HARDIN COUNTY
HAZARD MITIGATION ACTION PLAN

UPDATE 2022

November 21, 2022 - November 20, 2027

Maintaining a Safe, Secure, and Sustainable Community

SETRPC
SOUTH EAST TEXAS REGIONAL PLANNING COMMISSION

H2O PARTNERS

U.S. Department of Homeland Security
FEMA Region 6
800 N. Loop 288
Denton, TX 76209

FEMA

November 21, 2022

Josh Davies, State Hazard Mitigation Officer
Texas Division of Emergency Management
313 East Anderson
Austin, TX 78752

RE: Approval of the Hardin County, Texas Multi-Jurisdiction Hazard Mitigation Plan
Funding Source: HMGP; FEMA-4466-DR-TX; 0006

Dear Mr. Davies:

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 November 20, 2027.

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

cc: Marty Chester, R6-MT-HM

Approved Participants

Attached is the list of approved participating governments included in the November 21, 2022 review of the referenced Hazard Mitigation plan.

	Community Name
1)	Hardin County
2)	Kountze city
3)	Lumberton city
4)	Rose Hill Acres city
5)	Silsbee city
6)	Sour Lake city

For more information, visit our website at:

co.hardin.tx.us

Written comments should be forwarded to:

H2O Partners, Inc.
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Austin, Texas 78716
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SECTION 1: INTRODUCTION

BACKGROUND

Hardin County is located on the flat coastal plains of Southeast Texas and is largely covered by the dense forest of the Big Thicket. The county's center is sixty-eight miles northeast of Houston, twenty-three miles northwest of Beaumont, and fifty-four miles from the Gulf of Mexico. Hardin County is surrounded by the following counties: Tyler to the north, Jasper and Orange to the east, Jefferson to the south, Liberty to the west, and Polk to the northwest. The City of Kountze is the county seat.

Texas is prone to extremely heavy rains and flooding with half of the world record rainfall rates (48 hours or less).[1] While flooding is a well-known risk, Hardin County is susceptible to a wide range of natural hazards, including but not limited to extreme heat, tornadoes, hail, and wildfires. 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 effect from many hazards to people and property can be lessened. This concept is known as hazard mitigation, which is defined by the Federal Emergency Management Agency (FEMA) as *sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects.*[2] Communities participate in hazard mitigation by developing hazard mitigation plans. The Texas Division of Emergency Management (TDEM) is required to review the plan and FEMA has the authority to review and approve hazard mitigation plans through the Disaster Mitigation Act of 2000.

In 2005-2006, Hardin County and the participating jurisdictions originally developed their Hazard Mitigation Action Plan (HMAP). Then in 2011, information about the planning area and hazard events were updated. In 2017, the South East Texas Regional Planning Commission (SETRPC) coordinated among Orange County, Hardin County, and Jefferson County to update each of their HMAP plans, and selected the consultant team of H2O Partners, Inc. to write and develop the HMAP Update 2017 for each of the three counties, including Hardin County.

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. Since FEMA approved the Hardin County HMAP in 2006, and then approved updates in 2011 and 2017, the County began the process of developing a Hazard Mitigation Action Plan Update in order to maintain eligibility for grant funding within the five-year window. The SETRPC coordinated among

[1] http://www.floodsafety.com/texas/regional-info/san-antonio-flooding/
[2] http://www.fema.gov/hazard-mitigation-planning-resources

Orange County, Hardin County, Jefferson County, and Jasper County to update each of their plans. The HMAP Update planning process provided an opportunity for Hardin County to evaluate successful mitigation actions and explore opportunities to avoid future disaster loss. The 2017 HMAP Update will expire in 2022, therefore the SETRPC and Hardin County selected H2O Partners, Inc. to write and develop the 2022 HMAP Update, hereinafter titled: "Hardin County Hazard Mitigation Plan Update 2022: Maintaining a Safe, Secure, and Sustainable Community" (Plan or Plan Update). This is a multi-jurisdictional plan; the participating jurisdictions include: Hardin County, the City of Kountze, the City of Lumberton, the City of Rose Hill Acres, the City of Silsbee, and the City of Sour Lake.

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 to a hazard mitigation plan addresses hazard vulnerability that exists 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 Hardin 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 Hardin 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 Hardin 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 Hardin 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 Hardin County, and planning participants identified ten natural hazards to be addressed by the Plan Update. Additional hazards that have a very low risk or no risk to the planning area are included in Appendix A. The specific goals of the Plan Update are to:

- Provide a comprehensive update to the 2017 HMAP;
- Minimize disruption to participating jurisdictions within Hardin 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 grant and technical assistance programs offered by the State or Federal government. The Plan will enable participating jurisdictions within Hardin County to take advantage of rapidly developing mitigation grant opportunities as they arise; and
- Ensure that participating jurisdictions within Hardin County maintain eligibility for the full range of future Federal disaster relief.

AUTHORITY

The Plan is tailored specifically for participating jurisdictions within Hardin 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 Plan Review Guide" (October 2011), and the "Local Mitigation Planning Handbook" (March 2013). Additionally, the Plan is developed in accordance with FEMA's Community Rating System (CRS) Floodplain Management Plan standards and policies.

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 Hardin County's population and economy.

Sections 4 through 14 present a hazard overview and information on individual natural hazards in the planning area. The hazards generally appear in order of priority based on potential losses to life and property, and other community concerns. For each hazard, the Plan Update presents a description of the hazard, a list of historical hazard events, and the results of the vulnerability and risk assessment process.

Section 15 presents hazard mitigation goals and objectives. Section 16 gives an analysis for the previous actions and Section 17 presents hazard mitigation actions for Hardin County and the participating jurisdictions. Section 18 identifies Plan maintenance mechanisms.

Several hazards that were included in the previous plans that have very low or no risk to the planning area are included in Appendix A and are updated with any occurrences that have arisen in the past five years. The list of planning team members and stakeholders is located in Appendix B. Public survey results are analyzed and presented in Appendix C. Appendix D contains a detailed list of critical facilities for the area. Appendix E contains information regarding workshops

and meeting documentation. Capability Assessment results for participating jurisdictions within Hardin County are in Appendix F.[3]

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

SECTION 2: PLANNING PROCESS

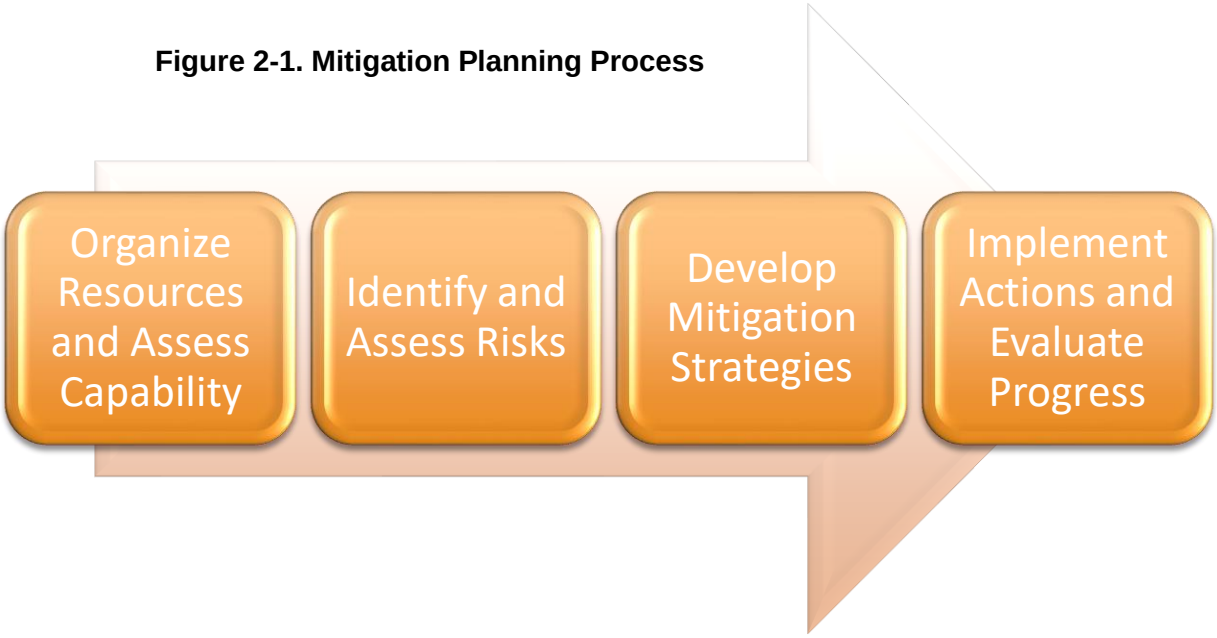
PLAN PREPARATION AND DEVELOPMENT

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 South East Texas Regional Planning Commission (SETRPC) hired H2O Partners, Inc. (Consultant Team), to provide technical support and oversee the development of the Hardin County Hazard Mitigation Action Plan Update 2022. The Consultant Team used the FEMA "Local Mitigation Plan Review Guide" (October 1, 2011), and the "Local Mitigation Planning Handbook" (March 2013) to develop the Plan Update. The overall planning process is shown in Figure 2-1 below.

Figure 2-1. Mitigation Planning Process



Hardin County, participating jurisdictions, and the Consultant Team met in June 2021 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 from each of the participating jurisdictions within Hardin County and SETRPC, shown in Table 2-1, was formed to coordinate planning efforts and request input and participation in the planning process. Table 2-2 reflects the Advisory Planning Team, consisting of additional representatives from area organizations and departments from the participating jurisdictions within Hardin County that participated throughout the planning process.

Table 2-1. Executive Planning Team

ORGANIZATION / DEPARTMENT	TITLE
SETRPC	Director of Homeland Security
SETRPC	Regional Emergency Planner
Hardin County	Emergency Management Coordinator
City of Kountze	Public Works Director
City of Lumberton	City Manager
City of Rose Hill Acres	Emergency Management Coordinator

ORGANIZATION / DEPARTMENT	TITLE
City of Silsbee	Emergency Management Coordinator/Chief of Police
City of Sour Lake	Emergency Management Coordinator/ Chief of Police

Table 2-2. Advisory Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Hardin County	County Sheriff
Hardin County	County Judge
Hardin County	Precinct 3 Commissioner
City of Kountze	Building Inspector
City of Kountze	City Administrator
City of Lumberton	Mayor
City of Lumberton	Chief of Police
City of Rose Hill Acres	Mayor
City of Rose Hill Acres	City Secretary
City of Silsbee	Assistant Chief of Police
City of Silsbee	City Manager
City of Silsbee	Sergeant
City of Silsbee	Water/Wastewater Supervisor
City of Sour Lake	City Manager

Additionally, a Stakeholder Group was invited to participate in the planning process via e-mail. The Consultant Team, Planning Teams, and Stakeholder Group coordinated to identify mitigation goals, and develop mitigation strategies and actions for the Plan. Appendix B provides a complete listing of all participating Planning Team members and stakeholders from participating jurisdictions within Hardin County by organization and title.

Based on results of completed Capability Assessment, participating jurisdictions within Hardin County described methods for achieving future hazard mitigation measures by expanding existing capabilities. For example, several of the jurisdictions do not have a Comprehensive Master Plan in place. Other options for improving capabilities include the following:

- Establishing Planning Team members with the authority to monitor the Plan and identify grant funding opportunities for expanding staff.

- Identifying 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.
- Reviewing current floodplain ordinances for opportunities to increase resiliency such as modifying permitting or building codes.
- Developing 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 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 hazards including potential flooding, hail, and extreme heat. The actions include but are not limited to drainage improvement projects, installing generators at critical facilities, 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 Hardin 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 18. Participation of Planning Team members, stakeholders, and the public at each of the workshops is documented in Appendix E.

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

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

KICKOFF WORKSHOP

The Kickoff Workshop was held on July 20, 2021 at the Orange County Expo Center/EOC. 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 including, but not limited to local emergency service districts (ESDs), the National Parks Conservation Association, the Baptist Hospital of South East Texas, 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.

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 as a whole, the 2018 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 ten natural hazards which pose a significant threat to the planning area.

RISK ASSESSMENT

An initial risk assessment for participating jurisdictions within Hardin County was completed in November 2021 and results were presented to Planning Team members at the Risk Assessment Workshop held on November 18, 2021 at the Jasper County Annex (Expo) Building. 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. Each participant at the Risk Assessment Workshop was provided a risk ranking sheet that asked participants to rank hazards in terms of the probability or frequency of occurrence, extent of spatial impact, and the magnitude of impact. The results of the ranking sheets identified unique perspectives on varied risks throughout the planning area.

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 14.

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 January 27, 2022 at the Orange County Expo Center. In addition to the Planning Team, stakeholder groups were invited to attend the workshop. Regarding hazard mitigation actions, workshop participants emphasized the desire for flood and thunderstorm wind projects. Additionally, the participating jurisdictions were proactive in identifying mitigation actions to lessen the risk of all the identified hazards included in the Plan Update.

An inclusive and structured process was used to develop and prioritize new hazard mitigation actions for the Plan Update. The prioritization method was based on FEMA's STAPLE+E criteria and included social, technical, administrative, political, legal, economic, and environmental considerations. As a result, each Planning Team Member assigned an overall priority to each hazard mitigation action. The overall priority of each action is reflected in the hazard mitigation actions found in Section 17.

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 the Hardin County Office of Emergency Management 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 5-14) 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. State Data Center documents were used to obtain population projections. The State Demographer webpages were reviewed for population and other projections and included in Section 3 of the Plan. Information 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 Hardin County which provided information pertaining to existing plans, policies, ordinances, and regulations to be integrated into the goals and objectives of the Plan Update. The relevant information was included in a master Capability Assessment, Appendix F.

Existing projects and studies were utilized as a starting point for discussing hazard mitigation actions among Planning and Consultant Team members. For example, the City of Rose Hill Acres has a Road and Bridge Grant to elevate road and bridges necessary for emergency egress from residential areas. Additionally, the City of Silsbee continuously seeks CDBG grant funding and has received a sewer grant as well as grant funding for sanitary sewer improvements. The City of Sour Lake has completed drainage projects along with sewer and water projects over the past few years.

Additionally, policies and ordinances were reviewed by several of the participating jurisdictions. These jurisdictions have included actions to develop and adopt higher building code standards. Other plans were reviewed, such as Emergency Operations Plan, to identify any additional mitigation actions. Finally, the 2018 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 2018 State Plan was also used as a guidance document, along with FEMA materials, in the development of the Hardin County Hazard Mitigation Action Plan Update 2022.

INCORPORATION OF THE HMAP INTO OTHER PLANNING MECHANISMS

Planning Team members will integrate implementation of the Plan Update with other planning mechanisms for Hardin 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 Hardin 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 Hardin County will be responsible for implementing hazard mitigation actions contained in Section 17. 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 Hardin 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. Hardin 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 Hardin 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, Hardin 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 2-3 identifies types of planning mechanisms and examples of methods for incorporating the Plan into other planning efforts.

Table 2-3. 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 Hardin 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	Participating jurisdictions within Hardin County have a Capital Improvement Plan (CIP) in place. Prior to any revisions to the CIP, County and 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.

Planning Mechanism	Incorporation of Plan
Comprehensive Plans	Participating jurisdictions within Hardin County have Long-term Comprehensive Development Plans in place. Since comprehensive plans involve developing a unified vision for a community, the mitigation vision and goals of the Plan will be reviewed in the development or revision of a Comprehensive Plan.
Floodplain Management Plans	Floodplain management plans include preventative and corrective actions to address the flood hazard. Therefore, the actions for flooding and information found in Section 6 of this Plan Update discussing the people and property at risk to flood will be reviewed and revised when participating jurisdictions within Hardin County update their management plans or develops new plans.
Grant Applications	The Plan will be evaluated by participating jurisdictions within Hardin 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, participating jurisdictions within Hardin County have regulatory plans in place, such as Emergency Management Plans, Continuity of Operations Plans, Land Use Plans, and Evacuation Plans. The Plan Update will be consulted when County and 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 provides an overview of Planning Team members' existing planning and regulatory capabilities to support implementation of mitigation strategy objectives. Appendix F also provides further analysis of how each intends to incorporate hazard mitigation actions into existing plans, policies, and the annual budget review as it pertains to prioritizing grant applications for funding and implementation of identified hazard mitigation projects.

It should be noted for the purposes of the Plan Update that the HMAP has been used as a reference when reviewing and updating all plans and ordinances for the entire planning area, including all participating jurisdictions. The Emergency Management Plans developed for Hardin County, City of Kountze, City of Lumberton, City of Rose Hill Acres, City of Silsbee, and City of Sour Lake are updated every 5 years and incorporates goals, objectives and actions identified in the mitigation plan.

PLAN REVIEW AND PLAN UPDATE

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

TIMELINE FOR IMPLEMENTING MITIGATION ACTIONS

Both the Executive Planning Team (Table B-1, Appendix B) and the Advisory Planning Team (Table B-2, Appendix B) 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 Hardin 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 Hardin 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 Hardin County Hazard Mitigation Action Plan Update 2022 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 Hardin County and participating jurisdictions' websites upon approval from FEMA, and a copy will be kept at the Hardin County Office of Emergency Management.

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 B-3 in Appendix B, and Table 2-4, below), included a broad range of representatives from both the public and private sector and served as a key component in Hardin 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 e-mail is found in Table 2-4.

Table 2-4. Stakeholder Working Group

AGENCY	TITLE	PARTICIPATED
Baptist Hospital of South East Texas	Director of Administrative Facilities Management	
Baptist Hospital of South East Texas	Executive Director	
Baptist Hospital of South East Texas	Safety Office	
Baptist Hospital of South East Texas	Trauma Program Manager	
Batson Fire	Volunteer Fire Department	
Beaumont Public Health	PHEP Planner	X
Christus Health	Operations Manager	
Colonial Pipeline	General Representative	
Colonial Pipeline	Operations Manager	X
Consultant at Carroll and Blackman, Inc.	PE, Vice President	
Consultant at David Waxman	Engineering	
Consultant at MPTX Associates	Certified Floodplain Manager	
Consultant at Sabine River Authority	Technical Service Manager	
Consultant at Texas FFA Association	Regional Manager	
Department of Homeland Security	Advisor	
Department of Transportation	Director	

AGENCY	TITLE	PARTICIPATED
Environmental Protection Agency (EPA)	Regional Representative	
General Land Office (GLO)	Regional Representative	X
Hardin County ESD #5	Fire Chief	
Jasper-Newton County Health	Program Director	
Jefferson County Drainage District #7	General Laborer	
Jefferson County Drainage District #7	Supervisor	
Jefferson County ESD #4	District Administrator	
Lamar University	Professor, Department of Industrial and Systems Engineering	
Local Emergency Planning Committee	Southeast Regional Representative	
Long-term Care Partnership (LTCP)	State Farm Representative	
National Parks Conservation Association	Consultant	
National Parks Conservation Association	Regional Director Texas & Oklahoma	X
National Oceanic and Atmospheric Administration (NOAA)	Regional Representative	
Orange County Economic Development Center	Executive Director	
Orange County ESD #2	VFD Chief	
Orange County Navigation and Port District	Executive Port Director	
Saratoga Fire	Volunteer Fire Department	
South East Texas Disaster Recovery Group	Representative	
South East Texas Ground Water Conservation Group	General Manager	
Texas Commission on Environmental Quality (TCEQ)	Outreach Coordinator	
Texas Division on Emergency Management (TDEM)	Regional Representative	
Texas A&M University (TAMU)	District Forester I, Forest Resource Development & Sustainable Forestry	
Texas A&M University (TAMU)	Professor, Department of Marketing and Commerce	
Texas A&M University (TAMU)	Texas A&M Agrilife County Extension Agent	
Texas Department of Public Safety (TDPS)	Telecommunication Division	

AGENCY	TITLE	PARTICIPATED
Texas Congress	District Director to Congressman	
Texas House District 19	Representative	
Texas House District 19	Representative	
Texas House District 21	Representative	
Texas House District 22	Representative	
Texas Senate	District Coordinator	
Texas Senate District 3	Senate	
Texas Senate District 4	Senate	
Thicket Fire	Volunteer Fire Department	
United Way	Beaumont Office Representative	
United Way	Orange County Office Representative	

Stakeholders and participants from neighboring communities that attended the Planning Team and public meetings played a key role in the planning process. For example, hurricane was one of the concerns to stakeholders, so participating jurisdictions included actions to assist in efficient evacuations throughout the county including but not limited to improved signage, widening roads and bridges, traffic monitoring systems and improved road connectivity.

PUBLIC MEETINGS

A series of public meetings were held throughout the planning area to collect public and stakeholder input. Topics of discussion included the purpose of hazard mitigation, discussion of the planning process, and types of natural hazards. Each participating jurisdiction within Hardin 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 and Twitter, 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 and locations:

- July 20, 2021, South East Texas Regional Planning Commission
- November 18, 2021, South East Texas Regional Planning Commission
- January 27, 2022, virtual via Microsoft Teams

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 221 surveys were completed online. The survey results are analyzed in Appendix C. Participating jurisdictions within Hardin County reviewed the input from the surveys and decided which information to incorporate into the Plan as hazard mitigation actions. For example, many citizens mentioned concerns about flood, and suggested drainage improvements. In response, several actions were added to the Plan to design and construct large reservoirs and drainage systems for flood control and drought assistance.

SECTION 3: COUNTY PROFILE

OVERVIEW

Hardin County was established in 1858, after the region's population had increased sufficiently to warrant establishment of its own county government. Territory was drawn from both Liberty and Jefferson Counties, and legislators specified that the county's name honor the Hardin family of Liberty and instructed that the county seat, to be located within five miles of the center, also bear that name. A log courthouse was completed in 1859 and followed later by a frame structure. Hardin remained the county seat until the mid-1880s.

In 1881 the Sabine and East Texas Railroad bypassed Hardin in favor of its own newly established town, Kountze, two miles east of Hardin. Agitation soon developed for removal of county government to the new site, however the resulting election favored Hardin. A courthouse fire in August 1886 reopened the issue, and a second vote settled the matter permanently in favor of Kountze.

Hardin County has a total area of 898 square miles, of which 891 square miles is land and 7 square miles is water. Hardin County lies within the Neches and Trinity River basins. The Trinity River basin occupies a small corner of the northwest portion of the county and the remainder is contained within the Neches River basin. Major rivers and bayous include the Neches River and Pine Island Bayou. Other smaller water courses include: Little Pine Island Bayou, Boggy Creek, Coon Marsh Gulley, Black Creek, Village Creek, and Mill Creek. Pine Island and Little Pine Island bayous join Village and Cypress creeks to drain the area into the Neches River, which forms the eastern county line. Soils in Hardin County consist mainly of acidic, poorly drained, loamy soils. The Big Thicket National Preserve provides recreational opportunities for county residents and tourists.

Figure 3-1 shows the general location of Hardin County along with the Cities that are located within the County.

Figure 3-1. Location of Hardin County

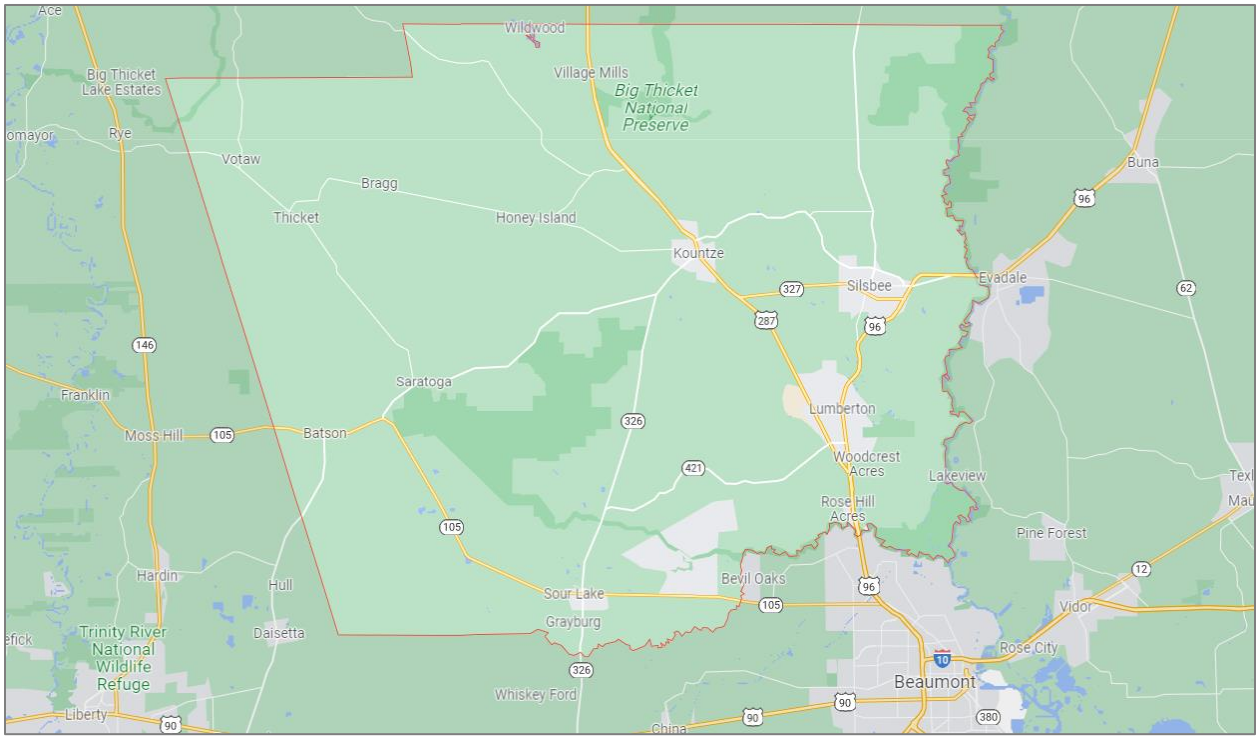
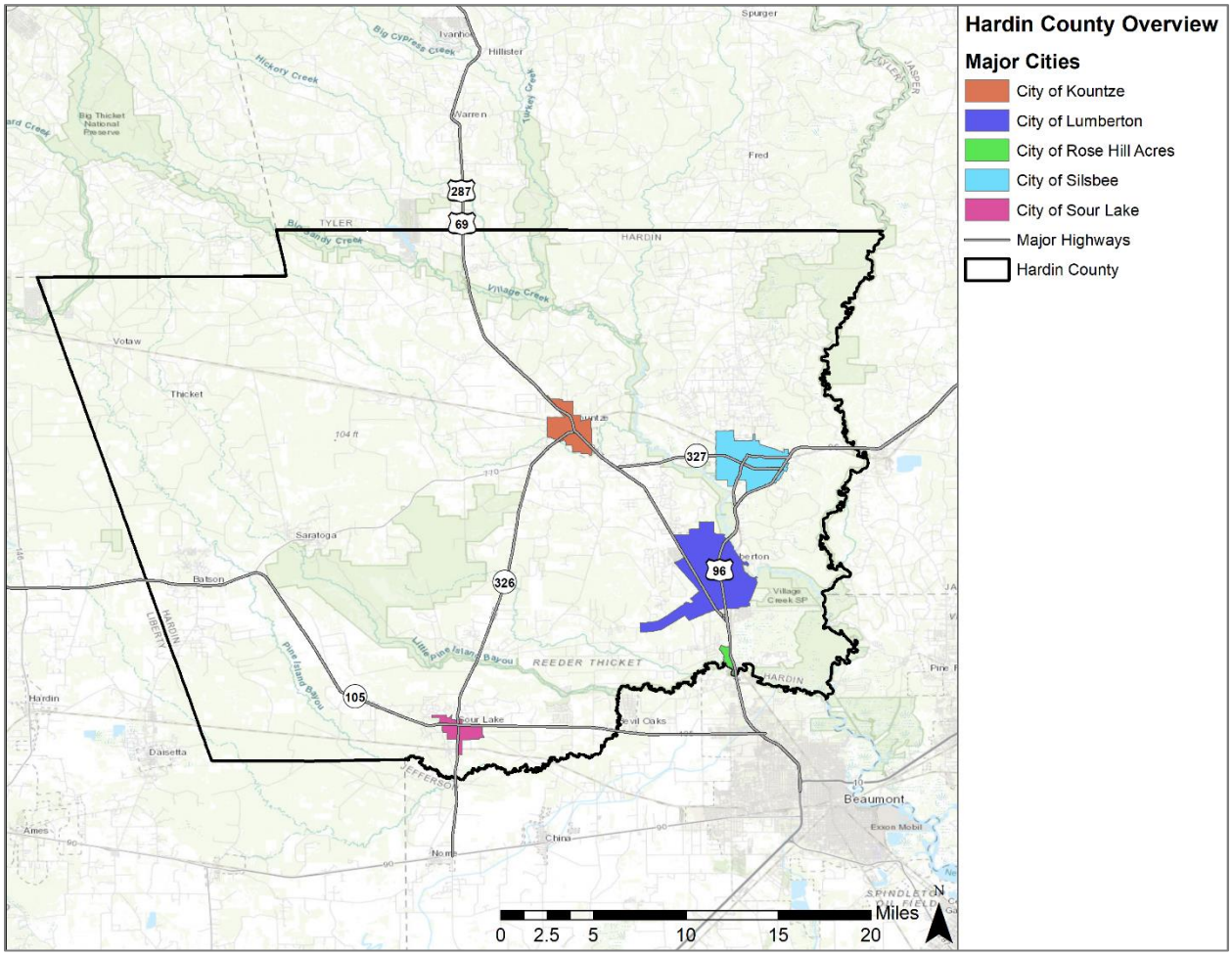


Figure 3-2 shows the participating jurisdictions within Hardin County that are covered in the risk assessment analysis of the Plan Update.

Figure 3-2. Hardin County Planning Area



Provided in Table 3-1 below is a listing of the jurisdictions in Hardin County that participated in the Hardin County Hazard Mitigation Action Plan Update 2022.

Table 3-1. Participating Jurisdictions

PARTICIPATING JURISDICTIONS
Hardin County
City of Kountze
City of Lumberton
City of Rose Hill Acres
City of Silsbee
City of Sour Lake

POPULATION AND DEMOGRAPHICS

In the official Census population count, as of April 1, 2010, Hardin County has a population of 54,635 residents. By 2020, the census population count is 57,356. Table 3-2 provides the population distribution by jurisdiction within Hardin County based on the 2010 and 2020 Census information.[1]

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 3-2. Population Distribution by Jurisdiction

JURISDICTION	TOTAL 2010 POPULATION	PERCENTAGE (based on 2010 Population)	TOTAL 2020 POPULATION	ESTIMATED VULNERABLE OR SENSITIVE POPULATIONS		
				Youth (Under 5)	Elderly (Over 65)	Below Poverty Level
City of Kountze	2,123	3.9%	2,047	118	446	317
City of Lumberton	11,943	21.9%	12,939	810	2,654	750
City of Rose Hill Acres	441	0.8%	300	12	54	12
City of Silsbee	6,611	12.1%	6,642	436	1,275	697
City of Sour Lake	1,813	3.3%	2,449	272	296	313
Unincorporated Hardin County	31,704	58.0%	32,979	2,036	4,956	4,794
Hardin County	**54,635**	**100%**	**57,356**	**3,684**	**9,681**	**6,883**

POPULATION GROWTH

The official 2010 Hardin County population is 54,635. By 2020, the census is 57,356. Overall, Hardin County experienced an increase in population between 1980 and 2020 by 40.9%, or an increase by 16,635. The City of Kountze, the City of Rose Hill Acres, and the City of Silsbee experienced a decrease in population between 1980 and 2020. Between 2010 and 2020, the City of Kountze and the City of Rose Hill Acres experienced a population decline, while the other participating jurisdictions, including Hardin County as a whole, experienced a population growth. Table 3-3 provides historic growth rates in Hardin County.

[1] Source: https://demographics.texas.gov/Data/Decennial/2010/ and https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/2020/

Table 3-3. Population for Hardin County, 1980-2020

JURISDICTIONS	1980	1990	2000	2010	2020	POP CHANGE 1980-2020	PERCENT OF CHANGE	POP CHANGE 2010-2020	PERCENT OF CHANGE
City of Kountze	2,716	2,067	2,115	2,123	2,047	-669	-24.63%	-76	-3.58%
City of Lumberton	2,480	6,640	8,731	11,943	12,939	10,467	423.42%	996	8.34%
City of Rose Hill Acres	460	468	480	441	300	-160	-34.78%	-141	-31.97%
City of Silsbee	7,684	6,368	6,393	6,611	6,642	-1,042	-13.56%	31	0.47%
City of Sour Lake	1,807	1,547	1,667	1,813	2,449	642	35.53%	636	35.08%
Unincorporated Hardin County	25,574	24,230	28,687	31,704	32,979	7,405	28.96%	1,275	4.02%
Hardin County	**40,721**	**41,320**	**48,073**	**54,635**	**57,356**	**16,635**	**40.85%**	**2,721**	**4.98%**

FUTURE DEVELOPMENT

To better understand how future growth and development in the 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 3-4, as provided by the Office of the State Demographer, Texas State Data Center, and the Institute for Demographic and Socioeconomic Research. Population projections are based on a 0.5 scenario growth rate, which is 50 percent of the population growth rate that occurred during 2000-2010. This information is only available at the County level; however, the population projection shows an increase in population density for the County, which would mean overall growth for the County.

Table 3-4. Hardin County Population Projections

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)
890.57	54,635	61.34	56,486	62.43	57,438	64.50	56,600	63.55	54,630	61.34

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 Hardin 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.

Major employers in the area are critical to the health of the economy, as well as effective transportation connectivity.

Hardin County is part of the South East Texas Regional Planning Commission (SETRPC) which has many departments to promote intergovernmental cooperation and coordination, conduct comprehensive regional planning, and provide a forum for the discussion and study of area issues. The Transportation and Environmental Resources Division administers federal and state funds for the planning and implementation of programs, projects, and policies related to air quality, various modes of transportation, solid waste management, and economic development for the three-county region. The staff of the Division works with federal, state, and local entities to enhance the quality of life of southeast Texas citizens, improve air quality and assist the regions' efforts to attain federal Clean Air Act air quality standards, support economic development, provide improved mobility, increased transportation options, and improved intermodal connections within the region, promote coordination of collection, transportation, and disposal of solid waste, maximize community benefit and protect the environment, maintain an variety of data and information on southeast Texas, including GIS data and demographics, and encourage community participation and increase awareness of individual roles and responsibilities.

The mission of the Silsbee Economic Development Corporation (EDC) is to support economic and community development projects that will improve the business climate, strengthen the economy, create jobs, and enhance the quality of life in the City of Silsbee.

EXISTING AND FUTURE LAND USE AND DEVELOPMENT TRENDS

The following jurisdictions have a Master or Comprehensive Plan in place: City of Lumberton, City of Rose Hill Acres, and City of Silsbee. These 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 individuals in making decisions which affect the community with the understanding of the long-term effects.

The City of Lumberton's comprehensive plan provides guidance to the present mayor and city council as well as future councils in matters concerning the development of the city in regards to land usage, street infrastructure, economic growth, drainage planning, and recreation facilities. The comprehensive plan will help position the community for the future while maintaining a quality of life and environment that will be the primary locational asset attracting new law-abiding citizens and businesses to the community.

SECTION 4: RISK OVERVIEW

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 14, 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 Hardin County identified ten natural 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 2018 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. Atmospheric hazards that have been identified as significant for the Planning Area include extreme heat, hail, hurricane wind, 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” for purposes of description.

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

Appendix A will include additional hazards that have a very low risk or no risk to the planning area: geologic hazard, tsunami, earthquake, water contamination, dam failure, hazardous materials incident 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 Wind	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 miles per hour, 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	
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.

Hazards that weren't 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.
Dam Failure	There are two dams located in the unincorporated area of Hardin County. However, there are no historical occurrences of these dams failing and there is none expected in the future. If the dams were to fail, Hardin County would not experience any impact to life, property, or services provided by the community.
Earthquake	According to the State Plan, an earthquake occurrence for the Hardin County planning area is considered exceedingly rare. Although a small event is possible, it would pose little to no risk for the area. There is no history of impact to critical structures, systems, populations or other community assets or vial services as a result of earthquake and non is expected in the future.
Expansive Soils	There is no history of impact to critical structures, systems, populations or other community assets or vital services as a result of expansive soils and none is expected in the future.

HAZARD CONSIDERED	REASON FOR DETERMINATION
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.

NATURAL HAZARDS AND CLIMATE CHANGE

Climate change is defined as a long-term hazard which can increase or decrease the risk of other weather hazards. It directly endangers property due to sea level rise and biological organisms due to habitat destruction.

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. While sea level rise is a natural phenomenon and has been occurring for several thousand years, the general scientific consensus is that the rate has increased in the past 200 years, from 0.5 millimeters per year to 2 millimeters per year.

Texas is considered one of the more vulnerable states in the U.S. to both abrupt climate changes and to the impact of gradual climate changes to the natural and built environments. Mega-droughts can trigger abrupt changes to regional ecosystems and the water cycle, drastically increase extreme summer temperature and fire risk, and reduce availability of water resources, as Texas experienced during 2011-2012.

Paleoclimate records also show that the climate over Texas had large changes between periods of frequent mega-droughts and the periods of mild droughts that Texas is currently experiencing. While the cause of these fluctuations is unclear, it would be wise to anticipate that such changes could occur again and may even be occurring now.

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 Hardin County. Remaining records identifying the occurrence of hazard events in the planning area and the maximum recorded magnitude of each event were also evaluated.

The use of geographic information system (GIS) technology to identify and assess risks for Hardin 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 4-3, and impact statements are defined in Table 4-4 below.

Table 4-3. 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 4-4. 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 for at least two 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 more than 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 Hardin 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 Hardin County was reviewed based on recent development changes that occurred throughout the planning area. Hardin County has increased slightly between 2010 and 2020 according to the U.S. Census Bureau, therefore there has been no significant factors or development trends with a consequential effect or increase in vulnerability to the population, infrastructure and buildings for hazards.

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.

Table 4-5. Hazard Risk Ranking

HAZARD	FREQUENCY OF OCCURENCE	POTENTIAL SEVERITY
Hurricane Wind	Occasional	Minor
Flood	Highly Likely	Minor
Thunderstorm Wind	Highly Likely	Limited
Lightning	Highly Likely	Limited
Tornado	Likely	Limited
Hail	Highly Likely	Limited
Extreme Heat	Highly Likely	Limited
Wildfire	Highly Likely	Limited
Winter Storm	Highly Likely	Limited
Drought	Occasional	Limited

SECTION 5: HURRICANE WIND

HAZARD DESCRIPTION

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, resulting in heavy rainfall, high winds and tidal surge in coastal communities. When maximum sustained winds reach or exceed 39 mph, the system becomes a tropical storm. Once sustained winds reach or exceed 74 mph, the storm becomes a hurricane.

The intensity of a land falling hurricane is expressed in categories relating wind speeds and 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.

According to the National Hurricane Center, the greatest potential for loss of life related to a hurricane is from storm surge. This happens when low pressure and high circular winds “pile” the water into a dome shape that can be 50-100 miles wide. The surge travels with the storm and is most severe on the right side of the storm, relative to the direction the storm travels. The surge can be 15 feet deep, topped by waves, and make landfall ahead of the center, or “eye”, of the hurricane. Wind-driven waves are superimposed on the storm tide. This rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with normal high tides.

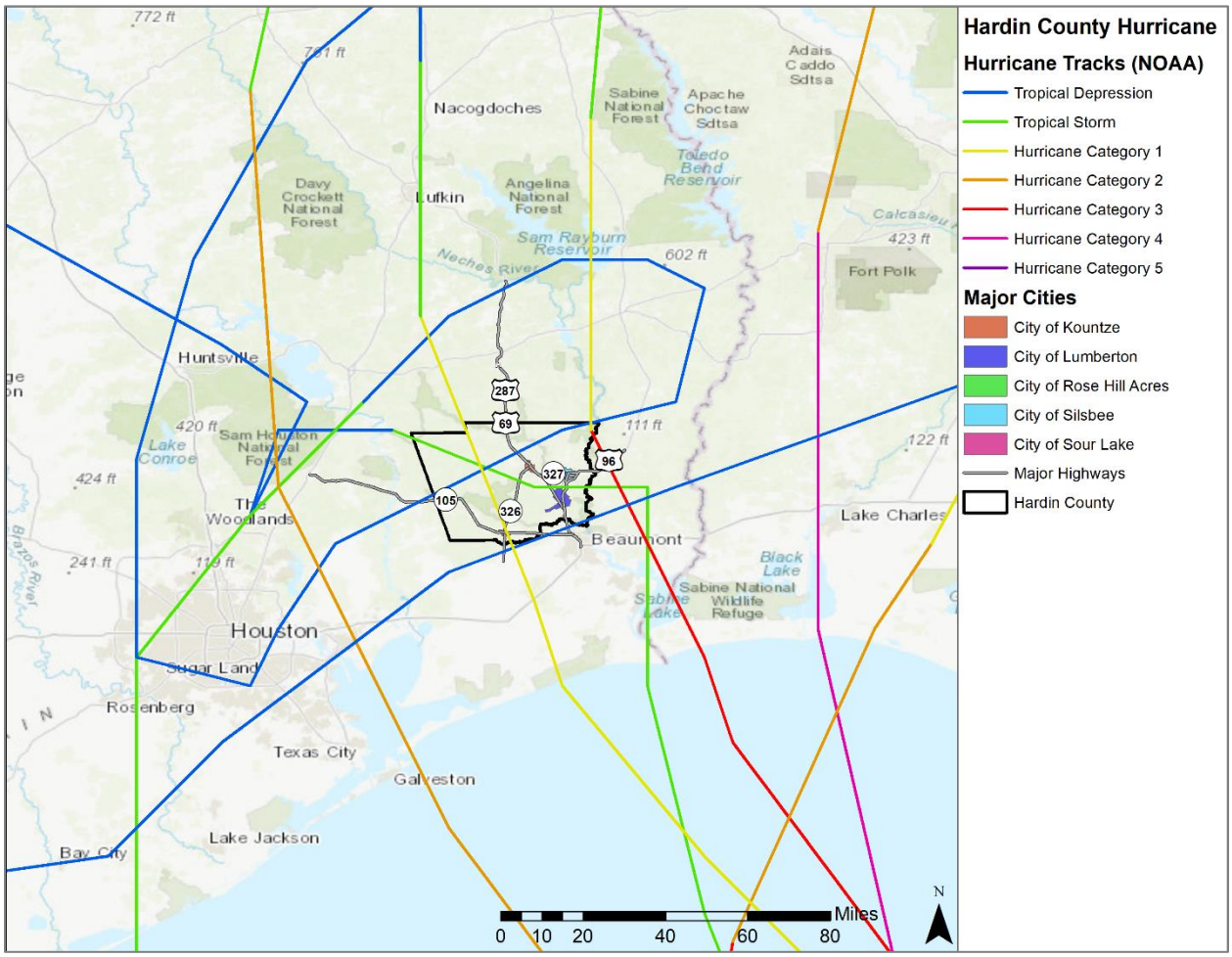
LOCATION

The location of Hardin County near the coast makes the planning area vulnerable to threats directly and indirectly related to a hurricane event, such as high-force winds, and flooding. While the county is not located along the Gulf coast, the southeast county line is located approximately 30 miles from the Gulf of Mexico coast making it susceptible to hurricanes. Hurricanes and/or tropical storms can impact Hardin County from June to November, the official Atlantic U.S. hurricane season.

SECTION 5: HURRICANE WIND

Hardin County is in a moderate to high-risk area for hurricane wind speeds of 110 to more than 155 miles per hour (mph). In Figure 5-1 below, hurricane tracks are reflective of their strength in the Hardin County planning area.

Figure 5-1. Location of Historic Storm Tracks



EXTENT

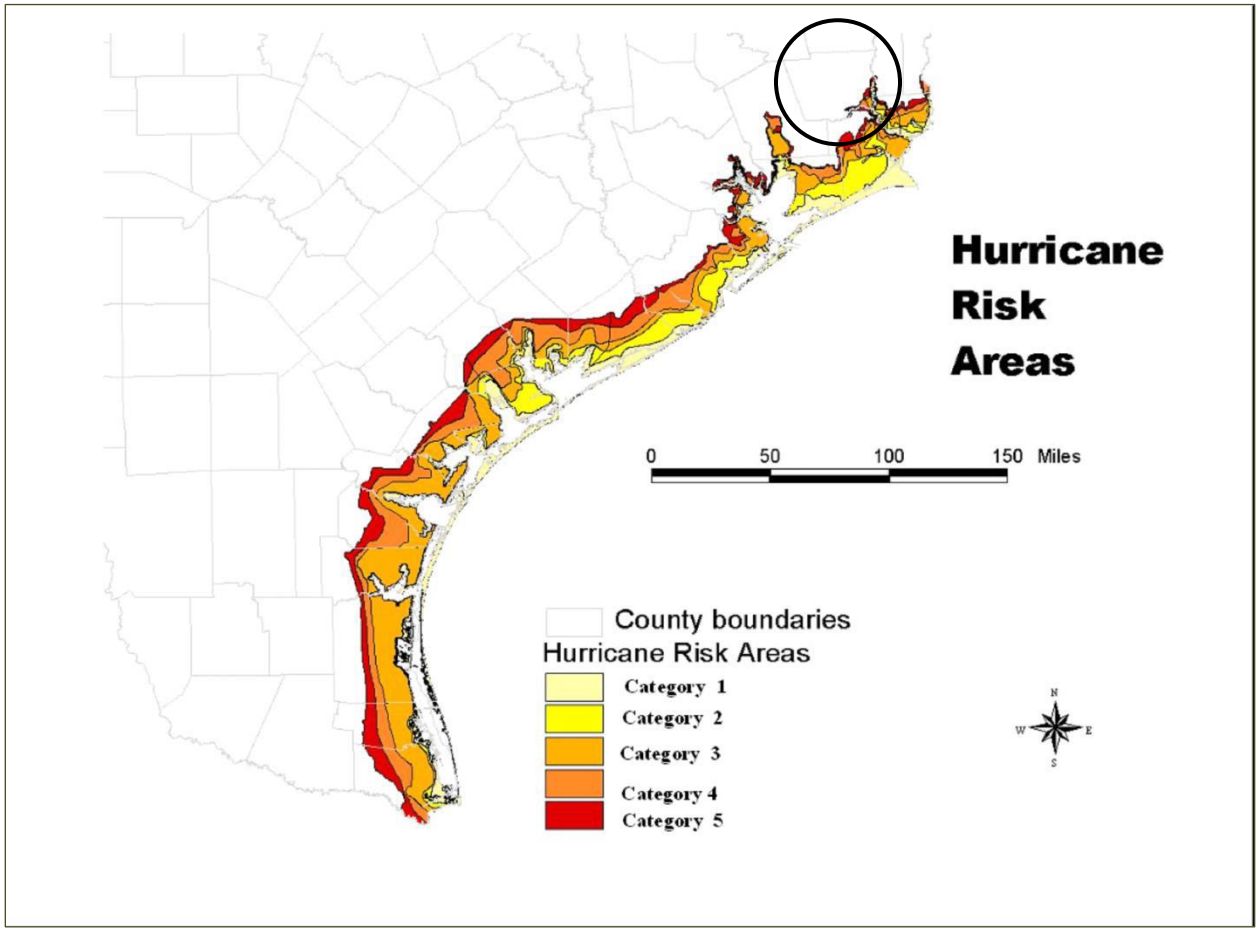
Hurricanes are categorized according to the strength and intensity of their winds using the Saffir-Simpson Hurricane Scale (See Table 5-1). A Category 1 storm has the lowest wind speeds, while a Category 5 hurricane has the highest. This scale only ranks wind speed, but lower category storms can inflict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

Table 5-1. Extent Scale for Hurricanes

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 for hurricanes and tropical storms, as well as the location of Hardin County, the average extent to be mitigated for is a Category 3 storm. The Hardin County planning area has experienced wind speeds up to 130 mph, therefore a Category 3 should be mitigated in the event of a hurricane. Figure 5-2 displays the location of hurricane risk by storm category along the Gulf Coast.

Figure 5-2. Location of Hurricane Risk along the Texas Coast



HISTORICAL OCCURRENCES

Previous occurrences include storms that had a direct path through the Hardin County planning area, including all participating jurisdictions, or storm events that passed close enough in proximity to the planning area to create damages. Table 5-2 below lists the storms that have impacted the Hardin County planning area during the years of 1960-2021.

Table 5-2. Historical Hurricane Events for the Hardin County Planning Area, 1960-2021[1]

DATE	NAME	CATEGORY[2]	PROPERTY DAMAGE	CROP DAMAGE
7/15-7/29/1979	Claudette	Tropical Storm	None Reported	$0
6/24-7/1/1989	Allison	Extratropical	None Reported	$0
9/18-9/26/2005	Rita	Category 2	$73,259,077	$0
9/1-9/15/2008	Ike[3]	Category 2	$87,347,783	$0
8/20-8/29/2020	Laura[4]	Category 4	$33,511,984	$0
9/17-9/25/2020	Beta	Tropical Storm	None Reported	$0
10/4-10/11/2020	Delta[5]	Category 2	$11,186,310	$0
TOTAL			**$205,305,154**	

Based on the list of historical hurricane events for the Hardin County planning area (listed above), including all participating jurisdictions, three events have occurred since the 2017 Plan.

SIGNIFICANT EVENTS

Hurricane Laura, August 20-29, 2020 – Hardin County

Hurricane Laura entered the Gulf of Mexico and became a hurricane on the 25th. Outer bands spread inland during the afternoon of the 26th and it made landfall at Cameron, Louisiana on the 27th. The west side of the category 4 hurricane impacted Southeast Texas as the center moved north across west Louisiana, causing damages totaling roughly $1.95 Billion. There was a mandatory evacuation for Hardin County. Many trees and power lines were blown down across the county. Homes and businesses were damaged from downed trees and severe wind. Over 40 percent of the county was without power immediately after the storm. Wind gusts ranged from 35 to 70 mph across the county.

Hurricane Ike, September 12-13, 2008 – Hardin County

Hurricane Ike caused wind damage and significant storm surge flooding across southeast Texas. Ike made landfall near Galveston, TX early in the morning on September 13th as a strong category 2 hurricane. Sustained hurricane force winds were confined to Jefferson County, Hardin County,

[1] Values are reported in 2022 dollars.

[2] Category at time of landfall.

[3] Ike made landfall in Texas and the hurricane's path was in close proximity to the planning area causing significant damages.

[4] Laura made landfall in Louisiana, approximately 60 miles southeast of the planning area. However, high winds and squalls with wind gusts up to 70 mph reached the planning area causing significant damages.

[5] Delta made landfall in Louisiana, approximately 80 miles southeast of the planning area. However, high winds and squalls with wind gusts up to 100 mph reached the planning area causing significant damages.

western Orange County, southwestern Jasper County, and western Tyler County. The highest recorded winds were at Southeast Texas Regional Airport with sustained winds of 61 knots (70 mph) and gusts of 83 knots (96 mph). Maximum storm total rainfall was between 5 and 8 inches across Jefferson, Hardin, Orange, and southern Jasper counties. Hurricane Ike caused category 1 wind damage across Hardin County. Many trees and power lines were downed, some landing on homes and businesses.

Hurricane Rita, September 18-26, 2005 – Hardin County
Hurricane Rita made landfall just east of the Texas - Louisiana border. The hurricane moved northwest and across southeast Texas in the morning hours of September 24th as a dangerous category 3 hurricane with sustained winds of 120 mph. Along the coast of neighboring Jefferson County, storm surges near 10 feet occurred near Sabine Pass, where over 90 percent of the homes were severely damaged or destroyed. The storm surge backed up the Sabine River and flooded a small section of downtown neighboring Orange with around 4 to 5 feet of storm surge. Winds blew over 100 mph across the entire region, snapping and uprooting trees, and damaged over 125,000 homes and businesses. Some homes in neighboring Jasper and Newton counties did not have electricity restored for over six weeks. Seven fatalities were attributed to the storm, however none of the deaths occurred in Hardin County.

PROBABILITY OF FUTURE EVENTS

Due to the location near the Gulf Coast, and the previous history of 7 events over a 62-year reporting period for the area, the likelihood or future probability of a tropical storm or hurricane in the Hardin County planning area is occasional, meaning an event is probable in the next five years.

VULNERABILITY AND IMPACT

Hurricane-force winds 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. Warning time for hurricanes has lengthened due to modern and early warning technology. Hurricane-force winds can easily destroy poorly constructed buildings and mobile homes, as well as debris such as signs, roofing materials, and small items left outside become extremely hazardous in hurricanes and tropical storms. Extensive damage to trees, towers, and underground utility lines (from uprooted trees) and fallen poles cause considerable civic disruption. Older structures may suffer greater damages from storm surge along the coast due to lower elevation of foundations.

The Hardin County planning area features multiple mobile or manufactured home parks throughout the planning area, including most of the participating jurisdictions. 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 and unincorporated areas of the county which would also be more vulnerable. The US Census data indicates a total of 6,787 manufactured homes located in the Hardin County planning area (27.0%), including participating jurisdictions (Table 5-3). In addition, 38.1% (approximately 9,560 structures) of the single family residential (SFR) structures in the entire planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant tornado events.

Table 5-3. Structures at Greater Risk by Jurisdiction

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Hardin County[6]	6,787	9,560
City of Kountze	318	441
City of Lumberton	828	1,420
City of Rose Hill Acres	0	123
City of Silsbee	253	1,814
City of Sour Lake	238	466

The following critical facilities would be vulnerable to hurricane wind events in the planning area, including all participating jurisdictions.

Table 5-4. Critical Facilities by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Hardin County	4 Fire Station Facilities, 2 Water/Wastewater Treatment Facilities, 1 Communications Tower, 5 School Facilities
City of Kountze	1 Fire Station, 1 Sheriff's Department, 1 Police Station, 4 Schools, 1 Medical Facility, 1 EOC, 3 Water Plants, 2 Water Storage Facilities, 1 Wastewater Treatment Facility, 8 Pump Stations, 1 Natural Gas Service Facility, 1 Regulator Station, 2 Government Facilities, 1 County Dispatch Facility, 1 Airport
City of Lumberton	1 Fire Station, 1 Police Station, 1 Water Control District Facility, 1 Drainage District Facility, 1 Hospital, 4 Schools, 1 Government Facility, 1 Municipal Utility District Facility, 1 Community Center (Performance Arts Center)
City of Rose Hill Acres	1 Government Facility
City of Silsbee	1 Fire Station Facility, 1 Police Station Facility, 3 Water/ Wastewater Treatment Facilities, 1 Government Facility, 5 School Facilities, 1 Communications Tower
City of Sour Lake	1 Fire Station, 1 Police Station, 1 Water Control District Facility, 3 School Facilities, 1 Water/Wastewater Treatment Facility, 1 Government Facility, 1 Communications Tower

Storm track data was available for the past 150 years; however, property and crop loss data is only available from 1960 through December 2021. Table 5-5 shows impact or loss estimation for storms impacting the county. Damages are reported on a countywide basis and are not available for each participating jurisdiction. Annual loss estimates were based on the 62-year reporting period for such damages (Table 5-5). The average annualized loss estimate for the Hardin County planning area is estimated to be approximately $3,311,373.

[6] County totals includes all incorporated jurisdictions and unincorporated areas.

Table 5-5. Potential Annualized Losses Hardin County, 1960-2021

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Hardin County	$205,305,154	$3,311,373

While all citizens are at risk to the impacts of a hurricane, 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 12.0% of the planning area population live below the poverty level (Table 5-6).

Table 5-6. Populations at Greatest Risk by Jurisdiction[7]

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Hardin County	6,883
City of Kountze	317
City of Lumberton	750
City of Rose Hill Acres	12
City of Silsbee	697
City of Sour Lake	313

The potential severity of impact from a hurricane for the Hardin County planning area, including all participating jurisdictions, is classified as “minor”; injuries or illness do not result in permanent disability, complete shutdown of critical facilities and services for one week or more, and more than 10 percent of property would be destroyed or have major damage.

ASSESSMENT OF IMPACTS

Hurricane 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. Worsening hurricane 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.
- Driving conditions in all jurisdictions may be dangerous during a hurricane event, 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.

[7] US Census Bureau 2020 data for Hardin County

- 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.
- 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 and protect citizens and 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.
- City or county departments may be damaged, delaying response and recovery efforts for the entire community.
- Private sector entities that the city 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.
- 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.
- 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 damages without a backup power source.

The economic and financial impacts of a hurricane 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 hurricane event.

SECTION 6: FLOOD

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 surface. Typically, floods are long-term events that may last for several days.

The primary types of general flooding are inland and coastal flooding. 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, thus 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.

LOCATION

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

- Zone A: Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance requirements and floodplain management standards apply.
- Zone AE: Areas subject to inundation by 1-percent-annual-chance shallow flooding. It is the base floodplain where BFEs are provided. AE zones are now used on new format FIRMs instead of A1-30 zones.

- Zone AO: Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet. Average flood depths derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply.
- Zone X: Moderate risk areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by a levee. No BFEs or base flood depths are shown within these zones.

Locations of flood zones in Hardin County based on the digital Flood Insurance Rate Map (DFIRM) from FEMA are illustrated in Figures 6-1 to 6-6.

Figure 6-1. Estimated Flood Zones in Hardin County

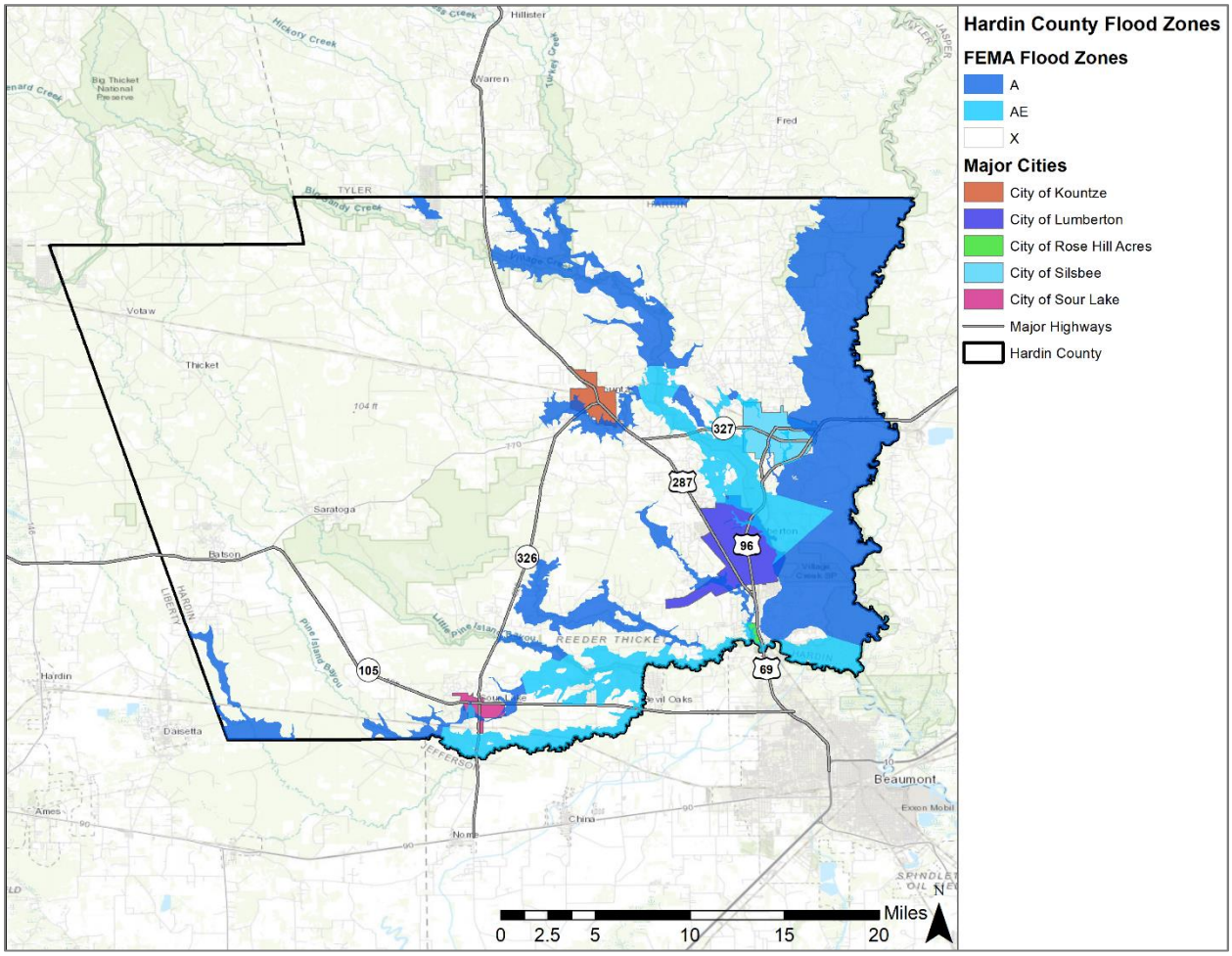


Figure 6-2. Estimated Flood Zones in the City of Kountze

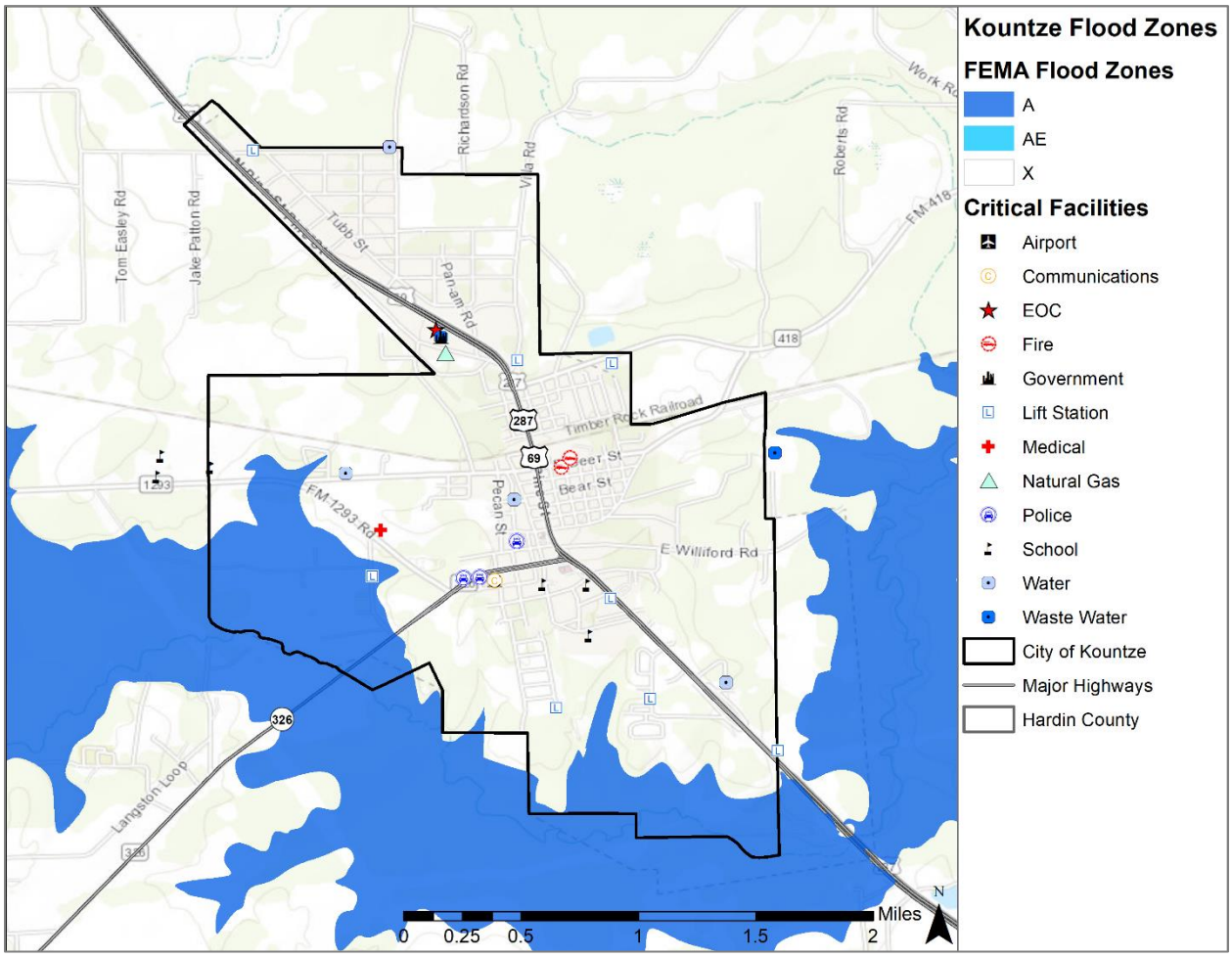


Figure 6-3. Estimated Flood Zones in the City of Lumberton

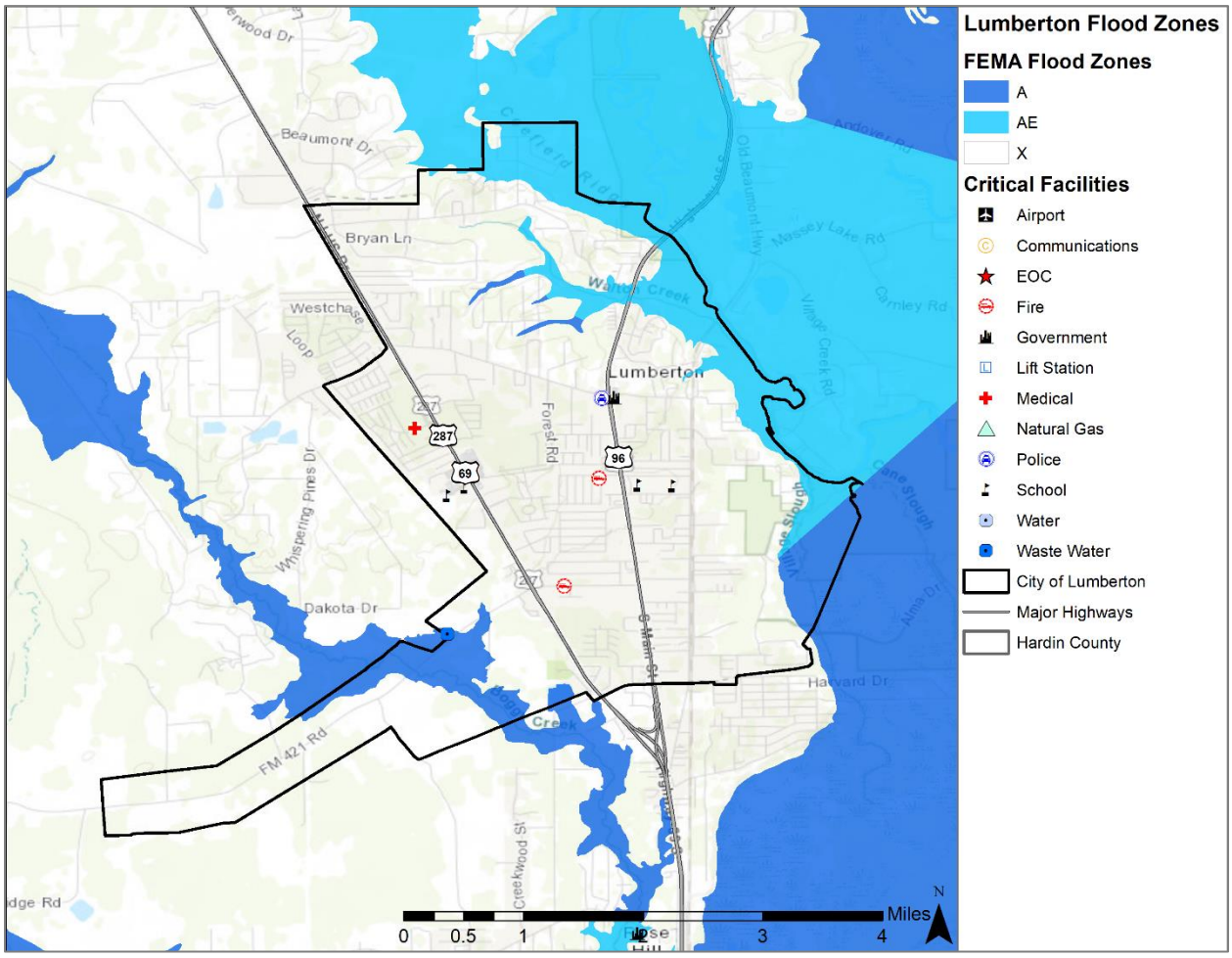


Figure 6-4. Estimated Flood Zones in the City of Rose Hill Acres

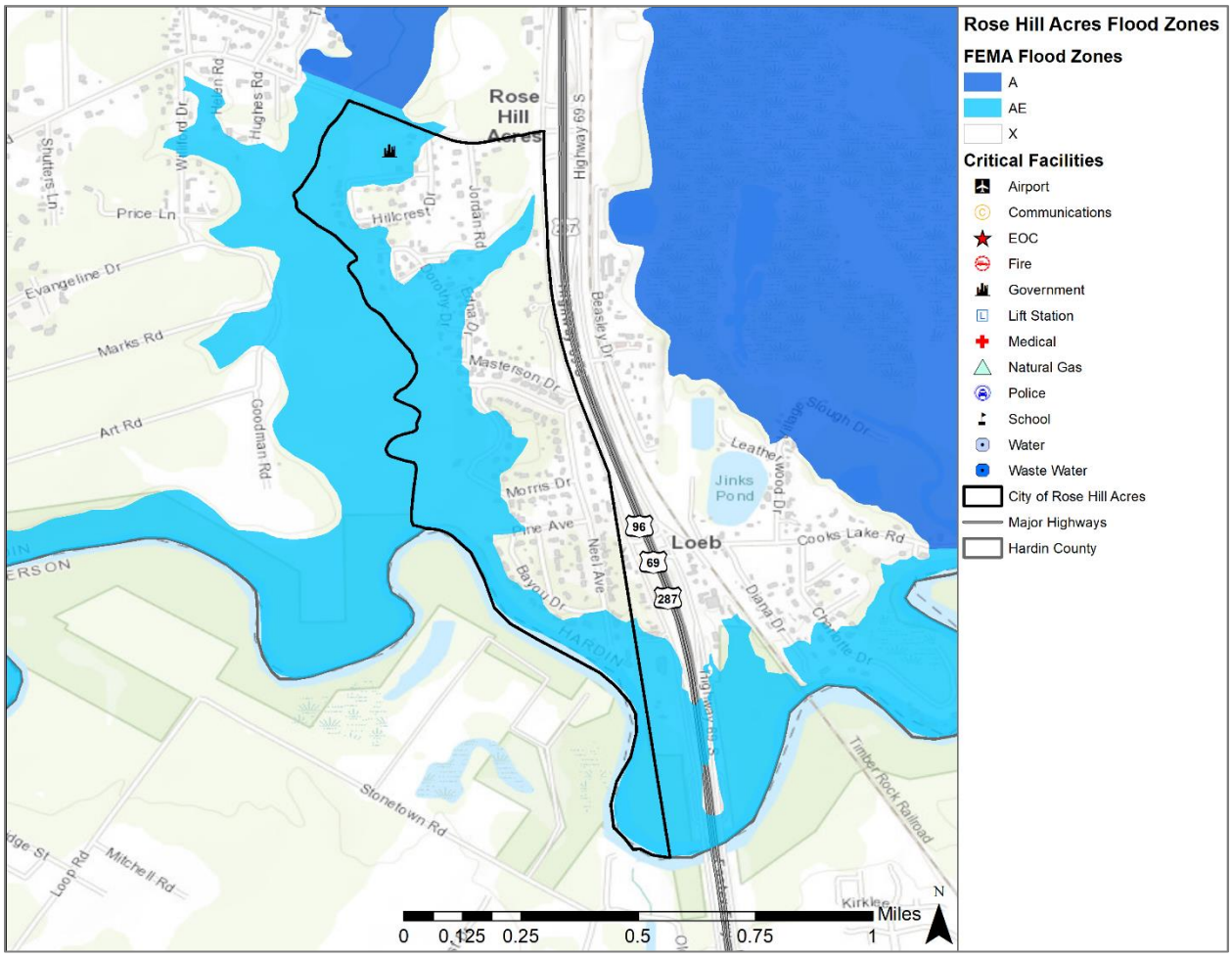


Figure 6-5. Estimated Flood Zones in the City of Silsbee

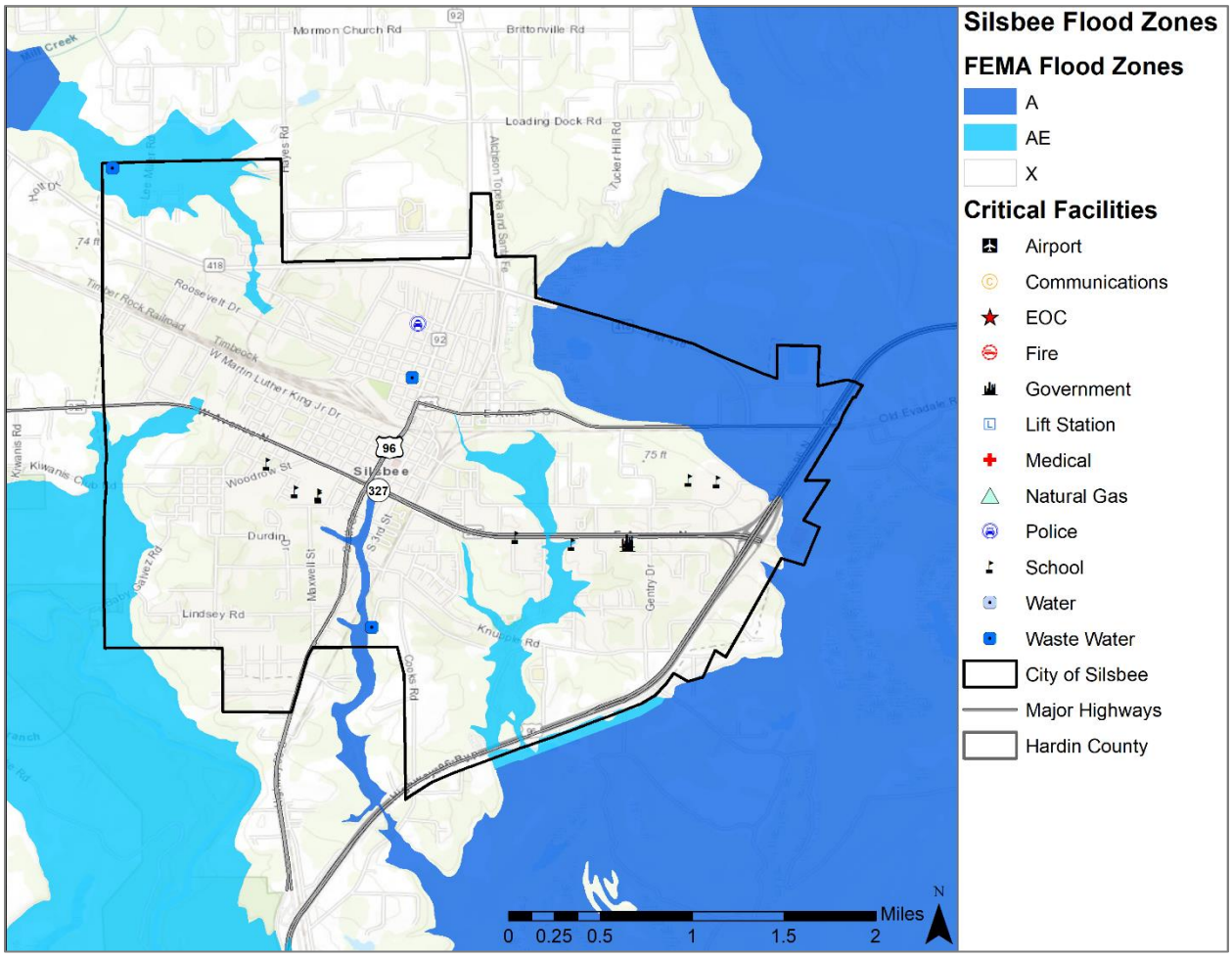
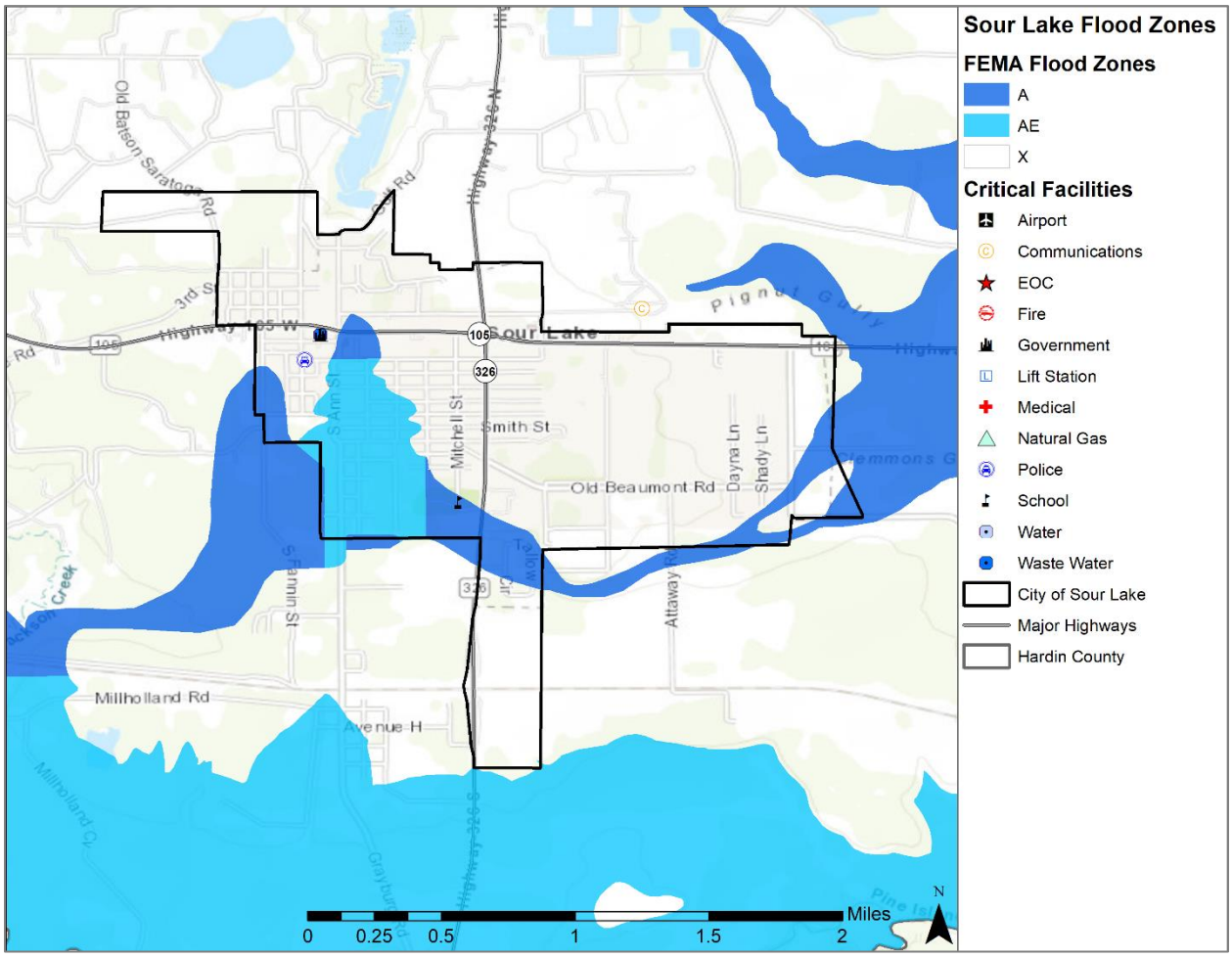


Figure 6-6. Estimated Flood Zones in the City of Sour Lake



EXTENT

The severity of a flood event is determined by a combination of several factors including stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and degree of vegetative clearing and impervious surface. 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 depths of flood waters. 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 Flood Insurance Rate Maps. Table 6-1 provides a description of FEMA flood zones and the flood impact in terms of severity or potential harm. Flood Zones A, AE, AO and X are the only hazard areas mapped in the region. Figures 6-1 through 6-6 should be read in conjunction with the extent for flooding in Tables 6-1 and 6-2 to determine the intensity of a potential flood event.

Table 6-1. Flood Zones

INTENSITY	ZONE	DESCRIPTION
HIGH	ZONE A	Areas with a one 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 base flood elevations 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 one percent or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from one to three 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 one percent annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from one to three feet. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
	ZONE A99	Areas with a one 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 base flood elevations 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.
HIGH COASTAL	ZONE VE, V1-30	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. No base flood elevations are shown within these zones.
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 one foot or with drainage areas less than one square mile; or an area protected by levees from 100-year flooding.

Zone A is interchangeably referred to as the 100-year flood, the one 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. Utility systems, such as heating, ventilation, air conditioning, fuel, electrical systems, sewage maintenance systems and water systems, if not elevated above base flood elevation, may also be damaged.

The intensity and magnitude of a flood event is also determined by the depth of flood waters. Table 6-2 describes the stream gauge data provided by the United States Geological Survey (USGS).

Table 6-2. Extent for Hardin County[1]

JURISDICTION[2]	PEAK FLOOD EVENT
Hardin County	Village Creek, near Kountz in Hardin County, Texas reached an overflow elevation of 35.96 feet in August 2017. The average peak flow for the Village Creek is 18.5 feet at this site.
Jefferson County	Pine Island Bayou, near Sour Lake Texas, reached an overflow elevation of 39.7 feet in August 2017. The average peak flow for the Pine Island Bayou is 28.4 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, including all participating jurisdictions, could expect to experience from 8-18 inches of rain within a 24-hour period, resulting in flash flooding.

The data described in Tables 6-1 and 6-2, together with Figures 6-1 through 6-6, and historical occurrences for the area, provides an estimated potential magnitude and severity for the planning area. For example, the City of Sour Lake, as shown in Figure 6-6, has areas designated as Zone A and AE. Reading this figure in conjunction with Table 6-1 means the area is an area of high risk for flood.

HISTORICAL OCCURRENCES

Historical evidence indicates that areas within the planning area, including all participating jurisdictions, 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 6-3 identifies historical flood events within the Hardin County planning area, including all participating jurisdictions. Table 6-4 provides the historical flood event summary

[1] Severity estimated by averaging floods at certain stage level over the history of flood events. Severity and peak events are based on U.S. Geological Survey data.
[2] Severity is provided for jurisdictions where peak data was provided.

by jurisdiction. Historical data is provided by team members and the Storm Prediction Center (NOAA), NCEI database for Hardin County.

Table 6-3. Historical Flood Events, 1996-2021[3]

JURISDICTION	DATE	TIME	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Kountze	6/24/1997	5:30 PM	0	0	$9,086	$0
City of Lumberton	1/6/1998	10:00 AM	0	0	$18,026	$0
City of Silsbee	1/13/1998	11:00 AM	0	0	$18,026	$0
Hardin County	10/22/2000	8:00 PM	0	0	$33,482	$0
City of Lumberton	6/7/2001	4:00 AM	0	0	$818,242	$0
City of Sour Lake	11/27/2001	8:00 AM	0	0	$16,420	$0
Hardin County	10/16/2006	7:00 AM	0	0	$28,870	$0
City of Kountze	10/16/2006	2:00 PM	0	0	$4,331	$0
City of Lumberton	10/16/2006	12:00 PM	0	0	$2,886,959	$0
City of Silsbee	10/18/2006	6:00 PM	0	0	$7,217	$0
City of Lumberton	2/12/2007	7:45 PM	0	0	$71,571	$0
City of Sour Lake	2/12/2007	6:00 PM	0	0	$14,314	$0
Hardin County	5/10/2013	1:00 PM	0	0	$125,048	$0
City of Sour Lake	3/12/2015	7:00 AM	0	0	$2,467	$0
Hardin County	5/18/2015	4:00 PM	0	0	$2,450	$0
Hardin County	5/25/2015	9:45 PM	0	0	$6,125	$0
Hardin County	6/17/2015	1:29 PM	0	0	$2,441	$0
Hardin County	10/31/2015	2:00 PM	0	0	$306,190	$0
City of Sour Lake	10/31/2015	5:15 AM	0	0	$2,449,517	$0
Hardin County	3/10/2016	8:00 PM	0	0	$122,325	$0
Hardin County	3/10/2016	5:17 AM	0	0	$183,487	$0
Hardin County	8/27/2017	12:40 PM	0	0	$711,865,561	$0
Hardin County	9/18/2019	9:31 PM	0	0	$9,076,034	$0

[3] Only recorded events with fatalities, injuries, and/or damages are listed, values are in 2022 dollars. Historical events are listed from January 1996 through December 2021.

JURISDICTION	DATE	TIME	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
TOTALS			**0**	**0**	**$728,068,188**	**$0**

Table 6-4. Summary of Historical Flood Events, January 1996-2021

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hardin County	21	0	0	$721,752,013	$0
City of Kountze	5	0	0	$13,416	$0
City of Lumberton	4	0	0	$3,794,798	$0
City of Rose Hill Acres	0	0	0	$0	$0
City of Silsbee	2	0	0	$25,243	$0
City of Sour Lake	5	0	0	$2,482,718	$0
TOTAL LOSSES	**37**	**0**	**0**	**$728,068,188**	

Based on the list of historical flood events for the Hardin County planning area (listed above), including all participating jurisdictions, 6 of the events have occurred since the 2017 Plan.

SIGNIFICANT EVENTS

Flash Flood August 27, 2017 – Hardin County

Hurricane Harvey moved across the Gulf of Mexico into the central Texas Coast during the last week of August. After the initial landfall, the cyclone moved back into the gulf a couple days later and then made another landfall in Southwest Louisiana during the morning of the 30th. The first rains from the system moved across the region during the afternoon of the 25th and finally ended during the morning of September 1. One to 5 feet of rain fell across Southeast Texas during the week which in some cases was slightly more than a normal yearly rainfall total. Widespread flooding occurred and a new rainfall record was set regarding the total for a tropical cyclone in the United States.

Between 20 to 40 inches fell across the Hardin County planning area which resulted in flooding of approximately 10,000 homes. Worst hit areas were around Lumberton, Silsbee, Sour Lake, and Kountze. Record flooding occurred on Pine Island Bayou and Village Creek. The second highest crest of the Neches occurred at Evadale. The US Highway 96 bridge near Silsbee collapsed due to the current. Damage estimates exceeded 700 million (2022 dollars) for Hardin County.

Flood on October 31, 2015 – Sour Lake/Hardin County

Deep moisture moved into Southeast Texas from the gulf ahead of an approaching shortwave and cold front. Heavy rain fell across portions of the area that had just received several inches less than a week before. The radar estimated a storm total of 10 to 20 inches over the week with some locations receiving almost one foot from this event alone.

Heavy rain moved into Hardin County early during the morning of the 31st. Flooding of roadways with water at least 2 feet deep was reported in Silsbee by sunrise. By mid-morning the Department of Highways reported that most roads in the county had water covering them and water rescues were ongoing according to the county police department near Silsbee and Kountze. Around 50 houses in the county were flooded. By the end of the event Reeves Elementary in Silsbee received 9.0 inches, Kountze Elementary received 9.71 inches, 11.58 inches was reported from West Hardin High School in Saratoga, and 14.25 reported at Highway 105 at Pine Island Bayou near Batson. Damages were estimated at approximately $2,000,000.

Flood on October 16, 2006 – Hardin County
An abundance of moisture and high wind shear resulted in flash floods across southeast Texas. Two-day rain totals of 12 to 18 inches resulted in long duration flooding across portions of Hardin County. The hardest hit areas were along near Village Creek near Lumberton, where many roads were flooded for almost a week and homes were cut off by high water. Approximately 25 homes near Brushy Creek had flood damage. Another 75 homes were damaged across the county. Damages were estimated at approximately $2,000,000.

Flash Flood June 7, 2001 – Hardin County
Tropical Storm Allison caused minor problems along coastal sections of southeast Texas, but eventually resulted in catastrophic flood losses further inland. Wind gusts of 30 to 40 mph resulted in minor roof damage to less than ten homes along the coast in neighboring Jefferson County between the evening of June 5th and the early morning hours of June 6th. A two-foot storm surge resulted in minor beach erosion and portions of Highway 82 between Sabine Pass and Port Arthur to go under water during high tide during the nighttime high tide of June 5th to 6th. The specific flood events that occurred between June 7th and 9th were a result of the remnants of Tropical Storm Allison, as it meandered across southeast and east Texas. Southern sections of Hardin County received between six and ten inches of rain in less than six hours, resulting in almost 40 homes flooded in rural portions of the Sour Lake to Lumberton area.

PROBABILITY OF FUTURE EVENTS

Based on 37 recorded historical occurrences within a 26-year reporting period within the Hardin County planning area, including all participating jurisdictions, flooding is highly likely with 1 to 2 events per year anticipated.

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. The County and all participating jurisdictions encourage development outside of the floodplain, and the impact for flood for the entire planning area is "Minor" as facilities and services would be shut down for one week or more, more 10 percent of property destroyed or with major damage, and injuries or illness that do not result in permanent disability.

Table 6-5 includes the critical facilities identified in Appendix D that were determined to be located within the SFHA by FIRM mapping and further by each participating jurisdiction.

Table 6-5. Critical Facilities in the Floodplain by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Hardin County	1 Fire Station, 1 Water/Wastewater Treatment Facility
City of Kountze	1 School, 1 Lift Station
City of Lumberton	1 Municipal Utility District
City of Rose Hill Acres	1 Government Facility
City of Silsbee	2 Schools, 1 Fire Station, 1 Water/Wastewater Facility
City of Sour Lake	1 Fire Station, 1 School

Historic loss estimates due to flood are presented in Table 6-6 below. Considering 37 flood events over a 26-year period, frequency is approximately one to two events every year.

Table 6-6. Potential Annualized Losses by Jurisdiction

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Hardin County	$721,752,013	$27,759,693
City of Kountze	$13,416	$516
City of Lumberton	$3,794,798	$145,954
City of Rose Hill Acres	$0	$0
City of Silsbee	$25,243	$971
City of Sour Lake	$2,482,718	$95,489
Planning Area	**$728,068,188**	**$28,002,623**

While all citizens are at risk to 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. An estimated 12.0% of the planning area population live below the poverty level (Table 6-7).

Table 6-7. Populations at Greatest Risk by Jurisdiction[4]

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Hardin County	6,883
City of Kountze	317

[4] US Census Bureau 2020 data for Hardin County

JURISDICTION	POPULATION BELOW POVERTY LEVEL
City of Lumberton	750
City of Rose Hill Acres	12
City of Silsbee	697
City of Sour Lake	313

The severity of a flooding event varies depending on the relative risk to citizens and structures located within each jurisdiction. Table 6-8 depicts the level of impact for Hardin County and each participating jurisdiction.

Table 6-8. Impact by Jurisdiction

JURISDICTION	IMPACT	DESCRIPTION
Hardin County	Minor	It is anticipated that the Hardin County could anticipate an impact of “minor” with critical facilities would be shut down for one week with more and more than 10 percent of property would be destroyed or damaged.
City of Kountze	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged in the city.
City of Lumberton	Minor	Any injuries and/or illnesses do not result in permanent disability. Complete shutdown of facilities and services for more than 1 week. More than 10 percent of property is destroyed or with major damage.
City of Rose Hill Acres	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged in the city.
City of Silsbee	Limited	Any injuries or illnesses would be treatable with first aid, with minor quality of life lost. If critical facilities are shut down it would be for 24 hours or less, and it is expected that less than 10 percent of property would be destroyed or damaged in the city.
City of Sour Lake	Minor	Any injuries and/or illnesses do not result in permanent disability. Complete shutdown of facilities and services for more than 1 week. More than 10 percent of property is destroyed or with major damage.

SECTION 6: FLOOD

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 Hardin County planning area. The impact of climate change could produce larger, more severe flood events, exacerbating the current flood impacts. Worsening flood conditions can be frequently associated with a variety of impacts, including:

- 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.
- 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 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.
- 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 impacted by a flood event and 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 jurisdiction 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, and 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.
- Flooding may cause significant disruptions of clean water and sewer services, elevating health risks and delaying recovery efforts.
- The psycho-social 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.
- Recreation activities at Village Creek State Park or along the Neches River may be unavailable and tourism can be unappealing for years following a large flood event, devastating directly related local businesses and negatively impaction economic recovery.
- The Big Thicket National Preserve area may suffer significant wildlife mortality during and following a flood due to damaged or destroyed ecosystems and water contamination.

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

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. Hardin County and all participating jurisdictions are currently participating in the NFIP and are in good standing.

Hardin County, Lumberton, and Sour Lake currently have adopted higher standards above the NFIP minimum such as 1 foot of freeboard for new construction and substantial Improvements of structures. Kountze, Lumberton, and Silsbee currently have adopted the minimum NFIP standards. These jurisdictions are considering adopting additional higher regulatory NFIP standards to limit floodplain development.

SECTION 6: FLOOD

The flood hazard areas throughout the planning area are subject to periodic inundation, which may result 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, of which adversely affect public safety.

These 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 drainage systems and bridges and expanding drainage culverts and storm water structures to more adequately convey flood waters.

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

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

In order to accomplish these tasks, Hardin County and all participating jurisdictions seek to follow these guidelines to achieve flood mitigation by:

- 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 and/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

As mentioned, Hardin County and all participating jurisdictions have developed mitigation actions that relate to either NFIP maintenance or compliance. Compliance and maintenance actions can be found in Section 17.

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

Each NFIP participating jurisdiction has a designated floodplain administrator. The 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 jurisdictions outline the minimum requirements for development in special flood hazard areas.

REPETITIVE LOSS

The Severe Repetitive Loss (SRL) 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 severe repetitive loss residential structures insured under the NFIP. The Texas Water Development Board (TWDB) administers the SRL 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 residential properties that are:

- Covered under the NFIP and have at least four 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 two 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 two of the referenced claims must have occurred within any ten-year period and must be greater than 10 days apart.[5] Table 6-9 shows repetitive loss and severe repetitive loss properties for the Hardin County planning area.

Table 6-9. Repetitive Loss and Severe Repetitive Loss Properties

JURISDICTION	BUILDING TYPE	NUMBER OF STRUCTURES	NUMBER OF LOSSES
Hardin County	Single Family	4	8
	Assumed Condo	1	2
City of Kountze	Single Family	7	17
	Assumed Condo	1	3
City of Lumberton	Single Family	81	332
	Assumed Condo	1	3
	Non-Residential	6	22
City of Rose Hill Acres	Single Family	3	10
City of Silsbee	Single Family	22	65
City of Sour Lake	Single Family	28	108
	Assumed Condo	2	9
	Non-Residential	2	5

[5] Source: Texas Water Development Board

SECTION 7: THUNDERSTORM WIND

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 the high toward the 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 is accelerated.

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

Thunderstorms 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 Hardin County's planning area, including all participating jurisdictions, as these storms develop randomly and are not confined to any geographic area within the County. It is assumed that the Hardin County planning area is uniformly exposed to the threat of thunderstorms winds.

SECTION 7: THUNDERSTORM WIND

EXTENT

The extent or magnitude of a thunderstorm wind event is measured by the Beaufort Wind Scale. Table 7-1 describes the different intensities of wind in terms of speed and effects, from calm to violent and destructive.

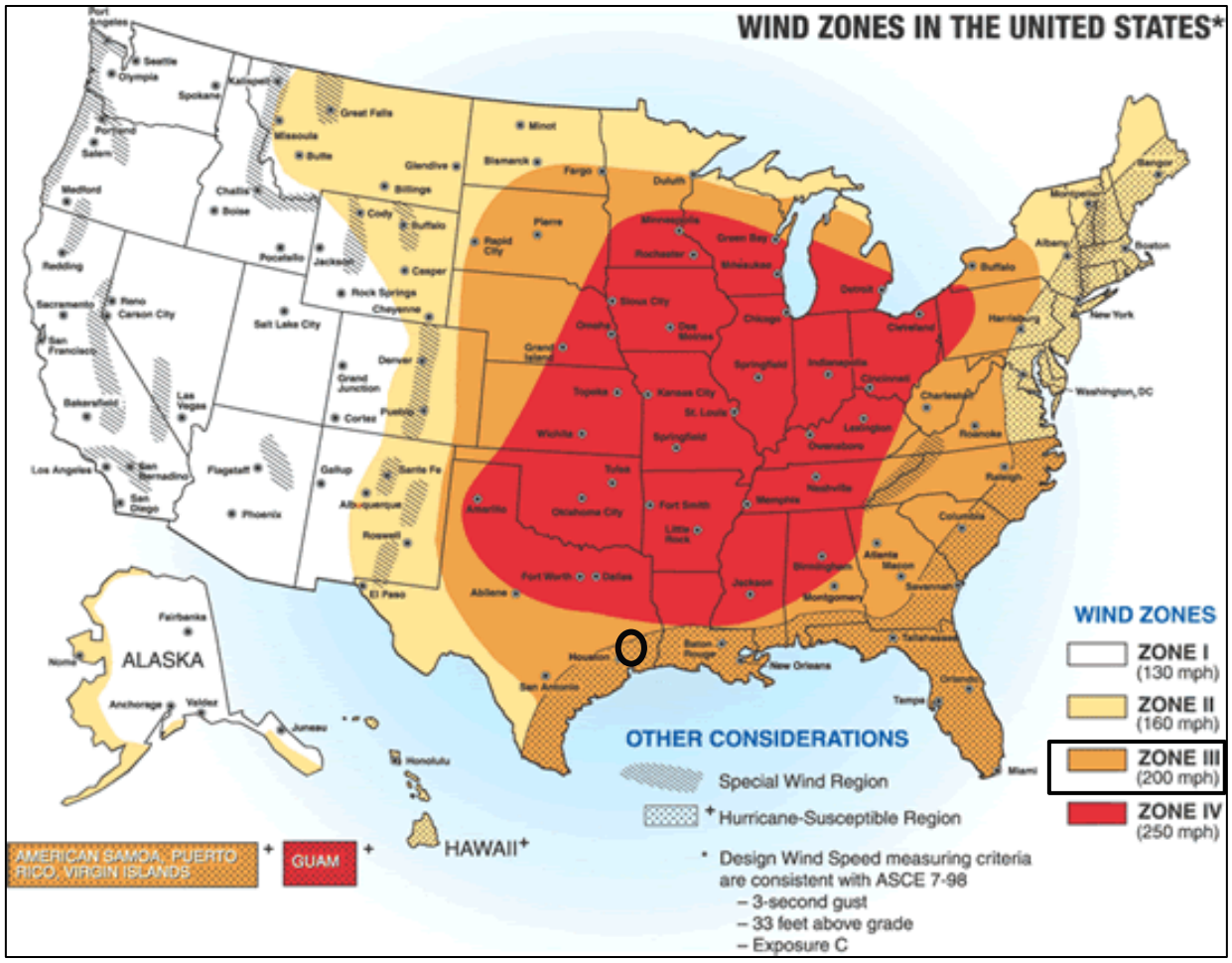
Table 7-1. Beaufort Wind Scale[1]

FORCE	WIND (MHP)	WMO CLASSIFICATION	APPEARANCE OF WIND EFFECTS
0	Less than 1	Calm	Calm, smoke rises vertically
1	1-3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4-8	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	9-14	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	15-21	Moderate Breeze	Dust, leaves and loose paper lifted, small tree branches move
5	22-28	Fresh Breeze	Small trees in leaf begin to sway
6	29-36	Strong Breeze	Larger tree branches moving, whistling in wires
7	37-44	Near Gale	Whole trees moving, resistance felt walking against wind
8	45-53	Gale	Whole trees in motion, resistance felt walking against wind
9	54-62	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	63-72	Storm	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	73-83	Violent Storm	If experienced on land, widespread damage
12	84+	Hurricane	Violence and destruction

Figure 7-1 displays the wind zones as derived from NOAA.

[1] Source: World Meteorological Organization

Figure 7-1. Wind Zones in the United States[2]



On average, the planning area experiences one to two thunderstorm wind events every year. The County is located in Zone III, meaning they can experience winds up to 200 mph. Hardin County has experienced a significant wind event or an event with winds in the range of "Force 12" on the Beaufort Wind Scale with winds at or above 84 mph. Based on historical occurrences for thunderstorm wind events, a Force 12 on the Beaufort Wind scale is the maximum force anticipated for future events in the planning area.

HISTORICAL OCCURRENCES

Tables 7-2, 7-3, and 7-4 depict historical occurrences of thunderstorm wind events for the Hardin County planning area according to the National Centers for Environmental Information (NCEI) data. Since January 1961, 104 thunderstorm wind events are known to have impacted the Hardin County planning area, including all participating jurisdictions, based upon NCEI records. Table 7-3 presents information on known historical events impacting the Hardin County planning area with resulting damages, injuries or fatalities. It is important to note that high wind events associated with other hazards, such as tornadoes, are not accounted for in this section.

[2] Hardin County is indicated by the circle.

SECTION 7: THUNDERSTORM WIND

The NCEI is a national data source organized under the National Oceanic and Atmospheric Administration. The NCEI is the largest archive available for climate data; however, it is important to note that the only incidents recorded are those that are reported to the NCEI from 1961 through December 2021 have been factored into this risk assessment. In the tables that follow throughout this section, some occurrences seem to appear multiple times in one table. This is due to reports from various locations throughout the County. In addition, property damage estimates are not always available. Where an estimate has been provided in a table for losses, the dollar amounts have been altered to indicate the damage in 2022 dollars. Historical thunderstorm wind data for all of the participating jurisdictions are provided on a County-wide basis per the NCEI database.

Table 7-2. Historical Thunderstorm Wind Events with Reported Damages, 1961-2021

MAXIMUM WIND SPEED RECORDED (MPH)	NUMBER OF REPORTED EVENTS
0-30	33
31-40	2
41-50	28
51-60	11
61-70	0
71-80	0
81-90	2
91-100+	1
Unknown	27

Table 7-3. Historical Thunderstorm Wind Events, 1961-2021[3]

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Lumberton	5/9/1993	11:15 PM	0	0	0	$0	$10,100
City of Kountze	5/29/1994	3:28 PM	52	0	0	$9,874	$9,874
City of Silsbee	5/29/1994	3:30 PM	0	0	0	$9,874	$9,874
City of Kountze	4/22/1996	5:45 PM	Unknown	0	0	$9,318	$0
City of Silsbee	5/29/1996	6:45 PM	Unknown	0	0	$9,301	$9,301
City of Sour Lake	5/29/1996	9:05 PM	Unknown	0	1	$2,046,128	$46,503
Hardin County	6/13/1996	4:45 PM	Unknown	0	0	$9,295	$0

[3] Only recorded events with fatalities, injuries or damages are listed. Magnitude is listed when available. Damage values are in 2022 dollars.

SECTION 7: THUNDERSTORM WIND

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hardin County	9/15/1996	11:30 AM	Unknown	0	0	$18,460	$0
City of Sour Lake	1/27/1997	8:30 PM	Unknown	0	0	$18,309	$0
Hardin County	9/9/1997	4:00 PM	Unknown	0	0	$18,071	$0
Hardin County	12/23/1997	6:15 PM	Unknown	0	0	$36,118	$0
City of Silsbee	12/23/1997	6:50 PM	Unknown	0	0	$18,059	$0
City of Kountze	1/26/1998	6:10 AM	Unknown	0	0	$90,128	$0
City of Silsbee	2/10/1998	1:40 PM	Unknown	0	0	$449,806	$0
City of Silsbee	8/21/1998	2:59 PM	Unknown	0	0	$44,568	$0
City of Kountze	1/1/1999	11:51 PM	Unknown	0	0	$17,729	$0
City of Silsbee	7/12/1999	1:00 PM	Unknown	0	0	$3,494	$0
City of Silsbee	3/26/2000	6:30 AM	Unknown	0	0	$17,014	$0
City of Kountze	5/2/2000	4:30 AM	Unknown	0	0	$3,397	$0
City of Silsbee	8/11/2000	4:20 PM	Unknown	0	0	$3,372	$0
Hardin County	9/1/2000	3:20 PM	Unknown	0	0	$3,354	$0
City of Sour Lake	9/1/2000	3:54 PM	Unknown	0	0	$8,384	$0
City of Kountze	11/8/2000	1:45 AM	Unknown	0	0	$8,365	$0
Hardin County	10/13/2001	4:00 AM	Unknown	0	0	$32,785	$0
City of Silsbee	12/13/2001	12:20 PM	Unknown	0	0	$8,243	$0
City of Kountze	4/8/2002	1:03 AM	Unknown	0	0	$8,101	$0
Hardin County	7/7/2002	10:49 PM	Unknown	0	0	$8,087	$0
City of Silsbee	8/27/2002	11:50 AM	Unknown	0	0	$3,224	$0
City of Sour Lake	8/27/2002	12:00 PM	Unknown	0	0	$8,060	$0
City of Lumberton	12/23/2002	10:50 PM	Unknown	0	0	$8,052	$0
Hardin County	3/18/2003	12:50 PM	50	0	0	$3,163	$0
City of Silsbee	8/21/2003	4:58 PM	50	0	0	$7,889	$0
City of Lumberton	8/23/2003	2:30 PM	50	0	0	$39,449	$0
City of Kountze	11/17/2003	6:40 PM	50	0	0	$15,788	$0

SECTION 7: THUNDERSTORM WIND

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Silsbee	11/18/2003	12:30 AM	50	0	0	$7,894	$0
Hardin County	6/2/2004	1:30 AM	50	0	0	$3,071	$0
City of Lumberton	11/23/2004	11:18 PM	50	0	0	$152,511	$0
City of Lumberton	4/11/2005	10:40 AM	50	0	0	$7,484	$0
City of Lumberton	5/25/2005	6:28 PM	50	0	0	$2,997	$0
City of Lumberton	5/29/2005	7:50 PM	50	0	0	$2,997	$0
City of Kountze	4/29/2006	9:45 AM	50	0	0	$14,457	$0
City of Silsbee	8/5/2006	9:10 PM	50	0	0	$2,857	$0
Hardin County	10/16/2006	6:10 AM	60	0	0	$28,870	$0
City of Sour Lake	2/12/2007	5:30 PM	50	0	0	$2,863	$0
Hardin County	5/11/2008	3:24 AM	50	0	0	$13,446	$0
City of Kountze	5/11/2008	3:20 AM	50	0	0	$6,723	$0
Hardin County	1/9/2011	12:00 PM	43	0	0	$6,613	$0
Hardin County	4/26/2011	1:59 AM	52	0	0	$2,591	$0
City of Silsbee	4/26/2011	1:05 AM	52	0	0	$3,886	$0
Hardin County	6/6/2011	2:25 PM	50	0	0	$12,905	$0
Hardin County	6/12/2012	12:05 PM	50	0	0	$3,808	$0
Hardin County	12/25/2012	10:05 AM	40	0	0	$5,075	$0
Hardin County	6/6/2013	5:20 PM	50	0	0	$3,742	$0
Hardin County	4/25/2015	7:45 AM	50	0	0	$6,156	$0
City of Kountze	5/25/2015	7:52 PM	50	0	0	$1,225	$0
City of Kountze	5/25/2015	8:32 PM	50	0	0	$2,450	$0
City of Kountze	8/11/2015	3:05 PM	87	0	0	$619,179	$0
City of Silsbee	8/11/2015	3:05 PM	87	0	0	$611,151	$0
City of Kountze	4/27/2016	5:05 AM	50	0	0	$12,174	$0
Hardin County	5/27/2016	4:40 AM	50	0	0	$2,425	$0
City of Kountze	5/3/2017	6:37 AM	50	0	0	$2,380	$0

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hardin County	4/7/2019	1:16 PM	50	0	0	$3,420	$0
City of Silsbee	10/29/2019	3:04 PM	120	0	1	$3,395,710	$0
TOTALS			**(Max Extent)**	**0**	**2**	**$7,936,319**	**$85,652**

Table 7-4. Summary of Historical Thunderstorm Wind Events, 1961-2020

JURISDICTION	NUMBER OF EVENTS	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hardin County	52	60	0	0	$221,455	$0
City of Kountze	18	87	0	0	$821,288	$9,874
City of Lumberton	9	50	0	0	$213,490	$10,100
City of Rose Hill Acres	0	N/A	0	0	$0	$0
City of Silsbee	17	120	0	1	$4,596,342	$19,175
City of Sour Lake	8	52	0	1	$2,083,744	$46,503
TOTAL LOSSES	**104**	**(Max Extent)**	**0**	**2**	**$8,021,971**	

Based on the list of historical thunderstorm wind events for the Hardin County planning area (listed above), including all participating jurisdictions, 6 of the events have occurred since the 2017 Plan.

SIGNIFICANT EVENTS

October 29, 2019 – City of Silsbee/Hardin County

A thunderstorm downburst produced wind gusts of 90 to 100 mph across parts of Hardin County from Kountze to Silsbee. Damage started around the Hwy 326/ Hwy 770 intersection southwest of Kountze, where numerous trees were snapped or uprooted. Part of the roof of the Hardin County Show Barn was ripped off. Several trees were snapped or uprooted in Kountze near the county courthouse. The intermediate school lost part of a metal roof on the gymnasium. Further south, a church lost part of its roof on Hwy 96, and part of the roof at the Hawthorne Airport hangar came off. A small building near the airport was flipped over. A man that was in the building received minor injuries. The Enchanted Forest subdivision near Silsbee was hit especially hard. Numerous trees were uprooted or snapped, with several homes having roof damage from trees landed on them. The area of damage was 7,040 yards wide and reported damages exceeded $4.5 million in 2022 dollars.

August 11, 2015 – Kountze

A severe thunderstorm hit the City of Kountze damaging the local airport. High winds from a microburst resulted in eight general aviation aircrafts breaking loose from tie downs and being picked up and thrown. One aircraft hangar was also damaged. Damage estimates exceeded $500,000.

February 10, 1998 – Silsbee
Several cars were overturned at the Pine Harbor Health Center in Silsbee. Local wind equipment recorded winds in excess of 79 mph. At the Louisiana Pacific Lumber Company, over one hundred tall pine trees were snapped. Several homes and businesses in the area received roof damage. Strong winds, in excess of 50 knots, blew through the Little Cypress area damaging a barn. Several roofs were damaged in the area. Damage estimates exceeded $250,000.

May 29, 1996 – Sour Lake
Severe downburst winds hit the community of Sour Lake. A man was injured in a motel room when the ceiling and air conditioner collapsed on him. Between 20 and 30 percent of the buildings in Sour Lake received some kind of damage including 5 homes that were completely destroyed, 20 homes severely damaged, and 60 homes with minor damage.

PROBABILITY OF FUTURE EVENTS

Most thunderstorm winds occur during the months of March, April, May, and September. Based on available records of historic events, there have been 104 events in a 61-year reporting period, which provides a probability of one to two events every year. Even though the intensity of thunderstorm wind events is not always damaging for the Hardin 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 Hardin County planning area, including all participating jurisdictions.

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 in the Hardin County planning area, including all participating jurisdictions, 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 numerous instances roofs have been reported as having been torn off of buildings. The portable buildings typically used at schools and construction sites would be more vulnerable to thunderstorm wind events than typical site-built structures and could potentially pose a greater risk for wind-blown debris.

The US Census data indicates a total of 6,787 manufactured homes located in the Hardin County planning area (27%), including participating jurisdictions (Table 7-5). In addition, 38.1% (approximately 9,560 structures) of the single family residential (SFR) structures in the entire planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant wind events.

Table 7-5. Structures at Greater Risk by Jurisdiction

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Hardin County[4]	6,787	9,560
City of Kountze	318	441
City of Lumberton	828	1,420
City of Rose Hill Acres	0	123
City of Silsbee	253	1,814
City of Sour Lake	238	466

While all citizens are at risk 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 12.0% of the planning area population live below the poverty level (Table 7-6).

Table 7-6. Populations at Greatest Risk by Jurisdiction[5]

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Hardin County	6,883
City of Kountze	317
City of Lumberton	750
City of Rose Hill Acres	12
City of Silsbee	697
City of Sour Lake	313

The following critical facilities would be vulnerable to thunderstorm wind events in each participating jurisdiction:

Table 7-7. Critical Facilities at Risk by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Hardin County	4 Fire Station Facilities, 2 Water/Wastewater Treatment Facilities, 1 Communications Tower, 5 School Facilities
City of Kountze	1 Fire Station, 1 Sheriff's Department, 1 Police Station, 4 Schools, 1 Medical Facility, 1 EOC, 3 Water Plants, 2 Water Storage Facilities, 1 Wastewater Treatment Facility, 8 Pump Stations, 1 Natural Gas

[4] County totals includes all jurisdictions and unincorporated areas within the county.

[5] US Census Bureau 2020 data for Hardin County

JURISDICTION	CRITICAL FACILITIES
	Service Facility, 1 Regulator Station, 2 Government Facilities, 1 County Dispatch Facility, 1 Airport
City of Lumberton	1 Fire Station, 1 Police Station, 1 Water Control District Facility, 1 Drainage District Facility, 1 Hospital, 4 Schools, 1 Government Facility, 1 Municipal Utility District Facility, 1 Community Center (Performance Arts Center)
City of Rose Hill Acres	1 Government Facility
City of Silsbee	1 Fire Station Facility, 1 Police Station Facility, 3 Water/ Wastewater Treatment Facilities, 1 Government Facility, 5 School Facilities, 1 Communications Tower
City of Sour Lake	1 Fire Station, 1 Police Station, 1 Water Control District Facility, 3 School Facilities, 1 Water/Wastewater Treatment Facility, 1 Government Facility, 1 Communications Tower

A thunderstorm wind event can also result in traffic disruptions, injuries and in rare cases, fatalities. Impact of thunderstorms winds experienced in the Hardin County planning area has resulted in two injuries and no fatalities. Impact of thunderstorm wind events experienced in the Hardin County planning area, including all participating jurisdictions, would be “Limited,” and injuries and illnesses would be treatable with first aid, less than ten percent of property damaged or destroyed, and facilities would be shut down for 24 hours or less. Overall, the average loss estimate (in 2022 dollars) is $8,021,971, having an approximate annual loss estimate of $131,508 (Table 7-8).

Table 7-8. Potential Annualized Losses by Jurisdiction

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Hardin County	$221,455	$3,630
City of Kountze	$831,162	$13,626
City of Lumberton	$223,590	$3,665
City of Rose Hill Acres	$0	$0
City of Silsbee	$4,615,517	$75,664
City of Sour Lake	$2,130,247	$34,922
Planning Area	**$8,021,971**	**$131,508**

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. The impact of climate change could produce larger, more severe thunderstorm wind events, exacerbating the current thunderstorm wind impacts. Worsening 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.
- During exceptionally heavy wind events, 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.
- 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.
- 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.
- City or county departments may be damaged, delaying response and recovery efforts for the entire community.
- Private sector entities that the City 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.
- 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 built to less stringent building codes may suffer greater damage as they are typically more vulnerable to thunderstorm winds.
- Large scale wind events 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, and normal day-to-day operating expenses.
- Businesses that are more reliant on utility infrastructure than others may suffer greater damages without a backup power source.
- Recreational areas and parks may be damaged or inaccessible due to downed trees or debris, causing temporary impacts to area businesses.

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.

SECTION 8: LIGHTNING

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 FEMA, an average of 300 people are injured and 80 people are killed in the United States each year by lightning. Direct lightning strikes also have the ability to cause significant damage to buildings, critical facilities, and infrastructure. 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

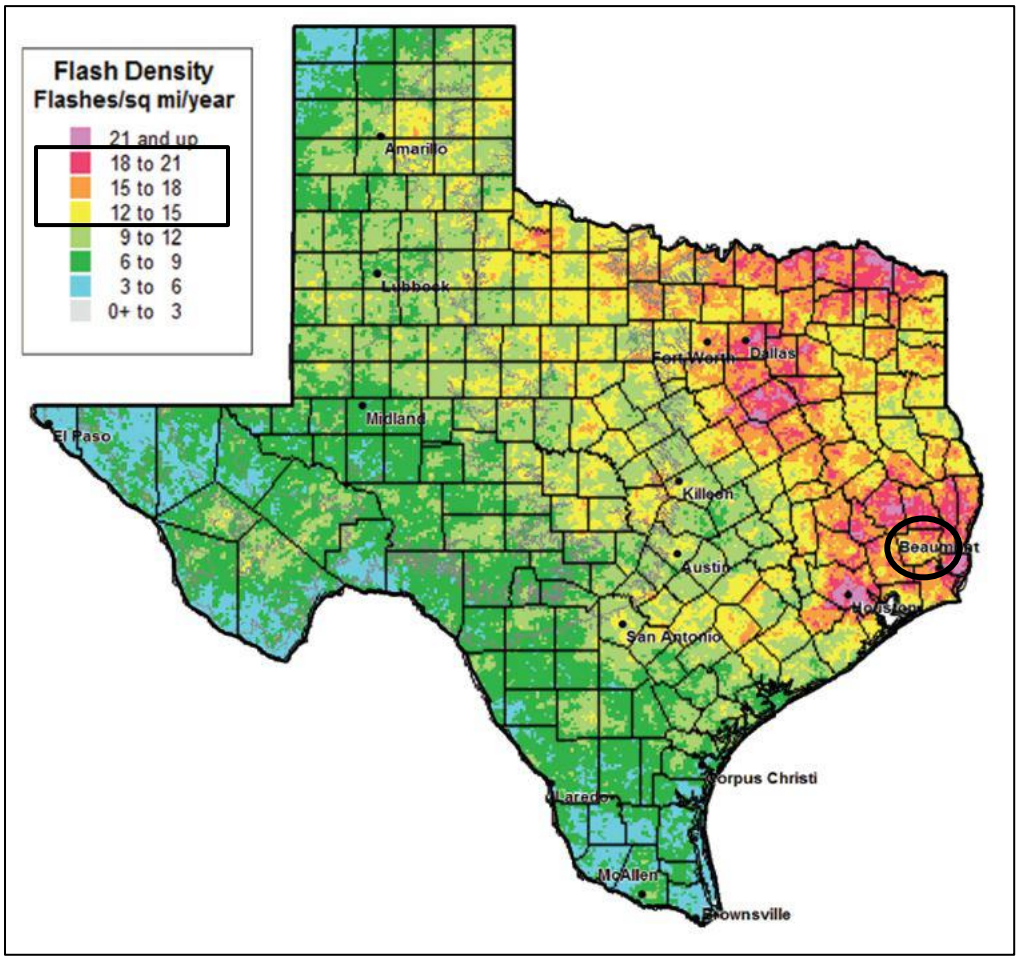
Lightning can strike in any geographic location and is considered a common occurrence in Texas. The Hardin County planning area, including all participating jurisdictions, is in a region of the country that is moderately susceptible to a lightning strike. Therefore, lightning could occur at any location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

EXTENT

According to the NOAA, the average number of cloud-to-ground flashes for the State of Texas between 2006 and 2016 was 11.3 flashes per square mile. Vaisala's U.S. National Lightning Detection Network lightning flash density map (Figure 8-1) shows a range of twelve to twenty-one cloud-to-ground lightning flashes per square mile per year for the entire Hardin County planning area. This rate equates to approximately 7,560 to 13,230 flashes per year for the entire planning area.

SECTION 8: LIGHTNING

Figure 8-1. Lightning Flash Density, 2006-2016



The extent for lightning can be expressed in terms of the number of strikes in an interval. NOAA utilizes lightning activity levels (LALs) on a scale from 1-6. LAL rankings reflect the frequency of cloud-to-ground lightning either forecast or observed (Table 8-1).

Table 8-1. NOAA Lightning Activity Levels (LAL)

LAL	CLOUD & STORM DEVELOPMENT	LIGHTNING STRIKES/ 15 MIN
1	No thunderstorms.	-
2	Cumulus clouds are common but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent.	1-8
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground, and lightning is infrequent.	9-15

LAL	CLOUD & STORM DEVELOPMENT	LIGHTNING STRIKES/ 15 MIN
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common and lightning is frequent.	16-25
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent and intense.	>25
6	Similar to LAL 3 except thunderstorms are dry.	

The NCEI does not include the LAL for historical lightning events, therefore in order to determine the extent of lightning strikes, the yearly average range of estimated number of lightning strikes within the planning area (7,560 to 13,230 flashes) and a cloud-to-ground flash density of twelve to twenty per square mile were divided by the number[1] of thunderstorm events that occur annually in the planning area. Hardin County, including all participating jurisdictions, should expect an average range of three to twelve lightning strikes within 15 minutes at any given time during a lightning or combined lightning and thunderstorm event, indicating lightning strikes have an average LAL range of 2 to 3. The highest being a 3 on the LAL for all participating jurisdictions in the future.

HISTORICAL OCCURRENCES

Since January 1996, there has only been two recorded events for the Hardin County planning area. It is highly likely multiple lightning occurrences have gone unreported before and during the recording period. The NCEI is a national data source organized under the National Oceanic and Atmospheric Administration and considered a reliable resource for hazards. However, the flash density for the planning area along with input from local team members indicates regular lightning occurrences that simply have not been reported.

Table 8-2 Historical Lightning Events, 1996- 2021[2]

JURISDICTION	DATE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
City of Sour Lake	11/12/2008	0	0	$102,846	$0
Hardin County	2/6/2018	1	1	$0	$0
TOTALS		**1**	**1**	**$102,846**	**$0**

Based on the list of historical lightning events for the Hardin County planning area (listed above), including all participating jurisdictions, one event has occurred since the 2017 Plan.

[1] Analysis includes the highest number of events recorded in a given year during the reporting period in order to account for typical under reporting of thunderstorm and lightning events.

[2] Damages are reported in 2022 dollars.

SECTION 8: LIGHTNING

SIGNIFICANT EVENTS

November 12, 2008 – Sour Lake

A low-pressure area tracked across east Texas and western Louisiana, creating up to 8 inches of rainfall. The storm event produced some lightning through the storm's path. Lightning struck a church educational building in Sour Lake, destroying it.

February 6, 2018 – Hardin County

A 22-year-old male was struck by lightning while working on cattle fencing along Starlight Road near Honey Island. A 57-year-old male was also hit sustaining 2nd degree burns. A nearby cow was knocked to the ground.

PROBABILITY OF FUTURE EVENTS

Based on historical records and input from the planning team the probability of occurrence for future lightning events in the Hardin County planning area, including all participating jurisdictions, 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 NOAA, the Hardin County planning area is located in an area of the country that experiences twelve to twenty-one lightning flashes per square mile per year (approximately 7,560 to 13,230 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 damages throughout the planning area, including all participating jurisdictions.

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 damages depending on the strike location. Due to the randomness of these events, all existing and future structures and facilities in the Hardin County planning area could potentially be impacted and remain vulnerable to possible injury and property loss from lightning strikes. The Hardin County planning area has two reported lightning events per the NCEI, however the county, including all participating jurisdictions, are vulnerable and could be impacted by lightning.

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 Hardin County, including all participating jurisdictions, is 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. Population located outdoors is considered at risk and more vulnerable to a lightning strike compared to being 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 Hardin 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. Agricultural losses can be extensive due to lightning and resulting fires.

SECTION 8: LIGHTNING

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 12.0% of the planning area population live below the poverty level (Table 8-3).

Table 8-3. Populations at Greatest Risk by Jurisdiction[3]

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Hardin County	6,883
City of Kountze	317
City of Lumberton	750
City of Rose Hill Acres	12
City of Silsbee	697
City of Sour Lake	313

The following critical facilities would be vulnerable to lightning events in each participating jurisdiction:

Table 8-4. Critical Facilities at Risk by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Hardin County	4 Fire Station Facilities, 2 Water/Wastewater Treatment Facilities, 1 Communications Tower, 5 School Facilities
City of Kountze	1 Fire Station, 1 Sheriff's Department, 1 Police Station, 4 Schools, 1 Medical Facility, 1 EOC, 3 Water Plants, 2 Water Storage Facilities, 1 Wastewater Treatment Facility, 8 Pump Stations, 1 Natural Gas Service Facility, 1 Regulator Station, 2 Government Facilities, 1 County Dispatch Facility, 1 Airport
City of Lumberton	1 Fire Station, 1 Police Station, 1 Water Control District Facility, 1 Drainage District Facility, 1 Hospital, 4 Schools, 1 Government Facility, 1 Municipal Utility District Facility, 1 Community Center (Performance Arts Center)
City of Rose Hill Acres	1 Government Facility
City of Silsbee	1 Fire Station Facility, 1 Police Station Facility, 3 Water/ Wastewater Treatment Facilities, 1 Government Facility, 5 School Facilities, 1 Communications Tower
City of Sour Lake	1 Fire Station, 1 Police Station, 1 Water Control District Facility, 3 School Facilities, 1 Water/Wastewater Treatment Facility, 1 Government Facility, 1 Communications Tower

[3] US Census Bureau 2020 data for Hardin County.

Impact of lightning experienced in the Hardin County planning area has resulted in one injury and one fatality. The damages created by lightning events experienced in the planning area indicate a “Limited” impact, with minimal quality of life lost and facilities shut down for 24 hours or less. However, the historical injury and fatality indicates a “Substantial” impact with multiple fatalities possible depending on the severity of the event Overall, the average loss estimate for Hardin County, including all participating jurisdictions, (in 2022 dollars) is $102,846, having an approximate annual loss estimate of $3,956 (Table 8-5).

Table 8-5. Potential Annualized Losses by Jurisdiction[4]

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATE
Hardin County	$0	$0
City of Kountze	$0	$0
City of Lumberton	$0	$0
City of Rose Hill Acres	$0	$0
City of Silsbee	$0	$0
City of Sour Lake	$102,846	$3,956
PLANNING AREA	**$102,846**	**$3,956**

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. The impact of climate change could produce more frequent and severe lightning events, exacerbating the current lightning impacts. Additional impacts to the planning area can include:

- 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.
- City or county departments may be damaged, delaying response and recovery efforts for the entire community.

[4] Damage values are in 2022 dollars.

- 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 damages 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 county, communities, local businesses, and citizens will also contribute to the overall economic and financial conditions in the aftermath of any lightning event.

SECTION 9: TORNADO

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 or more. In extreme cases, winds may approach 300 miles per hour. 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 9-1. Variations among Tornadoes

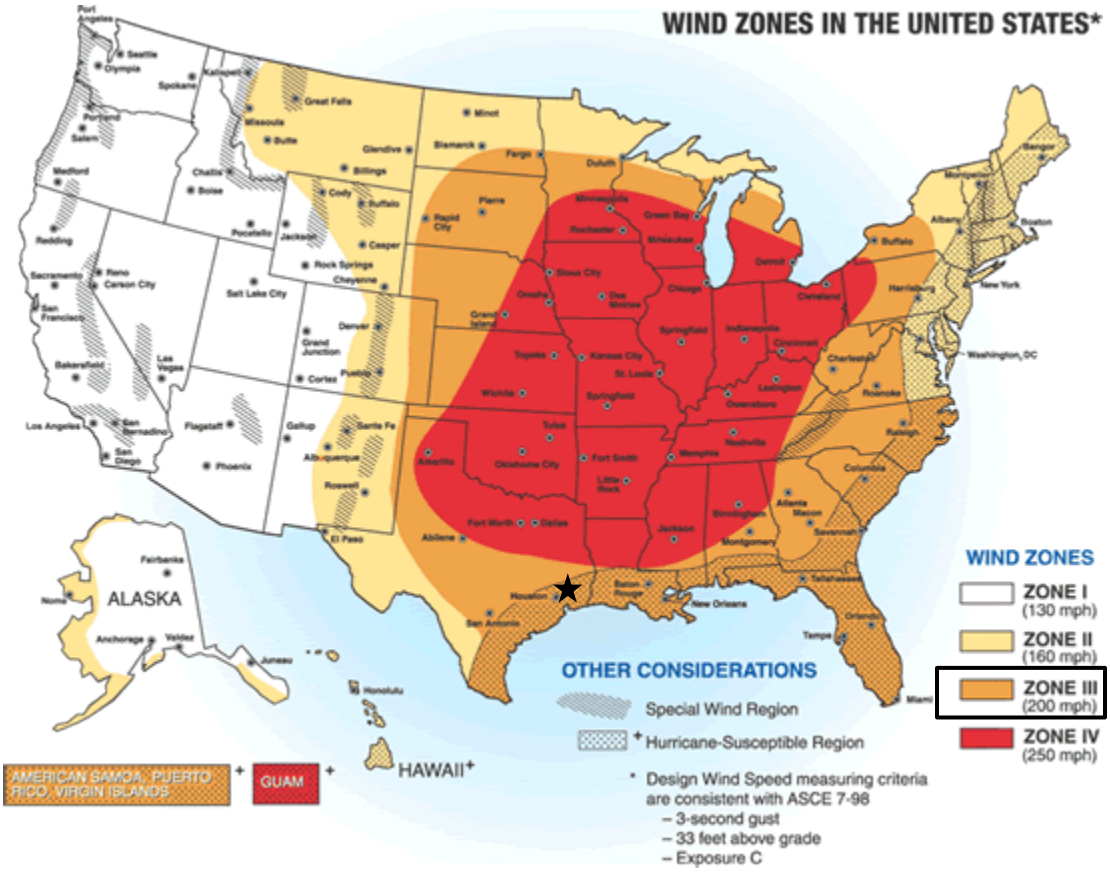
WEAK TORNADOES	STRONG TORNADOES	VIOLENT TORNADOES
• 69% of all tornadoes • Less than 5% of tornado deaths • Lifetime 1-10+ minutes • Winds less than 110 mph	• 29% of all tornadoes • Nearly 30% of all tornado deaths • May last 20 minutes or longer • Winds 110 – 205 mph	• 2% of all tornadoes • 70% of all 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 Hardin County planning area including all participating

jurisdictions, are uniformly exposed to tornado activity. The entire Hardin County planning area is located in Wind Zone III (Figure 9-1), where tornado winds can be as high as 200 mph.

Figure 9-1. 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).

[1] Hardin County is indicated by the star.

Table 9-2. The Fujita Tornado Scale[2]

F-SCALE NUMBER	INTENSITY	WIND SPEED (MPH)	TYPE OF DAMAGE DONE	PERCENT OF APPRAISED STRUCTURE VALUE LOST DUE TO DAMAGE
F0	Gale Tornado	40 – 72	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.	None Estimated
F1	Moderate Tornado	73 – 112	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off roads; attached garages may be destroyed.	0% – 20%
F2	Significant Tornado	113 – 157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.	50% – 100%
F3	Severe Tornado	158 – 206	Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.	100%
F4	Devastating Tornado	207 – 260	Well-constructed homes leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.	100%
F5	Incredible Tornado	261 – 318	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles flying through the air in excess of 330 yards; trees debarked; steel reinforced concrete badly damaged.	100%

[2] Source: http://www.tornadoproject.com/fscale/fscale.htm

Tornado magnitudes prior to 2005 were determined using the traditional version of the Fujita Scale (Table 9-2). Since February 2007, the Fujita Scale has been replaced by the Enhanced Fujita Scale (Table 9-3), which 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 9-3. Enhanced Fujita Scale for Tornadoes

STORM CATEGORY	DAMAGE LEVEL	3 SECOND GUST (MPH)	DESCRIPTION OF DAMAGES	PHOTO EXAMPLE
EF0	Gale	65 – 85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.	
EF1	Weak	86 – 110	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off roads; attached garages may be destroyed.	
EF2	Strong	111 – 135	Considerable damage; roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.	
EF3	Severe	136 – 165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.	
EF4	Devastating	166 – 200	Well-constructed homes leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.	
EF5	Incredible	200+	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles flying through the air in excess of 330 yards; trees debarked; steel reinforced concrete badly damaged.	

Both the Fujita Scale and Enhanced Fujita Scale should be referenced in reviewing previous occurrences since tornado events prior to 2007 will follow the original Fujita Scale. The largest

magnitude reported within the planning area is an F2 on the Fujita Scale, a “Strong Tornado.” Based on the planning areas location in Wind Zone III, the planning area could experience anywhere from an EF0 to EF4 depending on the wind speed.

The events in Hardin County (converted from the Fujita Scale) have been between EF0 and EF3 (Table 9-4). Therefore, the range of intensity that the Hardin County planning area, including all participating jurisdictions, would be expected to mitigate is a tornado event that would be a low to severe risk, an EF0 to EF3. Historically, the strongest tornado to strike the planning area was a F2, which would be an EF3 on the Enhanced Fujita Scale with the highest wind speed. This is the strongest event the planning area can anticipate in the future.

HISTORICAL OCCURRENCES

Only reported tornadoes were factored into the Risk Assessment. It is likely that a high number of occurrences have gone unreported over the past 58 years. Historical tornado data for the county, participating jurisdictions and is provided within a jurisdiction-wide basis per the NCEI database.

Figure 9-2 identifies the locations of previous occurrences in the Hardin County planning area from 1964 through December 2021. A total of 27 events have been recorded by the Storm Prediction Center (NOAA) and NCEI databases for the Hardin County planning area, including all participating jurisdictions.

Figure 9-2. Spatial Historical Tornado Events, 1964-2021[3]

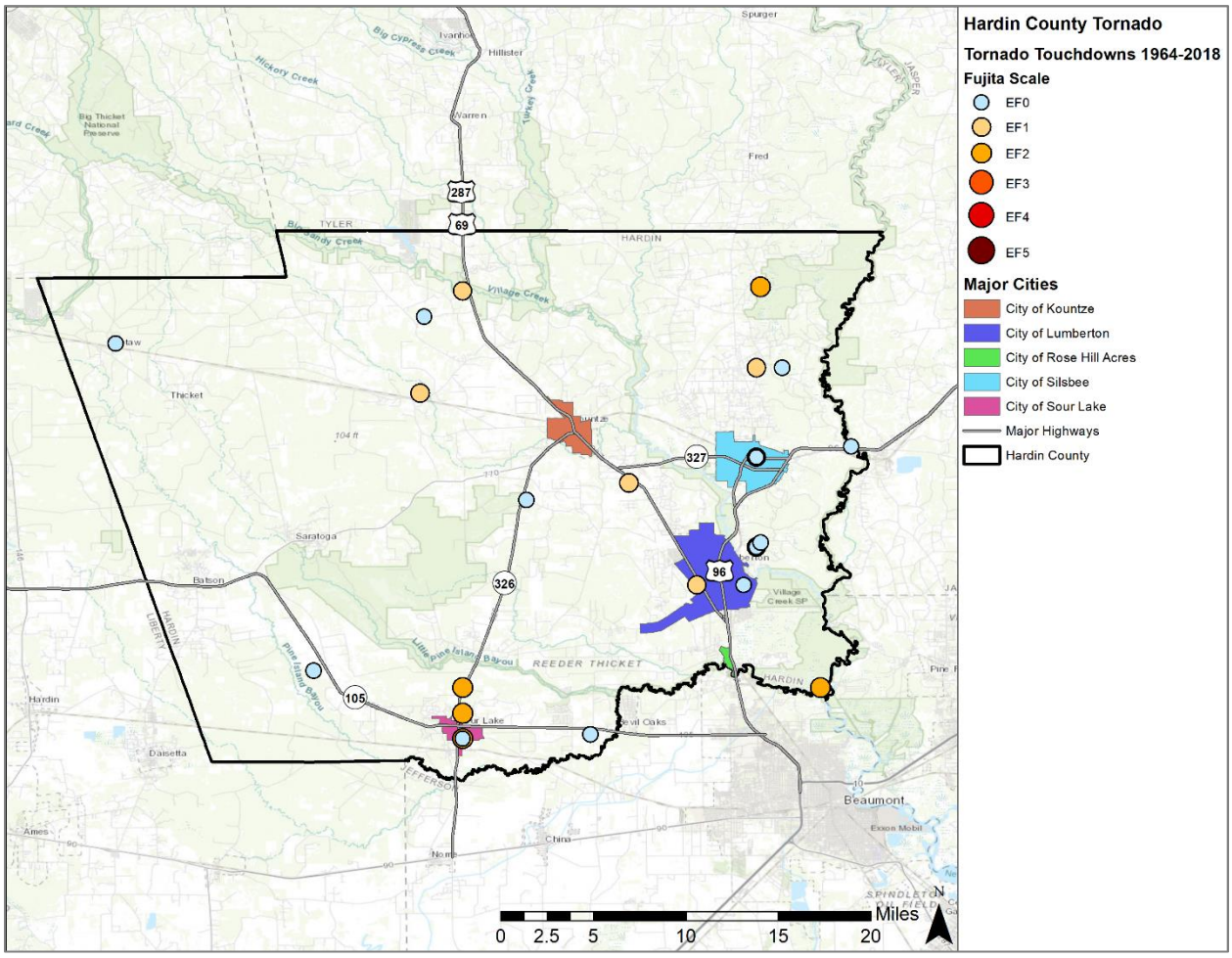


Table 9-4. Historical Tornado Events, 1964-2021[4]

JURISDICTION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hardin County	3/19/1964	4:00 AM	F2	0	0	$2,356,749	$0
Hardin County	3/20/1967	10:00 AM	F0	0	0	$22,068	$0
Hardin County	5/30/1967	6:00 PM	F2	0	0	$219,349	$0
Hardin County	1/10/1970	9:30 PM	F2	0	0	$19,266	$0
Hardin County	10/23/1970	4:00 PM	F1	0	0	$18,484	$0
Hardin County	6/12/1973	3:35 PM	F0	0	0	$1,647	$0

[3] Source: NOAA Records
[4] Only recorded events with fatalities, injuries or damages are listed. Magnitude is listed when available. Damage values are in 2022 dollars.

JURISDICTION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hardin County	12/19/1973	9:25 AM	F1	0	0	$157,627	$0
Hardin County	10/28/1974	2:10 PM	F2	0	0	$1,425,118	$0
Hardin County	8/28/1978	3:20 PM	F1	0	0	$11,034	$0
Hardin County	10/22/1979	5:15 AM	F1	0	0	$96,840	$0
City of Sour Lake	11/5/1994	6:45 AM	F2	0	1	$5,838	$0
City of Sour Lake	10/18/1998	8:20 AM	F0	0	0	$17,762	$0
City of Silsbee	5/10/1999	6:55 AM	F0	0	0	$87,634	$0
Hardin County	10/11/2001	9:30 AM	F0	0	0	$16,392	$0
City of Lumberton	10/12/2001	2:40 PM	F0	0	0	$3,279	$0
City of Lumberton	10/28/2002	10:58 PM	F1	0	0	$160,670	$0
Hardin County	11/23/2004	4:08 PM	F1	0	0	$152,511	$1,525,100
City of Kountze	11/23/2004	4:27 PM	F2	1	0	$762,551	$0
City of Kountze	4/29/2006	9:55 AM	F0	0	0	$14,457	$0
Hardin County	10/16/2006	6:00 AM	F0	0	0	$7,217	$0
Hardin County	1/25/2012	12:10 PM	EF0	0	0	$12,851	$0
City of Silsbee	10/31/2018	6:47 PM	EF0	0	0	$1,152	$0
TOTALS			**(Max Extent)**	**1**	**1**	**$5,570,496**	**$1,525,100**

Table 9-5. Summary of Historical Events, 1964-2021[5]

JURISDICTION	Number of Events	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hardin County	17	F2	0	0	$4,517,153	$1,525,100
City of Kountze	2	F2	1	0	$777,008	$0
City of Lumberton	3	F1	0	0	$163,949	$0
City of Rose Hill Acres	0	N/A	0	0	$0	$0
City of Silsbee	2	F0	0	0	$88,786	$0

[5] Damages reported in 2021 dollars.

JURISDICTION	Number of Events	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Sour Lake	3	F2	0	1	$23,600	$0
TOTAL LOSSES	**27**	**(Max Extent)**	**1**	**1**	**$7,095,596**	

Based on the list of historical tornado events for the Hardin County planning area (listed above), including all participating jurisdictions, there has been one recorded event since the 2017 Plan.

SIGNIFICANT EVENTS

October 21, 2018 – Hardin County

A tornado began just west of the Neches River then moved into Jasper County. Damage was done to a few trees before moving across the river.

November 23, 2004 – Hardin County

A tornado touched down in northeastern Hardin County on November 23, 2004. Residents reported seeing two tornadoes on the ground for a brief time. One elderly woman was killed when several large trees fell on the mobile home she was in. Between 10 and 20 homes were damaged or destroyed, primarily near Highway 92 near the Hardin-Tyler County line.

October 28, 2002 – Lumberton

A tornado touched down in Lumberton on October 28, 2002. The F1 tornado was 10 yards wide and stayed on the ground for more than two miles. The National Weather Service storm survey indicated the worst damage occurred along Keith Road and Creekwood Road, where several new homes were damaged from flying debris or falling trees. Damage estimates exceeded $100,000.

PROBABILITY OF FUTURE EVENTS

Tornadic storms 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. According to historical records, Hardin County, including all participating jurisdictions, can experience a tornado touchdown approximately once every two years. This frequency supports a “Likely” probability of future events for Hardin County, including all participating jurisdictions, or an event probable in the next two to three years.

VULNERABILITY AND IMPACT

Because tornadoes often cross jurisdictional boundaries, all existing and future buildings, facilities, and populations in the entire Hardin County planning area, including all 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 on crawlspaces (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 to respond 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 Hardin County planning area features multiple mobile or manufactured home parks throughout the planning area, including all participation jurisdictions. 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 including all participating jurisdictions and unincorporated areas of the county which would also be more vulnerable. The US Census data indicates a total of 6,787 manufactured homes located in the Hardin County planning area (27%), including participating jurisdictions (Table 9-6). In addition, 38.1% (approximately 9,560 structures) of the single family residential (SFR) structures in the entire planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant wind events.

Table 9-6. Structures at Greater Risk by Jurisdiction

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Hardin County	6,787	9,560
City of Kountze	318	441
City of Lumberton	828	1,420
City of Rose Hill Acres	0	123
City of Silsbee	253	1,814
City of Sour Lake	238	466

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. An estimated 12.0% of the planning area population live below the poverty level (Table 9-7).

Table 9-7. Populations at Greatest Risk by Jurisdiction[6]

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Hardin County	6,883
City of Kountze	317
City of Lumberton	750
City of Rose Hill Acres	12
City of Silsbee	697
City of Sour Lake	313

The following critical facilities would be vulnerable to tornado events in each participating jurisdiction:

Table 9-8. Critical Facilities at Risk by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Hardin County	4 Fire Station Facilities, 2 Water/Wastewater Treatment Facilities, 1 Communications Tower, 5 School Facilities
City of Kountze	1 Fire Station, 1 Sheriff's Department, 1 Police Station, 4 Schools, 1 Medical Facility, 1 EOC, 3 Water Plants, 2 Water Storage Facilities, 1 Wastewater Treatment Facility, 8 Pump Stations, 1 Natural Gas Service Facility, 1 Regulator Station, 2 Government Facilities, 1 County Dispatch Facility, 1 Airport
City of Lumberton	1 Fire Station, 1 Police Station, 1 Water Control District Facility, 1 Drainage District Facility, 1 Hospital, 4 Schools, 1 Government Facility, 1 Municipal Utility District Facility, 1 Community Center (Performance Arts Center)
City of Rose Hill Acres	1 Government Facility
City of Silsbee	1 Fire Station Facility, 1 Police Station Facility, 3 Water/ Wastewater Treatment Facilities, 1 Government Facility, 5 School Facilities, 1 Communications Tower
City of Sour Lake	1 Fire Station, 1 Police Station, 1 Water Control District Facility, 3 School Facilities, 1 Water/Wastewater Treatment Facility, 1 Government Facility, 1 Communications Tower

The average loss estimate of property and crop is $7,095,596 (in 2022 dollars), having an approximate annual loss estimate of $122,338 (Table 9-9). Based on historic loss and damages, the impact of tornado on the Hardin County planning area, including all participating jurisdictions, can be considered “Limited,” with less than 10 percent of property expected to be destroyed,

[6] US Census Bureau 2020 data for Hardin County

injuries that can be treated with first aid, and critical facilities shut down for 24-hours or less. However, with one injury and one fatality from historical events, the impact for the planning area is considered “Substantial” with multiple fatalities possible depending on the severity of the event.

Table 9-9. Potential Annualized Losses by Jurisdiction

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Hardin County	$6,042,253	$104,177
City of Kountze	$777,008	$13,397
City of Lumberton	$163,949	$2,827
City of Rose Hill Acres	$0	$0
City of Silsbee	$88,786	$1,531
City of Sour Lake	$23,600	$407
Planning Area	**$7,095,596**	**$122,338**

ASSESSMENT OF IMPACTS

Tornadoes have the potential to pose a significant risk to the population and can create dangerous situations. Often times, 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 may suffer substantial damage as they would be more vulnerable than typical site-built 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.
- City or county departments may be damaged or destroyed, delaying response and recovery efforts for the entire community.
- Private sector entities that the City 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.
- Economic disruption negatively impacts the programs and services provided by the community due to short- and long-term loss in revenue.
- Damage to infrastructure may slow economic recovery since repairs may be extensive and lengthy.
- Some businesses not directly damaged by the tornado may be negatively impacted while roads and utilities are being restored, 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, 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.

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

SECTION 10: HAIL

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.

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 Hardin County planning area, including all participating jurisdictions, are equally at risk to the hazard of hail.

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 10-1.

Table 10-1. Hail Intensity and Magnitude[1]

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 10-1 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 available data regarding the previous occurrences for the area, the Hardin County planning area, including all participating jurisdictions, may experience hailstorms ranging from an H0 to an H8. The County can mitigate a storm from low risk or hard hail to a super hailstorm with baseball size hail that leads to extensive structural damage and could cause fatal injuries. The largest hail event in the Hardin County planning area resulted in hail measuring 3 inches in diameter, or a H8, which is considered very destructive. This is the worst extent the planning area can anticipate in the future.

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

HISTORICAL OCCURRENCES

Historical evidence shown in Figure 10-1 demonstrates that the planning area is vulnerable to hail events overall, which typically result from severe thunderstorm activity. Historical events with reported damages, injuries, or fatalities are shown in Table 10-2. A total of 76 reported historical hail events impacted the Hardin County planning area between 1957 through December 2021 (Summary Table 10-3). These events were reported to NCEI and NOAA databases and may not represent all hail events to have occurred during the past 65 years. Only those events for the Hardin County planning area with latitude and longitude available were plotted (Figure 10-1).

Figure 10-1. Spatial Historical Hail Events, 1957-2021

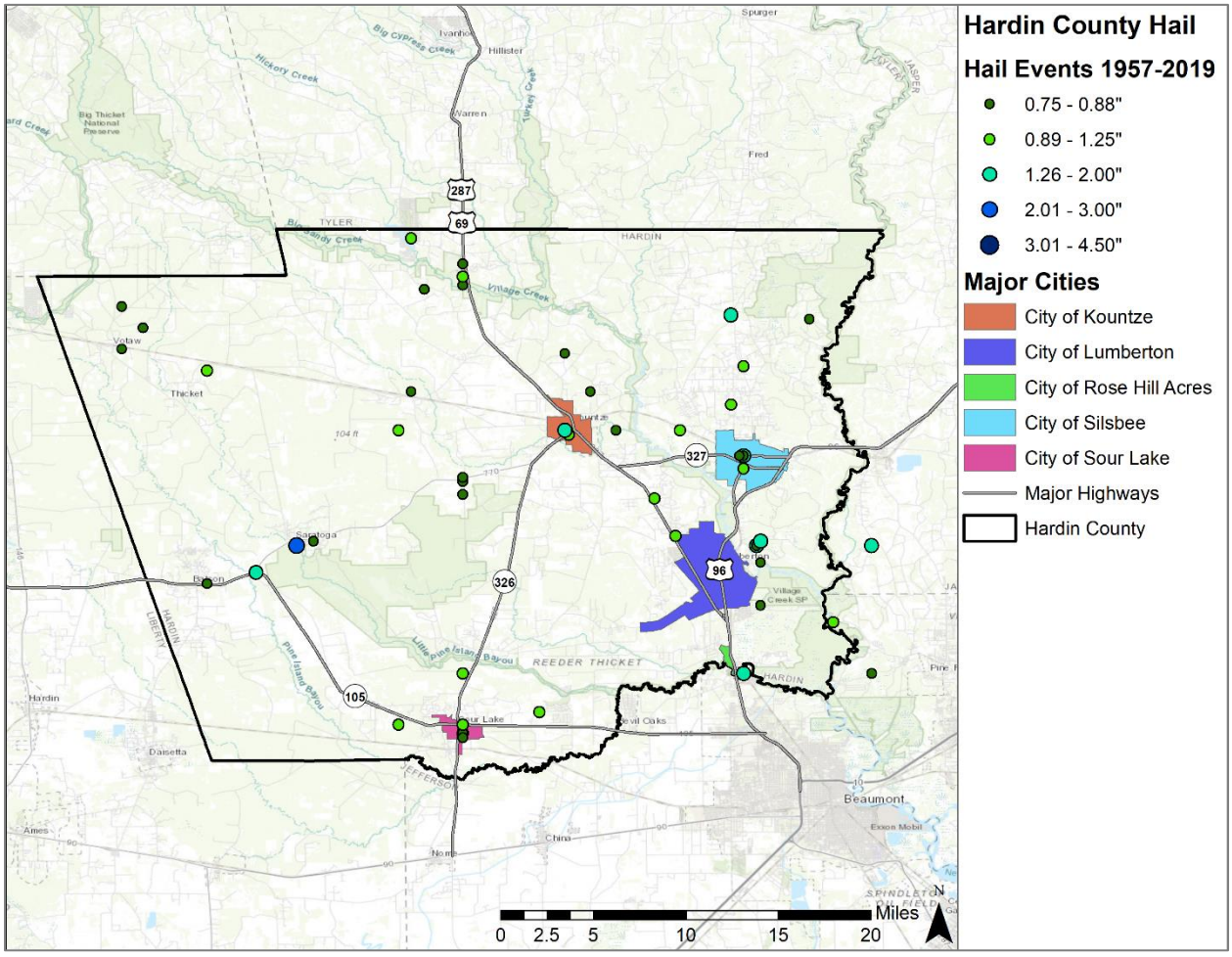


Table 10-2. Historical Hail Events, 1957-2021[2]

JURISDICTION	DATE	MAGNITUDE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Hardin County	2/11/2013	1	0	0	$1,255	$0
TOTALS		**(Max Extent)**	**0**	**0**	**$1,255**	

[2] Only recorded events with fatalities, injuries, and/or damages are listed.

Table 10-3. Historical Hail Events Summary, 1957-2021

JURISDICTION	NUMBER of EVENTS	MAGNITUDE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Hardin County	47	2.75 inches	0	0	$1,255	$0
City of Kountze	11	3.0 inches	0	0	$0	$0
City of Lumberton	7	1.75 inches	0	0	$0	$0
City of Rose Hill Acres	0	N/A	0	0	$0	$0
City of Silsbee	5	1.75 inches	0	0	$0	$0
City of Sour Lake	6	1.25 inches	0	0	$0	$0
TOTAL LOSSES	**76**	**(Max Extent)**	**0**	**0**	**$1,255**	

Based on the list of historical hail events for the Hardin County planning area (listed above), including all participating jurisdictions, 8 of the events have occurred since the 2017 Plan.

SIGNIFICANT EVENTS

May 9, 2019 – Hardin County

A cold front entered Southeast Texas during the 8th and stalled over the region. Multiple strong upper-level disturbances crossed the area during the period causing a few rounds of severe weather and flooding that lasted into the 11th. A picture was posted on social media of a person holding hail about the size of a baseball.

February 11, 2013 – Hardin County

On February 11, 2013, a strong cold front swept through the planning area with strong to severe storms ahead of the boundary. Pea to quarter sized hail was reported on social media in the Village Mills area of Hardin County. A local ham radio operator reported car and property damage caused by nickel to quarter sized hail.

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, 76 events in a 65-year reporting period for Hardin County provides a probability of one to two events per year. This frequency supports a highly likely probability of future events for the Hardin County planning area including all participating jurisdictions.

VULNERABILITY AND IMPACT

Damage from hail approaches 1 billion dollars in the U.S. each year. 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 commonly damaged by hail.

Utility systems on roofs at school districts 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 Hardin 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 US Census data indicates a total of 6,787 manufactured homes located in the Hardin County planning area (27.0%), including participating jurisdictions (Table 10-4). In addition, 38.1% (approximately 9,560 structures) of the single family residential (SFR) structures in the entire planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant wind events.

Table 10-4. Structures at Greater Risk by Jurisdiction

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Hardin County	6,787	9,560
City of Kountze	318	441
City of Lumberton	828	1,420
City of Rose Hill Acres	0	123
City of Silsbee	253	1,814
City of Sour Lake	238	466

While all citizens are at risk to 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 12.0% of the planning area population live below the poverty level (Table 10-5).

Table 10-5. Populations at Greatest Risk by Jurisdiction[3]

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Hardin County	6,883
City of Kountze	317
City of Lumberton	750
City of Rose Hill Acres	12

[3] US Census Bureau 2020 data for Hardin County

JURISDICTION	POPULATION BELOW POVERTY LEVEL
City of Silsbee	697
City of Sour Lake	313

The following critical facilities would be vulnerable to hail events in each participating jurisdiction:

Table 10-6. Critical Facilities at Risk by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Hardin County	4 Fire Station Facilities, 2 Water/Wastewater Treatment Facilities, 1 Communications Tower, 5 School Facilities
City of Kountze	1 Fire Station, 1 Sheriff's Department, 1 Police Station, 4 Schools, 1 Medical Facility, 1 EOC, 3 Water Plants, 2 Water Storage Facilities, 1 Wastewater Treatment Facility, 8 Pump Stations, 1 Natural Gas Service Facility, 1 Regulator Station, 2 Government Facilities, 1 County Dispatch Facility, 1 Airport
City of Lumberton	1 Fire Station, 1 Police Station, 1 Water Control District Facility, 1 Drainage District Facility, 1 Hospital, 4 Schools, 1 Government Facility, 1 Municipal Utility District Facility, 1 Community Center (Performance Arts Center)
City of Rose Hill Acres	1 Government Facility
City of Silsbee	1 Fire Station Facility, 1 Police Station Facility, 3 Water/ Wastewater Treatment Facilities, 1 Government Facility, 5 School Facilities, 1 Communications Tower
City of Sour Lake	1 Fire Station, 1 Police Station, 1 Water Control District Facility, 3 School Facilities, 1 Water/Wastewater Treatment Facility, 1 Government Facility, 1 Communications Tower

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 negligible. Based on historic loss and damages, the impact of hail damages on the Hardin County planning area, including all participating jurisdictions, can be considered “Limited” severity of impact meaning injuries and illness can be treated with first aid, community critical facilities are shut down for 24-hours or less, and less than ten percent of property destroyed or with major damage.

Table 10-7. Potential Annualized Losses by Jurisdiction

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATE
Hardin County	$1,255	$19
City of Kountze	$0	$0
City of Lumberton	$0	$0

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATE
City of Silsbee	$0	$0
City of Sour Lake	$0	$0
Planning Area	**$1,255**	**$19**

ASSESSMENT OF IMPACTS

Hail events have the potential to pose a significant risk to people and can create dangerous situations. The impact of climate change could produce larger, more severe hail events, exacerbating the current hail impacts. Worsening hail conditions can be frequently associated with a variety of impacts, including:

- Hail may create hazardous road conditions during and immediately following an event, delaying first responders from providing for or preserving public health and safety.
- 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.
- Residential structures can be damaged by falling trees, which can result in physical harm to occupants.
- 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.
- 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.
- Downed power lines and large debris, such as downed trees, can result in the inability of emergency response vehicles to access areas of the community.
- Hazardous road conditions may prevent critical staff from reporting for duty, limiting response capabilities.
- 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 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 damages without a backup power source.
- 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 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.
- A large hail event could impact the accessibility of recreational areas and parks due to extended power outages or debris clogged access roads.

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.

SECTION 11: EXTREME HEAT

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 Hardin County is no exception. The entire planning area, including all participating jurisdictions, typically experience extended heat waves. A heat wave is 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 severe summer 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.

LOCATION

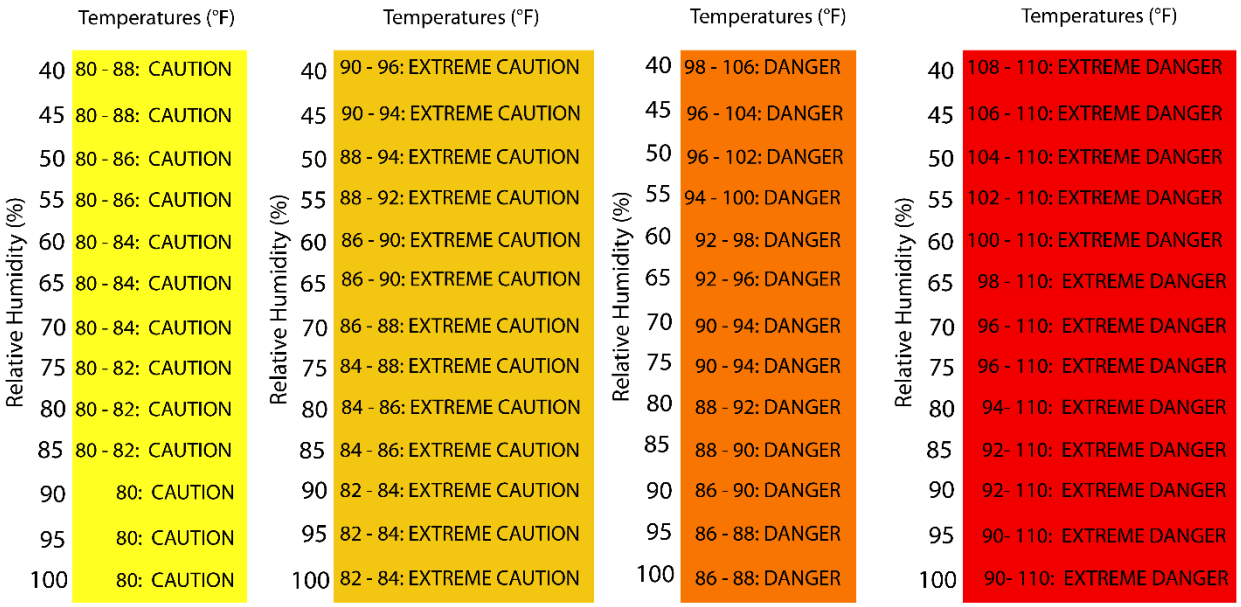
Though a death from extreme heat has not been recorded at a specific location in the County, there is no specific geographic scope to the extreme heat hazard. Extreme heat could occur anywhere within the Hardin County planning area, including all participating.

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 11-1. This index measures how hot it feels outside when humidity is combined with high temperatures.

SECTION 11: EXTREME HEAT

Figure 11-1. Extent Scale for Extreme Summer Heat[1]



The Extent Scale in Figure 11-1 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 11-1.

Table 11-1. Heat Index and Warnings

CATEGORY	HEAT INDEX	POSSIBLE HEAT DISORDERS	WARNING TYPE
Extreme Danger	125°F and higher	Heat stroke or sun stroke likely.	
Danger	103 – 124°F	Sunstroke, muscle cramps, and/or heat exhaustion are likely. Heatstroke possible with prolonged exposure and/or physical activity.	A heat advisory will be issued to warn that the Heat Index may exceed 105°F.
Extreme Caution	90 – 103°F	Sunstroke, muscle cramps, and/or heat exhaustion possible	An Excessive Heat Warning is issued if the Heat Index

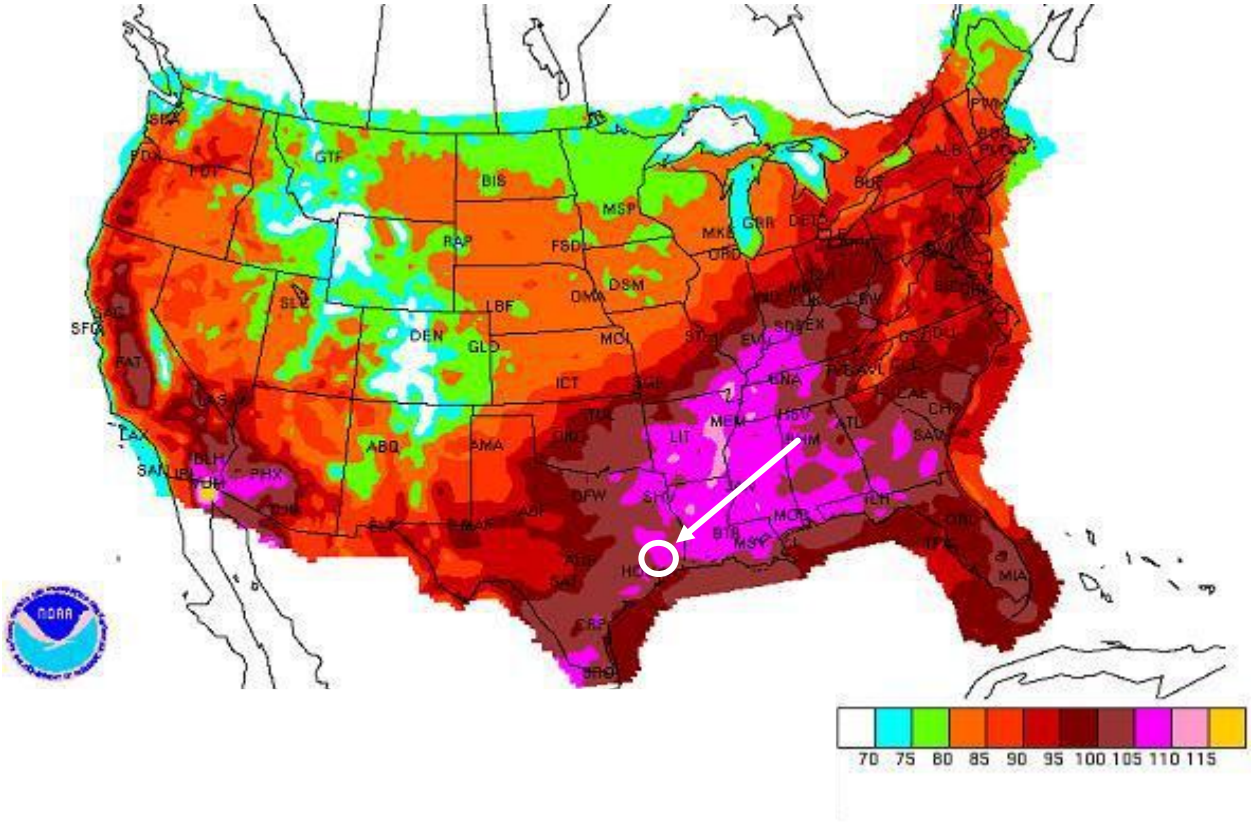
[1] Source: NOAA

CATEGORY	HEAT INDEX	POSSIBLE HEAT DISORDERS	WARNING TYPE
		with prolonged exposure and/or physical activity.	rises above 105°F at least 3 hours during the day or above 80°F at night.
Caution	80 – 90°F	Fatigue is possible with prolonged exposure and/or physical activity.	

Hardin County's terrain is relatively level terrain with limited elevation variations located in Southeast Texas. The county is largely covered by forest land of the Big Thicket. Due to its geography, and its warm, sunny, humid subtropical climate, the Hardin 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. Also at risk are those working or remaining outdoors.

Figure 11-2 displays the daily maximum heat index as derived from NOAA based on data compiled from 1838 to 2015. The white circle shows the Hardin County planning area. The primary pink and partial brown colors indicate a daily maximum heat index of 100-110 degrees F. The Hardin County planning area, including all participating jurisdictions, could experience extreme heat from 90° to 110° and should mitigate to the extent of "danger", which can include sunstroke, muscle cramps, heat exhaustion and potential heatstroke with prolonged exposure. The record high temperature for the Hardin County planning area was 105.6°F in 2012. This is the highest temperature (danger category) the planning area can expect.

Figure 11-2. Average Daily Maximum Heat Index Days[2]



HISTORICAL OCCURRENCES

Every summer, the hazard of heat-related illness becomes a significant public health issue throughout much of the US. Mortality from all causes increases during heat waves, and excessive heat is an important contributing factor to deaths from other causes, particularly among the elderly. Table 11-2 depicts historical occurrences of mortality from heat from 1994 to 2004 from the Texas Department of State Health Services and 2005 through December 2021 from the NCEI database.

Table 11-2. Extreme Heat Related Deaths in Texas

YEAR	DEATHS
1994	1
1995	12
1996	10
1997	2

[2] Source: NRDC and the white circle indicates the Hardin County planning area.

YEAR	DEATHS
1998	66
1999	22
2000	71
2001	20
2002	1
2003	0
2004	3
2005	49
2006	2
2007	2
2008	7
2009	120
2010	4
2011	46
2012	3
2013	2
2014	0
2015	5
2016	6
2017	3
2018	7
2019	7
2020	1

Because the Texas Department of State Health Services reports on total events statewide, previous occurrences for extreme heat are derived from the NCEI database. According to heat related incidents located solely within Hardin County, there is only one heat wave[3] on record for the Hardin County planning area (Table 11-3). Historical extreme heat information, as provided

[3] Even though the County experiences heat waves each summer, NCEI data only records events reported. Based on reports, only one event is on record.

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. Historical extreme heat data for all participating jurisdictions are provided on a County-wide basis per the NCEI database. 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 11-3. Historical Extreme Heat Events, 1996-2021

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hardin County	8/29/2000	0	0	$0	$0
Hardin County	9/1/2000	0	0	$0	$0
TOTALS		**0**	**0**	**$0**	**$0**

Based on the list of historical extreme heat events for the Hardin County planning area (listed above), including all participating jurisdictions, no events were reported to the NCEI since the 2017 Plan.

SIGNIFICANT EVENTS

August 29, 2000 – Hardin County

Record heat occurred in late August across southeast Texas. At the Southeast Texas Regional Airport, the all-time record high of 108 was tied on August 31st. The first event occurred on July 14, 1902.

PROBABILITY OF FUTURE EVENTS

Average high temperatures for the planning area through the summer months indicate a probability of one event or more every year. This frequency supports a highly likely probability of future events.

VULNERABILITY AND IMPACT

There is no defined geographic boundary for extreme heat events. While the entire Hardin County planning area, including all participating jurisdictions, 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.

Extreme temperatures do however 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 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. Children may also be more vulnerable if left unattended

in vehicles. In addition, populations living below the poverty level are unable to run air-conditioning on a regular basis and are limited in their ability to seek medical treatment. Another segment of the population at risk are those whose jobs consist of strenuous labor outdoors. Additionally, livestock and crops can become stressed, decreasing in quality or in production, during times of extreme heat.

The population over 65 in the Hardin County planning area is estimated at 16.9% of the total population and children under the age of 5 are estimated at 6.4%, or an estimated total of 13,365 potentially vulnerable residents in the planning area based on age. In addition, an estimated 12.0% of the planning area population live below the poverty level (Table 11-4). Under privileged populations disproportionately impacted by extreme heat events as they are less likely to be able to afford air conditioning during the hot summer months as well as less likely to have access to medical care.

Table 11-4. Populations at Greater Risk by Jurisdiction

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION BELOW POVERTY LEVEL
Hardin County	9,681	3,684	6,883
City of Kountze	446	118	317
City of Lumberton	2,654	810	750
City of Rose Hill Acres	54	12	12
City of Silsbee	1,275	436	697
City of Sour Lake	296	272	313

Extreme 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.

The potential impact of extreme heat for the entire Hardin County planning area, including all participating jurisdictions, can be considered “Limited”. 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. Less than ten percent of residential and commercial property could be damaged if extreme heat events lead to structure fires. Based on historical records over a 26-year period, annualized property and crop losses for the Hardin County planning area are negligible. In terms of vulnerability to structures, the impact from extreme heat is considered negligible

ASSESSMENT OF IMPACTS

The greatest risk from extreme heat is to public health and safety. The impact of climate change could produce longer, more severe heat waves, exacerbating the current impacts. Worsening extreme heat conditions can be frequently associated with a variety of impacts, including:

- Vulnerable populations, particularly the elderly and children under 5, 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.
- Vehicles 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.
- Food suppliers can anticipate an increase in food costs due to increases in production costs and crop and livestock losses.
- Fisheries may be negatively impacted by extreme heat, suffering damage to fish habitats (either natural or man-made) and a loss of fish and/or other aquatic organisms due to decreased water flows or availability.
- 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 predominant in the Big Thicket National Preserve and Village Creek State Park areas may be negatively impacted during extreme heat events, reducing seasonal revenue.

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 jurisdiction, local businesses, and citizens will impact the overall economic and financial conditions before, during, and after an extreme heat event.

SECTION 12: WILDFIRE

HAZARD DESCRIPTION

A wildfire event can rapidly spread out of control and occurs most often in the summer when the brush is dry and flames can move unchecked through a highly vegetative area. Wildfires can start as a slow burning fire along the forest floor, killing and damaging trees. The fires often spread more rapidly as they reach the tops of trees with wind carrying the flames from tree to tree. Usually, dense smoke is the first indication of a wildfire.

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, 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 event can be a potentially damaging consequence of drought. 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 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 WUI. (Figures 12-1 through 12-6). It is estimated that 84.8 percent of the total population in Hardin County live within the WUI. However, the entire Hardin County planning area is at some risk for wildfires.

Figure 12-1. Wildland Urban Interface Map – Hardin County

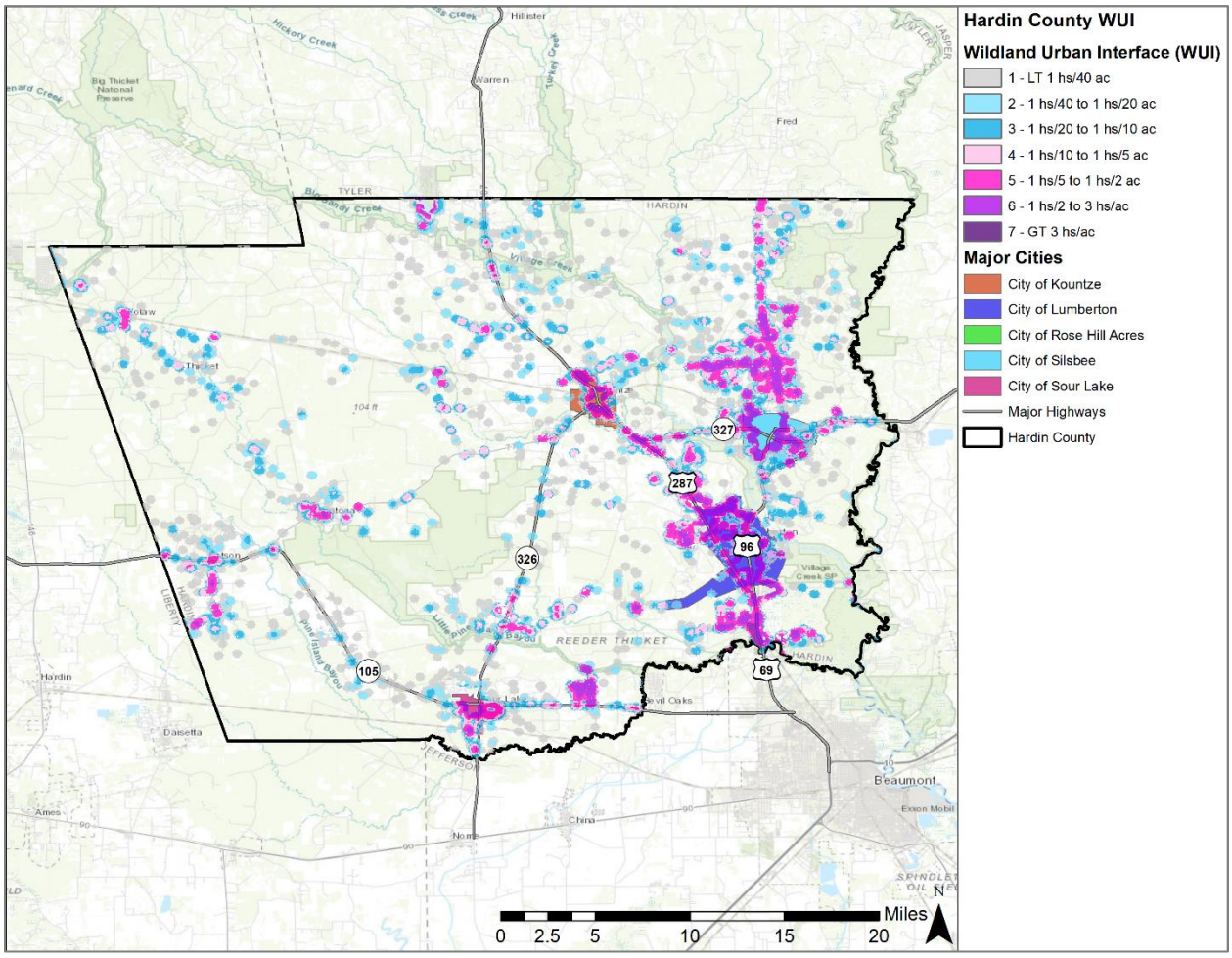
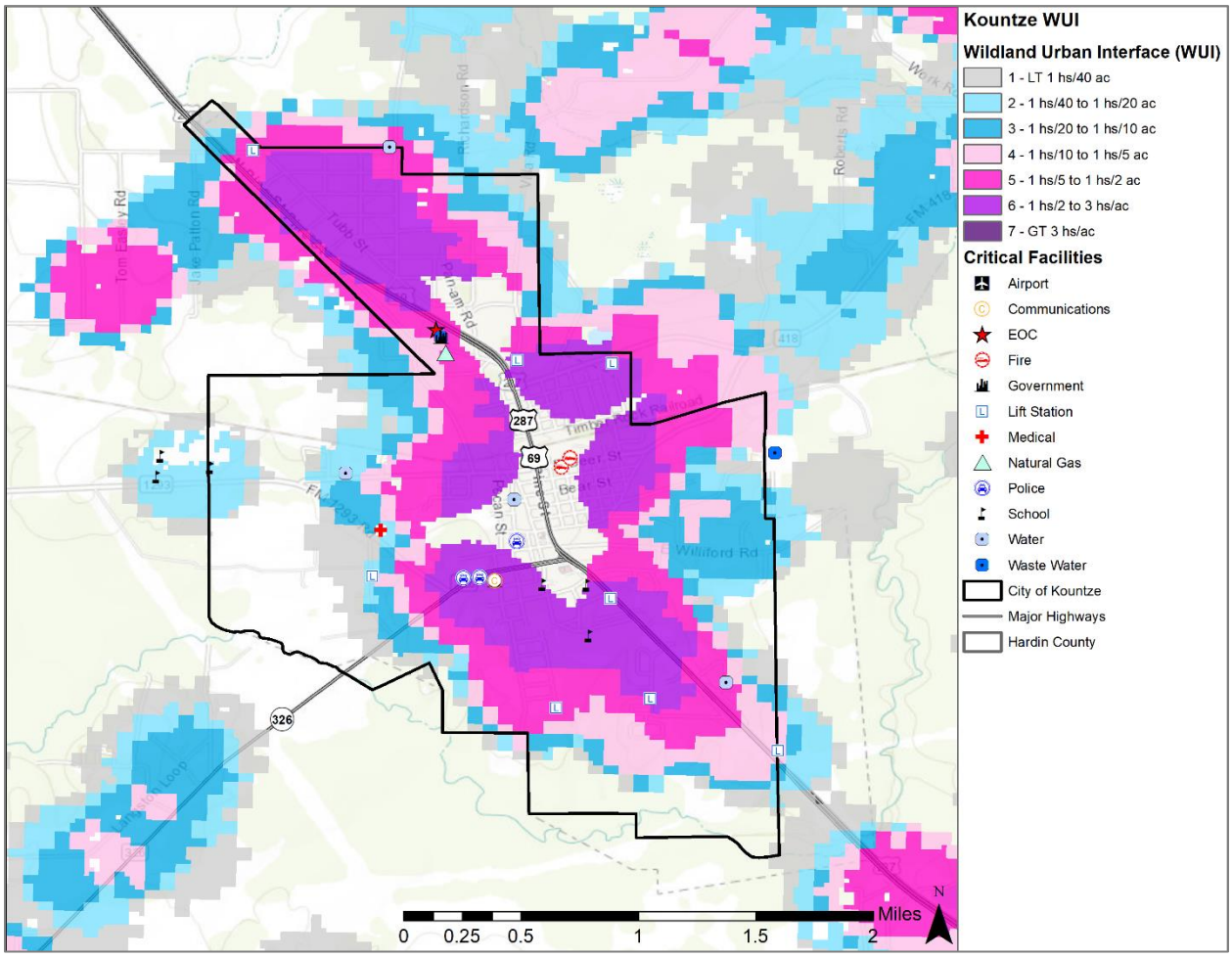
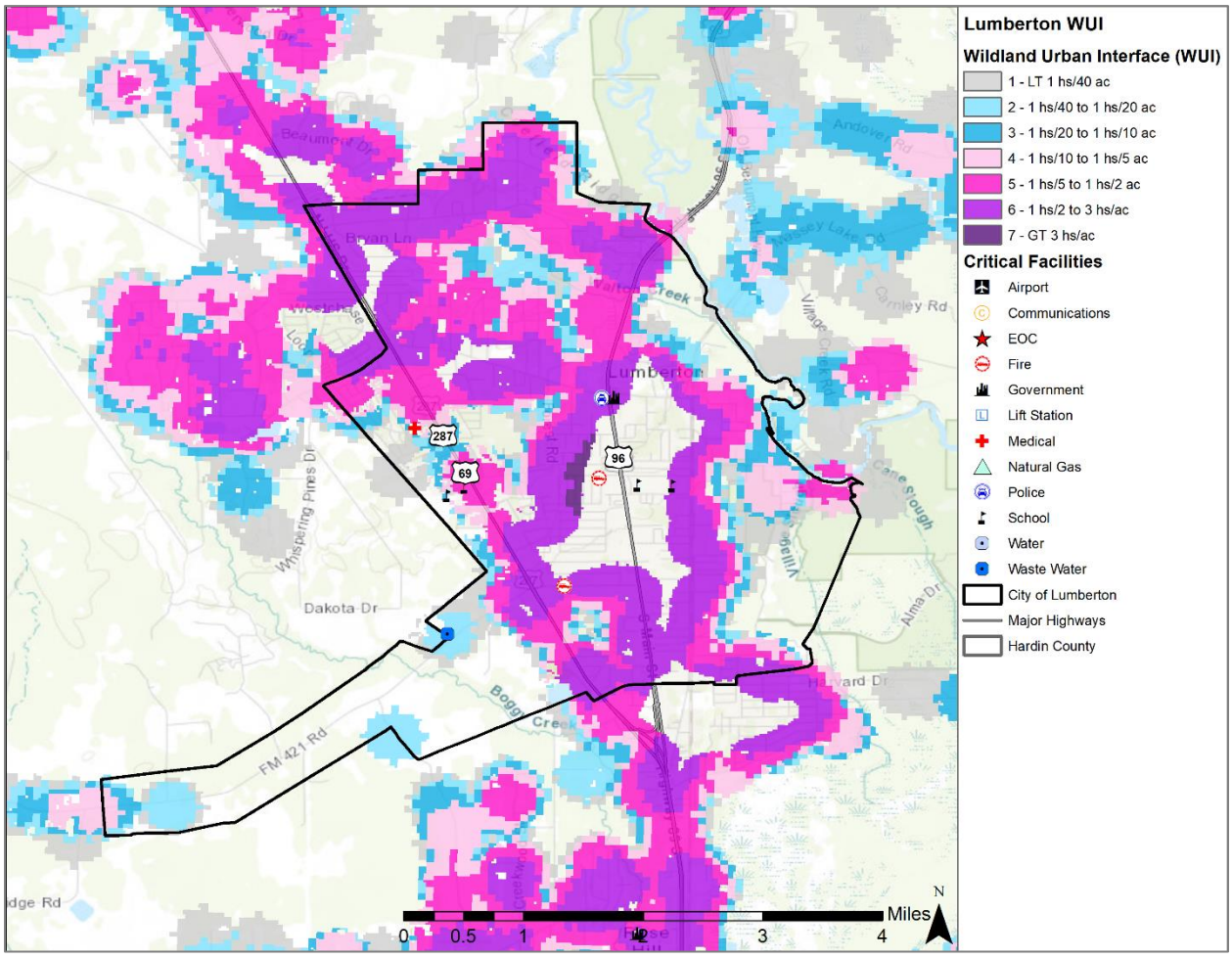


Figure 12-2. Wildland Urban Interface Map – City of Kountze



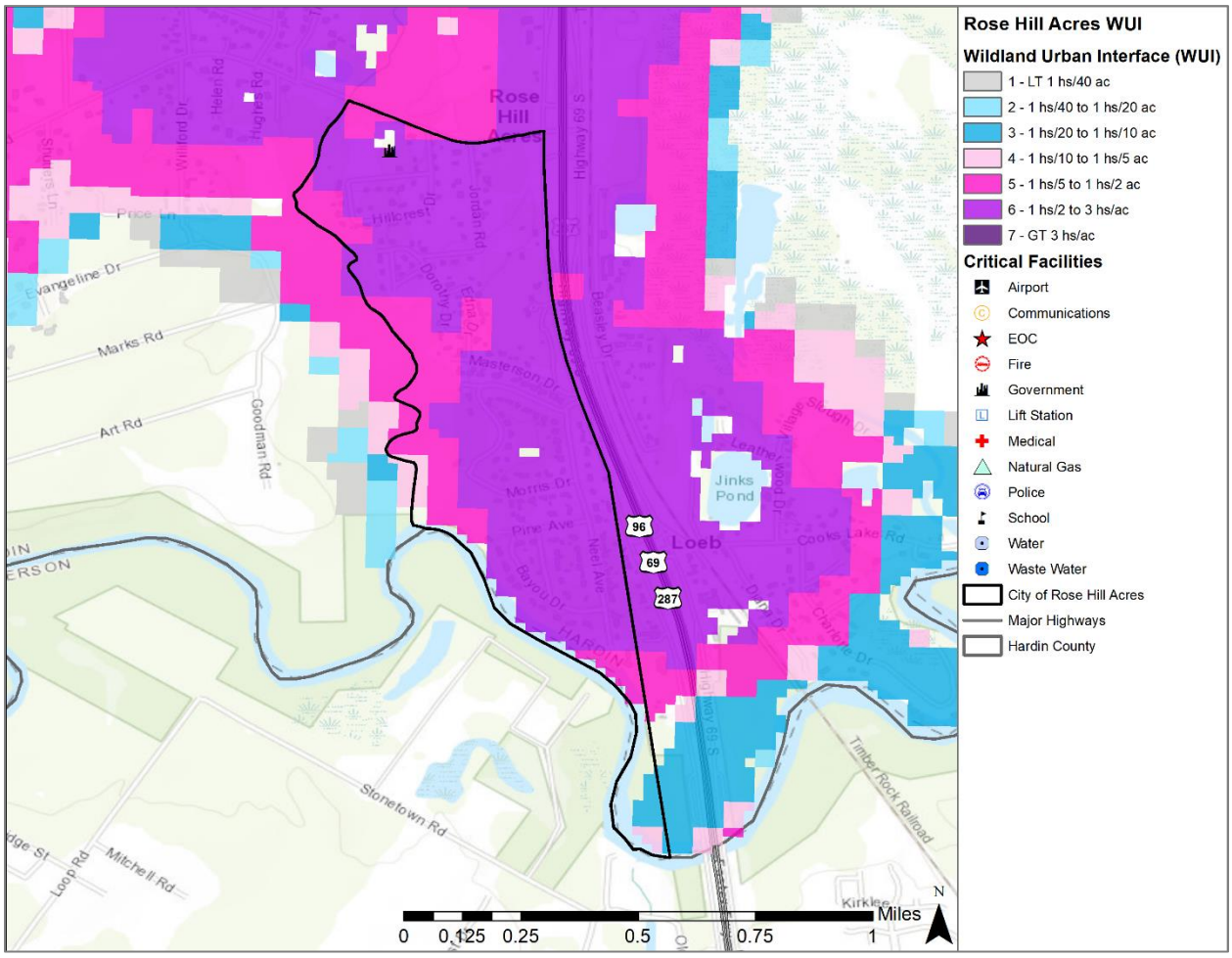
It is estimated that 85.4 percent of the total population in the City of Kountze live within the WUI. However, the entire City of Kountze is at some risk for wildfires.

Figure 12-3. Wildland Urban Interface Map – City of Lumberton



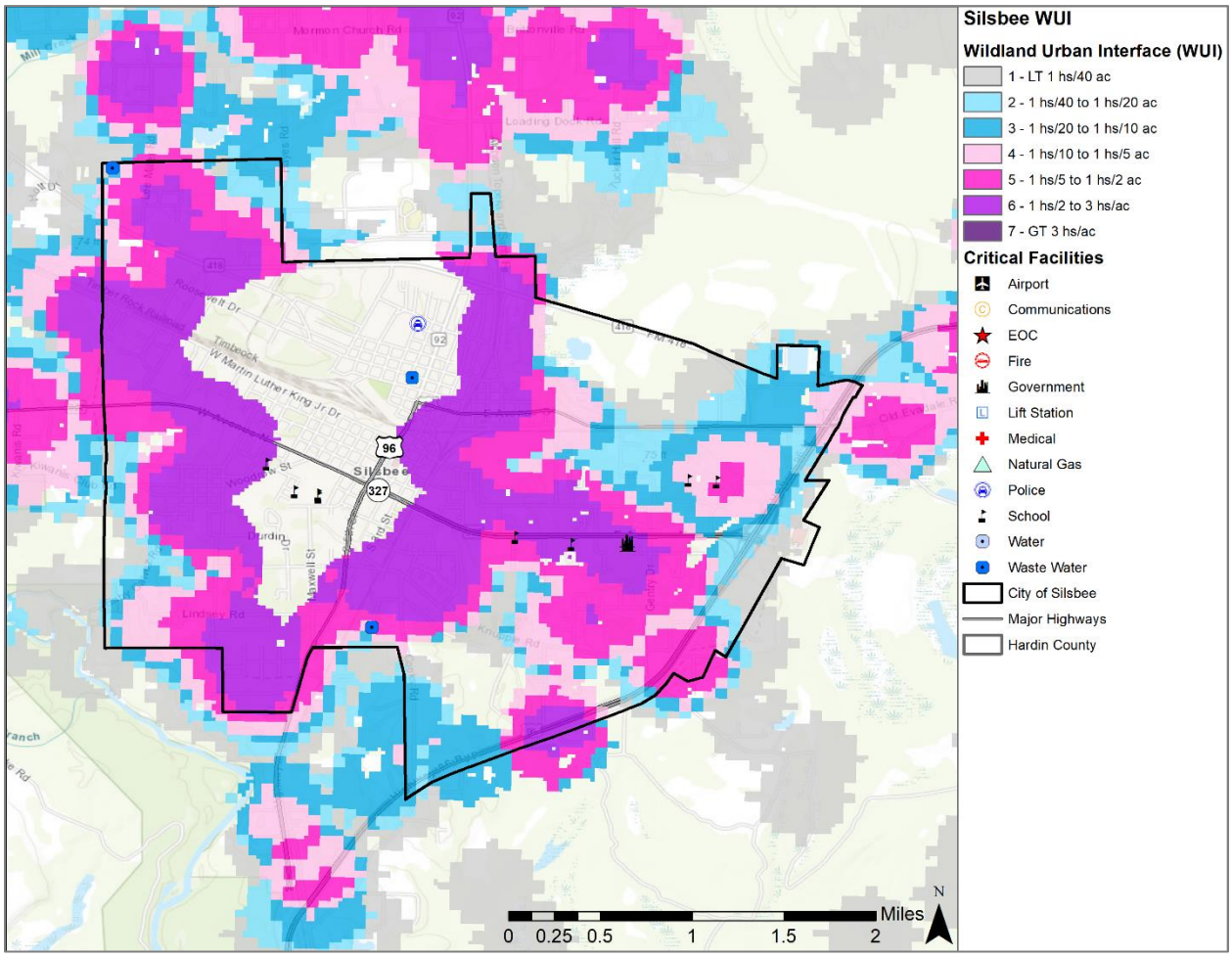
It is estimated that 67.8 percent of the total population in the City of Lumberton live within the WUI. However, the entire City of Lumberton is at some risk for wildfires.

Figure 12-4. Wildland Urban Interface Map – City of Rose Hill Acres



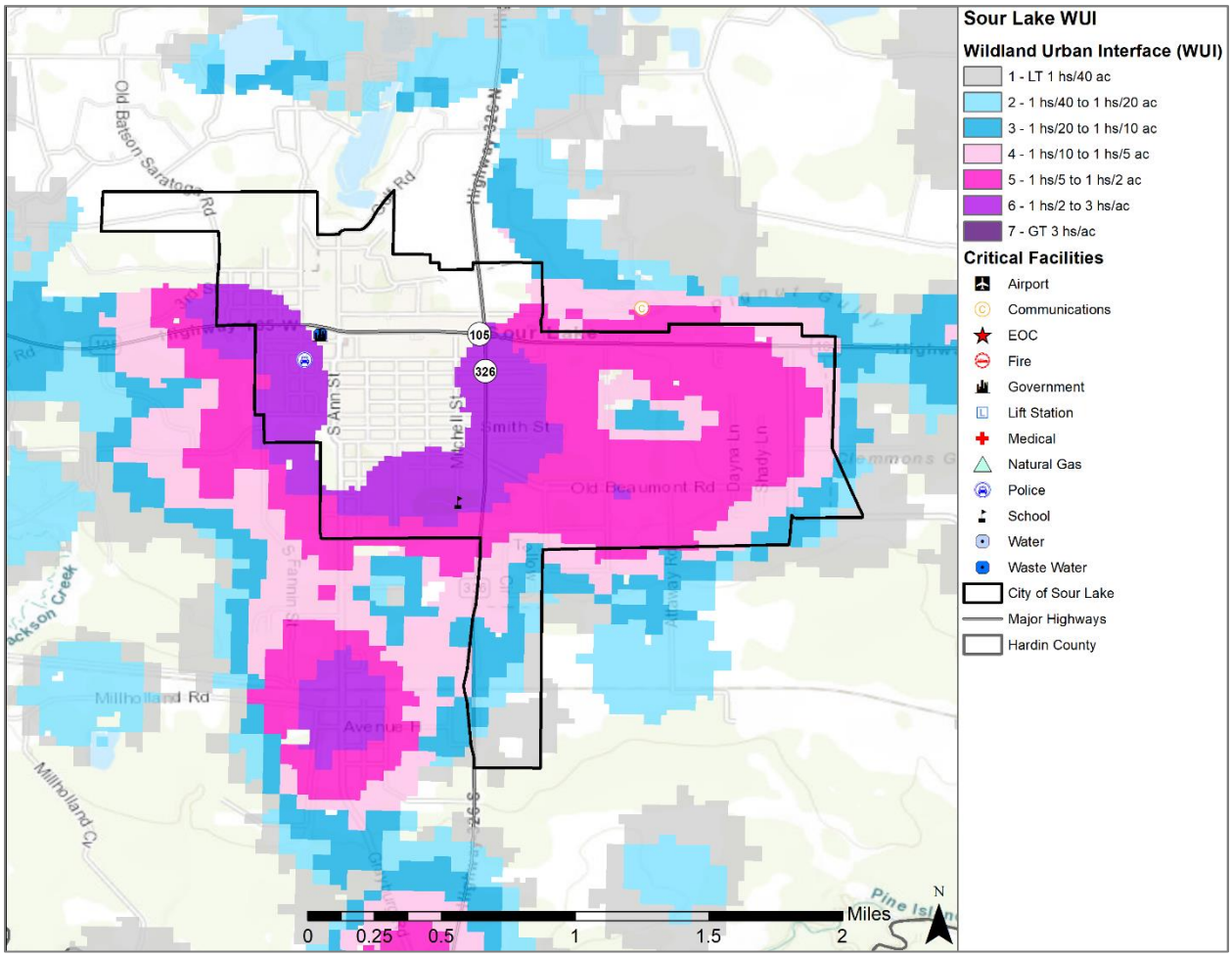
It is estimated that 100 percent of the total population in the City of Rose Hill Acres live within the WUI and are at risk for wildfires.

Figure 12-5. Wildland Urban Interface Map – City of Silsbee



It is estimated that 69.0 percent of the total population in the City of Silsbee live within the WUI. However, the entire City of Silsbee is at some risk for wildfires.

Figure 12-6. Wildland Urban Interface Map – City of Sour Lake

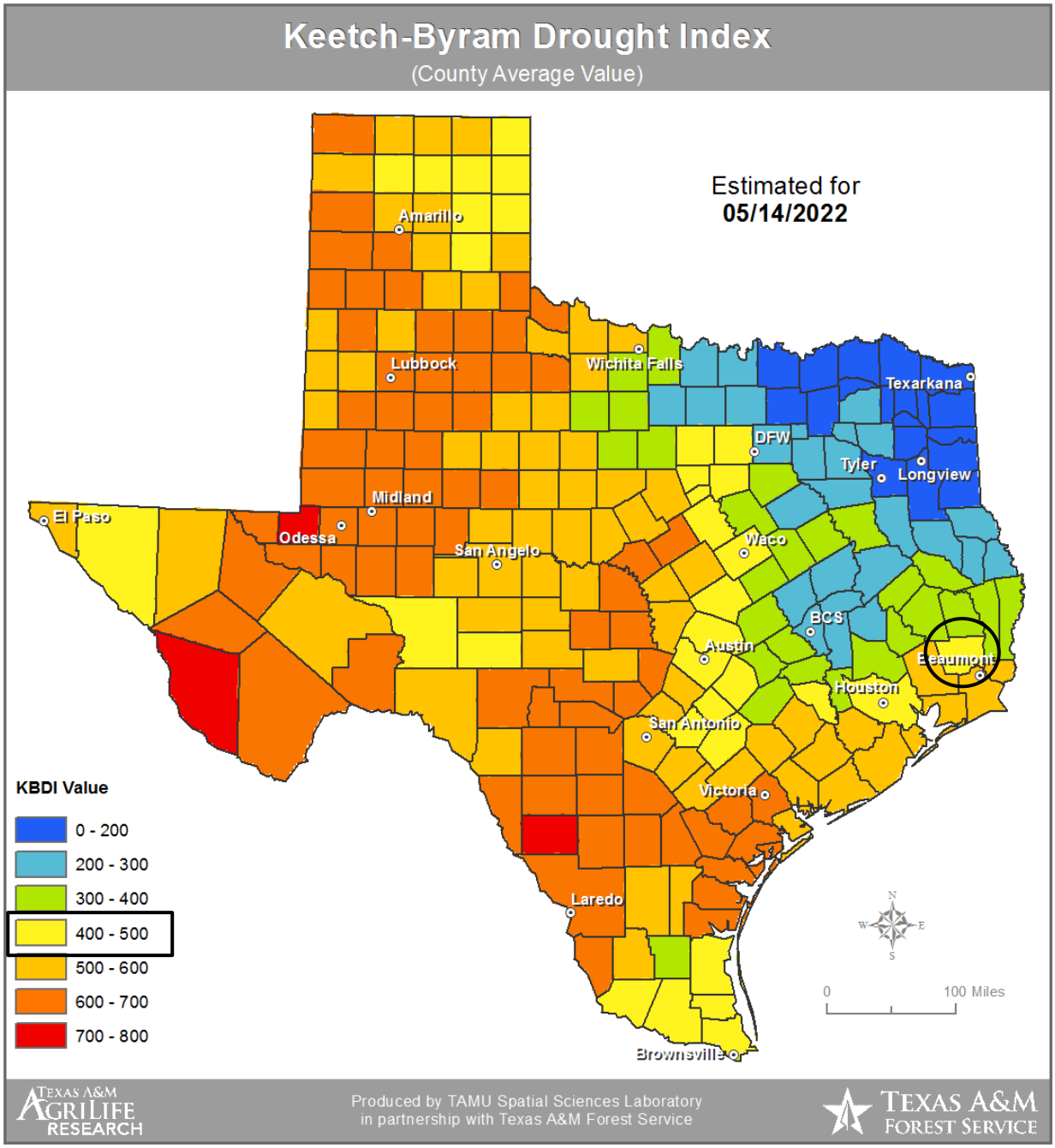


It is estimated that 55.0 percent of the total population in the City of Sour Lake live within the WUI. However, the entire City of Sour Lake is at some risk for wildfires.

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.

Figure 12-7. Keetch-Byram Drought Index (KBDI) for the State of Texas, 2022[1]



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.

[1] Hardin County is located within the black circle.

- **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 Hardin County planning area in a wildfire event is within 389 to 736. The average extent to be mitigated for the Hardin County planning area, including all participating jurisdictions, is a KBDI of 521. At this level fires intensity begins to significantly increase. Fire will readily burn in all directions exposing mineral soils in some locations. The worst the planning area can anticipate based on historical occurrences and readily available fuel is 600 to 800 as 736 falls within this range. At this level 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. Hardin County is between a potential limited to moderate wildfire intensities. Figures 12-8 through 12-13 identify the wildfire intensity for the Hardin County planning area.

Figure 12-8. Fire Intensity Scale Map – Hardin County

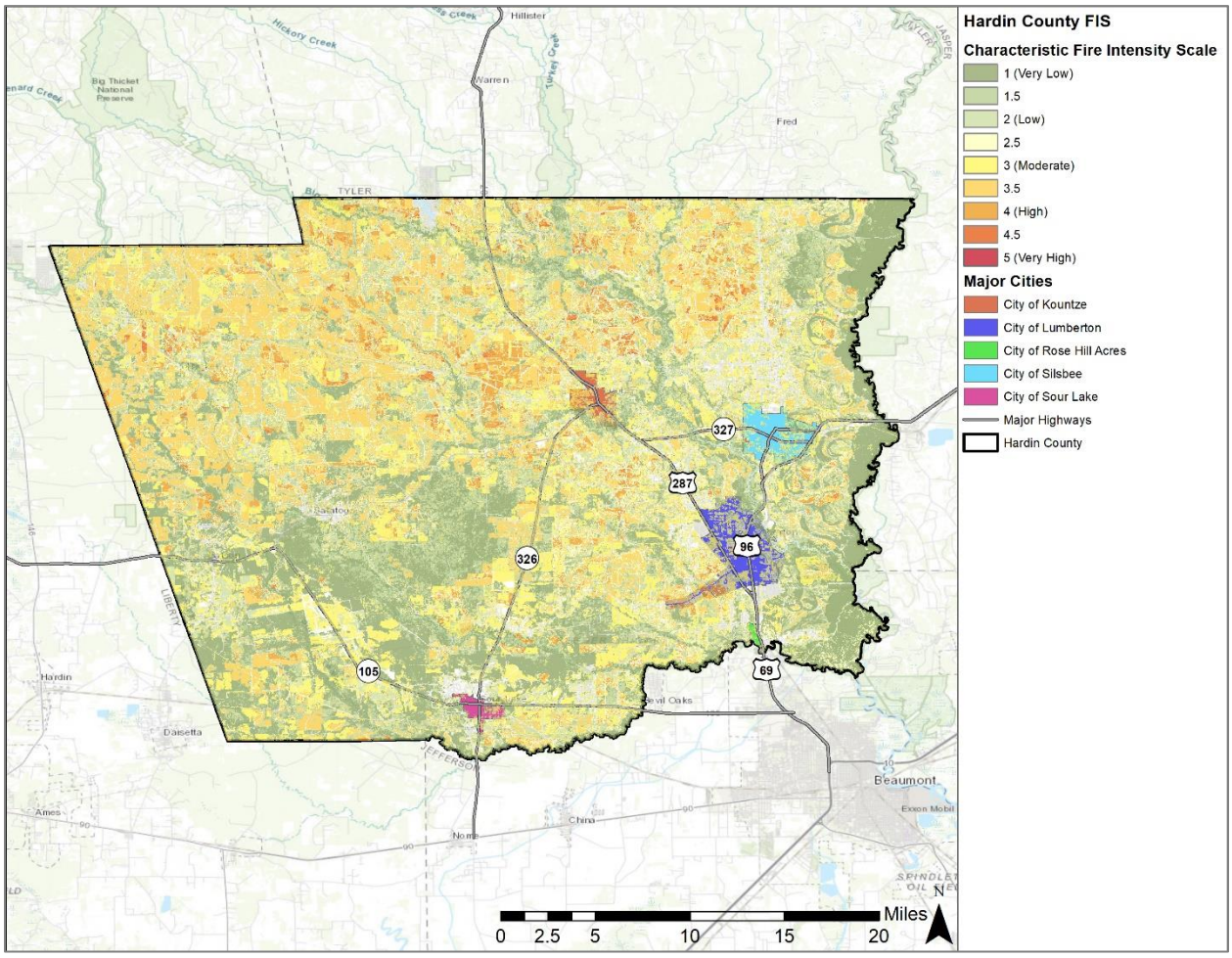


Figure 12-9. Fire Intensity Scale Map – City of Kountze

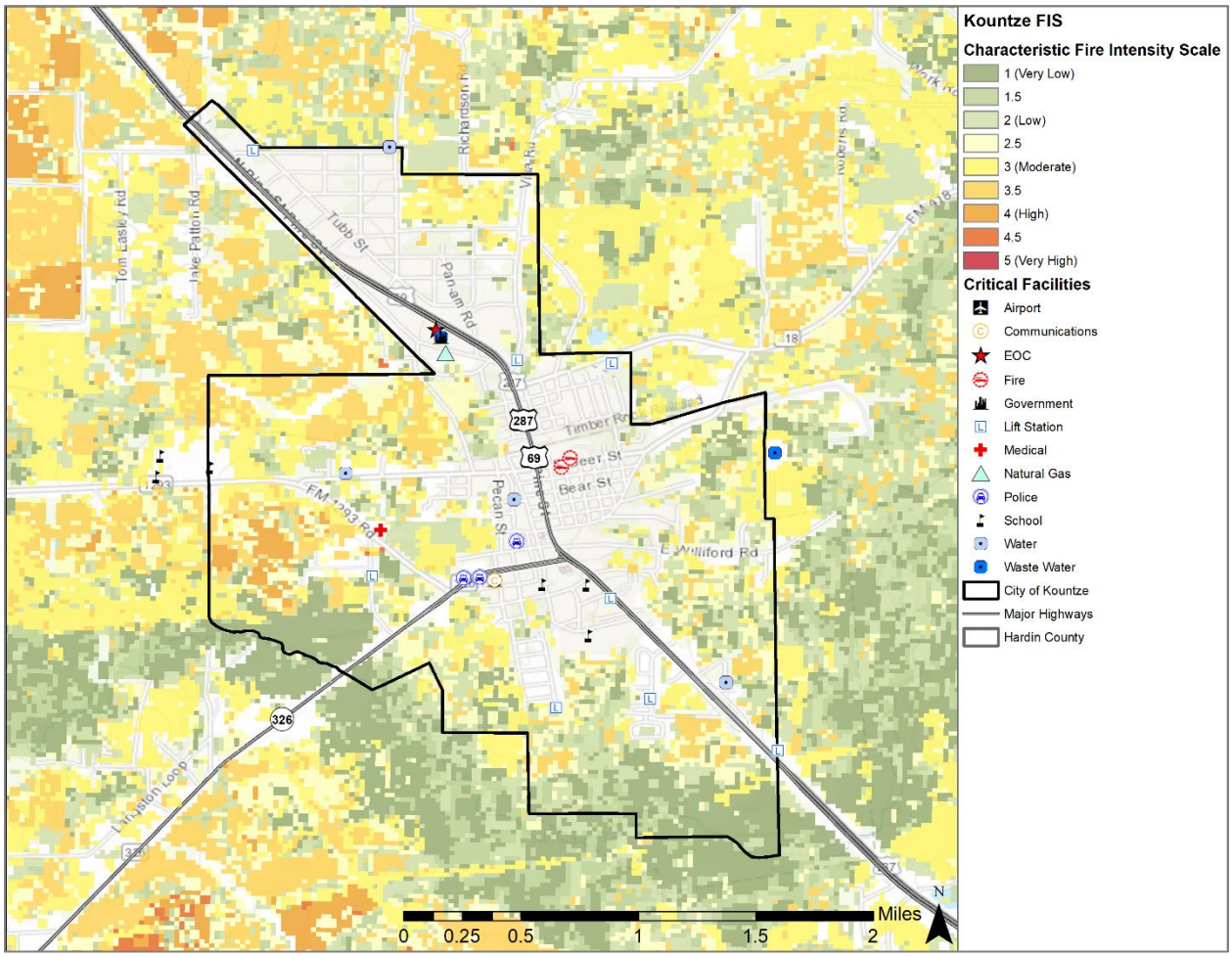


Figure 12-10. Fire Intensity Scale Map – City of Lumberton

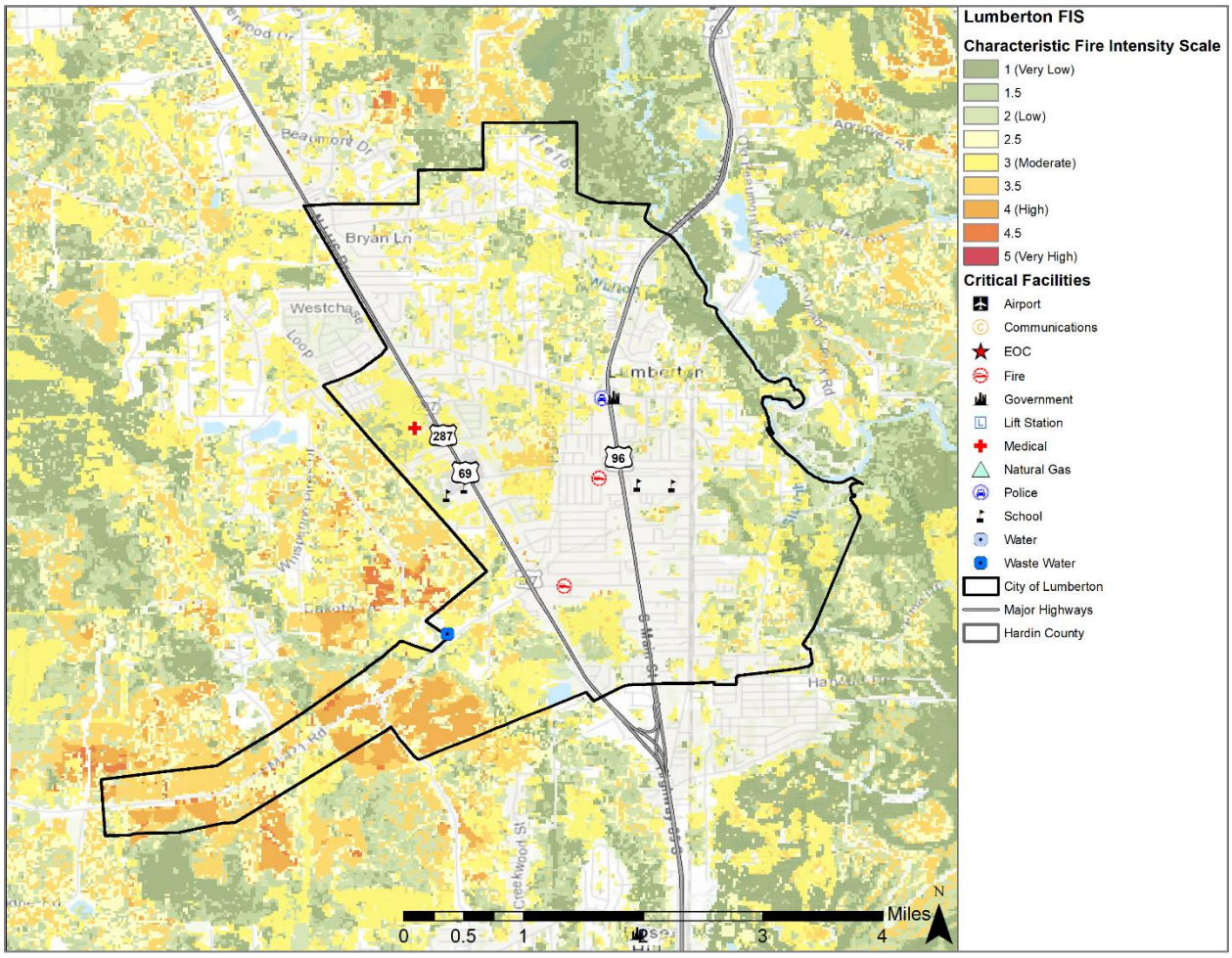


Figure 12-11. Fire Intensity Scale Map – City of Rose Hill Acres

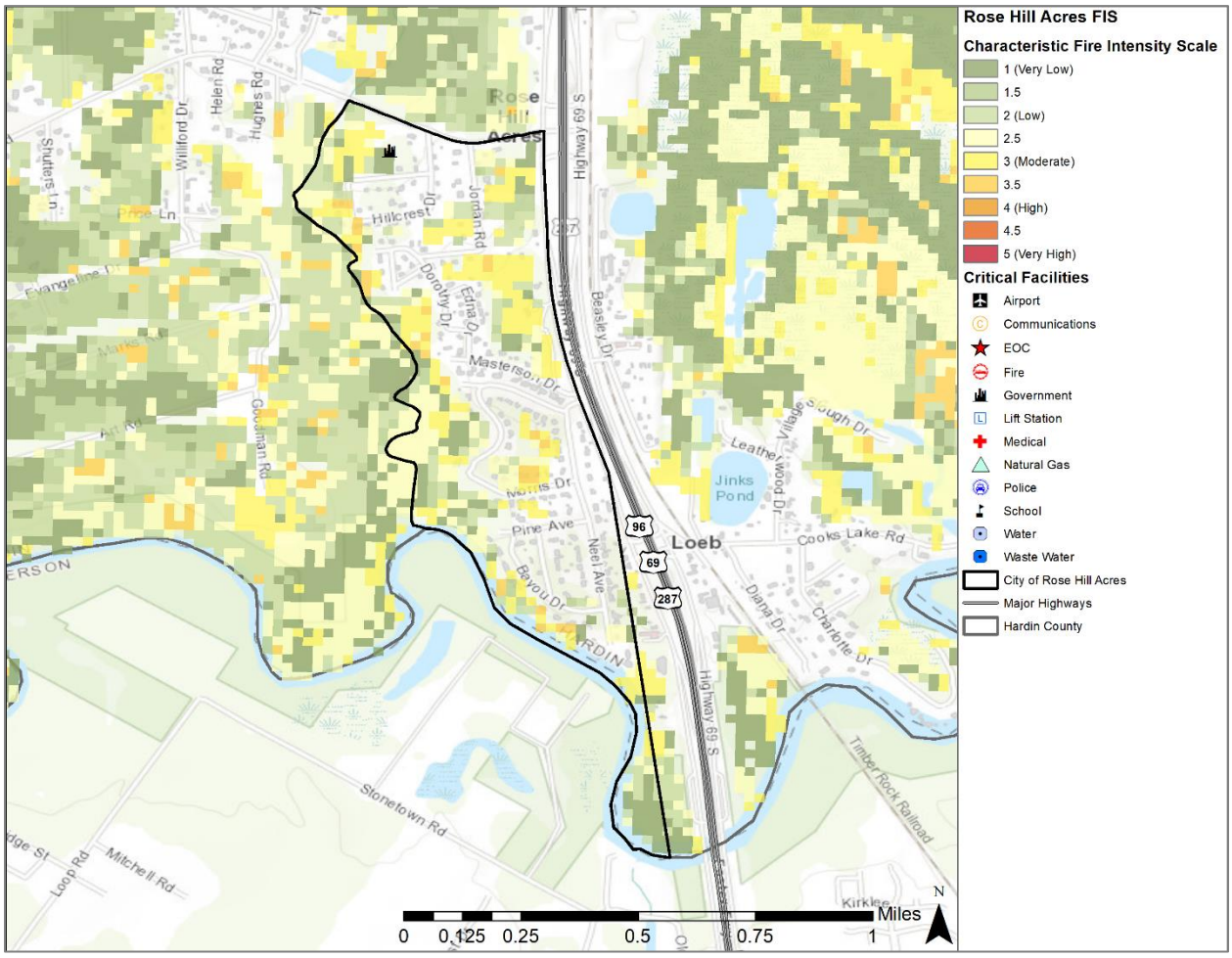


Figure 12-12. Fire Intensity Scale Map – City of Silsbee

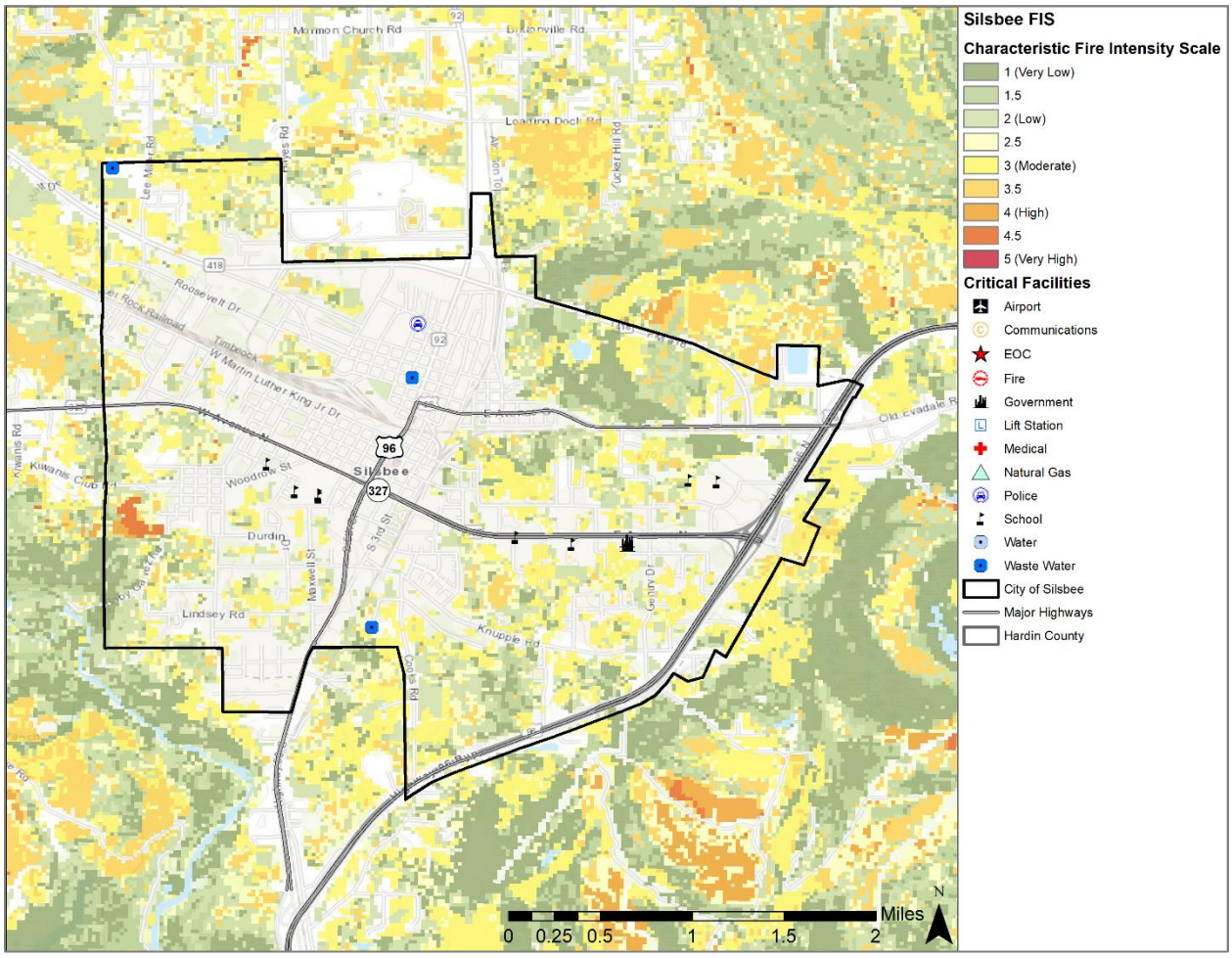
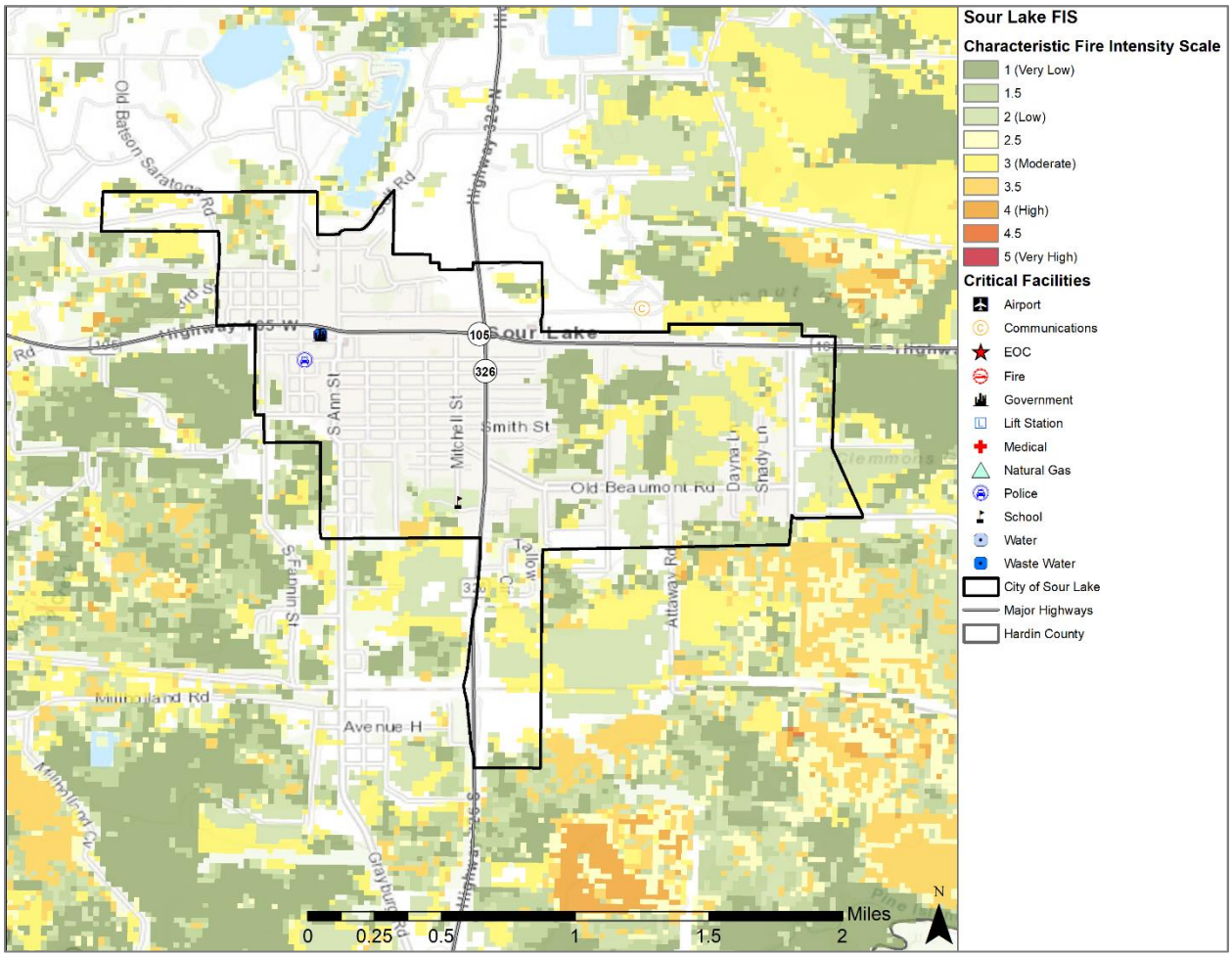


Figure 12-13. Fire Intensity Scale Map – City of Sour Lake



HISTORICAL OCCURRENCES

The Texas Forest Service reported 1,048 wildfire events between 2005 and 2020. The National Center for Environmental Information (NCEI) reported five events from 1996 through December 2021, which have been accounted for in the event data below. Due to a lack of recorded data for wildfire events prior to 2005 and after 2020[2], frequency calculations are based on a sixteen-year 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 12-14). Table 12-1 identifies the number of wildfires by jurisdiction and total acreage burned.

[2] The Texas Forest Service data is currently only available through 2020.

Figure 12-14. Location and Historic Wildfire Events for Hardin County Planning Area

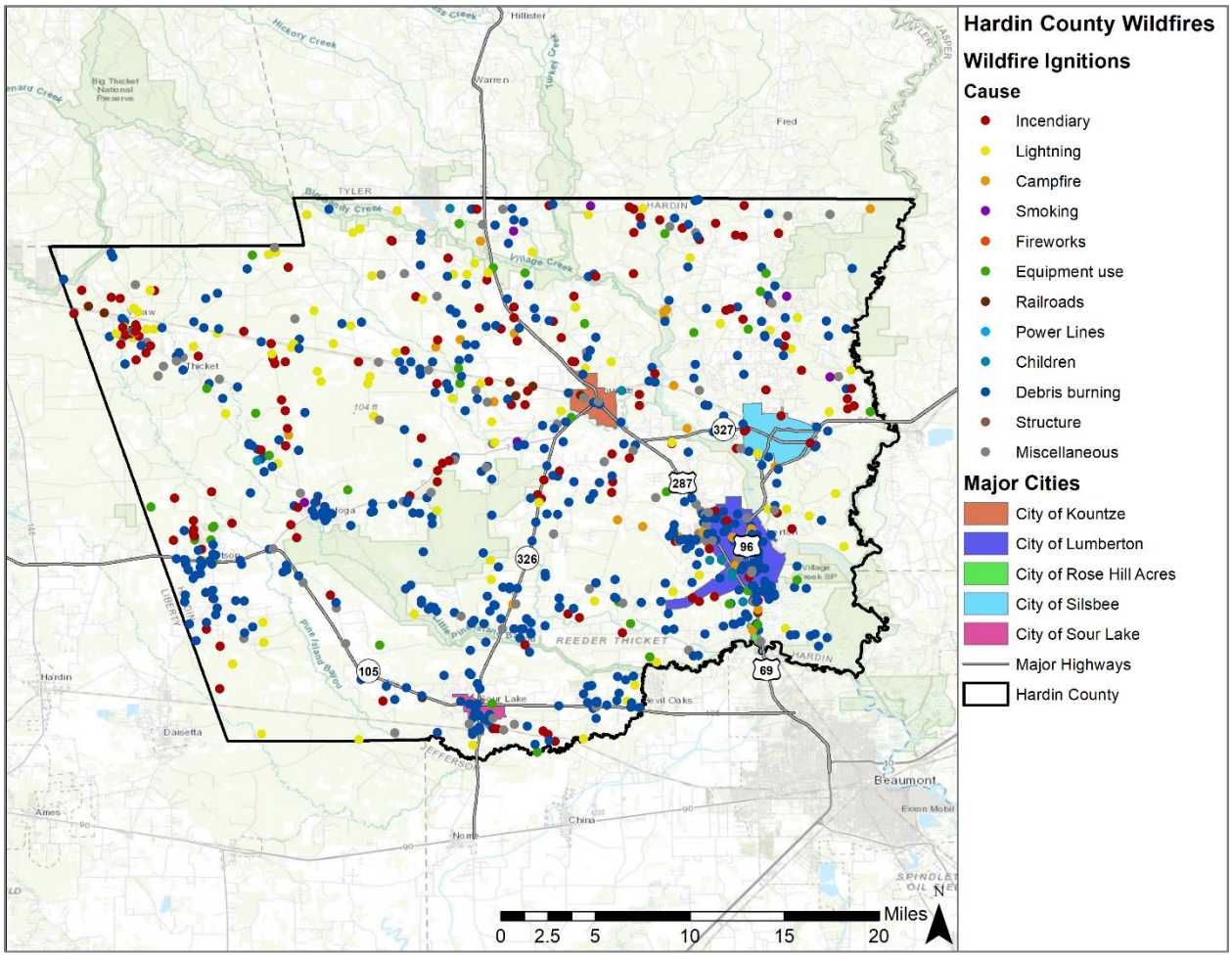


Table 12-1. Historical Wildfire Events Summary

JURISDICTION	NUMBER OF EVENTS	ACRES BURNED
Hardin County	931	17,652
City of Kountze	12	100
City of Lumberton	84	57
City of Rose Hill Acres	2	0
City of Silsbee	8	39
City of Sour Lake	11	28

Table 12-2. Acreage of Suppressed Wildfire by Year

YEAR	Hardin County	City of Kountze	City of Lumberton	City of Rose Hill Acres	City of Silsbee	City of Sour Lake
2005	1,827	0	0	0	19	0
2006	1,294	0	16	0	6	0
2007	169	1	6	0	0	0
2008	1,228	5	20	0	3	1
2009	1,158	0	12	0	0	6
2010	3,921	61	1	0	0	7
2011	5,925	23	0	0	7	9
2012	1,084	10	2	0	4	0
2013	358	0	0	0	0	5
2014	86	0	0	0	0	0
2015	25	0	0	0	0	0
2016	215	0	0	0	0	0
2017	82	0	0	0	0	0
2018	194	0	0	0	0	0
2019	86	0	0	0	0	0
2020	0	0	0	0	0	0
Total	**17,652**	**100**	**57**	**0**	**39**	**28**

Based on the list of historical wildfire events for the Hardin County planning area (listed above), including all participating jurisdictions, 36 events have occurred since the 2017 Plan.

PROBABILITY OF FUTURE EVENTS

Wildfires can occur at any time of the year. As the jurisdictions within the county move into wildland, the potential area of occurrence of wildfire increases. With 1,048 events in a 16-year period, an event within Hardin County, including all participating jurisdictions, is highly likely, meaning an event is probable within the next year.

VULNERABILITY AND IMPACT

Periods of drought, dry conditions, high temperatures, and low humidity are factors that contribute to the occurrence of a wildfire event. Areas along railroads and people whose homes are in woodland settings have an increased risk of being affected by wildfire.

SECTION 12: WILDFIRE

The heavily populated, urban areas of Hardin County are not likely to experience large, sweeping fires. Areas in the unincorporated areas of Hardin County are vulnerable, including rural areas. 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 mostly along the perimeter of the study area where wildland and urban areas interface.

The sparsely populated unincorporated areas of Hardin County and the small community of Rose Hill Acres are capable of experiencing large sweeping fires, especially where areas of vegetation are not maintained. Areas along major highways in Silsbee and Sour Lake, as well as Hardin County have an increased vulnerability where empty lots and unoccupied areas are located. Figures 12-1 through 12-6 illustrate the areas that are the most vulnerable to wildfire throughout the planning area.

The following critical facilities are located in the WUI and are more susceptible to wildfire in each participating jurisdiction:

Table 12-3. Critical Facilities Located in WUI by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Hardin County	3 Fire Station Facilities, 2 Water/Wastewater Treatment Facilities
Kountze	4 Schools, 1 Medical Facility, 1 EOC, 2 Water Plants, 1 Water Storage Facility, 8 Pump Stations, 1 Natural Gas Service Facility, 1 Regulator Station
Lumberton	None
Rose Hill Acres	1 Government Facility
Silsbee	1 Fire Station Facility, 2 Water/ Wastewater Treatment Facilities, 1 Government Facility, 3 School Facilities
Sour Lake	1 Police Station, 1 Water Control District Facility, 4 School Facilities

Within Hardin County, a total of 1,048 fire events were reported from 2005 to 2020. All of these events were suspected wildfires. Historic loss and annualized estimates due to wildfires are presented in Table 12-4 below. The frequency is approximately 66 events every year.

Table 12-4. Potential Annualized Losses by Jurisdiction[3]

JURISDICTION	ACRES BURNED	ANNUAL ACRE LOSSES
Hardin County	17,652	1,103.3
City of Kountze	100	6.3
City of Lumberton	57	3.6
City of Rose Hill Acres	0	0.0

[3] Events divided by 11 years of data.

JURISDICTION	ACRES BURNED	ANNUAL ACRE LOSSES
City of Silsbee	39	2.4
City of Sour Lake	28	1.8
Planning Area	**17,876**	**1,117.3**

Figures 12-15 through 12-20 show Hardin County and the threat of wildfire to the County and all participating jurisdictions.

Figure 12-15. Wildfire Ignition Density – Hardin County

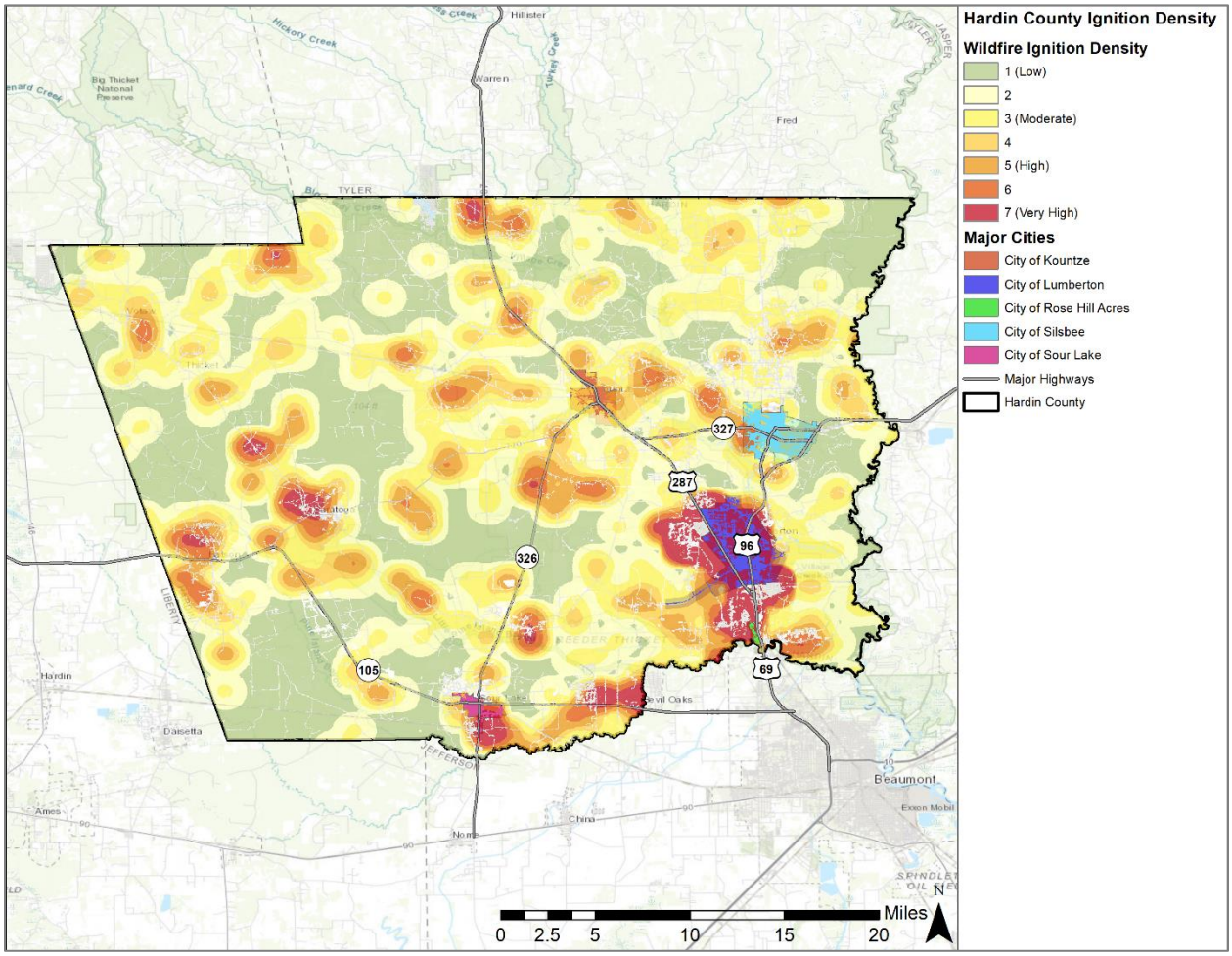


Figure 12-16. Wildfire Ignition Density – City of Kountze

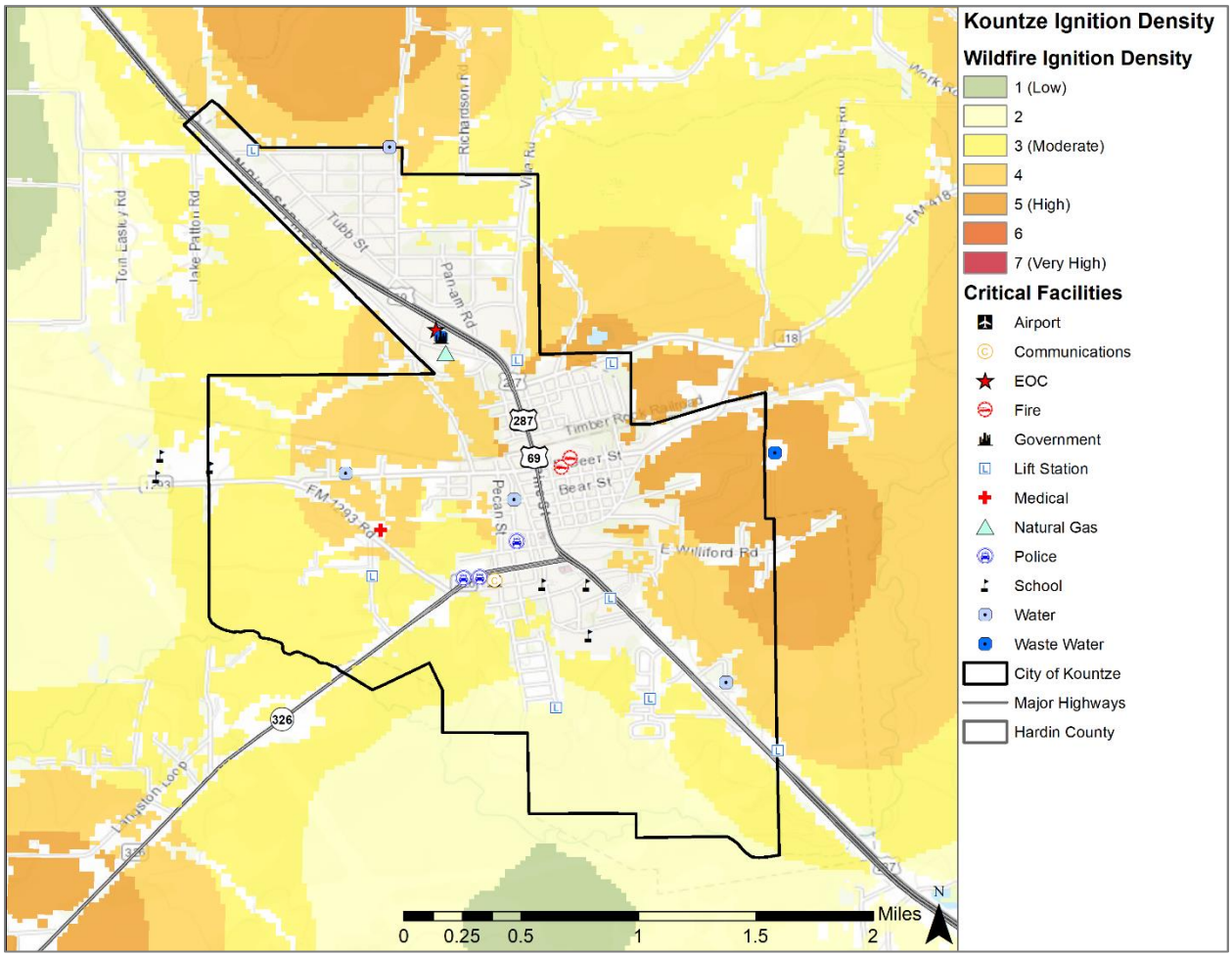


Figure 12-17. Wildfire Ignition Density – City of Lumberton

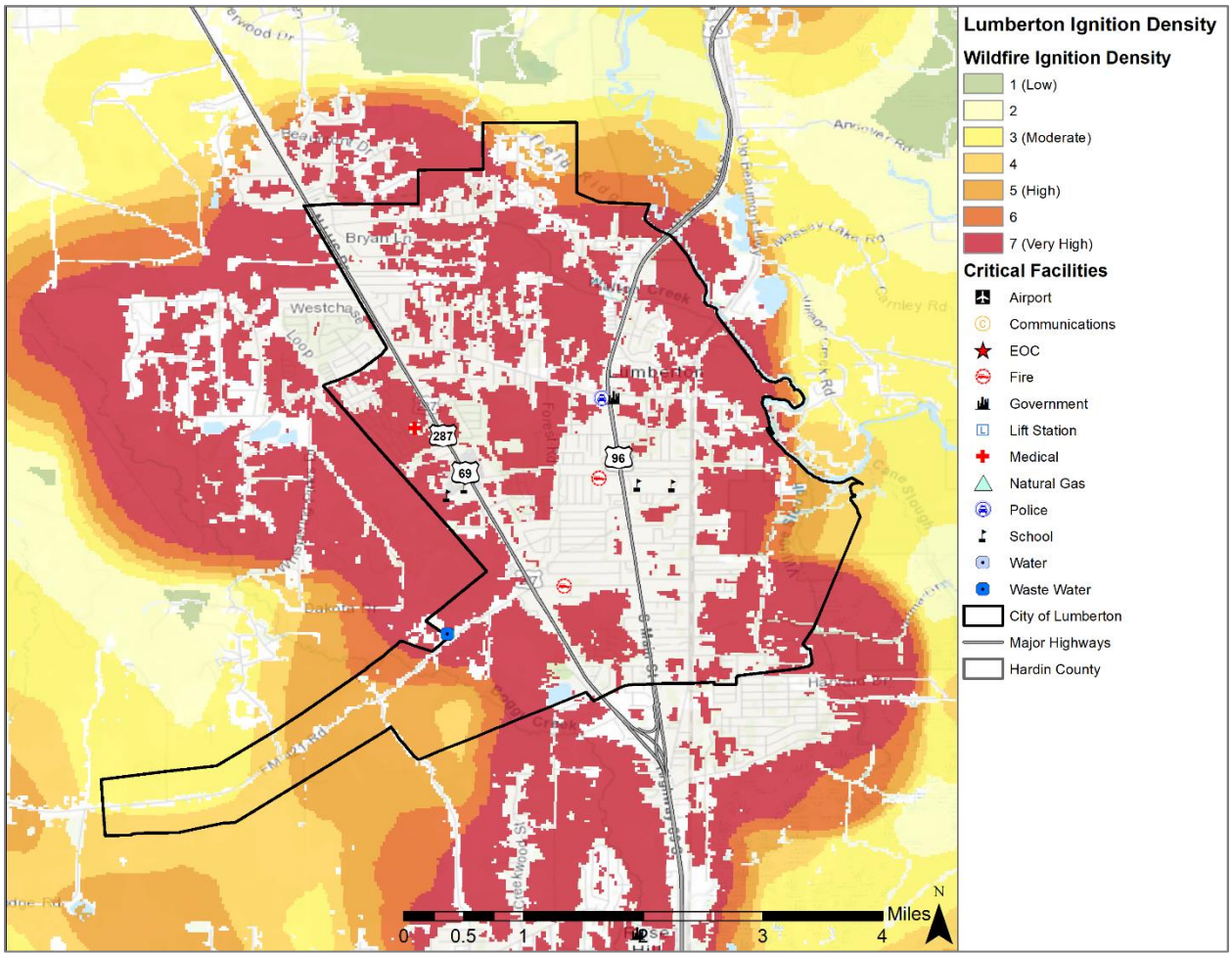


Figure 12-18. Wildfire Ignition Density – City of Rose Hill Acres

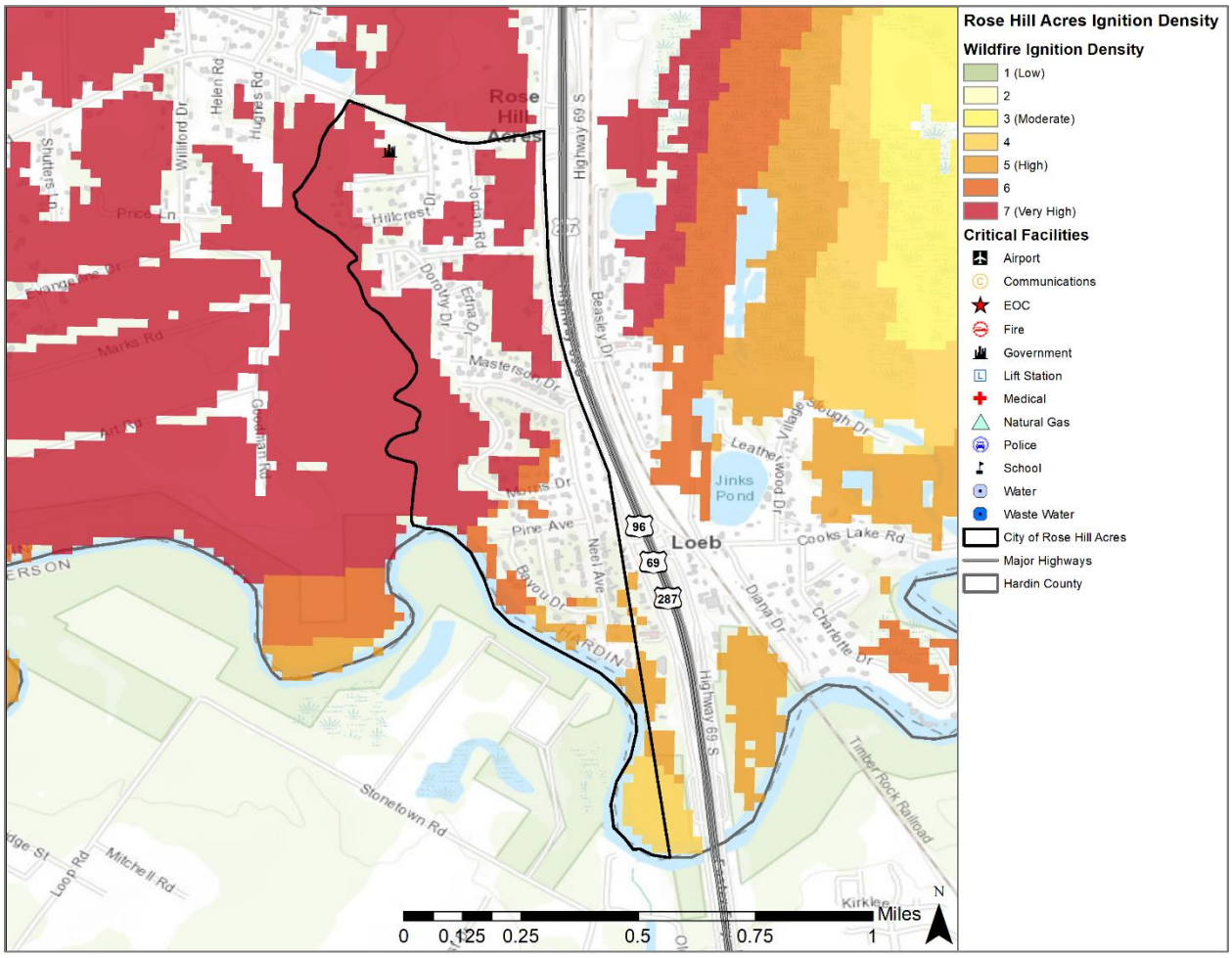


Figure 12-19. Wildfire Ignition Density – City of Silsbee

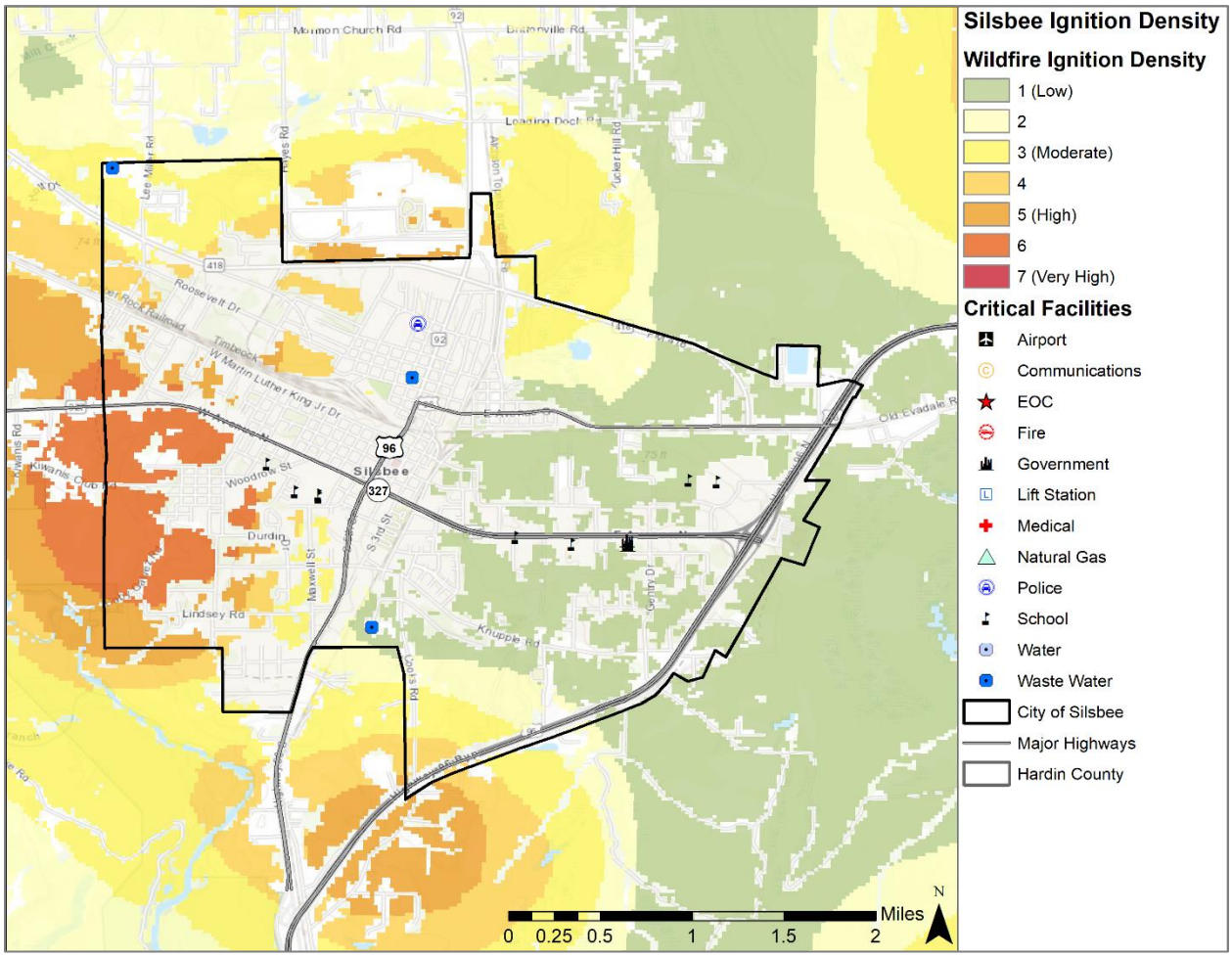
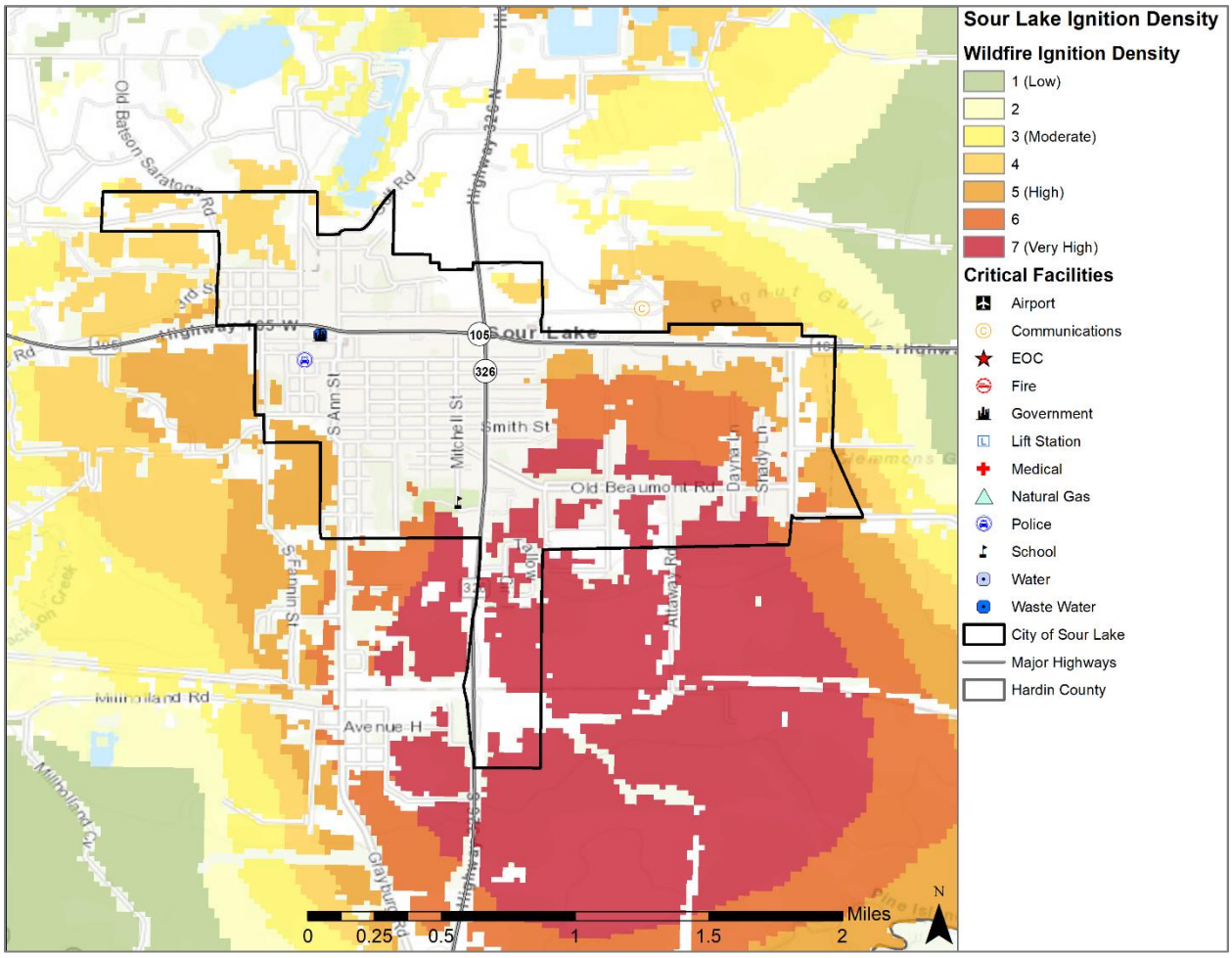


Figure 12-20. Wildfire Ignition Density – City of Sour Lake



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 Hardin County planning area, the impact from a wildfire event can be 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 percent of property is destroyed or with major damage.

Severity of impact is gauged by acreage burned, homes and structures lost, injuries and fatalities. Based on this, impact for each participating jurisdiction is listed below in Table 12-5.

Table 12-5. Impact by Jurisdiction

JURISDICTION	IMPACT	DESCRIPTION
Hardin County	Limited	Hardin County has an estimated 45,319 people or 84.8 percent of the total population that live within the Wildland Urban Interface (WUI). Hardin County, including citizens in unincorporated areas, may suffer minor injuries that can be treated with first aid. Critical facilities could be shut down for 24 hours or less, and less than 10 percent of total property could be damaged.
City of Kountze	Limited	The largest population in the City of Kountze live in an area that is semi-dense (1-3 houses per 1 acre) in the WUI, and the city has a low to moderate wildfire threat. Citizens may suffer minor injuries treatable with first aid. Critical facilities could be shut down for 24 hours of less, and less than 10 percent of total property could be damaged.
City of Lumberton	Limited	The largest population in the City of Lumberton live in an area that is semi-dense (1-3 houses per 1 acre) in the WUI, and the city has a low to moderate wildfire threat. Citizens may suffer minor injuries treatable with first aid. Critical facilities could be shut down for 24 hours of less, and less than 10 percent of total property could be damaged.
Rose Hill Acres	Limited	The largest population in the City of Rose Hill Acres live in an area that is semi-dense (1-3 houses per 1 acre) in the WUI, and the city has a low to moderate wildfire threat. Citizens may suffer minor injuries treatable with first aid. Critical facilities could be shut down for 24 hours of less, and less than 10 percent of total property could be damaged
Silsbee	Limited	The largest population in the City of Silsbee live in an area that is semi-dense (1-3 houses per 1 acre) in the WUI, and the city has a low to moderate wildfire threat. Citizens may suffer minor injuries treatable with first aid. Critical facilities could be shut down for 24 hours of less, and less than 10 percent of total property could be damaged

JURISDICTION	IMPACT	DESCRIPTION
City of Sour Lake	Limited	The largest population in the City of Sour Lake live in an area that is semi-dense (1-3 houses per 1 acre) in the WUI, and the city has a low to moderate wildfire threat. Citizens may suffer minor injuries treatable with first aid. Critical facilities could be shut down for 24 hours of less, and less 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 the direct damages. The impact of climate change could produce larger, more wide-spread wildfire events, exacerbating the current wildfire impacts. More extreme wildfire conditions can be frequently associated with a variety of impacts, including:

- Persons 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 since they are 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 city and/or county 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, further 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.
- 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.
- Vegetated dunes can be stripped, significantly damaging the function of the dunes to protect inland areas from the destructive forces of wind and waves.

- 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.
- Neches River and Village Creek State Park recreation and tourism can be unappealing for years following a large wildfire, devastating directly related businesses.
- 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 government, businesses, and citizens will contribute to the overall economic and financial conditions in the aftermath of a wildfire event.

SECTION 13: WINTER STORM

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 Hardin County planning area usually begin as powerful cold fronts that push south from central Canada. Although the county is at risk to 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 13-1, the Hardin County planning area, including all participating jurisdictions, is located in USDA Hardiness Zone 8b, with annual minimum temperatures between 15° and 20°. During times of ice and snow accumulation, response times will increase until public works road crews are able to make major roads passable. Table 7-1 describes the types of winter storms possible to occur in the Hardin County planning area including all participating jurisdictions.

Figure 13-1. Annual Minimum Temperature

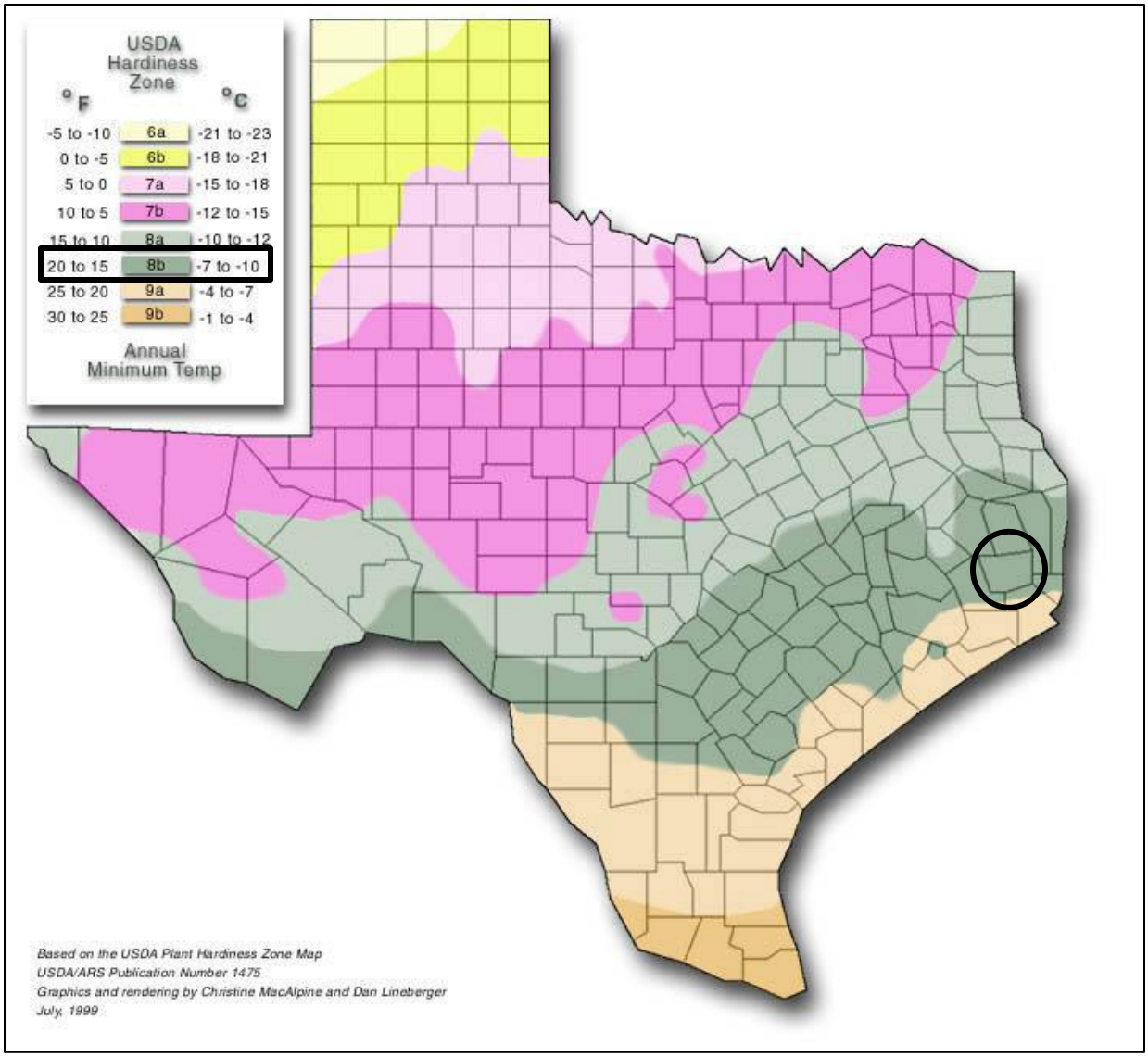


Table 13-1. Types of Winter Storms

TYPE OF WINTER STORM	DESCRIPTION
Winter Weather Advisory	This alert may be issued for a variety of severe conditions. Weather advisories may be announced for snow, blowing or drifting snow, freezing drizzle, freezing rain, or a combination of weather events.
Winter Storm Watch	Severe winter weather conditions may affect your area (freezing rain, sleet, or heavy snow may occur separately or in combination).
Winter Storm Warning	Severe winter weather conditions are imminent.

TYPE OF WINTER STORM	DESCRIPTION
Freezing Rain or Freezing Drizzle	Rain or drizzle is likely to freeze upon impact, resulting in a coating of ice glaze on roads and all other exposed objects.
Sleet	Small particles of ice usually mixed with rain. If enough sleet accumulates on the ground, it makes travel hazardous.
Blizzard Warning	Sustained wind speeds of at least 35 mph are accompanied by considerable falling or blowing snow. This alert is the most perilous winter storm with visibility dangerously restricted.
Frost/Freeze Warning	Below freezing temperatures are expected and may cause significant damage to plants, crops, and fruit trees.
Wind Chill	A strong wind combined with a temperature slightly below freezing can have the same chilling effect as a temperature nearly 50 degrees lower in a calm atmosphere. The combined cooling power of the wind and temperature on exposed flesh is called the wind-chill factor.

LOCATION

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

EXTENT

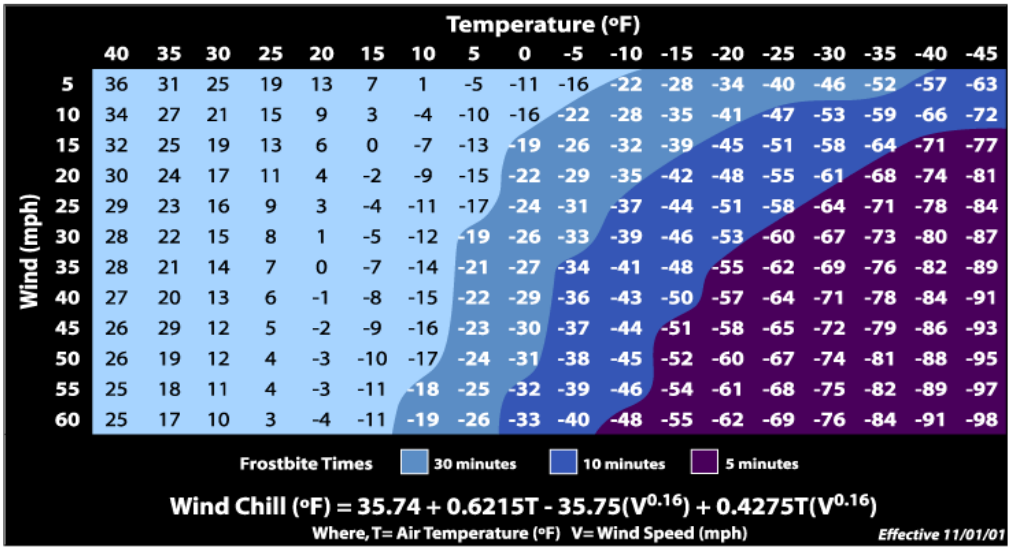
The extent or magnitude of a severe winter storm is measured in intensity based on the temperature and level of accumulations as shown in Table 13-2. Table 13-2 should be read in conjunction with the wind-chill factor described in Figure 13-2 to determine the intensity of a winter storm. The chart is not applicable when temperatures are over 50°F or winds are calm. This is an index developed by the National Weather Service.

Table 13-2. 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

INTENSITY	TEMPERATURE RANGE (Fahrenheit)	EXTENT DESCRIPTION
Severe	Below 20°	Winds of 35 mph or more and snow and sleet greater than 4 inches

Figure 13-2. Wind Chill Chart



Wind chill temperature is a measure of how cold the wind makes real air temperature feel to the human body. Since wind can dramatically accelerate heat loss from the body, a blustery 30°F day would feel just as cold as a calm day with 0°F temperatures. The Hardin County planning area, including all participating jurisdictions, has never experienced a blizzard, but based on 14 previous occurrences recorded from 1996 through December 2021, it has been subject to winter storm watches, warnings, freezing rain, sleet, and snow.

The average number of cold days is similar for the entire planning area, including all participating jurisdictions. Therefore, the intensity or extent of a winter storm event to be mitigated for the area ranges from mild to significant according to the definitions at Table 13-2. Hardin County planning area, including all participating jurisdictions, can expect anywhere between 0.1 to 4.0 inches of ice and snow during a winter storm event and temperatures between 15 and 20 degrees with winds ranging from 0 to 20 mph. This is the worst that can be anticipated to mitigate against in the future for all participating jurisdictions.

HISTORICAL OCCURRENCES

Table 13-3 shows historical occurrences for Hardin County from 1996 through December 2021 provided by the NCEI database. There have been 14 recorded winter storm events in Hardin County, including all participating jurisdictions. 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. Historical winter storm data for the county and all participating jurisdictions are provided on a County-wide basis per the NCEI database. Table 13-3 shows historical incident information for the planning area.

Table 13-3. Historical Winter Storm Events, 1996-2021[1]

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hardin County	1/12/1997	0	0	$1,830,888	$0
Hardin County	4/7/2007	0	0	$0	$0
Hardin County	12/11/2008	0	0	$0	$0
Hardin County	12/4/2009	0	0	$0	$0
Hardin County	2/23/2010	0	0	$0	$0
Hardin County	1/8/2010	0	0	$68,098	$0
Hardin County	2/3/2011	0	0	$13,163	$0
Hardin County	1/28/2014	0	0	$0	$0
Hardin County	1/23/2014	0	0	$0	$0
Hardin County	3/4/2014	0	0	$6,164	$0
Hardin County	12/7/2017	0	0	$0	$0
Hardin County	1/16/2018	0	0	$0	$0
Hardin County	2/14/2021	0	0	$0	$0
Hardin County	2/17/2021	0	0	$0	$0
TOTALS		**0**	**0**	**$1,918,313**	

Based on the list of historical winter storm events for the Hardin County planning area (listed above), including all participating jurisdictions, four of the events have occurred since the 2017 Plan.

SIGNIFICANT EVENTS

February 14-15, 2021 – Hardin County

The first in a series of Arctic Cold Fronts arrived during the 12th pushing tide levels down along the coast, however the subfreezing temperatures and winter weather did not arrive until the 14th. The event on the 14th began at many places as a light glaze of freezing rain, but quickly changed over to sleet or snow. The event set many records in the area and rivaled the historic freezes in the region. The event was likely the longest and coldest since December 1989 Interior sections of Southeast Texas saw lows in the single digits and mid-teens were recorded at the coast during the coldest night. Temperatures fell through the afternoon and evening across Hardin County as

[1] Values are in 2022 dollars.

showers developed. Rain turned to freezing rain during the evening and then quickly over to sleet. Light snow mixed in by the end of the event. Accumulations ranged from 1 to 2 inches. Bridges and overpasses became iced and closed. Most roads were hazardous.

January 8 – 11, 2010 – Hardin County
A deep upper-level trough moving eastward across the United States forced a bitterly cold Arctic air mass southward from Canada into the Gulf Coast states on January 7, 2010. This air mass remained in place for several days across southeast Texas, leading to the coldest temperatures seen across this region since February 1996. A few record low temperatures and record low maximum temperatures were set. Many locations in the Lakes Region of southeast Texas remained below freezing for over 36 hours from around midnight early on January 8th through the afternoon on Saturday January 9th.

The cold temperatures led to several school closures, numerous weather-related fires, and widespread plumbing ruptures throughout southeast Texas. One indirect fatality occurred near Jamestown in neighboring Newton County due to a house fire. The Insurance Council of Texas estimated losses across southeast Texas from the cold weather at around $1 million.

January 12 - 14, 1997 – Hardin County
A record ice storm paralyzed southeast Texas and southwest Louisiana. Around 90,000 electric customers across southeast Texas were without power for up to six days. Emergency shelters were opened for several nights due to the cold weather following the ice storm. Hundreds of homes received minor damage due to trees or tree limbs falling on roofs. Several house fires were directly or indirectly related to the ice storm. Numerous traffic accidents attributed to icy roads led to several minor injuries. One death was indirectly attributed to the ice storm in neighboring Orange County.

PROBABILITY OF FUTURE EVENTS

According to historical records, the planning area experiences approximately one winter storm event each year. Hence, the probability of a future winter storm event affecting the Hardin County planning area, including all participating jurisdictions, is highly likely, with a winter storm likely to occur within the next year.

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.

All populations, buildings, critical facilities, and infrastructure in the entire Hardin County planning area, including all participating jurisdictions, are vulnerable to severe winter events.

The following critical facilities would be vulnerable to Winter Storm events in each participating jurisdiction:

Table 13-4. Critical Facilities by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Hardin County	4 Fire Station Facilities, 2 Water/Wastewater Treatment Facilities, 1 Communications Tower, 5 School Facilities
City of Kountze	1 Fire Station, 1 Sheriff's Department, 1 Police Station, 4 Schools, 1 Medical Facility, 1 EOC, 3 Water Plants, 2 Water Storage Facilities, 1 Wastewater Treatment Facility, 8 Pump Stations, 1 Natural Gas Service Facility, 1 Regulator Station, 2 Government Facilities, 1 County Dispatch Facility, 1 Airport
City of Lumberton	1 Fire Station, 1 Police Station, 1 Water Control District Facility, 1 Drainage District Facility, 1 Hospital, 4 Schools, 1 Government Facility, 1 Municipal Utility District Facility, 1 Community Center (Performance Arts Center)
City of Rose Hill Acres	1 Government Facility
City of Silsbee	1 Fire Station Facility, 1 Police Station Facility, 3 Water/ Wastewater Treatment Facilities, 1 Government Facility, 5 School Facilities, 1 Communications Tower
City of Sour Lake	1 Fire Station, 1 Police Station, 1 Water Control District Facility, 3 School Facilities, 1 Water/Wastewater Treatment Facility, 1 Government Facility, 1 Communications Tower

People and animals are subject to health risks from extended exposure to cold air. Elderly people are at greater risk of death from hypothermia during these events, especially in the rural areas of the county where populations are sparse, icy roads may impede travel, and there are fewer neighbors to check in on the elderly. 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. In addition, populations living below the poverty level may not be able to afford to run heat on a regular basis

Population over 65 in the entire Hardin County planning area is estimated at 16.9% of the total population or an estimated total of 9,681[2] potentially vulnerable residents in the planning area based on age. An estimated 12.0% of the planning area population live below the poverty level (Table 13-5).

Table 13-5. Population at Greater Risk by Jurisdiction

JURISDICTION	POPULATION 65 AND OLDER	POPULATION BELOW POVERTY LEVEL
Hardin County	9,681	6,883
City of Kountze	446	317
City of Lumberton	2,654	750
City of Rose Hill Acres	54	12

[2] US Census Bureau 2020 data for Hardin County.

JURISDICTION	POPULATION 65 AND OLDER	POPULATION BELOW POVERTY LEVEL
City of Silsbee	1,275	697
City of Sour Lake	296	313

Historic loss, in 2022 dollars, is estimated at $1,918,313 in damages over the 26-year recording period giving an approximate loss of $73,781 in damages annually (Table 13-6). The potential severity of impact for the Hardin County planning area, including all participating jurisdictions, is "Limited" meaning injuries are treatable with first aid, shutdown of facilities and services for 24 hours or less, and less than 10% of property destroyed or with major damage.

Table 13-6. Potential Annualized Losses for Hardin County

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Hardin County	$1,918,313	$73,781

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 and children under 5, 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.
- A winter storm event could lead to tree, shrub, and plant damage or death.
- Severe cold and ice could significantly damage agricultural crops.
- 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 businesses and citizens will also contribute to the overall economic and financial conditions in the aftermath of a winter storm event.

SECTION 14: DROUGHT

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 14-1 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 14-1. 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.

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

LOCATION

Droughts occur regularly throughout Texas and the Hardin County planning area and are a normal condition. However, they can vary greatly in their intensity and duration. The Drought Monitor shows the planning area is currently experiencing abnormally dry conditions throughout most of the county (Figure 14-1). However, the planning area has experienced a range of conditions from normal to exceptional drought conditions over the last decade (Figure 14-2). There is no distinct geographic boundary to drought; therefore, it can occur throughout the Hardin County planning area equally, including all participating jurisdictions.

Figure 14-1. U.S. Drought Monitor, May 2022

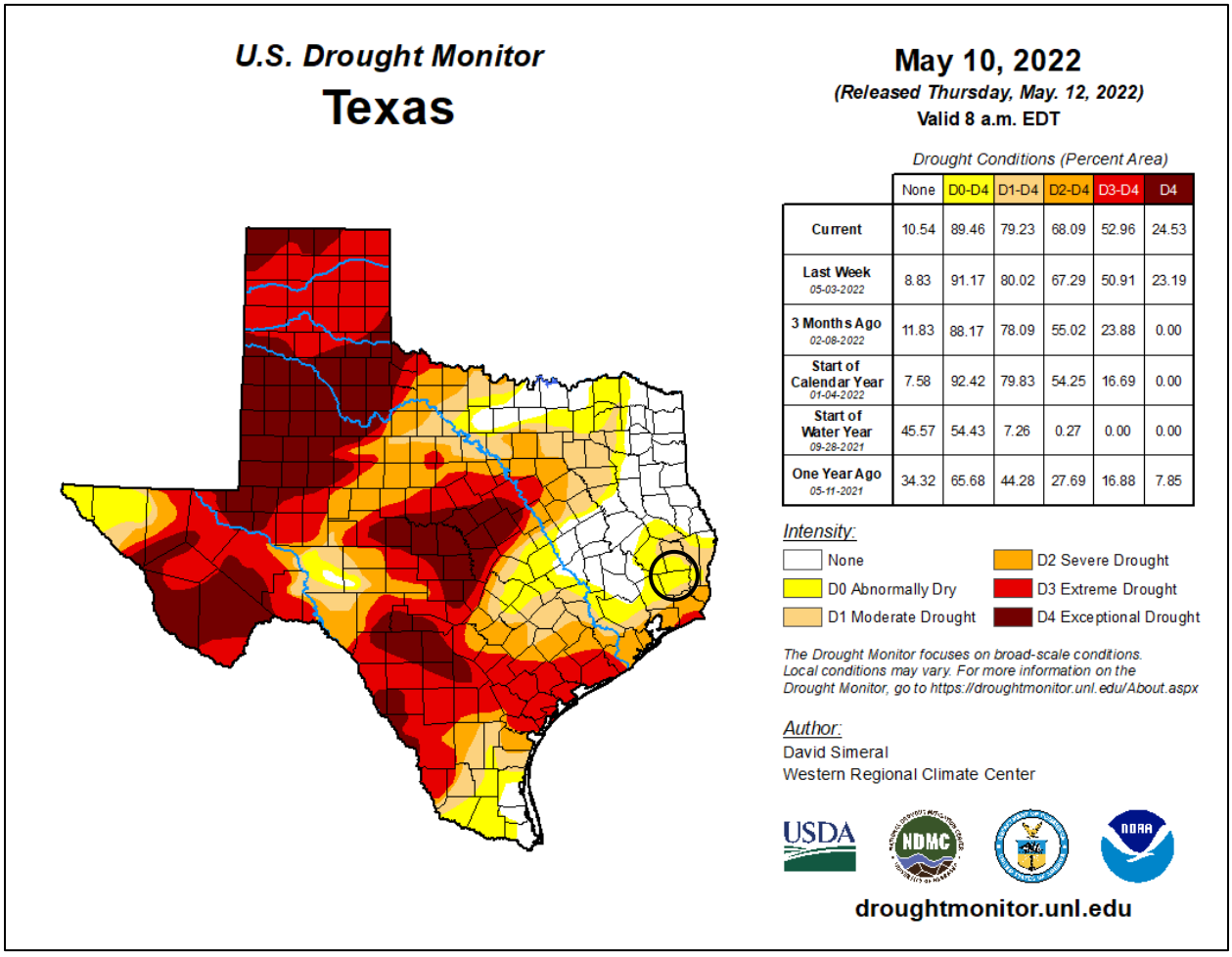
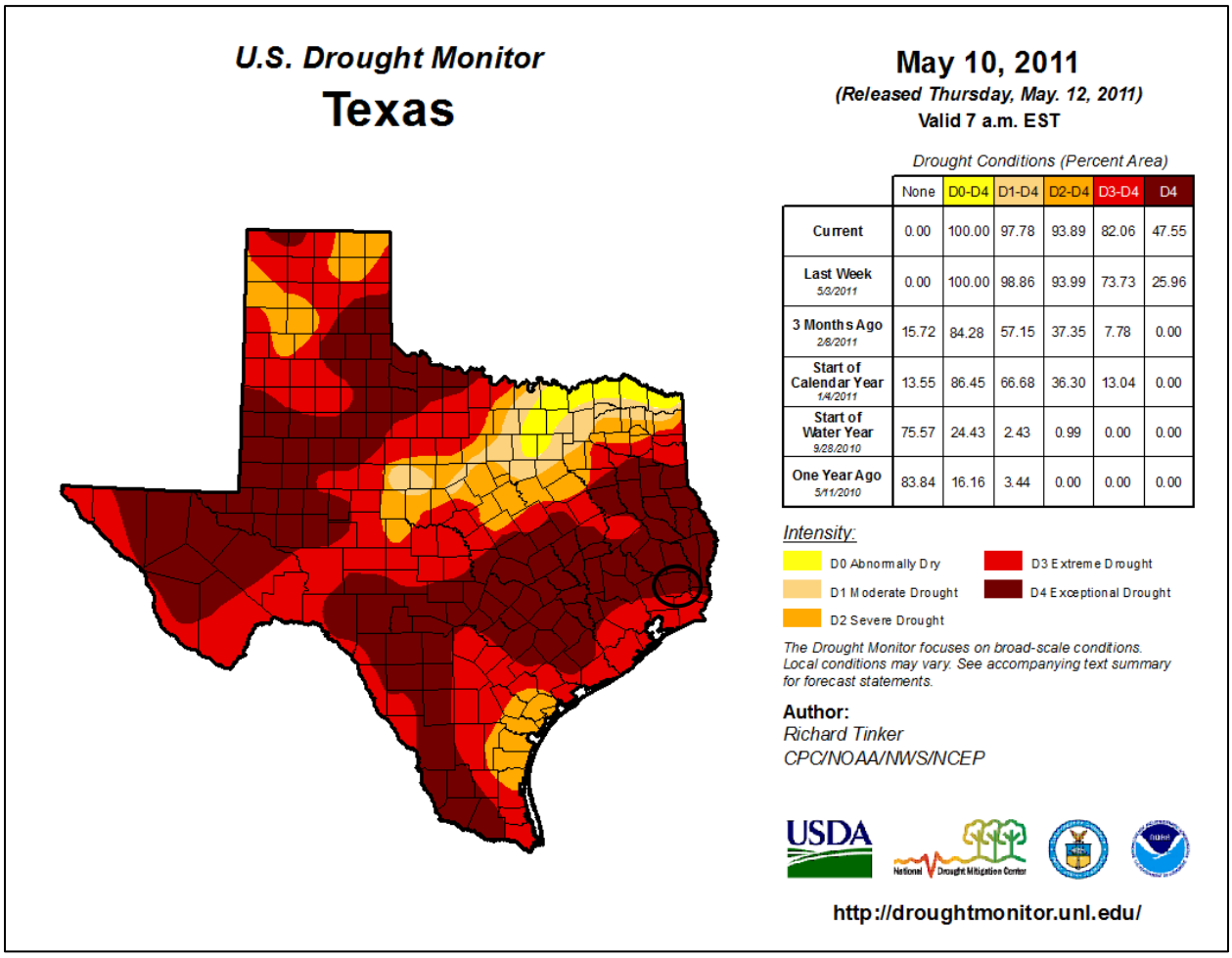


Figure 14-2. U.S. Drought Monitor, May 2011



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 14-2 depicts magnitude of drought, while Table 14-3 describes the classification descriptions.

Table 14-2. 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 14-3. 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

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.

[2] Source: National Drought Mitigation Center

SECTION 14: DROUGHT

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

HISTORICAL OCCURRENCES

The Hardin County planning area may typically experience a severe drought. Table 14-4 lists historical events that have occurred in the Hardin County planning area as reported in the National Centers for Environmental Information (NCEI). Historical events are shown in Table 14-5. A total of 5 reported historical drought events, with 3 unique drought periods that have impacted the Hardin County planning area between 1996 through December 2021 (Summary Table 14-6).

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 for all participating jurisdictions in the Hardin County planning area are provided on a county-wide basis per the NCEI database.

Table 14-4. Historical Drought Years, 1996-2021[3]

DROUGHT YEAR
1996
1998
2000
3 unique events

Table 14-5. Historical Drought Events, 1996-2021

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Hardin County	5/1/1996	0	0	$0	$0
Hardin County	5/20/1998	0	0	$0	$0
Hardin County	6/1/1998	0	0	$0	$0
Hardin County	7/1/1998	0	0	$0	$0
Hardin County	2/1/2000	0	0	$0	$0
TOTALS		**0**	**0**	**$0**	**$0**

[3] Historical data is reported from January 1996 through December 2021.

Table 14-6. Historical Drought Events Summary, 1996-2021

JURISDICTION	NUMBER of EVENTS	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Hardin County	3	0	0	$0	$0

Based on the historical drought events for the Hardin County planning area, including all participating jurisdictions, none of the reported drought events have occurred since the 2017 Plan.

SIGNIFICANT EVENTS

January - May, 1996 – Hardin County

Rainfall totals from January through May averaged 10 to 15 inches below normal. The main areas affected include farming and fire protection. Crop damage in neighboring counties exceeded 1 million dollars. Drought conditions continue across southeast Texas through May.

May - July, 1998 – Hardin County

Drought conditions began by mid-May, as southeast Texans had gone over 6 weeks without any significant rainfall. By the end of May, many locations had seen less than 0.10 inches of rain for the month. This was the start of a significant impact on agriculture and forestry resources. A mild to moderate drought continued across southeast Texas in the month of June. Only 2 days provided any relief from the dry weather, June 5 and June 26, 1998. Many places recorded less than 2 inches of rain for the entire month of June. Crop losses continued to mount, primarily in the rice business, as well as forestry resources.

February, 2000 – Hardin County

The month of February was one of the 5 driest Februarys on record across southeast Texas. Less than 1 inch of rain fell across the entire region. The 2-month total for January and February 2000 was the second driest on record for the neighboring Beaumont/Port Arthur area, with less than 2.5 inches of rainfall.

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, there have been 3 extended time periods of drought (ranging in length from approximately 30 days to over 90 days) within a 26-year reporting period, which provides a probability of one event every five years. This frequency supports an “Occasional” probability of future events.

VULNERABILITY AND IMPACT

Loss estimates were based on 26 years of statistical data from the NCEI. 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. Table 14-7 shows annualized exposure.

Table 14-7. Potential Annualized Losses for Hardin County

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Hardin County	$0	$0

SECTION 14: DROUGHT

Drought impacts large areas and crosses jurisdictional boundaries. 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 and crop/livestock losses on agricultural lands and typically have no impact on buildings.

In terms of vulnerability, population, agriculture, property, socioeconomics, and environment are all vulnerable to drought in the Hardin County planning area, including all participating jurisdictions. Typical demand can deplete water 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, the ill, and those living below the poverty level. 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 the ill. Population over 65 in the Hardin County planning area is estimated at 16.9% of the total population, and children under the age of 5 are estimated at 6.4% or an estimated total of 13,365 potentially vulnerable residents in the planning area based on age. In addition, an estimated 12.0% of the planning area population live below the poverty level (Table 14-8) which may contribute to overall health impacts of a drought.

Table 14-8. Populations at Greater Risk by Jurisdiction

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION BELOW POVERTY LEVEL
Hardin County	9,681	3,684	6,883
City of Kountze	446	118	317
City of Lumberton	2,654	810	750
City of Rose Hill Acres	54	12	12
City of Silsbee	1,275	436	697
City of Sour Lake	296	272	313

The population 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 Hardin County planning area could be adversely affected by drought conditions, which could limit water supplies and present health threats. During summer drought, or hot and dry conditions, elderly persons, small children, infants and the chronically ill who do not have adequate cooling units in their homes may become more vulnerable to injury and/or death.

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 a number of years, the direct and indirect economic impact can be significant.

Habitat damage is a vulnerability of the environment during periods of drought for both aquatic and terrestrial species. The environment also becomes vulnerable during periods of extreme or prolonged drought due to severe erosion and land degradation.

Impact of droughts experienced in the Hardin County planning area, including all participating jurisdictions, has resulted in no injuries or fatalities supporting a “Limited” severity of impact 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. Annualized loss over the 26-year reporting period in Hardin County is considered negligible.

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: the 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 from Federal, State, and local agencies, as well as the general public. Table 14-9 lists the drought impacts to Hardin County from 2005 to 2021 based on reports received by the Drought Impact Reporter.

Table 14-9. Drought Impacts, 2005-2021

DROUGHT IMPACTS 2005-2021	
Agriculture	39
Business & Industry	2
Energy	1
Fire	13
Plants & Wildlife	22
Relief, Response & Restrictions	15
Society & Public Health	2
Tourism & Recreation	0
Water Supply & Quality	4

Drought has the potential to impact people in the Hardin 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. The impact of climate change could produce longer, more severe droughts, exacerbating the current drought impacts. Worsening drought conditions can be frequently associated with a variety of impacts, including:

- The number of health-related low-flow issues (e.g., diminished sewage flows, increased pollution concentrations, reduced firefighting capacity, and cross-connection contamination) will increase as the drought intensifies.
- Public safety from forest/range/wildfires will increase as water availability and/or pressure decreases.
- Respiratory ailments may increase as the air quality decreases.
- There may be an increase in disease due to wildlife concentrations (e.g., rabies, Rocky Mountain spotted fever, Lyme disease).
- Jurisdictions and residents may disagree 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.
- 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.
- 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.

SECTION 14: DROUGHT

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

SECTION 15: MITIGATION STRATEGY

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 2017 Plan Update. At the Mitigation Workshop in January 2022, Planning Team members reviewed the mitigation strategy from the previous 2017 Plan Update. The consensus among all members present was that the strategy developed for the 2017 Plan did not require changes, as it identified overall improvements to be sought in the Plan Update. However, the order and priority of the goals and objectives were reorganized.

GOAL 1

Protect public health and safety.

OBJECTIVE 1.1

Advise the public about health and safety precautions to guard against injury and loss of life from hazards.

OBJECTIVE 1.2

Maximize utilization of the latest technology to provide adequate warning, communication, and mitigation of hazard events.

OBJECTIVE 1.3

Reduce the danger to, and enhance protection of, high risk areas during hazard events.

OBJECTIVE 1.4

Protect critical facilities and services.

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.

SECTION 16: PREVIOUS ACTIONS

SUMMARY

Planning Team members were given copies of the previous mitigation actions submitted in the 2017 Plan at the mitigation workshop. Participating jurisdictions within Hardin County 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 2017 Plan are included in this section as they were written in 2017, with the exception of the "2022 Analysis" section.

HARDIN COUNTY – COUNTY-WIDE ACTIONS

	Hardin County (County-Wide) –Action #1
Proposed Action:	Voluntary acquisition of Repetitive Loss and flood prone properties throughout Hardin County and all jurisdictions. Assist relocation to safer locations within the County.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Low lying repetitive loss and flood prone properties throughout the county and all jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improve public safety, reduce flood losses, reduce demand for emergency services, improve floodplain functions and water quality, and improve floodplain ordinance compliance.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane
Effect on New/Existing Buildings:	Eliminate risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000,000 - $4,000,000
Potential Funding Sources:	FMA, RFC, SRL, PDM, HMGP, GLO
Lead Agency/Department Responsible:	County and City Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Comprehensive Plan

2022 ANALYSIS
Defer to Plan Update.

	Hardin County (County-wide) – Action #2
Proposed Action:	Upgrade storm water capacity throughout the county and local jurisdictions. Actions include but are not limited to installing/upgrading culverts and headwalls, and enlarging storm water ditches and canals.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide including all jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improved water outflow capacity to prevent/reduce impacts of flash flooding, rising water, etc. Reduction of damage to new and existing buildings.
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, Hurricane, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk of damage to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$8,000,000 - $16,000,000
Potential Funding Sources:	PDM, HMGP, TWDB, GLO, other grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Drainage Plan

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

	Hardin County (County-wide) – Action #3
Proposed Action:	Elevate existing roadways and bridges prone to inundation from flooding. Projects can include general road elevation; installing, upsizing culverts and headwalls; and bridge upgrades.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Various locations throughout Hardin County and all jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improve public safety; facilitate evacuation and emergency response; and reduce infrastructure damage.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000 - $10,000,000
Potential Funding Sources:	PDM, HMGP, GLO, Highway Departments, other
Lead Agency/Department Responsible:	Hardin County Public Works, Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Drainage Plan

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

	Hardin County (County-wide) – Action #4
Proposed Action:	Provide educational brochures and make presentations to the general public and schools regarding mitigation measures for the general public, commercial businesses, and industry. Provide educational materials and presentations to increase awareness and educate citizens on mitigation techniques, emergency preparedness, evacuation routes, and other hazard information as appropriate**.**
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide including all jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improve public education and individual preparedness which will in turn reduce need for some emergency services.
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, Hurricane, Wildfire, Winter Storm, Tornado, Extreme Heat, Drought, Hail, Lightning, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000 - $50,000
Potential Funding Sources:	PDM, HMGP, GLO, other grants
Lead Agency/Department Responsible:	County and City Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

	Hardin County (County-wide) – Action #5
Proposed Action:	Relocate utility lines for existing buildings underground to mitigate hazard impacts and prevent loss of function. Require power lines to be buried for future development projects.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide including all jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Maintain electrical service during storms; decrease utility and public services restoration time and expense.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane, Wildfire, Winter Storm, Tornado, Hail, Lightning, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing and new structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000 - $4,000,000
Potential Funding Sources:	HMGP, PDM, operating budgets, utility fees
Lead Agency/Department Responsible:	County and City Public Works, Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Comprehensive Plan, Local Ordinances

2022 ANALYSIS
Defer to Plan Update. Cost estimate needs to be updated to $5,000,000-$10,000,000.

SECTION 16: PREVIOUS ACTIONS

	Hardin County (County-wide) – Action #6
Proposed Action:	Construct water retention ponds to collect storm water run-off, reduce flooding and use as an alternate water source throughout Hardin County.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Locations TBD throughout Hardin County and all participating jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Prevent flooding damage to homes, improve water storage capacity for times of drought and fighting wildfires.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Flood, Hurricane, Wildfire
Effect on New/Existing Buildings:	Reduce damages to existing and new structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $2,000,000
Potential Funding Sources:	Operating budgets, local funding, PDM, HMGP
Lead Agency/Department Responsible:	County and City Public Works, Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Master Drainage Plan, Water Plan

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

	Hardin County (County-wide) – Action #7
Proposed Action:	Install frangible links/break away connections on utility poles to maintain utility operation during and after a hazard event.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Hardin County and all jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Maintain electrical service during storms, decrease utility and public services restoration time and expense.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane, Tornado, Thunderstorm Wind, Hail, Lightning, Winter Storm
Effect on New/Existing Buildings:	Reduce damages to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000 - $3,000,000
Potential Funding Sources:	Operating budgets, local funding, PDM, HMGP
Lead Agency/Department Responsible:	County and City Public Works, Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Comprehensive Plan

2022 ANALYSIS
Defer to Plan Update. Cost estimate needs to be updated to $4,000,000-$7,000,000.

SECTION 16: PREVIOUS ACTIONS

	Hardin County (County-wide) – Action #8
Proposed Action:	Identify and pursue mitigation activities that would assist in efficient evacuations throughout the county including but not limited to improved signage, widening roads and bridges, traffic monitoring systems, and improved road connectivity.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Hardin County and all jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Make evacuation process more efficient and safer.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Flood, Wildfire
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $3,500,000
Potential Funding Sources:	PDM, HMGP
Lead Agency/Department Responsible:	County and City Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Evacuation Plan

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

	Hardin County (County-wide) – Action #9
Proposed Action:	Install signage to notify public when Burn Ban is activated. Improve enforcement through education and coordination.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Hardin County and all jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improve public education and compliance with Burn Ban to reduce wildfires.
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:	Wildfire, Drought
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000 - $90,000
Potential Funding Sources:	HMGP, PDM, local budgets, TFS grants
Lead Agency/Department Responsible:	County and City Fire Departments, Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Community Wildfire Protection Plans

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

Hardin County (County-wide) – Action #10	
Proposed Action:	Conduct tree pruning initiative along power lines. Hardin County will work closely with local energy companies to develop a realistic schedule for tree pruning along electrical power lines.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide, including all jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce power outage and road closure due to downed trees during and after storms; improve emergency response and first responder safety.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Hail, Lightning, Hurricane, Tornado
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$600,000 - $800,000
Potential Funding Sources:	Operating budgets, utility fees
Lead Agency/Department Responsible:	County and City Public Works, Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Completed and Defer to Plan Update as this is a reoccurring issue. Cost estimate needs to be updated to $1,000,000-$2,500,000.

SECTION 16: PREVIOUS ACTIONS

	Hardin County (County-wide) – Action #11
Proposed Action:	Elevate flood prone homes including electrical systems to a minimum of 1' above Base Flood Elevation.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Hardin County homes located near Rivers, Bayous, Canals, and Creeks, or other low lying areas subject to rising water and flooding. Local jurisdiction flood prone or repetitive loss properties.
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Mitigate flood damage; improve compliance with floodplain ordinance.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000
Potential Funding Sources:	HMGP, PDM, GLO, local funding
Lead Agency/Department Responsible:	County and City Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Comprehensive Plan

2022 ANALYSIS
Defer to Plan Update. Cost estimate needs to be updated to $10,000,000.

SECTION 16: PREVIOUS ACTIONS

	Hardin County (County-wide) – Action #12
Proposed Action:	Educate homeowners and builders on the importance of maintaining defensible space surrounding structures to prevent damage.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide, including all jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce wildfire and drought damage; improve individual participation in wildfire mitigation; improve safety through site design for future development; and reduce water use for firefighting.
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:	Wildfire, Drought
Effect on New/Existing Buildings:	Mitigate residential and property losses, existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000 - $3,000,000
Potential Funding Sources:	Operating budgets, local funding, PDM, HMGP, TFS grants
Lead Agency/Department Responsible:	County and City Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Community Wildfire Protection Plan

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

	Hardin County (County-wide) – Action #13
Proposed Action:	Construct/install safe shelters in public buildings capable of providing protection from severe tornados, extreme straight line winds in accordance with FEMA Publication 320 and/or National Performance Criteria for Tornado Shelters specifications.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Hardin County, including all jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improve public safety; life safety benefits.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Wind, Hurricane
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000 - $80,000
Potential Funding Sources:	PDM, HMGP, GLO
Lead Agency/Department Responsible:	County and City Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update. Cost estimate needs to be updated to $250,000-$1,000,000.

SECTION 16: PREVIOUS ACTIONS

	Hardin County (County-wide) – Action #14
Proposed Action:	Develop incentives and provide instruction for homeowners to construct/install residential safe shelters capable of providing protection from severe tornados, extreme straight winds in accordance with FEMA Publication 320 and/or National Performance Criteria for Tornado Shelters specifications.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide, including all jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improved public safety; life safety benefits.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Thunderstorm Wind, Tornado
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000 - $200,000
Potential Funding Sources:	HMGP, PDM, GLO, local funding
Lead Agency/Department Responsible:	County and City Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

	Hardin County (County-wide) – Action #15
Proposed Action:	Develop water conservation strategies and/or ordinances for implementation during times of drought.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide, including all jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improve public cooperation during water shortages; ensure that water sources are not completely depleted in times of drought; and that the county has adequate water supplies.
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):	High
Estimated Cost:	$50,000 - $80,000
Potential Funding Sources:	Operating budgets, local funding, PDM, HMGP
Lead Agency/Department Responsible:	County and City Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Local Ordinances

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

	Hardin County (County-wide) – Action #16
Proposed Action:	Retrofit existing structures to act as cooling/warming stations in times of extreme heat and extreme cold.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide, including all jurisdictions – locations TBD
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improved health and safety of general population and special needs populations.
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, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$60,000 - $80,000
Potential Funding Sources:	Operating budgets, local funding, PDM, HMGP
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 24-36 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Response Plan

2022 ANALYSIS
Defer to Plan Update. Cost estimate needs to be updated to $100,000-$1,000,000

SECTION 16: PREVIOUS ACTIONS

	Hardin County (County-wide) – Action #17
Proposed Action:	Institute policy of considering drought tolerant landscaping at the design stage for future public development.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide, including all jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce water use.
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):	Moderate
Estimated Cost:	$2,000 - $5,000
Potential Funding Sources:	TFS, HMGP, PDM, other grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 24-36 months of plan adoption pending available funding
Incorporation into Existing Plans:	Local Ordinance

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

	Hardin County (County-wide) – Action #18
Proposed Action:	Develop and implement a public education program to educate residents of the risk of dam failure, actions to reduce risk, and evacuation routes and procedures for residents downstream of the Sam Rayburn Dam and the Toleda Bend Dam in the event of a dam failure.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide, including all jurisdictions
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce loss of life
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:	Prevent or minimize flood damage to structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,000 - $5,000
Potential Funding Sources:	HMGP, PDM, other grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 24-36 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update.

		Hardin County (County-wide) –Action #19
	Proposed Action:	Retrofit new or existing county critical facilities (Courthouse Annex, EOC, government buildings, and others) as needed, including but not limited to installation of the following features for severe storm protection: storm shutters or tinted shatter-resistant laminate film for windows; roof straps and strengthening for high wind load; roll-up door reinforcement (i.e. fire stations); non-permeable exterior walls, door seals and flood-proofing measures; alternate power supply (generators) with permanent hook-ups; fold down alternate site antennas; security cameras; electrical surge protection; secured data back- up systems and critical equipment, as a measure to mitigate or prevent storm damage.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Critical facilities in and throughout Hardin County and all jurisdictions
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Continuity of county government during and after a storm event; damage prevention.
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Tornado, Thunderstorm Wind, Flood, Winter Storm, Wildfire, Lightning, Extreme Heat, Hail
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,500,000 - $3,500,000
Potential Funding Sources:	HMGP, PDM, GLO, Texas Safe Shelter Initiative, TWDB, other grants sources available
Lead Agency/Department Responsible:	County and City Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Mitigation Action Plan, Comprehensive Plan

2022 ANALYSIS
Defer to Plan Update.

HARDIN COUNTY

	Hardin County – Action #1
Proposed Action:	Seek funding and construct centralized shelter(s) of last resort within the county that is elevated out of the flood prone area and designed for appropriate wind load, in coordination with the Texas Safe Shelter Initiative.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Location TBD – Hardin County
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Public safety and protection for special needs populations and first responders.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Tornado
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000 - $10,000,000
Potential Funding Sources:	HMGP, PDM, GLO, TWBD, Texas Safe Shelter Initiative Program, other grants available
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Mitigation Action Plan, Emergency Response Plan

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

		Hardin County – Action #2
	Proposed Action:	Rectify and enlarge main outfall channels for the Pinewood subdivision including excavating interior roadside ditches and driveway culvert system.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Pinewood subdivision including adjacent and interior roadside ditches and driveway culvert system
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Flood damage mitigation – mitigation needed for 10 separate outfalls draining three interior sections of Pinewood, Sections 1, 2, and 3, to reduce/eliminate future flood damage to flood prone structures including 9 repetitive loss properties within WCID#1 district boundaries.
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000 - $3,000,000
Potential Funding Sources:	Operating budgets, PDM, HMGP, other grants
Lead Agency/Department Responsible:	Hardin County Public Works, Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Drainage Plan

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

		Hardin County – Action #3
	Proposed Action:	Install alternate power supply (possibly generators) within permanent hook-ups in existing and future county buildings.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Government and Critical Infrastructure Buildings
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Continuity of county government.
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Flood, Thunderstorm Wind, Extreme Heat, Hail, Lightning, Tornado, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,500,000
Potential Funding Sources:	Operating budgets, local funding, HMGP, PDM
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update.

	Hardin County – Action #4
Proposed Action:	Drainage improvement and storm water conveyance project for Coon Marsh Gulley. Five stage project for building damage prevention consists of the following: • Excavate approximately 4,800 feet of Coon Marsh Gulley Diversion Ditch channel; line bottom with concrete; and install erosion control. • Excavate approximately 1,500 feet of Coon Marsh Gulley Diversion Ditch channel from diversion ditch to Hardin County WCID#1 south boundary line; install concrete lining along bottom sides, and install wing walls at the Pinewood Blvd. Bridge; and install erosion control. • Excavate approximately 5,000 feet of Coon Marsh Gulley channel through Countrywood from the south boundary of the Hardin County WCID#1 to Bonura Road; install box culverts and wing walls at Bonura Road crossing; and install erosion control. • Excavate channel and floodway upstream and downstream from Little Pine Island Bridge at Woodway Blvd. • Replace Pines Shadows Bridge of Clemmons Gulley.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Coon Marsh Gulley – as indicated above
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce flooding risk to structures and infrastructure in Hardin County.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$4,000,000
Potential Funding Sources:	HMGP, GLO, PDM, other grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

SECTION 16: PREVIOUS ACTIONS

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

		Hardin County – Action #5
	Proposed Action:	Form a Drainage District to construct and maintain drainage projects and oversee structural and regulatory storm water mitigation for new and future development.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Water outflow capacity from all over the county and industrial complexes
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improved floodwater or rising water outflow capacity from county and industrial complexes to reduce/ prevent impacts of flooding, storm surge, and flash flood.
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000,000
Potential Funding Sources:	PDM, HMGP, operating budgets, local funding
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Comprehensive Plan

2022 ANALYSIS
Defer to Plan Update. Cost estimate needs to be updated to $10,000,000.

SECTION 16: PREVIOUS ACTIONS

	Hardin County – Action #6
Proposed Action:	Widen and reinforce critical bridges in Hardin County to assist evacuation.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide critical bridges
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improve citizen and transportation safety; facilitate evacuation and emergency response.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane, Wildfire
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000 - $10,000,000
Potential Funding Sources:	Operating budgets, HMGP, GLO, PDM
Lead Agency/Department Responsible:	Hardin County Public Works, Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Comprehensive Plan

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

	Hardin County – Action #7
Proposed Action:	Expand and maintain training opportunities for first responders.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improve knowledge and coordination of emergency responders.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Education and Awareness - Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane, Wildfire, Winter Storm, Tornado, Extreme Heat, Drought, Hail, Lightning, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$20,000 - $30,000
Potential Funding Sources:	PDM, HMGP, GLO, other grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 24-36 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

		Hardin County – Action #8
	Proposed Action:	Continue participation in the National Flood Insurance Program (NFIP) and participate in the Community Rating System (CRS). Activities may include: improvement of flood mapping and elevation data, mitigation for repetitive loss properties, instituting higher regulatory standards for future floodplain development, storm water management plans, and standards for future development to control runoff.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Maintain NFIP compliance and benefits, mitigate flooding, and reduce cost of flood insurance.
	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
Priority (High, Moderate, Low):	High
Estimated Cost:	Minimal – Staff Time
Potential Funding Sources:	Operating budget
Lead Agency/Department Responsible:	Hardin County Floodplain Management
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Floodplain Management Plan, Floodplain

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

	Hardin County – Action #9
Proposed Action:	Develop-upgrade contact information database for first responders, volunteers, special needs, and medical special needs populations.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce loss of life; safety and protection for all of the population.
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, Hurricane, Extreme Heat, Winter Storm, Hail, Lightning, Thunderstorm Wind, Wildfire
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000
Potential Funding Sources:	HMGP, GLO, PDM, local funding
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Response Plan

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

		Hardin County – Action #10
	Proposed Action:	Educate the public on issues related to the inappropriate discharge of hazardous materials and wastewater in the environment and the impacts it has on the waterways.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Appropriate training facilities, school distribution (handouts and brochures), website and media outlets
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improved public health and safety; environmental and recreational benefits.
	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:	Hazardous Materials
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$100,000
Potential Funding Sources:	CIAP, PDM, HMGP, other grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 24-36 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

		Hardin County – Action #11
	Proposed Action:	Develop inventory of pipelines that are buried too shallow for safety and that do not meet modern standards.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Mitigate or help prevent unnecessary rupture of pipelines; enhanced risk assessment.
	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:	Hazardous Materials
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$25,000 - $45,000
Potential Funding Sources:	HMGP, PDM, other grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 24-36 months of plan adoption pending available funding
Incorporation into Existing Plans:	Local Emergency Plans

2022 ANALYSIS
Defer to Plan Update.

	Hardin County – Action #12
Proposed Action:	Develop local requirements for mobile home tie-down and anchoring systems, and build capacity to conduct periodic inspections.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Unincorporated areas of Hardin County
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improved public safety.
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:	Tornado, Thunderstorm Wind, Hurricane
Effect on New/Existing Buildings:	Reduce risk to existing and new structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$40,000 - $60,000/year
Potential Funding Sources:	PDM, HMGP, CDBG, TWDB, other grants
Lead Agency/Department Responsible:	Hardin County OEM, Hardin County Floodplain Office
Implementation Schedule:	Within 24-36 months of plan adoption pending available funding
Incorporation into Existing Plans:	Local Ordinances

2022 ANALYSIS
Defer to Plan Update.

CITY OF KOUNTZE

	City of Kountze – Action #1
Proposed Action:	Seek funding and construct centralized shelters of last resort within the City of Kountze that are elevated out of the flood prone area and designed for appropriate wind load in coordination with the Texas Safe Shelter Initiative.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Locations TBD in City of Kountze
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce risk to residents; reduce on-going repair cost; continue essential utility services during severe weather event; and reduce disaster response time. Public safety and protection for special needs populations.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Thunderstorm Wind, Tornado, Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000
Potential Funding Sources:	HMGP, TDEM, local operating budgets
Lead Agency/Department Responsible:	City of Kountze OEM / Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update. The Lead Agency and Department Responsible needs to be updated to reflect City of Kountze and Kountze Emergency Management, respectively. The budget for this mitigation action item may possibly need a revision based on if and when the project is approved.

	City of Kountze – Action #2
Proposed Action:	Retrofit city critical facilities as needed including but not limited to installation of the following features for severe storm protection: storm shutters or tinted shatter-resistant laminate film for windows; roof straps and strengthening for high wind load; roll-up door reinforcement (fire stations); non-permeable exterior walls, door seals and flood-proofing measures; alternate power supply (generators) with permanent hook-ups; fold down alternate site antennas; security cameras; electrical surge protection; secure data back-up systems and critical equipment.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide critical facilities
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)* **:**	Reduce damages to critical facilities and ensure continuity of critical services.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Thunderstorm Wind, Tornado, Flood, Winter Storm, Wildfire, Extreme Heat, Hail, Lightning
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,500,000
Potential Funding Sources:	HMGP, local operating budgets, PDM
Lead Agency/Department Responsible:	City of Kountze OEM / Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update. The Lead Agency and Department Responsible needs to be updated to reflect City of Kountze and Kountze Emergency Management, respectively. The budget for this mitigation action item may possibly need a revision based on if and when the project is approved.

	City of Kountze – Action #3
Proposed Action:	Voluntary acquisition of Repetitive Loss and flood prone properties in the City of Kountze. Assist relocation to safer locations within the city. Property acquired will remain as open space for perpetuity and used for the benefit of the community.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide flood prone structures
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Eliminate damages to repetitive loss structures; reduce emergency response burden.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Flood
Effect on New/Existing Buildings:	Eliminate risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000
Potential Funding Sources:	HMGP, PDM, FMA
Lead Agency/Department Responsible:	City of Kountze OEM / Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Comprehensive Plan

2022 ANALYSIS
Defer to Plan Update. The Lead Agency and Department Responsible needs to be updated to reflect City of Kountze and Kountze Emergency Management, respectively. The budget for this mitigation action item may possibly need a revision based on if and when the project is approved.

	City of Kountze – Action #4
Proposed Action:	Upgrade storm water capacity throughout the City of Kountze. Actions include but are not limited to installing/upgrading culverts and headwalls, enlarging storm water ditches and canals.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce flood damages to structures and infrastructure due to undersized or inadequate storm water drainage.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

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:	$1,000,000 - $3,000,000
Potential Funding Sources:	HMGP, PDM, local operating budgets
Lead Agency/Department Responsible:	City of Kountze OEM / Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Drainage Plan

2022 ANALYSIS
Defer to Plan Update. The Lead Agency and Department Responsible needs to be updated to reflect City of Kountze and Kountze Emergency Management, respectively. The budget for this mitigation action item may possibly need a revision based on if and when the project is approved.

	City of Kountze – Action #5
Proposed Action:	Elevate roadways and bridges prone to inundation from flooding. Projects can include general road elevation; installing, upsizing culverts and headwalls; and bridge upgrades**.**
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce risk to residents; reduce on-going repair cost; continue essential utility services during severe weather events; 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 Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$600,000 - $2,000,000
Potential Funding Sources:	HMGP, PDM, local operating budget
Lead Agency/Department Responsible:	City of Kountze OEM / Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Drainage Plan

2022 ANALYSIS
Defer to Plan Update. The Lead Agency and Department Responsible needs to be updated to reflect City of Kountze and Kountze Emergency Management, respectively. The budget for this mitigation action item may possibly need a revision based on if and when the project is approved.

	City of Kountze – Action #6
Proposed Action:	Construct/install safe shelters in city critical facilities and fire department buildings, providing protection from severe tornados, and/or extreme straight line winds in accordance with FEMA publication 320 and/or National Performance Criteria for tornado shelters specification.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Kountze – Critical Facilities
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce risk to structures and provide protection for first responders and emergency personnel.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Thunderstorm Wind, Tornado
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000 - $80,000 per shelter
Potential Funding Sources:	HMGP, PDM
Lead Agency/Department Responsible:	City of Kountze OEM / Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update. The Lead Agency and Department Responsible needs to be updated to reflect City of Kountze and Kountze Emergency Management, respectively. The budget for this mitigation action item may possibly need a revision based on if and when the project is approved.

SECTION 16: PREVIOUS ACTIONS

	City of Kountze – Action #7
Proposed Action:	Continue participation in the National Flood Insurance Program (NFIP) and participate in the Community Rating System (CRS). Activities may include: improvement of flood mapping and elevation data, mitigation for repetitive loss properties, instituting higher regulatory standards for future floodplain development, storm water management plans and standards for future development to control runoff.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce risk to residents; reduce on-going repair costs due to flooding; reduce insurance premiums.
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
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000 - $10,000
Potential Funding Sources:	Local operating budgets
Lead Agency/Department Responsible:	City of Kountze OEM / Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Floodplain Management Plan, Floodplain

2022 ANALYSIS
Defer to Plan Update. The Lead Agency and Department Responsible needs to be updated to reflect City of Kountze and Kountze Emergency Management, respectively. The budget for this mitigation action item may possibly need a revision based on if and when the project is approved.

	City of Kountze – Action #8
Proposed Action:	Develop-upgrade contact information database for first responders and special needs populations with emphasis on populations exceptionally vulnerable in the event of long-term power outages.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce risk to vulnerable populations through early identification and preparedness.
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:	Hurricane, Thunderstorm Wind, Tornado, Flood, Wildfire, Extreme Heat, Winter Storm, Hail, Lightning
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,000 - $10,000
Potential Funding Sources:	Local operating budget
Lead Agency/Department Responsible:	City of Kountze OEM / Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Response Plan

2022 ANALYSIS
Defer to Plan Update. The Lead Agency and Department Responsible needs to be updated to reflect City of Kountze and Kountze Emergency Management, respectively. The budget for this mitigation action item may possibly need a revision based on if and when the project is approved.

	City of Kountze – Action #9
Proposed Action:	Retrofit existing structures such as social service agencies to act as cooling stations in times of extreme heat. Educate public on locations and availability of cooling centers.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Kountze – locations TBD
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce risk to residents during extreme heat events.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$60,000 - $80,000
Potential Funding Sources:	Local operating budgets, PDM, HMGP
Lead Agency/Department Responsible:	City of Kountze OEM / Public Works
Implementation Schedule:	Within 24-36 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update. The Lead Agency and Department Responsible needs to be updated to reflect City of Kountze and Kountze Emergency Management, respectively. The budget for this mitigation action item may possibly need a revision based on if and when the project is approved.

CITY OF LUMBERTON

	City of Lumberton – Action #1
Proposed Action:	Voluntary acquisition of Repetitive Loss and flood prone properties in the City of Lumberton. Assist relocation to safer locations within the city. Property acquired will remain as open space for perpetuity and used for the benefit of the community.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Lumberton
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improve public safety; reduce flood loss; reduce demand for emergency services; improve floodplain functions and water quality; improve floodplain ordinance compliance.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane
Effect on New/Existing Buildings:	Eliminate risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,500,000 - $3,000,000 – TBD per structure
Potential Funding Sources:	FMA, PDM, HMGP
Lead Agency/Department Responsible:	City of Lumberton City Administration
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Comprehensive Plan

2022 ANALYSIS
Defer to Plan Update. Ongoing project. Some properties have been bought out since Hurricane Rita. Update Department Responsible to also include Hardin County. Update Implementation schedule to 1-5 years.

	City of Lumberton – Action #2
Proposed Action:	Retrofit any and all government and/or city critical facilities as needed including but not limited to installation of the following features for severe storm protection: storm shutters or tinted shatter-resistant laminate film for windows; roof straps and strengthening for high wind load; roll-up door reinforcement (i.e. fire stations); non-permeable exterior walls, door seals and flood-proofing measures; alternate power supply (generators) with permanent hook-ups; fold down alternate site antennas; security cameras; electrical surge protection; secure data back- up systems and critical equipment.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Lumberton
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improve Public Safety.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Tornado, Thunderstorm Wind, Flood, Winter Storm, Wildfire, Lightning, Extreme Heat, Hail
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,200,000 - $1,500,000
Potential Funding Sources:	PDM, HMGP operating budgets, local funding
Lead Agency/Department Responsible:	City of Lumberton Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update. Update Department Responsible to include City of Lumberton's Office of Emergency Management.

	City of Lumberton – Action #3
Proposed Action:	Construct water retention ponds to collect storm water run-off, reduce flooding and use as an alternate water source throughout Lumberton.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Lumberton
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improve Public Safety; prevent flooding damage to new and existing homes; improve water storage for times of drought and fighting wildfires.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane, Wildfire, Drought
Effect on New/Existing Buildings:	Reduce damages to existing and new structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,500,000
Potential Funding Sources:	PDM, HMGP, operating budgets, local funding
Lead Agency/Department Responsible:	City of Lumberton Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Master Drainage Plan, Water Plan

2022 ANALYSIS
Defer to Plan Update. In progress, detention pond at HWY FM 421. Update funding source to include grant funding; City has received fund from FEMA for project. Update cost to $8-10 million.

SECTION 16: PREVIOUS ACTIONS

	City of Lumberton – Action #4
Proposed Action:	Upgrade storm water capacity throughout the City of Lumberton. Actions include but are not limited to installing/upgrading culverts and headwalls, excavating and enlarging storm water ditches and canals.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Various locations throughout City of Lumberton
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improved floodwater outflow capacity from city centers and industrial complexes is needed to reduce/ prevent impacts of flash flooding.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000 - $3,000,000
Potential Funding Sources:	PDM, HMGP, operating budgets, local funding
Lead Agency/Department Responsible:	City of Lumberton Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Drainage Plan

2022 ANALYSIS
Defer to Plan Update. Continuing to address drainage improvements throughout the City.

	City of Lumberton – Action #5
Proposed Action:	Elevate roadways and bridges prone to inundation from flooding. Projects can include general road elevation; installing, upsizing culverts and headwalls; and bridge upgrades.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Lumberton
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improve public safety; facilitate evacuation and emergency response; reduce flood damages to infrastructure and surrounding structures.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

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:	$800,000 - $4,000,000
Potential Funding Sources:	PDM, HMGP, GLO
Lead Agency/Department Responsible:	City of Lumberton Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Drainage Plan

2022 ANALYSIS
Complete and Defer to Plan Update. Completed at Taft Rd and Brushy Creek subdivision, however need to revise due to fault road work.

	City of Lumberton – Action #6
Proposed Action:	Install frangible links/break away connections on utility poles in the City to maintain utility operation during and after a hazard event.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Lumberton
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Maintain electrical service during storms.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane, Tornado, Thunderstorm, Hail, Lightning, Winter Storm
Effect on New/Existing Buildings:	Reduce damages to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$200,000 - $400,000
Potential Funding Sources:	Operating budgets, local funding, PDM, HMGP,
Lead Agency/Department Responsible:	City of Lumberton Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Comprehensive Plan

2022 ANALYSIS
Defer to Plan Update.

	City of Lumberton – Action #7
Proposed Action:	Construct/install safe shelters in City buildings capable of providing protection from severe tornados, and/or extreme straight line winds in accordance with FEMA Publication 320 and/or National Performance Criteria for Tornado Shelters specifications.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Lumberton
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improved public safety.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Thunderstorm Wind, Tornado
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000 - $80,000 per shelter
Potential Funding Sources:	PDM, HMGP
Lead Agency/Department Responsible:	City of Lumberton City Administration
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update. Currently in designing a facility “Lumberton Event Center” that would offer shelter. Update location to 836 North Main St. Update funding source to State of Texas Grant, Economic Development, and Surcharge/Tax. Update cost to $1.6 million.

	City of Lumberton – Action #8
Proposed Action:	Retrofit existing structures such as social service agencies to act as cooling/warming stations in times of extreme heat and extreme cold.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Lumberton
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improved health and safety of general population and special needs population.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$60,000 - $80,000
Potential Funding Sources:	Operating budgets, local funding, PDM, HMGP
Lead Agency/Department Responsible:	City of Lumberton City Administration
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Response Plan

2022 ANALYSIS
Completed and Defer to Plan Update. Reported that 3 critical facilities (City Hall, Police Department/Municipal Court, and Senior Center) all have generators. Would need to explore other critical structures. SOW for Lumberton Event Center has generator listed.

	City of Lumberton – Action #9
Proposed Action:	Identify and pursue mitigation activities that would assist efficient evacuations through the City including but not limited to improved signage, widening roads and bridges, traffic monitoring systems, improved road connectivity, etc.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Lumberton
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Make evacuation process more efficient and safer; life safety benefits of improved evacuation routes and procedures.
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:	Hurricane
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,500,000
Potential Funding Sources:	PDM, HMGP
Lead Agency/Department Responsible:	City of Lumberton Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Completed and Defer to Plan Update. This is an annual action that maintenance department attends to. Update department responsible to also include Lumberton Maintenance Department. Update implementation schedule to annual. Explore possibly adjusting estimate cost figure. Potential funding source updated to include Maintenance Department budget.

	City of Lumberton – Action #10
Proposed Action:	Continue participation in the National Flood Insurance Program (NFIP) and participate in the Community Rating System (CRS). Activities may include: improvement of flood mapping and elevation data, mitigation for repetitive loss properties, instituting higher regulatory standards for future floodplain development, storm water management plans and standards for future development to control runoff.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Lumberton
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Maintain NFIP compliance; reduce cost of flood insurance; mitigate flood damages.
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
Priority (High, Moderate, Low):	High
Estimated Cost:	Minimal – Staff Time
Potential Funding Sources:	PDM, HMGP
Lead Agency/Department Responsible:	City of Lumberton Floodplain Management
Implementation Schedule:	Within 12 months of plan adoption pending available funding
Incorporation into Existing Plans:	Floodplain Management Plan, Floodplain

2022 ANALYSIS
Completed and Defer to Plan Update. Update to department responsible to include Hardin County.

CITY OF ROSE HILL ACRES

		City of Rose Hill Acres – Action #1
	Proposed Action:	Upgrade storm water capacity and drainage throughout the Town of Rose Hill Acres. Actions include but are not limited to installing/upgrading culverts and headwalls, excavating new and/or enlarging storm water ditches and canals.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Town of Rose Hill Acres, all easements diverting drainage from municipal out flows to Boggy Creek and Pine Island Bayou.
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improved floodwater outflow capacity from town centers and industrial complexes is needed to reduce/ prevent impacts of flash flooding; reduce risk to residents from standing water, i.e. mosquito born disease, virus, etc.
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing and future structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000 - $1,500,000
Potential Funding Sources:	PDM, HMGP, operating budgets, local funding
Lead Agency/Department Responsible:	City of Rose Hill Acres Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Flood Management Plan, Drainage Plan

2022 ANALYSIS
Defer to Plan Update. Update Hazards Addressed needs to be updated to include Hurricane and Thunderstorm. Lead agency updated to reflect Coordinating Agency Town Hall, Public Works, Floodplain Administrator, in coordination with the County. Implementation schedule updated to 2-5 years, and lastly, include Zoning Ordinances within Existing Plans.

		City of Rose Hill Acres – Action #2
	Proposed Action:	Retrofit town critical facilities as needed including but not limited to installation of the following features for severe storm protection: storm shutters or tinted shatter-resistant laminate film for windows; roof straps and strengthening for high wind load; roll-up door reinforcement (i.e. fire stations); non-permeable exterior walls, door seals and flood proofing measures; alternate power supply (generators) with permanent hook-ups; fold down alternate site antennas; security cameras; electrical surge protection; hail and fire resistant roofing material; secure data back-up systems and critical equipment.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Town Hall and supporting critical facilities
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Rehabilitation of incident; monitoring before, during, and post event allowing for onsite operations protecting life and property; providing for communications and emergency assistance; maintain continuity of Municipal government during and after a storm event; damage prevention and IC Operations.
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Tornado, Flood, Thunderstorm Wind, Winter Storm, Wildfire, Lightning, Extreme Heat
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$400,000 - $500,000
Potential Funding Sources:	PDM, HMGP, operating budgets, local funding
Lead Agency/Department Responsible:	City of Rose Hill Acres Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update. Updated action description to state “Retrofit city critical facilities as needed including but not limited to installation of the following features for severe storm protection: storm shutters or tinted shatter-resistant laminate film for windows; roof straps and strengthening for high wind load; roll-up door reinforcement (i.e. fire stations); non-permeable exterior walls, door seals and flood-proofing measures; alternate power supply (generators); fold down alternate site antennas; security cameras; electrical surge protection; secure data back-up systems and critical equipment.” Update hazards addressed to only represent Wind Storm, Hurricane, Tornado, Floods. Lead agency updated to reflect Coordinating Agency City Hall, Public Works Implementation schedule to reflect 1-5 years.

SECTION 16: PREVIOUS ACTIONS

	City of Rose Hill Acres – Action #3
Proposed Action:	Install box culvert, concrete pipe, or similar mechanism as needed to mitigate inadequate drainage and improve storm water capacity and conveyance.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Town of Rose Hill Acres bridge and roads
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce flooding damage to structures and infrastructure and road inundation.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Thunderstorm Wind, Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$200,000 - $400,000
Potential Funding Sources:	Operating budget, local funding, PDM, HMGP
Lead Agency/Department Responsible:	City of Rose Hill Acres Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Drainage Plan

2022 ANALYSIS
Defer to Plan Update. Update hazards address to reflect Wind Storm, Hurricane, followed by rain event, Floods. Lead agency updated to reflect Coordinating Agency City Hall, Public Works Implementation schedule to reflect 1-3 years.

SECTION 16: PREVIOUS ACTIONS

	City of Rose Hill Acres – Action #4
Proposed Action:	Pursue the coordination, construction, expansion, and maintenance of flood control structures (barriers, berms) for the purpose of protecting critical facilities, potable water sources, and agricultural resources from water contamination and salt water intrusion.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Municipal pumping stations, floodways, critical facilities
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Protect critical facilities, potable water sources, and agricultural resources from water contamination and salt water intrusion.
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:	Hurricane, Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000 - $3,000,000
Potential Funding Sources:	Operating budgets, local funding, PDM, HMGP
Lead Agency/Department Responsible:	City of Rose Hill Acres Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Drainage Plan

2022 ANALYSIS
Defer to Plan Update. Update hazards address to reflect Wind Storm, Hurricane, followed by rain event, Floods. Lead agency updated to reflect Coordinating Agency WCID#1, Public Works, City Hall, HC OEM. Implementation schedule to reflect 1-3 years. Existing plans updated to reflect: Flood Management, administration and Emergency Management Plan.

	City of Rose Hill Acres – Action #5
Proposed Action:	Rectify and enlarge main outfall channels including excavating interior roadside ditches and driveway culvert system to reduce/eliminate future flood damage to flood prone structures.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Town of Rose Hill Acres interior also bayou and creek properties
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Avoid municipal infrastructure and property losses; improved floodwater outflow capacity from town centers and industrial complexes is needed to reduce/ prevent impacts of flash flooding.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

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:	$1,000,000 - $3,000,000
Potential Funding Sources:	Local funding, PDM, HMGP
Lead Agency/Department Responsible:	City of Rose Hill Acres Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Drainage Plan

2022 ANALYSIS
Defer to Plan Update. Update hazards address to reflect Wind Storm, Hurricane, followed by rain event, Floods. Lead agency updated to reflect Coordinating Agency WCID#1, Public Works, City Hall, HC OEM. Implementation schedule to reflect 1-3 years. Existing plans updated to reflect: Flood Management, administration and Emergency Management Plan.

	City of Rose Hill Acres – Action #6
Proposed Action:	Construct/install safe shelters in town buildings capable of providing protection from severe tornados, and/or extreme straight line winds in accordance with FEMA Publication 320 and/or National Performance Criteria for Tornado Shelters specifications.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Town of Rose Hill Acres residential, municipal, and commercial structures
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Provide improved public safety.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Wind, Hurricane, Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$10,000 - $80,000 per shelter
Potential Funding Sources:	PDM, HMGP
Lead Agency/Department Responsible:	City of Rose Hill Acres Administration
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Mitigation Action Plan

2022 ANALYSIS
Defer to Plan Update. Update effect on new/existing buildings to reflect “Reinforce structures to improve public safety”. Lead agency updated to reflect Coordinating agencies City Hall.

SECTION 16: PREVIOUS ACTIONS

	City of Rose Hill Acres – Action #7
Proposed Action:	Elevate roadways and bridges prone to inundation from flooding. Projects can include general road elevation; installing, upsizing culverts and headwalls; and bridge upgrades.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Rose Hill Acres, elevating roadways and bridges prone to inundation from flooding
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce flooding damage and road inundation; flood water management; ensure emergency access.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$600,000 - $1,800,000
Potential Funding Sources:	PDM, HMGP
Lead Agency/Department Responsible:	City of Rose Hill Acres Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Comprehensive Plan

2022 ANALYSIS
Defer to Plan Update. Risk Benefit, updated to include" Improve public safety, facilitate evacuation and emergency response "Update hazards address to reflect Rising water, Flooding, Hurricanes. Update effect on new/existing buildings to include "Improve access and egress to residents during high water events". Lead agency updated to reflect Coordinating Agency City Hall, Floodplain Administrator, and Public Works. Implementation schedule to reflect 1-5 years. Existing plans updated to reflect: Infrastructure development and Zoning Ordinance.

City of Rose Hill Acres – Action #8	
Proposed Action:	Identify and pursue mitigation activities that would assist efficient evacuations through the town including but not limited to improved signage, widening roads and bridges, traffic monitoring systems, improved road connectivity, etc. Educate citizens on evacuation routes and procedures.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Rose Hill Acres town-wide. Specific to intersections, one way street routing and signage fixed and portable to facilitate traffic flow.
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Make evacuation process more efficient and safer; life safety benefits of early evacuation.
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, Hurricane
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,500,000
Potential Funding Sources:	PDM, HMGP
Lead Agency/Department Responsible:	City of Rose Hill Acres Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Response Plan

2022 ANALYSIS
Defer to Plan Update. Update Risk Benefits to also include “Improve public safety, facilitate evacuation and emergency response, and promote safe exit strategies for residents making evacuation process more efficient and safer.” Update Hazard Addressed to include Rising Water. Update effect of new/existing buildings to reflect “Reduce road congestion for emergency vehicles”. Update Lead Agency to reflect “Coordinating Agency City Hall, Hardin County OEM, public works”. Update Implementation Schedule to state 1-5 years. Update Existing Plans to include “2016-2017 Emergency management and hazard mitigation plan”.

SECTION 16: PREVIOUS ACTIONS

		City of Rose Hill Acres – Action #9
	Proposed Action:	Widen and reinforce critical bridges throughout the town to assist evacuation.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Rose Hill Acres
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Facilitate evacuation and emergency response.
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Flood, CBRNE* Incident
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000,000 - $10,000,000
Potential Funding Sources:	PDM, HMGP, State and Federal Highway
Lead Agency/Department Responsible:	Hardin County / City of Rose Hill Acres OEM, City of Rose Hill Acres Public Works, TXDOT, Texas Department of Transportation
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Rose Hill Acres Mitigation Action Plan

2022 ANALYSIS
Defer to Plan Update. Update Hazard addressed to state “Hurricane, *CBRNE Incident; Chemical, Biological, Radiological, Nuclear & Explosive Incidents”. Update implementation schedule to state 1-5 years. Update site location to incorporate: 69/96 feeder road N. and S. bound lanes in Drafting and Engineering stage (TxDOT). Update Risk Benefits to also include “Improve public safety, facilitate evacuation and emergency response”

	City of Rose Hill Acres – Action #10
Proposed Action:	Continue participation in the National Flood Insurance Program (NFIP) and investigate participation in the Community Rating System (CRS). Activities may include: improvement of flood mapping and elevation data, mitigation for repetitive loss properties, instituting higher regulatory standards for future floodplain development, storm water management plans and standards for future development to control runoff.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Town of Rose Hill Acres
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Maintain and improve NFIP compliance and benefits; mitigate future flooding; reduce cost of flood insurance.
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:	Hurricane, Flood
Effect on New/Existing Buildings:	Reduce risk to existing and future structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	PDM, local operating budget
Lead Agency/Department Responsible:	City of Rose Hill Acres Floodplain Management
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Floodplain Management Plan

2022 ANALYSIS
Defer to Plan Update. Updated Hazard Addressed to include “Hurricane, Thunderstorm, Floods, Rising water”. Updated Lead Agency to include, Coordinating Agencies Floodplain Management, and City Hall.

	City of Rose Hill Acres – Action #11
Proposed Action:	Install frangible links/break away connections on utility poles in the town to maintain utility operation during and after a hazard event.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Town of Rose Hill Acres
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Maintain utility operation during and after a hazard event; improve public safety; facilitate evacuation and emergency response.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Thunderstorm Wind, Tornado, Hail, Winter Storm, Lightning
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000 - $100,000
Potential Funding Sources:	Operating budgets, local funding, PDM, HMGP
Lead Agency/Department Responsible:	City of Rose Hill Acres Public Works, Utility Companies
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Rose Hill Acres Emergency Management Plan/Hardin County Emergency Management

2022 ANALYSIS
Defer to Plan Update. Update Hazard Addressed to remove Hail, Winter Storm, and Lightning.

	City of Rose Hill Acres – Action #12
Proposed Action:	Construct structure(s) of last resort with in the town that is elevated out of the flood prone area and designed for the appropriate wind load in compliance with the safe shelter initiative.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Elevate Property within Town of Rose Hill Acres
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Public safety and protection for special needs populations.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane, Thunderstorm Wind, Tornado
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$750,000 - $1,500,000
Potential Funding Sources:	Local funding, HMGP, Texas Safe Shelter
Lead Agency/Department Responsible:	City of Rose Hill Acres Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Rose Hill Acres Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update. Updated Risk Benefits to also include, with additional consideration for special needs and disabled population. Update Lead Agency to also include, City Hall. Update implementation schedule to include 2-5 years.

CITY OF SILSBEE

	City of Silsbee – Action #1
Proposed Action:	Retrofit city critical facilities as needed including but not limited to installation of the following features for severe storm protection: storm shutters or tinted shatter-resistant laminate film for windows; roof straps and strengthening for high wind load; roll-up door reinforcement (i.e. fire stations); non-permeable exterior walls, door seals and flood-proofing measures; alternate power supply (generators) with permanent hook-ups; fold down alternate site antennas; security cameras; electrical surge protection; secure data back- up systems and critical equipment. These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce damages to critical facilities and ensure continuity of city government during and after a storm event.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Thunderstorm Wind, Tornado, Hail, Lightning, Flood, Winter Storm, Wildfire, Extreme Heat
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,500,000
Potential Funding Sources:	PDM, HMGP, Operating budgets, local funding
Lead Agency/Department Responsible:	City of Silsbee Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Disaster Response Plan

2022 ANALYSIS
Defer to Plan Update, in progress. In 2021 received grant funding through GLO. In 2017, the City applied for HMGP funding for generators, however funding was denied.

	City of Silsbee – Action #2
Proposed Action:	Voluntary acquisition of Repetitive Loss and flood prone properties in the City of Silsbee. Assist relocation to safer locations within the city. Property acquired will remain as open space for perpetuity and used for the benefit of the community.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide repetitive loss structures
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improve public safety; reduce flood losses; reduce demand for emergency services; improve floodplain functions and water quality; improve floodplain ordinance compliance.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane
Effect on New/Existing Buildings:	Eliminate risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$200,000 - $500,000 – TBD per structure
Potential Funding Sources:	PDM, HMGP, FMA
Lead Agency/Department Responsible:	City of Silsbee Administration
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Comprehensive Plan

2022 ANALYSIS
Defer to Plan Update. In progress. A residential property that was flood prone, and had been flooded multiple times, was bought out in the 100 block of Easy Street in Silsbee. The home has been demolished and the City will eventually receive the deed to the property and maintain said property. This grant was received by Hardin County.

	City of Silsbee – Action #3
Proposed Action:	Upgrade storm water capacity and drainage throughout the City of Silsbee. Actions include but are not limited to installing/upgrading culverts and headwalls, excavating new and/or enlarging storm water ditches and canals. These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Improved floodwater outflow capacity from city centers and industrial complexes is needed to reduce/prevent impacts of flash flooding.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing and future structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000 - $1,500,000
Potential Funding Sources:	PDM, HMGP, operating budgets, local funding
Lead Agency/Department Responsible:	City of Silsbee Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Drainage Plan

2022 ANALYSIS
Defer to Plan Update. Funds have been budgeted for culvert improvements; however, the City has many culverts that need to be replaced but funding has not been sufficient.

	City of Silsbee – Action #4
Proposed Action:	Construct retention ponds to store and regulate discharge of storm water during flooding events. These actions include creating new infrastructure to mitigate or reduce potential or threatening floodwater damage or runoff.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Locations TBD within Silsbee
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Prevent flooding damage to new and existing homes; improve water storage capacity for times of drought and fighting wildfires.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Drought, Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,500,000
Potential Funding Sources:	Operating budgets, local funding, PDM, HMGP
Lead Agency/Department Responsible:	City of Silsbee Public Works
Implementation Schedule:	Within 12-24 months of Plan adoption pending available funding
Incorporation into Existing Plans:	Drainage Plan

2022 ANALYSIS
Defer to Plan Update. We have applied for funding but have not received. The City has not been able to conduct this action due to lack of funding.

	City of Silsbee – Action #5
Proposed Action:	Continue participation in the National Flood Insurance Program (NFIP) and investigate participation in the Community Rating System (CRS). Activities may include: improvement of flood mapping and elevation data, mitigation for repetitive loss properties, instituting higher regulatory standards for future floodplain development, storm water management plans and standards for future development to control runoff.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Maintain and improve NFIP compliance and benefits; mitigate future flooding; reduce cost of flood insurance.
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 damages to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$25,000
Potential Funding Sources:	HMGP, PDM, local operating budgets
Lead Agency/Department Responsible:	City of Silsbee Floodplain Management
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Floodplain Management Plan

2022 ANALYSIS
Completed and Defer to Plan Update. We are still participating and will continue to participate in the National Flood Insurance Program (NFIP).

CITY OF SOUR LAKE

	City of Sour Lake – Action #1
Proposed Action:	Construct water retention ponds to store and regulate discharge of storm water during flood events.
BACKGROUND INFORMATION	
Jurisdiction/Location:	TBD site in Sour Lake
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Localized flood reduction and improved water storage for times of drought and wildfire.
Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Wildfire, Drought
Effect on New/Existing Buildings:	Reduce damages to existing and new structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,000,000
Potential Funding Sources:	HMGP, PDM, local operating budgets
Lead Agency/Department Responsible:	City of Sour Lake Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Master Drainage Plan, Water Plan

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

		City of Sour Lake – Action #2
	Proposed Action:	Continue participation in the NFIP and participate in CRS. Activities may include: improvement of flood mapping and elevation data, mitigation of repetitive loss properties, instituting higher regulatory standards for future floodplain development, storm water management plans and standards for future development to control runoff.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City of Sour Lake
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Maintain and improve NFIP compliance and benefits; mitigate future flooding; reduce cost of flood insurance.
	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 damages to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	HMGP, PDM, local operating budgets
Lead Agency/Department Responsible:	City Sour Lake Floodplain Management
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Floodplain Management Plan

2022 ANALYSIS
Defer to Plan Update.

		City of Sour Lake – Action #3
	Proposed Action:	Install large concrete channel, box culvert, concrete pipe, and/or mechanisms as needed to mitigate drainage ditch erosion and improve water capacity and conveyance.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City of Sour Lake
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce risk to structures and infrastructure through improved flood control measures.
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing and new structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$400,000
Potential Funding Sources:	HMGP, PDM, local operating budgets
Lead Agency/Department Responsible:	City Sour Lake Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Drainage Plan

2022 ANALYSIS
Defer to Plan Update.

		City of Sour Lake – Action #4
	Proposed Action:	Provide the general public and schools with educational brochures for mitigating damages, planning ahead for disasters and reducing the risk of injury during events, including: mitigation measures such as window film, elevated appliances, surge protectors, insulating pipes, and drought tolerate landscaping, etc. Education on when to take cover, when to evacuate, locations of local safe rooms, signs of dehydration, and proper storage of flammable materials, or other appropriate materials to mitigate damages and health hazards.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City of Sour Lake
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce risk to residents and structures through education and preparedness.
	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:	Hurricane, Flood, Thunderstorm Wind, Winter Storm, Wildfire, Tornado, Lightning, Extreme Heat, Hail, Drought
Effect on New/Existing Buildings:	Reduce risk to existing and new structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$30,000
Potential Funding Sources:	HMGP, PDM, local operating budgets
Lead Agency/Department Responsible:	City of Sour Lake Emergency Management
Implementation Schedule:	Within 12 months of plan adoption pending available funding
Incorporation into Existing Plans:	Emergency Management Plan

2022 ANALYSIS
Defer to Plan Update.

		City of Sour Lake – Action #5
	Proposed Action:	Storm harden/retrofit critical facilities throughout Sour Lake. Actions can include but are not limited to window shutters, roof straps, flood proofing, roll-up door reinforcement (i.e. for fire stations), backup generator power with permanent hook-ups, secure data backup systems, hail resistant roofing materials, surge protectors or other appropriate measures to mitigate storm damage.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Critical facilities in Sour Lake
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Protect critical facilities from damages 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 Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane, Tornado, Thunderstorm Wind, Flood, Winter Storm, Wildfire, Lightning, Extreme Heat, Hail
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000
Potential Funding Sources:	HMGP, PDM, local operating budgets
Lead Agency/Department Responsible:	City of Sour Lake Public Works
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Disaster Response Plan

2022 ANALYSIS
Defer to Plan Update.

		City of Sour Lake – Action #6
	Proposed Action:	Relocate utility lines for existing buildings underground to mitigate hazard impacts and prevent loss of function. Require installation of underground lines at time of construction for new and future development projects to reduce future hazard impacts.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Utility lines throughout Sour Lake
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce risk of loss of power 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 Project Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane, Thunderstorm Wind, Winter Storm, Tornado, Lightning, Hail
Effect on New/Existing Buildings:	Reduce risk to existing and future structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$200,000
Potential Funding Sources:	HMGP, PDM, local operating budgets, TDEM
Lead Agency/Department Responsible:	City of Sour Lake Public Works, Local Power Company
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Comprehensive Plan, Local Ordinance

2022 ANALYSIS
Defer to Plan Update.

		City of Sour Lake – Action #7
	Proposed Action:	Identify and pursue any mitigation activities that would assist efficient evacuations in Sour Lake, including but not limited to: improved signage, traffic monitoring systems, and encourage developers of new and future subdivisions to consider evacuation efficiency in street design.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City of Sour Lake
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Life safety benefits through preparedness.
	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:	Hurricane, Flood, Winter Storm, Tornado, Thunderstorm Wind, Wildfire
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$150,000
Potential Funding Sources:	HMGP, PDM
Lead Agency/Department Responsible:	City of Sour Lake Administration, HCESD#5
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Evacuation Plan

2022 ANALYSIS
Defer to Plan Update.

		City of Sour Lake – Action #8
	Proposed Action:	Install/improve signage to notify public when burn ban is activated. Improve enforcement through education and coordination.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City of Sour Lake
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Life safety benefits and damage reduction through education and awareness.
	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:	Wildfire, Drought
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	HMGP, PDM, local operating budgets, TFS Grants
Lead Agency/Department Responsible:	City of Sour Lake Administration
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	Community Wildfire Protection Plan

2022 ANALYSIS
Defer to Plan Update.

		City of Sour Lake – Action #9
	Proposed Action:	Remove structures from flood prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving lands subject to repetitive flooding.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City of Sour Lake flood prone structures
	Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Mitigate flood damage; improve compliance with floodplain ordinance; prevent flooding damage to existing structures.
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane
Effect on New/Existing Buildings:	Reduce or eliminate risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	TBD – per structure
Potential Funding Sources:	HMGP, PDM, FMA, RFC
Lead Agency/Department Responsible:	City of Sour Lake Floodplain Management
Implementation Schedule:	Within 12-24 months of plan adoption pending available funding
Incorporation into Existing Plans:	HCFPM Plans

2022 ANALYSIS
Defer to Plan Update.

	City of Sour Lake – Action #10
Proposed Action:	Educate residents and home builders on the importance of constructing and maintaining defensible space around new and existing homes to prevent or mitigate wildfire damage.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Sour Lake Wildland Urban Interface
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce wildfire damage; improve individual participation in wildfire mitigation; improve safety through site design for future development; and reduce water use for firefighting.
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:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing and new structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$40,000
Potential Funding Sources:	Hardin County, HCESD#5, local operating budget
Lead Agency/Department Responsible:	City of Sour Lake Administration
Implementation Schedule:	Within 12 months of plan adoption pending available funding
Incorporation into Existing Plans:	Community Wildfire Protection Plan

2022 ANALYSIS
Defer to Plan Update.

SECTION 16: PREVIOUS ACTIONS

	City of Sour Lake – Action #11
Proposed Action:	Develop local requirements for mobile home tie-downs and anchoring systems and build capacity to conduct periodic inspections to oversee proper implementation for future development.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Sour Lake
Risk Reduction Benefit: *(Current Cost/ Losses Avoided)*	Reduce damages through improved building code requirements.
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:	Thunderstorm Wind, Hurricane, Tornado
Effect on New/Existing Buildings:	Reduce risk to existing and new structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$40,000
Potential Funding Sources:	Hardin County, local operating budget
Lead Agency/Department Responsible:	City of Sour Lake Administration
Implementation Schedule:	Within 24-36 months of plan adoption pending available funding
Incorporation into Existing Plans:	Local Ordinances

2022 ANALYSIS
Defer to Plan Update.

SECTION 17: MITIGATION ACTIONS

SUMMARY

As discussed in Section 2, at the mitigation workshop the planning team and stakeholders met to develop mitigation actions for each of the natural hazards included in the Plan Update. Each of the actions in this section were prioritized based on FEMA's Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) criteria necessary for the implementation of each action.

As part of the economic evaluation of the STAPLEE analysis, jurisdictions analyzed each action in terms of the overall costs, measuring whether the potential benefit to be gained from the action outweighed costs associated with it. As a result of this exercise, priority was assigned to each mitigation action by marking them as High (H), Moderate (M), or Low (L). An action that is ranked as "High" indicates that the action will be implemented as soon as funding is received. A "Moderate" action is one that may not be implemented right away depending on the cost and number of citizens served by the action. Actions ranked as "Low" indicate that they will not be implemented without first seeking grant funding and after "High" and "Moderate" actions have been completed.

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 two actions, per hazard, and of two different types for each participating jurisdiction. The term county-wide action refers to Hardin County and the Cities of Kountze, Lumberton, Rose Hill Acres, Silsbee and Sour Lake.

SECTION 17: MITIGATION ACTIONS

Table 17-1. Hardin 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 (Black)
Action #3 – Natural Systems Protections (Green)	

Jurisdiction	Flood	Hurricane Wind	Lightning	Thunderstorm Wind	Extreme Heat	Hail	Tornado	Wildfire	Winter Storm	Drought
Hardin County	XXXXX	XXXX	XXXX	XXXX	XXX	XXXX	XXXX	XXXX	XXXX	XXXX
City of Kountze	XXXX	XXX	XX	XXX	XX	XX	XXX	XX	XX	XXX
City of Lumberton	XXXX	XXX	XX	XX	XX	XX	XX	XXX	XX	XX
City of Rose Hill Acres	XXXX	XXX	XXX	XXX	XX	XXX	XXX	XX	XXX	XX
City of Silsbee	XXXX	XX	XX	XX	XX	XX	XX	XX	XX	XX
City of Sour Lake	XXXX	XXX	XXX	XXX	XX	XXX	XXX	XXX	XXX	XX

HARDIN COUNTY – COUNTY-WIDE ACTIONS

		Hardin County-wide – Action #1
	Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide including all participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Promote hazard awareness and protect citizens from potential injuries and damages.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm, Hurricane Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$25,000
Potential Funding Sources:	Local Funds (staff time), State and Federal Grants
Lead Agency/Department Responsible:	County and Local Emergency Managers
Implementation Schedule:	Within 24 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.

		Hardin County-wide – Action #2
	Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide including all participating jurisdictions
	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:	Extreme Heat, Flood, Hail, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm, Hurricane Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	County Public Works/City Engineer/City Administrator
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

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

		Hardin County-wide – Action #3
	Proposed Action:	Upgrade critical facilities to include drought mitigation measures such as greywater reuse systems and drought tolerant landscaping.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide including all participating jurisdictions
	Risk Reduction Benefit: *(Current Cost/Losses Avoided)*	Reduce damages at critical facilities.
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on New/Existing Buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	County Public Works/City Engineer/City Administrator
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan (applicable jurisdictions)

COMMENTS:

		Hardin County-wide – Action #4
	Proposed Action:	Harden/retrofit critical facilities to hazard-resistant levels.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide including all participating jurisdictions
	Risk Reduction Benefit: *(Current Cost/Losses Avoided)*	Reduce damages at critical facilities; Ensure continuity of critical services during and after event; Reduce risk of injury to emergency and critical personnel.
	Type of Action: *(Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	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 Funds, State and Federal Grants
Lead Agency/Department Responsible:	County Public Works/City Engineer/City Administrator
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan; Capital Improvement Plan (applicable jurisdictions)

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

	Hardin County-wide– Action #5
Proposed Action:	Plan for the Protection of Vulnerable Populations by identifying at-risk populations and coordinating with home health agencies, medical equipment companies, local churches, and neighborhood associations to assist during extreme weather events. Organize strategies for protecting vulnerable populations and develop a plan to activate strategies when need be.
BACKGROUND INFORMATION	
Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Promote hazard awareness and protect citizens and at-risk populations from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$25,000 - $100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC
Implementation Schedule:	Ongoing project
Incorporation into Existing Plans:	Emergency Management Plan

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

		Hardin County-wide– Action #6
	Proposed Action:	Facilitate use of all mass notification systems including but not limited to the Southeast Texas Alerting Network (STAN), to notify and educate the public of impending hazardous events.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Promote hazard awareness and protect citizens and at-risk populations from potential injuries and damages.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC
Implementation Schedule:	Ongoing project
Incorporation into Existing Plans:	EOPs

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

		Hardin County-wide– Action #7
	Proposed Action:	Public Awareness and Education of Vulnerable Population through creation of a database and special group in STAN (Southeast Texas Alerting Network regional emergency alerting system) whereby public information protection actions can be disseminated.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Expedite access and hazard awareness and protect citizens and at-risk populations from potential injuries and damages.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000 - $100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC
Implementation Schedule:	Ongoing project
Incorporation into Existing Plans:	Emergency Management Plan

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

		Hardin County-wide– Action #8
	Proposed Action:	Coordinate and implement a natural hazards public awareness campaign among the jurisdictions. Target audiences will include schools, neighborhood watch groups, various civic groups, neighborhood associations, community groups, and industry groups. FEMA publications will also be made available in city hall libraries, municipal courts, police and fire departments, public works departments, public access TV channels, city libraries and on the SETRPC and jurisdictional websites.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Promote hazard awareness and protect citizens and at-risk populations from potential injuries and damages.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$25,000 - $75,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC
Implementation Schedule:	Ongoing project
Incorporation into Existing Plans:	Emergency Management Plan

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

		Hardin County-wide– Action #9
	Proposed Action:	Coordinate with federal, state and local partners to provide all hazards, ICS, and specialized training that may enhance preparedness for first responders.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Promote hazard awareness and protect citizens and at-risk populations from potential injuries and damages.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000 - $50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange, and Jasper Counties
Implementation Schedule:	Within 12 months of plan adoption, ongoing
Incorporation into Existing Plans:	Emergency Operations Plan

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

		Hardin County-wide– Action #10
	Proposed Action:	Develop a drought emergency plan, incorporating criteria or triggers for drought-related actions, enact water conservation measures during drought conditions, and develop a drought communication plan and early warning system to facilitate timely communication of relevant information.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of potential 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:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$75,000 - $100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC
Implementation Schedule:	Ongoing project
Incorporation into Existing Plans:	Local water plans and ordinances

COMMENTS:

		Hardin County-wide– Action #11
	Proposed Action:	Harden/retrofit existing and/or construct new structures to act as shelters during severe weather events.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of injury 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:	Hurricane Wind, Thunderstorm Wind, Tornado, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,500,000 - $5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange and Jasper Counties
Implementation Schedule:	Within 12-24 months of plan adoption, ongoing
Incorporation into Existing Plans:	Emergency Management Plan

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

	Hardin County-wide– Action #12
Proposed Action:	Harden/retrofit critical facilities and infrastructures to hazard-resistant levels. Implement standard for new construction and developments.
BACKGROUND INFORMATION	
Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
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 personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000 - $2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange, and Jasper Counties
Implementation Schedule:	Within 24 months of plan adoption, ongoing
Incorporation into Existing Plans:	Emergency Management Plan

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

		Hardin County-wide– Action #13
	Proposed Action:	Coordinate Emergency Management Plans for coastal storm/hurricane events. Specific efforts include encouraging jurisdictions to install and maintain back up power at identified facilities, construct and designate emergency operations centers for disaster/emergency operations and solicit participation in Community Emergency Response training.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damages, injury or fatalities. Ensures 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:	Hurricane Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000 - $50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange, and Jasper Counties
Implementation Schedule:	Within 12-36 months of plan adoption, ongoing
Incorporation into Existing Plans:	Emergency Response Plan

COMMENTS:

		Hardin County-wide– Action #14
	Proposed Action:	Conduct flood insurance educational seminars for area realtors to increase their knowledge of National Flood Insurance Program (NFIP) and the benefits to homeowners in security flood insurance.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce flood insurance premiums for residents. Reduce flood risk and build resiliency.
	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, Hurricane Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000 - $50,000
Potential Funding Sources:	Local Funds (staff time), State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange, and Jasper Counties
Implementation Schedule:	Within 12 months of plan adoption, ongoing
Incorporation into Existing Plans:	N/A

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

		Hardin County-wide– Action #15
	Proposed Action:	Coordinate public/private partnerships to ensure special needs populations are protected from health risks due to extreme weather conditions. Actions will be targeted toward citizens with physical limitations and others who may be unable to reach safety in times of severe weather. Volunteer groups may be available to assist by visiting special needs groups to ensure their safety and comfort during extreme weather events or assist when evacuations are necessary.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of potential injuries and fatalities especially for at-risk populations.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000 - $100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange, and Jasper Counties
Implementation Schedule:	Ongoing project
Incorporation into Existing Plans:	Emergency Response Plan

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

		Hardin County-wide– Action #16
	Proposed Action:	Acquisition / Buy-out: Acquire and demolish flood-prone properties that are deemed Repetitive and Severe Repetitive Loss properties.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Eliminate risk of flood damages to high-risk structures and prevent future losses in high-risk flood hazard areas.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$90,000 - $10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange, and Jasper Counties
Implementation Schedule:	Within 12-60 months of plan adoption, ongoing
Incorporation into Existing Plans:	Comprehensive Plan

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

		Hardin County-wide– Action #17
	Proposed Action:	Elevation of new and existing flood prone structures and infrastructures.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood damages to high-risk structures and prevent future losses in high-risk flood hazard areas.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$90,000 - $2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange, and Jasper Counties
Implementation Schedule:	Within 12-60 months of plan adoption, ongoing
Incorporation into Existing Plans:	Comprehensive Plan

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

		Hardin County-wide– Action #18
	Proposed Action:	Continually review, revise, update, and systematically maintain floodplain data and maps of flood prone areas throughout the Southeast Texas Region.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce flood risk to structures through understanding risk and vulnerability.
	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, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000 - $5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange, and Jasper Counties
Implementation Schedule:	Within 12 months of plan adoption, ongoing
Incorporation into Existing Plans:	Floodplain Ordinance

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

		Hardin County-wide– Action #19
	Proposed Action:	Mitigate damage to utilities in order to maintain function during and after a hazard event. Action can include but not limited to: bury utility lines underground, frangible links/break away connections, harden utility poles, and easement area/clearance of utility lines/ poles from tree lines.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages to infrastructure. Ensure continuity of critical services during and after event. Reduce risk of injuries or fatalities to vulnerable populations.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm Wind, Winter Storm, Tornado, Lightning, Hail
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$150,000 - $600,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange, and Jasper Counties
Implementation Schedule:	Within 12-24 months of plan adoption, ongoing
Incorporation into Existing Plans:	Comprehensive Plan, Local Ordinance

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

		Hardin County-wide– Action #20
	Proposed Action:	Design and implement a program to remove and/ or minimize damage to structures and infrastructure from falling trees and debris.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages to infrastructure. Ensure continuity of critical services during and after event. Reduce risk of injuries or fatalities to vulnerable populations.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations, Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm Wind, Winter Storm, Tornado, Lightning, Hail
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$50,000 - $100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange, and Jasper Counties
Implementation Schedule:	Within 24 months of plan adoption, ongoing
Incorporation into Existing Plans:	Public Works SOP

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

		Hardin County-wide– Action #21
	Proposed Action:	Pursue drainage improvements. Actions can include but are not limited to installing/upgrading culverts and headwalls as well as enlarging storm water ditches and canals.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or 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:	Flood, Hurricane Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	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- $5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange, and Jasper Counties
Implementation Schedule:	Within 12 months of plan adoption, ongoing
Incorporation into Existing Plans:	Drainage Plan

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

		Hardin County-wide– Action #22
	Proposed Action:	Identify and implement mitigation activities that would aid/enhance evacuations throughout the region.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damage, injury and loss of life. Improve evacuation and emergency response.
	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 Wind, Flood, Tornado, Winter Storm, Wildfire, Thunderstorm Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structure and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000 - $500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange, and Jasper Counties
Implementation Schedule:	Within 12-24 months of plan adoption, ongoing
Incorporation into Existing Plans:	Emergency Management Plan

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

		Hardin County-wide– Action #23
	Proposed Action:	Coordinate and implement construction, expansion, and maintenance of flood control structures/barriers for the purpose of mitigating damage and protect freshwater resources from storm surge, sea level rise, and other sources of saltwater intrusion; in addition to water contamination.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damage, injury, and loss of life.
	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 Wind, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange and Jasper Counties
Implementation Schedule:	Within 12-24 months of plan adoption, ongoing
Incorporation into Existing Plans:	Master Drainage Plan

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

		Hardin County-wide– Action #24
	Proposed Action:	Construct water retention ponds to collect storm water run-off and use as an alternate water source for agricultural resources throughout the Southeast Texas region.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Improve alternate source of water. Reduce risk of injuries or 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:	Flood, Hurricane Wind, Drought, Thunderstorm Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	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- $250,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange, and Jasper Counties
Implementation Schedule:	Within 12 months of plan adoption, ongoing
Incorporation into Existing Plans:	Drainage Plan

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

		Hardin County-wide– Action #25
	Proposed Action:	Pursue the identification and construction of alternate freshwater resources.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Improve alternate source of water. Reduce risk of injuries or 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
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	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- $200,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC
Implementation Schedule:	Within 12-24 months of plan adoption, ongoing
Incorporation into Existing Plans:	Local Water Management Plan

COMMENTS:

	Hardin County-wide– Action #26
Proposed Action:	Secure and maintain backup information systems to store critical information at off-site locations.
BACKGROUND INFORMATION	
Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce loss of critical government data and files through redundant systems.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$50,000 - $350,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange, and Jasper Counties
Implementation Schedule:	Within 24 months of plan adoption, ongoing
Incorporation into Existing Plans:	N/A

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

		Hardin County-wide– Action #27
	Proposed Action:	Coordinate with county and municipal governments to allow the SETRPC to maintain a copy of all local ordinances relevant to mitigation activities.
	BACKGROUND INFORMATION	
	Site and Location:	Southeast Texas Region for Hardin County and participating jurisdictions
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce loss of local ordinances through redundant systems.
	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, Flood, Extreme Heat, Hurricane Wind, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000 - $15,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	SETRPC, Hardin, Jefferson, Orange, and Jasper Counties
Implementation Schedule:	Within 24 months of plan adoption, ongoing
Incorporation into Existing Plans:	N/A

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

HARDIN COUNTY

		Hardin County– Action #1
	Proposed Action:	Construct an elevated helipad/parking lot, accessible within each ESD within the county for evacuation, supply distribution and medical evacuation during an emergency.
	BACKGROUND INFORMATION	
	Site and Location:	Site to be determined
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Ensure continuity of critical services during and after event. Reduce risk of injury to residents, 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:	Hurricane Wind, Flood, Thunderstorm Wind, Winter Storm, Wildfire, Tornado, Lightning
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Health/Medical
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$250,000 each
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County and City Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Mitigation Action Plan, Emergency Response Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical services continue caused by unforeseen events. Promotes public safety.

		Hardin County– Action #2
	Proposed Action:	Design and construct large detention pond on Black Creek, include a granular watershed study of this creek.
	BACKGROUND INFORMATION	
	Site and Location:	Lumberton (Hardin County oversees the action however physical location is City of Lumberton) / Hardin County
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or fatalities to vulnerable populations.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$15,000,000 - $20,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County, Hardin County OEM
Implementation Schedule:	Within 60 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.

	Hardin County– Action #3
Proposed Action:	Design and construct large detention pond on Boggy Creek, include a granular watershed study of this creek.
BACKGROUND INFORMATION	
Site and Location:	Lumberton (Hardin County oversees the action however physical location is City of Lumberton) / Hardin County
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$15,000,000 - $20,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County, Hardin County OEM
Implementation Schedule:	Within 60 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.

		Hardin County– Action #4
	Proposed Action:	Widen, reinforce, and elevate Cooks Lake Road Bridge.
	BACKGROUND INFORMATION	
	Site and Location:	Lumberton (Hardin County oversees the action however physical location is City of Lumberton), Hardin County
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damages, injuries and loss of life. Ensure access for emergency response.
	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, Hurricane Wind, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000,000 - $5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County, Hardin County OEM
Implementation Schedule:	Within 24 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.

		Hardin County– Action #5
	Proposed Action:	Voluntary elevations of flood prone properties in Hardin County.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide flood prone structures and repetitive loss properties
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduces risk of flood damages to high risk structures. Reduces burden to emergency response personnel.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000,000 - $7,500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County, Hardin County OEM
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

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

	Hardin County– Action #6
Proposed Action:	Design and construct large reservoir for flood control / drought assistance.
BACKGROUND INFORMATION	
Site and Location:	Possibly Northwest of Sour Lake (physical location only)
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduces injury and loss of life of vulnerable populations and residents.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000,000,000 - $15,000,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Army Corps of Engineers
Implementation Schedule:	Within 60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
POP may exceed typical implementation schedule.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

	Hardin County– Action #7
Proposed Action:	Design and construct large drainage system to drain / retain flood waters around the communities of Pinewood, Countrywood, Bevil Oaks, and Rose Hill Acres.
BACKGROUND INFORMATION	
Site and Location:	Communities of Pinewood, Countrywood, Bevil Oaks, and Rose Hill Acres
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$15,000,000 - $20,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County, Hardin County OEM
Implementation Schedule:	Within 60 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.

		Hardin County– Action #8
	Proposed Action:	Design and construct large drainage system to drain Lumberton directly into the Neches River, instead of Pine Island Bayou.
	BACKGROUND INFORMATION	
	Site and Location:	Vast majority of Lumberton, including adjacent and interior roadside ditches, outfall (Hardin County oversees the action however physical location is City of Lumberton)
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or fatalities to vulnerable populations.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000,000 - $85,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County, Hardin County OEM
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

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

	Hardin County– Action #9
Proposed Action:	Replacement of water infrastructure and related treatment equipment at Water Well No.1, including but not limited to, chemical/control building, concrete slabs, booster pumps, piping, chemical feed equipment, chemical storage tanks, electrical controls, and stand-by generator. LMUD is the sole source of safe and reliable drinking water for residential, commercial, emergency response, and health/medical facilities within the City of Lumberton. This proposed action grants LMUD the ability to seek Hazard Mitigation Funds to restore functionality of its Water Well in the event of a natural disaster or during emergency situations.
BACKGROUND INFORMATION	
Site and Location:	105 Benny Ave., Lumberton TX 77657
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or fatalities to vulnerable populations
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structure and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,182,921.00
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County, City of Lumberton and Lumberton MUD
Implementation Schedule:	Within 48 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

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

Hardin County– Action #10	
Proposed Action:	Replacement of water infrastructure and related treatment equipment at Water Well No.2, including but not limited to, chemical/control building, concrete slabs, booster pumps, piping, chemical feed equipment, chemical storage tanks, electrical controls, and stand-by generator. LMUD is the sole source of safe and reliable drinking water for residential, commercial, emergency response, and health/medical facilities within the City of Lumberton.
BACKGROUND INFORMATION	
Site and Location:	55 West Chance, Lumberton TX 77657
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,182,981.00
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County, City of Lumberton, and Lumberton MUD
Implementation Schedule:	Within 60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Loss of production and treatment is a loss in the District's and commercial revenue. LMUD currently serves several urgent care centers, nursing homes, and emergency responders, loss of water would be a catastrophic event for the public health and safety of the City of Lumberton.
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

	Hardin County– Action #11
Proposed Action:	Seek funding and construct centralized shelter(s) of last resort within the county that is sited out of flood prone areas and designed for appropriate wind load, in coordination with the Texas Safe Shelter Initiative.
BACKGROUND INFORMATION	
Site and Location:	Kountze (location only), Hardin County
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk to citizens by providing shelters 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 Wind, Tornado, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000 - $12,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Mitigation Action Plan, Emergency Response Plan

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

	Hardin County– Action #12
Proposed Action:	Seek funding and construct centralized shelter(s) of last resort within the county that is sited out of flood prone areas and designed for appropriate wind load, in coordination with the Texas Safe Shelter Initiative.
BACKGROUND INFORMATION	
Site and Location:	Saratoga, Hardin County – Possible West Hardin
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk to citizens by providing shelters 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 Wind, Tornado, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000 - $12,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Mitigation Action Plan, Emergency Response Plan

COMMENTS:
Deferred action #1
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		Hardin County– Action #13
	Proposed Action:	Seek funding and construct centralized shelter(s) of last resort within the county that is sited out of flood prone areas and designed for appropriate wind load, in coordination with the Texas Safe Shelter Initiative.
	BACKGROUND INFORMATION	
	Site and Location:	Silsbee (location only), Hardin County – Possible Silsbee ISD
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk to citizens by providing shelters 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 Wind, Tornado, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000 - $12,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Mitigation Action Plan, Emergency Response Plan

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

	Hardin County– Action #14
Proposed Action:	Seek funding and construct centralized shelter(s) of last resort within the county that is sited out of flood prone areas and designed for appropriate wind load, in coordination with the Texas Safe Shelter Initiative.
BACKGROUND INFORMATION	
Site and Location:	Sour Lake (location only), Hardin County – Possible HJISD
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk to citizens by providing shelters 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 Wind, Tornado, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000 - $12,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Mitigation Action Plan, Emergency Response Plan

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

		Hardin County– Action #15
	Proposed Action:	Seek funding and construct centralized shelter(s) of last resort within the county that is sited out of flood prone areas and designed for appropriate wind load, in coordination with the Texas Safe Shelter Initiative.
	BACKGROUND INFORMATION	
	Site and Location:	Hardin County- Location(s) TBD
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk to citizens by providing shelters 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 Wind, Tornado, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Low
Estimated Cost:	$500,000 +
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan

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

		Hardin County– Action #16
	Proposed Action:	Enlarge main outfall channels for the Pinewood subdivision including excavating interior roadside ditches and driveway culvert system.
	BACKGROUND INFORMATION	
	Site and Location:	Pinewood subdivision including adjacent and interior roadside ditches and driveway culvert system
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or 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:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000 - $3,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM, Public Works Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Deferred action #2
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

	Hardin County– Action #17
Proposed Action:	Acquire and install generators and/or alternative power supply with hard wired quick connections at all critical facilities.
BACKGROUND INFORMATION	
Site and Location:	County 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:	Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 +
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Deferred action #3
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

	Hardin County– Action #18
Proposed Action:	Drainage improvement and storm water conveyance project for Coon Marsh Gulley. This project is looking to be conducted in five phases.
BACKGROUND INFORMATION	
Site and Location:	Coon Marsh Gulley Diversion Ditch
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or 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:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$4,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM, WCID #1
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Deferred action #4
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

	Hardin County– Action #19
Proposed Action:	Form Drainage District: Purpose would be to oversee/maintain, and construct required drainage projects for the County. Regulate storm water mitigation for new and future developments.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Improve stormwater drainage and drainage capacity.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	Reduce risk to new and existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$4,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County Administration, OEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
Deferred action #5
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

	Hardin County– Action #20
Proposed Action:	Widen and reinforce critical bridges, in addition to review evacuation routes for necessary improvements, to ensure evacuation for residents.
BACKGROUND INFORMATION	
Site and Location:	County-wide bridges and identified evacuation routes
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Improve evacuation capacities. Reduce risk to residents through improved evacuations routes.
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, Hurricane Wind, Tornado, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000 - $10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM, Public Works Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Evacuation Plan

COMMENTS:
Deferred action #6
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

		Hardin County– Action #21
	Proposed Action:	Maintain training opportunities for first responders.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Improve knowledge and coordinator of emergency responders. Reduce risk of fatalities.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000 (annually)
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM, County-wide first responders
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Deferred action #7
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

	Hardin County– Action #22
Proposed Action:	Continue participation in the National Flood Insurance Program (NFIP) and participate in the Community Rating System (CRS). Activities may include: improvement of flood mapping and elevation data, mitigation for repetitive loss properties, instituting higher regulatory standards for future floodplain development, storm water management plans, and standards for future development to control runoff.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce flood insurance premiums for local residents. Reduce flood risk and build resiliency.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Hardin County OEM, Floodplain Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
Deferred action #8
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

		Hardin County– Action #23
	Proposed Action:	Develop and upgrade a database system to maintain contact information for first responders, volunteers, and special needs populations.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce loss of life and injury.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication, Health/Medical
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan

COMMENTS:
Deferred action #9
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during unforeseen events.

		Hardin County– Action #24
	Proposed Action:	Develop local ordinance for mobile home tie-down and anchoring systems, and build capacity to conduct periodic inspections.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages to structures and infrastructure. Reduce risk of injuries or fatalities.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado, Hurricane Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$3,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	Hardin County OEM, Floodplain Office
Implementation Schedule:	Within 34-36 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

COMMENTS:
Deferred action #12

	Hardin County– Action #25
Proposed Action:	Educate the public on issues related to the inappropriate discharge of hazardous materials and wastewater in the environment and the impacts it has on the waterways. This can be through training, handouts/brochures, and media outlets.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of injury and loss of life. Reduce risk of damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Deferred action #10
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

		Hardin County– Action #26
	Proposed Action:	Voluntary acquisition of Repetitive Loss and flood prone properties throughout Hardin County and all jurisdictions. Assist residents in relocating to safer locations within the County.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide repetitive loss and flood prone properties
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Eliminate risk of flood damages to high risk structures and prevent future losses in high risk flood hazard areas.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000,000 - $4,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County and City Emergency Management Personnel
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
Deferred county-wide action #1
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

	Hardin County– Action #27
Proposed Action:	Upgrade storm water capacity throughout the county and local jurisdictions. Actions include but are not limited to installing/upgrading culverts and headwalls, and enlarging storm water ditches and canals.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood damages through improve drainage capacity. Reduce risk of injuries to citizens.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$3,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Deferred county-wide action #2
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

	Hardin County– Action #28
Proposed Action:	Elevate existing roadways and bridges prone to inundation from flooding. Projects can include general road elevation; installing, upsizing culverts and headwalls; and bridge upgrades.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damage, injury and loss of life. Improve evacuation and emergency response.
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, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000 - $10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM, Public Works Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Deferred county-wide action #3
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		Hardin County– Action #29
	Proposed Action:	Implement education and awareness program utilizing media, social media, bulletins, flyers, etc. to educate citizens of hazard that can threaten the area and mitigation measures to reduce injuries fatalities and property damages. Include links to weather alerts and departmental phone listings with contact personnel for residents.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide, specifically also for residents downstream of the Sam Rayburn Dam and the Toleda Bend Dam
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Promote hazard awareness and protect citizens from potential injuries and damages.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire. Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,000
Potential Funding Sources:	Local Funds (staff time), State and Federal Grants
Lead Agency/Department Responsible:	Hardin County Emergency Management
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
Deferred county-wide action #4, #18
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

	Hardin County– Action #30
Proposed Action:	Relocate utility lines for existing buildings underground to mitigate hazard impacts and prevent loss of function. Require power lines to be buried for future development projects.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages to infrastructure. Ensure continuity of critical services during and after event. Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire. Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	Reduce risk to existing and new structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,000,000 - $10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

COMMENTS:
Deferred county-wide action #5
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		Hardin County– Action #31
	Proposed Action:	Construct water retention ponds to collect storm water run-off, reduce flooding and use as an alternate water source throughout Hardin County.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood damages through improve drainage capacity. Reduce risk of injuries to citizens.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Flood, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce damages to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Deferred county-wide action #6
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

	Hardin County– Action #32
Proposed Action:	Install frangible links/break away connections on utility poles to maintain utility operation during and after a hazard event.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages to infrastructure. Ensure continuity of critical services during and after event. Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	Reduce risk to existing and new structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$4,000,000 - $7,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County Emergency Management
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
Deferred county-wide action #7
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

	Hardin County– Action #33
Proposed Action:	Identify and pursue mitigation activities that would assist in efficient evacuations throughout the county including but not limited to improved signage, widening roads and bridges, traffic monitoring systems, and improved road connectivity.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damages, injuries and loss of life. Ensure access for emergency response.
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, Hurricane Wind, Tornado, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing and new structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $3,500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Evacuation Plan

COMMENTS:
Deferred county-wide action #8
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

	Hardin County– Action #34
Proposed Action:	Install signage to notify public when Burn Ban is activated. Improve enforcement through education and coordination.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	Reduce risk to existing and new structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000 - $90,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM, County Fire Department
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

COMMENTS:
Deferred county-wide action #9

		Hardin County– Action #35
	Proposed Action:	Conduct tree trimming initiative along power lines
	BACKGROUND INFORMATION	
	Site and Location:	County-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages to infrastructure. Ensure continuity of critical services during and after event. Reduce risk of injuries or fatalities to vulnerable populations.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Local Plans and Regulation

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	Reduce risk to existing and new structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000 - $2,500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM, Local Energy Companies
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Deferred county-wide action #10
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

		Hardin County– Action #36
	Proposed Action:	Elevate flood prone homes including electrical systems above Base Flood Elevation.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide flood risk properties, properties that are deemed repetitive loss or flood prone
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce flood damages through development restrictions and improve construction requirements in flood-prone areas.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Local Plans and Regulation

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County Emergency Management
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
Deferred county-wide action #11
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

	Hardin County– Action #37
Proposed Action:	Build safe room shelters in public buildings capable of providing protection from severe weather events. Develop incentives and instruction for homeowners to construct/install residential safe shelters.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk to citizens by providing shelters 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, Local Plans and Regulation

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood (community safe rooms), Hurricane Wind, Thunderstorm Wind, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$250,000 - $1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County Emergency Management
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Deferred county-wide action #13 & 14
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

	Hardin County– Action #38
Proposed Action:	Develop water conservation strategies and/or ordinances for implementation during times of drought.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulation

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000 - $80,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County Public Works Department
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

COMMENTS:
Deferred county-wide action #15

		Hardin County– Action #39
	Proposed Action:	Harden/retrofit critical facilities to hazard-resistant levels, including structures that can be utilized as cooling/warming stations.
	BACKGROUND INFORMATION	
	Site and Location:	County-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages at critical facilities. Ensure continuity of critical services during and after event. Reduce risk of injury to emergency and critical personnel.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000 - $1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Deferred county-wide action #16 & 19
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

	Hardin County– Action #40
Proposed Action:	Adopt a policy for drought tolerant landscaping for future public development.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damages, injuries and loss of life.
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, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new structure and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,000 - $5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County OEM and Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

COMMENTS:
Deferred county-wide action #17

	Hardin County– Action #41
Proposed Action:	Educate homeowners and builders on the importance of maintaining defensible space surrounding structures to prevent damage.
BACKGROUND INFORMATION	
Site and Location:	County-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damages, injuries, and loss of life.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Hardin County Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

COMMENTS:
Deferred county-wide action #12

CITY OF KOUNTZE

	City of Kountze– Action #1
Proposed Action:	Install backup generator systems to all critical city facilities.
BACKGROUND INFORMATION	
Site and Location:	Critical Facilities in the City of Kountze
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:	Hurricane Wind, Thunderstorm Wind, Tornado, Flood, Winter Storm, Extreme Heat, Hail, Lightning, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	Reduce risk to existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Kountze Public Works
Implementation Schedule:	Within 18 months of plan adoption
Incorporation into Existing Plans:	Emergency Management 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 Kountze Action #2
	Proposed Action:	Implement a water saving program, including the purchase of water saving equipment and fixtures in all city facilities, such as low flow fixtures.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide critical facilities
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduces water consumption and lessen the demand during drought conditions. Reduces impact to residents and vulnerable populations.
	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:	Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Health/medical, Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$25,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Kountze Public Works
Implementation Schedule:	Within 18 months of plan adoption
Incorporation into Existing Plans:	Drought Contingency Plan

COMMENTS:

		City of Kountze– Action #3
	Proposed Action:	Install lightning protection equipment for all critical facilities and infrastructure to prevent future lightning damage.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide critical facilities and infrastructure
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduces damages and injuries. Ensures 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:	Lightning
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Health/Medical
Effect on new/existing buildings:	Reduce risk to existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000 - $300,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Kountze Public Works
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:

		City of Kountze– Action #4
	Proposed Action:	Implement education and awareness program utilizing social media to educate citizens of hazards that can threaten the area and mitigation measures to reduce injuries, fatalities, and property damages.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Promotes hazard awareness and protects residents from potential injuries and damages.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Educational and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind, Thunderstorm Wind, Tornado, Flood, Winter Storm, Extreme Heat, Hail, Lightning, Wildfire, Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication, Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,500 - $5,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Kountze Emergency Management
Implementation Schedule:	Within 1 year of plan adoption
Incorporation into Existing Plans:	N/A

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

	City of Kountze– Action #5
Proposed Action:	Install communication software at all critical water, wastewater, and natural gas facilities with supervisory control and data acquisition which can be viewed remotely.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical water, wastewater, and natural gas facilities
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damage, and injury. Ensures continuity of critical services during severe 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 Wind, Flood, Tornado, Winter Storm, Drought, Thunderstorm Wind, Lightning, Extreme Heat
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Kountze Public Works
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan, Drought Contingency Plan, Natural Gas Operations and Maintenance Plan, Water Operations and Maintenance Plan, Wastewater Operations and Maintenance Plan

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

	City of Kountze– Action #6
Proposed Action:	Equip sewer manholes with watertight covers and manhole guards.
BACKGROUND INFORMATION	
Site and Location:	City-wide
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, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$250,000 - $1,250,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Kountze Public Works
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Wastewater Operations and Maintenance Plan

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

		City of Kountze– Action #7
	Proposed Action:	Increase drainage capacity; add stormwater detention and / or retention basins as deemed necessary to reduce flood risk; add stormwater pumping stations in areas where gravity flow of stormwater is not feasible
	BACKGROUND INFORMATION	
	Site and Location:	Drainage infrastructure throughout the City of Kountze
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or fatalities to vulnerable populations.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$500,000 - $1,500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Kountze Public Works
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

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

	City of Kountze– Action #8
Proposed Action:	Relocate electric utility lines for all existing critical facilities underground. Require installation of underground electric utilities for all new construction of critical facilities.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities and utility lines
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of loss of electricity and damages to critical facilities and infrastructure. 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:	Hurricane Wind, Tornado, Hail, Lightning, Flood, Wildfire, Thunderstorm Wind, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$200,000 - $500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Kountze Public Works
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	All Operation and Maintenance Plans, Capital Improvement 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 Kountze– Action #9
Proposed Action:	Construct centralized shelters of last resort within the City of Kountze that are sited out of flood prone areas and designed for appropriate wind load in coordination with the Texas Safe Shelter Initiative.
BACKGROUND INFORMATION	
Site and Location:	City of Kountze- Site Location to be determined
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of injury and loss of life.
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 Wind, Thunderstorm Wind, Tornado, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Kountze and Kountze Emergency Management
Implementation Schedule:	Within 2 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Deferred action #1
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

		City of Kountze– Action #10
	Proposed Action:	Harden/retrofit critical facilities to hazard-resistant levels, include sites that can serve as cooling /warming centers.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages at critical facilities. Ensure continuity of critical services during and after event. Reduce risk of injury to emergency and critical personnel.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Kountze and Kountze Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan, Capital Improvement Plan

COMMENTS:
Deferred action #2 & 9
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

	City of Kountze– Action #11
Proposed Action:	Voluntary acquisition of Repetitive Loss and flood prone properties throughout City. Assist residents in relocating to safer locations within the City-limits.
BACKGROUND INFORMATION	
Site and Location:	City-wide, repetitive loss and flood prone properties
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Eliminate risk of flood damages to high risk structures and prevent future losses in high risk flood hazard areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Kountze and Kountze Emergency Management
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS:
Deferred action #3
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

		City of Kountze– Action #12
	Proposed Action:	Upgrade storm water capacity throughout the City. Actions include but are not limited to installing/upgrading culverts and headwalls, and enlarging storm water ditches and canals.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood damages through improve drainage capacity. Reduce risk of injuries to citizens.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$3,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Kountze and Kountze Emergency Management
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Deferred action #4
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

	City of Kountze– Action #13
Proposed Action:	Elevate roadways and bridges prone to inundation from flooding. Projects can include general road elevation; installing, upsizing culverts and headwalls; and bridge upgrades**.**
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damages, injuries and loss of life. Ensure access for emergency response.
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, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$600,000 - $2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Kountze and Kountze Emergency Management
Implementation Schedule:	Within 24-36 of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan, Evacuation Plan

COMMENTS:
Deferred action #5
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		City of Kountze– Action #14
	Proposed Action:	Build safe room shelters in public buildings capable of providing protection from severe weather events. Develop incentives and instruction for homeowners to construct/install residential safe shelters.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide critical facilities and fire departments
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk to citizens by providing shelters 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, Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind, Thunderstorm Wind, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000 - $80,000 per shelter
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Kountze and Kountze Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Deferred action #6

	City of Kountze– Action #15
Proposed Action:	Develop and upgrade a database system to maintain contact information for first responders, volunteers, and special needs populations.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities and fire departments
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce loss of life and injury.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Health/Medical, Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000 - $10,000
Potential Funding Sources:	Local Funds
Lead Agency/Department Responsible:	City of Kountze and Kountze Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan

COMMENTS:
Deferred action #8
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue caused by unforeseen events.

	City of Kountze– Action #16
Proposed Action:	Continue participation in the National Flood Insurance Program (NFIP) and participate in the Community Rating System (CRS). Activities may include: improvement of flood mapping and elevation data, mitigation for repetitive loss properties, instituting higher regulatory standards for future floodplain development, storm water management plans, and standards for future development to control runoff.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce flood insurance premiums for local residents. Reduce flood risk and build resiliency.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000 - $10,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Kountze and Kountze Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
Deferred action #7
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

CITY OF LUMBERTON

	City of Lumberton– Action #1
Proposed Action:	Storm water improvements within City of Lumberton. Actions include but are not limited to excavating, regrading, shaping, concrete lining, installing/upgrading culverts and headwalls, installing/upgrading storm sewer pipes/ditches to convey storm runoff and appurtenances.
BACKGROUND INFORMATION	
Site and Location:	City of Lumberton – Adler Ditch from Hwy 96, south to FM 421.
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood water contamination and risk of surface water infiltration and sewage backup. Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000,000 - $4,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lumberton Public Works
Implementation Schedule:	Within 18-24 of plan adoption
Incorporation into Existing Plans:	Drainage Plan

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

	City of Lumberton– Action #2
Proposed Action:	Storm water improvements within City of Lumberton. Actions include but are not limited to excavating, regrading, shaping, installing /upgrading culverts and headwalls, installing /upgrading storm sewer pipes/ditches and necessary appurtenances to divert storm run-off.
BACKGROUND INFORMATION	
Site and Location:	City of Lumberton – East of Village Creek Parkway
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood water contamination and risk of surface water infiltration and sewage backup. Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$3,000,000 - $6,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lumberton Public Works
Implementation Schedule:	Within 18-24 of plan adoption
Incorporation into Existing Plans:	Drainage Plan

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

	City of Lumberton– Action #3
Proposed Action:	Storm water improvements within City of Lumberton. Actions include but are not limited to excavating, regrading, shaping, concrete lining, installing /upgrading culverts and headwalls, installing /upgrading storm sewer pipes/ditches and necessary appurtenances to convey run-off.
BACKGROUND INFORMATION	
Site and Location:	City of Lumberton – Extension of Greens Branch Ditch west of Hwy 96
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood water contamination and risk of surface water infiltration and sewage backup. Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$400,000 - $800,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lumberton Public Works
Implementation Schedule:	Within 18-24 of plan adoption
Incorporation into Existing Plans:	Drainage Plan

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

	City of Lumberton– Action #4
Proposed Action:	Improvement of major outfall ditches with cement lining.
BACKGROUND INFORMATION	
Site and Location:	City of Lumberton –Hwy 96 to Chance Cut Off.
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood water contamination and risk of surface water infiltration and sewage backup. Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lumberton 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.

	City of Lumberton– Action #5
Proposed Action:	Continue participation in the National Flood Insurance Program (NFIP) and participate in the Community Rating System (CRS). Activities may include: improvement of flood mapping and elevation data, mitigation for repetitive loss properties, instituting higher regulatory standards for future floodplain development, storm water management plans, and standards for future development to control runoff.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce flood insurance premiums for local residents. Reduce flood risk and build resiliency.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Lumberton Floodplain Coordinator, Hardin County
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
Deferred action #10
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		City of Lumberton– Action #6
	Proposed Action:	Harden/retrofit critical facilities to hazard-resistant levels, include facilities that can serve as cooling/warming stations.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages at critical facilities. Ensure continuity of critical services during and after event. Reduce risk of injury to emergency and critical personnel and vulnerable populations.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,200,000 - $1,500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lumberton OEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan, Capital Improvement Plan

COMMENTS:
Includes deferred action #2 & 8
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

	City of Lumberton– Action #7	
	Proposed Action:	Voluntary acquisition of Repetitive Loss and flood prone properties throughout City. Assist relocation to safer locations within the City-limits.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide, repetitive loss and flood prone properties
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Eliminate risk of flood damages to high risk structures and prevent future losses in high risk flood hazard areas.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lumberton Administration, Hardin County
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan

COMMENTS:
Deferred action #1
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

		City of Lumberton– Action #8
	Proposed Action:	Construct water retention ponds to collect storm water run-off, reduce flooding and use as an alternate water source throughout the City.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide Site specific location at HWY FM 421
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood damages through improve drainage capacity. Reduce risk of injuries to citizens.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Drought, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	Reduce damages to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$8,000,000 - $10,000,000
Potential Funding Sources:	FEMA
Lead Agency/Department Responsible:	City of Lumberton Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	CWPP; Drainage Plan

COMMENTS:
Deferred action #3
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

	City of Lumberton– Action #9
Proposed Action:	Upgrade storm water capacity throughout the City. Actions include but are not limited to installing/upgrading culverts and headwalls, and enlarging storm water ditches and canals.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood damages through improve drainage capacity. Reduce risk of injuries to citizens.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$3,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lumberton Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Deferred action #4
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		City of Lumberton– Action #10
	Proposed Action:	Obtain and completed engineering study. Implement findings to elevate existing roadways and bridges prone to inundation from flooding. Projects can include general road elevation; installing, upsizing culverts and headwalls; and bridge upgrades.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide Site specific location at Taft Rd and Brushy Creek subdivision
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damage, injury and loss of life. Improve evacuation and emergency response.
	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, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$800,000 - $4,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lumberton Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Deferred action #5
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		City of Lumberton– Action #11
	Proposed Action:	Build safe room shelters in public buildings capable of providing protection from severe weather events.
	BACKGROUND INFORMATION	
	Site and Location:	Lumberton Event Center- 836 North Main St.
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk to citizens by providing shelters in high risk areas during extreme weather events.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Wind, Hurricane Wind, Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,600,000
Potential Funding Sources:	State of Texas Grant, Economic Development, and Surcharge/Tax
Lead Agency/Department Responsible:	City of Lumberton Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Deferred action #7
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

	City of Lumberton– Action #12
Proposed Action:	Develop and implement activities that would assist in efficient evacuations throughout the county including but not limited to improved signage, widening roads and bridges, traffic monitoring systems, and improved road connectivity.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damages, injuries and loss of life. Ensure access for emergency response. Improve public safety, facilitate evacuation and emergency response, and promote safe exit strategies for residents making evacuation process more efficient and safer.
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, Hurricane Wind, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lumberton Public Works, Police Department
Implementation Schedule:	Annual
Incorporation into Existing Plans:	CWPP, Emergency Management Plan

COMMENTS:
Deferred action #9
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

		City of Lumberton– Action #13
	Proposed Action:	Install frangible links/break away connection on utility poles in the City to maintain utility operation during and after hazard event.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damages and injures. 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, Tornado, Thunderstorm Wind, Hurricane Wind, Hail, Lightning, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$200,000 - $400,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Lumberton Public Works, Local Utility Companies
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan, Emergency Management Plan

COMMENTS:
Deferred action #6
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

CITY OF ROSE HILL ACRES

	City of Rose Hill Acres– Action #1
Proposed Action:	Develop drainage study to identify flood mitigation measures in and around Rise Hill Acres ETJ. Implement drainage improvements as identified in the study. Implementation may require the purchase of easements in the ETJ or a possible MOU to implement improvements.
BACKGROUND INFORMATION	
Site and Location:	City-wide ETJ Areas
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Eliminate risk of flood damages to high risk structures and prevent future losses in high risk flood hazard areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres OEM, Hardin County
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

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

	City of Rose Hill Acres– Action #2
Proposed Action:	Acquisition / Buy-out: Acquire and demolish flood-prone properties that are deemed Repetitive and Severe Repetitive Loss properties.
BACKGROUND INFORMATION	
Site and Location:	City-wide, repetitive loss and flood prone properties
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Eliminate risk of flood damages to high risk structures and prevent future losses in high risk flood hazard areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$200,000 - $5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hills Acres City Hall, Fire Department, Floodplain Administrator, Approved Contractor
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan; Flood Damage Prevention Ordinance

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

	City of Rose Hill Acres– Action #3
Proposed Action:	Construct centralized shelter(s) of last resort within the county that is elevated out of the flood prone area and designed for appropriate wind load, in coordination with the Texas Safe Shelter Initiative.
BACKGROUND INFORMATION	
Site and Location:	City-wide residential, municipal, and commercial structures
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk to citizens by providing shelters 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:	Flood, Hurricane Wind, Thunderstorm Wind, Winter Storm, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres Administration, Hardin County OEM, and coordinating with municipalities and ISDs
Implementation Schedule:	Within 2-3 years of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan, Emergency Management Plan

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

	City of Rose Hill Acres– Action #4
Proposed Action:	Elevate flood prone homes including electrical systems to or above the Base Flood Elevation.
BACKGROUND INFORMATION	
Site and Location:	City-wide residences located near Rivers, Bayous, Canals, and Creeks or other low lying areas subject to rising water and flooding.
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood damages to high risk structures and prevent future losses in high risk flood hazard areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres Administration, Hardin County OEM
Implementation Schedule:	Within 2-3 years of plan adoption
Incorporation into Existing Plans:	Flood Damage Prevention Ordinance

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

	City of Rose Hill Acres– Action #5
Proposed Action:	Educate homeowners and builders on the importance of maintaining defensible space around structures to prevent damage due to wildfires.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$30,000 - $40,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres Administration, Hardin County OEM, Fire Department
Implementation Schedule:	Within 1-5 years of plan adoption
Incorporation into Existing Plans:	CWPP

COMMENTS:

	City of Rose Hill Acres– Action #6
Proposed Action:	Harden/retrofit critical facilities to hazard-resistant levels, including designation of cooling / warming stations and to act as shelters during severe weather events.
BACKGROUND INFORMATION	
Site and Location:	City-wide facilities, including but not limited to Government and social service 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 personnel.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$60,000 - $80,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres Administration, Hardin OEM, social service agencies
Implementation Schedule:	Within 1-3 years 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.

	City of Rose Hill Acres– Action #7
Proposed Action:	Bury utility lines in order to maintain utility operation during and after a hazard event. Identify opportunities to install underground lines at time of construction for future development projects.
BACKGROUND INFORMATION	
Site and Location:	City-wide utility lines
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages to infrastructure. Ensure continuity of critical services during and after event. Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm Wind, Winter Storm, Tornado, Lightning, Hail
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$750,000 - $1,500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres Public Works, Local Utility Companies, Hardin County OEM
Implementation Schedule:	Within 1-5 years of plan adoption
Incorporation into Existing Plans:	Capital Improvement 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 Rose Hill Acres– Action #8
Proposed Action:	Upgrade storm water capacity throughout the City. Actions include but are not limited to installing/upgrading culverts and headwalls, and enlarging storm water ditches and canals.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood damages through improve drainage capacity. Reduce risk of injuries to citizens.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000 - $1,500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres City Hall, Public Works, Floodplain Administrator, Hardin County
Implementation Schedule:	Within 2-5 years of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan, Zoning Ordinances. Drainage Plan

COMMENTS:
Deferred action #1
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

	City of Rose Hill Acres– Action #9
Proposed Action:	Retrofit city critical facilities as needed including but not limited to installation of the following features for severe storm protection: storm shutters or tinted shatter-resistant laminate film for windows; roof straps and strengthening for high wind load; roll-up door reinforcement (i.e. fire stations); non-permeable exterior walls, door seals and flood-proofing measures; alternate power supply (generators); fold down alternate site antennas; security cameras; electrical surge protection; secure data back-up systems and critical equipment.
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:	Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$400,000 - $500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres City Hall, Public Works
Implementation Schedule:	Within 1-5 years of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan

COMMENTS:
Deferred action #2
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

	City of Rose Hill Acres– Action #10
Proposed Action:	Install box culvert, concrete pipe, or similar mechanism as needed to mitigate inadequate drainage and improve storm water capacity and conveyance.
BACKGROUND INFORMATION	
Site and Location:	City-wide road and bridges
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood damages through improve drainage capacity. Reduce risk of injuries to citizens.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$200,000 - $400,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres City Hall, Public Works
Implementation Schedule:	Within 1-3 years of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Deferred action #3
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

	City of Rose Hill Acres– Action #11
Proposed Action:	Upgrade flood control structures (barriers, berms) for the purpose of protecting critical facilities, potable water sources, and agricultural resources from water contamination and saltwater intrusion.
BACKGROUND INFORMATION	
Site and Location:	City-wide pumping stations, floodways, and critical facilities
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood damages through improve drainage capacity. Reduce risk of injuries to citizens.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,000,000 - $3,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres City Hall, Public Works, City Hall, Hardin County OEM, WCID #1
Implementation Schedule:	Within 1-3 years of plan adoption
Incorporation into Existing Plans:	Flood Management Plan, Emergency Management Plan, Drainage Plan

COMMENTS:
Deferred action #4
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

	City of Rose Hill Acres– Action #12
Proposed Action:	Rectify and enlarge main outfall channels including excavating interior roadside ditches and driveway culvert system.
BACKGROUND INFORMATION	
Site and Location:	City-wide, and bayou / creek properties
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or 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:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000 - $3,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres City Hall, Public Works, City Hall, Hardin County OEM, WCID #1
Implementation Schedule:	Within 1-3 years of plan adoption
Incorporation into Existing Plans:	Flood Management Plan, Drainage Plan

COMMENTS:
Deferred action #5
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

	City of Rose Hill Acres– Action #13
Proposed Action:	Build safe room shelters in town capable of providing protection from severe weather events. Develop incentives and instruction for homeowners to construct/install residential safe shelters.
BACKGROUND INFORMATION	
Site and Location:	City-wide residential, municipal, and commercial structures
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk to citizens by providing shelters in high risk areas during extreme weather events.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Tornado, Thunderstorm Wind, Hurricane Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reinforce structures to improve public safety
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000 - $80,000 per shelter
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres City Hall
Implementation Schedule:	Within 1-2 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Deferred action #6

	City of Rose Hill Acres– Action #14
Proposed Action:	Elevate roadways and bridges prone to inundation from flooding. Projects can include general road elevation; installing, upsizing culverts and headwalls; and bridge upgrades.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damage, injury and loss of life. Improve public safety, facilitate evacuation and emergency response.
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, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures. Improve access and egress to residents during high water events
Priority (High, Moderate, Low):	High
Estimated Cost:	$600,000 - $1,800,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres City Hall, Floodplain Administrator, Public Works
Implementation Schedule:	Within 1-5 years of plan adoption
Incorporation into Existing Plans:	Infrastructure development and Zoning Ordinance, Capital Improvement Plan

COMMENTS:
Deferred action #7
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

City of Rose Hill Acres– Action #15	
Proposed Action:	Develop and implement activities that would assist in efficient evacuations throughout the county including but not limited to improved signage, widening roads and bridges, traffic monitoring systems, and improved road connectivity
BACKGROUND INFORMATION	
Site and Location:	City-wide; Specific to intersections, one way street routing and signage fixed and portable to facilitate traffic flow.
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damages, injuries and loss of life. Ensure access for emergency response. Improve public safety, facilitate evacuation and emergency response, and promote safe exit strategies for residents making evacuation process more efficient and safer.
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, Hurricane Wind, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres City Hall, Public Works, Hardin County OEM
Implementation Schedule:	Within 1-5 years of plan adoption
Incorporation into Existing Plans:	CWPP, Emergency Management Plan

COMMENTS:
Deferred action #8
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

	City of Rose Hill Acres– Action #16
Proposed Action:	Widen and reinforce critical bridges throughout the town to reduce damages and assist evacuation.
BACKGROUND INFORMATION	
Site and Location:	City-wide: 69/96 feeder road N. and S. bound lanes in Drafting and Engineering stage (TxDOT)
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Improve public safety, facilitate evacuation and emergency response.
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, Hurricane Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000,000 - $10,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres OEM, Public Works, Hardin County OEM, TxDOT
Implementation Schedule:	Within 1-5 years of plan adoption
Incorporation into Existing Plans:	Capital Improvement Plan, Emergency Management Plan, Evacuation Plan

COMMENTS:
Deferred action #9
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

		City of Rose Hill Acres– Action #17
	Proposed Action:	Continue participation in the National Flood Insurance Program (NFIP) and participate in the Community Rating System (CRS). Activities may include: improvement of flood mapping and elevation data, mitigation for repetitive loss properties, instituting higher regulatory standards for future floodplain development, storm water management plans, and standards for future development to control runoff.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce flood insurance premiums for local residents. Reduce flood risk and build resiliency.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Rose Hills Acres City Hall, Floodplain Management
Implementation Schedule:	Within 1 year of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
Deferred action #10
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

	City of Rose Hill Acres– Action #18
Proposed Action:	Install frangible links/break away connections on utility poles to maintain utility operation during and after a hazard event.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages to infrastructure. Ensure continuity of critical services during and after event. Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Tornado, Thunderstorm Wind, Hail, Lightning, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000 - $100,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres Town Hall, Public Works, and utility companies
Implementation Schedule:	Within 1-2 years of plan adoption
Incorporation into Existing Plans:	City Emergency Management Plan

COMMENTS:
Deferred action #11
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue to provide services during a power outage caused by unforeseen events.

	City of Rose Hill Acres– Action #19
Proposed Action:	Construct shelters throughout the City that are sited out of flood prone areas and designed for the appropriate wind load in compliance with the safe shelter initiative.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk to citizens by providing shelters in high risk areas during extreme weather events, with additional consideration for special needs and disabled population.
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, Hurricane Wind, Tornado
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$750,000-$1,500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Rose Hill Acres Town Hall, Public Works
Implementation Schedule:	Within 2-5 years of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Deferred action #12
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

CITY OF SILSBEE

	City of Silsbee– Action #1
Proposed Action:	Upgrade drainage ditches and explore converting necessary ditches into curb / sewer construction.
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. Reduce risk of injuries or fatalities to vulnerable populations.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Silsbee 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 communities and reduces risk of flooding.

		City of Silsbee– Action #2
	Proposed Action:	Explore and implement flood mitigation strategies within the Hendrix Development.
	BACKGROUND INFORMATION	
	Site and Location:	Hendrix Development
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damages and injury. Enhances response for emergency responders.
	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, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Silsbee Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan, Capital Improvement Plan

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

		City of Silsbee– Action #3
	Proposed Action:	Upgrade sewage and water infrastructure throughout city.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	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, Drought, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Silsbee Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan, Capital Improvement Plan

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

		City of Silsbee– Action #4
	Proposed Action:	Implement drainage improvements. Actions can include but are not limited to installing/upgrading culverts and headwalls as well as enlarging storm water ditches and canals.
	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. Reduce risk of injuries or 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:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$100,000 - $1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Silsbee Public Works
Implementation Schedule:	Within 12-36 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.

	City of Silsbee– Action #5
Proposed Action:	Construct Emergency Community / Hurricane Shelter to facilitate emergency responders and vulnerable populations during severe weather events.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of injury. Enhances emergency response within the community.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hurricane Wind, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants, CDBG-MIT
Lead Agency/Department Responsible:	City of Silsbee OEM
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan

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

		City of Silsbee– Action #6
	Proposed Action:	Construct public community safe rooms (per FEMA 361 construction guidelines) that can also serve as multi-purpose community centers.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of injury. Enhances emergency response within the community.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hurricane Wind, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Silsbee OEM
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan

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

		City of Silsbee– Action #7
	Proposed Action:	Update drainage system within the flood prone area of Easy Street.
	BACKGROUND INFORMATION	
	Site and Location:	Easy Street, Silsbee TX
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages caused by flooding by maintaining or restoring drainage capacity. Reduce risk of injuries or fatalities to vulnerable populations.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000
Potential Funding Sources:	Local Funds, State and Federal Grants, GLO
Lead Agency/Department Responsible:	City of Silsbee OEM
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan

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

		City of Silsbee– Action #8
	Proposed Action:	Harden/retrofit critical facilities to hazard-resistant levels, including cooling/warming stations.
	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:	Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,500,000
Potential Funding Sources:	Local Funds, State and Federal Grants, General Revenue, GLO
Lead Agency/Department Responsible:	City of Silsbee Administration, Public Works, Roads and Bridges
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Deferred action #1
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

		City of Silsbee– Action #9
	Proposed Action:	Voluntary acquisition of Repetitive Loss and flood prone properties throughout the City. Assist relocation to safer locations within city limits. Property then acquired and held as open space for perpetuity.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide, repetitive loss and flood prone properties, consider additional properties around the 100 block of Easy Street
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Eliminate risk of flood damages to high risk structures and prevent future losses in high risk flood hazard areas.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$200,000 - $500,000 per structure
Potential Funding Sources:	Local Funds, State and Federal Grants, GLO
Lead Agency/Department Responsible:	City of Silsbee Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Comprehensive Plan

COMMENTS:
Deferred action #2
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

		City of Silsbee– Action #10
	Proposed Action:	Upgrade storm water capacity throughout the City. Actions include but are not limited to installing/upgrading culverts and headwalls and enlarging storm water ditches and canals.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide culverts and additional infrastructures
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood damages through improve drainage capacity. Reduce risk of injuries to citizens.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000 - $1,500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Silsbee Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Deferred action #3
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		City of Silsbee– Action #11
	Proposed Action:	Construct water retention ponds to regulate storm water run-off, reduce flooding and use as an alternate water source throughout the City.
	BACKGROUND INFORMATION	
	Site and Location:	Site location to be determined with City-limits
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood damages through improve drainage capacity. Reduce risk of injuries to citizens.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Flood, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	Reduce damages to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $2,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Silsbee Public Works
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Deferred action #4
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		City of Silsbee– Action #12
	Proposed Action:	Continue participation in the National Flood Insurance Program (NFIP) and participate in the Community Rating System (CRS). Activities may include: improvement of flood mapping and elevation data, mitigation for repetitive loss properties, instituting higher regulatory standards for future floodplain development, storm water management plans, and standards for future development to control runoff.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce flood insurance premiums for local residents. Reduce flood risk and build resiliency.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$25,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Silsbee Floodplain Management
Implementation Schedule:	Ongoing
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
Deferred action #5
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

CITY OF SOUR LAKE

	City of Sour Lake– Action #1
Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities and infrastructure.
BACKGROUND INFORMATION	
Site and Location:	City-wide critical facilities and infrastructure including but not limited to: Community Center (Centralized Shelter), Library and Warehouse
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:	Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$400,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sour Lake Administration and OEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management 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 Sour Lake– Action #2
	Proposed Action:	Construct Law Enforcement Center "EOC, LE & Fire Communication Center & First Responder Shelter" within the city, which is elevated out of the flood prone area and designed for appropriate wind load and natural hazard protections.
	BACKGROUND INFORMATION	
	Site and Location:	Law Enforcement Center "EOC, LE & Fire Communication Center & First Responder Shelter
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damages. Ensure continuity of critical services during a severe weather event.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$3,000,000 - $5,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sour Lake Police, Fire and OEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Mitigation Action Plan, Emergency Response Plan

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

		City of Sour Lake– Action #3
	Proposed Action:	Rectify, enlarge, and maintain outfall channels for the City of Sour Lake, including excavating interior roadside ditches.
	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. Reduce risk of injuries or fatalities to vulnerable populations.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sour Lake Public Works, OEM
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Mitigation Action Plan, Emergency Response Plan

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

		City of Sour Lake– Action #4
	Proposed Action:	Harden/retrofit and/or remodel Sour Lake Community Center (Centralized Shelter) for temporary living quarters for emergency personnel during disaster.
	BACKGROUND INFORMATION	
	Site and Location:	Community Center (Centralized Shelter)
	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:	Hurricane Wind, Flood, Thunderstorm Wind, Winter Storm, Wildfire, Tornado, Lightning
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sour Lake Police, Fire, OEM, HCESD#5
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Mitigation Action Plan, Emergency Response Plan

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

		City of Sour Lake– Action #5
	Proposed Action:	Harden/retrofit and/or remodel Sour Lake Fire Department (SAR HQ/POD) by upgrading existing backup power supply and renovating to comply with ADA Standards.
	BACKGROUND INFORMATION	
	Site and Location:	Sour Lake Fire Department (SAR HQ/POD)
	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:	Hurricane Wind, Flood, Thunderstorm Wind, Winter Storm, Wildfire, Tornado, Lightning
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sour Lake Police, Fire, OEM, HCESD#5
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Mitigation Action Plan, Emergency Response Plan

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

	City of Sour Lake– Action #6
Proposed Action:	Construct an elevated helipad/parking lot, accessible from the Community Center and SL Fire Dept. for evacuation, supply distribution and medical evacuation during an emergency on existing city owned property.
BACKGROUND INFORMATION	
Site and Location:	Site to be determined within city-limits
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Ensure continuity of critical services during and after event. Reduce risk of injury to residents, 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:	Hurricane Wind, Flood, Thunderstorm Wind, Winter Storm, Wildfire, Tornado, Lightning
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Health/Medical
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$250,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sour Lake Police, Fire, OEM, HCESD#5
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Mitigation Action Plan, Emergency Response Plan

COMMENTS:
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Helps ensure critical facilities continue caused by unforeseen events. Promotes public safety.

		City of Sour Lake– Action #7
	Proposed Action:	Construct water retention ponds to collect storm water run-off, reduce flooding and use as an alternate water source throughout the City.
	BACKGROUND INFORMATION	
	Site and Location:	Specific site location to be determined within City limits
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood damages through improve drainage capacity. Reduce risk of injuries to citizens.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Flood, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce damages to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,000,000 - $7,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sour Lake Public Works
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Deferred action #1
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		City of Sour Lake– Action #8
	Proposed Action:	Continue participation in the National Flood Insurance Program (NFIP) and participate in the Community Rating System (CRS). Activities may include: improvement of flood mapping and elevation data, mitigation for repetitive loss properties, instituting higher regulatory standards for future floodplain development, storm water management plans, and standards for future development to control runoff.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce flood insurance premiums for local residents. Reduce flood risk and build resiliency.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Sour Lake Floodplain Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Floodplain Management Plan

COMMENTS:
Deferred action #2
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

		City of Sour Lake– Action #9
	Proposed Action:	Install large concrete channel, box culvert, concrete pipe, and/or mechanisms as needed to mitigate drainage ditch erosion and improve water capacity and conveyance.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of flood damages through improve flood control measures. Reduce risk of injuries to citizens.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$400,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sour Lake Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Drainage Plan

COMMENTS:
Deferred action #3
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects communities and reduces risk of flooding.

		City of Sour Lake– Action #10
	Proposed Action:	Educate the public on issues related to the inappropriate discharge of hazardous materials and wastewater in the environment and the impacts it has on the waterways. This can be through training, handouts/brochures, and media outlets.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of injury and loss of life. Reduce risk of damages.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Communication
Effect on new/existing buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sour Lake Emergency Management
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS:
Deferred action #4
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

		City of Sour Lake– Action #11
	Proposed Action:	Bury existing utility lines for existing buildings to mitigate hazard impacts and prevent loss of function. Require power lines to be buried for future development projects.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages to infrastructure. Ensure continuity of critical services during and after event. Reduce risk of injuries or fatalities to vulnerable populations.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Wildfire, Winter Storm, Tornado, Hail, Lightning, Thunderstorm Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety/Security, Energy (Power/Fuel)
Effect on new/existing buildings:	Reduce risk to existing and new structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$200,000 - $1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sour Lake Public Works, Local Power Companies
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

COMMENTS:
Deferred action #6

		City of Sour Lake– Action #12
	Proposed Action:	Harden/retrofit critical facilities to hazard-resistant levels.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages at critical facilities. Ensure continuity of critical services during and after event. Reduce risk of injury to emergency and critical personnel.
	Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000 - $1,000,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sour Lake Public Works
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Disaster Response Plan

COMMENTS:
Deferred action #5
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

		City of Sour Lake– Action #13
	Proposed Action:	Identify and pursue mitigation activities that would assist in efficient evacuations throughout the county including but not limited to improved signage, widening roads and bridges, traffic monitoring systems, and improved road connectivity.
	BACKGROUND INFORMATION	
	Site and Location:	City-wide
	Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damages, injuries and loss of life. Ensure access for emergency response.
	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, Hurricane Wind, Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	Reduce risk to existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$150,000 - $500,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sour Lake Administration, Hardin County ESD#5
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Evacuation Plan

COMMENTS:
Deferred action #7
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Promotes public safety.

	City of Sour Lake– Action #14
Proposed Action:	Install/ improve signage to notify public when Burn Ban is activated. Improve enforcement through education and coordination.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Drought
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Communication, Safety and Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sour Lake Administration
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

COMMENTS:
Deferred action #8

	City of Sour Lake– Action #15
Proposed Action:	Remove structures from flood prone areas throughout the city. Acquire properties for demolishing and maintaining open space or through elevation.
BACKGROUND INFORMATION	
Site and Location:	City-wide, repetitive loss and flood prone properties
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Eliminate risk of flood damages to high-risk structures and prevent future losses in high risk flood hazard areas.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure, Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$200,000 - $500,000 per structure
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sour Lake Floodplain Management
Implementation Schedule:	Within 12-60 months of plan adoption
Incorporation into Existing Plans:	HCFPM Plans

COMMENTS:
Deferred action #9
NFIP & WHY MITIGATION ACTION IS APPROPRIATE:
Protects infrastructure, reduces cost of reparation and prevents injury to residents.

	City of Sour Lake– Action #16
Proposed Action:	Educate homeowners and builders on the importance of maintaining defensible space surrounding structures to prevent damage.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce risk of damages, injuries and loss of life. Ensure access for emergency response.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security, Communication
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructures
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	City of Sour Lake Administration
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Community Wildfire Protection Plan

COMMENTS:
Deferred action #10

	City of Sour Lake– Action #17
Proposed Action:	Develop local ordinance for mobile home tie-down and anchoring systems and build capacity to conduct periodic inspections.
BACKGROUND INFORMATION	
Site and Location:	City-wide
Risk Reduction Benefit (Current Cost/Losses Avoided)**:**	Reduce damages to structures and infrastructure. Reduce risk of injuries or fatalities.
Type of Action: (Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Thunderstorm Wind, Tornado, Hurricane Wind
Community Lifeline (Safety/Security, Health/Medical, Energy (Power/Fuel), Communication):	Safety and Security
Effect on new/existing buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$50,000
Potential Funding Sources:	Local Funds (staff time)
Lead Agency/Department Responsible:	City of Sour Lake Administration, Hardin County
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Local Ordinances

COMMENTS:
Deferred action #11

SECTION 18: PLAN MAINTENANCE

PLAN MAINTENANCE PROCEDURES

The following is an explanation of how the participating jurisdictions within Hardin 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 Hardin 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 Hardin 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.

SECTION 18: PLAN MAINTENANCE

Participating jurisdictions within Hardin 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. 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, 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.

Hardin County is committed to supporting the participating jurisdictions as they implement their mitigation actions. Planning team members will review and revise, as necessary, the long-range goals and objectives in strategic plan and budgets to ensure that they are consistent with this mitigation action plan. Additionally, the Planning Area will work to advance the goals of this hazard mitigation plan through its routine, ongoing, long-range planning, budgeting, and work processes.

Table 18-1 identifies types of planning mechanisms and examples of methods for incorporating the Plan Update into other planning efforts. The team members, listed in Table 18-2 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 18-1. Methods of Incorporation of the Plan

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
Annual Budget Review	Hardin County: EMC City of Kountze: Public Works Director City of Lumberton: City Manager City of Rose Hill Acres: EMC City of Silsbee: EMC City of Sour Lake: EMC / Chief of Police	Various departments and key personnel that participated in the planning process for participating jurisdictions within Hardin 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.

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
Capital Improvement Plans	City of Kountze: Public Works Director City of Lumberton: City Manager City of Rose Hill Acres: EMC City of Silsbee: EMC	Participating jurisdictions within Hardin County have a Capital Improvement Plan (CIP) in place. Prior to any revisions to the CIP, County and 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 Lumberton: City Manager City of Rose Hill Acres: EMC City of Silsbee: EMC	Participating jurisdictions within Hardin County have Long-term Comprehensive Development Plans in place. Since comprehensive plans involve developing a unified vision for a community, the mitigation vision and goals of the Plan will be reviewed in the development or revision of a Comprehensive Plan.
Floodplain Management Plans	Hardin County: Floodplain Administrator City of Kountze: Floodplain Administrator City of Lumberton: Floodplain Administrator City of Rose Hill Acres: Floodplain Administrator City of Silsbee: Floodplain Administrator City of Sour Lake: 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 6 of this Plan Update discussing the people and property at risk to flood will be reviewed and revised when participating jurisdictions within Hardin County update their management plans or develops new plans.
Grant Applications	Hardin County: EMC City of Kountze: Public Works Director City of Lumberton: City Manager City of Rose Hill Acres: EMC City of Silsbee: EMC City of Sour Lake: EMC / Chief of Police	The Plan will be evaluated by participating jurisdictions within Hardin 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	Hardin County: EMC City of Kountze: Public Works Director City of Lumberton: City Manager	Currently, participating jurisdictions within Hardin County have regulatory plans in place, such as Emergency Management Plans, Continuity of

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
	City of Rose Hill Acres: EMC City of Silsbee: EMC City of Sour Lake: EMC / Chief of Police	Operations Plans, Land Use Plans, and Evacuation Plans. The Plan Update will be consulted when County and 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 18-2 indicates the department and title of the party responsible for Plan monitoring, evaluating, updating, and review of the Plan.

Table 18-2. Team Members Responsible for Plan Monitoring, Evaluating, Updating, and Review of the Plan

JURISDICTION	TITLE
Hardin County	Emergency Management Coordinator
City of Kountze	Public Works Director
City of Lumberton	City Manager
City of Rose Hill Acres	Emergency Management Coordinator
City of Silsbee	Emergency Management Coordinator
City of Sour Lake	Emergency Management Coordinator / Chief of Police

MONITORING

Designated Planning Team members are responsible for monitoring, evaluating, updating, and reviewing the Plan, as shown in Table 18-2. Individuals holding the title listed in Table 18-2 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.

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 Hardin County Hazard Mitigation Action Plan Update 2022. Material changes to mitigation actions or major changes in the overall direction of the Plan or the policies contained within it, must be subject to formal adoption by the participating jurisdictions.

The participating jurisdictions within Hardin 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 Hardin 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 participating jurisdictions' websites, where officials and the public are invited to provide ongoing feedback, via email.

The Planning Team may also designate voluntary citizens from the planning area or willing stakeholder members from the private sector businesses that were involved in the Plan's development to provide feedback on an annual basis. It is important that stakeholders and the immediate community maintain a vested interest in preserving the functionality of the planning area as it pertains to the overall goals of the mitigation plan. The Planning team is responsible for notifying stakeholders and community members on an annual basis and maintaining the Plan.

Media, including local newspaper and radio stations, will be used to notify the public of any maintenance or periodic review activities during the implementation, monitoring, and evaluation phases. Additionally, local news media will be contacted to cover information regarding Plan updates, status of grant applications, and project implementation. Local and social media outlets, such as Facebook and Twitter, will keep the public and stakeholders apprised of potential opportunities to fund and implement mitigation projects identified in the Plan.

APPENDIX A: LOW RISK AND MANMADE HAZARDS

OVERVIEW

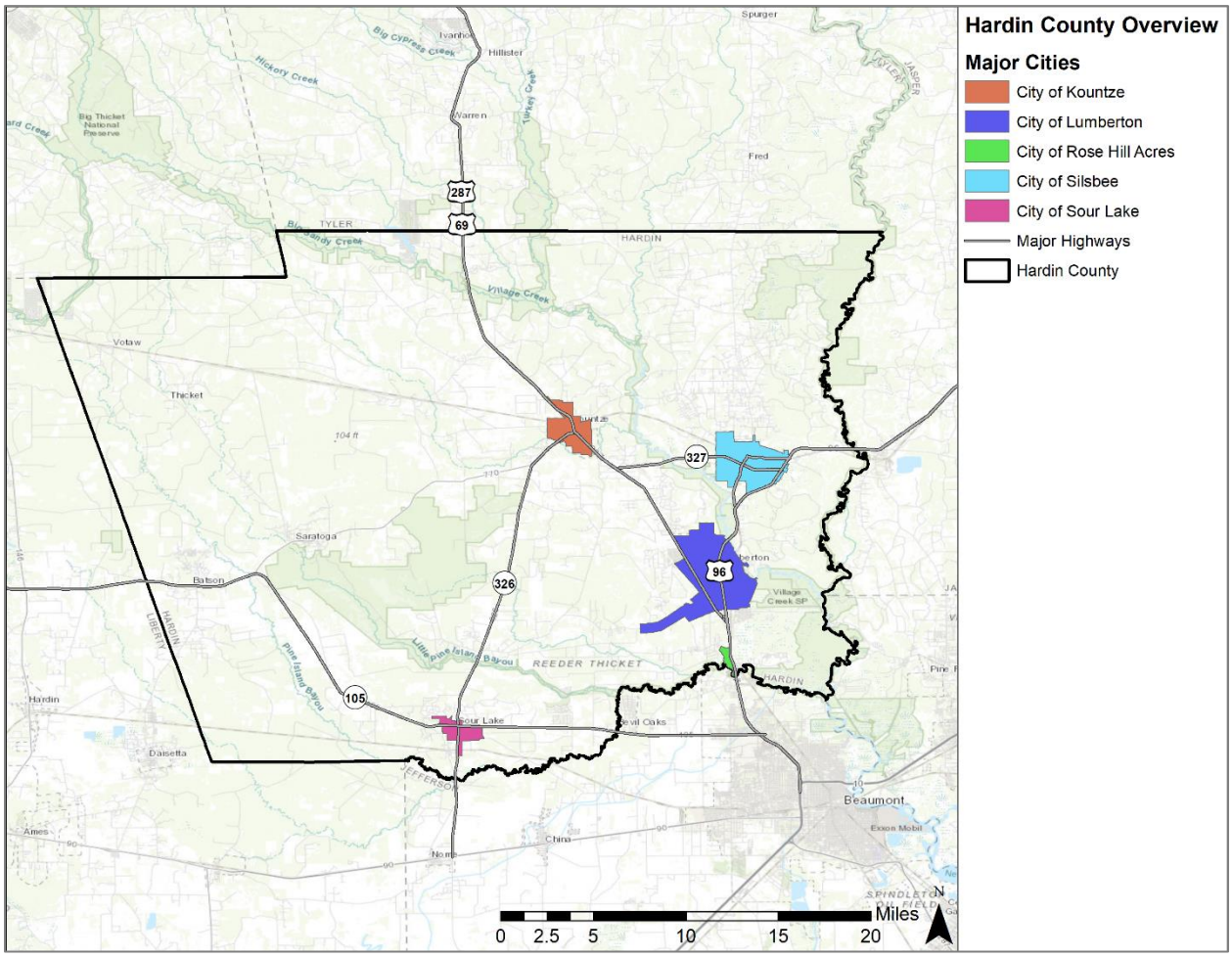
During the early stages of the planning process the team analyzed several natural hazards that were considered low risk. These hazards include Earthquake, Tsunami, Dam Failure and Geologic Hazards. In addition, the team reviewed technological hazards including Hazardous Material Incidents, Terrorism, and Water Contamination. A description of the hazard and Hardin County's overall vulnerability to that hazard was developed. Annualized loss data is provided where available and impact is addressed looking at the warning time or potential speed of onset of the hazard, where appropriate.

None of these hazards have had reported damages to any of the critical facilities for the Hardin County planning area, therefore the planning area has not had any impact due to these hazards nor do they pose a risk to the critical services provided. In the 44 CFR 201.6(c)(2)(i) & 44 CRF 201.6(c)(2)(iii) the intent is to, "To understand the potential and chronic hazards affecting the planning area in order to identify which hazard risks are most significant (…),". Based on the intent, it is the participating jurisdictions belief that earthquakes, tsunamis, geologic hazards, and dam failure are not hazards that are most significant to the jurisdiction. During public outreach none of these hazards were a concern of the public population.

STUDY AREA DEFINITION

All areas of Hardin County and participating jurisdictions and entities are included. Figure A-1 shows the study area for the Hardin County HMAP Update.

Figure A-1. Hardin County Study Area



HAZARD PROFILES, VULNERABILITY, AND IMPACT

Each low risk natural hazard includes a description of the hazard and a summary of the planning area's risk. For each of the three technological hazards, a description of the hazard and Hardin County's overall vulnerability to that hazard was developed. Impact is addressed looking at the warning time or potential speed of onset of the hazard. Impact statements are defined in Table A-1 below.

Table A-1. 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 for at least two weeks. More than 25 percent of property destroyed or with major damage.

POTENTIAL SEVERITY	DESCRIPTION
Minor	Injuries and illnesses do not result in permanent disability. Complete shutdown of critical facilities for more than 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.

The term “technological hazards” refers to the origins of incidents that can arise from human activities such as (for the purposes of this risk assessment) the use of gas and oil pipeline and their manufacture, transportation, and storage. The use of hazardous materials across all industries is a technological hazard, as well as water contamination and acts of terrorism.

The scope of this risk assessment assumes that hazardous material incidents and water contamination events addressed in this section would be accidental in nature and that their consequences are unplanned and unintended.

GEOLOGIC HAZARD

A geologic hazard is a natural geologic event that can endanger human lives and threaten property and infrastructure. While geologic hazards are by definition a natural event, they can be caused or exacerbated by human activities. For the purpose of this hazard mitigation action plan update for Hardin County, included in this hazard type are riverine erosion, landslides, and land subsidence (sinkholes). The U.S. Geological Survey (USGS) serves as the primary data and forecasting source for geologic hazards.

Riverine erosion is defined as downstream flow, shifting, or removal of sediment from a watershed. Caving river and stream banks are common associations with the migration of river channel alignment, and can threaten structures, undermine bridge foundations, and pose public safety risk.

Landslide is a general term used to describe the process of movement of material (i.e., soil, rock, mud, etc.) down a slope by falling, sliding or flowing under the force of gravity. The major causes of landslides are earthquakes, volcanic eruptions, or extreme rain events. Landslides are commonly associated with areas of steep slopes, but can also occur in relatively level topography on un-retained constructed slopes and dirt embankments. Sloughing fill material can cause property and infrastructure damage, and indirectly threaten public safety.

Land Subsidence can occur either gradually or dramatically (as in sinkhole occurrence), and refers to the loss of surface elevation due to remove of subsurface support. Land subsidence can be caused by crustal deformation; sediment compaction; withdrawal of groundwater, hydrocarbons (crude oil and natural gas), geothermal fluids or minerals (Sulphur); or increased surface load associated with high-rise buildings.

All three geologic hazards were researched for previous occurrences. Impacts of geologic hazards in Hardin County are not widespread, and historically have been limited to negligible land loss along creeks, tributaries and rivers such as the Neches River. Probability of future events is considered unlikely. Due to relatively isolated occurrence of impacts and no recorded occurrence

of damages, injuries or fatalities, the hazard is considered to have a negligible impact on the planning area and is therefore considered a nuisance.

TSUNAMI

The National Oceanic and Atmospheric Administration (NOAA) describes a tsunami as a series of ocean waves generated by sudden displacements in the sea floor, landslides, volcanic activity or other large, abrupt disturbance of the sea-surface. Tsunamis have reached heights of more than 100 feet. As the waves approach shallow coastal waters, they appear normal and the speed decreases. If the disturbance is close to the coastline, tsunamis can demolish coastal communities within minutes, and a large disturbance can cause inundation and destruction thousands of miles away from its epicenter.

The USGS monitors earthquakes through network of seismic detectors. This information is critical to understand when a tsunami wave might be generated. The USGS and NOAA's National Ocean Service has the responsibilities for providing ocean bathymetry, coastlines and topography. The information is critical to understand how and where a tsunami wave will come ashore. NOAA research develops models that forecast tsunami impacts and create inundation maps of modeled events. NOAA research provides the forecast models to the NOAA's Weather Service forecasters and the inundation models and maps to state and national planner and emergency managers. NOAA monitors sea height through a network of buoys and tide gauges. This information is critical to understand the height a tsunami wave may be when it comes ashore. NOAA completed the original 6-buoy operational array in 2001 and expanded to a full network of 30 stations in March 2008 which includes the Gulf of Mexico.

According to the National Oceanic and Atmospheric Administration (NOAA), since 1900, over 200 tsunami events have affected the coasts of the United States and its territories, causing more than 500 deaths. Tsunami events are well documented in the Pacific Ocean Basin. Tsunamis have also occurred in the Gulf of Mexico. In 1991, a magnitude 7.6 earthquake in Costa Rica produced a six foot high tsunami that flooded nearly 1,000 feet inland on the Caribbean side of the country. The Caribbean also has a number of active submarine volcanoes and fault systems that are capable of producing large earthquakes like that in Haiti, which could generate a tsunami. There are no recorded occurrences of tsunami impacts in Hardin County.

The National Tsunami Hazard Mitigation Program produced an assessment in August 2008 that assigned a "very low" hazard classification for the U.S. Gulf Coast based on previous frequency and local earthquake probability. Probability of future events is considered unlikely. Overall vulnerability to tsunami is considered very low based on the inland location of Hardin County and the remote potential for causal.

DAM FAILURE

Dams are water storage, control, or diversion structures that impound water upstream in reservoirs. Dam failure can take several forms, including a collapse of or breach in the structure. While most dams have storage volumes small enough that failures have few or no repercussions, dams storing large amounts can cause significant flooding downstream. Currently, there are 2 dams located in Hardin County and both are classified as "low-hazard" dams (Table A-2).

Table A-2. Hardin County Dam Survey

JURISDICTION	DAM NAME	HEIGHT (ft.)	STORAGE (Acre ft.)	POTENTIAL HAZARD CLASSIFICATION
Hardin County	Lake Kimble Dam	23	500	Low
Hardin County	Saratoga Salt Retention Pond Dam	8	800	Low

The extent or magnitude of a dam failure event is described in terms of the classification of damages that could result from a dam's failure; not the probability of failure. As of 2009, the National Interagency Committee on Dam Safety defines high hazard dams as those where failure or mis-operation would cause loss of human life. Prior to 2009, high hazard dams were defined as those at which failure or mis-operation would probably cause loss of human life. Dams classified as "significant" were those at which failure or mis-operation probably would not result in loss of human life but could cause economic loss, environmental damage, and disruption of lifeline facilities or other significant damage. Low hazard potential dams were those at which failure or mis-operation probably would not result in loss of human life but would cause limited economic and/or environmental losses. Losses would be limited mainly to the owner's property. Classifications for extent after 2009 are found in Table A-3 below.

Table A-3. Extent Classifications

HAZARD POTENTIAL CLASSIFICATION	LOSS OF HUMAN LIFE	DAM STORAGE CAPACITY
Low	None Expected	Less than 10,000 acre-feet
Significant	Probable (1 to 6)	Between 10,000 and 100,000 acre-feet
High	Loss of Life Expected (7 or More)	100,000 acre-feet or more

Both dams in the planning area have an extent classification of "Low" due to the small size and limited capacity of each dam. There has not been a recorded dam failure event for the entire Hardin County planning area, including all participating jurisdictions. The planning area has no history of damages due to dam failure and no future damages are anticipated. A breach at either dam would not result in injuries or loss of life and damages to structures, or infrastructure is not anticipated. Based on the probability of future occurrences and magnitude/severity, the overall vulnerability is considered low, and the hazard is considered to have a negligible impact on the planning area.

EARTHQUAKE

An earthquake is a sudden motion or trembling of the earth caused by an abrupt release of stored energy in the rocks beneath the earth's surface. The energy released results in vibrations known as seismic waves that are responsible for the trembling and shaking of the ground during an earthquake. Ground motion is expressed as peak ground acceleration (PGA). PGA is expressed as a percent of gravity or "g".

Earthquakes are typically described in terms of magnitude and intensity. The traditional measurement of amplitude of the seismic wave through the assignment of a single number to quantify the amount of seismic energy released by an earthquake is the Richter scale. The intensity of how strong the shock was felt at a particular location is the Modified Mercalli Intensity (MMI) scale. The scale quantifies the effects of an earthquake on the Earth's surface, humans, objects of nature and man-made structures. Table A-4 below is a combined earthquake magnitude and intensity comparison from the United States Geological Survey.

Table A-4. Earthquake Magnitude/Intensity Comparison[1]

PGA (% g)	Magnitude (Richter)	Intensity (MMI)	Description
<0.17	1.0 - 3.0	I	**I**. Not felt except by a very few under especially favorable conditions.
0.17 - 1.4	3.0 - 3.9	II - III	**II**. Felt only by a few persons at rest, especially on upper floors of buildings. **III**. Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
1.4 - 9.2	4.0 - 4.9	IV - V	**IV**. Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably. **V**. Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
9.2 - 34	5.0 - 5.9	VI - VII	**VI**. Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight. **VII**. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
34 - 124	6.0 - 6.9	VII - IX	**VIII**. Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. **IX**. Damage considerable in specially designed structures; well-designed frame structures thrown

[1] Source: Wald, D., et al., 1999, "Relationship between Peak Ground Acceleration, Peak Ground Motion, and Modified Mercalli Intensity in California," *Earthquake Spectra*, v. 15, p. 557 – 564.
USGS Magnitude/Intensity Comparison http://earthquake.usgs.gov/learn/topics/mag_vs_int.php

PGA (% g)	Magnitude (Richter)	Intensity (MMI)	Description
			out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
>124	7.0 and higher	VIII or higher	**X**. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent. **XI**. Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly **XII**. Damage total. Lines of sight and level are distorted. Objects thrown into the air.

There are no recorded earthquakes with epicenters in Hardin County, and the planning area is roughly 80-100 miles south from the region of recent (minor) seismic activity in east Texas and 120-150 miles northeast of recent (minor) seismic activity in south central Texas. The annual probability for earthquakes capable of structural damage in the planning area is considered very low. The magnitude or intensity of a potential earthquake in the planning area based on historical data is an Intensity level of I or II (Table A-4). Based on the probability of future occurrences and magnitude/severity the overall vulnerability is considered low and the hazard is considered to have a negligible impact on the planning area.

WATER CONTAMINATION

HAZARD PROFILE

Water Contamination is the introduction of point and non-point source pollutants into public ground and/or surface water supplies. Microbiological and chemical contaminants can enter water supplies. Chemicals can leach through soils from leaking underground storage tanks, feedlots and waste disposal sites. Human wastes and pesticides can also be carried into surface waters during high water events.

The Environmental Protection Agency (EPA) is the federal agency authorized to protect the environment and public health. Congress writes the laws and the President signs them into law. The EPA is a regulatory agency with the duty to prepare administrative rules and procedures on how these laws and Presidential Executive Orders will be implemented and enforced.

The Clean Water Act establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Under the Clean Water Act, the EPA has implemented pollution control programs. The Clean Water Act made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. The EPA's National Pollution Discharge Elimination System (NPDES) permit program controls discharges.

Further, the EPA is the federal authority to protect drinking water. The Safe Water Drinking Act was established to protect the quality of drinking water in the U.S. The law focuses on all water actually or potentially designed for drinking use, whether from above ground or underground sources. The Act authorizes the EPA to establish minimum standards to protect tap water and

requires all owners or operators of public water systems to comply with these primary health related standards[2].

States must adopt rules that are at least as restrictive as the Clean Water Act and the Safe Water Drinking Act standards. The Texas Commission on Environmental Quality establishes State rules and regulations for public water systems and also specifies construction and operational standards for public water supply systems.

Disasters such as hurricanes and floods can disrupt drinking water supply and wastewater disposal systems. The Texas Commission on Environmental Quality provides guidance on remediation of public water supply systems after potential contamination due to natural disasters.

LOCATION

Potential and ongoing water contamination is present along all waterways and in the groundwater supply. Per a 2022 State Water Plan, Hardin County is part of the East Texas Regional Water Planning area comprised of all or parts of twenty counties including Hardin County. The principle surface water sources of the East Texas Region are the Sabine and Neches Rivers. For the East Texas Region, surface water accounts for 80-percent of the total existing water supply. Ground-water needs, including all municipal requirements in Hardin County, were met almost entirely from the Gulf Coast Aquifer.

EXTENT

In general, levels of water contamination can influence community health when considered severe. Accordingly, magnitude and severity of water contamination is considered Critical by the Team, with potential public safety risks present and the potential for extended loss of function for water processing facilities. The high concentration of hazardous materials processing and shipping facilities in the planning area, low topographic gradient influencing river discharge rates and levels of dissolved oxygen, and relatively high total maximum daily load readings (TMDLs) in monitored surface water, all contribute to the magnitude and severity assessment by the Team.

PREVIOUS OCCURRENCES

According to the Evaluation of Water Resources of Orange and Eastern Jefferson Counties (Texas Water Development Board, 1990), the main ground-water quality problem is elevated chloride concentrations caused by saline-water encroachment in areas of concentrated plumage, although from the late 1970's to 1988, chloride concentrations have not changed significantly due to decreased ground-water withdrawals.

PROBABILITY OF FUTURE EVENTS

Considering ongoing problems and previous water quality monitoring results, probability of future occurrence is considered highly likely.

VULNERABILITY AND IMPACT

Water contamination can have a “substantial” impact. Overall vulnerability for the planning area could result in multiple deaths during extreme contamination events.

[2] Source: EPA

APPENDIX A: LOW RISK AND MANMADE HAZARDS

HAZARDOUS MATERIALS INCIDENT (FIXED AND MOBILE)

HAZARD PROFILE

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

The location of the most concentrated and potentially hazardous materials in the planning area are: fixed industrial facilities including oil and gas wells and storage facilities, pipelines, large and small industrial complexes that use or process chemicals or petroleum products, highways, and railroads. Numerous other sources are also present across the planning area, including storage areas for insecticides, herbicides, and fertilizers, wrecking yards, retail fueling stations, and abandoned industrial facilities. Within regard to pipeline locations, roughly one third (1/3) of the 367,000 linear miles of pipelines transporting hazardous materials in the State of Texas are located in the southeast region of the state. This concentration of pipelines in the region that includes Hardin County relates to a corresponding high probability of hazardous material transport accidents.

The Toxics Release Inventory (TRI) is a publicly available database from the federal Environmental Protection Agency (EPA) that contains information on toxic chemical releases and other waste management activities reported annually by certain covered industry groups, as well as 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 EPA and to 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; RCRA Subtitle C treatment, storage and disposal (TSD) facilities; and solvent recovery services.
- Have 10 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, bioaccumulative and toxic (PBT) chemicals are subject to different thresholds of 10 pounds, 100 pounds or 0.1 grams, depending on the chemical.

Tier 2 data is a publicly available database from the Texas Department of State Health Services Tier 2 Chemical Reporting Program. 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. The Texas Tier 2 Reports contain 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, according to Tier 2 requirements.

- If an industry has an OSHA deemed hazardous chemical that exceeds the appropriate threshold at a certain point in time, that chemical must be reported. These chemicals may be on the list of 356 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 have to be reported if the quantity is either greater than 500 pounds, or if the Threshold Planning Quantity (TPQ) amount is less than 500 pounds.

LOCATION

The locations of available TRI and Tier 2 toxic sites in the Hardin County planning area are shown below in Table A-5.

Table A-5. Toxic Sites in Hardin County[3]

JURISDICTION	FACILITY NAME	ADDRESS	NUMBER OF CHEMICALS
City of Kountze	Forged Components INC	1299 US 69	1
City of Silsbee	Clearstream Wastewater Systems INC	2987 Old Evalde Rd	1
City of Silsbee	Dragon Products North Silsbee Facility	972 FM 92 N	3
City of Silsbee	Dragon Silsbee South Facility	580 Willard Lake Rd	1
City of Silsbee	South Hampton Resources INC	7752 FM 418	12

EXTENT

From a hazardous materials incident, the micro-meteorological effects of the buildings and terrain can alter travel and duration of agents. Shielding in the form of sheltering-in-place can protect people and property from harmful effects. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time for hazardous materials incidents is minimal to none.

PREVIOUS OCCURRENCES

Hazardous materials are substances which if released or misused can cause death, serious injury, long-lasting health effects, and damage to structure and other properties as well as to 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 55 transportation incidents have been reported in the Hardin County planning area over the last 72 years. The data collected is from 1950 to 2021 and identifies the hazardous materials transportation incidents as in-transit, loading, and unloading of transport vehicles. A summary of reported events are listed in Table A-6 below by jurisdiction.

[3] Source: EPA Toxic Release Inventory

Table A-6. Hardin County Hazardous Material Incident Events by Jurisdiction[4]

JURISDICTION	NUMBER OF INCIDENTS	INJURIES	FATALITIES	PROPERTY AND CROP DAMAGE
City of Kountze	1	0	0	$0
City of Lumberton	4	0	0	$7,284
City of Rose Hill Acres	0	0	0	$0
City of Silsbee	41	6	0	$165,706
City of Sour Lake	8	0	0	$526,031
Hardin County	1	0	0	$0
TOTAL LOSSES	**55**	**0**	**6**	**$699,021**

PROBABILITY OF FUTURE EVENTS

Based on the historic incident records, the frequency of occurrence is highly likely and an event is probable in the next year in the Hardin County planning area.

VULNERABILITY AND IMPACT

Hazardous materials or toxic releases can have a “substantial” impact. 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.

TERRORISM

HAZARD PROFILE

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

[4] Damages reported in 2022 dollars.

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 Hardin County planning area.

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. 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 A-2.[5]

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

The 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 is minimal to none.

Figure A-2. National Terrorism Advisory

PREVIOUS 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; and the bombing of the World Trade Center in 1993.

Hardin County has not experienced a terrorist act. While complete prevention of an attack may not be attainable, the County can lessen the likelihood and/or the potential effects of an incident. The 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.

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 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. They 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.

APPENDIX B: PLANNING TEAM

PLANNING TEAM MEMBERS

The Hardin County Hazard Mitigation Action Plan 2022 was organized using a direct representative model. An Executive Planning Team from the participating jurisdictions, shown in Table B-1, was formed to coordinate planning efforts and request input and participation in the planning process. Table B-2 reflects the Advisory Planning Team, consisting of area organizations and departments that participated throughout the planning process. Table B-3 is comprised of stakeholders who were invited to provide Plan input. Public outreach efforts and meeting documentation is provided in Appendix F.

Table B-1. Executive Planning Team

ORGANIZATION / DEPARTMENT	TITLE
SETRPC	Director of Homeland Security
SETRPC	Regional Emergency Planner
Hardin County	Emergency Management Coordinator
City of Kountze	Public Works Director
City of Lumberton	City Manager
City of Rose Hill Acres	Emergency Management Coordinator
City of Silsbee	Emergency Management Coordinator / Chief of Police
City of Sour Lake	Emergency Management Coordinator / Chief of Police

Table B-2. Advisory Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Hardin County	County Sheriff
Hardin County	County Judge
Hardin County	Precinct 3 Commissioner
City of Kountze	Building Inspector
City of Kountze	City Administrator

APPENDIX B: PLANNING TEAM

ORGANIZATION / DEPARTMENT	TITLE
City of Lumberton	Chief of Police
City of Lumberton	Mayor
City of Rose Hill Acres	City Secretary
City of Rose Hill Acres	Mayor
City of Silsbee	Assistant Chief of Police
City of Silsbee	City Manager
City of Silsbee	Sergeant
City of Silsbee	Water/Wastewater Supervisor
City of Sour Lake	City Manager

STAKEHOLDERS

The following groups listed in Table B-3 represent a list of organizations invited to stakeholder meetings, public meetings, and workshops throughout the planning process and include: non-profit organizations, private businesses, universities, 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 F[1].

Table B-3. Stakeholders

AGENCY	TITLE
Baptist Hospital of South East Texas	Director of Administrative Facilities Management
Baptist Hospital of South East Texas	Executive Director
Baptist Hospital of South East Texas	Safety Office
Baptist Hospital of South East Texas	Trauma Program Manager
Batson Fire	Volunteer Fire Department
Christus Health	Operations Manager
Colonial Pipeline	General Representative
Colonial Pipeline	Operations Manager

[1] Information contained in Appendix F is exempt from public release under the Freedom of Information Act (FOIA).

APPENDIX B: PLANNING TEAM

AGENCY	TITLE
Consultant at Carroll and Blackman, Inc.	PE, Vice President
Consultant at David Waxman	Engineering
Consultant at MPTX Associates	Certified Floodplain Manager
Consultant at Sabine River Authority	Technical Service Manager
Consultant at Texas FFA Association	Regional Manager
Department of Homeland Security	Advisor
Department of Transportation	Director
Environmental Protection Agency (EPA)	Regional Representative
General Land Office (GLO)	Regional Representative
Hardin County ESD #5	Fire Chief
Jasper-Newton County Health	Program Director
Jefferson County Drainage District #7	General Laborer
Jefferson County Drainage District #7	Supervisor
Jefferson County ESD #4	District Administrator
Lamar University	Professor, Department of Industrial and Systems Engineering
Local Emergency Planning Committee	Southeast Regional Representative
Long-term Care Partnership (LTCP)	State Farm Representative
National Parks Conservation Association	Consultant
National Parks Conservation Association	Regional Director Texas & Oklahoma
National Oceanic and Atmospheric Administration (NOAA)	Regional Representative
Orange County Economic Development Center	Executive Director
Orange County ESD #2	VFD Chief
Orange County Navigation and Port District	Executive Port Director
Saratoga Fire	Volunteer Fire Department
South East Texas Disaster Recovery Group	Representative
South East Texas Ground Water Conservation Group	General Manager
Texas A&M University (TAMU)	District Forester I, Forest Resource Development & Sustainable Forestry

APPENDIX B: PLANNING TEAM

AGENCY	TITLE
Texas A&M University (TAMU)	Professor, Department of Marketing and Commerce
Texas A&M University (TAMU)	Texas A&M Agrilife County Extension Agent
Texas Commission on Environmental Quality (TCEQ)	Outreach Coordinator
Texas Congress	District Director to Congressman
Texas Department of Public Safety (TDPS)	Telecommunication Division
Texas Division on Emergency Management (TDEM)	Regional Representative
Texas House District 19	Representative
Texas House District 19	Representative
Texas House District 21	Representative
Texas House District 22	Representative
Texas Senate	District Coordinator
Texas Senate District 3	Senate
Texas Senate District 4	Senate
Thicket Fire	Volunteer Fire Department
United Way	Beaumont Office Representative
United Way	Orange County Office Representative

APPENDIX C: PUBLIC SURVEY RESULTS

OVERVIEW

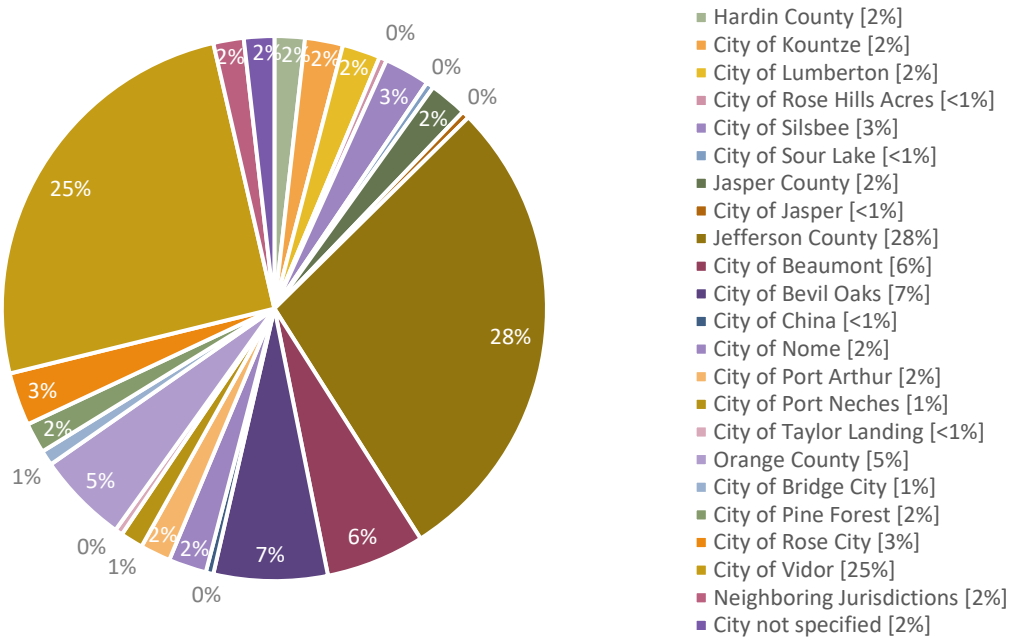
South East Texas Regional Planning Commission and Hardin County prepared a public survey that requested public opinion on a wide range of questions relating to natural hazards. The survey was made available via their websites to all Counties the SETRPC coordinated to update, including Hardin County and participating jurisdictions. This survey link was also distributed at public meetings and stakeholder events throughout the planning process.

A total of 221 surveys were collected, the results of which are analyzed in Appendix C. The purpose of the survey was twofold: 1) to solicit public input during the planning process, and 2) to help the jurisdictions identify any potential actions or problem areas.

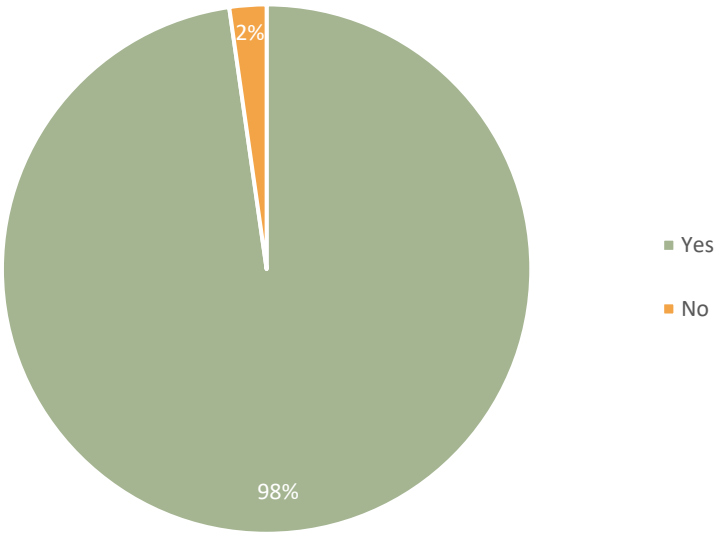
The following survey results depict the percentage of responses for each answer. Similar responses have been summarized for questions that did not provide a multiple-choice answer or that required an explanation.

PUBLIC SURVEY RESULTS

1. Please state the jurisdiction (city or community) where you reside.[1]

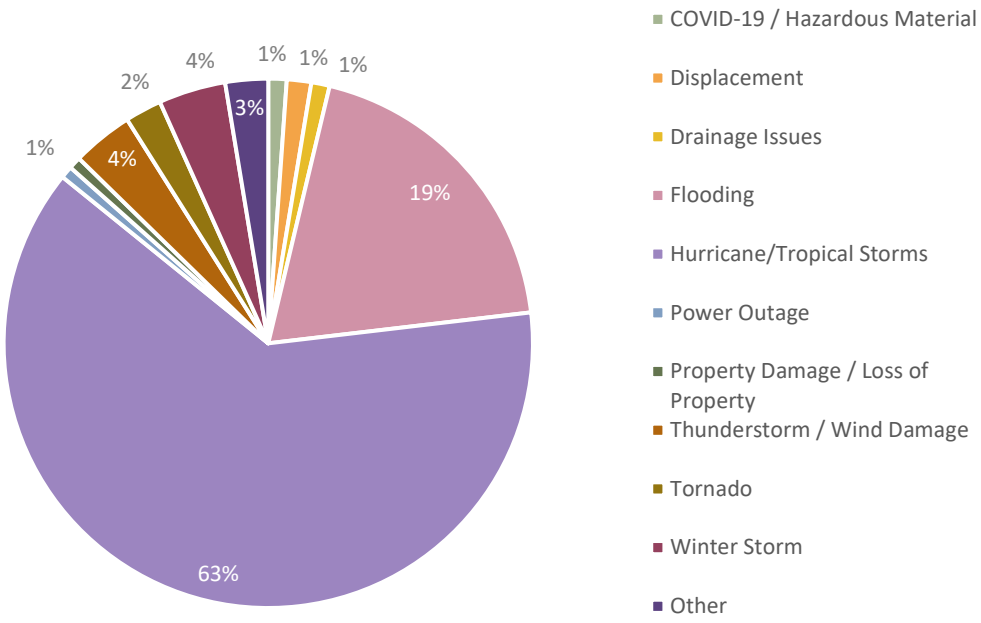


2. Have you ever experienced or been impacted by a disaster?

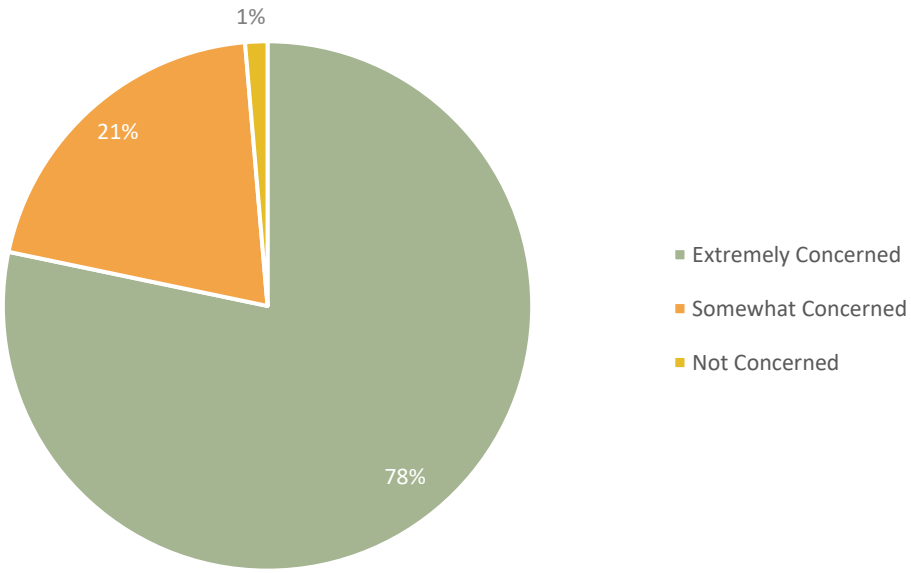


[1] Some respondents were in neighboring counties, however due to their proximity to Hardin County, their responses were included in the survey results.

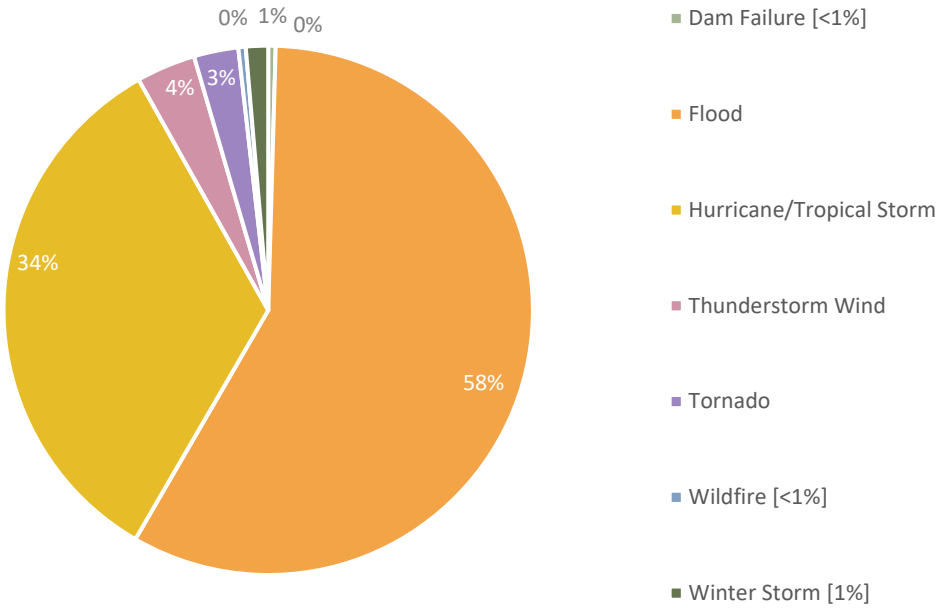
3. If you answered “Yes” to Question #2, please explain.



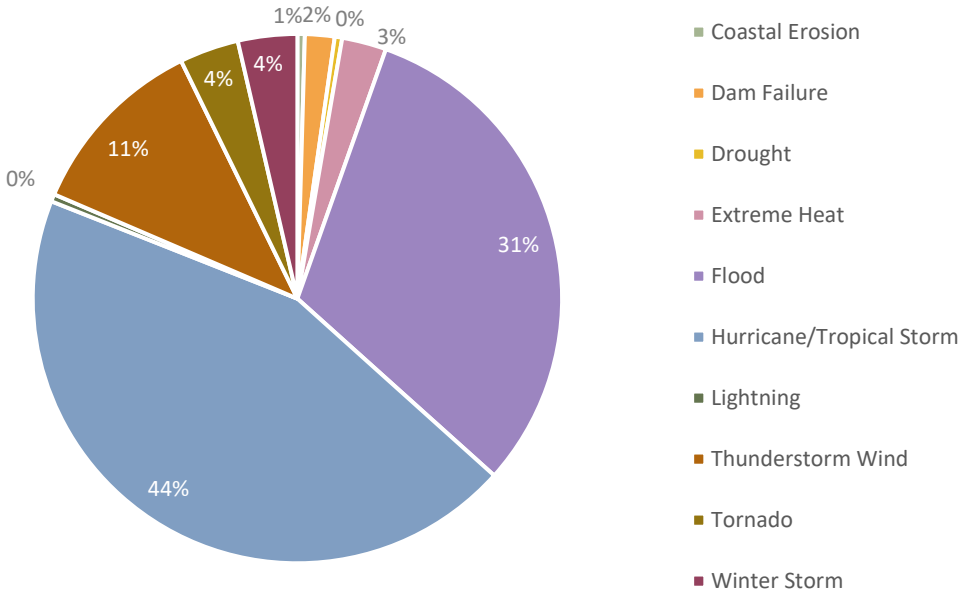
4. How concerned are you about the possibility of your community being impacted by a disaster?



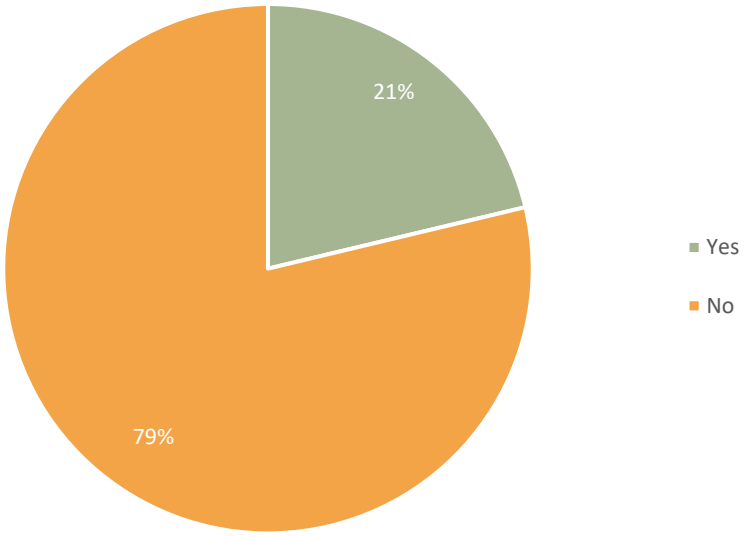
5. Please select the one hazard you think is the highest threat to your neighborhood:



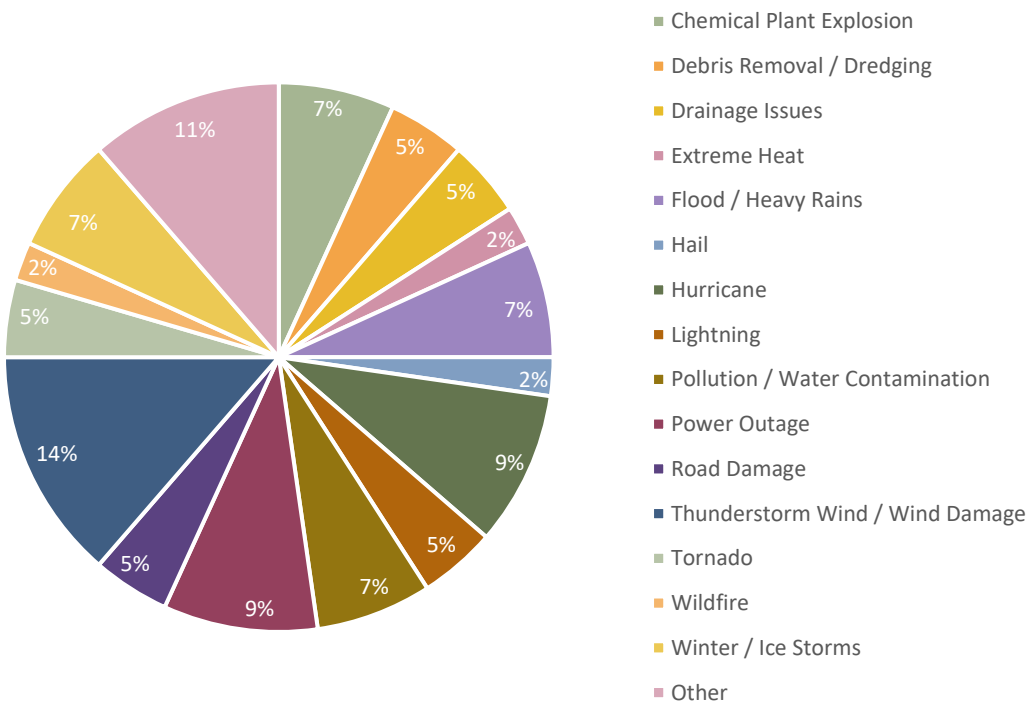
6. Please select the one hazard you think is the second highest threat to your neighborhood:



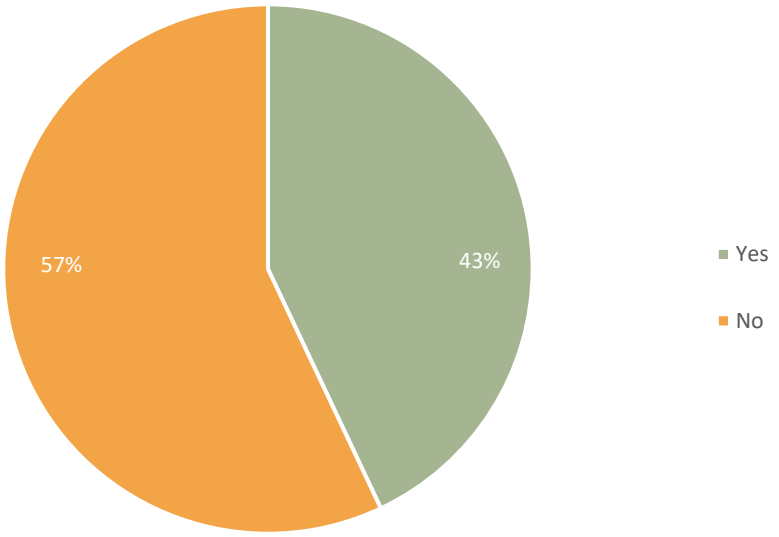
7. Is there another hazard not listed above that you this is a wide-scale threat to your neighborhood?



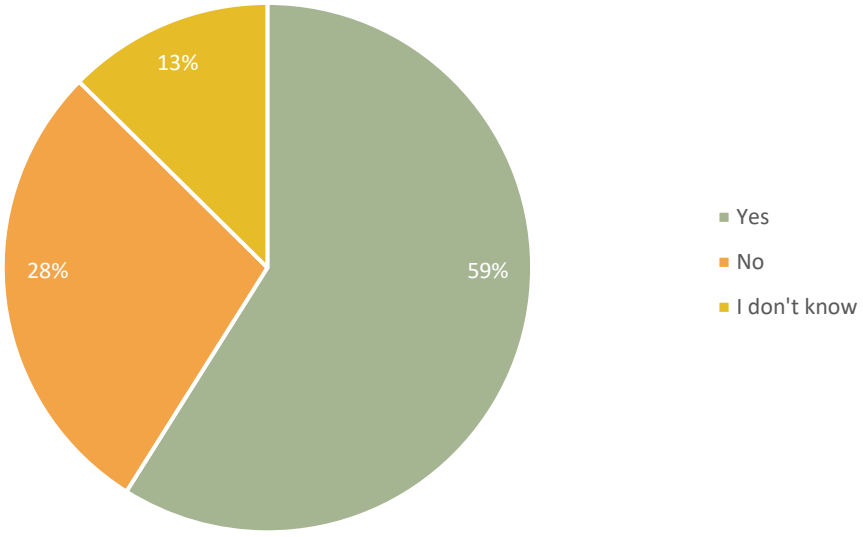
8. If you answered “Yes” to Question #7, please explain.



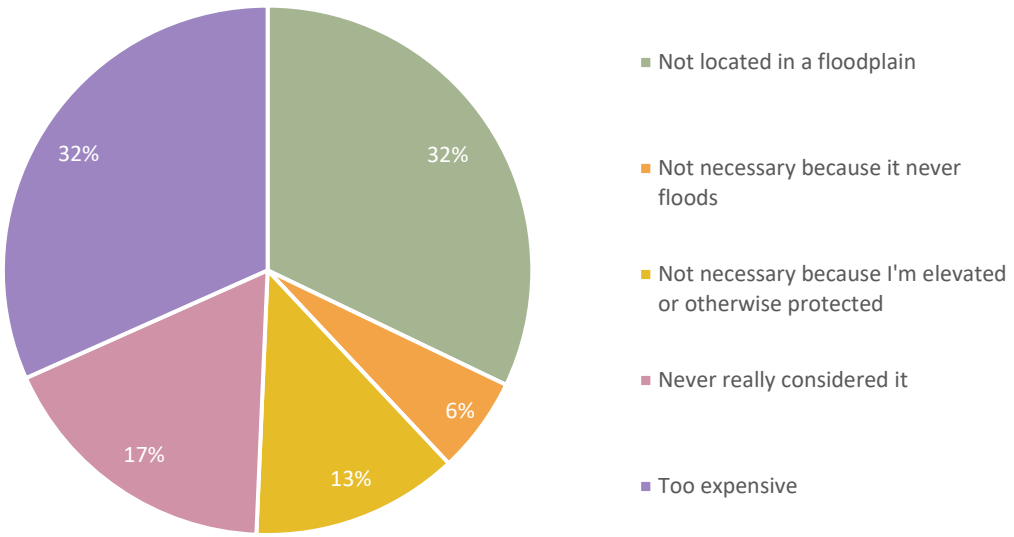
9. Is your home located in a floodplain?



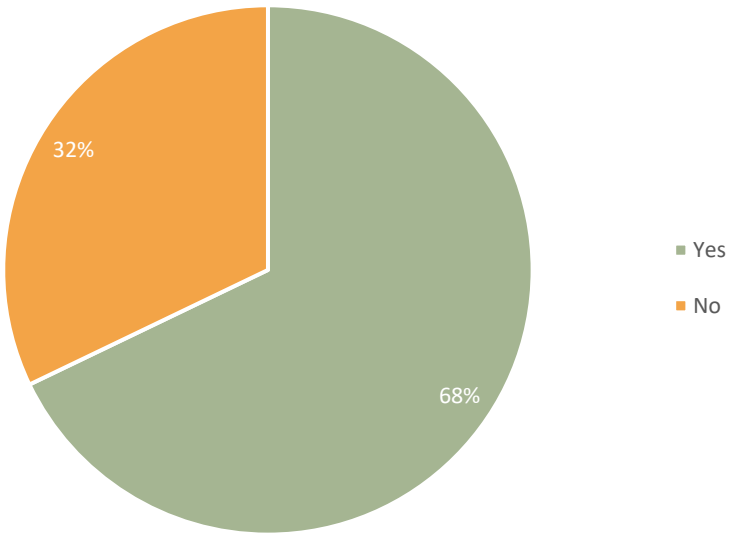
10. Do you have flood insurance?



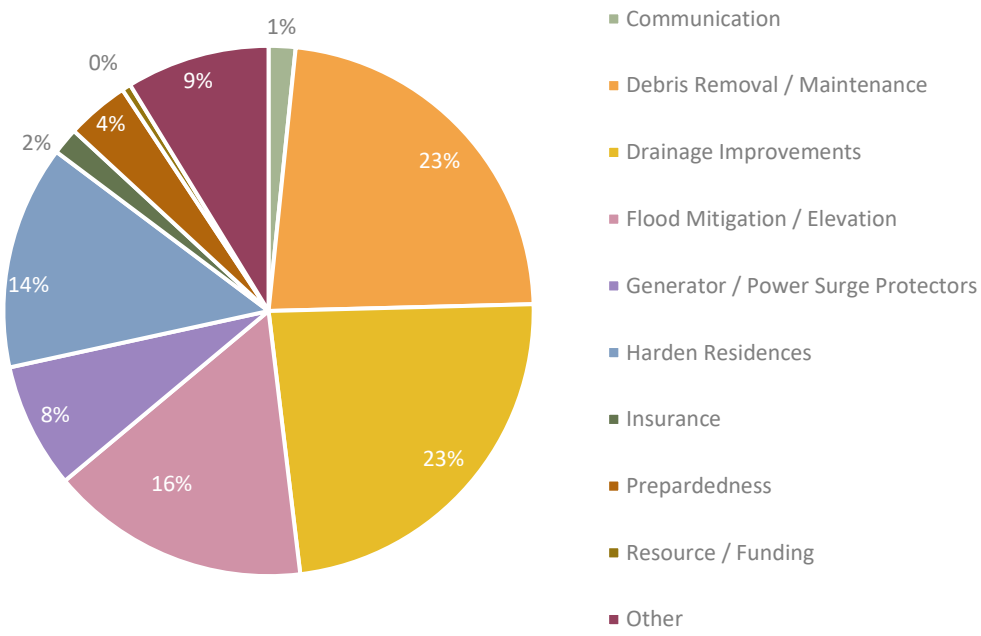
11. If you do not have flood insurance, why not?



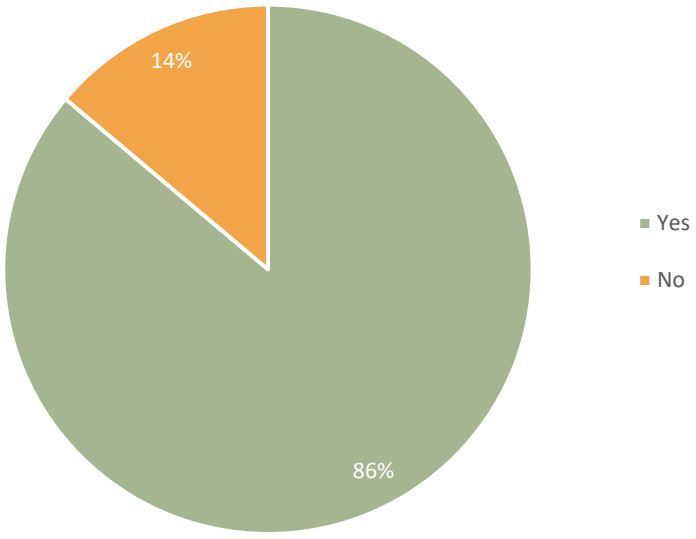
12. Have you taken any actions to make your home or neighborhood more resistant to hazards?



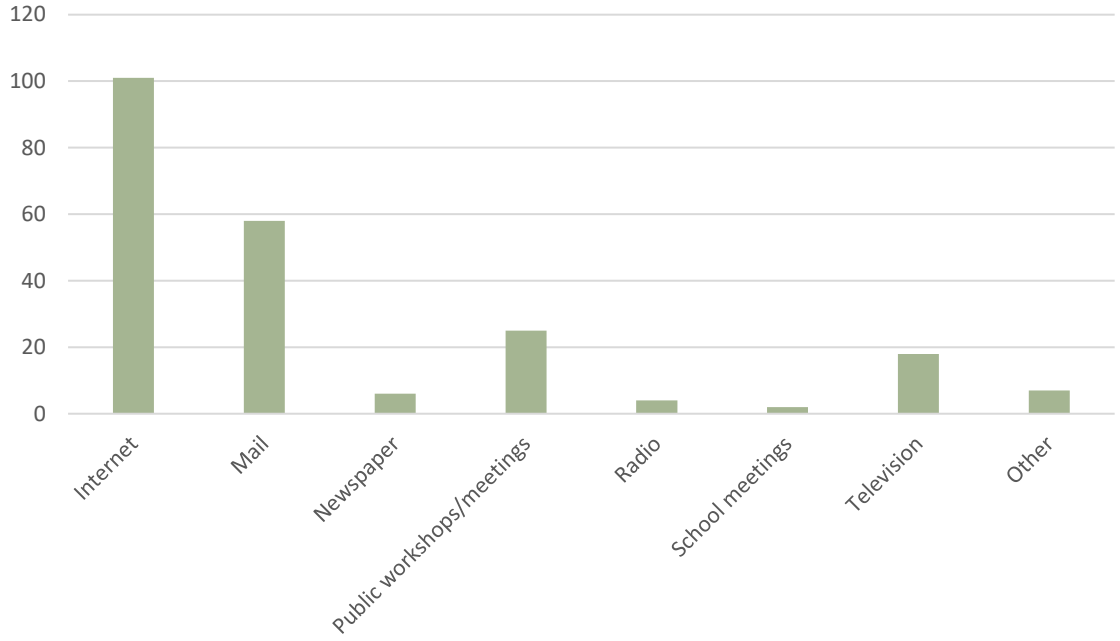
13. If you answered “Yes” to Question #12, please explain.



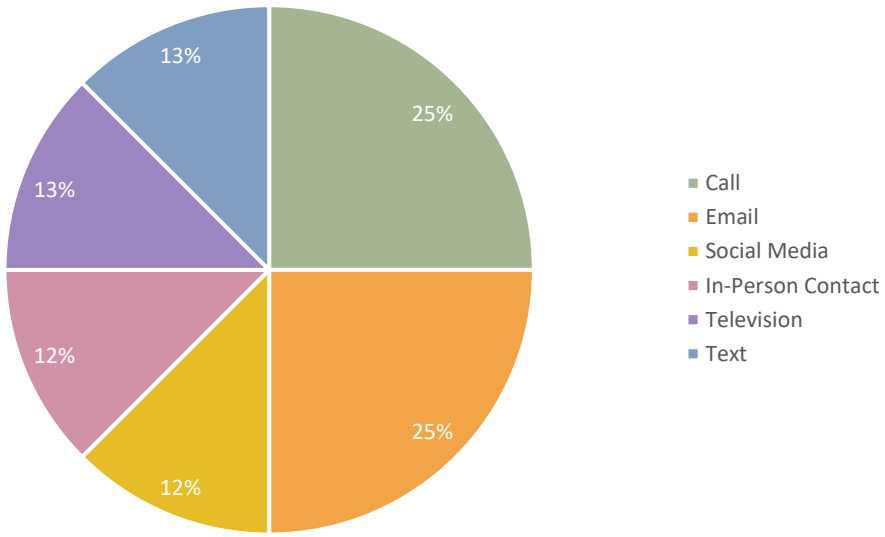
14. Are you interested in making your home or neighborhood more resistant to hazards?



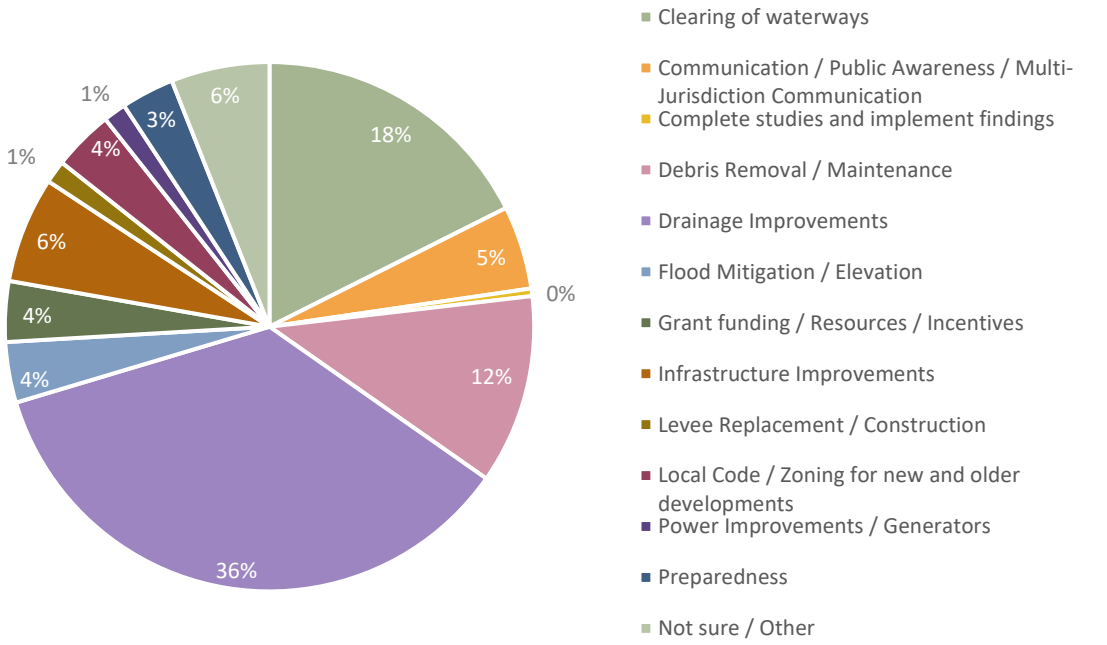
15. What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards?



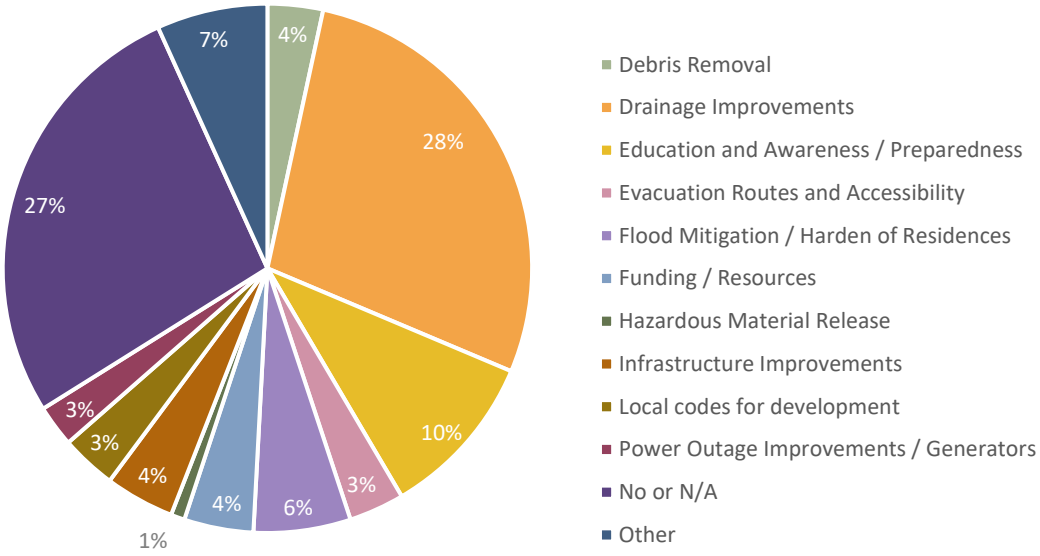
16. If you answered “Other” to Question #15, please explain.



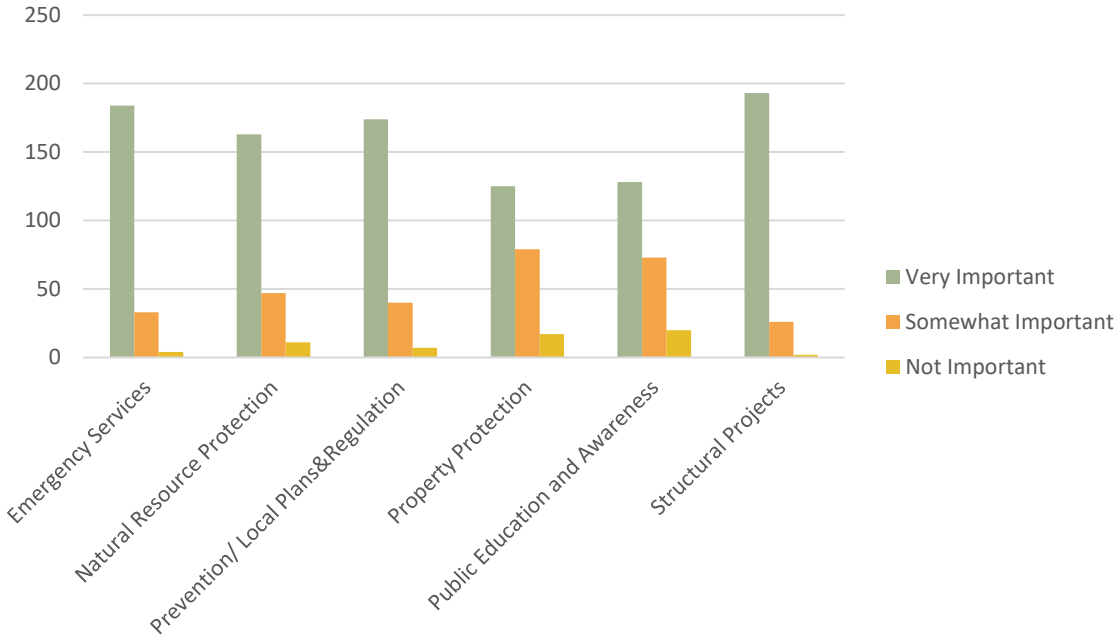
17. In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood?



18. 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?



19. 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 D: CRITICAL FACILITIES

This Appendix is **For Official Use Only (FOUO)** and may be exempt from public release under Freedom of Information Act (FOIA).

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

OVERVIEW

A Community Capability Assessment is an integral component of the Hazard Mitigation Planning Process. It is an invaluable tool in assessing a community's existing planning and regulatory capabilities to support implementation of mitigation strategy objectives.

Beginning on Page 2, a completed Capability Assessment Checklist provides information on existing policies, plans, and regulations in place for Planning Team members at the local level or that may be provided by the County on an as-needed basis. ***Participation is denoted with an "x" on the Checklist.***

COMMUNITY CAPABILITY ASSESSMENTS

COMMUNITY CAPABILITY CHECKLIST	*Hardin County*	*City of Kountze*	*City of Lumberton*	*City of Rose Hill Acres*	*City of Silsbee*	*City of Sour Lake*
Plans						
Capital Improvements Plan		X	X	X	X	
Community Wildfire Protection Plan	X	X	X	X	X	X
Comprehensive / Master Plan / Land Use Plan			X	X	X	
Continuity of Operations	X			X		
Emergency Operations Plan	X	X	X	X	X	X
Evacuation Plan	X	X	X	X	X	X
Hazard Mitigation Plan	X	X	X	X	X	X
Stormwater Management Plan			X	X	X	
Policies/Ordinances						
Building Codes		X	X	X	X	
Fire Code		X		X		X
Floodplain Ordinance	X	X	X	X	X	X
Stormwater Ordinance	X		X	X	X	
Subdivision Regulations	X	X	X	X	X	X
Wildfire Ordinance				X	X	X
Zoning Ordinance/Land Use Restrictions			X	X	X	X
Programs						
Floodplain Maps/Flood Insurance Studies	X	X	X	X	X	X
Hydrologic/Hydraulic Studies					X	

APPENDIX F: CAPABILITY ASSESSMENT

COMMUNITY CAPABILITY CHECKLIST	*Hardin County*	*City of Kountze*	*City of Lumberton*	*City of Rose Hill Acres*	*City of Silsbee*	*City of Sour Lake*
Mutual Aid Agreement	X	X	X	X	X	X
National Flood Insurance Program Participant	X	X	X	X	X	X
NFIP Community Rating System Participant	X	X	X	X	X	X
Property Acquisition Program				X		X
Public Education/Awareness Programs	X	X	X	X	X	X
Storm Drainage Systems Maintenance Program			X		X	
Stream Maintenance Program				X		
Warning Systems/Services (reverse 911, outdoor warning signals)		X		X		
Staff/Departments						
Building Code Official		X	X	X	X	
Emergency Manager	X	X	X	X	X	X
Engineers	X	X	X		X	
Environmental Conservation Specialist						
Floodplain Administrator/Manager	X	X	X	X	X	X
Geographic Information Systems (GIS) Coordinator						
Personnel with Hazard Knowledge		X		X	X	
Planners						
Public Information Official	X	X	X	X	X	X
Resource Development/Grant Writer			X	X		