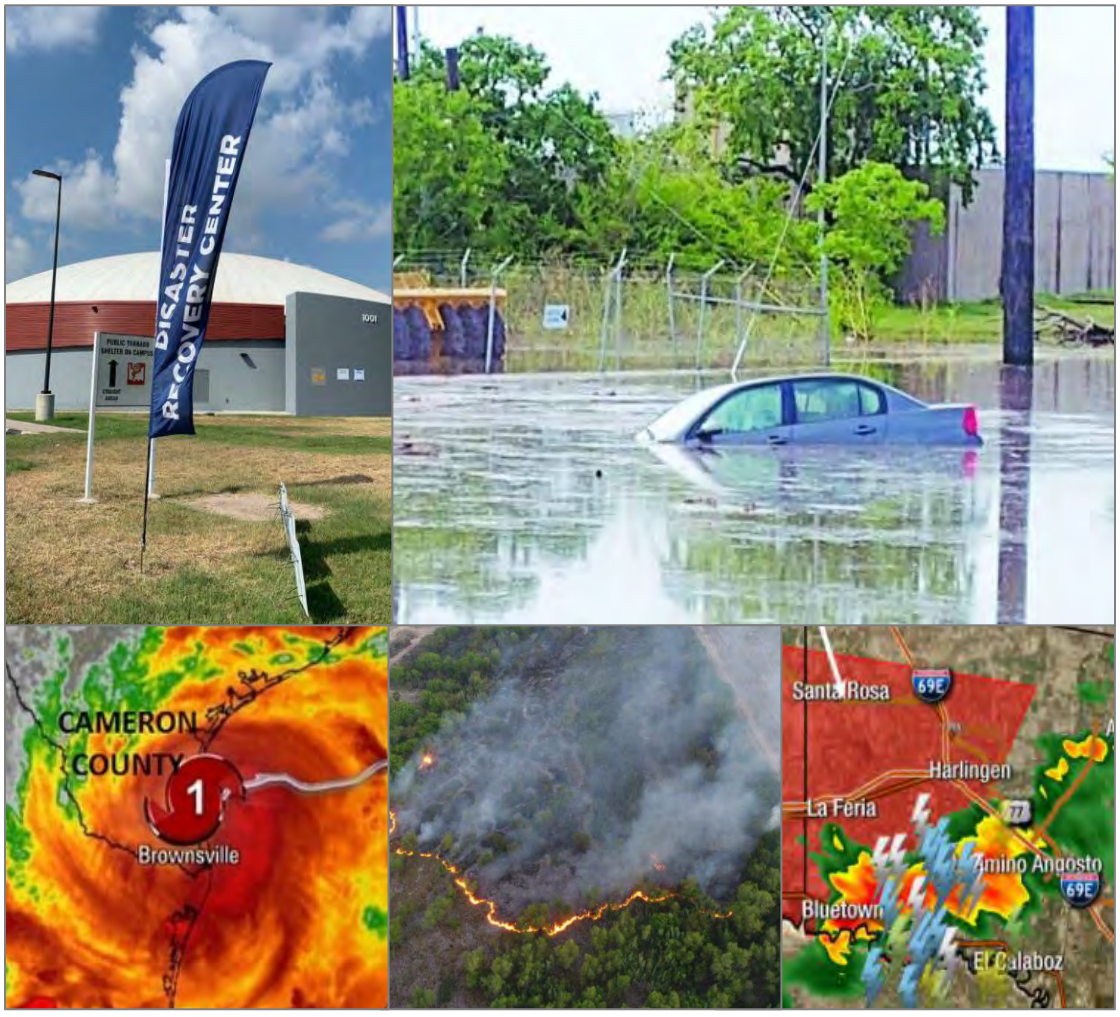
CAMERON COUNTY

HAZARD MITIGATION ACTION PLAN UPDATE 2021

Planning Participants: Cameron County, City of Harlingen, City of Palm Valley



Maintaining a Safe, Secure, and Sustainable Community

APA: February 2, 2021

H2O PARTNERS

THE COUNTY OF CAMERON BROWNSVILLE, TEXAS

For more information, visit our website at:

https://www.cameroncounty.us/emergency-management/

Written comments should be forwarded to:

Cameron County Judge's Division Office of Emergency Management
964 E. Harrison St.
Brownsville, Texas 78520
Email: ccoem@co.cameron.tx.us

SECTION 1 – INTRODUCTION

Background 1-1
Scope and Participation 1-2
Purpose 1-2
Authority 1-3
Summary of Sections 1-3

SECTION 2 – PLANNING PROCESS

Plan Preparation and Development 2-1
Review and Incorporation of Existing Plans 2-7
Timeline for Implementing Mitigation Actions 2-10
Public and Stakeholder Involvement 2-11

SECTION 3 – COUNTY PROFILE

Overview 3-1
Population and Demographics 3-3
Future Development 3-5
Economic Impact 3-5
Existing and Future Land Use and Development Trends 3-6

SECTION 4 – RISK OVERVIEW

Hazard Description 4-1
Natural Hazards and Climate Change 4-4
Overview of Hazard Analysis 4-4

SECTION 5 – FLOOD

Hazard Description 5-1
Location 5-1
Extent 5-3
Historical Occurrences 5-7
Probability of Future Events 5-9
Vulnerability and Impact 5-11
NFIP Participation 5-14
NFIP Compliance and Maintenance 5-15
Repetitive Loss 5-16

SECTION 6 – HURRICANE WIND

Hazard Description 6-1
Location 6-1
Extent 6-2
Historical Occurrences 6-4
Probability of Future Events 6-7
Vulnerability and Impact 6-7

SECTION 7 – EXTREME HEAT

Hazard Description 7-1
Location 7-1
Extent 7-1
Historical Occurrences 7-4
Probability of Future Events 7-6
Vulnerability and Impact 7-6

SECTION 8 – THUNDERSTORM WIND

Hazard Description 8-1
Location 8-1
Extent 8-2
Historical Occurrences 8-3
Probability of Future Events 8-7
Vulnerability and Impact 8-8

SECTION 9 – LIGHTNING

Hazard Description 9-1
Location 9-1
Extent 9-1
Historical Occurrences 9-3
Probability of Future Events 9-4
Vulnerability and Impact 9-4

SECTION 10 – DROUGHT

Hazard Description 10-1
Location 10-2
Extent 10-3

Historical Occurrences 10-4
Probability of Future Events 10-6
Vulnerability and Impact 10-7

SECTION 11 – TORNADO

Hazard Description 11-1
Location 11-2
Extent 11-2
Historical Occurrences 11-5
Probability of Future Events 11-9
Vulnerability and Impact 11-9

SECTION 12 – HAIL

Hazard Description 12-1
Location 12-1
Extent 12-1
Historical Occurrences 12-3
Probability of Future Events 12-5
Vulnerability and Impact 12-5

SECTION 13 – WINTER STORM

Hazard Description 13-1
Location 13-3
Extent 13-3
Historical Occurrences 13-4
Probability of Future Events 13-5
Vulnerability and Impact 13-5

SECTION 14 – WILDFIRE

Hazard Description 14-1
Location 14-1
Extent 14-4
Historical Occurrences 14-9
Probability of Future Events 14-11
Vulnerability and Impact 14-11

SECTION 15 – DAM AND LEVEE FAILURE

Hazard Description 15-1
Location 15-3
Extent 15-4
Historical Occurrences 15-6
Probability of Future Events 15-6
Vulnerability and Impact 15-6

SECTION 16 – COASTAL EROSION

Hazard Description 16-1
Location 16-1
Extent 16-2
Historical Occurrences 16-3
Probability of Future Events 16-4
Vulnerability and Impact 16-4

SECTION 17 – MITIGATION STRATEGY

Mitigation Goals 17-1
Goal 1 17-1
Goal 2 17-1
Goal 3 17-2
Goal 4 17-2
Goal 5 17-2

SECTION 18 – PREVIOUS ACTIONS

Sumamry 18-1
Cameron County – County Wide Actions 18-2
Cameron County 18-14
City of Harlingen 18-38

SECTION 19 – MITIGATION ACTIONS

Sumamry 19-1
Cameron County – County Wide Actions 19-3
Cameron County 19-23
City of Harlingen 19-44
City of Palm Valley 19-136

SECTION 20 – PLAN MAINTENANCE

Plan Maintenance Procedures 20-1
Incorporation 20-1
Monitoring and Evaluation 20-4
Updating 20-5
Continued Public Involvement 20-6

APPENDIX A – PLANNING TEAM
APPENDIX B – PUBLIC SURVEY RESULTS
APPENDIX C – CRITICAL FACILITIES
APPENDIX D – DAM LOCATIONS
APPENDIX E – MEETING DOCUMENTATION
APPENDIX F – CAPABILITY ASSESSMENT
APPENDIX G – LRGVDC REGIONAL PROJECTS

SECTION 1: INTRODUCTION

Background 1
Scope 2
Purpose 2
Authority 3
Summary of Sections 3

BACKGROUND

Cameron County is the southernmost county of Texas located in the Rio Grande Plains region of South Texas. The county, named for the Mier Expedition member Captain Ewen Cameron, is bordered on the north by Willacy County, on the west by Hidalgo County, on the east by the Gulf of Mexico, and on the south by Mexico. The county's largest city and county seat is Brownsville.

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, Cameron County is susceptible to a wide range of natural hazards, including but not limited to drought, extreme heat, hail, and winter storms. 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 2008, Cameron County and the City of Harlingen participated in the multi-county, regional 'Cover the Border' Hazard Mitigation Action Plan. Then in 2015, Cameron County and the City of Harlingen developed a Hazard Mitigation Plan that was considered a new, stand-alone Plan.

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 originally approved the Cameron County Hazard Mitigation Plan in 2015, 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.

This Plan Update, hereinafter titled: "Cameron County Hazard Mitigation Action Plan Update 2021: Maintaining a Safe, Secure, and Sustainable Community" (Plan or Plan Update) was developed specifically for Cameron County, and is a multi-jurisdictional Plan. The participating jurisdictions include Cameron County, City of Harlingen, and City of Palm Valley.

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

SECTION 1: INTRODUCTION

Hazard mitigation activities are an investment in a community's safety and sustainability. It is widely accepted that the most effective hazard mitigation measures are implemented at the local government level, where decisions on the regulation and control of development are ultimately made. A comprehensive review 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 Cameron 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 Cameron 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 and property from known hazards by identifying and implementing cost-effective hazard mitigation actions. The planning process is an opportunity for participating jurisdictions within Cameron 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 Cameron 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 Cameron County, and planning participants identified twelve natural hazards to be addressed by the Plan Update. The specific goals of the Plan Update are to:

- Minimize disruption to participating jurisdictions within Cameron 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 Cameron County to take advantage of rapidly developing mitigation grant opportunities as they arise; and
- Ensure that participating jurisdictions within Cameron County maintain eligibility for the full range of future Federal disaster relief.

SECTION 1: INTRODUCTION

AUTHORITY

The Plan is tailored specifically for participating jurisdictions within Cameron 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 Cameron County's population and economy.

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

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

The list of planning team members and stakeholders is located in Appendix A. Public survey results are analyzed and presented in Appendix B. Appendix C contains a detailed list of critical facilities for the area, and Appendix D is dam locations. Appendix E contains information regarding workshops and meeting documentation. Capability Assessment results for participating jurisdictions within Cameron County are in Appendix F. Appendix G includes a list of the Lower Rio Grande Valley Development Council regional actions that have a direct impact on flood hazards in the Cameron County planning area. [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 1
Overview of the Plan 1
Planning Team 2
Planning Process 5
Kickoff Workshop 5
Hazard Identification 6
Risk Assessment 6
Mitigation Review and Development 6
Review and Incorporation of Existing Plans 7
Review 7
Incorporation of Existing Plans into the HMAP Process 8
Incorporation of the HMAP into Other Planning Mechanisms 8
Plan Review and Plan Update 10
Timeline for Implementing Mitigation Actions 10
Public and Stakeholder Involvement 11
Stakeholder Involvement 11
Public Meetings 13
Public Participation Survey 13

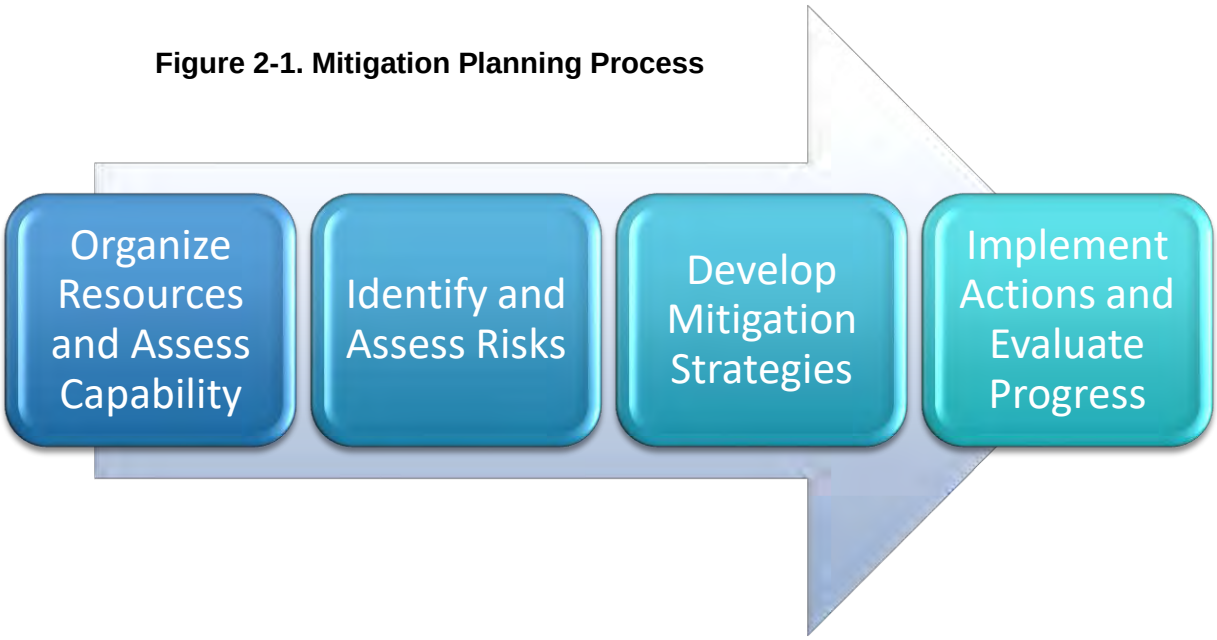
PLAN PREPARATION AND DEVELOPMENT

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

Cameron County hired H2O Partners, Inc. (Consultant Team), to provide technical support and oversee the development of the Cameron County Hazard Mitigation Action Plan Update 2021. 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



Cameron County, participating jurisdictions, and the Consultant Team met in February 2020 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 Cameron County, 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 Cameron County that participated throughout the planning process.

Table 2-1. Executive Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Cameron County	EMC
Cameron County	Fire Marshal
Cameron County	Planner
City of Harlingen	Assistant City Manager
City of Palm Valley	Police Chief

Table 2-2. Advisory Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Cameron County	Deputy Fire Marshal
Cameron County	Assistant Deputy Fire Marshal
Cameron County	County Judge
Cameron County	County Administrator
Cameron County	County Engineer
Cameron County	Assistant Engineer
Cameron County	Public Relations Officer
Cameron County	Administrative Assistant Pct. 2
Cameron County	County Commissioner Pct. 4
Cameron County	Administrative Assistant Pct. 4
Cameron County	Building Official
Cameron County	Cartographer
Cameron County	Bridge Manager
Cameron County	Parks Director
Cameron County	Deputy Parks Director
Cameron County	Public Works Superintendent
Cameron County	Foreman Pct. 4
Cameron County	Planning Director
Cameron County	Natural Resources Coordinator
City of Harlingen	City Manager
City of Harlingen	Executive Administrative Assistant
City of Harlingen	City Engineer
City of Harlingen	Special Projects Director
City of Harlingen	Media Contact
City of Harlingen	Fire Chief

ORGANIZATION / DEPARTMENT	TITLE
City of Harlingen	Chief of Police
City of Harlingen	Assistant Chief of Police
City of Harlingen	Police Commander
City of Harlingen	Police Commander
City of Harlingen	Deputy Chief of Police
City of Harlingen	Public Works Director
City of Harlingen	Water Works - System Engineer
City of Harlingen	Assistant City Manager
City of Harlingen	Assistant City Engineer
City of Harlingen	Accreditation
City of Harlingen	Assistant Fire Chief
City of Harlingen	Planning Director
City of Palm Valley	Mayor
City of Palm Valley	Public Works Director
City of Palm Valley	City Secretary

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 A provides a complete listing of all participating Planning Team members and stakeholders from participating jurisdictions within Cameron County by organization and title.

Based on results of completed Capability Assessment, participating jurisdictions within Cameron County described methods for achieving future hazard mitigation measures by expanding existing capabilities. For example, the City of Palm Valley does not have a community wildfire protection 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 Cameron County's identified vulnerabilities, specific mitigation strategies were discussed and developed at the Mitigation Strategy Workshop. Finally, Plan maintenance and implementation procedures were developed and are included in Section 20. Participation of Planning Team members, stakeholders, and the public at each of the workshops is documented in Appendix E.

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

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

KICKOFF WORKSHOP

The Kickoff Workshop was held on February 13, 2020. 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 the Valley International Airport, drainage districts, Independent School Districts, and surrounding cities. 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 twelve natural hazards which pose a significant threat to the planning area.

RISK ASSESSMENT

An initial risk assessment for participating jurisdictions within Cameron County was completed in May 2020 and results were presented to Planning Team members at the Risk Assessment Workshop held on May 18, 2020 via webinar. 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 16.

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 June 9, 2020 via webinar. 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 19.

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

Specifically, the process involved:

- Listing optional hazard mitigation actions based on information collected from previous plan reviews, studies, and interviews with federal, state, and local officials. Workshop participants reviewed the optional mitigation actions and selected actions that were most applicable to their area of responsibility, cost-effective in reducing risk, easily implemented, and likely to receive institutional and community support.
- Workshop participants inventoried federal and state funding sources that could assist in implementing the proposed hazard mitigation actions. Information was collected, including the program name, authority, purpose of the program, types of assistance and eligible 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 made available to the general public for review on the County's website, along with the participating jurisdictions' websites, with the chance to comment via sending an email.

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 5-15) 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 Cameron 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 Palm Valley has contracted to have studies done to discover where additional drainage is needed or where improvements can be made.

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 Cameron County Hazard Mitigation Action Plan Update 2021.

INCORPORATION OF THE HMAP INTO OTHER PLANNING MECHANISMS

Planning Team members will integrate implementation of the Plan Update with other planning mechanisms for Cameron 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 Cameron 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 Cameron County will be responsible for implementing hazard mitigation actions contained in Section 19. Each hazard mitigation action has been assigned to a specific County and 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 Cameron 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. Cameron 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 amendments or updates in light of the approved Plan Update. Participating jurisdictions within Cameron 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, Cameron 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 Cameron 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 Cameron 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	Cameron County and the City of Harlingen 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 5 of this Plan Update discussing the people and property at risk to flood will be reviewed

Planning Mechanism	Incorporation of Plan
	and revised when participating jurisdictions within Cameron County update their management plans or develops new plans.
Grant Applications	The Plan will be evaluated by participating jurisdictions within Cameron County when grant funding is sought for mitigation projects. If a project is not in the Plan Update, an amendment may be necessary to include the action in the Plan.
Regulatory Plans	Currently, participating jurisdictions within Cameron 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 independently by Cameron County, the City of Harlingen, and the City of Palm Valley 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 Cameron 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 twice 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 A-1, Appendix A) and the Advisory Planning Team (Table A-2, Appendix A) will engage in discussions regarding a timeframe for how and when to implement each hazard mitigation action. Considerations include when the action will be started, how existing planning mechanisms' timelines affect implementation, and when the action should be fully implemented. Timeframes may be general, and there will be short, medium, and long-term goals for implementation based on prioritization of each action, as identified on individual

Hazard Mitigation Action worksheets included in the Plan Update for participating jurisdictions within Cameron 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 Cameron 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 Cameron County Hazard Mitigation Action Plan Update 2021 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 Cameron County and participating jurisdictions' websites upon approval from FEMA, and a copy will be kept at the Cameron County courthouse.

STAKEHOLDER INVOLVEMENT

Stakeholder involvement is essential to hazard mitigation planning since a wide range of stakeholders can provide input on specific topics and from various points of view. Throughout the planning process, members of community groups, local businesses, neighboring jurisdictions, schools, and hospitals were invited to participate in development of the Plan Update. The Stakeholder Group (Table A-3 in Appendix A, and Table 2-4, below), included a broad range of representatives from both the public and private sector and served as a key component in Cameron 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
Arroyo City – Volunteer Fire Department	Public Information Officer	X
Brownsville ISD	Superintendent	
Cameron County Drainage District #1	Chief of Operations	
Cameron County Drainage District #3 & Irrigation #2	Manager	
City of Brownsville	EMC	
City of Brownsville	EM Planner	X
East Rio Hondo Water Supply	President of the Board	
EPA	Border Office	
La Feria Irrigation District #3	District Manager	X
Los Fresnos ISD	Superintendent	
Rio Hondo ISD	Superintendent	
San Benito ISD	Superintendent	
San Benito ISD	Student Services	X
SWG Engineering	Project Engineer	X
TAMU	Planning Specialist, Texas Sea Grant	X
TAMU	County Extension Agent	X
Texas Legislators	Representative	
Texas Legislators	Representative	
Texas Legislators	Representative	
Texas Legislators	Senator	
Valley Baptist Medical Center	Nurse Director	
Valley International Airport	Police Chief	X
Valley International Airport	Assistant Airport Director	X

Stakeholders and participants from neighboring communities that attended the Planning Team and public meetings played a key role in the planning process. For example, flood was one of the concerns to stakeholders, so participating jurisdictions included actions to improve drainage

system by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.

PUBLIC MEETINGS

A series of public meetings were held throughout the Cameron County 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 Cameron 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:

- February 13, 2020, Harlingen City Hall
- May 18, 2020, Adobe Connect Webinar
- June 9, 2020, Adobe Connect Webinar

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 297 surveys were completed online. The survey results are analyzed in Appendix B. Participating jurisdictions within Cameron 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 hurricane wind, and suggested drainage improvements and additional neighborhood meetings to allow for better communications. In response, several actions were added to the Plan to improve drainage within the participating jurisdictions; update the Drainage, Development, and Stormwater policy; construct a retention facility to reduce runoff and flooding; and to implement education and awareness programs to educate citizens of the hazards that can threaten the area and mitigation measures they can take to reduce injuries, fatalities, and property damage.

SECTION 3: COUNTY PROFILE

Overview 1
Population and Demographics 3
Population Growth 4
Future Development 5
Economic Impact 5
Existing and Future Land Use and Development Trends 6

OVERVIEW

In early 1846 United State troops marched into the disputed territory between the Nueces River and the Rio Grande and constructed a defensive position across from Matamoros. The temporary fort was originally called Fort Texas but was renamed Fort Brown a short time later. On April 25, 1846, a skirmish occurred between United States and Mexican troops at Las Rucias, in southwest Cameron County, which became known as the spot where “American blood was shed on American soil”, the verbal spark that ignited the Mexican War. Two other Mexican War battles were fought in Cameron County: the battle of Palo Alto and the battle of Resaca de la Palma.

On February 12, 1848, the Texas legislature decreed the existence of Cameron County, and with the signing of the Treaty of Guadalupe Hidalgo on July 4 the area officially became part of the United States. The new county encompassed 3,308 square miles, including parts of the future Hidalgo, Willacy, Kenedy, and Brooks counties. An election of county officers was held on August 7, but organization was not completed until September 11. Santa Rita, five miles downstream from Fort Brown and believed to be the earliest English-speaking town in the area, was made the county seat. The same year Charles Stillman established Brownsville just west of Fort Brown. In December, another election was held, and after intense effort on Stillman’s part, Brownsville was chosen county seat.

Cameron County covers 1,276 square miles, of which 891 square miles is land and 385 square miles is water. The county’s largest city and county seat is Brownsville, which serves as the terminus of U.S. Highways 77, 83, and 281 and the Missouri Pacific and Southern Pacific railroads.

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

Figure 3-1. Location of Cameron County

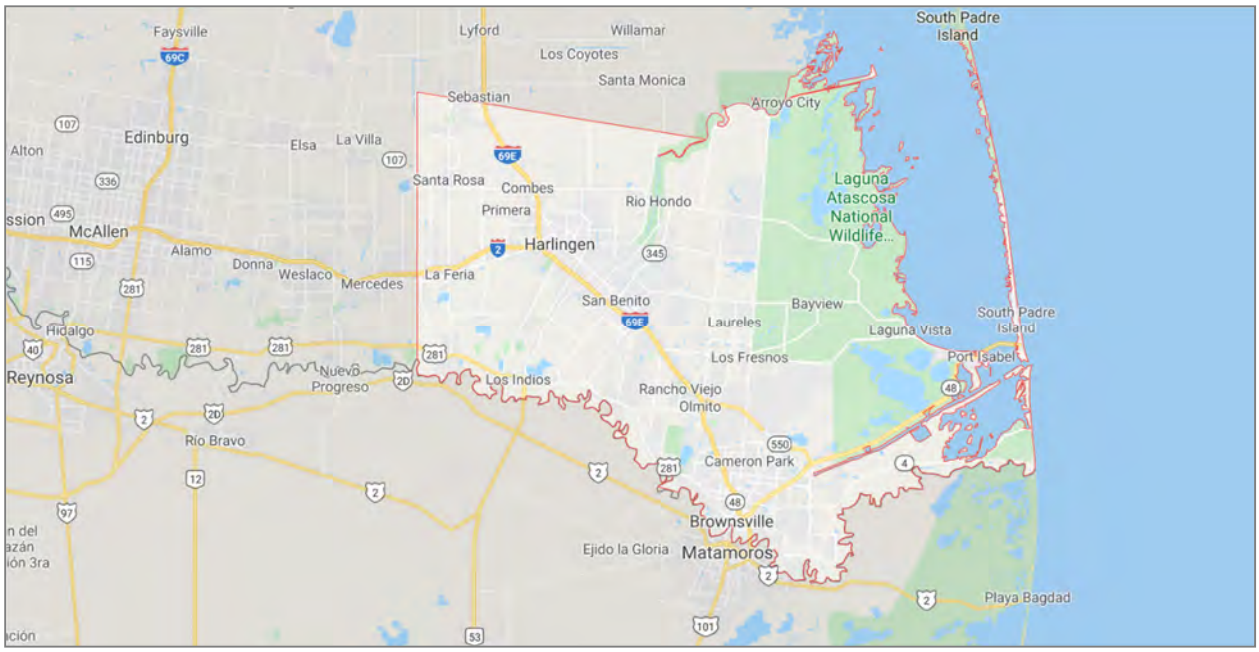
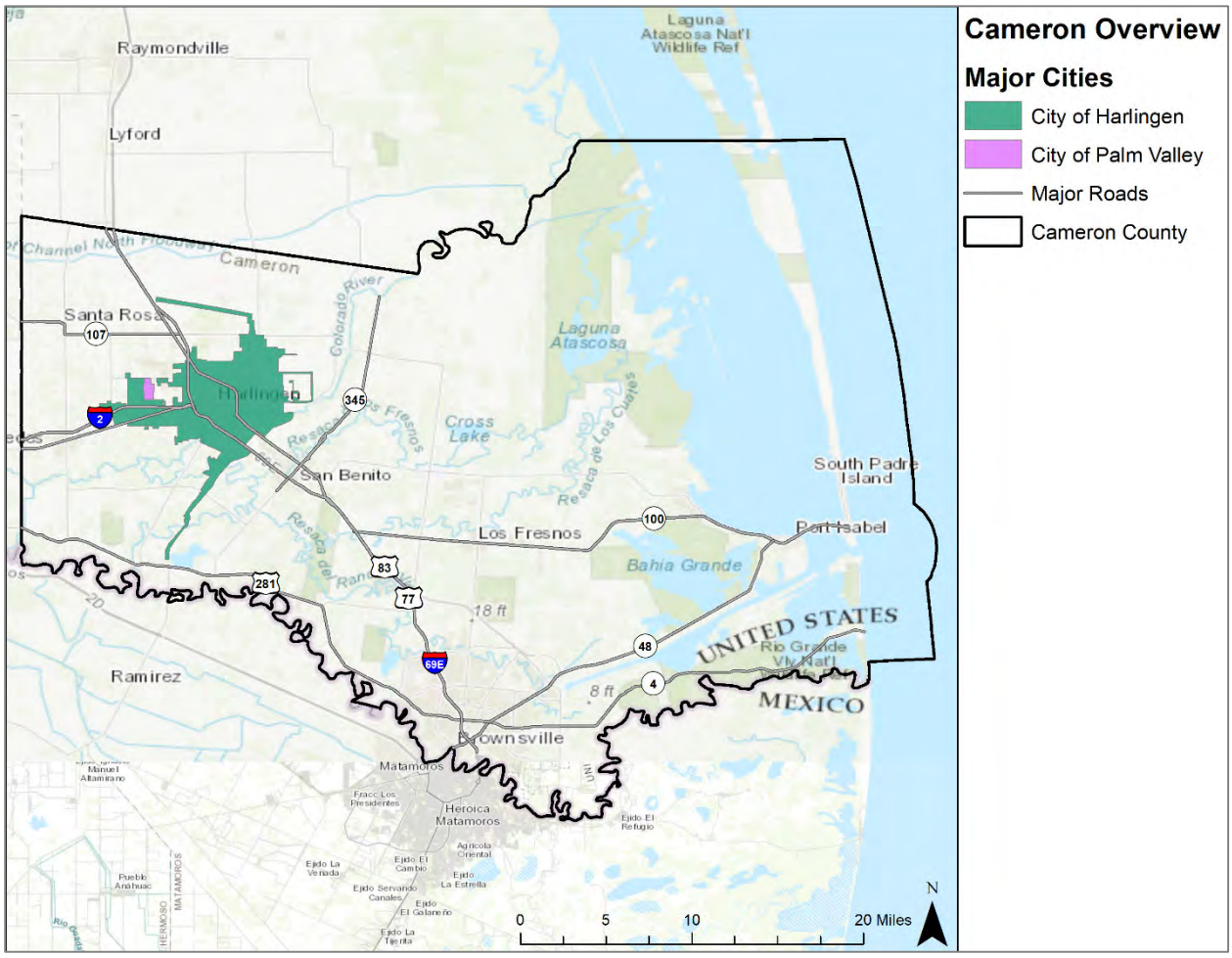


Figure 3-2 shows the participating jurisdictions within Cameron County that are covered in the risk assessment analysis of the Plan Update.

Figure 3-2. Cameron County Planning Area



Provided in Table 3-1 below is a listing of the jurisdictions in Cameron County that participated in the Cameron County Hazard Mitigation Action Plan Update 2021.

Table 3-1. Participating Jurisdictions

PARTICIPATING JURISDICTIONS
Cameron County
City of Harlingen
City of Palm Valley

POPULATION AND DEMOGRAPHICS

In the official Census population count, as of April 1, 2010, Cameron County has a population of 406,220 residents. By 2018, the number was estimated at 421,750. Table 3-2 provides the

population distribution by jurisdiction within Cameron County based on the 2010 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)	2018 POPULATION ESTIMATE	ESTIMATED VULNERABLE OR SENSITIVE POPULATIONS[2]		
				Youth (Under 5)	Elderly (Over 65)	Below Poverty Level
City of Harlingen	64,849	16.0%	65,449	6,465	9,701	19,766
City of Palm Valley	1,304	0.3%	1,706	90	654	85
Unincorporated Cameron County	340,067	83.7%	354,595	29,097	43,826	109,205
Cameron County	**406,220**	**100%**	**421,750**	**35,652**	**54,181**	**129,056**

POPULATION GROWTH

The official 2010 Cameron County population is 406,220. Overall, Cameron County experienced an increase in population between 1980 and 2010 by 93.7%, or an increase by 196,493. The City of Harlingen and the City of Palm Valley both experienced an increase in population between 1980 and 2010. Between 2000 and 2010, the City of Harlingen, the City of Palm Valley, and Cameron County, as a whole, experienced a population growth. Table 3-3 provides historic growth rates in Cameron County.

Table 3-3. Population for Cameron County, 1980-2010

JURISDICTIONS	1980	1990	2000	2010	POP CHANGE 1980-2010	PERCENT OF CHANGE	POP CHANGE 2000-2010	PERCENT OF CHANGE
City of Harlingen	43,543	48,746	57,564	64,849	21,306	48.9%	7,285	12.7%
City of Palm Valley	-	1,199	1,298	1,304	-	-	6	0.5%
Unincorporated Cameron County	166,184	210,175	276,365	340,067	173,883	104.6%	63,702	23.0%
Cameron County	**209,727**	**260,120**	**335,227**	**406,220**	**196,493**	**93.7%**	**70,993**	**21.2%**

[1] Source: https://www.census.gov/quickfacts/fact/table/cameroncountytexas/PST120218 and https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml

[2] The Estimated Vulnerable or Sensitive Populations are based off the 2018 American Community Survey.

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 2040 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. Cameron County Population Projections

County	LAND AREA (SQ MI)	2010		2020		2030		2040	
		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)
Cameron	891	406,220	456	479,754	538	560,637	629	641,946	721

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 Cameron 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. Cameron County's strategic location on the Mexican border is served by four international bridges and one rail-only bridge, Brownsville's deep-water port, Harlingen's intracoastal waterway access, highway system, rail access, two commercial airports and one county general aviation airport all with long runways.

The Economic Development & Community Affairs function of Cameron County prides itself on the assistance that has been brought to the county's colonia developments located in the rural areas. Cameron County Self-Help Colonia Initiative provides residents in five colonias on-site technical assistance to low and very low-income individuals and families in a variety of ways including housing, and community development activities, infrastructure improvements, and outreach and education.

EXISTING AND FUTURE LAND USE AND DEVELOPMENT TRENDS

The following jurisdictions have a Master or Comprehensive Plan in place: Cameron County and the City of Harlingen. 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.

Cameron county operates a system of parks that serve both the residents of the County as well as visitors to the area. The County's park system includes a series of coastal parks that are located along the Gulf of Mexico on South Padre Island, and these parks are among the most popular and heavily used in the entire system. With a view toward improving the park experience for all who visit, the Cameron County Commissioners Court ordered that a master plan for the system's coastal parks be developed. The Coastal Parks Master Plan (CPMP) prioritizes what improvements are needed in the near term to service the existing park user base and identifies areas within the coastal parks that present opportunities for improved recreation and related uses would be in the future.

The City of Harlingen's Community Development Division's mission is to assist in the creation and development of a viable community through suburb customer service, community outreach, partnerships in economic development, affordable housing and social service agencies. Through the use of CDBG and HOME Programs, the City is provided with an opportunity to develop viable communities by funding activities that provide a suitable living environment, create decent affordable housing, and provide economic opportunities to/for low and moderate-income households.

SECTION 4: RISK OVERVIEW

Hazard Description 1
Natural Hazards and Climate Change 4
Overview of Hazard Analysis 4

HAZARD DESCRIPTION

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

Upon a review of the full range of natural hazards suggested under FEMA planning guidance, participating jurisdictions within Cameron County identified twelve natural hazards that are addressed in the Hazard Mitigation Plan Update. Of the hazards identified, eleven natural hazards and one quasi-technological[1] hazard (dam failure) 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 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, drought, and coastal erosion.

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

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

[1] While dam failure is generally considered a quasi-technological hazard, it is profiled in the Plan Update as a natural hazard, i.e. a breach caused by extensive rainfall or flooding.

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.
Coastal Erosion	Coastal erosion is a hydrologic hazard defined as the wearing away of land and loss of beach, shoreline, or dune material as a result of natural coastal processes or manmade influences.
OTHER	
Wildfire	A wildfire is an uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase the risk for people and property located within wildfire hazard areas or along the urban/wildland interface. Wildfires are part of the natural management of forest ecosystems, but most are caused by human factors.
TECHNOLOGICAL	
Dam Failure	Dam failure is the collapse, breach, or other failure of a dam structure resulting in downstream flooding. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and severe property damage if development exists downstream of the dam.

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
Earthquake	According to the State Plan, an earthquake occurrence for the planning area is considered exceedingly rare. Earthquake events are not considered to pose a risk to the planning area. There is no history of impact to critical structures, systems, populations or other community assets or vital services as a result of earthquakes and impact is not 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 Cameron 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 Cameron 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.

To better understand how future growth and development in the Cameron 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 Cameron County was reviewed based on recent development changes that occurred throughout the planning area. Cameron County has increased slightly between 2010 and 2018 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.

SECTION 5: FLOOD

Hazard Description 1
Location 1
Extent 3
Historical Occurrences 7
Significant Events 9
Probability of Future Events 11
Vulnerability and Impact 11
Assessment of Impacts 12
National Flood Insurance Program (NFIP) Participation 14
NFIP Compliance and Maintenance 15
Repetitive Loss 16

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 Cameron County and the City of Harlingen 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 VE: Coastal areas with a 1-percent-annual-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. BFEs are provided.
- 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.

It is noted that the City of Palm Valley currently has No Special Flood Hazard Locations (NSFHA's). Locations of flood zones in Cameron County and all participating jurisdictions are based on the Digital Flood Insurance Rate Map (DFIRM) from FEMA are detailed below (Figure 5-1 through 5-3).

Figure 5-1. Estimated Flood Zones in the Cameron County

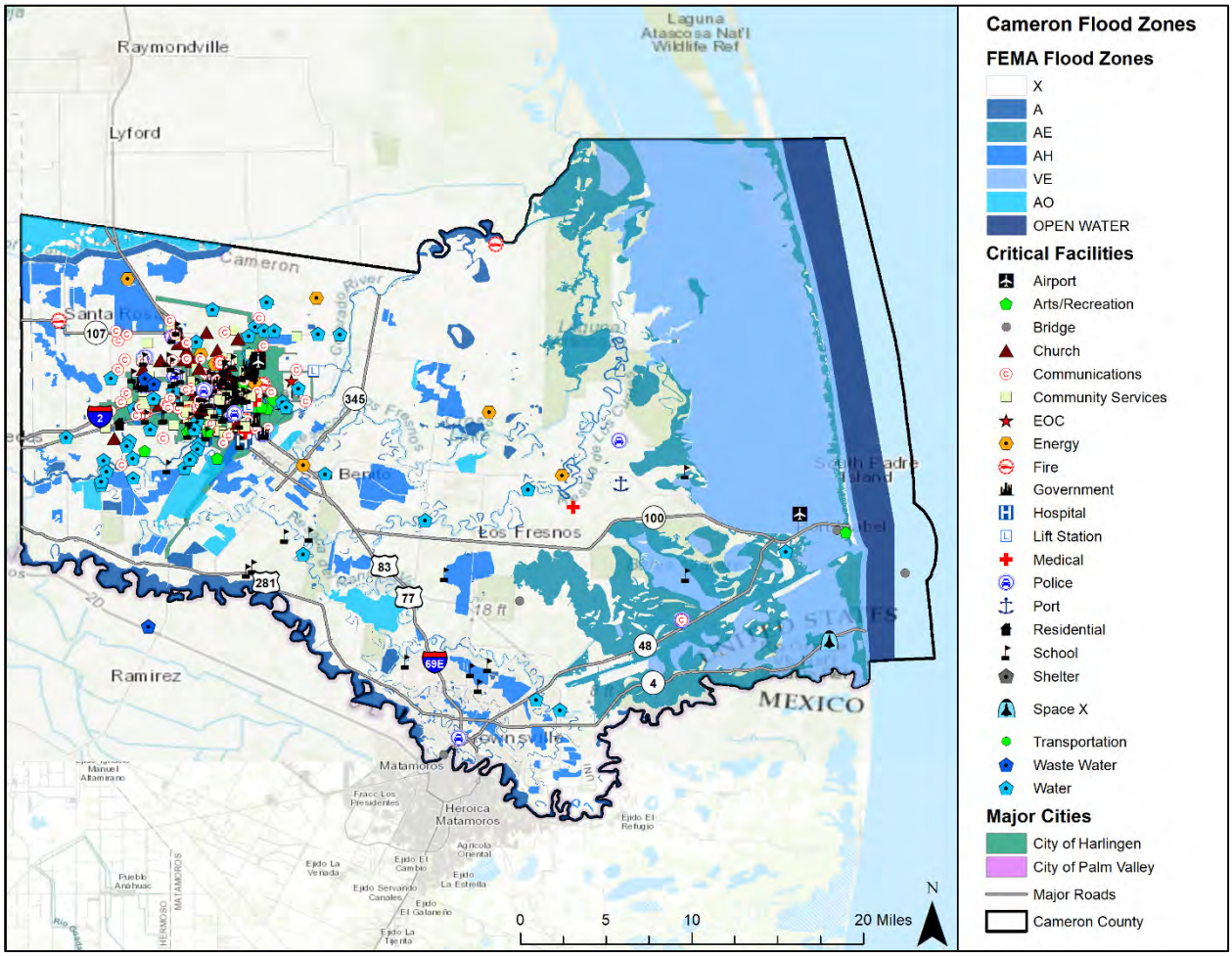


Figure 5-2. Estimated Flood Zones in the City of Harlingen

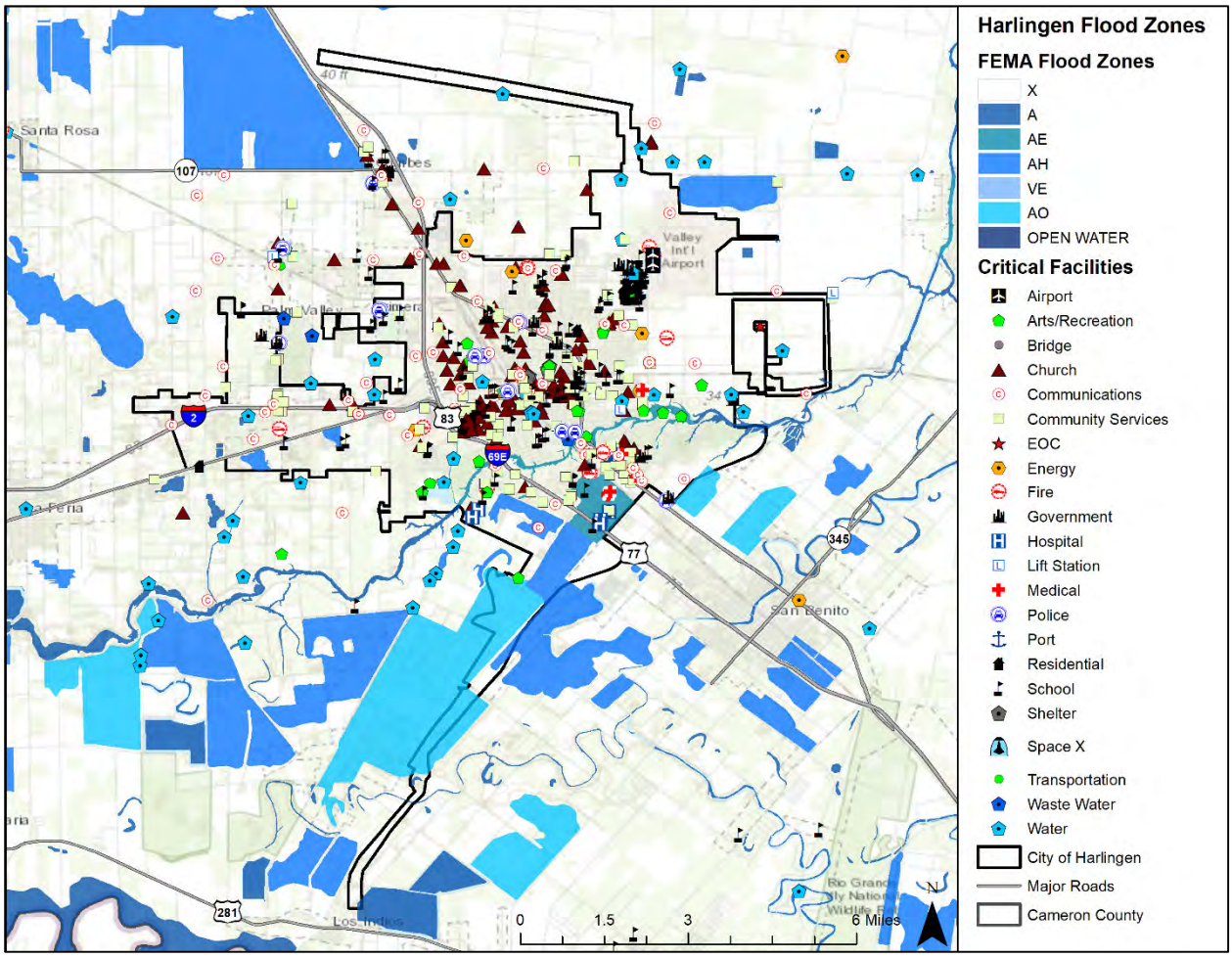
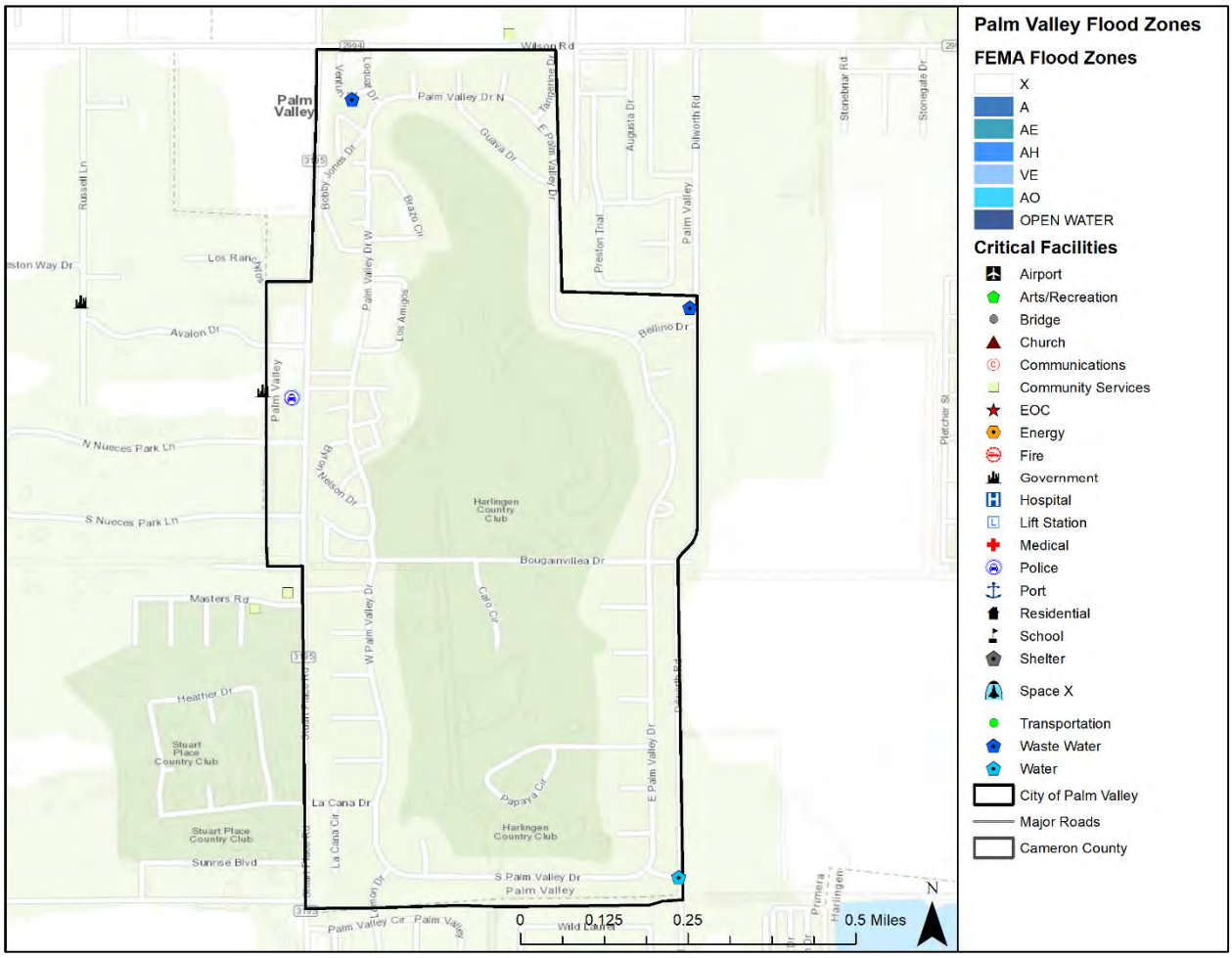


Figure 5-3. Estimated Flood Zones in the City of Palm Valley



In addition to the estimated flood zones (Figures 5-1 through 5-3), there are two dams of concern that are outside of the planning area that could create substantial flooding for the planning area along the Rio Grande River. The Anzalduas Dam is located in Hidalgo County approximately 25 miles away from the Cameron County line. The Falcon reservoir is an international reservoir approximately 40 miles south of Laredo and approximately 90 miles west of the Cameron County line. The planning area lies well outside of the estimated inundation zones for either of these dams. However, in the event of a breach the Rio Grande River, downstream of the breach, could experience extensive flooding that may exceed the boundaries of the Special Flood Hazard Area (SFHA).

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 5-1 provides a description of FEMA flood zones and the flood impact in terms of severity or potential harm. Flood Zones A, AE, VE and X are the only hazard areas mapped in the region. Figures 5-1 through 5-3 should be read in conjunction with the extent for flooding in Tables 5-1 and 5-2 to determine the intensity of a potential flood event.

Table 5-1. 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.

INTENSITY	ZONE	DESCRIPTION
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 5-2 describes the stream gauge data provided by the United States Geological Survey (USGS).

Table 5-2. Extent for Cameron County[1]

JURISDICTION[2]	PEAK FLOOD EVENT
Cameron County	The Rio Grande River near San Benito, Texas reached an overflow elevation of 61.05 feet in September 1967. The average peak flow for the Rio Grande is 50.59 feet at this site.
Cameron County	The Rio Grande River near Brownsville, Texas reached an overflow elevation of 33.2 feet in September 1942. The average peak flow for the Rio Grande is 25.7 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 up to 7.8 inches of rainfall within a 17-hour period, resulting in flash flooding.

[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.

The data described in Tables 5-1 and 5-2, together with Figures 5-1 through 5-3, and historical occurrences for the area, provides an estimated potential magnitude and severity for the planning area. For example, the City of Harlingen, as shown in Figure 5-2, has areas designated as Zone A. Reading this figure in conjunction with Table 5-1 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 5-3 identifies historical flood events within the Cameron County planning area, including all participating jurisdictions. Table 5-4 provides the historical flood event summary by jurisdiction. Historical data is provided by team members and the Storm Prediction Center (NOAA), NCEI database for Cameron County.

Table 5-3. Historical Flood Events, 1996-2019[3]

JURISDICTION	DATE	TIME	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	10/11/1997	3:30 PM	0	0	$6,385	$0
Cameron County	10/13/1997	10:00 AM	0	0	$59,704	$0
Cameron County	9/19/2003	10:20 AM	0	0	$34,823	$0
Cameron County	9/19/2003	6:00 PM	0	0	$1,950,105	$0
City of Harlingen	10/7/2003	3:10 PM	0	0	$69,722	$0
Cameron County	10/13/2003	9:00 AM	0	0	$6,274,970	$0
Cameron County	3/15/2004	5:30 AM	0	0	$34,414	$0
Cameron County	5/8/2004	2:00 PM	0	0	$2,728,408	$0
City of Harlingen	5/25/2007	2:00 PM	0	0	$24,811	$0
City of Harlingen	5/25/2007	3:03 PM	0	0	$124,055	$0
Cameron County	7/23/2008	10:45 AM	0	0	$50,137	$43,979,526
Cameron County	7/24/2008	4:01 AM	0	0	$50,137	$43,979,526

[3] Only recorded events with fatalities, injuries, and/or damages are listed, values are in 2020 dollars. Historical events are listed from January 1996 through November 2019.

JURISDICTION	DATE	TIME	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	8/23/2008	3:00 PM	0	0	$5,887	$0
Cameron County	8/27/2008	2:17 PM	0	0	$1,177	$0
City of Harlingen	4/16/2010	5:00 PM	0	0	$2,367	$0
Cameron County	6/30/2010	12:00 PM	0	0	$11,835	$0
Cameron County	6/30/2010	3:00 PM	0	0	$177,531	$0
Cameron County	7/1/2010	12:00 AM	0	0	$592	$0
Cameron County	7/13/2010	6:30 AM	0	0	$118,329	$118,329
Cameron County	9/6/2010	11:30 PM	0	0	$0	$11,810
Cameron County	9/19/2010	5:00 AM	0	0	$5,904,875	$0
Cameron County	6/30/2012	3:45 PM	0	0	$84,312	$0
Cameron County	11/6/2013	9:20 PM	0	0	$11,068	$0
Cameron County	8/31/2015	1:00 PM	0	0	$216,495	$0
Cameron County	10/30/2015	11:00 AM	0	0	$108,465	$0
Cameron County	6/19/2018	5:30 PM	0	0	$5,118,696	$0
Cameron County	6/20/2018	4:00 AM	0	0	$35,830,870	$0
Cameron County	6/20/2018	4:00 PM	0	0	$20,474,783	$0
Cameron County	9/12/2018	7:00 PM	0	0	$102,191	$0
Cameron County	6/24/2019	7:30 PM	0	0	$30,214,099	$5,035,683
City of Palm Valley	6/24/2019	8:30 PM	0	0	$54,000,000	$0
TOTALS			**0**	**0**	**$163,791,245**	**$93,124,875**

Table 5-4. Summary of Historical Flood Events, January 1996-2019

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	74	0	0	$109,570,291	$93,124,875

JURISDICTION	NUMBER OF EVENTS	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
City of Harlingen	9	0	0	$220,954	$0
City of Palm Valley	1	0	0	$54,000,000	$0
TOTAL LOSSES	**84**	**0**	**0**	**$256,916,120**	

Based on the list of historical flood events for the Cameron County planning area (listed above), including all participating jurisdictions, 16 of the events have occurred since the 2015 Plan.

SIGNIFICANT EVENTS

Flash Flood on June 24, 2019 (Great June Flood II)
Just 367 days after the last of the Great June Flood of 2018 had left its memorable mark on nearly all of the populated Rio Grande Valley, a confluence of atmospheric events came together during the late afternoon and evening of June 24th, 2019, to produce another memorable, and unfortunate situation for parts of the Rio Grande Valley. This time, the impacted area was smaller and less populated but the results the same. For most of Willacy County's population, the western third of Cameron, and a corner of eastern Hidalgo, significant impacts were noted. These included: Over a foot of rain fell in about six hours, including a peak total of more than 15 inches near Santa Rosa (Cameron/Hidalgo line); hundreds of streets flooded, including 30 Texas-managed highways; 1,188 homes were considered destroyed or incurring major damage requiring significant repairs, with an additional 182 homes sustaining minor damage or mildly affected. FEMA Individual Assistance costs were estimated at $27.6 million. FEMA Public Assistance costs were over $5 million. Total damage estimates ranged from $50 to $100 million or more. More than 100 persons were evacuated to safe high ground from dozens of homes threatened by 2 or more feet of water in several locations in each county. At least 45,000 private and public utility power customers were without power at the peak of the storm and estimated 65 to 75 mph winds caused at least five poorly built mobile homes to be rolled or demolished in eastern Hidalgo County. New daily rainfall records were set at most available Rio Grande Valley climate recording locations. These totals ranged from 2.06 inches in Brownsville to 15.20 inches in Santa Rosa.

Flash Flood on June 18-22, 2018 (Great June Flood of 2018)
Multiple cells and clusters of thunderstorms in western Cameron County caused widespread flooding between La Feria, Harlingen, San Benito, and other locations. The first serious flooding event developed during the late night and early morning hours of June 19th across the South Texas Brush Country of Duval, Jim Wells, and Brooks County. Torrential rains of more than 12 inches by midday west of Falfurrias, and flooding of at least 1 to 2 feet of water covered the streets of the city, closing many of them. Soon after, Palo Blanco Creek over-spilled its banks and contributed additional water flows, and Los Olmos Creek spiked quickly and by evening reached flood stage by late afternoon and would crest just over moderate stage, the third highest crest in the modern record and highest since 1971.

The second flooding rain event struck Cameron County from Brownsville to Los Fresnos, when a slow moving line of thunderstorms from west to east intersected the sea breeze and stalled, dumping 3 to 5 inches of rain over a 2 to 3 hour period and caused significant street flooding and

some road closures in the area. The "big one" followed just 12 hours later, when the peak of the tropical moisture plume was lifted by an embedded upper level disturbance parked between the central Rio Grande Valley and the South Texas Brush Country. Incredible rainfall rates of up to 5 or more inches per hour struck the highly populated mid Valley between the east side of the McAllen Metro region to Harlingen, with peak rainfall just north of Weslaco and Mercedes. 11 to 13 inches fell in just a few hours at and near the Mid Valley Airport in Weslaco, though amounts may have been a couple inches higher in the heaviest rain core several miles northeast of this location. The cooperative observing station on the Mid Valley Airport grounds reported 11.36 inches in 3 hours. Drainage was unable to handle the deluge, and widespread flooding with photo and video evidence of at least 3 to 5 feet of water depth in many streets of each town ensued. The number of homes, businesses, and vehicles impacted by the floodwaters exceeded that from the October 22-24 Atmospheric River Event. Weslaco City estimates were more than 2500 homes, 100+ businesses, and at least 2500 vehicles with various degrees of damage. The homes and businesses had a minimum of 18 inches of floodwater depth inside portions of each.

The third event struck Cameron County again, in nearly the same locations between Brownsville and northeast of Los Fresnos that same afternoon. This time, 4 to 6 inches fell, making for two day totals of 6 to 10 inches in the area and triggering additional flooding, especially in and northeast of Los Fresnos where several neighborhoods were inundated by a foot or more of water, with estimates of 3 feet or more of standing water in poor drainage locations as well as open fields. Parts of Harlingen were dealt a "triple" blow with rain during the afternoon of the 19th, morning of the 20th, and afternoon of the 20th. 10 inches fell there as well. Additional rainfall impacted Cameron County as short-liced but heavy rainfall events proceeded throughout the afternoon of the 21st. Detailed damage for this particular event was not known, though total damage through multiple agencies along with standard doubling for uninsured properties, as well as significant damage to drainage canals, suggested event totals in Cameron County were over $60 million. There were an unknown number of properties and vehicles damaged in this particular flood, though the numbers are likely above 1,000 for each case.

Flash Flood on June 30, 2012

A weak upper level disturbance, which had produced a few days of healthy thunderstorms in the western Gulf of Mexico during the final week of June, crossed the coast on June 30th and produced local downpours that flooded small portions of Cameron and Zapata/western Starr County. The disturbance combined with sea breeze influences and boundaries from activity across the Coastal Bend to enhance initial thunderstorms along the coast of eastern Willacy and Cameron County around noon. Heavy rain fell during the afternoon hours across Brownsville. Western and downtown portions of Brownsville were especially hard hit with rainfall totals over 5 inches reported. Flash floods closed several roads, overtopped resaca's, and reached into properties near and in downtown. A trained spotter reported water in the streets and resaca's out of their banks and over walls; this spotter also reported five inches of rain. A NWS employee reported that Price Road was impassible with at least a foot of water over it in western Brownsville. The Emergency Manager reported water in a few homes in downtown Brownsville and resaca's getting high. The Emergency Manager also reported that Price Road was mostly closed, Boca Chica Blvd was closed in a few spots, and a few other streets were closed as well.

PROBABILITY OF FUTURE EVENTS

Based on 83 recorded historical occurrences within a 24-year reporting period within the Cameron County planning area, including all participating jurisdictions, flooding is highly likely with 3 to 4 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 than 10 percent of property destroyed or with major damage, and injuries or illness that does not result in permanent disability depending on the scale of the storm.

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

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

JURISDICTION	CRITICAL FACILITIES
Cameron County	1 Airport, 2 Bridges, 3 Schools, 1 Park, 1 Police Dispatch Facility, 1 Police Station, 1 Water District Facility, 1 Fire Station, 1 Space-X Port
City of Harlingen	1 Communications Center, 2 Fire Stations, 1 Communication Tower, 1 Church, 1 School, 3 Hospitals/Medical Facilities, 5 Nursing Home Facilities, 2 Pump Stations, 1 Lift Station, 1 Water Tower, 1 Daycare
City of Palm Valley	None

Historic loss estimates due to flood are presented in Table 5-6 below. Considering 83 flood events over a 24-year period, frequency is approximately three to four events every year.

Table 5-6. Potential Annualized Losses by Jurisdiction

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Cameron County	$202,695,166	$8,445,632
City of Harlingen	$220,954	$9,206
City of Palm Valley	$54,000,000	$2,250,000
Planning Area	**$256,916,120**	**$81,704,838**

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 30.6% of the planning area population live below the poverty level (Table 5-7).

Table 5-7. Populations at Greatest Risk by Jurisdiction[4]

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Cameron County	129,056
City of Harlingen	16,624
City of Palm Valley	85

The severity of a flooding event varies depending on the relative risk to citizens and structures located within each city. Table 5-8 depicts the level of impact for Cameron County and each participating jurisdiction.

Table 5-8. Impact by Jurisdiction

JURISDICTION	IMPACT	DESCRIPTION
Cameron County	Limited	It is anticipated that Cameron County could anticipate an impact of "minor" with critical facilities would be shut down for one week or more and more than 10 percent of property would be destroyed or damaged.
City of Harlingen	Limited	It is anticipated that the City of Harlingen could anticipate an impact of "limited" with critical facilities would be shut down for 24 hours or less and less than 10 percent of property would be destroyed or damaged.
City of Palm Valley	Limited	It is anticipated that the City of Palm Valley could anticipate an impact of "limited" with critical facilities would be shut down for 24 hours or less and less than 10 percent of property would be destroyed or damaged. Palm Valley currently has a FEMA finding of NSFHA.

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 Cameron 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.

[4] US Census Bureau 2018 data for Cameron County

- 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.
- Recreation activities such as fishing, boating, and camping activities at Laguna Atascosa National Wildlife Preserve, Rio Grande River, Bahia Grande Tidal Basin, may be

unavailable and tourism can be unappealing for years following a large flood event, devastating directly related local businesses and negatively impacting economic recovery.

- Flooding may cause significant disruptions of clean water and sewer services, elevating health risks and delaying recovery efforts.
- The 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.

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

Cameron County and all participating jurisdictions currently have in place minimum NFIP standards for new construction and substantial improvements of structures. All jurisdictions are considering adopting additional higher regulatory NFIP standards to limit floodplain development. 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 Cameron 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, Cameron 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, Cameron County and all participating jurisdictions has developed mitigation actions that relate to either NFIP maintenance or compliance. Compliance and maintenance actions can be found in Section 19.

Flooding was identified by all 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] It is noted that the City of Palm Valley does not currently have any repetitive loss properties. Table 5-9 shows repetitive loss and severe repetitive loss properties for the Cameron County planning area.

Table 5-9. Repetitive Loss and Severe Repetitive Loss Properties

JURISDICTION	BUILDING TYPE	NUMBER OF STRUCTURES	NUMBER OF LOSSES
Cameron County	2-4 Family	4	10
	Assumed Condo	5	20
	Non-Residential	11	42
	Other Residential	4	12
	Single Family	91	237
City of Harlingen	Non-Residential	16	41
	Other Residential	3	6
	Single Family	45	113

[5] Source: Texas Water Development Board

SECTION 5: FLOOD

SECTION 6: HURRICANE WIND

Hazard Description 1
Location 1
Extent 2
Historical Occurrences 4
Significant Events 5
Probability of Future Events 7
Vulnerability and Impact 7
Assessment of Impacts 9

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.

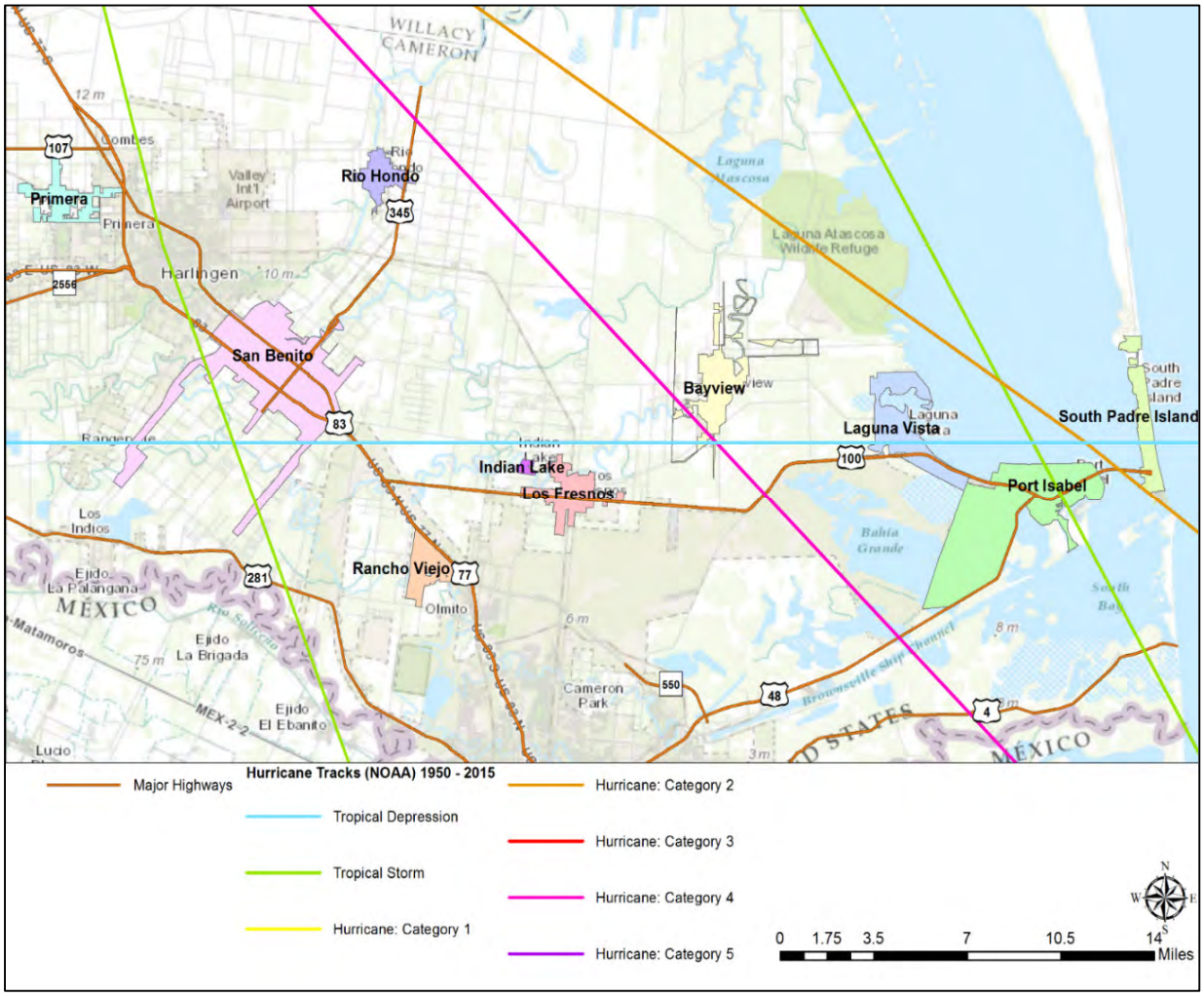
The intensity of a land falling hurricane is expressed in categories relating wind speeds and potential damage. Tropical storm-force winds are strong enough to be dangerous to those caught in them. For this reason, emergency managers plan to have evacuations completed and personnel sheltered before winds 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

As a coastal community, Cameron County, including all participating jurisdictions, is vulnerable to threats directly and indirectly related to a hurricane event, such as high-force winds, storm surge, flooding, and coastal erosion. Hurricanes and/or tropical storms can impact Cameron County from June to November, the official Atlantic U.S. hurricane season. Cameron 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 6-1 below, hurricane tracks are reflective of their strength in the Cameron County planning area.

Figure 6-1. 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 6-1). 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.

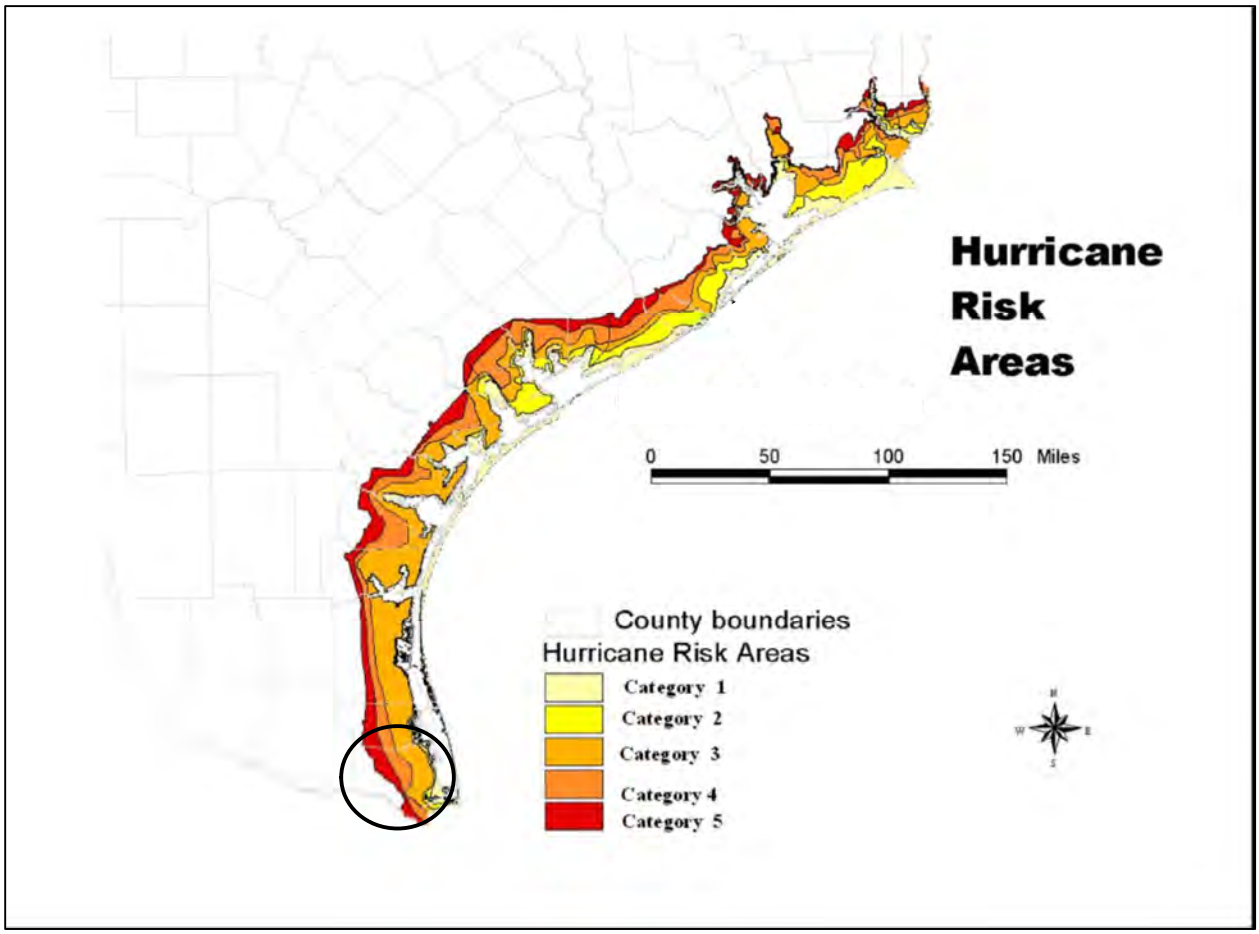
Table 6-1. Extent Scale for Hurricanes

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

CATEGORY	MAXIMUM SUSTAINED WIND SPEED (Mph)	MINIMUM SURFACE PRESSURE (Millibars)	STORM SURGE (Feet)
4	131 – 155	944 – 920	13 – 18
5	155 +	Less than 920	19 +

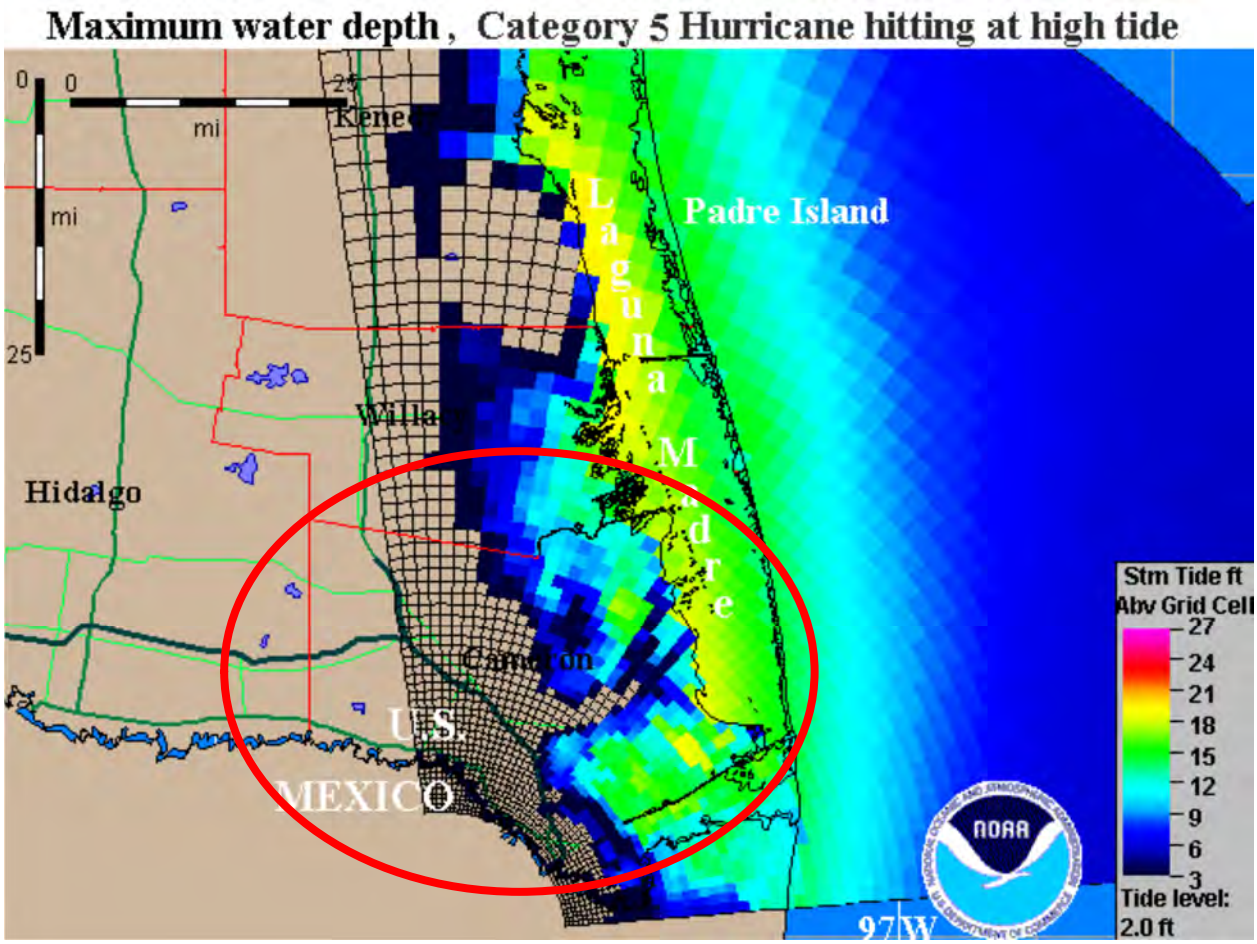
Based on the historical storm tracks for hurricanes and tropical storms, as well as the coastal location of Cameron County, the average extent to be mitigated for is a Category 3 storm. The Cameron County planning area is located in the 110-155 wind zone in terms of average wind speeds that should be mitigated in the event of a hurricane. This data is based on the design wind speeds for a 100-year event. The strongest hurricane to have impacted the Cameron County planning area, including all participating jurisdictions, is a category 4 in 1967. Figure 6-2 displays the location of hurricane risk by storm category along the Gulf Coast.

Figure 6-2. Location of Hurricane Risk along the Texas Coast



The worst-case scenarios of potential extent of a Category 5 hurricane of storm surge in the Cameron County planning area is displayed in Figure 6-3; the Cameron County study area is indicated by the red circle. The map reflects a general geographic analysis that does not consider specific factors such as levee system.

Figure 6-3. Maximum Storm Surge Water Depths, Category 5 Hurricane[1]



The planning area is located along the coast, and therefore all participating jurisdictions have a greater risk, with all land and buildings being vulnerable to all storms, category 1 through 5.

HISTORICAL OCCURRENCES

Previous occurrences include storms that had a direct path through the Cameron County planning area, including the participating jurisdictions. Table 6-2 below lists the storms that have impacted the Cameron County planning area during the years of 1960-2019.

Table 6-2. Historical Hurricane Events for the Cameron County Planning Area, 1960-2019[2]

JURISDICTION	DATE	NAME	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Countywide	9/8/1961	Hurricane Carla	0	4	$4,340,746	$4,340,746
Countywide	9/16/1963	Hurricane Cindy	0	0	$1,049,758	$104,976

[1] Source: NOAA SLOSH (Sea, Lake, and Overland Surge from Hurricanes).
[2] Values are reported in 2020 dollars.

JURISDICTION	DATE	NAME	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Countywide	9/5/1967	Hurricane Beulah	0	1	$265,103,550	$0
Countywide	6/23/1968	Tropical Storm Candy	0	0	$335,663	$335,663
Countywide	7/31/1970	Hurricane Celia	0	6	$4,357,378	$447,517
Countywide	9/9/1971	Hurricane Fern	0	0	$520,097	$520,097
Countywide	9/14/1971	Hurricane Edith	0	0	$5,565	$5,565
Countywide	9/4/1973	Tropical Storm	0	0	$241,163	$24,116,049
Countywide	7/31/1980	Hurricane Allen	0	0	$16,588,815	$1,658,881
Countywide	11/12/1980	Tropical Storm Jeanne	0	0	$9,746	$0
Countywide	9/16/1988	Hurricane Gilbert	0	0	$278,456	$2,785
Countywide	7/23/2008	Hurricane Dolly	0	2	$923,570,050	$0
Countywide	9/12/2008	Storm Surge/Tide	0	0	$23,871	$0
Countywide	6/30/2010	Storm Surge/Tide	0	0	$176,1775	$0
Countywide	9/6/2010	Tropical Storm Hermine	0	0	$14,142,088	$0
TOTALS				**13**	**$1,262,276,000**	

SIGNIFICANT EVENTS

Tropical Storm Hermine on September 6, 2010

Hermine arrived with frequent gusty feeder band showers followed by relatively calm conditions through the day and early evening of September 6th. Between 9:30 and 10 PM CDT, the action got underway as the central core of Hermine brought a rapid increase in sustained winds and gusts, along with increasingly heavy rainfall. Between 11 PM and 12 AM CDT, the northern doughnut crossed the Rio Grande over lower populated southwest Cameron County. Meanwhile, intense feeder bands east of the center, where some of the strongest winds were sampled, pounded Brownsville with sustained winds of 40 to 55 mph and gusts as high as 69 mph at the Brownsville/SPI International Airport. Between 1 and 1:30 AM, a very intense band would reform around the center, curling from just south of Harlingen to north of Brownsville. This band would cross Harlingen just prior to 2 AM, and produced near hurricane force gusts (72.5 mph) along with brief sustained winds of 59 mph, which damaged a number of roofs, knocked down limbs and uprooted trees, and wiped out power to more than 14,000 residents, many in the Harlingen/San Benito area. In all, between 46,000 and 50,000 customers in Cameron County were without power

during the peak of the storm, including those in the AEP Texas, Brownsville PUB, and Magic Valley Electric Co-op service areas.

After the inner core of Hermine sliced through, winds quickly diminished below tropical storm force from south to north across the county, between 1:30 AM CDT near the river and 2:30 CDT near the Willacy County line. Significant damage included the roof collapsing at two apartment complexes, displacing at least two families. A large part of an industrial building roof collapsed in north Harlingen, and other poorly constructed lightweight roofs were blown off in Brownsville and the Port of Brownsville. Hundreds of medium to large tree limbs fell along the Highway 77 corridor from Brownsville through San Benito and the central and east side of Harlingen. Boaters, particularly Mexican shrimping vessels, did their best to seek refuge in the Port of Brownsville prior to the arrival of the storm. The sharp increase in waves broke as high as the windows of the Harbormaster office. Sixty-four vessels reached the Port, but 5 others became stranded at the coast, including three running aground in Texas and two in Mexico when buoys floated toward the beach and guided the boats toward the rocks. Each boat was able to beach safely, with no human casualties.

Hurricane Dolly on July 23, 2008

The approach of Hurricane Dolly to the barrier shoreline of South Padre Island early on the morning of July 23rd brought sustained tropical storm force winds inland to the east side of Brownsville, including the Port, just before 7:30 AM on the 23rd. Prior rain bands had produced frequent gusts to 40 mph, but the arrival of sustained tropical storm winds was soon followed by wind damage and power outages, particularly during the afternoon. Prior to Dolly's landfall along the Cameron/Willacy County line, the western and southern eyewall intensified. The core of the eyewall traversed northern Cameron County, where impacts were more substantial than in southern Cameron County.

Northern Cameron (Harlingen, San Benito, Rio Hondo): A period of estimated and measured sustained winds between 60 and 70 mph, with frequent gusts to hurricane force (at least 78 mph measured at 2.25 meters), developed around 1 PM and continue through around 5 PM, beginning in northeast Cameron County near Arroyo City and extending west through Las Yescas, Rio Hondo, Harlingen, San Benito, Palm Valley, and La Feria, not only created widespread freshwater flooding, but created notable damage to poorly fastened roofs and some walls, particularly at industrial parks, strip centers, and farm buildings, especially from Harlingen to points east. Otherwise, numerous large limbs, power lines and power poles, highway signs and billboards, were blown down across the area during this time period. As Dolly's center eased slowly from southern Willacy into northern Hidalgo County, the last of the sustained tropical storm force winds began to exit Cameron County from Palm Valley to Santa Rosa and La Feria, just after midnight on the 24th.

Southern Cameron: Along and just north of the Rio Grande, from the Kellers Corner/Brownsville Airport area through Brownsville and to points west, roughly along federal highway 281 through Los Indios out toward the Hidalgo/Cameron County line, conditions were a bit more benign, as the core of the southern and western eyewall generally missed the area. Here, sustained tropical storm force winds persisted from around 8:30 AM until 6 PM, though gusts above 40 mph persisted until near midnight. In this area, sustained wind generally peaked between 45 and 55 mph, with peak gusts just below hurricane force between 11:30 AM and 2 PM. Here, damage was primarily to thousands of tree limbs, hundreds of power lines, and many elevated highway signs

and billboards, but structural damage was primarily to unfastened shingles of roofs of moderate to well-constructed buildings, and occasional failures of more poorly constructed roofs at industrial parks and farm buildings.

At the peak of the storm, power was out to just about all of Cameron County, with an estimated 115,000 customers down during the middle of the afternoon. Across northern Cameron County, power recovery took days to more than a week, while many locations in southern Cameron County returned to power within a few days after Dolly's passage.

PROBABILITY OF FUTURE EVENTS

Due to the location on the Gulf Coast, and the previous history of 15 events over a 60 year reporting period for the area, the likelihood or future probability of a tropical storm or hurricane in the Cameron County planning area is likely, 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 Cameron County planning area features multiple mobile or manufactured home parks throughout the planning area, including the City of Harlingen. 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 17,923 manufactured homes located in the Cameron County planning area (12%), including all the City of Harlingen (Table 6-3). It should be noted that the City of Palm Valley currently does not feature any manufactured homes. In addition, 33.9% (approximately 50,767 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 6-3. Structures at Greater Risk by Jurisdiction

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Cameron County[3]	17,923	50,767
City of Harlingen	2,657	10,939

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

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
City of Palm Valley	0	476

The following critical facilities would be vulnerable to hurricane wind events in each participating jurisdiction, respectively.

Table 6-4. Critical Facilities by Jurisdiction

Jurisdiction	Critical Facilities
Cameron County	1 Airport, 6 Bridges, 2 Detention Centers, 1 EOC, 2 Fire Stations, 2 Heliports, 2 Hospitals, 11 Park, 2 Police Dispatch Facilities, 1 Police Station, 15 Schools, 2 Seaports, 1 Shelter/Government Facility, 1 Space-X Port, 1 Utility Facility, 9 Water District Facilities, 2 Wind Farms
City of Harlingen	2 EOCs/Government Facilities, 4 Police Station, 1 Communications Center, 1 Public Works Facility, 8 Fire Stations, 3 Communication Towers, 5 Evacuation Centers, 1 Helipad, 18 Banks, 133 Churches, 1 School, 11 Parks, 5 Medical Facilities Hospital, 9 Nursing Home, 1 Communication Tower, 1 Communication Switch Box, 1 Constable Office, 1 DPS Station, 1 EMS, 27 Pump Stations, 2 Lift Stations, 5 Government Facilities, 1 Power Company, 1 Power Plant, 1 Power Utility Station, 62 School Facilities (buildings, teaching facilities, warehouses, offices), 1 Sheriff's Office, 1 College Campus, 1 Water Plant, 1 Airport
City of Palm Valley	1 Government Facility, 1 Wastewater Treatment Facility, 2 Lift Stations, 1 Pump Station, 1 Business

Storm track data was available for the past 150 years; however, property and crop loss data is only available from 1960 through November 2019. Table 6-5 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 60 year reporting period for such damages (Table 6-5). The average annual loss estimate for the Cameron County planning area is estimated to be approximately $18,032,514.

Table 6-5. Potential Annualized Losses Cameron County, 1960-2019

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Cameron County	$1,262,276,000	$18,032,514

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 30.6% of the planning area population live below the poverty level (Table 6-6).

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

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Cameron County	129,056
City of Harlingen	16,624
City of Palm Valley	85

The potential severity of impact from a hurricane for the Cameron County planning area, including all participating jurisdictions, is classified as “major”; injuries or illness resulting in permanent disability, complete shutdown of critical facilities and services for two weeks, and more than 25 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.
- Coastal communities may suffer substantial damage, requiring immediate shelter and long term displacement assistance.
- Damaged bridges in and out of Bayview and South Padre Island (Causeway) could prevent or delay emergency response, strand or prevent entry of tourists, commuters, supply delivery, or goods and services for extended periods.
- Driving conditions in all jurisdictions may be dangerous during a hurricane event, especially over the Causeway or other elevated bridges, elevating the risk of injury and accidents during evacuations if not timed properly.
- Additional resources may be required for emergency preparedness and response during the summer months due to increases in populations along the coast.
- Significant coastal erosion could be expected with a hurricane for South Padre Island, Laguna Vista and Bayview, potentially contributing to structural damages and damaged infrastructure.
- Emergency evacuations may be necessary prior to a hurricane landfall, requiring emergency responders, evacuation routing and temporary shelters.
- Significant debris and downed trees can result in emergency response vehicles being unable to access areas of the community.
- Downed power lines may result in roadways being unsafe for use, which may prevent first responders from answering calls for assistance or rescue.

[4] US Census Bureau 2018 data for Cameron County

- 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 7: EXTREME HEAT

Hazard Description 1
Location 1
Extent 1
Historical Occurrences 4
Probability of Future Events 6
Vulnerability and Impact 6
Assessment of Impacts 7

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 Cameron 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

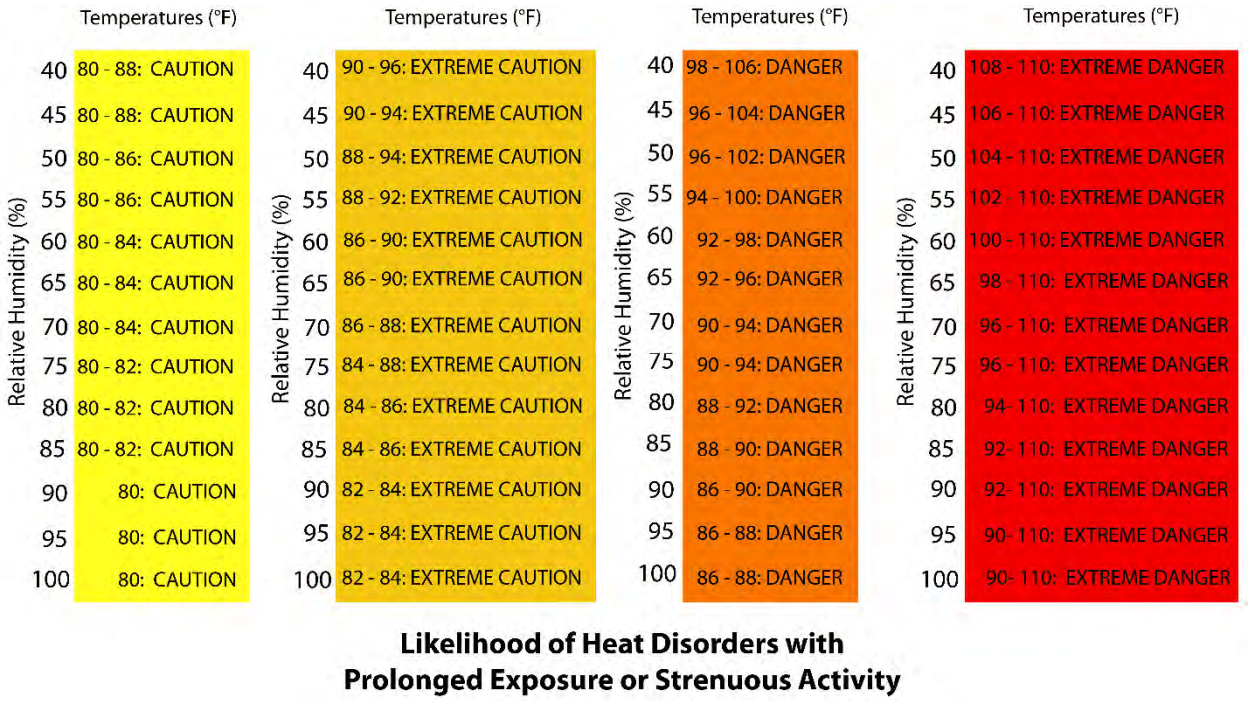
Though a death from extreme heat has not been recorded at a specific location in the County, there is no specific geographic scope to the extreme heat hazard. Extreme heat could occur anywhere within the Cameron County planning area, including all participating jurisdictions.

EXTENT

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

SECTION 7: EXTREME HEAT

Figure 7-1. Extent Scale for Extreme Summer Heat[1]



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

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

Table 7-1. Heat Index and Warnings

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

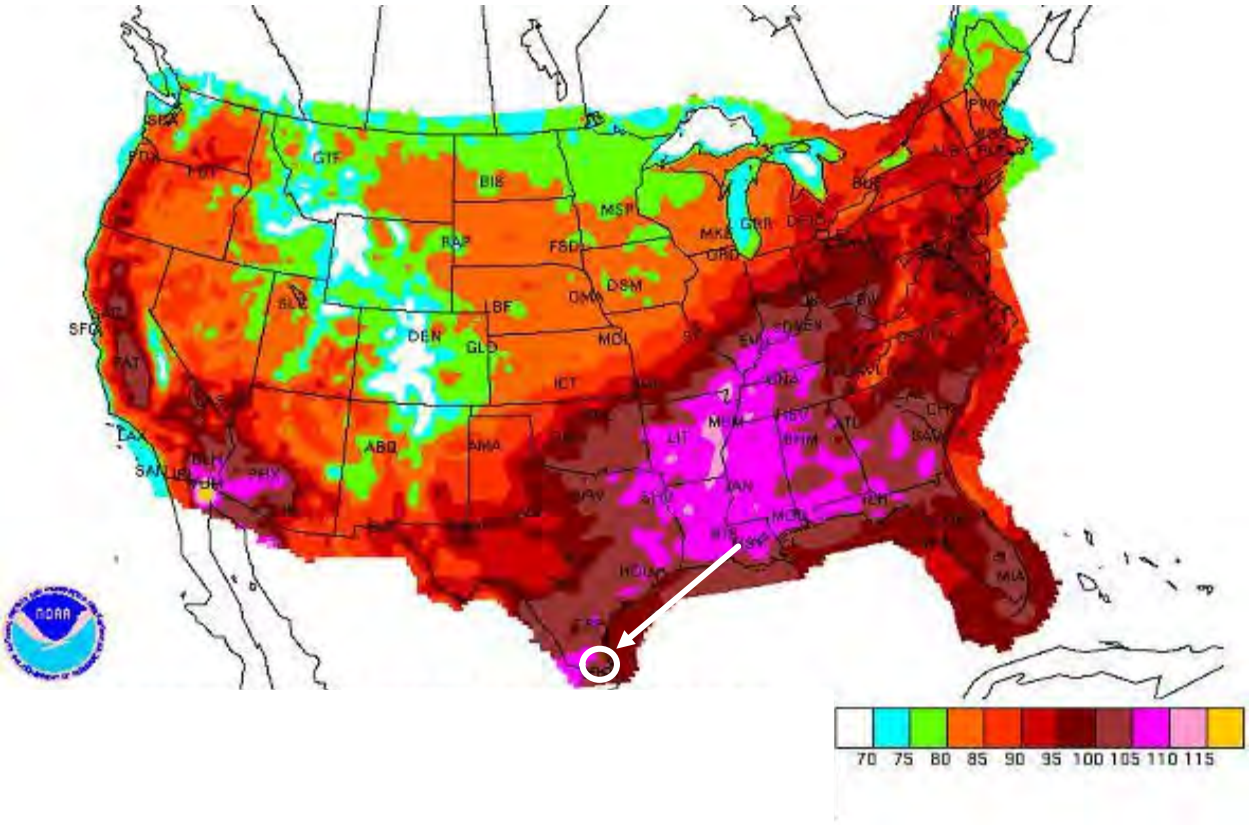
[1] Source: NOAA

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.	

Cameron County covers 1,276 square miles, with an elevation range from sea level to sixty feet. Vegetation along the eastern edge of the county is typical of the Gulf Prairie and Marsh vegetation areas, with marsh grasses, bluestems, and grama grasses predominating. The vegetation of the rest of the county is like that of the South Texas Plains area, with small trees, brush, weeds, and grasses found in abundance. Mesquite, live oak, post oak, and shrubs also grow densely in some areas. Between 41 and 50 percent of the county is considered prime farmland. Cameron County's climate is subtropical and sub-humid, with hot summers and mild winters. Temperatures range from an average low of 50° F to 69° in January and from an average high of 75° F to 94° in July. Rainfall averages twenty-six inches per year. Snowfall is exceedingly rare. The growing season lasts 320 days, with the first freeze in mid-December and the last in late January.

Figure 7-2 displays the daily maximum heat index as derived from NOAA based on data compiled from 1838 to 2015. The white circle shows the Cameron County planning area. The pink and brown colors indicate a daily maximum heat index of 100° to 110°F. Cameron County, including all participating jurisdictions could experience extreme heat from 90° to 110°F in the future. The record high temperature for the Cameron County planning area was 117°F in 2018. This is the highest temperature (danger category) the planning area can expect.

Figure 7-2. 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 7-2 depicts historical occurrences of mortality from heat from 1994 to 2004 from the Texas Department of State Health Services and 2005 through November 2019 from the NCEI database.

Table 7-2. 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 Cameron 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

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 Cameron County, there is only five heat waves[3] on record for the Cameron County planning area (Table 7-3). Historical extreme heat information, as provided by the NCEI, shows extreme heat activity across a multi-county forecast area for each event, the appropriate percentage of the total property and crop damage reported for the entire forecast area has been allocated to each county impacted by the event. Historical extreme heat

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

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 7-3. Historical Extreme Heat Events, 1997-2018

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	5/22/2008	0	0	$0	$0
Cameron County	6/12/2009	1	0	$0	$0
Cameron County	7/6/2009	0	0	$0	$0
Cameron County	7/30/2009	0	0	$0	$0
Cameron County	8/20/2009	0	0	$0	$0
TOTALS		**1**	**0**	**$0**	**$0**

SIGNIFICANT EVENTS

June 12, 2009 – Cameron County/City of Harlingen

A man was found dead in a parking lot near a restaurant in downtown Harlingen during the afternoon of June 12th. Residents believed the man to be homeless, and the suspected cause of death was heat stroke. The man was pronounced dead at 5:50 PM CDT but may have died a few hours earlier during the peak of the heat. Heat index values at the Harlingen/Valley International Airport peaked at 107° during the afternoon, and at 112° at McAllen/Miller Airport in Hidalgo County. It is quite possible that where the fatality occurred, in a more urban setting, heat index values could have been at or very near local advisory criteria, which is 111° during the afternoon.

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 Cameron 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 Cameron County planning area is estimated at 12.0% of the total population and children under the age of 5 are estimated at 12.8%, or an estimated total of 89,833[4] potentially vulnerable residents in the planning area based on age. In addition, an estimated 30.6% of the planning area population live below the poverty level (Table 7-4).

Table 7-4. Populations at Greater Risk by Jurisdiction

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION BELOW POVERTY LEVEL
Cameron County[5]	54,181	35,652	129,056
City of Harlingen	9,701	6,465	16,624
City of Palm Valley	654	90	85

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. In terms of vulnerability to structures, the impact from extreme heat would be negligible. It is possible that critical facilities and infrastructure could be shut down for 24 hours if cooling units are running constantly, leading to a temporary power outage. Less than ten percent of residential and commercial property could be damaged if extreme heat events lead to structure fires. However, based on the historical fatality in the planning area, the potential impact of extreme heat for the entire Cameron County planning area can be considered “Substantial,” with multiple deaths possible depending on the length and degree of the heat wave. Based on historical records over a 24-year period, annualized property and crop losses for the Cameron County planning area are 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:

[4] U.S. Census Bureau 2018 data for Cameron County

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

- 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.
- Outdoor activities such as fishing, boating, and camping activities at Laguna Atascosa National Wildlife Preserve, Rio Grande River, and Bahia Grande Tidal Basin may see an increase in injury or illness during extreme heat events.

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

SECTION 8: THUNDERSTORM WIND

Hazard Description 1
Location 1
Extent 2
Historical Occurrences 3
Significant Events 7
Probability of Future Events 7
Vulnerability and Impact 8
Assessment of Impacts 10

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 Cameron 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 Cameron County planning area is uniformly exposed to the threat of thunderstorms winds.

EXTENT

The extent or magnitude of a thunderstorm wind event is measured by the Beaufort Wind Scale. Table 8-1 describes the different intensities of wind in terms of speed and effects, from calm to violent and destructive.

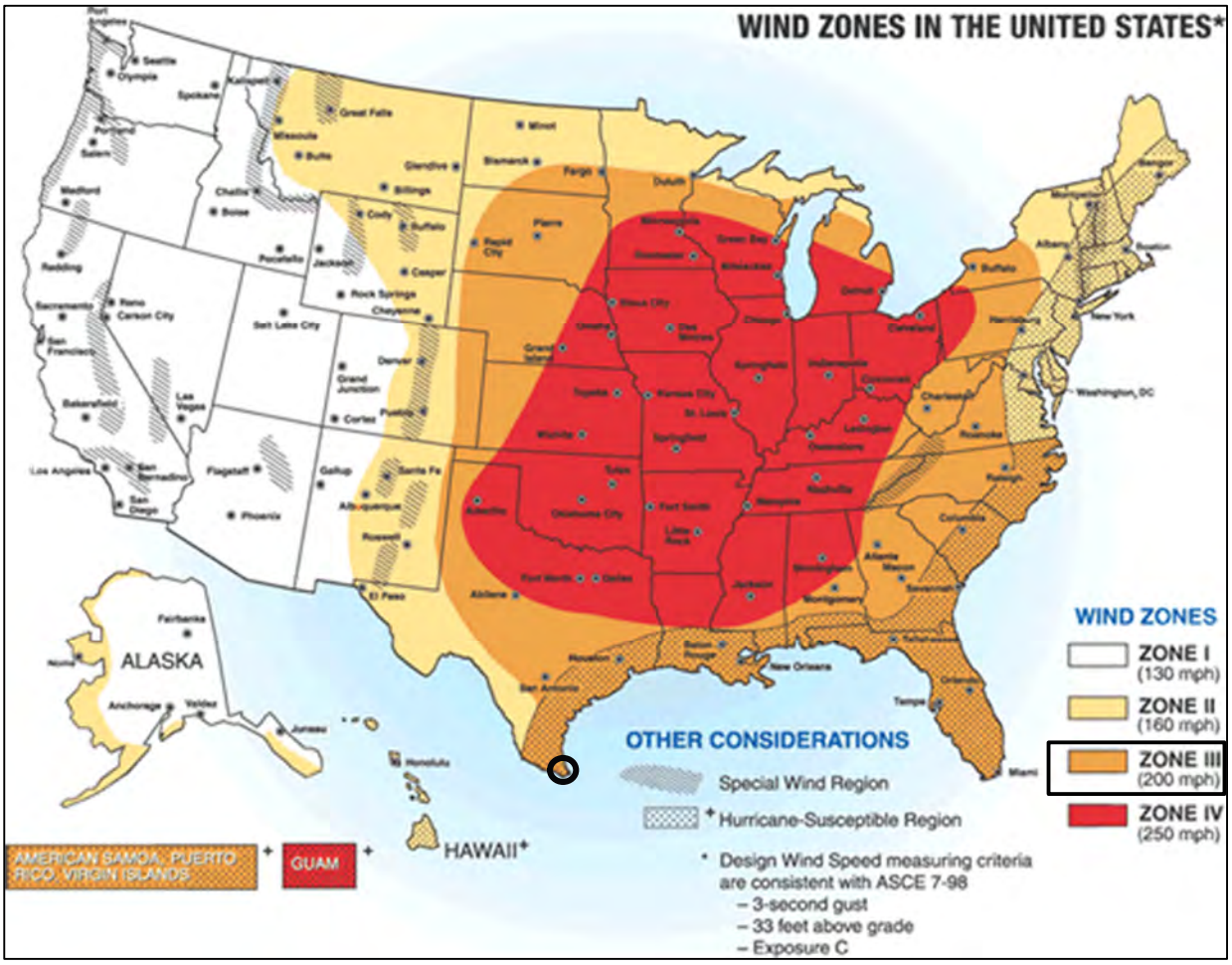
Table 8-1. Beaufort Wind Scale[1]

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 8-1 displays the wind zones as derived from NOAA.

[1] Source: World Meteorological Organization

Figure 8-1. Wind Zones in the United States[2]



On average, the planning area experiences two to three thunderstorm wind events every year. The County is located in Zone III, meaning they can experience winds up to 200 mph. Cameron 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 83 mph. This is the most significant event that can be expected in the future for all participating jurisdictions.

HISTORICAL OCCURRENCES

Tables 8-2, 8-3, and 8-4 depict historical occurrences of thunderstorm wind events for the Cameron County planning area according to the National Centers for Environmental Information (NCEI) data. Since January 1961, 155 thunderstorm wind events are known to have impacted the Cameron County planning area, including all participating jurisdictions, based upon NCEI records. Table 8-3 presents information on known historical events impacting the Cameron 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] Cameron County is indicated by the circle.

SECTION 8: 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 November 2019 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 2020 dollars.

Historical thunderstorm wind data for the all participating jurisdictions are provided on a County-wide basis per the NCEI database.

Table 8-2. Historical Thunderstorm Wind Events with Reported Damages, 1961-2019

MAXIMUM WIND SPEED RECORDED (MPH)	NUMBER OF REPORTED EVENTS
0-30	38
31-40	5
41-50	28
51-60	54
61-70	19
71-80	6
81-90	0
91-100	1
Unknown	4

Table 8-3. Historical Thunderstorm Wind Events, 1961-2019[3]

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	5/14/1992	4:40 PM	0	0	1	$0	$0
Cameron County	3/12/1993	6:05 AM	0	0	0	$89,823	$898
Cameron County	6/13/1994	11:30 AM	0	0	0	$8,715	$872
Cameron County	2/28/1995	3:30 PM	0	0	0	$1,710	$0
City of Harlingen	2/28/1995	3:40 PM	0	0	0	$10,257	$0

[3] Only recorded events with fatalities, injuries or damages are listed. Magnitude is listed when available. Damage values are in 2020 dollars.

SECTION 8: THUNDERSTORM WIND

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	4/4/1995	8:30 PM	0	0	0	$8,491	$0
Cameron County	4/4/1995	8:30 PM	0	0	0	$8,491	$0
City of Harlingen	2/1/1998	4:22 PM	Unknown	0	0	$7,967	$0
Cameron County	11/4/1998	3:15 AM	Unknown	0	0	$119,548	$0
Cameron County	5/18/1999	5:15 AM	Unknown	0	0	$3,104	$0
Cameron County	5/2/2000	7:20 PM	100	0	0	$7,521,020	$0
Cameron County	8/19/2003	2:00 AM	50	0	0	$13,975	$0
Cameron County	2/25/2004	1:30 PM	40	0	0	$41,564	$0
Cameron County	7/20/2005	6:00 AM	55	0	0	$99,017	$0
Cameron County	10/31/2005	9:23 PM	60	0	0	$12,950	$0
Cameron County	4/29/2006	12:01 AM	60	0	0	$64,013	$0
Cameron County	12/23/2006	5:30 PM	52	0	0	$12,783	$0
Cameron County	12/23/2006	5:45 PM	52	0	0	$6,392	$0
Cameron County	3/2/2008	12:00 PM	42	0	0	$604	$0
Cameron County	3/17/2008	11:00 AM	41	0	0	$604	$0
Cameron County	5/16/2008	2:50 AM	70	0	0	$59,541	$0
City of Harlingen	5/16/2008	3:00 AM	75	0	0	$238,165	$0
Cameron County	6/24/2008	11:08 AM	50	0	0	$589	$0
Cameron County	5/24/2009	5:00 AM	46	0	0	$12,063	$0
Cameron County	5/27/2009	4:25 PM	52	0	0	$2,413	$0
Cameron County	6/1/2009	2:16 PM	53	0	0	$1,196	$0
Cameron County	10/26/2009	1:50 PM	49	0	0	$1,193	$0
Cameron County	12/24/2009	4:25 AM	42	0	0	$1,195	$0
Cameron County	5/18/2010	8:20 AM	52	0	0	$5,912	$0

SECTION 8: THUNDERSTORM WIND

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	5/18/2010	9:05 AM	50	0	0	$11,824	$0
Cameron County	5/18/2010	9:25 AM	56	0	0	$29,560	$0
Cameron County	2/9/2011	1:00 PM	42	0	0	$1,166	$0
Cameron County	11/26/2011	10:00 PM	36	0	0	$2,281	$0
Cameron County	5/15/2012	8:49 PM	48	0	0	$3,368	$0
Cameron County	1/29/2013	12:17 PM	42	0	0	$1,120	$0
Cameron County	4/28/2013	12:19 PM	52	0	0	$2,219	$0
Cameron County	4/28/2013	12:23 PM	56	0	0	$55,470	$0
Cameron County	4/28/2013	12:25 PM	52	0	0	$2,219	$0
Cameron County	11/22/2013	2:40 PM	34	0	0	$3,321	$0
Cameron County	11/22/2013	4:00 PM	33	0	0	$5,534	$0
Cameron County	12/21/2013	5:34 AM	42	0	0	$1,107	$0
Cameron County	12/21/2013	10:58 AM	42	0	0	$5,535	$0
Cameron County	1/24/2014	3:54 AM	42	0	0	$5,514	$0
Cameron County	4/14/2014	2:00 PM	44	0	0	$1,088	$0
Cameron County	4/24/2015	10:20 PM	52	0	0	$2,181	$0
Cameron County	4/24/2015	10:25 PM	52	0	0	$10,903	$0
Cameron County	4/24/2015	10:25 PM	52	0	0	$5,452	$0
Cameron County	5/12/2015	12:25 AM	52	0	0	$1,085	$0
Cameron County	8/17/2015	5:05 PM	52	0	0	$16,237	$0
Cameron County	8/17/2015	5:17 PM	56	0	0	$32,474	$0
Cameron County	1/16/2016	1:00 PM	43	0	0	$5,444	$0
Cameron County	4/18/2016	9:26 PM	43	0	0	$5,391	$0
Cameron County	4/19/2016	12:35 AM	47	0	0	$216	$0

JURISDICTION	DATE	TIME	MAGNITUDE (MPH)	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	6/2/2016	6:15 PM	44	0	0	$5,352	$0
Cameron County	6/4/2016	9:33 AM	52	0	0	$2,141	$0
Cameron County	6/5/2017	4:48 PM	52	0	0	$10,531	$0
Cameron County	1/11/2018	7:30 PM	47	0	0	$15,611	$0
Cameron County	8/12/2018	2:17 PM	40	0	0	$511,551	$0
Cameron County	8/12/2018	2:32 PM	45	0	0	$511,551	$0
Cameron County	1/23/2019	4:51 AM	45	0	0	$5,124	$0
Cameron County	4/7/2019	8:15 AM	64	0	0	$10,095	$0
Cameron County	4/7/2019	8:15 AM	64	0	0	$10,095	$0
City of Harlingen	9/10/2019	11:26 AM	47	0	0	$2,009	$0
Cameron County	10/21/2019	1:06 AM	65	0	0	$25,060	$0
Cameron County	10/21/2019	1:24 AM	61	0	0	$2,004,834	$0
TOTALS			**(Max Extent)**	**0**	**1**	**$11,677,957**	**$1,770**

Table 8-4. Summary of Historical Thunderstorm Wind Events, 1961-2019

JURISDICTION	NUMBER OF EVENTS	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	146	100	0	1	$11,419,558	$1,770
City of Harlingen	9	75	0	0	$258,399	$0
City of Palm Valley	0	N/A	N/A	N/A	$0	$0
TOTAL LOSSES	**155**	**(Max Extent)**	**0**	**1**	**$11,679,727**	

Based on the list of historical thunderstorm wind events for the Cameron County planning area (listed above), including all participating jurisdictions, 26 of the events have occurred since the 2015 Plan.

SIGNIFICANT EVENTS

October 21, 2019

A cluster of potent thunderstorms developed in northeastern Mexico and moved north into Cameron County early Sunday morning. Within this cluster of storms, a strong linear downburst crossed South Padre Island from 1:24 AM CST to 1:40 AM CST. The South Padre Island Police

Department reported downed power lines in between the paralleling Padre Blvd and Laguna Blvd on South Padre Island, and at one point all of South Padre Island had lost power due to 31 transmission poles that were taken down by the wind.

August 12, 2018
Thunderstorm winds of between 45 and 52 mph knocked down several palm fronds and blew unfastened lawn furniture around portions of the City of Los Fresnos to Harlingen. Harlingen/Valley International Airport recorded a wind gust of 52 mph at 2:46 PM CST.

April 28, 2013
A small but potent line of strong to severe thunderstorms dumped torrential rains, produced frequent lightning strikes, and slammed heavy winds across much of the Rio Grande Valley during the afternoon of April 28th. A microburst powered up when it reached Cameron County, and ultimately caused significant damage to two poorly built mobile trailers in northern Los Fresnos. Tin roofs were lifted from the trailers in a colonia neighborhood just east of the intersection of FM 510 and FM 1847 (Arroyo Blvd). Severe water and structural damage occurred at each residence; insulation was peeled from the roofs and some walls had cracked or collapsed. Both structures were uninhabitable and nine persons were displaced. Farther west along FM 510, a power pole was leaning at a 45 degree angle, and a mesquite tree was uprooted near the intersection of FM 803 and Henderson Road, about 4 miles to the southwest of the residential 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 155 events in a 59-year reporting period, which provides a probability of two to three events every year. Even though the intensity of thunderstorm wind events is not always damaging for the Cameron 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 Cameron 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 Cameron 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 17,923 manufactured homes (approximately 12%) located in the Cameron County planning area, including the City of Harlingen, (Table 8-5). It is noted that the City of Palm Valley does not currently feature any manufactured homes. In addition, 33.9% (approximately 50,767 structures) of the residential structures in the Cameron County planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant wind events.

Table 8-5. Structures at Greater Risk by Jurisdiction

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Cameron County[4]	17,923	50,767
City of Harlingen	2,657	10.939
City of Palm Valley	0	476

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 30.6% of the planning area population live below the poverty level (Table 8-6).

Table 8-6. Populations at Greatest Risk by Jurisdiction[5]

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Cameron County	129.056
City of Harlingen	16,624
City of Palm Valley	85

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

Table 8-7. Critical Facilities at Risk by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Cameron County	1 Airport, 6 Bridges, 2 Detention Centers, 1 EOC, 2 Fire Stations, 2 Heliports, 2 Hospitals, 11 Park, 2 Police Dispatch Facilities, 1 Police Station, 15 Schools, 2 Seaports, 1 Shelter/Government Facility, 1 Space-X Port, 1 Utility Facility, 9 Water District Facilities, 2 Wind Farms
City of Harlingen	2 EOCs/Government Facilities, 4 Police Station, 1 Communications Center, 1 Public Works Facility, 8 Fire Stations, 3 Communication

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

[5] US Census Bureau 2018 data for Cameron County

JURISDICTION	CRITICAL FACILITIES
	Towers, 5 Evacuation Centers, 1 Helipad, 18 Banks, 133 Churches, 1 School, 11 Parks, 5 Medical Facilities Hospital, 9 Nursing Home, 1 Communication Tower, 1 Communication Switch Box, 1 Constable Office, 1 DPS Station, 1 EMS, 27 Pump Stations, 2 Lift Stations, 5 Government Facilities, 1 Power Company, 1 Power Plant, 1 Power Utility Station, 62 School Facilities (buildings, teaching facilities, warehouses, offices), 1 Sheriff's Office, 1 College Campus, 1 Water Plant, 1 Airport
City of Palm Valley	1 Government Facility, 1 Wastewater Treatment Facility, 2 Lift Stations, 1 Pump Station, 1 Business

A thunderstorm wind event can also result in traffic disruptions, injuries and in rare cases, fatalities. Impact of thunderstorms winds experienced in the Cameron County planning area has resulted in one injury and no fatalities. Impact of thunderstorm wind events experienced in the Cameron 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 2020 dollars) is $11,679,728, having an approximate annual loss estimate of $197,962 (Table 8-8).

Table 8-8. Potential Annualized Losses by Jurisdiction

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Cameron County	$11,421,328	$193,581
City of Harlingen	$258,399	$4,379
City of Palm Valley	$0	$0
Planning Area	**$11,679,727**	**$197,961**

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.
- Activities at locations such as Laguna Atascosa National Wildlife Preserve, Rio Grande River and Bahia Grande Tidal Basin. attract tourism including hiking, camping, boating, and fishing throughout the year. A large thunderstorm wind event could impact recreational activities, placing visitors in imminent danger, potentially requiring emergency services or evacuations.
- 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 9: LIGHTNING

Hazard Description 1
Location 1
Extent 1
Historical Occurrences 3
Probability of Future Events 4
Vulnerability and Impact 4
Assessment of Impacts 6

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.

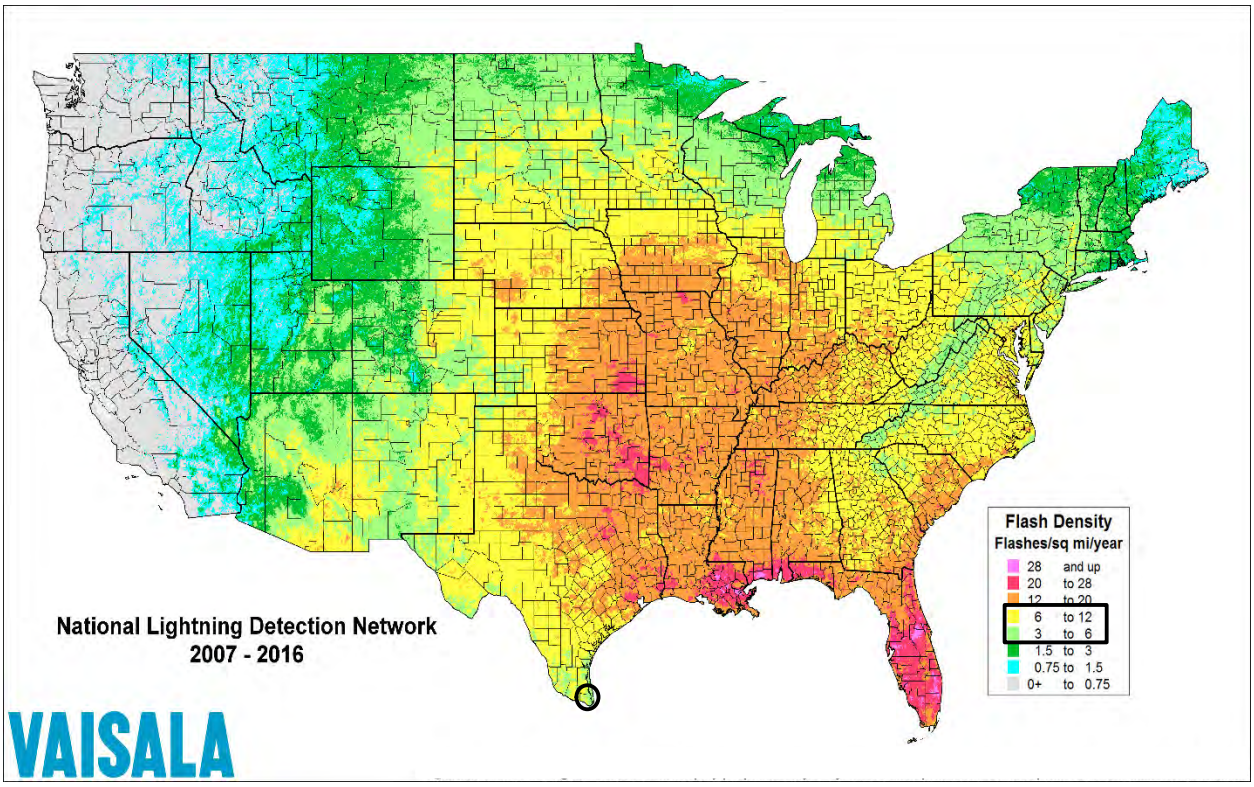
LOCATION

Lightning can strike in any geographic location and is considered a common occurrence in Texas. The Cameron 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 Cameron 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 2007 and 2016 was 11.3 flashes per square mile. Vaisala's U.S. National Lightning Detection Network lightning flash density map (Figure 9-1) shows a range of three to twelve cloud-to-ground lightning flashes per square mile per year for the entire Cameron County planning area. This rate equates to approximately 3,828 to 15,312 flashes per year for the entire planning area.

Figure 9-1. Lightning Flash Density, 2007-2016



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 9-1).

Table 9-1. 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
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

LAL	CLOUD & STORM DEVELOPMENT	LIGHTNING STRIKES/ 15 MIN
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 (3,828 to 15,312 flashes) and a cloud-to-ground flash density of three to twelve per square mile were divided by the number[1] of thunderstorm events that occur annually in the planning area. Cameron County, including all participating jurisdictions, should expect an average range of three to thirteen 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 three recorded events for the Cameron 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 9-2 Historical Lightning Events, 1996- 2018[2]

JURISDICTION	DATE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	9/29/2011	0	0	$1,705	$0
Cameron County	5/12/2012	0	0	$5,613	$0
Cameron County	5/28/2014	0	0	$10,844	$0
TOTALS		**0**	**0**	**$18,162**	**$0**

Based on the list of historical lightning events for the Cameron County planning area (listed above), including all participating jurisdictions, one event has occurred since the 2015 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 2020 dollars.

SECTION 9: LIGHTNING

SIGNIFICANT EVENTS

May 28, 2014 – Cameron County

Local law enforcement officials reported two house fires started by lightning strikes in the town of Laguna Vista. Lightning struck a transformer which caused a power outage to approximately 800 residents.

PROBABILITY OF FUTURE EVENTS

Based on historical records and input from the planning team the probability of occurrence for future lightning events in the Cameron 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 Cameron County planning area is located in an area of the country that experiences three to twelve lightning flashes per square mile per year (approximately 3,828 to 15,312 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 Cameron County planning area could potentially be impacted and remain vulnerable to possible injury and property loss from lightning strikes. The Cameron County planning area has three 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 Cameron 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 Cameron 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.

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 30.6% of the planning area population live below the poverty level (Table 9-3).

Table 9-3. Populations at Greatest Risk by Jurisdiction[3]

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Cameron County	35,652
City of Harlingen	6,465
City of Palm Valley	90

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

Table 9-4. Critical Facilities at Risk by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Cameron County	1 Airport, 6 Bridges, 2 Detention Centers, 1 EOC, 2 Fire Stations, 2 Heliports, 2 Hospitals, 11 Park, 2 Police Dispatch Facilities, 1 Police Station, 15 Schools, 2 Seaports, 1 Shelter/Government Facility, 1 Space-X Port, 1 Utility Facility, 9 Water District Facilities, 2 Wind Farms
City of Harlingen	2 EOCs/Government Facilities, 4 Police Station, 1 Communications Center, 1 Public Works Facility, 8 Fire Stations, 3 Communication Towers, 5 Evacuation Centers, 1 Helipad, 18 Banks, 133 Churches, 1 School, 11 Parks, 5 Medical Facilities Hospital, 9 Nursing Home, 1 Communication Tower, 1 Communication Switch Box, 1 Constable Office, 1 DPS Station, 1 EMS, 27 Pump Stations, 2 Lift Stations, 5 Government Facilities, 1 Power Company, 1 Power Plant, 1 Power Utility Station, 62 School Facilities (buildings, teaching facilities, warehouses, offices), 1 Sheriff's Office, 1 College Campus, 1 Water Plant, 1 Airport
City of Palm Valley	1 Government Facility, 1 Wastewater Treatment Facility, 2 Lift Stations, 1 Pump Station, 1 Business

Impact of lightning experienced in the Cameron County planning area has resulted in no injuries or fatalities. Impact of lightning events experienced in the Cameron County planning area, including all participating jurisdictions, would be "Limited," and injuries and illnesses would be treatable with first aid. The quality of life lost would be minor, and facilities would be shut down for 24 hours or less. Overall, the average loss estimate for Cameron County, including all participating jurisdictions, is negligible.

[3] US Census Bureau 2018 data for Cameron County

Table 9-5. Potential Annualized Losses by Jurisdiction[4]

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATE
Cameron County	$18,162	$757
City of Harlingen	$0	$0
City of Palm Valley	$0	$0
PLANNING AREA	**$18,162**	**$757**

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.
- 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.

[4] Damage values are in 2020 dollars.

SECTION 10: DROUGHT

Hazard Description 1
Location 2
Extent 3
Historical Occurrences 4
Significant Events 6
Probability of Future Events 6
Vulnerability and Impact 7
Assessment of Impacts 8

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 10-1 presents definitions for these different types of drought.

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 10-1. 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 Cameron 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 severe drought conditions throughout the county (Figure 10-1). However, the planning area has experienced a range of conditions from normal to exceptional drought conditions over the last ten years (Figure 10-2). There is no distinct geographic boundary to drought; therefore, it can occur throughout the Cameron County planning area equally, including all participating jurisdictions.

Figure 10-1. U.S. Drought Monitor, May 2020

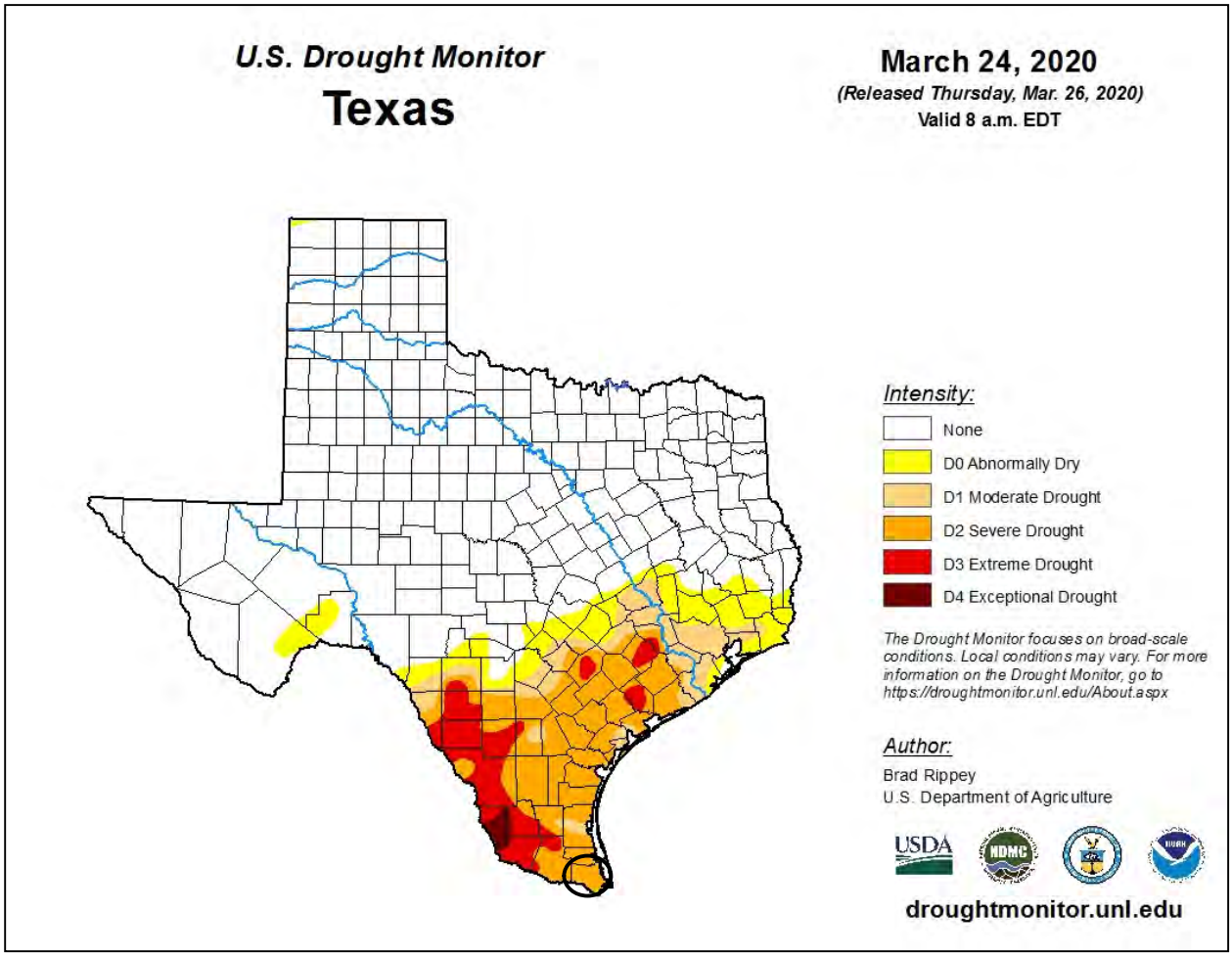
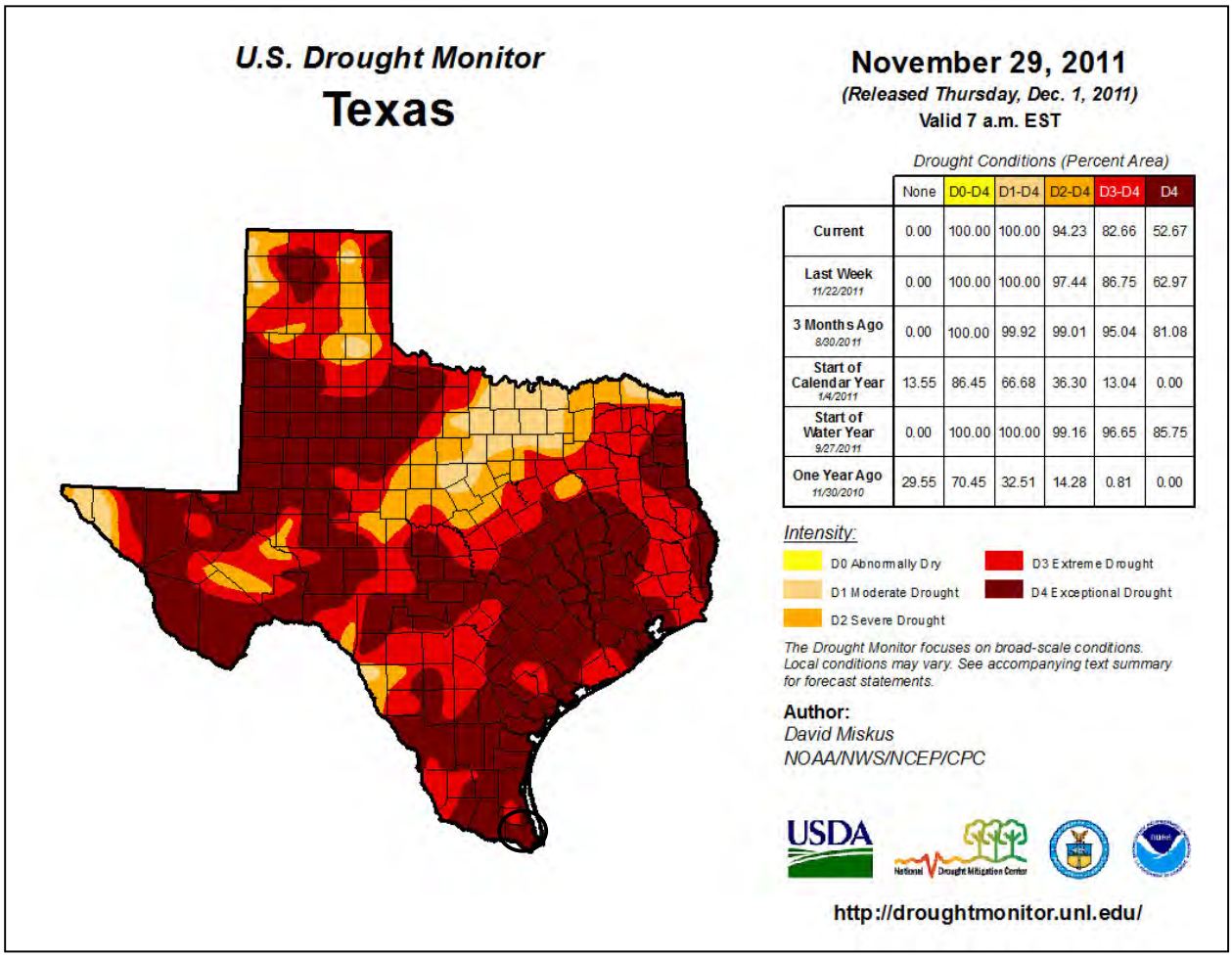


Figure 10-2. U.S. Drought Monitor, November 2011



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. He hydrological impacts of drought (e.g., reservoir levels, groundwater levels, etc.) take longer to develop. Table 10-2 depicts magnitude of drought, while Table 10-3 describes the classification descriptions.

Table 10-2. 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 10-3. 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.

Based on the historical occurrences for drought and the location of the Cameron 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 Cameron County planning area may typically experience a severe drought. Table 10-4 lists historical events that have occurred in the Cameron County planning area as reported in the

[2] Source: National Drought Mitigation Center

National Centers for Environmental Information (NCEI). Historical events with reported damages, injuries, or fatalities are shown in Table 10-5. A total of 191 reported historical drought events impacted the Cameron County planning area between 1996 through November 2019 (Summary Table 10-6).

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 Cameron County planning area are provided on a county-wide basis per the NCEI database.

Table 10-4. Historical Drought Years, 1996-2019[3]

DROUGHT YEAR
1996
2000
2000-2001
2001-2002
2002
2003
2008[4]
2009
2011-2013
2014
2016
2017
2018
14 unique events

Table 10-5. Historical Drought Events, 1996-2019[5]

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	1/1/2001	0	0	$0	$14,555,988

[3] Historical data is reported from January 1996 through November 2019.
[4] Two unique events were reported in this year.
[5] Only historical events with reported injuries, fatalities or damages are listed. Values are reported in 2020 dollars.

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	8/18/2009	0	0	$0	$24,741,235
Cameron County	6/1/2011	0	0	$0	$2,091,453
Cameron County	8/23/2011	0	0	$0	$5,295,041
TOTALS		**0**	**0**	**$0**	**$46,683,717**

Table 10-6. Historical Drought Events Summary, 1996-2019

JURISDICTION	NUMBER of EVENTS	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	191	0	0	$0	$46,683,717

Based on the historical drought events for the Cameron County planning area, including all participating jurisdictions, 3 of the unique events have occurred since the 2015 Plan.

SIGNIFICANT EVENTS

Drought - May 2017

Drought conditions intensified across southern Cameron County as the area continued to miss out on rainfall. Rainfall the last week of May, allowed for some slight improvement to D1 conditions.

Drought - March 2011- December 2013

Starting in March 2011 with high temperatures in the 80-90's Cameron County experienced D2 Conditions. In the summer of 2011 drought conditions worsened to D4. Many crops were damaged during the season. As the year progressed it changed between D2 and D3 entering the year 2012 in D3 drought status. Drought conditions improved with a few thunderstorms that came across in the late spring bringing a D2 to the area. This went into July that allowed some rain to bring the status to D1 in summer of 2012. However, that was short lived and the last several months of the 2012 year created D2 and D3 drought impacts. The new year of 2013 experienced some rain bringing the drought to a steady D2 for a month in January. However, early Spring brought a worsened drought to the area with very little rain (D4 conditions). For the summer of 2013 the D4 was alleviated on and off with some rain bringing the drought impact to D3. Towards the end of 2013 the drought seemed to come to a close with the index dropping to D1.

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, there have been fourteen extended time periods of drought (ranging in length from approximately 30 days to over 270 days) within a 24-year reporting period, which provides a probability of one event every one to two years. This frequency supports a highly likely probability of future events. All participating jurisdiction events are included under the County.

VULNERABILITY AND IMPACT

Loss estimates were based on 24 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 10-7 shows annualized exposure.

Table 10-7. Potential Annualized Losses for Cameron County

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Cameron County	$46,683,717	$1,945,155

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 Cameron 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 Cameron County planning area is estimated at 12.8% of the total population, and children under the age of 5 are estimated at 8.5% or an estimated total of 88,833[6] potentially vulnerable residents in the planning area based on age. In addition, an estimated 31.2% of the planning area population live below the poverty level (Table 10-8) which may contribute to overall health impacts of a drought.

Table 10-8. Populations at Greater Risk by Jurisdiction

JURISDICTION	POPULATION 65 AND OLDER	POPULATION UNDER 5	POPULATION BELOW POVERTY LEVEL
Cameron County[7]	54,181	35,652	129,056
City of Harlingen	9,701	6,465	16,624
City of Palm Valley	654	90	85

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

[6] US Census Bureau 2018 data for Cameron County

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

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 Cameron 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 24-year reporting period in Cameron County is estimated to be $1,945,155.

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 10-9 lists the drought impacts to Cameron County from 2005 to 2019 based on reports received by the Drought Impact Reporter.

Table 10-9. Drought Impacts, 2005-2019

DROUGHT IMPACTS 2005-2019	
Agriculture	94
Business & Industry	1
Energy	1
Fire	23
Plants & Wildlife	59
Relief, Response & Restrictions	29
Society & Public Health	8
Tourism & Recreation	1
Water Supply & Quality	54

Drought has the potential to impact people in the Cameron 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 10: 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 11: TORNADO

Hazard Description 1
Location 2
Extent 2
Historical Occurrences 5
Significant Events 8
Probability of Future Events 9
Vulnerability and Impact 9
Assessment of Impacts 11

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 11-1. 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 Cameron County planning area including all participating jurisdictions are uniformly exposed to tornado activity. The entire Cameron County planning area is located in Wind Zone III (Figure 11-1), where tornado winds can be as high as 200 mph.

Figure 11-1. 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] Cameron County is indicated by the star.

Table 11-2. 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 11-2). Since February 2007, the Fujita Scale has been replaced by the Enhanced Fujita Scale (Table 11-3), 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 11-3. 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 F3 on the Fujita Scale, a “Severe Tornado.” Based on the planning areas location in Wind Zone III, the planning area could experience anywhere from an EF0 to EF5 depending on the wind speed.

The events in Cameron County (converted from the Fujita Scale) have been between EF0 and EF5 (Table 11-4). Therefore, the range of intensity that the Cameron County planning area, including all participating jurisdictions, would be expected to mitigate is a tornado event that would be a low to incredible risk, an EF0 to EF5. Historically, the strongest tornado to strike the planning area was a F3, which would be an EF5 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 67 years. Historical tornado data for the county and participating jurisdictions is provided within a jurisdiction-wide basis per the NCEI database.

Figure 11-2 identifies the locations of previous occurrences in the Cameron County planning area from 1953 through November 2019. A total of 63 events have been recorded by the Storm Prediction Center (NOAA) and NCEI databases for the Cameron County planning area, including all participating jurisdictions.

Figure 11-2. Spatial Historical Tornado Events, 1953-2019[3]

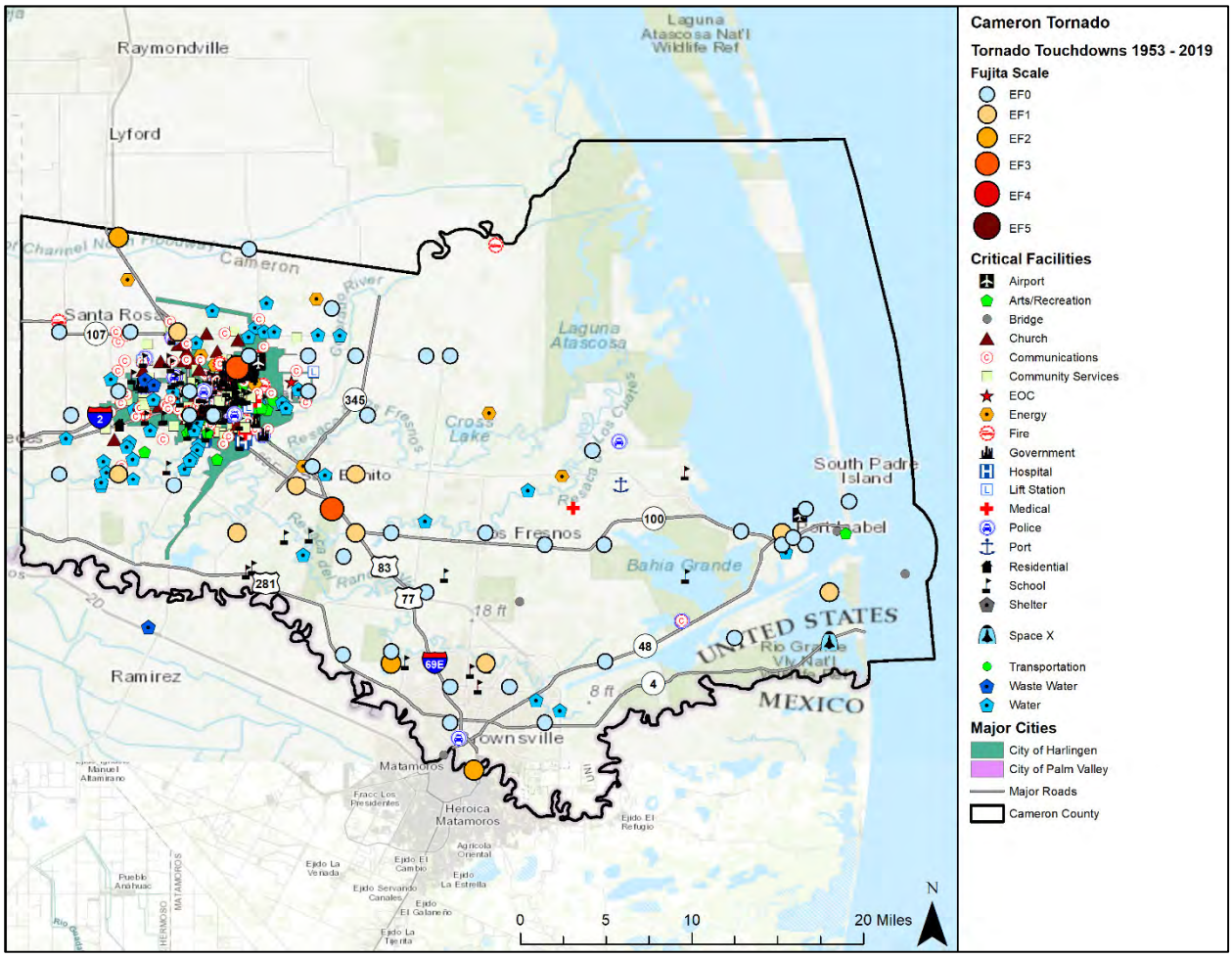


Table 11-4. Historical Tornado Events, 1953-2019[4]

JURISDICTION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	7/15/1953	1:30 PM	F1	0	0	$2,406	$0
Cameron County	2/16/1957	1:30 PM	F0	0	0	$2,328	$0
Cameron County	5/12/1969	6:00 PM	F3	0	0	$177,178	$0
Cameron County	5/12/1969	8:30 PM	F2	0	0	$177,178	$0
Cameron County	5/12/1969	9:00 PM	F3	0	0	$177,178	$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 2020 dollars.

SECTION 11: TORNADO

JURISDICTION	DATE	TIME	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	5/13/1969	1:30 AM	F1	0	0	$1,772	$0
Cameron County	5/24/1970	6:23 PM	F2	0	0	$167,080	$0
Cameron County	8/24/1976	1:00 PM	F0	0	0	$11,236	$0
Cameron County	4/16/1977	6:25 AM	F1	0	0	$107,488	$0
Cameron County	4/21/1977	2:15 PM	F1	0	0	$1,074,879	$0
Cameron County	8/9/1980	3:45 AM	F2	0	0	$7,742,227	$0
Cameron County	11/6/1983	11:30 AM	F0	0	0	$63,728	$0
Cameron County	11/6/1983	11:50 AM	F0	0	0	$63,728	$0
Cameron County	9/16/1988	12:30 PM	F0	0	0	$538,337	$0
Cameron County	9/16/1988	1:00 PM	F0	0	0	$538,337	$0
Cameron County	9/16/1988	2:00 PM	F1	0	0	$5,383,368	$0
Cameron County	11/17/1989	2:50 PM	F0	0	0	$51,225	$0
Cameron County	4/29/1991	7:03 AM	F0	0	0	$4,770	$0
Cameron County	4/4/1997	3:25 AM	F1	0	0	$72,464	$0
Cameron County	11/4/1998	3:25 AM	F0	0	0	$31,460	$0
Cameron County	4/26/1999	4:35 PM	F0	0	0	$1	$3,104
Cameron County	5/29/2002	7:17 PM	F0	0	0	$14,348	$0
Cameron County	7/20/2005	6:35 AM	F0	0	0	$39,607	$0
Cameron County	11/7/2008	12:10 PM	EF0	0	0	$1,214	$0
Cameron County	6/30/2010	9:10 AM	EF0	0	0	$4,734	$0
Cameron County	6/30/2010	9:35 AM	EF0	0	0	$11,835	$0
Cameron County	5/11/2012	2:15 AM	EF0	0	0	$16,838	$0
Cameron County	7/26/2019	2:15 PM	EF0	0	0	$503	$0
TOTALS			**(Max Extent)**	**0**	**2**	**$16,477,445**	**$3,104**

Table 11-5. Summary of Historical Events, 1953-2018[5]

JURISDICTION	Number of Events	MAGNITUDE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	57	F3	0	0	$16,477,445	$3,104
City of Harlingen	6	F0	0	0	$0	$0
City of Palm Valley	0	N/A	N/A	N/A	$0	$0
TOTAL LOSSES	**63**	**(Max Extent)**	**0**	**2**	**$16,480,550**	

Based on the list of historical tornado events for the Cameron County planning area (listed above), including all participating jurisdictions, 2 of the events have occurred since the 2015 Plan.

SIGNIFICANT EVENTS

July 26, 2019 – Cameron County

Beach Patrol and Emergency Management from the City of South Padre Island, as well as public video, showed a brief waterspout moved onshore near Gulf Boulevard City Beach Access #10. Before dissipating, the waterspout displaced beach umbrellas and tents, with minimal damage.

August 31, 2005 – City of Harlingen

Clusters of severe thunderstorms moved through the Lower Rio Grande Valley of Texas causing damage to numerous trees, utility poles, railroad equipment, and buildings extending from Raymondville to Harlingen to McCook and Edinburg. The storms began to develop in the midafternoon hours between 2 and 3 PM CDT as the sea breeze boundary migrated westward from the Gulf of Mexico. Additional thunderstorms over northern Hidalgo and Starr counties began generating surface outflow boundaries near the original storm northeast of Raymondville. Of interesting note, several large dust devils had been observed by NWS meteorologists in Kenedy and Willacy counties in the early afternoon, suggesting that the surface air was quite unstable and sufficient rotation was available for tornadoes to form. As the outflow boundaries began to converge at Raymondville, the storm began producing severe wind gusts. A tornado moved through Raymondville, Texas at 4:50 PM CDT, lasting about two minutes, while the entire storm lasted from 4:45 PM until about 5:30 PM CDT. The tornado touched down near 6th Street and San Francisco, moving southwest along the railroad track and Business 77. The director of Emergency Management in Raymondville was a witness to the tornado and relayed the report to the police department. The tornado dissipated at the southern end of town and appeared to have been the only tornado to form out of this storm. Spotter reports and damage survey crews noted isolated damage along the path with several trees and buildings sustaining minor damage. Rail gate crossings were twisted and broken apart along with several utility poles that were snapped apart several feet above the ground. Another tornado was reported just west of Combes, Texas. That tornado was short-lived and did not produce any damage. Elsewhere, reports of funnel clouds and a tornado were also received in Harlingen, Texas south of Raymondville. The tornado touched down in open farmland spinning up dust and some debris. However, no damage was

[5] Damages reported in 2020 dollars.

reported with this twister. Additional storms generated severe winds around McCook, Texas, where minor damage was sustained to barns and smaller structures. Several reports of broken trees (6-8 inches in diameter) were also noted. At the intersection of M Road and Schunior, in Edinburg, Texas, a series of high-tension power poles were snapped off 10 to 12 feet above the ground. Oddly, no other structures in the vicinity sustained damage and it appears that the damage was caused by straight line severe thunderstorm wind gusts. Incidentally, several days prior to these severe thunderstorms, the Rio Grande Valley and northeast Mexico (state of Tamaulipas) had experienced record maximum temperatures ranging from 104 to 106 degrees Fahrenheit, due in large part to atmospheric subsidence caused by the effects of Hurricane Katrina.

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, Cameron County, including all participating jurisdictions, can experience a tornado touchdown approximately once every year. This frequency supports a highly likely probability of future events for Cameron County, including all participating jurisdictions.

VULNERABILITY AND IMPACT

Because tornadoes often cross jurisdictional boundaries, all existing and future buildings, facilities, and populations in the entire Cameron 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 Cameron 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 17,923 manufactured homes located in the Cameron County planning area (12%), including all the City of Harlingen (Table 11-6). It should be noted that the City of Palm Valley currently does not feature any manufactured homes. In addition, 33.9% (approximately 50,767 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 11-6. Structures at Greater Risk by Jurisdiction

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Cameron County[6]	17,923	50,767
City of Harlingen	2,657	10,939
City of Palm Valley	0	476

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 30.6% of the planning area population live below the poverty level (Table 11-7).

Table 11-7. Populations at Greatest Risk by Jurisdiction[7]

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Cameron County	129,056
City of Harlingen	16,624
City of Palm Valley	85

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

Table 11-8. Critical Facilities at Risk by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Cameron County	1 Airport, 6 Bridges, 2 Detention Centers, 1 EOC, 2 Fire Stations, 2 Heliports, 2 Hospitals, 11 Park, 2 Police Dispatch Facilities, 1 Police Station, 15 Schools, 2 Seaports, 1 Shelter/Government Facility, 1 Space-X Port, 1 Utility Facility, 9 Water District Facilities, 2 Wind Farms

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

[7] US Census Bureau 2018 data for Cameron County

JURISDICTION	CRITICAL FACILITIES
City of Harlingen	2 EOCs/Government Facilities, 4 Police Station, 1 Communications Center, 1 Public Works Facility, 8 Fire Stations, 3 Communication Towers, 5 Evacuation Centers, 1 Helipad, 18 Banks, 133 Churches, 1 School, 11 Parks, 5 Medical Facilities Hospital, 9 Nursing Home, 1 Communication Tower, 1 Communication Switch Box, 1 Constable Office, 1 DPS Station, 1 EMS, 27 Pump Stations, 2 Lift Stations, 5 Government Facilities, 1 Power Company, 1 Power Plant, 1 Power Utility Station, 62 School Facilities (buildings, teaching facilities, warehouses, offices), 1 Sheriff's Office, 1 College Campus, 1 Water Plant, 1 Airport
City of Palm Valley	1 Government Facility, 1 Wastewater Treatment Facility, 2 Lift Stations, 1 Pump Station, 1 Business

The average loss estimate of property and crop is $16,480,550 (in 2020 dollars), having an approximate annual loss estimate of $245,978 (Table 11-9). Based on historic loss and damages, the impact of tornado on the Cameron County planning area, including all participating jurisdictions, can be considered "Limited," with less than 10 percent of property expected to be destroyed, injuries that can be treated with first aid, and critical facilities shut down for 24-hours or less.

Table 11-9. Potential Annualized Losses by Jurisdiction

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Cameron County	$16,480,550	$245,978
City of Harlingen	$0	$0
City of Palm Valley	$0	$0
Planning Area	**$16,480,550**	**$245,978**

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.

SECTION 11: TORNADO

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 12: HAIL

Hazard Description 1
Location 1
Extent 1
Historical Occurrences 3
Significant Events 4
Probability of Future Events 5
Vulnerability and Impact 5
Assessment of Impacts 7

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 Cameron 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 12-1.

Table 12-1. 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 12-1 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 Cameron County planning area, including all participating jurisdictions, may experience hailstorms ranging from an H0 to an H10. 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 Cameron County planning area resulted in hail measuring 4.0 inches in diameter, or a H10, Super Hailstorm. 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 12-1 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 12-2. A total of 82 reported historical hail events impacted the Cameron County planning area between 1956 through November 2019 (Summary Table 12-3). These events were reported to NCEI and NOAA databases and may not represent all hail events to have occurred during the past 64 years. Only those events for the Cameron County planning area with latitude and longitude available were plotted (Figure 12-1).

Figure 12-1. Spatial Historical Hail Events, 1956-2019

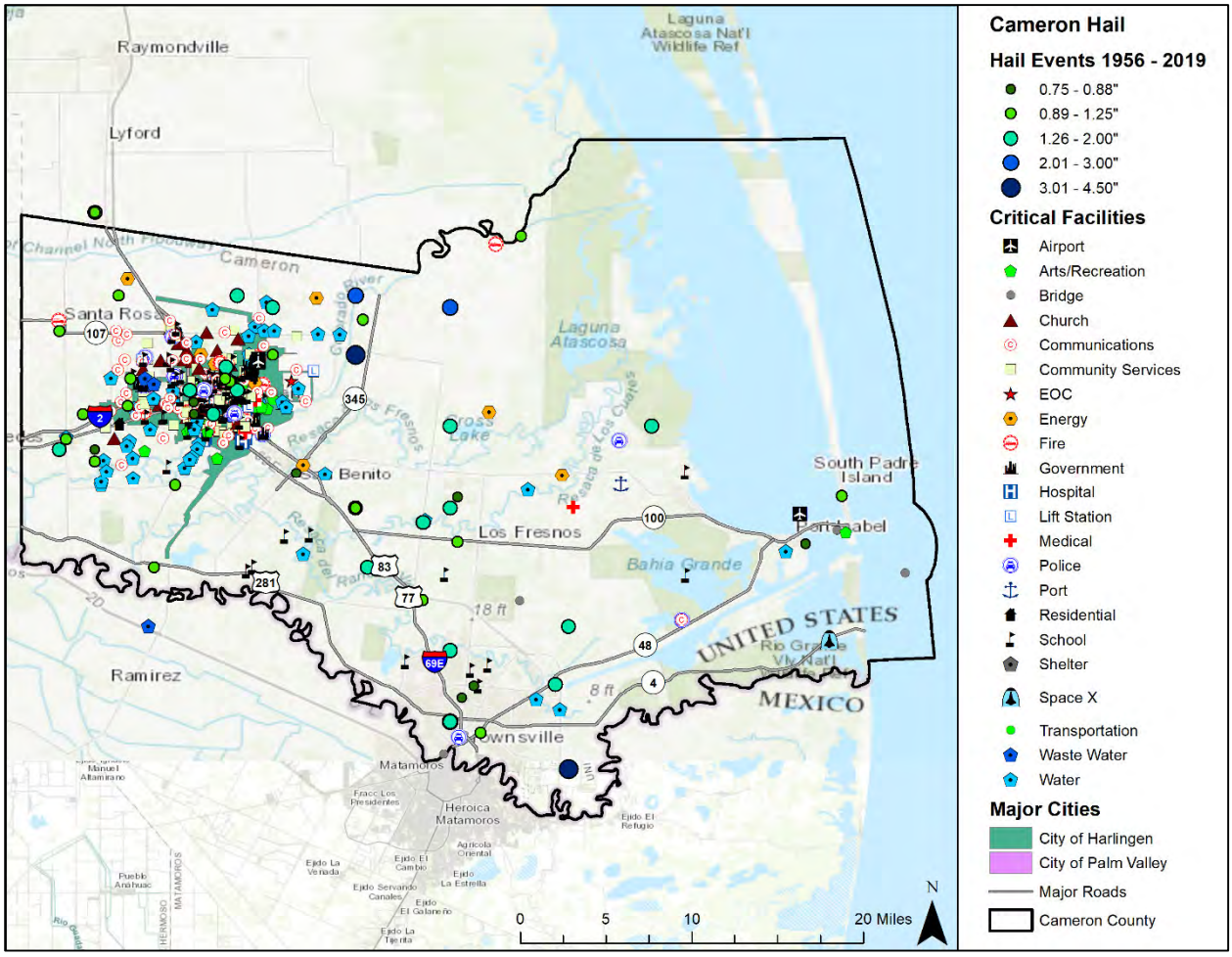


Table 12-2. Historical Hail Events, 1956-2019[2]

JURISDICTION	DATE	MAGNITUDE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
City of Harlingen	3/9/1994	1.75	0	0	$87,626	$8,763
Cameron County	4/8/2003	2.75	5	0	$70,177,095	$0

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

JURISDICTION	DATE	MAGNITUDE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	5/12/2012	1.25	0	0	$561	$0
Cameron County	4/2/2017	2.75	0	0	$10,550	$0
Cameron County	4/2/2017	2.5	0	0	$2,110	$0
Cameron County	4/2/2017	3.01	0	0	$15,825	$0
TOTALS		**(Max Extent)**	**5**	**0**	**$70,302,530**	

Table 12-3. Historical Hail Events Summary, 1956-2019

JURISDICTION	NUMBER of EVENTS	MAGNITUDE	INJURIES	DEATHS	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	76	4.0 inches	5	0	$70,206,141	$0
City of Harlingen	6	1.75 inches	0	0	$87,626	$8,763
City of Palm Valley	0	N/A	N/A	N/A	$0	$0
TOTAL LOSSES	**82**	**(Max Extent)**	**5**	**0**	**$70,302,530**	

Based on the list of historical hail events for the Cameron County planning area (listed above), including all participating jurisdictions, 13 of the events have occurred since the 2015 Plan.

SIGNIFICANT EVENTS

April 2, 2017 – Cameron County

Scattered severe thunderstorms developed across the coastal counties in the morning producing hail the size of a quarter. Shortly before 9 pm, another storm developed between La Feria and Harlingen, dropping quarter to golf ball sized hail to the north half of Harlingen, from near Bass Boulevard north of I-2 eastward to Loop 499 and Valley International Airport; a second round formed on the rear flank of the initial storm and dropped another round of smaller hail 15 to 30 minutes later over some of the same areas. The first Harlingen storm peaked over Rio Hondo, 7 miles east of Harlingen, between 905 and 920 pm, where hailstones up to 3.5 inches in diameter fell. Dozens of vehicles in each storm sustained damage from cracked windshields and dinged or dented exteriors, as well as roofs.

May 12, 2012 – City of Harlingen

A little more than a day after a thunderstorm system brought more severe weather to the Rio Grande Valley, the last vestige of very unstable air held forth mainly along and east of Highway 77. Despite unfavorable upper level conditions, the combination of the unstable air with a trigger in the form of a wind shift/dry line, which moved within striking distance of Highway 77, allowed a small but potent cluster of thunderstorms to explosively grow initially in northern Willacy County just before 4 PM CDT. These storms would produce south moving outflows, which added to the dryline trigger. Additional storms would fire in only a half hour, working on the very unstable

atmosphere to increase updraft speed and develop at least quarter to half dollar sized hail between west Harlingen, La Feria, and points south between 5:15 and 5:45 PM CDT. Once again, there was some damage to vehicles caught in the hail, many containing jagged edges. Many residents were caught by surprise by the rapid development and moved their vehicles under gas station canopies, car washes, and highway underpasses. Nickel to quarter size hail was reported at Altas Palmas and Highway 83, and quarter size hail along Highway 83 on the west side of Harlingen. A report from the spouse of a NWS employee confirmed that a car windshield was broken from the hail.

PROBABILITY OF FUTURE EVENTS

Based on available records of historic events, 82 events in a 64-year reporting period for Cameron County provides a probability of one event per year. This frequency supports a highly likely probability of future events for the Cameron 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 Cameron 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 the City of Harlingen which would also be more vulnerable. It should be noted that the City of Palm Valley does not currently feature any manufactured homes. The US Census data indicates a total of 17,923 (12%) manufactured homes located in the Cameron County planning area including all participating jurisdictions (Table 12-4). In addition, 33.9 (approximately 50,767 structures) of the single family residential (SFR) structures in the Cameron County planning area were built before 1980. These structures would typically be built to lower or less stringent construction standards than newer construction and may be more susceptible to damages during significant hail events.

Table 12-4. Structures at Greater Risk by Jurisdiction

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
Cameron County[3]	17,923	50,767

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

JURISDICTION	MANUFACTURED HOMES	SFR STRUCTURES BUILT BEFORE 1980
City of Harlingen	2,657	10,939
City of Palm Valley	0	476

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 30.6% of the planning area population live below the poverty level (Table 12-5).

Table 12-5. Populations at Greatest Risk by Jurisdiction[4]

JURISDICTION	POPULATION BELOW POVERTY LEVEL
Cameron County	129,056
City of Harlingen	16,624
City of Palm Valley	85

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

Table 12-6. Critical Facilities at Risk by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Cameron County	1 Airport, 6 Bridges, 2 Detention Centers, 1 EOC, 2 Fire Stations, 2 Heliports, 2 Hospitals, 11 Park, 2 Police Dispatch Facilities, 1 Police Station, 15 Schools, 2 Seaports, 1 Shelter/Government Facility, 1 Space-X Port, 1 Utility Facility, 9 Water District Facilities, 2 Wind Farms
City of Harlingen	2 EOCs/Government Facilities, 4 Police Station, 1 Communications Center, 1 Public Works Facility, 8 Fire Stations, 3 Communication Towers, 5 Evacuation Centers, 1 Helipad, 18 Banks, 133 Churches, 1 School, 11 Parks, 5 Medical Facilities Hospital, 9 Nursing Home, 1 Communication Tower, 1 Communication Switch Box, 1 Constable Office, 1 DPS Station, 1 EMS, 27 Pump Stations, 2 Lift Stations, 5 Government Facilities, 1 Power Company, 1 Power Plant, 1 Power Utility Station, 62 School Facilities (buildings, teaching facilities, warehouses, offices), 1 Sheriff's Office, 1 College Campus, 1 Water Plant, 1 Airport
City of Palm Valley	1 Government Facility, 1 Wastewater Treatment Facility, 2 Lift Stations, 1 Pump Station, 1 Business

Hail has been known to cause injury to humans and occasionally has been fatal. Overall, the average loss estimate of property and crops (in 2020 dollars) is $70,302,530, having an approximate annual loss estimate of $1,098,477. Based on historic loss and damages, the impact

[4] US Census Bureau 2018 data for Cameron County

of hail damages on the Cameron County planning area, including all participating jurisdictions, can be considered “Minor” severity of impact meaning injuries and illness do not result in permanent disability, county area facilities are shut down for one week or more, and more than ten percent of property destroyed or with major damage.

Table 12-7. Potential Annualized Losses by Jurisdiction

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATE
Cameron County	$70,206,141	$1,096,971
City of Harlingen	$96,389	$1,506
City of Palm Valley	$0	$0
Planning Area	**$70,302,530**	**$1,098,477**

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 13: WINTER STORM

Hazard Description 1
Location 3
Extent 3
Historical Occurrences 4
Significant Events 5
Probability of Future Events 5
Vulnerability and Impact 5
Assessment of Impacts 7

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 Cameron 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, on average, the Cameron County planning area, including all participating jurisdictions, typically experience approximately 1-10 extreme cold days a year, meaning up to 10 days are at or around freezing temperatures. During times of ice and snow accumulation, response times will increase until public works road crews are able to make major roads passable. Table 13-1 describes the types of winter storms possible to occur in the Cameron County planning area, including all participating jurisdictions.

Figure 13-1. Extreme Cold Days, 1960-2003[1]

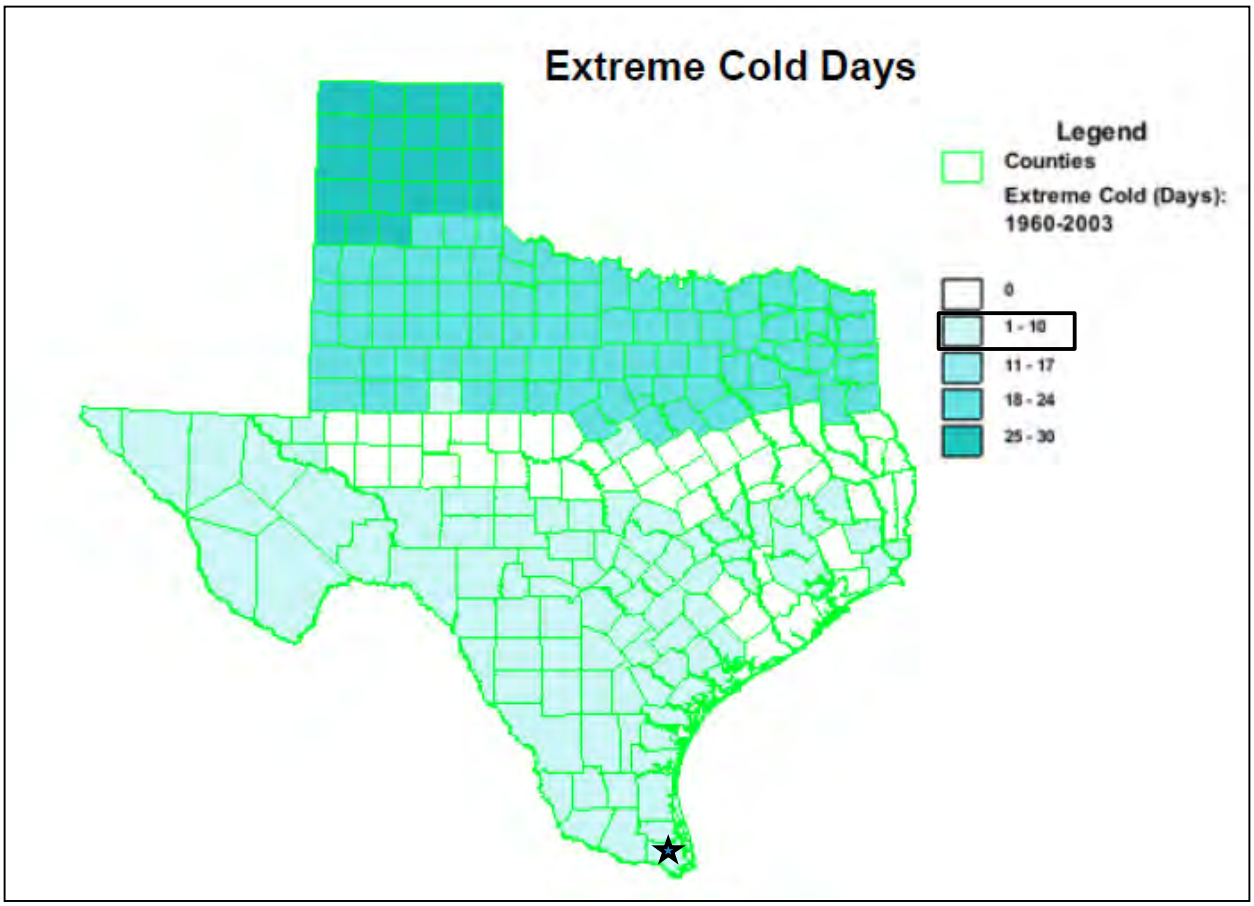


Table 13-1. Types of Winter Storms

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.
Freezing Rain or Freezing Drizzle	Rain or drizzle is likely to freeze upon impact, resulting in a coating of ice glaze on roads and all other exposed objects.
Sleet	Small particles of ice usually mixed with rain. If enough sleet accumulates on the ground, it makes travel hazardous.

[1] Source: National Weather Service. Cameron County indicated by star.

TYPE OF WINTER STORM	DESCRIPTION
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 Cameron County planning area, including all participating jurisdictions, are considered to be exposed to a winter storm hazard and could potentially be impacted.

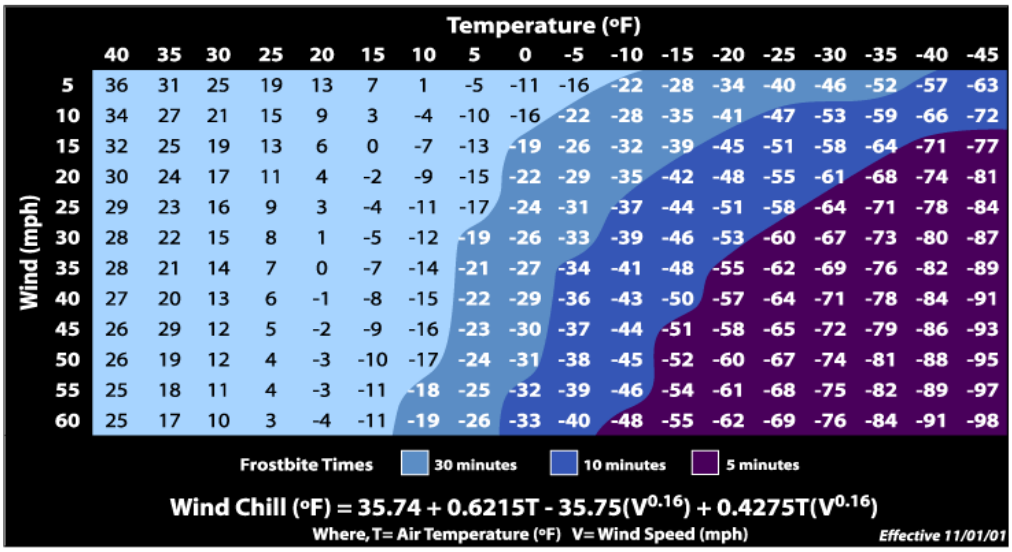
EXTENT

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
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 Cameron County planning area, including all participating jurisdictions, has never experienced a blizzard, but based on 34 previous occurrences recorded from 1996 through November 2019, it has been subject to winter storm watches, warnings, freezing rain, sleet, and wind chill.

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. Cameron 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 25 and 50 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 Cameron County from 1996 through November 2019 provided by the NCEI database. There have been 34 recorded winter storm events in Cameron 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, 1996-2019[2]

JURISDICTION	DATE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
Cameron County	2/3/2011	0	0	$0	$5,828,299
Cameron County	2/3/2011	0	0	$5,828	$0
Cameron County	2/3/2011	0	0	$11,657	$0
Cameron County	1/16/2018	0	0	$52,038	$0
TOTALS		**0**	**0**	**$5,897,822**	

Based on the list of historical winter storm events for the Cameron County planning area (listed above), including all participating jurisdictions, 10 of the events have occurred since the 2015 Plan.

SIGNIFICANT EVENTS

January 16, 2018 – Cameron County

Ice glazed 1/8 to 1/16 inch on trees and grasses beginning late afternoon of January 16th and continuing through just prior to midnight before precipitation tapered off. Temperatures, which fell to between 28 and 30 degrees allowed untreated elevated road surfaces to quickly glaze over. This resulted in dozens of mostly minor accidents along elevated portions of IH-2 and IH-69E during the peak and for a few hours after the evening commute. The elevated interchanges between these highways was closed through the morning commute after at least two tractor-trailer trucks slid and blocked access. Other elevated portions of these and other roads, including FM-511 and SR 550 (toll) were closed due to the glaze. Power outages in the county exceeded 22 thousand (most likely in Cameron County), though the source may have been related more to intense usage on an early weeknight during the peak of the winter school and work season than to glaze icing alone.

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 Cameron 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

[2] Values are in 2020 dollars. Only historical events with injuries, fatalities, or damages have been listed.

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 Cameron 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
Cameron County	1 Airport, 6 Bridges, 2 Detention Centers, 1 EOC, 2 Fire Stations, 2 Heliports, 2 Hospitals, 11 Park, 2 Police Dispatch Facilities, 1 Police Station, 15 Schools, 2 Seaports, 1 Shelter/Government Facility, 1 Space-X Port, 1 Utility Facility, 9 Water District Facilities, 2 Wind Farms
City of Harlingen	2 EOCs/Government Facilities, 4 Police Station, 1 Communications Center, 1 Public Works Facility, 8 Fire Stations, 3 Communication Towers, 5 Evacuation Centers, 1 Helipad, 18 Banks, 133 Churches, 1 School, 11 Parks, 5 Medical Facilities Hospital, 9 Nursing Home, 1 Communication Tower, 1 Communication Switch Box, 1 Constable Office, 1 DPS Station, 1 EMS, 27 Pump Stations, 2 Lift Stations, 5 Government Facilities, 1 Power Company, 1 Power Plant, 1 Power Utility Station, 62 School Facilities (buildings, teaching facilities, warehouses, offices), 1 Sheriff's Office, 1 College Campus, 1 Water Plant, 1 Airport
City of Palm Valley	1 Government Facility, 1 Wastewater Treatment Facility, 2 Lift Stations, 1 Pump Station, 1 Business

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 Cameron County planning area is estimated at 12.8% of the total population or an estimated total of 54,181[3] potentially vulnerable residents in the planning area based on age. An estimated 30.6% of the planning area population live below the poverty level (Table 13-5).

[3] US Census Bureau 2018 data for Cameron County

Table 13-5. Population at Greater Risk by Jurisdiction

JURISDICTION	POPULATION 65 AND OLDER	POPULATION BELOW POVERTY LEVEL
Cameron County[4]	54,181	129,056
City of Harlingen	9,701	16,624
City of Palm Valley	654	85

Historic loss, in 2020 dollars, is estimated at $5,897,822 in damages over the 24-year recording period giving an approximate loss of $245,743 in damages annually (Table 13-6). The potential severity of impact for the Cameron County planning area, including all participating jurisdictions, are "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 Cameron County

JURISDICTION	PROPERTY & CROP LOSS	ANNUAL LOSS ESTIMATES
Cameron County	$5,897,822	$245,743

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.

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

- 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: WILDFIRE

Hazard Description 1
Location 1
Extent 4
Historical Occurrences 9
Probability of Future Events 11
Vulnerability and Impact 11
Assessment of Impacts 15

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 14-1 through 14-3). It is estimated that 36.2 percent of the total population in Cameron County live within the WUI. However, the entire Cameron County planning area is at risk for wildfires.

Figure 14-1. Wildland Urban Interface Map – Cameron County

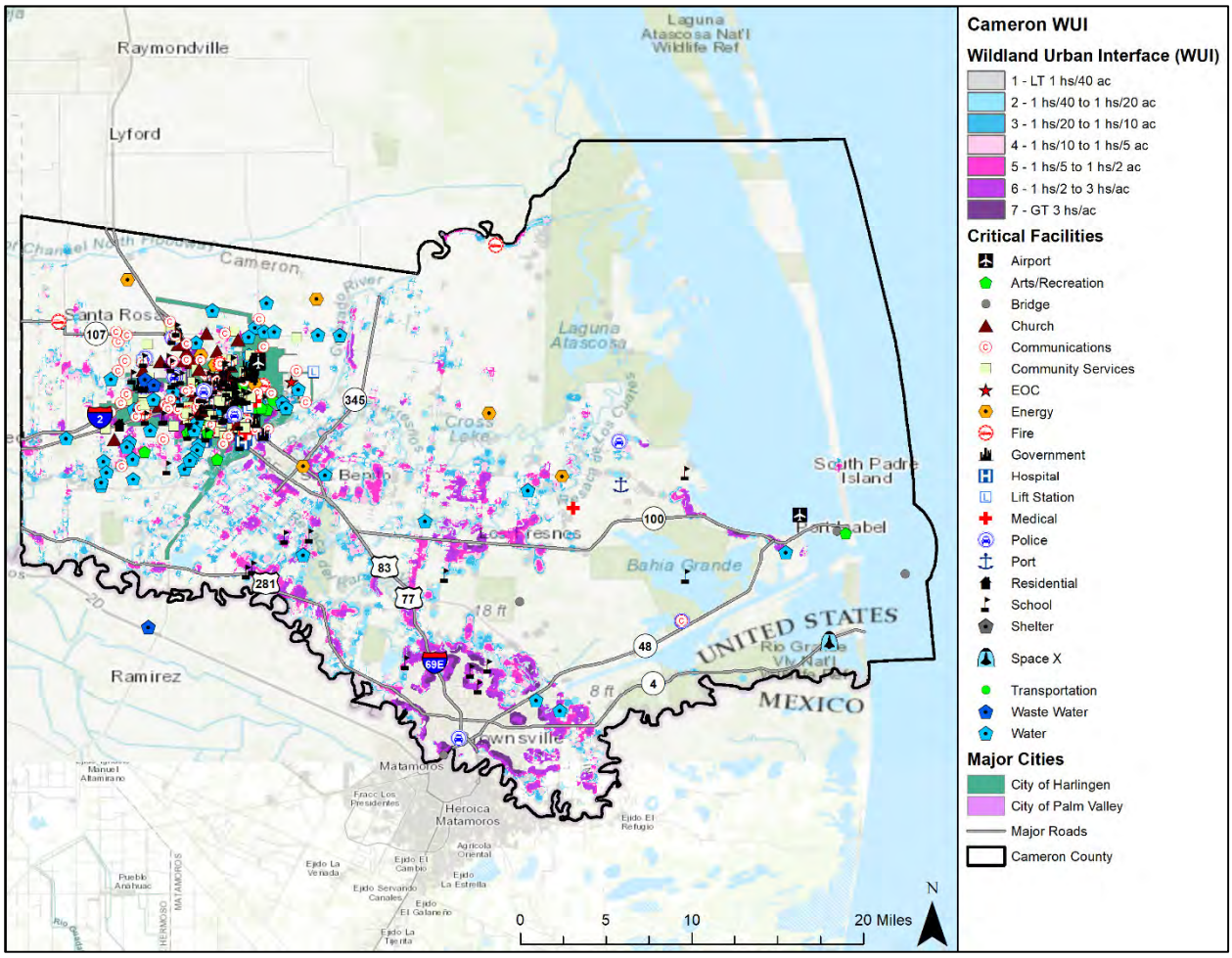
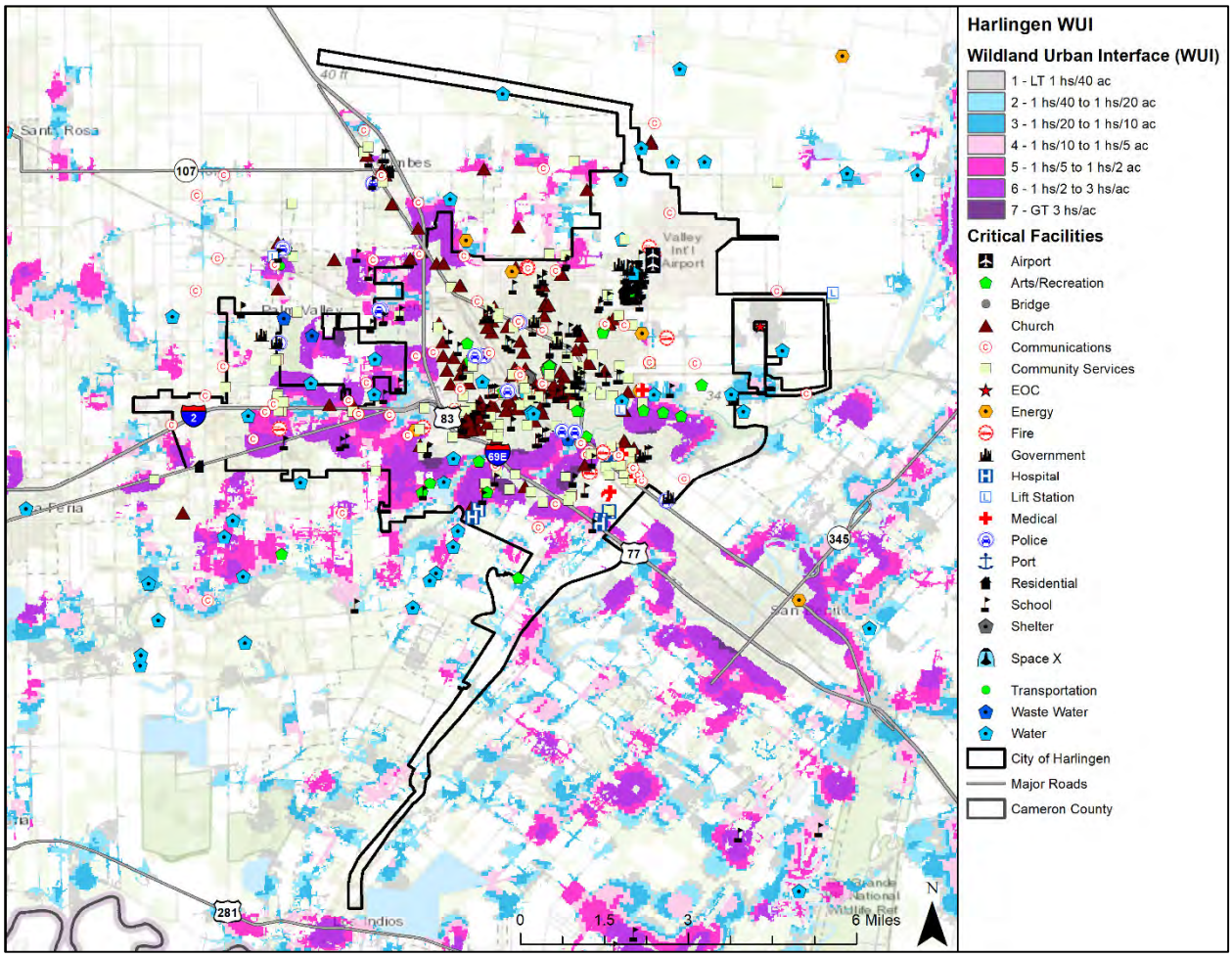
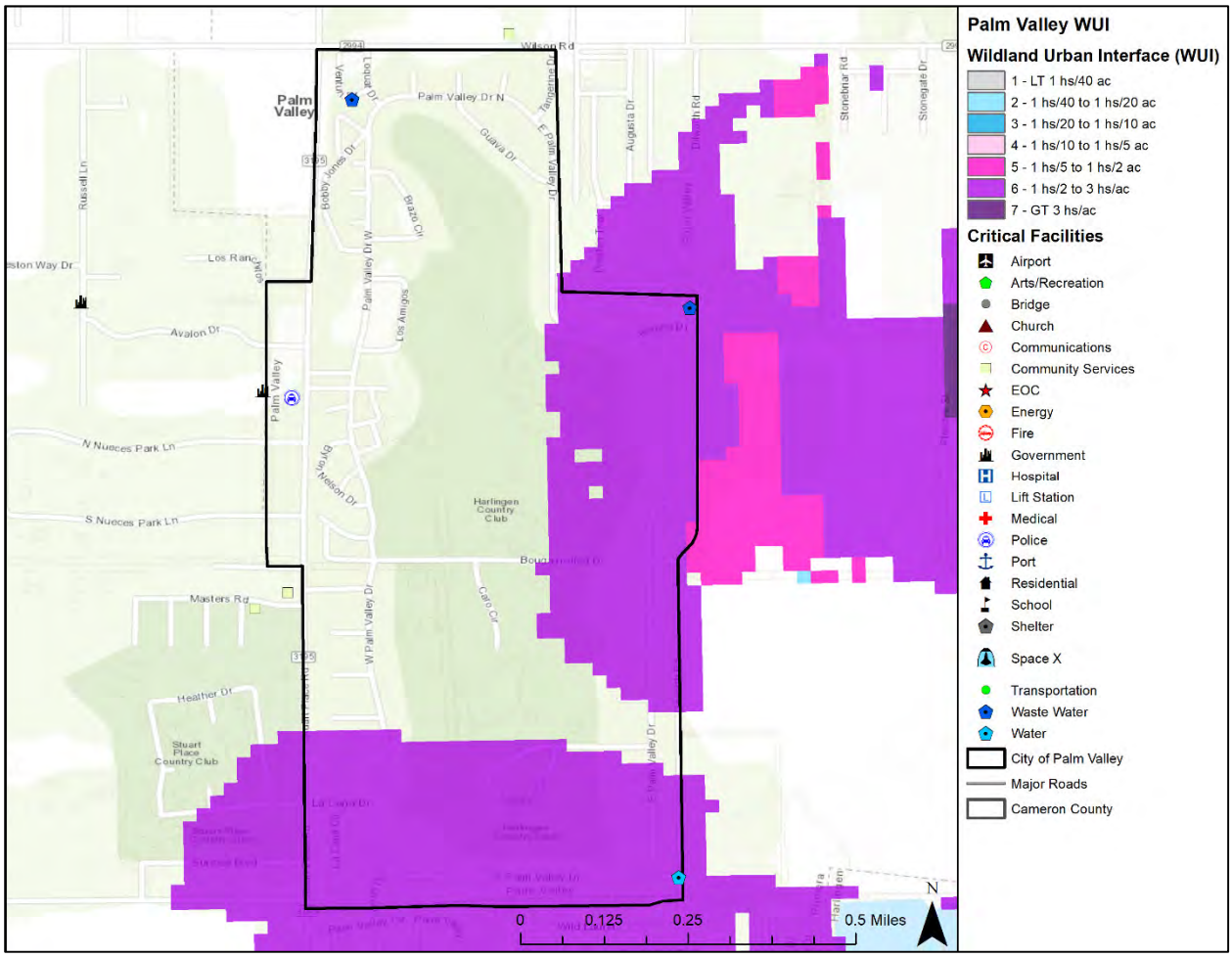


Figure 14-2. Wildland Urban Interface Map – City of Harlingen



It is estimated that 23.3 percent of the total population in the City of Harlingen live within the WUI. However, the entire City of Harlingen is at risk for wildfires.

Figure 14-3. Wildland Urban Interface Map – City of Palm Valley

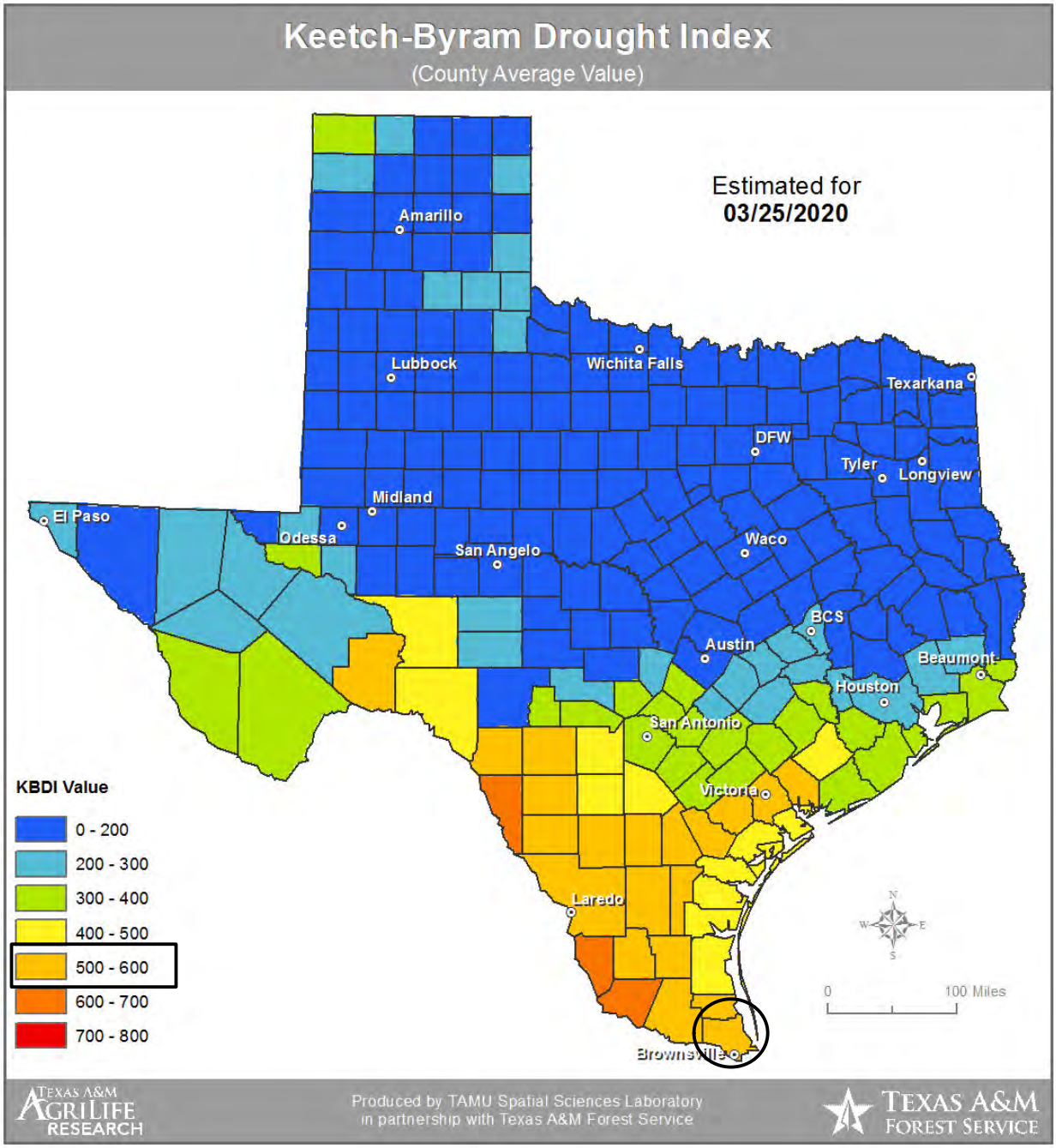


It is estimated that 45.6 percent of the total population in the City of Palm Valley live within the WUI. However, the entire City of Palm Valley is at risk for wildfires.

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 14-4. Keetch-Byram Drought Index (KBDI) for the State of Texas, 2020[1]



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

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

- **0 -200:** Soil and fuel moisture are high. Most fuels will not readily ignite or burn. However, with sufficient sunlight and wind, cured grasses and some light surface fuels will burn in spots and patches.
- **200 -400:** Fires more readily burn and will carry across an area with no gaps. Heavier fuels will not readily ignite and burn. Expect smoldering and the resulting smoke to carry into and possibly through the night.
- **400 -600:** Fires intensity begins to significantly increase. Fires will readily burn in all directions exposing mineral soils in some locations. Larger fuels may burn or smolder for several days creating possible smoke and control problems.
- **600 -800:** Fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn through the night and heavier fuels will actively burn and contribute to fire intensity.

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

The range of intensity for the Cameron County planning area in a wildfire event is within 245 to 640. The average extent to be mitigated for the Cameron County planning area, including all participating jurisdictions, is a KBDI of 543. 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 640 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. Cameron County is between a potential limited to low wildfire intensities. Figures 14-5 through 14-7 identify the wildfire intensity for the Cameron County planning area.

Figure 14-5. Fire Intensity Scale Map – Cameron County

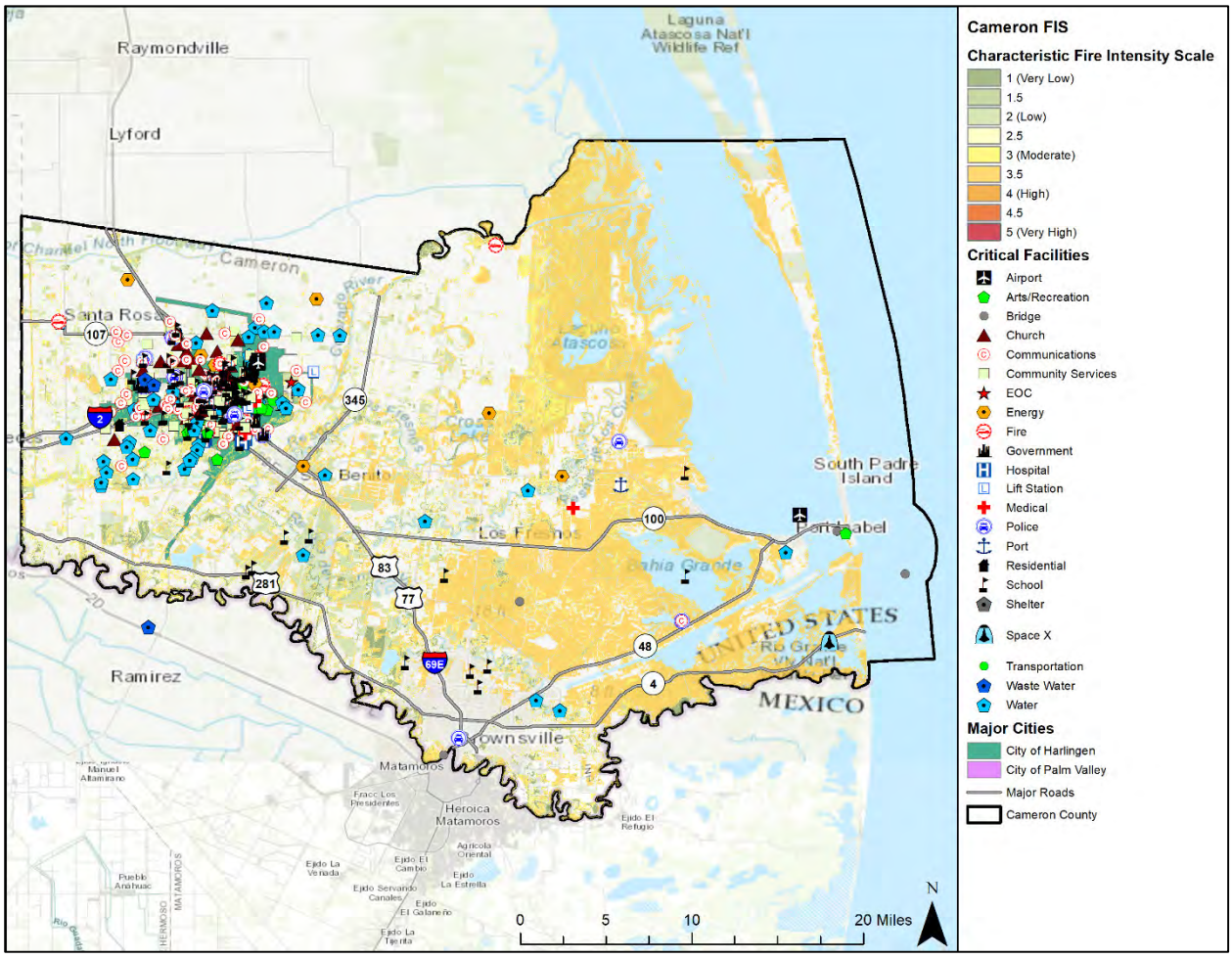


Figure 14-6. Fire Intensity Scale Map – City of Harlingen

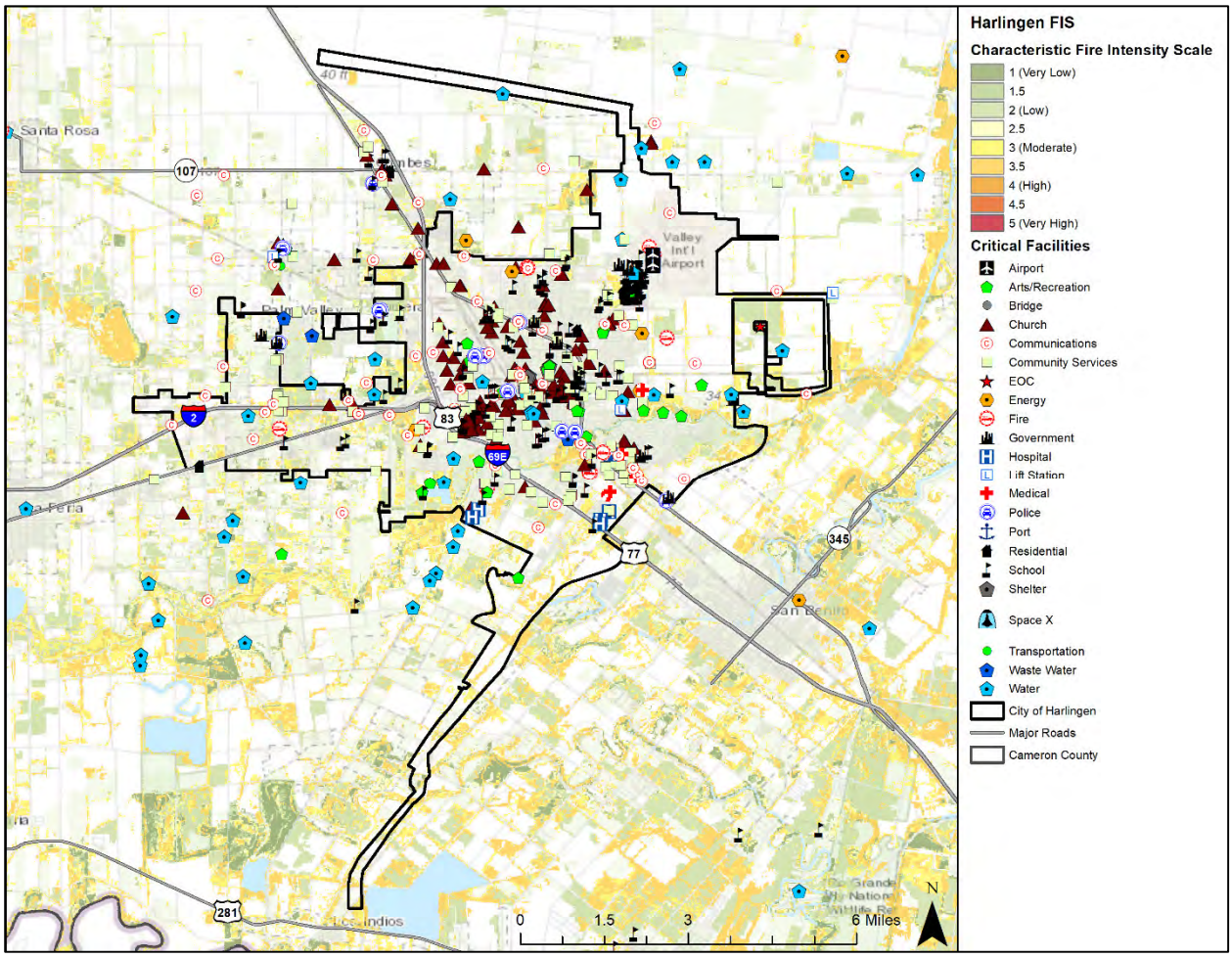
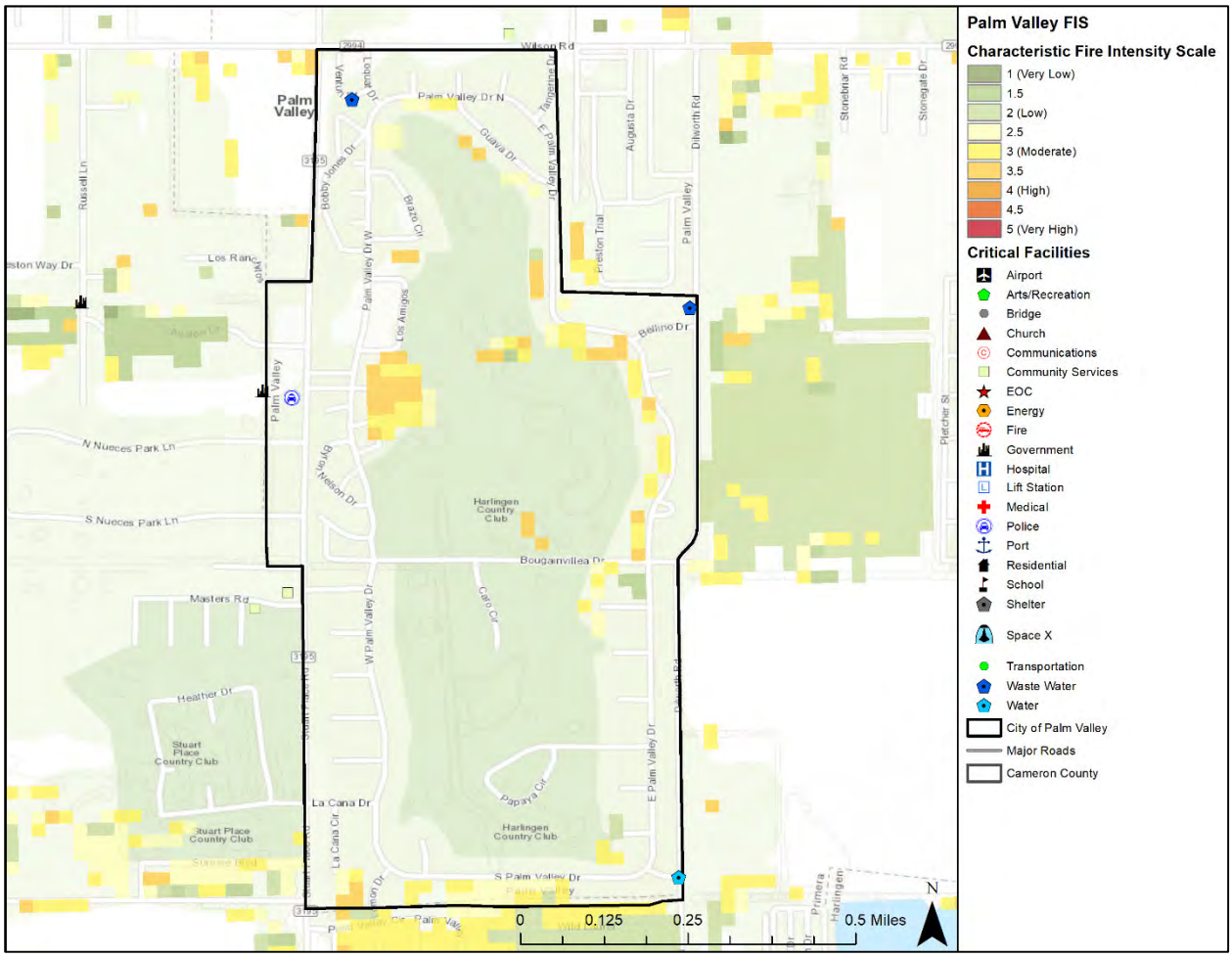


Figure 14-7. Fire Intensity Scale Map – City of Palm Valley



HISTORICAL OCCURRENCES

The Texas Forest Service reported 115 wildfire events between 2005 and 2015. The National Center for Environmental Information (NCEI) did not have any reported events from 1996 through November 2019. Due to a lack of recorded data for wildfire events prior to 2005 and after 2015[2], frequency calculations are based on an eleven-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 14-8). Table 14-1 identifies the number of wildfires by jurisdiction and total acreage burned.

[2] The Texas Forest Service data is currently only available through 2015.

Figure 14-8. Location and Historic Wildfire Events for Cameron County Planning Area

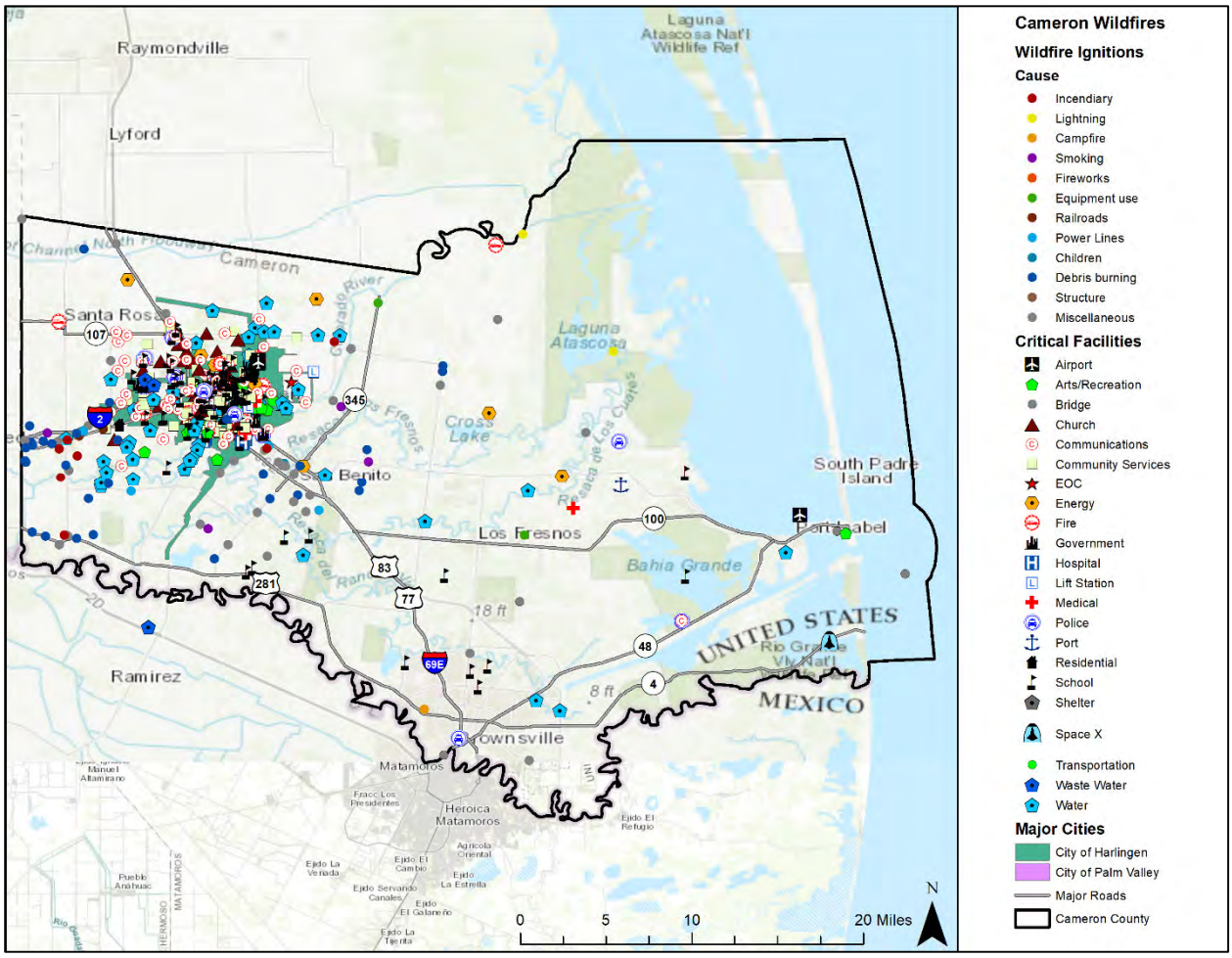


Table 14-1. Historical Wildfire Events Summary

JURISDICTION	NUMBER OF EVENTS	ACRES BURNED
Cameron County	112	809
City of Harlingen	3	9
City of Palm Valley	0	0

Table 14-2. Acreage of Suppressed Wildfire by Year

JURISDICTION	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Cameron County	93	238	1	14	0	100	0	295	1	2	65
City of Harlingen	1	3	0	0	0	0	0	5	0	0	0
City of Palm Valley	0	0	0	0	0	0	0	0	0	0	0

Based on the list of historical wildfire events for the Cameron County planning area (listed above), including all participating jurisdictions, 65 of the events have occurred since the 2015 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 115 events in an 11-year period, an event within Cameron 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.

The heavily populated, urban areas of Cameron County are not likely to experience large, sweeping fires. Areas in the unincorporated areas of Cameron County are vulnerable, including rural areas such as Interstate 69 north of Combes, and Highway 2 between La Feria and Harlingen. 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. Figures 14-1 through 14-3 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 14-3. Critical Facilities Located in WUI by Jurisdiction

JURISDICTION	CRITICAL FACILITIES
Cameron County	9 Schools, 1 Space-X Port, 4 Water District Facilities
City of Harlingen	1 EOC/Government Facility, 1 Police Station, Fire Stations, 1 Communication Tower, 7 Banks, 9 Churches, 5 Parks, 5 Medical Facilities/ Hospitals, 6 Nursing Homes, 26 Communication Towers,1 Constable Office, 13 Pump Stations, 1 Lift Station, 3 Government Facilities, 1 Power Company, 1 Power Plant, 1 Power Utility Station, 22 School Facilities (buildings, teaching facilities, warehouses, offices), 1 Sheriff's Office, 3 Water Towers, 2 Water/Wastewater Plants,
City of Palm Valley	1 Wastewater Treatment Facility, 1 Pump Station

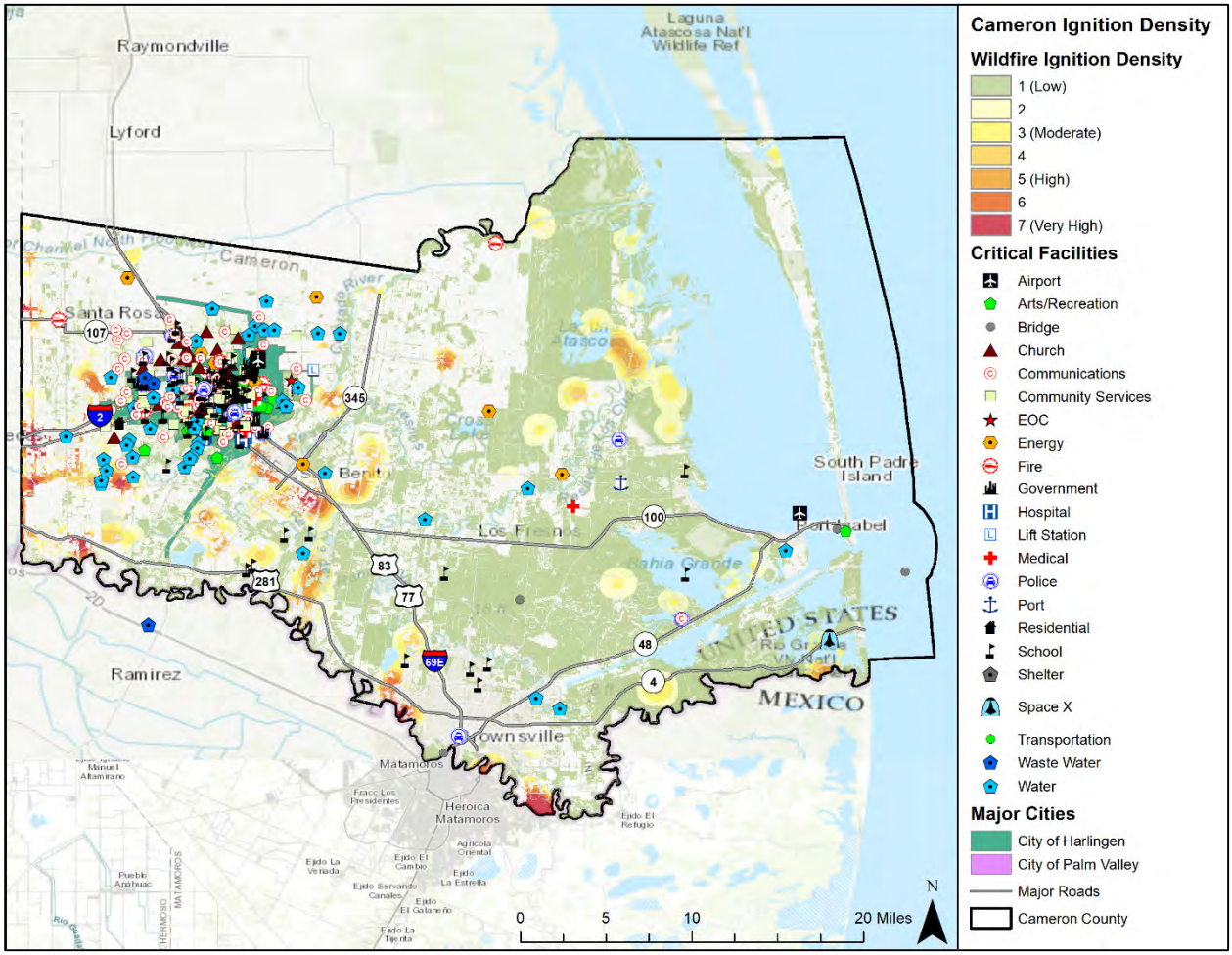
Within Cameron County, a total of 115 fire events were reported from 2005 to 2015. All of these events were suspected wildfires. Historic loss and annualized estimates due to wildfires are presented in Table 14-4 below. The frequency is approximately 10 events every year.

Table 14-4. Potential Annualized Losses by Jurisdiction[3]

JURISDICTION	ACRES BURNED	ANNUAL ACRE LOSSES
Cameron County	809	73.5
City of Harlingen	9	0.8
City of Palm Valley	0	0
Planning Area	**818**	**74.4**

Figures 14-9 through 14-11 show Cameron County and the threat of wildfire to the County and all participating jurisdictions.

Figure 14-9. Wildfire Ignition Density – Cameron County



[3] Events divided by 11 years of data.

Figure 14-10. Wildfire Ignition Density – City of Harlingen

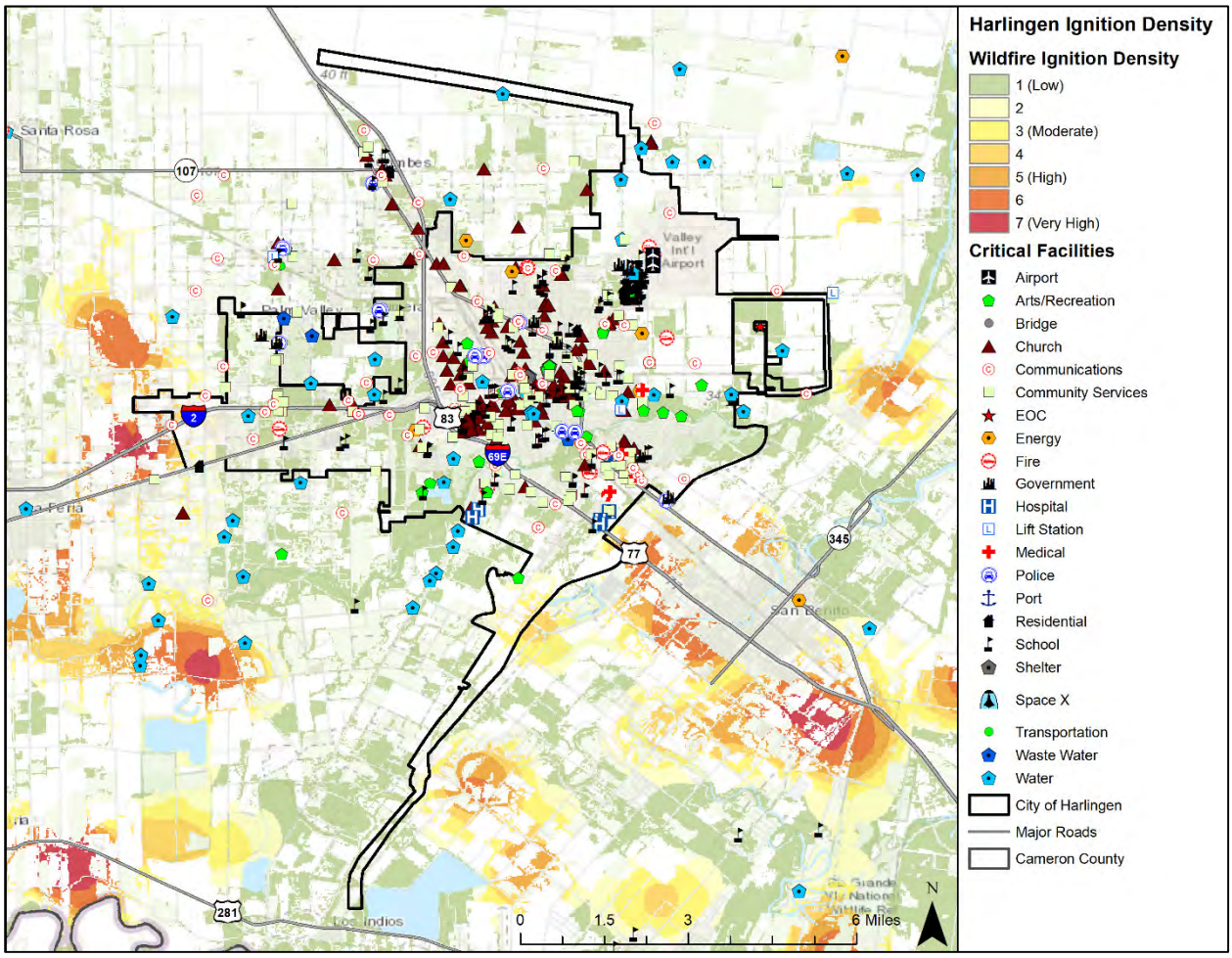
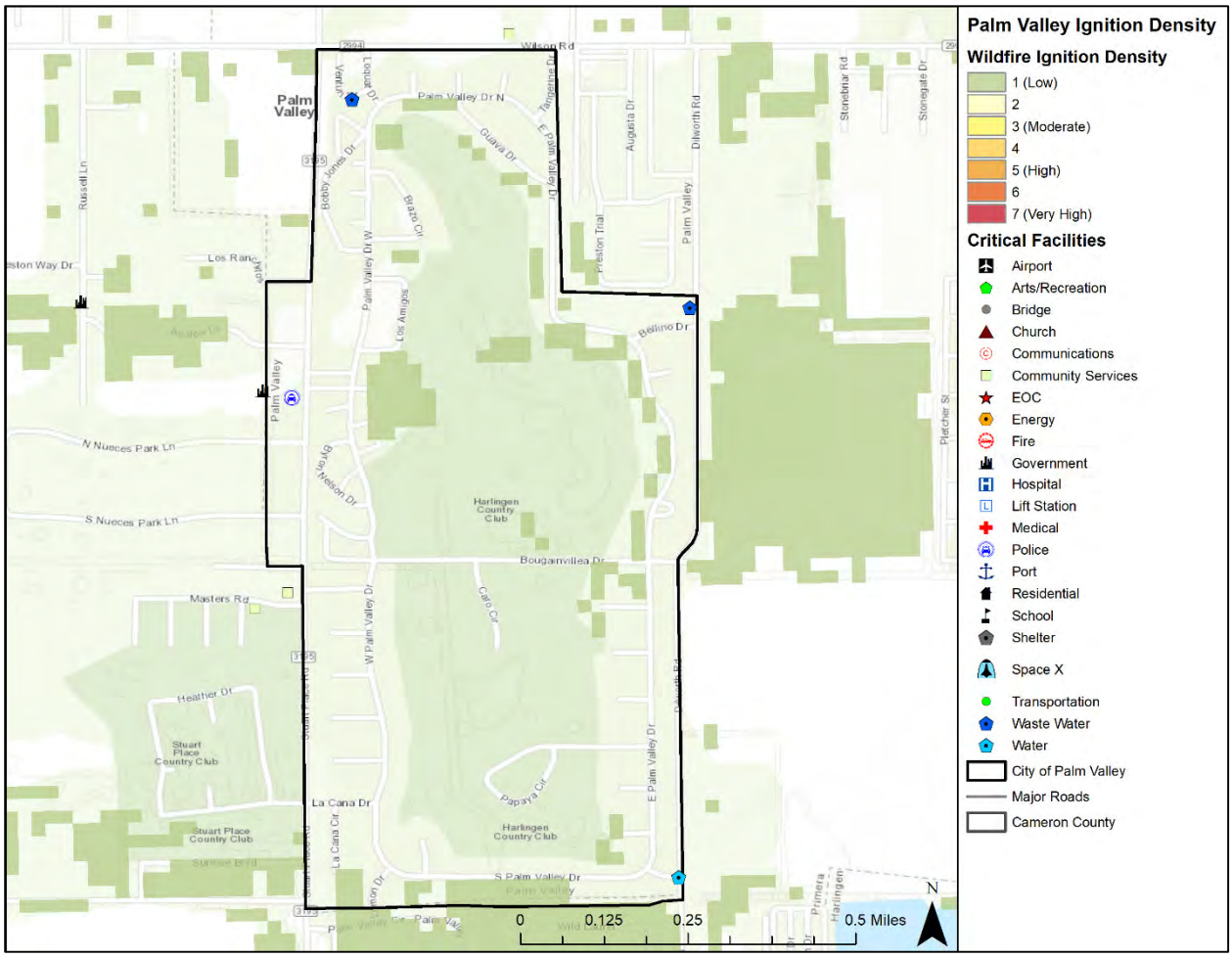


Figure 14-11. Wildfire Ignition Density – City of Palm Valley



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 Cameron 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 14-5.

Table 14-5. Impact by Jurisdiction

JURISDICTION	IMPACT	DESCRIPTION
Cameron County	Limited	Cameron County has an estimated 143,321 people or 36.2 percent of the total population that live within the Wildland Urban Interface (WUI). Cameron 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 Harlingen	Limited	The largest population in the City of Harlingen live in an area that is semi-dense (1-3 houses per 1 acre) in the WUI, and the City has a low 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 Palm Valley	Limited	The entire population in the City of Palm Valley live in an area that is semi-dense (1-3 houses per 1 acre) in the WUI, and the City has a low 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.
- Area lakes such as Laguna Atascosa National Wildlife Preserve Rio Grande River, and Bahia Grande Tidal Basin, 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 15: DAM AND LEVEE FAILURE

Hazard Description 1
Dams 1
Levee 2
Location 3
Extent 4
Historical Occurrences 6
Probability of Future Events 6
Vulnerability and Impact 7
Assessment of Impacts 7

HAZARD DESCRIPTION

DAMS

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. Dam failures can result from any one or a combination of the following causes:

- Prolonged periods of rainfall and flooding, which cause most failures;
- Inadequate spillway capacity, resulting in excess overtopping of the embankment;
- Internal erosion caused by embankment or foundation leakage or piping;
- Improper maintenance, including failure to remove trees, repair internal seepage problems, or maintain gates, valves, and other operational components;
- Improper design or use of improper construction materials;
- Failure of upstream dams in the same drainage basin;
- High winds, which can cause significant wave action and result in substantial erosion;
- Destructive acts of terrorism; and,
- Earthquakes, which typically cause longitudinal cracks at the tops of the embankments, leading to structural failure.

Benefits provided by dams include water supplies for drinking; irrigation and industrial uses; flood control; hydroelectric power; recreation; and navigation. At the same time, dams also represent a risk to public safety. Dams require ongoing maintenance, monitoring, safety inspections, and sometimes even rehabilitation to continue safe service.

In the event of a dam failure, the energy of the water stored behind the dam is capable of causing rapid and unexpected flooding downstream, resulting in loss of life and substantial property damage. A devastating effect on water supply and power generation could be expected as well. The terrorist attacks of September 11, 2001 generated increased focus on protecting the country's infrastructure, including ensuring the safety of dams.

SECTION 15: DAM AND LEVEE FAILURE

One major issue with the safety of dams is their age. The average age of America's 84,000 dams is 52 years. According to statistics released in 2009 by the Association of State Dam Safety Officials[1], more than 2,000 dams near population centers are in need of repair. In addition to the continual aging of dams, there have not been significant increases in the number of safety inspectors resulting in haphazard maintenance and inspection.

The Association of State Dam Safety Officials estimate that $16 billion will be needed to repair all high-hazard dams, but the total for all state dam-safety budgets is less than $60 million[2]. The current maintenance budget does not match the scale of America's long-term modifications of its watersheds. Worse still, more people are moving into risky areas. As the American population grows, dams that once could have failed without major repercussions are now upstream of cities and development.

LEVEE

A levee is simply a man-made embankment built to keep a river from overflowing its banks or to prevent ocean waves from washing into undesired areas. A levee is typically little more than a mound of less permeable soil, like clay, wider at the base and narrower at the top. These mounds run in a long strip in varying height, sometimes for many miles, along a river, lake or ocean. But there's no set height for levees. Their measurements vary according to the storms the area receives, even if those storms occur only once every hundred or thousand years.

Living by the water provides humans with a number of advantages: fertile farmland, transportation, trade and hydroelectric power. Levees allow humans to enjoy these assets without fear of flooding. But humans often forget how powerful waters behind a levee can be. In 1927, the Mississippi River swelled under heavy rains, charging through a line of levees and flooding

[1] Association of State Dam Safety Officials, Journal of Dam Safety
[2] Source: www.damsafety.org

an area the size of Ireland. In 1953, the North Sea broke through the Netherland's ancient system of dikes and killed thousands.

In 2005, New Orleans made international news when Hurricane Katrina breached its levees. Much of the city lies 10 feet (3 meters) below sea level. Over the course of the city's history, low-lying, boggy areas have been pumped dry to create new land. Much of this reclaimed land has sunk as it dried out. The entire city now depends on the levees, along with massive pumping stations, to keep the water out.

LOCATION

The State of Texas has 7,413 dams, all regulated by the Texas Commission on Environmental Quality (TCEQ). The National Dam Safety Review Board (in coordination with FEMA) and the National Inventory of Dams (NID) lists a total of forty-two dams or levees in or near the Cameron County planning area, including all participating jurisdictions (complete list located in Appendix D). Each of these dams were analyzed individually by location, volume, elevation, and condition (where available) when determining the risk, if any, for each dam. Each dam or levee site was further analyzed for potential risks utilizing FEMA's National Flood Hazard Layer (where available) to map locations and fully understand development near the dam or levee and topographical variations that may increase risk. Most of the dams listed were embankments for typically dry detention drainage areas, irrigation reservoirs, or shored up stream embankments. These types of structures are utilized for flood control and irrigation and do not pose a dam or levee failure risk. Other dams in the planning area feature such limited storage capacity that they pose no risk to structures, infrastructure, or citizens. Dams that were deemed to pose no past, current, or future risk to the planning area are not profiled in the plan as no loss of life or impact to critical facilities or infrastructure is expected in the event of a breach. Based on this detailed analysis, the planning team was able to determine that only three of the forty-two dams pose a risk to the planning area. The only jurisdiction profiling dam or levee failure is Cameron County. These dams, listed in Table 15-1, are profiled in detail in the Extent section of this hazard profile. Figure 15-1 illustrates the general location for the critical dams in the planning area.

While inundation maps are not available for the profiled dams, an estimated inundation radius has been included on the location map for each profiled dam or levee (indicated by the red circle). In addition, the dam failure risk area is described for each profiled dam under extent. All three profiled dams have a maximum storage capacity of less than 10,000 acre-feet. As such, all structures within one mile of each dam are considered to be at risk to potential dam or levee failure hazards. It should be noted that the City of Harlingen and the City of Palm Valley are not located within any of the estimated inundation zones. Neither of these jurisdictions will profile dam or levee failure as a hazard for their location.

It should be noted that there are two dams of concern that are outside of the planning area. The Anzalduas Dam is located in Hidalgo County approximately 25 miles away from the Cameron County line. The Falcon reservoir is an international reservoir approximately 40 miles south of Laredo and approximately 90 miles west of the Cameron County line. The planning area lies well outside of the estimated inundation zones for either of these dams. In the event of a breach the Rio Grande River, downstream of the breach, could experience extensive flooding. The planning areas flood hazard risk is covered in the flood profile (Section 5) of this plan.

Figure 15-1. Cameron County Critical Dam and Levee Locations

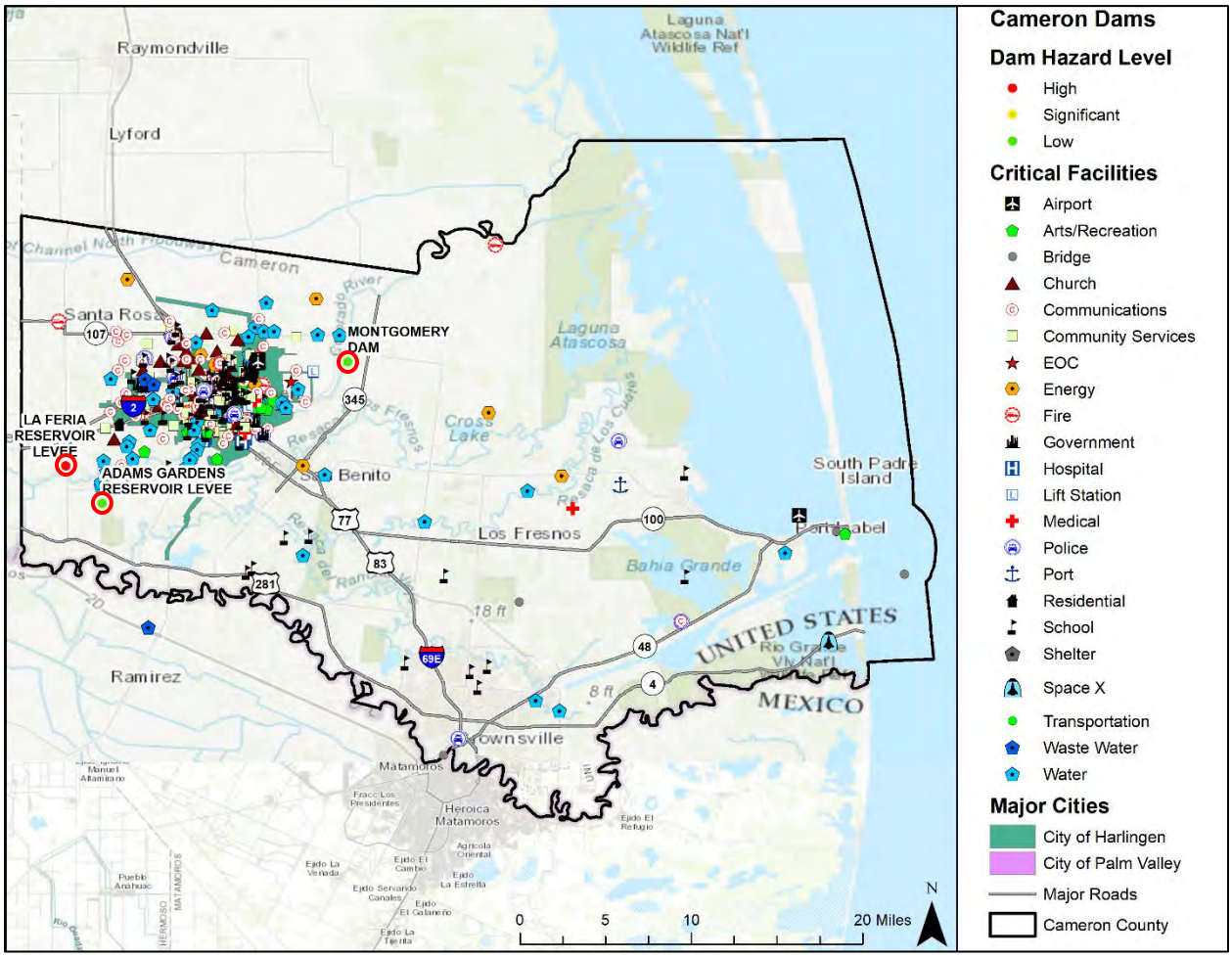


Table 15-1. Cameron County Dam and Levee Survey

JURISDICTION	DAM OR LEVEE NAME	HEIGHT (Ft.)	STORAGE (Acre Ft.)	CONDITION	PROFILED
Cameron County	Montgomery Dam	21	505	Not Rated	Yes
Cameron County	La Feria Reservoir	20	2,480	Not Rated	Yes
Cameron County	Adams Gardens Reservoir Levee	16	4,100	Not Rated	Yes

EXTENT

The extent or magnitude of a dam or levee failure event is described in terms of the classification of damages that could result from a dam's failure, not the probability of failure. For dams with a maximum storage capacity of 100,000 acre-feet or more, all census blocks within five miles are considered to be at risk to potential dam or levee failure hazards. For dams with a maximum storage capacity between 10,000 and 100,000 acre-feet, all census blocks within three miles are considered to be at risk to potential dam or levee failure hazards. For dams with a maximum

storage capacity of less than 10,000 acre-feet, all census blocks within one mile are considered to be at risk to potential dam or levee failure hazards.

Montgomery Dam:
Montgomery Dam is located in unincorporated Cameron County on the Arroyo Colorado River. The dam was constructed in 1963 and is used primarily for irrigation. It is owned by the City of Rio Hondo. The area located near the dam is semi-rural with limited development within a one-mile radius. A breach should follow the path of the river, but it is anticipated that the water released by the breach could temporarily exceed the capacity and overflow the banks of the river for approximately one mile. Approximately 48 residential structures, a county park and agricultural land could be impacted by a breach. No critical facilities would be impacted. A dam failure could cause limited infrastructure damages, power outages, and utility systems disruptions. In the event of a breach, it is estimated the average breach width would be 96.4 feet with a maximum breach flow of 17,248 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth up to 10 feet with the highest depth in the immediate area of the dam breach.

La Feria Reservoir Dam:
La Feria Reservoir Levee Dam is located in unincorporated rural west Cameron County right next to the City of La Feria. It uses off-channel water from the Arroyo Colorado River and is used for irrigation purposes. A breach should follow the path of the river, but it is anticipated that the water released by the breach could temporarily exceed the capacity and overflow the banks of the channel for approximately one mile. It is owned by La Feria Irrigation District Cameron County No. 3 and was constructed in 1926 by earthen construction with a core of homogeneous, earth. The area located near the dam is semi-rural with limited development within a one-mile radius. Minimal populations in the plan area including approximately 80 residential structures and several access roads may be impacted. No critical facilities would be impacted. If there was a breach, it is estimated the average breach width would be 141.8 ft. with a maximum breach flow of 37,413 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam breach could result in an estimated depth up to 15 feet with the highest depth in the immediate area of the dam breach.

Adams Gardens Reservoir Levee Dam:
Adams Gardens Reservoir Levee Dam is located in unincorporated Cameron County. The levee was constructed in 1934 and is used primarily for irrigation. It is owned by the Adams Gardens Irrigation District 19. It uses off-channel water from the Resaca De Los Fresnos and is used for irrigation purposes. A breach should follow the path of the river, but it is anticipated that the water released by the breach could temporarily exceed the capacity and overflow the banks of the channel for approximately one mile. The area located near the levee is rural with limited development within a one-mile radius. Agricultural land and several access roads could be impacted by a breach. No critical facilities would be impacted. A levee failure could cause very limited infrastructure damages, power outages, and utility systems disruptions. In the event of a breach, it is estimated the average breach width would be 152 feet with a maximum breach flow of 19,036 cubic feet per second according to the National Weather Service (NWS) Dam Break Equation. A dam or levee breach could result in an estimated depth up to 8 feet with the highest depth in the immediate area of the levee breach.

Table 15-2 represents the extent or magnitude of a dam or levee failure event that could be expected for the Cameron County planning area for each profiled dam.

Table 15-2. Extent by Jurisdiction

JURISDICTION	PROFILED DAM	EXTENT (FLOW DEPTH)	LEVEL OF INTENSITY TO MITIGATE
Cameron County	Montgomery Dam	0-10 Feet	Dam failure presents a low threat for the county. Loss of life is not expected. While some residential structures could be impacted, the greatest threat in the event of a breach would be localized flooding. Critical facilities would not be impacted. Some infrastructure and utilities could be minimally impacted. Economic loss would be minimal.
Cameron County	La Feria Reservoir	0-15 Feet	Dam failure presents a low threat for the county. Loss of life is not expected. While some residential structures could be impacted, the greatest threat in the event of a breach would be localized flooding. Critical facilities would not be impacted. Some infrastructure and utilities could be minimally impacted. Economic loss would be minimal.
Cameron County	Adams Gardens Reservoir Levee	0-8 Feet	Levee failure presents a low threat for the county. Loss of life is not expected. While agricultural land and several access roads could be impacted, the greatest threat in the event of a breach would be localized flooding. Critical facilities would not be impacted. Some infrastructure and utilities could be minimally impacted. Economic loss would be minimal.

HISTORICAL OCCURRENCES

The State of Texas has not experienced loss of life or extensive economic damage due to a dam or levee failure since the first half of the twentieth century. However, there may be many incidents that are not reported and, therefore, the actual number of incidents is likely to be greater.

There has not been a recorded dam or levee failure event for any of the participating jurisdictions in the Cameron County planning area.

PROBABILITY OF FUTURE EVENTS

No historical events of dam or levee failure have been recorded in the Cameron County planning area, though the risk of dam or levee failure is monitored closely. Due to the lack of historical

occurrences, the probability of a future event is unlikely for those jurisdictions profiling dam or levee failure as a hazard, meaning an event is possible in the next ten years.

VULNERABILITY AND IMPACT

There are forty-two dams and/or levees in or near the Cameron County planning area. All dams or levees were evaluated in-depth to determine the risk, if any, associated with each dam. This analysis indicated three dams or levees in the planning area that presents a risk to structures or infrastructure in the planning area.

Flooding is the most prominent effect of dam or levee failure. If the dam or levee failure is extensive, a large amount of water would enter the downstream waterways forcing them out of their banks. There may be significant environmental effects, resulting in flooding that could disperse debris and hazardous materials downstream that can damage local ecosystems. If the event is severe, debris carried downstream can block traffic flow, cause power outages, and disrupt local utilities, such as water and wastewater, which could result in school closures. For specific vulnerability, please refer to the narrative for each dam or levee under the Extent section of this profile.

Annualized loss-estimates for dam or levee failure are not available; neither is there a breakdown of potential dollar losses for critical facilities, infrastructure and lifelines, or hazardous-materials facilities. If a significant dam or levee should fail, however, the severity of impact for the planning area would likely be minimal.

The severity of impact from a dam or levee breach would be “Limited,” meaning it could result in injuries that can be treated with first-aid, critical facilities being shut down for 24-hours or less and less than 10% of the property in the estimated breach inundation area destroyed or with major damage. For these reasons, creating mitigation actions to remove or protect people and structures from the path of destruction is necessary in order to minimize impact from dam or levee failure.

ASSESSMENT OF IMPACTS

Any individual dam or levee has a very specific area that will be impacted by a catastrophic failure. Dams identified as high or significant hazard can directly threaten the lives of individuals living or working in the inundation zone below the dam. The impact from any catastrophic failure would be similar to that of a flash flood. The impact of climate change could produce greater risk of dam or levee failures due to larger more frequent floods, exacerbating the current dam or levee failure impacts. Increased dam or levee failure threats can be associated with a variety of impacts, including:

- Lives could be lost.
- There could be injuries from impacts with debris carried by the flood.
- Swift-water rescue of individuals trapped by the water puts the immediate responders at risk for their own lives.
- Individuals involved in the cleanup may be at risk from the debris left behind.
- Continuity of operations for any jurisdiction outside the direct impact area could be very limited.
- Roads and bridges could be destroyed.
- Homes and businesses could be damaged or destroyed.

- Emergency services may be temporarily unavailable.
- Disruption of operations and the delivery of services in the impacted area.
- A large dam or levee with a high head of water could effectively scour the terrain below it for miles, taking out all buildings and other infrastructure.
- Scouring force could erode soil and any buried pipelines.
- Scouring action of a large dam or levee will destroy all vegetation in its path.
- Wildlife and wildlife habitat caught in the flow will likely be destroyed.
- Fish habitat will likely be destroyed.
- Topsoil will erode, slowing the return of natural vegetation.
- The destructive high velocity water flow may include substantial debris and hazardous materials, significantly increasing the risks to life and property in its path.
- Debris and hazardous material deposited downstream may cause further pollution of areas far greater than the inundation zone.
- Destroyed businesses and homes may not be rebuilt, reducing the tax base and impacting long term economic recovery.
- Historical or cultural resources may be damaged or destroyed.
- Recreational activities and tourism may be temporarily unavailable or unappealing, slowing economic recovery.

The economic and financial impacts of dam or levee failure on the area will depend entirely on the location of the dam, 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 dam or levee failure event.

SECTION 16: COASTAL EROSION

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

HAZARD DESCRIPTION

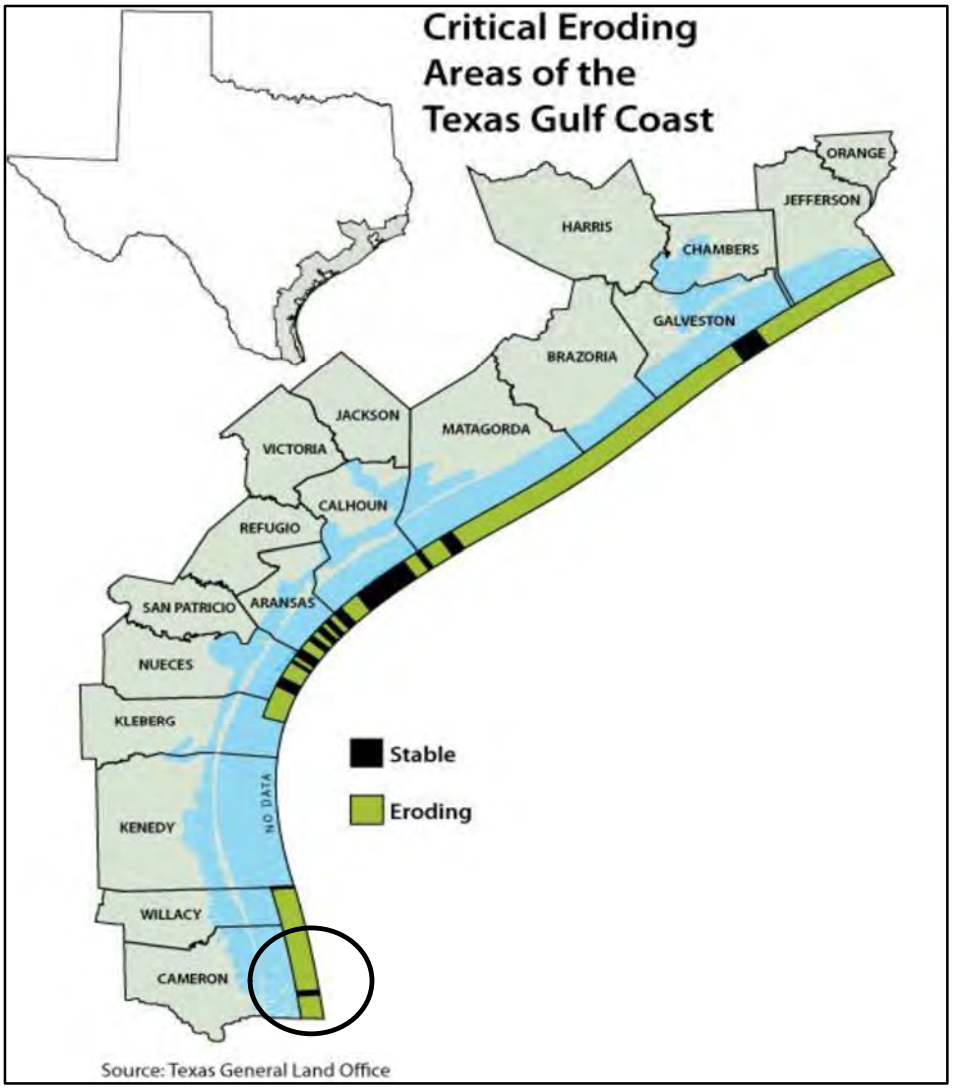
Coastal erosion is the wearing away of land and loss of beach, shoreline, or dune material because of natural coastal processes or manmade influences. Erosion is the process by which large storms, flooding, strong wave action, sea level rise, and human activities wear away beaches and bluffs along coastlines. All beaches are affected by storms and other natural events that cause erosion; however, the extent and severity of the problem differs in different parts of the country. The two major erosion mechanisms are wind and water. Wind that blows across sparsely vegetated or disturbed lands can cause erosion by picking up soil, carrying it through the air, and displacing it in another place. Water erosion occurs over land, and in streams and channels. Major storms can cause coastal erosion from the combination of high winds and heavy surf and storm surge. Human interactions, such as construction and development in coastal and riparian regions, can also exacerbate erosion.

While coastal erosion affects all regions of the United States, erosion rates and potential impacts are highly localized. Average coastline recession rates of 25 feet per year are not uncommon on some barrier islands in the Southeast. Texas has one of the longest coastlines in America coupled with some of the highest rates of coastal erosion in the nation. Sixty-four percent of the Texas coast is eroding at an average of 6 feet per year, with an overall average rate of 4.1 feet per year for the 367 miles of Texas coast, according to the Texas General Land Office. However, some locations are losing more than 30 feet per year. Coastal erosion can have long-term economic and social consequences.

LOCATION

While the Cameron County planning area is considered a coastal community, only one of the participating jurisdictions is located directly on the coast and is subject to coastal erosion. Portions of Cameron County (South Padre Island) are vulnerable to threats directly related to coastal erosion resulting from extreme hazards such as hurricane and tropical storm events. The most common time for such extreme storm events to impact the planning area is from June to November, the official Atlantic U.S. hurricane season.

Figure 16-1. Location of Jurisdiction at Risk for Coastal Erosion

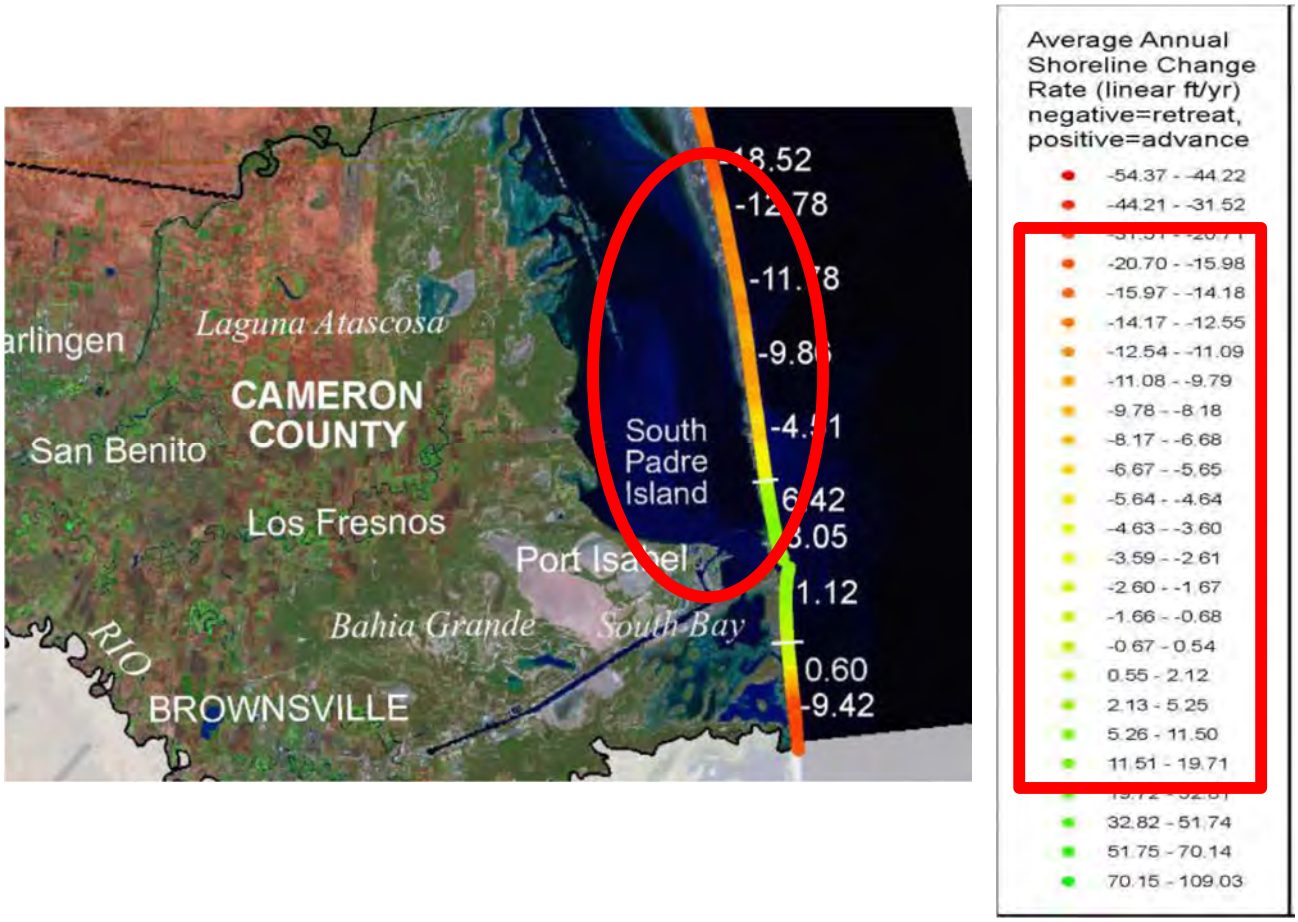


EXTENT

Cameron County is vulnerable to the effects of coastal erosion from the Gulf of Mexico. The county's barrier island has no stable (vegetated) dunes in the area located as close to the mean low water (MLW) line. Through experience it has proven that barrier island development imposes risks on private property owners, investors, and to taxpayers statewide. The average rate of retreat or extent of coastal erosion is estimated between 3 and 12 feet per year for the area according to the study for the Erosion Protection Dune System (EPDS)[1].

[1] Cameron County Erosion Analysis, Study of Future Shoreline Change and Public Cost Implications of Beachfront Development, Texas General Land Office, 2013

Figure 16-2. Critical Eroding Areas, South Padre Island



HISTORICAL OCCURRENCES

Previous occurrences for coastal erosion are not reported by the NCEI. In addition, local governments do not typically have the capabilities to monitor or report statistical data for coastal erosion for a specific event. Coastal erosion is typically measured as an average annual shoreline change rate in linear feet. While the Cameron County planning area does not record historical coastal erosion rates per event, the 2013 Texas Hazard Mitigation Plan depicts coastal erosion occurrences for the Cameron County Planning Area, including the barrier island, South Padre Island (Table 16-2).

Table 16-2. Historical Coastal Erosion Rates, Cameron County[2]

JURISDICTION	GULF SHORELINE	BAY SHORELINE	CRITICAL EROSION	EROSION RATES
Cameron County	166,320 ft	1,145,760 ft	147,840 ft	-2 to -25 ft/yr

[2] State of Texas Mitigation Plan Update 2013 Page 126 as reported by the Texas General Land Office

PROBABILITY OF FUTURE EVENTS

Due to data limitations, the planning team relied on available studies and research as well as the Texas State Hazard Mitigation Plan to determine coastal erosion probability. According to Texas General Land Office (GLO) the average coastal erosion rate for Cameron County, South Padre Island, is between 3 and 12 feet per year with an average of approximately 6 feet per year. This rate supports a highly likely probability of future events, with an event probable in the next year.

VULNERABILITY AND IMPACT

The barrier island known as South Padre Island in Cameron County is continuously subject to coastal erosion, as all barrier islands are. While usually a slow-evolving hazard, coastal erosion presents a serious threat to this portion of Cameron County. As a densely-populated barrier island, any loss of land equates to an increase in the areas vulnerability to hurricanes, coastal storms and above-average tidal events. When the land lost is beach that provides valuable protections from these coastal storm events, that loss results in greater vulnerability.

The rate of the coastal erosion for the island is typically offset by continuous and aggressive community planning to protect the island assets including critical structures and infrastructure. However, the very nature of a barrier island makes it prone to erosion as detailed in the sections above. While it is critical to employ mitigation techniques to protect the assets of the community, it is equally critical to regulate future development to reduce the risk of future losses. While erosion is a continuous threat, aggressive planning and regulations have ensured limited damages to the island structures and infrastructures resulting from erosion. Extreme building codes have been adopted along with restrictions on development to preserve open space and protect the barrier system while enhancing economic development and growth.

The vast majority of beachfront properties in Cameron County are developed, including bulkheads along the historical building line. The area, including its public infrastructure and private property, is vulnerable to the effects of beach erosion. Protection of the built environment landward of the beach from damage caused by coastal storms is dependent upon the maintenance of a healthy, continuous dune system. The South Padre Island Erosion Response Plan provides and annual cost estimate of $400,000 for beach nourishment to protect structures and infrastructure from the effects of coastal erosion.

The potential severity of impact from coastal erosion for the Cameron County planning area is classified as limited, meaning minor quality of life is lost and shutdown of critical facilities; services are loss less than 24 hours; and less than 10 percent of property would be destroyed or have major damage.

ASSESSMENT OF IMPACTS

Coastal erosion events have the potential to pose a significant risk to structures, infrastructure and the local economy. Impacts to the planning area can include:

- Structures and infrastructure can be damaged or destroyed. Extreme erosion, typically resulting from a significant storm event, may result in uninhabitable parcels where structures cannot be rebuilt.
- Coastal communities may suffer substantial damage, requiring immediate shelter and long term displacement assistance.

- Damaged bridges in and out of Bayview and South Padre Island (Causeway) could prevent or delay emergency response, strand or prevent entry of tourists, commuters, supply delivery, or goods and services for extended periods.
- Coastal erosion may dramatically prohibit rebuilding and recovery efforts.
- Beaches may be less desirable, reducing tourism and negatively impacting the economy.
- 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 coastal erosion may be negatively impacted while access roads or beach front properties are repaired.

The economic and financial impacts of coastal erosion 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 reduction of coastal erosion impacts.

SECTION 17: MITIGATION STRATEGY

Mitigation Goals 1
Goal 1 1
Goal 2 1
Goal 3 2
Goal 4 2
Goal 5 2

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 2015 Plan. At the Mitigation Workshop in June 2020, Planning Team members reviewed the mitigation strategy from the previous 2015 Plan. The consensus among all members present was that the strategy developed for the 2015 did not require changes, as it identified overall improvements to be sought in the Plan Update, but the order of the goals has been altered.

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/town 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.

SECTION 18: PREVIOUS ACTIONS

Summary 1
Cameron County – County Wide Actions 2
Cameron County 14
City of Harlingen 38

SUMMARY

Planning Team members were given copies of the previous mitigation actions submitted in the 2015 Plan at the mitigation workshop. Participating jurisdictions within Cameron 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 2015 Plan are included in this section as they were written in 2015, with the exception of the "2021 Analysis" section. The City of Palm Valley was not a participant within the last plan, therefore there are no past actions for their review.

CAMERON COUNTY – COUNTY WIDE ACTIONS

	Cameron County-Wide (Previous Action) #1
Proposed Action:	Secure Memorandum of Understanding (MOU) with Lower Rio Grande Flood Control agency regarding potential dam and levee failure of upstream flood control system.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County and City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce potential dollar losses and loss of life from Dam Failure from Anzalduas Dam and Falcon Reservoir.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on New/Existing Buildings:	Prevent or minimize flood damage to structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	Lower Rio Grande Water User fee
Lead Agency/Department Responsible:	LRGFC, Cameron County Emergency Management
Implementation Schedule:	2014-2019
Incorporation into Existing Plans:	Emergency Response Plan, Emergency Management Plan, Partnering agreements

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		Cameron County-Wide (Previous Action) #2
	Proposed Action:	Develop and implement a public education program for evacuating residents downstream of the Lower Rio Grande Flood Control system in the event of dam or levee failure.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and City of Harlingen
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce loss of life from Dam Failure from Anzalduas Dam and Falcon Reservoir.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on New/Existing Buildings:	Prevent or minimize flood damage to structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$25,000
Potential Funding Sources:	Lower Rio Grande Water User fee
Lead Agency/Department Responsible:	LRGFC, Cameron County Emergency Management
Implementation Schedule:	2014-2019
Incorporation into Existing Plans:	Emergency Response Plan, Emergency Management Plan, Partnering agreements

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		Cameron County-Wide (Previous Action) #3
	Proposed Action:	Construct a regional retention facility to reduce runoff and flooding for City of Harlingen and Cameron County, and capture secondary water supply for future drought events.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	South of Hickory Hills subdivision, White Ranch, and Mariposa area
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Mitigate flooding and damage/displacement of residents.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Projects

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm, Drought
Effect on New/Existing Buildings:	Reduce potential flooding of adjacent structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000,000
Potential Funding Sources:	Grants, HMGP
Lead Agency/Department Responsible:	County Engineering Dept.
Implementation Schedule:	3-5 years
Incorporation into Existing Plans:	Stormwater Management Plan, Floodplain Mgmt. Plan, partnering agreements

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		Cameron County-Wide (Previous Action) #4
	Proposed Action:	Develop and implement a Master Flood Protection Plan for Cameron County Drainage District No. 5 to construct drainage features to mitigate flooding such as levees, widening, constructing channels, and detention ponds.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Encompassing most of the cities of Harlingen, Primera, and Combes
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce flood risk to people and parcels
	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, Hurricane Wind, Dam Failure
Effect on New/Existing Buildings:	Reduction of damage to new and existing buildings
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	Local Revenue, Drainage fees
Lead Agency/Department Responsible:	Cameron County Drainage District No. 5
Implementation Schedule:	2014
Incorporation into Existing Plans:	Stormwater Management Plan, Comprehensive Land Use, Flood Management Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		Cameron County-Wide (Previous Action) #5
	Proposed Action:	Conduct an NFIP public education program regarding availability of flood insurance, and promoting NFIP flood insurance protection.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and City of Harlingen
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduction of lives lost in the event of a levee failure, flood insurance protection of structures
	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, Thunderstorm
Effect on New/Existing Buildings:	Financial protection in the event of flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$10,000 - $50,000
Potential Funding Sources:	General Revenues and Grants
Lead Agency/Department Responsible:	Cameron/Harlingen Floodplain Coordinator
Implementation Schedule:	2014-2015
Incorporation into Existing Plans:	Flood Ordinance, Flood Management Plan, Community Rating System

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		Cameron County-Wide (Previous Action) #6
	Proposed Action:	Conduct a public information campaign regarding hurricane and flood preparedness.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and City of Harlingen
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduction of lives and property lost during flood and hurricane events.
	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
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	410,000 - $20,000
Potential Funding Sources:	Grants, General Revenues
Lead Agency/Department Responsible:	County/City of Harlingen Emergency Management
Implementation Schedule:	2014
Incorporation into Existing Plans:	Flood Management Plan, Emergency Operation Plan, Emergency Response Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

	Cameron County-Wide (Previous Action) #7
Proposed Action:	Join the FIREWISE program.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County and City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce fire fuels and mitigate wildfire and urban fire potential.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Protect structures by reducing fire fuels around structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,000
Potential Funding Sources:	Texas Forest Service
Lead Agency/Department Responsible:	Fire Departments
Implementation Schedule:	2014
Incorporation into Existing Plans:	Emergency Management Plan

2021 ANALYSIS
Completed.

SECTION 18: PREVIOUS ACTIONS

		Cameron County-Wide (Previous Action) #8
	Proposed Action:	Work with South Padre Island to implement an evacuation plan for the proposed bridge connecting the mainland to South Padre Island.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Site of bridge undetermined
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce loss of lives during evacuation, particularly during a hurricane event and peak season.
	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:	Hurricane Wind
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$25,000
Potential Funding Sources:	HMGP, Local Revenue
Lead Agency/Department Responsible:	County/City of Harlingen Emergency Management
Implementation Schedule:	2016-2017
Incorporation into Existing Plans:	Emergency Management Plan, Emergency Response Plan, Evacuation Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		Cameron County-Wide (Previous Action) #9
	Proposed Action:	Construct a bridge connecting the mainland to South Padre Island.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Site of bridge undetermined
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce loss of lives during evacuation, particularly during a hurricane event and peak season.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Portion of proposed $16 - $20 million project
Potential Funding Sources:	HMGP, Local Revenue
Lead Agency/Department Responsible:	County/City of Harlingen Emergency Management
Implementation Schedule:	2016-2017
Incorporation into Existing Plans:	Emergency Management Plan, Emergency Response Plan, Evacuation Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update. Increase estimated cost to $40 million.

SECTION 18: PREVIOUS ACTIONS

	Cameron County-Wide (Previous Action) #10
Proposed Action:	Install color-coded street signs in evacuation zones throughout Cameron County, Harlingen, and other participating communities.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County and City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Assist in expediting evacuation of residents in the event of natural disaster, dam failure, reduce loss of lives.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Wildfire, Dam Failure
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	General Revenues and Grants
Lead Agency/Department Responsible:	Cameron/Harlingen Floodplain Coordinator
Implementation Schedule:	2014-2015
Incorporation into Existing Plans:	Annual Budget, Emergency Response Plan, Evacuation Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

	Cameron County-Wide (Previous Action) #11
Proposed Action:	Conduct an educational program for residents on evacuation zones and location of shelters in conjunction with installing color-coded street signs.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County and City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Assist in expediting evacuation of residents in the event of natural disasters; reduce loss of lives.
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, Wildfire, Dam Failure
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	General Revenues and Grants
Lead Agency/Department Responsible:	Cameron/Harlingen Floodplain Coordinator
Implementation Schedule:	2014-2015
Incorporation into Existing Plans:	Emergency Response Plan, Evacuation Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		Cameron County-Wide (Previous Action) #12
	Proposed Action:	Upgrade building codes and ordinances to require increased freeboard for new construction in areas of flood inundation as a result of dam failure and levee breach upstream of the Cameron County planning area.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Unincorporated Cameron County and City of Harlingen
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce flood risk to people and parcels by elevating new construction.
	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, Hurricane, Wind, Dam Failure
Effect on New/Existing Buildings:	Reduction of damage to new buildings
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	Local Revenue, Drainage fees
Lead Agency/Department Responsible:	Building Code and Inspection Dept.
Implementation Schedule:	2016
Incorporation into Existing Plans:	Stormwater Management Plan, Comprehensive Land Use, Flood Management Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

CAMERON COUNTY

	Cameron County (Previous Action) #1
Proposed Action:	Flood proof basement of the County Emergency Management Office by incorporating Floodproofing components that my include floodwalls, small localized levees, pumps, berms around buildings, or a combination thereof.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Dancy Bldg. 1100 E. Monroe, Brownsville, TX 78520
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce impact of flooding on first responder and emergency operations, ensure continuance of critical operations during flood event; reduce cost to repair and maintain structure following a flood event.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce cost to repair and maintain structure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$500,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Emergency Management office
Implementation Schedule:	2014-2020
Incorporation into Existing Plans:	Emergency Operations Plan, Floodplain Mgmt. Plan, Flood Response Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update. $200,000 EOC upgrades for equipment and technological equipment upgrades.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #2
	Proposed Action:	Install temporary cooling stations at county facilities to aid low income and elderly residents during extreme heat events.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County facilities: San Benito Annex (Health Dept.), Isla Blanca Park/Recreation Center, Dancy Building, Lucio Clinic, and possible other sites
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce health risk, loss of life to a segment of population without air-conditioning
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000
Potential Funding Sources:	HUD grant/CDBG/HMGP
Lead Agency/Department Responsible:	County Health and Hospital Authority
Implementation Schedule:	1-3 Years
Incorporation into Existing Plans:	Emergency Operations Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update. Increase estimated cost to $50,000.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #3
	Proposed Action:	Install hail guards on A/C units for all Cameron County critical facilities.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County critical facilities
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Increase efficiency of units by minimizing debris damage, reduce electrical costs, reduce health risk from overheating units unable to properly cool buildings.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail
Effect on New/Existing Buildings:	Retrofit and protect all buildings
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	County maintenance dept.
Implementation Schedule:	2014
Incorporation into Existing Plans:	Emergency Operations, Continuity of Operations Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #4
	Proposed Action:	Relocate the Emergency Operations Center (EOC) to an existing county structure at a higher elevation and retrofit with enhanced wind protection.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County facility
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Ensure essential operations continue and protect residents from all natural hazard and disaster events.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind
Effect on New/Existing Buildings:	Secure EOC structure
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000,000
Potential Funding Sources:	HMGP, Homeland Security grants
Lead Agency/Department Responsible:	Cameron County Emergency Management
Implementation Schedule:	2015-2019
Incorporation into Existing Plans:	Emergency Operations Plan

2021 ANALYSIS
Completed.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #5
	Proposed Action:	Install permanent and mobile back-up generators on county critical facilities.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Critical facilities in county
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Ensures vital services continue to function in an emergency.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind, Flood, Tornado, Thunderstorm, Extreme Heat
Effect on New/Existing Buildings:	Provide back-up power for new and existing buildings in the event of a disaster
Priority (High, Moderate, Low):	High
Estimated Cost:	$300,000
Potential Funding Sources:	General Revenue, Grants
Lead Agency/Department Responsible:	Cameron County Emergency Management
Implementation Schedule:	2014-2015
Incorporation into Existing Plans:	Emergency Operations, Continuity of Operations Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update. Increase estimated cost to $600,000

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #6
	Proposed Action:	Work with General Land Office to develop and implement a dune restoration plan to protect roads and minimize washouts from flooding and tidal surge.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Coastal areas of county
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Prevent County, State, and Federal agencies from having to continually incur repair costs and prevent loss of life and property.
	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:	Hurricane Wind
Effect on New/Existing Buildings:	Continue essential services to structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,000,000
Potential Funding Sources:	State and Federal Grants
Lead Agency/Department Responsible:	Cameron County Parks and Recreation, GLO
Implementation Schedule:	24 months after start date
Incorporation into Existing Plans:	Flood Response Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update. Increase estimated cost to $4 million.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #7
	Proposed Action:	Update the existing Regional Mobility Authority Plan (RMA) to include long-range planning mechanisms.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	The RMA would provide a mechanism for long-range planning, administration and implementation of structural projects to mitigate hazards.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Response Action not funded under federal grant programs

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Hail, Thunderstorm, Tornado, Drought
Effect on New/Existing Buildings:	Reduction of damage for new and existing buildings
Priority (High, Moderate, Low):	High
Estimated Cost:	$16,000,000
Potential Funding Sources:	General Revenues
Lead Agency/Department Responsible:	County Administrator
Implementation Schedule:	2014
Incorporation into Existing Plans:	Annual Budget, Stormwater Plan, Floodplain Management Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #8
	Proposed Action:	Remove debris from beaches that may act as projectiles and damage and exacerbate erosion on shorelines.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Coastal areas of County
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Removing hazardous debris from the beaches will make recreational areas safer and cleaner for the residents of Cameron County
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Preparedness Action not eligible under federal grant programs

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Coastal Erosion, Hurricane Wind, Thunderstorm, Flood, Tornado
Effect on New/Existing Buildings:	Minimize debris that can damage/destroy structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$85,000
Potential Funding Sources:	State or Federal funds, GLO
Lead Agency/Department Responsible:	Parks and Recreation
Implementation Schedule:	2014
Incorporation into Existing Plans:	Emergency Response Plan

2021 ANALYSIS
Completed. Continuous effort.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #9
	Proposed Action:	Survey structures and implement a FEMA buyout for repetitive loss flood prone structures.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Green Valley Farms, Kendall Street, Tio Cano Lake & White Ranch Road area, Iowa Gardens, Laureles Subdivision
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Restore natural flood prone areas, reduce loss to NFIP Program, remove unsafe structures from flood prone areas, reduce loss of lives from flooding.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Remove repetitive loss structures from floodplain
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$15,000,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Floodplain Administrator
Implementation Schedule:	2017
Incorporation into Existing Plans:	Annual Budget, Flood Ordinance, Flood Management Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #10
	Proposed Action:	Work with General Land Office to develop a living coastline constructed from natural materials derived from regional materials such as rock and seagrass.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Laguna Madre area
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce the risk of dune washout.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind
Effect on New/Existing Buildings:	Protect coastal properties
Priority (High, Moderate, Low):	Low
Estimated Cost:	$5 Million
Potential Funding Sources:	State land office grants, HMGP
Lead Agency/Department Responsible:	County Parks & Recreation, TX Parks & Recreation, GLO
Implementation Schedule:	2015-2020
Incorporation into Existing Plans:	Dune Restoration Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #11
	Proposed Action:	Create and implement a wildfire recovery plan to address soil erosion control and vegetative recovery.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Unincorporated areas in county
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce the risk to public health, safety, and welfare; protect natural habitat area.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Minimize wildfire damage to area structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$20,000
Potential Funding Sources:	Grant, General Fund, Texas Forest Service
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	FireWise, Fire Code

2021 ANALYSIS
Delete Action.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #12
	Proposed Action:	Conduct a Public Education Campaign to address extreme heat.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Provides education to the public on the dangers of extreme heat; reduces the risk to public health and welfare.
	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
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$30,000
Potential Funding Sources:	Grant, General fund, CDBG
Lead Agency/Department Responsible:	Health Department, CDBG
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Emergency Operations Plan, County Health Dept. Regs

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #13
	Proposed Action:	Conduct a public education campaign through social media regarding relocating or elevating HVAC and utility systems in and around the home in the event of dam failure.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce risk to public health, safety, and welfare.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on New/Existing Buildings:	Educate residents on protecting structures/evacuation
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$50,000
Potential Funding Sources:	Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Public Information Officer
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Emergency Operations, Evacuation Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	Cameron County (Previous Action) #14
Proposed Action:	Conduct a public education campaign for drought.
BACKGROUND INFORMATION	
Jurisdiction/Location:	County-wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Provide an increase level of preparedness to reduce risk to public health, safety, and welfare, reduce risk to agricultural and wildlife; ensure continued essential water supply.
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
Effect on New/Existing Buildings:	Xeriscape plantings protect exposure of buildings to extreme heat temperatures and drought conditions
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$30,000
Potential Funding Sources:	Grants, General funds
Lead Agency/Department Responsible:	VFD, County Fire Depts.
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	FireWise Plan, County Health Dept. Regs.

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #15
	Proposed Action:	Improve Animal Shelter capability during and following disaster events by expanding capacity, and upgrading and reinforcing county shelter.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County Animal Shelter, 26957 FM 510, San Benito, TX 78586
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce risk to public health, safety, and general welfare to animals and the general public; eliminate displaced animals due to an event.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project not eligible under federal grant programs

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm, Hurricane
Effect on New/Existing Buildings:	Expand and upgrade facility
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,500,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Cameron County Dept. of Health and Human Services
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	FireWise Plan, County Health Dept. Regs; Emergency Plan

2021 ANALYSIS
Completed.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #16
	Proposed Action:	Upgrade codes and regulations to require burying power lines in conjunction with new construction in coastal areas.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and incorporated boundaries along coastline
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce risk to public health, safety, and general welfare.
	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:	Hurricane Wind, Tornado, Flood Thunderstorm
Effect on New/Existing Buildings:	Expand and upgrade existing lines
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,500,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Cameron County Electric Utility
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Emergency Plan, Comprehensive Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

		Cameron County (Previous Action) #17
	Proposed Action:	Upgrade existing wooden power poles to concrete along coastal areas.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and incorporated boundaries along coastline
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk to public health, safety, and general welfare.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind, Tornado, Flood
Effect on New/Existing Buildings:	Expand and upgrade existing lines
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,500,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Cameron County Electric Utility Services
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Emergency Plan, Comprehensive Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #18
	Proposed Action:	Work with General Land Office to implement beach nourishment activities to sustain dune protection from storm surge and erosion.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Laguna Madre area and coastal areas of county
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce the risk of dune washout.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind
Effect on New/Existing Buildings:	Protect coastal properties
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5 Million
Potential Funding Sources:	State land office grants, HMGP
Lead Agency/Department Responsible:	County Parks & Recreation, TX Parks & Recreation, GLO
Implementation Schedule:	2015-2020
Incorporation into Existing Plans:	Dune Restoration Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

	Cameron County (Previous Action) #19
Proposed Action:	Develop and implement a Drought Emergency Plan to protect new and existing buildings during wildfire events.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Unincorporated county areas
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Ensure essential water supplies to protect structures during extreme drought conditions.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce potential fire danger to structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$10,000
Potential Funding Sources:	Texas Forest Service, FireWise
Lead Agency/Department Responsible:	Parks & Recreation
Implementation Schedule:	2016
Incorporation into Existing Plans:	FireWise Plan, Fire Protection Plan

2021 ANALYSIS
Delete Action.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #20
	Proposed Action:	Install shutters on glass windows and doors to protect critical facilities during severe hail and thunderstorm events, hurricane wind, and tornado.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Key critical facilities within county area
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce continued glass replacement and repairs; reduce possible injury to county staff and residents due to flying glass 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 Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Hurricane Wind, Tornado, Thunderstorm
Effect on New/Existing Buildings:	Reduce damage to structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$350,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	2015-2016
Incorporation into Existing Plans:	Emergency Management Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		Cameron County (Previous Action) #21
	Proposed Action:	Become a "StormReady" community to reduce risk and damage caused by hail, tornado, and thunderstorm events.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Unincorporated county
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Assist residents in preparing, mitigating risk to hail, tornado, and thunderstorms.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Tornado, Thunderstorm
Effect on New/Existing Buildings:	Reduce damage to structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	2015-2016
Incorporation into Existing Plans:	Emergency Management Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

	Cameron County (Previous Action) #22
Proposed Action:	Remove dead and downed trees to decrease fire fuels in Wildland Urban Interface (WUI) areas.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Unincorporated county areas
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Natural landform protection and reduce risk of loss of property due to wildfire.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Drought
Effect on New/Existing Buildings:	Reduce potential fire danger to structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$25,000
Potential Funding Sources:	Texas Forest Service, FireWise
Lead Agency/Department Responsible:	Parks & Recreation
Implementation Schedule:	2016
Incorporation into Existing Plans:	FireWise Plan, Fire Protection Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

		Cameron County (Previous Action) #23
	Proposed Action:	Install hail guards on HVAC systems supporting critical facilities and to protect against severe Hail in excess of ½ inch diameter.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Key critical facilities within county area
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce repairs and replacement of costly systems and continue essential service to facilities.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail
Effect on New/Existing Buildings:	Reduce damage to structure/HVAC systems
Priority (High, Moderate, Low):	High
Estimated Cost:	$250,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	2015-2016
Incorporation into Existing Plans:	Emergency Management Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

		Cameron County (Previous Action) #24
	Proposed Action:	Add protective cover to parking areas to reduce damage to county-owned vehicles in the event of hail and thunderstorm events.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Parking facilities within county area
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce repairs and replacement of costly vehicles
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Thunderstorm
Effect on New/Existing Buildings:	Reduce damage to structures/HVAC systems
Priority (High, Moderate, Low):	High
Estimated Cost:	$250,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	2015-2016
Incorporation into Existing Plans:	Emergency Management Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update. Increase estimated cost to $6 million.

CITY OF HARLINGEN

	City of Harlingen (Previous Action) #1
Proposed Action:	Improve drainage systems by expanding capacity through an increase in channel size and culvert size (13th Street Drainage Ditch Improvements).
BACKGROUND INFORMATION	
Jurisdiction/Location:	On the west side of 13th Street from Alcott Avenue north to the North Main Drain outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$750,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Annual Budget, Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Completed.

		City of Harlingen (Previous Action) #2
	Proposed Action:	Improve drainage systems by expanding capacity through an increase in channel size and culvert size (Dixieland Drainage Ditch Improvements).
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	From Lincoln Avenue, between Dixieland Road and Tucker Road, to the outfall at the Arroyo Colorado
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,100,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #3
Proposed Action:	Improve drainage systems by expanding capacity through an increase in culver size (Lipscomb Drainage Ditch Improvements).
BACKGROUND INFORMATION	
Jurisdiction/Location:	Culvert crossing on Louisiana, south of Calle Reina
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses)
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$300,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Completed.

SECTION 18: PREVIOUS ACTIONS

		City of Harlingen (Previous Action) #4
	Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 001).
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	On New Combs Avenue between Pitman and B Street; On First Street between Brentwood and Austin
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$252,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #5
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 002).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From Lincoln and 3rd Street north to Buchanan, west on Buchanan to A Street; from Buchanan and 1st Street, south to Grant; From Grant and A Street to 3rd Street, south to the Arroyo Colorado (outfall)
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,400,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

	City of Harlingen (Previous Action) #6
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 004).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From 9th and Grimes, west on Grimes to 77 Sunshine Strip, west on 77 Sunshine Strip to outfall (3rd Street Ditch); from Marshall and 7th Street, south on 7th to 77 Sunshine Strip; Bowie and 7th Street, north on 7th Street to 77 Sunshine Strip
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,068,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

	City of Harlingen (Previous Action) #7
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 005).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From 9th and Monroe, south on 9th to Pierce, east on Pierce to 11th Street, south to canal and east along canal to tie into existing system; from 13th and Tyler south to Pierce, west to 11th Street to tie into system
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,920,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Under Construction.

SECTION 18: PREVIOUS ACTIONS

	City of Harlingen (Previous Action) #8
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 007).
BACKGROUND INFORMATION	
Jurisdiction/Location:	Along 21st St North of Theresa south tying into Washington then west about 750'; from that same tie in on Washington south to Jefferson outfall; from Van Buren along 21st St North to Jefferson outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,212,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		City of Harlingen (Previous Action) #9
	Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 008).
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	From intersection of Haine and Treasure Hills running northward along 25th slightly north of Becky; from Treasure Hills and 25th fork east along Treasure Hills slightly past Treasure Hills Cir then NW crossing over into outfall
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$780,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		City of Harlingen (Previous Action) #10
	Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 012).
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	From existing 30: on Alcott St eastward onto 13th St outfall
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$162,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		City of Harlingen (Previous Action) #11
	Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 013).
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	South of Arroyo Vista Cir heading North to opposite curve then NW to outfall
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$180,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		City of Harlingen (Previous Action) #12
	Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 017).
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Along Beck from New Combes outfall west about 250’
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$90,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #13
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 021).
BACKGROUND INFORMATION	
Jurisdiction/Location:	Adams from A St to 3rd St; Jefferson from A St to 3rd St then south on 3rd to Madison; A street from Monroe Ave to Van Buren then along Commerce about 200'; 5th from Van Buren south to Commerce; 7th from Polk south to Commerce
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,680,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		City of Harlingen (Previous Action) #14
	Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 022).
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	1st St from existing on Davis south to Williamson
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$156,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #15
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 023).
BACKGROUND INFORMATION	
Jurisdiction/Location:	Marjory from Kelly to Dennis; Kelly from existing on Davis north about 600'; Davis from existing about 750' eastward then south about 270' then eastward about 60' to outfall; On Pickens from the corner east of Kelly about 800' to the outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$780,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #16
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 027).
BACKGROUND INFORMATION	
Jurisdiction/Location:	Buchanan from A St westward past F St; Lincoln from D St eastward to B St; Grant Ave from E St to A St; Roosevelt from D St to B St then North slightly past Cleveland
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,560,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

	City of Harlingen (Previous Action) #17
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 100).
BACKGROUND INFORMATION	
Jurisdiction/Location:	South side of Ed Carey from existing south of Haine north 1,875' cross over NW about 200' to tie into existing then north 1,750' to tie into 77 Sunshine , branch off SE about 200' to cross over Ed Carey then north about 500' to tie into existing. From previous existing on 77 head north about 3,500' then cross over NE and tie into existing; from existing on Benwood about 150' north to Hiane drive
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,868,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #18
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 102).
BACKGROUND INFORMATION	
Jurisdiction/Location:	About 3660' west from emerald lake and Ted St intersection; from the same intersection north along emerald lake about 270; then east about 150' to outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$516,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		City of Harlingen (Previous Action) #19
	Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 103).
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	From intersection of Encino and Regency about 720' east to out fall; from intersection of Euno and Hoogland east about 600' to tie into existing
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$276,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #20
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 105).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing north of U St east about 1,020' to tie into existing then south then south about 1,100' to tie into existing; then east about 660'to tie into existing; from existing of Fair Park Blvd and O St SW about 720' the west about 300'
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,320,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

	City of Harlingen (Previous Action) #21
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 112).
BACKGROUND INFORMATION	
Jurisdiction/Location:	To replace existing 24” pipe with 36” pipe on Haine Drive North of Whalen to outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$264,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #22
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 113).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing north of Haine drive and FM 509 intersection west about 240' crossing over FM 509 the SW about 120' then west along Haine Drive about 240'
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$138,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #23
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 115).
BACKGROUND INFORMATION	
Jurisdiction/Location:	North side of Houston St about 80'west of Falcon heading south about 80' then east to out fall; branch off that pipe at about 360' NW about 80' crossing over Houston; starting about 120' west of Falcon on Hale heading east to outfall; From NW corner of Sesame Circle heading NW about 120' then north about 160' then east about 20' to outfall; From NE corner of Live Oak heading SW about 120' then east 240' then NW about 240' to outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$792,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #24
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 122).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing MH on NW corner of Jacaranda and Willowicke SE about 70' then SW about 550'
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$138,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #25
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (System 123).
BACKGROUND INFORMATION	
Jurisdiction/Location:	Starting about 150' from the back of curb on Monroe near 25th St then north about 60' then West to outfall; on North side of Jackson near 25th from existing west to outfall; starting about 150' from the back of curb on Van Buren near 25th St then north about 60' then West to outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$108,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #26
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 124).
BACKGROUND INFORMATION	
Jurisdiction/Location:	On 5th from Monroe to Van Buren; on 13th from existing on Jefferson to Harrison Ave then east about 450'; from existing on Jefferson at intersection of Jefferson and 10th heading west along Jefferson to existing slightly east of 3rd St; from existing on Jefferson at the intersection of Jefferson and 6th north along 76 drive to existing east of Sul Ross
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,280,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #27
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (System 127).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing on the NW of Estrellita heading SW about 340' crossing Lamb then slightly NW about 180' then SW to outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$156,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		City of Harlingen (Previous Action) #28
	Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 132).
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	From existing on Calle Princesa about 450' behind the houses then slightly SW about 300' then about 210' then slightly SW to outfall
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$480,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #29
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 135).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing at the intersection of Matz and Breedlove heading west about 1,300' slightly past Rose; from the intersection of Matz and Breedlove north about 650' then east about 550'
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$660,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #30
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 139).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing on Marshall heading west about 240' then SW to south corner of Marshal and 13th then south 1,020' then east 120' then south about 300' then to follow 77 Sunshine curve till corner south of Washington then SE about 120' then south to Jefferson outfall; From intersection on Crockett Ave and && Sunshine Strip along && to Austin then east to 13th St; from existing at the intersection of Morgan Blvd and Chaparral west about 900' to tie into the proposed following along 77 Sunshine Strip curve
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,280,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #31
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 141).
BACKGROUND INFORMATION	
Jurisdiction/Location:	Start on Warren St then to follow Morgan Blvd heading south slightly to tie into existing storm sewer east of Morgan, High St east to Morgan Blvd Grimes south on 21st St to run along Citrus Terrace to Bowie, On Austin St from 25th St west half the street distance towards 21st St Susan St from 25th St to Whitehouse 25th St from Washington to Jefferson (existing)
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,560,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #32
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 142).
BACKGROUND INFORMATION	
Jurisdiction/Location:	Along 77 Sunshine Strip NW slightly past Markowsky to tie into existing, then north to cross 77, then SE to G St then North along G St two-thirds of the street distance. On Orange Heights from existing Eastward to tie into existing on 1St St. On 77 from existing on intersection of 1St and 77 NW to tie into existing on 77
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$960,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #33
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 145).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing on the intersection of Jones St and Sam Houston in between the houses to run slightly NW along alley way crossing Lamar till the alley ends
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$360,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #34
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 148).
BACKGROUND INFORMATION	
Jurisdiction/Location:	New Hampshire Rd south of Bus 77 from the halfway point south to railroad tracks, from one safety end treatment to the other, then north on the opposite side of New Hampshire Rd to water entrance
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$300,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		City of Harlingen (Previous Action) #35
	Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 149).
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	End of Oregon St from the existing storm sewer north 2/3 length of the street towards Bus 77
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$252,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #36
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 153).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing storm sewer West of Rose St running through the subdivision North to tie into the existing on Loop 499
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$132,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #37
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 154).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing on Dilworth south about 500 ft.
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$120,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #38
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 157).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing located across Quail Run to cross Emerald Lake and end south of Quail Run opening the run across Quail Run opening
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$30,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #39
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 158).
BACKGROUND INFORMATION	
Jurisdiction/Location:	Along La Vaca from Colorado to Rangerville then turn north along Rangerville Rd to tie into existing south of Knox
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$516,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #40
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 159).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing on Rangerville Rd and Ponderosa intersection south 900 ft. from that same intersection west to Arroyo Colorado(outfall), from existing across Rangerville in front of Ponderosa straight through Outpatient clinic to back parking lot then run through across parking lot to field
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$180,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #41
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 161).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing on Davis and 7th St intersection to run south along 7th St and tie into existing in front of Calvary Baptist Church
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 240,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #42
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 200).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From outfall to run in between houses crossing Ebony Rd and Cenizo Rd to the alley between Cenizo Rd and Lantana Rd
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$ 240,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #43
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 204).
BACKGROUND INFORMATION	
Jurisdiction/Location:	250ft east of Hand Rd from the outfall north of Roosevelt Rd north across Lazy Palms Drive S then NE about 50ft
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$ 480,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #44
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 206).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing on S Sesame Cir cross about 60ft then south about 300 feet the head west to outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 180,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		City of Harlingen (Previous Action) #45
	Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 207).
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	From existing east of Kratzer St north about 300ft to tie into the existing east of Burke Ct
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$ 120,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #46
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 216).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing north of Harrison on the intersection of Harrison and Bus 77 crossing Bus 77 westward to tie into existing manhole From existing MH on the intersection of Tyler (west of 77) and Bus 77 to head south to the intersection of Filmore Ave and 77 then 80ft west then south to the outfall near Little Creek
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$ 600,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #47
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 224).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing off US Highway 77east 300' along north side of Fair Park Blvd then south about 200' then east about 300' to cross T St then north crossing over Fairpark Blvd to the corner
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 276,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #48
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 227).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing safety end treatment located in front of L&F Distributers headed east about 270' to tie into existing storm sewer
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$ 60,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #49
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 229).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From Tamm Lane N of USH 83 to run east about 700' to tie into existing, opposite of that existing to start proposed along US Highway 83 past Stuart Place Rd about 1000' then NE to outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$ 3,000,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #50
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 230).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing on US Bus 83 and Harrison Ave 240'west to existing across US 77 Frontage then south about 380' then east about 380' to tie into existing
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$ 276,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #51
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 233).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From corner block of the intersection on north side of Vinson and 77 Sunshine Strip following 77 Sunshine southward to existing sewer system
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses)
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$ 372,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #52
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 234).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing on Austin Ave (west of Ed Carey, north of the fields) 500' to the west slightly past Sonesta Drive
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	Low
Estimated Cost:	$ 138,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		City of Harlingen (Previous Action) #53
	Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 237).
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	From existing on Beck St east of 3rd heading east to about 275' to the outfall
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 72,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #54
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 244).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing MH on Adam's Crossing between Karis Drive and Gabriel's Landing about 550' east then north about 500' to cross Christian Drive
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 360,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #55
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 245).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing on the north side of Summerfield at the intersection of Summerfield and 13th street heading NW crossing 13th St to the outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 48,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #56
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 247).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing 30“ on Mark Cir east of Thomas about 330’ east crossing E Mark Cir then heading south about 150’; from existing 36” pipe North of Leggett about 1,000’ to outfall tying into each 18” pipe along the way; off the opposite end of the same 36” pipe North of Leggett about 210’ west to tie into existing 30” sewer system
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 660,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #57
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 248).
BACKGROUND INFORMATION	
Jurisdiction/Location:	East of Country Drive on 7th St from existing 36" pipe south about 80' to tie into existing; opposite end of that existing south about 140' to tie into existing 30" pipe coming off Tumbleweed; from that point about 200' south to tie into existing 42" pipe; opposite end of that 42" pipe about 220' south to the corner on Matz Ave; then west along Matz about 1,000' then cross over NW about 400' to outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 900,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #58
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 251).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From Breedlove straight across from Hoogland about 1500' north towards Loop 499 then across Breedlove behind the homes about 1,350' to the outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 840,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #59
Proposed Action:	Improve the existing drainage systems by increasing the capacity of the drainage pipes and replacing the inlets and manholes (Drainage System 252).
BACKGROUND INFORMATION	
Jurisdiction/Location:	From existing 18" pipe south of Sun Chase Drive east about 420' to tie into existing MH then about 60' NE crossing Sunnyside Drive then about 660' NE to Stuart Place Main Drain (outfall)
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	Reduce drainage problems and potential flooding
Priority (High, Moderate, Low):	High
Estimated Cost:	$300,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #60
Proposed Action:	Develop and implement a Public Education Campaign to address extreme heat. Develop a city web page with information regarding location of cooling stations, develop and distribute brochures in English and Spanish. Create and give presentations at local schools, daycares (adult and child), mobile home parks, public housing, boys & girls clubs. Involve care for pets in extreme heat and drought conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Provides education to the public on the dangers of extreme heat; reduces the risk to public health and welfare.
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
Effect on New/Existing Buildings:	None
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$30,000
Potential Funding Sources:	Grant, General fund, CDBG
Lead Agency/Department Responsible:	Health Department, CDBG
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Partnering agreements with city depts.

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #61
Proposed Action:	Expand artificial grass project in landscaped medians to include other areas within public right-of-ways.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Various locations throughout the city
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Product has 15 year life span without need to irrigate medians; product is fire retardant, drought and heat-resistant, eliminates city personnel replacing grass following hurricane, tornado, or flood.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project not eligible for federal grant programs

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Wildfire, Hurricane Wind, Tornado, Flood
Effect on New/Existing Buildings:	None
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$7,230,000
Potential Funding Sources:	Grants, general funds, partnerships
Lead Agency/Department Responsible:	Public Works, Engineering Department
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Water District Plan, Harlingen Proud Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #62
Proposed Action:	Join the Community Rating System Program.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City Wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk to public health, safety, and welfare; increase awareness and regulations.
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
Effect on New/Existing Buildings:	Promote flood insurance and minimize flooding through higher regulatory standards
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$50,000
Potential Funding Sources:	Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Flood Plan, NFIP Ordinance

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #63
Proposed Action:	Increase drainage capacity of the retention ponds in the Treasure Hills area.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Treasure Hill area within Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce damage to critical infrastructure (streets and drainage system); reduce risk to public health, safety, and welfare.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,000,000
Potential Funding Sources:	Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

		City of Harlingen (Previous Action) #64
	Proposed Action:	Develop and implement a plan to construct Cooling Centers throughout the City of Harlingen.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Community centers, shelters, public buildings, library
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Provides an implementation method(s) for reducing and educating the public on the dangers of extreme heat and drought; reduces the risk to the public health and safety.
	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
Effect on New/Existing Buildings:	None
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$30,000
Potential Funding Sources:	Grants, donations, CDBG
Lead Agency/Department Responsible:	Health Department, Public Buildings
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Emergency Operations, Partnering Agreements with city depts.

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

		City of Harlingen (Previous Action) #65
	Proposed Action:	Develop and implement a Drought Mitigation Plan.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City limits and surrounding communities for implementation
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Provides an increase level of preparedness to reduce risk to public health, safety, and welfare, reduce risk to agricultural and wildlife; ensure continued essential water supply.
	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
Effect on New/Existing Buildings:	Xeriscape plantings protect exposure of buildings to extreme heat temperatures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$30,000
Potential Funding Sources:	Grants, General funds
Lead Agency/Department Responsible:	Public Works, Planning Department
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	FireWise, Water Utilities

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #66
Proposed Action:	Upgrade and expand access roads used during wildfire events.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City wide with primary focus on the area around the Arroyo Colorado and birding centers
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce the risk to public health, safety, and welfare; reduce damage to wildlife habitats when responding to emergencies.
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
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$20,000
Potential Funding Sources:	Grant, General Fund, Texas Forest Service
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	FireWise, Wildfire Recovery Plan, Emergency Mgmt. Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #67
Proposed Action:	Improve Baker Potts roadway for access into subdivisions in all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Baker Potts from Business 83 to Drury Lane
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improvement of caliche/dirt roadway to a 37' B-B curb & gutter road to allow all weather access of emergency response vehicles and allow for evacuations, eliminate ongoing roadway repairs due to flooding.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm
Effect on New/Existing Buildings:	Reduce threat of flooding for new/existing construction
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,000,000
Potential Funding Sources:	Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #68
Proposed Action:	Implement bi-annual or annual program to remove overgrown and dead brush from undeveloped/vacant land, city parkland.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce the risk to public health, safety, and welfare; reduce fuel for wildfire on vacant land or ranch land.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$80,000
Potential Funding Sources:	Grant, General Fund, Texas Forest Service
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	FireWise, Wildfire Response Plan, Parks/Rec. Regs.

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #69
Proposed Action:	Improve Dilworth Bridge crossing for access into subdivisions in all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Improvement of bridge crossing to ensure safety for vehicles crossing drainage ditch; ensures access of responding vehicles to areas; provides for evacuation route.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm
Effect on New/Existing Buildings:	Minimize flooding to area structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$800,000
Potential Funding Sources:	Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update. Increase estimated cost to $1.4 million.

	City of Harlingen (Previous Action) #70
Proposed Action:	Improve Drury Lane roadway for access into subdivisions in all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Drury Lane from Beckham Road to Tamm Lane
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improvement of caliche/dirt roadway to a 37' B-B curb & gutter road to allow all weather access of emergency response vehicles and allow for evacuations, eliminate ongoing roadway repairs due to flooding.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm
Effect on New/Existing Buildings:	Minimize flooding to area structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$3,000,000
Potential Funding Sources:	Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 18: PREVIOUS ACTIONS

		City of Harlingen (Previous Action) #71
	Proposed Action:	Improve and upgrade the Emergency Operations Building.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Fire Station #3 on Loop 499
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Provides for continuation of critical operations during emergency events.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm, Tornado, Hail, Wildfire, Dam Failure
Effect on New/Existing Buildings:	Reduce impact on critical facility in natural disasters
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,500,000
Potential Funding Sources:	Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Emergency Operation Plan

2021 ANALYSIS
Completed.

		City of Harlingen (Previous Action) #72
	Proposed Action:	Conduct a public education campaign in the event of a necessary evacuation.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City wide
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce risk to public health, safety, and welfare.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood, Hurricane Wind, Tornado, Wildfire
Effect on New/Existing Buildings:	Educate residents on protecting structures pre-disaster
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$50,000
Potential Funding Sources:	Grant, General fund
Lead Agency/Department Responsible:	Public Works, Engineering, Public Information Officer
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Emergency Operations Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #73
Proposed Action:	Work with area agencies to develop and implement evacuation / shelter-in-place plan (pre & post) to address multiple hazards.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce risk to public health, safety, and welfare.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood, Hurricane Wind, Tornado, Wildfire
Effect on New/Existing Buildings:	Retrofit and protect structures for shelter in place
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$30,000
Potential Funding Sources:	Grant, General fund
Lead Agency/Department Responsible:	Public Works, Engineering Department, Emergency Management Coordinator,
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Emergency Operations Plan, Evacuation Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #74
Proposed Action:	Install mobile and permanent generators at critical facilities.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Critical facilities within the City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Services will continue to function in the event of an emergency.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Tornado, Thunderstorm, Hail
Effect on New/Existing Buildings:	Would provide backup power to existing building used for city services, evacuation centers, and/or staging areas
Priority (High, Moderate, Low):	High
Estimated Cost:	$200,000 - $300,000 each generator
Potential Funding Sources:	Grant, General funds
Lead Agency/Department Responsible:	Public Works, Public Buildings, Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Emergency Operations Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #75
Proposed Action:	Install hail guards on HVAC systems supporting critical facilities and to protect against severe Hail in excess of ½ inch diameter.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Key critical facilities within city
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce repairs and replacement of costly systems and continue essential service to 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:	Hail
Effect on New/Existing Buildings:	Reduce damage to structures/HVA C systems
Priority (High, Moderate, Low):	High
Estimated Cost:	$250,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	2015-2016
Incorporation into Existing Plans:	Emergency Management Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #76
Proposed Action:	Improve Hughes Road roadway for access into subdivisions in all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Hughes Road from Tamm Lane west to F.M. 800 Bass Boulevard
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improvement of caliche/dirt roadway to a 37' B-B curb & gutter road to allow all weather access of emergency response vehicles and allow for evacuations, eliminate ongoing roadway repairs due to flooding.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm
Effect on New/Existing Buildings:	Minimize flooding to area structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,000,000
Potential Funding Sources:	Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #77
Proposed Action:	Improve Lipscomb Road roadway for access into subdivisions in all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Lipscomb Road from Rangerville Road (F.M. 1479) east to Ed Carey (F.M. 801)
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Improvement of roadway from caliche/dirt to 37' B-B curb & gutter to allow all weather access of emergency response vehicles and allow for evacuations, eliminate ongoing roadway repairs due to flooding.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm
Effect on New/Existing Buildings:	Minimize flooding to area structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,600,000
Potential Funding Sources:	Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #78
Proposed Action:	Improve Morris Road roadway for access into subdivisions in all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Morris Road from Rangerville Road (F.M. 1479) to Ed Carey (F.M. 801)
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improvement of roadway from 18' asphalt rural section roadway to 37' B-B- curb & gutter rural section to allow all weather access of emergency response vehicles and allow for evacuations, eliminate ongoing roadway repairs due to flooding.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm
Effect on New/Existing Buildings:	Minimize flooding to area structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,600,000
Potential Funding Sources:	Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #79
Proposed Action:	Purchase NOAA "all hazards" radios for early warning and post –event information and place in schools, critical facilities.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce the risk to public health, safety, and welfare.
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, Dam Failure, Hurricane Wind, Hail, Tornado, Thunderstorm, Wildfire
Effect on New/Existing Buildings:	Protect area structures with warning
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$30,000
Potential Funding Sources:	Grant, General Fund, CDBG, Private and Public partnerships
Lead Agency/Department Responsible:	Emergency operations
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Emergency Operations Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #80
Proposed Action:	Improve North Tamm Lane for access into subdivisions in all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	North Tamm Lane from the frontage road on Expressway 83 north to Hick Hill Road
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improvement of roadway from caliche/dirt road to a 37' B-B curb & gutter section to allow all weather access of emergency response vehicles and allow for evacuations, eliminate ongoing roadway repairs due to flooding.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm
Effect on New/Existing Buildings:	Minimize flooding to area structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,500,000
Potential Funding Sources:	Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #81
Proposed Action:	Install pump station at the North Floodway.
BACKGROUND INFORMATION	
Jurisdiction/Location:	East of Expressway 77 along Ballenger Road. Location of pump will be along the south bank of the floodway
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce the damage to critical infrastructure and reduce the risk to public health, safety, and welfare, and reduce the damage to structures (residential and commercial).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm, Hurricane Wind
Effect on New/Existing Buildings:	Would create a building to house the pump
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000
Potential Funding Sources:	Grants, General Funds, Partnerships
Lead Agency/Department Responsible:	Public Works, Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Flood Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update. Include ‘increase site of outfall boxes’ to the action. Increase estimated cost to $1.5 million.

	City of Harlingen (Previous Action) #82
Proposed Action:	Install an area-wide telephone emergency notification system (Reverse 911).
BACKGROUND INFORMATION	
Jurisdiction/Location:	City wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce the risk to public health, safety, and welfare; provide better communication for evacuations or instructions to the public in the event of an emergency.
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, Thunderstorm, Tornado, Hail, Wildfire, Dam Failure, Extreme Heat
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$150,000
Potential Funding Sources:	Grant, General Fund, CDBG
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Emergency Operations Plan, coordination with other depts.

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #83
Proposed Action:	Install a stream gauge monitoring station at the spillway.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Treasure Hills spillway located on Clifford Street
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce damage to critical infrastructure (drainage system).
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam failure, Flood, Hurricane Wind, Thunderstorm
Effect on New/Existing Buildings:	Minimize flooding to area structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$100,000
Potential Funding Sources:	Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Flood plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update. Increase estimated cost to $150,000.

	City of Harlingen (Previous Action) #84
Proposed Action:	Improve Teege Road Bridge crossing for access into subdivisions in all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Teege Road and Brazil Road
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improvement of bridge crossing to ensure safety for vehicles crossing drainage ditch; ensures access of responding vehicles to areas; provides for evacuation route.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm
Effect on New/Existing Buildings:	Minimize flooding to area structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$800,000
Potential Funding Sources:	Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations; Cameron County
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #85
Proposed Action:	Improve Traxler Way roadway for access into subdivision in all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Traxler Way from the frontage on Expressway 83 west to F.M. 800
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improvement of roadway from 16' asphalt/caliche rural section to 37' B-B curb & gutter rural section to allow all weather access of emergency response vehicles and allow for evacuations and eliminate ongoing roadway repairs due to flooding.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm
Effect on New/Existing Buildings:	Minimize damage to area structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,000,000
Potential Funding Sources:	Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

		City of Harlingen (Previous Action) #86
	Proposed Action:	Create and implement a wildfire recovery plan to address soil erosion control and vegetative recovery.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	City wide with primary focus on the area around the Arroyo Colorado
	Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Reduce the risk to public health, safety, and welfare; protect natural habitat area.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Minimize wildfire damage to area structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$20,000
Potential Funding Sources:	Grant, General Fund, Texas Forest Service
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	2014 or upon funding
Incorporation into Existing Plans:	FireWise, Land Use Plans

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #87
Proposed Action:	Remove dead and downed trees to decrease fire fuels in Wildland Urban Interface (WUI) areas.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)***:**	Natural landform protection and reduced risk of loss of property due to wildfire.
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Drought
Effect on New/Existing Buildings:	Reduce potential fire danger to structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$25,000
Potential Funding Sources:	Texas Forest Service, FireWise
Lead Agency/Department Responsible:	Parks & Recreation
Implementation Schedule:	2016
Incorporation into Existing Plans:	FireWise Plan, Fire Protection Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

	City of Harlingen (Previous Action) #88
Proposed Action:	Develop and implement a Drought Emergency Plan to include rainwater harvesting, water conservation measures and promoting drought-tolerant landscaping.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City-wide
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Conserve water for long-term availability for area residents
Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural Systems Protection, or Education and Awareness)*	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	Reduce potential fire danger to structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$10,000
Potential Funding Sources:	Texas Forest Service, FireWise
Lead Agency/Department Responsible:	Parks & Recreation
Implementation Schedule:	2016
Incorporation into Existing Plans:	FireWise Plan, Fire Protection Plan

2021 ANALYSIS
Defer Action – Action will be included in the 2021 Plan Update.

SECTION 19: MITIGATION ACTIONS

Summary 1
Cameron County – County-wide Actions 3
Cameron County 23
City of Harlingen 44
City of Palm Valley 136

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 Cameron County and all participating jurisdictions.

SECTION 19: MITIGATION ACTIONS

Table 19-1. Cameron 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	Extreme Heat	Thunderstorm Wind	Lightning	Drought	Tornado	Hail	Winter Storm	Wildfire	Dam Failure	Coastal Erosion
Cameron County	xxxxx	xxxxx	xxx	xxxx	xxx	xxxx	xxxxx	xxxx	xxx	xxxx	xxx	xxx
City of Harlingen	xxxxx	xxxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxxx	N/A	N/A
City of Palm Valley	xxxx	xxxx	xxx	xxx	xxx	xx	xxx	xxx	xxx	xxx	N/A	N/A

CAMERON COUNTY – COUNTY-WIDE ACTIONS

	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	
Jurisdiction/Location:	Cameron County and all participating jurisdictions
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Promote hazard awareness and protect citizens from potential injuries and damages.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure (applicable jurisdiction), Coastal Erosion (applicable jurisdiction), Drought, Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000
Potential Funding Sources:	Local Funds, State and Federal Grants
Lead Agency/Department Responsible:	Cameron/Harlingen Floodplain Coordinator
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	N/A

COMMENTS

		County-Wide – Action #2
	Proposed Action:	Acquire and install generators with hard wired quick connections at all critical facilities.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and 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 Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure (applicable jurisdiction), Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
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 and Local Public Works
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS

		County-Wide – Action #3
	Proposed Action:	Upgrade critical facilities to include drought mitigation measures such as greywater reuse systems, drought tolerant landscaping, and installation of a sprinkler system with regular watering schedule.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions critical facilities
	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 Project

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

COMMENTS

		County-Wide – Action #4
	Proposed Action:	Incorporate higher standards for hazard resistance in local application of the building code.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce risk of damages to structures through improved construction techniques; Reduce recovery efforts for the community after an event.
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure (applicable jurisdiction), Coastal Erosion (applicable jurisdiction), Extreme Heat, Flood, Hail, Hurricane Wind, Lightning, Thunderstorm Wind, Tornado, Wildfire, Winter Storm
Effect on New/Existing Buildings:	Reduce risk to new structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$20,000
Potential Funding Sources:	General Revenues, State and Federal Grants
Lead Agency/Department Responsible:	Cameron/Harlingen Engineering
Implementation Schedule:	Within 24-36 months of plan adoption
Incorporation into Existing Plans:	Local Building Codes

COMMENTS

		County-Wide – Action #5
	Proposed Action:	Conduct an NFIP public education program regarding availability of flood insurance and promoting NFIP flood insurance protection.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduction of lives lost; flood insurance protection of structures.
	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, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$11,500-$57,500
Potential Funding Sources:	General Revenues and Grants
Lead Agency/Department Responsible:	Cameron/Harlingen Floodplain Coordinator
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Flood Ordinance, Flood Management Plan, Community Rating System

COMMENTS

		County-Wide – Action #6
	Proposed Action:	Conduct a public information campaign regarding hurricane and flood preparedness.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduction of lives and property lost during flood and hurricane events.
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Education and Awareness Preparedness/Response

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$11,500- $23,000
Potential Funding Sources:	State and Federal Grants, General Revenues
Lead Agency/Department Responsible:	County/City of Harlingen Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Flood Management Plan, Emergency Operation Plan, Emergency Response Plan

COMMENTS

		County-Wide – Action #7
	Proposed Action:	Join the FIREWISE program.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce fire fuels and mitigate wildfire and urban fire potential.
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$5,750
Potential Funding Sources:	Texas Forest Service
Lead Agency/Department Responsible:	Fire Departments
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS

		County-Wide – Action #8
	Proposed Action:	Work with South Padre Island to implement an evacuation plan for the proposed bridge connecting the mainland to South Padre Island.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce loss of lives during evacuation, particularly during a hurricane event and peak season.
	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:	Hurricane Wind
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$28,750
Potential Funding Sources:	HMGP, Local Revenue
Lead Agency/Department Responsible:	County/City of Harlingen Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan, Emergency Response Plan, Evacuation Plan

COMMENTS
The Rio Grande Valley's population continues to grow as does traffic on the Queen Isabella causeway, currently the only bridge connecting the island to Cameron County. On peak days, there have been more than 40,000 vehicle crossings the bridge. With only one bridge, estimate a 40 to 50-minute drive from hospitals in Brownsville or Harlingen through severe traffic jams.

		County-Wide – Action #9
	Proposed Action:	Construct a bridge connecting the mainland to South Padre Island.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce loss of lives during evacuation, particularly during a hurricane event and peak season.
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	Portion of proposed $18 - $23 million project
Potential Funding Sources:	HMGP, Local Revenue, State and Federal Grants
Lead Agency/Department Responsible:	County/City of Harlingen Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan, Emergency Response Plan, Evacuation Plan

COMMENTS
The Rio Grande Valley's population continues to grow as does traffic on the Queen Isabella causeway, currently the only bridge connecting the island to Cameron County. On peak days, there have been more than 40,000 vehicle crossings the bridge. With only one bridge, estimate a 40 to 50-minute drive from hospitals in Brownsville or Harlingen through severe traffic jams.

		County-Wide – Action #10
	Proposed Action:	Install color-coded street signs in evacuation zones throughout Cameron County, the City of Harlingen, and other participating communities.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Assist in expediting evacuation of residents in the event of natural disasters, dam failure, reduce loss of lives.
	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, Wildfire, Dam Failure (applicable jurisdiction)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$115,000
Potential Funding Sources:	General Revenues and Grants
Lead Agency/Department Responsible:	Cameron/Harlingen Floodplain Coordinator
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Annual Budget, Emergency Response Plan, Evacuation Plan

COMMENTS
Evacuation and shelter signs provide direction during emergency situations and identify designated evacuation areas during a power outage, fire, thunderstorm, or dam failure.

	County-Wide – Action #11
Proposed Action:	Conduct an educational program for residents on evacuation zones and location of shelters in conjunction with installing color-coded street signs.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County and all participating jurisdictions
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Assist in expediting evacuation of residents in the event of natural disasters; reduce loss of lives.
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, Wildfire, Dam Failure (applicable jurisdiction)
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$115,000
Potential Funding Sources:	General Revenues and Grants
Lead Agency/Department Responsible:	Cameron/Harlingen Floodplain Coordinator
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan, Evacuation Plan

COMMENTS
Evacuation and shelter signs provide direction during emergency situations and identify designated evacuation areas during a power outage, fire, thunderstorm, dam failure (applicable jursidction). Outreach to include leaflets, social media, public notices in local paper, etc.

		County-Wide – Action #12
	Proposed Action:	Upgrade building codes and ordinances to require an increased freeboard for new construction in areas of flood inundation as a result of dam failure and levee breach upstream of the Cameron County planning area.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce flood risk to people and parcels by elevating new construction.
	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
Effect on New/Existing Buildings:	Reduce risk to new structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$57,500
Potential Funding Sources:	Local Revenue, Drainage fees
Lead Agency/Department Responsible:	Building Code and Inspection Dept.
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan, Comprehensive Land Use, Flood Management Plan

COMMENTS

		County-Wide – Action #13
	Proposed Action:	Construct a regional retention facility to reduce runoff and flooding for the City of Harlingen and Cameron County, and capture secondary water supply for future drought events.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions: South of Hickory Hills subdivision, White Ranch, and Mariposa area
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Mitigate flooding and damage / displacement of residents.
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm Wind, Drought
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$11,500,000
Potential Funding Sources:	State and Federal Grants, HMGP
Lead Agency/Department Responsible:	County Engineering Dept.
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan, Floodplain Mgmt. Plan, partnering agreements

COMMENTS
The ponds will serve as a park facility when dry.

		County-Wide – Action #14
	Proposed Action:	Develop and implement a Master Flood Protection Plan for Cameron County Drainage District No. 5 to construct drainage features to mitigate flooding such as levees, widening, constructing channels, and detention ponds.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions: Encompassing most of the cities of Harlingen, Primera, and Combes
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce flood risk to people and parcels.
	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, Hurricane Wind, Dam Failure (applicable jurisdiction)
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000
Potential Funding Sources:	Local Revenue, Drainage fees
Lead Agency/Department Responsible:	Cameron County Drainage District No.5
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan, Comprehensive Land Use, Flood Management Plan

COMMENTS

		County-Wide – Action #15
	Proposed Action:	County-Wide Hydrologic & Hydraulic Model Update and Maintenance.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce flood risk to, structures, infrastructure and residents; Enhanced risk assessment.
	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
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$500,000 (5-year planning cycle)
Potential Funding Sources:	Local Revenue, Drainage fees, State and Federal Grants, TWDB
Lead Agency/Department Responsible:	Cameron County Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan, Comprehensive Land Use, Flood Management Plan

COMMENTS
Regular updates to and enhancement of the Cameron County Water Model (CCWM). The CCWM will be an adaptive resolution ensemble of H&H models, ranging from coarse-grid HUC12-scale hydrologic models, to fine-resolution hydraulic models applied at the catchment scale. Adaptive resolution implementation allows for phased coverage, with coarse-grid hydrologic models being deployed initially, and fine-resolution hydraulic models being initially developed for specific catchments identified as high-priority. In order to ensure comprehensive coverage of the entire County with sufficient resolution in catchments where hydraulic forecasts (for early warning) and hindcasts (for structural control design development) are anticipated to be needed, hydrographic data must continue to be collected for uncharacterized areas and updated for previously characterized areas, followed by development and calibration of models, and integration into CCWM cyber-infrastructure for ready access and use by the County and developers. Following the initial investment, continued annual investment is needed to ensure CCWM responsiveness to County growth needs. Return on Investment is assured from reduction in lives lost and property damages from flood reduction.

		County-Wide – Action #16
	Proposed Action:	County-Wide Real-Time Hydrologic Monitoring.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce flood risk to, structures, infrastructure and residents; Enhanced risk assessment.
	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
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$375,000 (5-year planning cycle)
Potential Funding Sources:	Local Revenue, Drainage fees, State and Federal Grants, TWDB
Lead Agency/Department Responsible:	Cameron County Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan, Comprehensive Land Use, Flood Management Plan

COMMENTS
Because of Cameron County's unique topography, prevalence of Resacas that significantly modify local drainage patterns, and extensive anthropogenic modifications to the regional hydrography through the construction of irrigation and drainage networks, engineered drainage modifications at the local level, even down to subdivision scale, can have significant impacts on the regional hydrology. Further, local control structures such and gate valves and drainage pumps are ubiquitous, as mechanisms for managing local drainage issues. Overlapping operational jurisdictions, such as irrigation districts with responsibilities for Resacas and the control of structures for maintaining their level for water supply and aesthetics, and drainage districts that operate gate valves and high capacity pumps for flood control, often work against each other. The limited coordination of these locally managed diversions and control operations have significant impact on regional hydrology that cannot be readily programmatically integrated into a regional hydrodynamic model. The combination of these factors necessitates real-time validation of any forecasting or hindcasting tools using observed data, more so than any other region in the LRGV.

		County-Wide – Action #17
	Proposed Action:	Integration of County Hydrologic Knowledge into National Water Model.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce flood risk to, structures, infrastructure and residents; Enhanced risk assessment.
	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
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$375,000
Potential Funding Sources:	Local Revenue, Drainage fees, State and Federal Grants, TWDB
Lead Agency/Department Responsible:	Cameron County Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan, Comprehensive Land Use, Flood Management Plan

COMMENTS
The National Water Model (NWM) is a real-time hydrologic forecast tool that provides forecasts of in-stream discharge at over 2.6M locations across the coterminous United States. The NWM provides forecasts from 18-hour, typically used for flood emergency management, through 30-day, used more for planning and water-supply applications. The NWM relies on the National Hydrography Dataset (NHD) to form the basis of its hydrologic forecasts, along with various meteorological forecasts and other data. The accuracy of NWM's forecasts are directly related to the availability of local water intelligence to derive flow patterns from contributing tributaries and diversions.

		County-Wide – Action #18
	Proposed Action:	Develop and adopt higher building code standards.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce flood risk to, structures, infrastructure and residents; Enhanced risk assessment.
	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
Effect on New/Existing Buildings:	Reduce risk to new structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$700,000
Potential Funding Sources:	Local Revenue, Drainage fees, State and Federal Grants, TWDB
Lead Agency/Department Responsible:	Cameron County Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan, Comprehensive Land Use, Flood Management Plan

COMMENTS
Designing new structures to exceed select provisions of the 2015International Building Code (IBC) and International Residential Code (IRC) and the adoption of the2015 International Wildland-Urban Interface Code (IWUIC). This resulted in a national benefit of $4 for every $1 invested.

		County-Wide – Action #19
	Proposed Action:	Drainage, Development, and stormwater policy update.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County and all participating jurisdictions
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce flood risk to, structures, infrastructure and residents; Enhanced risk assessment.
	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
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$250,000
Potential Funding Sources:	Local Revenue, Drainage fees, State and Federal Grants, TWDB
Lead Agency/Department Responsible:	Cameron County Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan, Comprehensive Land Use, Flood Management Plan

COMMENTS
Cameron County's current subdivision rules and drainage/stormwater policies are in need for an update to better integrate the current best practices of development, stormwater management and drainage requirements. The current rules are not strict enough and do not address the pressing issues and challenges of today's weather nature. The new policies should include (not limited to): Private Development Regulations • Flood detention requirement • Water quality requirement • GSI/LID regulatory credit • Stormwater retention requirement; Private Development Incentives • Regulatory incentives • Financial incentives • Stormwater fee discount; Public Initiatives • Capital project construction • Street construction • Education.

		County-Wide – Action #22
	Proposed Action:	Implement projects from LRGVDC regional action plan to address flooding issues. See attached list appendix G.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	County-wide (applicable jurisdictions) – Multiple actions as listed in Appendix G
	Risk Reduction Benefit *(Current Cost/ Losses Avoided)*:	Reduce risk to structures, infrastructure and citizens through various drainage improvements, flood control projects and watershed management projects.
	Type of Action *(Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness)*	Structure and Infrastructure Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce or eliminate the impacts on new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$562,407,832
Potential Funding Sources:	Bond, Federal Grants, TWDB
Lead Agency/Department Responsible:	LRGVDC in coordination with Cameron County Engineers
Implementation Schedule:	Within the five-year planning cycle upon plan adoption
Incorporation into Existing Plans:	Drainage Plan, Capital Improvement Plan

COMMENTS

CAMERON COUNTY

	Cameron County – Action #1
Proposed Action:	Construct a retention facility to reduce runoff and flooding for the Town of Santa Rosa, the City of La Feria and Cameron County, and capture secondary water supply for future drought events; Improve drainage flow and reduce flood levels and impacts.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County outside of Santa Rosa and La Feria
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Mitigate flooding and damage / displacement of residents.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Drought
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000,000
Potential Funding Sources:	State and Federal Grants, HMGP
Lead Agency/Department Responsible:	County Engineering Dept.
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan, Floodplain Mgmt. Plan, partnering agreements

COMMENTS

		Cameron County – Action #2
	Proposed Action:	Flood proof basement of the County Emergency Management Office by incorporating Floodproofing components that my include floodwalls, small localized levees, pumps, berms around buildings, or a combination thereof. Upgrade EOC equipment including technological equipment.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Dancy Bldg. 1100 E. Monroe, Brownsville, TX 78520
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce impact of flooding on first responder and emergency operations, ensure continuance of critical operations during flood event; reduce cost to repair and maintain structure following a flood event.
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$700,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Emergency Management office
Implementation Schedule:	Within 36-48 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan, Floodplain Mgmt. Plan, Flood Response Plan

COMMENTS
The Dancy Building basement previously experienced flooding, requiring sandbagging and evacuation of employees. As the County EOC is located in the building, the Emergency Operations Center could be forced to shut down.

	Cameron County – Action #3
Proposed Action:	Install temporary cooling stations at county facilities to aid low income and elderly residents during extreme heat events.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County facilities: San Benito Annex (Health Dept.), Isla Blanca Park/Recreation Center, Dancy Building, Lucio Clinic, and possible other sites
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce health risk, loss of life to a segment of population without air-conditioning.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Extreme Heat
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$50,000
Potential Funding Sources:	HUD grant/CDBG/HMGP
Lead Agency/Department Responsible:	County Health and Hospital Authority
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS
Cooling stations may be installed at county parks, recreation centers or other facilities; some may include misting areas.

	Cameron County – Action #4
Proposed Action:	Install hail guards on A/C units for all Cameron County critical facilities.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County critical facilities
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Increase efficiency of units by minimizing debris damage, reduce electrical costs, reduce health risk from overheating units unable to properly cool buildings.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	County maintenance dept.
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations, Continuity of Operations Plan

COMMENTS

	Cameron County – Action #5
Proposed Action:	Work with General Land Office to develop and implement a dune restoration plan to protect roads and minimize washouts from flooding and tidal surge.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Coastal areas of Cameron County
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Prevent County, State, and Federal agencies from having to continually incur repair costs and prevent loss of life and property.
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:	Hurricane Wind, Coastal Erosion
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$4,000,000
Potential Funding Sources:	State and Federal Grants
Lead Agency/Department Responsible:	Cameron County Parks and Recreation, GLO
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Flood Response Plan

COMMENTS

	Cameron County – Action #6
Proposed Action:	Update the existing Regional Mobility Authority Plan (RMA) to include long-range planning mechanisms.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	The RMA would provide a mechanism for long-range planning, administration and implementation of structural projects to mitigate hazards.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Response Action not funded under federal grant programs

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Hail, Thunderstorm Wind, Tornado, Drought
Effect on New/Existing Buildings:	Reduce risk to new and existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$16,000,000
Potential Funding Sources:	General Revenues
Lead Agency/Department Responsible:	County Administrator
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Annual Budget, Stormwater Plan, Floodplain Management Plan

COMMENTS

		Cameron County – Action #7
	Proposed Action:	Survey structures and implement a FEMA buyout for repetitive loss flood prone structures.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Green Valley Farms, Kendall Street, Tio Cano Lake & White Ranch Road area, Iowa Gardens, Laureles Subdivision
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Restore natural flood prone areas, reduce loss to NFIP Program, remove unsafe structures from flood prone areas, reduce loss of lives from flooding.
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$15,000,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Floodplain Administrator
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Annual Budget, Flood Ordinance, Flood Management Plan

COMMENTS

SECTION 19: MITIGATION ACTIONS

		Cameron County – Action #8
	Proposed Action:	Work with General Land Office to develop a living coastline constructed from natural materials derived from regional materials such as rock and seagrass.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Laguna Madre area
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce the risk of dune washout.
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind, Coastal Erosion
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Low
Estimated Cost:	$5,000,000
Potential Funding Sources:	State land office grants, HMGP
Lead Agency/Department Responsible:	County Parks & Recreation, TX Parks & Recreation, GLO
Implementation Schedule:	Within 24 to 48 months of plan adoption
Incorporation into Existing Plans:	Dune Restoration Plan

COMMENTS

	Cameron County – Action #9
Proposed Action:	Conduct a Public Education Campaign to address extreme heat.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Provides education to the public on the dangers of extreme heat; reduces the risk to public health and welfare.
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
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$30,000
Potential Funding Sources:	Grant, General fund, CDBG
Lead Agency/Department Responsible:	Health Department, CDBG
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan, County Health Dept. Regs

COMMENTS
Provide information on EOC website regarding location of cooling stations, dangers of working outdoors in extreme heat, care for pets in extreme heat and drought conditions.

	Cameron County – Action #10
Proposed Action:	Conduct a public education campaign through social media regarding relocating or elevating HVAC and utility systems in and around the home in the event of dam failure.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce risk to public health, safety, and welfare.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$50,000
Potential Funding Sources:	Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Public Information Officer
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations, Evacuation Plan

COMMENTS
Develop a public awareness campaign regarding evacuation routes, safety information, documentations needed for re-entry into evacuated areas, medical transportation, shelters, and animal care facilities and evacuations procedure for people with pets, etc. Will include development of brochures, fliers, T.V. and/or radio spots, webpage development; Requires coordination with multiple agencies and departments.

	Cameron County – Action #11
Proposed Action:	Conduct a public education campaign for drought.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Provide an increase level of preparedness to reduce risk to public health, safety, and welfare, reduce risk to agricultural and wildlife; ensure continued essential water supply.
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
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$30,000
Potential Funding Sources:	Grants, General funds
Lead Agency/Department Responsible:	VFD, County Fire Depts.
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	FireWise Plan, County Health Dept. Regs.

COMMENTS
Develop pre-disaster activities to increase the level of preparedness in county, create mitigation actions to identify/address the slow onset nature of drought; Partner with fire department, water works, irrigation and drainage districts, agriculture groups, conservation groups, and wildlife groups; Look into alternate technologies and methodologies for water conservation including xeriscaping.

	Cameron County – Action #12
Proposed Action:	Upgrade codes and regulations to require burying power lines in conjunction with new construction in coastal areas.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County and incorporated boundaries along coastline
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce risk to public health, safety, and general welfare.
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:	Hurricane Wind, Tornado, Flood Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,500,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Cameron County Electric Utility
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Plan, Comprehensive Plan

COMMENTS

	Cameron County – Action #13
Proposed Action:	Upgrade existing wooden power poles to concrete along coastal areas.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County and incorporated boundaries along coastline
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce risk to public health, safety, and general welfare.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind, Tornado, Flood
Effect on New/Existing Buildings:	Reduce risk to existing infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,500,000
Potential Funding Sources:	Grants
Lead Agency/Department Responsible:	Cameron County Electric Utility Services
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Plan, Comprehensive Plan

COMMENTS

	Cameron County – Action #14
Proposed Action:	Work with General Land Office to implement beach nourishment activities to sustain dune protection from storm surge and erosion.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Laguna Madre area and coastal areas of county
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce the risk of dune washout.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricane Wind, Coastal Erosion
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$5,000,000
Potential Funding Sources:	State land office grants, HMGP
Lead Agency/Department Responsible:	County Parks & Recreation, TX Parks & Recreation, GLO
Implementation Schedule:	Within 24 to 48 months of plan adoption
Incorporation into Existing Plans:	Dune Restoration Plan

COMMENTS

		Cameron County – Action #15
	Proposed Action:	Install shutters on glass windows and doors to protect critical facilities during severe hail and thunderstorm events, hurricane wind, and tornado.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Key critical facilities within Cameron County
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce continued glass replacement and repairs; reduce possible injury to county staff and residents due to flying glass 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 Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Hurricane Wind, Tornado, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$350,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 24 to 48 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS

		Cameron County – Action #16
	Proposed Action:	Become a "StormReady" community to reduce risk and damage caused by hail, tornado, and thunderstorm events.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Assist residents in preparing, mitigating risk to hail, tornado, and thunderstorms.
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Tornado, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$20,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 24 to 48 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS

		Cameron County – Action #17
	Proposed Action:	Remove dead and downed trees to decrease fire fuels in Wildland Urban Interface (WUI) areas.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Cameron County
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Natural landform protection and reduce risk of loss of property due to wildfire.
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Drought
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$25,000
Potential Funding Sources:	Texas Forest Service, FireWise
Lead Agency/Department Responsible:	Parks & Recreation
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	FireWise Plan, Fire Protection Plan

COMMENTS

	Cameron County – Action #18
Proposed Action:	Install hail guards on HVAC systems supporting critical facilities and to protect against severe Hail in excess of ½ inch diameter.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Key critical facilities within Cameron County
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce repairs and replacement of costly systems and continue essential service to facilities.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$250,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 24 to 36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS

	Cameron County – Action #19
Proposed Action:	Add protective cover to parking areas to reduce damage to county-owned vehicles in the event of hail and thunderstorm events.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Parking facilities within Cameron County
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce repairs and replacement of costly vehicles
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hail, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$6,000,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 24 to 36 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS

	Cameron County – Action #20
Proposed Action:	Secure Memorandum of Understanding (MOU) with Lower Rio Grande Flood Control agency regarding potential dam and levee failure of upstream flood control system.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce potential dollar losses and loss of life from Dam Failure from Anzalduas Dam and Falcon Reservoir.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$57,500
Potential Funding Sources:	Lower Rio Grande Water User fee
Lead Agency/Department Responsible:	LRGFC, Cameron County Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan, Emergency Management Plan, Partnering agreements

COMMENTS
For purposes of the HMAP, upstream dam failure would affect the majority of communities within Cameron County boundaries. Due to potential of dam failure, levee failure money is needed to maintain levees.

	Cameron County – Action #21
Proposed Action:	Develop and implement a public education program for evacuating residents downstream of the Lower Rio Grande Flood Control system in the event of dam or levee failure.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Cameron County
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce loss of life from Dam Failure from Anzalduas Dam and Falcon Reservoir.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure, Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	High
Estimated Cost:	$28,750
Potential Funding Sources:	Lower Rio Grande Water User fee
Lead Agency/Department Responsible:	LRGFC, Cameron County Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Response Plan, Emergency Management Plan, Partnering agreements

COMMENTS
For purposes of the HMAP, upstream dam failure would affect majority of communities within Cameron County boundaries. Due to potential of dam failure, levee failure money is needed to maintain levees.

CITY OF HARLINGEN

	City of Harlingen – Action #1
Proposed Action:	Improve existing drainage system 001 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	The proposed improvements are located on New Combs Hwy, between Pitman St. and N. B Street; and along First Street between Brentwood Drive and Austin Ave
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$289,800
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS

	City of Harlingen – Action #2
Proposed Action:	Improve Drainage System 002 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Along Buchanan from A St. to 3rd Street then head south up to Lincoln Ave.; from Buchanan and 1st Street, South to Grant; From Grant and A Street to 3rd Street then South to the Arroyo Colorado (outfall)
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$3,170,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 4 to 5 phases to complete.

		City of Harlingen – Action #3
	Proposed Action:	Improve Drainage System 004 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	From 9th and Grimes, West on Grimes to 77 Sunshine Strip, West on 77 Sunshine Strip to outfall (3rd Street Ditch); From Marshall and 7th Street, South on 7th to 77 Sunshine Strip; Bowie and 7th Street, North on 7th Street to 77 Sunshine Strip
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,750,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 3 to 4 phases to complete project.

	City of Harlingen – Action #4
Proposed Action:	Improve Drainage System 005 by replacing the existing inlets and increasing the capacity of the existing drainage pipes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	The location of the improvements will be from 9th and Monroe, South on 9th to Pierce, East on Pierce to 11th Street, South to canal and East along canal to tie into existing system; from 13th and Tyler South to Pierce, West to 11th Street to tie into system
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,735,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 4 to 5 phases to be completed.

	City of Harlingen – Action #5
Proposed Action:	Improve Drainage System 007 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	The proposed improvements are along 21st St heading South from North of Theresa into Jefferson outfall; tying into Washington then West about 750'; from Van Buren along 21st St head North to Jefferson outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,676,590
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 3 to 4 phases to be completed.

	City of Harlingen – Action #6	
	Proposed Action:	Improve Drainage System 008 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes and adding new storm sewer lines and manholes.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Beginning at the inlet located on the northwest intersection of Haine Drive, head northwest approximately 1,000 feet along south 25th Street. The next lateral extends west approximately 115 feet and connects into storm sewer system 018. Another lateral runs east from the intersection of Treasure Hills and 25th street, past Emerald Lake Drive, then heads North into the outfall.
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$1,064,700
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 2 to 3 phases to complete.

		City of Harlingen – Action #7
	Proposed Action:	Improve existing Drainage System 012 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Beginning from the existing 30” storm sewer pipe located along Alcott St., Eastward into the 13th St outfall
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$186,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

		City of Harlingen – Action #8
	Proposed Action:	Improve existing Drainage System 013 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Begin South of Arroyo Vista Circle and head North to opposite curve then NW into outfall
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$207,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 1 or 2 phases.

	City of Harlingen – Action #9
Proposed Action:	Improve Drainage System 017 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	About 250' West along Beck into New Combes outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$103,500
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #10
Proposed Action:	Improve Drainage System 021 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Along Adams from A St to 3rd St; Along Jefferson from A St to 3rd St then South on 3rd to Madison; Along A street from Monroe Ave to Van Buren then along Commerce about 200'; Along 5th St from Van Buren South to Commerce; Along 7th from Polk South to Commerce
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,815,977
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 3 or 4 phases.

	City of Harlingen – Action #11
Proposed Action:	Improve Drainage System 022 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	The proposed improvements will tie into the existing drainage system on Davis and head South towards Williamson, along 1st Street.
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$179,500
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #12	
	Proposed Action:	Improve Drainage System 023 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	The proposed improvements are along Marjory from Kelly to Dennis; along Kelly from existing drainage system on Davis towards the North about 600'; along Davis from existing drainage system about 750' Eastward then South about 270' then Eastward about 60' to outfall; along Pickens from the South West corner of Kelly about 800' to the outfall
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,530,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 3 or 4 phases.

	City of Harlingen – Action #13
Proposed Action:	Improve Drainage System 027 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	The proposed improvements are located along Buchanan from A St Westward past F St; along Lincoln from D St Eastward to B St; along Grant Ave from E St to A St; along Roosevelt from D St to B St then North slightly past Cleveland
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,795,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 3 or 4 phases.

	City of Harlingen – Action #14
Proposed Action:	Improve Drainage Systems 100 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	South side of Ed Carey from existing South of Haine North 1,875' cross over NW about 200' to tie into existing then North 1,750' to tie into 77 Sunshine, branch off SE about 200' to cross over Ed Carey then North about 500' to tie into existing. From previous existing on 77 head North about 3,500' then cross over NE and tie into existing; from existing on Benwood about 150' North to Haine drive
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$3,298,200
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 3 or 4 phases.

	City of Harlingen – Action #15
Proposed Action:	Improve Drainage Systems 102 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	About 3660' West from the intersection of Emerald Lake and Ted Street; North from the intersection of Emerald Lake and Ted St. along Emerald Lake about 270; then East about 150' into outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$593,500
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 1 or 2 phases.

	City of Harlingen – Action #16
Proposed Action:	Improve Drainage Systems 103 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	About 720' East from the intersection of Encino and Regency into the out fall; About 600' East from the intersection of Euno and Hoogland and tie-in into existing storm sewer system
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$317,500
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 1 or 2 phases.

	City of Harlingen – Action #17
Proposed Action:	Improve Drainage System 105 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Tie-in to the existing storm sewer system North of U Street and head about 1,020' East, then South about 1,100' to tie into existing storm sewer system; then East about 660' to tie into the existing storm sewer system; from the existing storm sewer system located on Fair Park Blvd and O Street, head South West about 720' then West about 300'
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,518,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 3 or 4 phases.

		City of Harlingen – Action #18
	Proposed Action:	Improve Drainage System 112 by increasing the capacity of the existing drainage pipes and replacing the inlets and manholes.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Replace the existing 24” storm pipe with a 36” storm pipe on Haine Drive North of Whalen into the outfall
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$303,600
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #19
Proposed Action:	Improve Drainage System 113 by increasing the capacity of the drainage pipes and replacing the inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	From the existing drainage system North of the intersection of Haine drive and FM 509, head West about 240' crossing over FM 509 then 120' Southwest, then 240' West along Haine Drive
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$158,700
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #20
Proposed Action:	Improve Drainage System 115 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	On the North side of Houston St about 80' West of Falcon, heading South about 80' then East into the out fall; branch off that pipe at about 360' Northwest about 80' crossing over Houston; starting about 120' West of Falcon on Hale heading East into outfall; From Northwest corner of Sesame Circle heading Northwest about 120' then North about 160' then East about 20' to outfall; From Northeast corner of Live Oak heading Southwest about 120' then 240' East then about 240' Northwest in to outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$910,800
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 3 or 4 phases.

	City of Harlingen – Action #21
Proposed Action:	Improve Drainage System 122 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	From the existing manhole located on the Northwest corner of Jacaranda and Willowicke, about 70' Southeast and then approximately 550' Southwest
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$158,700
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #22
Proposed Action:	Improve Drainage System 123 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Starting approximately 150' from the back of curb on Monroe near 25th St then North about 60' then West to outfall; on North side of Jackson near 25th from existing West to outfall; starting about 150' from the back of curb on Van Buren near 25th St then North about 60' then West to outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$124,200
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #23
Proposed Action:	Improve Drainage System 124 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Along 5th from Monroe to Van Buren; along 13th from existing on Jefferson to Harrison Ave then East about 450'; from the existing drainage system on Jefferson at the intersection of Jefferson and 10th heading West along Jefferson into existing drainage system slightly East of 3rd St; from existing drainage system on Jefferson at the intersection of Jefferson and 6th North along 76 drive to existing drainage system East of Sul Ross
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,600,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 3 or 4 phases.

	City of Harlingen – Action #24
Proposed Action:	Improve Drainage System 127 by increasing the capacity of the drainage pipes and replacing the inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	From the existing drainage system on the Northwest of Estrellita, heading Southwest approximately 340' crossing Lamb, then slightly Northwest approximately 180' then Southwest into the outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$656,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 1 or 2 phases.

	City of Harlingen – Action #25
Proposed Action:	Improve Drainage System 132 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	From the existing drainage system located on Calle Princesa, approximately 450' behind the houses then slightly approximately 300' Southwest then approximately 210' Southwest into the outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$552,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 2 or 3 phases.

	City of Harlingen – Action #26
Proposed Action:	Improve Drainage System 135 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Head approximately 1,300' West from the existing drainage system located at the intersection of Matz and Breedlove, slightly past Rose; Head approximately 650' North from the intersection of Matz and Breedlove then approximately 550' East
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$759,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 2 or 3 phases.

	City of Harlingen – Action #27
Proposed Action:	Improve Drainage System 139 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Head approximately 240' West from the existing drainage system located on Marshall, then Southwest to the South corner of Marshal and 13th, then about 1,020' South then East about 120' then South about 300' then along the 77 Sunshine curve to the corner South of Washington then SE about 120' then South to Jefferson outfall; From the intersection of Crockett Ave and Sunshine Strip along Austin then East to 13th Street; from the existing system at the intersection of Morgan Blvd and Chaparral West about 900' to tie into the proposed system following along the curve on 77 Sunshine Strip
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$4,138,016
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 4 or 5 phases.

		City of Harlingen – Action #28
	Proposed Action:	Improve Drainage System 141 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Begin on Warren St. into Morgan Blvd heading South slightly to tie into existing storm sewer East of Morgan, High St East to Morgan Blvd Grimes South on 21st St to run along Citrus Terrace to Bowie, On Austin St from 25th St West half the street distance towards 21st St Susan St from 25th St to Whitehouse 25th St from Washington to Jefferson (existing)
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,794,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 3 to 4 phases to complete.

	City of Harlingen – Action #29
Proposed Action:	Improve Drainage System 142 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Head Northwest along 77 Sunshine Strip past Markowsky to tie into the existing storm sewer system, then North to cross 77, then Southeast to G St then North along G St two-thirds of the street distance. On Orange Heights from the existing storm sewer system, head Eastward to tie into the existing storm sewer system on 1St St. On 77 from the existing storm sewer system, on intersection of 1St and 77, head Northwest to tie into the existing storm sewer system on 77
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,104,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 2 to 3 phases to complete.

	City of Harlingen – Action #30
Proposed Action:	Improve Drainage System 145 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	From the existing storm sewer system located on the intersection of Jones St and Sam Houston, go between the houses, slightly Northwest along the alley way, and cross Lamar until the alley ends
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$414,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #31
Proposed Action:	Improve Drainage System 148 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Begin on South of New Hampshire Road, off of Bus 77, from the halfway point South to railroad tracks, from one safety end treatment to the other, then North on the opposite side of New Hampshire Road to water entrance
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$345,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #32
Proposed Action:	Improve Drainage System 149 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Begin at the end of Oregon St from the existing storm sewer system and head North 2/3 length of the street towards Bus 77
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$289,800
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #33
Proposed Action:	Improve Drainage System 153 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Begin from the existing storm sewer system West of Rose St, North through the subdivision to tie into the existing storm sewer system located on Loop 499
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$152,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

		City of Harlingen – Action #34
	Proposed Action:	Improve Drainage System 154 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Begin from the existing storm sewer system on Dilworth, head South approximately 500 ft.
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$138,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #35
Proposed Action:	Improve Drainage System 157 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning at the existing storm sewer system located across Quail Run, cross Emerald Lake and end South of Quail Run opening
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$35,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #36
Proposed Action:	Improve Drainage System 158 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Along La Vaca from Colorado to Rangerville then turn North along Rangerville Rd to tie into the existing storm sewer system South of Knox
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$593,400
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 1 or 2 phases.

	City of Harlingen – Action #37
Proposed Action:	Improve Drainage System 159 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning at the existing storm sewer system located on the intersection of Rangerville Rd and Ponderosa, head South approximately 900 ft. from that same intersection West to Arroyo Colorado (outfall), from the existing storm sewer system located across Rangerville, in front of Ponderosa, head straight through Outpatient clinic to the back of the parking lot, then run across the parking lot to the field
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$207,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 2 or 3 phases.

	City of Harlingen – Action #38
Proposed Action:	Improve Drainage System 161 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning at the existing storm sewer system at the intersection of Davis and 7th St, run South along 7th St and tie into the existing storm sewer system in front of Calvary Baptist Church
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 276,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #39
Proposed Action:	Improve Drainage System 200 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning at the outfall, along the houses and crossing Ebony Road and Cenizo Road to the alley between Cenizo Road and Lantana Road
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$ 276,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #40
Proposed Action:	Improve Drainage System 204 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Approximately 250' East of Hand Rd from the outfall North of Roosevelt Rd, head North across Lazy Palms Drive S, then approximate 50' Northeast
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$ 552,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 1 or 2 phases.

	City of Harlingen – Action #41
Proposed Action:	Improve Drainage System 206 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning at the existing storm sewer system located on S Sesame Cir, cross approximately 60' then approximately 300' South, then West to the outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 207,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #42
Proposed Action:	Improve Drainage System 207 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning at the existing storm sewer system East of Kratzer St, head North about 300ft to tie into the existing storm sewer system East of Burke Ct
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$ 138,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #43
Proposed Action:	Improve Drainage System 216 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning at the existing storm sewer system located North of Harrison, on the intersection of Harrison and Bus 77 crossing Bus 77 Westward to tie into the existing manhole. Beginning at the existing manhole on the intersection of Tyler (West of 77) and Bus 77 to head South to the intersection of Filmore Ave and 77 then 80' West then South to the outfall near Little Creek
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$ 690,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 2 or 3 phases.

	City of Harlingen – Action #44
Proposed Action:	Improve Drainage System 224 by increasing the capacity of the existing drainage pipes and replacing the inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning at the existing storm sewer system off of US Highway 77, head East approximately 300' along North side of Fair Park Blvd then South approximately 200' then East approximately 300' to cross T St then North crossing over Fairpark Blvd to the corner
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 317,400
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 1 or 2 phases.

	City of Harlingen – Action #45
Proposed Action:	Improve Drainage System 227 by increasing the capacity of the drainage pipes and replacing the inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning at the existing safety end treatment located in front of L&F Distributers headed East about 270' to tie into existing storm sewer system
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$ 69,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

		City of Harlingen – Action #46
	Proposed Action:	Improve Drainage System 229 by increasing the capacity of the drainage pipes and replacing the inlets and manholes.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Beginning at Tamm Lane, North of US Highway 83 to run East approximately 700' to tie into the existing storm sewer system, opposite of that existing storm sewer system, to start proposed storm sewer system along US Highway 83 past Stuart Place Rd approximately 1000' then North to the outfall
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$ 3,450,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 3 or 4 phases.

	City of Harlingen – Action #47
Proposed Action:	Improve Drainage System 230 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning at the existing storm sewer system located on US Bus 83 and Harrison Ave, approximately 240' West to existing storm sewer system, across US 77 Frontage then South approximately 380' then East approximately 380' to tie into the existing storm sewer system
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$ 317,500
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 1 or 2 phases.

	City of Harlingen – Action #48
Proposed Action:	Improve Drainage System 233 by increasing the capacity of the drainage pipes and replacing the inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning at the corner block of the intersection on North side of Vinson and 77 Sunshine Strip along 77 Sunshine Southward to existing storm sewer system
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$ 472,800
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 1 or 2 phases.

	City of Harlingen – Action #49
Proposed Action:	Improve Drainage System 234 by increasing the capacity of the drainage pipes and replacing the inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning from the existing storm sewer system located on Austin Ave (West of Ed Carey, North of the fields) approximately 500' to the West past Sonesta Drive
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Low
Estimated Cost:	$ 159,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #50
Proposed Action:	Improve Drainage System 237 by increasing the capacity of the existing drainage pipes and replacing the inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning from the existing storm sewer system located on Beck St, East of 3rd heading East to approximately 275' to the outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 83,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #51
Proposed Action:	Improve Drainage System 244 by increasing the capacity of the drainage pipes and replacing the inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning from the existing manhole on Adam's, approximately 550' East crossing between Karis Drive and Gabriel's Landing, then approximately 500' North to cross Christian Drive
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 414,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split in 1 or 2 phases.

		City of Harlingen – Action 52#
	Proposed Action:	Improve Drainage System 245 by increasing the capacity of the drainage pipes and replacing the inlets and manholes.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Beginning from the existing storm sewer system located on the North side of Summerfield, heading Northwest at the intersection of Summerfield and 13th street into the outfall
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 55,200
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be completed in 1 phase.

	City of Harlingen – Action #53
Proposed Action:	Improve Drainage System 247 by increasing the capacity of the drainage pipes and replacing the inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning at the existing 30“storm sewer pipe on Mark Cir, approximately 330’ East of Thomas, East crossing E Mark Cir then heading South about 150’; from existing 36” storm sewer pipe North of Leggett about 1,000’ to outfall tying into each 18” pipe along the way; off the opposite end of the same existing 36” pipe North of Leggett about 210’ West to tie into existing 30” sewer system
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 759,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 2 or 3 phases.

City of Harlingen – Action #54	
Proposed Action:	Improve Drainage System 248 by increasing the capacity of the drainage pipes and replacing the inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning East of Country Drive on 7th St from existing 36" storm sewer pipe, head South approximately 80' to tie into the existing storm sewer system; opposite end of that existing system, head South about 140' to tie into existing 30" pipe coming off Tumbleweed; from that point about 200' South to tie into existing 42" pipe; opposite end of that 42" pipe about 220' South to the corner on Matz Ave; then West along Matz about 1,000' then cross over Northwest about 400' to outfall
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 1,035,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 2 or 3 phases.

		City of Harlingen – Action #55
	Proposed Action:	Improve Drainage System 251 by increasing the capacity of the drainage pipes and replacing the inlets and manholes.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Beginning at Breedlove straight across from Hoogland approximately 1500' North towards Loop 499 then across Breedlove behind the homes approximately 1,350' to the outfall
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 966,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 2 or 3 phases.

City of Harlingen – Action #56	
Proposed Action:	Improve existing drainage system 252 by increasing the capacity of the existing drainage pipes and replacing the existing inlets and manholes.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Beginning at the existing 18" storm sewer pipe located South of Sun Chase Drive, approximately 420' East to tie into the existing manhole, then approximately 60' Northeast crossing Sunnyside Drive then approximately 660' Northeast to Stuart Place Main Drain (outfall)
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$ 345,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The project can be split into 1 or 2 phases.

	City of Harlingen – Action #57
Proposed Action:	Commissioning of four (4) remote Real-Time-Hydrologic-Systems (RTHS) to directly measure stream gage heights, water temperature, precipitation, barometric pressure, wind speed direction, air temperature, and relative humidity. Measurements of volumetric flow rate and near real time access to measured and derived data products will also be available.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Along the Arroyo Colorado located near or within the City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$100,000
Potential Funding Sources:	State and Federal Grant, General fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS

	City of Harlingen – Action #58
Proposed Action:	Improve Drainage System near Fire Station No. 1. (System 021) by increasing the capacity of the drainage pipes and replacing the inlets and manholes to help mitigate flooding issues.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Along West Jefferson Ave from approximately 350' west of 3rd street head east along Jefferson avenue towards commerce street.
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,500,000
Potential Funding Sources:	State and Federal Grant, General fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
Improvements may require coordination with railroad company if drainage system is crossing or near the railroad tracks.

	City of Harlingen – Action #59
Proposed Action:	Improve the drainage system near the Harlingen Police Department by increasing the capacity of the drainage pipes and replacing the inlets and manholes to help mitigate flooding issues.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Along Fair Park Blvd and Wichita Ave
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare; reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$3,000,000
Potential Funding Sources:	State and Federal Grant, General fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
Improvements may require coordination with railroad company if drainage system is crossing or near the railroad tracks.

City of Harlingen – Action #60	
Proposed Action:	Develop and implement a Public Education Campaign to address extreme heat. Develop a city web page with information regarding location of cooling stations, develop and distribute brochures in English and Spanish. Create and give presentations at local schools, daycares (adult and child), mobile home parks, public housing, boys & girls clubs. Involve care for pets in extreme heat and drought conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Provides education to the public on the dangers of extreme heat; reduces the risk to public health and welfare.
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
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$34,500
Potential Funding Sources:	State and Federal Grant, General fund, CDBG
Lead Agency/Department Responsible:	Health Department, CDBG
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Partnering agreements with city depts.

COMMENTS
Develop a city web page with information regarding location of cooling stations, develop and distribute brochures in English and Spanish. Create and give presentations at local schools, daycares (adult and child), mobile home parks, public housing, boys & girls clubs. Involve care for pets in extreme heat and drought conditions.

	City of Harlingen – Action #61
Proposed Action:	Expand artificial grass project in landscaped medians to include other areas within public rights-of-ways.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Various locations throughout the city
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Product has 15-year life span without need to irrigate medians; product is fire retardant, drought and heat- resistant, eliminates city personnel replacing grass following hurricane, tornado, or flood.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project not eligible for federal grant programs

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought, Extreme Heat, Wildfire, Hurricane Wind, Tornado, Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$8,314,500
Potential Funding Sources:	State and Federal Grants, general funds, partnerships
Lead Agency/Department Responsible:	Public Works, Engineering Department
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Water District Plan, Harlingen Proud Plan

COMMENTS
Install artificial grass in landscape medians to reduce the amount of irrigated landscape and reduce the consumption of water. Also reduce the exposure of city personnel to high traffic areas while beautifying thoroughfares; Partner with Harlingen Proud, water works, irrigation districts.

City of Harlingen – Action #62	
Proposed Action:	Join the Community Rating System Program.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce risk to public health, safety, and welfare; increase awareness and regulations.
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
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$57,500
Potential Funding Sources:	General Fund, Staff Time, Federal Grant
Lead Agency/Department Responsible:	Public Works, Engineering
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Flood Plan, NFIP Ordinance

COMMENTS

	City of Harlingen – Action #63
Proposed Action:	Increase drainage capacity of the retention ponds in the Treasure Hills area.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Treasure Hill area within City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to critical infrastructure (streets and drainage system); reduce risk to public health, safety, and welfare.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Thunderstorm Wind
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,300,000
Potential Funding Sources:	State and Federal Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

COMMENTS
With increased growth in the area of Treasure Hills the existing retention ponds no longer provide adequate retention, the ponds need to be increased in depth (dredged) as the increase in size is limited due to their location.

	City of Harlingen – Action #64
Proposed Action:	Develop and implement a plan to construct Cooling Centers throughout the City of Harlingen.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Community centers, shelters, public buildings, library
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Provides an implementation method(s) for reducing and educating the public on the dangers of extreme heat and drought; reduces the risk to the public health and safety.
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
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$34,500
Potential Funding Sources:	Grants, donations, CDBG
Lead Agency/Department Responsible:	Health Department, Public Buildings
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations, Partnering Agreements with city depts.

COMMENTS
Create and develop a plan which identifies cooling centers in days of extreme heat. Identify public locations for cooling areas, notification for the public (TV, radio, public access stations, HCISD channels), provide free transportation to sites via bus lines; partner with nonprofit organizations such as Red Cross, Salvation Army, and churches to coordinate donation of fans or window AC units.

	City of Harlingen – Action #65
Proposed Action:	Develop and implement a Drought Mitigation Plan.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City limits and surrounding communities for implementation
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Provides an increase level of preparedness to reduce risk to public health, safety, and welfare reduce risk to agricultural and wildlife; ensure continued essential water supply.
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
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$34,500
Potential Funding Sources:	State and Federal Grants, General funds
Lead Agency/Department Responsible:	Public Works, Planning Department
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	FireWise, Water Utilities

COMMENTS
Develop pre-disaster activities to increase the level of preparedness within the city; create mitigation actions to identify/address the slow on set nature of drought; Partner with fire department, water works, irrigation and drainage districts, agriculture groups, conservation groups, and wildlife groups; Look into alternate technologies and methodologies for water conservation.

City of Harlingen – Action #66	
Proposed Action:	Upgrade and expand access roads used during wildfire events.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City wide with primary focus on the area around the Arroyo Colorado and birding centers
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce the risk to public health, safety, and welfare; reduce damage to wildlife habitats when responding to emergencies.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$23,000
Potential Funding Sources:	State and Federal Grant, General Fund, Texas Forest Service
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	FireWise, Wildfire Recovery Plan, Emergency Mgmt. Plan

COMMENTS

	City of Harlingen – Action #67
Proposed Action:	Improve Baker Potts roadway for access into subdivisions during all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Baker Potts from Business 83 to Drury Lane
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improvement of caliche/dirt roadway to a 37' B-B curb & gutter road to allow all weather access of emergency response vehicles and allow for evacuations, eliminate ongoing roadway repairs due to flooding.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,300,000
Potential Funding Sources:	State and Federal Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

COMMENTS

	City of Harlingen – Action #68
Proposed Action:	Implement bi-annual or annual program to remove overgrown and dead brush from undeveloped / vacant land, city parkland.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce the risk to public health, safety, and welfare; reduce fuel for wildfire on vacant land or ranch land.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire, Flood
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$92,000
Potential Funding Sources:	State and Federal Grant, General Fund, Texas Forest Service
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	FireWise, Wildfire Response Plan, Parks/Rec. Regs.

COMMENTS
Develop a plan for brush and/or overgrown vegetation on undeveloped/vacant land which do not currently have brush pickup with the city.

	City of Harlingen – Action #69
Proposed Action:	Improve Dilworth Bridge crossing for access into subdivisions in all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Dilworth Bridge crossing
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improvement of bridge crossing to ensure safety for vehicles crossing drainage ditch; ensures access of responding vehicles to areas; provides for evacuation route.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,400,000
Potential Funding Sources:	State and Federal Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

COMMENTS

		City of Harlingen – Action #70
	Proposed Action:	Improve Drury Lane roadway for access into subdivisions in all weather conditions.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Drury Lane from Beckham Road and Tamm Lane
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improve of caliche/dirt roadway to a 37' B-B curb & gutter road to allow all weather access of emergency response vehicles and allow for evacuations, eliminate ongoing roadway repairs due to flooding.
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$3,450,000
Potential Funding Sources:	State and Federal Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

COMMENTS
Partner with Cameron County on roadways.

	City of Harlingen – Action #71
Proposed Action:	The City of Harlingen shall conduct a public education campaign in the event of a necessary evacuation.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce risk to public health, safety, and welfare.
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
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$64,400
Potential Funding Sources:	State and Federal Grant, General fund
Lead Agency/Department Responsible:	Public Works, Engineering, Public Information Officer
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS
Develop a public awareness campaign regarding evacuation routes, safety information, documentations needed for re-entry into evacuated areas, medical transportation, shelters, and animal care facilities and evacuations procedure for people with pets, etc. Will include development of brochures, fliers, T.V. and/or radio spots, webpage development; Requires coordination with multiple agencies and departments.

	City of Harlingen – Action #72
Proposed Action:	Work with area agencies to develop and implement evacuation / shelter-in-place plan (pre & post) to address multiple hazards.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce risk to public health, safety, and welfare.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Local Plans and Regulations, Education and Awareness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Tornado, Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$34,500
Potential Funding Sources:	State and Federal Grant, General fund
Lead Agency/Department Responsible:	Public Works, Engineering Department, Emergency Management Coordinator,
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan, Evacuation Plan

COMMENTS
Develop a plan regarding evacuation routes, safety information, documentations needed for re-entry into evacuated areas, medical transportation, shelters, animal care facilities and evacuations of animals, shelter- in-place facilities, and post event clean up procedures, etc.; Will require coordination with multiple agencies and departments.

	City of Harlingen – Action #73
Proposed Action:	Install mobile and permanent generators with permanent quick connections at critical facilities.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Critical facilities within the City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Services will continue to function in the event of an emergency.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Tornado, Thunderstorm Wind, Hail, Extreme Heat, Lightning, Winter Storm, Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$230,000 - $345,000 each generator
Potential Funding Sources:	State and Federal Grant, General funds
Lead Agency/Department Responsible:	Public Works, Public Buildings, Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS
May require additional work to buildings for connection of the buildings to generators (electrical services, concrete pads, etc.) Locations of generators would be City Hall, Lon C Hill Building, Auditorium, Casa de Amistad, and Case del Sol.

	City of Harlingen – Action #74
Proposed Action:	Improve Morris Road roadway for access into subdivisions in all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Morris Road from Rangerville Road (F.M. 1479) to Ed Carey (F.M. 801)
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improve the roadway from 18' asphalt rural section roadway to 37' B-B curb & gutter rural section to allow all weather access of emergency response vehicles and allow for evacuations, eliminate ongoing roadway repairs due to flooding.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$6,440,000
Potential Funding Sources:	State and Federal Grant, General funds
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Storm Mgmt., Flood Plan, CIP Budget

COMMENTS
Partner with Cameron County on roadway as sections are in the county.

	City of Harlingen – Action #75
Proposed Action:	Install hail guards on HVAC systems supporting critical facilities and to protect against severe Hail in excess of ½ inch diameter.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Key critical facilities within City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce repairs and replacement of costly systems and continue essential service to 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:	Hail
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	High
Estimated Cost:	$287,500
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Emergency Management
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Emergency Management Plan

COMMENTS

		City of Harlingen – Action #76
	Proposed Action:	Improve Hughes Road roadway for access into subdivisions in all weather conditions.
	BACKGROUND INFORMATION	
	Jurisdiction/Location:	Hughes Road from Tamm Lane west to FM 800 Bass Boulevard
	Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improvement of caliche/dirt roadway to a 37' B-B curb and gutter road to allow all weather access of emergency response vehicles and allow for evacuations, eliminate ongoing roadway repairs due to flooding.
	Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,300,000
Potential Funding Sources:	State and Federal Grant, General funds
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Storm Mgmt., Flood Plan, CIP Budget

COMMENTS

	City of Harlingen – Action #77
Proposed Action:	Improve Lipscomb Road roadway for access into subdivisions in all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	The proposed improvements are on Lipscomb Road from Rangerville Road (F.M. 1479) East to Ed Carey (F.M. 801)
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improvement of roadway from caliche/dirt to 37' B-B curb & gutter to allow all weather access of emergency response vehicles and allow for evacuations, eliminate ongoing roadway repairs due to flooding.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$6,440,000
Potential Funding Sources:	State and Federal Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

COMMENTS

	City of Harlingen – Action #78
Proposed Action:	Purchase property to use as drainage easement.
BACKGROUND INFORMATION	
Jurisdiction/Location:	The proposed easement shall be located on the Northeast of Lot 1 of Colunga Subdivision
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Providing a drainage easement along the property will allow the City of Harlingen to alleviate ongoing flooding issues in the area.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$50,000
Potential Funding Sources:	State and Federal Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

COMMENTS

City of Harlingen – Action #79	
Proposed Action:	Purchase NOAA "all hazards" radios for early warning and post –event information and place in schools, critical facilities.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce the risk to public health, safety, and welfare.
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, Hail, Tornado, Thunderstorm Wind, Wildfire
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$34,500
Potential Funding Sources:	Grant, General Fund, CDBG, Private and Public partnerships
Lead Agency/Department Responsible:	Emergency operations
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan

COMMENTS
Purchase of radios for distribution; cost of radios is approximately $50.00 each radio; possible distribution to include public housing and mobile home parks.

City of Harlingen – Action #80	
Proposed Action:	Improve North Tamm Lane for access into subdivisions in all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	The proposed improvements shall be constructed on North Tamm Lane from the frontage road on Expressway 83 North to Hick Hill Road
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improvement of roadway from caliche/dirt road to a 37' B-B curb & gutter section to allow all weather access of emergency response vehicles and allow for evacuations, eliminate ongoing roadway repairs due to flooding.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$1,725,000
Potential Funding Sources:	State and Federal Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

COMMENTS

	City of Harlingen – Action #81
Proposed Action:	Install pump station and increase the size of outfall boxes at the North Floodway.
BACKGROUND INFORMATION	
Jurisdiction/Location:	East of Expressway 77 along Ballenger Road. Location of pump will be along the South bank of the floodway
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce the damage to critical infrastructure and reduce the risk to public health, safety, and welfare, and reduce the damage to structures (residential and commercial).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structure and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,500,000
Potential Funding Sources:	State and Federal Grants, General Funds, Partnerships
Lead Agency/Department Responsible:	Public Works, Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Flood Plan

COMMENTS
Pump would allow for continuous drainage when the floodgates to the North Floodway are closed due to flooding concerns. The project would include a pump, housing, security measures (fencing), remote access (via cellular service), elevation of structure, etc.

	City of Harlingen – Action #82
Proposed Action:	Install an area-wide telephone emergency notification system (Reverse 911).
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce the risk to public health, safety, and welfare; provide better communication for evacuations or instructions to the public in the event of an emergency.
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, Thunderstorm Wind, Tornado, Hail, Wildfire, Extreme Heat
Effect on New/Existing Buildings:	N/A
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$172,500
Potential Funding Sources:	State and Federal Grant, General Fund, CDBG
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Emergency Operations Plan, coordination with other depts.

COMMENTS
Provide public with instructions or information regarding emergency situations.

	City of Harlingen – Action #83
Proposed Action:	Install a stream gauge monitoring station at the spillway.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Treasure Hills spillway located on Clifford Street
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce damage to critical infrastructure (drainage system).
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
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$150,000
Potential Funding Sources:	State and Federal Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Flood plan

COMMENTS
Install the monitoring station to ensure damage to spillway is minimized.

	City of Harlingen – Action #84
Proposed Action:	Improve Teege Road Bridge crossing for access into subdivisions in all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	The bridge is located to the West of the intersection of Teege Road and Brazil Road
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improvement of bridge crossing to ensure safety for vehicles crossing drainage ditch; ensures access of responding vehicles to areas; provides for evacuation route.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$920,000
Potential Funding Sources:	State and Federal Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations; Cameron County
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

COMMENTS
Partner with Cameron County as bridge is in the county.

	City of Harlingen – Action #85
Proposed Action:	Improve Traxler Way roadway for access into subdivision throughout all weather conditions.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Traxler Way from the frontage on Expressway 83 West to F.M. 800
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Improvement of roadway from 16' asphalt/caliche rural section to 37' B-B curb & gutter rural section to allow all weather access of emergency response vehicles and allow for evacuations and eliminate ongoing roadway repairs due to flooding.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$2,300,000
Potential Funding Sources:	State and Federal Grant, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Mgmt., Flood Plan, CIP Budget

COMMENTS

	City of Harlingen – Action #86
Proposed Action:	The City of Harlingen shall create and implement a wildfire recovery plan to address soil erosion control and vegetative recovery.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City wide with primary focus on the area around the Arroyo Colorado
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Reduce the risk to public health, safety, and welfare; protect natural habitat area.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Natural Systems Protection Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$23,000
Potential Funding Sources:	State and Federal Grant, General Fund, Texas Forest Service
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	FireWise, Land Use Plans

COMMENTS

City of Harlingen – Action #87	
Proposed Action:	The City of Harlingen shall remove dead and downed trees to decrease fire fuels in Wildland Urban Interface (WUI) areas.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Natural landform protection and reduced risk of loss of property due to wildfire.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Natural Systems Protection

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Wildfire
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$28,750
Potential Funding Sources:	Texas Forest Service, FireWise
Lead Agency/Department Responsible:	Parks & Recreation
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	FireWise Plan, Fire Protection Plan

COMMENTS

City of Harlingen – Action #88	
Proposed Action:	The City of Harlingen shall develop and implement a Drought Emergency Plan to include rainwater harvesting, water conservation measures and promoting drought-tolerant landscaping.
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Harlingen
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Conserve water for long-term availability for area residents.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Education and Awareness Local Plans and Regulations

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Drought
Effect on New/Existing Buildings:	Reduce risk to existing structures
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	$11,500
Potential Funding Sources:	Texas Forest Service, FireWise
Lead Agency/Department Responsible:	Parks & Recreation
Implementation Schedule:	Within 24 months of plan adoption
Incorporation into Existing Plans:	FireWise Plan, Fire Protection Plan

COMMENTS

City of Harlingen – Action #89	
Proposed Action:	The proposed drainage improvements will include an increase in channel and culvert size to expand capacity though System C – Dixieland Drainage Ditch Improvements.
BACKGROUND INFORMATION	
Jurisdiction/Location:	The ditch improvements will be from Lincoln Avenue, between Dixieland Road and Tucker Road, to the outfall at the Arroyo Colorado
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	The proposed improvements will reduce damage to infrastructure (streets and drainage systems), reduce risk to public health, safety, and welfare, reduce damage to structures (homes and businesses).
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$3,270,000
Potential Funding Sources:	State and Federal Grants, General Fund
Lead Agency/Department Responsible:	Public Works/Engineering
Implementation Schedule:	Within 12-24 months of plan adoption
Incorporation into Existing Plans:	Stormwater Plan, Floodplain Mgmt. Plan, CIP Budget

COMMENTS
The proposed project improvements will be a collaborative effort between the Drainage District and the City of Harlingen.

	City of Harlingen – Action #90
Proposed Action:	Improve and upgrade the Emergency Operations Building
BACKGROUND INFORMATION	
Jurisdiction/Location:	Fire Station #3 on Loop 499
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Provides for continuation of critical operations during emergency events.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Thunderstorm, Tornado, Hail, Wildfire
Effect on New/Existing Buildings:	Reduce impact on critical facility in natural disasters
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,575,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	Within 12 months of plan adoption
Incorporation into Existing Plans:	Emergency Operation Plan

COMMENTS

City of Harlingen – Action #91	
Proposed Action:	Perform a Right-of-Way asset inventory throughout the entire City
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Harlingen city limits
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Provides for photo and data documentation of the existing conditions for all above-ground City infrastructure.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Local Plans & Regulations - Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Hurricane Wind, Extreme Heat, Thunderstorm Wind, Lightning, Drought, Tornado, Hail, Winter storm, Wildfire
Effect on New/Existing Buildings:	Provides snapshot of existing infrastructure conditions
Priority (High, Moderate, Low):	High
Estimated Cost:	$500,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	2020 or upon funding
Incorporation into Existing Plans:	Emergency Operation Plan

COMMENTS

City of Harlingen – Action #92	
Proposed Action:	Perform a drainage system asset inventory throughout the entire City
BACKGROUND INFORMATION	
Jurisdiction/Location:	City of Harlingen city limits
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Provides for photo and data documentation of the existing conditions for all drainage appurtenances.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Local Plans & Regulations - Preparedness

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood, Extreme Heat, Drought, Tornado, Wildfire
Effect on New/Existing Buildings:	Provides snapshot of existing infrastructure conditions
Priority (High, Moderate, Low):	High
Estimated Cost:	$2,500,000
Potential Funding Sources:	Grants, General Fund
Lead Agency/Department Responsible:	Public Works, Engineering, Emergency Operations
Implementation Schedule:	2020 or upon funding
Incorporation into Existing Plans:	Emergency Operation Plan

COMMENTS

CITY OF PALM VALLEY

City of Palm Valley – Action #1	
Proposed Action:	Drainage improvement and infrastructure project including: Dredging all 8 lakes; improve/upgrade retention walls and bulkheads as needed to all lakes; Remove existing underground drainage pipes and replace with larger diameter pipes to increase water flow.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Palm Valley area lakes
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Mitigate flooding and damage / improve drainage capacity.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$3,800,000
Potential Funding Sources:	State and Federal Grants, HMGP, TWDB
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan, Floodplain Mgmt. Plan

COMMENTS

	City of Palm Valley – Action #2
Proposed Action:	Lake 7: Install new underground drainage pipe from Lake #7 (north-most lake) utilizing existing public easements and connect it to the drainage ditch on Dilworth Rd.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Palm Valley lake #7
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Mitigate flooding and damage / improve drainage capacity.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,500,000
Potential Funding Sources:	State and Federal Grants, HMGP, TWDB
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan, Floodplain Mgmt. Plan

COMMENTS

	City of Palm Valley – Action #3
Proposed Action:	Papaya: Install a new underground drainage pipe from Papaya Circle and connect it to lake(s) 2 & 1 then to new drainage ditch on the golf course that drains to the south.
BACKGROUND INFORMATION	
Jurisdiction/Location:	Palm Valley lake3 #1 and 2
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Mitigate flooding and damage / improve drainage capacity.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$350,000
Potential Funding Sources:	State and Federal Grants, HMGP, TWDB
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan, Floodplain Mgmt. Plan

COMMENTS

	City of Palm Valley – Action #4
Proposed Action:	South Ditch: In conjunction with Drainage District 5 Project, remove existing underground drainage pipe, excavate ditch and in lieu of drainage pipe, create open ditch which will be concrete-lined the entire length of the ditch (drains south).
BACKGROUND INFORMATION	
Jurisdiction/Location:	Palm Valley south ditch
Risk Reduction Benefit *(Current Cost/Losses Avoided)*:	Mitigate flooding and damage / improve drainage capacity.
Type of Action (*Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection, or Education and Awareness)*:	Structure and Infrastructure Project

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Flood
Effect on New/Existing Buildings:	Reduce risk to new and existing structures and infrastructure
Priority (High, Moderate, Low):	High
Estimated Cost:	$1,500,000
Potential Funding Sources:	State and Federal Grants, HMGP, TWDB
Lead Agency/Department Responsible:	City Administration
Implementation Schedule:	Within 12-36 months of plan adoption
Incorporation into Existing Plans:	Stormwater Management Plan, Floodplain Mgmt. Plan

COMMENTS

SECTION 20: PLAN MAINTENANCE

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

PLAN MAINTENANCE PROCEDURES

The following is an explanation of how the participating jurisdictions within Cameron 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 Cameron 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 Cameron 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 20: PLAN MAINTENANCE

Participating jurisdictions within Cameron 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 amendments in light of the approved Plan. The planning team will review all comprehensive land use plans, capital improvement plans, 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 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.

Cameron County is committed to supporting the participating jurisdictions as they implement their mitigation actions. Planning team members will review and revise, as necessary, the long-range goals and objectives in strategic plan and budgets to ensure that they are consistent with this mitigation action plan. Additionally, the Planning Area will work to advance the goals of this hazard mitigation plan through its routine, ongoing, long-range planning, budgeting, and work processes.

Table 20-1 identifies types of planning mechanisms and examples of methods for incorporating the Plan Update into other planning efforts. The team members, listed in Table 20-2 below, will be responsible for the review of these planning mechanisms and their incorporation of the plan, with the exception of the Floodplain Management Plans; the jurisdictions who have a Floodplain Administrator on staff will be responsible for incorporating the plan when floodplain management plans are updated or new plans are developed.

Table 20-1. Methods of Incorporation of the Plan

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
Annual Budget Review	Cameron County: EMC City of Harlingen: Assistant City Manager City of Palm Valley: Police Chief	Various departments and key personnel that participated in the planning process for participating jurisdictions within Cameron County will review the Plan and mitigation actions therein when conducting their annual budget review. Allowances will be made in accordance with grant applications sought, and mitigation actions that will be undertaken, according to the implementation schedule of the specific action.

SECTION 20: PLAN MAINTENANCE

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
Capital Improvement Plans	Cameron County: EMC City of Harlingen: Assistant City Manager City of Palm Valley: Police Chief	Participating jurisdictions within Cameron 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	Cameron County: EMC City of Harlingen: Assistant City Manager City of Palm Valley: Police Chief	Participating jurisdictions within Cameron County have a Long-term Comprehensive Development Plan 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	Cameron County: Floodplain Manager City of Harlingen: Floodplain Manager City of Palm Valley: Floodplain Manager	Floodplain management plans include preventative and corrective actions to address the flood hazard. Therefore, the actions for flooding and information found in Section 5 of this Plan Update discussing the people and property at risk to flood will be reviewed and revised when participating jurisdictions within Cameron County update their management plans or develops new plans.
Grant Applications	Cameron County: EMC City of Harlingen: Assistant City Manager City of Palm Valley: Police Chief	The Plan will be evaluated by participating jurisdictions within Cameron County when grant funding is sought for mitigation projects. If a project is not in the Plan Update, an amendment may be necessary to include the action in the Plan.
Regulatory Plans	Cameron County: EMC City of Harlingen: Assistant City Manager City of Palm Valley: Police Chief	Currently, participating jurisdictions within Cameron County have regulatory plans in place, such as Emergency Management Plans, Continuity of Operations Plans, Land Use Plans, and Evacuation Plans. The

PLANNING MECHANISM	DEPARTMENT / TITLE RESPONSIBLE	INCORPORATION OF PLAN
		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 20-2 indicates the department and title of the party responsible for Plan monitoring, evaluating, updating, and review of the Plan.

Table 20-2. Team Members Responsible for Plan Monitoring, Evaluating, Updating, and Review of the Plan

JURISDICTION	TITLE
Cameron County	EMC
Cameron County	Fire Marshal
Cameron County	Planner
City of Harlingen	Assistant City Manager
City of Palm Valley	Police Chief

MONITORING

Designated Planning Team members are responsible for monitoring, evaluating, updating, and reviewing the Plan, as shown in Table 20-2. Individuals holding the title listed in Table 20-2 will be responsible for monitoring the Plan on an annual basis. Plan monitoring includes reviewing and incorporating into the Plan other existing planning mechanisms that relate or support goals and objectives of the Plan; monitoring the incorporation of the Plan into future updates of other existing planning mechanisms as appropriate; reviewing mitigation actions submitted and coordinating with various County 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 AMENDMENTS

At any time, minor technical changes may be made to update the Cameron County Hazard Mitigation Action Plan Update 2021. 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 Cameron County will review proposed amendments and vote to accept, reject, or amend the proposed change. Upon ratification, the amendment will be transmitted to TDEM.

In determining whether to recommend approval or denial of a Plan amendment 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 Cameron 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 amendment process outlined herein. Upon completion of the review, update, and amendment 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: PLANNING TEAM

Planning Team Members 1
Stakeholders 3

PLANNING TEAM MEMBERS

The Cameron County Hazard Mitigation Action Plan 2021 was organized using a direct representative model. An Executive Planning Team from the participating jurisdictions, shown in Table A-1, was formed to coordinate planning efforts and request input and participation in the planning process. Table A-2 reflects the Advisory Planning Team, consisting of area organizations and departments that participated throughout the planning process. Table A-3 is comprised of stakeholders who were invited to provide Plan input. Public outreach efforts and meeting documentation is provided in Appendix E.

Table A-1. Executive Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Cameron County	EMC
Cameron County	Fire Marshal
Cameron County	Planner
City of Harlingen	Assistant City Manager
City of Palm Valley	Police Chief

Table A-2. Advisory Planning Team

ORGANIZATION / DEPARTMENT	TITLE
Cameron County	Deputy Fire Marshal
Cameron County	Assistant Deputy Fire Marshal
Cameron County	County Judge
Cameron County	County Administrator
Cameron County	County Engineer
Cameron County	Assistant Engineer
Cameron County	Public Relations Officer
Cameron County	Administrative Assistant Pct. 2

APPENDIX A: PLANNING TEAM

ORGANIZATION / DEPARTMENT	TITLE
Cameron County	County Commissioner Pct. 4
Cameron County	Administrative Assistant Pct. 4
Cameron County	Building Official
Cameron County	Cartographer
Cameron County	Bridge Manager
Cameron County	Parks Director
Cameron County	Deputy Parks Director
Cameron County	Public Works Superintendent
Cameron County	Foreman Pct. 4
Cameron County	Planning Director
Cameron County	Natural Resources Coordinator
City of Harlingen	City Manager
City of Harlingen	Executive Administrative Assistant
City of Harlingen	City Engineer
City of Harlingen	Special Projects Director
City of Harlingen	Media Contact
City of Harlingen	Fire Chief
City of Harlingen	Chief of Police
City of Harlingen	Assistant Chief of Police
City of Harlingen	Police Commander
City of Harlingen	Police Commander
City of Harlingen	Deputy Chief of Police
City of Harlingen	Public Works Director
City of Harlingen	Water Works - System Engineer
City of Harlingen	Assistant City Manager
City of Harlingen	Assistant City Engineer
City of Harlingen	Accreditation

APPENDIX A: PLANNING TEAM

ORGANIZATION / DEPARTMENT	TITLE
City of Harlingen	Assistant Fire Chief
City of Harlingen	Planning Director
City of Palm Valley	Mayor
City of Palm Valley	Public Works Director
City of Palm Valley	City Secretary

STAKEHOLDERS

The following groups listed in Table A-3 represent a list of organizations invited to stakeholder meetings, public meetings, and workshops throughout the planning process and include: 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 E[1].

Table A-3. Stakeholders

AGENCY	TITLE
Arroyo City – Volunteer Fire Department	Public Information Officer
Brownsville ISD	Superintendent
Cameron County Drainage District #1	Chief of Operations
Cameron County Drainage District #3 & Irrigation #2	Manager
City of Brownsville	EMC
City of Brownsville	EM Planner
East Rio Hondo Water Supply	President of the Board
EPA	Border Office
La Feria Irrigation District #3	District Manager
Los Fresnos ISD	Superintendent
Rio Hondo ISD	Superintendent
San Benito ISD	Superintendent
San Benito ISD	Student Services

[1] Information contained in Appendix E is exempt from public release under the Freedom of Information Act (FOIA).

APPENDIX A: PLANNING TEAM

AGENCY	TITLE
SWG Engineering	Project Engineer
TAMU	Planning Specialist, Texas Sea Grant
TAMU	County Extension Agent
Texas Legislators	Representative
Texas Legislators	Representative
Texas Legislators	Representative
Texas Legislators	Senator
Valley Baptist Medical Center	Nurse Director
Valley International Airport	Police Chief
Valley International Airport	Assistant Airport Director

APPENDIX B: PUBLIC SURVEY RESULTS

Overview 1
Public Survey Results 2

OVERVIEW

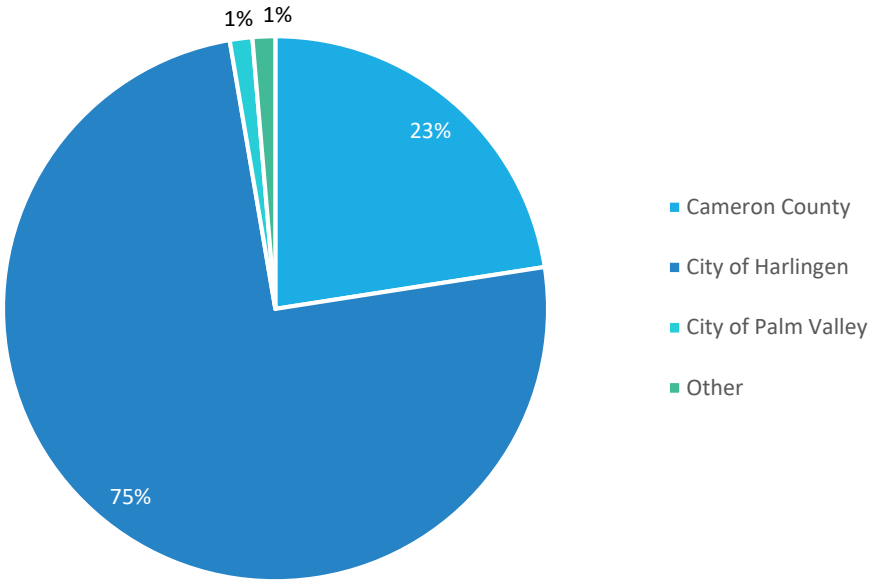
Cameron County prepared a public survey that requested public opinion on a wide range of questions relating to natural hazards. The survey was made available via the County's websites, along with participating jurisdictions. This survey link was also distributed at public meetings and stakeholder events throughout the planning process.

A total of 297 surveys were collected, the results of which are analyzed in Appendix B. The purpose of the survey was twofold: 1) to solicit public input during the planning process, and 2) to help the jurisdictions identify any potential actions or problem areas.

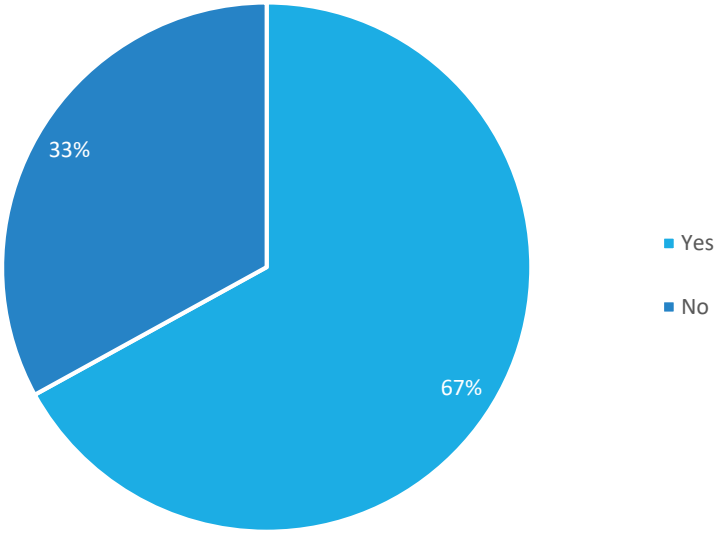
The following survey results depict the percentage of responses for each answer. Similar responses have been summarized for questions that did not provide a multiple-choice answer or that required an explanation.

PUBLIC SURVEY RESULTS

1. Please state the jurisdiction (city or community) where you reside.[1]

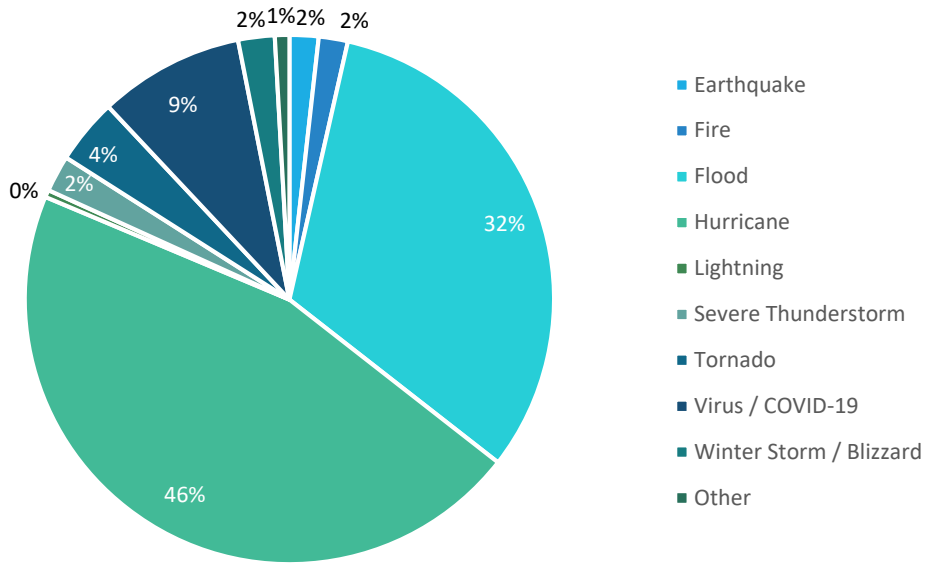


2. Have you ever experienced or been impacted by a disaster?

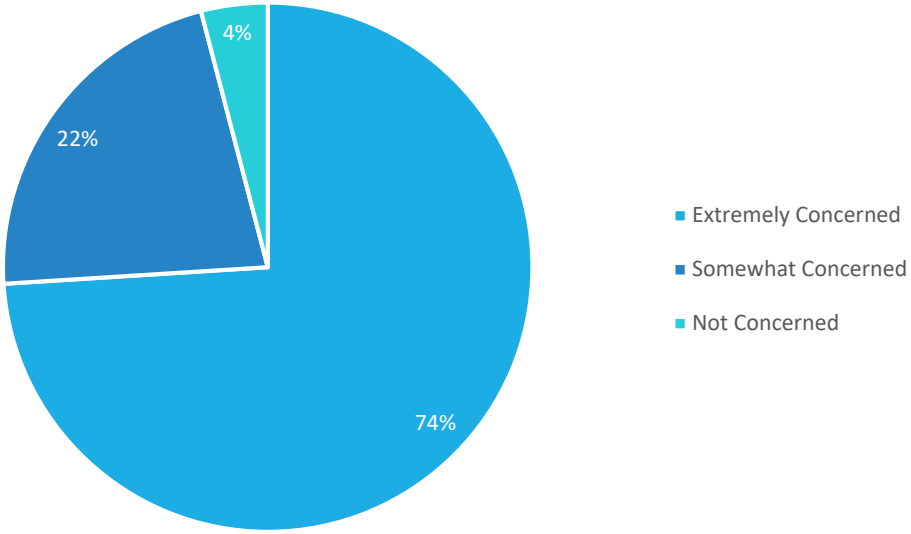


[1] Some respondents were in neighboring counties, however due to their proximity to Cameron County, their responses were included in the survey results.

3. If you answered “Yes” to Question #2, please explain.[2]

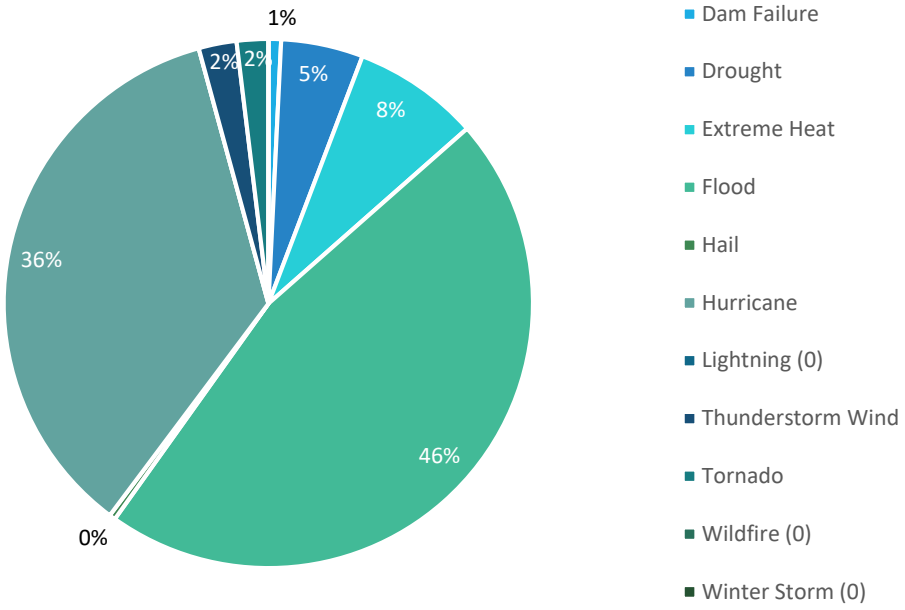


4. How concerned are you about the possibility of your community being impacted by a disaster?

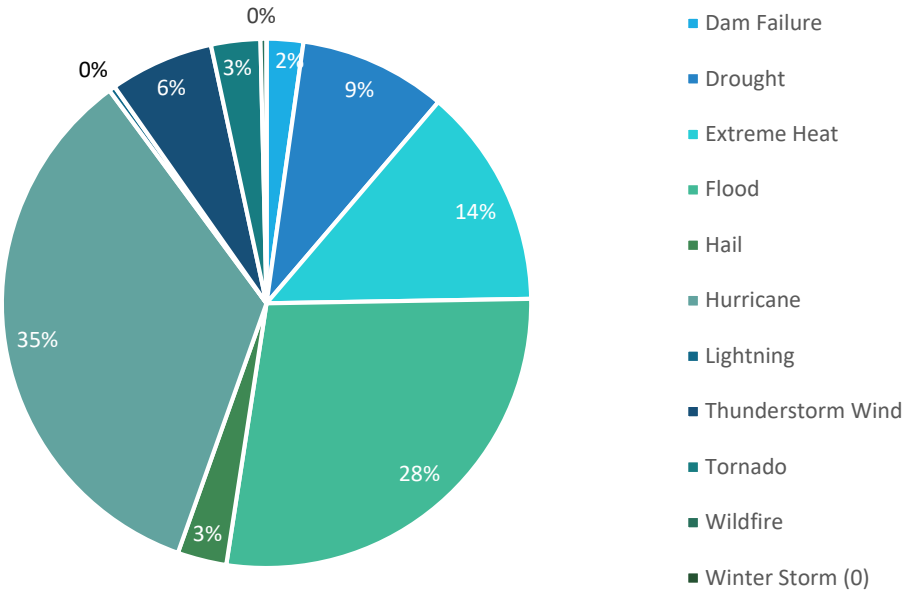


[2] Those who experienced Earthquakes were not living within the Planning Area when they were impacted by them.

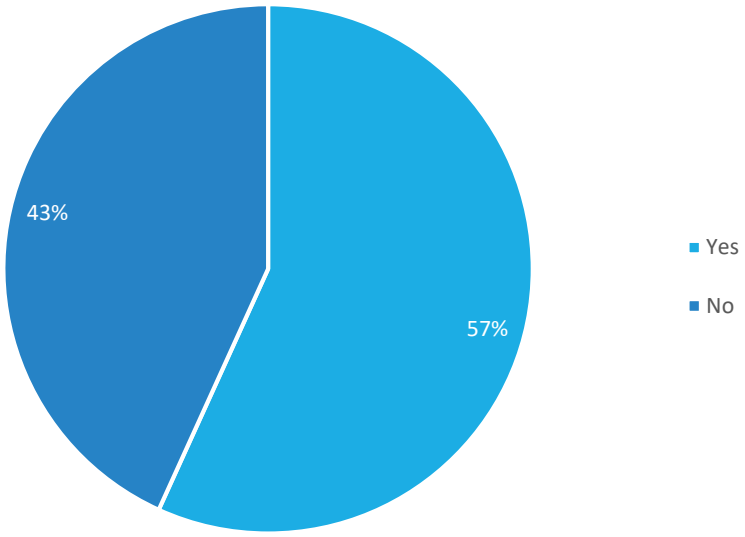
5. Please select the one hazard you think is the highest threat to your neighborhood:



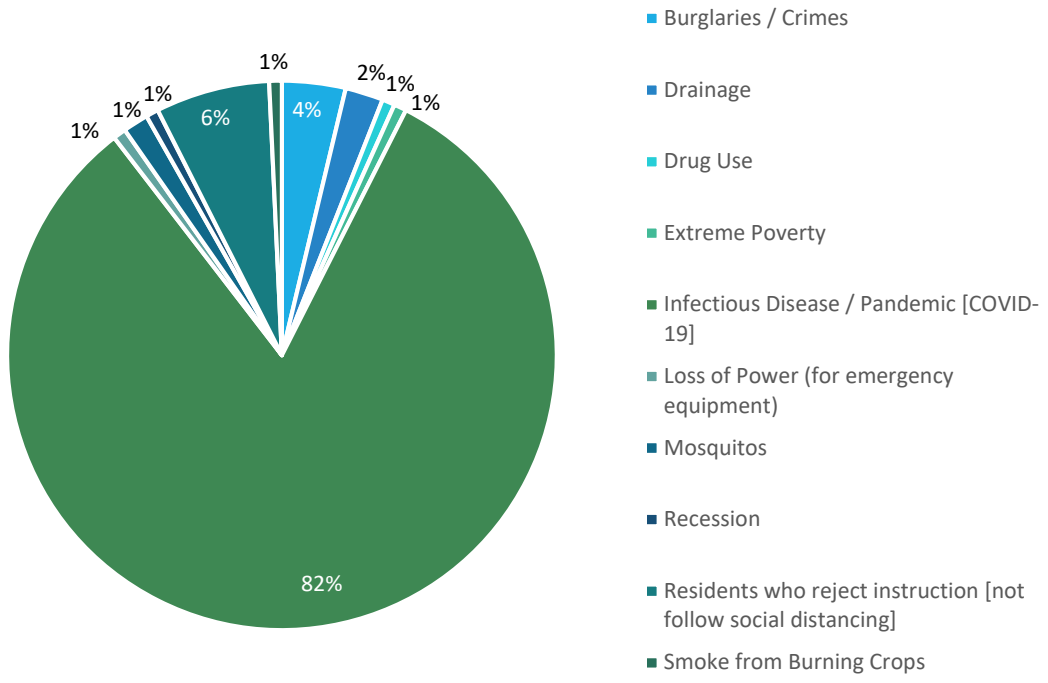
6. Please select the one hazard you think is the second highest threat to your neighborhood:



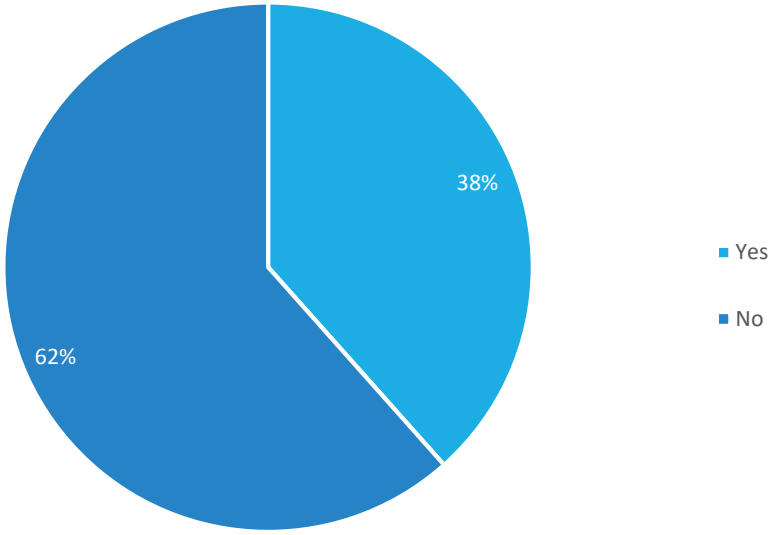
7. Is there another hazard not listed above that you this is a wide-scale threat to your neighborhood?



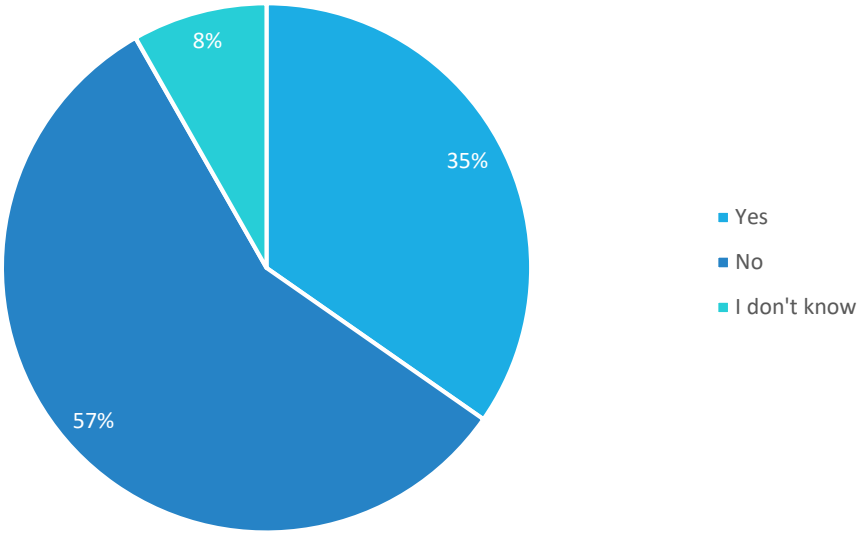
8. If you answered “Yes” to Question #7, please explain.



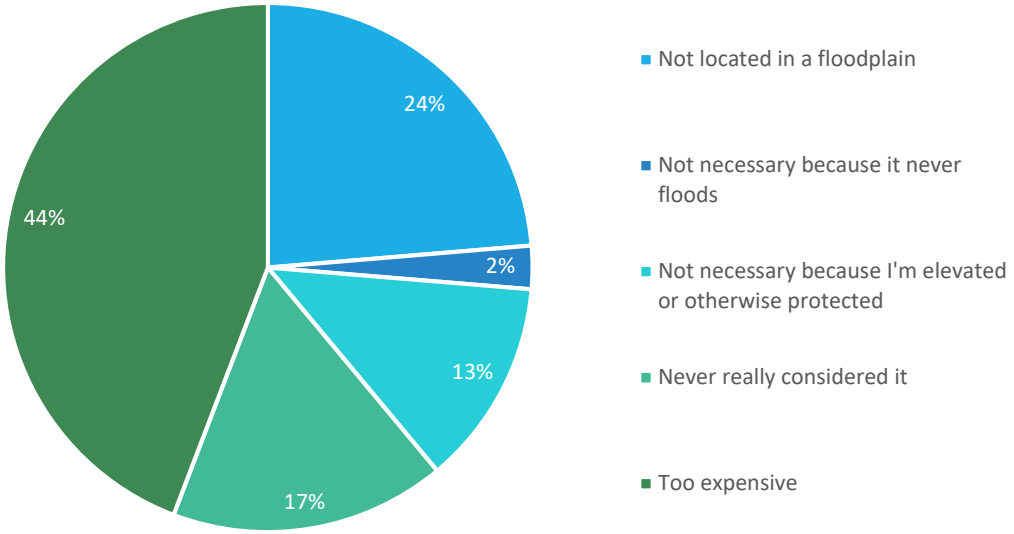
9. Is your home located in a floodplain?



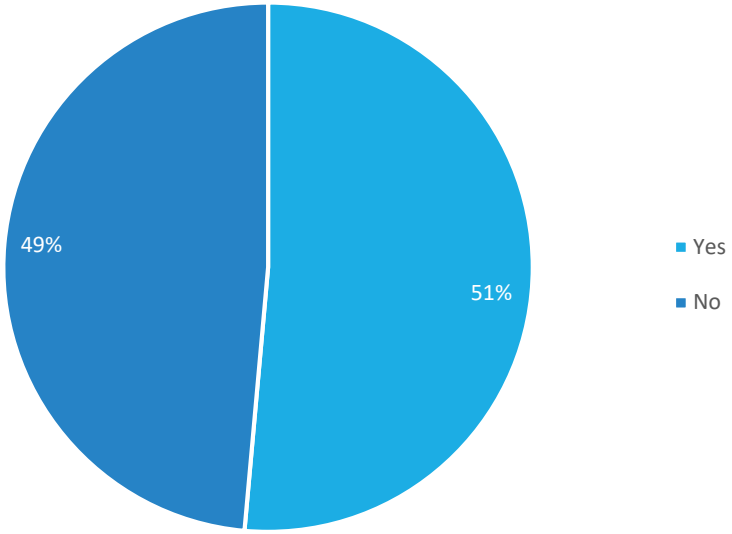
10. Do you have flood insurance?



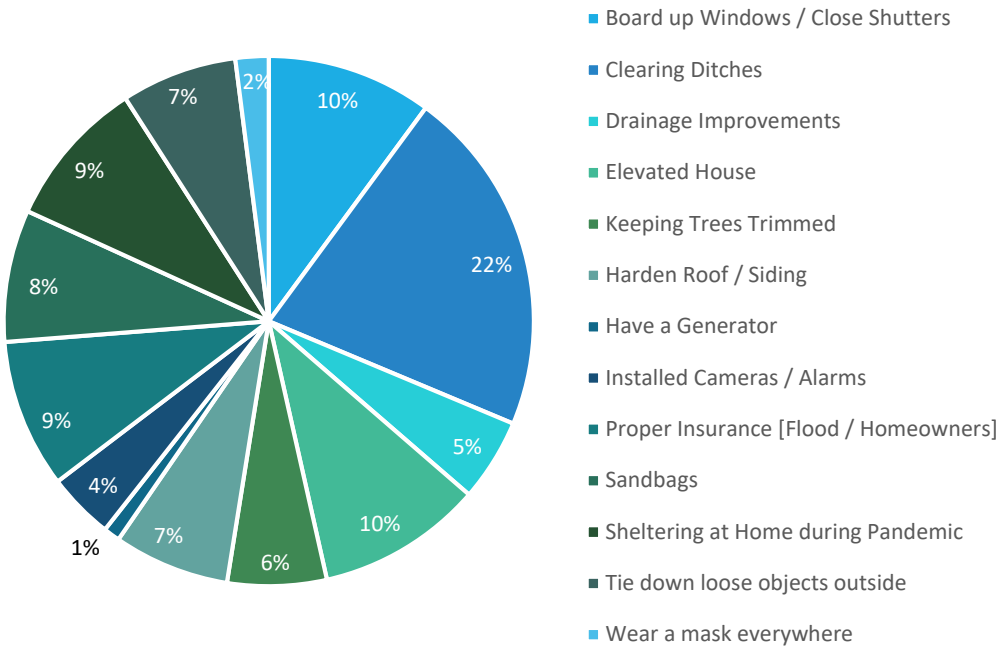
11. If you do not have flood insurance, why not?



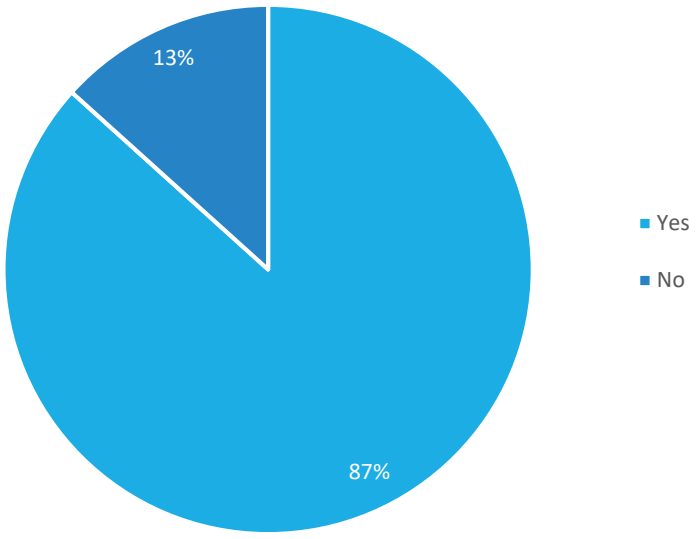
12. Have you taken any actions to make your home or neighborhood more resistant to hazards?



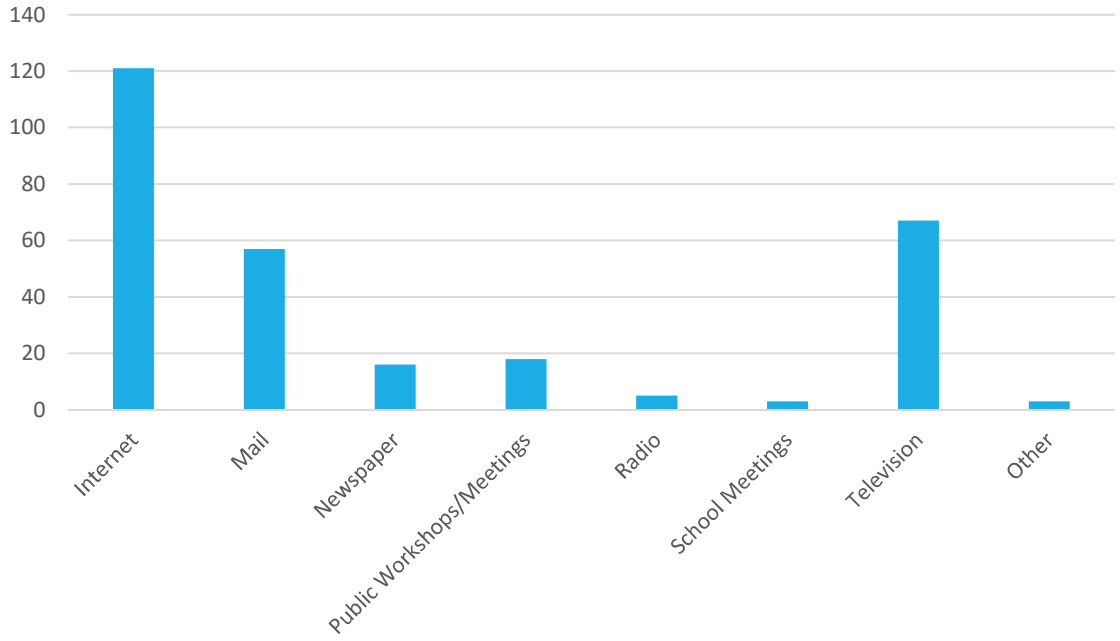
13. If you answered “Yes” to Question #12, please explain.



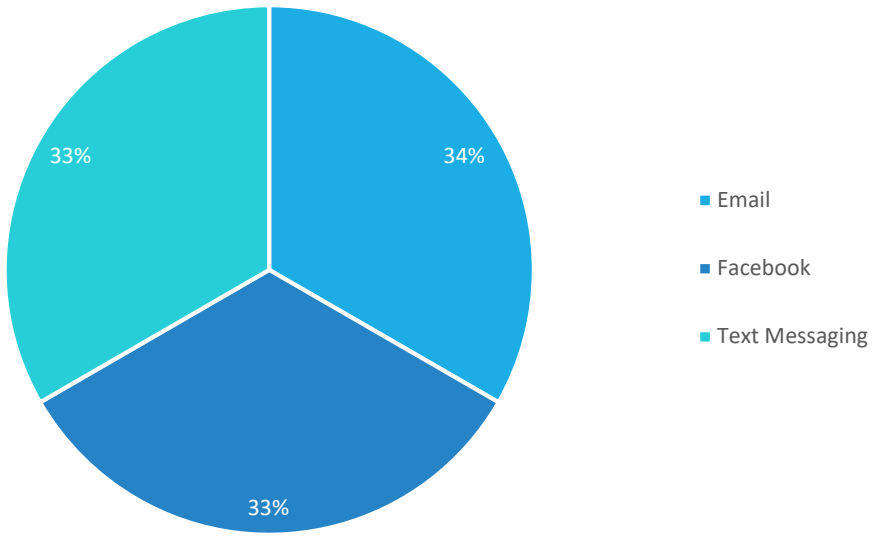
14. Are you interested in making your home or neighborhood more resistant to hazards?



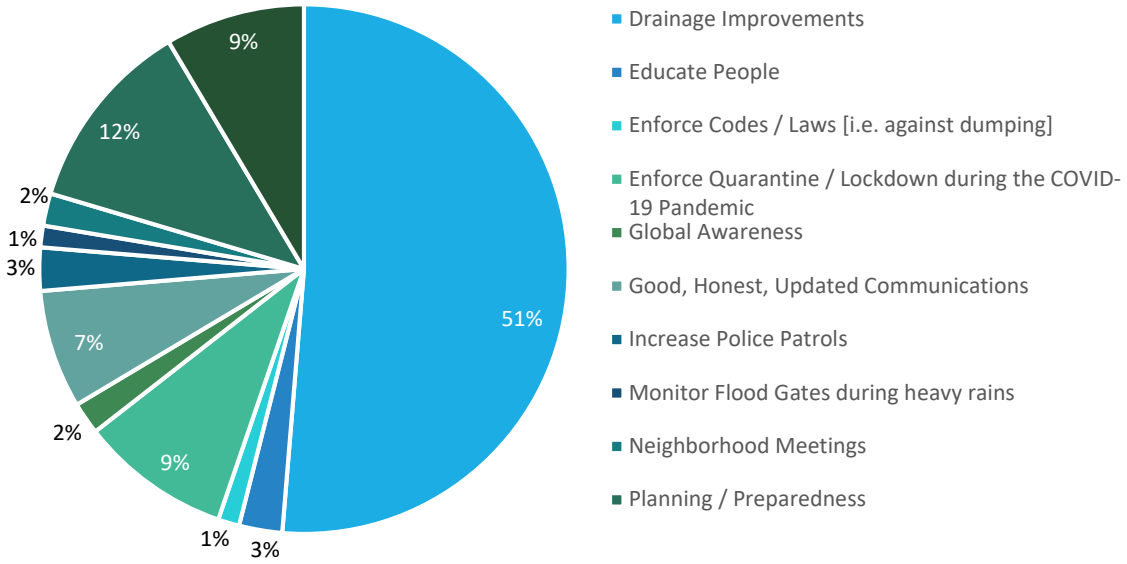
15. What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards?



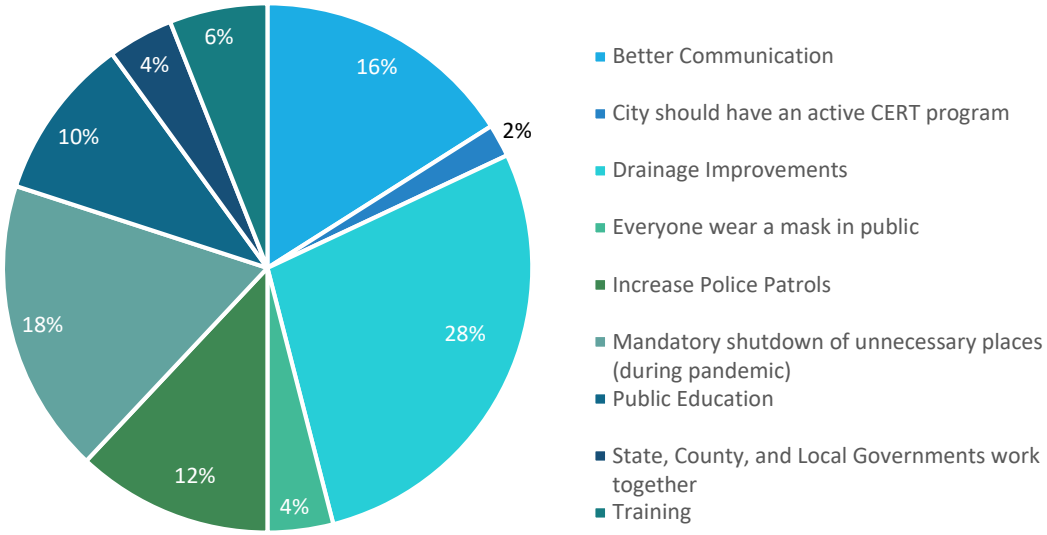
16. If you answered “Other” to Question #15, please explain.



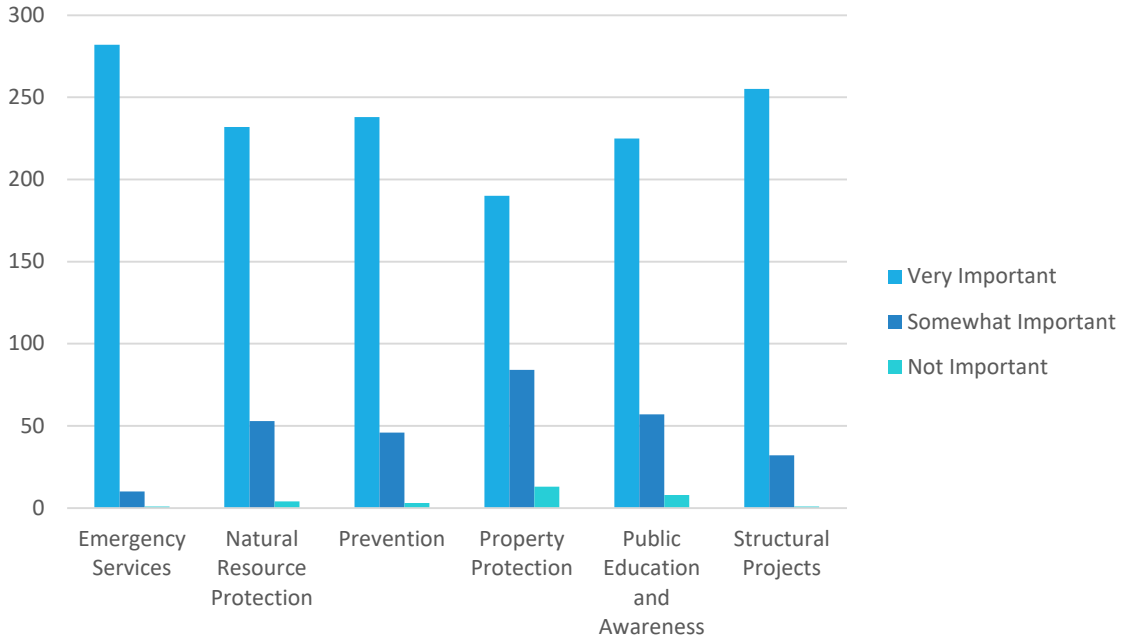
17. In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood?



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 C: CRITICAL FACILITIES

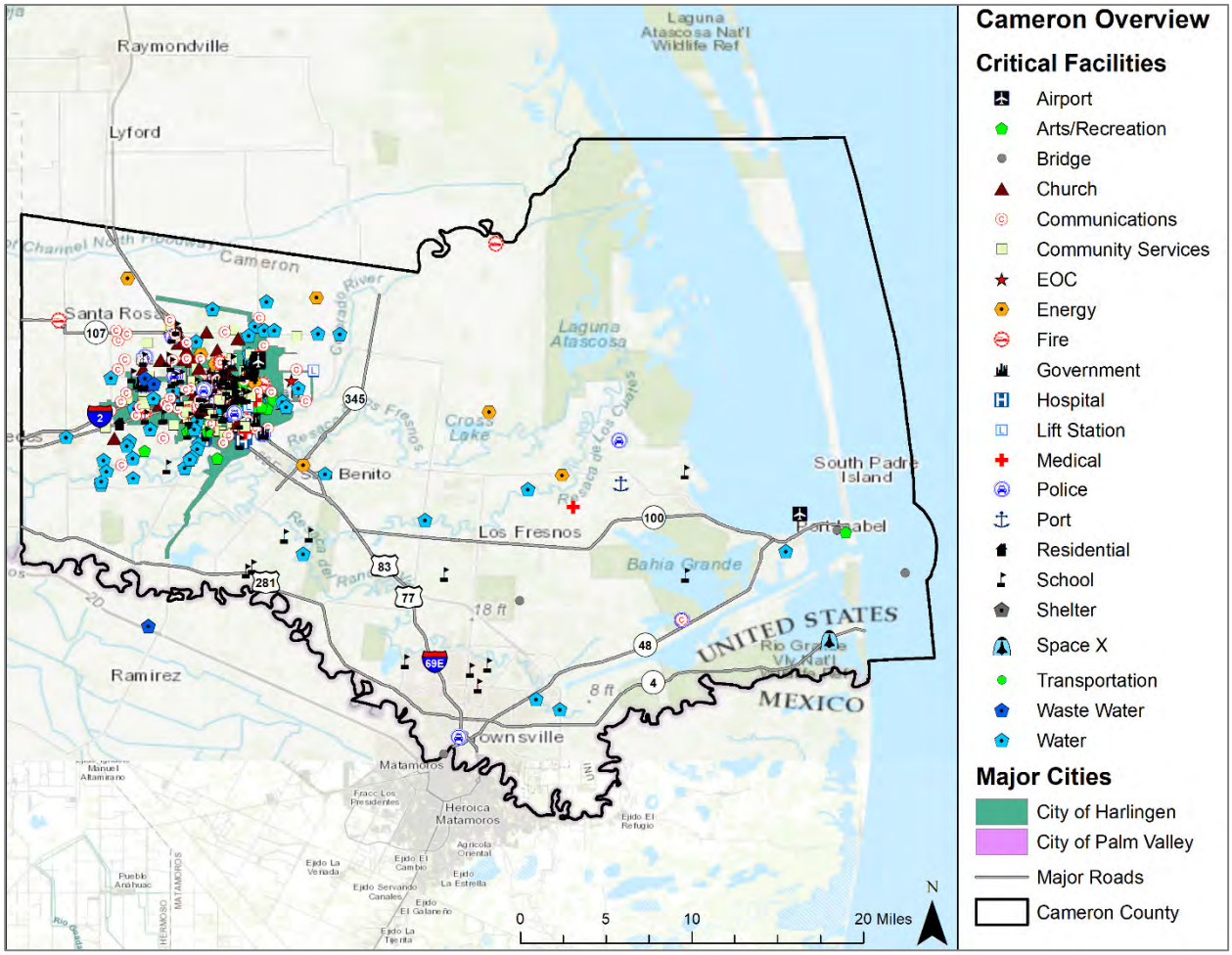
Overview 1
Critical Facilities 1

OVERVIEW

This Appendix is **For Official Use Only (FOUO)** and may be exempt from public release under FOIA. Figures C-1 through C-3 locate all critical facilities that were included in the risk assessment. Mapped facilities were provided by Planning Team members. Tables C-1 through C-3 note the critical facilities by type.

CRITICAL FACILITIES

Figure C-1. Critical Facilities in Cameron County



APPENDIX C: CRITICAL FACILITIES

Table C-1. Critical Facilities by Type in Cameron County

TYPE	NUMBER
Airport	1
Bridge	6
Detention Center	2
EOC	1
Fire Department	2
Heliport	2
Hospital	2
Park	1
Police Dispatch	2
Police Station	1
Sea Port	2
School	15
Shelter	1
SpaceX	1
Utilities	1
Water District	9
Wind Farm	2

Figure C-2. Critical Facilities in the City of Harlingen

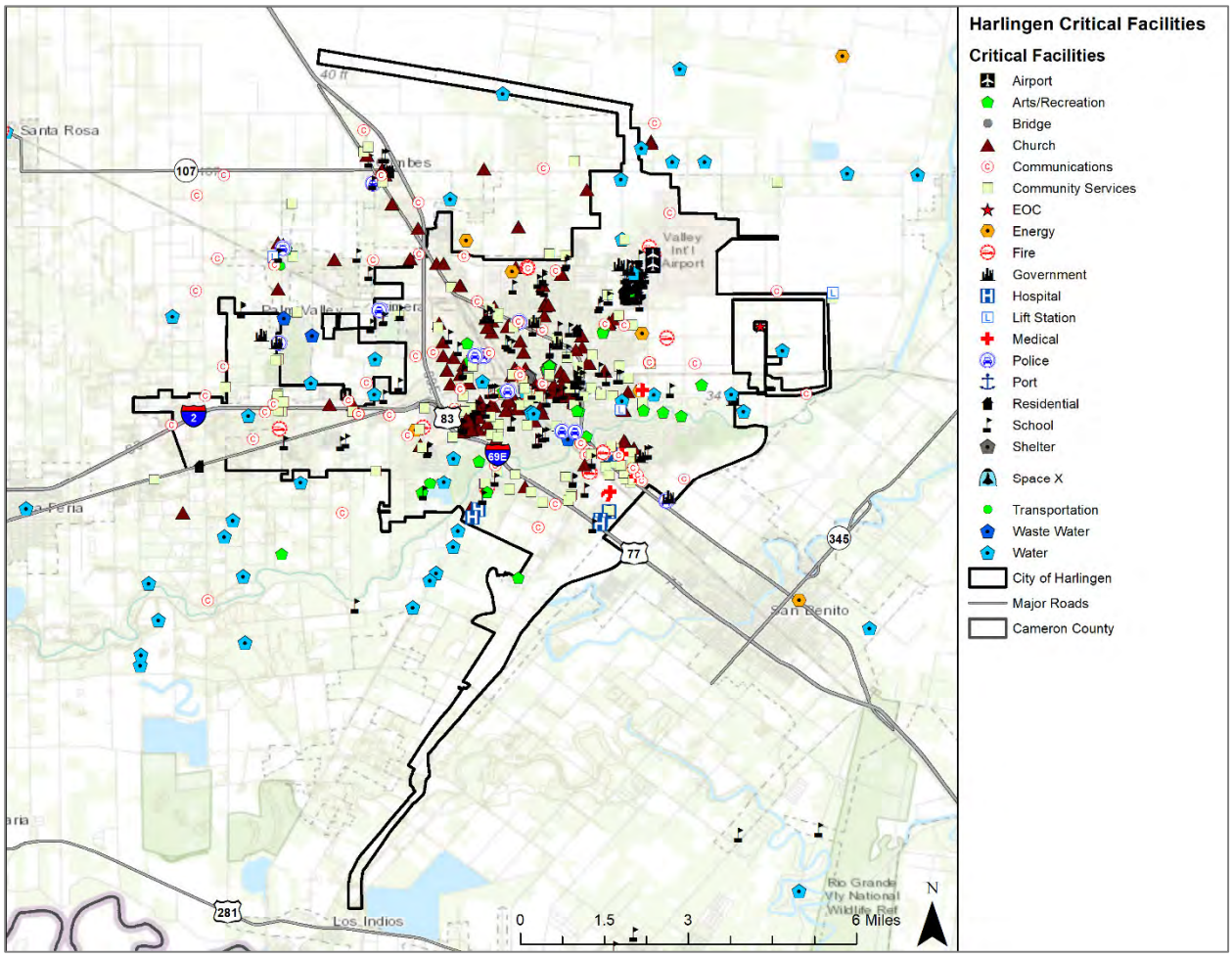


Table C-2. Critical Facilities by Type in the City of Harlingen

TYPE	NUMBER
Airport	1
Animal Clinic	1
Bank	17
Church	133
City Annex / EOC	1
City Hall	1
Communication	3
Evacuation Centers	5
Fire Station	8

APPENDIX C: CRITICAL FACILITIES

TYPE	NUMBER
Hospital / ER	6
Nursing Home	9
Park	10
Police Equipment	2
Post Office	2
Power Plant	3
Public Safety Building	1
Public Works	1
Pump	17
School – Elementary	18
School – High School	7
School – Middle School	6
School – Other Buildings	16
Water District Pump	10

Figure C-3. Critical Facilities in the City of Palm Valley

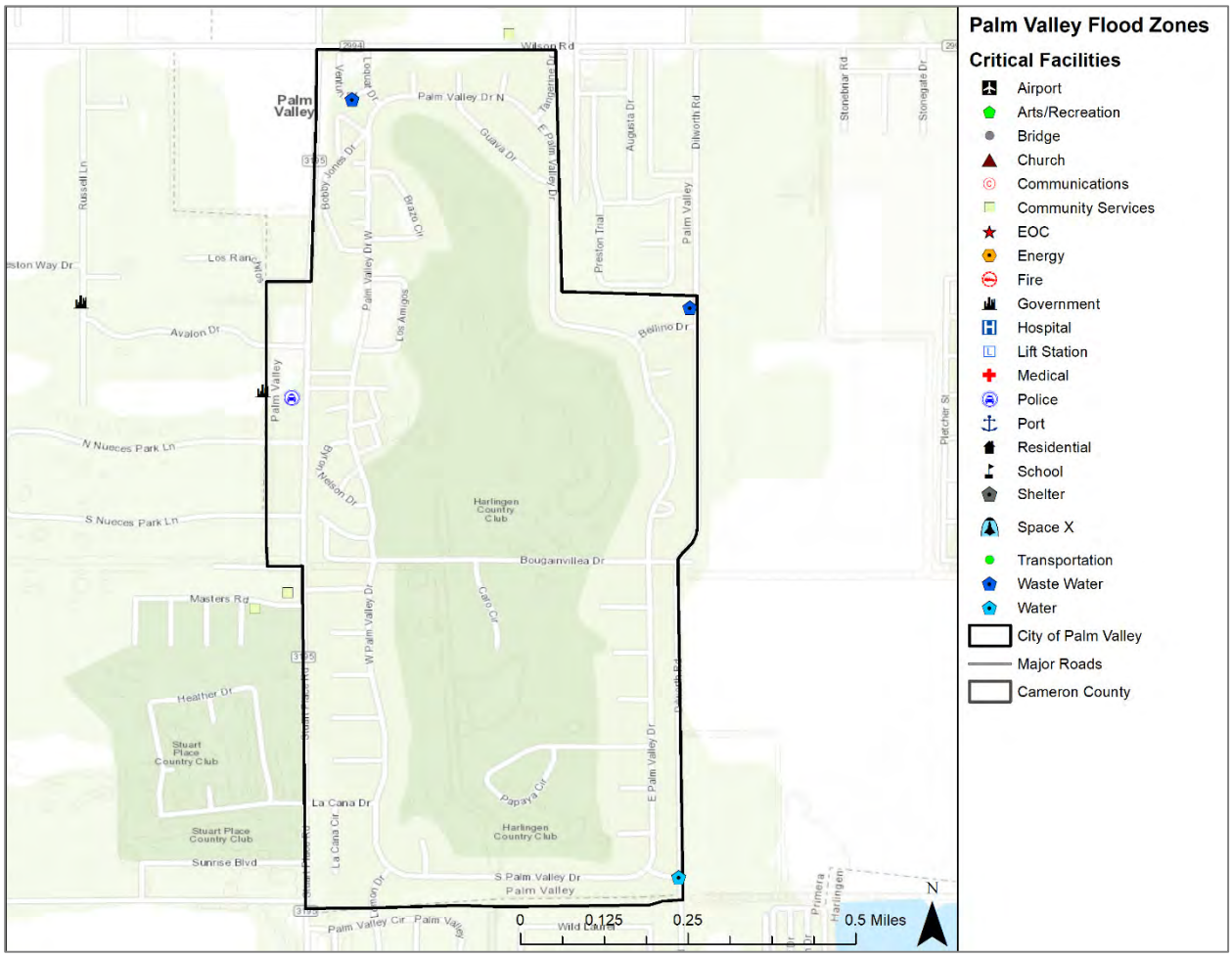


Table C-3. Critical Facilities by Type in the City of Palm Valley

TYPE	NUMBER
Admin Building	1
Business	1
Wastewater	3
Water	1

APPENDIX D: DAM LOCATIONS

Overview 1
Dam Locations 1

OVERVIEW

Appendix D is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

DAM LOCATIONS

Table D-1 below reflects all dams that are located in the participating jurisdictions within the Cameron County Hazard Mitigation Action Plan Update. This list includes High, Significant, and Low Hazard Dams. Section 15 of the Plan doesn't profile dams that were deemed to pose no past, current, or future risk to the planning area as no loss of life or impact to critical facilities or infrastructure is expected in the event of a breach. The asterisk denotes those that were profiled in the hazard assessment.

Table D-1. List of Dam Locations and Storage Capacities

JURISDICTION	LATITUDE	LONGITUDE	HEIGHT (Feet)	STORAGE (Acre Feet)
Cameron County	26.121427	-97.314092	7	1,900
Cameron County	26.055761	-97.463956	8	525
Cameron County	26.042858	-97.463902	8	374
Cameron County	26.172838	-97.375303	8	336
Cameron County	26.148953	-97.454718	7	2,000
Cameron County	26.17177	-97.498706	8	6,000
Cameron County	26.192157	-97.363245	10	430
Cameron County	26.029442	-97.606232	7	380
Cameron County	26.053232	-97.61899	8	2,171
Cameron County	26.093627	-97.54947	14	1,075
Cameron County	26.04249954	-97.61090088	7	201
Cameron County	26.03660011	-97.61380005	7	107
Cameron County	26.073185	-97.596907	7	245
Cameron County	26.062007	-97.725512	14	3,595
Cameron County	26.071677	-97.716446	15	1,872

APPENDIX D: DAM LOCATIONS

JURISDICTION	LATITUDE	LONGITUDE	HEIGHT (Feet)	STORAGE (Acre Feet)
Cameron County	26.243332	-97.645	7	168
Cameron County	26.221241	-97.598002	9	120
Cameron County*	26.22463	-97.586095	21	505
Cameron County	26.13732	-97.523457	8	425
Cameron County	26.167608	-97.522361	10	505
Cameron County*	26.10523	-97.793662	16	4,100
Cameron County*	26.137057	-97.824216	20	2,480
Cameron County	26.255226	-97.613527	15	660
Cameron County	26.261667	-97.585	9	235
Cameron County	26.261667	-97.585	7	126
Cameron County	26.26781	-97.654046	7	300
Cameron County	25.961572	-97.551751	9	4,500
Cameron County	25.978255	-97.531471	8	122
Cameron County	26.06917	-97.766617	12	1,200
Cameron County	26.078886	-97.55884	12	550
Cameron County	26.032342	-97.543081	7	295
Cameron County	26.015933	-97.538465	7	150
Cameron County	26.002595	-97.540142	7	300
Cameron County	25.997442	-97.553173	8	255
Cameron County	26.179402	-97.652005	9	129
Cameron County	26.09633	-97.310463	10	293
Cameron County	26.073751	-97.596577	10	953
Cameron County	26.064592	-97.486586	11.2	104.9
Cameron County	26.2677784	-97.39527893	7.7	34,579
Cameron County	26.32805634	-97.3916626	7.4	19,248
Cameron County	26.16060066	-97.30329895	7.5	288
City of Harlingen	26.161732	-97.713662	8	1,205

APPENDIX E: MEETING DOCUMENTATION

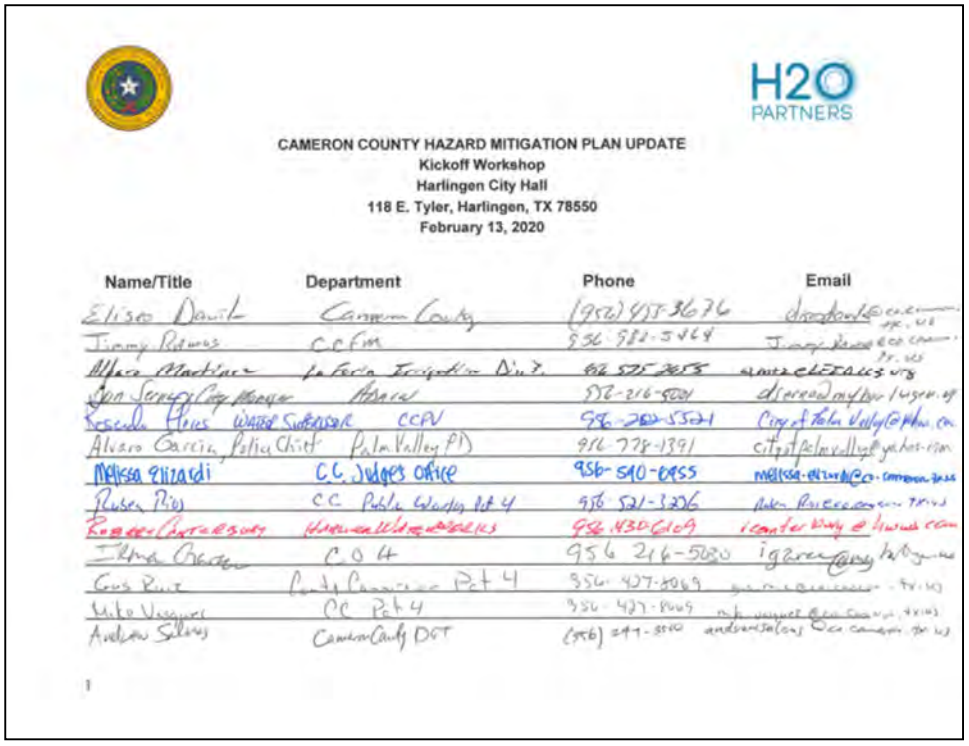
Workshop Documentation 1
Public Meeting Documentation 6
Public Notices 8

WORKSHOP DOCUMENTATION

Appendix E is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

Cameron County held a series of Planning Team workshops: a Kickoff Workshop on February 13, 2020, a Risk Assessment Workshop via webinar on May 18, 2020, and a Mitigation Strategy Workshop via webinar on June 9, 2020. At each of these workshops members of the Planning Team were informed of the planning process, expressed opinions, and volunteered information. Cameron County hosted public meetings. The sign-in sheets for each workshop and public meeting are included below. For more details on the workshops and planning process, see Section 2.

Figure E-1. Cameron County Kickoff Workshop, February 13, 2020

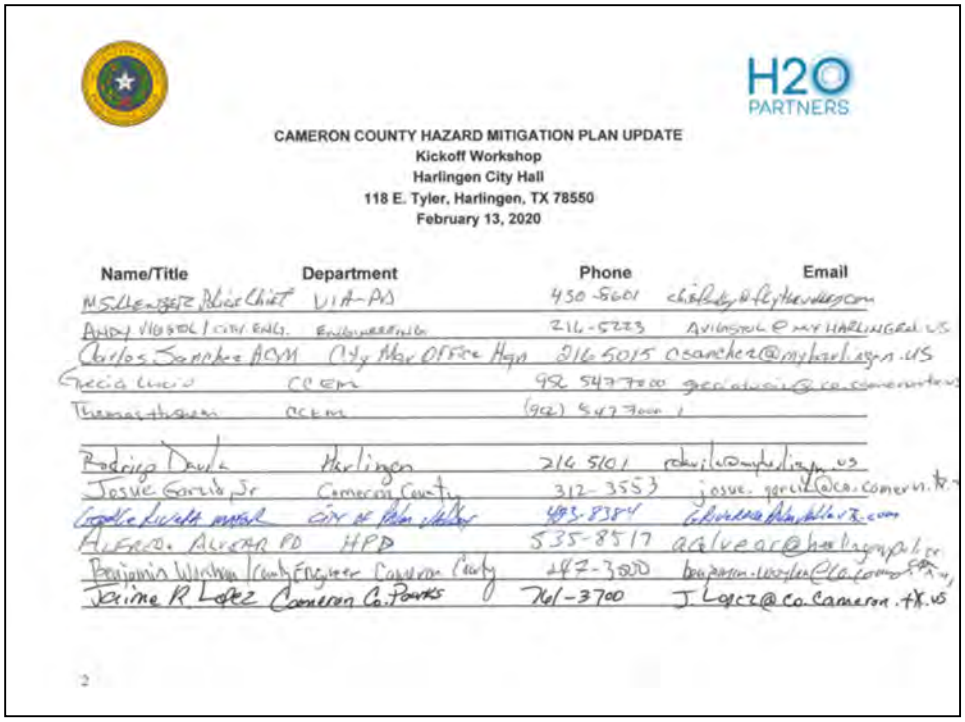


H2O PARTNERS

CAMERON COUNTY HAZARD MITIGATION PLAN UPDATE
Kickoff Workshop
Harlingen City Hall
118 E. Tyler, Harlingen, TX 78550
February 13, 2020

Name/Title	Department	Phone	Email
Eliseo Davila	Cameron County	(956) 973-3676	
Jimmy Reeves	CCFM	956-582-5464	
Alfaro Martinez	La Feria Irrigation Dist.	956 535 2655	
Jon Serna/City Manager	Aborca	512-216-5004	
Rosendo Flores	Water Supervisor CCPV	956-262-5521	
Alvaro Garcia, Police Chief	Palm Valley PD	956-778-1391	
Melissa Elizardi	C.C. Judges Office	956-540-6955	
Ruben Rios	C.C. Public Works Pct 4	956 521-3206	
Roberto Castaneda	Harlingen Water Works	956 430 6109	
Ilma Garcia	C.O 4	956 216-5020	
Gus Ruiz	County Commissioner Pct 4	956 437-8069	
Mike Vasquez	CC Pct 4	956 437-8069	
Andrew Silvas	Cameron County DOT	(956) 247-3500	

APPENDIX E: MEETING DOCUMENTATION

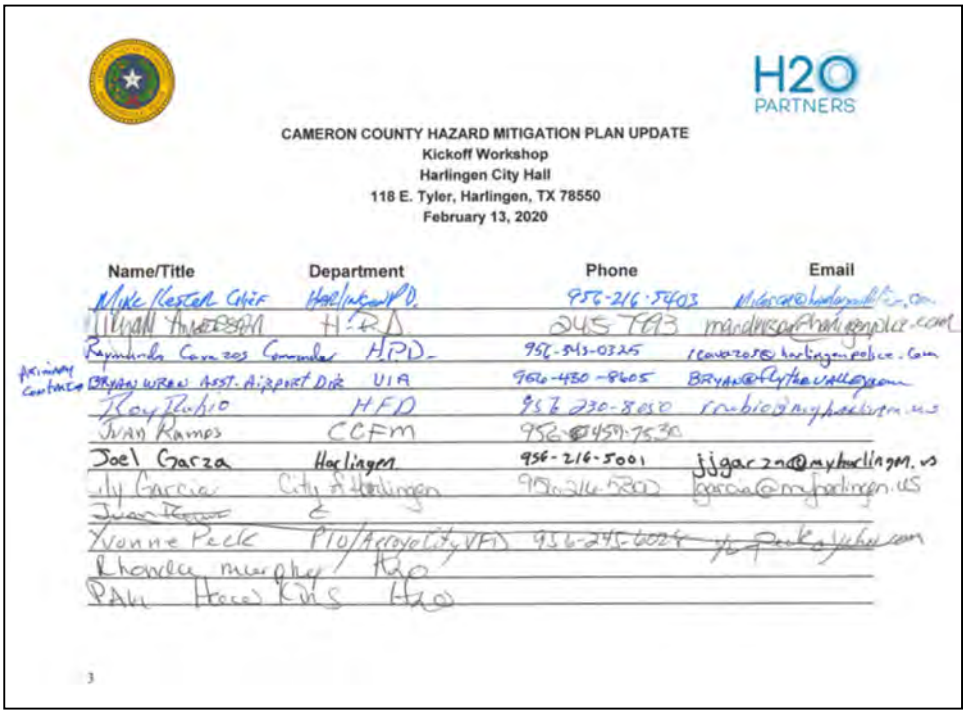


H2O PARTNERS

CAMERON COUNTY HAZARD MITIGATION PLAN UPDATE
Kickoff Workshop
Harlingen City Hall
118 E. Tyler, Harlingen, TX 78550
February 13, 2020

Name/Title	Department	Phone	Email
M. Skelton Police Chief	VIA-PD	430-5601	chiefskelton@flythevalley.com
Andy Vidaurri / City Engr.	Engineering	216-5223	AVidaurri@myharlingen.us
Carlos Sanchez ACM	City Mgr Office Hgn	216 5015	csanchez@myharlingen.us
Grecia Lucio	CCEM	956 547 7000	greciaLucio@co.cameron.tx.us
Thomas Thoreen	CCEM	(956) 547 7000	
Rodrigo Davila	Harlingen	214 5101	rdavila@myharlingen.us
Josue Garcia Jr	Cameron County	312-3553	josue.garcia@co.cameron.tx.us
Cecilia Rivera	City of Palm Valley	423-8384	CRivera@palmvalley.com
Alfredo Alvear PD	HPD	535-8517	aalvear@harlingenpd.org
Benjamin Wilson	County Engineer Cameron County	247-3500	benjamin.wilson@co.cameron.tx.us
Jaime R Lopez	Cameron Co. Parks	761-3700	J.Lopez@co.Cameron.tx.us

2



H2O PARTNERS

CAMERON COUNTY HAZARD MITIGATION PLAN UPDATE
Kickoff Workshop
Harlingen City Hall
118 E. Tyler, Harlingen, TX 78550
February 13, 2020

Name/Title	Department	Phone	Email
Mike Kestler Chief	Harlingen PD	956-216-5403	Mkestler@harlingenpolice.com
Ryan Anderson	HRD	245 7793	mandersonRyan@harlingenpolice.com
Raymundo Cavazos Commander	HPD	956-343-0325	rcavazos@harlingenpolice.com
Primary Contact — BRYAN WREN Asst. Airport Dir.	VIA	956-430-8605	BRYAN@flytheVALLEY.com
Roy Rubio	HFD	956 230-8810	rrubio@myharlingen.us
Juan Ramos	CCFM	956-459-7530	
Joel Garza	Harlingen	956-216-5001	jjgarza@myharlingen.us
Ily Garcia	City of Harlingen	956-216-5800	igarcia@myharlingen.us
Juan Reyes	&		
Yvonne Peele	PIO/Arroyo City VFD	956-245-6024	yp.peele@yahoo.com
Rhonda Murphy	H2O		
Pam Hacel KMS	H2O		

3

Figure E-2. Cameron County Risk Assessment Workshop, May 18, 2020

CAMERON COUNTY HAZARD MITIGATION PLAN UPDATE
Risk Assessment Workshop
Adobe Connect Webinar
May 18, 2020

Name/Title	Jurisdiction	Title	Email	Phone
Alfredo Alvear	Harlingen	Deputy Chief	aalvear@harlingenpolice.com	956-535-8517
Alvaro Garcia	City of Palm Valley	Police Chief	cityofpalmvalley@yahoo.com	956-423-8384
Andrew Salinas	Cameron	Asst. County Engineer	andrew.salinas@co.cameron.tx.us	956-247-3500
Andy Vigstol	City of Harlingen	City Engineer	avigstol@myharlingen.us	956-216-5223
Augusto Sanchez Gonzalez	Cameron County	Natural Resources Coordinator	augusto.sanchez@co.cameron.tx.us	956-247-3530
Benjamin Worsham	Cameron County	County Engineer	benjamin.worsham@co.cameron.tx.us	956-247-3500
Carlos Reyes	Cameron County	Road Administrator	Carlos.Reyes@co.cameron.tx.us	956-204-4656
Carlos Sanchez	City of Harlingen	Assistant City Manager / EMC	csanchez@myharlingen.us	956-216-5015
George Rivera	City of Palm Valley	Mayor	grivera@palmvalleytx.com	956-873-7113
Grecia Lucio	Cameron County	Planner	grecia.lucio@co.cameron.tx.us	956-518-1324
Jaime Lopez	Cameron County	Deputy Parks Director	j.lopez@co.cameorn.tx.us	956-761-3700
Javier Mendez	City of Harlingen	Director	jmendez@myharlingen.us	956-216-5951

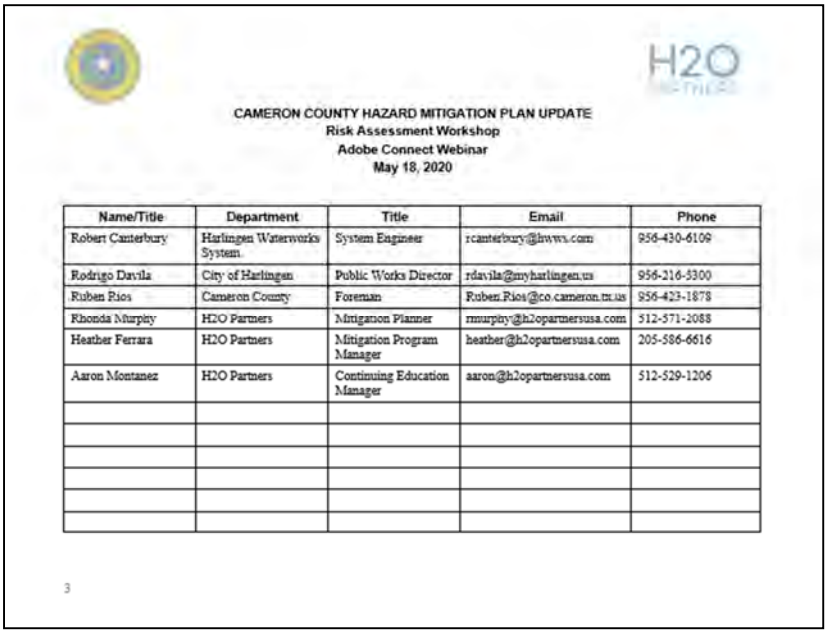
1

CAMERON COUNTY HAZARD MITIGATION PLAN UPDATE
Risk Assessment Workshop
Adobe Connect Webinar
May 18, 2020

Name/Title	Department	Title	Email	Phone
Joe E. Vega	Cameron County	Parks Director	JEVega@co.cameron.tx.us	956-761-3700
Josue Garcia	Cameron County	Bridge System Director	josue.garcia@co.cameron.tx.us	956-574-8771
Kimberly Salinas	City of Harlingen	Assistant City Engineer	ksalinas@myharlingen.us	956-216-5283
Lily Garcia	Cameron County	Asst. Public Works Director	lgarcia@myharlingen.us	956-216-5300
Lisa Chambers	Austin	Mitigation Specialist	lchambers@h2opartnersusa.com	512-540-0464
mark yates	Cameron county	County employee	mark.yates@co.cameron.tx.us	956-550-1370
Melissa Elizardi	Cameron County	Public Relations Officer	melissa.elizardi@co.cameron.tx.us	956-982-5415
Michael Kester	Harlingen Police Dept	Chief of Police	mkester@harlingenpolice.com	956-216-5403
Miryam Anderson	Harlingen	Assistant Chief of Police	manderson@harlingenpolice.com	956-245-7993
Rene Tabarez	City of Brownsville	EM Planner	rene.tabarez@cob.us	956-203-9062
Reynaldo Delua	Harlingen	Accreditation	reydelua@harlingenpolice.com	956-216-5504

2

APPENDIX E: MEETING DOCUMENTATION

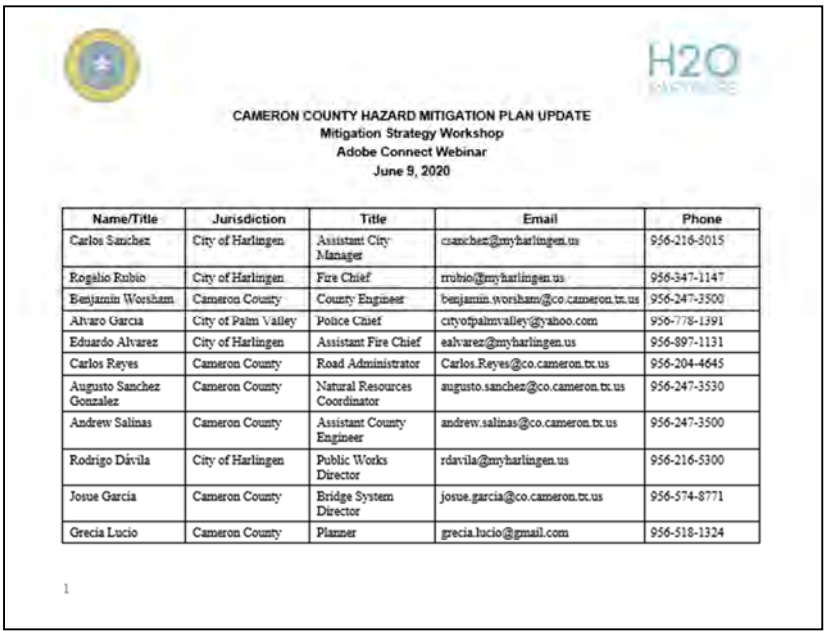


CAMERON COUNTY HAZARD MITIGATION PLAN UPDATE
Risk Assessment Workshop
Adobe Connect Webinar
May 18, 2020

Name/Title	Department	Title	Email	Phone
Robert Canterbury	Harlingen Waterworks System	System Engineer	rcanterbury@hwws.com	956-430-6109
Rodrigo Davila	City of Harlingen	Public Works Director	rdavila@myharlingen.us	956-216-5300
Ruben Rios	Cameron County	Foreman	Ruben.Rios@co.cameron.tx.us	956-423-1878
Rhonda Murphy	H2O Partners	Mitigation Planner	rmurphy@h2opartnersusa.com	512-571-2088
Heather Ferrara	H2O Partners	Mitigation Program Manager	heather@h2opartnersusa.com	205-586-6616
Aaron Montanez	H2O Partners	Continuing Education Manager	aaron@h2opartnersusa.com	512-529-1206

3

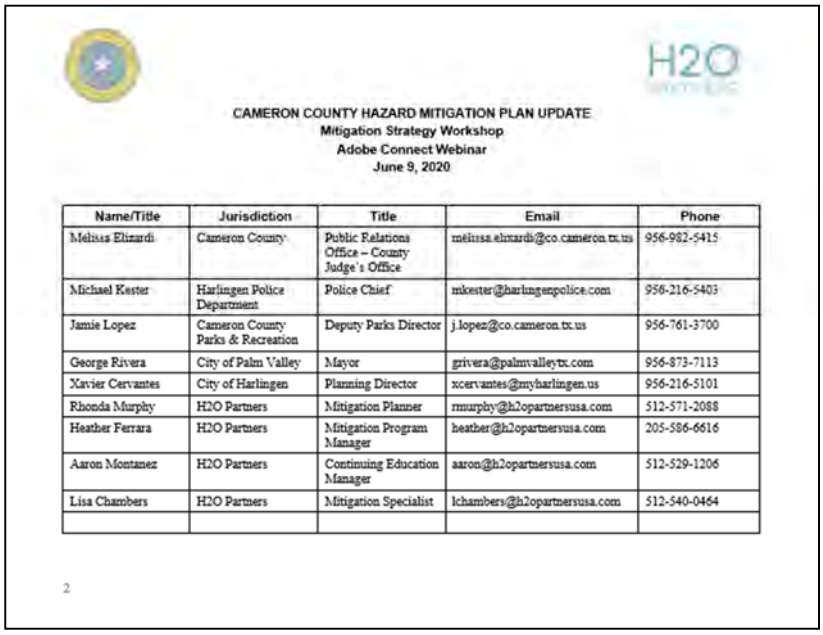
Figure E-3. Cameron County Mitigation Strategy Workshop, June 9, 2020



CAMERON COUNTY HAZARD MITIGATION PLAN UPDATE
Mitigation Strategy Workshop
Adobe Connect Webinar
June 9, 2020

Name/Title	Jurisdiction	Title	Email	Phone
Carlos Sanchez	City of Harlingen	Assistant City Manager	csanchez@myharlingen.us	956-216-5015
Rogalio Rubio	City of Harlingen	Fire Chief	rrubio@myharlingen.us	956-347-1147
Benjamin Worsham	Cameron County	County Engineer	benjamin.worsham@co.cameron.tx.us	956-247-3500
Alvaro Garcia	City of Palm Valley	Police Chief	cityofpalmvalley@yahoo.com	956-778-1391
Eduardo Alvarez	City of Harlingen	Assistant Fire Chief	ealvarez@myharlingen.us	956-897-1131
Carlos Reyes	Cameron County	Road Administrator	Carlos.Reyes@co.cameron.tx.us	956-204-4645
Augusto Sanchez Gonzalez	Cameron County	Natural Resources Coordinator	augusto.sanchez@co.cameron.tx.us	956-247-3530
Andrew Salinas	Cameron County	Assistant County Engineer	andrew.salinas@co.cameron.tx.us	956-247-3500
Rodrigo Dávila	City of Harlingen	Public Works Director	rdavila@myharlingen.us	956-216-5300
Josue Garcia	Cameron County	Bridge System Director	josue.garcia@co.cameron.tx.us	956-574-8771
Grecia Lucio	Cameron County	Planner	grecia.lucio@gmail.com	956-518-1324

1



CAMERON COUNTY HAZARD MITIGATION PLAN UPDATE
Mitigation Strategy Workshop
Adobe Connect Webinar
June 9, 2020

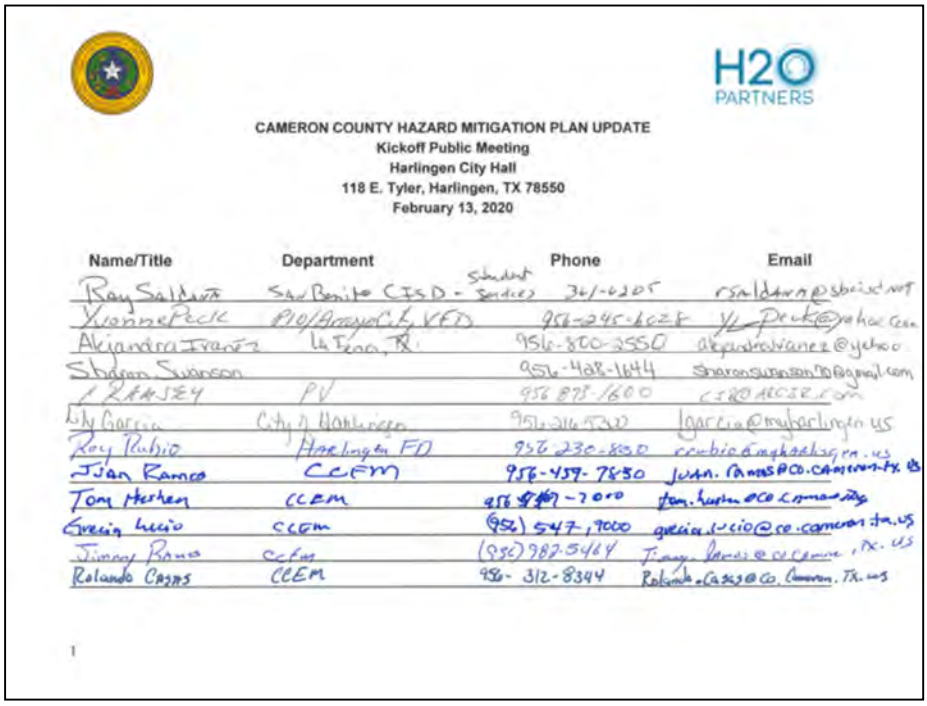
Name/Title	Jurisdiction	Title	Email	Phone
Melissa Elizardi	Cameron County	Public Relations Office – County Judge's Office	melissa.elizardi@co.cameron.tx.us	956-982-5415
Michael Kester	Harlingen Police Department	Police Chief	mkester@harlingenpolice.com	956-216-5403
Jamie Lopez	Cameron County Parks & Recreation	Deputy Parks Director	j.lopez@co.cameron.tx.us	956-761-3700
George Rivera	City of Palm Valley	Mayor	grivera@palmvalleytx.com	956-873-7113
Xavier Cervantes	City of Harlingen	Planning Director	xcervantes@myharlingen.us	956-216-5101
Rhonda Murphy	H2O Partners	Mitigation Planner	rmurphy@h2opartnersusa.com	512-571-2088
Heather Ferrara	H2O Partners	Mitigation Program Manager	heather@h2opartnersusa.com	205-586-6616
Aaron Montanez	H2O Partners	Continuing Education Manager	aaron@h2opartnersusa.com	512-529-1206
Lisa Chambers	H2O Partners	Mitigation Specialist	lchambers@h2opartnersusa.com	512-540-0464

2

PUBLIC MEETING DOCUMENTATION

As discussed in Section 2, public meetings were held in Cameron County. Documentation in the form of sign-in sheets for each of the meetings follows.

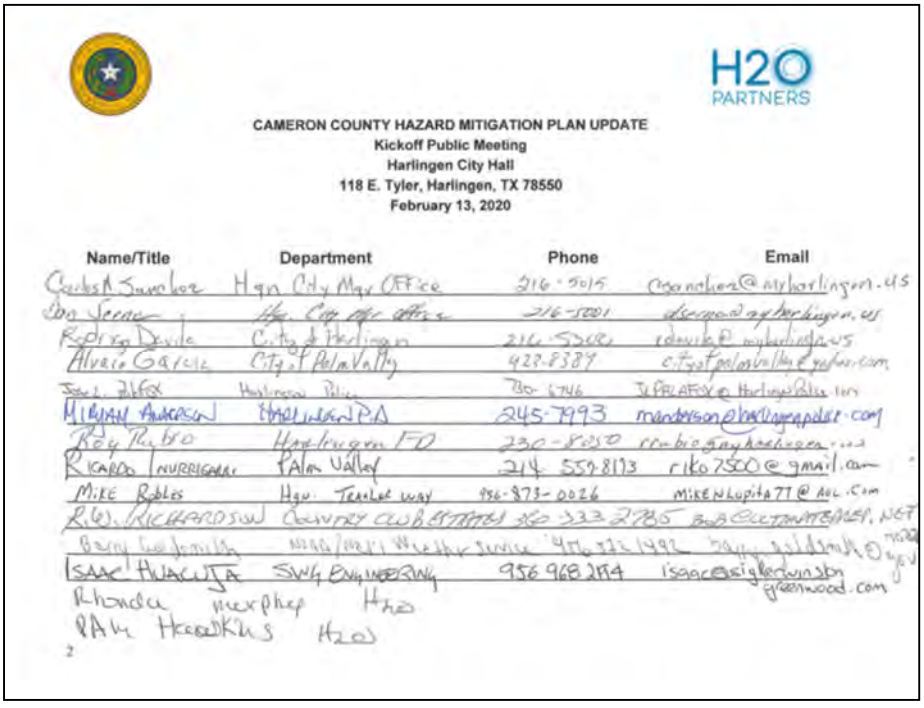
Figure E-4. Public Meeting, February 13, 2020



CAMERON COUNTY HAZARD MITIGATION PLAN UPDATE
Kickoff Public Meeting
Harlingen City Hall
118 E. Tyler, Harlingen, TX 78550
February 13, 2020

Name/Title	Department	Phone	Email
Ray Saldaña	San Benito CISD - Student Services	361-6205	rsaldana@sbcisd.net
Yvonne Peck	PIO/Arroyo City VFD	956-245-6028	Yv_Peck@yahoo.com
Alejandra Ivanez	La Feria, TX	956-800-3550	alejandraivanez@yahoo
Sharon Swanson		956-408-1644	SharonSwanson70@gmail.com
J. RAMSEY	PV	956 878-1600	CJ@ARCSR.com
Lily Garcia	City of Harlingen	956-216-5322	lgarcia@myharlingen.us
Roy Rubio	Harlingen FD	956 230-8850	rrubio@myharlingen.us
Juan Ramos	CCEM	956-459-7850	Juan.RamosPCO.Cameron.tx.us
Tom Herbert	CCEM	956 [illegible]-7000	tom.herbert@co.cameron.tx.us
Gracie Lucio	CCEM	(956) 547-7000	gracie.lucio@co.cameron.tx.us
Jimmy Ramos	CCEM	(956) 982-5464	Jimmy.ramos@co.cameron.tx.us
Rolando Casas	CCEM	956-312-8344	Rolando.Casas@co.Cameron.Tx.us

1

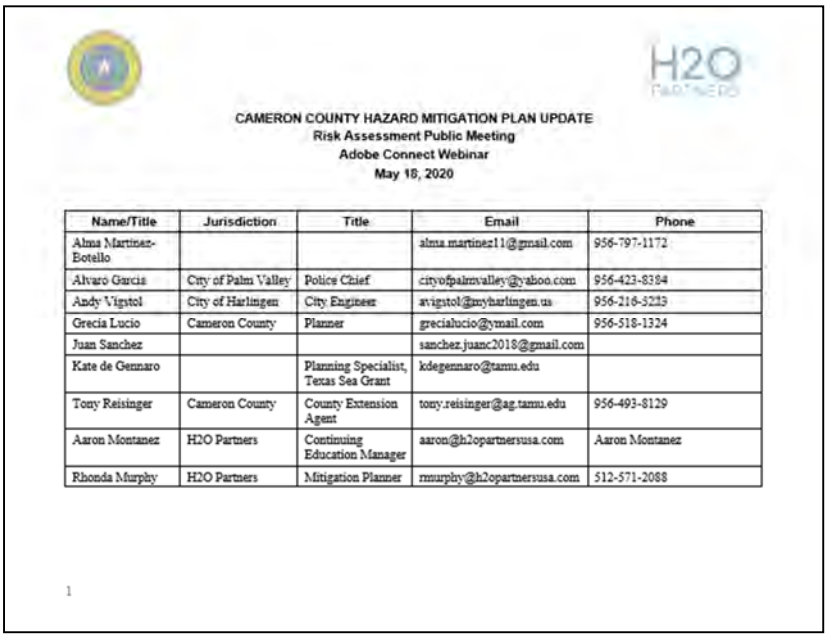


CAMERON COUNTY HAZARD MITIGATION PLAN UPDATE
Kickoff Public Meeting
Harlingen City Hall
118 E. Tyler, Harlingen, TX 78550
February 13, 2020

Name/Title	Department	Phone	Email
Carlos A. Sanchez	Hgn City Mgr Office	216-5015	csanchez@myharlingen.us
Jose Serna	Hgn. City Mgr Office	216-5001	jserna@myharlingen.us
Rodrigo Davila	City of Harlingen	216-5260	rdavila@myharlingen.us
Alvaro Garcia	City of Palm Valley	423-8387	c.cityofpalmvalley@yahoo.com
Jose L. Alfaro	Harlingen Police	430-6746	JLPALFARO@harlingenpolice.org
MIRIAM ANDERSON	HARLINGEN PD	245-7993	manderson@harlingenpolice.com
Roy Rubio	Harlingen FD	230-8850	rrubio@myharlingen.us
RICARDO NURRIGARA	Palm Valley	214 559-8173	riko7500@gmail.com
MIKE ROBLES	Hgn. Treeline way	956-873-0026	MIKENLupita77@AOL.com
R.G. RICHARDSON	COUNTRY CLUB ESTATES	460-333-2785	BUBCUSTOMTEES@SBCGLOBAL.NET
Barry Lee Jenkins	MRD/MRI Weather Service	956-778-1492	barry.jenkins@noaa.gov
ISAAC HUACUJA	SWA ENGINEERING	956 968 2184	isaac@sigleglawson greenwood.com
Rhonda Murphey	H2O		
PAM HOOKINS	H2O		

2

Figure E-5. Public Meeting, May 18, 2020



CAMERON COUNTY HAZARD MITIGATION PLAN UPDATE
Risk Assessment Public Meeting
Adobe Connect Webinar
May 18, 2020

Name/Title	Jurisdiction	Title	Email	Phone
Alma Martinez-Botello			alma.martinez11@gmail.com	956-797-1172
Alvaro Garcia	City of Palm Valley	Police Chief	cityofpalmvalley@yahoo.com	956-423-8384
Andy Vigstol	City of Harlingen	City Engineer	avigstol@myharlingen.us	956-216-5283
Grecia Lucio	Cameron County	Planner	grecialucio@ymail.com	956-518-1324
Juan Sanchez			sanchez.juanc2018@gmail.com	
Kate de Gennaro		Planning Specialist, Texas Sea Grant	kdegennaro@tamu.edu	
Tony Reisinger	Cameron County	County Extension Agent	tony.reisinger@ag.tamu.edu	956-493-8129
Aaron Montanez	H2O Partners	Continuing Education Manager	aaron@h2opartnersusa.com	Aaron Montanez
Rhonda Murphy	H2O Partners	Mitigation Planner	rmurphy@h2opartnersusa.com	512-571-2088

1

Figure E-6. Public Meeting, June 9, 2020

CAMERON COUNTY HAZARD MITIGATION PLAN UPDATE
Mitigation Strategy Public Meeting
Adobe Connect Webinar
June 9, 2020

Name/Title	Jurisdiction	Title	Email	Phone
Madeline Cohn			Madeline.cohn@co.cameron.tx.us	
Grecia Lucio	Cameron County	Planner	grecia.lucio@gmail.com	956-518-1324
John Barrientes	Cameron County	Citizen	j_barrientes@yahoo.com	956-887-0345
Ruben Rios	Cameron County Public Works Pct. 4	Foreman	Ruben.Rios@co.cameron.tx.us	956-423-1878
Andy Vigstol			avigstol@myharlingen.us	
Carlos Reyes	Cameron County	Road Administrator	Carols.Reyes@co.cameron.tx.us	956-204-4656
Tom Husben		EMC	Tom.husben@co.cameron.tx.us	
Kate de Gennaro		Planning Specialist	kdegennaro@tamu.edu	512-695-2946
Kimberly Salinas	City of Harlingen	Assistant City Engineer	ksalinas@myharlingen.us	956-216-5283
Rachel Andrews	H2O Partners	Mitigation Specialist	rachel@h2opartnersusa.com	512-983-0092
Aaron Montanez	H2O Partners	Continuing Education Manager	aaron@h2opartnersusa.com	
Rhonda Murphy	H2O Partners	Mitigation Planner	rmurphy@h2opartnersusa.com	512-571-2088

1

PUBLIC NOTICES

Public notices to announce Cameron County's participation in the Plan Update development process were posted 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.

Figure E-7. Cameron County Public Notice, Facebook

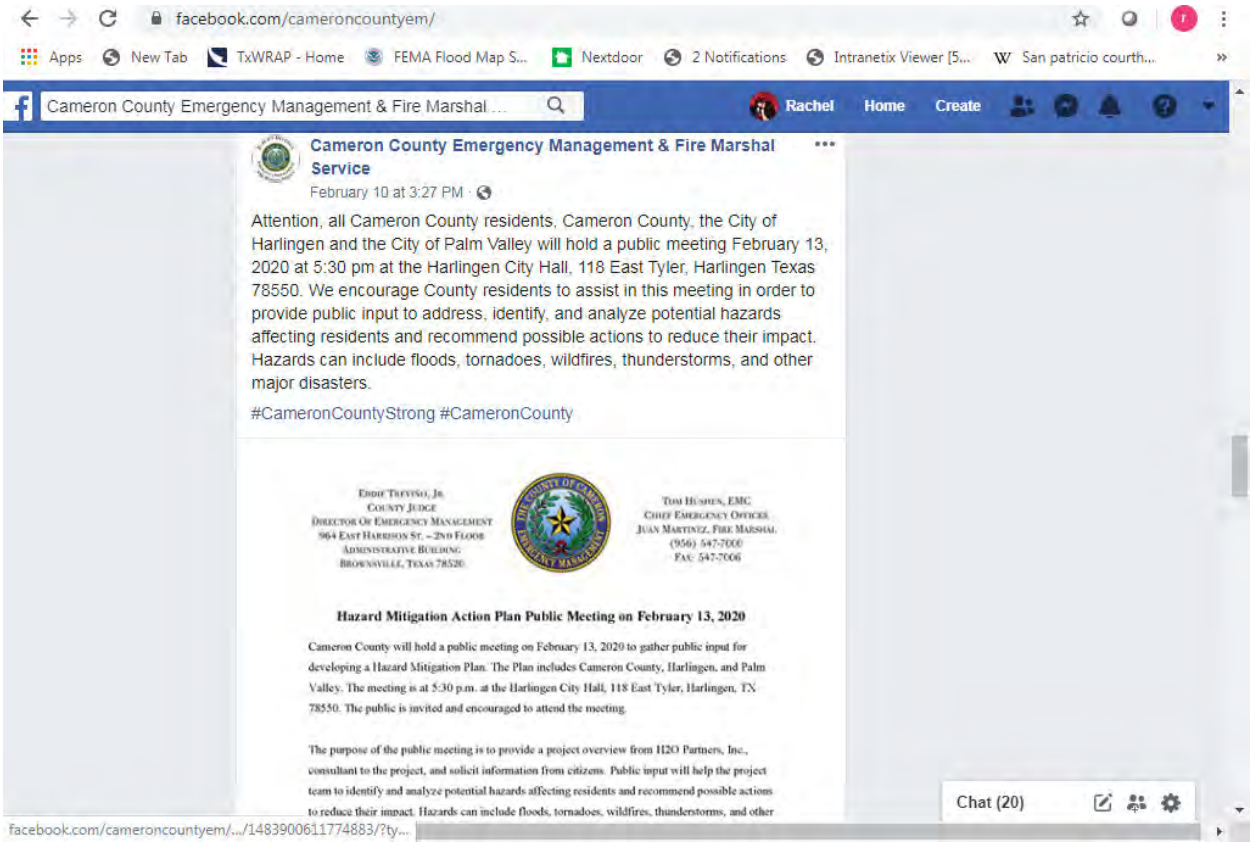


Figure E-8. Cameron County Public Notice, Twitter

Figure E-9. Cameron County Public Notice, Instagram

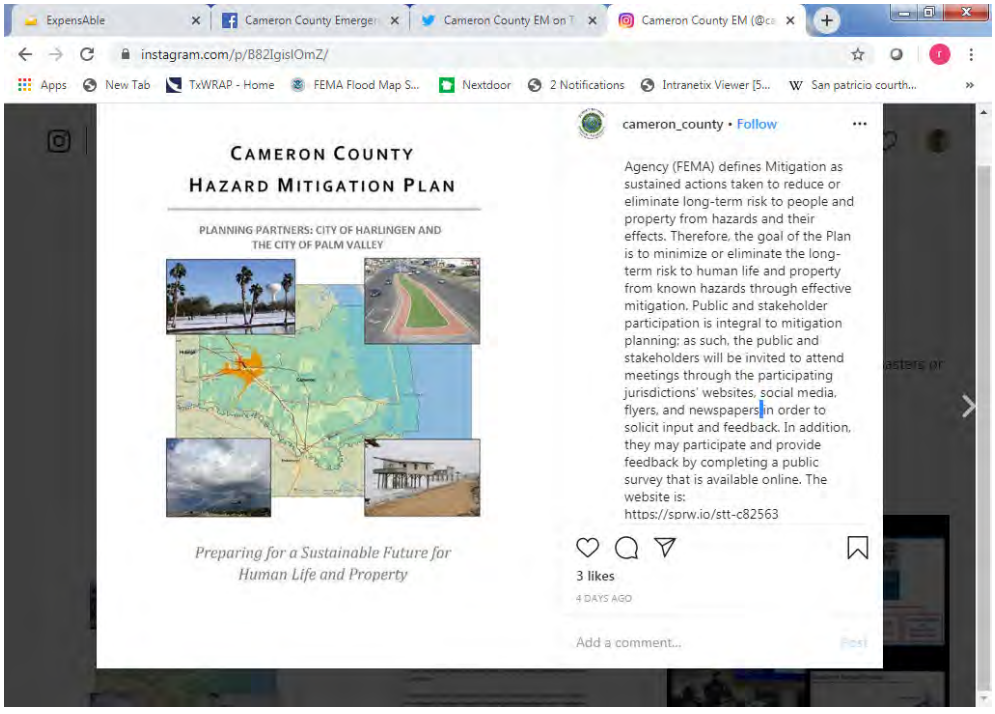


Figure E-10. City of Harlingen Public Notice, Valley Morning Star newspaper, February 9, 2020

PUBLIC NOTICE OF THE CAMERON COUNTY HAZARDOUS MITIGATION PLAN

Hazard Mitigation Plan Public Meeting on February 13, 2020

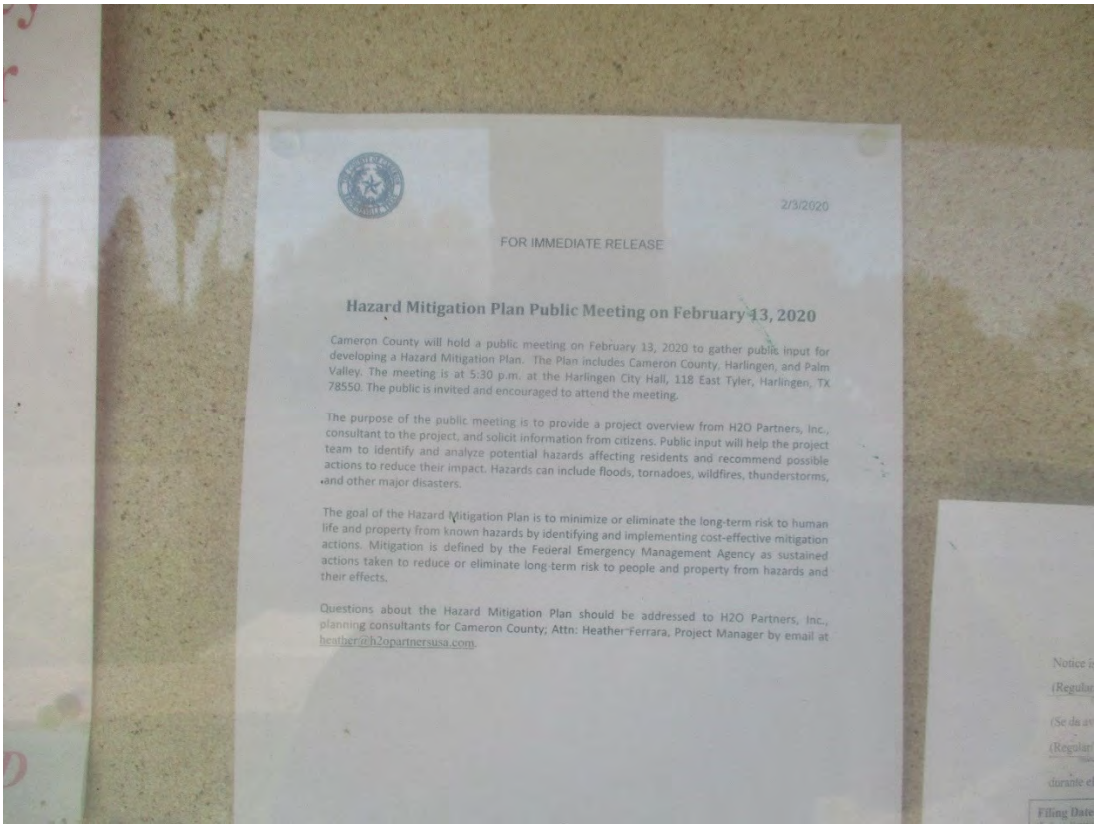
Cameron County will hold a public meeting on February 13, 2020 to gather public input for developing a Hazard Mitigation Plan (Plan). The Plan includes Cameron County, Harlingen, and Palm Valley. The meeting is at 5:30 p.m. at the Harlingen City Hall, 118 East Tyler, Harlingen, TX 78550. The public is invited and encouraged to attend the meeting.

The purpose of the public meeting is to provide a project overview from H2O Partners, Inc., consultant to the project, and solicit information from citizens. Public input will help the project team to identify and analyze potential hazards affecting residents and recommend possible actions to reduce their impact. Hazards can include floods, tornadoes, wildfires, thunderstorms, and other major disasters.

The goal of the Plan is to minimize or eliminate the long-term risk to human life and property from known hazards by identifying and implementing cost-effective mitigation actions. Mitigation is defined by the Federal Emergency Management Agency as sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects.

Questions about the Plan should be addressed to H2O Partners, Inc., planning consultants for Cameron County; Attn: Heather Ferrara, Project Manager by email at heather@h2opartnersusa.com. Comments may also be submitted by email to Carlos A. Sanchez, P.E., Assistant City Manager at csanchez@myharlingen.us or to Tom Hushen, Cameron County Chief Emergency Office at tom.hushen@co.cameron.tx.us

Figure E-11. City of Palm Valley Public Notice, City Hall posting



2/3/2020

FOR IMMEDIATE RELEASE

Hazard Mitigation Plan Public Meeting on February 13, 2020

Cameron County will hold a public meeting on February 13, 2020 to gather public input for developing a Hazard Mitigation Plan. The Plan includes Cameron County, Harlingen, and Palm Valley. The meeting is at 5:30 p.m. at the Harlingen City Hall, 118 East Tyler, Harlingen, TX 78550. The public is invited and encouraged to attend the meeting.

The purpose of the public meeting is to provide a project overview from H2O Partners, Inc., consultant to the project, and solicit information from citizens. Public input will help the project team to identify and analyze potential hazards affecting residents and recommend possible actions to reduce their impact. Hazards can include floods, tornadoes, wildfires, thunderstorms, and other major disasters.

The goal of the Hazard Mitigation Plan is to minimize or eliminate the long-term risk to human life and property from known hazards by identifying and implementing cost-effective mitigation actions. Mitigation is defined by the Federal Emergency Management Agency as sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects.

Questions about the Hazard Mitigation Plan should be addressed to H2O Partners, Inc., planning consultants for Cameron County; Attn: Heather Ferrara, Project Manager by email at heather@h2opartnersusa.com.

Figure E-12. City of Palm Valley Public Notice, website

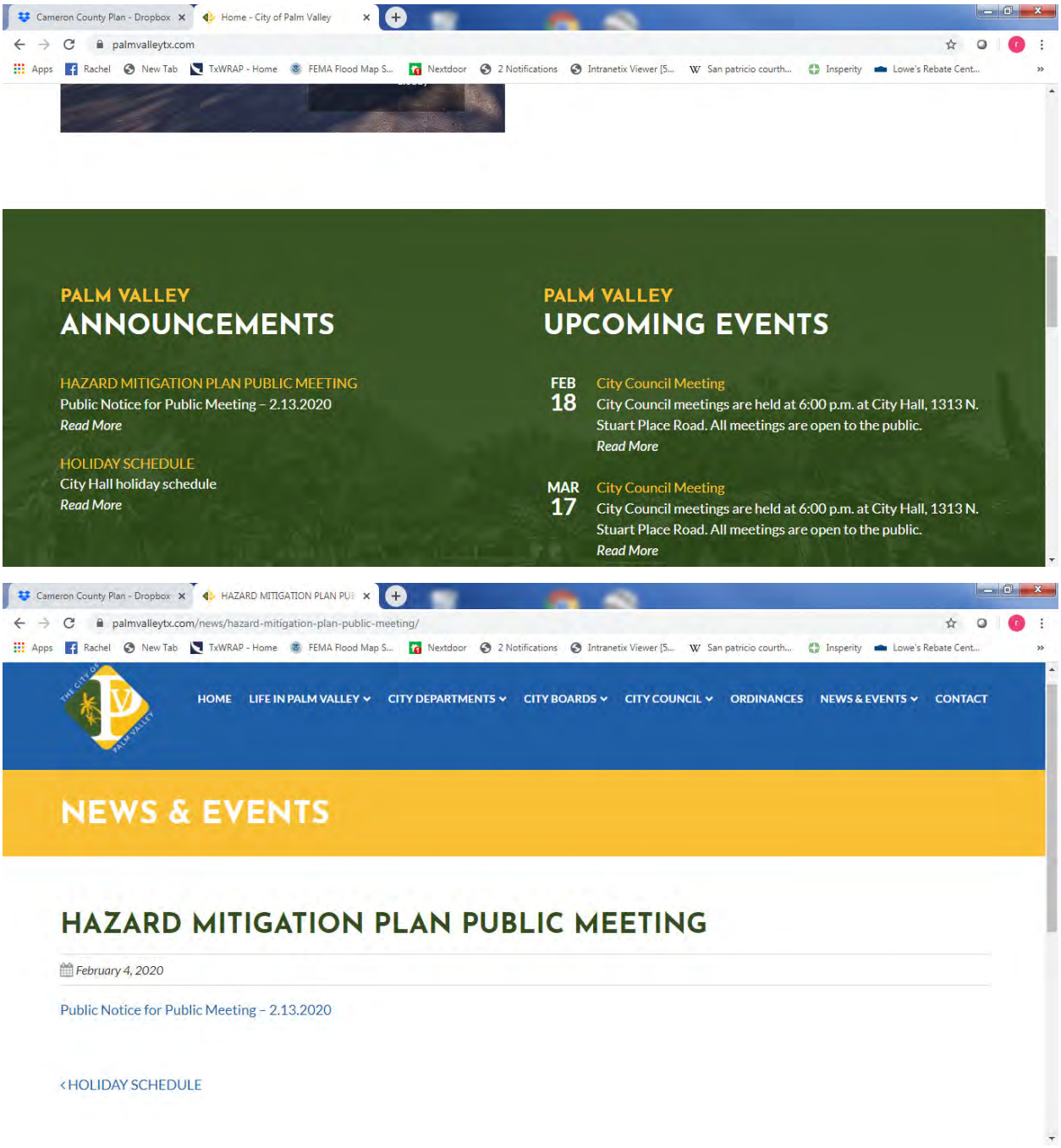


Figure E-13. City of Palm Valley Public Notice, NextDoor

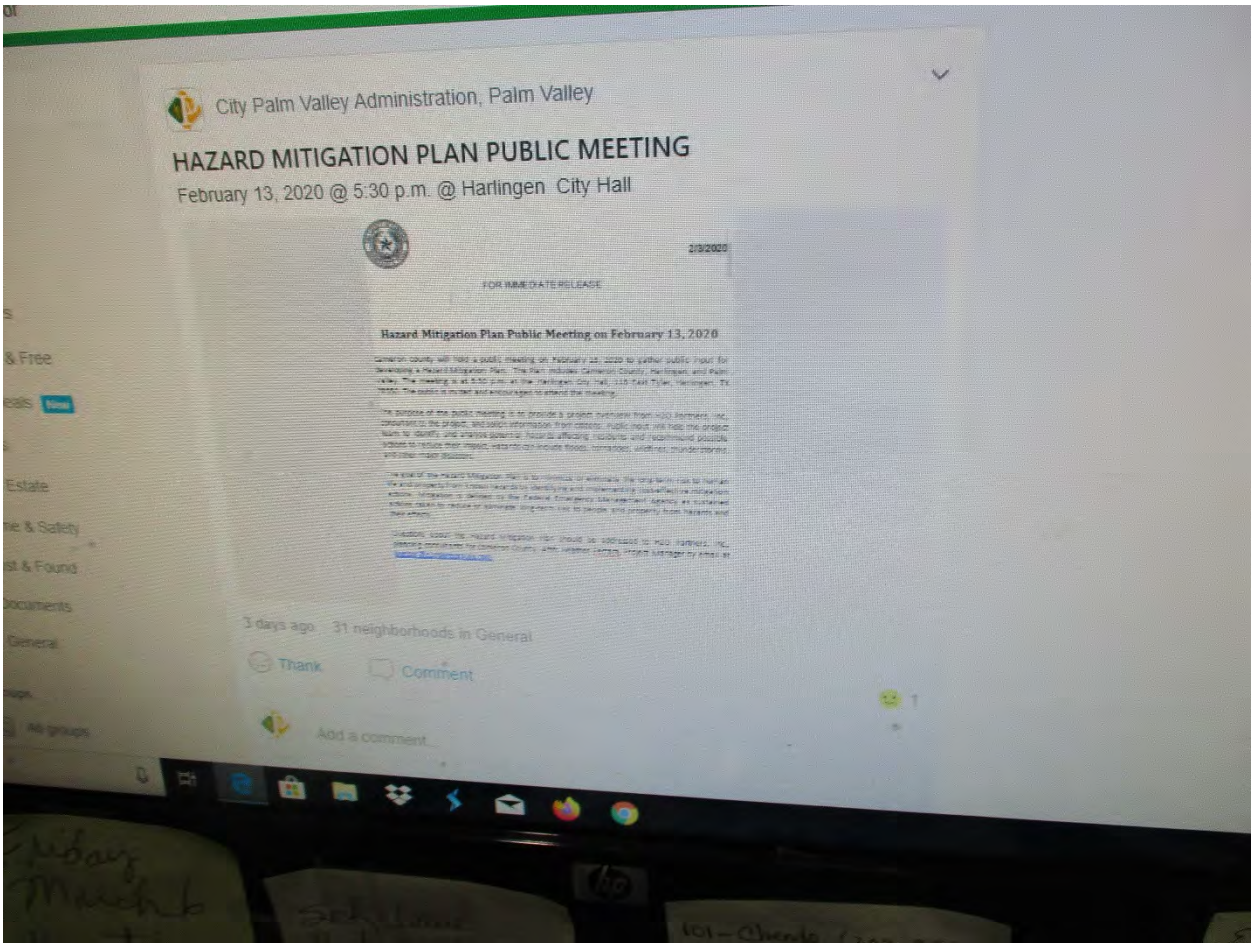


Figure E-14. Cameron County Public Notice, Valley Central news

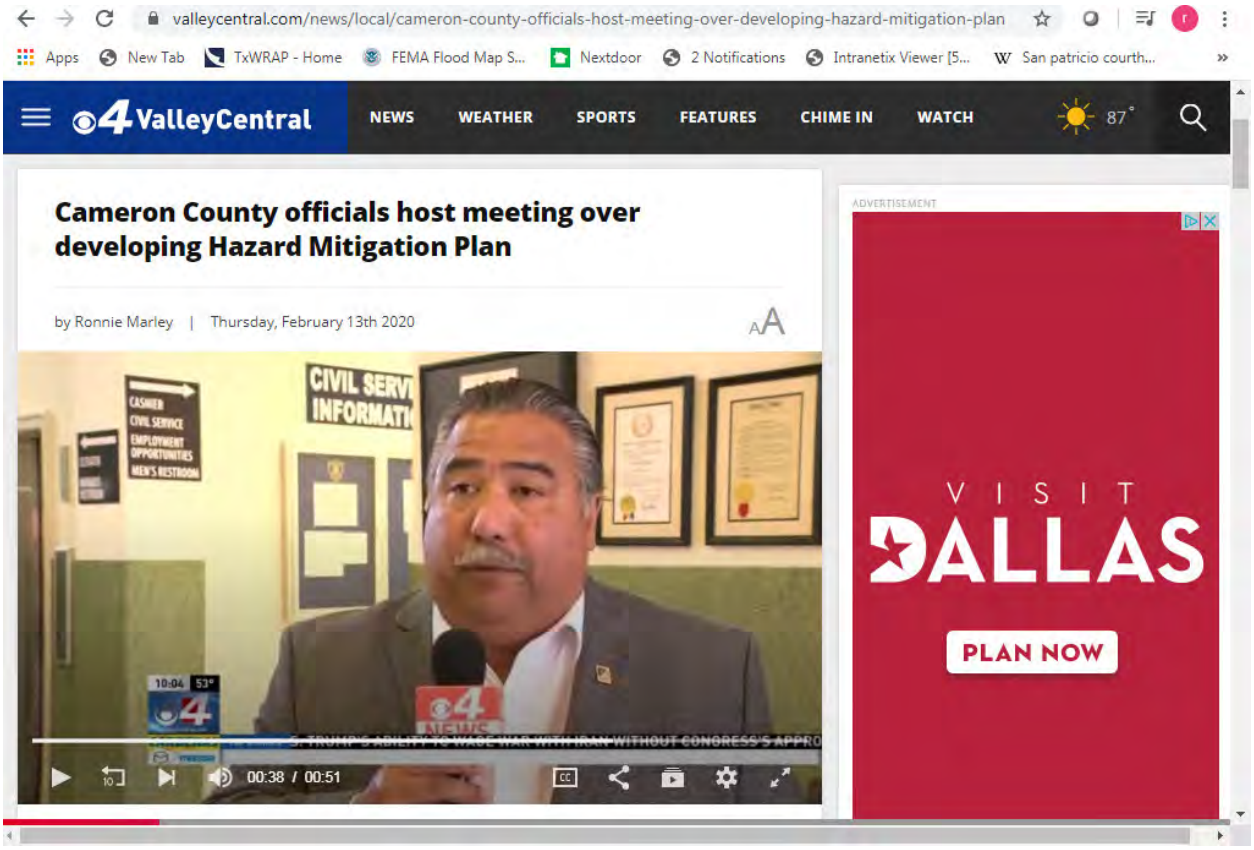


Figure E-15. Cameron County Public Notice, Facebook

Figure E-16. Cameron County Public Notice, Facebook

Figure E-17. Cameron County Public Survey, Facebook

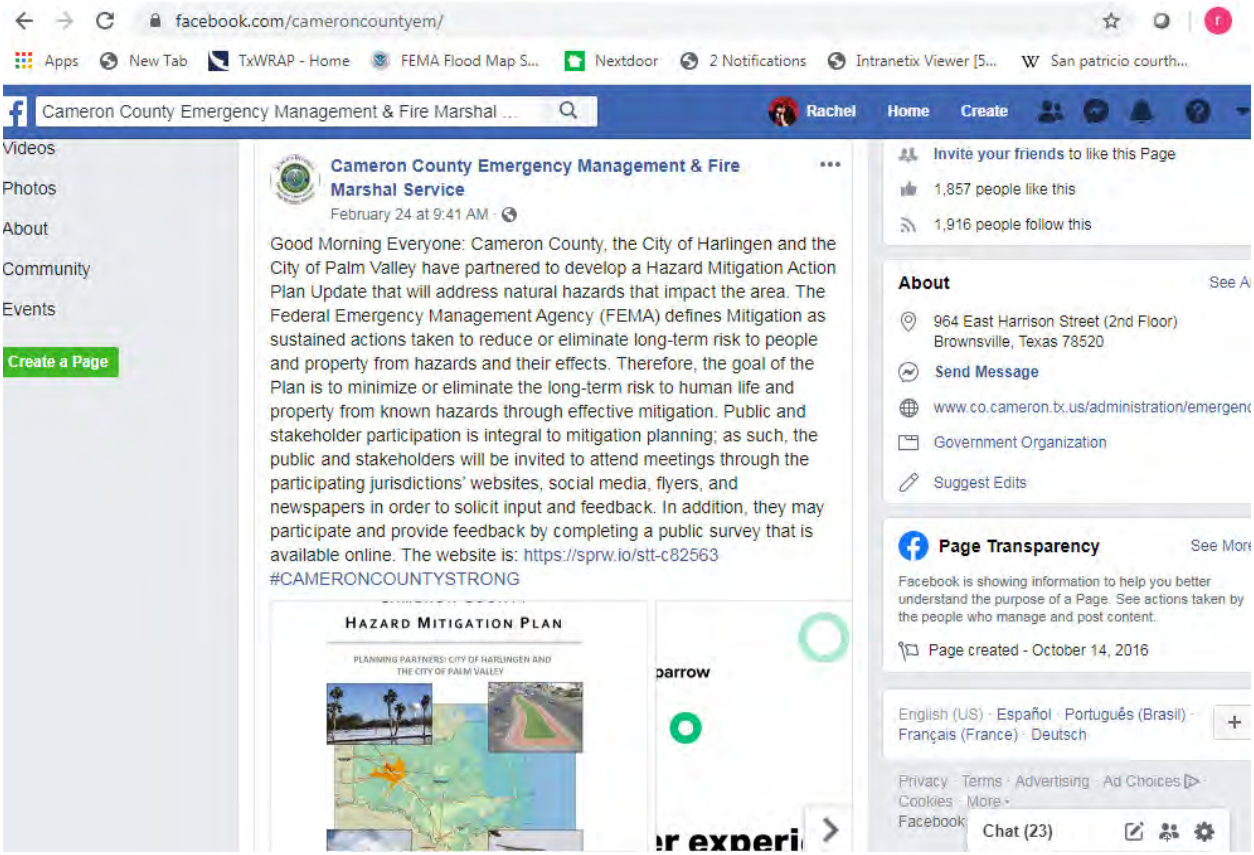
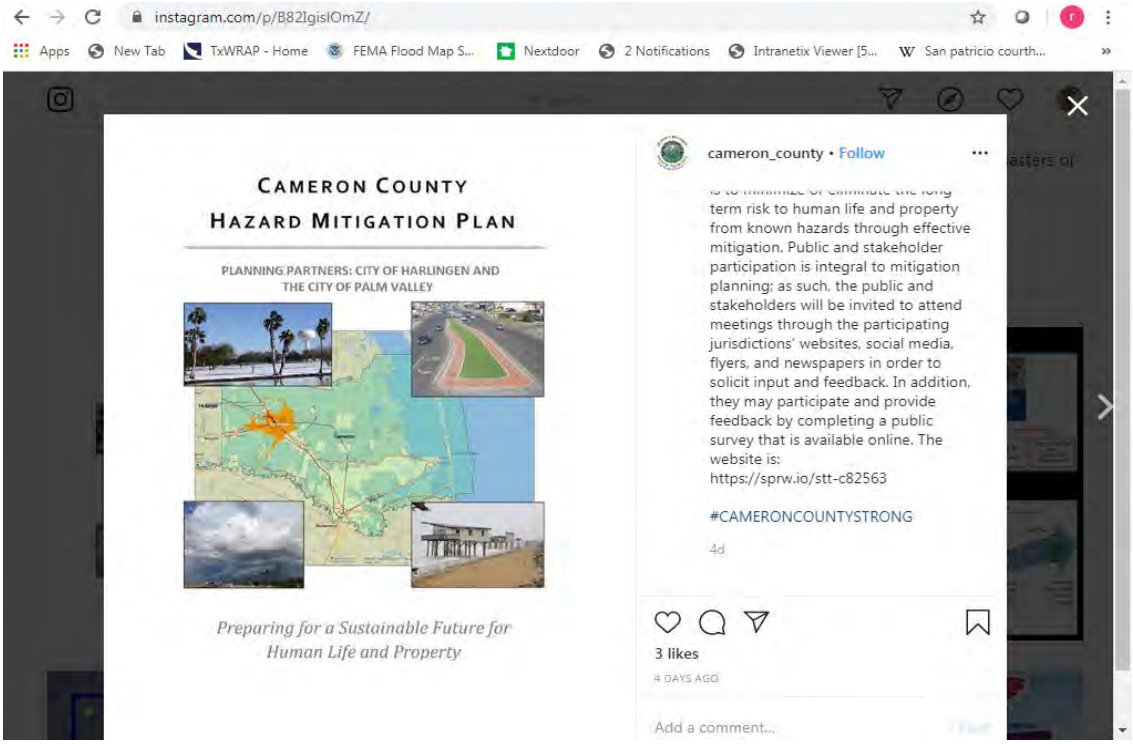


Figure E-18. Cameron County Public Survey, Twitter

Figure E-19. Cameron County Public Notice, Instagram



APPENDIX F: CAPABILITY ASSESSMENT

Overview 1
Community Capability Assessments 2

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	*Cameron County*	*City of Harlingen*	*City of Palm City*
Plans			
Capital Improvements Plan	X	X	X
Community Wildfire Protection Plan	X		
Comprehensive / Master Plan / Land Use Plan	X	X	
Continuity of Operations	X		X
Emergency Operations Plan	X	X	X
Evacuation Plan	X	X	X
Hazard Mitigation Plan	X	X	X
Stormwater Management Plan		X	X
Drought Contingency & Emergency Water Plan		X	
Policies/Ordinances			
Building Codes	X	X	X
Fire Code	X	X	X
Floodplain Ordinance	X	X	X
Stormwater Ordinance	X	X	X
Subdivision Regulations	X	X	X
Wildfire Ordinance			
Zoning Ordinance/Land Use Restrictions		X	X
Programs			
Floodplain Maps/Flood Insurance Studies	X	X	X
Hydrologic/Hydraulic Studies	X	X	X

APPENDIX F: CAPABILITY ASSESSMENT

COMMUNITY CAPABILITY CHECKLIST	*Cameron County*	*City of Harlingen*	*City of Palm City*
Mutual Aid Agreement	X	X	
National Flood Insurance Program Participant	X	X	X
NFIP Community Rating System Participant			
Property Acquisition Program	X		
Public Education/Awareness Programs	X	X	X
Storm Drainage Systems Maintenance Program	X	X	X
Stream Maintenance Program	X		
Warning Systems/Services	X	X	
Staff/Departments			
Building Code Official	X	X	X
Emergency Manager	X	X	X
Engineer	X	X	X
Environmental Conservation Specialist	X		
Floodplain Administrator	X	X	X
GIS Coordinator	X	X	
Planner	X	X	
Public Information Official	X	X	X
Resource Development/Grant Writer	X	X	

APPENDIX G: LRGVDC-REGIONAL WATER PROJECT LIST

Overview 1
Regional Project List 1

OVERVIEW

Appendix G is **For Official Use Only (FOUO)** and may be exempt from public release under the Freedom of Information Act (FOIA).

The Lower Rio Grande Valley Development Council, in coordination with Cameron County, has created regional action plan to address flooding in the Lower Rio Grande Valley and have a direct impact on flood hazards in the Cameron County planning area. These projects are included under **Section 19**, Cameron County-wide Action #22. Additional details for each individual action are listed in the table below.

REGIONAL PROJECT LIST

Table G-1. Regional Project List

Entity	County	Project Name	Project Description	Estimated Cost
Cameron County Drainage District #1	Cameron	Study Watershed	Study watershed drainage in Ditch #2 - Main Ditch	$500,000
Cameron County Drainage District #1	Cameron	Enhance SCADA System	Enhance SCADA System to include critical points in additional ditches	$500,000
Cameron County Drainage District #1	Cameron	Grated Culverts	Design and construct 4 grated culverts	$750,000
Cameron County Drainage District #1	Cameron	Concrete Drainage Pipes	Purchase and install 6 concrete drainage pipes	$50,000
City of Harlingen	Cameron	Hickory Hill Regional Facility	Construct a regional facility to reduce runoff and flooding for the City of Harlingen and Cameron County, and capture secondary water supply for future drought event.	$11,252,000
City of Edinburg	Hidalgo	UTRGV West Drainage Improvements		$1,715,150

APPENDIX G: LRGVDC-REGIONAL WATER PROJECT LIST

Entity	County	Project Name	Project Description	Estimated Cost
City of Edinburg	Hidalgo	Freddy Gonzalez & Mon Mack Rd. Drainage Improvements		$6,417,190
City of Edinburg	Hidalgo	Hobbs & Second St. Flooding Improvements		$1,159,558
City of Edinburg	Hidalgo	Hidalgo County Irrigation District #1 Canal Replacement Project		$5,416,597
HCDD1	Hidalgo	Raymondville Drain	Project consists of a new drainage ditch connecting to existing channels. Existing channels will be improved to the approximate 63-mile drainage system of in-line and off-line detention reservoirs, and control structures that stretches from Edinburg Lake (Hidalgo County) to the Laguna Madre (Willacy County)	$417,617,336
HCDD1	Hidalgo	Delta Region Water Management Project	The Delta Region Water Management Project is a regional mitigation project that will provide increased flood control for the northernmost area of Hidalgo County, increase the water supply for the region, provide enhanced water quality to the Laguna Madre, promote and support economic development and establish a process to reclaim the water for municipal use. It is proposed to be constructed in three phases and includes an off-line stormwater detention pond/reservoir and treatment facility at the following locations: Phase I-Delta Reservoir, Phase II-Santa Cruz Reservoir & Phase III-Carlton Barth Reservoir.	$94,000,000
HCDD1	Hidalgo	East Mercedes Ditch 23	Channel, culvert, and IBWC structure improvements to the existing Ditch 23 drainage system. Project commences at the IBWC structure	$930,001

Entity	County	Project Name	Project Description	Estimated Cost
			into the Arroyo Colorado and extends north crossing I2 at Capasillo Terrace to the east of FM 1425.	
City of San Perlita	Willacy	City-Wide Public Facilities Upgrade	Harden of city-owned Facilities	$300,000
City of San Perlita	Willacy	City-Wide Drainage Project #1c	Construction of drainage controls and gates to ease flooding within the city jurisdiction	$1,000,000
City of San Perlita	Willacy	City-County Drainage Project #1b	Joint city-county construction of drainage pump stations to alleviate flooding overflow in Raymondville Drain	$600,000
City of San Perlita	Willacy	City-County Drainage Project #1a	Joint city-county construction of detention ponds to alleviate flooding overflow in Raymondville Drain.	$400,000
City of San Perlita	Willacy	City-Wide Sewer System Upgrade #1	Conduct improvements to sewer plant and service lines replacement and upgrades	$2,500,000
City of San Perlita	Willacy	City-Wide Street Improvements #1	Construction/upgrade of city streets, including surface, drainage culverts, and curb and gutter.	$2,300,000
Willacy County	Willacy	Widen Existing and Construct New Drainage Laterals (County Wide)	This action proposes the widening of existing canal/drainage laterals, as well as construction of new laterals, across the entire County of Willacy. This may include land acquisition, installation of critical flood control gates, and pumping stations, all of which may be needed to ensure additional lateral capacity and to assist in flood mitigation. The proposed drainage infrastructure will provide substantial regional drainage relief by assisting with the draining of upper Rio Grande Valley storm waters, as well as reducing the potential impact of future regional flood events. (Existing and New Infrastructure	$15,000,000
				$562,407,832