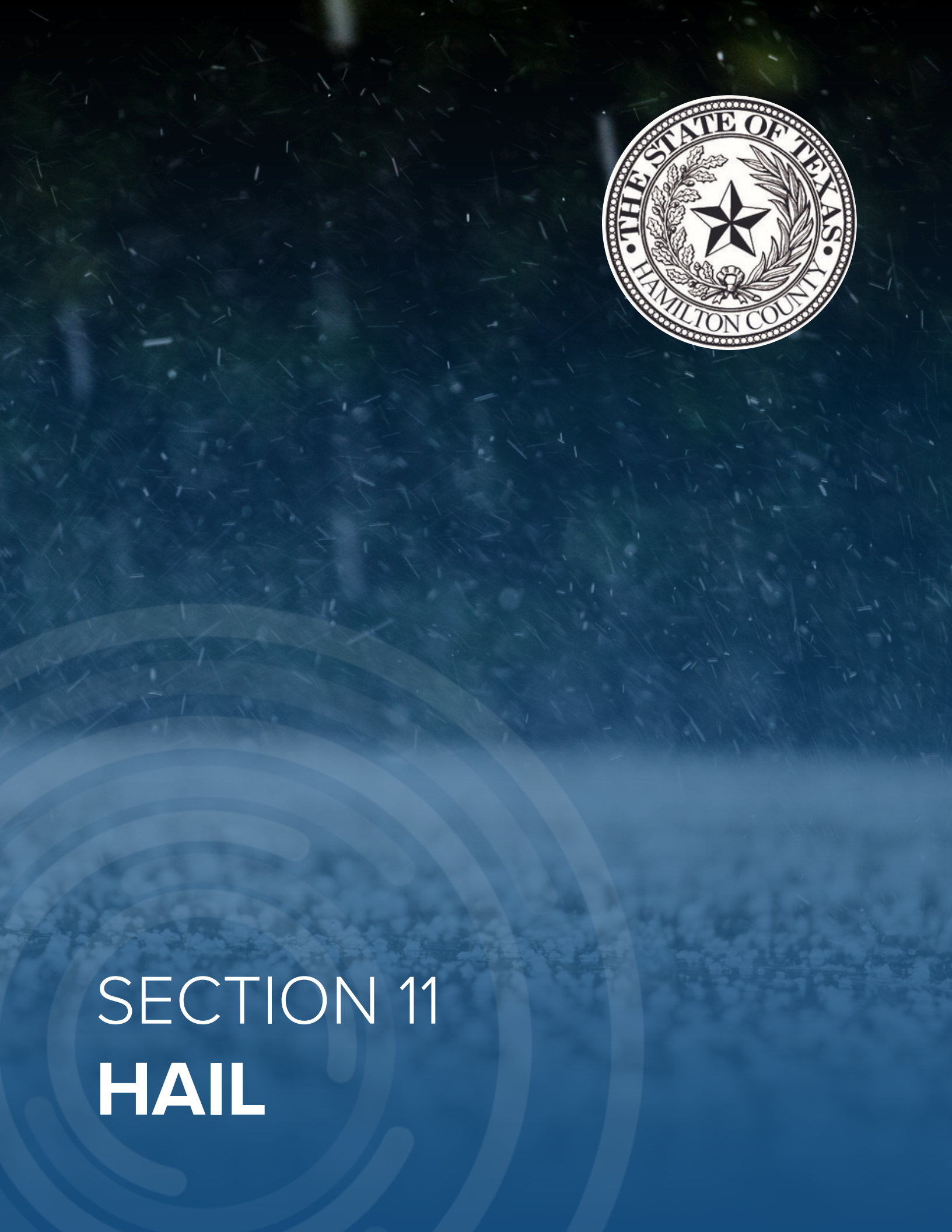
- Any insurable building for which 2 or more claims of more than $1,000 each, paid by the National Flood Insurance Program (NFIP) within any 10-year period, since 1978;
- May or may not be currently insured under the NFIP.

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.

In either scenario, at least 2 of the referenced claims must have occurred within any 10-year period and must be greater than 10 days apart.[7] There are no repetitive or severe repetitive loss properties reported for the Hamilton County planning area, including all participating jurisdictions.

[7] Source: Texas Water Development Board.



SECTION 11

HAIL

SECTION 11: HAIL

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Vulnerability and Impact 6
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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 Hamilton County planning area is equally

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

at risk to the hazard of hail. Refer to Figure 11-1 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 11-1.

Table 11-1. Hail Intensity and Magnitude[2]

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 11-1 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 Hamilton County planning area may experience

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

hailstorms ranging from an H0 (pea size) to an H10 (baseball size). The largest size hail to be reported was 3 inches in diameter, or a H8, which is considered a very destructive hailstorm that can cause severe infrastructure damage. Events of this magnitude occurred on April 3, 2023, and April 28, 2023. Refer to the Historical Occurrences section below for more details on these events. This is likely the greatest extent the planning area can anticipate in the future, based on historical events.

HISTORICAL OCCURRENCES

Historical evidence shown in Figure 11-1 demonstrates that the planning area is vulnerable to hail events overall. Historical events with reported damages, injuries, or fatalities are shown in Table 11-2. A total of 187 reported historical hail events impacted the Hamilton County planning area between 1968 and 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 Hamilton County planning area with latitude and longitude available were plotted (Figure 11-1).

Figure 11-1. Spatial Historical Hail Events, 1968-2023

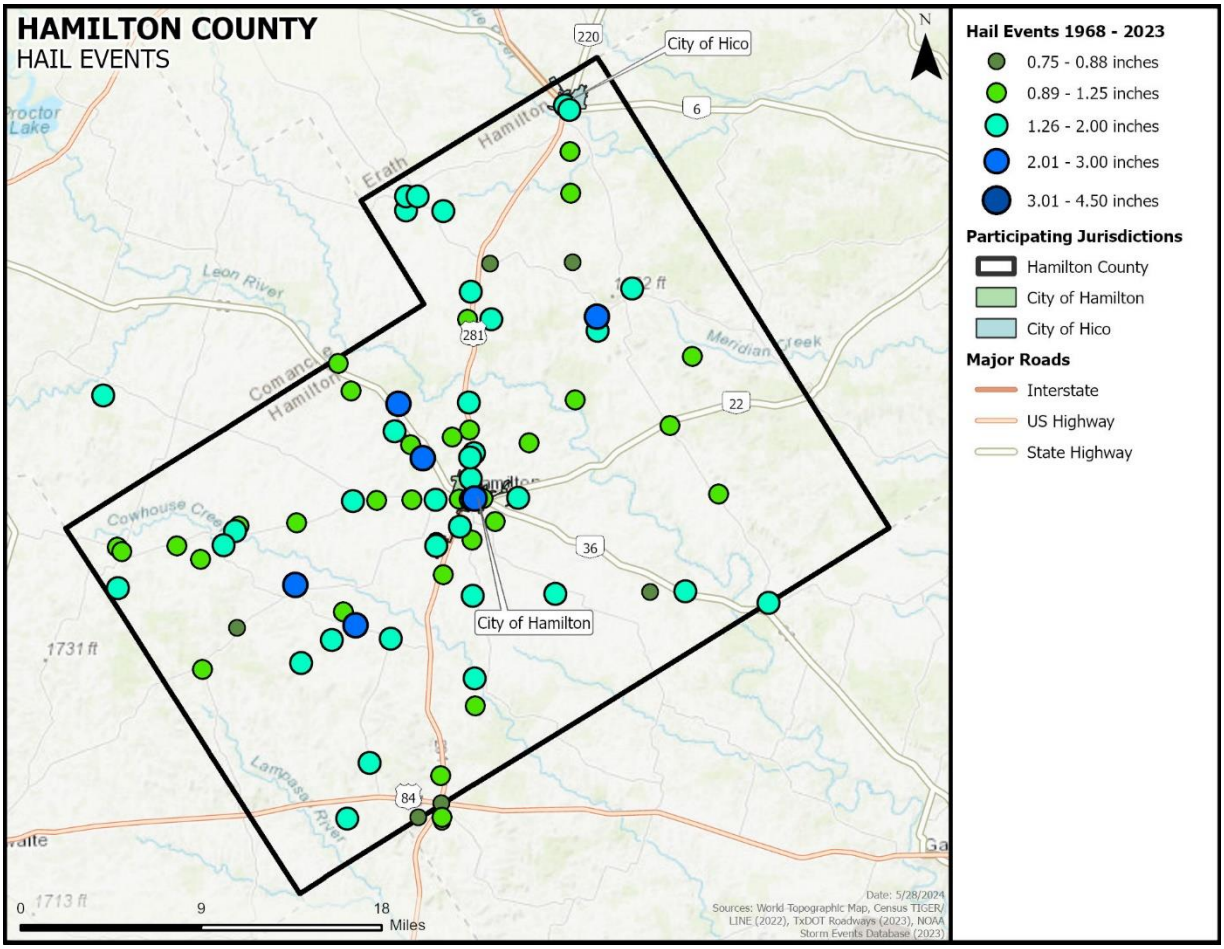


Table 11-2. Damaging Historical Hail Events, 1968-2023[3]

JURISDICTION	DATE	MAGNITUDE (Inches)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	4/26/1994	0	0	0	$10,046,500	$0
City of Hamilton	4/10/2005	2.75	0	0	$15,200	$0
Hamilton County	5/5/2006	1.75	0	0	$7,300	$0
City of Hamilton	2/10/2009	1.75	0	0	$14,000	$0
Hamilton County	4/10/2011	1.75	0	0	$32,900	$0
City of Hamilton	4/10/2011	1.75	0	0	$329,200	$0
City of Hamilton	5/21/2011	2.75	0	0	$9,200	$0
City of Hamilton	5/21/2011	1.75	0	0	$6,600	$0
City of Hamilton	5/9/2013	1.75	0	0	$8,900	$0
Hamilton County	5/15/2013	2.75	0	0	$12,700	$0
Hamilton County	5/15/2013	1.75	0	0	$6,400	$12,700
Hamilton County	5/15/2013	1.75	0	0	$3,800	$6,400
Hamilton County	5/20/2013	1.75	0	0	$3,800	$0
Hamilton County	5/20/2013	1.5	0	0	$12,700	$0
City of Hamilton	5/20/2013	1.5	0	0	$3,800	$0
Hamilton County	4/6/2018	1.5	0	0	$1,200	$0
Hamilton County	4/6/2018	1.5	0	0	$300	$0
City of Hamilton	6/9/2019	1.75	0	0	$11,600	$0
Hamilton County	1/10/2020	1.75	0	0	$1,100	$0
Hamilton County	4/8/2021	2	0	0	$22,200	$0
Hamilton County	4/8/2021	1.75	0	0	$7,800	$0
Hamilton County	4/3/2023	2	0	0	$5,000	$0
Hamilton County	4/3/2023	3	0	0	$100,000	$0
Hamilton County	4/28/2023	3	0	0	$250,000	$0
TOTALS		**(Max Extent)**	**0**	**0**	**$10,912,200**	**$19,100**

[3] Only recorded events with damages are listed. No reports of injuries or fatalities were recorded in the NCEI database.

Table 11-3. Historical Hail Events Summary, 1968-2023

JURISDICTION	NUMBER of EVENTS	MAX MAGNITUDE (Inches)	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	114	3	0	0	$10,513,700	$19,100
City of Hamilton	53	2.75	0	0	$398,500	$0
City of Hico	20	2.75	0	0	$0	$0
TOTAL LOSSES	**187**	**(Max Extent)**	**0**	**0**	**$10,912,200**	**$19,100**

Based on the list of historical hail events for the Hamilton County planning area (listed above), 22 of the events have occurred since 2018 Plan according to reports in the NCEI database. The most significant event in relation to damages occurred on April 26, 1994, with just over $10 million in damages (2023 dollars).

SIGNIFICANT EVENTS

April 26, 1994

A system produced severe thunderstorms with hail and caused damage across the Hamilton County planning area. The City of Hico area had the worst reported damages. This is the costliest hail event in the planning area and caused more than $10,046,500 (2023 dollars) in property damage.

April 10, 2011

A strong upper-level low pressure system aided in the late evening development of severe thunderstorms along a dryline across central Texas. These storms caused 70 to 80 mph winds, brief tornadoes, and large hail. Golf ball sized hail was reported in the City of Hamilton, damaging roofs, siding, automobiles, and windows. The hail left holes in the siding of many homes and the windows at the City Hall and the post office were shattered. This event caused $362,100 (2023 dollars) in property damages.

April 28, 2023

A complex surface pattern unfolded on Friday, April 28, 2023, comprising of a low-pressure center, warm front, dryline, and pacific cold front. All these features contributed to the development of strong to severe thunderstorms. Hail was reported to be three inches in diameter in the Hamilton County planning area and this event caused $250,000 in property damages.

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, 187 events in a 56-year reporting period for Hamilton 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 Hamilton County planning area. 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 Hamilton 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 304 (7 percent of total housing stock) manufactured homes located in the Hamilton County planning area. In addition, 69 percent (approximately 3,003 structures) of the housing structures in the Hamilton County 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 11-4. Structures at Greater Risk by Participating Jurisdiction

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980	MANUFACTURED HOMES
Hamilton County	3,003	304
City of Hamilton	1,024	84
City of Hico	625	38

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 17 percent of the planning area population live below the poverty level (Table 11-5). 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.

Table 11-5. Populations at Greatest Risk by Jurisdiction[4]

JURISDICTION	ELDERLY (over 65)	YOUTH (under 5)	WITH A DISABILITY	BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Hamilton	631	105	632	438	433
City of Hico	375	201	422	137	74
Unincorporated Hamilton County	1,117	113	553	835	396
Hamilton County	**2,123**	**419**	**1,607**	**1,410**	**903**

The Hamilton County Planning Team identified the following critical facilities (Table 11-6) 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 11-6. Critical Facilities Vulnerable to Hail

CRITICAL FACILITY TYPE	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	• 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	• 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.
Commercial Supplier (Food, fuel, etc.)	• Facilities or infrastructure may be damaged, destroyed or otherwise inaccessible. • Essential supplies like medicines, water, food, and equipment deliveries may be significantly delayed.

[4] US Census Bureau 2022 data for Hamilton County

CRITICAL FACILITY TYPE	POTENTIAL IMPACTS
Utility Services and Infrastructure (electric, water, wastewater, communications)	• 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 average loss estimate of property and crops in the planning area is considered $10,931,300 with an average annualized loss of $195,200. Based on historic loss and damages, the impact of hail damages on the Hamilton County planning area can be considered “Limited” severity of impact, 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.

Table 11-7. Estimated Annualized Losses by Jurisdiction

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Hamilton County	$10,532,800	$188,100
City of Hamilton	$398,500	$7,100
City of Hico	$0	$0
TOTALS	**$10,931,300**	**$195,200**

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:

- 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.

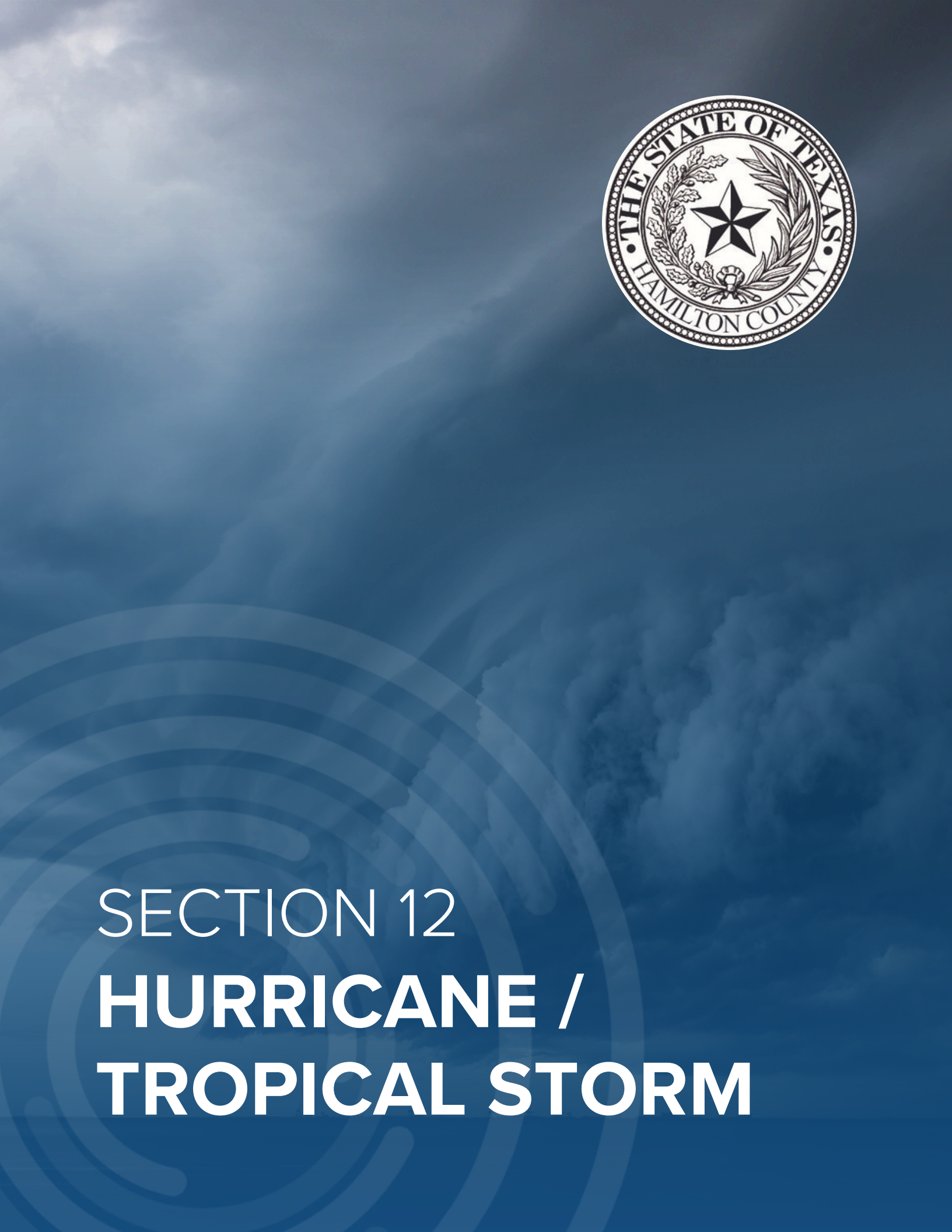
- Extended power outage can result in an increase in structure fires and/or carbon monoxide poisoning, as individuals attempt to cook or heat their home with alternate, unsafe cooking or heating devices, such as grills.
- First responders are exposed to downed power lines, damaged structures, hazardous 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 is one historical site listed on the National Register of Historic Places for Hamilton 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 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.[5]

[5] Yale Climate Connections, Hailstorms and Climate Change, March 17, 2022.



SECTION 12

HURRICANE / TROPICAL STORM

SECTION 12: HURRICANE / TROPICAL STORM

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HAZARD DESCRIPTION



According to the National Oceanic and Atmospheric Administration (NOAA), a hurricane is an intense tropical weather system of strong thunderstorms with well-defined surface circulation and maximum sustained winds of 74 mph or higher. In the Northern Hemisphere, circulation of winds near the Earth's surface is counterclockwise.

Hurricanes often begin as tropical depressions that intensify into tropical storms when maximum sustained winds increase to between 35–64 knots (39–73 mph). At these wind speeds, the storm becomes more organized and circular in shape and begins to resemble a hurricane. Tropical storms can be equally problematic without ever becoming a hurricane. Tropical storms resulting in high winds and heavy rainfall can be dangerous to people and property, as Tropical Storm Frances was for southeast Texas in September 1998. Once sustained winds reach or exceed 74 mph, the storm becomes a hurricane. The intensity of a landfalling hurricane is expressed in categories relating wind speeds to potential damage. Tropical storm-force winds are strong enough to be dangerous to those caught in them. For this reason, emergency managers plan to have evacuations completed and personnel sheltered before winds of tropical storm-force arrive, which precedes the arrival of hurricane-force winds.

LOCATION

The location of the Hamilton County planning area is approximately 300 miles from the coast making the planning area vulnerable to threats directly and indirectly related to a hurricane event, such as high-force winds and flooding. While Hamilton County is not located along the Gulf Coast, due to the regional nature of hurricanes and tropical storms, the County is exposed and susceptible to the impacts of hurricane and tropical storm events. Hurricanes and tropical storms can impact Hamilton County from June to November, the official Atlantic U.S. hurricane season. Hamilton County planning area is in a low to moderate risk area for hurricane wind speeds up to 200 miles per hour (mph).

EXTENT

As a hurricane develops, the barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour, the storm is deemed a hurricane.

Hurricanes are categorized according to the strength and intensity of their winds using the Saffir-Simpson Hurricane Scale (Table 12-1). A Category 1 storm has the lowest wind speeds, while a Category 5 hurricane has the highest. However, a lower category storm can inflict greater damage than higher category storms depending on where they strike, the amount of storm surge, other weather they interact with, and how slow they move.

Table 12-1. Extent Scale for Hurricanes[1]

CATEGORY	MAXIMUM SUSTAINED WIND SPEED (mph)	MINIMUM SURFACE PRESSURE (millibars)	STORM SURGE (feet)
1	74 – 95	Greater than 980	3 – 5
2	96 – 110	979 – 965	6 – 8
3	111 – 130	964 – 945	9 – 12
4	131 – 155	944 – 920	13 – 18
5	155+	Less than 920	19+

Based on the historical storm tracks, most hurricanes turn into tropical storms by the time they reach Hamilton County, however, the average estimated extent to be mitigated for is a Category 3 storm.

HISTORICAL OCCURRENCES

Hamilton County is located inland and is not directly along the coastline. As hurricanes typically form over the ocean and affect coastal areas, Hamilton County is less prone to direct impacts from hurricanes. The hurricanes usually fade and downgrade to tropical storms or tropical depressions as they move away from the coast. However, it is important to note that the remnants of tropical systems, including hurricanes, can still bring heavy rainfall and potential flooding to inland areas.

Hurricanes and tropical storms do not typically track across the planning area. Only four systems have ever tracked across Hamilton County including an unnamed tropical storm in 1874, an unnamed tropical depression in 1932, tropical storm Candy in 1968, and tropical storm Edouard in 2008. While tropical storms and hurricanes frequently make landfall along the Gulf Coast, these systems weaken over land. By the time these systems reach the planning area they have typically been downgraded to a tropical storm or tropical depression. Historical systems that have tracked

[1] Source: National Hurricane Center, https://www.nhc.noaa.gov/HAW2/english/basics/saffir_simpson.shtml

in close proximity to the planning area, bringing storm systems, excessive precipitation and potentially damaging wind to Hamilton County and participating jurisdictions, are listed in Table 12-2 below.

According to the historical hurricane tracks from NOAA's National Hurricane Center, there have been 13 storms that are known to have come within 60 miles of the Hamilton County planning area from 1961 through 2023. There are no reported damages for these events.[2]

Figure 12-1. Historical Hurricane/Tropical Storm Events, 1961-2023

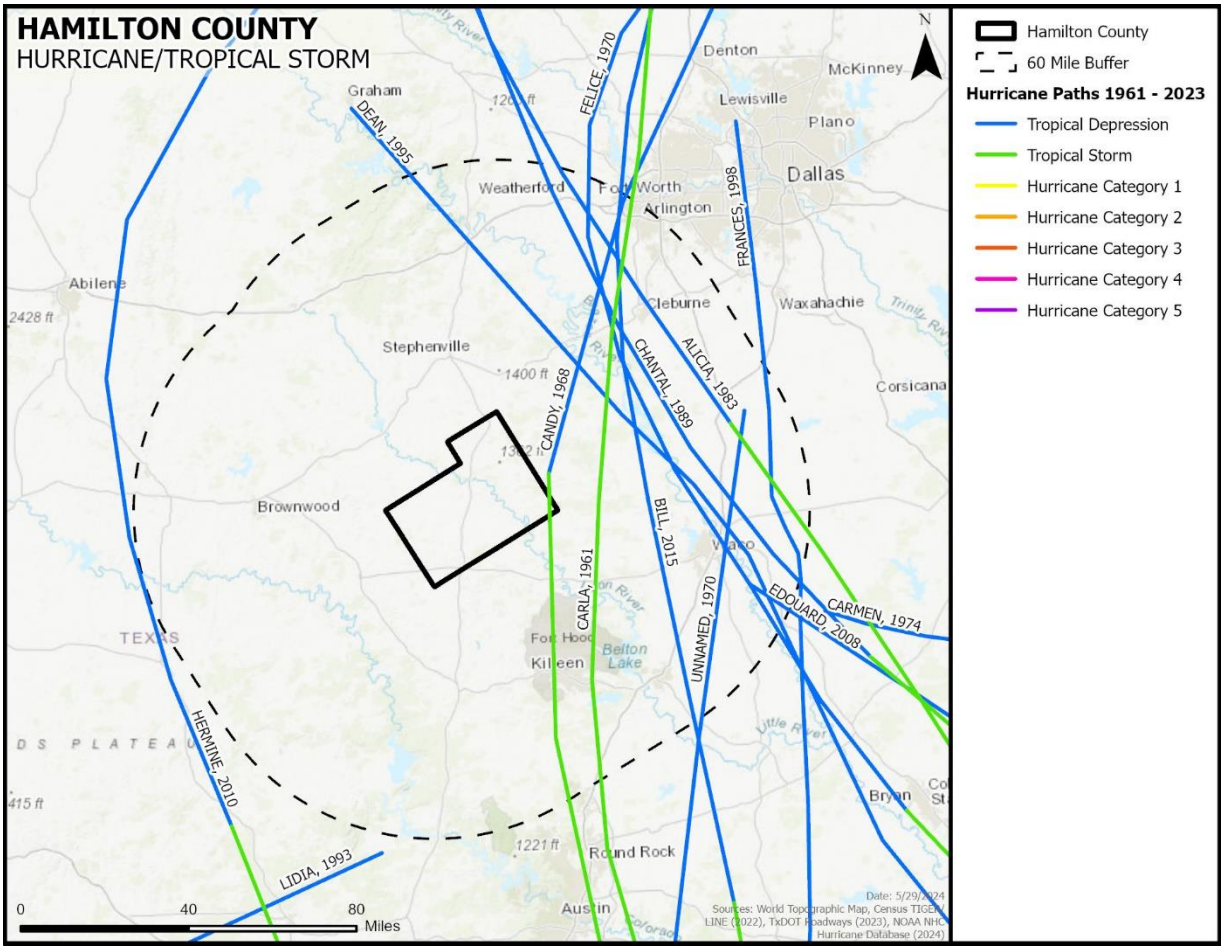


Table 12-2. Historical Hurricane/Tropical Storm Events, 1961-2023[3]

DATE	STORM NAME	CATEGORY (Max)
9/3/1961 - 9/18/1961	Carla	Category 4
6/22/1968 - 6/26/1968	Candy	Tropical Storm
9/1/1970 -9/2/1970	Unnamed	Tropical Depression

[2] Flood damages associated with tropical storm systems are covered under the flood hazard profile (Section 10).
[3] Source: NOAA Historical Hurricane Tracks, https://coast.noaa.gov/hurricanes/#map=4/32/-80

DATE	STORM NAME	CATEGORY (Max)
9/12/1970 - 9/19/1970	Felice	Tropical Storm
8/29/1974 – 9/10/1974	Carmen	Category 4
8/15/1983-8/21/1983	Alicia	Category 3
7/30/1989 - 8/03/1989	Chantal	Category 1
9/8/1993 - 9/14/1993	Lidia	Category 4
7/28/1995 - 8/2/1995	Dean	Tropical Storm
9/8/1998 - 9/13/1998	Frances	Tropical Storm
8/3/2008 - 8/6/2008	Edouard	Tropical Storm
9/4/2010 - 9/10/2010	Hermine	Tropical Storm
6/16/2015 - 6/21/2015	Bill	Tropical Storm

Based on the list of historical hurricane events for Hamilton County planning area, no events have occurred since the 2018 Plan.

SIGNIFICANT EVENTS

There have been 3 declared disasters and emergency declarations between 1996 and 2023 (Table 12-3). These declarations were related to Tropical Storm Charley in 1998 and Hurricane Rita in 2005.

Table 12-3. Disaster Declarations for Hurricane/Tropical Storm, 1996-2023

YEAR	DECLARATION TITLE	DECLARATION TYPE	DISASTER NO.
2005	Hurricane Katrina	EM	3216
2005	Hurricane Rita	EM	3261
2005	Hurricane Rita	DR	1606

PROBABILITY OF FUTURE EVENTS

Based on historical occurrences of significant hurricane events, the probability of future events is “Unlikely”, with an event probable in the next ten years for Hamilton County planning area. Impacts of climate change are not expected to increase the average frequency of events but may lead to an increase in the intensity of these storms. See additional information on climate change at the end of this section.

VULNERABILITY AND IMPACT

Hurricane and tropical storm events can cause major damage to large areas; hence, all existing buildings, facilities, and populations are equally exposed and vulnerable to this hazard and could

potentially be impacted. Hamilton County planning area features multiple mobile or manufactured home parks throughout the planning area. These mobile home parks are typically more vulnerable to hurricane events than typical site-built structures. The U.S. Census data indicates a total of 304 (7 percent of total housing stock) manufactured homes located in the Hamilton County planning area. In addition, 69 percent (approximately 3,003 structures) of the housing structures in the Hamilton County planning area were built before 1980.[4] These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant events.

Table 12-4. Structures at Greater Risk[5]

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980	MANUFACTURED HOMES
Hamilton County	3,003	304
City of Hamilton	1,024	84
City of Hico	625	38

Hamilton County 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 hurricane and tropical storm events.

Table 12-5. Critical Facilities Vulnerable to Hurricane and Tropical Storm Events

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	• 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.

[4] Source: US Census Bureau data estimates for 2022.
[5] US Census Bureau American Community Survey Five-Year Estimates 2018-2022 data for Hamilton County.

CRITICAL FACILITIES	POTENTIAL IMPACTS
Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	• Structures can be damaged by falling trees or flying debris. • Power outages could disrupt critical care. • 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 damages to facilities.
Commercial Supplier (Food, fuel, etc.)	• 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)	• 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.

Storm track data was available for the past 150 years, however, there is no property and crop loss data available for hurricane and tropical storm events in Hamilton County. With limited reported damages and no reported injuries or fatalities, the potential severity of impact from a hurricane for Hamilton County planning area is considered to be “Limited”, meaning injuries and illnesses are treatable with first aid, shutdown of critical facilities and services for 24-hours or less, and less than ten percent of property destroyed or with major damage.

ASSESSMENT OF IMPACTS

Hurricane and tropical storm events have the potential to pose a significant risk to people and can create dangerous and difficult situations for public health and safety officials. The impact of climate change could produce larger, more severe hurricane events, exacerbating the current hurricane impacts. Impacts to the planning area can include:

- 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.
- Driving conditions in the planning area may be dangerous during a hurricane event, especially over elevated bridges, elevating the risk of injury and accidents during evacuations if not timed properly.
- Emergency evacuations may be necessary prior to a hurricane landfall, requiring emergency responders, evacuation routing, and temporary shelters.
- 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.
- During hurricane landfall, first responders may be prevented from responding to calls as the winds may reach a speed in which their vehicles and equipment are unsafe to operate.
- Hurricane 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.
- Extended power outages can also be deadly for individuals reliant on electricity to live independently in their homes.
- Extreme hurricane events may rupture gas lines and down trees and power lines, increasing the risk of structure fires during and after a storm event.
- Extreme hurricane events may lead to prolonged evacuations during search and rescue, and immediate recovery efforts requiring additional emergency personnel and resources to prevent entry, protect residents, and protect property.
- First responders are exposed to downed power lines, unstable and unusual debris, hazardous materials, and generally unsafe conditions.
- Emergency operations and services may be significantly impacted due to damaged facilities and/or loss of communications.
- Critical staff may be unable to report for duty, limiting response capabilities.
- County and City departments may be damaged, delaying response and recovery efforts for the entire community.
- Private sector entities that the County, Cities and 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.
- Some businesses not directly damaged by the hurricane may be negatively impacted while roads are cleared and utilities are being restored, further slowing economic recovery.
- Older structures built to less stringent building codes may suffer greater damage as they are typically more vulnerable to hurricane damage. In Hamilton County, 69 percent of homes were built before 1980, and one building in the county is on the National Register of Historic Places, which pre-dates modern building codes.

- Vegetation in the City urban parks may become flattened or oversaturated from high winds and heavy rains.
- Large scale hurricanes can have significant economic impact on the affected area, as it must now fund expenses such as infrastructure repair and restoration, temporary services and facilities, overtime pay for responders, as well as normal day-to-day operating expenses.
- Businesses that are more reliant on utility infrastructure than others may suffer greater damage without a backup power source.
- As the Hamilton County planning area continues to increase in population, the number of people and housing developments exposed to the hazard increases. Continued public education on the planning area's risks to hurricane and tropical storm events will continue to be key to the Planning Team's overall mitigation strategy.

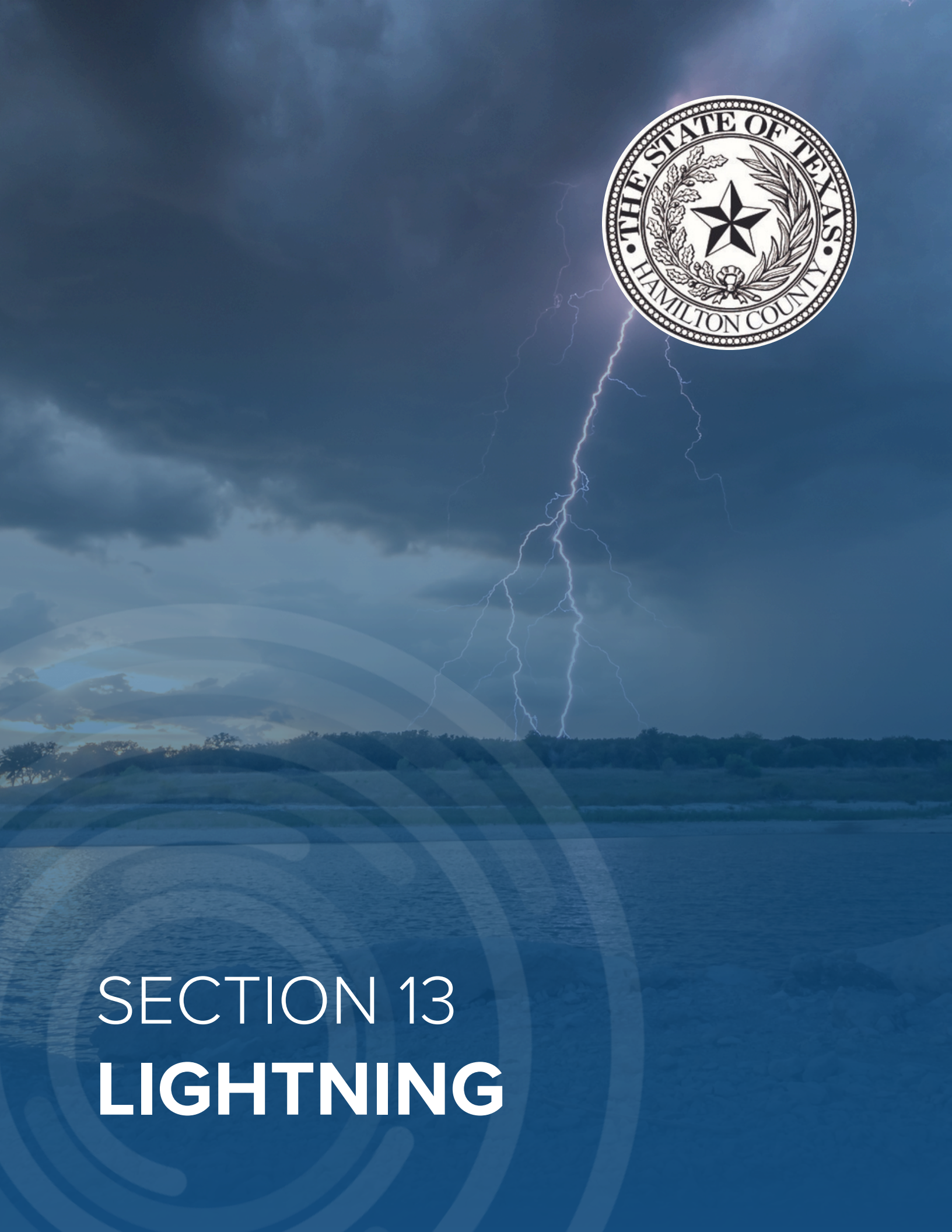
The economic and financial impacts of hurricane events on the area will depend on the scale of the event, what is damaged, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness and pre-event planning done by the community, local businesses, and citizens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

CLIMATE CHANGE CONSIDERATIONS

Hurricane and tropical storm events have the potential to pose a significant risk to people and property. Such events can create dangerous situations for public health and safety officials and cause catastrophic damages. The impact of climate change could produce larger, more severe hurricane events, exacerbating the current hurricane impacts. The economic and financial impacts of hurricanes and tropical storms will depend entirely on the scale of the events, what is damaged, and how quickly repairs to critical components of the economy can be implemented.

The current climate assessment report for Texas indicates an expected increase in the intensity of very strong hurricanes, despite an expected lack of increase, or even a decrease, in hurricane frequency overall. Different research studies have produced some conflicting results. While some recent research has pointed to an apparent trend for U.S. tropical cyclones to move more slowly at landfall, much like Hurricane Harvey, other research suggests that Texas may be spared from such a slowdown. At this point, the enhanced risk is difficult to quantify, but substantial scientific progress on this topic is likely as climate models become better able to simulate the observed spatial distribution, frequency, and intensity of hurricanes.[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 13
LIGHTNING

SECTION 13: 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 Hamilton 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 Hamilton County planning area, including participating jurisdictions, is uniformly exposed to the threat of lightning.

EXTENT

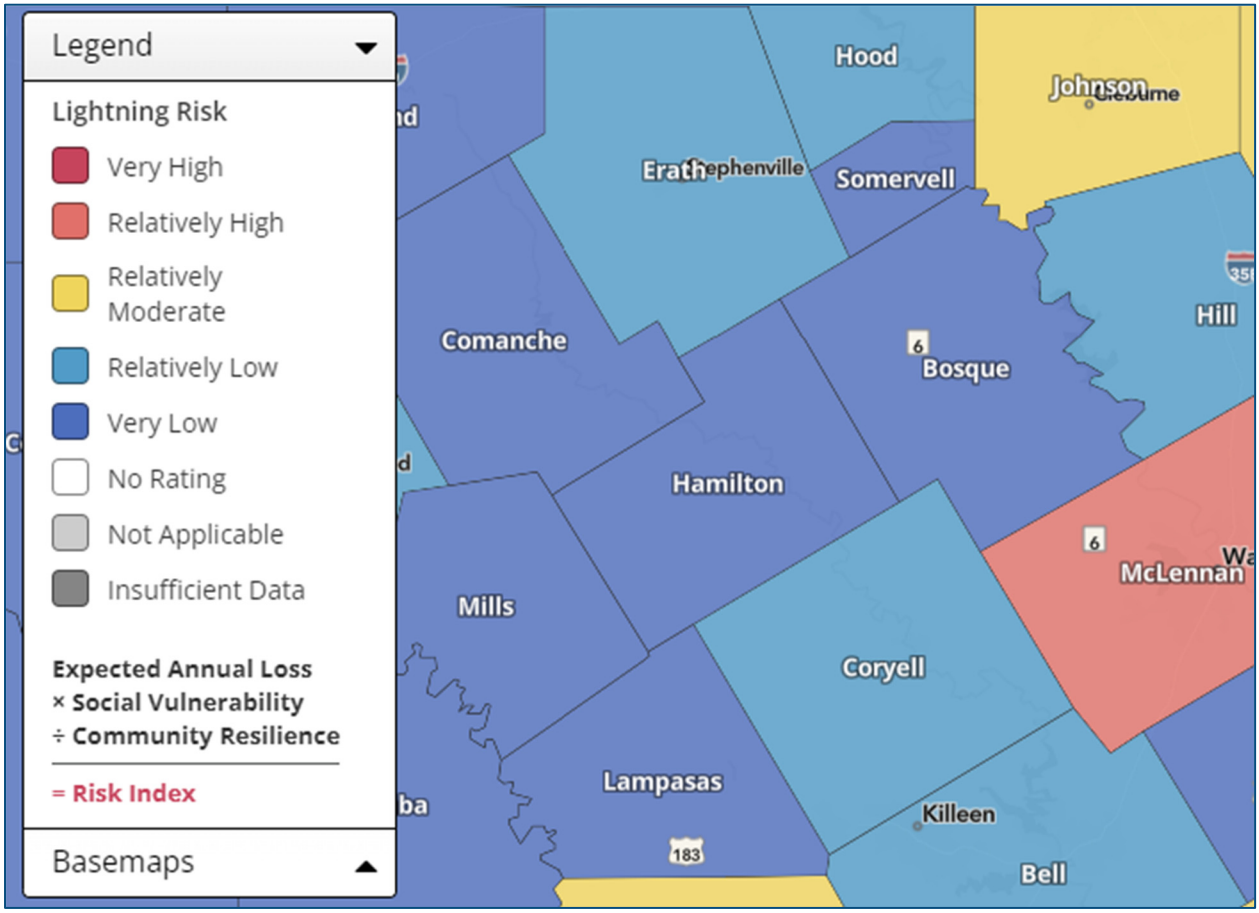
According to the 2023 Annual Lightning Report by Vaisala, the State of Texas ranks tenth in the U.S. for lightning strike density with an average of 157.7 flashes per square mile.[1] Vaisala's U.S. National Lightning Detection Network lightning flash density map shows an average of 166.8 lightning events per square mile per year for the Hamilton County planning area. This rate equates

[1] Source: https://www.xweather.com/annual-lightning-report

to approximately 139,400 flashes per year for the entire planning area, or 3.9 flashes per 15-minute interval during storm events.

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. Hamilton County is located in an area where the extent is classified as very low (Figure 13-1).

Figure 13-1. Hamilton County Lightning Risk, National Risk Index, May 2024[2]



HISTORICAL OCCURRENCES

Since January 1996, there have been no recorded lightning events for the Hamilton County planning area, based upon NCEI records. 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 across the planning area that simply have not been reported.

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

PROBABILITY OF FUTURE EVENTS

Based on historical records and input from the planning team the probability of occurrence for future lightning events in the Hamilton County planning area 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 Hamilton County planning area, including participating jurisdictions, is located in an area of the country that experiences approximately 166.8 lightning flashes per square mile per year (approximately 134,900 flashes per year). Given this estimated probability of events, it can be expected that future lightning events will continue to threaten life and cause minor 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 Hamilton County planning area 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 Hamilton 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 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 Hamilton 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. An estimated 17 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 weather-related warnings and instructions regarding safety measures. Table 13-1 lists these vulnerable populations and several others for Hamilton County and the participating jurisdictions.

Table 13-1. Populations at Greatest Risk by Jurisdiction[3]

JURISDICTION	ELDERLY (over 65)	YOUTH (under 5)	WITH A DISABILITY	BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Hamilton	631	105	632	438	433
City of Hico	375	201	422	137	74
Unincorporated Hamilton County	1,117	113	553	835	396
Hamilton County	**2,123**	**419**	**1,607**	**1,410**	**903**

The Hamilton County Planning Team identified the following critical facilities (Table 13-2) 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 13-2. Critical Facilities Vulnerable to Lightning Events

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	• 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	• 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.

[3] US Census Bureau, American Community Survey Five-Year Estimates, 2022

CRITICAL FACILITIES	POTENTIAL IMPACTS
Commercial Supplier (food, fuel, etc.)	• 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)	• 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 are no recorded fatalities or injuries within the Hamilton County planning area due to lightning events. Additionally, there are no recorded lightning events in the planning area, and therefore total monetary losses or annual loss estimates due to lightning are difficult to determine. The limited recorded impacts on the Hamilton County planning area indicate a "Limited" severity of impact, meaning minimal quality of life lost, critical facilities and services shut down for 24 hours or less, and less than 10 percent of property destroyed.

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 Hamilton 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. 69 percent of homes in Hamilton County were built before 1980. Similarly, historic buildings may lack fire mitigation materials or measures due to their historic status. One historic building in the planning area, the Hamilton County Courthouse, is 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.
- 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.

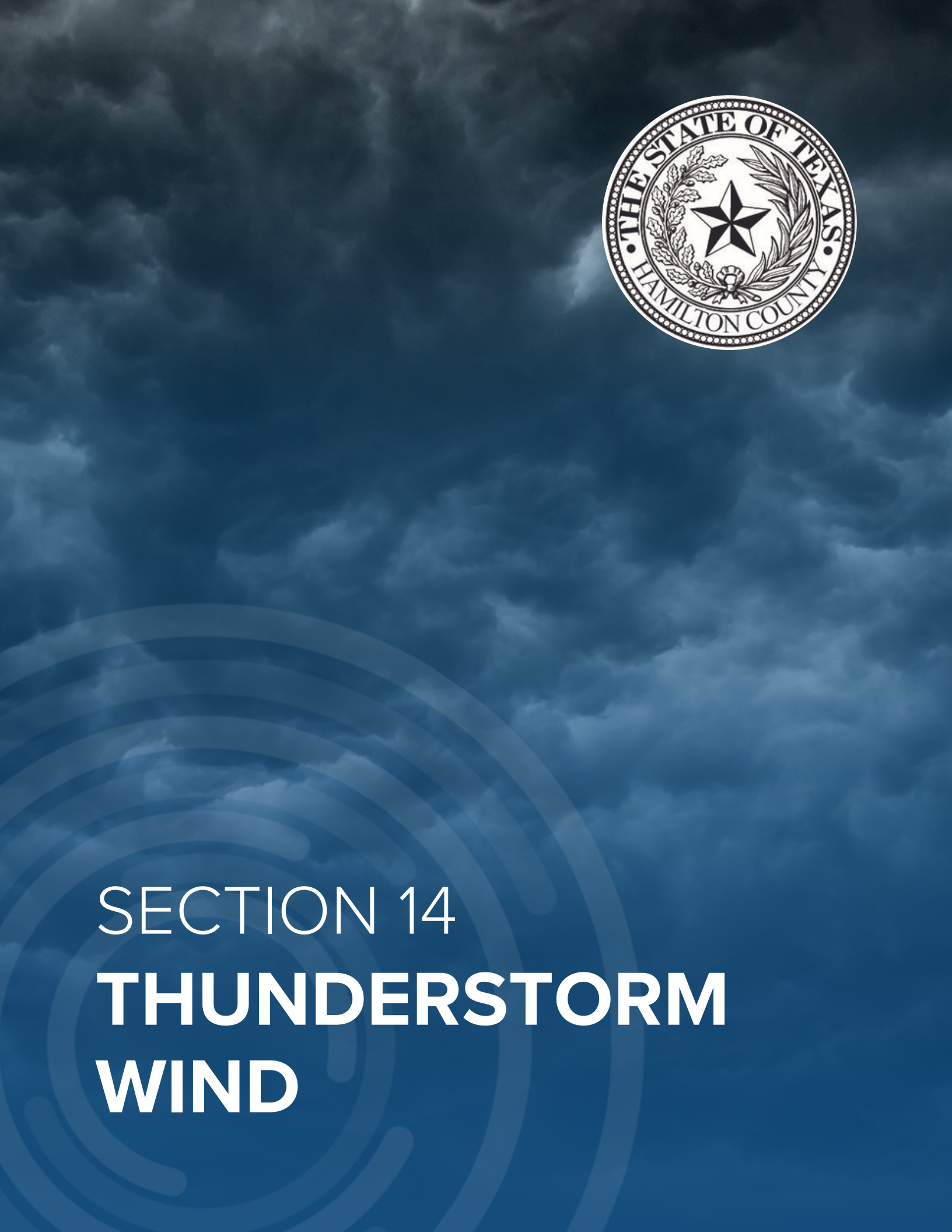
CLIMATE CHANGE CONSIDERATIONS

As CO_2 increases and the land surface warms, stronger updrafts are more likely to produce lightning. In a climate with double the amount of CO_2, 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.[4]

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

[4] Environmental Journal, Nathan Neal, January 11, 2021.

development continues to rise, the overall vulnerability and impact are expected to increase in the next five years.



SECTION 14

THUNDERSTORM WIND

SECTION 14: 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 Hamilton County planning area. These storms develop randomly and are not confined to any geographic area within the planning area. It is assumed that the entire Hamilton County planning area is uniformly exposed to the threat of thunderstorm winds.

SECTION 14: THUNDERSTORM WIND

EXTENT

The extent or magnitude of a thunderstorm wind event is measured by the Beaufort Wind Scale. Table 14-1 describes the different intensities of wind in terms of speed and effects, from calm to violent and destructive.

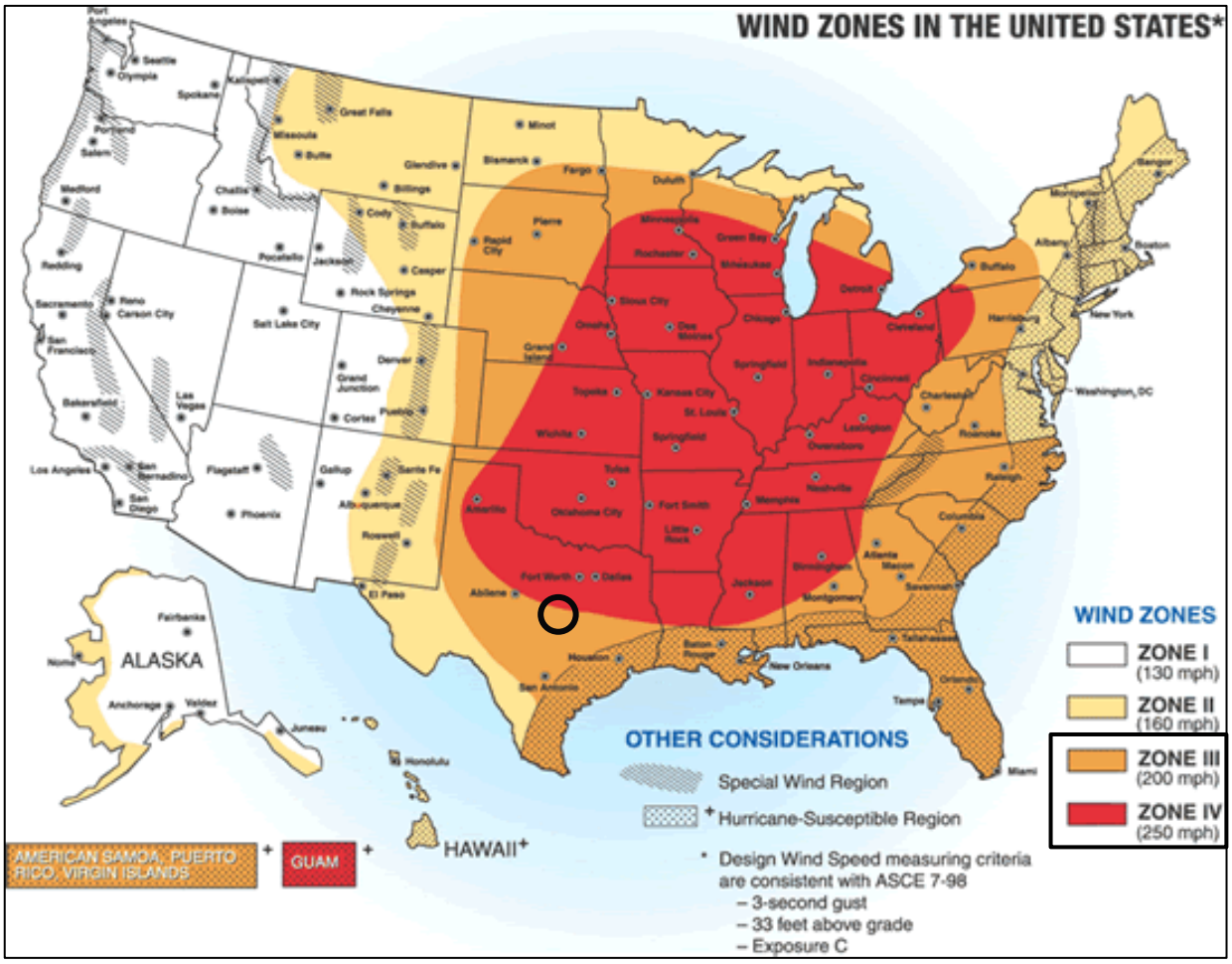
Table 14-1. Beaufort Wind Scale[1]

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 14-1 displays the wind zones as derived from NOAA.

[1] Source: World Meteorological Organization

Figure 14-1. Wind Zones in the United States[2]



On average, the planning area experiences one to two thunderstorm wind events every year. The Hamilton County planning area is largely located within Wind Zone III, with the northern edge near Wind Zone IV. This means the majority of the planning area can experience winds up to 200 mph, while the northern portion of the planning area may experience winds up to 250 mph. The Hamilton County planning area has experienced a significant wind event, or an event with winds in 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 a search of past events between 1956 through 2023, the greatest magnitude wind event that Hamilton County planning area experienced was 74 knots, or 85 mph, during an event occurring on June 10, 2009. Property damage of an estimated $41,200 (2023 dollars) was reported as a result of this event.

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

[2] Hamilton County planning area is indicated by the black circle.

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 68 years. Tables 14-2 and 14-3 depict historical occurrences of thunderstorm wind events for the Hamilton County planning area according to the NCEI database.

Since 1956, 116 thunderstorm wind events are known to have occurred in the Hamilton County planning area. Table 14-3 presents information on known historical events impacting the Hamilton County planning area, resulting in damages, injuries, or fatalities. The strongest event reported in the planning area occurred in Hamilton County on June 10, 2009, with reported wind speeds of 74 knots, or 85 mph. The most damaging event in the planning area was reported in Hamilton County on April 10, 2011, and caused $724,300 in property and crop damages (2023 dollars).

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 14-2. Historical Thunderstorm Wind Speeds, 1956-2023

MAXIMUM WIND SPEED RECORDED (knots)	NUMBER OF REPORTED EVENTS
0-30	0
31-40	1
41-50	13
51-60	41
61-70	16
71-80	2
81-90	0
91-100+	0
Unknown	43

Table 14-3. Historical Thunderstorm Wind Events, 1956-2023[3]

JURISDICTION	DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Hamilton	4/29/1993	0	0	0	$102,800	$0
Hamilton County	4/29/1993	0	0	0	$10,300	$0
Hamilton County	10/12/1993	0	0	0	$101,600	$0

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

SECTION 14: THUNDERSTORM WIND

JURISDICTION	DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Hamilton	10/12/1993	0	0	0	$101,600	$0
City of Hico	4/26/1994	0	0	0	$10,000	$0
City of Hamilton	5/27/1994	52	0	0	$1,000	$0
Hamilton County	6/9/1994	0	0	0	$10,000	$0
City of Hico	6/9/1994	0	0	0	$10,000	$0
City of Hamilton	4/19/1995	0	0	0	$13,600	$0
City of Hamilton	5/29/1995	69	0	0	$38,900	$0
Hamilton County	5/29/1995	0	0	0	$233,500	$0
Hamilton County	5/6/1996	Unknown	0	0	$3,800	$0
Hamilton County	5/29/1996	Unknown	0	0	$3,800	$0
City of Hamilton	4/8/1998	Unknown	0	0	$1,800	$0
City of Hamilton	7/16/1998	Unknown	0	0	$1,800	$0
City of Hamilton	7/17/1998	Unknown	0	0	$27,200	$0
City of Hamilton	12/2/1999	Unknown	0	0	$3,500	$0
Hamilton County	3/19/2002	Unknown	0	0	$1,700	$0
City of Hamilton	3/19/2002	Unknown	0	0	$1,700	$0
City of Hamilton	7/13/2002	52	0	0	$3,300	$0
City of Hico	8/14/2002	52	0	0	$4,900	$0
City of Hamilton	6/11/2003	52	0	0	$8,100	$0
City of Hamilton	8/22/2003	52	0	0	$8,000	$0
City of Hamilton	8/22/2003	50	0	0	$3,200	$0
Hamilton County	3/4/2004	61	0	0	$23,700	$0
City of Hamilton	3/4/2004	52	0	0	$23,700	$0
Hamilton County	3/4/2004	50	0	0	$23,700	$0
City of Hamilton	3/4/2004	50	0	0	$7,900	$0
City of Hamilton	6/1/2004	61	0	0	$3,100	$0
Hamilton County	5/9/2005	50	0	0	$4,600	$0
City of Hico	5/2/2007	50	0	1	$42,700	$0

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JURISDICTION	DATE	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Hico	4/10/2008	56	0	0	$41,400	$0
City of Hamilton	6/20/2008	50	0	0	$1,400	$0
Hamilton County	2/10/2009	61	0	0	$69,800	$0
Hamilton County	2/10/2009	61	0	0	$11,200	$0
City of Hamilton	2/10/2009	61	0	0	$7,000	$0
City of Hamilton	5/26/2009	52	0	0	$4,200	$0
Hamilton County	6/10/2009	74	0	0	$41,200	$0
Hamilton County	6/11/2009	55	0	0	$5,500	$0
Hamilton County	4/10/2011	70	0	0	$10,500	$0
Hamilton County	4/10/2011	65	0	0	$395,100	$329,200
Hamilton County	4/10/2011	61	0	0	$65,800	$0
City of Hamilton	4/10/2011	56	0	0	$263,400	$0
City of Hamilton	6/21/2011	61	0	0	$13,100	$0
City of Hamilton	3/9/2013	63	0	0	$127,200	$0
City of Hamilton	8/16/2013	39	0	0	$1,300	$0
City of Hamilton	8/18/2014	52	0	0	$1,200	$0
Hamilton County	5/25/2015	50	0	0	$6,200	$0
City of Hamilton	6/29/2015	55	0	0	$600	$0
City of Hamilton	6/29/2015	52	0	0	$600	$0
City of Hamilton	3/30/2016	52	0	0	$2,500	$0
Hamilton County	5/10/2016	52	0	0	$2,500	$0
Hamilton County	5/15/2018	50	0	0	$2,400	$0
Hamilton County	5/15/2018	50	0	0	$1,200	$0
City of Hamilton	6/9/2019	59	0	0	$5,800	$0
City of Hamilton	6/9/2019	55	0	0	$28,900	$0
TOTALS		**74 (MAX EXTENT)**	**0**	**1**	**$1,945,500**	**$329,200**

Table 14-4. Summary of Historical Events by Jurisdiction, 1956-2023

JURISDICTION	NUMBER OF EVENTS	MAGNITUDE (knots)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	56	74	0	0	$1,027,900	$329,200
City of Hamilton	50	71	0	0	$808,500	$0
City of Hico	10	60	0	1	$109,100	$0
TOTALS	**116**	**(MAX EXTENT)**	**0**	**1**	**$2,274,700**	

Based on the list of historical thunderstorm wind events for the Hamilton County planning area, nine events have occurred since the 2018 Plan, four of which resulted in reported property damage.

SIGNIFICANT EVENTS

May 2, 2007 – City of Hico

A split in the upper levels of the atmosphere steered several southern stream impulses into North Texas, producing flash flooding, strong winds, and a few tornadoes. The most impressive of these events was a derecho which moved through North Texas on May 2. It produced winds in excess of 85 miles per hour. In Hamilton County, numerous trees were downed across the county causing damage. Additionally, two trailers were damaged in the county with one person being trapped inside and injured. Property damage from this even is estimated at $42,700 (2023 dollars).

April 10, 2011 – Hamilton County

A strong upper-level low pressure system over the southern Rockies aided in the late evening development of severe thunderstorms along a dry-line across north central and central Texas. One of these storms was a strong linear mesoscale convective system which produced a swath of wind damage from Goldthwaite northeast into southern portions of the Dallas-Fort Worth Metroplex and continued northeast to near Sulphur Springs. A swath of wind damage consistent with 70 to 80 mph winds was associated with this storm. Other supercell thunderstorms in the area produced brief tornadoes and large hail. Severe thunderstorm winds damaged barns, outbuildings, and trees across Hamilton County. Some trees were fully uprooted. The combination of severe winds and large hail damaged oat and wheat fields that were already suffering from the ongoing drought. For this storm event, four separate reports were made recording damages in the Hamilton County planning area. In total, these reports estimated $734,800 in property damage as well as $329,200 in crop damages (2023 dollars).

March 9, 2013 – City of Hamilton

A line of thunderstorms moved through North and Central Texas on March 9. The storms began as discrete cells in the early afternoon, before becoming a squall line by sunset. In the City of Hamilton, a microburst caused damage to several buildings. The Hamilton Police Department reported a supermarket roof collapsed and several trees were blown down in the City of Hamilton. Total damages resulting from this event are estimated at $127,200 (2023 dollars).

June 9, 2019 – City of Hamilton

A complex of storms moved south from Oklahoma into North Texas, producing widespread wind damage from the Dallas-Fort Worth Metroplex southward through a good portion of the region

during the afternoon. The strong winds resulted in a construction crane collapse in Dallas which caused one fatality. In Coryell County, an EF-2 tornado also occurred out of the storm system. In Hamilton County, the Hamilton Municipal Airport observed wind gusts up to 68 miles per hour. In the City of Hamilton, a tree was blown down onto a house resulting in a fire. In total, reports estimated property damage in Hamilton County at $34,700 (2023 dollars).

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 116 events in a 68-year reporting period, which provides an estimated annual frequency of one to two events every year. Even though the intensity of thunderstorm wind events is not always damaging for the Hamilton 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 Hamilton 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 Hamilton 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 recepticles, 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 more severe 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 304 manufactured homes are located in the Hamilton County planning area (7 percent of total housing stock). In addition, 69 percent (approximately 3,003 structures) of the housing units 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 14-5. Structures at Greater Risk by Participating Jurisdiction

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980	MANUFACTURED HOMES
City of Hamilton	1,024	84
City of Hico	625	38

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980	MANUFACTURED HOMES
Unincorporated Hamilton County	1,354	182
Hamilton County	**3,003**	**304**

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 17 percent of the planning area population live below the poverty level (Table 14-6). 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.

Table 14-6. Populations at Greatest Risk by Jurisdiction[4]

JURISDICTION	ELDERLY (over 65)	YOUTH (under 5)	WITH A DISABILITY	BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Hamilton	631	105	632	438	433
City of Hico	375	201	422	137	74
Unincorporated Hamilton County	1,117	113	553	835	396
Hamilton County	**2,123**	**419**	**1,607**	**1,410**	**903**

The Hamilton County Planning Team identified the following critical facilities (Table 14-7) 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.

[4] US Census Bureau 2022 data for Hamilton County.

Table 14-7. Critical Facilities Vulnerable to Thunderstorm Wind Event

CRITICAL FACILITY TYPE	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	• 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 Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	• Structures can be damaged by falling trees or flying debris. • Power outages could disrupt critical care. • 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.)	• 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)	• 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.

CRITICAL FACILITY TYPE	POTENTIAL IMPACTS
	• 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 Hamilton County planning area have resulted in one injury and no 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 one recorded injury, the impact is considered "Minor" with the possibility of injuries that do not result in permanent disability depending on the severity of the event. Overall, in the past 68 years there has been an estimated total of $2,274,800 damages (2023 dollars) in the Hamilton County planning area due to thunderstorm wind events. The estimated average annual loss from thunderstorm wind events is $33,500 (2023 dollars).

Table 14-8. Estimated Annualized Losses by Participating Jurisdiction

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Hamilton County	$1,357,100	$20,000
City of Hamilton	$808,600	11,900
City of Hico	$109,100	$1,600
PLANNING AREA	**$2,274,800**	**$33,500**

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.

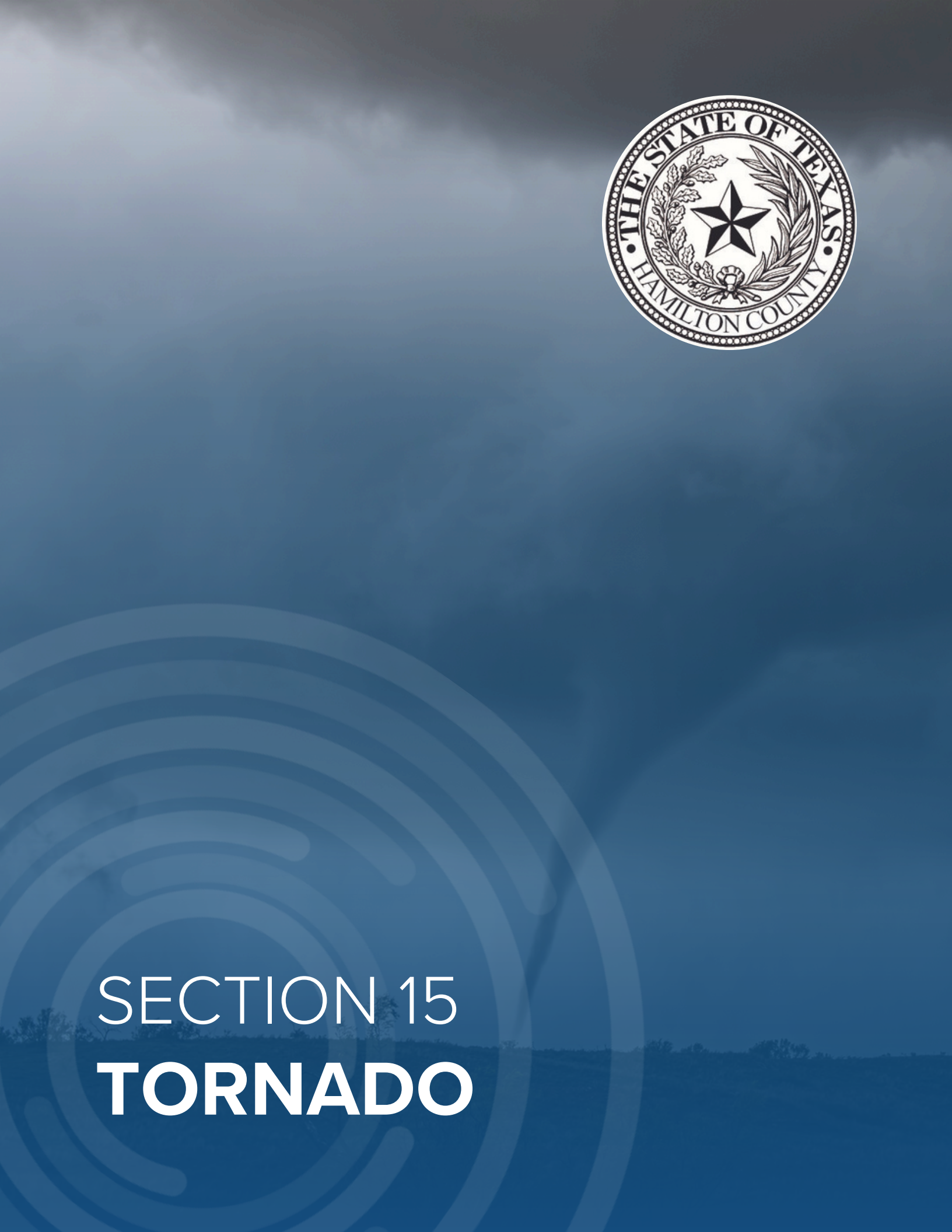
- Extended power outage often results in an increase in structure fires and carbon monoxide poisoning, as individuals attempt to cook or heat their homes with alternate, unsafe cooking or heating devices, such as grills.
- Critical staff may be unable to report for duty, limiting response capabilities.
- 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.
- 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 (69 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.
- 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. One historical site, the Hamilton County Courthouse, is listed on the National Register of Historic Places for Hamilton 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.[5]

[5] 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
TORNADO

SECTION 15: 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**.**

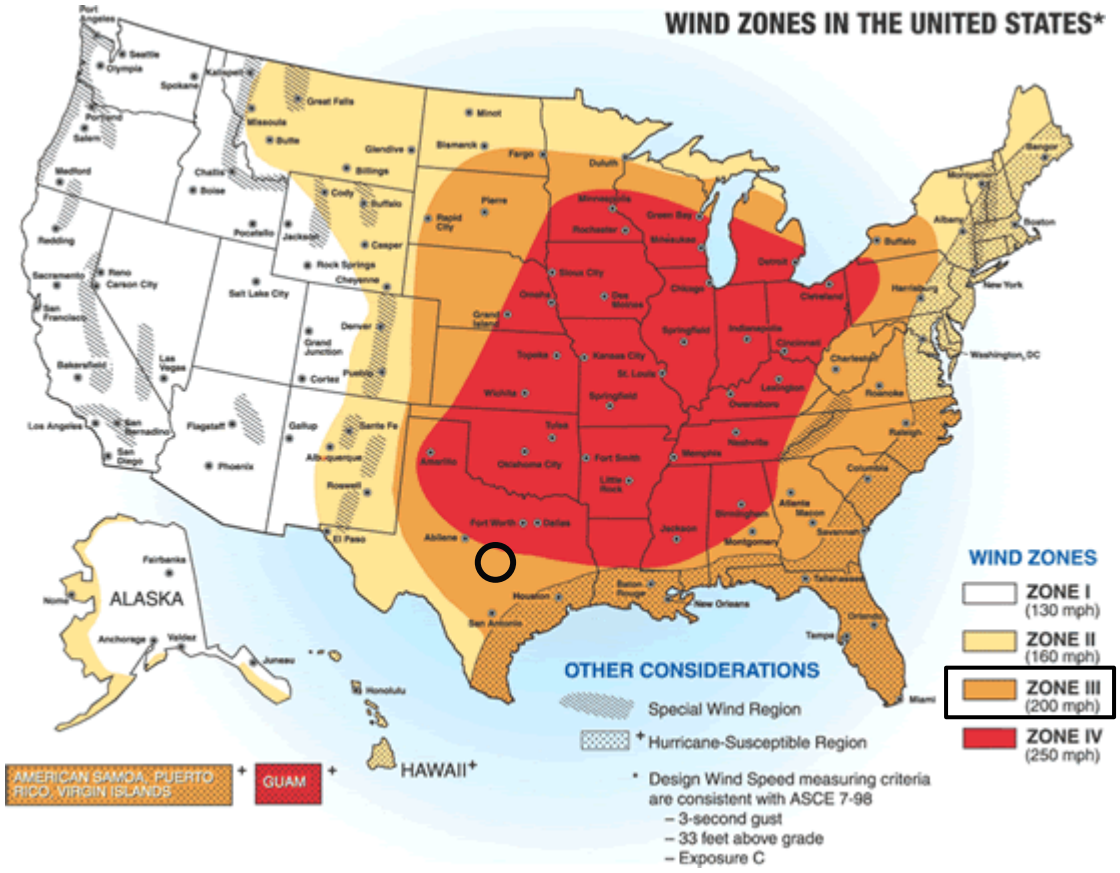
Table 15-1. Variations among Tornadoes

WEAK TORNADOES	STRONG TORNADOES	VIOLENT TORNADOES
• 69% of all tornadoes • Less than 5% of tornado deaths • Lifetime 1-10+ minutes • Winds less than 110 mph	• 29% of all tornadoes • Nearly 30% of all tornado deaths • May last 20 minutes or longer • Winds 110 – 205 mph	• 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 Hamilton County planning area, including participating jurisdictions, is uniformly exposed to tornado activity. The entire Hamilton County planning area is in Wind Zone III (Figure 15-1), where tornado winds can be as high as 200 mph.

Figure 15-1. FEMA Wind Zones in the United States[1]



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 15-2 includes both scales for reference when analyzing historical tornados since tornado events prior to 2007 will follow the original Fujita Scale.

[1] Hamilton County is indicated by the circle

Table 15-2. The Fujita and Enhanced Fujita Tornado Scale[2]

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] http://www.tornadoproject.com/fscale/fscale.htm

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 F2 (an EF2 or EF3 when converted to the on the Enhanced Fujita Scale, depending on exact wind speed), a strong to severe tornado. Based on the planning area's location in Wind Zone III, the planning area has the potential to experience anywhere from an EF0 to an EF5 depending on the wind speed. Previous tornado events in the Hamilton County planning area (converted from the Fujita Scale) have been between EF0 and EF3 (Figure 15-2).

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.

Figure 15-2 identifies the locations of previous occurrences in the Hamilton County planning area from 1954 through 2023. A total of 26 events have been recorded by NOAA's Storm Prediction Center and the NCEI Storm Events databases for the Hamilton County planning area. The strongest event reported in the planning area was an F2 tornado in 1979 which caused three injuries and $1,048,800 (2023 dollars) in damages.

Figure 15-2. Spatial Historical Tornado Events, 1954-2023[3]

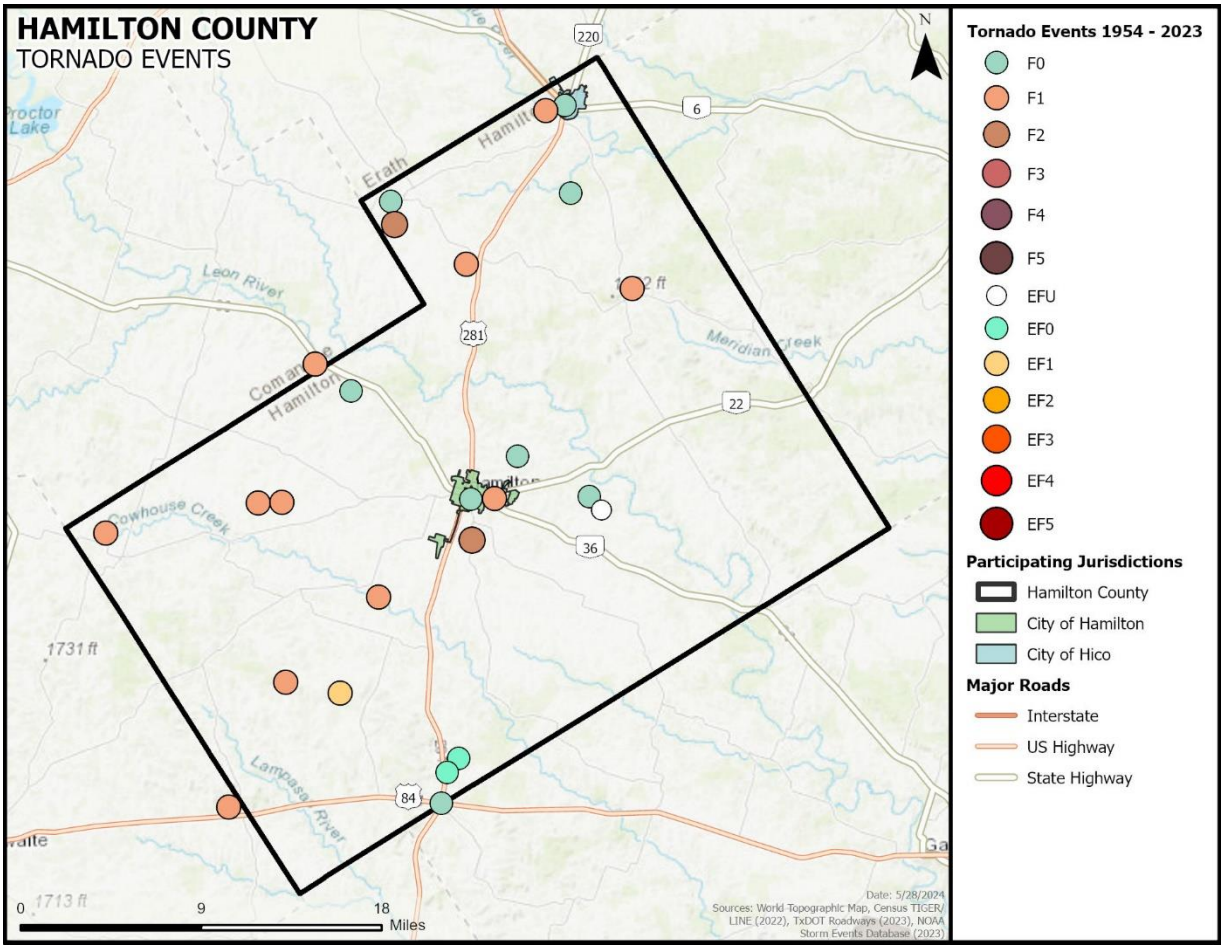


Table 15-4. Historical Tornado Events, 1954-2023[4]

JURISDICTION	DATE	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	4/30/1954	F1	0	0	$276,300	$0
Hamilton County	8/29/1955	F1	0	0	$2,800	$0
Hamilton County	4/24/1964	F1	0	3	$24,000	$0
Hamilton County	4/16/1971	F1	0	0	$18,500	$0
Hamilton County	4/11/1979	F2	0	3	$1,048,800	$0
Hamilton County	5/12/1982	F1	0	0	$77,300	$0
Hamilton County	5/27/1987	F0	0	4	$0	$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.

JURISDICTION	DATE	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	4/28/1991	F1	0	0	$547,700	$0
Hamilton County	4/28/1991	F2	0	0	$547,700	$0
Hamilton County	3/30/2002	F0	0	0	$8,300	$0
City of Hico	3/30/2002	F0	0	0	$124,200	$0
Hamilton County	5/15/2013	EF0	0	0	$0	$25,400
Hamilton County	5/15/2013	EF0	0	0	$0	$12,700
Hamilton County	5/10/2015	EF1	0	0	$124,500	$0
TOTALS		**(MAX EXTENT)**	**0**	**10**	**$2,800,100**	**$38,100**

Table 15-5. Summary of Historical Tornado Events, 1954-2023

JURISDICTION	NUMBER OF EVENTS	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	22	F2	0	10	$2,675,900	$38,100
City of Hamilton	2	F0	0	0	$0	$0
City of Hico	2	F0	0	0	$124,200	$0
TOTALS	**26**	**(MAX EXTENT)**	**0**	**10**	**$2,838,200**	

Based on the list of historical tornado events for the Hamilton County planning area, including all participating jurisdictions, there has been one recorded event since the 2018 Plan.

SIGNIFICANT EVENTS

April 11, 1979

The 1979 Red River Valley tornado outbreak was deadly and destructive. This is one of the most significant tornado outbreaks to ever impact north and central Texas and southern Oklahoma. The most notable tornado during this event is the F4 tornado that destroyed part of Wichita Falls, Texas. Overall, this outbreak produced nearly 30 tornadoes. The Hamilton County planning area experienced an F2 tornado, the strongest tornado ever recorded for the planning area. There are reports of damaged barns, homes, and roofs. This is the costliest tornado event for the planning area causing $1,048,800 (2023 dollars) in damages. One individual was injured when their truck rolled into the ditch they used to take cover. A total of three injuries were reported during this event in the planning area.[5]

[5] National Weather Service. The Red River Valley Tornado Outbreak. https://www.weather.gov/oun/events-19790410

May 15, 2013
A tornado and severe weather outbreak resulted in nineteen tornadoes, including one EF4 and one EF3, across the north and central region of Texas. This event caused many injuries and fatalities outside of the planning area and an estimated 170 homes were damaged throughout the event. The Hamilton County Emergency Manager observed two nearly simultaneous tornadoes south of the City of Hamilton. Both tornadoes were an EF0 and combined caused $38,100 (2023 dollars) in crop damages for the Hamilton County planning area.

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 frequency period can emerge in the fall during the brief transition between the warm and cold seasons. With 26 historical events over a 70-year reporting period, the Hamilton County planning area can anticipate a tornado touchdown approximately once every two to three years. This frequency supports an “Likely” probability of future events for the Hamilton County planning area.

VULNERABILITY AND IMPACT

Because tornadoes often cross jurisdictional boundaries, all existing and future buildings, facilities, and populations in the entire Hamilton County planning area, including participating jurisdictions, 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 Hamilton 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 304 (7 percent of total housing stock) manufactured homes located in the Hamilton County planning area. In addition, 69 percent (approximately 3,003 structures) of the housing structures in the Hamilton County 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 15-6).

Table 15-6. Structures at Greater Risk by Participating Jurisdiction

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980	MANUFACTURED HOMES
Hamilton County	3,003	304
City of Hamilton	1,024	84
City of Hico	625	38

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 Hamilton County planning area is estimated at 26 percent of the total population and children under the age of 5 are estimated at 5 percent. The population with a disability is estimated at 19 percent of the total population. An estimated 17 percent of the planning area population live below the poverty level and 11 percent of the populations speaks a language other than English (Table 15-7).

Table 15-7. Populations at Greater Risk by Participating Jurisdiction[6]

JURISDICTION	ELDERLY (over 65)	YOUTH (under 5)	WITH A DISABILITY	BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Hamilton	631	105	632	438	433
City of Hico	375	201	422	137	74
Unincorporated Hamilton County	1,117	113	553	835	396
Hamilton County	**2,123**	**419**	**1,607**	**1,410**	**903**

The Hamilton 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 15-8). 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.

[6] U.S. Census Bureau 2022 data for Hamilton County

Table 15-8. Critical Facilities Vulnerable to Tornado Event

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	• 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 Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	• 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 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.)	• 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)	• 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.

CRITICAL FACILITIES	POTENTIAL IMPACTS
	• 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 $2,838,200 (2023 dollars), having an approximate average annual loss estimate of $40,600. Based on historical damages, the impact of a tornado event on the Hamilton County planning area would be considered Limited, with less than 10 percent of property destroyed or with major damage and critical facilities shut down for less than 24-hours. However, the ten reported injuries indicate a “Major” potential severity with multiple injuries or illness resulting in permanent disability possible depending on the size of the event.

Table 15-9. Estimated Average Annual Losses by Jurisdiction

JURISDICTION	TOTAL PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Hamilton County	$2,714,000	$38,800
City of Hamilton	$0	$0
City of Hico	$124,200	$1,800
Planning Area	**$2,838,200**	**$40,600**

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 (7 percent of total housing stock) may suffer substantial damage as they would be more vulnerable than typical site-built structures.
- 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 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 Hamilton County planning area has one historical property.

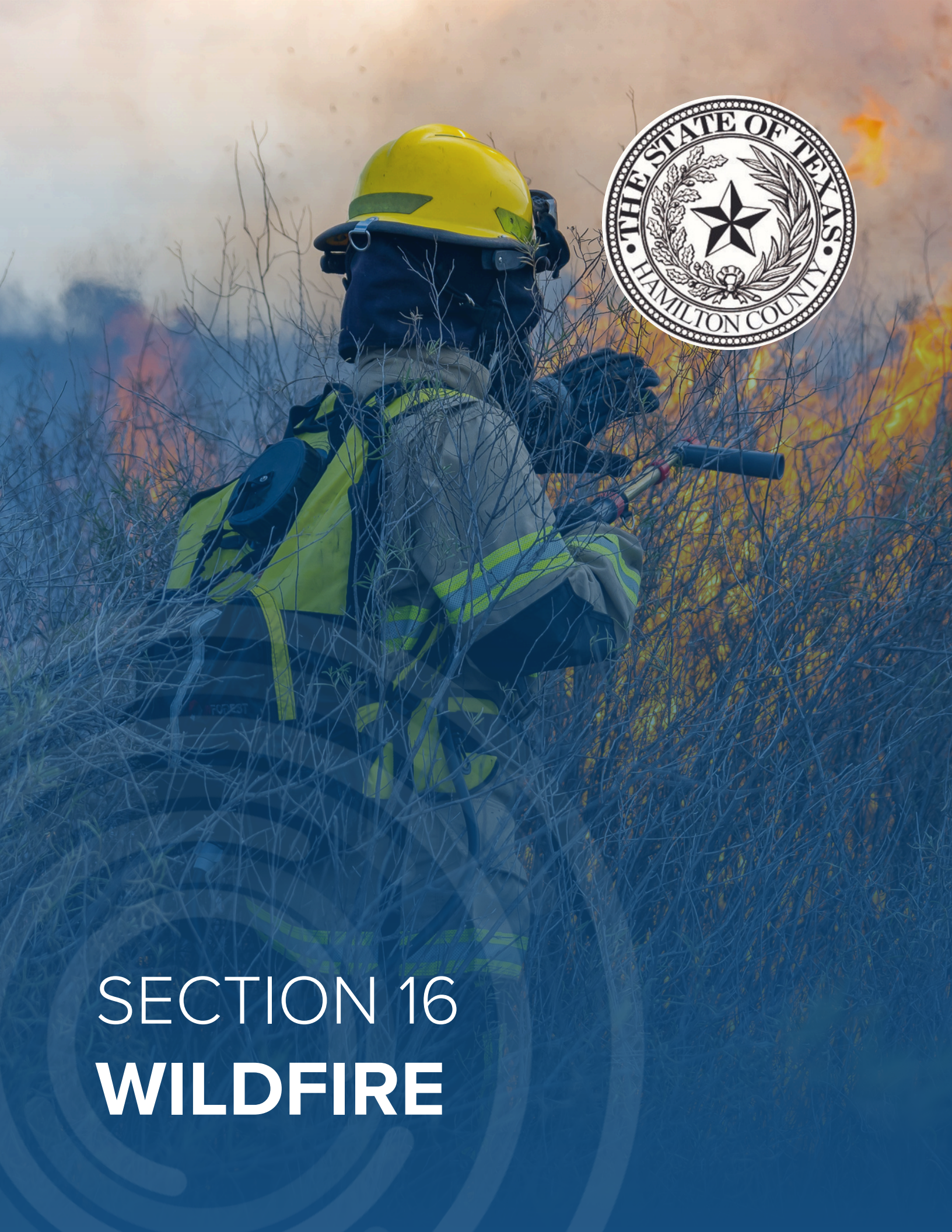
The economic and financial impacts of a tornado event on the community will depend on the scale of the event, what is damaged, costs of repair or replacement, lost business days in impacted areas, and how quickly repairs to critical components of the economy can be implemented. The level of preparedness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



SECTION 16
WILDFIRE

SECTION 16: WILDFIRE

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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 Hamilton County planning area has an estimated 85 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]

While the Hamilton County population is not expected to increase significantly overtime, according to 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, Hamilton 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/

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 Hamilton 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 16-1 through 16-3). It is estimated that 85 percent of the total population in the Hamilton 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/

Figure 16-1. Wildland Urban Interface Map – Hamilton County

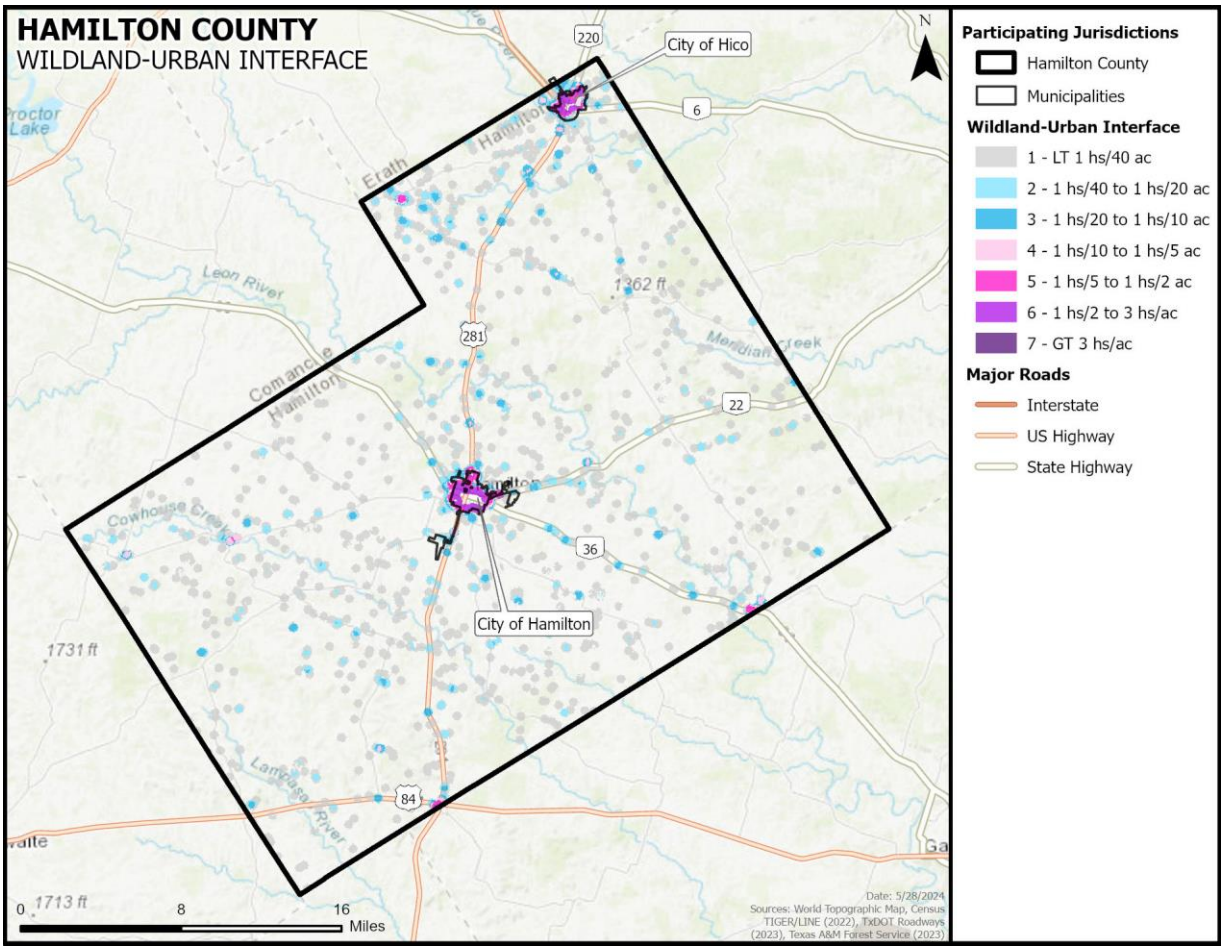
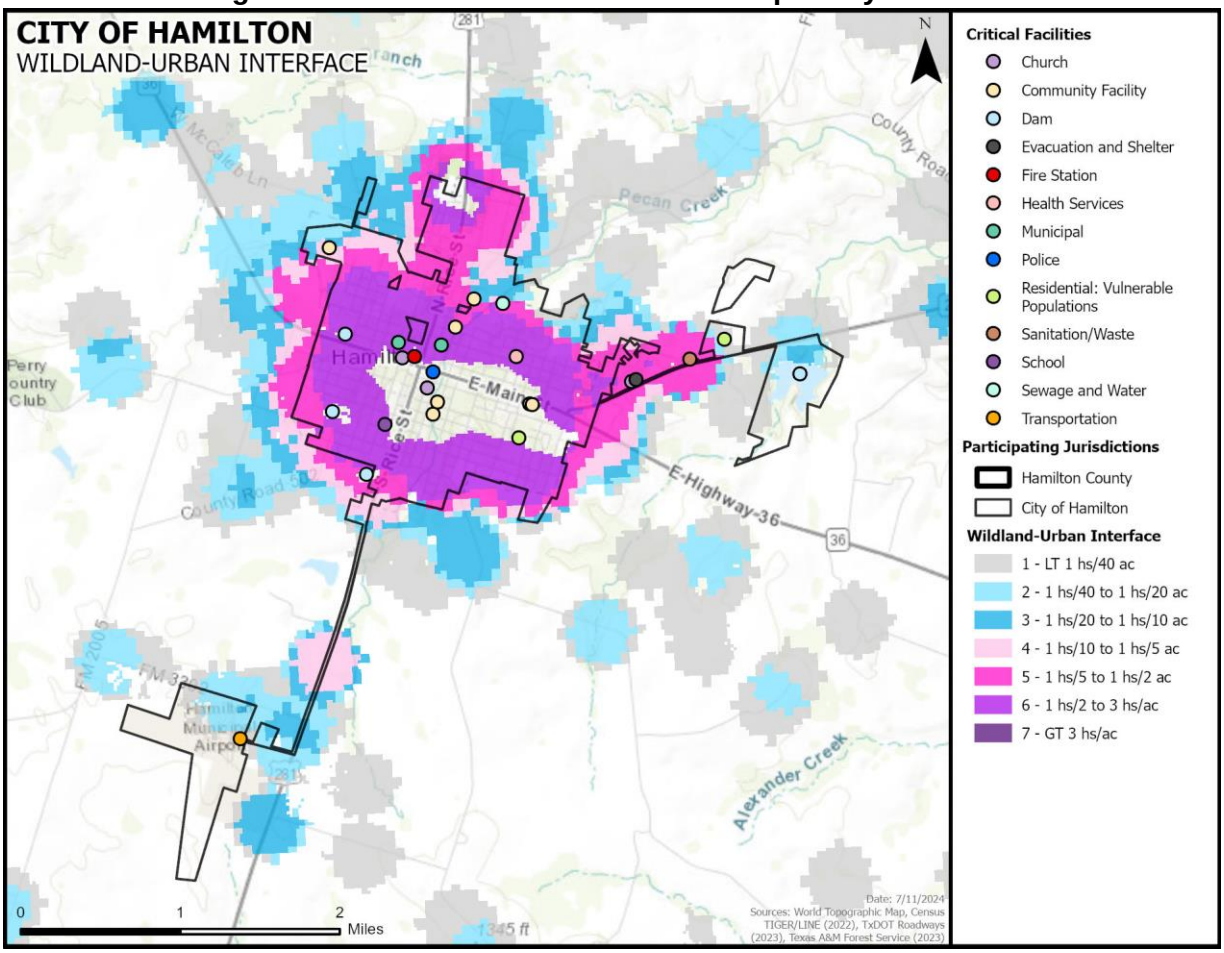
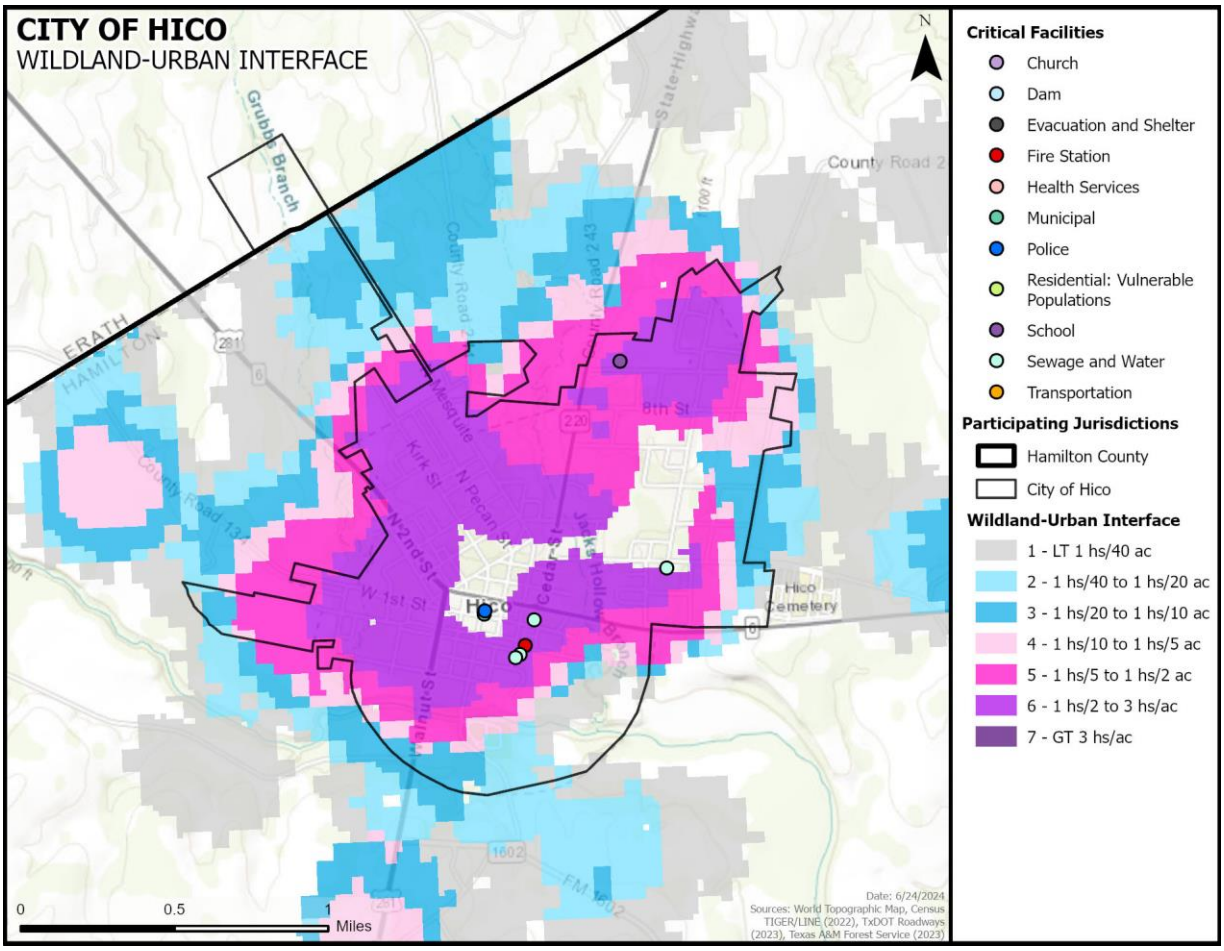


Figure 16-2. Wildland Urban Interface Map – City of Hamilton



It is estimated that 67 percent of the total population in the City of Hamilton live within the WUI. However, the entire City is at some risk for wildfires.

Figure 16-3. Wildland Urban Interface Map – City of Hico



It is estimated that 88 percent of the total population in the City of Hico live within the WUI. However, the entire City is at some risk for wildfires.

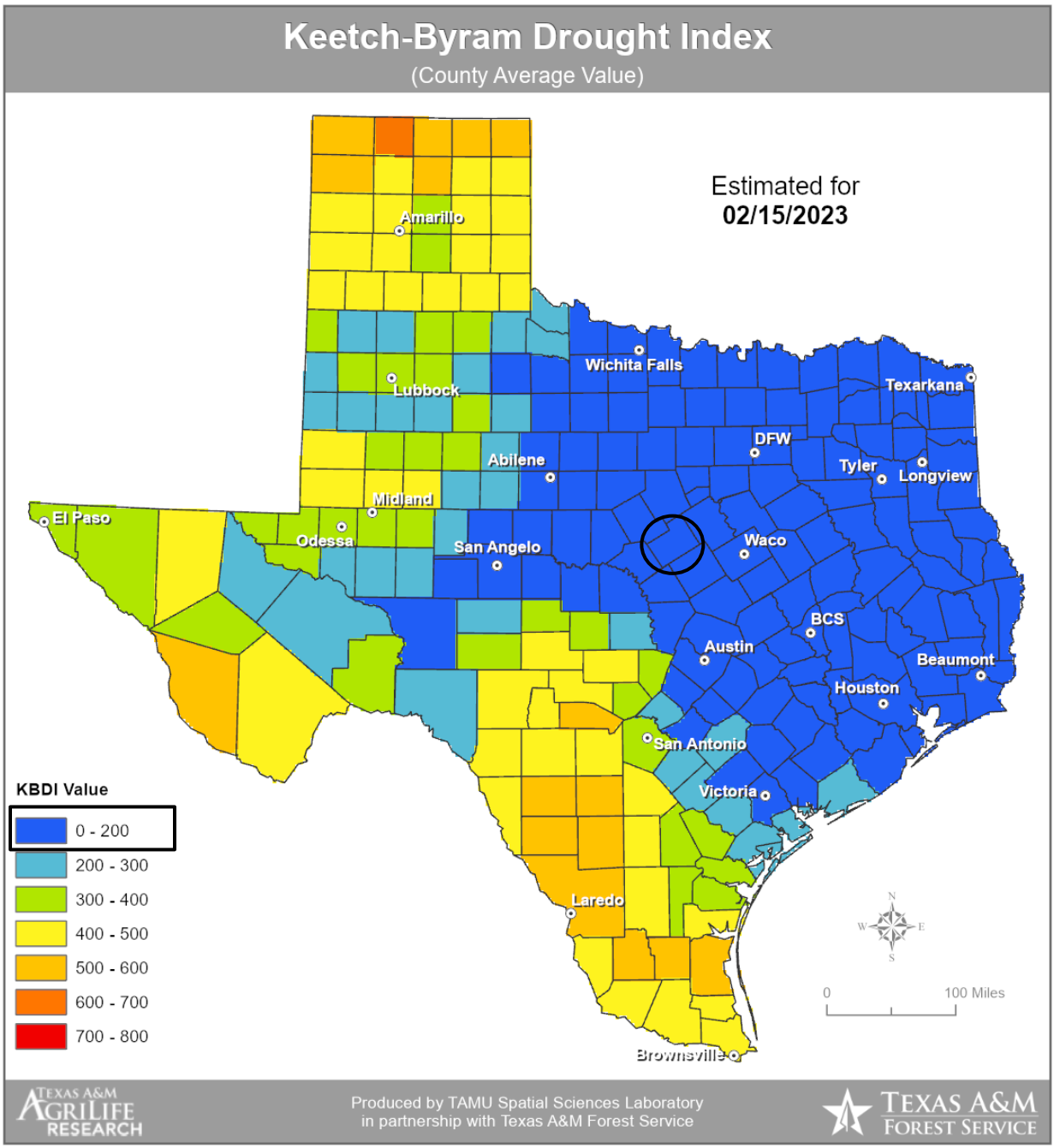
EXTENT



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.

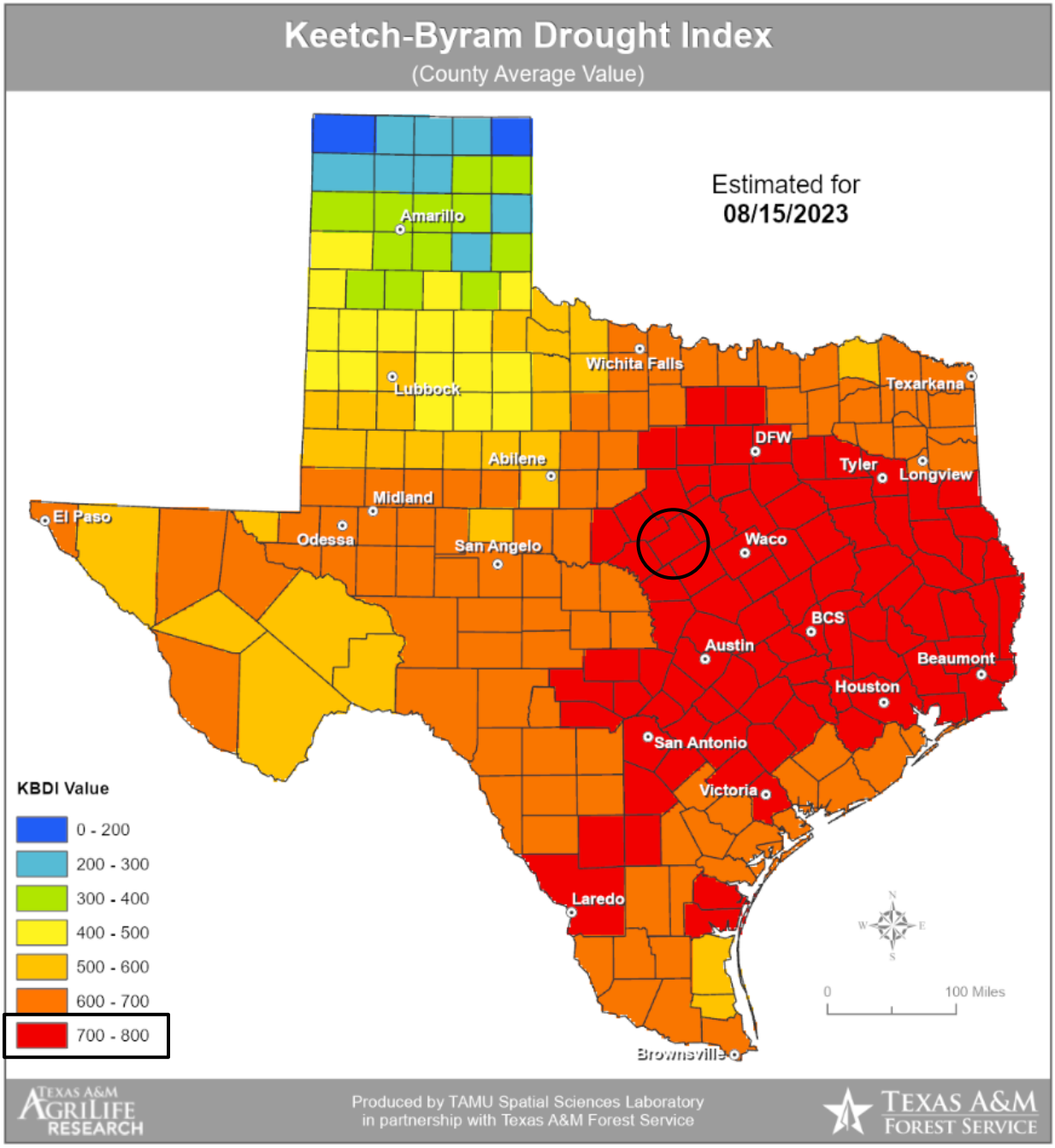
Each color in Figure 16-4 and 16-5 represents the drought index at that location, by date. The drought index ranges from 0 to 800. A drought index of 0 represents no moisture depletion, and a drought index of 800 represents absolutely dry conditions.

Figure 16-4. Keetch-Byram Drought Index (KBDI) for the State of Texas, 2/15/2023[5]



[5] Hamilton County planning area is located within the black circle.

Figure 16-5. 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.

- **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 Hamilton County planning area, in a wildfire event, is within 700 to 800. The average extent to be mitigated for the planning area is a KBDI of 400. 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 Hamilton County planning area has a potential for a full range of wildfire intensities. Figure 16-6 through 16-8 identifies the wildfire intensity for the planning area.

Figure 16-6. Fire Intensity Scale Map – Hamilton County

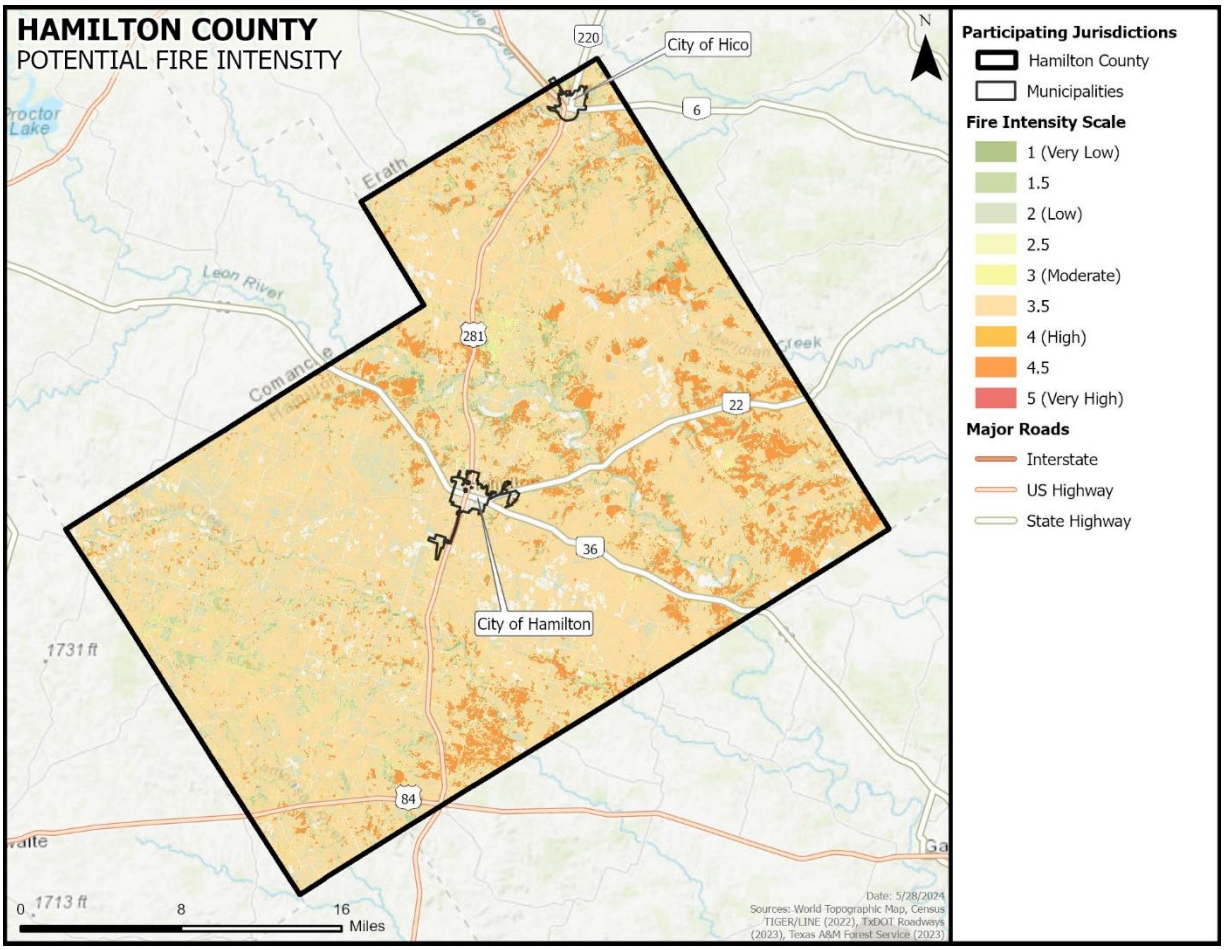


Figure 16-7. Fire Intensity Scale Map – City of Hamilton

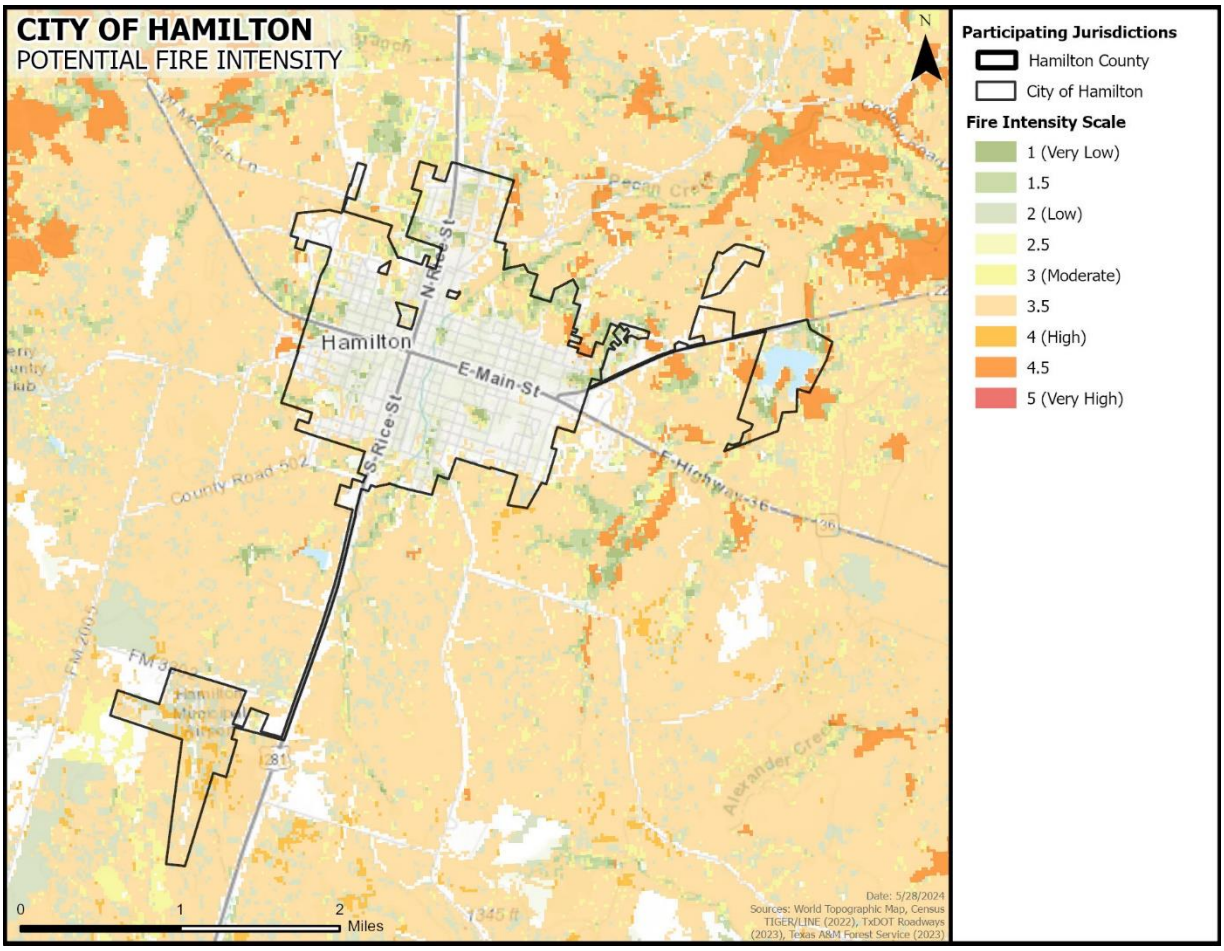
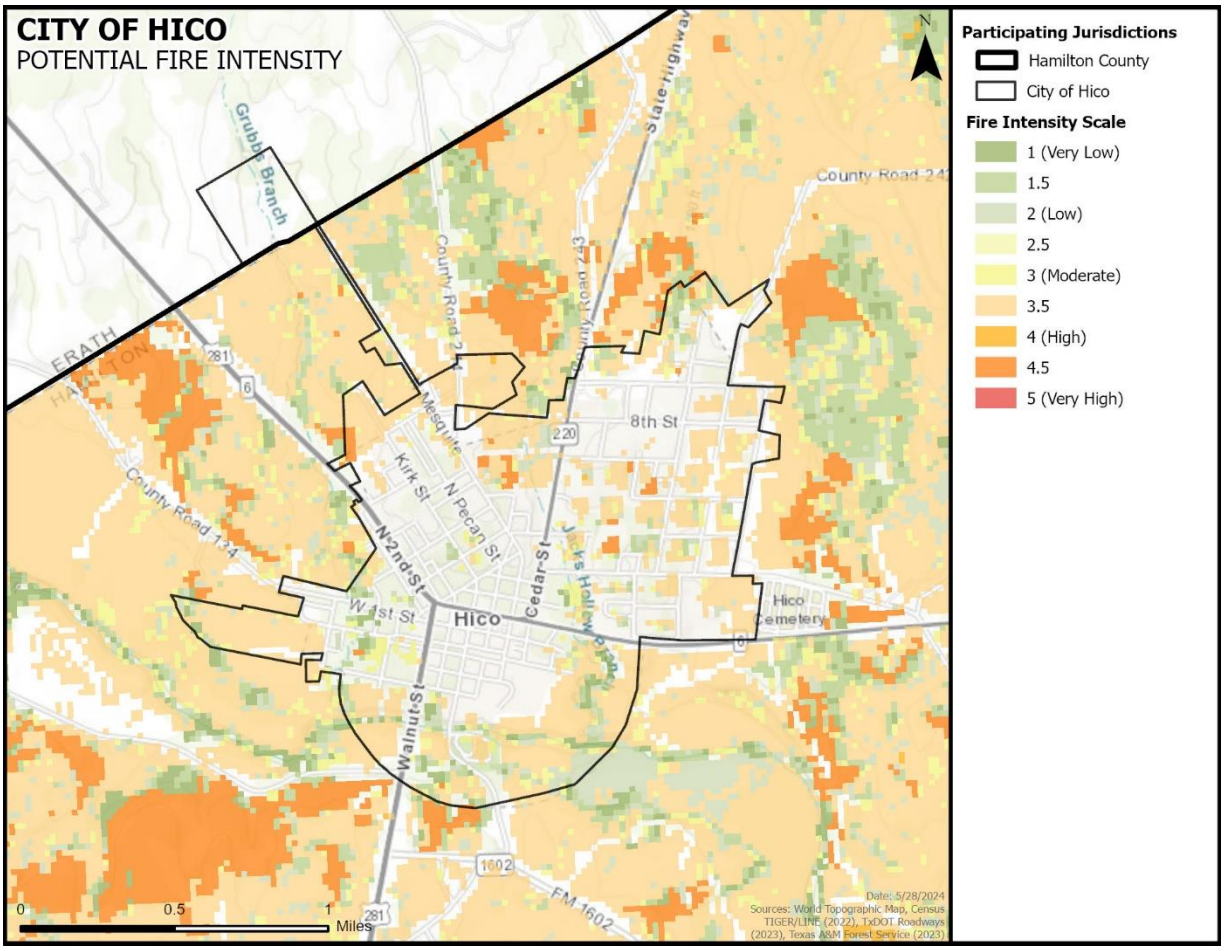


Figure 16-8. Fire Intensity Scale Map – City of Hico



HISTORICAL OCCURRENCES

The Texas A&M Forest Service (TFS) reported 958 wildfire events for the Hamilton County planning area between 2005 and 2021. The NCEI Storm Events Database includes two records of wildfire events from 1996 through 2023. These events were accounted for in the TFS reporting. The Texas A&M Forest Service 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 16-9). Tables 16-1 through 16-3 identify the number of wildfires and total acreage burned each year within the county boundaries.

Figure 16-9. Location and Historic Wildfire Events in Hamilton County

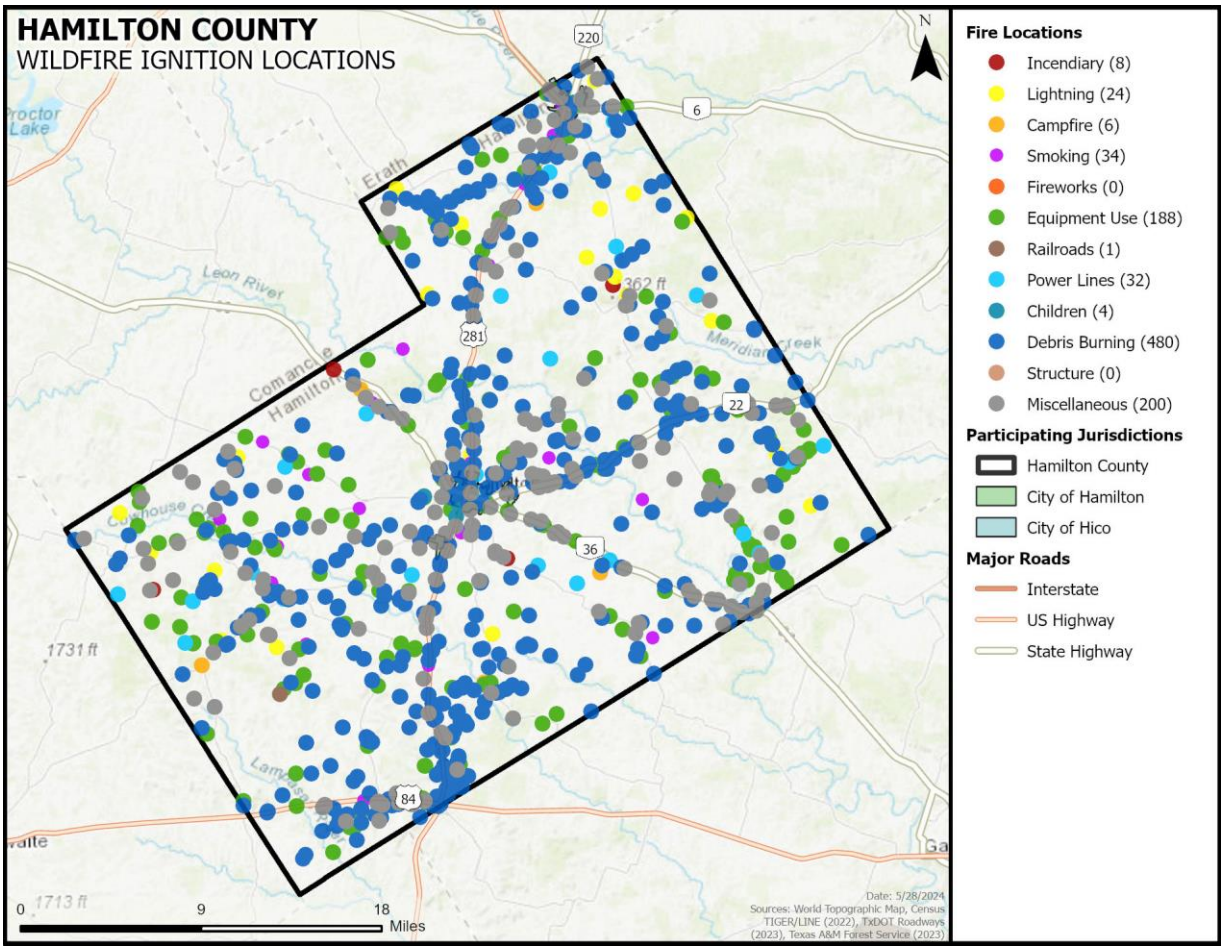


Table 16-1. Historical Wildfire Events Summary, 2005 - 2021[6]

JURISDICTION	NUMBER OF EVENTS	ACRES BURNED
Hamilton County	932	22,572
City of Hamilton	12	690
City of Hico	14	37

Table 16-2. Historical Wildfire Events by Year

YEAR	HAMILTON COUNTY	CITY OF HAMILTON	CITY OF HICO
2005	25	1	0
2006	155	2	0

[6] Source: Texas A&M Forest Service

YEAR	HAMILTON COUNTY	CITY OF HAMILTON	CITY OF HICO
2007	33	0	0
2008	164	4	2
2009	59	0	1
2010	67	0	3
2011	73	0	8
2012	32	2	0
2013	11	0	0
2014	23	0	0
2015	24	0	0
2016	28	0	0
2017	17	0	0
2018	66	1	0
2019	38	0	0
2020	60	0	0
2021	57	2	0
Total	**932**	**12**	**14**

Based on the list of historical wildfire events for the Hamilton County planning area (listed above), 157 events have occurred since the 2018 plan.

Table 16-3. Acreage of Suppressed Wildfire by Year

YEAR	HAMILTON COUNTY	CITY OF HAMILTON	CITY OF HICO
2005	2,972	280	0
2006	3,039	1	0
2007	404	0	0
2008	3,857	102	2
2009	4,114	0	3
2010	690	0	3
2011	1,514	0	29

YEAR	HAMILTON COUNTY	CITY OF HAMILTON	CITY OF HICO
2012	837	150	0
2013	73	0	0
2014	161	0	0
2015	340	0	0
2016	281	0	0
2017	462	0	0
2018	2,355	155	0
2019	597	0	0
2020	588	0	0
2021	288	2	0
Total	**22,572**	**690**	**37**

SIGNIFICANT EVENTS

There have been 4 declared disasters related to wildfire in Hamilton County between 1999 and 2023 (Table 16-4). Additional details on certain wildfire events are described below.

Table 16-4. Disaster Declarations for Wildfire, 1999-2023

YEAR	DECLARATION TITLE	DECLARATION TYPE	DISASTER NO.
1999	Texas Extreme Fire Hazards	EM	EM-3142-TX
2005	Extreme Wildfire Threat in Texas	DR	DR-1624-TX
2008	Wildfires in Texas	EM	EM-3284-TX
2009	Texas 617 Fire	FM	FM-2815-TX

January 29, 2008

A low-pressure cold front moved across the state, causing strong winds. A large wildfire began and was made worse when 40 mph winds spread the fire. This event burned more than 1,000 acres north of the City of Hico. No structures were known to have been lost.

August 13, 2012

Dry conditions and above normal temperatures across the region left the planning area susceptible to grass fires during the early part of September in 2012. The Texas Division of Emergency Management (TDEM) reported a 25-acre grass fire along FM 219 near the City of Hico. This wildfire destroyed five outbuildings and damaged a house.

PROBABILITY OF FUTURE EVENTS

Wildfires can occur at any time of the year. As Hamilton County communities move into wildland, the potential area of occurrence of wildfire increases. With 958 events in a 17-year period, an event within the Hamilton 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.

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 16-10 through 16-12[7] illustrates the areas that are the most vulnerable to wildfire throughout the Hamilton County planning area.

The Hamilton County Planning Team identified the following critical facilities (Table 16-5) 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 16-5. 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	Hamilton County: 7 Fire Stations, 1 Police Station, 1 Health Service Facility City of Hamilton: 1 Fire Station, 1 Health Services Facility City of Hico: 1 Fire Station	• 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. • 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.

[7] Source: TxWRAP portal at the following site: https://texaswildfirerisk.com/

CRITICAL FACILITIES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
		• First responders can experience heart disease, respiratory problems, and other long-term related illnesses from prolonged exposure to smoke, chemicals, and heat. • 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. • 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.
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	Hamilton County: 2 Municipal Facilities, 1 Transportation City of Hamilton: 2 Churches, 3 Community Facilities, 1 Evacuation Shelter, 2 Municipal, 1 Residential Facility (Vulnerable Populations), 1 School, 1 Transportation City of Hico: 1 School	• 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.
Utility Services and Infrastructure (electric, water, wastewater, communications)	City of Hamilton: 4 Dams, 1 Sanitation/Waste, 2 Sewage and Water City of Hico: 3 Sewage and Water	• 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.

CRITICAL FACILITIES	CRITICAL FACILITIES AT RISK	POTENTIAL IMPACTS
		• Any service disruptions can negatively impact or delay emergency management operations. • Power losses

Within the Hamilton County planning area, a total of 958 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 16-6 below. The average frequency is approximately 56 events every year.

Table 16-6. Average Annualized Acreage Losses[8]

JURISDICTION	TOTAL ACRES BURNED	AVERAGE ANNUAL ACRE LOSSES
Hamilton County	22,572	1,328
City of Hamilton	690	41
City of Hico	37	2
TOTAL	**23,299**	**1,371**

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.[9]

Figures 16-10 through 16-12 show the threat of wildfire to the Hamilton County planning area.

[8] Events divided by 17 years of data.
[9] Source: TxWRAP portal at the following site: https://texaswildfirerisk.com/

Figure 16-10. Wildfire Ignition Density – Hamilton County

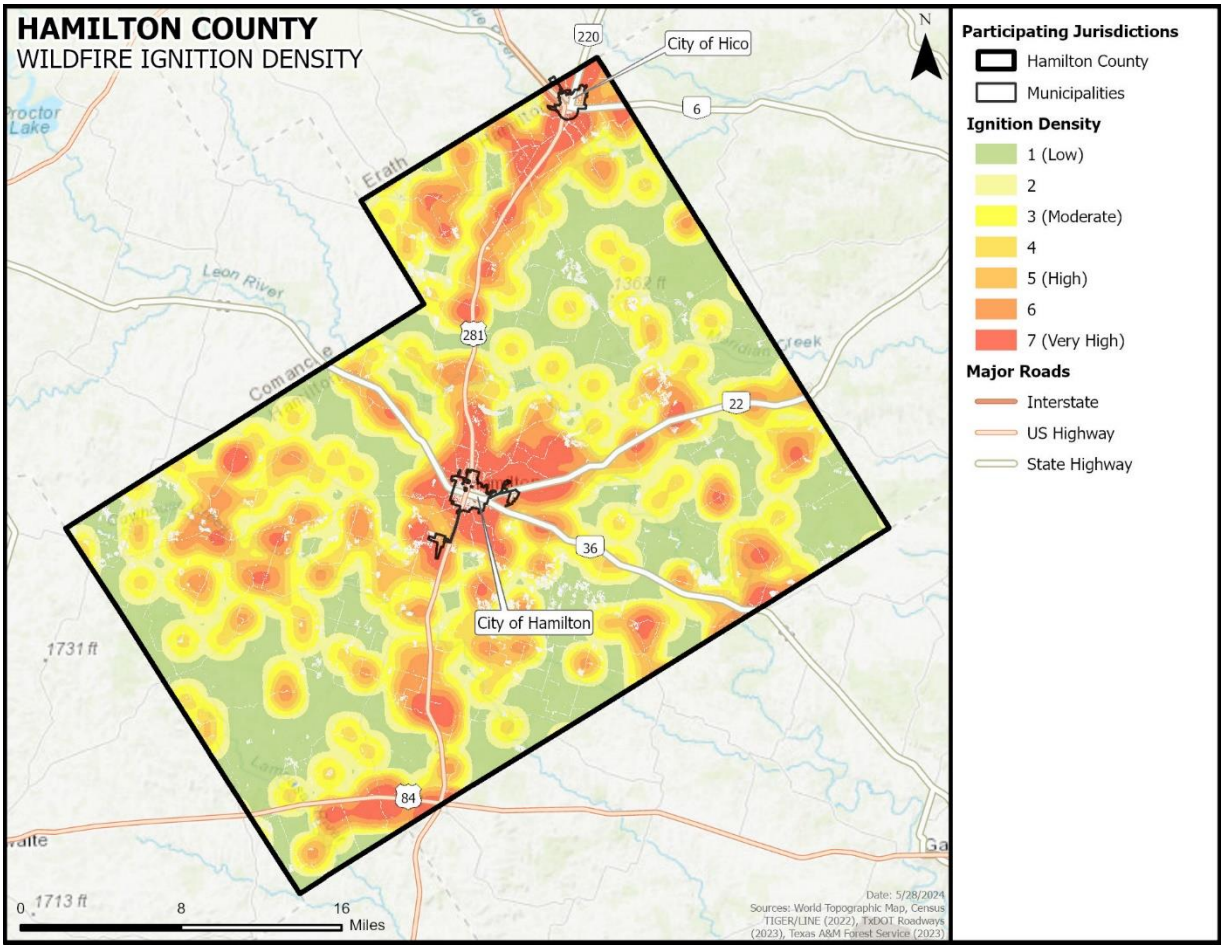


Figure 16-11. Wildfire Ignition Density – City of Hamilton

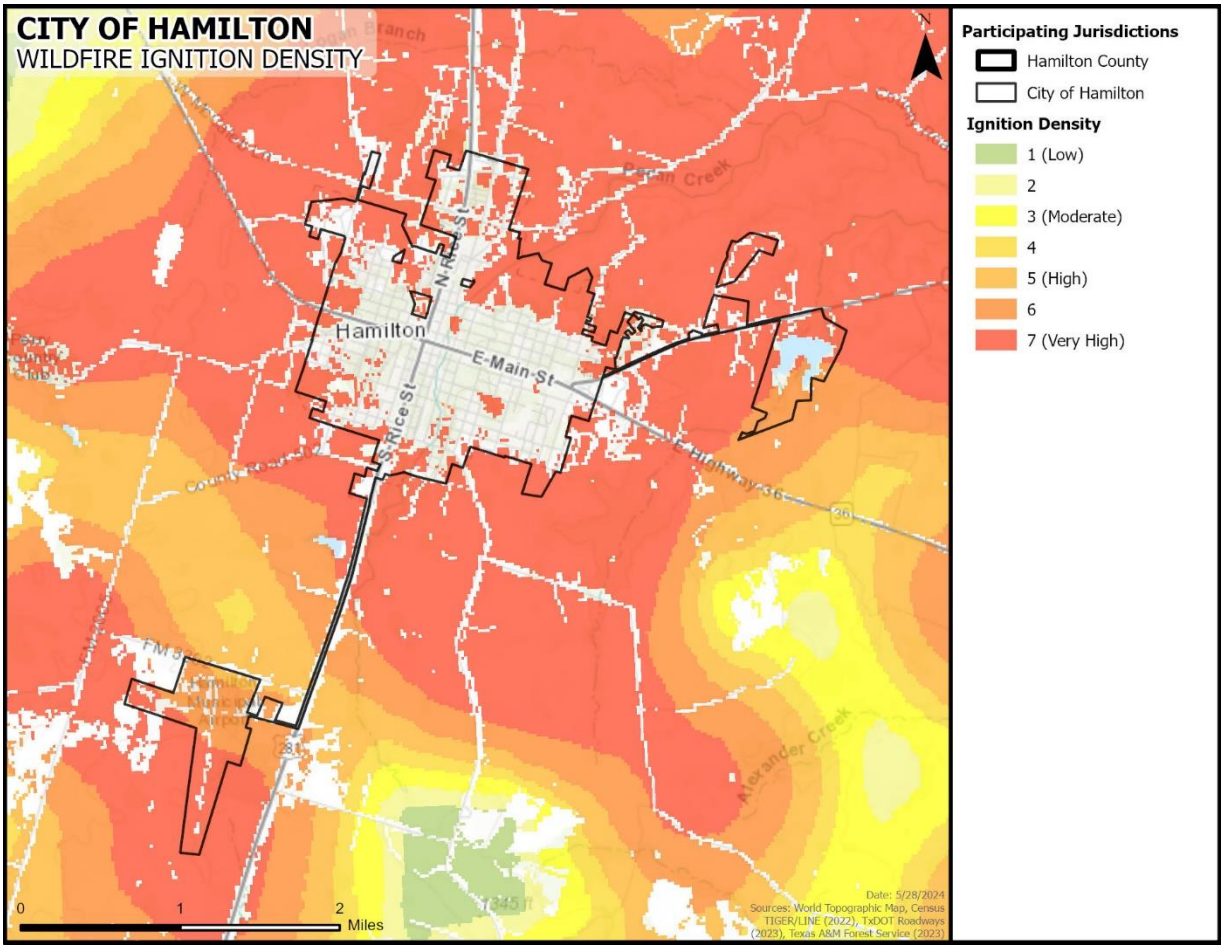
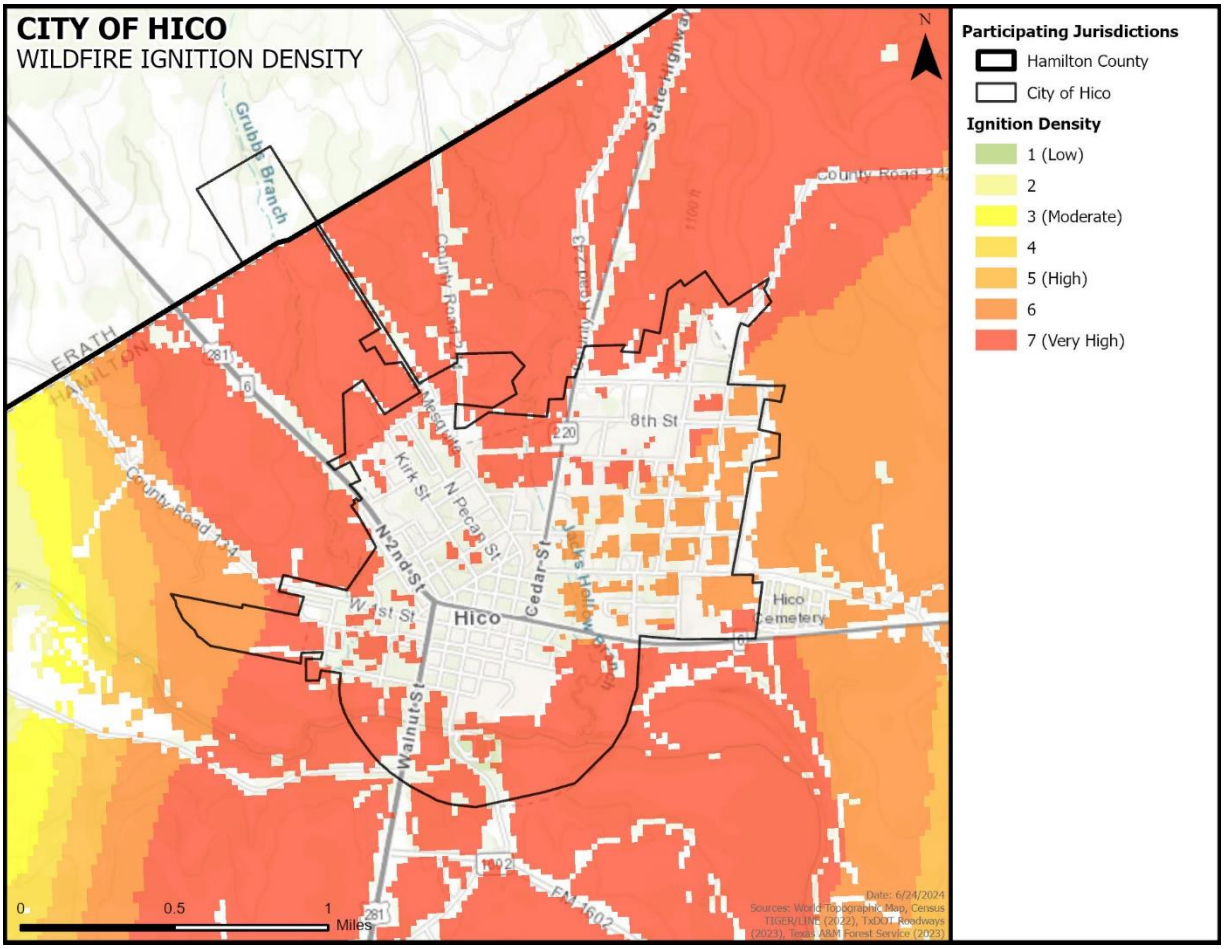


Figure 16-12. Wildfire Ignition Density – City of Hico



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 Hamilton County planning area, the impact from a wildfire event can be considered “Minor," meaning injuries and/or illnesses do not result in permanent disability, complete shutdown of facilities and services for more than one week and more than 10 percent of property

is destroyed or with major damage. Severity of impact is gauged by acreage burned, homes and structures lost, injuries and fatalities.

Table 16-7. Impact for Hamilton County

JURISDICTION	IMPACT	DESCRIPTION
Hamilton County	Minor	Hamilton County has an estimated 6,827 people or 85% 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 do not 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 Hamilton	Minor	Within the City of Hamilton, it is estimated 2,020 people or 67% 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 do not 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 Hico	Minor	Within the City of Hico, it is estimated 1,208 people or 88% 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 do not 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.

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 Hamilton 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.
- 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. 69 percent (approximately 3,003 structures) of homes in the planning area were built before 1980. Similarly, historic buildings may lack fire mitigation materials or measures due to their historic status. There is one historical site listed on the National Register of Historic Places for Hamilton 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 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.[10]

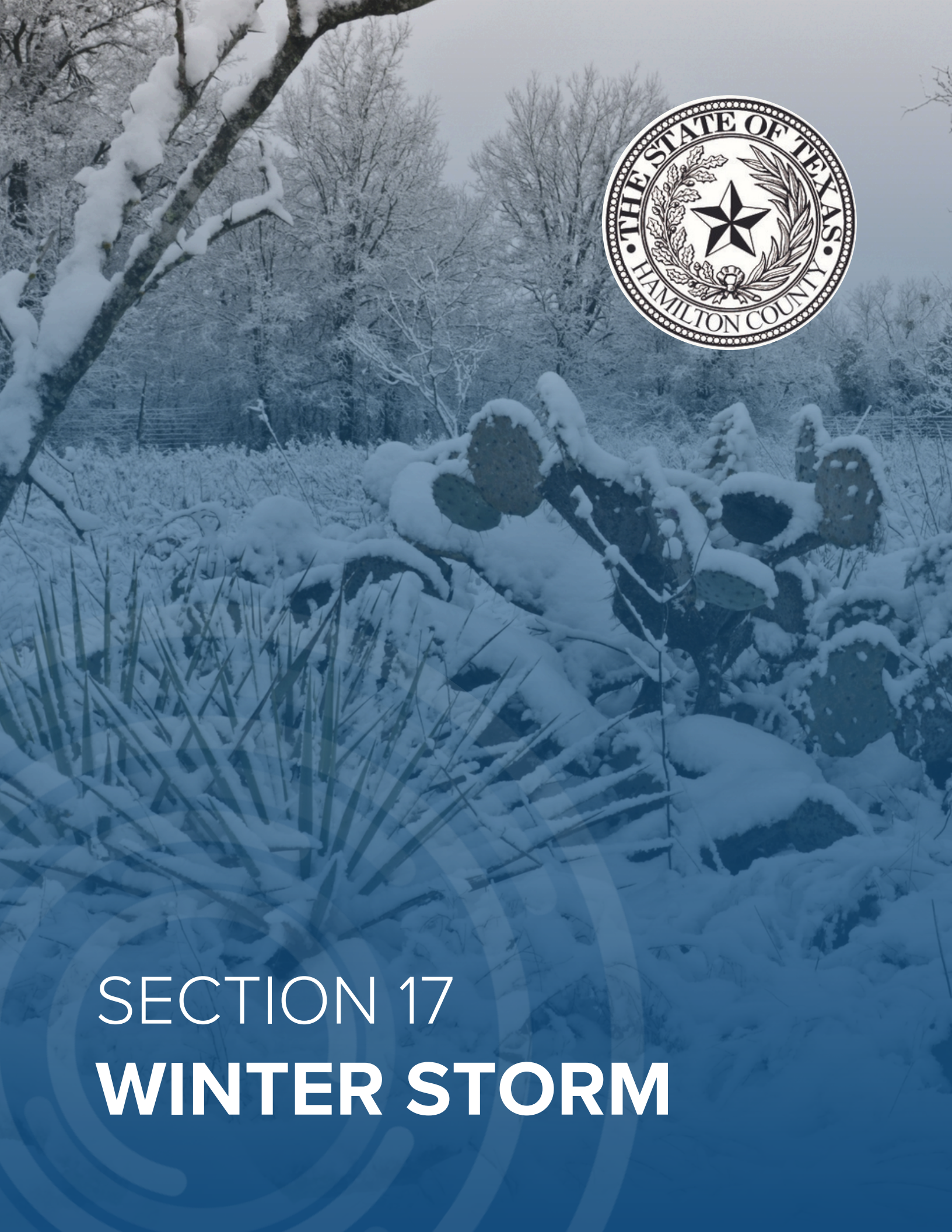
Vapor pressure deficit, an indicator of the ability of moisture to evaporate, is projected to increase as temperatures rise and carbon dioxide fertilization reduces transpiration, leading to both lower humidity and increased surface dryness. Overall, increased dryness should extend the wildfire season in places where the fire season is presently constrained by low levels of aridity, such as eastern Texas.[11]

Additionally, it is projected that future changes to Hamilton 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 100°F in Hamilton County, but between 2035 and 2064 the average will be 106°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 9 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.

[10] NOAA Wildfire Climate Connection, August 2022: wildfire-climate-connection.

[11] 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 17
WINTER STORM

SECTION 17: WINTER STORM

Hazard Description 1
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Historical Occurrences 5
Significant Events 6
Probability of Future Events 7
Vulnerability and Impact 7
Assessment of Impacts 10
Climate Change Considerations 11

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 Hamilton 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 17-1, the Hamilton County planning area is located in USDA Hardiness Zone 8b, with annual 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 17-1 describes the types of winter weather possible to occur in the Hamilton County planning area.

Figure 17-1. Annual Minimum Temperature[1]

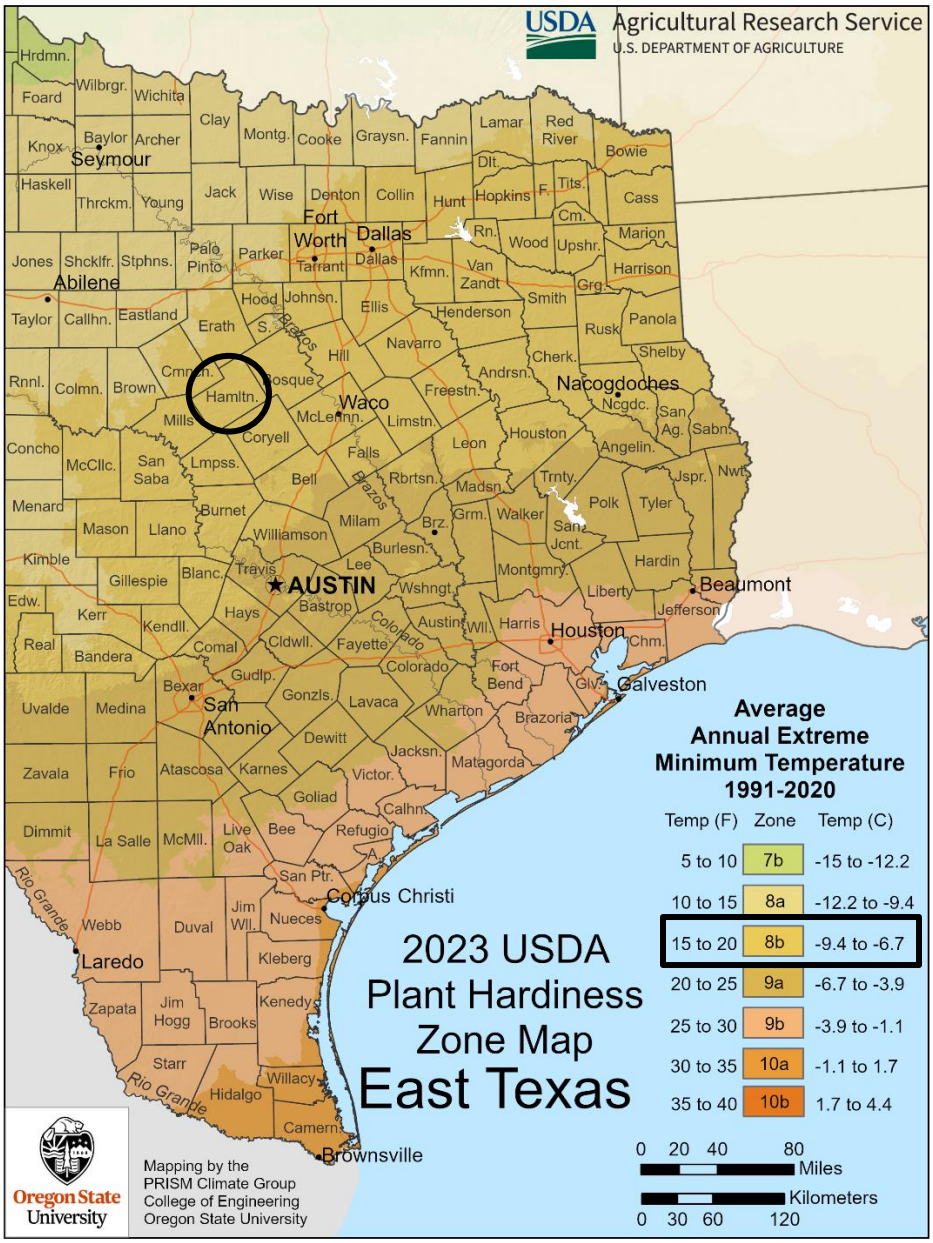


Table 17-1. Types of Winter Weather

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.

[1] USDA

TYPE OF WINTER WEATHER	DESCRIPTION
Sleet	Small particles of ice usually mixed with rain. If enough sleet accumulates on the ground, it makes travel hazardous.
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 Hamilton County planning area are vulnerable to a winter storm hazard and could potentially be impacted.

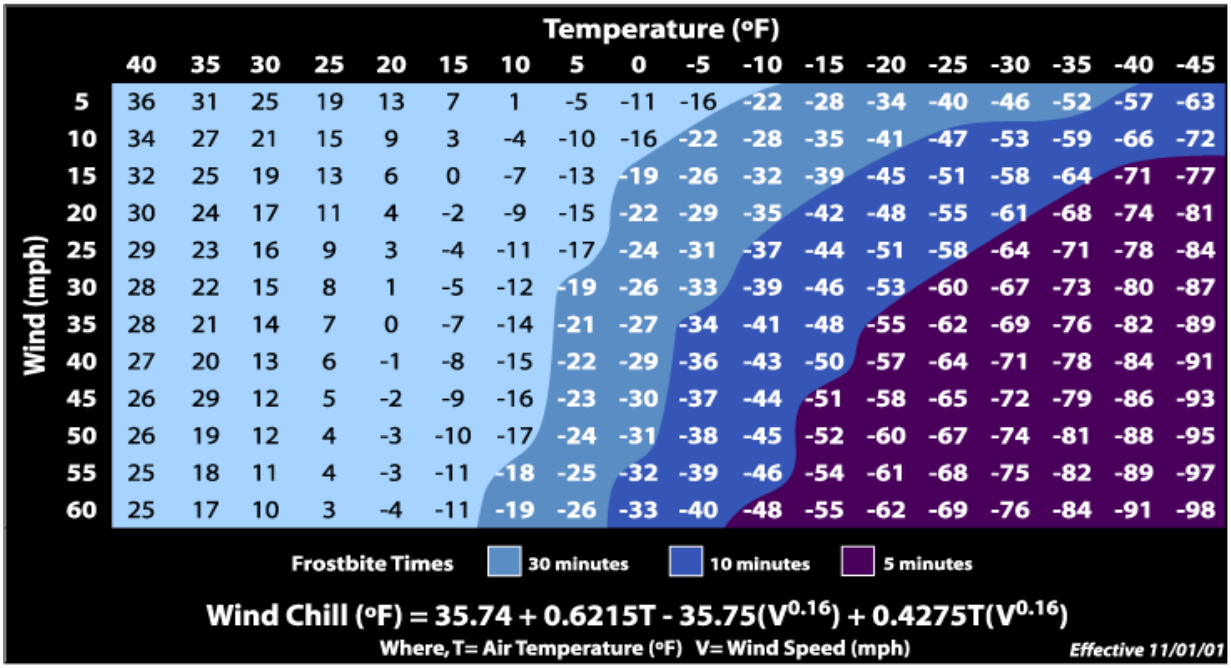
EXTENT

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 17-2. Table 17-2 should be read in conjunction with the wind-chill factor described in Figure 17-2 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 17-2. 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

Figure 17-2. Wind Chill Chart



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

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 Hamilton County planning area has 22 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 moderate according to the definitions at Table 16-2. The Hamilton County planning area can expect anywhere between 0.1 to 4.0 inches of ice and snow during a winter storm event, and temperatures between 15°F and 20°F with winds ranging from 0 to over 35 mph.

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. Hamilton County could be under any of these warning types in advance of a winter storm event. Table 17-3 describes when each warning type would be issued.

Table 17-3. 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.

TYPE OF WINTER WEATHER	DESCRIPTION
Winter Storm Watch	Severe winter weather conditions may affect your area (freezing rain, sleet, or heavy snow may occur separately or in combination).
Winter Storm Warning	Severe winter weather conditions are imminent.
Freezing Rain or Freezing Drizzle	Rain or drizzle is likely to freeze upon impact, resulting in a coating of ice glaze on roads and all other exposed objects.
Sleet	Small particles of ice usually mixed with rain. If enough sleet accumulates on the ground, it makes travel hazardous.
Blizzard	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.

HISTORICAL OCCURRENCES

According to historical records and the best available data there have been 22 recorded winter storm events in Hamilton County planning area. 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 17-4 shows historical incident information for the planning area.

Table 17-4. Historical Winter Storm Events, 1996-2023[2]

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	11/24/1996	0	0	$0	$0
Hamilton County	1/6/1997	0	0	$0	$0
Hamilton County	1/12/1997	0	0	$0	$0
Hamilton County	12/22/1998	0	0	$0	$0
Hamilton County	1/25/2000	0	0	$0	$0
Hamilton County	12/12/2000	0	0	$0	$0
Hamilton County	12/25/2000	0	0	$0	$0
Hamilton County	12/31/2000	0	0	$0	$0

[2] Values are in 2023 dollars.

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hamilton County	1/1/2001	0	0	$0	$0
Hamilton County	1/18/2001	0	0	$0	$0
Hamilton County	11/28/2001	0	0	$0	$0
Hamilton County	2/24/2003	0	0	$0	$0
Hamilton County	12/22/2004	0	0	$0	$0
Hamilton County	1/17/2007	0	0	$0	$0
Hamilton County	4/7/2007	0	0	$0	$0
Hamilton County	12/24/2009	0	0	$13,700	$0
Hamilton County	2/11/2010	0	0	$4,100	$0
Hamilton County	2/1/2011	0	0	$133,800	$0
Hamilton County	12/5/2013	0	0	$635,400	$0
Hamilton County	1/10/2021	0	0	$0	$0
Hamilton County	2/13/2021	0	0	$0	$0
Hamilton County	2/1/2023	0	0	$0	$0
TOTALS		**0**	**0**	**$787,000**	

Table 17-5. Historical Winter Storm Events Summary, 1996-2023

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGES	CROP DAMAGES
Hamilton County	22	0	0	$787,000	$0

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

SIGNIFICANT EVENTS

December 5, 2013

A winter storm impacted much of north and central Texas for several days with a combination of freezing rain, sleet, and snow. As the sleet settled, a thick layer of ice paralyzed most of the area, with two inches of ice reported in the Hamilton County planning area. Temperatures remained below freezing for five days resulting in a prolonged winter event. Most residents were forced to remain at home for several days due to limited transportation. A new term, coined cobblestone ice, was used to describe the condition of the ice on the interstates and highways due to the compaction of ice and sleet. As a result of the ice storm, significant tree damage occurred with thousands of tree branches falling under the weight of the ice. Power lines were also brought down, and at the peak of the storm, 275,000 customers were without power in the north and central Texas region. Local schools and businesses were closed for several days. An estimated $635,400 (2023 dollars) in damage was reported for the planning area.

February 13, 2021 – Winter Storm Uri (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 Southeast 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 Hamilton County, and many areas were placed under a Winter Storm Warning.

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]

In Hamilton County, the winter weather resulted in snow accumulations of 2-4 inches. While the winter precipitation did have an impact on the transportation in the county, the more severe impacts were due to the extreme cold and wind chills. The cold temperatures resulted in days-long power outages for those in the county, and an immeasurable amount of pipe, infrastructure and building damage.

PROBABILITY OF FUTURE EVENTS

According to historical records, the Hamilton County planning area is expected to experience approximately one winter storm event each year. The probability of a future winter storm event affecting the Hamilton County planning area 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 Hamilton County Planning Team identified the following critical facilities (Table 17-6) 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

Table 17-6. Critical Facilities Vulnerable to Winter Storm Events

CRITICAL FACILITIES	POTENTIAL IMPACTS
Emergency Response Services (EOC, Fire, Police, EMS), Hospitals and Medical Centers	• 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.
Airport, Academic Institutions, Animal Shelter, Evacuation Centers & Shelters, Governmental Facilities, Residential/ Assisted Living Facilities	• 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.
Commercial Supplier (food, fuel, etc.)	• 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)	• 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 17-7). 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 17: 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 Hamilton County planning area is estimated at 26 percent of the total population and children under the age of 5 are estimated at 5 percent. The population with a disability is estimated at 19 percent of the total population. An estimated 17 percent of the planning area population live below the poverty level and 11 percent of the populations speaks a language other than English (Table 17-7).

Older homes tend to be more vulnerable to the impacts of winter storm events. Approximately, 69 percent (an estimated 3,003 structures) of the housing units in the planning area were built before 1980 (Table 17-8).

Table 17-7. Populations at Greater Risk of Winter Storm Events

JURISDICTION	ELDERLY (over 65)	YOUTH (under 5)	WITH A DISABILITY	BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Hamilton	631	105	632	438	433
City of Hico	375	201	422	137	74
Unincorporated Hamilton County	1,117	113	553	835	396
Hamilton County	**2,123**	**419**	**1,607**	**1,410**	**903**

Table 17-8. Structures at Greater Risk of Winter Storm Events

JURISDICTION	SFR STRUCTURES BUILT BEFORE 1980
Hamilton County	3,003
City of Hamilton	1,024
City of Hico	625

Winter Storms have been known to cause injury to humans and occasionally have been fatal. Overall, the average reported loss estimate of property and crops in the planning area is approximately $787,000 with an average annualized loss of $28,100. Based on historic loss and damages, the impact of winter storm damages on the Hamilton County planning area can be considered “Limited” severity of impact, 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.

Table 17-9. Winter Storm Event Damage Totals, 1996-2023

JURISDICTION	PROPERTY & CROP LOSS	AVERAGE ANNUAL LOSS ESTIMATES
Hamilton County	$787,000	$28,100

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 (26 percent of total population), children under 5 (5 percent of total population), and those with a disability (19 percent of total 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.

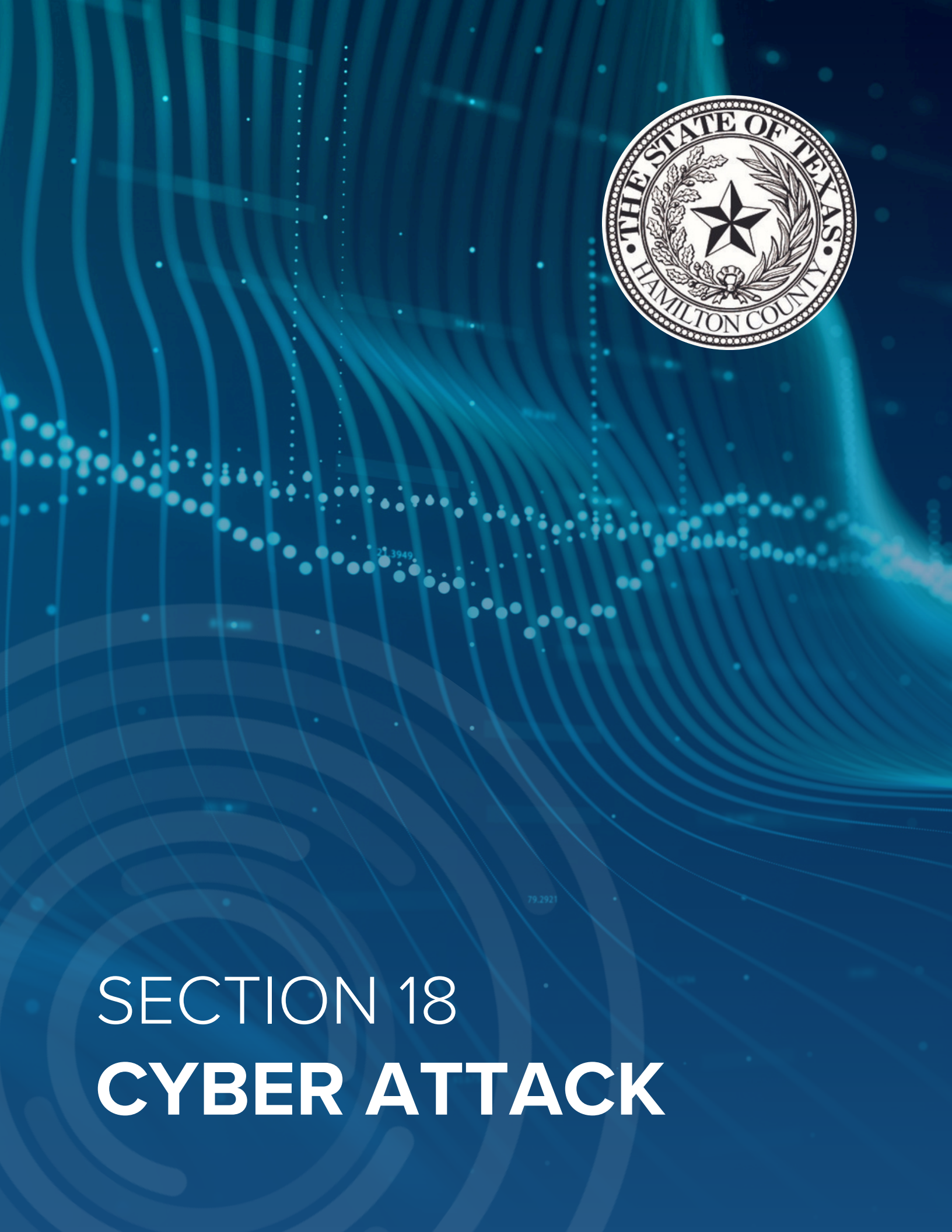
- Older structures built to less stringent building codes may suffer greater damage as they are typically more vulnerable to impacts of winter storm events. Approximately 69 percent of homes in the County were built before 1980. Similarly, historic buildings and sites are placed at a higher risk of impact due to materials used and the inability to change properties due to their historic status. There is one historical site listed on the National Register of Historic Places for Hamilton 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.

CLIMATE CHANGE CONSIDERATIONS

Climate change is expected to reduce the number of extreme cold events statewide but increase in the variability of events.[4] 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.[5] A trend that is expected to continue with winter extremes estimated to be milder by 2036 compared to extremes in the historic record.[6]

[4] Fourth National Climate Assessment. Chapter 23 Southern Great Plans. U.S. Global Change Program. 2018.
[5] 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.
[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 18

CYBER ATTACK

SECTION 18: CYBER ATTACK

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HAZARD DESCRIPTION

A cyber-attack is any type of offensive maneuver employed by individuals or organizations that targets computer information systems, infrastructures, computer networks, and personal computer devices by various means of malicious acts. The malicious act usually originates from an anonymous source that either steals, alters, or destroys a specified target by hacking into a susceptible system.



Cyberspace and its underlying infrastructure are vulnerable to a wide range of risk including both physical and cyber threats and hazards. Sophisticated cyber actors and nation-states exploit vulnerabilities to steal information and money and can develop capabilities to disrupt, destroy, or threaten the delivery of essential services. Various crimes are perpetrated through cyberspace including the production and distribution of child pornography and child exploitation conspiracies, banking and financial fraud, intellectual property violations, and other crimes, all of which have substantial human and economic consequences.

Cyberspace is particularly difficult to secure from cyber-attack events, due to a number of factors including the ability of malicious actors to operate from anywhere in the world, the links between cyberspace and physical systems, and the difficulty of reducing vulnerabilities and consequences in complex cyber networks. Of growing concern is the cyber threat to critical infrastructure, which is increasingly subject to sophisticated cyber intrusions that pose new risks. As information

technology becomes increasingly integrated with physical infrastructure operations, there is increased risk for wide scale or high-consequence events that could cause harm or disrupt services upon which our economy and the daily lives of millions of Americans depend. In light of the risk and potential consequences of cyber events, strengthening the security and resilience of cyberspace has become an important homeland security mission.[1]

Hamilton County takes steps to safeguard the integrity of its data and to prevent unauthorized access to information that is maintained in their computer systems. These measures are designed and intended to prevent corruption of data, block unauthorized access, and to ensure the integrity of information. This section reviews the hazards to the cybersecurity assets for the Hamilton County planning area.

HAZARDS

DENIAL OF SERVICE ATTACKS

A denial of service attack (DoS) is the attempt to make a computer or network resource unavailable to its intended users. A DoS attack may come from one or several computers, while a distributed denial of service attack (DDoS) will be launched from many, often thousands of computers. While DoS attacks may occur frequently and typically can be handled by the County's equipment, a DDoS attack can overload the Hamilton County's network or computer resources resulting in extended downtime. Often these attacks rely on lower-level network vulnerabilities.

DATA LOSS/LEAKAGE

Data loss can result from a variety of reasons, both intentional and unintentional. Data loss may result from a failure to properly backup or have disaster recovery equipment and processes, employees improperly handling sensitive data, and criminal activities such as espionage, theft, sabotage, and other malicious acts.

INFRASTRUCTURE LOSS/FAILURE

Loss of computer and network resources may result from a variety of natural and human-caused disasters including tornadoes, hurricanes, and explosions due to accidents, power loss, terrorism, and fire.

INSIDER THREATS

Insider threats are malicious threats to the planning area that come from Hamilton County employees, contractors, and volunteers who have access to the County's computers, networks, and data. An insider can initiate a DoS attack, leak or steal data, and sabotage the infrastructure and data.

ORGANIZED CYBERCRIME, STATE-SPONSORED HACKERS ESPIONAGE

Organized cybercrime, which may include state-sponsored cybercrime, are attacks on the Hamilton County's computers, network, and data by criminal organizations. These criminals may be motivated by money or political reasons. Often these attacks are well planned out, difficult to identify due to their more limited scope, and can result in extensive damage.

THIRD PARTY MISMANAGEMENT

Reliance on third parties for cyber services implies acceptance of the risk that the third party will properly protect the cyber resources from loss or unavailability. Hazards from the use of third

[1] Source: Department of Homeland Security

parties include DoS, DDoS, data loss and leakage, infrastructure loss and failure, insider threats, and organized cybercrime.

ADVANCE PERSISTENT THREATS

An advanced persistent threat (APT) is a stealthy and continuous attack on Hamilton County over a long period of time. The "advanced" process signifies sophisticated techniques using malware to exploit vulnerabilities in systems. The "persistent" process suggests that an external command and control system is continuously monitoring and extracting data from a specific target. The "threat" process indicates human involvement in orchestrating the attack.

CIVIL DISORDER

Civil disorder may impact the cybersecurity of the planning area by directly or indirectly impacting Hamilton County's ability to support its computers, networks, and data. Civil disorder can result in the planning area not having resources due to direct impact to the computers and networks, and indirectly by limiting the resources necessary to run the computers and networks.

LOCATION

Cyberwar is deceptive, invisible to most, and fought out of sight. It takes place in cyberspace, a location that cannot be seen, touched, or felt. Physical instruments, such as computers, routers, and cables can be seen; however, these instruments interact in cyberspace, a virtual and unseen realm. Thus, the source of the hazard can extend from one part of the world to attacks on public or private sector entities in another part of the world, and the perpetrator can remain unknown in a legally provable sense. The entire Hamilton County planning area, including all participating jurisdictions, can be affected by a cyber-attack.

EXTENT

Currently an official index for measuring the extent of a cyber-attack does not exist. The extent, nature, and timing of cyber-attack events are impossible to predict. There may or may not be any warning. Some cyber-attack events take a long time (weeks, months, or years) to be discovered and identified.[2] Therefore, the Hamilton County planning area is vulnerable to all types of cyber-attack, and can occur anywhere, and at any time.

The extent of damages in the Hamilton County planning area are classified as low, medium, and high. These extents are based on historical incidents; third party information regarding the impact; and if the planning area has experienced an occurrence of the incident.

Denial of service attacks: Low

A DoS and DDoS attack could result in an extended cyber-outage in the planning area. The outage, although impacting the daily business of the planning area, would not have a substantial economic impact to the county.

Data loss/leakage: High

Data loss and leakage experienced by the planning area could result in costly remediation efforts to ensue. For example, if personally identifiable information (PII) is leaked, the county may be required to pay for credit protection services. Since Hamilton County and the participating

[2] Source: http://www.ready.gov/cyber-attack

jurisdictions manage a large quantity of sensitive information, the possibility of costly remediation efforts is high.

Infrastructure loss/failure: High
Loss of a cyber-processing facility could result in very high expenses to remediate, repair, and recover from the loss.

Insider threats: Medium
Insider threats can result in substantial impacts to the organization, depending on what data the insider has accessed. Hamilton County has remediated insider threats by using the industry standard separation of duties, and performing background checks of its employees, contractors, and volunteers.

Organized cybercrime, state-sponsored hackers' espionage: Medium
The planning area is a moderate target for organized criminals and state-sponsored hackers due to its political environment and the size of the organization. Due to the potential extent of attacks by organized criminals, the possibility and severity of resulting damages are great.

Third party mismanagement: Low
Since each vendor is isolated to the service it performs, the damages from one third party's mismanagement are fairly low.

Advanced persistent threats: High
The impact of an APT to the planning area can be severe because a large number of systems can be affected and the remediation of such an attack could be expensive to recover from.

Civil disorder: High
The impacts of civil disorder on cybersecurity could be extensive due to the typical physical nature of the attacks.

HISTORICAL OCCURRENCES

It's been reported that the electric grid is attacked every four days either physically or through cyber threats.[3] The numbers of attacks are accelerating and becoming more sophisticated. The Texas Governor announced that websites belonging to state agencies have seen an increase in attempted cyber-attacks coming out of Iran (about 10,000 per minute) in the time since Iranian general Qassem Soleimani was killed in a U.S. drone strike.[4] While the majority of attacks to gather data are not successful, Hamilton County's technology security team remains on high alert. The Electric Reliability Council of Texas (ERCOT) reportedly has a team of professionals and a series of procedures they utilized to protect the planning area systems from cyber-attacks.

Based on available data, two notable past cyber-attacks have affected the Hamilton County planning area. One cyber-attack occurred in Hamilton County, in September of 2020 leading up to that year's U.S. presidential election. In the attack, a County Clerk email address was hacked, sending email replies to voters and election administrators with malware hidden inside Microsoft Word document attachments. The fraudulent emails were traced back to email addresses of Sri

[3] Source: USA Today, March 2015, website: https://www.usatoday.com/story/news/2015/03/24/power-grid-physical-and-cyber-attacks-concern-security-experts/24892471/
[4] Statesman News Network, January 2020, Website: https://www.statesman.com/news/20200110/austin-on-guard-after-texas-hit-with-increased-cyberattacks-from-iran

Lankan and Congolese origin. Although the malware used originated from foreign hackers, reports state the attack was part of a widespread campaign that did not specifically target election-related sites. Because Hamilton is an "off-line" County, the effects did not spread to the State of Texas's voter systems, and the attack did not ultimately impact election ballots in Hamilton County either.[5] Another past attack in the City of Hamilton, similarly, resulted in fake emails being sent from a newspaper office.

Even though cyber-attack events are virtually impossible to predict, the Hamilton County planning area has the potential of an occurrence happening at any time.

PROBABILITY OF FUTURE EVENTS

The probability of occurrence based on historical incidents in the planning area are classified as low, medium, and high; as well as third party information regarding the likelihood of incidents if the county has not had an occurrence of the incident.

Denial of service attacks: Low

The planning area has frequent DOS attacks which are not severe enough to impact Hamilton County's service levels. The County has had no DDoS attacks over the last year which successfully impacted services. Although there have been attempts for service disruptions through phishing emails, a fraudulent attempt to obtain sensitive information has not been successful. In the past, significant bad actors were identified by the U.S. Federal Government as Russia, Iran, and North Korea who historically attempt to disrupt or corrupt systems by damaging or gaining sensitive information through software. Several participating jurisdictions within Hamilton County employs vendor software, such as network monitoring software, which supports critical infrastructure.

Data loss/leakage: Low

The planning area is subject to several compliance requirements which specifically address data loss and leakage. These compliance standards include but are not limited to:

- Payment Card Industry Security Standard (PCI DSS)
- Health Insurance Portability and Accountability Act of 1996 (HIPAA)
- Criminal Justice Information Services Division (CJIS)

Hamilton County had no known instances of data loss over the last year which resulted in the County having to remediate the situation.

Infrastructure loss/failure: Low

The planning area has multiple data centers which are hardened in various ways to minimize the possibility of outage. Resilience and redundancy are continuously being reviewed and addressed to reduce the risk of loss or failure. Historically, the infrastructure has had few outages that were extended. A prime example of potentially affected infrastructure would be health care systems within the planning area.

[5] Source: https://www.propublica.org/article/foreign-hackers-cripple-texas-countys-email-system-raising-election-security-concerns

Insider threats: Low
Jurisdictions in the Hamilton County planning area require anyone who has access to government network and resources to have gone through a background check, which is regularly reviewed. There has never been evidence of insider attacks in Hamilton County or any participating jurisdictions.

Organized cybercrime, state-sponsored hackers' espionage: High
Over the last five years, many organized cyberattack attempts may have been made on Hamilton County and participating jurisdictions, as DDoS and malware attacks have become more and more frequent across the globe. One instance, a September 2020 attack affecting Hamilton County, was successful in spreading malware through fraudulent emails appearing to be from a county clerk. However, the effects were minor and had minimal impact on residents, that year's U.S. presidential election, or the planning area as a whole.

Third party mismanagement: Low
Participating jurisdictions within the Hamilton County planning area utilize third parties for implementing certain cybersecurity measures, such as network monitoring, endpoint protection, and advanced threat protection. There have not been any recorded instances of third-party mismanagement in Hamilton County to date.

Advanced persistent threats (APT): Low
APTs are defined as a highly sophisticated threat actor with the resources and knowledge needed to stage a long-term attack campaign and remain undetected for extended periods of time. APTs may use a wide variety of techniques to attack their targets, including malware and ransomware strains. Hamilton County jurisdictions maintain systems which monitor symptoms of APT. While Hamilton County and the City of Hamilton have both suffered a recent cyber-attack in 2019, there is not conclusive, available evidence that these attacks were part of larger APT campaigns.

Civil disorder: Low
Nationally, civil disorder events have been correlated or followed up by a cyber-attack to critical infrastructure, and national trends indicate a general rise in such events. However, Hamilton County has low civil disorder in its modern history, and there have been no cyber-attacks tied into civil disturbance events within the last five years. Local, state, and federal officials monitor such events and establish lines of communication in the event that a cyber incident may unfold. The probability of following this national trend is low for the planning area.

Overall, cyber-attacks of all kinds are impossible to predict, but attack attempts have continuously risen across the country in recent years. Based on these global trends and historical evidence, the Hamilton County planning area is vulnerable to a range of cyber threats, and the probability of future cyber-attacks is considered "Highly Likely" meaning an event is probable in the next year.

VULNERABILITY AND IMPACT

With the internet being largely open and unregulated, it leaves the planning area vulnerable to cyber-attacks and threats. The attack can be on information systems resulting in a data breach, or the spread of a virus. With the growing dependence on digital interconnectivity even a small incident may have widespread and damaging consequences.



Transportation, public safety, and utility services are all critical, and highly dependent on information technology. The motive behind such disruptions can be driven by religious, political, and other objectives.

A cyber-attack can last a few minutes to a couple of days, although large-scale events and their impacts can last much longer. Cyber-attacks differ by motive, type, vector, and perpetrator profile.

Cybersecurity involves protecting infrastructure by preventing, detecting, and responding to cyber-attack incidents. Unlike physical threats that prompt immediate action, such as "stop, drop, and roll," in the event of a fire; cyber threats are often difficult to identify and comprehend. Among these dangers are viruses erasing entire systems, intruders breaking into systems and altering files, intruders using a computer or device to attack others, and intruders stealing confidential information. The spectrum of cyber-attack risks is limitless. Threats of cyber-attack can have wide-ranging effects on the individual, community, organizational, and national level. Risks from cyber-attack include:

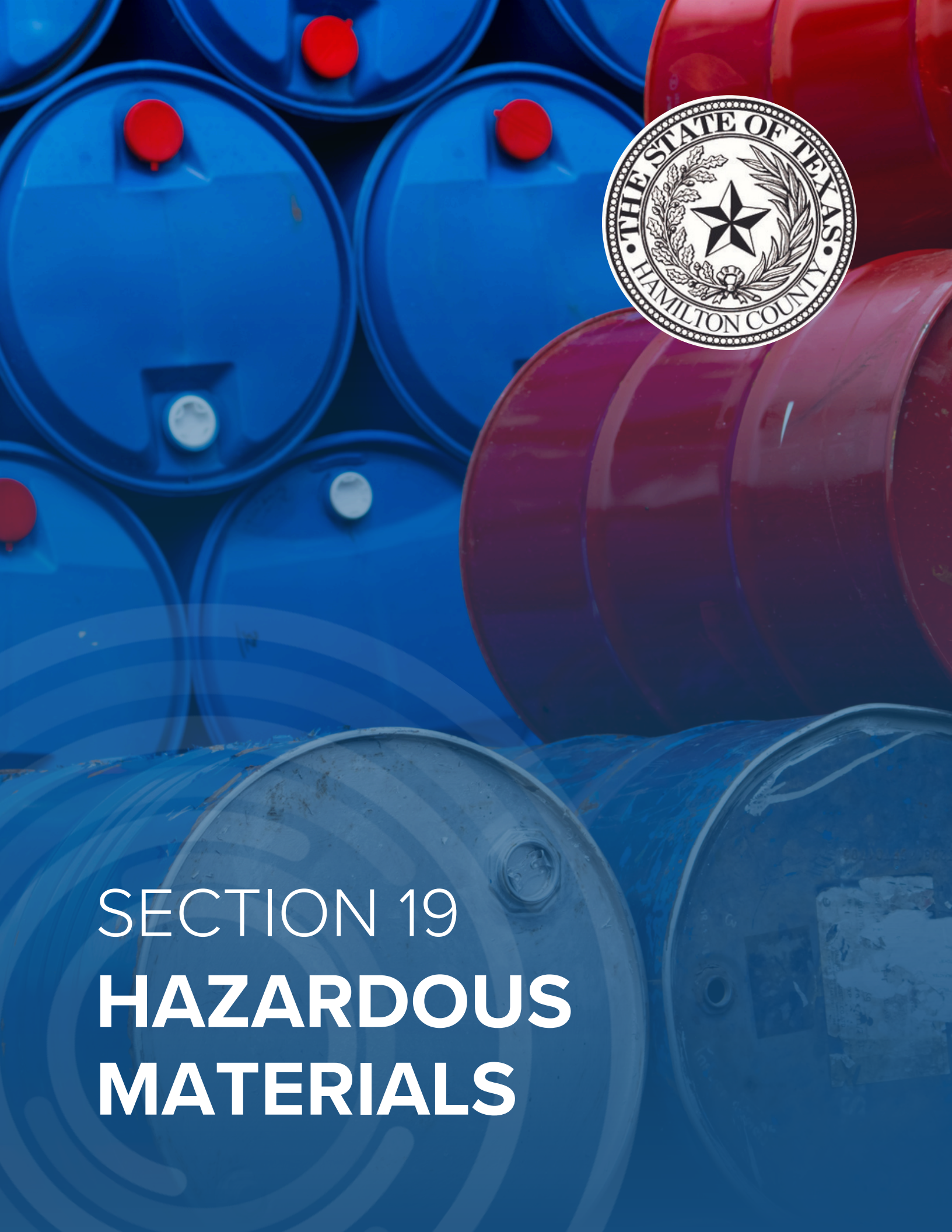
- Organized cybercrime, state-sponsored hackers, and cyber espionage, which can pose national security risks to our country.
- Transportation, power, and other services may be disrupted by large scale cyber incidents, and the extent of the disruption is highly uncertain as it will be determined by many unknown factors including the target and size of the incident.
- Vulnerability to data breach and loss increases if an organization's network is compromised, and therefore information about a company, its employees, and its customers can be at risk.
- Individually-owned devices such as computers, tablets, mobile phones, and gaming systems that connect to the Internet are vulnerable to intrusion, and therefore personal information may be at risk without proper security.[6]

Based on historical events and trends both in the planning area and globally, the potential impact of cyber-attacks for the entire Hamilton County planning area can be considered "Major" due to the critical facilities that can be indirectly impacted by an attack. While deaths, injuries or damages to the built environment are not directly caused by a cyber-attack, the secondary or cascading effects of an attack could be devastating.

CLIMATE CHANGE CONSIDERATIONS

As a non-natural hazard, climate change has no direct impact on the future occurrences of cyber-attack incidents. However, climate change is associated with an increase in severe weather. If severe weather events occur concurrently with a cyber-attack, the stress on emergency services, critical infrastructure, and the community may be compounded. Research and data regarding the impact of climate change on non-natural events is minimal and limited.

[6] Source: http://www.ready.gov/cyber-attack



SECTION 19

HAZARDOUS MATERIALS

SECTION 19: HAZARDOUS MATERIALS

Hazard Description 1
Location 2
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Vulnerability and Impact 4
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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.
- 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 major highways near populated areas in the Hamilton County planning area is of concern to the planning team. 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. The major highways of note in Hamilton County include US Route 84, US Route 281, Texas Highway 36, and Texas Highway 22. Rail roads can carry the same concern due to the potential for train spills, however there are no major rail roads in the Hamilton County planning area.

All major highways and the surrounding areas are at risk of a HAZMAT incident. In the Hamilton County planning area, the City of Hamilton is an area 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 Texas Highway 22, Texas Highway 36, and US Route 281. The City of Hico is also vulnerable to hazardous material incidents occurring due to spills in transportation, as the city sits at the convergence of Texas Highway 220, Texas Highway 6, and US Route 281.

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 Hamilton County planning area.[1]

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.

According to EPA data, there are no reported TRI toxic sites in or around the Hamilton County planning area and no reported toxic chemical releases or related waste management data available between 2005 and 2023. This does not necessarily mean that no toxic chemical releases have occurred within the Hamilton County planning area, as TRI data does not include information from all facilities that may manage TRI chemicals, nor does it cover every chemical that can potentially cause harm. Additionally, it is possible that facilities in the planning area may produce TRI chemicals but do not reach the quantity threshold for reporting to be required.

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 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 31 spill incidents have been reported in Hamilton County between 2003 and 2023 according to the Texas Commission on Environmental Quality (TCEQ) Emergency Response Spills database.[2] This includes chemical spills reported to and investigated by TCEQ. Damages,

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

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

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. In addition to spill incidents in TCEQ's database, Planning Team members for the City of Hamilton reported two hazardous material incidents in the city due to sewage overflows.

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 Hamilton County planning area.

VULNERABILITY AND IMPACT

Based on the prevalence and geographic proximity of hazardous materials transportation routes, most of the Hamilton County planning area is minimally vulnerable to the impacts of a HAZMAT incident. The City of Hamilton is the most vulnerable region of the planning area, due to its dense population and proximity to major roadways.

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 and under the age of 5 in the Hamilton County planning area is estimated at 31 percent of the total population or an estimated total of 2,542 potentially vulnerable residents in the planning area based on age.

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 17 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 weather-related warnings and instructions regarding safety measures. An estimated 11 percent of the planning area speaks a language other than English.

Table 19-2. Populations at Greater Risk of HAZMAT Incidents[3]

JURISDICTION	ELDERLY (over 65)	YOUTH (under 5)	WITH A DISABILITY	BELOW POVERTY LEVEL	NON-ENGLISH SPEAKING
City of Hamilton	631	105	632	438	433
City of Hico	375	201	422	137	74
Unincorporated Hamilton County	1,117	113	553	835	396
Hamilton County	**2,123**	**419**	**1,607**	**1,410**	**903**

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 Hamilton 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 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 Hamilton 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 Hamilton County Planning Team are similar to the impacts listed in Sections 5 through 20. 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 (26 percent of total population) and children under 5 (5 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.

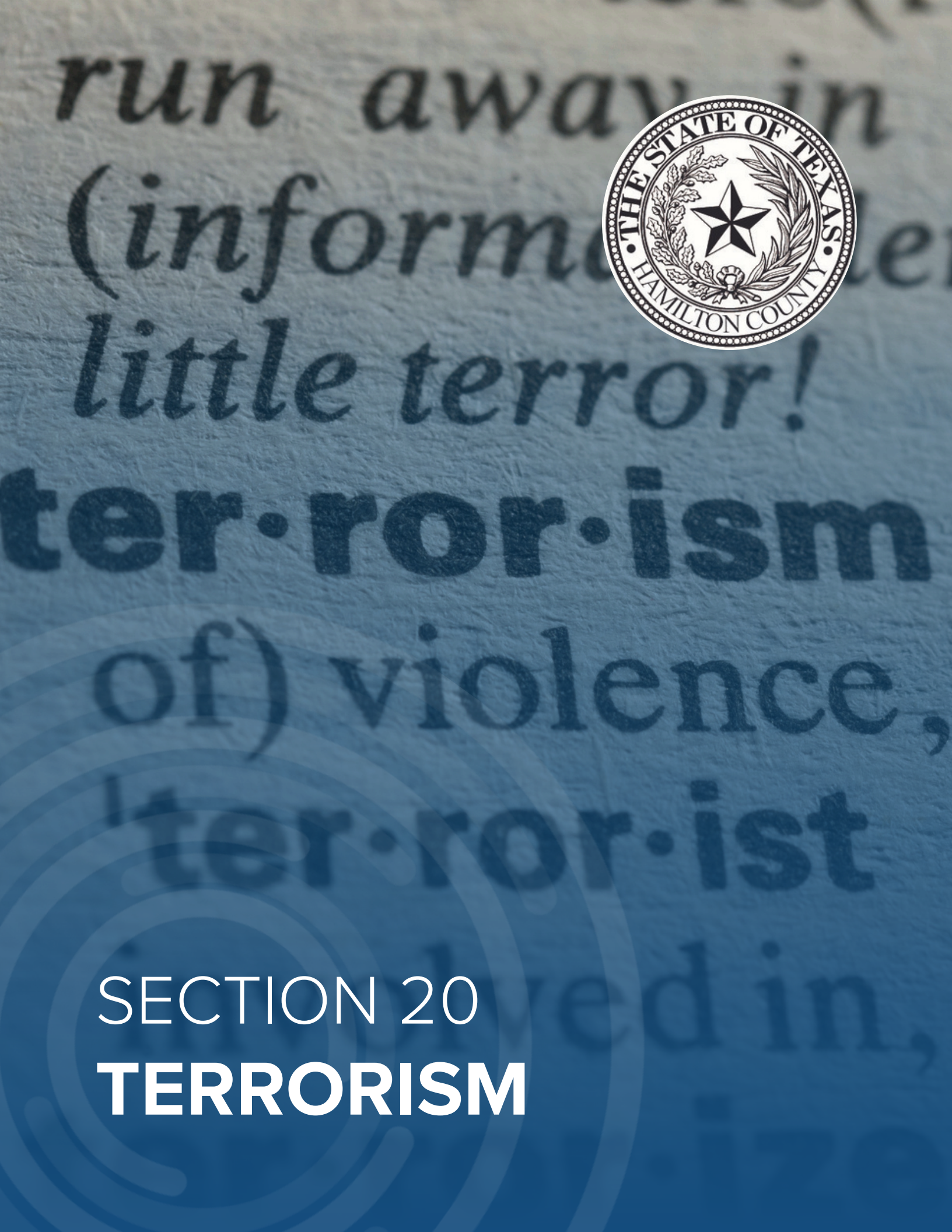
[3] U.S. Census Bureau, American Community Survey, 2022

- 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 20
TERRORISM

SECTION 20: TERRORISM

Hazard Description 1
Location 1
Extent 2
Historical Occurrences 3
Probability of Future Events 4
Vulnerability and Impact 5
Assessment of Impacts 5
Climate Change considerations 5

HAZARD DESCRIPTION

The Federal Bureau of Investigation (FBI) categorizes terrorism in the United States as one of two types—domestic terrorism or international terrorism. Domestic terrorism involves groups or individuals whose terrorist activities are directed at elements of our government or population without foreign direction. International terrorism involves groups or individuals whose terrorist activities are foreign-based and/or directed by countries or groups outside of the United States, or whose activities transcend their national boundaries.

A terrorist attack can take several forms, depending on the technological means available to the terrorist, the nature of issue motivating the attack, and the points of weakness of the terrorist's target. Bombings are the most frequently used terrorist method in the United States. A terrorist using a chemical or biological weapon is of particular concern to officials. Special training and equipment is needed in order to safely manage a Weapons of Mass Destruction incident.

Biological agents are infectious microbes or toxins used to produce illness or death in people, animals or plants. Biological agents can be dispersed as aerosols or airborne particles. Terrorists may use biological agents to contaminate food or water, as they are extremely difficult to detect.

Chemical agents kill or incapacitate people, destroy livestock, or ravage crops. Some chemical agents are odorless and tasteless and are therefore difficult to detect. These chemical agents can have an immediate effect (a few seconds to a few minutes) or a delayed effect (several hours to several days).

The Department of Defense estimates that as many as 26 nations may possess chemical agents and/or weapons, and an additional 12 may be seeking to develop them. The Central Intelligence Agency reports that at least 10 countries are believed to possess or are currently conducting research on biological agents for weaponization.

Terrorist incidents – as with other natural and technological disasters – involve the application of one or more modes of harmful force to the built environment. These modes include contamination (as in the case of chemical, biological radiological or nuclear hazards), energy (explosives, arson, and even electromagnetic waves), or denial of service (sabotage, infrastructure breakdown, and transportation service disruption).

LOCATION

There is no distinct geographic boundary to the threat of terrorism. An event is possible throughout the Hamilton County planning area. However, it is important to note that high-risk targets for acts

of terrorism include military and civilian government facilities, international airports, large cities, and high-profile landmarks. Terrorists might also target large public gatherings, water and food supplies, utilities, and corporate centers. Further, terrorists can spread fear by sending explosives or chemical and biological agents through the mail.

EXTENT

The Homeland Security Advisory System, issued by the U. S. Department of Homeland Security, previously used a color-coded terrorism warning system that identified five threat levels. In 2011, the Department of Homeland Security (DHS) replaced the color-coded alerts of the Homeland Security Advisory System (HSAS) with the National Terrorism Advisory System (NTAS), designed to more effectively communicate information about terrorist threats by providing timely, detailed information to the American public.

NTAS now consists of two types of advisories: Bulletins and Alerts. DHS has added Bulletins to the advisory system to be able to communicate current developments or general trends regarding threats of terrorism. As of April 2024, there has not been an active Bulletin since November 24, 2023. However, a Bulletin was active continuously from January 27, 2021, through November 24, 2023. NTAS Bulletins permit the Secretary to communicate critical terrorism information that, while not necessarily indicative of a specific threat against the United States, can reach homeland security partners or the public quickly, thereby allowing recipients to implement necessary protective measures. Because DHS may issue NTAS Bulletins in circumstances not warranting a more specific warning, NTAS Bulletins provide the Secretary with greater flexibility to provide timely information to stakeholders and members of the public.

When there is specific, credible information about a terrorist threat against the United States, DHS will share an NTAS Alert with the American public when circumstances warrant doing so. The Alert may include specific information, if available, about the nature of the threat, including the geographic region, mode of transportation, or critical infrastructure potentially affected by the threat, as well as steps that individuals and communities can take to protect themselves and help prevent, mitigate, or respond to the threat. The Alert may take one of two forms: Elevated, if there is credible threat information, but only general information about timing and target such that it is reasonable to recommend implementation of protective measures to thwart or mitigate against an attack; or Imminent, if the threat is believed credible, specific, and impending in the very near term. Terrorism Advisory System Alerts are described in Figure 20-1.[1]

[1] Source: Department of Homeland Security, https://www.dhs.gov/national-terrorism-advisory-system

Figure 20-1. National Terrorism Advisory



Red Cross also issues Advisory System Recommendations for individuals, families, neighborhoods, schools and businesses for each alert level. These may be found at: *www.redcross.org.*

Heightened periods for terrorism risk are based on intelligence and other information. A potential terrorist event could devastate the community physically, economically and psychologically for many years to come. Warning time for terrorism may be minimal to none.

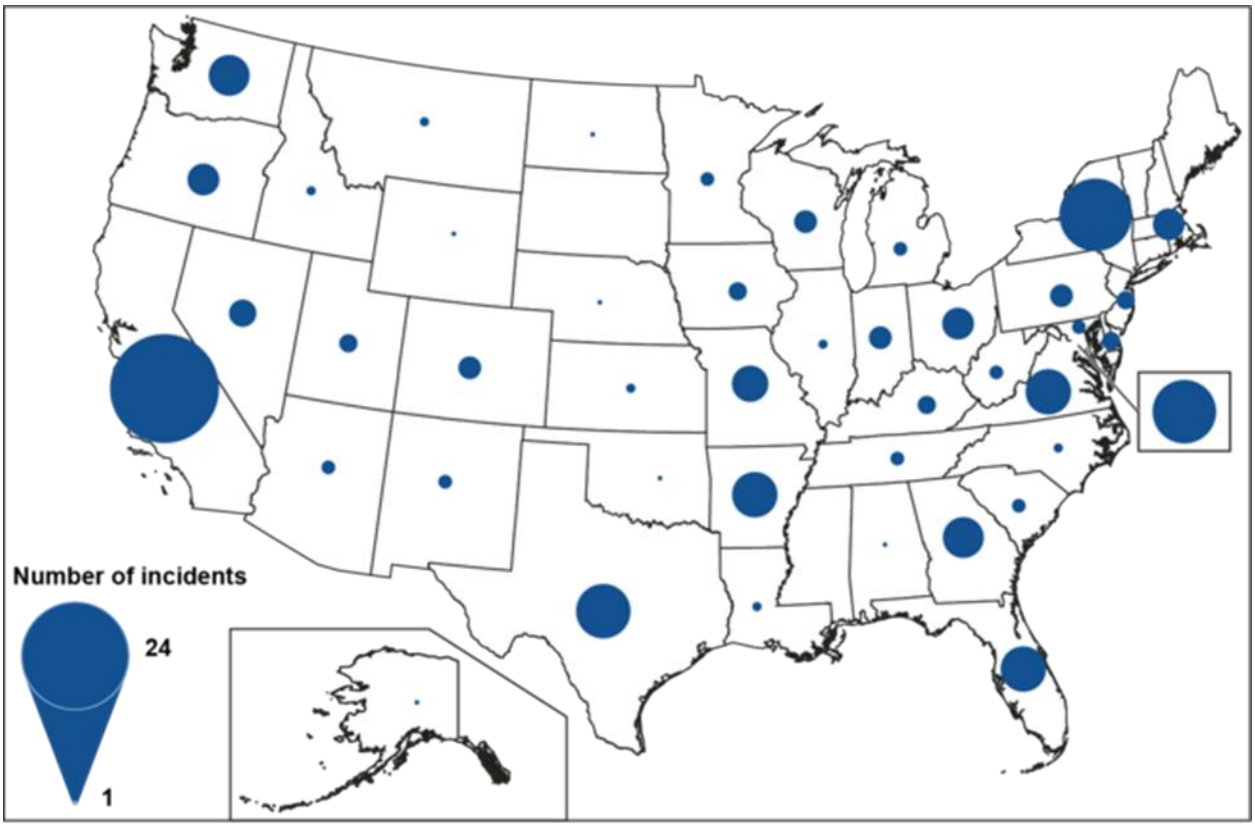
HISTORICAL OCCURRENCES

The history of terrorism on United States soil includes the attacks of September 11, 2001, on the World Trade Center in New York and the Pentagon in Washington, D.C. and the ensuing anthrax attacks; the 1995 bombing of the Murrah Federal Building in Oklahoma City; the bombing of the World Trade Center in 1993; and the Boston Marathon Bombings in 2013.

However, the State of Texas has experienced a significant number of domestic terrorism events as shown in Figure 20-2. The United States Department of Homeland Security reported 231

domestic terrorism incidents between 2010 and 2021. These incidents occurred across the United States, but the greatest number of events occurred in states with major metropolitan areas such as California, New York, and Washington D.C.

Figure 20-2. National Terrorism Advisory



Source: GAO analysis of Department of Homeland Security Counterterrorism Mission Center data. | GAO-23-104720

None of these incidents occurred within the planning area, but surrounding communities have been impacted, and some of the nation's worst attacks have occurred within the state. While complete prevention of an attack may not be attainable, the County can lessen the likelihood and/or the potential effects of an incident. Hamilton County continues to improve its readiness to respond to a terrorist incident through participation in state and federal programs that provide training and equipment for agencies that would respond to a local terrorist incident, and in exercises that help to improve agency coordination and test local response plans.

PROBABILITY OF FUTURE EVENTS

The types, frequencies, and locations of many natural hazards are identifiable and, even in some cases, predictable, as the laws of physics and nature govern them. Malevolence, however, cannot be forecast with any accuracy. There is, therefore, some potential for most, if not all, types of intentional terrorist acts to occur anywhere and at any time. Reports also show that domestic terrorist incidents are on the rise in the United States, which indicates the slight possibility of an increased risk in the future. Based on best available data, it is "Unlikely" for a terrorist event to occur in the planning area in the next ten years.

VULNERABILITY AND IMPACT

There is no defined geographic boundary for a terrorist event. All of the population, buildings, critical facilities, infrastructure and lifelines, and hazardous materials facilities within the Hamilton County planning area are considered exposed to the hazards of terrorism and could potentially be affected.

There are no past local events. Therefore, all assets and facilities are potentially at risk to damages that may, for the most part, be secondary.

Terrorist events can have a “Substantial” severity of impact, meaning multiple deaths, complete shutdown of facilities for 30 days or more, and more than 50 percent of affected properties destroyed or with major damage.

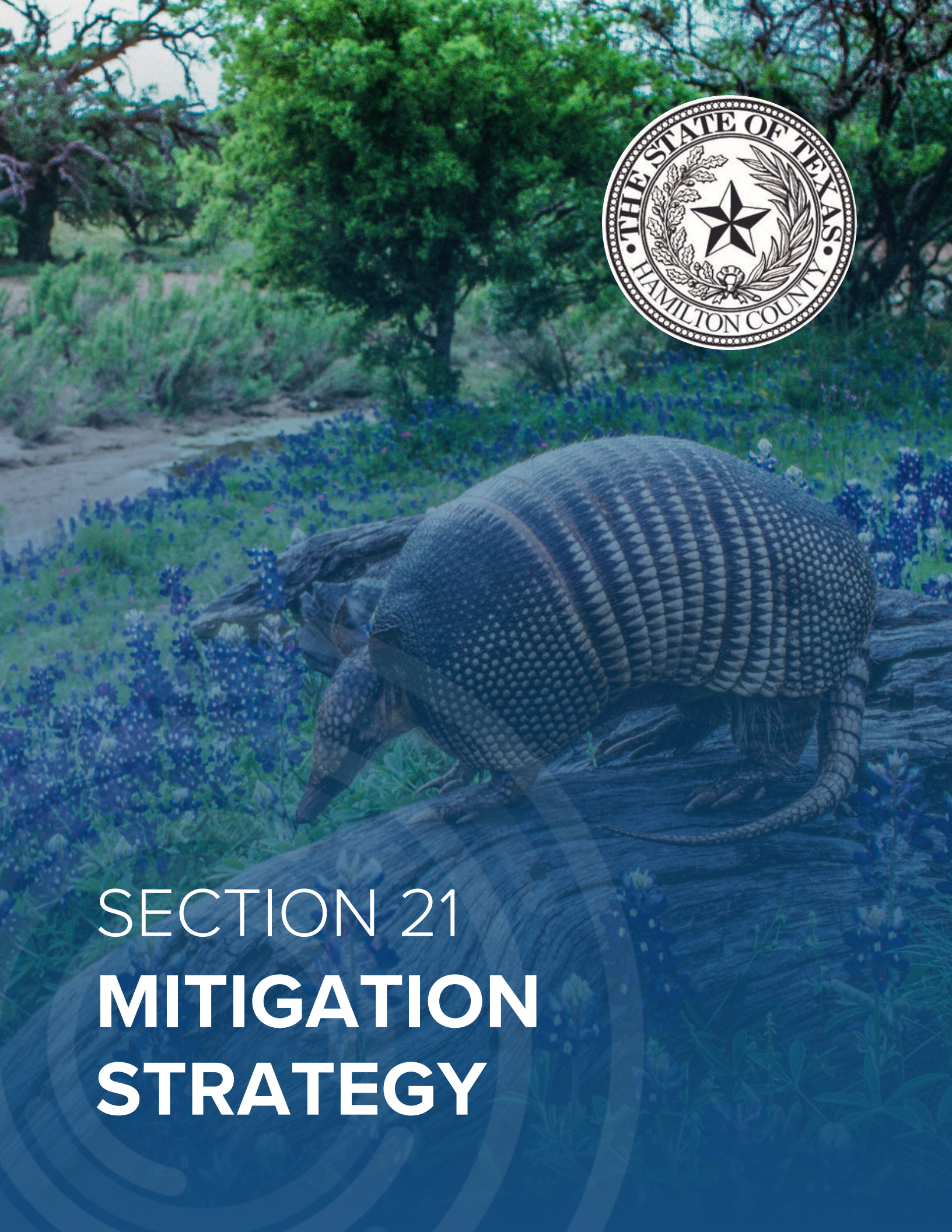
ASSESSMENT OF IMPACTS

Terrorist events have the potential to pose a significant risk to people, critical infrastructure and facilities, the economy, and built and natural environments. Due to the unforeseeable nature of terrorist attacks, as well as the broad variety of methods terrorist actors may utilize, the impacts of an event vary widely and are impossible to predict. Some of the potential impacts of a terrorist event include:

- Direct economic injury or destruction in the planning area can occur from terrorist attacks which target plants, machines, transportation systems, workers, or other smaller economic resources such as local businesses or restaurants.
- A terrorist attack can lead to community-wide mental health issues and trauma such as PTSD, depression, anxiety, a sense of helplessness, and substance abuse.
- Evacuations, shelter in place orders, or the closure of transportation routes can lead to the disruption of critical facilities, businesses, and schools.
- In the event of chemical or biological weapons being used, the environment may experience significant damage leading to air and water contamination, loss of wildfire, agriculture, and tourism.
- First responders are exposed to toxic chemicals, hazardous materials, and generally unsafe conditions, which could result in sickness and long-term health impacts.
- Vulnerable populations, particularly the elderly (26 percent of total population) and children under 5 (5 percent of total population), can face serious or life-threatening health problems from exposure to toxic chemicals.
- The population who speaks languages other than English (11 percent of total population) may have difficulty receiving urgent updates and safety guidance in the event of a terrorist attack.
- Terrorist attacks targeting critical facilities may result in the shutdown of essential services for extended periods of time. (See Appendix C for a comprehensive list of critical facilities in the Hamilton County planning area.)

CLIMATE CHANGE CONSIDERATIONS

As a non-natural hazard, climate change has no direct impact on the future occurrences of terrorism incidents. However, climate change is associated with an increase in severe weather. If severe weather events occur concurrently with a terrorist attack, the stress on emergency services, critical infrastructure, and the community may be compounded. Research and data regarding the impact of climate change on non-natural events is minimal and limited.



SECTION 21

MITIGATION STRATEGY

SECTION 21: MITIGATION STRATEGY

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Goal 2 1
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Goal 4 2
Goal 5 2
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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 required some changes including expanding on existing goals and the addition of a seventh goal around equity and vulnerable populations.

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.

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.

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 and city 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.

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 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 22

PREVIOUS ACTIONS

SECTION 22: PREVIOUS ACTIONS

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SUMMARY

This section includes analysis from the 2018 Hamilton County Hazard Mitigation Plan. Planning Team members were given copies of the previous mitigation actions submitted in the 2018 Hamilton 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, except for the “2024 Analysis” section.

SECTION 22: PREVIOUS ACTIONS

HAMILTON COUNTY

	Hamilton County – Previous Action #1
Proposed Action:	Drainage improvements in the Pottsville neighborhood to reduce flood risk to structures and infrastructure.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Pottsville neighborhood
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce flood risk to previously flooded structures in the neighborhood.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$100,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #2
	Proposed Action:	Design and implement flood control retention structure for the Cow House Creek.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cow House Creek
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce flood risk to downstream structures and infrastructure through drainage retention and controlled release.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$1,000,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County Public Works
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #3
	Proposed Action:	Developing a dam failure study and emergency action plan for Hamilton City Lake Dam.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Hamilton City Lake Dam
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce flood risk structures in inundation zone through improved risk analysis and emergency preparedness.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations (Preparedness)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$100,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County Public Works in coordination with the City of Hamilton
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	Emergency Action Plan (EAP)

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #4
	Proposed Action:	Develop and implement plan to control brush and vegetation on county maintained flood control structures.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide flood control structures
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce flood risk through maintaining maximum flow capacity.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$20,000
Potential Funding Sources:	Local Funding
Lead Agency/Department Responsible:	Hamilton County Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #5
	Proposed Action:	Install high water signage and flood gates in high risk areas.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide flood-prone areas
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of residents entering or driving through high floodwaters.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$100,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #6
	Proposed Action:	Train firefighters in use of back burns; provide support and financial assistance to local fire departments for training and equipment.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide wildfire-prone areas
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce spread of wildfire through training and preparedness.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness (Preparedness)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County Fire Marshall
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #7
	Proposed Action:	Acquire and install reinforced electric gates at Pecan Creek Dam.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Pecan Creek Dam
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	The current gates along top of the dam do not prevent residents from circumventing the gates and driving along the dam which compromises the integrity of the dam structure, leading to future dam breach. Reinforced electric gates would prevent future access and associated damage to the dam.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on New/Existing Buildings:	Reduce risk to critical infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County Public Works in coordination with the City of Hamilton
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Action Plan (EAP)

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #8
	Proposed Action:	Complete flood study for the unincorporated areas of the county and develop floodplain maps. Participate in the NFIP.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Hamilton County unincorporated areas
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Improve risk assessment; Reduce flood losses through regulated development; Ensure access to flood insurance for county residents.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing and future structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #9
	Proposed Action:	Develop and implement an education and awareness program to provide residents with mitigation measures to reduce property losses as well as health and safety tips to protect residents from all hazards that can impact the community.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide (including all participating jurisdictions)
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce property loss and risk of injuries through risk awareness and mitigation education.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System 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
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$10,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County Agrilife Extension Service in cooperation with all jurisdictions
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #10
	Proposed Action:	Upgrade low water crossings to prevent erosion and mitigate damages during flood events.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide low water crossings (including all participating jurisdictions)
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce flood damages as low water crossings and ensure continuity of emergency services.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County and Local Jurisdiction Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #11
	Proposed Action:	Develop and implement fuels reduction program in the Wildland Urban Interface.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide Wildland Urban Interface (including all participating jurisdictions)
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce wildfire risk to structures and infrastructure through proactive fuels reduction program.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$250,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County and Local Fire Departments
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #12
	Proposed Action:	Adopt and implement program to regularly clean and clear debris from bridges, streams and culverts.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide drainage systems (including all participating jurisdictions)
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce flood damages by maintaining full drainage capacity.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County and Local Jurisdiction Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	County Maintenance Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #13
	Proposed Action:	Adopt and implement tree trimming program along right-of-way; Remove dead and downed trees from drainage system.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide right-of-way and drainage systems (including all participating jurisdictions)
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of power outages and damages due to downed trees and limbs; Reduce flood damages by maintaining full drainage capacity.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County and Local Jurisdiction Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #14
	Proposed Action:	Install flood gauges in flood prone areas.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide flood hazard areas (including all participating jurisdictions)
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Improve risk assessment; Reduce risk to residents through improved monitoring and early warning.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk of injury to residents
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$10,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County and Local Jurisdiction Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #15
	Proposed Action:	Adopt and implement burn bans during periods of drought or other high wildfire risk periods.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide (including all participating jurisdictions)
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of wildfires through regulations.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,500
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County and Local Jurisdiction Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances, Community Wildfire Protection Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #16
	Proposed Action:	Plant additional trees in parks and common areas near public buildings and parking lots to reduce heat island effect in developed areas and to provide shade for residents and visitors.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide (including all participating jurisdictions)
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of heat island effect in developed areas; Provide shaded rest areas for residents.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	$1,000
Potential Funding Sources:	Local Funding, State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County and Local Jurisdiction Administration
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

2024 ANALYSIS:
Defer to plan update. Amend action to natural systems protection type.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #17
	Proposed Action:	Designate public facilities as heating and cooling centers for vulnerable populations during extreme temperatures; Educate residents on the location of designated centers and the operating procedures.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Locations to be determined per jurisdiction
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of illness or loss of life by designating public centers to provide relief to residents during extreme temperatures.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	$1,000
Potential Funding Sources:	Local Funding (staff time)
Lead Agency/Department Responsible:	Hamilton County and Local Jurisdiction Administration
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #18
	Proposed Action:	Develop drought contingency plan; Develop and adoption regulations for water conservation during periods of drought.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide (including all participating jurisdictions)
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce water consumption through water conservation measures during drought events.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	$5,000
Potential Funding Sources:	Local Funding; TWDB; State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County and Local Jurisdiction Administration
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	Drought Contingency Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		Hamilton County – Previous Action #19
	Proposed Action:	Revise and enhance local building codes to include additional development restrictions and construction techniques to reduce damages from natural hazard events.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide (including all participating jurisdictions)
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of damages to structures through improved construction practices; Reduce or eliminate damages to structures and infrastructure through development restrictions in high risk areas.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure (where applicable), Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire
Effect on New/Existing Buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$20,000
Potential Funding Sources:	Local Funding; State and Federal Grants
Lead Agency/Department Responsible:	Hamilton County and Local Jurisdiction Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes and Ordinances

2024 ANALYSIS:
Defer to plan update.

CITY OF HAMILTON

	City of Hamilton – Previous Action #1
Proposed Action:	Adopt and implement a program for cleaning debris from bridges, drains and culverts. Include provisions for trimming trees near power lines and along right-of-ways.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Maintain and/or improve drainage capacity. Reduce the risk of power outages due to downed trees and branches.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Tornado, Thunderstorm Wind, Hail, Lightning, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structure and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$50,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Emergency Management Division
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance, Operations and Maintenance Plan

2024 ANALYSIS:
Defer to plan update. On going.

	City of Hamilton – Previous Action #2
Proposed Action:	Adopt and enforce ordinance that regulates dumping in streams and ditches. Install signs prohibiting dumping in creeks, ditches, waterways and flood plain areas.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk to property and residents during a flooding event by effectively maintaining drainage capacity.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$5,000
Potential Funding Sources:	Local Revenue
Lead Agency/Department Responsible:	Emergency Management Division
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

2024 ANALYSIS:
Completed. The City implemented a bulk trash transfer station in 2018.

SECTION 22: PREVIOUS ACTIONS

	City of Hamilton – Previous Action #3
Proposed Action:	Distribute pamphlets with information on pre-disaster mitigation ideas, health and safety tips and local risk for all natural hazards.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk to property and residents during natural hazard events.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Dam Failure, Drought, Extreme Heat, Flood, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Low
Estimated Cost:	$5,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Emergency Management Division
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

City of Hamilton – Previous Action #4	
Proposed Action:	Incorporate higher standards for natural hazard resilience in local application of building codes including but not limited to: • Mandate the use of steel connectors in new and existing construction • Require manufactured housing be securely anchored to permanent foundations • Require fire-resistant roofing materials when re-roofing
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk to property and residents during hazard events through improved construction standards.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Flood, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to new or substantially improved structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Emergency Management Division
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes

2024 ANALYSIS:
Completed. The City adopted building codes in 2018.

SECTION 22: PREVIOUS ACTIONS

	City of Hamilton – Previous Action #5
Proposed Action:	Purchase and install a back-up generator with permanent quick connections at the public safety building.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City Hall / Police Department
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce loss of City services and reduce disaster response time.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Emergency Management Division
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

2024 ANALYSIS:
Defer to plan update. The City is currently applying for a grant. Update action cost to $450,000.

SECTION 22: PREVIOUS ACTIONS

	City of Hamilton – Previous Action #6
Proposed Action:	Upgrade the City's Emergency Notification System to provide faster and more detailed information on all natural hazard events. Expand and upgrade the Tornado Warning System. Purchase and distribute NOAA "all hazard" radios for early warning and post-event information and place in area schools, businesses and critical facilities.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk to residents and property.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Drought, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Emergency Management Division
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

2024 ANALYSIS:
Delete Action. The City is now using sirens and Code Red to notify residents of emergencies so this action is no longer a priority.

SECTION 22: PREVIOUS ACTIONS

		City of Hamilton – Previous Action #7
	Proposed Action:	Adopt and implement program for routine fire hydrant maintenance to ensure functionality during wildfire events.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk to residents and property.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	Emergency Management Division
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		City of Hamilton – Previous Action #8
	Proposed Action:	Regularly apprise local governing body of new mitigation measures.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Keep city government updated on mitigation efforts.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness (Preparedness)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	Negligible / Staff Time
Potential Funding Sources:	Local Revenue
Lead Agency/Department Responsible:	Emergency Management Division
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

	City of Hamilton – Previous Action #9	
	Proposed Action:	Adopt and enforce drought tolerant practices and regulations.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce impacts of drought on structures, infrastructure and natural environment.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	Reduce impact to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$5,000
Potential Funding Sources:	Local Funds
Lead Agency/Department Responsible:	Emergency Management Division
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

2024 ANALYSIS:
Completed. The City's Drought Contingency plan has been adopted and will be reviewed by the City Council every 5 years.

SECTION 22: PREVIOUS ACTIONS

	City of Hamilton – Previous Action #10
Proposed Action:	Develop diversion channel around wastewater treatment plant.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Hamilton wastewater treatment facility
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	The wastewater treatment plant was built near Pecan Creek. During long rainfall events the creek rises and the plant must be shut down (relocation of plant is not an option).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000,000
Potential Funding Sources:	Local Revenue, Bonds, TWDB, State and Federal Grants
Lead Agency/Department Responsible:	City Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		City of Hamilton – Previous Action #11
	Proposed Action:	Update and upgrade community pool and install splash pads.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Hamilton community pool on Pecan Street
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	The current pool leaks and needs to be resurfaced to prevent water loss; Splash pads will provide cooling center for residents during extreme heat events.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure (Drought) Education and Awareness (Extreme Heat)

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$200,000
Potential Funding Sources:	Local Revenue, Bonds, TX Parks and Wildlife
Lead Agency/Department Responsible:	City Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Defer to plan update.

CITY OF HICO

	City of Hico – Previous Action #1
Proposed Action:	Utilize social media and/or distribute pamphlets with information on pre-disaster mitigation ideas, health and safety tips and local risk for all natural hazards.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk to property and residents during natural hazard events.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Drought, Extreme Heat, Flood, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Delete Action. This action is no longer a priority for the City.

SECTION 22: PREVIOUS ACTIONS

		City of Hico – Previous Action #2
	Proposed Action:	Harden critical facilities; Install back-up generators with permanent hard wiring for all critical facilities.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide critical facilities
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of damages to critical facilities; Ensure continuity of emergency services.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Extreme Heat, Flood, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$100,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

2024 ANALYSIS:
Defer to plan update.

SECTION 22: PREVIOUS ACTIONS

		City of Hico – Previous Action #3
	Proposed Action:	Adopt and implement program to clean and clear debris from drainage ditches and culverts; Upgrade undersized culverts to increase capacity.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide drainage system
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk of damages to structures and infrastructure through maintaining or improving drainage capacity throughout the city.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing and future structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$250,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

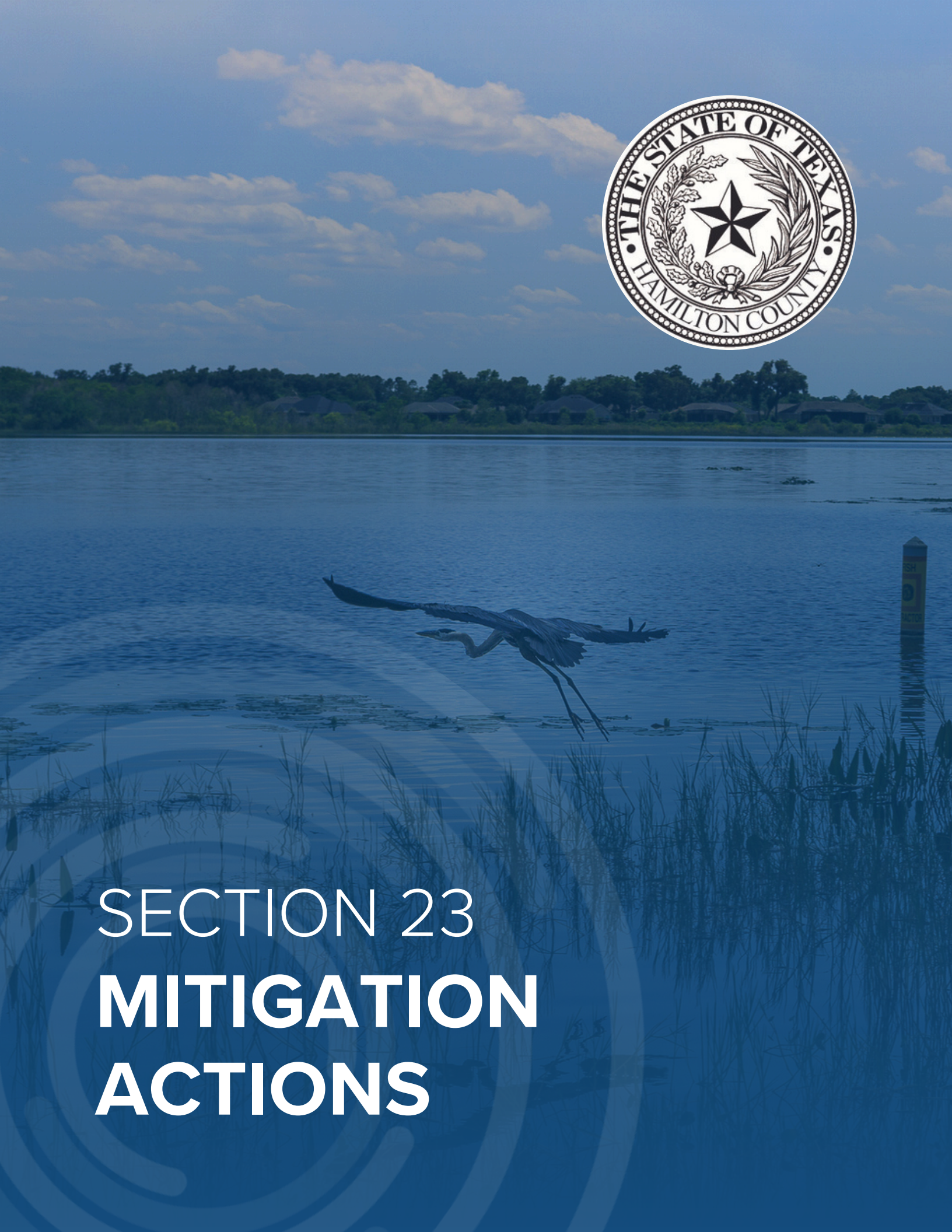
2024 ANALYSIS:
Delete Action. This action is no longer a priority for the City.

SECTION 22: PREVIOUS ACTIONS

		City of Hico – Previous Action #4
	Proposed Action:	Install drought tolerant landscaping at all public buildings.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City-wide public buildings
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce water usage at public facilities during times of drought; Increase water conservation.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	$5,000
Potential Funding Sources:	Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	N/A

2024 ANALYSIS:
Completed.



SECTION 23

MITIGATION ACTIONS

SECTION 23: 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 residents 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.

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 Hamilton County, the City of Hamilton, and the City of Hico.

SECTION 23: MITIGATION ACTIONS

Table 23-1. Hamilton County Mitigation Action Matrix

TYPE OF ACTION	
Action #1 – Plans/Regulations (Blue)	Action #4 – Structural (Orange)
Action #2 – Education/Awareness (Red)	Action #5 – Preparedness/Response
Action #3 – Natural Systems Protections (Green)	

JURISDICTION	Dam Failure	Drought	Earthquake	Expansive Soils	Extreme Heat	Flood	Hail	Hurricane/Tropical Storm	Lightning	Thunderstorm Wind	Tornado	Wildfire	Winter Storm
Hamilton County	●●●	●●●	●●	●●	●●●	●●●	●●●	●●	●●●	●●●	●●●	●●●●●	●●●
City of Hamilton	●●	●●	●●	●●	●●	●●●	●●●	●●	●●●	●●●	●●●	●●●	●●●
City of Hico	N/A	●●	●●	●●	●●	●●	●●	●●	●●	●●	●●	●●●	●●

HAMILTON COUNTY-WIDE ACTIONS

		Hamilton County-wide – Action #1
	Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate residents 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 residents 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, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, 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)	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.

	Hamilton County-wide – Action #2
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.
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, Expansive Soils
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:

		Hamilton 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 community-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, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, 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.

		Hamilton County-wide – Action #4
	Proposed Action:	Harden/retrofit critical facilities to hazard-resistant levels.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide and community-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, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, 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 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.

		Hamilton 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: City of Hamilton, City of Hico
	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:	N/A

COMMENTS:

HAMILTON COUNTY

		Hamilton County – Action #1
	Proposed Action:	Drainage improvements in the Pottsville neighborhood to reduce flood risk to structures and infrastructure.
	BACKGROUND INFORMATION	
	Site and Location:	Pottsville neighborhood
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood risk to previously flooded structures in the neighborhood.
	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)	Structure and Infrastructure
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$100,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

		Hamilton County – Action #2
	Proposed Action:	Design and implement flood control retention structure for the Cow House Creek.
	BACKGROUND INFORMATION	
	Site and Location:	Cow House Creek
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood risk to downstream structures and infrastructure through drainage retention and controlled release.
	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)	Structure and Infrastructure
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$1,000,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County Public Works
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

		Hamilton County – Action #3
	Proposed Action:	Developing a dam failure study and emergency action plan for Hamilton City Lake Dam.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood risk structures in inundation zone through improved risk analysis; Reduce risk of damages to structures.
	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)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$100,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County Public Works in coordination with the City of Hamilton
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	Emergency Action Plan (EAP)

COMMENTS:

		Hamilton County – Action #4
	Proposed Action:	Develop and implement plan to control brush and vegetation on county-maintained flood control structures.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide flood control structures
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood risk through maintaining maximum flow capacity; Reduce risk of damages to structures.
	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)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$20,000
Potential Funding Sources:	Local Funding
Lead Agency/Department Responsible:	Hamilton County Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		Hamilton County – Action #5
	Proposed Action:	Install high water signage and flood gates in high-risk areas.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide flood-prone areas
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injuries, fatalities and damages through education and 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:	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:	$100,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

		Hamilton County – Action #6
	Proposed Action:	Train firefighters in use of back burns and provide financial assistance to local fire departments for training and equipment.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide wildfire-prone areas
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of injuries, fatalities and damages through education and awareness; 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 Preparedness/Response

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:	$100,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County Fire Marshall
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

COMMENTS:

		Hamilton County – Action #7
	Proposed Action:	Acquire and install reinforced electric gates at Pecan Creek Dam.
	BACKGROUND INFORMATION	
	Site and Location:	Pecan Creek Dam
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages to infrastructure; 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:	Dam Failure
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 critical infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County Public Works in coordination with the City of Hamilton
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Action Plan (EAP)

COMMENTS:

		Hamilton County – Action #8
	Proposed Action:	Complete flood study for the unincorporated areas of the county and develop floodplain maps. Participate in the NFIP.
	BACKGROUND INFORMATION	
	Site and Location:	Hamilton County unincorporated areas
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve risk assessment; Reduce flood losses through regulated development; Ensure access to flood insurance for county residents.
	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 existing and future structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

		Hamilton County – Action #9
	Proposed Action:	Develop and implement an education and awareness program to provide residents with mitigation measures to reduce property losses as well as health and safety tips to protect residents from all hazards that can impact the community.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect residents 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, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, 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)	Communication
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$10,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County AgriLife Extension Service in cooperation with all jurisdictions
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

		Hamilton County – Action #10
	Proposed Action:	Upgrade low water crossings to prevent erosion and mitigate damages during flood events.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide low water crossings
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	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)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County and Local Jurisdiction Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
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 23: MITIGATION ACTIONS

		Hamilton County – Action #11
	Proposed Action:	Develop and implement fuels reduction program in the Wildland Urban Interface.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce wildfire risk to structures and infrastructure through proactive fuels reduction program.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	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 existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$250,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County and Local Fire Departments
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

COMMENTS:

		Hamilton County – Action #12
	Proposed Action:	Adopt and implement program to regularly clean and clear debris from bridges, streams, and culverts.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide drainage systems
	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)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County and Local Jurisdiction Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	County Maintenance Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

SECTION 23: MITIGATION ACTIONS

		Hamilton County – Action #13
	Proposed Action:	Adopt and implement tree trimming program along right-of-way; Remove dead and downed trees from drainage system.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide right-of-way and drainage systems
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of power outages and damages due to downed trees and limbs; Reduce flood damages by maintaining full drainage capacity.
	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, Hail, Lightning, Thunderstorm Wind, Tornado, 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:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County and Local Jurisdiction Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		Hamilton County – Action #14
	Proposed Action:	Install flood gauges in flood prone areas.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide flood hazard areas
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Improve risk assessment; Reduce risk to residents through improved monitoring and early warning.
	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 of injury to residents
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$10,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County and Local Jurisdiction Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
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 23: MITIGATION ACTIONS

		Hamilton County – Action #15
	Proposed Action:	Adopt and implement burn bans during periods of drought or other high wildfire risk periods.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of wildfires; Reduce risk of damages to structures; Reduce injuries and fatalities.
	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 existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,500
Potential Funding Sources:	Local Funding, 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:	Hamilton County and Local Jurisdiction Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances, Community Wildfire Protection Plan

COMMENTS:

		Hamilton County – Action #16
	Proposed Action:	Plant additional trees in parks and common areas near public buildings and parking lots to reduce heat island effect in developed areas and to provide shade for residents and visitors.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of heat island effect in developed areas; Provide shaded rest areas for residents.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Natural Systems Protection

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):	Low
Estimated Cost:	$1,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County and Local Jurisdiction Administration
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

COMMENTS:

		Hamilton County – Action #17
	Proposed Action:	Designate public facilities as heating and cooling centers for vulnerable populations during extreme temperatures; Educate residents on the location of designated centers and the operating procedures.
	BACKGROUND INFORMATION	
	Site and Location:	Locations to be determined per jurisdiction
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents 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)	Local Plans and Regulations 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):	Low
Estimated Cost:	$1,000
Potential Funding Sources:	Local Funding (staff time)
Lead Agency/Department Responsible:	Hamilton County and Local Jurisdiction Administration
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

		Hamilton County – Action #18
	Proposed Action:	Develop a drought contingency plan and adopt regulations for water conservation during periods of drought.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce water consumption during drought events; 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
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:	$5,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County and Local Jurisdiction Administration
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

		Hamilton County – Action #19
	Proposed Action:	Revise and enhance local building codes to include additional development restrictions and construction techniques to reduce damages from natural hazard events.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to structures through improved construction practices; Reduce or eliminate damages to structures and infrastructure through development restrictions in high-risk 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:	Dam Failure, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, 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
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$20,000
Potential Funding Sources:	Local Funding, 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:	Hamilton County and Local Jurisdiction Administration
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes and Ordinances

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

CITY OF HAMILTON

	City of Hamilton – Action #1	
	Proposed Action:	City Lake Dam Rehabilitation
	BACKGROUND INFORMATION	
	Site and Location:	City Lake 1157 E. St. Highway 22 Hamilton, TX 76531 GPS - 31°42'10.7"N 98°04'53.4"W
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Prevent flood risk and damages; Reduce risk to major transportation networks.
	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:	Reduces risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$12,000,000
Potential Funding Sources:	Local Funding, Staff time, Bonds, Tax Revenue; State Grants: GLO, TAMFS, TDA, TDEM, TWDB, TXDOT; Federal Grants: FEMA HMA Grants, HHPD, CDBG, CDC, DOH, EDA, EPA, HUD, NFIP, NFWF, NOAA, NRCS, SBA, USACE, USDA, USFS, USFWS
Lead Agency/Department Responsible:	City Administration, Emergency Management Division
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

		City of Hamilton – Action #2
	Proposed Action:	Adopt and implement a program for cleaning debris from bridges, drains, and culverts. Include provisions for trimming trees near power lines and along rights-of-ways.
	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)	Local Plans and Regulations Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, 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 existing structure and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$50,000
Potential Funding Sources:	Local Funding, 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:	Emergency Management Division
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance, Operations and Maintenance Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		City of Hamilton – Action #3
	Proposed Action:	Distribute pamphlets with information on pre-disaster mitigation ideas, health and safety tips and local risk for all natural hazards.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect residents 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, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, 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)	Communication
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Low
Estimated Cost:	$5,000
Potential Funding Sources:	Local Funding, 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:	Emergency Management Division
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

		City of Hamilton – Action #4
	Proposed Action:	Purchase and install a back-up generator with permanent quick connections at critical facilities, including the public safety building.
	BACKGROUND INFORMATION	
	Site and Location:	City Hall / Police Department Water Treatment Plant Wastewater Treatment Plant
	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, Drought, Earthquake, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, 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:	$450,000
Potential Funding Sources:	Local Funding, 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:	Emergency Management Division
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

		City of Hamilton – Action #5
	Proposed Action:	Develop and implement a plan to control brush and vegetation on all city-maintained flood control structures.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide flood control structures (3 control dams and City Lake)
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce flood risk through maintaining maximum flow capacity; Reduce risk of damages to structures.
	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, 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 existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	Local Funding, 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:	Emergency Management Division
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		City of Hamilton – Action #6
	Proposed Action:	Adopt and implement program for routine fire hydrant maintenance to ensure functionality during wildfire events.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk to residents and property.
	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:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,000
Potential Funding Sources:	Local Funding, 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:	Emergency Management Division
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinance

COMMENTS:

		City of Hamilton – Action #7
	Proposed Action:	Regularly apprise local governing body of new mitigation measures.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Keep city government updated on mitigation efforts; Promote hazard and risk 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, Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, 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):	Low
Estimated Cost:	Local Budget, Staff Time
Potential Funding Sources:	Local Revenue
Lead Agency/Department Responsible:	Emergency Management Division
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

		City of Hamilton – Action #8
	Proposed Action:	Develop diversion channel around wastewater treatment plant.
	BACKGROUND INFORMATION	
	Site and Location:	Hamilton wastewater treatment facility
	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

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)	Water Systems
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000,000
Potential Funding Sources:	Local Funding, 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 Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		City of Hamilton – Action #9
	Proposed Action:	Update and upgrade community pool and install splash pads.
	BACKGROUND INFORMATION	
	Site and Location:	Hamilton community pool on Pecan Street
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Promote hazard awareness and protect residents from potential injuries and fatalities.
	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
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):	Moderate
Estimated Cost:	$200,000
Potential Funding Sources:	Local Funding, 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 Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:

		City of Hamilton – Action #9
	Proposed Action:	Upgrade low water crossings and storm drainage to prevent erosion and mitigate street damage.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide low water crossings and drainage system
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce damages caused by flooding by maintaining or restoring drainage capacity; 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:	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 existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000,000
Potential Funding Sources:	Local Funding, 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 Public Works
Implementation Schedule:	Within 24-48 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

CITY OF HICO

		City of Hico – Action #1
	Proposed Action:	Harden/retrofit critical facilities to hazard-resistant levels.
	BACKGROUND INFORMATION	
	Site and Location:	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:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, 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 existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$100,000
Potential Funding Sources:	Local Funding, 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 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation, and prevents injury to residents.

		City of Hico – Action #2
	Proposed Action:	Install back-up generators with permanent hard wiring for all critical facilities.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide critical facilities
	Risk Reduction Benefit: (Current Cost/Losses Avoided)	Reduce risk of damages to critical facilities; Ensure continuity of emergency services.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

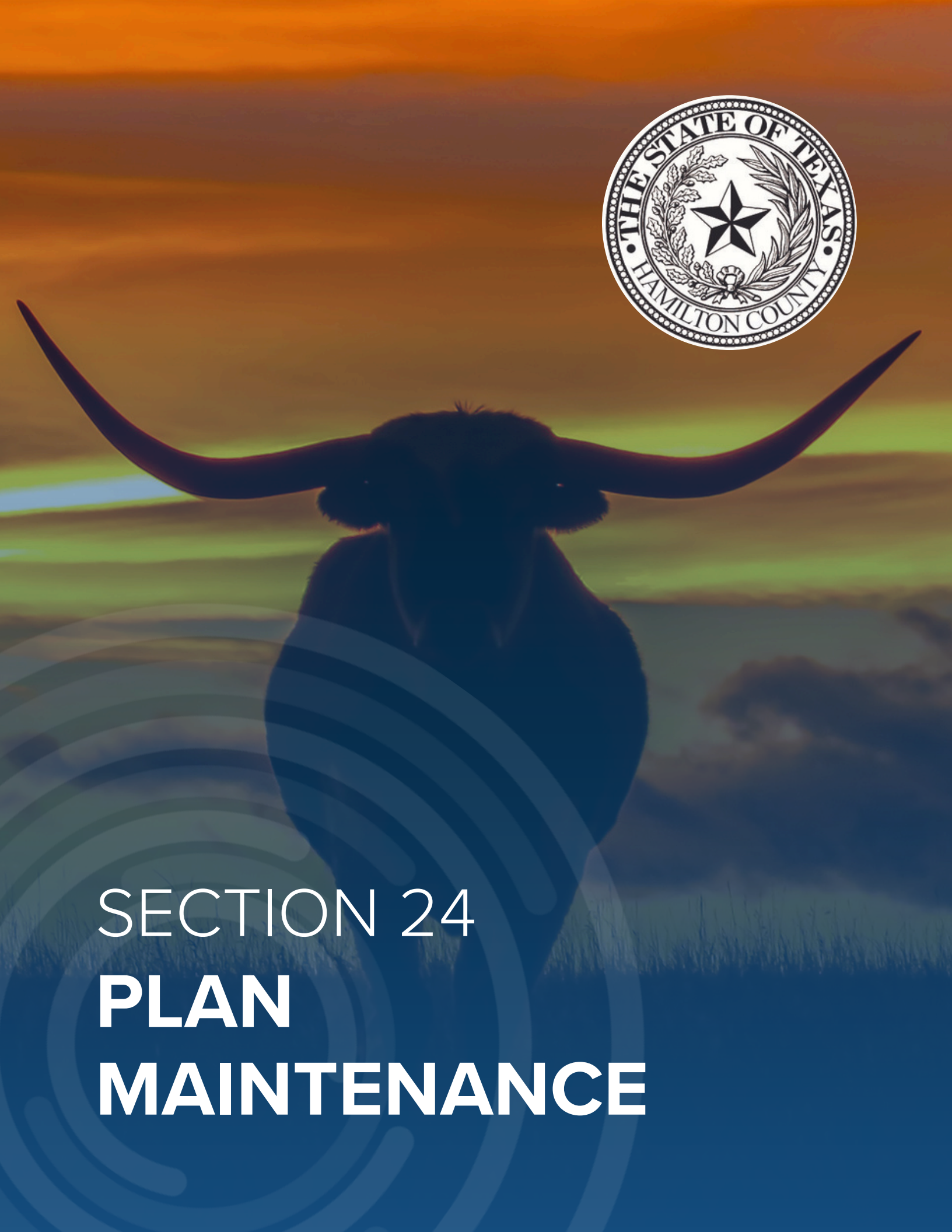
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Earthquake, Expansive Soils, Extreme Heat, Flood, Hail, Hurricane / Tropical Storm, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline: (Safety/Security, Food, Hydration, Shelter, Health/Medical, Energy (Power/Fuel), Communications, Transportation, Hazardous Materials, Water Systems)	Energy (Power/Fuel)
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$500,000
Potential Funding Sources:	Local Funding, 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 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

		City of Hico – Action #3
	Proposed Action:	Build safe room shelters throughout the jurisdiction so that residents can reach shelter in less than five minutes.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	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:	Hurricane / Tropical Storm, Lightning, 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):	Low
Estimated Cost:	$1,000,000
Potential Funding Sources:	Local Funding, 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 48 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:



SECTION 24

PLAN MAINTENANCE

SECTION 24: PLAN MAINTENANCE

Plan Maintenance Procedures 1
Incorporation 1
Process of Incorporation 1
Monitoring and Evaluation 4
Monitoring 4
Evaluation 5
Updating 5
Plan Revisions 5
Five (5) Year Review 5
Continued Public Involvement 6

PLAN MAINTENANCE PROCEDURES

The following is an explanation of how the participating jurisdictions within Hamilton 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 Hamilton 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 Hamilton 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 Hamilton 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 24: 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 hazard mitigation Plan Update, existing planning mechanisms will be reviewed by each jurisdiction.

The Central Texas Council of Governments (CTCOG) and Hamilton County are 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 24-1 identifies types of planning mechanisms and examples of methods for incorporating the Plan Update into other planning efforts. The team members, listed in Table 24-2 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 24-1. Methods of Incorporation of the Plan

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
Annual Budget Review	Hamilton County: EM & Communications Administrator City of Hamilton: City Administrator City of Hico: City Administrator	Various departments and key personnel that participated in the planning process for participating jurisdictions within Hamilton 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 24: PLAN MAINTENANCE

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
Capital Improvement Plans	City of Hico: City Administrator	One participating jurisdiction within Hamilton County, City of Hico, has 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 Hamilton: City Administrator City of Hico: City Administrator	The cities of Hamilton and Hico have Long-term Comprehensive 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	City of Hamilton: Floodplain Administrator City of Hico: 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 10 of this Plan Update discussing the people and property at risk to flood will be reviewed and revised when participating jurisdictions within Hamilton County update their management plans or develops new plans.
Grant Applications	Hamilton County: EM & Communications Administrator City of Hamilton: City Administrator City of Hico: City Administrator	The Plan will be evaluated by participating jurisdictions within Hamilton 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	Hamilton County: EM & Communications Administrator City of Hamilton: City Administrator City of Hico: City Administrator	Currently, all participating jurisdictions within Hamilton County have regulatory plans in place, such as Emergency Operations Plans, Continuity of Operations Plans, Land

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
		Use Plans, and Evacuation Plans. The Plan Update will be consulted when county or city 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 24-2 indicates the department and title of the party responsible for Plan monitoring, evaluating, updating, and review of the Plan.

Table 24-2. Team Members Responsible for Plan Monitoring, Evaluating, Updating, and Review of the Plan

JURISDICTION	TITLE
Hamilton County	EM & Communications Administrator
City of Hamilton	City Administrator
City of Hico	City Administrator

MONITORING

Designated Planning Team members are responsible for monitoring, evaluating, updating, and reviewing the Plan, as shown in Table 24-2. Individuals holding the title listed in Table 24-2 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 and City 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.

SECTION 24: PLAN MAINTENANCE

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.

UPDATING

PLAN REVISIONS

At any time, minor technical changes may be made to update the Hamilton 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 CTCOG, along with the participating jurisdictions within Hamilton 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 Hamilton 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.

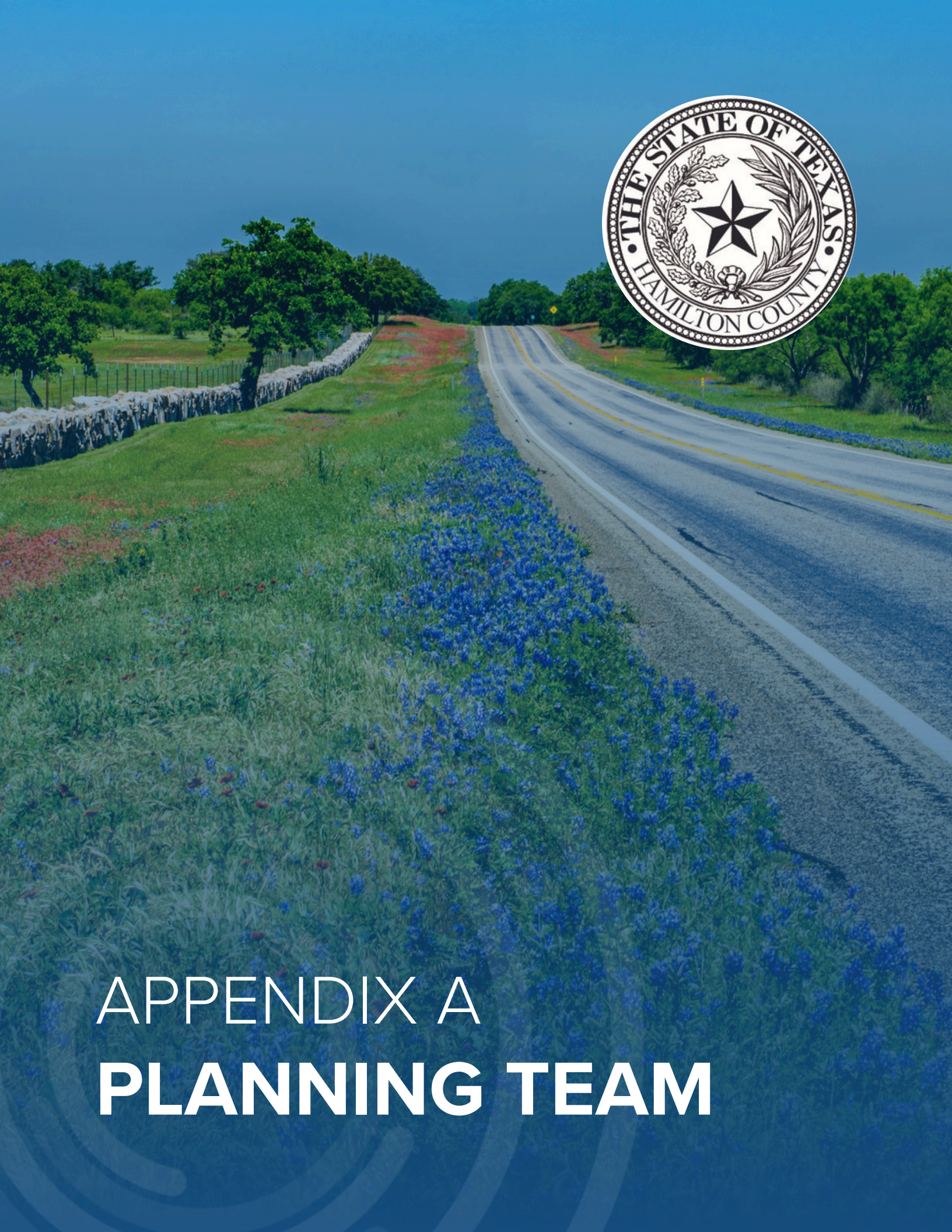
CONTINUED PUBLIC INVOLVEMENT

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.

The public can review the Plan on the CTCOG's or participating jurisdictions' websites, or at the CTCOG Office, 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, 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 2

PLANNING TEAM MEMBERS

The Hamilton 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
Central Texas Council of Governments	Emergency Services Program Manager
Central Texas Council of Governments	Planning & Regional Service Director
Central Texas Council of Governments	Special Projects Coordinator
Hamilton County	Emergency Management Coordinator & Communications Administrator
City of Hamilton	City Administrator
City of Hico	City Administrator

Table A-2. Advisory Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Hamilton County	County Auditor / Administrative Assistant
Hamilton County	County Judge
Hamilton County	County Sheriff
Hamilton County	Facilities Maintenance Manager
Hamilton County	Precinct 1 Commissioner
Hamilton County	Precinct 2 Commissioner
Hamilton County	Precinct 3 Commissioner
Hamilton County	Precinct 4 Commissioner
City of Hamilton	Building & Planning / Code Enforcement
City of Hamilton	Chief of Police

APPENDIX A: PLANNING TEAM

ORGANIZATION / DEPARTMENT	TITLE
City of Hamilton	City Secretary
City of Hamilton	Executive Director of Economic Development Corporation
City of Hamilton	Mayor
City of Hico	Chief of Police
City of Hico	City Secretary
City of Hico	Mayor

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 e-mail throughout the planning process. Many of the invited 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 E[1].

Table A-3. Stakeholders

AGENCY	TITLE	STAKEHOLDER TYPE
Advent Health Central Texas	Bell County - Killeen	Health Care Facility
Advent Health Central Texas	Safety Officer	Health Care Facility
Amateru Radio Races	Radio Broadcaster	Community Organization
American Red Cross	Community Preparedness	Non-Profit / Community Organization
American Veterans Mission	General Representative	Community Organization
Area Agency on Aging of Central Texas	Supervisor	Community Organization
Bartlett ISD	Superintendent	Academia
Baylor, Scott & White Hospital	Regional Director of Emergency Management	Health Care Facility
Bell County Animal Shelter	General Representative	Community Organization
Bell County Public Health	Emergency Preparedness Representative	Community Organization

[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
Bell County WCID #1	General Representative	Utility Provider
Bell County WCID #3	General Representative	Utility Provider
Bell County Storm Water Management	Engineering Tech	Utility Provider
Belton Economic Development	Executive Director	Community Organization
Belton Fire Corporation	Office Manager	Community Organization
Belton Fire Corporation	President	Community Organization
Belton ISD	Coordinator of Emergency Management	Academia
Bosque County	Emergency Management Coordinator	Neighboring Community
Bring Everyone in the Zone	Executive Director	Non-Profit / Community Organization
BSWH-Faith Community Health	Director	Health Care Facility
Burleson County	Emergency Management Coordinator	Neighboring Community
Burnet County	Emergency Management Coordinator	Neighboring Community
Carl R Darnall Army Medical Center	Bell County – Fort Cavazos	Health Care Facility
Central Texas 4C	Executive Director	Non-Profit / Community Organization
Central Texas College	Chancellor	Academia
Central Texas Food Bank	Communications Representative	Community Organization
Citizens for Progress	President	Community Organization
Clearwater Underground Water Conservation District	General Manager	Utility Provider
Comanche County	Emergency Management Coordinator	Neighboring Community
Communities in Schools – Greater Central Texas	CEO	Community Organizations
Department of Homeland Security	Media Representative	Federal Agency
Eagle Waste Disposal – Salado	General Representative	Utility Provider
Environmental Protection Agency	General Representative	Federal Agency

APPENDIX A: PLANNING TEAM

AGENCY	TITLE	STAKEHOLDER TYPE
Erath County	Emergency Management Coordinator	Neighboring Community
Falls County	Emergency Management Coordinator	Neighboring Community
Food Care Center	General Representative	Non-Profit / Community Organization
Fort Cavazos	Director, Public Affairs	Army Base
Fort Cavazos	Chief Community Relations	Army Base
Fort Cavazos	Chief Media Relations	Army Base
Gause ISD	Superintendent	Academia
Grand Central Texas	Economic Development – Belton	Regional Agency
Grand Central Texas	Economic Development - Temple	Regional Agency
Goldthwaite Eagle	Reporter	Community Organization
Goldthwaite Municipal Airport	General Representative	Community Organization
Hamilton County Hospital District	Director of EMS & Emergency Management	Health Care Facility
Hamilton Hearld News	Editor	Community Organization
Hamilton ISD	Superintendent	Academia
Hispanic American Chamber of Commerce of Central Texas	General Representative	Community Organization
Holland ISD	Superintendent	Academia
HOME / Community Development	Director	Community Organization
HOP/Hill Country Transit District	Chief Safety and Security Officer	Community Organization
Innovation Black Chamber of Commerce	General Representative	Community Organization
Kempner Family Community Development	Director	Community Organization
Killeen-Fort Hood Regional Airport	General Representative	Community Organization
Killeen ISD	Superintendent	Academia
Killeen Water and Sewer	Director of Water and Sewer Facilities	Utility Provider

APPENDIX A: PLANNING TEAM

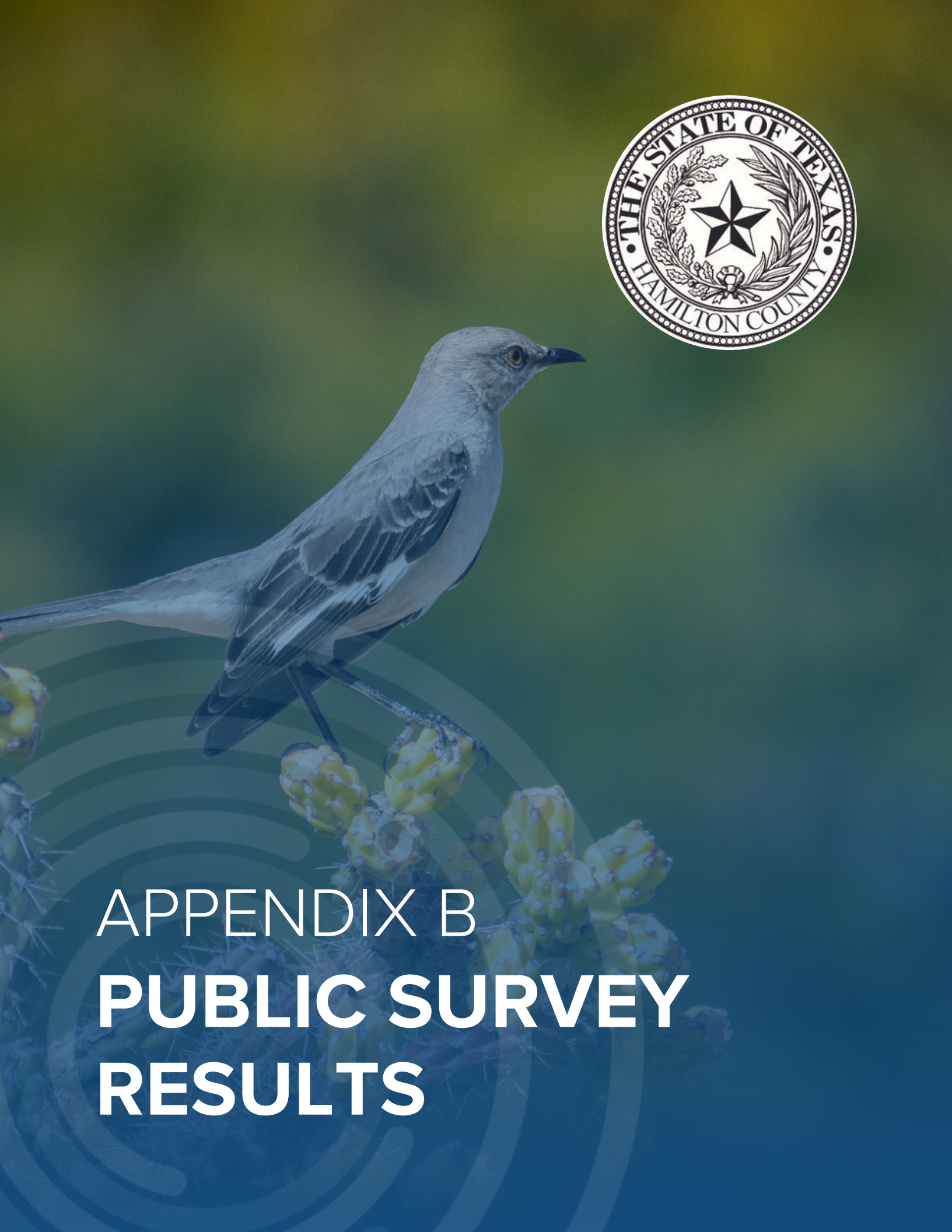
AGENCY	TITLE	STAKEHOLDER TYPE
Lampasas County Chamber of Commerce	General Representative	Community Organization
Lampasas Dispatch Record	News Reporter	Community Organization
Lampasas ISD	Superintendent	Academia
Lee County	Emergency Management Coordinator	Neighboring Community
Lometa ISD	Superintendent	Academia
McLennan County	Emergency Management Coordinator	Neighboring Community
Mills County Ministerial Association	Representative	Community Organization
Milam County	Emergency Management Coordinator/Homeland Security	Neighboring Community
NOAA	General Representative	Federal Agency
Rehab Warriors	President of Business Development & Government Affairs	Community Organization
Robertson County	Emergency Management Coordinator	Neighboring Community
Rogers ISD	Superintendent	Academia
Office of Rural and Community Affairs	Executive Director	State Agency
Olin E. Teague Veteran's Medical Center	Office of Public Information	Health Care Facility
Salado ESD/VFD	Fire Chief	Community Organization
Salado ISD	Superintendent	Academia
Salado Water Supply Corporation	General Manager	Utility Provider
Salvation Army	Director of Social Services for Bell County	Non-Profit / Community Organization
Salvation Army	General Representative for Lampasas County	Non-Profit / Community Organization
San Saba County	Emergency Management Coordinator	Neighboring Community
Seton Medical Center	Vice President Operations	Health Care Facility
Somervell County	Emergency Management Coordinator/County Judge	Neighboring Community

APPENDIX A: PLANNING TEAM

AGENCY	TITLE	STAKEHOLDER TYPE
Sutron Environmental & Hydrological	General Representative	Private Organization
SVFD	Communications Representative	Community Organization
Teex TAMU	Regional Training Manager	Community Organization
Temple College	Associate Vice President / Chief of Operations	Academia
Temple College	University Police Department	Academia
Temple ISD	Superintendent	Academia
Texas A&M AgriLife Extension	Bell County Representative	State Agency
Texas A&M AgriLife Extension	Hamilton County Representative	State Agency
Texas A&M AgriLife Extension	Lampasas County Representative	State Agency
Texas A&M AgriLife Extension	Mills County Representative	State Agency
Texas A&M Central Texas	Safety & Risk Management Officer	Academia
Texas A&M Forest Service	City of Hamilton General Representative	State Agency
Texas A&M Forest Service	City of Temple General Representative	State Agency
Texas Department of Transportation	Safety Coordinator for Coryell, Bell and Miliam	State Agency
Texas Division of Emergency Management	District Coordinator	State Agency
Texas Division of Emergency Management	Regional Representative for Mills and Hamilton County	State Agency
Texas State Legislature	Representative District 59	State Agency
Texas State Legislature	Representative District 54	State Agency
Texas State Legislature	Representative District 55	State Agency
Texas State Senate	Senator District 24	State Agency
Texas State Soil & Water	Field Representative	State Agency
Texas State Soil & Water	Field Representative for Hamilton-Coryell SWCID #506	State Agency

APPENDIX A: PLANNING TEAM

AGENCY	TITLE	STAKEHOLDER TYPE
Texas State Soil & Water	Field Representative for Mills County SWCID #554	State Agency
Texas Water Development Board	Communications Representative	State Agency
Texas Windstorm Association	General Representative	State Agency
Troy ISD	Superintendent	Academia
University of Mary Hardin-Baylor	Senior Vice President of Administration & Chief Operating Officer	Academia
University of Mary Hardin-Baylor	University Police Department	Academia
University of Mary Hardin-Baylor	Vice President for Policy and Risk Management	Academia
U.S. Fish & Wildlife	Southwest Regional Representative	Federal Agency
U.S. Army Corps of Engineers	Southwest Regional Representative	Federal Agency
Veteran Services	Director of Bell County	Community Organization
Veteran Services	Lampasas County VSO	Community Organization
Veteran Services	Mills County VSO	Community Organization
Williamson County	Emergency Management Coordinator	Neighboring Community
Workforce Solutions of Central Texas	Supervisor	Community Organization



APPENDIX B
PUBLIC SURVEY RESULTS

APPENDIX B: PUBLIC SURVEY RESULTS

Overview 1
Public Survey Results 2

OVERVIEW

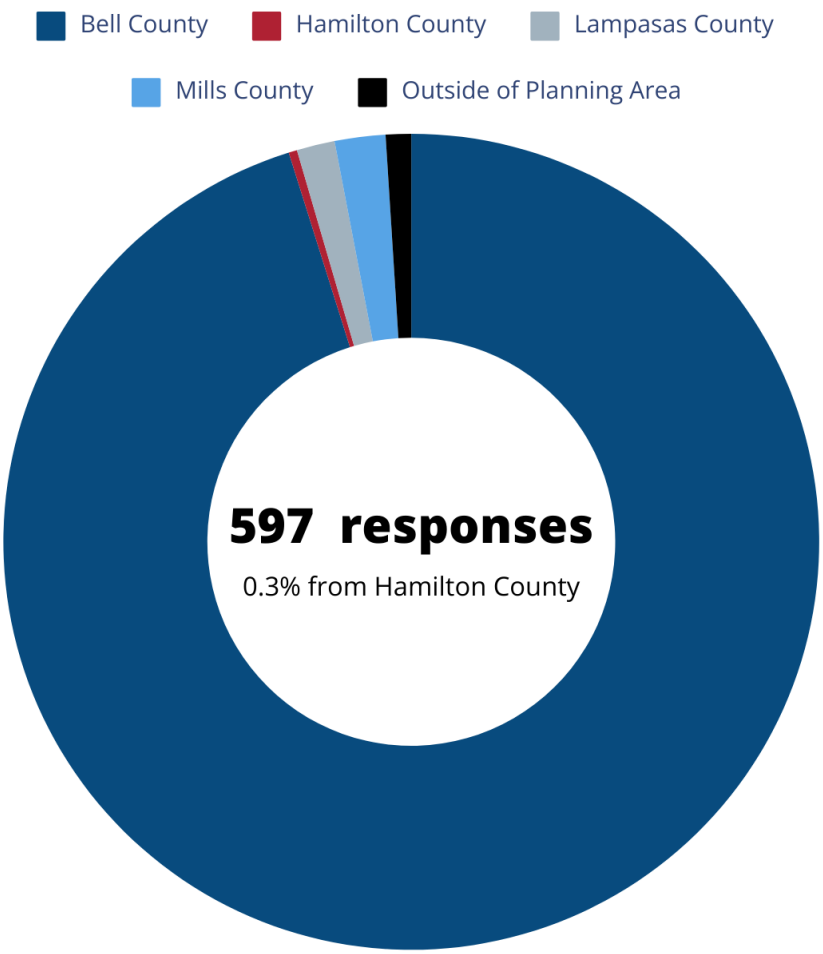
Central Texas Council of Governments (CTCOG) prepared a public survey that requested public opinion on a wide range of questions relating to natural hazards. The survey was made available through the participating counties and jurisdictions' websites. This survey link was also distributed at public meetings and stakeholder events throughout the planning process.

A total of 597 surveys were collected across the four participating counties, 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 mitigation actions or problem areas.

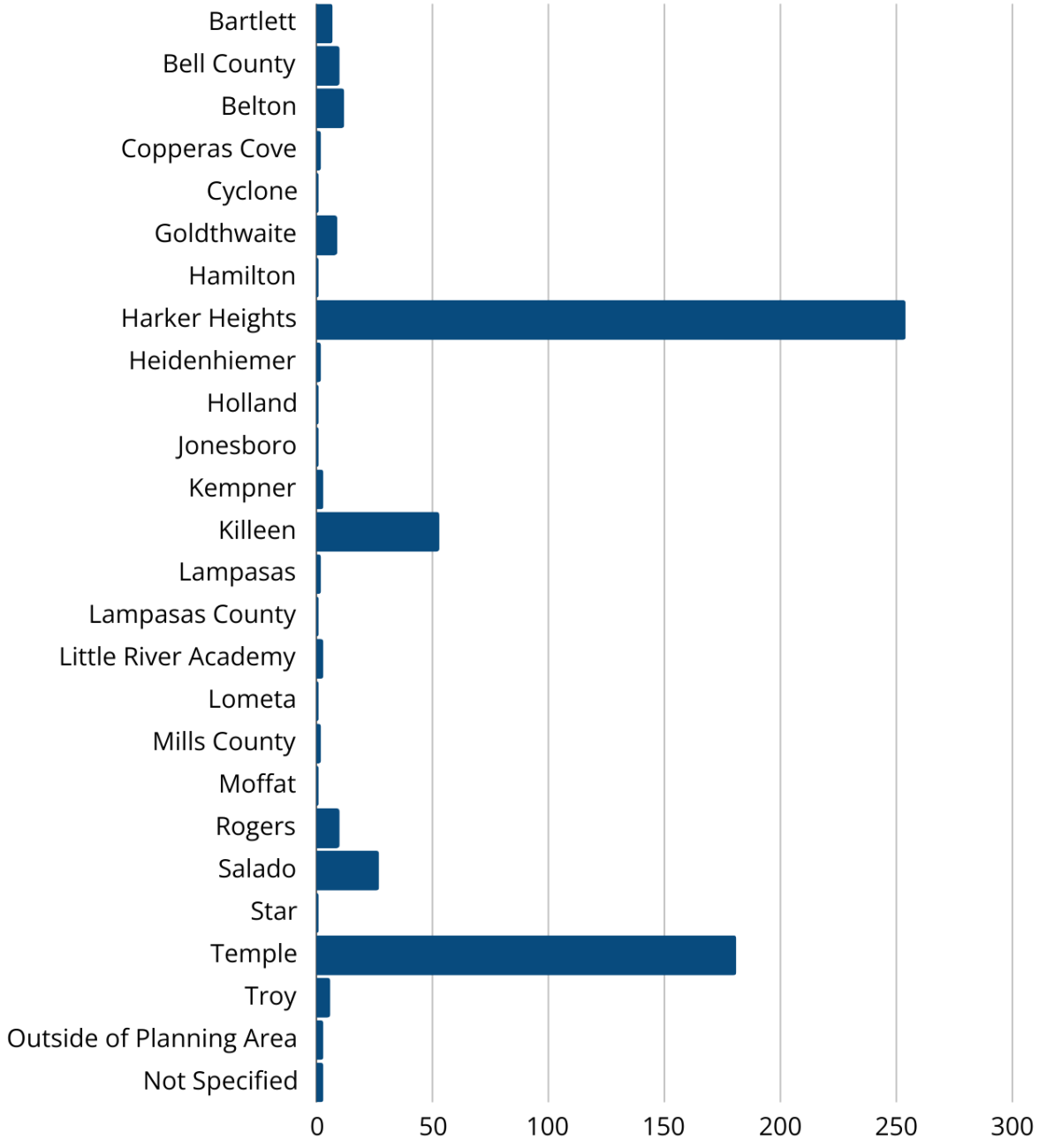
All public survey results were discussed and shared with the Planning Team during the Mitigation Strategy Workshop. These results are also provided below. The survey results provide information regarding the public's experience with natural hazards, their perceived hazards of concern, recommended mitigation 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.

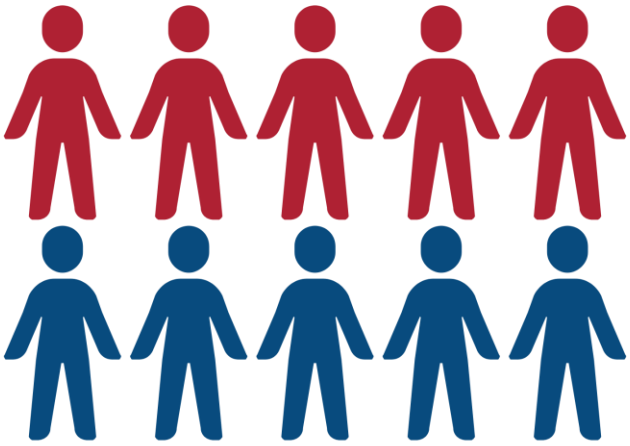
PUBLIC SURVEY RESULTS

Responses by County:



Responses by Jurisdiction:





48.24% of survey responders have been impacted by a disaster.

Personal experiences shared in survey responses included:

"2011 drought, 2021 winter storm / no electricity so froze our pipes which burst, causing about $300,000.00 damage"

"We experienced a swimming pool business had a chemical explosion with chlorine fumes in the air in Temple, Belton and Nolanville. Tornadoes in Jarrell, Salado. There was a bridge on I35 in Salado. Shooting on Fort Hood."

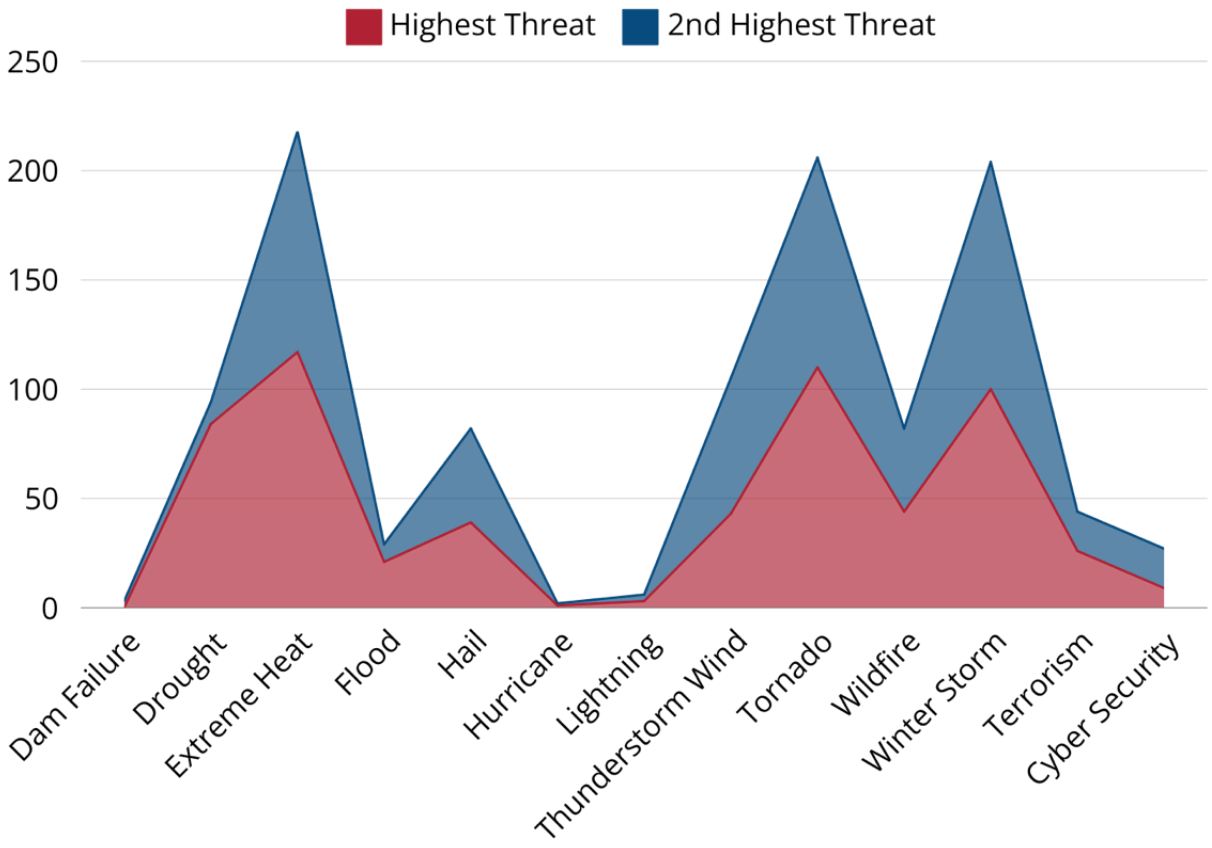
"No power for nearly a week after Winter Storm Uri (2021); air conditioning failure at both work and home during extreme heat (2023); drought effects on yard, trees, house, foundations, and community; severe weather - wind and hail (annually)"

"I have experienced Tornadoes, drought, flooding, active shooters, and the COVID pandemic over the past 48 years of living in Bell County."

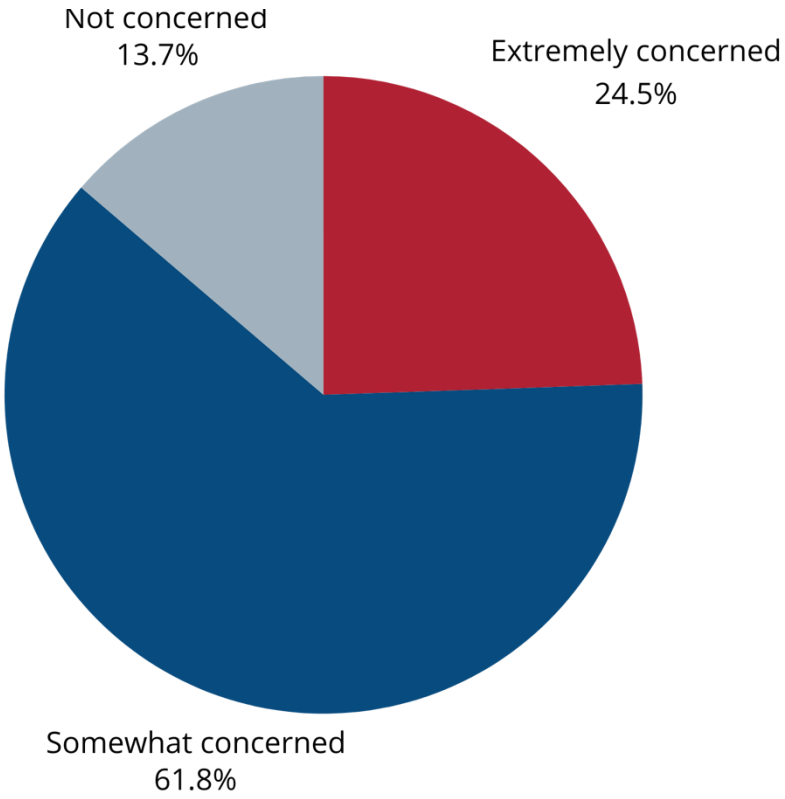
48% of those who have been impacted by a disaster mentioned winter storms in their response.



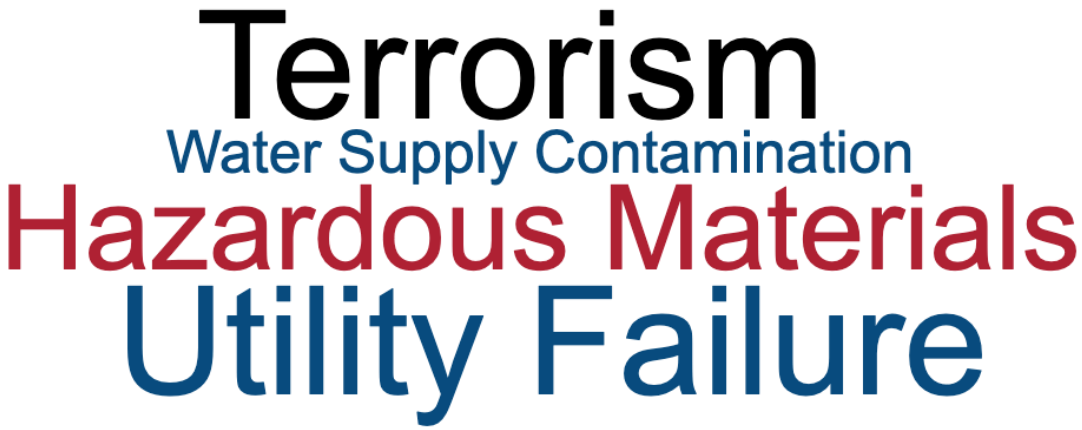
Hazards that pose the highest perceived threat level:



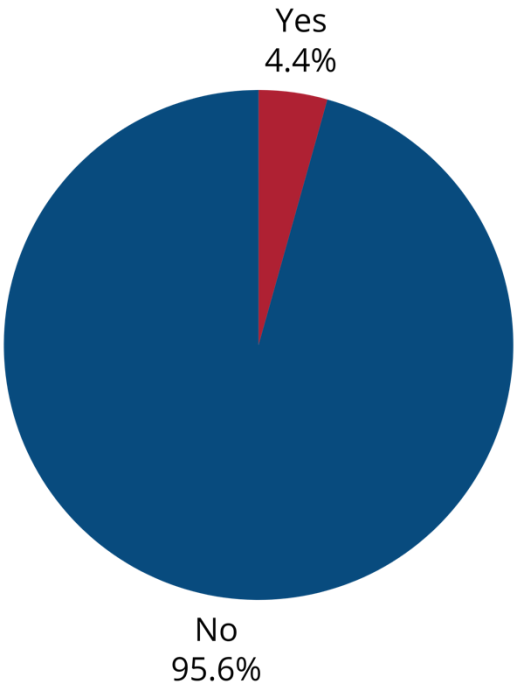
Concern level for potential hazard impacts:



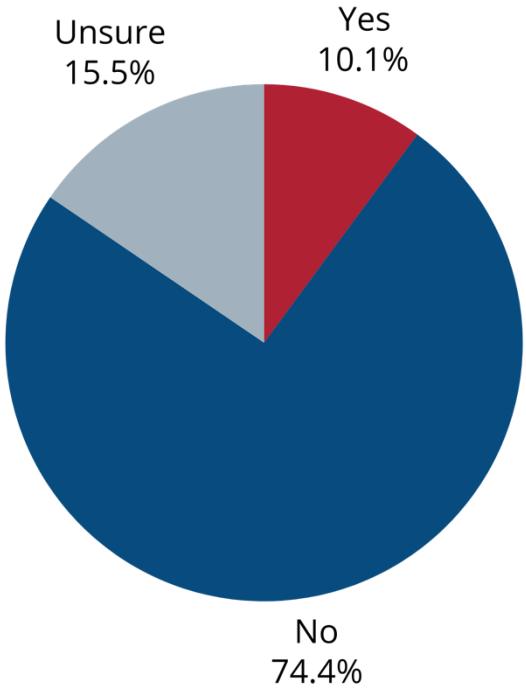
Hazards not profiled in the Hazard Mitigation Plan update that are of concern included:



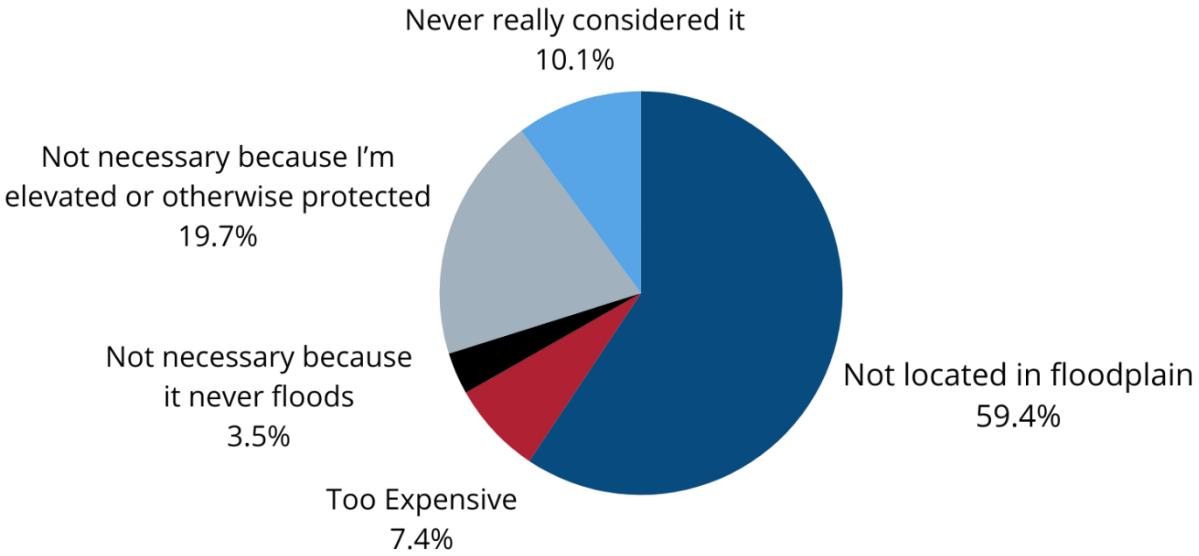
Home is in floodplain:



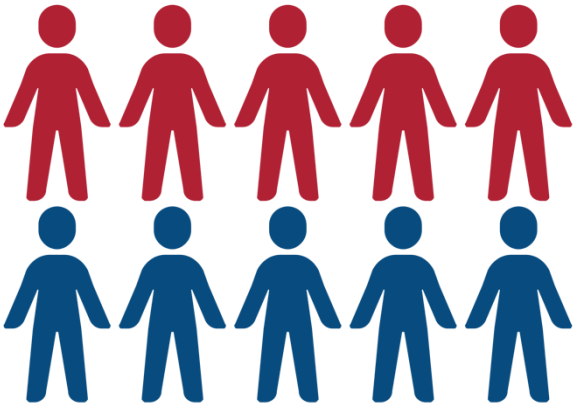
Has flood insurance:



Reasoning for not having flood insurance:

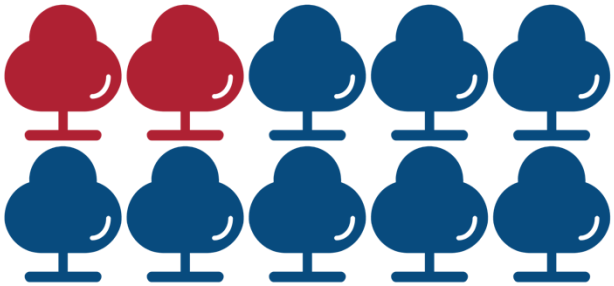


Have you taken any actions to make your home or neighborhood more resistant to hazards?



83.42% responded 'Yes'

23% have taken action through tree / debris management.



83.24% of all survey responders are interested in making their home more resistant to hazards.



Actions taken included:

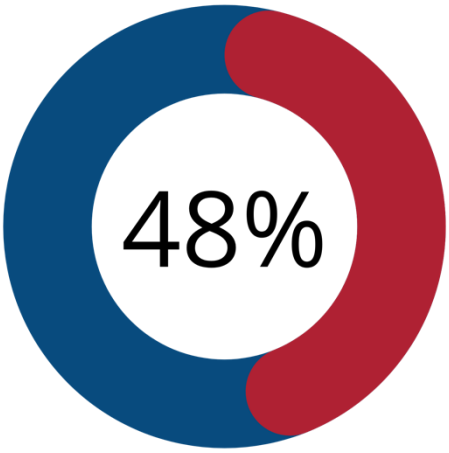
"Updated insulation in attic and added radiant barrier to save on energy and protect against extreme heat. Also updated old air conditioner condenser."

"Home improvement's such as rain gutters, home insulation, upgraded home windows, front and rear patio covers, planted trees and scrubs."

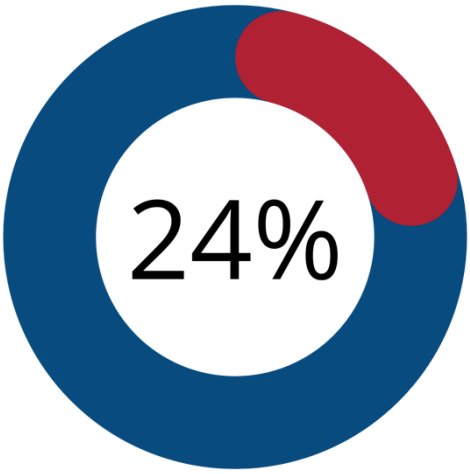
"Attempt to remove obstructions (plants, trees, debris, trash) to natural flow of storm water. Try to keep valuables on higher ground whenever possible."

"Had trees trimmed near power lines to avoid power outage due to ice / snow storms."

Effectiveness of communication methods for receiving information about how to make your home and neighborhood more resistant to hazards.



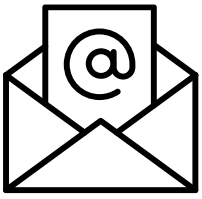
Selected 'Internet'



Selected 'Mail'

Other responses: Public Workshops/Meetings 7.04%, Newspaper 6.37%, Television 5.19%, Radio 0.5%, School Meetings 0.34%.

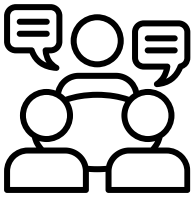
Additional communication methods suggested:



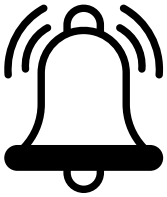
Email



Social Media



Neighborhood Meetings



Alerts

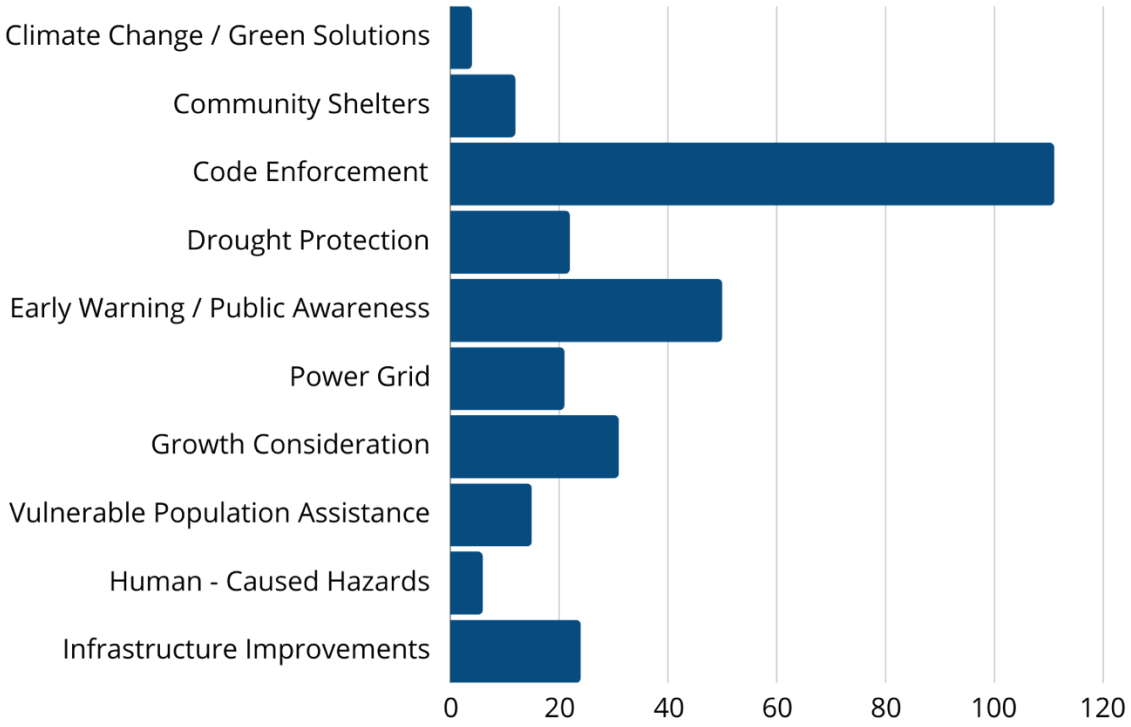


Texts

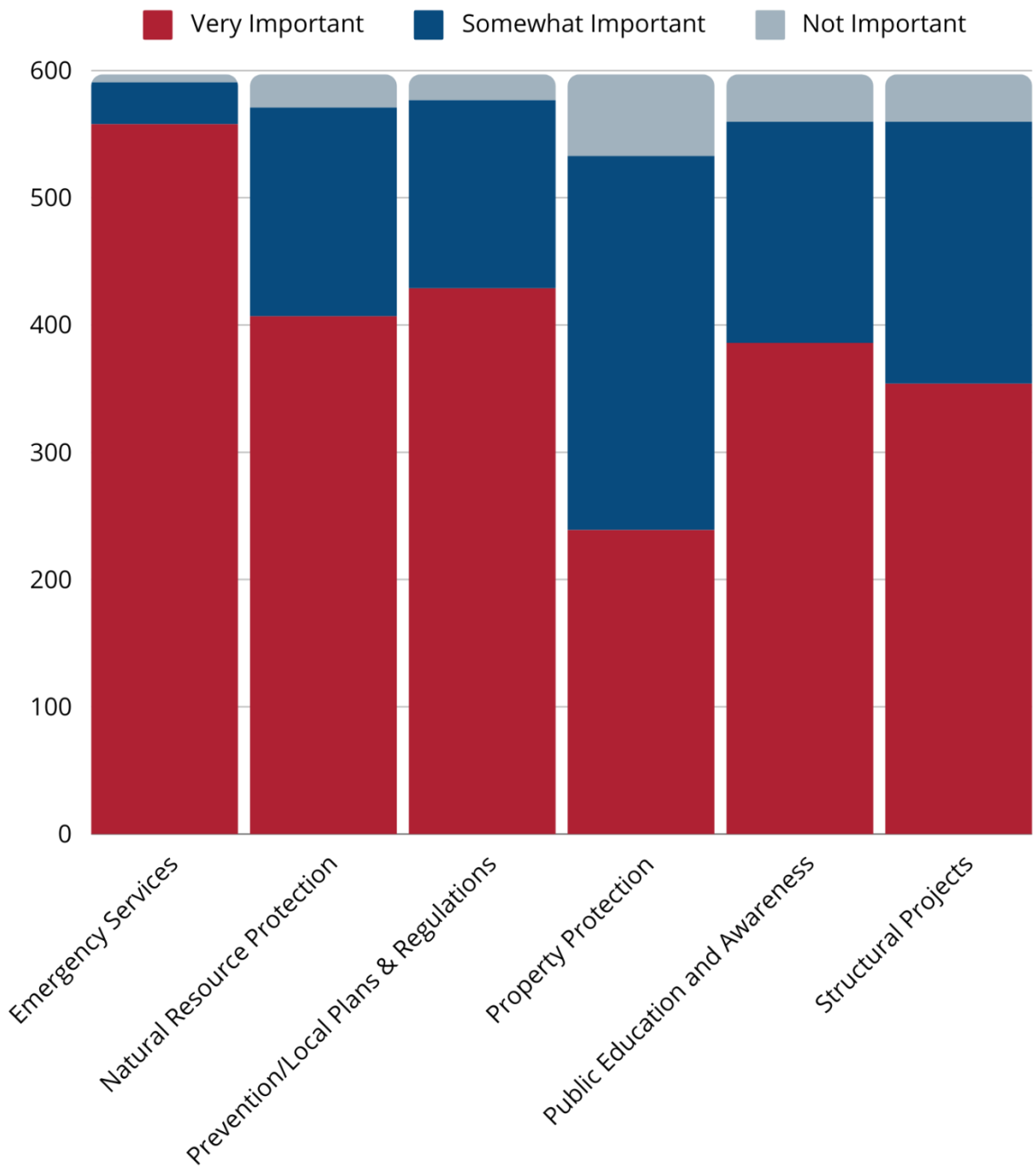
Steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood:



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



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.

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.

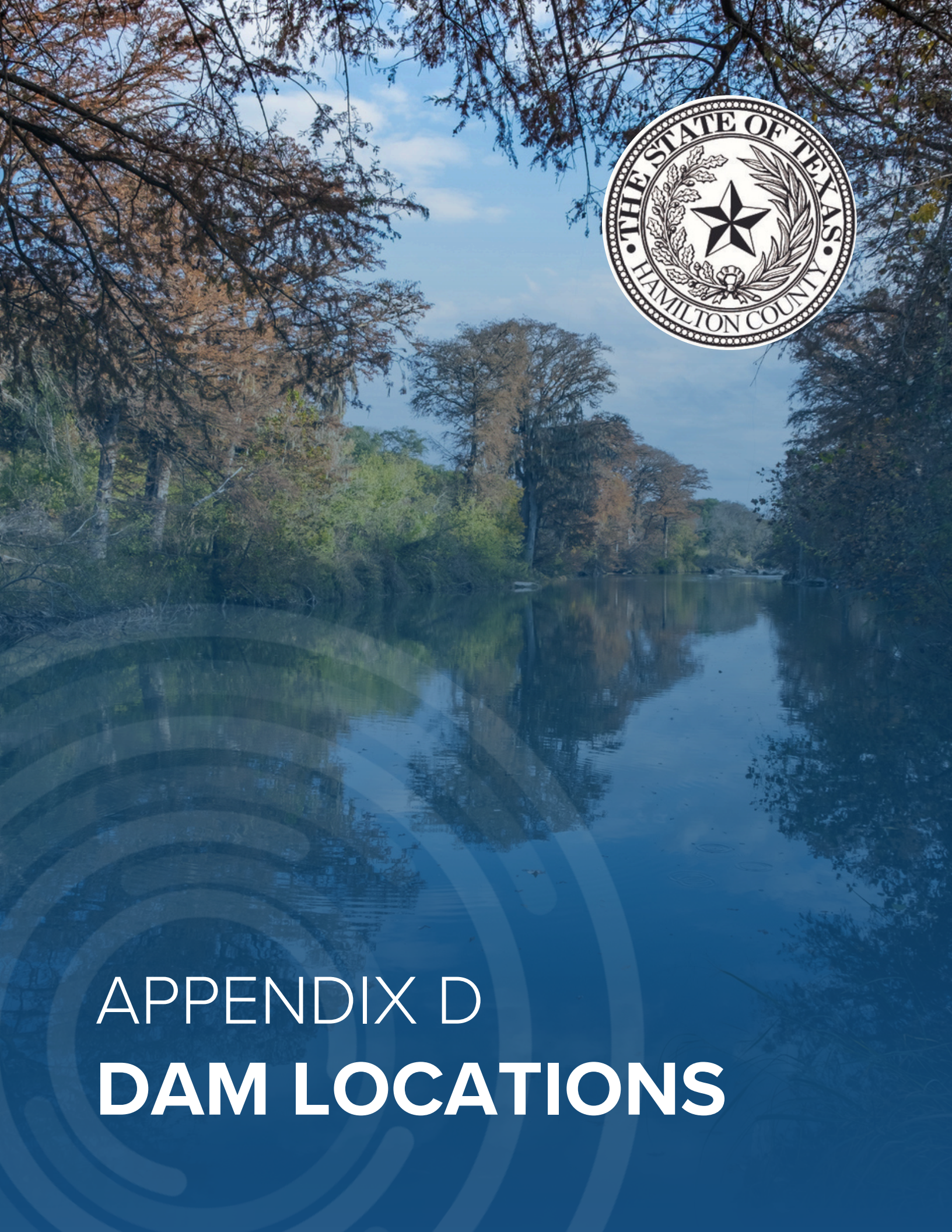
Structural Projects - Actions intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include dams, levees, seawalls detention / retention basins, channel modification, retaining walls, and storm sewers.



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

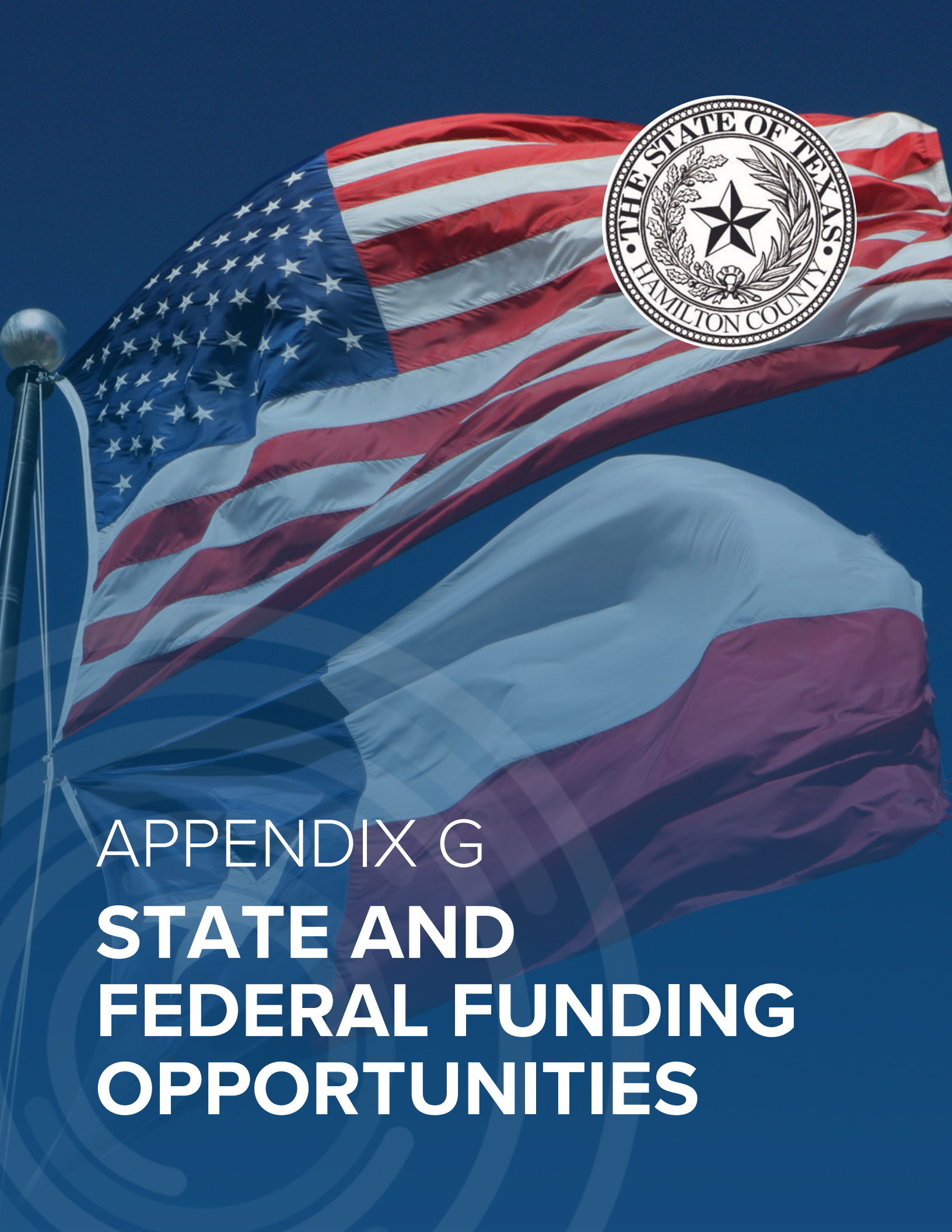
Appendix E is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).



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)	• 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)	• 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)	• 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)	• Texas HOME Disaster Relief
Texas Department of State Health Services (TXDSHS)	• 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)	• 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)	• 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
Texas Economic Development & Tourism (EDT)	• Economic Development Administration Grants and Investments
Texas General Land Office (TXGLO)	• 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)	• 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)	• Clean Water Act Section 319 Grants • Nonpoint Source Grant Program
Texas Water Development Board (TWDB)	• 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

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

AGENCY	FUNDING PROGRAM
	• Flood Infrastructure Fund (FIF) • 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) • Texas Water Development Fund (DFund) • Water Research Grant Program • Water SMART - Drought Response Program

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
Agricultural Management Assistance (AMA)	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.
Agricultural Water Enhancement Program (AWEP)	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
				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	TAMFS's Mitigation & Prevention Department annually implements four prescribed fire grants intended to protect local communities and restore ecosystems. (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

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
Prescribed Fire Grants (continued)				communities in Texas that are at the highest risk for loss during a Southern Plains Wildfire Outbreak event. (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. (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. (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.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
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.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
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.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
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.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
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	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: • 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. Highlighting the ecological and economic value of working lands and the opportunities to conserve working lands for the future.
Texas HOME Disaster Relief	Federal	TDHCA	TDHCA	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).
Texas Longleaf Conservation Assistance Program	Federal	National Fish and Wildlife Foundation (NFWF)	TAMFS	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.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
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 though the storm drainage system, picking up various pollutants along the way. UTC also reduces the urban heat

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
				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.
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.

APPENDIX G: STATE AND FEDERAL FUNDING OPPORTUNITIES

NAME	LEVEL	SOURCE AGENCY	MANAGING STATE AGENCY	PURPOSE OF FUNDING
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.
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.

RESOLUTION FOR HAMILTON COUNTY

APPROVAL OF HAZARD MITIGATION ACTION PLAN UPDATE

WHEREAS, natural hazards in Hamilton County, Texas, historically have caused significant disasters with losses of life and property and natural resources damage; and

WHEREAS, Hamilton County sponsored a FEMA Hazard Mitigation Action Plan Update, and the Cities of Hamilton and Hico participated in the Hazard Mitigation Plan Update; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a Hazard Mitigation Action Plan to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires that communities update Hazard Mitigation Action Plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, the County of Hamilton, through the hazard mitigation planning process, has assessed the County of Hamilton's potential risks and hazards and is committed to planning for a sustainable future and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Hamilton County Hazard Mitigation Action Plan Update outlines a mitigation vision, goals, and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards that threaten the planning area.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Hamilton County Hazard Mitigation Action Plan Update is approved in its entirety;
2. The County of Hamilton will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. The Hamilton County Commissioner's Court has the responsibility, authority, and means to inform all parties of this action; assure that the Hazard Mitigation Action Plan Update will

be reviewed at least annually; and that any needed adjustments will be presented to the Commissioner's Court for consideration; and

4. The County of Hamilton agrees to take such other action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Action Plan Update and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

ADOPTED and SIGNED on this the 12th day of November, 2024.

James Yates, Hamilton County Judge

Johnny Wagner, County Commissioner, Pct. 1

Keith Allen Curry, County Commissioner, Pct. 2

Lloyd Huggins, County Commissioner, Pct. 3

Dickie Clary, County Commissioner, Pct. 4

Attest: Rachel Geeslin, Hamilton County Clerk

COUNTY COMMISSIONER'S COURT HAMILTON COUNTY, TX

RESOLUTION #97-24

A RESOLUTION OF THE CITY OF HAMILTON TEXAS APPROVING THE HAZARD MITIGATION ACTION PLAN UPDATE

WHEREAS, natural hazards in the City of Hamilton area historically have caused significant disasters with losses of life and property and natural resources damage; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a hazard mitigation action plan to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires that communities update hazard mitigation action plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, the City of Hamilton has assessed the community's potential risks and hazards and is committed to planning for a sustainable community and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Hamilton County Hazard Mitigation Action Plan Update outlines a mitigation vision, goals and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards that threaten the community.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Hamilton County Hazard Mitigation Action Plan Update is approved in its entirety;
2. The City of Hamilton will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. The City of Hamilton vests with the Mayor the responsibility, authority, and means to inform all parties of this action; assure that the Hazard Mitigation Action Plan Update will be reviewed at least annually; and that any needed adjustments will be presented to the City Council for consideration; and
4. The City of Hamilton to take such other action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Action Plan Update and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

PASSED AND APPROVED by a majority vote at a regular City Council meeting had and held after due notice to the public November 14, 2024.

THE CITY OF HAMILTON, TEXAS

By: _____
Richard Buchanan, Mayor

ATTESTED:

_____
Brooke Waters, City Secretary

CITY OF HAMILTON SEAL HAMILTON TEXAS

RESOLUTION #112524

RESOLUTION FOR CITY OF HICO
APPROVAL OF HAZARD MITIGATION ACTION PLAN UPDATE

WHEREAS, natural hazards in the City of Hico area historically have caused significant disasters with losses of life and property and natural resources damage; and

WHEREAS, the Federal Disaster Mitigation Act of 2000 and Federal Emergency Management Agency (FEMA) require communities to adopt a hazard mitigation action plan to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, FEMA requires that communities update hazard mitigation action plans every five years in order to be eligible for the full range of pre-disaster and post-disaster federal funding for mitigation purposes; and

WHEREAS, the City of Hico has assessed the community's potential risks and hazards and is committed to planning for a sustainable community and reducing the long-term consequences of natural and man-caused hazards; and

WHEREAS, the Hamilton County Hazard Mitigation Action Plan Update outlines a mitigation vision, goals and objectives; assesses risk from a range of hazards; and identifies risk reduction strategies and actions for hazards that threaten the community.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Hamilton County Hazard Mitigation Action Plan Update is approved in its entirety;
2. The City of Hico will pursue available funding opportunities for implementation of the proposals designated therein, and will, upon receipt of such funding or other necessary resources, seek to implement the actions contained in the mitigation strategies;
3. The City of Hico vests with the Mayor the responsibility, authority, and means to inform all parties of this action; assure that the Hazard Mitigation Action Plan Update will be reviewed at least annually; and that any needed adjustments will be presented to the City Council for consideration; and
4. The City of Hico to take such other action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Action Plan Update and report on progress as required by FEMA and the Texas Division of Emergency Management (TDEM).

ADOPTED this 25th day of Nov, 2024.

APPROVED:

BOBBY EDWARD "EDDIE" NEEDHAM-
MAYOR

ATTEST:

KARI' DRUECKHAMMER, CITY SECRETARY