Hays County
Hays County Hazard Mitigation Plan Update
2017

Table of Contents

Tables

Figures

Hays County Annex
Section 1: Organize and Review

This section contains a brief description of Hays County and its features. In addition, Section 1 contains the following details regarding Hays County's:

- participation in the Hays County HMP Update process,
- stakeholder engagement,
- public outreach strategy,
- incorporation efforts, and
- plan maintenance procedures.

*Population :	194,739
Size of Community:	584 sq. miles
*Population over 65 years old	6,784
*Population under 16 years old	18,469
*Economically Disadvantaged Population ($0-$20k)	2,352

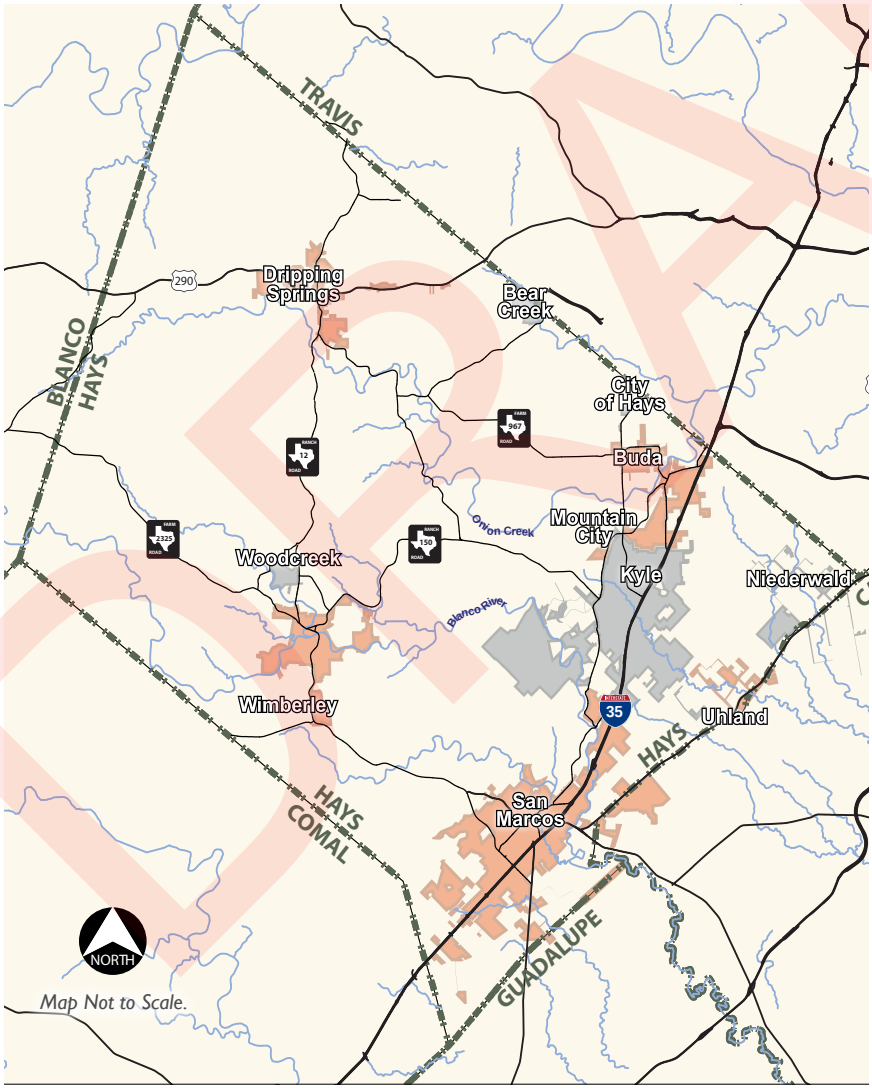
Hays County is serviced by the following responders:

Fire & EMS - Buda Fire Department, Kyle Fire Department, North Hays County Fire Rescue, San Marcos Fire Department, San Marcos Hays County EMS, South Hays Fire Department, ESD#3, Wimberley EMS, Wimberley Fire and Rescue

Law Enforcement- Hays County Sheriff's Office

HAZUS-MH 3.2 updated Census 2010 Population Estimates

Figure HC.1, Hays County Planning Area



Community Description

When planning, it is important to take into account the characteristics that make a community unique. Consideration of unique needs when it comes to mitigating or recovering from natural hazards ensures that all members of the community and their needs are addressed.

Within this community annex, reference to the community of Hays County is meant to encompass the areas within the County that are unincorporated.

At the center of Flash Flood Alley, Hays County is located just south of Austin. The County is on the border of 2 river basins, the Colorado and Guadalupe, and has abundant springs, including the San Marcos Springs, fed by the Edwards Aquifer, and the Trinity Aquifer which feeds Jacobs Well. The Edwards and Trinity Aquifers underlie much of the County and are a major source of drinking water for the region. Geographically, the Balcones Escarpment divides the County into 2 distinct areas: the Texas Hill Country to the northwest and the Blackland Prairie to the southeast.

Demographically, the County

economy continues to change as it continues to develop and grow. Listed as 1 of the nation's 10 fastest growing large counties with a population of at least 10,000 for 2017, the population grew by nearly 10,000 new residents during 2016. (MacCormack, 2017) Major highways that pass through Hays County include Interstate 35 (IH-35), U.S. Highway 290 (HWY 290), State Highway 21 (HWY 21), and State Highway 80 (HWY 80).

School districts that serve children in the unincorporated areas within Hays County include San Marcos Consolidated, Dripping Springs Independent, Wimberley Independent and Hays Consolidated school districts. Hays County's main utility providers are shown in Table HC.1.

The planning area are governed by a County Judge and 4 elected Commissioners. The County government center is in the County Seat, San Marcos, and employs 832 people.

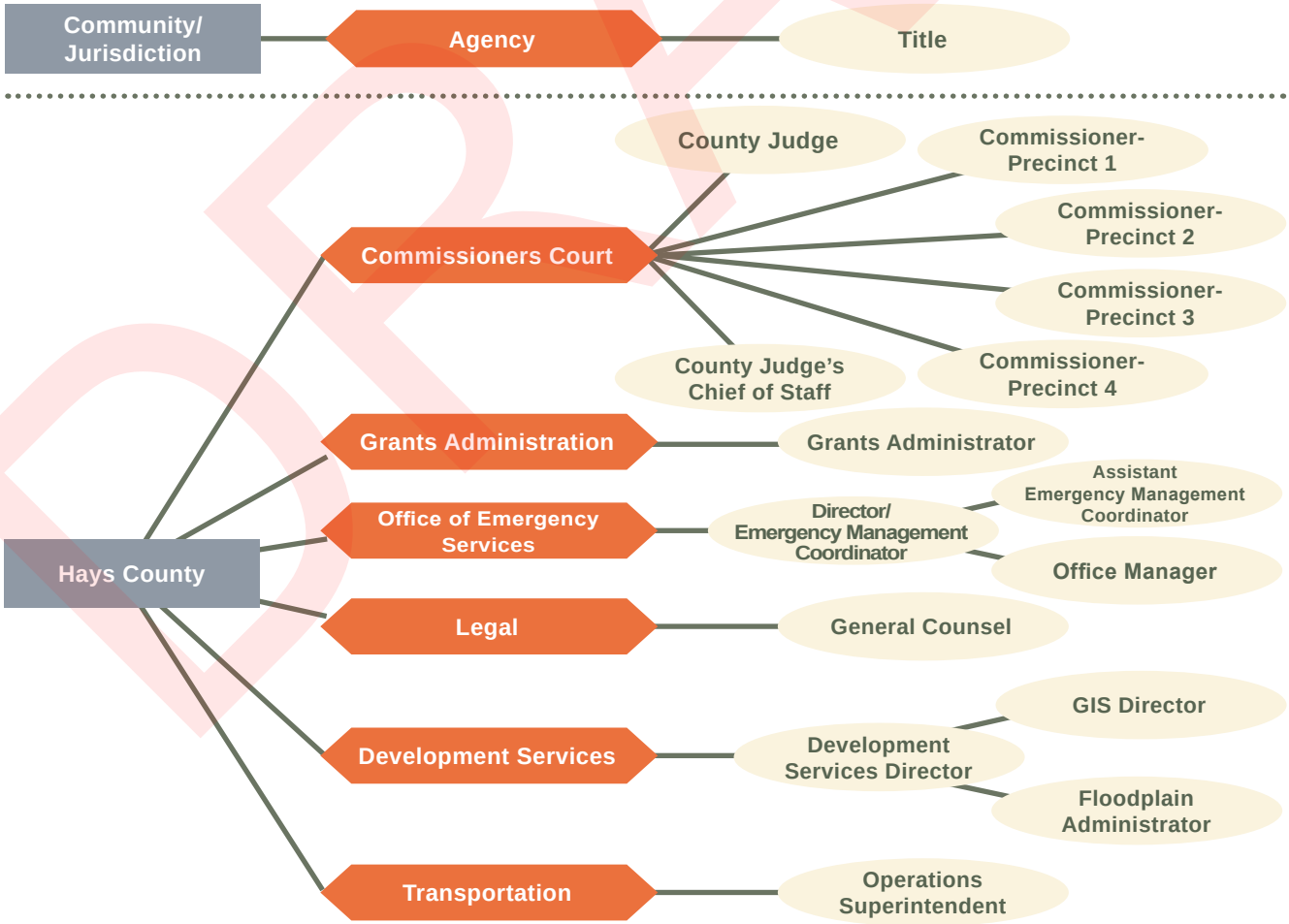
Table HC.1, Utility Providers (not an all-inclusive listing)

Type	Provider
Electric	Pedernales Electric Cooperative (PEC)/Bluebonnet Electric Cooperative
Natural Gas	Center Point Energy/Direct Propane Services
Water	Many water service providers
Cable	Frontier

Planning Committee

Planners who represented Hays County in the update process and are collectively known as the Hays County Mitigation Planning Committee (MPC) and are shown in Figure HC.2.

Figure HC.2, Planning Committee Membership



Community Planning Involvement

MPC planning activities for the Hays County Hazard Mitigation Plan (HMP) Update are captured in Figure HC.3, which utilizes check-marks to indicate each of the activities that were completed by the Hays County MPC.

Figure HC.3, Hays County Plan Participation

Meetings

- ✓ Kick-Off
- ✓ Risk Assessment
- ✓ Mitigation Strategy

Data Submission

- ✓ Planner's Survey
- ✓ Data Collection Spreadsheet/ GIS Data
- ✓ Planning Worksheets
- ✓ Phone Interview

Public Involvement

- ✓ City Council/Commissioner's Court Agenda Items
- ✓ Public Survey Posting/ Collection

Stakeholders

During the Phase 1 Kick-Off Meeting, planners were provided with a Planner/Stakeholder worksheet, referred to in Chapter 1, the Plan Process portion of the Hays County HMP Update. This document allowed planners to identify stakeholders for inclusion in the Risk Assessment and Mitigation Strategy Meetings. Table HC.2 identifies the stakeholders that were invited to participate by the following email:

Good Morning,

You or your organization has been identified by a local community planner as a stakeholder (interested/affected party) for the Hays County Hazard Mitigation Plan Update process. The planning team, made up of community officials from throughout Hays County, is working to update this plan that identifies actions for reducing and mitigating the risk from natural hazards (flood, tornado, severe winter, etc…) affecting Hays County and the communities within it. If your schedule allows, your insight would be valuable at a meeting being held on Thursday, January 12, 2017, from 1 p.m. to 4 p.m. at

Wimberley Community Center
14068 Ranch Road 12
Wimberley, TX 78676

Please register for the Hazard Mitigation Plan Update- Risk Assessment Meeting. https://www.eventbrite.com/e/hays-county-hazard-mitigation-plan-update-risk-assessment-meeting-registration-30892049953

If unable to complete registration on the Eventbrite site, please reply to this email and indicate who will attend from your organization so that the meeting facility can be prepared for the proper number of attendees.

JWSA and Halff Associates are providing coordination and facilitation support for this process for Hays County and participating communities utilizing FEMA mitigation grant funding. Any questions regarding this meeting can be directed to Paloma Alaniz at palaniz@halff.com.

Thank you.

Table HC.2, Plan Stakeholders

Jurisdiction	Agency	Title
Hays County	Sheriff's Office	Sheriff
Hays County	Development Services	Natural Resources Manager
Hays County	Sheriff's Office	Lieutenant
Hays County	Parks and Recreation	Lead Parks Specialist
Hays CISD	School District	Director of Student Services
Hays CISD	School District	Superintendent
San Marcos CISD	School District	Superintendent
Dripping Springs ISD	School District	Superintendent
Wimberley ISD	School District	Superintendent
Texas State University	Higher Education	Emergency Management Coordinator
Texas State University	Police Department	Chief
Guadalupe Blanco River Authority	River Authority	Engineer
Lower Colorado River Authority	River Authority	Chair
Blanco River Regional Recovery Team (BR3T)	Organization	Executive Director
North Hays County Fire & Rescue	Fire Department/EMS	Fire Chief
North Hays County Fire & Rescue	Fire Department/EMS	Lieutenant
South Hays Fire	Fire Department	Fire Chief
Buda	Fire Department/EMS	Chief
Kyle	Fire Department	Chief
San Marcos	Fire Department	Chief
Wimberley	Fire Department	Chief
Buda	Police Department	Chief
Kyle	Police Department	Chief
San Marcos	Police Department	Chief

Outreach Strategy

Hays County was very active in their outreach activities used to request public participation in the Hays County HMP Update.

Public Survey Promotion

Hays County advertised the Hays County HMP Update Public Survey on the homepage of http://www.co.hays.tx.us/.

As of March 10, 2017, Hays County had 242 residents respond to the public survey. A copy of the survey questions can be found in Appendix A of the Hays County HMP Update. Details on how the survey data was directly incorporated into the Risk Ranking process for hazards is included in Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for a description of the Characteristic Fire Intensity Scale (FIS).

Commissioners Court Announcement

On January 31, 2017, the Hays County Grants Administrator presented information on the Hays County HMP Update to the Hays County Commissioners Court. The Court agenda and item report for this presentation are included in Appendix A of the Hays County HMP Update.

Plan Phase Newsletters

Hays County MPC utilized newsletters for each phase of the planning process in order to share updates on the planning process with stakeholders, elected officials, City staff and the public. Copies of the newsletters can be found in Plan Appendix A of the Hays County HMP Update.

Plan Draft Public Review and Comment Period

The draft Hays County HMP Update was posted on the Hays County website from July 12, 2017 to July 26, 2017. A hard copy was placed in the Hays County Government Center. Email comments were collected by the Hays County Grants Administrator.

Incorporation of Sources

In addition to stakeholder and public input, the MPC also reviewed other planning resources that could provide useful information to the plan update process. Table HC.3 lists the documents reviewed and how they were considered for incorporation in the updated plan.

Table HC.3, Review/Incorporation of Sources

Name of Document	Type	How Incorporated
2013 State of Texas HMP	Plan	Utilized hazard definitions and hazard classification names.
Flood Insurance Study	Study	Incorporated best available hydraulic and hydrologic study results for flood hazard profile.
Hays County Strategic Policy and Implementation Plan 2010	Plan	This plan is a framework for decision-making for the Commissioners Court. Considered incorporation for objectives to: • Coordinate existing and future County plans • Coordinate with local plans • Hold a Water Summit with Cities, MUDs, developers, River Authorities, Conservation Districts, water conservation and environmental groups • Support the Edwards Aquifer Authority's efforts to implement impervious cover restrictions • Increase education and outreach to residents on the importance of water quality, quantity and preservation • Work with AgriLife extension and landowners to support Texas Watershed Steward Program, brush management, creekside conservation, and other efforts to protect water quality and quantity • Incorporate Water Quality Best Practices into all road projects • Work with TxDOT, developers and others to focus their mitigation projects where most beneficial (Hays County, 2010)
Water and Wastewater Facilities Plan for the Portion of Hays County West of the IH-35 Corridor	Plan	Reviewed in order to consider recommendations: In the northwestern and north central portion of the County: • Expand water conservation efforts and use of rainwater collection systems in lieu of using limited Trinity groundwater; • Expand water reuse opportunities In the northeastern portion of the County: • Expand water conservation efforts and use of rainwater collection systems in lieu of using limited Edwards groundwater In the southwestern portion of the County: • Expand water conservation efforts and use of rainwater collection systems in lieu of using limited Trinity groundwater • Expand water reuse opportunities In the southeastern portion of the County: • Expand water conservation efforts and use of rainwater collection systems in lieu of using limited Edwards groundwater Countywide • The County and other jurisdictions within the County should continue to promote and incentivize water management actions that are more sustainable, including broad support for water conservation and reuse, and rainwater collection systems as an alternative to groundwater. (HDR Engineering, Inc., 2011)

Table HC.3, Review/Incorporation of Sources (cont.)

Name of Document	Type	How Incorporated
Hays County Regional Habitat Conservation Plan	Plan Overview Presentation	"Mitigation = acres of bird habitat protected and managed in perpetuity; also expressed as a "conservation credit" (Sedgwick LLP, 2013)
Hays County FM 150 West Character Plan	Report	Reviewed presentation for presence of mitigation practices or consideration - none found (Hays County , 2015)
Property Assessed Clean Energy (PACE) Program Proposed for Hays County	Report	Reviewed report of the efforts of this program to enable private sector owners of family residential properties with 5 or more dwelling units to obtain loans to pay for water conservation, energy efficiency, and renewable energy retrofits Benefits of the program related to mitigation • Reduce demand on electricity grid • Support the State's water conservation plan and better enable the County to meet its water conservation goals
Jacob's Well Natural Area Master Plan	Plan	Reviewed the Easement restrictions set by the plan for impervious cover, existing improvements not allowed in the floodplain. Improvements/Restoration efforts • Wetland planting and soil stabilization • Weather station to monitor local conditions • Rainwater collection • Sedimentation pond to filter runoff from parking overflow to secondary pond • Cisterns to hold collected water • Decrease impervious cover and demonstrate rain gardens • Rehabilitation of prairie • Enhanced vegetation with native plants to filter runoff into sink • Enhance native plants for bank stabilization (RVi Planning + Landscape Architecture, 2012)

Continued Public Participation in Maintenance Process

The strategy for updates at the local level for Hays County will include opportunities for public involvement, as shown in Table HC.4.

Table HC.4, Public Involvement for Updates

Activity	Public Involvement	Method Available
Monitoring	The public will be given notice when items will be reviewed and receive the opportunity to review the notes from any notable developments.	Newspaper/Social Media
Evaluation	The public will be given a means to voice their opinion on the completed actions.	SurveyMonkey/Paper Survey/ Commissioners Court
Updates	Once updates are made, the changes will be recorded in a public revision history document .	Newspaper/Social Media/ SurveyMonkey/Commissioners Court

Maintenance

Table HC.5 lists the method, schedule, and responsible agent for the monitoring, evaluation, and updating of the adopted 2017 HMP within the Plan's 5-year update cycle.

Table HC.5, Hays County HMP Maintenance Schedule, Hays County

Task	Scope	Method	Schedule	Responsible Agent
Monitoring	Jurisdictional	Review of mitigation action items using Mitigation Action Progress Report Worksheets (Appendix C of the Hays County HMP Update).	Every 12 months	Hays County, Emergency Services, Assistant Emergency Management Coordinator
Evaluation	Jurisdictional	Complete Online Planner Survey (using SurveyMonkey) with evaluation of plan process.	Every 12 months	Hays County, Emergency Services, Director
Updates	Jurisdictional	Perform updates to Mitigation Strategy to edit/add/omit actions identified during monitoring activities. Conduct post-disaster review of community annex in order to update for significant occurrences, construction of new critical infrastructure or facilities, changes in jurisdictional boundaries and development. Participate in MPC for 5-year HMP update process.	As needed	Hays County, Emergency Services, Asst. OES

Section 2: Risk Assessment

Hays County Jurisdictional Hazards

This section contains Hays County's hazard profiles for each natural hazard included in the Hays County HMP Update. Profiles include:

- Location - the area where the hazard is known to occur
- Previous Occurrences - a history of reported events for the hazard
- Significant Previous Occurrences (when applicable) - notable hazard events within the community
- Extent - the strength or magnitude of the hazard
- Probability - the likelihood of the hazard event occurring in the future
- Impact - the consequence or effect (or possible effect) of hazard events
- Vulnerability Summary - identification of structures, systems, populations or assets susceptible to loss or damage

Hazard descriptions and extent scales for hazard magnitudes, are found in Chapter 2, the Risk Assessment portion of the Hays County HMP Update.

When available, data specific to the unincorporated portions of Hays County was used for hazard analysis. When no instances were reported specifically for that area for regional hazards, County-level data was applied.

State and national datasets were used to determine occurrence, extent, and the respective probabilities, rather than verbal testimonies, in an effort to retain data consistency. For some hazards, the National Oceanic and Atmospheric Administration (NOAA) Storm Events Database was used as the most comprehensive data available for hazards. As a result, fatality, injury and damage amounts shown for previous hazard occurrences do not always reflect the most recent totals. The Previous Occurrences paragraph identifies instances in which this may occur. Verbal testimony, when available, was integrated into impact or vulnerability summaries.

Hazards profiled within the Risk Assessment include:

Drought

Extreme Heat

Severe Winter Storms

Lightning

Hailstorms

Windstorms

Tornadoes

Expansive Soils

Floods

Land Subsidence

Hurricanes/Tropical Storms

Earthquakes

Dam/Levee Failure

Wildfires

Drought

Drought: Location

As drought occurs on a regional scale, all of Hays County is equally at risk as it can occur anywhere within the planning area.

Drought: Previous Occurrences

It can be assumed that National Oceanic and Atmospheric Administration (NOAA) reported events described as "HAYS (ZONE)" impacted Hays County unincorporated areas as drought occurs on a regional scale. There were 27 documented events listed for Hays County since the year 1996 (see Table HC.6).

, injury and damage amounts are shown in Table HC.6, per the NOAA Storm Events Database. Community testimony indicates that these amounts do not reflect the most recent totals, however NOAA data is being used as the best source of information available for the record period.

Table HC.6, Reported Drought Occurrence, Hays County

Location	Date	Type	Fatalities	Injuries	Property Damage	Crop Damage
HAYS (ZONE)	4/1/1996	Drought	0	0	0.00	0.00
HAYS (ZONE)	5/1/1996	Drought	0	0	0.00	0.00
HAYS (ZONE)	6/1/1996	Drought	0	0	0.00	0.00
HAYS (ZONE)	7/1/1996	Drought	0	0	0.00	0.00
HAYS (ZONE)	8/1/1996	Drought	0	0	0.00	0.00
HAYS (ZONE)	7/1/2000	Drought	0	0	0.00	0.00
HAYS (ZONE)	8/1/2000	Drought	0	0	0.00	0.00
HAYS (ZONE)	9/1/2000	Drought	0	0	0.00	0.00
HAYS (ZONE)	10/1/2000	Drought	0	0	0.00	0.00
HAYS (ZONE)	5/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	6/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	7/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	8/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	9/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	10/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	11/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	12/1/2011	Drought	0	0	0.00	0.00
HAYS (ZONE)	1/1/2012	Drought	0	0	0.00	0.00
HAYS (ZONE)	6/1/2012	Drought	0	0	0.00	0.00
HAYS (ZONE)	12/1/2012	Drought	0	0	0.00	0.00
HAYS (ZONE)	2/1/2013	Drought	0	0	0.00	0.00
HAYS (ZONE)	3/1/2013	Drought	0	0	0.00	0.00
HAYS (ZONE)	4/1/2013	Drought	0	0	0.00	0.00
HAYS (ZONE)	6/1/2013	Drought	0	0	0.00	0.00
HAYS (ZONE)	7/1/2013	Drought	0	0	0.00	0.00
HAYS (ZONE)	8/1/2013	Drought	0	0	0.00	0.00
HAYS (ZONE)	8/1/2014	Drought	0	0	0.00	0.00
Total					$0.00	$0.00

(National Oceanic and Atmospheric Administration Storm Event Database, 2016)

Drought: Significant Past Events

According to NOAA Storm Events Database, in July of 2011, the Texas State Climatologist declared the drought occurring over South Central Texas as the most severe 1-year drought ever for the State. Most of the area remained in exceptional drought conditions (Stage D4). Fire danger in South Central Texas increased from moderate to very high and burn bans were implemented for all of the counties in the region. The Texas A&M Agricultural Program report indicated the region remained almost completely dry with respect to crops and in wildfire alert status. Many stock tanks were dry and water levels of some wells were low. Ranchers continued to provide supplemental feeding for livestock. At the end of the month, the 7 day stream flow average remained in the below or much below normal range for basins across South Central Texas and the Rio Grande Plains. Area lakes and reservoirs remained below normal pool elevations and the Edwards Aquifer was 17.5 feet below normal and 27.1 feet below the level from 1 year prior. Many communities across South Central Texas continued with some level of water restrictions.

According to NOAA Storm Events Database, the drought of 2011 continued into 2012 as the La Niña event continued into January. At this point, there was a mix of some worsening and improved conditions. There were several significant rainfall events during January with precipitation ranging from around .5 inch across the Rio Grande Plains to near 10 inches in part of Caldwell County. Hays County improved to severe drought conditions (Stage D2) at this time. Due to recent rain, fire danger was low to moderate by the end of January and only 14 counties still had burn bans in effect. The Edwards Aquifer rose slightly with the rains and was 12 feet below normal and 13.2 feet below the level from 1 year prior.

According to NOAA Storm Events Database, in August of 2013, the drought worsened across much of South Central Texas. With the exception of a small part of the southeast portion of the region and a few other isolated spots, most of the region received near or below normal rainfall. Hays County stayed in Stage D2 drought conditions. Fire danger at the end of the month was low to moderate. Hays County had outdoor burn bans in effect at the end of the month. The Texas Crop and Weather Report issued by Texas A&M Agricultural Program indicated extremely dry conditions which continued in most of the region with rangeland and pastures in poor condition. Area lakes and reservoirs continued well below normal pool elevations. The Edwards Aquifer Authority remained in Stage 3 water restrictions as the aquifer dropped to 26 feet below normal and 8.6 feet below the level at the end of July 2012. This meant that large water users were required to reduce pumping by 35%. San Marcos was moved to Stage 1 water restrictions from Stage 3.

Drought: Extent

The US Drought Monitor Drought Intensity scale classifies drought by 5 categories, D0 through D4. According to the reported previous drought occurrences in the jurisdiction, the maximum drought extent experienced is a Category D4 drought. Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for a description of the US Drought Monitor Drought Intensity Index.

Drought: Probability

Based on 6 years with reported drought events within 20 years, a drought event occurs approximately once every 3 years on average in Hays County. Since drought events can happen anywhere throughout the HMP update area and occur on a regional scale, Hays County's unincorporated areas' future probability is assumed to be similar to the entire County area. In the future, the planning area can expect a drought event approximately once every 3 years on average, with conditions up to a Stage D4 drought.

Number of Years with Reported Event (Drought Year)	Number of Years in Dataset	Probability
6	20	0.30

Drought: Impact

Table HC.7 lists the impact of drought from the years 1996 to 2016 for Hays County according to the Drought Impact Reporter. The DIR is the nation's first comprehensive database of drought impacts. This database contains information from multiple Federal agencies, such as NOAA and United States Geological Survey (USGS), related to drought impacts from a national to city level by category and extent of impact. The effects of drought are not confined to jurisdictional boundaries and occur on a regional scale. Impacts reported at the Hays County level are applicable in illustrating impact to all of the jurisdictions with the County.

Table HC.7, Reported Drought Impacts, Hays County

Hays County Drought Impacts 1996-2016	
Category	**# of Incidents Reported**
Agriculture	45
Business & Industry	3
Energy	2
Fire	24
Plants & Wildlife	33
Relief, Response & Restrictions	48
Society & Public Health	7
Tourism & Recreation	3
Water Supply & Quality	53

(University of Nebraska-Lincoln, 2016)

Drought: Vulnerability Summary

The impacts of a drought on the community would clearly affect water supply, as parts of the County utilize water from the Edwards and Trinity aquifers. The County is currently in the process of obtaining remote weather stations to monitor drought indexes.

When droughts affect Hays County, revenue from Jacob's Well can be affected due to the reliance of water flow for the park. There is also revenue from tourism into the County to visit the Blanco River. This also suffers during periods of drought.

Extreme Heat

Extreme Heat: Location

Extreme heat occurs on a regional scale; therefore, all of Hays County is equally at risk as it can occur anywhere within the planning area.

Extreme Heat: Previous Occurrences

NOAA's Online Weather Data (NOWData) provides temperature data ranging from year the 2000 to 2016. NOAA's National Weather Service Heat Index (located in Chapter 2, the Risk Assessment portion of the Hays County HMP Update) indicates that temperatures meeting or exceeding 90°F are designated with an "Extreme Caution" or greater warning classification. According to Canyon Dam Station, the closest local weather data collection center with comprehensive data, the mean number of days with a daily max temperature greater or equal to 90°F is 94 days. Currently, the greatest number of days during which the planning area experienced extreme heat is 119 days in 2008. The highest temperature experienced was 109°F in August 2011; a "Danger" NWS Heat Index classification. Canyon Dam Station is the closest reporting NOWData station to the area and applies equally to Hays County unincorporated areas due to the regional nature of extreme heat occurrence.

Extreme Heat: Extent

Extreme heat extent is classified by temperatures, as well as event level designations, within the NWS Heat Index. The extent of extreme heat that Hays County has experienced can be derived from the data provided from NOWData at Canyon Dam Station since the year 2000. The highest daily mean temperature experienced was 109°F in August 2011. This event is classified by the NWS Heat Index as "Danger". Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for a description of heat extent scale, NOAA's NWS Heat Index.

Extreme Heat: Probability

The probability of future events can be determined by assessing historical averages. Since extreme heat events occur on a regional scale, Hays County's unincorporated areas' future probability is assumed to be similar to the area surrounding Canyon Dam Station. Based on NOWData, the planning area can expect, on average, approximately 94 days a year with temperatures greater or equal to 90°F, and up to a "Danger" warning classification per the NOAA NWS Heat Index. As extreme heat events have occurred every year since 2000, the probability of extreme heat affecting the community is 100% in any given year.

Extreme Heat: Impact

Extreme heat has physical impacts on the public and the infrastructure that supports them. According to the Texas Health Care Information Collection and Trauma Registry from the Texas Department of State Health Services' Injury Epidemiology & Surveillance Branch, the following number of patients were received in Hays County medical facilities (including its incorporated jurisdictions) for Heat Related Injuries and Trauma, as shown in Tables HC. 8 and HC.9.

Table HC.8, Hays County Hospital Inpatient Data, Extreme Heat

Description	2010	2011	2012	2013	2014
Accidents caused by excessive heat due to weather conditions	1	3	5	0	0
Accidents due to excessive heat of unspecified origin	1	0	0	0	0

(Texas Department of State Health Services- Injury Epidemiology & Surveillance Branch, 2017)

Table HC.9, Hays County Trauma Data, Extreme Heat

Description	2010	2011	2012	2013	2014
Accidents due to excessive heat of unspecified origin	0	1	0	0	0

(Texas Department of State Health Services- Injury Epidemiology & Surveillance Branch, 2017)

In addition to the physical impacts, an excessive heat event can also be the cause of cascading incidents. Electrical outages could occur due to the high demands of electricity needed to power cooling systems. A loss of critical resources, such as power, has significant impact on the entire population, with higher impacts to those with vulnerabilities to such conditions. The following portion of Hays County's population (within its unincorporated areas) according to HAZUS-MH 3.2 updated Census 2010 population estimates, would be greatly impacted by the severe temperatures related to excessive heat and/or the loss of electrical energy in their dwellings.

Population over 65 years old	6,784
Population under 16 years old	18,469
Economically Disadvantaged Population ($0-$20k)	2,352

An organization called Inside Energy (http://insideenergy.org) provided a compiled database outlining 15 years of power outages across the United States from annual data available at the Department of Energy. Within the database, the following excessive heat events affected electrical availability in the areas in or near Hays County, including its incorporated jurisdictions (shown in Table HC.10).

Table HC.10, Extreme Heat Affecting Electrical Availability

Event Description	Year	Start Date	Start Time	End Date	Respondent	Location	Customers Affected
Declared Energy Emergency Alert2/Heat Wave	2007	8/14/2007	2:00 p.m.	8/14/2007	American Electric Power (CSWS)	CSWS Control Area of Southwest Power Pool Parts of Oklahoma, Texas, Louisiana, Arkansas	N/A

(Wirfs-Brock, 2014)

Extreme Heat: Vulnerability Summary

Hays County does not have a cooling station plan for the community but does have locations available in order to cool people. The available public facilities, however, lack generator back-up capabilities to continue to offer cooling in the event of a power outage.

Severe Winter Storms

Severe Winter Storms: Location

Severe winter storms occur on a regional scale; therefore, all of Hays County is equally at risk.

Severe Winter Storms: Previous Occurrences

It can be assumed that NOAA reported events described as "HAYS (ZONE)" impacted Hays County unincorporated areas as winter weather can happen anywhere in the planning area and occurs on a regional scale. There were 13 documented events listed for Hays County since the year 1996 (see Table HC.11).

Fatality, injury and damage amounts are shown in Table HC.11, per the NOAA Storm Events Database. Community testimony indicates that these amounts do not reflect the most recent totals, however NOAA data is being used as the best source of information available for the record period.

Table HC.11, Winter Weather Occurrences, Hays County

Location	Date	Type	Fatalities	Injuries	Property Damage	Crop Damage
HAYS (ZONE)	2/1/1996	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	1/7/1997	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	1/11/1997	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	12/23/1998	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	12/12/2000	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	11/28/2001	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	2/24/2003	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	12/7/2005	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	1/15/2007	Winter Storm	0	0	125,000.00	0.00
HAYS (ZONE)	2/3/2011	Winter Storm	0	0	0.00	0.00
HAYS (ZONE)	11/26/2013	Winter Weather	0	0	0.00	0.00
HAYS (ZONE)	1/23/2015	Winter Weather	0	0	0.00	0.00
HAYS (ZONE)	2/16/2015	Winter Weather	0	0	0.00	0.00
Total			0	0	$125,000.00	$0.00

(National Oceanic and Atmospheric Administration Storm Event Database, 2016)

Severe Winter Storms: Significant Past Events

According to NOAA Storm Events Database, in January of 2007, spotty 1 to 2 inch snowfalls were common over the Hill Country and Edwards Plateau. In addition, serious problems were associated with coatings of freezing rain and drizzle that varied from 1/2 inch to 3/4 of an inch in thickness. In many locations, schools, businesses, and local offices were already closed on January 15 due to the Martin Luther King Holiday and simply did not re-open until Tuesday, January 16, or Wednesday, January 17. Hundreds of accidents were reported on interstate highways as well as city and rural roads, causing additional closures and problems. Most area schools were closed on January 16 as a result of the storm. These documented quantities indicate an extent of RSI Category 1 and SPIA Ice Damage Index Category 2 conditions.

Severe Winter Storms: Extent

Ice accumulation is captured and measured with the Regional Snowfall Index (RSI) and the Sperry-Piltz Ice Accumulation (SPIA) Index, as detailed in Chapter 2, the Risk Assessment portion of the Hays County HMP Update. According to the reported previous winter weather occurrences in the planning area, the maximum winter weather extent experienced is a RSI Category 1 snowfall event or SPIA Ice Index Category 2 ice event. Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for a description of winter weather extent scales.

Severe Winter Storms: Probability

Based on 13 reported events from the NOAA Storm Events Database in 20 years, a winter weather event occurs approximately every 2 years on average in Hays County. Since these events can happen anywhere throughout the planning area and occur on a regional scale, Hays County's unincorporated areas' future probability is assumed to be similar to the surrounding County area. The planning area can expect a winter weather event approximately once every 2 years on average in the future, with up to a RSI Category 1 snowfall event or SPIA Ice Index Category 2 ice event.

Number of Reported Events	Number of Years in Dataset	Probability
13	20	0.65

Severe Winter Storms: Impact

Severe winter weather has physical impacts upon the public and the infrastructure that supports them. According to the Texas Health Care Information Collection and Trauma Registry from the Texas Department of State Health Services' Injury Epidemiology & Surveillance Branch, the following number of patients were received in Hays County medical facilities (including its incorporated jurisdictions) for Cold Related Injuries and Trauma (shown in Table HC.12 & HC.13).

Table HC.12, Hays County Hospital Inpatient Data, Severe Winter Storms

Description	2010	2011	2012	2013	2014
Accidents caused by excessive cold due to weather conditions	2	0	0	0	0
Accidents due to excessive cold of unspecified origin	1	0	0	0	1

(Texas Department of State Health Services- Injury Epidemiology & Surveillance Branch, 2017)

Table HC.13, Hays County Trauma Data, Severe Winter Storms

Description	2010	2011	2012	2013	2014
Accidents due to excessive cold due to weather conditions	1	0	0	0	0

(Texas Department of State Health Services- Injury Epidemiology & Surveillance Branch, 2017)

In addition to the physical impacts, a severe winter storm event can also be the cause of cascading incidents. Electrical outages could occur due to the high demands of electricity needed to power heating systems. A loss of critical resources, such as power, has significant impact on the entire population, with higher impacts to those with vulnerabilities to such conditions. The following portion of Hays County's population (within its unincorporated areas), according to HAZUS-MH 3.2 updated Census 2010 population estimates, would be greatly impacted by the extreme temperature conditions related to severe winter storms and/or the loss of electrical energy in their dwellings.

Population over 65 years old	6,784
Population under 16 years old	18,469
Economically Disadvantaged Population ($0-$20k)	2,352

An organization called Inside Energy (http://insideenergy.org) provided a compiled database outlining 15 years of power outages across the United States from annual data available at the Department of Energy. Within the database, the following winter storm events affected electrical availability in the areas in or near Hays County, including its incorporated jurisdictions (shown in Table HC.14).

Table HC.14, Severe Winter Storms Affecting Electrical Availability

Event Description	Year	Start Date	Start Time	End Date	Respondent	Location	Customers Affected
Cold Weather Event	2011	2/9/2011	4:30 PM	2/10/2011	ERCOT ISO	Texas	N/A
Public Appeal due to Severe Weather - Cold	2014	1/6/2014	7:01 AM	1/7/2014	ERCOT	Texas	N/A
Public Appeal due to Severe Weather - Cold	2014	3/2/2014	7:00 PM	3/4/2014	ERCOT	ERCOT Region Texas	N/A

**Electrical Reliability Council of Texas (ERCOT)*

(Wirfs-Brock, 2014)

In addition, severe winter storms and the icy roads that accompany them lead to dangerous driving conditions. Data available from the Texas Department of Transportation's Crash Records Information System shows that between the years of 2010 and 2017, rural Hays County experienced 42 crashes related to sleet/hail and snow conditions (shown in Table HC.15). Injuries sustained from these crash events included 12 incapacitating injuries, 6 non-incapacitating injuries, and 2 possible injuries.

Table HC.15, Severe Winter Storms, Vehicle Accidents, Hays County

City	Fatality	Incapacitating Injury	Non-Incapacitating	Possible Injury	Crash Year	Street Name	Surface Condition	Weather Condition
Rural Hays County	0	0	1	0	2010	US0290	Slush	Snow
Rural Hays County	0	0	1	0	2010	US0290	Slush	Snow
Rural Hays County	0	0	0	0	2010	W FITZHUGH RD	Slush	Snow
Rural Hays County	0	0	0	0	2010	US0290	Slush	Snow
Rural Hays County	0	0	0	0	2010	RM0012	Slush	Snow
Rural Hays County	0	0	0	0	2010	RM0012	Slush	Snow
Rural Hays County	0	0	0	0	2011	RM0967	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2011	US0290	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2011	MCGREGOR LN	Ice	Sleet/Hail
Rural Hays County	0	1	0	0	2011	RM0012	Ice	Sleet/Hail
Rural Hays County	0	1	0	0	2011	RM0012	Ice	Sleet/Hail
Rural Hays County	0	1	0	0	2011	RM0012	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2011	MCGREGOR LN	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2011	HILLIARD RD	Snow	Snow
Rural Hays County	0	0	0	1	2011	FM1626	Snow	Snow
Rural Hays County	0	0	0	0	2011	IH0035	Snow	Snow
Rural Hays County	0	0	0	0	2011	IH0035	Snow	Snow
Rural Hays County	0	0	0	0	2011	US0290	Ice	Snow
Rural Hays County	0	0	0	0	2011	US0290	Ice	Snow
Rural Hays County	0	3	0	0	2014	RM0012	Wet	Sleet/Hail
Rural Hays County	0	3	0	0	2014	RM0012	Wet	Sleet/Hail
Rural Hays County	0	3	0	0	2014	RM0012	Wet	Sleet/Hail
Rural Hays County	0	0	0	0	2014	RM0012	Wet	Sleet/Hail
Rural Hays County	0	0	0	0	2014	FM1626	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2014	FM1626	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2014	FM1626	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2014	FM1626	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2014	FM1626	Ice	Sleet/Hail
Rural Hays County	0	0	1	0	2014	DOVE DR	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2014	US0290	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2014	US0290	Ice	Sleet/Hail

Table HC.15, Severe Winter Storms, Vehicle Accidents, Hays County (cont.)

City	Fatality	Incapacitating Injury	Non-Incapacitating	Possible Injury	Crash Year	Street Name	Surface Condition	Weather Condition
Rural Hays County	0	0	0	0	2014	US0290	Ice	Sleet/Hail
Rural Hays County	0	0	0	0	2014	STAPLES RD	Ice	Sleet/Hail
Rural Hays County	0	0	0	1	2014	RM0165	Wet	Sleet/Hail
Rural Hays County	0	0	0	0	2015	RM0012	Wet	Sleet/Hail
Rural Hays County	0	0	0	0	2015	RM0012	Wet	Sleet/Hail
Rural Hays County	0	0	0	0	2015	RM0012	Wet	Sleet/Hail
Rural Hays County	0	0	0	0	2015	RM0012	Wet	Sleet/Hail
Rural Hays County	0	0	0	0	2015	RM0012	Wet	Sleet/Hail
Rural Hays County	0	0	1	0	2015	RM0150	Ice	Sleet/Hail
Rural Hays County	0	0	1	0	2015	RM0150	Ice	Sleet/Hail
Rural Hays County	0	0	1	0	2015	RM0150	Ice	Sleet/Hail

Crash Records Information System Query for Accidents in Hays County from 2010-2017 from non-Clear Weather Conditions (Texas Department of Transportation, 2017)

Severe Winter Storms: Vulnerability Summary

Hays County's has a large number of surface powerlines. These powerlines pose a vulnerability due to the impact on electricity to homes and businesses during cold temperatures when an accumulation of ice and snow on branches could cause them to fall on the exposed powerlines.

The County has the ability to spread sand and can also contract with the Texas Department of Transportation in the event that additional resources are needed. Even though Sanding capabilities exist, low water crossings and bridges in the area affect response times for emergency vehicles in the planning area.

Lightning

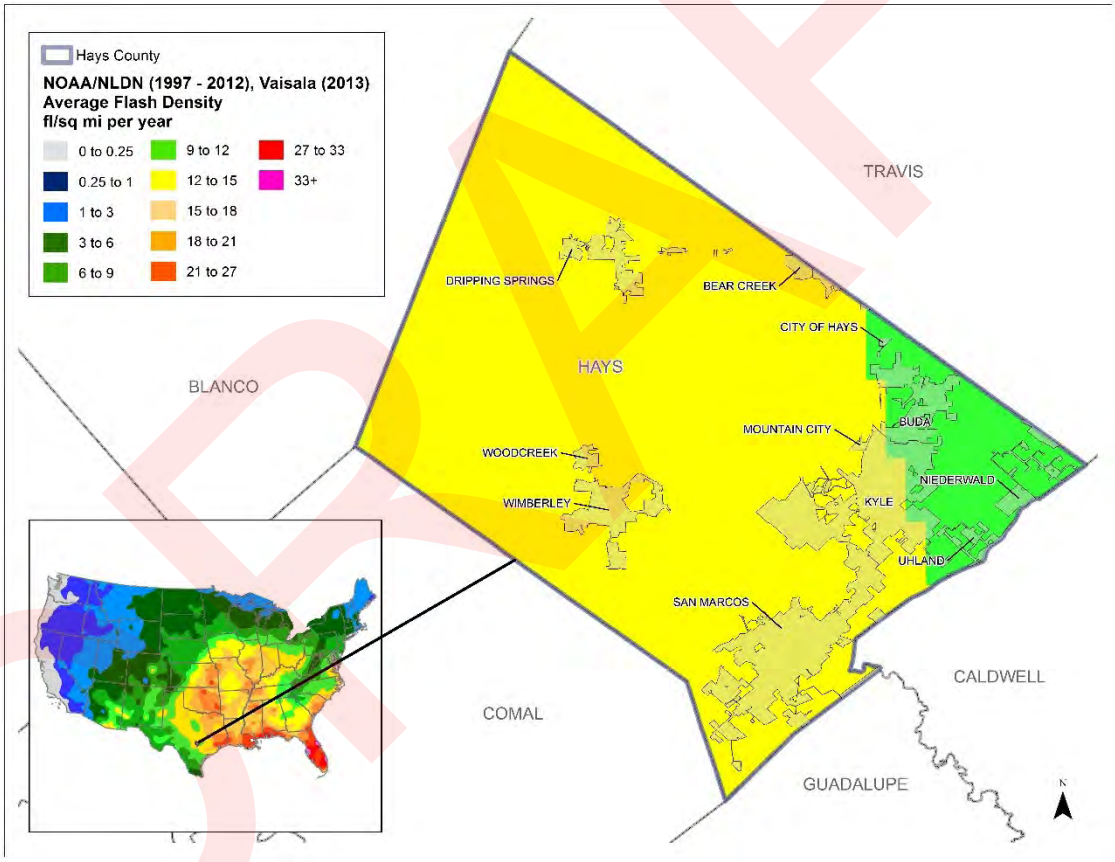
Lightning: Location

The entire extent of Hays County is exposed to some degree of lightning hazard. Since lightning can occur at any location, lightning events could be experienced anywhere within the planning area.

Lightning: Previous Occurrences

Figure HC.4 reflects Hays County reflects Hays County within the area that was calculated to receive approximately 9 - 12 lightning strikes per square mile per year on the eastern sector of the County while the rest of the planning area was calculated to receive 12 – 15 lightning strikes per square mile per year according to NLDN data for the years 1997 to 2012. There were no lightning events reported specifically for the jurisdiction in the NOAA Storm Events Database.

Figure HC.4, Average Annual Lightning Density, Hays County



(Vaisala NLDN, 2016)

Lightning: Extent

Due to the lack of reported occurrences, there is not sufficient data to determine the maximum LAL for the planning area (refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for a description of the LAL Grids). However, with the data available, the magnitudes of lightning events that Hays County has experienced can be derived from the NOAA/NLDL data seen in Figure HC.4. There were up to 12 to 15 strikes per square mile per year within the planning area of approximately 584 square miles.

Lightning: Probability

Since lightning can occur at any location, lightning events could be experienced anywhere within the planning area. Based on the data provided in Figure HC.4, Hays County can expect future events to fall in line with NLDN data from previous years with a probability of up to approximately 12 to 15 lightning strikes per square mile per year.

Lightning: Impact

The National Lightning Detection Network (NLDN) reported 217 lightning fatalities within the State between the years of 1959 and 2013. . According to the Texas Health Care Information Collection and Trauma Registry from the Texas Department of State Health Services' Injury Epidemiology & Surveillance Branch, the 2 patients were received in Hays County medical facilities for Lightning Related Trauma between the years of 2010 and 2014 (shown in Table HC.16).

Table HC.16, Hays County Trauma Registry Data, Lightning Events

E-Code	Description	2010	2011	2012	2013	2014
907.0	Accident due to lightning	0	1	0	0	1

(Texas Department of State Health Services- Injury Epidemiology & Surveillance Branch, 2017)

In addition to the physical impacts, lightning events can also be the cause of additional cascading incidents, such as electrical outage events, due to the impact that lightning strikes can have on electrical utility infrastructure. A loss of critical resources such as power has significant impact on the entire population, with higher impacts to those with vulnerabilities to such conditions. The following portion of the population from the Hays County planning area, according to HAZUS-MH 3.2 updated Census 2010 population estimates, would be greatly impacted by the loss of electrical energy in their dwellings.

Population over 65 years old	6,784
Population under 16 years old	18,469
Economically Disadvantaged Population ($0-$20k)	2,352

An organization called Inside Energy (http://insideenergy.org) provided a compiled database outlining 15 years of power outages across the United States from annual data available at the Department of Energy. Within the database, the following thunderstorm/severe storm events affected electrical availability in the areas in or near Hays County and its incorporated areas (shown in Table HC.17).

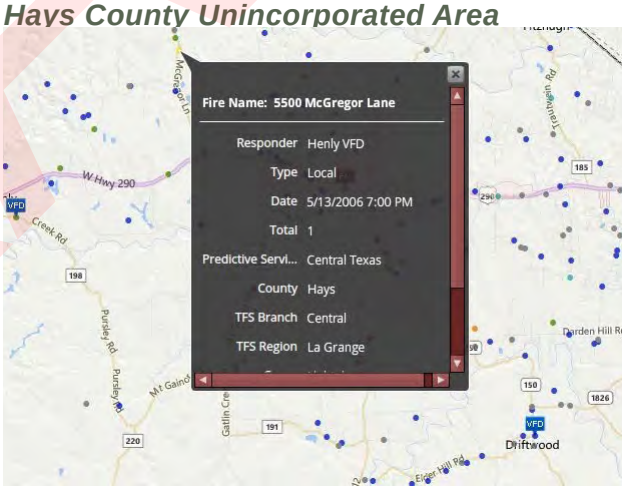
Table HC.17, Lightning Affecting Electrical Availability

Event Description	Year	Start Date	Start Time	End Date	Respondent	Location	Customers Affected
Severe Weather	2008	4/9/2008	4:00 p.m.	4/13/2008	Oncor Electric Delivery Company LLC	North, Central and East Texas	488,689
Severe Thunderstorms	2008	6/17/2008	9:01 a.m.	6/19/2008	Oncor Electric Delivery Company LLC	North, Central and East Texas	234,393
Severe Thunderstorms	2008	8/3/2008	1:30 a.m.	8/3/2008	Entergy Corporation	Mississippi, Louisiana, Texas	59,500
Severe Storms	2009	6/10/2009	6:00 p.m.	6/14/2009	Oncor Electric Delivery Company, LLC	North and Central Texas	800,000
Thunderstorms	2010	6/8/2010	11:00 a.m.	6/8/2010	Centerpoint Energy	Southeastern Texas	79,741

(Wirfs-Brock, 2014)

Lightning strikes can also cause wildfire ignitions. According to the National Fire Protection Association (NFPA), "during 2007-2011, U.S. local fire departments responded to an average of 22,600 fires per year that were started by lightning. These fires caused an average of 9 civilian deaths, 53 civilian injuries and $451 million in direct property damage per year." The source also cites that the fires are more common in June through August and in the late afternoon and evening. The Texas A&M Forest Service's Wildfire Risk Assessment Portal shows that there have been 4 wildfires ignited by lightning in Hays County's unincorporated areas. Figure HC.5 shows 1 of the ignitions occurring May 13, 2006 at 7:00 PM during which 1 acre was burned.

Figure HC.5, Lightning Ignited Wildfire in Hays County Unincorporated Area



(Texas A&M Forest Service, 2016)

Lightning: Vulnerability Summary

Lightning has impacts on outdoor resources in the community, putting those who are out during storms at risk. In addition, lightning strikes can affect critical infrastructure. An example of such an impact was the possible effects of lightning on Computer-Aided Dispatch system data dissemination. This can lead to an interruption in the emergency response services that County resources are able to provide during storm events.

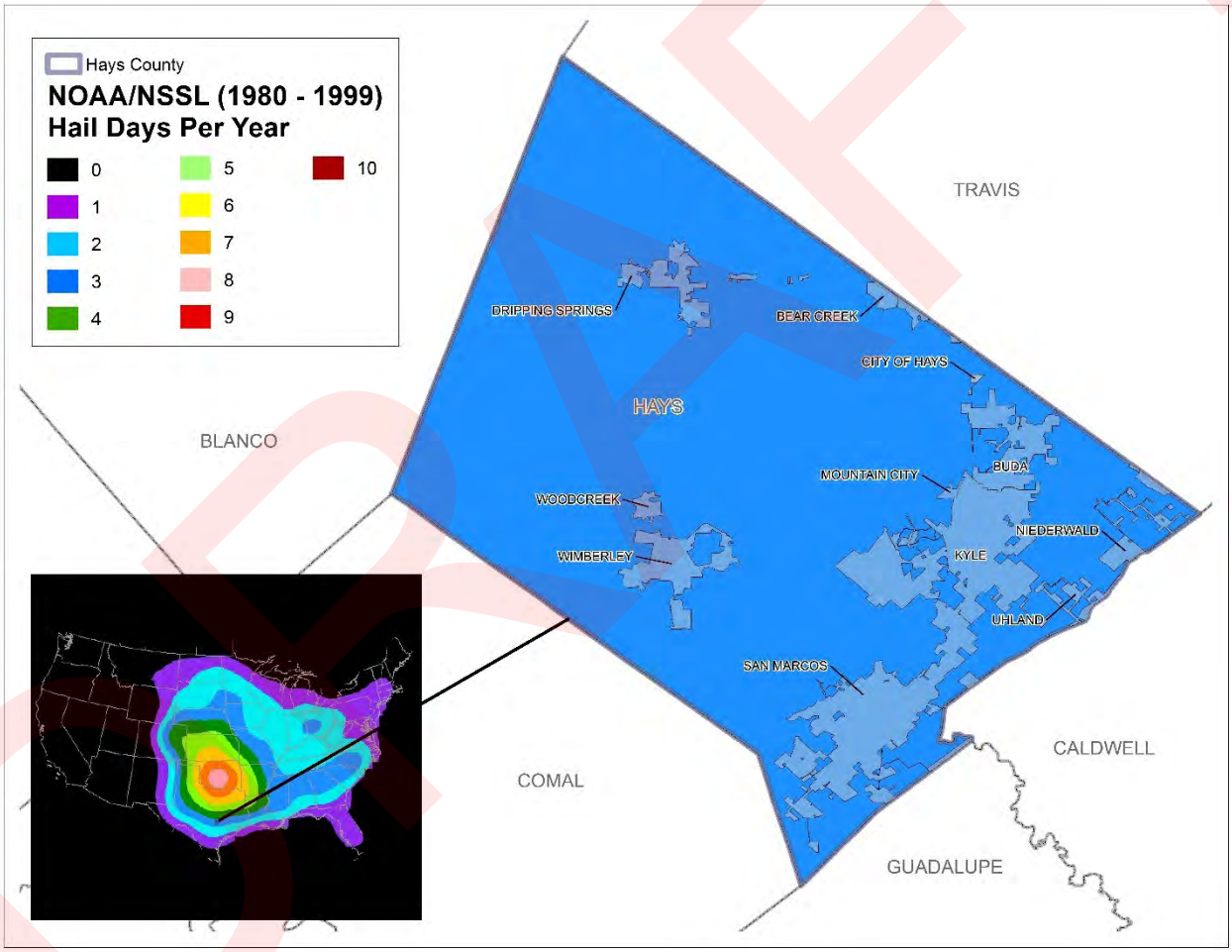
In addition, the many open space areas that are wooded are vulnerable to ignition during lightning strike, and especially during periods of drought.

Hailstorms

Hailstorms: Location

The entire extent of Hays County is exposed to some degree of hail hazard. Since hail can occur at any location, hail events could be experienced anywhere within the planning area. NOAA's National Severe Storms Laboratory used historical data from 1980 to 1999 to estimate the daily probability of hail occurrences of at least 0.75-inch diameter hail across the U.S. Figure HC.6 shows the average number of hail days per year determined from this analysis and the corresponding location of the planning area. The density of hail days per year in the map's legend indicates the probable number of hail days for each 25-square-mile cell within the contoured zone that can be expected per year. It should be noted that the density number does not indicate the number of events that can be expected within each cell, rather the average number of days per year with 1 or more event occurring within each cell.

Figure HC.6, National Hail Days Per Year, Hays County



(National Severe Storms Laboratory, 2016)

Hailstorms: Previous Occurrences

It can be assumed that NOAA reported events described as "HAYS County" or listed under unincorporated jurisdictions impacted Hays County unincorporated areas. Table HC.18 lists the 57 hail events reported for Hays County and its unincorporated jurisdictions since the year 1967. Note that multiple listings for the same dates are the result of reports from different affected parts of the County for the given event.

Fatality, injury and damage amounts are shown in Table HC.18, per the NOAA Storm Events Database. Community testimony indicates that these amounts do not reflect the most recent totals, however NOAA data is being used as the best source of information available for the record period.

Table HC.18, Hail Events, Hays County

Location	Date	Type	Extent (mm)	Fatalities	Injuries	Property Damage	Crop Damage
Hays County	5/20/1967	Hail	76.20	0	0	0.00	0.00
Hays County	5/8/1969	Hail	25.40	0	0	0.00	0.00
Hays County	10/27/1970	Hail	25.40	0	0	0.00	0.00
Hays County	2/25/1971	Hail	57.15	0	0	0.00	0.00
Hays County	3/12/1971	Hail	76.20	0	0	0.00	0.00
Hays County	5/29/1975	Hail	44.45	0	0	0.00	0.00
Hays County	3/30/1976	Hail	44.45	0	0	0.00	0.00
Hays County	4/7/1976	Hail	44.45	0	0	0.00	0.00
Hays County	4/7/1976	Hail	44.45	0	0	0.00	0.00
Hays County	4/7/1976	Hail	44.45	0	0	0.00	0.00
Hays County	4/7/1976	Hail	44.45	0	0	0.00	0.00
Hays County	4/7/1976	Hail	44.45	0	0	0.00	0.00
Hays County	5/5/1976	Hail	44.45	0	0	0.00	0.00
Hays County	4/3/1977	Hail	25.40	0	0	0.00	0.00
Hays County	4/14/1977	Hail	50.80	0	0	0.00	0.00
Hays County	4/14/1977	Hail	50.80	0	0	0.00	0.00
Hays County	4/18/1979	Hail	25.40	0	0	0.00	0.00
Hays County	1/17/1980	Hail	44.45	0	0	0.00	0.00
Hays County	1/17/1980	Hail	25.40	0	0	0.00	0.00
Hays County	2/29/1980	Hail	44.45	0	0	0.00	0.00
Hays County	4/11/1980	Hail	25.40	0	0	0.00	0.00
Hays County	5/8/1980	Hail	25.40	0	0	0.00	0.00
Hays County	5/9/1981	Hail	25.40	0	0	0.00	0.00
Hays County	4/20/1982	Hail	25.40	0	0	0.00	0.00
Hays County	5/13/1982	Hail	25.40	0	0	0.00	0.00
Hays County	3/30/1983	Hail	25.40	0	0	0.00	0.00
Hays County	5/20/1983	Hail	25.40	0	0	0.00	0.00
Hays County	5/20/1983	Hail	31.75	0	0	0.00	0.00
Hays County	5/20/1987	Hail	50.80	0	0	0.00	0.00
Hays County	5/5/1989	Hail	19.05	0	0	0.00	0.00
Hays County	5/5/1989	Hail	38.10	0	0	0.00	0.00
Hays County	5/10/1989	Hail	19.05	0	0	0.00	0.00
Hays County	5/10/1989	Hail	38.10	0	0	0.00	0.00
Hays County	2/1/1990	Hail	38.10	0	0	0.00	0.00
Hays County	4/14/1991	Hail	19.05	0	0	0.00	0.00
Hays County	4/28/1991	Hail	19.05	0	0	0.00	0.00
Hays County	4/19/1992	Hail	38.10	0	0	0.00	0.00
Hays County	5/12/1992	Hail	44.45	0	0	0.00	0.00
Hays County	5/12/1992	Hail	19.05	0	0	0.00	0.00
Hays County	5/27/1992	Hail	19.05	0	0	0.00	0.00
Hays County	5/27/1992	Hail	25.40	0	0	0.00	0.00

Table HC.18, Hail Events, Hays County (cont.)

Location	Date	Type	Extent (mm)	Fatalities	Injuries	Property Damage	Crop Damage
Henly	11/1/1995	Hail	44.45	0	0	0.00	0.00
Henly	3/7/1998	Hail	19.05	0	0	0.00	0.00
Henly	2/10/2009	Hail	25.4	0	0	0.00	0.00
Driftwood	5/11/2011	Hail	44.45	0	0	0.00	0.00
Mt. Gainor	5/20/2011	Hail	19.05	0	0	0.00	0.00
Driftwood	5/20/2011	Hail	25.40	0	0	0.00	0.00
Driftwood	5/20/2011	Hail	25.40	0	0	0.00	0.00
Mt. Gainor	5/20/2011	Hail	25.40	0	0	0.00	0.00
Driftwood	5/20/2011	Hail	25.40	0	0	0.00	0.00
Driftwood	5/20/2011	Hail	22.35	0	0	0.00	0.00
Fitzhugh	1/24/2012	Hail	25.40	0	0	0.00	0.00
Fitzhugh	3/19/2013	Hail	38.10	0	0	0.00	0.00
Driftwood	4/27/2013	Hail	44.45	0	0	0.00	0.00
Driftwood	5/27/2014	Hail	25.40	0	0	0.00	0.00
Fitzhugh	5/27/2014	Hail	19.05	0	0	0.00	0.00
Driftwood	4/16/2015	Hail	22.35	0	0	0.00	0.00
Total				**0**	**0**	**$0.00**	**$0.00**

(National Oceanic and Atmospheric Administration Storm Event Database, 2016)

Hailstorms: Extent

The Tornado and Storm Research Organization (TORRO) created a hail extent index to measure hail called the Hailstorm Intensity Scale. According to the reported previous hail occurrences in the planning area, the maximum hail extent experienced is hail up to 3 inches, or 76.20 millimeters, in diameter, corresponding to a TORRO Hailstorm Intensity Scale classification of a "Super Hailstorm." Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for hail extent scale descriptions.

Hailstorms: Probability

Figure HC.6 reports 3 hail days per year as a result of NLDN's nationwide analysis. Since this calculation is based on national data, a more specific calculation based on local-level NOAA reports was utilized to calculate probability. Based on 57 reported events in 49 years, a hail event occurs approximately once a year on average in Hays County. Since hail events can happen anywhere throughout the HMP planning area, Hays County unincorporated areas' future probability is assumed to be similar to the entire County area. The planning area can expect a hail event approximately once every year on average in the future, with hail up to 3 inches, or 76.20 millimeters, in diameter, corresponding to a TORRO Hailstorm Intensity Scale classification of a "Super Hailstorm."

Number of Reported Events	Number of Years in Dataset	Probability
57	49	1.16

Hailstorms: Impact

Although there are no specific occurrences for which hailstorm damages are captured, based on the maximum hail extent experienced (44.45 mm), the TORRO Hailstorm Intensity Scale (found in Chapter 2, the Risk Assessment portion of the Hays County HMP Update) indicates that impact can be expected to include any of the following:

- Varying degrees of damage to vegetation and crops
- Damage to plastic structures
- Varying degrees of damage to glass
- Paint and wood scored
- Vehicle bodywork damage
- Varying degrees of roof damage
- Varying degrees of risk of injuries
- Varying degrees of aircraft damage
- Brick walls pitted
- Risk of severe or even fatal injuries to persons caught in the open

Hailstorms: Vulnerability Summary

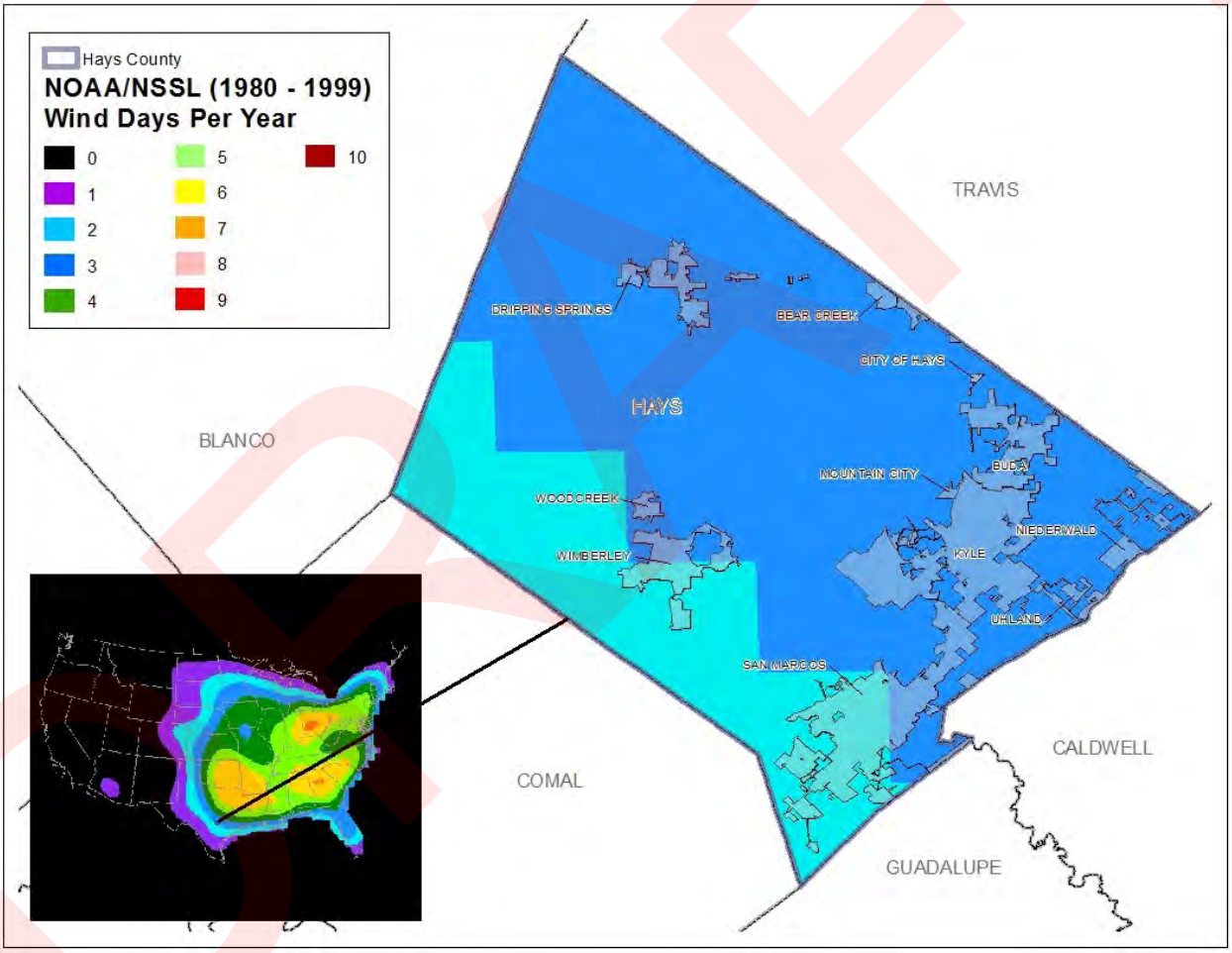
The roof types on the County structures could be susceptible to hail. Current plans for the new public safety building will include covered parking for police vehicles.

Windstorms

Windstorms: Location

The entire extent of Hays County is exposed to some degree of wind hazard. Since wind can occur at any location, wind events could be experienced anywhere within the planning area. NOAA's National Severe Storms Laboratory used historical data from 1980 to 1999 to estimate the daily probability of wind occurrences across the U.S. with gusts of at least 58 mph. Figure HC.7 shows the estimates for wind days determined from this analysis and the corresponding location of the planning area. The density of wind days per year in the map's legend indicates the probable number of wind days for each 25- square-mile cell within the contoured zone that can be expected per year. It should be noted that the density number does not indicate the number of events that can be expected within each cell, rather the average number of days per year with 1 or more events occurring within each cell.

Figure HC.7, National Wind Days Per Year, Hays County



(National Severe Storms Laboratory, 2016)

Windstorms: Previous Occurrences

It can be assumed that NOAA reported events described as "HAYS County", "Countywide", or under an unincorporated jurisdiction impacted Hays County unincorporated areas. Table HC.19 lists the 38 wind events reported for Hays County and its unincorporated jurisdictions since the year 1974.

Fatality, injury and damage amounts are shown in Table HC.19, per the NOAA Storm Events Database. Community testimony indicates that these amounts do not reflect the most recent totals, however NOAA data is being used as the best source of information available for the record period.

Table HC.19, Reported Wind Events, Hays County

Location	Date	Type	Extent (knots)	Fatalities	Injuries	Property Damage	Crop Damage
Hays County	5/9/1974	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	4/7/1975	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/19/1975	Thunderstorm Wind	70 kts.	0	0	0.00	0.00
Hays County	5/31/1976	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/31/1976	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/11/1978	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/29/1978	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	4/18/1979	Thunderstorm Wind	52 kts.	0	0	0.00	0.00
Hays County	7/10/1979	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	2/29/1980	Thunderstorm Wind	55 kts.	0	0	0.00	0.00
Hays County	5/13/1980	Thunderstorm Wind	52 kts.	0	0	0.00	0.00
Hays County	7/28/1980	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/13/1982	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	6/22/1982	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	3/30/1983	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	10/21/1984	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	12/31/1984	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/8/1985	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	6/12/1986	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/5/1989	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/20/1989	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	4/26/1990	Thunderstorm Wind	NA	0	0	0.00	0.00

Table HC.19, Reported Wind Events, Hays County (cont.)

Location	Date	Type	Extent (knots)	Fatalities	Injuries	Property Damage	Crop Damage
Hays County	4/26/1990	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/18/1990	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	4/7/1991	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	5/27/1992	Thunderstorm Wind	53 kts.	0	0	0.00	0.00
Hays County	6/12/1992	Thunderstorm Wind	60 kts.	0	0	0.00	0.00
Hays County	6/12/1992	Thunderstorm Wind	NA	0	0	0.00	0.00
Hays County	9/3/1992	Thunderstorm Wind	50 kts.	0	0	0.00	0.00
Hays County	9/3/1992	Thunderstorm Wind	50 kts.	0	0	0.00	0.00
Countywide	3/8/1995	Thunderstorm Wind	55 kts.	0	0	0.00	0.00
Countywide	6/11/1995	Thunderstorm Wind	NA	0	0	0.00	3,000.00
Countywide	3/19/2002	Thunderstorm Wind	NA	0	0	100,000.00	100,000.00
Driftwood	4/14/2014	Thunderstorm Wind	50 kts. EG	0	0	0.00	0.00
Driftwood	6/12/2014	Thunderstorm Wind	61 kts. EG	0	0	0.00	0.00
Fitzhugh	6/12/2014	Thunderstorm Wind	61 kts. EG	0	0	0.00	0.00
Fitzhugh	6/12/2014	Thunderstorm Wind	56 kts. EG	0	0	0.00	0.00
Mt. Gainor	4/30/2016	Thunderstorm Wind	61 kts. EG	0	0	0.00	0.00
Total				**0**	**0**	**$100,000.00**	**$103,000.00**

NA - No data available
EG - Estimated Gust

(National Oceanic and Atmospheric Administration Storm Event Database, 2016)

Windstorms: Extent

Wind is measured by the Beaufort Wind Scale that relates wind speed to observed conditions on land and sea. According to the reported previous windstorm occurrences in the planning area, the maximum wind extent experienced was 61 knots (Violent Storm Classification in the Beaufort Wind Scale). Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for a description of wind extent scales.

Windstorms: Probability

Figure HC.7 reports 3 wind days per year as a result of NLDN's nationwide analysis. Since this calculation is based on national data, a more specific calculation based on local-level NOAA reports was utilized to calculate probability. Based on 38 reported events in 42 years, a wind event occurs approximately once every year on average in Hays County. Since wind events can happen anywhere throughout the HMP planning area, Hays County's unincorporated areas' future probability is assumed to be similar to the surrounding County area. In the future, Hays County can expect a wind event of up to 70 knots or 80.55 miles per hour (Hurricane Classification in the Beaufort Wind Scale), approximately once every year on average in the future.

Number of Reported Events	Number of Years in Dataset	Probability
38	42	0.90

Windstorms: Impact

Data from the Texas Department of Transportation's Crash Records Information System shows that between the years of 2010 and 2017, rural Hays County experienced 5 crashes related to severe crosswind weather conditions (see Table HC.20). There were no injuries reported from these crash events.

Table HC.20, Windstorms, Vehicle Accidents, Hays County

City	Fatality	Incapacitating Injury	Non-Incapacitating	Possible Injury	Crash Year	Street Name	Surface Condition	Weather Condition
Rural Hays County	0	0	0	0	2010	LIME KILN RD	Dry	Severe Crosswinds
Rural Hays County	0	0	0	0	2014	IH0035	Dry	Severe Crosswinds
Rural Hays County	0	0	0	0	2014	IH0035	Dry	Severe Crosswinds
Rural Hays County	0	0	0	0	2014	IH0035	Dry	Severe Crosswinds
Rural Hays County	0	0	0	0	2017	US0290	Wet	Severe Crosswinds

Table 27(Texas Department of Transportation, 2017)

Windstorms: Vulnerability Summary

Hays County has previously experienced debris accumulation on roadways during past windstorm events. Such incidents could cause impact on the ability of public safety officials to access emergency calls.

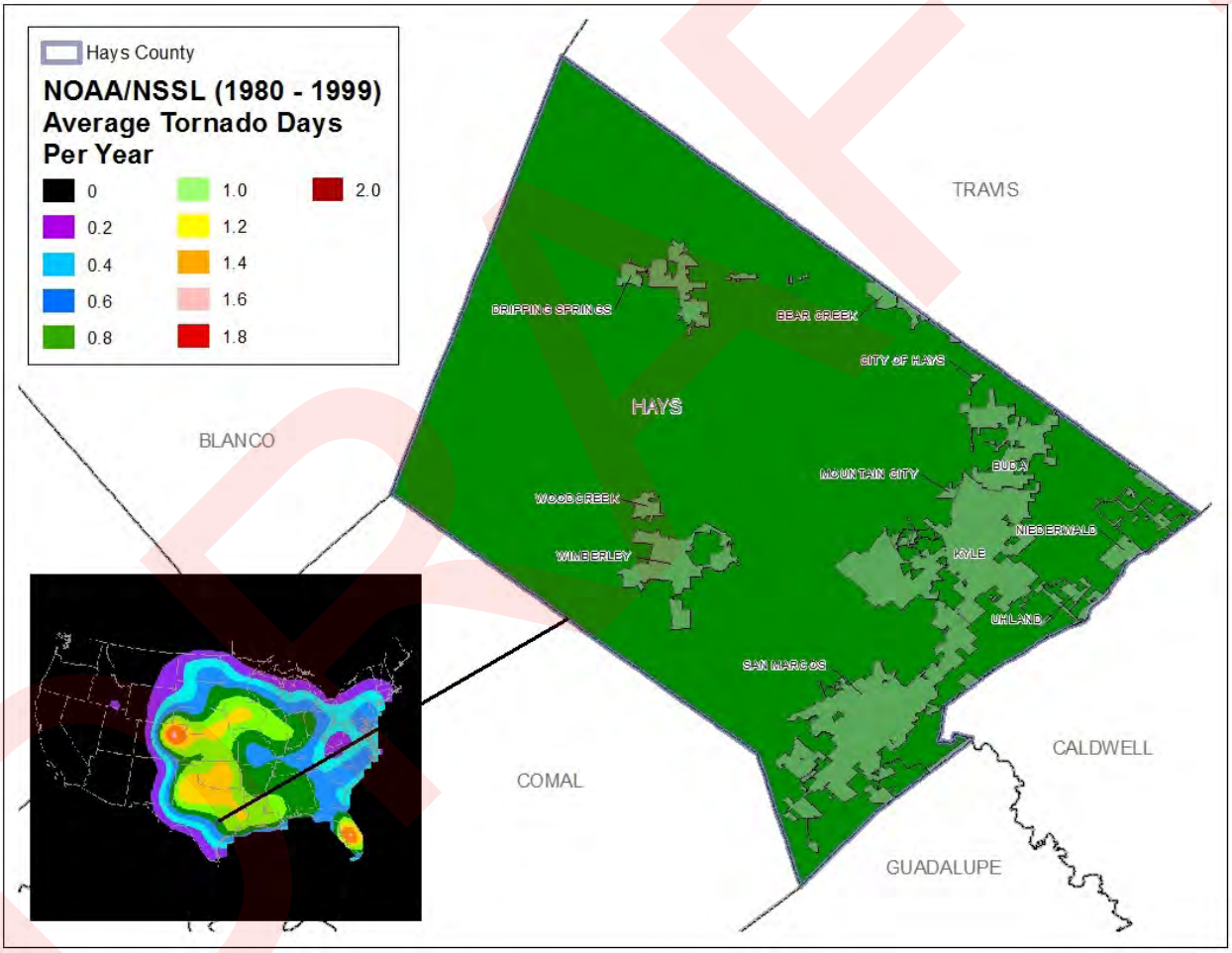
In addition, those swerving to avoid debris in the road could damage their vehicles or experience physical harm during a collision. According to the Office of Emergency Services, a large-scale event requiring extensive debris removal over the entire County area would be unmanageable for the County to handle as an individually funded effort.

Tornadoes

Tornadoes: Location

The entire extent of Hays County is exposed to some degree of tornado hazard. Since tornadoes can occur at any location, tornado events could be experienced anywhere within the planning area. NOAA's National Severe Storms Laboratory used historical data from 1980 to 1999 to estimate the daily probability of tornado occurrences across the U.S., regardless of tornado magnitude. Figure HC.8 shows the average number of tornado days resulting from this analysis and the respective location of the County area. The density of average tornado days per year in the map's legend indicates the probable number of tornado days for each 25-square-mile cell within the contoured zone that can be expected per year. This density number does not indicate the number of events that can be expected within each cell, rather the average number of days per year with 1 or more events occurring within each cell.

Figure HC.8, National Tornado Days Per Year, Hays County



(National Severe Storms Laboratory, 2016)

Tornadoes: Previous Occurrences

It can be assumed that NOAA reported events described as "HAYS County", "Countywide", or under an unincorporated jurisdiction impacted Hays County's unincorporated Areas. Table HC.21 lists the 16 tornado events reported for Hays County and its unincorporated jurisdictions since the year 1953

Fatality, injury and damage amounts are shown in Table HC.21, per the NOAA Storm Events Database. Community testimony indicates that these amounts do not reflect the most recent totals, however NOAA data is being used as the best source of information available for the record period.

Table HC.21, Tornado Events, Hays County

Location	Date	Type	Extent	Fatalities	Injuries	Property Damage	Crop Damage
Hays County	4/28/1953	Tornado	F3	1	5	250,000.00	0.00
Hays County	4/30/1954	Tornado	F1	0	0	250,000.00	0.00
Hays County	5/2/1958	Tornado	F1	0	0	30.00	0.00
Hays County	11/12/1961	Tornado	F2	0	0	2,500.00	0.00
Hays County	9/20/1967	Tornado	NA	0	0	250.00	0.00
Hays County	9/20/1967	Tornado	NA	0	0	30.00	0.00
Hays County	5/10/1975	Tornado	F1	0	0	25,000.00	0.00
Hays County	3/30/1976	Tornado	F2	0	0	25,000.00	0.00
Hays County	3/30/1976	Tornado	F2	0	1	250,000.00	0.00
Hays County	8/10/1980	Tornado	F2	0	0	25,000,000.00	0.00
Hays County	4/22/1985	Tornado	F2	0	0	250,000.00	0.00
Hays County	8/22/1991	Tornado	F1	0	0	2,500.00	0.00
Countywide	5/13/1994	Tornado	F0	0	0	500.00	500.00
Henly	11/15/2001	Tornado	F0	0	1	50,000.00	0.00
Driftwood	10/8/2002	Tornado	F0	0	0	70,000.00	0.00
Mt. Gainor	5/23/2015	Tornado	EF0	0	0	0.00	0.00
Total				1	7	$26,175,810.00	$500.00

(National Oceanic and Atmospheric Administration Storm Event Database, 2016)

Tornadoes: Extent

Tornadoes are measured by severity on the Enhanced Fujita Scale, with a range from 0-6. According to the reported previous tornado occurrences in the planning area, the maximum tornado extent experienced was a category F3 tornado in 1953. Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for a description of the Fujita (F) Scale and Operational Enhanced Fujita (EF) Scale.

Tornadoes: Probability

Figure HC.8 reports 0.8 tornado days per year as a result of NLDN's nationwide analysis. Since this calculation is based on national data, a more specific calculation based on local-level NOAA reports was utilized to calculate probability. Based on 16 reported events in 63 years, a tornado event occurs approximately every 4 years on average in Hays County. Since tornado events can happen anywhere throughout the HMP planning area, Hays County's unincorporated areas' future probability is assumed to be similar to the entire County area. The planning area can expect a tornado event approximately once every 4 years on average in the future, with up to an F3 magnitude.

Number of Reported Events	Number of Years in Dataset	Probability
16	63	0.25

Tornadoes: Impact

Tornadoes in Hays County could impact roadways due to the large amount of vegetation and other objects that could become debris in the event of the high winds that accompany a funnel cloud. This debris could also cause physical harm to residents who may be outside during such an event. The wind speeds and debris caused by tornadoes can impact all residents in the community.

Based on Hays County having experienced tornadoes between F0 and F3 levels in the past, if similar events were to happen in the future, the type of impacts that the planning area could expect associated with those magnitudes would include, from least to greatest:

- Light Damage - Broken branches; shallow rooted trees pushed over; some chimney damage.
- Moderate Damage - Surface damage to roofs; mobile homes pushed off foundation; moving vehicles pushed off the road.
- Significant Damage - Frame houses have roof torn off; mobile homes completely destroyed; train boxcars overturned; large trees snapped or uprooted; smaller debris turned into missiles.
- Severe Damage - Roofs completely torn off well-constructed buildings, along with some walls; majority of trees uprooted; trains overturned; vehicles lifted off the ground.

(Tornado Facts, 2016)

Additional impacts from tornado events could include downed utility poles, communication towers, street signals, and debris created from residential and urban property.

Critical infrastructure could be disrupted, resulting in periods of impact to service due to the lack of back-up utility resources. See Lightning: Impact section within this annex for more information on utility interruption.

Tornadoes: Vulnerability Summary

Tornado impact on County infrastructure could result in power outages, blocked roads, and damaged structures. Residential homes that were built prior to more stringent building codes, as well as manufactured homes in the unincorporated areas, would be highly vulnerable to the high winds and conditions associated with tornado events. Visitors to parks and other outdoor attractions would be at risk if they were not familiar with proper sheltering procedures.

There are no sirens in the unincorporated parts of the County; however, there is an Emergency Notification System that allows registrants to receive alerts to mobile phones by call, text and email. The only drawback is that visitors may not know to register and residents who do know how may not take the time to enroll their device in the database. Social media posts, radio stations, weather radios, FEMA's iPAWS (Integrated Public Alert System), CMAS, and HaysInformed.com are other ways that the County reaches out to the public.

Expansive Soils

Expansive Soils: Location

Locations within Hays County with structures that are underlain by soils containing clays with swelling potential are most affected by expansive soils. Figure 2.4 within Chapter 2 (the Risk Assessment portion of the Hays County HMP Update), shows the location of expansive soil areas for the planning area.

Expansive Soils: Previous Occurrences

There was no documentation of site-specific past events of structural damage due to expansive soils from local, state, or national databases queried. However, minor foundation shifting and narrow cracks in walls have occurred based on local knowledge and the presence of foundation repair contractors in this region. See section below for reference to the worst areas in the County for shrink-swell potential.

Expansive soils cannot be documented as a time-specific event, except when they lead to structural and infrastructure damage. There are no specific damage reports or historical records of events in the planning area, however future events can occur.

Expansive Soils: Extent

According to the USGS Expansive Soils Regions, Figure 2.4 in Chapter 2 (the Risk Assessment portion of the Hays County HMP Update), the western side of Hays County's unincorporated area is underlain with soils with little to no clays with swelling potential. However, the central region of Hays County has less than 50% of the area underlain by soils with clays of high swelling potential. The eastern side of the planning area has over 50% of the area underlain with soils that have abundant clays with high swelling potential. This is the area with the highest magnitude of expansive soil potential in the County.

Expansive Soils: Probability

Considering the amount of swelling potential within the planning area, as well as the lack of reported events, the probability of a future event is low (unlikely in next 10 years) for Hays County.

Expansive Soils: Impact

Areas within Hays County are experiencing higher amounts of development on previously undeveloped land and may find a higher impact as this will offer increased opportunity for structural foundation damage in areas with high clay content. The boundaries of extraterritorial jurisdictions are continuing to grow and the development of more land between Austin and Hays County can lead to identifying new areas of expansive soil.

Expansive Soils: Vulnerability Summary

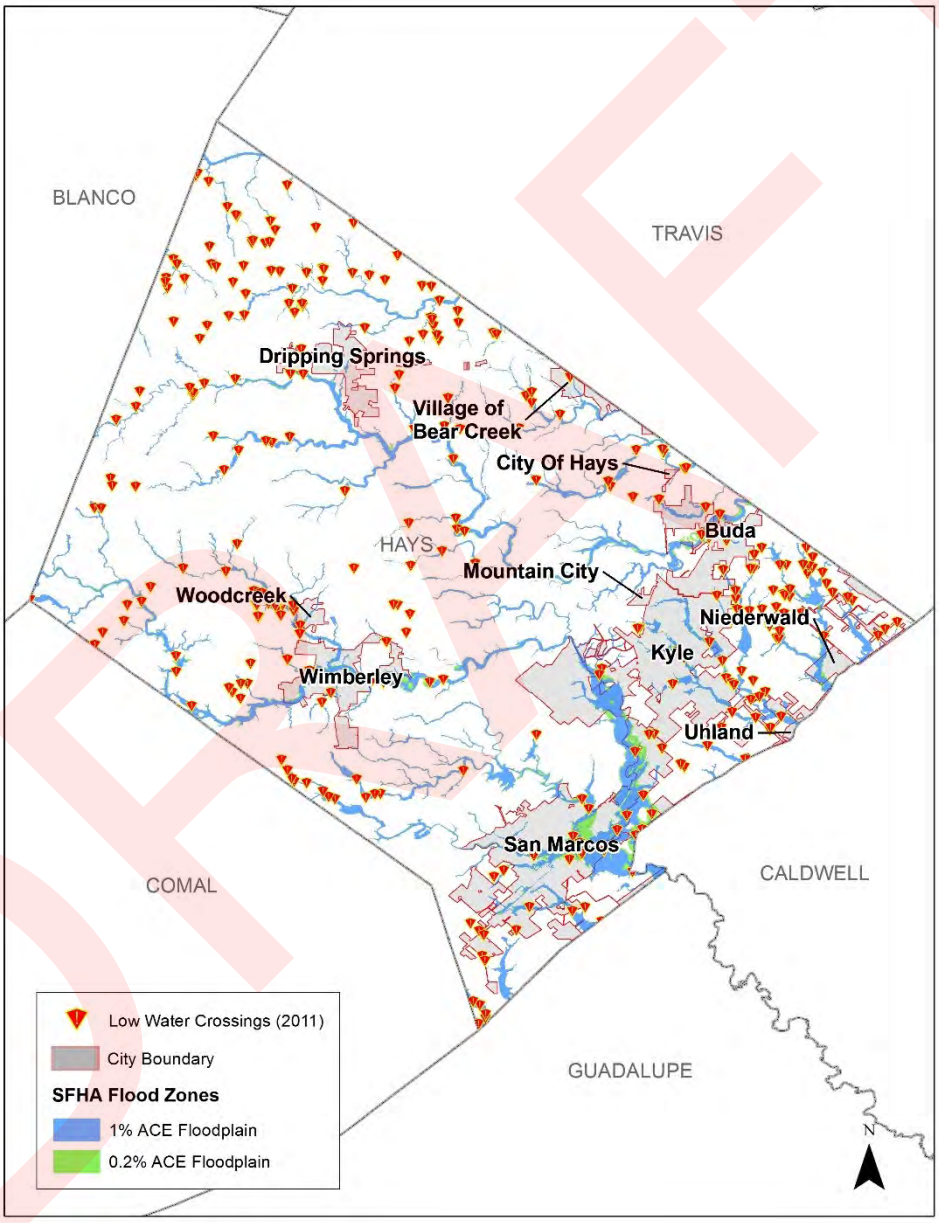
Based on community verbal testimony (without accompanying data for probability and extent analysis, therefore utilized for vulnerability), unincorporated areas surrounding the vicinity of Uhland and Niederwald are known problem areas for expansive soils. These are locations in the planning area that would be most vulnerable to foundation and structural problems, as well as effects to roads and other infrastructure.

Floods

Floods: Location

The location of low water crossings as well as the 1% (100 year) and 0.2% (500 year) Annual Chance Event (ACE) floodplains for Hays County are shown in Figure HC.9 and are the locations within the planning area that are most affected by flooding. This figure is based upon newly developed hydrologic and hydraulic analysis and is the best information available to date. Table HC.22 provides the total acreage in the jurisdiction that is located in the 1% and 0.2% floodplains.

Figure HC.9, Special Flood Hazard Areas and Low Water Crossings, Hays County



(Texas Natural Resources Information System, 2011)

Table HC.22, Hays County Floodplain Acreage

Jurisdiction	100yr (1%) Floodplain Acres (Includes Floodway)	500yr (0.2%) Floodplain Acres (Includes 100yr)
Hays County (Unincorporated Areas)	30,200	33,901

Floods: Previous Occurrences

It can be assumed that NOAA reported events described as 'Countywide', 'HAYS (ZONE)', '...Portion', or within unincorporated cities impacted Hays County's unincorporated areas. Table HC.23 lists the 69 documented events reported for Hays County and its unincorporated jurisdictions from the year 1997 to 2016. The County received 3 disaster declarations for flooding since October of 2013. Not all of these are reflected in the table below due to the nature of event location designations within NOAA's database. Instead, these events were reported under specific jurisdictions in that database. However, these had significant impact on the County. Narratives detailing these significant events are included under *Floods: Significant Past Events*.

Fatality, injury and damage amounts are shown in Table HC.23, per the NOAA Storm Events Database. Community testimony indicates that these amounts do not reflect the most recent totals, however NOAA data is being used as the best source of information available for the record period.

Table HC.23, Flood Events, Hays County

Location	Date	Type	Fatalities	Injuries	Property Damage	Crop Damage
Countywide	5/23/1997	Flash Flood	0	0	10,000.00	0.00
Countywide	6/6/1997	Flash Flood	0	0	10,000.00	0.00
Countywide	6/7/1997	Flash Flood	0	0	15,000.00	0.00
Countywide	6/8/1997	Flash Flood	2	7	2,500,000.00	50,000.00
Countywide	6/21/1997	Flash Flood	0	0	5,000.00	0.00
Countywide	6/22/1997	Flash Flood	0	0	50,000.00	50,000.00
Countywide	2/21/1998	Flash Flood	0	0	5,000.00	0.00
Countywide	7/3/1998	Flash Flood	0	0	20,000.00	0.00
Countywide	8/22/1998	Flash Flood	0	0	20,000.00	10,000.00
Countywide	8/23/1998	Flash Flood	0	0	10,000.00	0.00
Countywide	10/17/1998	Flash Flood	0	100	500,000.00	50,000.00
HAYS (ZONE)	10/17/1998	Flood	0	25	4,000,000.00	50,000.00
HAYS (ZONE)	10/17/1998	Flood	0	25	4,000,000.00	50,000.00
Countywide	6/21/1999	Flash Flood	0	0	3,000.00	0.00
Countywide	6/9/2000	Flash Flood	0	0	15,000.00	0.00
Countywide	11/2/2000	Flash Flood	0	0	20,000.00	0.00
HAYS (ZONE)	11/4/2000	Flood	0	0	0.00	0.00
North Portion	8/26/2001	Flash Flood	0	0	10,000.00	0.00
Countywide	8/31/2001	Flash Flood	0	0	20,000.00	0.00
Countywide	8/31/2001	Flash Flood	0	0	30,000.00	20,000.00
Countywide	11/15/2001	Flash Flood	0	20	200,000.00	50,000.00
HAYS (ZONE)	11/15/2001	Flood	0	0	0.00	0.00
West Portion	6/30/2002	Flash Flood	0	0	10,000.00	0.00
HAYS (ZONE)	7/1/2002	Flood	0	0	0.00	0.00
South Portion	7/1/2002	Flash Flood	0	0	0.00	0.00
Countywide	7/2/2002	Flash Flood	0	0	0.00	0.00
West Portion	7/3/2002	Flash Flood	0	0	0.00	0.00
West Portion	7/5/2002	Flash Flood	0	0	0.00	0.00
South Portion	9/19/2002	Flash Flood	0	0	0.00	0.00
South Portion	10/24/2002	Flash Flood	0	0	0.00	0.00

Table HC.23, Flood Events, Hays County (cont.)

Location	Date	Type	Fatalities	Injuries	Property Damage	Crop Damage
Countywide	11/4/2002	Flash Flood	0	0	0.00	0.00
Countywide	2/20/2003	Flash Flood	0	0	10,000.00	0.00
West Portion	6/13/2003	Flash Flood	0	0	5,000.00	0.00
South Portion	9/11/2003	Flash Flood	0	0	3,000.00	0.00
Northwest Portion	1/16/2004	Flash Flood	0	0	3,000.00	0.00
East Portion	6/5/2004	Flash Flood	0	0	0.00	0.00
Countywide	6/9/2004	Flash Flood	0	0	350,000.00	0.00
Driftwood	6/26/2004	Flash Flood	0	0	0.00	0.00
West Portion	6/27/2004	Flash Flood	0	0	0.00	0.00
West Portion	6/28/2004	Flash Flood	0	0	0.00	0.00
Countywide	6/29/2004	Flash Flood	0	0	0.00	0.00
South Portion	6/30/2004	Flash Flood	0	0	0.00	0.00
HAYS (ZONE)	6/30/2004	Flood	0	0	0.00	0.00
West Portion	7/25/2004	Flash Flood	0	0	0.00	0.00
Countywide	10/2/2004	Flash Flood	0	0	0.00	0.00
Countywide	10/23/2004	Flash Flood	0	0	0.00	0.00
HAYS (ZONE)	10/23/2004	Flood	0	0	0.00	0.00
HAYS (ZONE)	10/24/2004	Flood	0	0	0.00	0.00
Countywide	11/16/2004	Flash Flood	0	0	0.00	0.00
HAYS (ZONE)	11/17/2004	Flood	0	0	0.00	0.00
Countywide	11/21/2004	Flash Flood	0	0	0.00	0.00
Countywide	11/22/2004	Flash Flood	0	0	0.00	0.00
Countywide	11/22/2004	Flash Flood	0	0	0.00	0.00
Southeast Portion	11/23/2004	Flash Flood	0	0	0.00	0.00
South Portion	5/6/2006	Flash Flood	0	0	0.00	0.00
Henly	3/30/2007	Flash Flood	0	0	0.00	0.00
Driftwood	3/30/2007	Flood	0	0	0.00	0.00
Henly	5/2/2007	Flash Flood	0	0	0.00	0.00
Henly	7/2/2007	Flash Flood	0	0	0.00	0.00
Henly	5/17/2010	Flash Flood	0	0	0.00	0.00
Driftwood	9/7/2010	Flash Flood	0	0	0.00	0.00
Driftwood	5/10/2012	Flash Flood	0	0	0.00	0.00
Driftwood	5/11/2012	Flash Flood	0	0	0.00	0.00
Fitzhugh	5/17/2015	Flash Flood	0	0	0.00	0.00
Henly	5/30/2015	Flash Flood	0	0	0.00	0.00
Fitzhugh	6/14/2015	Flash Flood	0	0	0.00	0.00
Driftwood	10/30/2015	Flash Flood	0	0	10,000,000.00	0.00
Fitzhugh	5/19/2016	Flash Flood	0	0	0.00	0.00
Driftwood	8/16/2016	Flash Flood	0	0	0.00	0.00
Totals			2	177	$21,824,000.00	$330,000.00

(National Oceanic and Atmospheric Administration Storm Event Database, 2016)

Floods: Significant Past Events

The County received 3 disaster declarations for flooding since October of 2013. Aside from the October 2015 event reported under the unincorporated jurisdiction of Driftwood, these events are not reflected in Table HC.24. Due to the nature of NOAA's reporting, the other events described below were reported under incorporated jurisdictions. These events did, however, substantially affect Hays County and its unincorporated areas. Narratives detailing these significant events are included below.

According to NOAA Storm Events Database, in October of 2013 (Disaster 4159-DR), a surface trough was the focus of training storms which produced heavy rainfall that led to major flooding across the Onion Creek and Blanco/San Marcos River watersheds. Thunderstorms produced heavy rain that led to flash flooding in Wimberley, San Marcos, Buda, and Kyle. Public reports of 14 inches of rain fell near Wimberley and this rainfall made its way into the Blanco River and Onion Creek Watersheds. Rainfall totals near Buda and Kyle were upwards of 8 to 10 inches. The Blanco River flooded and major flooding occurred downstream to San Marcos. The Blanco River crested at 26.74 feet in Wimberley. The Blanco River USGS gage at Kyle crested at 35.92 feet. Flooding then occurred in the San Marcos River as the flood wave crossed IH-35. Reports indicate that the Blanco River was near or slightly higher than the 1998 flood of record. Sections of San Marcos flooded near the Blanco River including areas of Texas State University and areas along River Road where several evacuations of residences occurred. The Blanco River was 100 feet out of its banks. In many areas along the Blanco River, debris was found 15 to 20 feet up. Several roads needed repair and several homes were flooded out. Across Hays County, 47 homes sustained minor damage, 24 sustained major damage, and 1 home was destroyed. 4 businesses sustained major damage including the Buda Fire Department station and Buda Elementary.

According to NOAA Storm Events Database, in May of 2015 (Disaster 4223-DR), a historic flash flood occurred on the Blanco River late Saturday night into Sunday. Hundreds of homes were destroyed along the river from the City of Blanco down into Wimberley and San Marcos. The flood wave continued downstream for days affecting residents and homes along the San Marcos and Guadalupe Rivers.

Flood damage throughout Hays County

Flood damage throughout Hays County

Early estimates show damages in excess of 100 million dollars. Thunderstorms produced heavy rain that caused flash flooding. The Fischer Store Road Bridge over the Blanco River was destroyed by flood waters west of Wimberley. The Blanco River, downstream from the bridge at Wimberley reached a record crest. The gage failed at 40 feet and the USGS later estimated the crest at 44.9 feet and 175,000 cfs. This height was more than 10 feet over the previous record height of 33.3 feet from 1929. Homes along the banks of the Blanco River from the City of Blanco, through Wimberley, and down to San Marcos experienced a historic flood. Many homes were totally destroyed and swept downstream. Other homes were struck by large debris, including full size cypress trees which typically lined the banks of the river. The river experienced rises that exceeded 20 feet in 1 hour. Overall in Hays County, including Wimberley and San Marcos, 321 homes were destroyed, with hundreds more heavily damaged. According to the Office of Emergency Services, FEMA awarded over 3.5 million dollars in public assistance to Hays County in response to this disaster.

According to NOAA Storm Events Database, in October of 2015 (Disaster 4245-DR), a warm front combined with an upper level trough and deep moisture produced heavy rainfall and severe thunderstorms across much of South Central Texas on October 30th and 31st. Excessive rainfall resulted in widespread flash flooding along the IH-35 corridor Friday morning. Rainfall rates on the order of 5 to 7 inches per hour fell from San Marcos north through South Austin. Some daily rainfall totals exceeded 15 inches. Record flooding occurred in portions of Hays County. River and creek flooding was extensive across the County. Many areas, especially in San Marcos, compared this flooding to the record flooding of October 1998. Estimates of 2000 homes were flooded in or near the IH-35 corridor and many of them were destroyed or sustained major damage.

Floods: Extent

Flood extent is described by a combination of ground elevation, river heights, 100 year Water Surface Elevations (WSE's) and HAZUS depth grids. Areas along the major rivers and streams throughout the county, such as the San Marcos and Blanco River as well as Onion Creek, are exposed to the greatest extent of a flood event. In example of flooding within the jurisdiction is the area along Onion Creek outside the City of Driftwood. This area has an approximate overbank ground elevation of 895-900' with an intersecting 100 year WSE of 900 feet. For a 100 year event, water depth of approximately 5 feet can be expected within this area. A further analysis of Onion Creek is described below.

With Onion Creek having an approximate average normal in-channel elevation of 879.5 feet (per Light Detection and Ranging [LiDAR] data and USGS data) and an intersecting WSE of approximately of 900 feet, flood depths would be 20.5 feet. Such an event is categorized as a 'Major Flood Stage'. Refer to the Water Depth Extent Scale in Chapter 2 (the Risk Assessment portion of the Hays County HMP Update).

Floods: Probability

Probability has been calculated on the basis of NOAA reported events, as a standard, consistent calculation method for all hazards profiled with the Hays County HMP. Based on 69 reported events in 19 years, a flood event occurs approximately 3 to 4 times per year on average in Hays County and its unincorporated areas. Due to the size and extent of some flood occurrences, as well as the regional nature of reports in the NOAA Storm Events Database, Hays County's unincorporated areas' future probability is assumed to be similar to the entire County area. The planning area can expect a flood event approximately 3 to 4 times per year on average in the future, up to a "Major Flood Stage."

Number of Reported Events	Number of Years in Dataset	Probability
69	19	3.63

Floods: Impact

The following describes the inventory counts and building replacement values for the jurisdictional area.

Hays County (Unincorporated Areas) Building Counts			
Residential	Commercial	Other	Total
24,738	860	579	26,177

Hays County (Unincorporated Areas) Building Replacement Value		
Building ($)	Content ($)	Total ($)
7,944,608,057	4,372,683,580	12,317,291,637

A Probabilistic 100-year Return Period HAZUS-MH 3.2 analysis was run on the participating community. HAZUS results are calculated to census blocks. This analysis utilized the best available LiDAR (COA 2012 and CAPCOG 2008) and Depth Grids. These blocks where then intersected with the participating community to run a weighted area analysis to get jurisdictional results. The following describes results of the 100-year Return (1% Annual Chance Event) weighted area analysis.

Flood damage throughout Hays County

HAZUS-MH Results

General Building Stock Damage

HAZUS estimates that about 531 buildings will be at least moderately damaged in Hays County's unincorporated areas. 'At least moderately damaged' is defined by HAZUS as greater than 10% damage to a building. The majority of damage can be expected to impact residential areas (98%). The remaining damages (2%) are expected for commercial, industrial, agriculture and religious buildings.

Residential Buildings	Commercial Buildings	Other Buildings	Total Buildings
523	4	4	531

Building-Related Losses

Exposed Value is the total building and content values for structures within the community. The exposed value for the community is $12,317,291,637. The total building-related losses were $230,640,064 for this scenario. This represents 1.9% of the total replacement value of the community. Loss values are divided into building and content loss dollars.

Building Loss ($)	Content Loss ($)	Total Loss ($)
141,193,070	89,446,994	230,640,064

Essential Facility Damage

HAZUS does not estimate any critical facilities or infrastructure to be out of service for more than 1 day on the day of the event. Additionally, the model estimates that 100% of available hospital beds are ready for use by patients already in the hospital and for those injured by an event.

Debris Generation

HAZUS estimates the amount of debris that will be generated in this scenario. The model estimates that a total of 29,068 tons of debris will be generated. If the building debris tonnage is converted to an estimated number of truckloads, it will require 1,163 truckloads (with 1 to 25 tons per truck) to remove the building debris generated in this scenario.

Shelter Requirements

HAZUS estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. HAZUS also estimates those people displaced that will require accommodations in temporary public shelters. The model estimates 2,353 people will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 1,691 people are estimated to seek temporary shelter in public shelters.

Floods: Vulnerability Summary

Hays County is in the heart of "Flash Flood Alley," an area known worldwide for its instances of fast and powerful flows of flood water with little warning. While many efforts are under way to mitigate flooding in the area, the effects of flooding are difficult to control in this region. There are many low water crossings within the planning area. During a flooding event, these crossings present residents with challenges in traveling safely to or from their homes as well as first responders from accessing or responding to distress calls. Limited flood warning systems are in place and enhancements to the systems are ongoing. However, there is an issue with emergency messaging as many people turn the geo-locating function off on their mobile devices. This blocks the County Emergency Management from being able to send messaging out about the disaster conditions.

The large transient population poses a risk due to their possible unfamiliarity with flooding and alternate routes to bypass floodprone roads and bridges.

Floodwaters cripple electrical services, which often also power water lift and pump stations that provide water to homes and businesses. Roads that act as major thoroughfares are impacted and transportation that moves through the area has to detour onto other roads, causing traffic backups and secondary accidents.

Structures in flood prone areas and even areas outside of the mapped Special Flood Hazard Areas can experience inundation and, at times, even be washed off their foundations during exceptional flooding events. The recent magnitude of floods in the County yielded water depths so high that flood gages failed. Flooding is by far one of the most prevalent hazards in the Hays County area.

National Flood Insurance Program Repetitive Loss

Hays County currently participates in the National Flood Insurance Program (NFIP) and has 103 tallied RL payments (as of September of 2016) with an average total (building & contents) payment of $50,741.31.

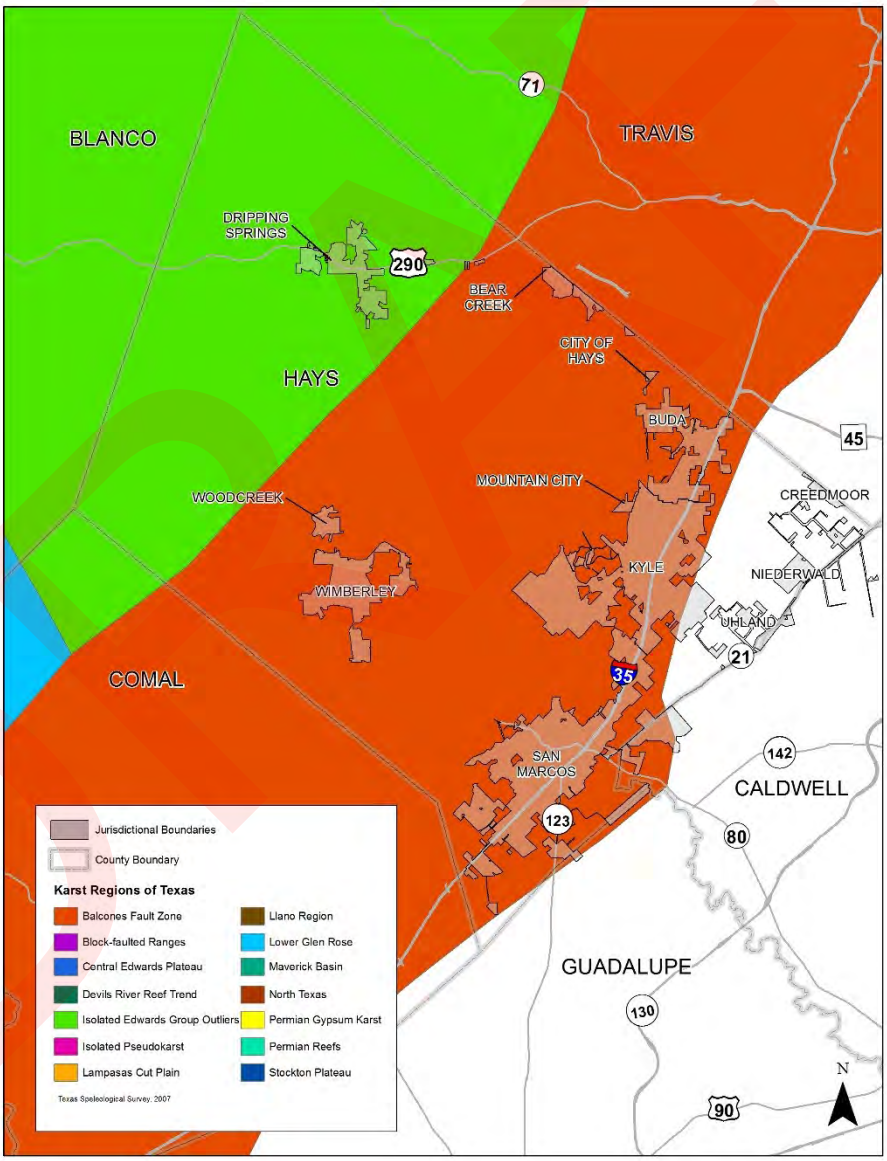
Structure Type	Number of Structures	Amount of Claims
Residential	41	$4,297,512.69
Non-Residential	3	$861,415.82

Land Subsidence

Land Subsidence: Location

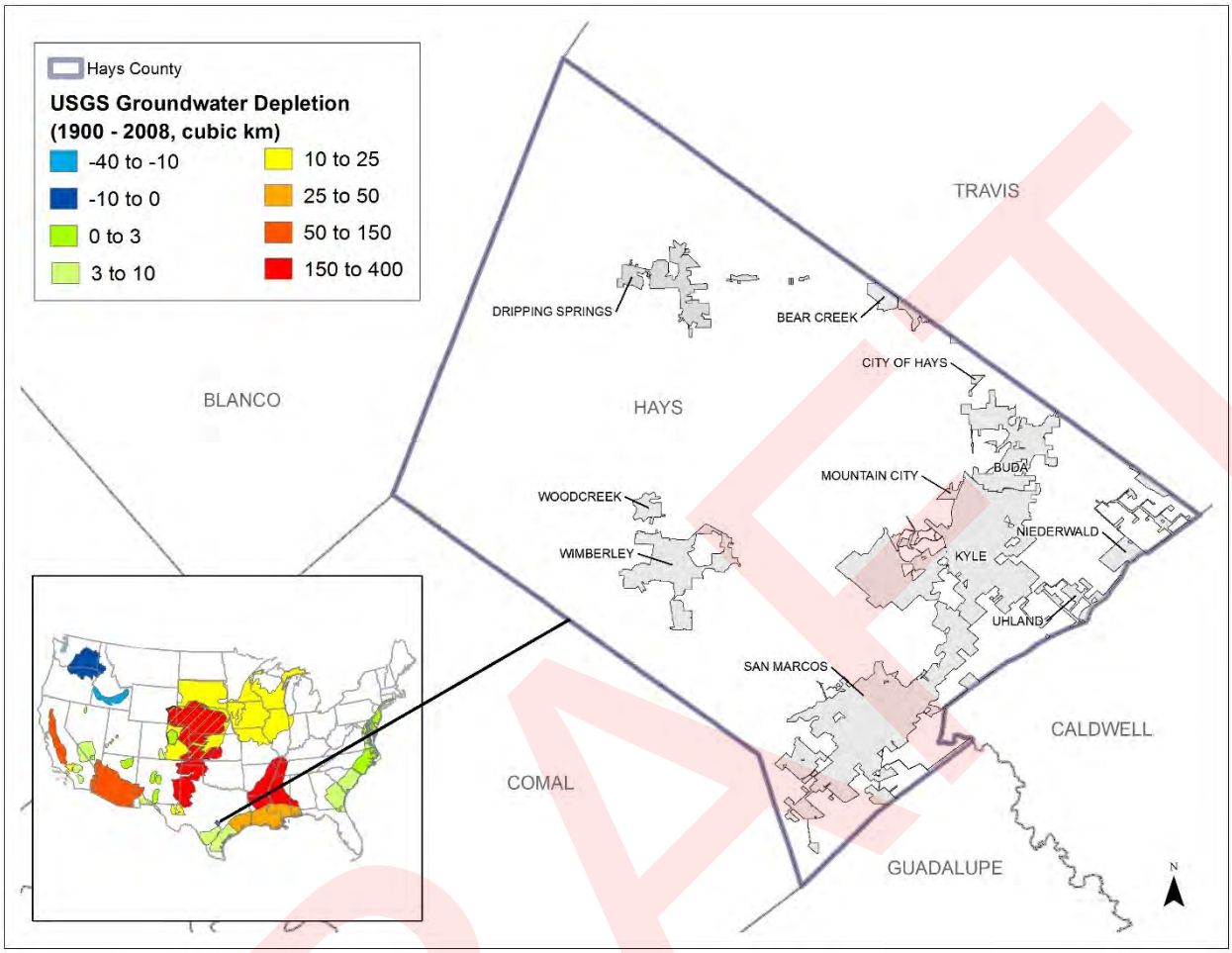
Karst features are a landscape formed from the dissolution of soluble rocks, such as limestone, that can cause sinkholes and caves. Locations within Hays County that are underlain by karst features or that are experiencing extensive groundwater depletion, are most at risk. Figures HC.10 and HC.11 illustrate the planning area's location in conjunction with the karst regions of Texas and USGS Groundwater Depletion Zones. According to Figure HC.10, the eastern portion of the County is located within the Balcones Fault Zone and the western portion of the County is located within the Isolated Edwards Group Outliers.

Figure HC.10, Karst Regions of Texas, Hays County



(Texas Speleological Survey, 2007)

Figure HC.11, Groundwater Depletion Zones, Hays County



(Groundwater depletion in the United States (1900–2008), 2013)

Land Subsidence: Previous Occurrences

There were no sinkhole or land subsidence events documented specifically for Hays County. As the data displayed in Figure HC.11 illustrates, the HMP planning area does not have a significant history of groundwater depletion.

Land subsidence can occur in the Central Texas Hill County Area. Recently, a small event occurred in Travis County when a 25-foot-wide and 12-foot-deep sinkhole opened up at a Costco parking lot in Austin, Texas (Mashhood, 2012), *Shopping center sinkhole provides chance to study runoff*, www.statesman.com). Hays County could potentially experience an event of similar depths, widths, and impact as the event described above, but conditions would vary depending on the location and geography of the event. Since future events cannot be predicted, the estimated extents previously described are hypothetical.

Land Subsidence: Extent

Due to the lack of reported occurrences, there is not sufficient data to determine the maximum extent of land subsidence for the planning area. However, if a future event were to occur, it can be assumed it would be similar in extent to previous events in the region. This includes the aforementioned sinkhole in Austin, Texas measuring 25-feet wide and 12-feet deep.

Land Subsidence: Probability

The occurrence of subsidence is an ongoing process resulting from natural and human-induced causes. As seen in Figure HC.10, the majority of Hays County is located within known karst regions; the Balcones Fault Zone and Isolated Edwards Group Outliers. However, with no documented history of subsidence, the probability of a future land subsidence event for the planning area is low (unlikely in next 10 years). If a future event were to occur, however unlikely, it can be assumed it would be similar in extent to previous events in the region. This includes the previously mentioned sinkhole documented in Austin, Texas.

Land Subsidence: Impact

When considering the impact of land subsidence, it is important to note that many areas within the karst zone have structures and infrastructure that could be affected by a collapsed area. The possible impact of isolated incidents within the karst region could include damage to any, but not all, of the 22,259 structures located in the zone in the unlikely event of a future occurrence. All structures are cumulatively valued at approximately $11,242,527,959 based on HAZUS building and content values.

Land Subsidence: Vulnerability Summary

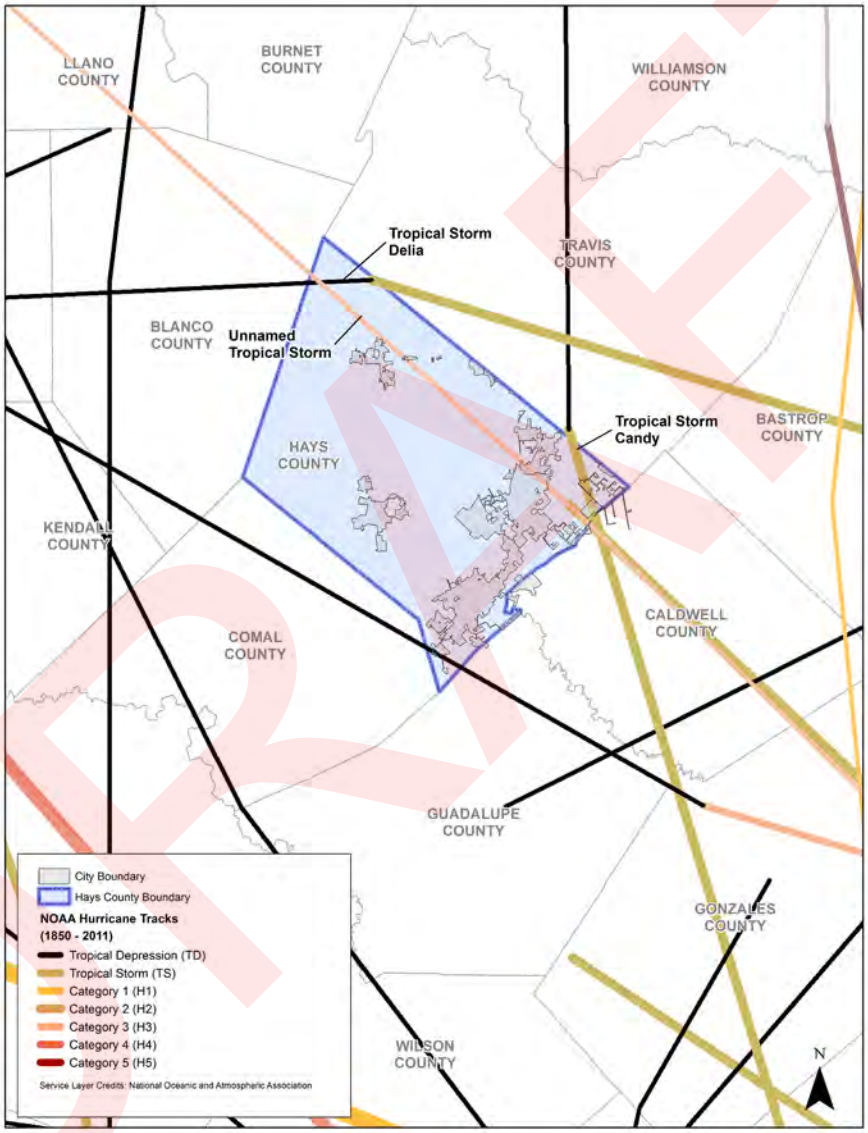
While land subsidence events are rare in Hays County, the area could become more vulnerable if groundwater depletion were to occur during severe droughts. As the demand for water from the growing population increases, the need for conservation efforts to mitigate this effect is critical and Hays County is taking action. Efforts to lessen groundwater depletion through surface water conservation includes the Hays Caldwell Public Utility Agency. This is a collaborative effort of several communities aimed at resolving the long-term water needs for its participants. Efforts, such as these and others that utilize effective drainage, wastewater and stormwater programs, all help with the overall effort of water conservation, which will in turn lessen potential land subsidence risk by minimizing groundwater depletion.

Hurricanes/Tropical Storms

Hurricanes/Tropical Storms: Location

Due to the regional nature of a hurricane or tropical storm event, the entire extent of Hays County is equally exposed to a hurricane or tropical storm. Figure HC.12 illustrates the location of the planning area with historical hurricane and tropical storm paths documented by NOAA's Hurricane Tracker from 1850 to 2011.

Figure HC.12, Historical Hurricane/Tropical Storm Paths, Hays County



(National Oceanic and Atmospheric Administration, 2016)

Hurricanes/Tropical Storms: Previous Occurrences

Previous events are listed below from NOAA Storm Events Database for Tropical Storm Hermine and NOAA Hurricane Tracker for all other events. By the time most hurricanes reach the County, they are tropical storms, depressions or thunderstorms. Because hurricane and tropical storm events occur on a regional scale, all events listed for Hays County have been included as they would impact Hays County's unincorporated areas.

July 13 to July 22, 1909 – An unnamed storm made landfall near Freeport, as a Category 3 Hurricane. This storm impacted Hays County and participating communities as a tropical depression with wind speeds up to 30 knots. No significant damages, injuries, or fatalities were reported for the planning area.

June 22 to June 26, 1968 – Tropical Storm Candy made landfall near Port Aransas. This storm impacted Hays County and participating communities as a tropical storm with wind speeds slowing to 30 knots as a tropical depression just after leaving the County. No significant damages, injuries, or fatalities were reported for the .

September 1 to September 7, 1973 – Tropical Storm Delia made landfall near the border of Brazoria and Matagorda Counties. This storm impacted Hays County and participating communities as a tropical storm with wind speeds slowing to 30 knots as a tropical depression just after leaving the County. No significant damages, injuries, or fatalities were reported for the planning area.

September 6 to September 8, 2010 – According to the NOAA Storm Events Database, Tropical Storm Hermine made landfall near the Texas/Mexico border on the night of September 6. South Central Texas was hit very hard with widespread rains of 8 to 12 inches across much of the IH-35 corridor from Austin down to San Antonio.

Hurricanes/Tropical Storms: Extent

The Saffir-Simpson Scale measures pressure, wind speed, and storm surge in 5 categories. According to the reported previous hurricane occurrences in the planning area, the maximum hurricane extent experienced was categorized as a Tropical Storm. Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for a description of storm extents.

Hurricanes/Tropical Storms: Probability

Based on 4 reported events in 107 years, a hurricane or tropical storm event occurs approximately every 27 years on average in Hays County. Since hurricane and tropical storm events can happen anywhere throughout the HMP planning area, the Hays County's unincorporated area's future probability is assumed to be similar to the surrounding County area. In the future, the planning area can expect an event approximately once every 27 years on average, of up to a magnitude of a Tropical Storm based on historical extents for the planning area.

Number of Events Reported	Number of Years in Dataset	Probability	100yr Max Wind Speed (mph)
4	107	0.04	78

Hurricanes/Tropical Storms: Impact

A Probabilistic 100-year Return Period HAZUS-MH 3.2 analysis was run on the participating communities. The following describes the results of this analysis.

HAZUS-MH Results

General Building Stock Damage

The total property damage losses were $14,530,046. The majority of damage can be expected to impact residential areas (98%). The remaining damages (2%) are for commercial, industrial, agricultural and religious buildings. While some building damage is experienced, it is estimated that no buildings will be completely destroyed or experience severe damage. Exposed Value is the total building and content values for structures within the community. Loss values are divided separately for building and content loss in dollars.

Exposed Value ($) (Building + Content)	Building Loss ($)	Content Loss ($)	Total Loss ($)
12,317,291,637	14,530,046	47,882	14,577,928

Essential Facility Damage

HAZUS does not estimate any critical facilities or infrastructure to be out of service for more than 1 day on the day of the event. Additionally, the model estimates that 100% of available hospital beds are ready for use by patients already in the hospital and for those injured by the hurricane.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the hurricane at a total of 1,017 tons. Of the total amount, Brick/Wood comprises 100% of the total. If the building debris tonnage is converted to an estimated number of truckloads, it will require 41 truckloads (with 1 to 25 tons per truck) to remove the building debris generated by the hurricane.

Shelter Requirements

HAZUS estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates no households to be displaced due to the hurricane. While there is an estimation of over $14,000,000 in property damages expected, it is aforementioned that “no buildings would be completely destroyed or experience severe damage.” Residents would likely remain in their homes as damages were repaired, therefore it is estimated that no temporary shelter is needed.

Hurricane/Tropical Storms: Vulnerability Summary

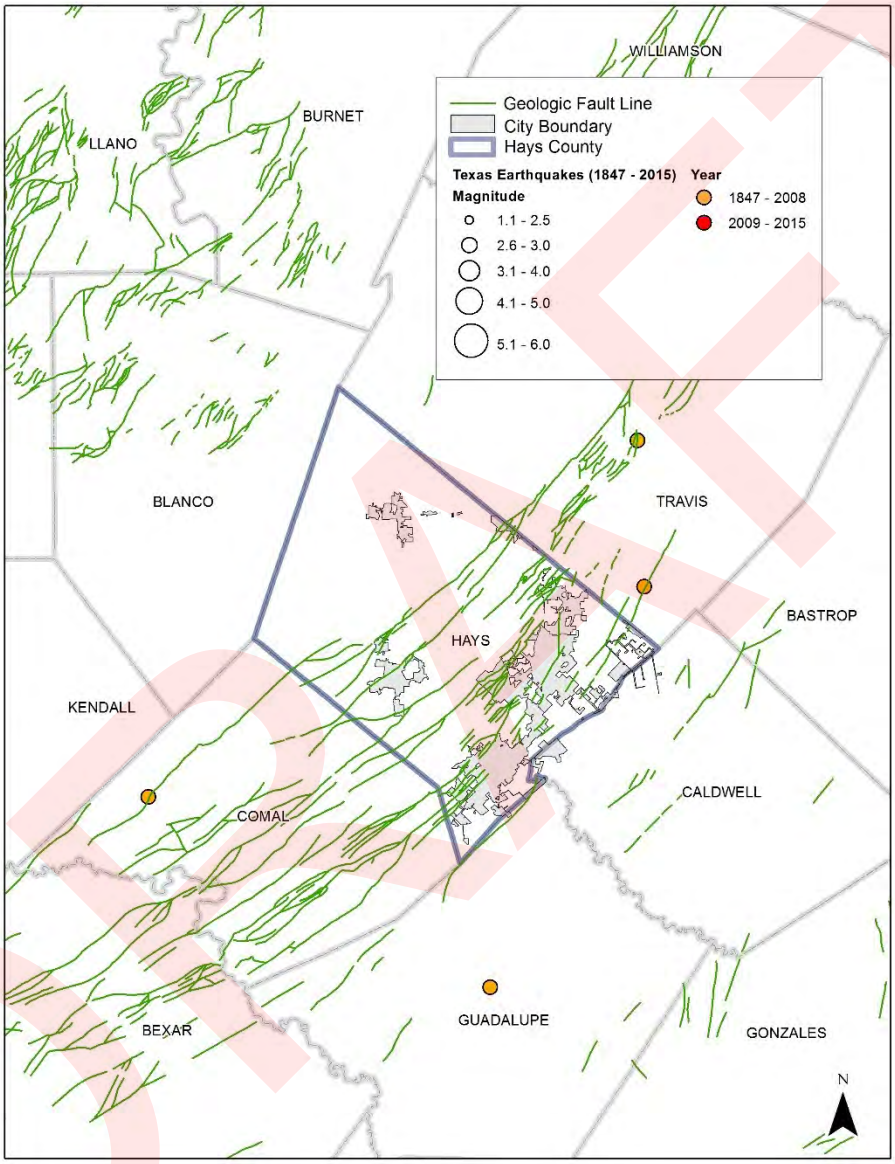
Similar to the impacts of windstorms, hailstorms, and lightning, Hays County can expect to be impacted with debris and possible utility interruptions of critical infrastructure. In addition, the community’s proximity to IH-35 could lead to traffic delays caused by major evacuation efforts if the highway is used as an evacuation route for coastal residents.

Earthquakes

Earthquakes: Location

Figure HC.13 shows no notable locations of USGS documented earthquake events in Texas from 1847 to 2015 and the respective location of Hays County.

Figure HC.13, Texas Earthquakes, 1847 – 2015, Hays County



(USGS Earthquake Hazard Program, 2015)

Earthquakes Previous Occurrences

There have been no documented earthquake events for Hays County according to USGS 1847-2015 data as illustrated in Figure HC.13.

Earthquakes: Extent

Earthquakes are measured by Peak Ground Acceleration (PGA). The HAZUS Max Peak Ground Acceleration (PGA) for the planning area is 1.58% (see Earthquakes: Impact Section for a description of the HAZUS Analysis). This corresponds to the Modified Mercalli Scale Category IV, with light perceived shaking and no potential structure damage. HAZUS measures PGA on a census tract level. Cities within more than 1

census tract were assigned the highest PGA level to reflect the maximum possible extent. Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for extent scale and PGA descriptions.

Earthquakes: Probability

As there have been no recorded previous occurrences of earthquakes for Hays County and the PGA is less than 2% for the area, the probability of an earthquake in the planning area in the future is low (unlikely within the next 10 years).

Number of Events Reported	Number of Years in Dataset	500yr PGA
0	170	1.58

Earthquakes: Impact

The FEMA How-To Guidance, Understanding Your Risks (FEMA 386-2, page 1-7), suggests the earthquake hazard should be profiled if the PGA is greater than 3%g, where PGA is measured in the acceleration of gravity (g). The City's PGA is less than 3%g (0.03) and there have been no recorded earthquakes in or near the update area. Therefore, only a minimum level-1 HAZUS analysis was profiled using the 500-year probability event scenario. The HAZUS analysis produced a PGA of 1.58%. HAZUS also produced $0 in building damages (Residential, Commercial, Agriculture, Religious and Government) from an event. Critical facilities and infrastructure did not experience any loss of service. There were no critical facilities or infrastructure that experienced moderate to complete damage. No debris was generated from this event and no people or households required temporary housing. There were no moderate, extensive or completely damaged buildings by this event. HAZUS estimates no households are expected to be displaced from their homes or will require accommodations in temporary public shelters due to the earthquake. Additionally, there were no causalities or fatalities from this event.

Earthquakes: Vulnerability Summary

While the probability of an earthquake in Hays County is low, with no significant prior events on file, there are fault lines within the community that could cause impact if there were to be an increase in seismic activity in the area. The planning area could expect to be impacted with debris and possible utility interruptions if an event were to occur in this unlikely and unprecedented scenario. If an event were to incapacitate a roadway, emergency responders would be hindered from responding, thus leaving the residents who were affected at risk.

The following major thoroughfares are crossed by the USGS fault lines displayed on Figure HC.13: IH-35, SH 80, and SH 123.

Additionally, the following critical facilities and infrastructure are located within 1 mile of a fault line within the community (according to HAZUS and community submitted critical facility data): Road and Bridge Dept./Developmental Services Dept., Precinct 2 Offices, Road and Bridge Precinct 3, Road and Bridge Supervisor Building, Camp Jacob, Jacobs Well Stewardship Center, Hays High School, Barton Middle School, Impact Center, San Marcos Baptist Academy, St. Stephens Episcopal School, Wonderland School, Live Oak Academy, Jacobs Well Elementary, and Carpenter Hill Elementary.

Pages 51-54, Dam/Levee Failure have been redacted from this copy of the plan.

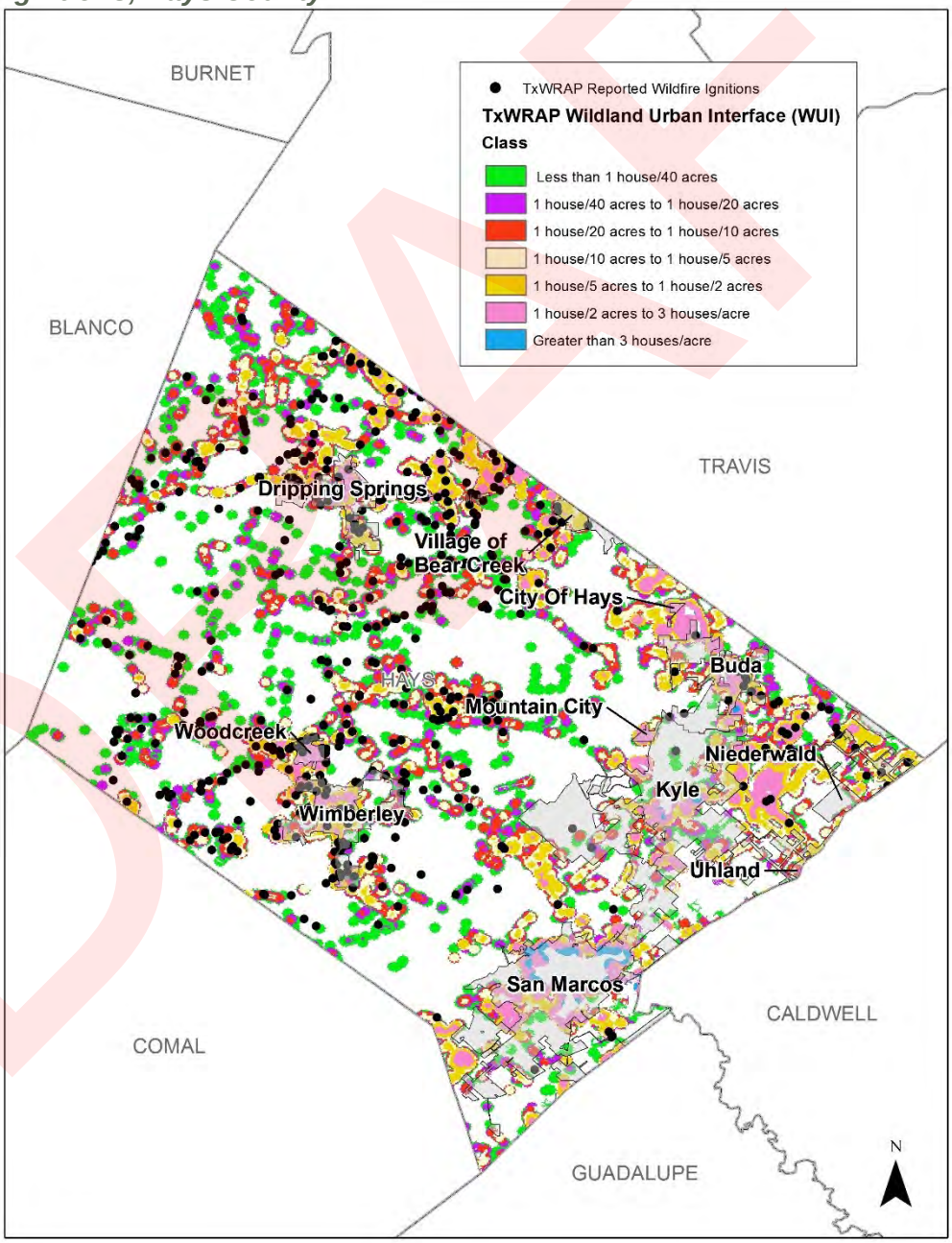
Pages 51-54, Dam/Levee Failure have been redacted from this copy of the plan.

Wildfires

Wildfires: Location

The Texas A&M Forest Service's Texas Wildfire Risk Assessment Portal (TxWRAP) can be used to help communities understand their wildfire risk. Figure HC.16 below shows the location of TxWRAP's documented wildfire occurrences with Wildland Urban Interface (WUI) classifications within Hays County. The WUI illustrates areas of development that are abutting natural areas. Here, communities and the built environment have an increased vulnerability to a wildfire event. Wildfires can be ignited from a variety of sources including lightning or human activity such as campfires, smoking, arson, or equipment use.

Figure HC.16, Wildland Urban Interface (WUI) and Reported Wildfire Ignitions, Hays County



(Texas A&M Forest Service, 2016)

Wildfires: Previous Occurrences

Table HC.25 shows the reported wildfire ignitions over 10 acres within the planning area according to TxWRAP and USGS Federal Fire Occurrence data from the years 1980 to 2015

Table HC.25, Wildfire Ignitions, Hays County

FPA ID	Date	Fire Size (Acres)
SFO-TX02230705-71367	11/30/2005	11
SFO-TX02230706-71464	1/11/2006	11
SFO-TX02240705-5445	7/31/2005	14
SFO-TX01430600-35765173	8/28/2000	15
SFO-TX01440604-3802	12/9/2004	15
SFO-TX02240705-7246	8/20/2005	15
SFO-TX02240707-86745	2/21/2007	15
SFO-TX0482-120778	2/21/2007	15
SFO-TX0482-126613	10/21/2007	15
SFO-TX0482-130379	3/11/2008	15
TFS-TXFD2009-191125	1/8/2009	15
TFS-TXFD2011-353399	10/2/2011	15
SFO-TX0483-72804	1/1/2008	18
TFS-TX2009-75556	8/6/2009	22
SFO-TX02240705-6418	4/17/2005	25
SFO-TX0482-126894	12/4/2007	25
TFS-TX2011-79767	9/2/2011	25
TFS-TX2011-1410263	9/24/2011	25
TFS-TXFD2009-212734	4/22/2009	25
TFS-TXFD2009-212714	6/25/2009	30
SFO-TX02240706-24815	2/2/2006	33
SFO-TX02240705-3729	4/17/2005	40
SFO-TX02240705-6386	3/17/2005	40
SFO-TX0483-72586	10/27/2007	40
SFO-TX0483-72994	1/31/2008	40
TFS-TX2009-75553	8/6/2009	45
SFO-TX0482-130394	2/5/2008	50
TFS-TXFD2011-372451	9/2/2011	50
TFS-TX2009-75550	7/23/2009	55
SFO-TX02240705-4649	7/6/2005	60
SFO-TX02230706-72013	11/15/2006	75
SFO-TX02230706-71518	2/12/2006	79
SFO-TX0483-74311	10/29/2008	80

Table HC.25, Wildfire Ignitions, Hays County (cont.)

FPA ID	Date	Fire Size (Acres)
SFO-TX0483-74009	7/22/2008	140
SFO-TX01430699-35765306	8/20/1999	230
SFO-TX0483-73023	1/29/2008	230
SFO-TX0483-72718	12/22/2007	241
SFO-TX02230707-72177	2/21/2007	381
TFS-TX2009-75588	7/13/2009	500
SFO-TX0483-73292	3/14/2008	866
SFO-TX02230706-72033	11/15/2006	956
SFO-TX01430601-35766403	8/6/2001	1,175

**N/A - Data not available*

Wildfire: Extent

Table HC.26 lists the Fire Intensity Acreage for the planning area according to the Texas A&M Forest Service TxWRAP Community Summary Report. Refer to Chapter 2, the Risk Assessment portion of the Hays County HMP Update, for a description of the Characteristic Fire Intensity Scale (FIS).

Table HC.26, TxWRAP Fire Intensity Acreage, Hays County

Class	Acres	Percent
Non-Burnable	30,756	8.0 %
1 (Very Low)	4,309	1.1 %
1.5	12,138	3.2 %
2 (Low)	6,318	1.6 %
2.5	15,574	4.0 %
3 (Moderate)	95,979	24.9 %
3.5	52,203	13.6 %
4 (High)	69,461	18.0 %
4.5	98,510	25.6 %
5 (Very High)	6	0.0 %
Total	385,254	100.0 %

Wildfires: Probability

Based on 382 reported events in 35 years, Hays County can expect a wildfire event approximately 10 to 11 times per year on average in the future, with up to a potential fire intensity of five, or "Very High" classification on the TxWRAP Characteristic Fire Intensity Scale.

Number of Reported Events	Number of Years in Dataset	Probability
382	35	10.91

Wildfires: Impact

Impact on the community can be measured using TxWRAP Housing Density levels within the WUI. Areas with a higher housing and population density would be affected to a greater extent than more rural areas, and especially areas near burnable fuels. Table HC.27 below lists the population, percent of total population, WUI acreage and percent of WUI acreage for the planning area, according to the Texas A&M Forest Service TxWRAP Community Summary Report. See Figure HC.16 for the location of WUI areas within the jurisdiction.

Table HC.27, WUI Acreage, Hays County

Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
LT 1hs/40ac	1,136	1.7 %	52,705	30.3 %
1hs/40ac to 1hs/20ac	1,631	2.4 %	25,119	14.5 %
1hs/20ac to 1hs/10ac	4,903	7.2 %	32,734	18.8 %
1hs/10ac to 1hs/5ac	10,174	15.0 %	29,586	17.0 %
1hs/5ac to 1hs/2ac	18,063	26.6 %	22,637	13.0 %
1hs/2ac to 3hs/1ac	29,908	44.1 %	10,891	6.3 %
GT 3hs/1ac	2,055	3.0 %	159	0.1 %
Total	67,870	100.0 %	173,831	100.0 %

Wildfires: Vulnerability Summary

The WUI is home to many water and power supply substations and cell towers. Even though there are road systems that, in theory, can serve as fire breaks, there are no other fire breaks in place at present time.

Another vulnerability is the lack of fire hydrants in many mobile home communities, leaving residents and their homes at risk for loss of life or structure. Currently, there is not a countywide brush clean-up event in place, however many incorporated jurisdictions have dedicated trash vendors that conduct large item pick-up events.

Risk Ranking Result

On January 12, 2017, planning representatives from Hays County completed a questionnaire as part of the Hays County HMP Update: Risk Assessment. The questions covered the risk associated with the hazards that affect each community based on the level of concern over each profiled hazard, the hazards' impact on health and safety, as well as property damage and business continuity. The answers from this questionnaire were combined with public survey results on perception of risk, and the values from both sources were analyzed using the Halff Risk Ranking Tool (details regarding the Risk Ranking Tool are in Chapter 2, the Risk Assessment portion of the Hays County HMP Update). The results provided a quantified ranking of risk with values ranging from 0 to 100. The results for Hays County unincorporated areas are shown below (hazard values are shown from highest to lowest risk):

Ranking Order	Hazard	Risk Ranking Value
1	Floods	96.6
2	Expansive Soils	92.4
3	Dam/Levee Failure	92.2
4	Extreme Heat	89.6
5	Severe Winter Storms	87.2
6	Wind Storms	80.3
7	Hail Storms	72.5
8	Lightning	72.4
9	Wildfire	59.6
10	Tornadoes	57.2
11	Land Subsidence	47.8
12	Drought	43.4
13	Earthquakes	43.2
14	Hurricanes/Tropical Storms	39.3

Section 3: Mitigation Strategy

This section examines the community's ability to perform mitigation (review of existing capabilities, shown in Table HC.28) and identifies specific actions to address vulnerabilities for each hazard profiled in the Hays County HMP Update. The mitigation strategy is the application of actions into an approach for performing structural and non-structural mitigation efforts within the jurisdiction. Actions are also prioritized and considered for incorporation into other community programs, regulations, projects or plans.

Completed and canceled actions are also included in a separate section for future reference.

Table HC.28, Existing Capabilities

Capability Name	Capability Type	How it can Accomplish Mitigation
County Judge	Elected Official	Provides political support for approving and funding mitigation actions.
Commissioners	Elected Officials	Supplements political support for implementation of mitigation actions.
Emergency Management Coordinator/Emergency Services Director	Contract Staff	Coordinates MPC, implementation of mitigation actions, and monitoring/evaluation/updating HMP.
Floodplain Administrator	County Staff	Ensures enforcement of existing flood damage prevention ordinance, and continued compliance with NFIP requirements.
Civil Engineer	County Staff and Consultants	Provides expertise and guidance for structural mitigation actions.
Public Works Director	County Staff	Collaborates with MPC on ensuring compliance with existing mitigation-related building requirements and consideration of new building practices to increase mitigation.
GIS Coordinator	County Staff	Can graphically demonstrate changes in development and changes in hazard areas.
Parks and Recreation Director	County Staff	Assists in identifying opportunities for integration of mitigation activities into long-term park development plans. Can also assist with coordinating public outreach events.
Sheriff	County Staff	Provides staff to assist with flood-related traffic control and evacuation planning.
Fire Chief	ESD Staff	Provides staff to assist with wildfire-related mitigation through existing programs and efforts as well as implementation of new measures.
Grants Administrator	County Staff	Pursues and manages grant funding for mitigation projects.
The Private Real Property Rights Preservation Act - Subchapter B: Chapter 2007 of the General Government Code	Authority	Authorizes a "taking"and to regulate construction in an area designated under law as a floodplain.
Texas Senate Bill 936- 77th Legislative Session	Authority	Allows counties and general law cities to regulate on the same level as cities are able to. Also allows counties to collect reasonable fees to cover administrative costs incurred by the administration of a local floodplain management program. Also provides for Criminal and Civil Penalties and injunctive relief.

Table HC.28, Existing Capabilities (cont.)

Capability Name	Capability Type	How it can Accomplish Mitigation
House Bill 1445- 77th Legislative Session-	Authority	Provides regulation of subdivisions in Extraterritorial Jurisdictions (ETJ) Authorizes the County to enter into an inter-local agreement to establish floodplain development regulations for plats and subdivisions within the ETJ.
House Bill 1481- 79th Legislative Session	Authority	Barricade law that makes it a criminal offense to cross a barricade at a flooded area.
County Property Tax	Funding	Potential funding for mitigation actions.
FEMA Hazard Mitigation Assistance Grants	Funding	Potential funding for mitlgation actions.
TWDB Loan Programs	Funding	Potential funding for mitigation actions.
Community Development Block Grant	Funding	Possible cost-share funds for mitigation grants.

National Flood Insurance Program Participation

Hays County participates in the National Flood Insurance Program. The program is administered by a highly experienced floodplain administrator who is a Certified Floodplain Manager with years of experience in not only reviewing development permits but also inspecting the sites for adherence to the flood damage prevention court order. The County is currently applying for participation in the Community Rating System and will continue to explore options for higher standards in floodplain management. The community has a total of 969 NFIP policies in the unincorporated area for a total of $257,867,200 in insurance coverage.

Mitigation Goals

The plan-level Mitigation Goals can be found in Chapter 3, the Mitigation Strategy portion of the Hays County HMP Update. These goals were mutually decided upon as the guiding goals for the development of actions in each planning area.

Mitigation Actions

Risk focus is defined as:
***E= Actions reducing risk to existing buildings and infrastructure**
***F= Actions reducing risk to new development and redevelopment**

Number/Title	Hazard	Item Description	Implementation Agency	
1 Flood Insurance Information Campaign (previously action 2 in 2011 plan, modified)	Floods	Promote the flood insurance program to lessen the number of structures uninsured from flood loss by providing citizens access to brochures about the NFIP at the County Government Center and links to resources on website.	Hays County Floodplain Administration	
Cost Estimate/Funding		**Schedule**	**Status as of 2017**	***Risk Focus:**
Existing County staff and free NFIP materials from FEMA publication warehouse		3 months	Not started	N/A
Cost and Benefit Considerations				
This project would indirectly benefit residents who need information about the hazard at little cost.				

Number/Title	Hazard	Item Description	Implementation Agency
2 Attend Advanced Local Floodplain Management Courses (previous action 19 in 2011 plan, modified)	Floods	Send members of the staff or elected official to training in order to receive advanced training modules in floodplain administration.	Hays County Floodplain Administration

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing Staff, cost of accommodations for FEMA session	6 months	Not started	E/F

Cost and Benefit Considerations
If attending the course at the Emergency Management Institute, the cost of the course would be very low, and only include a minimal meal ticket purchase. The benefit of an informed floodplain administrator would help both new and existing residents through guidance on how to mitigate flood damages to development.

Number/Title	Hazard	Item Description	Implementation Agency
3 Upgrade to Interoperability and Safety Band (previously action 4 in 2011 plan)	All Hazards	Upgrade existing County public safety radio bands in order to ensure interoperability with other entities during large scale events and operations.	Hays County Office of Emergency Services

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
$1.7 Million	12 months	Not started	N/A

Cost and Benefit Considerations
The benefits of interoperability of radio communication during disaster events would benefit all responders and citizens/tourists in the community.

Number/Title	Hazard	Item Description	Implementation Agency
4 StormReady Designation for Hays County (previously action 14 in 2011 plan)	Windstorm, Hailstorm, Severe Winter Storms, Lightning, Hurricanes/ Tropical Storms, Tornadoes, Floods	Application preparation and submission for StormReady designation from the National Weather Service that attests to the community's level of preparedness for severe winter.	Hays County Office of Emergency Services

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing Staff	12 months	Ongoing. SkyWarn training offered annually.	N/A

Cost and Benefit Considerations
This free application would benefit all members of the unincorporated area in increasing the preparedness of the local government.

Number/Title	Hazard	Item Description	Implementation Agency
5 Increase Public Awareness of Hazards	All Hazards	Updates to HaysInformed.com to incorporate latest mitigation data.	Hays County Office of Emergency Services

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing staff	6 months	Ongoing	N/A

Cost and Benefit Considerations
This free enhancement to the County's existing website would benefit all with internet access at little to no cost, except the staff resources required to do so.

Number/Title	Hazard	Item Description	Implementation Agency
6 Continue to Promote Firewise (previously actions 23 & 24 in 2011 plan, modified)	Wildfire	Continuation of activities for purposes of mitigating against wildfire risk and planning activities and maintaining Firewise designation for the County.	Hays County Fire Marshal

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing staff	12 months	Ongoing	E/F

Cost and Benefit Considerations
Program that is already being implemented and is funded.

Number/Title	Hazard	Item Description	Implementation Agency
7 Monitor Drought conditions (previously 16 in 2011 plan, modified)	Drought, Land Subsidence	Use HaysInformed.com to provide links to National Drought Monitor for daily drought report availability for the public.	Hays County Office of Emergency Services

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing staff	6 months	Ongoing	N/A

Cost and Benefit Considerations
This project that will provide awareness and visibility on drought trends and occurrences at no cost.

Number/Title	Hazard	Item Description	Implementation Agency
8 Engineering review of New Public Facilities to ensure soundness against natural hazards (previously action 27 in 2011 plan, modified)	Flood, Tornadoes, Windstorm, Hurricanes/ Tropical Storms, Hailstorms	Contract a consultation from an engineer to review older public facilities to ensure resiliency.	Hays County Development Services

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing staff, cost of engineer study	12 months	Not started	F

Cost and Benefit Considerations

The cost of this review will benefit the County government as it will assist with the assurance of the continuity of operations for the community during disaster conditions.

Number/Title	Hazard	Item Description	Implementation Agency
9 Evacuation Plans/ Alternate road consideration (previously action 29 in 2011 plan, modified)	Hurricanes/ Tropical Storms, Floods, Dam/ Levee Failure, Wildfire	Documentation of an evacuation plan that includes multiple exits.	Hays County Office of Emergency Services

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing staff, possible cost of buy out for an easement of land to develop an additional emergency exit for the community, pursuit of grant funding for effort	18 months	Ongoing	N/A

Cost and Benefit Considerations

The cost of not establishing a way out of the community would greatly outweigh the cost of mitigating this risk of not being to get citizens out of danger.

Number/Title	Hazard	Item Description	Implementation Agency
10 Expansive Soil Information Sheet	Expansive Soils	Creating and providing an information sheet regarding expansive soils in the development permit packet given to developers and citizens building in the community. The sheet will provide risk information about the hazard and provide recommendations for soil compaction and engineered foundations, especially for non-site built structures.	Hays County Development Services

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing Staff, $100 cost of printing	3 months	Not started	F

Cost and Benefit Considerations

This free effort would provide awareness and public information that will benefit those looking to perform new development and those who are improving or repairing existing property.

Number/Title	Hazard	Item Description	Implementation Agency
11 Dam Inundation Maps (previously action 31 in 2011 plan, modified)	Dam/Levee Failure, Floods	Work with TCEQ to continue to develop inundation maps for all High Hazard dams.	Hays Floodplain Administration

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Flood Protection Planning efforts currently in progress as well as contractual services	12 months	Phase 1 Completed and Being Continued	N/A

Cost and Benefit Considerations
This would benefit the community members that are downstream or within the outfall of dams. This would allow for visibility of hazard areas that may require mitigation but that are not regulated as Special Flood Hazard Areas, allowing for a mitigation measures where they otherwise may not be enforced.

Number/Title	Hazard	Item Description	Implementation Agency
12 Equipping Critical Buildings (beyond fire departments) in Hays County with backup generators (previously actions 6 & 18 in 2011 plan, modified)	Lightning, Extreme Heat, Severe Winter Storm, Windstorms, Hurricanes/ Tropical Storms, Tornadoes	Continuing the installation of emergency generators for back up power at Critical Buildings in Hays County.	Hays County Office of Emergency Services

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing staff, grant writing assistance, Hazard Mitigation Grant program funding, if applicable and eligible. Equipment estimated at $10,000 - $25,000 dependent on facility size and needs.	24 months	Not started	E/F

Cost and Benefit Considerations
This is an ongoing project that started in the previously planning period for fire stations and has been beneficial to the community. The pursuit of grant funding to support this effort would ensure the continuance. As generators are currently an applicable project for HMGP, the benefit cost requirements are likely to be achievable.

Number/Title	Hazard	Item Description	Implementation Agency
13 Acquisition or elevation of Repetitive Loss Structures within Hays Unincorporated planning Area (previously action 10 in 2011 plan)	Floods	Action to mitigate 38 identified properties with a total of 88 losses claimed for a total of $4 million from the NFIP.	Hays County Grants Administrator, Emergency Management Coordinator, Floodplain Administrator

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Using Current 2016 Assessment records for these 38 properties, it is estimated the average acquisition cost (to include all related costs of acquisition and demolition) is $400,000 for a total estimated cost of just over $15M. The estimated cost to elevate these homes, using the square footage of the homes from the 2016 Assessment records, and using $75/square foot of linear footprint, is $6.4M. Funding Sources: FEMA, TDEM, TWDB, GLO, Hays County	Delayed	Ongoing	E

Cost and Benefit Considerations
Cost effectiveness for these acquisitions or elevations are determined on a per structure or project basis.

Number/Title	Hazard	Item Description	Implementation Agency
14 Additional Stream & Rain Gauge and Flood Warning Systems (previously action 15 in 2011 plan, modified)	Floods	Next phase in an ongoing effort to increase the number of gages along high velocity flood areas and flood warnings at High Hazard Dams.	Hays County Office of Emergency Services

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Hays County Office of Emergency Services	48 months	Ongoing	N/A

Cost and Benefit Considerations

This action is a collaborative effort with the Texas Water Development Board. The costs to the community would be reduced through assistance from these organizations. The benefit would be preservation of life and property throughout the County and incorporated areas.

Number/Title	Hazard	Item Description	Implementation Agency
15 CRS Application and Community Rating System Participation benefit report for incorporated communities within Hays County (previously action 20 in 2011 plan, modified)	Floods	With some communities within Hays County having minimal staff, 1 community has only 1 employee, and also a low number of flood policies within the SFHA that would benefit from CRS program insurance premium discount benefits, the benefit cost of consideration of the administration of a CRS application and program may cost the City/ Village more than it saves them. An assessment of the number of policies that are in the SFHA with a listing of their potential for savings would assist with showing what communities would best benefit from participation.	Hays County Floodplain Administrator

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing staff with FEMA support	12 months	Ongoing	N/A

Cost and Benefit Considerations

This action would help show communities that have opportunities for great savings the benefits of completing the application for CRS. The cost-savings to the members of the communities would be directly related to the cost of citizen flood insurance policies.

Number/Title	Hazard	Item Description	Implementation Agency
16 Continue to Improve Emergency Warning Capabilities (previously action 3 in 2011 plan, modified)	All Hazards (except Exp. Soils and Land Sub.)	Research and possible implementation for redundancy in notifications through use of AM/FM radio and satellites.	Hays County Office of Emergency Management

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing staff until appropriate measures are identified	12 months	Ongoing	N/A

Cost and Benefit Considerations

Not independently cost-effective but critical for saving lives.

Number/Title	Hazard	Item Description	Implementation Agency
17 Minimize the risk of loss of life at low water crossings in Hays County (previously action 22 in 2011 plan, modified)	All Hazards	Continue efforts to improve and expand upon existing low water crossing alert systems, road blocking systems. Also making structural improvements to low water crossings to decrease vulnerability.	Hays County Office of Emergency Management

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
$500,000/ State and Federal Grants	48 months	Ongoing	E/F

Cost and Benefit Considerations
Not independently cost-effective but critical for saving lives.

Number/Title	Hazard	Item Description	Implementation Agency
18 Fuel Reduction Project to reduce Wildfire Risk	Wildfires	Identify and complete a fuel reduction project in order to lessen the risk of wildfire, with adherence to the existing FireWise planned activities.	Hays County Office of Emergency Management

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
Existing staff until project identified and cost determined	12 months	Ongoing	N/A

Cost and Benefit Considerations
Possible low-cost solutions to reducing loss of life and property adjacent to WUI.

Number/Title	Hazard	Item Description	Implementation Agency
19 Construct Needed Water System Improvements in Lower Colorado Region K and South Central Region L	Drought	Construction of projects needed to improve the water system in 2 regions.	Hays County Commissioners Court

Cost Estimate/Funding	Schedule	Status as of 2017	*Risk Focus:
472 million (South Central Texas Region- 21 counties) $256 million (14 county Lower Colorado Region), Funding sources: TWDB, GBRA, LCRA	48 months	Plan complete, pending project completion	E/F

Cost and Benefit Considerations
Solutions will be cost-effective, as required by grant funding.

Evaluation/Prioritization of Actions

Each action added to the plan was developed using the Mitigation Action Summary Worksheet shown in Figure HC.17. Non-cost effective projects were not included in prioritization activity.

Figure HC.17, Mitigation Action Summary Worksheet

Hays County Hazard Mitigation Plan Update Process

Mitigation Action Summary Worksheet

Community Name: _____

Person completing questionnaire: _____

Mitigation Action/ Project Title	
Background/ Issue	
Opportunities for Integration	
Responsible Agency	
Partners	
Strategy for Existing Structures	

Hays County Hazard Mitigation Plan Update Process

Mitigation Action Summary Worksheet

Strategy for Future Development	
Potential Funding	
Cost Estimate (Values from "Measuring Costs" fields from Benefit and Cost Review Worksheet)	
Benefits (Statements from the "Difference" fields on the Benefit and Cost Review Worksheet)	
Timeline	
Priority (Based off Priority worksheet)	

Table HC.29, Mitigation Action Prioritization (with Hazards in order of highest priority to lowest)

Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community	Risk Ranking Score	Total Score
9. Evacuation Plans/Alternate road consideration	1	1	1	1	1	1	1	1	1	1	97	107
19. Construct Needed Water System Improvements in Lower Colorado Region K and South Central Region L	1	1	1	1	1	1	1	1	1	1	97	107
5. Increase Public Awareness of Hazards	1	1	1	1	0	1	1	1	0	1	97	105
16. Improve Emergency Warning Capabilities	1	0	1	1	0	0	1	1	1	1	97	104
13. Acquisition or elevation of Repetitive Loss Structures within Hays County planning area	1	1	1	0	1	1	0	1	1	0	97	104
17. Minimize the risk of life at low water crossings in Hays County	1	0	1	1	0	0	1	1	1	1	97	104
2. Attend Advanced Local Floodplain Management Courses	1	1	1	1	1	1	0	1	0	0	97	104
3. Upgrade to Interoperability and Safety Band	1	0	1	1	1	0	1	1	0	1	97	104
11. Dam Inundation Maps	1	1	1	0	1	0	1	1	0	1	97	104
18. Additional Stream & Rain Gauge and Flood Warning Systems	1	0	1	1	0	0	1	1	1	1	97	104
8.Engineering review of New Public Facilities to ensure soundness against natural hazards	1	1	1	-1	0	1	1	1	0	1	97	103
19. Benefit Cost Study for Community Rating System Participation for Incorporated communities within Hays County	1	1	1	1	1	0	1	-1	0	1	97	103
1. Flood Insurance Information Campaign	0	0	1	1	0	0	1	1	0	0	97	101
12. Equipping Critical Buildings (beyond fire departments) in Hays County with backup generators	1	0	1	1	1	0	1	1	0	1	92	99
4. StormReady Designation for Hays County	1	0	1	1	0	0	1	1	0	1	92	98
7. Monitor Drought Conditions	1	0	1	1	0	1	1	1	1	1	80	88
6. Continue to Promote Firewise	1	1	1	1	1	0	1	1	1	1	60	69
18. Fuel Reduction Project	1	1	1	1	0	0	1	1	1	1	60	68
10. Expansive Soil Information Sheet	0	1	1	-1	0	0	1	-1	0	0	43	44

Mitigation Actions by Hazard

The mitigation actions in Table HC.30 are shown with the hazards that they mitigate.

Table HC.30, Mitigation Action Impact, Hays County Unincorporated

Action Number	Drought	Extreme Heat	Severe Winter Storms	Lightning	Hailstorms	Windstorms	Tornadoes	Expansive Soils	Floods	Land Subsidence	Hurricanes/ Tropical Storms	Earthquakes	Dam/ Levee Failure	Wildfire
1									X					
2									X					
3	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4			X	X	X	X	X		X		X			
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6														X
7	X									X				
8					X	X	X		X		X			
9									X		X		X	X
10								X						
11									X				X	
12		X	X	X		X	X				X			
13									X					
14									X					
15									X					
16	X	X	X	X	X	X	X		X		X	X	X	X
17									X					
18														X
19									X					

Integration Efforts

Table HC.31 captures ways that the Risk Assessment, Goals and Actions developed in the HMP can be integrated into other Hays County documents, programs and regulations

Table HC.31, Plan Integration Efforts, Hays County

Name of Document	Type	Item Type	Opportunity for Integration
Public Awareness Hazard Webpages	Website	Action	Each community participating in the Hays County HMP Update is going to create Public Awareness pages on their City/Village websites. HaysInformed.com could link to those hazard pages to guide page visitors to pages relevant to their own community.
Community Development Block Grants	Funding	Action	Once Benefit Cost analysis is done for flood mitigation structural actions, the County can determine if it will apply to utilize any Hazard Mitigation Grant Program funding. Cost-shares can be applied using CDBG funding for those low- to moderate income neighborhoods/households that would qualify for such assistance.
Hays County Strategic Policy and Implementation Plan 2010	Plan	Goals	Seek seats on the update committee for this plan in order to involve mitigation planning committee members so that the importance of mitigation and public safety can be included in the decisions made regarding future policy.
Property Assessed Clean Energy (PACE) Program Proposed for Hays County	Plan	Risk Assessments	Ensure that funding that is pursued under pace program is not being used to improve structures that are non-compliant in the floodplain.
Jacob's Well Natural Area Master Plan	Plan	Goals	Seek to further enhance the educational programs and tours at the park and provide insight on other mitigation materials that can be provided to the public that visit. Consider High water markers in the park.
Hazard Mitigation Grant Program (HMGP)	Funding	Action	Identify actions that can be funded through new and existing grant awards.
Pre-Disaster Mitigation (PDM)	Funding	Action	Identify actions that can be funded through new and existing grant awards.
Flood Mitigation Assistance (FMA)	Funding	Action	Identify actions that can be funded through new and existing grant awards.
TWDB Flood Protection Planning (FPP) Grant	Funding	Action	Identify actions that can be funded through new and existing grant awards.
TWDB Clean Water State Revolving Fund (CWSRF)	Funding	Action	Identify actions that can be funded through new and existing grant awards.
Texas Water Development Fund (DFund)	Funding	Action	Identify actions that can be funded through new and existing loans.

Section 4: Finalize Plan Update (Review, Evaluation, and Implementation)

Changes in Development

Hays County is known nationally for its growing population and industry. With these changes, there have been great expansions of Extra-Territorial Jurisdictions as the community boundary lines continue to change and expand. According to Texas Demographic Center estimates, the total populations of Counties and places in Texas for July 1st 2015 and January 1, 2016, Hays County experienced a 26.9 % change between 2010 and 2016 (Texas Demographic Center, 2017).

Past Mitigation Action Progress Reports Summary - Completed and Canceled

2011 Action Number	Hazard	Item Description	Lead Department
1	Flood	Increase the number of Hays County communities that participate in the NFIP	Hays County OES and FPM
Cost Estimate/Funding		**Schedule**	**Status as of 2017**
Cost and Funding: Existing staff resources, no cost		Completed	Completed
Cost Effectiveness			
Not independently cost-effective			

2011 Action Number	Hazard	Item Description	Lead Department
5	Flood	Minimize the risk of loss of life at low water crossings in Hays County(Phase 1 warning sign and barricades) (Phase 2- Rescue Fee)	OES and FPM
Cost Estimate/Funding		**Schedule**	**Status as of 2017**
$12,000 Annually and $2,000 per maintenance cost		Completed	Phase 1 complete. Phase 2 canceled, as it is not an approach the County wants to take.
Cost Effectiveness			
Not independently cost-effective but critical for reducing loss of life and injuries at low water crossings			

2011 Action Number	Hazard	Item Description	Lead Department
7	Tornado	Encourage Construction of Tornado “Safe Rooms”	OES
Cost Estimate/Funding		**Schedule**	**Status as of 2017**
Funding: Texas DEM, FEMA		Ongoing	Canceled. Not feasible.
Cost Effectiveness			
Not independently cost-effective			

2011 Action Number	Hazard	Item Description	Lead Department
8	Text	Increase Hays County OEM Staff	OES
Cost Estimate/Funding		**Schedule**	**Status as of 2017**
$50,000 per year salary and equipment- Hays County Funding: FEMA, Texas DEM, Hays County		Completed	Completed.
Cost Effectiveness			
Not independently cost-effective			

2011 Action Number	Hazard	Item Description	Lead Department
9	All hazard	Development of and maintenance of countywide and individual community HAZMAP Plans	OES
Cost Estimate/Funding		**Schedule**	**Status as of 2017**
Existing staff resources		Original Plan adopted on 4/20/2004. Update in 2011	Completed.
Cost Effectiveness			
Not independently cost-effective			

2011 Action Number	Hazard	Item Description	Lead Department
11	Tornado, Flood	Building Code Improvements	Hays County Development Services Department
Cost Estimate/Funding		**Schedule**	**Status as of 2017**
Funding: Texas DEM, CAPCOG, Hays County		Evaluation in 2006 Code updates, phased, ongoing	Canceled. Hays County has no building codes.
Cost Effectiveness			
Not independently cost-effective			

2011 Action Number	Hazard	Item Description	Lead Department
12	Flood	Adopt "Higher Standard" Flood Damage Prevention Ordinances	FPM
Cost Estimate/Funding		**Schedule**	**Status as of 2017**
Cost and Funding: Existing Staff resources, no cost		A higher standard Flood Damage Prevention Order was adopted in 2009. More restrictive ordinance anticipated in 2011.	Completed in August of 2011.
Cost Effectiveness			
Not independently cost-effective			

2011 Action Number	Hazard	Item Description	Lead Department
13	Hazardous Materials	Designate HAZMAT Cargo Routes in Hays County	Local Emergency Planning Committee

Cost Estimate/Funding	Schedule	Status as of 2017
$3000 estimated study cost, $5000 estimated cost to placard selected roadways Funding Sources: Texas DOT, Texas DEM, Hays County	2011 to 2015	Removed. This action is not focused on Natural Hazards, but is still being conducted at a regional level.

Cost Effectiveness
Not independently cost-effective

2011 Action Number	Hazard	Item Description	Lead Department
18	Flood	Update Hays County FIS and FIRM	FPM

Cost Estimate/Funding	Schedule	Status as of 2017
Funding: FEMA Funded Flood Insurance Study, USACE Onion Creek Federal Flood Protection Project	2006-2007	Canceled. Not a County function.

Cost Effectiveness
Not independently cost-effective but critical to update aging flood hazard maps

2011 Action Number	Hazard	Item Description	Lead Department
21	Extreme Heat	Reduce Impacts of Extreme Heat on Elderly, Disabled, Low-Income and Infants (Fan Distribution Program)	OES

Cost Estimate/Funding	Schedule	Status as of 2017
$2,000 to purchase and distribute 100 box fans and $3,000 estimated cost for a/c repairs Funding Sources: United Way, Rotary Clubs, Lion Clubs, Red Cross, Churches and charitable organizations, power companies	Completed	Canceled. Not feasible for the County to achieve.

Cost Effectiveness
Not independently cost-effective

2011 Action Number	Hazard	Item Description	Lead Department
25	Extreme Heat	Evaluate Excess Heat Risks Study	OES, Hays County Health

Cost Estimate/Funding	Schedule	Status as of 2017
No additional cost-uses existing staff resources	TBD: Probably initiated in 2011	Canceled. Replaced with other extreme heat actions.

Cost Effectiveness
Not independently cost-effective, but needed to develop adequate risk reduction efforts

2011 Action Number	Hazard	Item Description	Lead Department
28	Dam Failure	Understanding Dam Failure Risks Group formation	OES

Cost Estimate/Funding	Schedule	Status as of 2017
No additional cost-uses existing staff resources	Initiated in 2011 then ongoing	Canceled. Replaced

Cost Effectiveness
Not independently cost-effective

Changes in Priorities

The heart of flash flood alley, Hays County priorities remain highly fixed on the dangers and impacts of floods in the County. Since the last planning period, the priorities have remained consistent.

Section 5: Approval and Adoption

Approval and Adoption Procedure

Table HC.32, County Adoption Date

Municipality	APA Date	Adoption Date
Hays County		

Jurisdiction Adoption Documentation Placeholder

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