Bee County Multi-Hazard Mitigation Plan

2017

"Under the Federal Disaster Mitigation Act of 2000 (DMA 2000 or "the Act"), Bee County (County) is required to have a Federal Emergency Management Agency ("FEMA") - approved Local Hazard Mitigation Plan ("the Plan") in order to be eligible for certain pre- and post-disaster mitigation funds. Adoption of this Plan by the County and approval by FEMA will serve the dual objectives of providing direction and guidance on implementing hazard mitigation in the County, and qualify the County to obtain federal assistance for hazard mitigation. Solely to help achieve these objectives, the Plan attempts to systematically identify and address hazards that can affect the County. Nothing in this Plan is intended to be an admission, either expressed or implied, by or on behalf of the County, of any County obligation, responsibility, duty, fault or liability for any particular hazard or hazardous condition, and no such County obligation, responsibility, duty, fault or liability should be inferred or implied from the Plan, except where expressly stated."

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1. Introduction and Background

1) Participating Jurisdictions

The Bee County Multi-Hazard Mitigation plan includes three participating jurisdictions: Bee County, the City of Beeville, and Coastal Bend College.

2) Hazard Mitigation Plan History

Bee County is a participating jurisdiction in the Coastal Bend Mitigation Action Plan (CBMAP).

In May of 2002, the City of Corpus Christi submitted an application for a mitigation planning grant on behalf of itself, Kleberg, Nueces, and San Patricio counties. In July 2003, Aransas, Bee, Jim Wells, and Live Oak Counties were added to the project. The initial version of CBMAP received final FEMA approval in October 2006.

The mitigation planning regulation of the Disaster Mitigation Act requires that mitigation plans be reviewed and updated every five years to maintain eligibility for mitigation grant funding. During 2009, the Coastal Bend Council of Governments (CBCOG) applied for and received a grant to update the plan. The current version of the CBMAP was approved by FEMA on September 27, 2012.

The CBMAP plan identifies seven hazards that impact the seven-county planning area, including flooding. However, according to the CBMAP plan no spatial data was available at the time that plan was written to address the flood hazard present in Bee County.

The other hazards addressed in the CBMAP plan include: Hurricanes / Tropical Storms, Tornados, Dam Failure, Drought, Wildfire, and Coastal Erosion.

However, this plan is not an update of the CBMAP plan.

Due to a change in policy and an effort to increase a plan's value to each participating jurisdiction, plans covering more than two counties are no longer permitted. Even though this plan will consider the hazards addressed in the CBMAP plan, it is a new plan.

Bee County, the City of Beeville, and Coastal Bend College will address the following hazards: Hurricanes / Tropical Storms, Wildfire, Tornados, Drought, Earthquakes, Expansive Soils, Extreme Heat, Land Subsidence, Hailstorms, Severe Winter Storms, Windstorms, and Lightning.

In 2016, Bee County and the City of Beeville wrote and submitted a standalone flood mitigation plan for review. In June 2017, the Bee County Flood Mitigation Plan received FEMA approval pending adoption. The Bee County Flood Mitigation Plan is included in this plan as Appendix A, and it will serve as this plan's consideration of flood hazards.

The Bee County Flood Mitigation Plan was written with a grant from the Texas Water Development Board's Flood Mitigation Assistance program. Costal Bend College declined to participate in the Bee County Flood Mitigation Plan.

Consistent with rules preventing the duplication of benefits, the flood hazard did not receive additional consideration for any participant in the Bee County Flood Mitigation Plan. The flood hazard in the Bee County Multi-Hazard Mitigation Plan was only considered for Coastal Bend College.

All three jurisdictions determined that coastal erosion is not a threat because the County isn't directly adjacent to the coast.

According to the National Inventory of Dams[1] (NID), there is only dam in Bee County. It is privately owned, and based on its storage capacity, is considered a low-hazard dam[2].

After reviewing and confirming the NID data, all three jurisdictions determined that dam / levee failure is unlikely to pose a threat during the planning period.

[1] http://nid.usace.army.mil/cm_apex/f?p=838:4:0::NO
[2] https://www.fema.gov/media-library/assets/documents/3909

2. Planning Process

The Bee County Hazard Mitigation Plan is a multi-jurisdiction plan. Representatives to the local planning team were selected by each jurisdiction. Planning team members represented the following offices and departments:

Title	Agency or Department	Phone
Emergency Management Coordinator	Bee County Office of Emergency Management	361-621-1567
Road Administrator	Bee County Road and Bridge Department	361-362-9375
County Commissioner	Bee County Commissioners Court	361-621-1573
Patrol Lieutenant	Bee County Sheriff's Office	361-542-3544
Utilities Director	City of Beeville	361-362-5698
Director, Physical Plant	Coastal Bend College	361-658-3240

Once the planning team was established, members developed a schedule with specific goals and proposed meeting dates over the planning period.

Hazard mitigation planning team (HMPT) members contributed to the following activities throughout the planning process:

1. Providing technical assistance and necessary data to the HMPT.
2. Scheduling, coordinating, and facilitating community meetings.
3. Providing necessary materials for public planning meetings.
4. Collecting and analyzing data.
5. Developing mitigation goals and implementation strategies.
6. Preparing the first draft of the plan and providing technical writing assistance for review, editing, and formatting.

Each member of the HMPT participated in the following activities associated with development of the plan:

1. Identifying, contacting, coordinating, and implementing input from stakeholders.
2. Attending, conferencing in, or providing meeting support and information for regular HMPT meetings.
3. Identifying hazards and estimating potential losses from future hazard events.
4. Developing and prioritizing mitigation actions to address identified risks.
5. Coordinating public meetings to develop the plan.
6. Identifying community resources available to support planning effort.

7. Submitting proposed plan to all appropriate departments for review and comment, and working with the city to incorporate the resulting comments into the proposed plan.

Table 1: Plan Schedule

Proposed Timeline	July	August	September	October	November	December	January	February	March	April	May	Actual Completion
Organize Resources and Identify Planning Team												August
Create Outreach Strategy												August
Review Community Capabilities												December
Conduct Risk Assessment												December
Identify Mitigation Goals and Actions												May
Develop Action Plan for Implementation												May
Identify Plan Maintenance Procedures												May
Review Final Draft												May
Submit Plan to State and FEMA												May
Adopt Plan												TBD

Meetings												
Local Contact												7/27/2016
Planning Team												8/30/2016 12/8/2016 5/9/2017
Public Outreach												8/30/2016 12/8/2016 5/9/2017
Stakeholder Outreach												February

1) Existing Plans, Reports, Ordinances, and Technical Information Sources

Each planning team member worked to collect and provide the input and information necessary to develop the hazard mitigation strategy. Research was coordinated and conducted by local planning team members. The local planning team reviewed the following documents during the planning process:

Table 2: Plan Data Sources and Incorporation

Data Source	Data Incorporation	Purpose
National Climatic Data Center (NCDC)	Hazard occurrences	Previous event occurrences, damage dollars, and mapping for all hazards
Texas Forest Service-Texas Wildfire Risk Assessment Summary Report	Wildfire Threat and Urban Interface	Mapping and wildfire vulnerability data
National Dam Inventory	Dam information	High-hazard dam list
Federal Emergency Management Agency (FEMA) DFIRM Flood Zones	Flood zone maps	GIS mapping of flood zones
State of Texas Hazard Mitigation Plan 2013 Update	Hazard Descriptions	Official descriptions of hazards and their potential impacts
Texas State Data Center	Population and demographics	Population counts, parcel data, and land use data
Region N 2016 Regional Water Plan	Drought impact information	Review water supply and water demand projections
Coastal Bend Mitigation Action Plan	Previous planning approach, hazards addressed, and mitigation actions	Previous planning team representatives, plan maintenance, hazard histories, and mitigation actions
Bee County Appraisal Data	Population and demographics	Population counts, parcel data, and land use data
City of Beeville Comprehensive Annual Financial Report, 2015	Planned and existing expenses	Identifying financial capacity to fund mitigation actions
City of Beeville Zoning Ordinance	Zoning requirements and restrictions	Identifying zone locations and restrictions to limit future hazard exposure
Bee County Subdivision Ordinance	Subdivision requirements and restrictions	Identifying development restrictions to limit future hazard exposure
City of Beeville Subdivision Ordinance	Subdivision requirements and restrictions	Identifying development restrictions to limit future hazard exposure
City of Beeville Zoning Ordinance	Zoning requirements and restrictions	Identifying zone locations and restrictions to limit future hazard exposure
City of Beeville Nuisance Abatement Ordinance	Nuisance definitions and methods for remedy	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Beeville Junked Vehicle Ordinance	Junked vehicle definition and methods for remedy	Identifying measures permitted by an existing ordinance to address issues that may change the impact of natural hazard events
City of Beeville Drought Contingency Plan	Drought Stages and water restrictions	Review the measures already being taken to address the drought hazard and opportunities for additional measures

Additional information sources included: FEMA, the National Climatic Data Center, online articles from the Beeville *Bee-Picayune* newspaper, the Texas State Data Center, the Texas A&M Wildfire Risk Assessment Portal, USDA Census of Agriculture, United States Geological Survey,

Vaisala, and specific details about previous natural hazard events from planning team participants, the Emergency Management Coordinator in particular. Sources are noted throughout the document. Report titles and links to the most recently accessed websites hosting the related information are also noted, where appropriate.

Area stakeholders contacted to participate in the planning process included the following offices and departments within the participating jurisdictions and neighboring jurisdictions:

Table 3: Local Stakeholders Contacted

Title	Agency or Department	Phone Number	Participated
Program Director	City of Beeville Main Street Program	361-358-4641 x 235	N
County Executive Director	Bee County Farm Service Agency	361-358-3343	N
Manager	Bee County Groundwater Conservation District	361-449-7017	N
County Executive Director	Bee County Farm Service Agency	361-358-3343	N
Executive Director	Bee Development Authority, Chase Field Industrial Complex	361-358-2023	N
Emergency Management Planner	Coastal Bend Council of Governments	361-523-9447	N
Emergency Management Coordinator	Goliad County	361-645-1729	N
Emergency Management Coordinator	Karnes County	830-780-3511 830-780-3461	N
Emergency Management Coordinator	Live Oak County	361-449-2733	N
Emergency Management Coordinator	San Patricio County	361-387-3563	N
Manager	San Patricio County Drainage District	361-364-4268	N
Program Coordinator	Texas Natural Resources Conservation Service, Beeville Field Office	361-358-1178	N
County Extension Agent	Texas A&M Beeville Station	361-358-6390	N
County Extension Agent, Ag and Natural Resources	Texas A&M AgriLife Extension	361-621-1552	N
Maintenance Supervisor	TxDOT Beeville Office	361-358-3178	N

Area stakeholders were contacted by phone and email. In an effort to increase participation, each stakeholder was contacted at least twice. The planning team wasn't able to collect any information relevant to the planning process.

2) Project Meetings

The planning team met on three separate occasions. Additional communication was regularly carried out via email and over the phone.

The first planning team meeting was held on August 30, 2016. During this meeting, the planning team decided which hazards needed to be addressed in the mitigation plan and which were not relevant. To make these decisions, a hazard handout was produced to show previous occurrences of each hazard, associated deaths and injuries, and total dollar damages. The Emergency Management Coordinator provided additional knowledge and input to help the planning team's decision making process.

The team agreed to use the collected hazard data, as the foundation for its hazard risk assessment and ongoing research into hazard extent, impact, and vulnerability.

The planning team also identified area stakeholders to be contacted in the time between the first and second meeting.

At the end of the meeting, Planning team members were tasked with reviewing the CBMAP plan. Planning team members also agreed to compile relevant data, including city ordinances, and begin identifying critical facilities.

The second planning team meeting was held on December 8, 2016. Prior to the meeting, planning team members were provided with a meeting agenda and additional information about the meeting's scope based on the information the team had gathered between meetings.

To stay on schedule, the planning team needed to meet four objectives: Review and tentatively approve the critical facilities list, complete the community capability assessment, review previous mitigation actions, whether or not they were implemented and successful, and identify future mitigation actions appropriate to the natural hazards identified in the first planning team meeting.

The planning team met its objectives.

The final planning team meeting was held on May 9, 2017. The planning team reviewed the completed document, discussed final changes and reviewed the plan submission process in preparation of submitting the plan for official review on May 31, 2017.

3) Public Input

Members of the public were invited to attend three public hearings to provide input and feedback during the planning process. Each public hearing was advertised in the local paper at

least 72 hours in advance, and flyers were posted in public locations, including County and City offices, as well as on campus at the Coastal Bend College.

In an effort to provide an open process and collect any missing information related to hazard history, vulnerability, and impact, members of the public were given the opportunity to review an in-progress draft of the plan at the second meeting. The public was also given an opportunity to review and comment on the completed draft at the third public hearing before it was submitted for the formal review process on May 31, 2017.

Despite planning team efforts to generate public interest and collect input, no member of the public attended any of the public hearings or offered comments on the plan drafts made available during the planning process.

4) Plan Maintenance

The hazard mitigation plan is not a static document. As conditions change and mitigation actions are implemented, the plan will need to be updated to reflect new and changing conditions in each jurisdiction.

The planning team has identified specific departments to oversee action implementation in each jurisdiction. The planning team has also identified potential funding sources and an implementation timeframe for each mitigation action. The expected timeframes will be an important component in determining whether or not actions are implemented efficiently. The departments or persons identified for each jurisdiction include but are not limited to:

Table 4: Maintenance Responsibility

Title	Jurisdiction	Agency or Department	Phone
Bee County Emergency Management Coordinator	Bee County	Bee County Office of Emergency Management	361-621-1567
County Judge	Bee County	Bee County Judge's Office	361-621-1550
Mayor	City of Beeville	City of Beeville Mayor's Office	361-358-4641
Director	Coastal Bend College	Physical Plant	361-658-3240

Within one year of adoption of this plan, each department or agency will review and, as appropriate, integrate implementation of their respective mitigation actions with their existing internal plans and policies relating to capital improvements, land use, design and construction, and emergency management.

On a biannual basis, representatives from each jurisdiction serving as the planning team will evaluate progress on implementing the plan's mitigation actions. The planning team will review departmental / agency findings, public input, and future development plans to evaluate the effectiveness and appropriateness of the plan.

In light of changing funding sources, hazard vulnerability, and local mitigation priorities, the planning team will identify changes to plan goals and priorities for their respective jurisdictions, and they will report their findings to the rest of the planning team. It will be the planning team's responsibility to identify relevant reasons for delay or obstacles to completing the plan's mitigation actions, along with recommended strategies to overcome any deficiencies.

Any significant change to the plan, including but not limited to changing mitigation actions, abandoning mitigation actions, or pursuing new mitigation actions, will require the County and participating jurisdictions to provide opportunities for the public to make its views and concerns known. Bee County and the participating jurisdictions will provide notice to the public through announcements in the most widely circulated local paper, the *Bee Picayune*, fliers posted at the county courthouse, city hall, and Coastal Bend College's public message boards, as well as on Bee County, City of Beeville, and Coastal Bend College websites.

5) Plan Monitoring

The Emergency Management Coordinator (EMC) will be responsible for the overall continued coordination and monitoring of the mitigation plan and the actions assigned for each hazard. The agency or department identified above in Table 4 shall serve as the responsible party for each respective jurisdiction. The plan monitoring worksheet outlined below will serve as the basis for revision of the plan.

At a minimum, the mitigation plan will be reviewed by the EMC and planning team representatives from each jurisdiction quarterly, during budget workshops, and as other plans are being developed or revised including: comprehensive plans, capital improvement project plans, and emergency plans.

To execute the monitoring requirement, the EMC will produce a plan monitoring worksheet to be completed by each jurisdiction's representative. The worksheet will identify and track the following for each mitigation action: the expected implementation schedule, setbacks or delays, changes to the local risk assessment, changes in jurisdictional capabilities, and current and future opportunities for integration with other local plans.

Regularly monitoring the plan implementation process in each participating jurisdiction will ensure that every component of the plan gets reviewed for potential amendments.

After adoption of this plan, it will be posted to each participating jurisdiction's website or Facebook page, and a printed copy will be available for review in the Office of Emergency

Management. The goal is to create the opportunity for constant and continued feedback from local officials, stakeholders, and the general public.

6) Plan Evaluation

Proper evaluation will measure the progress and effectiveness of the mitigation actions identified in the plan. On a bi-annual basis the Emergency Management Coordinator along with the planning team representatives from each jurisdiction will use the following criteria, along with additional metrics as necessary, to assess the effectiveness of the plan:

- Do the specified goals and objectives still address current and expected conditions?
- Has the nature, magnitude, and/or risk of any hazard changed?
- Have there been changes in land development that the plan needs to address?
- Are available resources suitable for implementing the plan?
- Is funding budgeted or available to successfully implement prioritized mitigation actions?
- Are there opportunities in the local budgeting process or local, state, and national grant funding cycles to increase funding to implement mitigation actions?

Other steps will include site visits to completed mitigation projects in each jurisdiction to measure and ensure their success. In the event that a mitigation project fails to meet its goal, the planning team will evaluate the causes of the shortcoming. The planning team will use their assessment to amend the project and related projects in other jurisdictions, allocate additional resources to achieve the desired outcome for the project and related projects in other jurisdictions, or replace the project and similar projects in other jurisdictions with better projects.

The EMC and planning team members will also work to implement any additional revisions required to ensure that the plan and their respective jurisdiction is in full compliance with federal regulations and state statutes.

7) Plan Update

The plan is designed to address a five-year period. In accordance with 44CFR Section 201.6, it will be updated every five years to maintain compliance with State and Federal regulations. However, at least every two years from the date of approval, and quarterly on the fifth and final year of the plan, the EMC and planning team representatives from each participating jurisdiction will thoroughly review any significant changes in their respective jurisdictions that might impact the plan update.

During the update process, planning team representatives will do the following for their respective jurisdictions: collect data on recent occurrences of each natural hazard identified in the plan, record how each natural hazard impacted their jurisdiction during the preceding years, determine whether or not implemented mitigation actions produced the desired outcomes in

their jurisdiction, and determine whether or not to modify their jurisdiction's list of hazards to be addressed in the update.

Additional considerations to address on a jurisdictional level include but are not limited to: changes is local development, changes in exposure to natural hazards, the development of new mitigation capabilities or techniques, and revisions to state or federal legislation.

The update process will provide continued opportunity for the public and elected officials to determine which actions succeeded, failed, or are no longer relevant. It is also an opportunity for each jurisdiction to identify recent losses due to natural hazards and to consider whether or not any of those losses could have been avoided.

3. Bee County and Participating Jurisdictions Profile

1) Location and Characteristics

Bee County is located within the Coastal Bend Region of Texas. Corpus Christi is the largest urban area in the region. Other large nearby urban areas include San Antonio and Laredo.

In contrast with the majority of the Coastal Bend Region which is located within the Gulf Prairies and Marshes ecoregion, Bee County is located in the South Texas Plains ecoregion. The area has an average annual rainfall of between 20 – 32 inches. Monthly rainfall is typically lowest during the winter months and highest during spring and fall.

Bee County is located in the San Antonio – Nueces River Basin. There are four watersheds in the County: Mission, Aransas, Atascosa, and Lower Nueces.

2) Population

Data from the 2010 Census and the 2010-2014 ACS survey provides estimated populations for the participating jurisdictions, including data related to vulnerable populations.

		Estimated Vulnerable Population Totals	
Jurisdiction	**Total Estimated Population[3]**	**Elderly (Over 65)[4]**	**Low Income (≤ $25,000)[5]**
Bee County	32,462	3,436	7,370
City of Beeville	13,102	1,545	4,137
Coastal Bend College	1,500[6]	N/A	N/A

3) Land Use

Most existing land use in Bee County can be classified as agricultural or open space. Major land development is limited to Beeville and the Census Designated Places in Bee County. Land use varies between each, but no land use is unique to any. The overall breakdown of land use in Beeville and the eight Census Designated Places is shown by type, number of acres, and percentage of total acres in Figure 1 below.

[3] Table B01003, 2010-2014 ACS
[4] Table DP-1, 2010 Census, used to estimate current 65+ population
[5] Table S1901, 2010-2014 ACS, used to estimate low-income population
[6] Estimate based on Costal Bend College Enrollment data available at: http://www.coastalbend.edu/uploadedFiles/CBC/Content/Institutional_Research/Common_Data_Sets/CBC%20at%20a%20Glance.pdf

Land Use by Type in Beeville and Bee County Census Designated Places

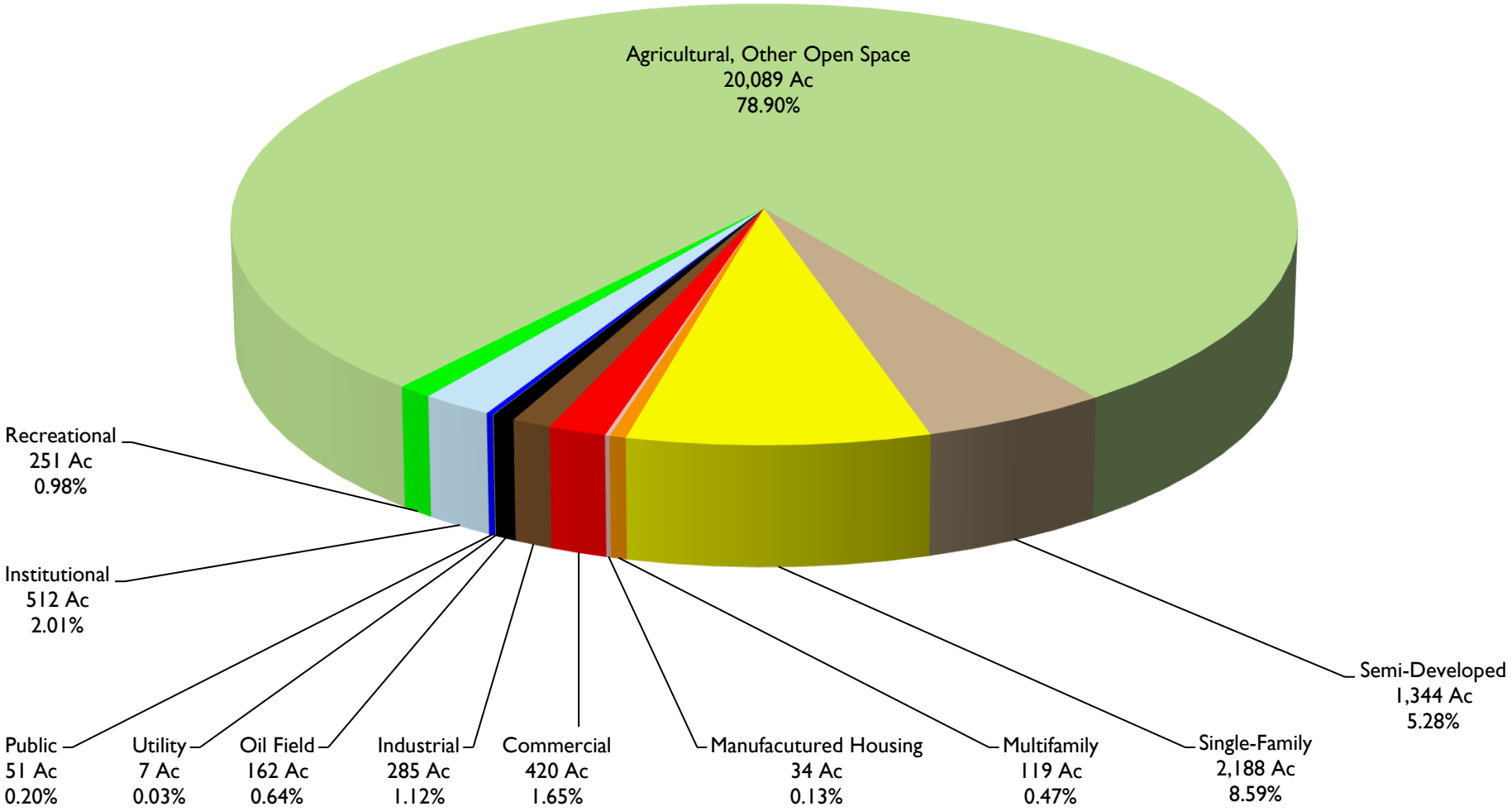

Figure 1: Land Use in Beeville and Bee County Census Designated Places

4) Economy

A) Largest Industries in Bee County

Tables 5 – 6 and list establishment, taxable sales, and employment data. The tables show that:

- Agriculture sustains the largest number of employment establishments in Bee County, followed by Retail Trade and the Accommodation and Food Service industries.

Table 5: Primary Bee County Establishments[7]

Industry	# Establishments County
Agriculture Operations	696
Retail Trade	280
Accommodation and Food Services	89
Other Services (except Public Administration)	88

Table 6: Primary City of Beeville Establishments

Industry	# Establishments City
Agriculture Operations	-
Construction	27
Retail Trade	156
Accommodation and Food Services	68

- According to the Texas Workforce Commission, average weekly wages in Bee County in the third quarter of 2015 were lower than average weekly wages in the Coastal Bend Workforce Development Area and the State.

[7] Source: Texas State Comptroller. Note: Comptroller does not collect information for establishments not subject to sales taxes; therefore, some financial institutions, franchise establishments, and similar organizations are not included; Comptroller also undercounts agriculture operations, so those are sourced from the most recent USDA data (http://quickstats.nass.usda.gov)

Table 7: 2nd Quarter 2016 Average Weekly Wages

	Bee County	Coastal Bend WDA	Texas
Average Weekly Wage (all industries)	$677	$812	$1,010

Source: Texas Workforce Commission, Tracer quarterly employment and wages

4. Determining Risk

1) Risk Assessment

Throughout the plan, each hazard addressed will be considered in light of its history, likelihood of future occurrence, extent, jurisdictional vulnerability, location and impact.

Likelihood of Future Occurrence is measured based on a hazard's expected frequency of occurrence in light of its previous frequency. Each hazard's likelihood of occurrence will be considered using the following standardized parameters:

- **Highly likely** – event probable in the next year
- **Likely** – event probable in the next three years
- **Occasional** – event possible in the next five years
- **Unlikely** – event possible in the next 10 years

Given this plan's five-year duration, hazards likely to occur during that period will be given priority when selecting and prioritizing mitigation actions.

2) Distribution of Property by Type and Market Value

Table 8: Estimated Potential Damage Values in Bee County[8]

PTAD classification	Property type	Parcel count	Potential Damage Value
A	Single Family Homes	6,967	$471,145,820
B	Multi Family Homes	79	$19,743,500
C	Vacant Land	2,759	$21,141,090
D1	Qualified Open Space "Ag" Land	5,531	$47,625,750
D2	Non-Qualified "Ag" Land	875	$19,641,050
E	Farm/Ranch Improvements	1,817	$152,498,730
F1	Commercial Real Property	696	$107,063,770
F2	Industrial Real Property	16	$339,135,280
G	Oil/Gas/Minerals	9,185	$184,064,790
J	Utilities	545	$261,396,320
L1	Commercial Personal Property	756	$54,304,500
L2	Industrial Personal Property	310	$173,490,780
M1	Mobile Homes	683	$7,862,290
S	Dealer's Special Inventory	10	$7,969,660
X	Exempt Property	2,471	$79,074,540
TOTAL		**32,700**	**$1,946,157,870**

[8] Property values based on Bee County Central Appraisal District's 2015 Annual Report, page 7. http://www.beecad.org/Posted/2015%20Annual%20Report.pdf

Table 9: Estimated Potential Damage Values in Bee County[9]

	Bee County		City of Beeville		Coastal Bend College	
Building Type	Count	Potential Damage Value	Count	Potential Damage Value	Count	Potential Damage Value
Residential	11,337	$1,124,708,000	5,848[10]	$580,169,536[11]	5	$6,743,450[12]
Commercial	482	$171,063,000	195[13]	$69,042,801.61[14]	-	-
Industrial	109	$43,074,000	44	$17,385,113.30	-	-
Agricultural	43	$5,865,000	17	$2,367,174.85	-	-
Religious	51	$25,017,000	21	$10,097,120.76	-	-
Governmental	35	$20,935,000	14	$8,449,583.20	-	-
Educational	20	$43,906,000	8	$17,720,917.13	30	$40,460,699
Total	**12,077**	**$1,434,568,000**	**6,147**	**$705,232,247**	**35**	**$47,204,149**

[9] Property values based on Bee County 2013 CHAMPS Report.
[10] Estimated count based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[11] Estimated value based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[12] Estimated as a percentage of total property value.
[13] Estimated count based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.
[14] Estimated value based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.

3) Distribution of Vulnerable Populations

For planning purposes, the vulnerable populations of each jurisdiction were broken down into two or three categories: young residents, elderly residents, and low income residents. Residents falling into these categories were deemed most likely to suffer disproportionate losses due to natural hazards because of their potentially limited means to prepare for and recover from a hazard event.

Table 10: Vulnerable Populations by Jurisdiction

Jurisdiction	Estimated Vulnerable Population Totals		
	Young[15]	Elderly[16]	Low Income (≤ $25,000 Annually)[17]
Bee County	5,803	3,436	7,370
City of Beeville	2,927	1,545	4,137
Coastal Bend College	N/A	N/A	N/A

In addition to identifying vulnerable population categories, the planning team worked to identify specific locations that are likely home to high concentrations of vulnerable residents.

The Housing Authority of the City of Beeville owns and manages 194 low-rent public housing units and administers up to 230 housing choice vouchers. The Housing Authority also has 76 U.S. Department of Agriculture-funded rural housing units. According to U.S. Department of Agriculture data, there are three multifamily housing facilities receiving USDA tax credits for 168 low-income units. These facilities are spread throughout the City of Beeville. Residents of low-income housing and/or subsidized housing facilities are expected to suffer disproportionate losses due to natural hazards because of their potentially limited means to prepare for and recover from a hazard event.

The participating jurisdictions have used housing type and housing conditions to identify additional vulnerable areas and concentrations of vulnerable residents.

In particular, the jurisdictions have identified areas with large numbers of mobile/manufactured housing as being disproportionately vulnerable to certain hazards including but not limited to: hurricanes and tropical storms, tornados, droughts, earthquakes, and windstorms.

Mobile and manufactured homes can be found throughout Bee County. However, Blue Berry Hill is home to a higher concentration of mobile homes than other parts of the county. Hill Top

[15] Table S1401, 2010-2014 ACS, nursery school through high school totals.
[16] Table DP-1, 2010 Census, used to estimate current 65+ population
[17] Table S1901, 2010-2014 ACS

Ranch, a mobile / manufactured home community, is located in Bee County along US 181 just north of Beeville.

There are at least three distinct mobile home communities in Beeville located south of US 59 between US BUS 181 and S. Tyler St.

The northernmost mobile / manufactured home community is bounded by Crockett St. to the north and Roberts St. to the south. It's bounded by Adams St. to the west and Tyler St. to the east.

The largest mobile / manufactured home community, Tyler Place, is located south of Dolan St. and between Adams St. to the west and Tyler St. to the east.

The southernmost and smallest mobile / manufactured home community is located just north of Catherine St. and bounded by Buchanan St. to the west and Oak Dr. to the east.

In addition to the mobile / manufactured home communities, Beeville is also home to a number of RV parks. These parks' populations fluctuate on a seasonal basis. Due to the express portability of RVs, the majority of these structures are expected to evacuate ahead of hazard events with significant warning times like hurricanes and tropical storms. However, RVs probably won't have time to evacuate ahead of less predictable hazard events like tornados. The single largest RV park, Archer Park, is located on a private road accessible from Archer St. between Kennedy St. and Clare St.

The jurisdictions have determined that homes in sub-standard condition may indicate that residents are low-income or otherwise means-limited and thus more vulnerable to certain hazards.

To be considered standard condition, a home must show few or no minor visible exterior defects such as:

- cracked, peeling, or missing paint
- cracked, sagging, rotting, or missing siding, steps, porch planks, or other wooden surfaces
- cracked or broken window panes
- cracked masonry, brick, or mortar surfaces
- missing or damaged roof shingles
- small rust spots on mobile homes

The home must generally meet building codes, and there can't be any detriment to health and safety present.

Structures in sub-standard condition may provide less protection to residents during certain hazard events like tropical storms, tornados, or hurricanes. Furthermore, because they're

already in a state of disrepair, additional damages due to hazard events may compound existing ones and potentially make these homes uninhabitable.

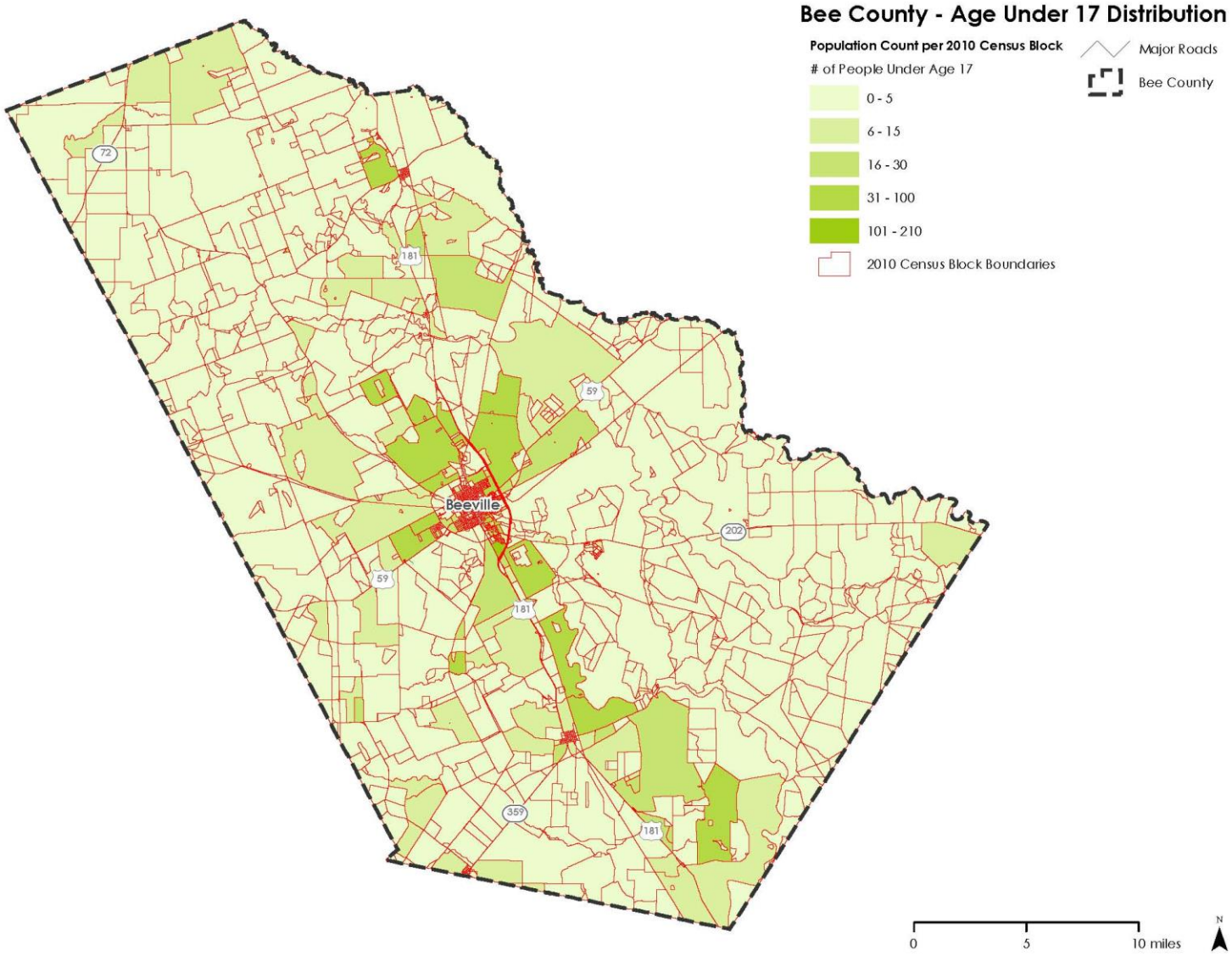

Figure 2: Bee County Age Distribution by Census Blockgroup, Under 17

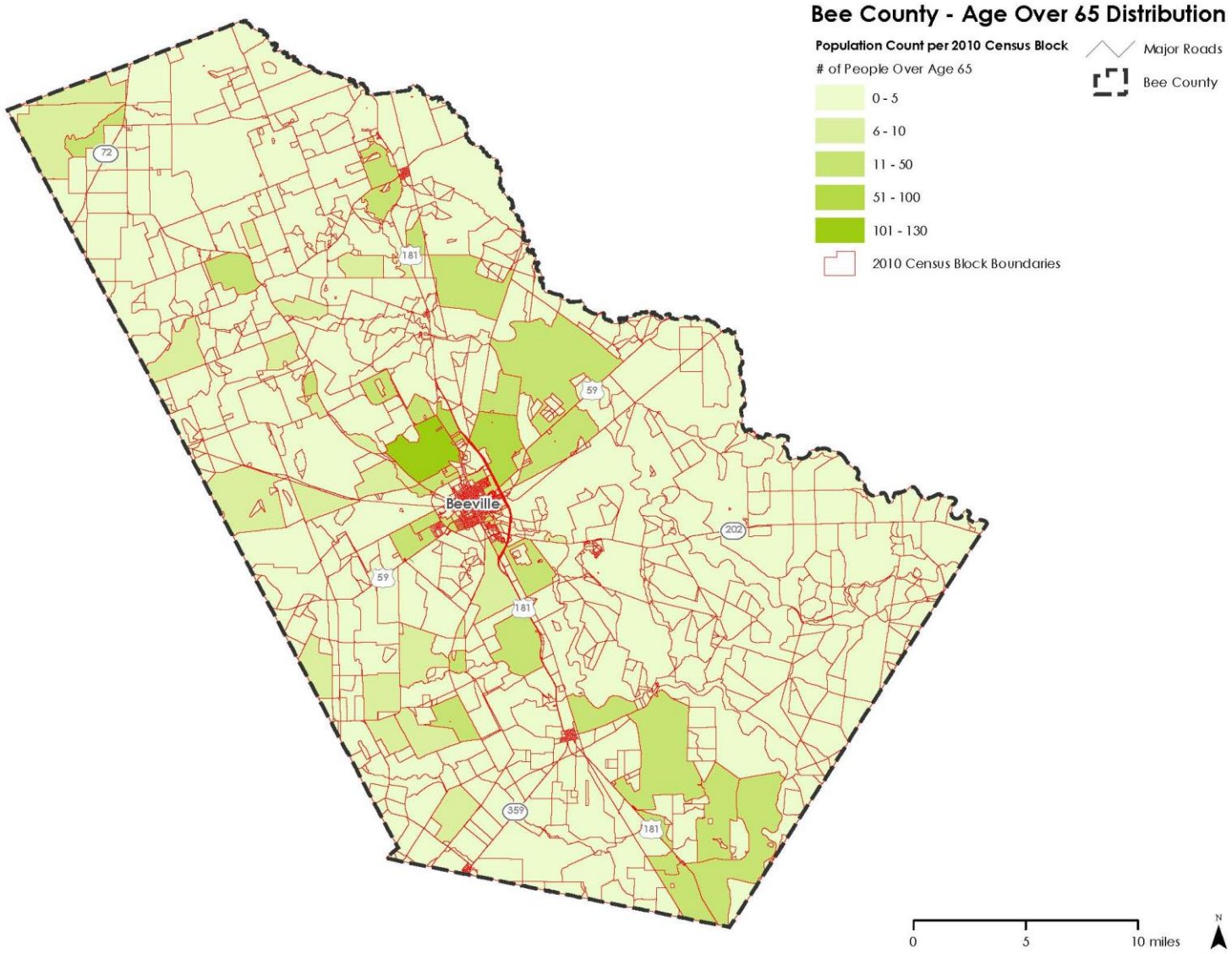

Figure 3: Bee County Age Distribution by Census Block Group, 65+

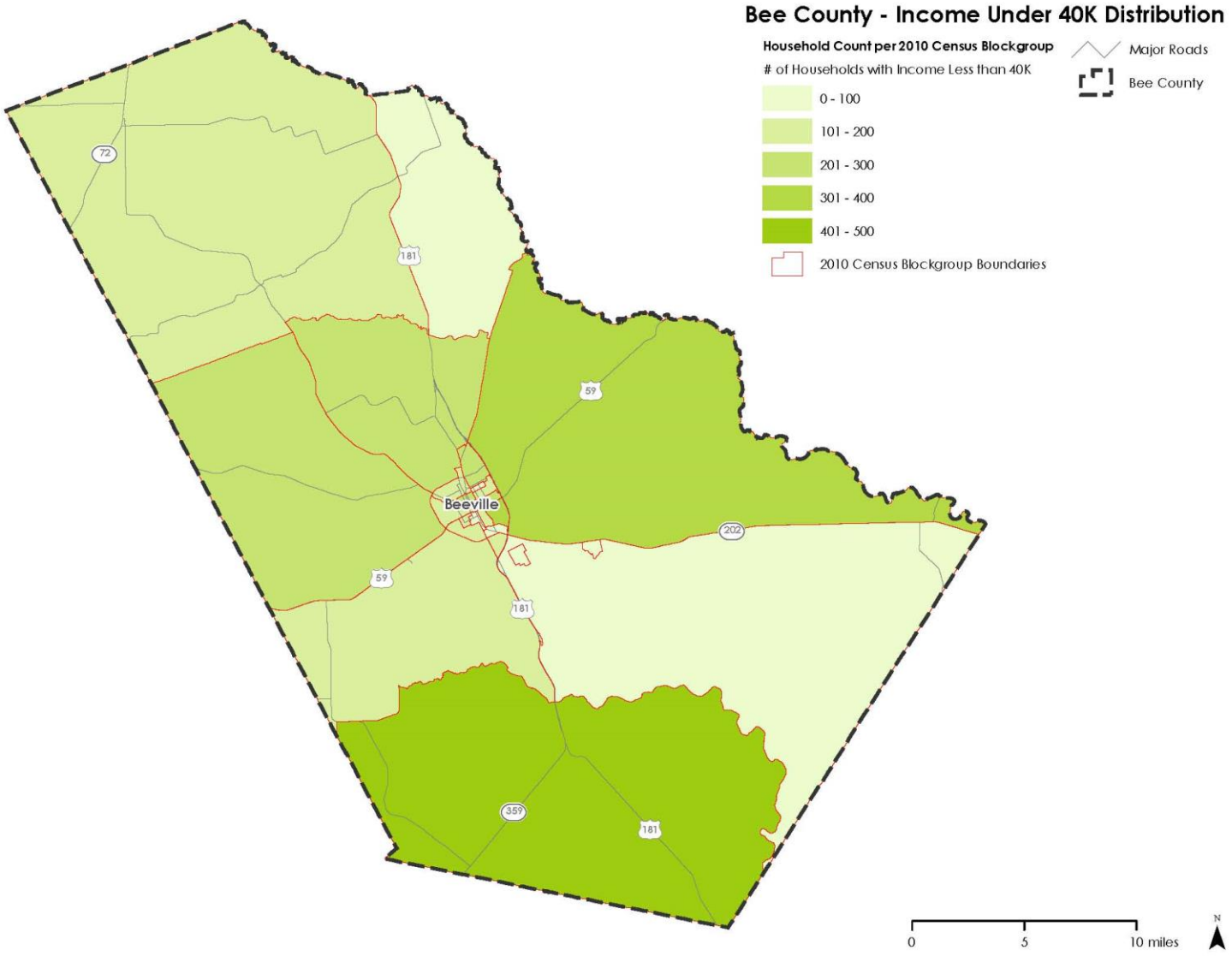

Figure 4: Bee County Income Distribution by Census Blockgroup

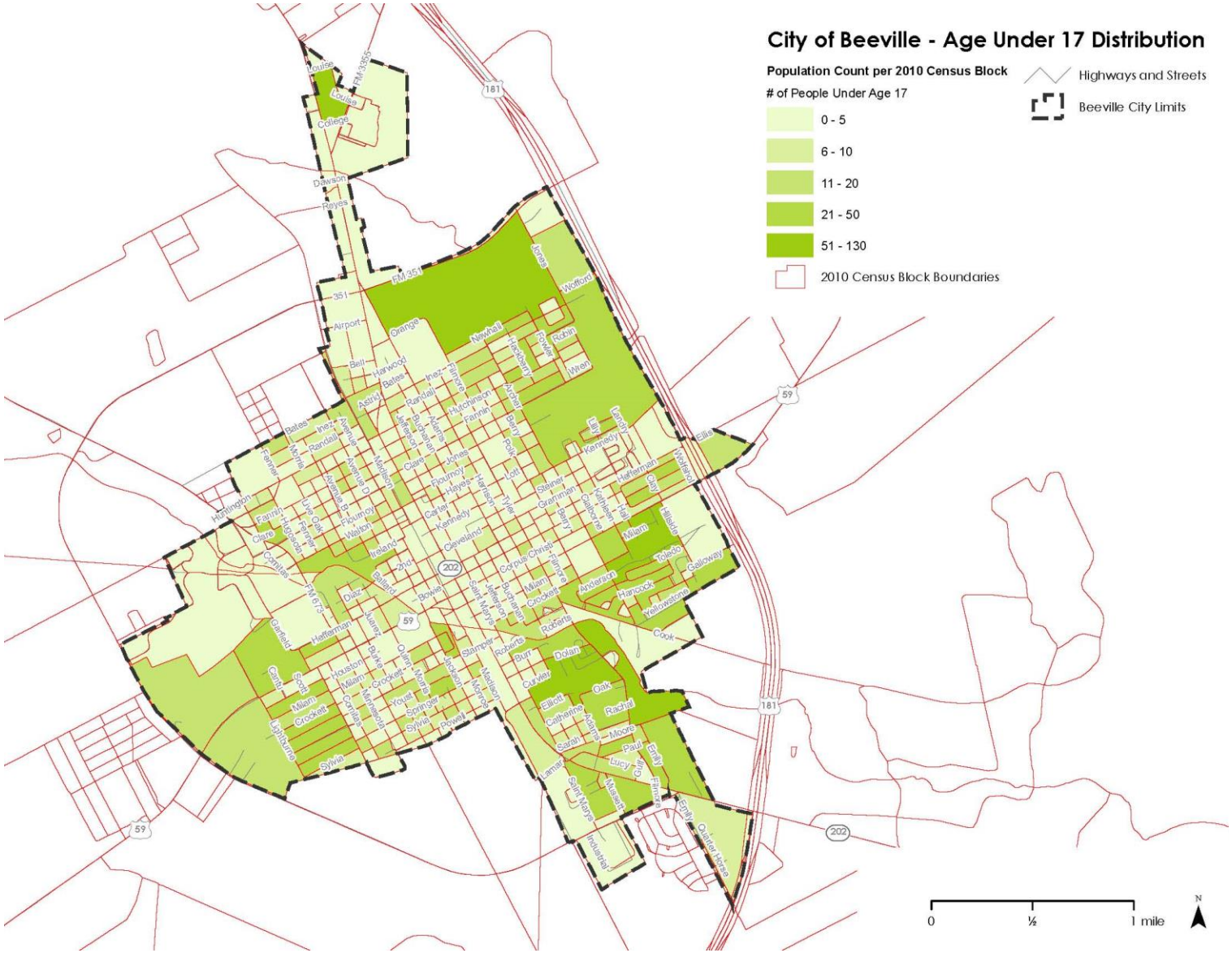

Figure 5: City of Beeville Age Distribution by Census Blockgroup, Under 17

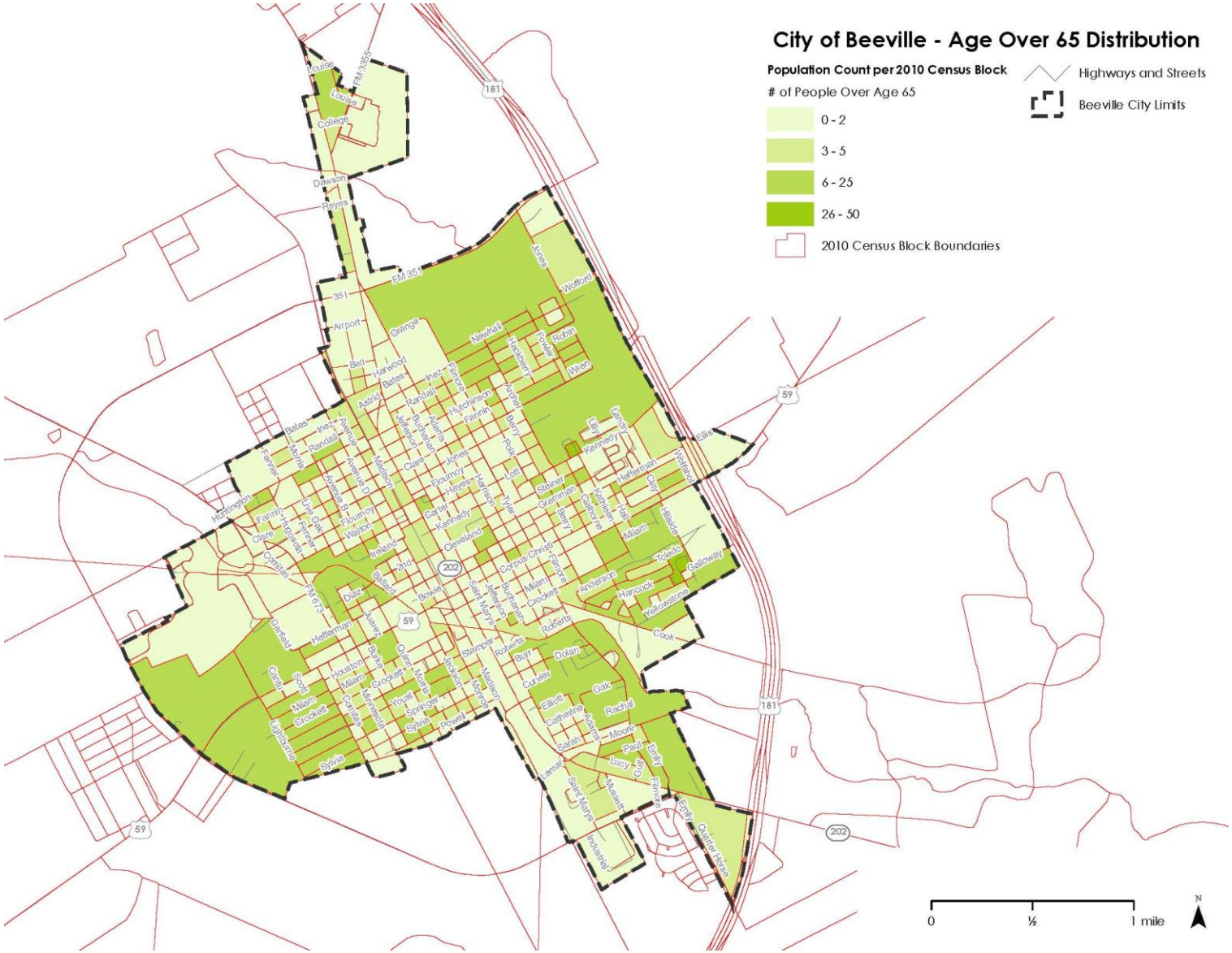

Figure 6: City of Beeville Age Distribution by Census Block Group, 65+

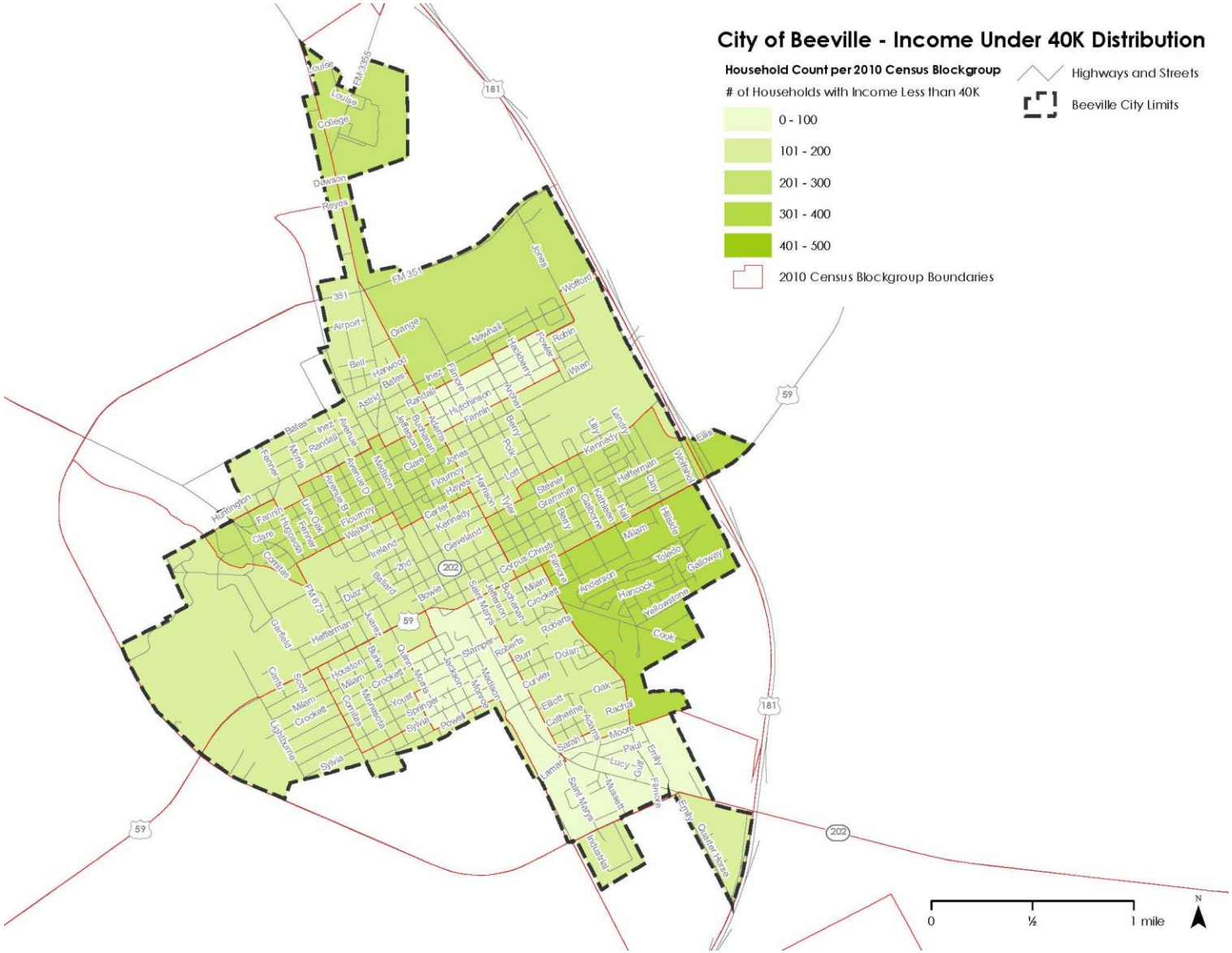

Figure 7: City of Beeville Income Distribution by Census Blockgroup

5. Flood – Coastal Bend College Only

According to the Texas State Hazard Mitigation Plan, Floods are defined as:

> [T]he accumulation of water within a water body and the overflow of excess water into adjacent floodplain lands.
>
> In hydrologic analysis, runoff is that portion of rainfall which, in combination with other factors, contributes to the stream flow of any surface drainage way. When runoff exceeds the carrying capacity of the stream or drainage, flooding occurs. Runoff is a product of two major groups of factors, climate and physiographic. Climatic factors may include precipitation, evaporation, transpiration and interception. Physiographic factors would include the characteristics of the watershed such as size, shape and slope of the basin's drainage area, the general land use within the basin. Average annual runoff decreases unevenly moving east to west across Texas, the localized variations based on these factors listed above.
>
> When surface water runoff enters into streams, rivers, or dry creek beds, riverine flooding conditions occur whenever the water carrying capacity of the water channel is compromised by excess runoff.
>
> If the local basin drainage area is relatively flat, shallow, slow-moving floodwater can last for days. In drainage areas with substantial slope, or the channel is narrow and confined, rapidly moving and extreme high water conditions, called a flash flood, can occur.

1) Flood History

Coastal Bend College is known to flood, but there is no officially recorded flood history. However, there were 14 flood events in the City of Beeville during the last 20 years. The most recently reported flood was in 2012. Every flooding event in Beeville was due to flash flooding. The frequency and type of flood events experienced on the Coastal Bend College campus are expected to be similar to those experienced in the City of Beeville. There haven't been any flood-related injuries or deaths on the campus.

National Flood Insurance Program

The National Flood Insurance Program (NFIP) is administered by FEMA to provide flood insurance coverage to then nation.

A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling ten-year period, since 1978. There are no repetitive loss structures at Coastal Bend College.

A severe repetitive loss property is: "a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding $5,000 and with cumulative amount of such claims payments exceeding $20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property. There are no severe repetitive loss properties at Coastal Bend College.

Coastal Bend College is located within the City of Beeville's city limits. Beeville has adopted and enforces a flood damage prevention ordinance that requires building permits and approval of the floodplain administrator before new construction or substantial improvements can begin on any structure located within FEMA special flood hazard areas. At this time, the ordinance doesn't require mandatory freeboard above the base flood elevation.

2) Likelihood of Future Occurrence

Probability is a measure of the likelihood a hazard event will occur in a given year. Typically, events with less than a 1% probability of occurrence in the next year or a recurrence interval of greater than every 100 years are classified as unlikely. Events with a 1% to 10% probability of occurrence in the next year or a recurrence interval of 11 to 100 years are classified as occasional. Events with a 10% to 90% probability of occurrence in the next year or a recurrence interval of 1 to 10 years are classified as likely. Events with a 90% to 100% probability of occurrence in the next year or a recurrence interval of less than1 year are classified as highly likely.

In the case of the FEMA 100-year flood, there's a 1% chance of an event in the next year, and for the 500-year flood, it's a 0.02% chance of an event in the next year. The probability of a 100-year flood event on the Coastal Bend College campus is therefore occasional. The probability of a 500-year flood event on the Coastal Bend College is therefore unlikely.

3) Extent

Extent is the strength or magnitude of a hazard. The magnitude of a flood event is typically designated by its return period. For this analysis, the primary focus is the FEMA 100-year floodplain because it's the standard used by the NFIP.

The FEMA 100-year floodplain designates areas on the Coastal Bend College that have a 1% chance of a flood event with a magnitude expected to be equaled or exceeded once on average during any 100-year period. However, despite the name and its significance, areas within the FEMA 100-year floodplain may flood more or less frequently over any given time period.

The FEMA 500-year floodplain designates areas that have a 0.02% chance of a flood event with a magnitude expected to be equaled or exceeded once on average during any 500-year period.

Like the FEMA 100-year floodplain, areas within the FEMA 500-year floodplain may flood more or less frequently over any given time period.

The flood extent at Coastal Bend College is expected to be similar to the extent in the City of Beeville. In the City of Beeville, the worst floods have caused street closures, required rescues for stranded drivers, and inflicted physical damages. Floodwater in the City has been as deep as 24".

The extent of future flood events at Coastal Bend College may meet or exceed previous worst-case city flood depths of 24" and may inflict damages to physical infrastructure, cause injuries or even fatalities.

4) Location and Impact

A) Location

As shown in Figure 8, the FEMA Designated Floodway passes through the southwestern corner of the Coastal Bend College Campus.

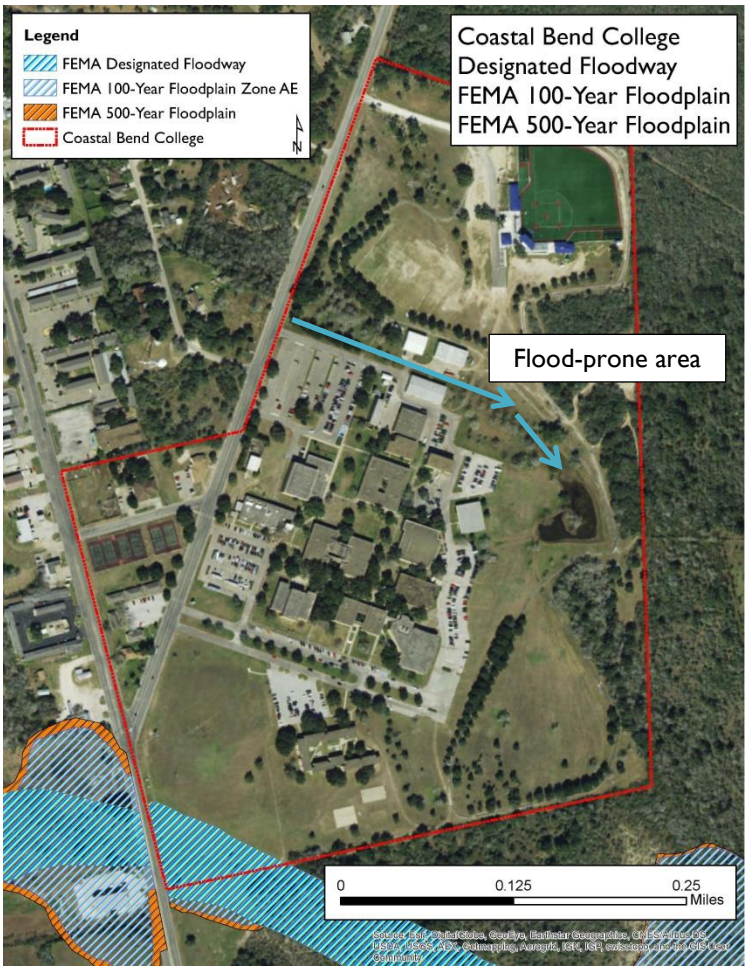

Figure 8: Coastal Bend College FEMA Special Flood Hazard Areas

B) Impact

Although none of Costal Bend College's facilities are located in a FEMA special flood hazard area, flooding does occur on campus. Previous flood events have inflicted minimal damages.

However, the hazard has the potential to flood structures, cause damages due to floodborne contaminants, cause damages due to debris flow, or even completely wash away structures.

Occupants of flooded structures may require rescue or aid during and after a flood event.

5) Vulnerability

Despite the fact that none of Coastal Bend College's infrastructure is located in a FEMA special flood hazard area, there is a flood-prone area on the north side of campus. The area, depicted in Figure 8 by the two blue arrows, is naturally low-lying. Located between Multipurpose Buildings A and B and Multipurpose Building C, the area often floods when it rains. Flooding at Coastal Bend College affects scheduled courses and pedestrians' ability to walk across the campus. During heavy flooding, the ability to evacuate the campus could be limited.

Previous flood events have inflicted minimal structural damages. Given the fact that all of the College's infrastructure is located outside of a FEMA special flood hazard area, future structural damages are also expected to be minimal.

6. Hurricanes / Tropical Storms

Once a tropical depression has intensified to the point where its maximum sustained winds are between 35-64 knots (39 – 73 mph), it becomes a tropical storm. At these wind speeds the storm becomes more organized and begins to become more circular in shape – resembling a hurricane. The rotation of a tropical storm is more recognizable than for a tropical depression. Tropical storms can cause many problems without becoming a hurricane. However, most of the problems a tropical storm causes stem from heavy rainfall and high winds.

According to National Oceanic and Atmospheric Administration (NOAA), a hurricane is an intense tropical weather system of strong thunderstorms with a well-defined surface circulation and maximum sustained winds of 74 mph or higher. Hurricanes are categorized according to the strength of their winds using the Saffir-Simpson Hurricane Scale. A Category 1 storm has the lowest wind speeds, while a Category 5 hurricane has the highest.

1) Hurricanes / Tropical Storms History

According to data from NOAA's National Weather Service Weather Forecast Office in Corpus Christi, Bee County's 2013 CHAMPS Report, local news reports, and data from the National Climatic Data Center, the following hurricanes and tropical storms affected Bee County and all participating jurisdictions:

Table 11: Historical Hurricanes & Tropical Storms that affected Bee County and the Participating Jurisdictions

Hurricane & Tropical Storm Events	Date	Hurricane Category[18]	Maximum Wind Speed[19]	Local Fatalities	Local Injuries	Local Rainfall Inches	Local Property Damage	Local Crop Damage	Local Property Damage $2016	Local Crop Damage $2016
Hurricane Carla[20]	9/11/1961	5	175 MPH	0	4	3"-5"	$493,295	$493,295	$3,973,632	$3,973,632
Hurricane Cindy[21]	9/16/1963	1	80 MPH	0	0	N/A	$124,949	$12,495	$983,474	$98,347
Hurricane Beulah[22]	9/20/1967	5	160 MPH	5[23]	1	27"	$2,213,738	$1,106,869	$15,963,633	$7,981,820
Hurricane Beulah	9/18/1967	5	160 MPH	0	1	27"	$727,371	$72,737	$5,245,194	$524,519
Hurricane Celia[24]	8/3/1970	3	130 MPH	0	6	N/A	$648,551	$66,608	$4,025,916	$413,472
Hurricane Fern[25]	9/9/1971	1	90 MPH	0	0	10"-26"	$76,169	$76,169	$452,977	$452,977
Hurricane Edith[26]	9/12/1971	5	160 MPH	0	0	1"	$855	$855	$5,086	$5,086
Hurricane Allen[27]	8/9/1980	5	190 MPH	0	0	7"-10"	$5,371,806	$537,181	$15,701,646	$1,570,165
Hurricane Gilbert[28]	9/16/1988	5	185 MPH	0	0	1"	$89,455	$895	$182,125	$1,821

[18] Hurricane Category at strongest point. However, given varying hurricane paths and rates of strength loss, these categories may not reflect the strength of the storm that affected Bee County and the participating jurisdictions.
[19] Wind speed highest point. However, given varying hurricane paths and rates of strength loss, these speeds may not reflect the speed of the winds that affected Bee County and the participating jurisdictions.
[20] http://www.wpc.ncep.noaa.gov/tropical/rain/carla1961.html
[21] http://www.wpc.ncep.noaa.gov/tropical/rain/cindy1963.html
[22] http://www.wpc.ncep.noaa.gov/tropical/rain/beulah1967.html
[23] https://www.twdb.texas.gov/publications/reports/numbered_reports/doc/R83/R83.pdf → See p. 27
[24] http://www.wpc.ncep.noaa.gov/tropical/rain/celia1970.html
[25] http://www.wpc.ncep.noaa.gov/tropical/rain/fern1971.html
[26] http://www.wpc.ncep.noaa.gov/tropical/rain/edith1971.html
[27] http://www.wpc.ncep.noaa.gov/tropical/rain/allen1980.html
[28] http://www.wpc.ncep.noaa.gov/tropical/rain/gilbert1988.html

Hurricane Claudette[29]	7/15/2003	1	90 MPH	0	0	5"	$5,731,813	$0	$7,530,138[30]	$0
Tropical Storm Hermine[31]	9/7/2010	N/A	70 MPH	0	0	3"	$24,931	$0	$27,537	$0

NOAA Report
CHAMPS Report
Reported by Both

Damages, injuries, and fatality data for these storms was not broken down beyond the county level.

The City of Beeville is generally known to have incurred most of the damage dollars for each storm. However, certain areas in unincorporated Bee County, Pettus in particular, are known to have incurred significant damage dollars, especially during Hurricane Beulah. Pettus is also the only area known to have sustained fatalities during a tropical storm or hurricane. Five people died there during Hurricane Beulah.

No tropical storm or hurricane data for Coastal Bend College has been recorded. However, given its location within the City of Beeville, it's likely that any storm causing damages in the City of Beeville will also affect Coastal Bend College's facilities.

No hurricane or tropical storm has affected any of the participating jurisdictions since 2010.

[29] http://mysoutex.com/bookmark/282221-First-hurricane-to-hit-Bee-County-area-in-four-years-dumps-rain-blows-some-but-causes-little-damage

[30] Value estimate based on 2010-2014 ACS Table B25077 – Median Home Value of $72,300. Roughly 10% of all homes damaged by wind during Hurricane Claudette were severely damaged. The 300 wind-damaged homes referenced in Footnote 30 were divided into 30 severely damaged with estimated damages equivalent to 70% of previous value. The remaining 270 were estimated to have experienced damages equal to 30% of previous value. Total value adjusted to $2016.

[31] http://www.wpc.ncep.noaa.gov/winter_storm_summaries/event_reviews/2010/Hermine2010.pdf

2) Likelihood of Future Occurrence

Hurricanes occur in seasonal patterns between June 1 and November 30. Based on the historical frequency of hurricane events in Bee County and the participating jurisdictions outlined above, the likelihood of a future event affecting any of the participating jurisdictions is unlikely, that is a hurricane is possible in the next ten years.

3) Extent

The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure, and storm surge potential. Wind, pressure, and surge are combined to estimate potential damage. Categories 3, 4 and 5 are classified as "major" hurricanes. Major hurricanes comprise only 20 percent of total tropical cyclone landfalls but they account for over 70 percent of the damage in the United States. Damage from hurricanes can result from spawned tornados, coastal flooding from storm surge, and inland flooding from heavy rainfall.

Table 12: Saffir-Simpson Scale

Category	Maximum Sustained Wind Speed (MPH)	Minimum Surface Pressure (Millibars)	Storm Surge (Feet)
1	74-95	Greater than 980	3-5
2	96-110	979-965	6-8
3	111-130	964-945	9-12
4	131-155	944-920	13-18
5	155+	Less than 920	19+

Storm surge occurs when a storm's winds push sea water toward the shore. The advancing surge combines with normal tides to create a hurricane storm tide, raising the average water level 15 feet or more.

Based on the NOAA Coastal Flood Exposure Mapper's storm surge scenarios for each hurricane category, Bee County and the participating jurisdictions are unlikely to experience storm surge impacts, even during a Category 5 event.

The worst hurricanes known to have affected Bee County and the participating jurisdictions have been as intense as Category 5 with sustained wind gusts exceeding 155 MPH. Rainfall totals have reached 27" and caused flood depths of up to 5'. Previous hurricanes and tropical storms have inflicted the inflation adjusted equivalent of over $15 million in property damages and over $7 million in crop damages. Previous hurricanes have injured up to 6 people. The deadliest hurricane in Bee County caused five deaths.

Future hurricanes affecting the participating jurisdictions may meet or exceed previous worst-case Category 5 events in terms of hurricane strength, damage inflicted, flooding, injuries, and even death.

4) Location and Impact

A) Location

Location is often referred to in terms of Tier I, II, and III counties, designated by the Texas State Office of Risk Management[32] for property insurance purposes, to represent differing levels of loss exposure to coastal counties and adjacent counties. Tier I counties are those adjacent to the Gulf of Mexico and Tier II counties are those typically adjacent to Tier I counties. Tier III counties are typically those adjacent to Tier II counties. Bee County is a Tier II county.

As a Tier 11 county, all of Bee County and its participating jurisdictions are in direct threat of tropical storms and hurricanes, including associated flooding and high winds. The effects of tropical storms and hurricanes begin to diminish as they move inland. However, the winds alone from Hurricane Ike reached as far as 120 miles from the eye of the storm. Tropical storms and hurricanes vary tremendously in terms of size, location, intensity and duration

B) Impact

Impacts from a tropical Storm or hurricane in Bee County and the participating jurisdictions may include but are not limited to: loss of power due to downed lines caused by flying debris or fallen trees, flooding, flooding due to damaged or destroyed roofs, damaged or broken windows, damage due to flying debris, wind damage, escaped livestock and pets, injured or killed livestock and pets, crop damage or destruction. In the worst storms, residents may be injured or even killed.

5) Vulnerability

A) Population

As described in the narrative, as well as Table 10 and Figures 2-7, in Section 3 of Chapter 4 above, Bee County and the participating jurisdictions are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The participating jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a hurricane or tropical storm.

Residents of mobile / manufactured housing are of particular concern. These structures are never considered safe during a hurricane, and depending on tie-down methods, may also be unsafe during strong tropical storms.

[32] https://www.sorm.state.tx.us/insurance-services/statewide-property-insurance-program

Residents of sub-standard structures are also of particular concern. Structures in sub-standard condition ahead of a tropical storm or hurricane, whether due to structural damages, missing windows or doors, holes in exterior walls or the roof, may be less safe during a hurricane or tropical storm than structures in standard condition. Existing structural weaknesses may mean increased damages, injuries, or loss of life.

B) Infrastructure – United States Highway 181

United States Highway 181is a TxDOT-designated major hurricane evacuation route for Corpus Christi. The distance between the southernmost and northernmost points of US 181 in Bee County is roughly 43 miles. The highway passes along the eastern border of the City of Beeville. It does not pass through Coastal Bend College.

As identified in the Bee County Flood Mitigation Plan, US 181 is known to flood in various areas during heavy rainfall. Previous flood depths have reached up to 24" in southern Bee County between Skidmore and Papalote and in northern Bee County between Pettus and Tulsita.

Flooding during a hurricane evacuation could strand motorists trying to escape the storm. These drivers may need to be rescued, and could be injured or killed.

C) Critical Facilities

The planning team identified 70 critical facilities spread across Bee County and participating jurisdictions. Because of Bee County's status as a Tier 11 County, all critical facilities, no matter their jurisdictional location, are equally vulnerable to a hurricane / tropical storm event. The following critical facilities and infrastructure in each jurisdiction are expected to play particularly important roles in a hurricane or tropical storm recovery process.

Table 13: Bee County Critical Facilities Vulnerable to Hurricanes and Tropical Storms

Bee County	Building Type	Potential Hurricane / Tropical Storm Impacts									
		Loss of Power	Flying Debris	Falling Trees	Flooding	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
Bee County Expo Center	Government Facility	x	x			x	x	x	x	x	x
Blanconia VFD	Emergency Services	x	x	x		x	x	x	x	x	x
Medio Creek Bridge (Normanna Bridge)	Government Facility		x	x	x				x		
Normanna Post Office	Post Office	x	x	x		x	x	x	x	x	x
Pawnee Elementary / Pawnee Junior High School	School	x	x	x		x	x	x	x	x	x
Pawnee Post Office	Post Office	x	x	x		x	x	x	x	x	x
Pawnee VFD	Emergency Services	x	x			x	x	x	x	x	x
Pettus - Tuleta VFD	Emergency Services	x	x	x		x	x	x	x	x	x
Pettus Elementary School	School	x	x	x	x	x	x	x	x	x	x
Pettus High School	School	x	x	x		x	x	x	x	x	x
Pettus Post Office	Post Office	x	x		x	x	x	x	x	x	x
Pettus Station (Electricity)	Electrical Facility	x	x						x	x	x
Skidmore Post Office	Post Office	x	x	x		x	x	x	x	x	x
Skidmore Station (Electricity)	Electrical Facility	x	x						x	x	x
Skidmore VFD	Emergency Services	x	x	x		x	x	x	x	x	x
Skidmore Water Supply Corp.	Water System Facility	x	x	x		x	x	x	x	x	x
Skidmore-Tynan Elementary / Junior High School / High School	School	x	x	x		x	x	x	x	x	x
Clem and Bettie Stoltzfus Community Center	Cultural Institution	x	x	x		x	x	x	x	x	x
Tuleta Post Office	Post Office	x	x	x		x	x	x	x	x	x
Tynan Post Office	Post Office	x	x	x		x	x	x	x	x	x
Tynan VFD	Emergency Services	x	x	x		x	x	x	x	x	x
Tynan Water Supply Corp.	Water System Facility	x	x	x		x	x	x	x	x	x

Structures on the National Register of Historic Places

Table 14: City of Beeville Critical Facilities Vulnerable to Hurricanes and Tropical Storms

City of Beeville	Building Type	Potential Hurricane / Tropical Storm Impacts									
		Loss of Power	Flying Debris	Falling Trees	Flooding	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
A.C. Jones High School	School	x	x	x		x	x	x	x	x	x
Bee County Courthouse	Government Facility	x	x	x		x	x	x	x	x	x
Bee County Library (Praeger Building)	Cultural Institution	x	x	x		x	x	x	x	x	x
Bee County Sheriff	Emergency Services	x	x	x		x	x	x	x	x	x
Bee County Tax Assessor Building	Government Facility	x	x	x		x	x	x	x	x	x
Beeville Art Museum	Cultural Institution	x	x	x		x	x	x	x	x	x
Beeville City Hall	Government Facility	x	x	x		x	x	x	x	x	x
Beeville Community Center	Cultural Institution	x	x	x		x	x	x	x	x	x
Beeville First National Bank	Commercial Facility	x	x	x		x	x	x	x	x	x
Beeville Municipal Airport	Government Facility	x	x	x		x	x	x	x	x	x
Beeville Police Department	Emergency Services	x	x	x		x	x	x	x	x	x
Beeville Post Office	Post Office	x	x	x		x	x	x	x	x	x
Beeville Station (Electricity)	Electrical Facility	x	x	x		x	x	x	x	x	x
Beeville Utility Department / Water System Facility	Water System Facility	x	x	x		x	x	x	x	x	x
Beeville Wastewater Treatment Plant	Wastewater System Facility	x	x	x	x	x	x	x	x	x	x
Beeville Water System Elevated Water Storage Tank	Water System Facility		x	x					x		
Beeville Water System Elevated Water Storage Tank	Water System Facility		x	x					x		
Beeville Water System Elevated Water Storage Tank	Water System Facility		x	x					x		
Beeville Water System Facility	Water System Facility	x	x	x		x	x	x	x	x	x
Beeville Water System Facility	Water System Facility	x	x	x	x	x	x	x	x	x	x
C. M. Smitty Smith Central Fire Station	Emergency Services	x	x	x		x	x	x	x	x	x
Chase Field	Government Facility	x	x	x		x	x	x	x	x	x
Christus Spohn Hospital Beeville	Medical Services Facility	x	x	x		x	x	x	x	x	x
Coastal Plains Community Center	Cultural Institution	x	x	x		x	x	x	x	x	x
Faden-McKeown-Chambliss Elementary School	School	x	x	x		x	x	x	x	x	x

Hampton-Moreno-Dugat Early Childhood Center	School	x	x	x		x	x	x	x	x	x
H-E-B Pharmacy	Medical Services Facility	x	x	x		x	x	x	x	x	x
IBC Beeville	Commercial Facility	x	x	x		x	x	x	x	x	x
La Amistad Adult Care & Activity Center	Cultural Institution	x	x	x		x	x	x	x	x	x
Lott-Canada School (Coastal Bend College Lott-Canada Facility)	School	x	x	x		x	x	x	x	x	x
Moore's City Drug	Medical Services Facility	x	x			x	x	x	x	x	x
Moreno Junior High School	School	x	x	x	x	x	x	x	x	x	x
Prosperity Bank Beeville	Commercial Facility	x	x	x		x	x	x	x	x	x
R.A. Hall Elementary School	School	x	x	x		x	x	x	x	x	x
Rialto Theater	Cultural Institution	x	x	x		x	x	x	x	x	x
Schulz & Wroten Pharmacy Inc.	Medical Services Facility	x	x			x	x	x	x	x	x
Texas Department of Criminal Justice, Garza East Unit	Government Facility	x	x			x	x	x	x	x	x
Texas Department of Criminal Justice, Garza West Unit	Government Facility	x	x			x	x	x	x	x	x
Texas Department of Criminal Justice, William G. McConnell Unit	Government Facility	x	x			x	x	x	x	x	x
Thomas Jefferson Intermediate School	School	x	x	x		x	x	x	x	x	x
Wal Mart / Pharmacy	Medical Services Facility	x	x			x	x	x	x	x	x
Walgreens	Medical Services Facility	x	x			x	x	x	x	x	x
Woodridge Nursing and Rehabilitation Center	Medical Services Facility	x	x	x		x	x	x	x	x	x

Structures on the National Register of Historic Places

Table 15: Coastal Bend College Critical Facilities Vulnerable to Hurricanes and Tropical Storms

Coastal Bend College	Building Type	Potential Hurricane / Tropical Storm Impacts									
		Loss of Power	Flying Debris	Falling Trees	Flooding	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
Robert J. Beasley Jr. Building	Administration	x	x	x		x	x	x	x	x	x

Fred C. Latchman Jr. Academic Building	Academic	x	x	x		x	x	x	x	x	x
Fred C. Latchman Jr. Science Building	Academic	x	x	x		x	x	x	x	x	x
Central Plant Building	Utility	x	x	x		x	x	x	x	x	x
R.W. Dirks Student Services Building	Administration	x	x	x		x	x	x	x	x	x

D) Vulnerable Structures

The Bee County CHAMPS Report, American Community Survey data, and Coastal Bend College's property assessment were used to identify the estimated number and value of every structure vulnerable to Hurricanes and Tropical Storms throughout the participating jurisdictions.

Table 16: Structures Vulnerable to Hurricanes and Tropical Storms

	Bee County		City of Beeville		Coastal Bend College	
Building Type	Count	Potential Damage Value	Count	Potential Damage Value	Count	Potential Damage Value
Residential	11,337	$1,124,708,000	5,848[33]	$580,169,536[34]	5	$6,743,450[35]
Commercial	482	$171,063,000	195[36]	$69,042,801.61[37]	-	-
Industrial	109	$43,074,000	44	$17,385,113.30	-	-
Agricultural	43	$5,865,000	17	$2,367,174.85	-	-
Religious	51	$25,017,000	21	$10,097,120.76	-	-
Governmental	35	$20,935,000	14	$8,449,583.20	-	-
Educational	20	$43,906,000	8	$17,720,917.13	30	$40,460,699

[33] Estimated count based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[34] Estimated value based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[35] Estimated as a percentage of total property value.
[36] Estimated count based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.
[37] Estimated value based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.

Total	**12,077**	**$1,434,568,000**	**6,147**	**$705,232,247**	**35**	**$47,204,149**

7. Wildfire

Wildfire is defined as a sweeping and destructive conflagration and can be further categorized as wildland, interface, or intermix fires.

Wildland fires are fueled almost exclusively by natural vegetation. Wildland/urban interface (WUI) fires include both vegetation and the built-environment. WUI fires occur in the zone of transition between unoccupied land and human development.

1) Wildfire History

The Texas A&M Forest Service Wildfire Risk Assessment Portal provides wildfire data on fires that occurred between 2005 – 2009. During that time, there were 260 wildfire ignitions in Bee County. Of those, 15 were located within the City of Beeville's city limits.

Previous wildfires burned 5,697 acres in Bee County and the City of Beeville. Debris burning was the leading cause of identified wildfire ignitions. The largest reported fire, known as the Pawnee Fire, burned 800 acres and was started by farm equipment.

No damage dollars, neither structural nor agricultural, were reported for any of the wildfire events for either jurisdiction.

The planning team didn't locate recorded data for wildfires after 2009. However, based on planning team members' expertise, the planning team determined that wildfires have continued to occur since then at a similar rate as occurred between 2005-2009.

2) Likelihood of Future Occurrence

A) Bee County

According to the data, Bee County experiences nearly 52 wildfires per year. Given prior frequency of wildfire events, the likelihood of a wildfire event in Bee County is highly likely, meaning an event is probable within the next year.

B) City of Beeville

According to the data, the City of Beeville experiences 3 wildfires per year. Given prior frequency of wildfire events, the likelihood of a wildfire event in the City of Beeville is highly likely, meaning an event is probable within the next year.

C) Coastal Bend College

Coastal Bend College does not have a history of on-campus wildfires, however, given its location within Beeville's city limits and the frequency of fires in the City of Beeville, the likelihood of a wildfire is occasional, meaning an event is possible in the next five years.

3) Extent

The Texas A&M Forest Service's Characteristic Fire Intensity Scale (FIS) specifically identifies areas where significant fuel hazards and associated dangerous fire behavior potential exist. The FIS is a fire behavior output, which is influenced by three environmental factors - fuels, weather, and topography. According to Texas A&M Forest Service data, Bee County and the participating jurisdictions are rated between Class 1 and Class 4.

Table 17: Characteristic Fire Intensity Scale[38]

Class 1 Very Low	Very small, discontinuous flames, usually less than one foot in length; very low rate of spread; no spotting. Fires are typically easy to suppress by firefighters with basic training and non-specialized equipment.
Class 2 Low	Small flames, usually less than two feet long; small amount of very short range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.
Class 3 Moderate	Flames up to 8 feet in length; short-range spotting is possible. Trained firefighters will find these fires difficult to suppress without support from aircraft or engines, but dozer and plows are generally effective. Increasing potential for harm or damage to life and property.
Class 4 High	Large flames, up to 30 feet in length; short-range spotting common; medium range spotting possible. Direct attack by trained firefighters, engines, and dozers is generally ineffective, indirect attack may be effective. Significant potential for harm or damage to life and property.
Class 5 Very High	Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds. Indirect attack marginally effective at the head of the fire. Great potential for harm or damage to life and property.

The National Wildfire Coordinating Group (NWCG) provides an additional way to measure extent by accounting for fire size. Based on NWCG numbers, the Pawnee Fire was a Class E event. Based on Texas A&M Forest Service data, the average fire in Bee County and the participating jurisdictions is a Class C event.

Table 18: National Wildfire Coordinating Group Size Class of Fire[39]

Class A	¼ acre or less
Class B	More than ¼ acre, but less than 10 acres
Class C	10 acres or more, but less than 100 acres
Class D	100 acres or more, but less than 300 acres

[38] https://www.texaswildfirerisk.com
[39] http://www.nwcg.gov/term/glossary/size-class-of-fire

Class E	300 acres or more, but less than 1,000 acres
Class F	1,000 acres or more, but less than 5,000 acres
Class G	5,000 acres or more

Previous wildfires in Bee County and the participating jurisdictions have ranged between Class 1 and Class 4 on the Characteristic Fire Intensity Scale, with flames up to 12' in length, and between Class A and Class E on the National Wildfire Coordinating Group Size Class of Fire scale (NWCGSCF). Most fires have been small and were contained quickly. However, the worst reported fire in Bee County burned 800 acres. The location of that fire included areas rated between Class 1 and Class 4 on the FIS with expected flame lengths up to 12'.

Future fire events in any of the participating jurisdictions may meet or exceed the worst reported Class E (NWCGSCF scale) and Class 4 (FIS) wildfires in terms of intensity, flame length acreage burned, and inflicted damage.

4) Location and Impact

A) Location

Due to wildfire's ability to inflict damages to both structures and landscapes, wildfire location has been assessed by parcel, rather than by structure. Parcels have been identified by land use type, and have been determined to be either partially or completely vulnerable to wildfire based on TxWRAP's Wildland Urban Interface boundaries. Certain parcels may contain various land uses, however, parcels have been identified based on the primary land use type.

Because wildfires are dynamically unpredictable, the following maps and tables may not be representative of every location and parcel at risk of wildfire.

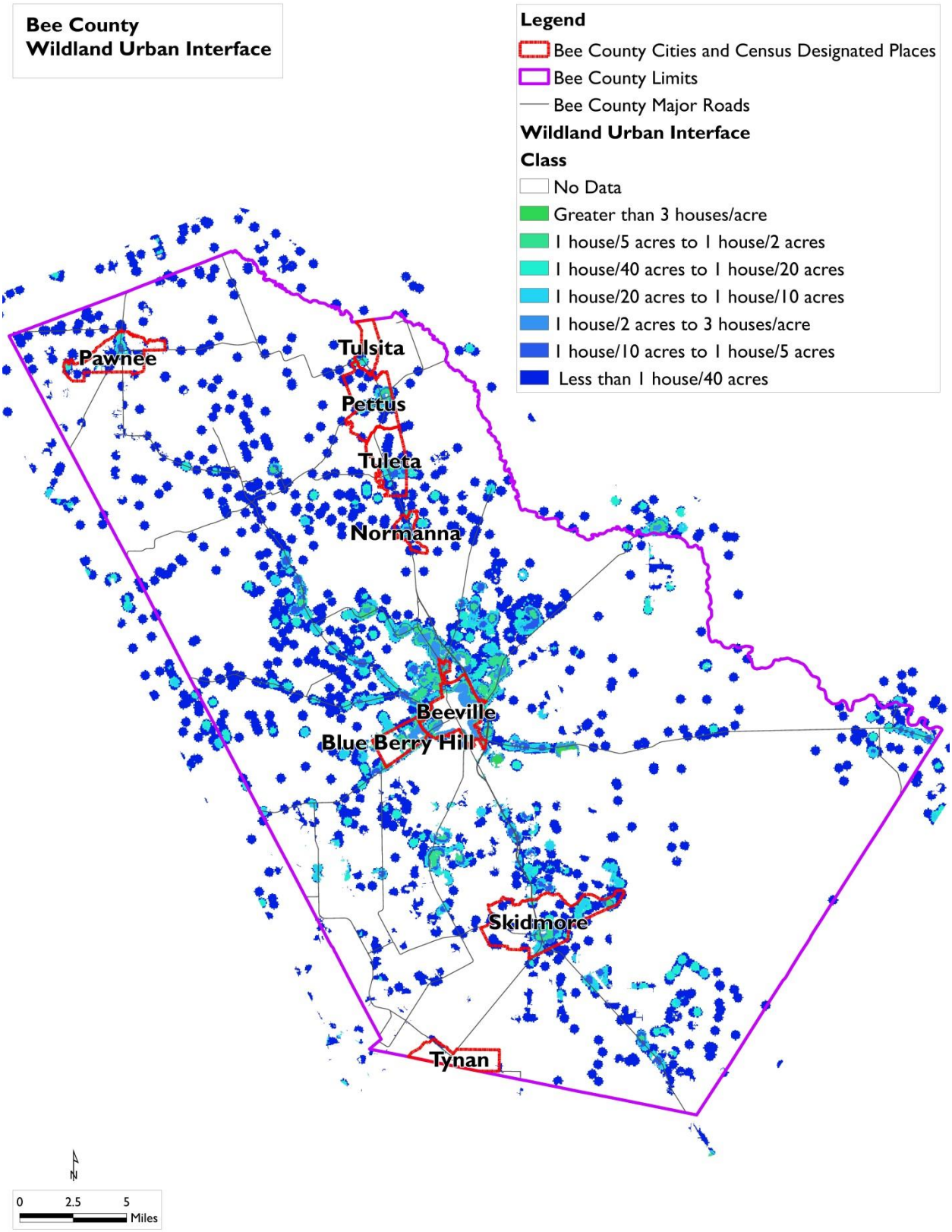

Figure 9: Bee County Wildland Urban Interface

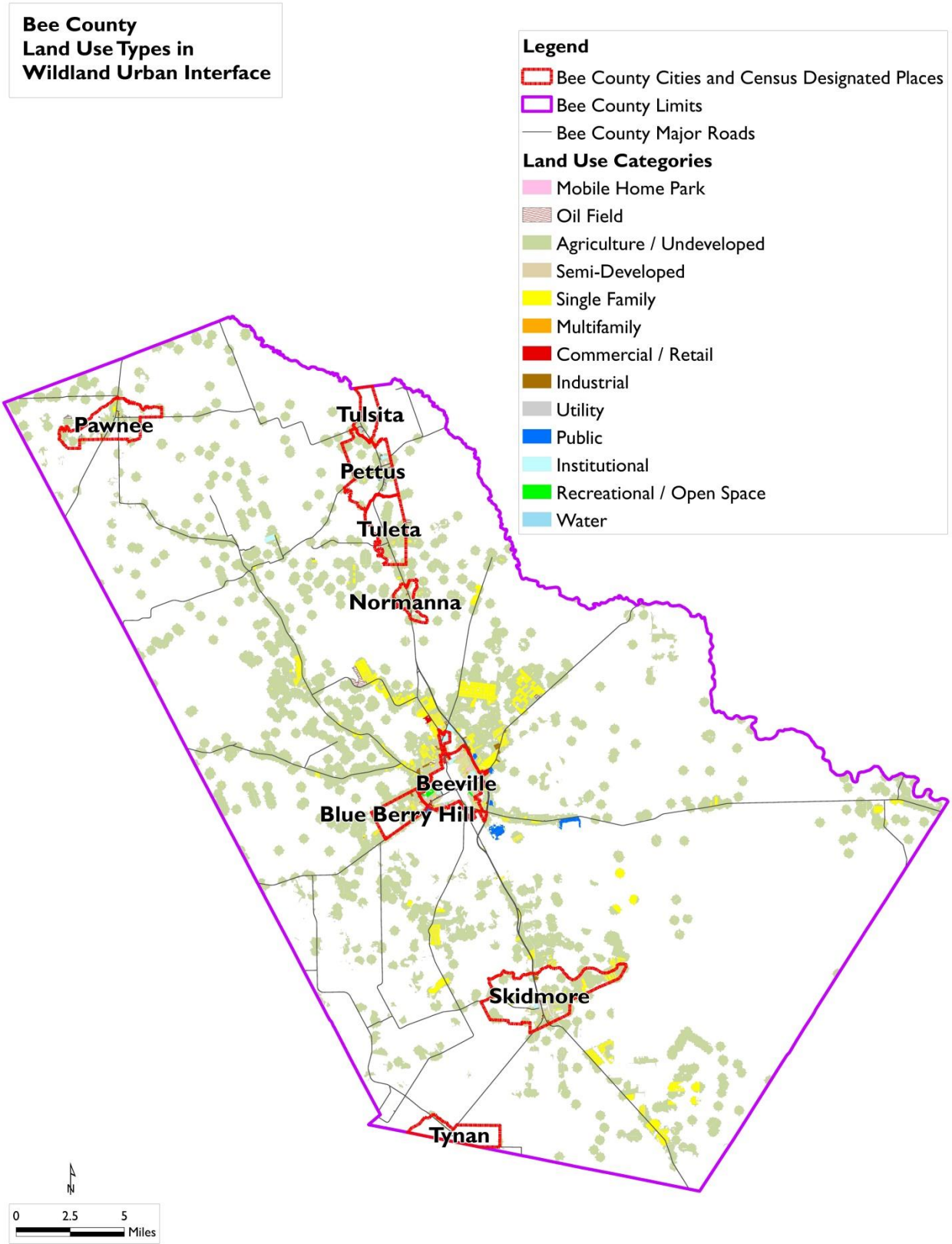

Figure 10: Bee County Land Use Types in Wildland Urban Interface

Table 19: Parcels Partially or Completely Vulnerable to Wildfire in Bee County

Parcel Type	Number of Parcels	Percentage of Parcels in WUI
Agriculture / Undeveloped	4,180	34%
Commercial / Retail	408	3%
Industrial	108	1%
Institutional	227	2%
Mobile Home Park	2	0%
Multifamily	74	1%
Oil Field	57	0%
Public	59	0%
Recreational / Open Space	9	0%
Semi-Developed	1,499	12%
Single Family	5,845	47%

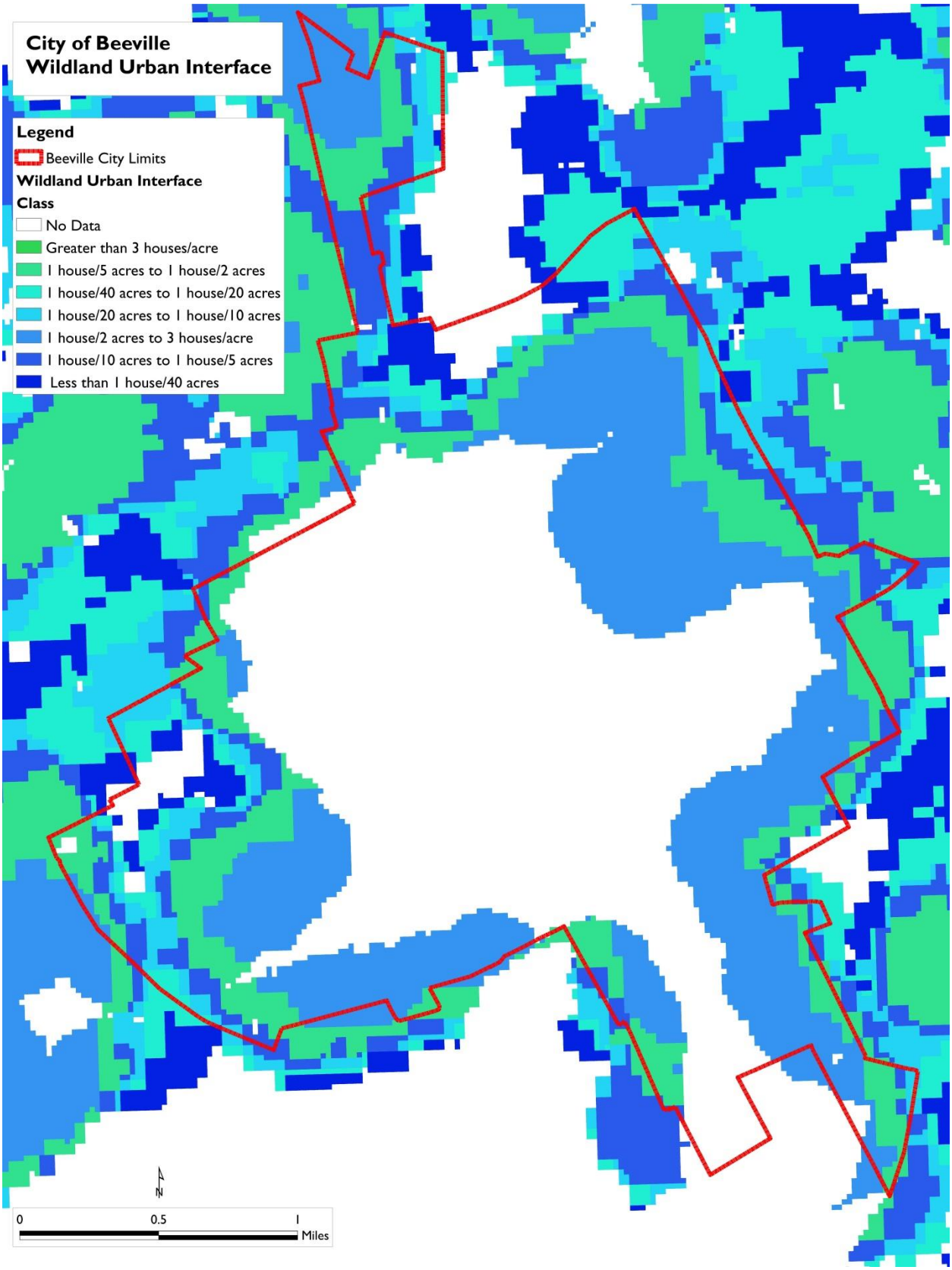

Figure 11: City of Beeville Wildland Urban Interface

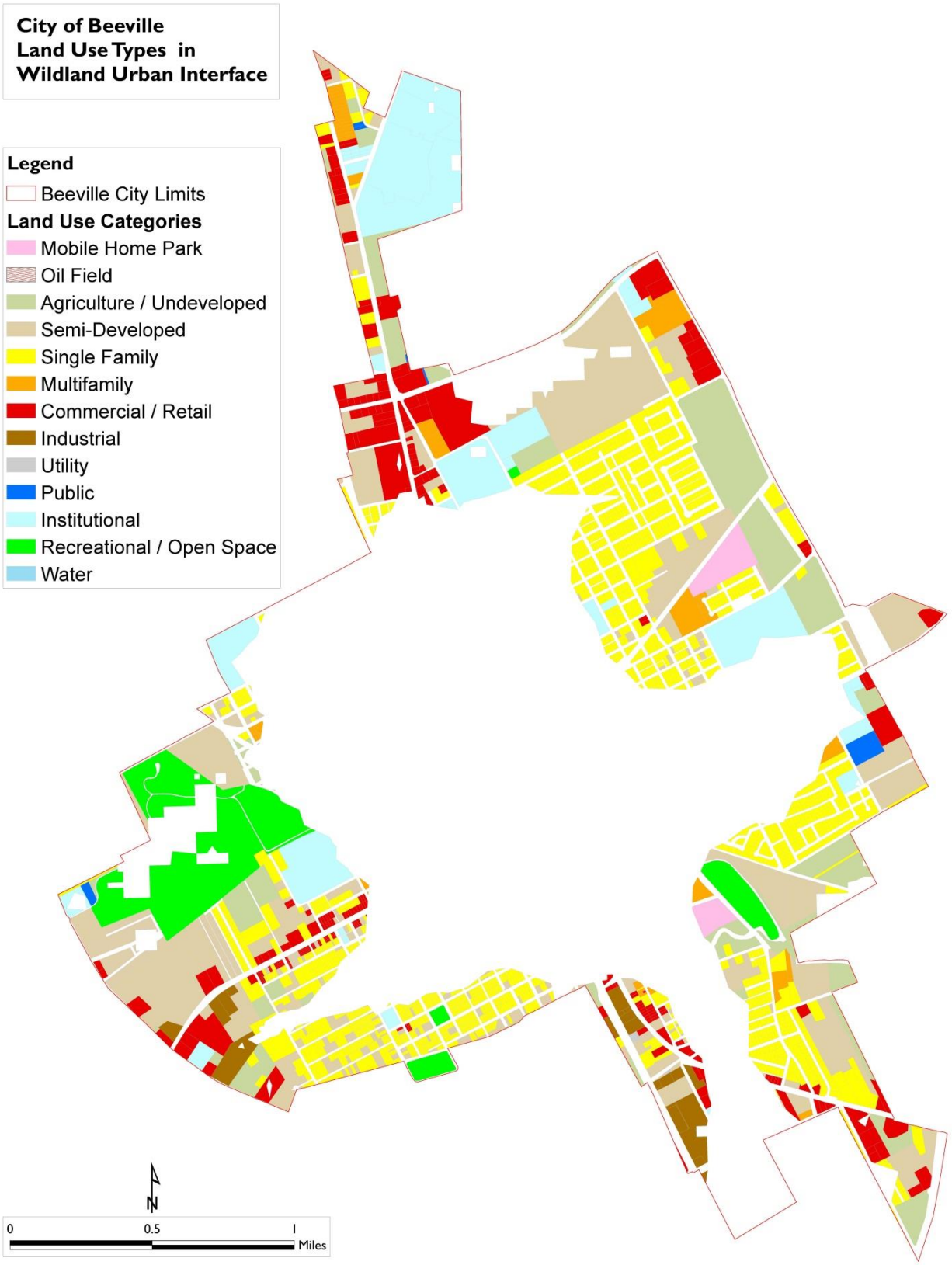

Figure 12: City of Beeville Land Use Types in Wildland Urban Interface

Table 20: Parcels Partially or Completely Vulnerable to Wildfire in City of Beeville

Parcel Type	Number of Parcels	Percentage of Parcels in WUI
Agriculture / Undeveloped	73	2%
Commercial / Retail	249	7%
Industrial	23	1%
Institutional	56	2%
Mobile Home Park	2	0%
Multifamily	60	2%
Oil Field	0	0%
Public	6	0%
Recreational / Open Space	8	0%
Semi-Developed	583	17%
Single Family	2,284	68%

Figure 13: Coastal Bend College Wildland Urban Interface

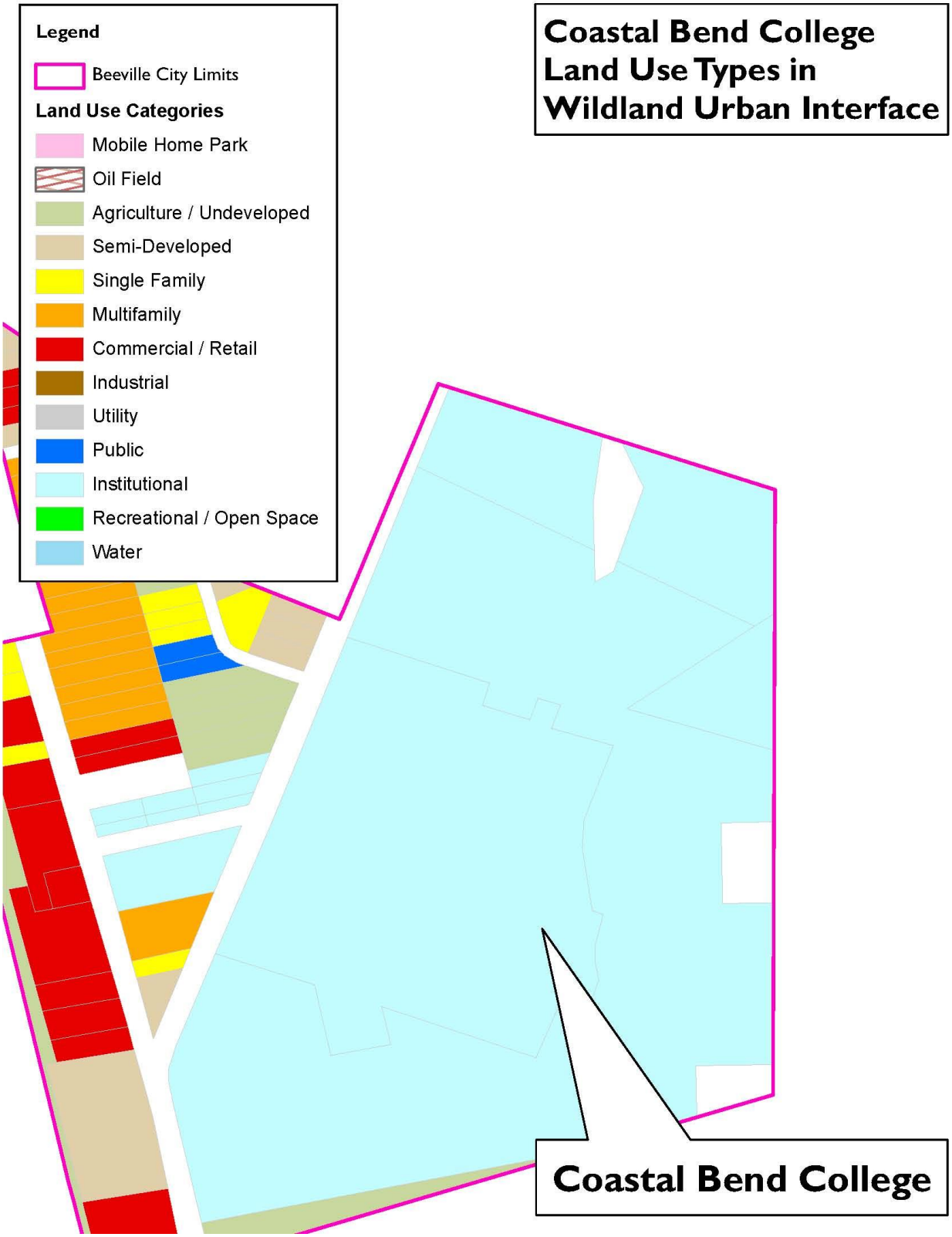

Figure 14: Coastal Bend College Land Use Types in Wildland Urban Interface

All of Coastal Bend College's property is located in the Wildland Urban Interface.

B) Impact

Impacts from a wildfire in Bee County and the participating jurisdictions may include but are not limited to: crop damage or destruction, damaged or destroyed agricultural, residential, commercial, educational, and industrial buildings, escaped, lost, injured or killed livestock and pets. In the worst cases, residents may be injured or killed.

5) Vulnerability

A) Population

As described in the narrative, as well as Table 10 and Figures 2-7, in Section 3 of Chapter 4 above, Bee County and the City of Beeville are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a wildfire.

Residents of mobile homes, specifically those built before HUD's Manufactured Housing and Standards requirements were introduced in 1976, are of particular concern[40]. These structures are more prone to fire and have a higher incidence of occupant death than modern manufactured homes.

Residents of sub-standard structures are also of particular concern. Structures in sub-standard condition ahead of a wildfire, whether due to structural damages, missing windows or doors, holes in exterior walls or the roof, may be less safe during a wildfire than structures in standard condition. Exterior damages may make the homes more prone to fire by more readily exposing flammable materials to flame. Missing windows and other exterior gaps may leave residents and structures prone to smoke inhalation and smoke damage.

All of these issues may increase damages and lead to injuries or loss of life.

B) Critical Facilities

Twenty-six critical facilities are located in the wildland urban interface (WUI), as defined by the Texas A&M Forest Service. Because of their location in the WUI, the density of development, and proximity to wildland areas, these facilities are believed to be particularly susceptible to future wildfire threats.

[40] https://www.usfa.fema.gov/downloads/pdf/statistics/rural.pdf

Table 21: Bee County Critical Facilities Vulnerable to Wildfire

Bee County	Building Type	Potential Wildfire Impacts				
		Destruction	Partial Destruction	Heat Damage	Smoke Damage	Water Damage
Blanconia VFD	Emergency Services	x	x	x	x	x
Medio Creek Bridge (Normanna Bridge)	Government Facility		x	x		
Normanna Post Office	Post Office	x	x	x	x	x
Pawnee Elementary / Pawnee Junior High School	School	x	x	x	x	x
Pawnee Post Office	Post Office	x	x	x	x	x
Pawnee VFD	Emergency Services	x	x	x	x	x
Pettus - Tuleta VFD	Emergency Services	x	x	x	x	x
Pettus Elementary School	School	x	x	x	x	x
Pettus High School	School	x	x	x	x	x
Pettus Post Office	Post Office	x	x	x	x	x
Pettus Station (Electricity)	Electrical Facility	x	x	x	x	x
Skidmore Post Office	Post Office	x	x	x	x	x
Skidmore Station (Electricity)	Electrical Facility	x	x	x	x	x
Skidmore VFD	Emergency Services	x	x	x	x	x
Skidmore Water Supply Corp.	Water System Facility	x	x	x	x	x
Skidmore-Tynan Elementary / Junior High School / High School	School	x	x	x	x	x
Clem and Bettie Stoltzfus Community Center	Cultural Institution	x	x	x	x	x
Tuleta Post Office	Post Office	x	x	x	x	x

Structures on the National Register of Historic Places

Table 22: City of Beeville Critical Facilities Vulnerable to Wildfire

City of Beeville	Building Type	Potential Wildfire Impacts				
		Destruction	Partial Destruction	Heat Damage	Smoke Damage	Water Damage
A.C. Jones High School	School	x	x	x	x	x
Bee County Sheriff	Emergency Services	x	x	x	x	x
Bee County Tax Assessor Office	Government Facility	x	x	x	x	x
Beeville Water System Elevated Water Storage Tank	Water System Facility		x	x		
Beeville Water System Facility	Water System Facility	x	x	x	x	x
Moreno Junior High School	School	x	x	x	x	x
Wal Mart / Pharmacy	Medical Services Facility	x	x	x	x	x
Woodridge Nursing and Rehabilitation Center	Medical Services Facility	x	x	x	x	x

Table 23: Coastal Bend College Critical Facilities Vulnerable to Wildfire

Coastal Bend College	Building Type	Potential Wildfire Impacts				
		Destruction	Partial Destruction	Heat Damage	Smoke Damage	Water Damage
Robert J. Beasley Jr. Building	Administration	x	x	x	x	x
Fred C. Latchman Jr. Academic Building	Academic	x	x	x	x	x
Fred C. Latchman Jr. Science Building	Academic	x	x	x	x	x
Central Plant Building	Utility	x	x	x	x	x
R.W. Dirks Student Services Building	Administration	x	x	x	x	x

8. Tornado

A tornado is defined as a rapidly rotating vortex or funnel of air extending ground-ward from a cumulonimbus cloud. Most of the time, vortices remain suspended in the atmosphere and are visible as a funnel cloud. However, when the lower tip of a vortex touches the ground, the tornado becomes a force of destruction. Tornado strength is currently measured using the Enhanced Fujita (EF) Scale. Like the previously used Fujita scale, the EF Scale uses damage to estimate tornado wind speeds and assign a number between 0 and 5. A rating of EF0 represents minor to no damage whereas a rating of EF5 represents total destruction of buildings.

1) Tornado History

According to data from NOAA's National Weather Service Weather Forecast Office in Corpus Christi, Bee County's 2013 CHAMPS Report, local news reports, and data from the National Climatic Data Center, the following tornados affected Bee County and all participating jurisdictions:

Table 24: Tornado History[41]

Date	Location	Time	F / EF Magnitude	Fatalities	Injuries	Property Damage	Crop Damage	Property Damage $2016	Crop Damage $2016
9/8/1961				0	4	$439,295	$439,295	$3,983,118	$3,983,118
6/1/1962		5:50 AM	F1	0	0	$250,000	$0	$1,998,576	$0
6/1/1962				0	0	$49,326	$0	$394,329	$0
6/29/1963		2:00 PM	F2	0	0	$25,000	$0	$197,245	$0
6/29/1963				0	0	$4,998	$0	$39,433	$0
3/19/1964		11:30 AM	F1	0	0	$2,500	$0	$19,470	$0
3/19/1964				0	0	$506	$0	$3,943	$0
9/20/1967		10:15 AM		0	0	$25,000	$0	$180,710	$0
9/22/1967		1:30 PM		0	0	$250	$0	$1,807	$0
9/17/1968		3:15 AM	F2	0	0	$250,000	$0	$1,734,397	$0
9/17/1968				0	0	$49,735	$0	$345,038	$0
7/16/1969		1:45 PM	F1	0	0	$0	$0	$0	$0
8/23/1970		8:40 PM	F0	0	0	$0	$0	$0	$0
8/23/1970		8:40 PM	F0	0	0	$0	$0	$0	$0
8/23/1970		8:40 PM	F0	0	0	$0	$0	$0	$0
9/2/1975		5:06 PM	F0	0	0	$0	$0	$0	$0
4/29/1976		7:00 AM	F3	0	0	$25,000	$0	$106,076	$0
4/29/1976				0	0	$5,004	$0	$21,233	$0
9/7/1977		7:45 PM	F1	0	0	$2,500	$0	$9,960	$0

[41] https://www.ncdc.noaa.gov/stormevents/

9/7/1977				0	0	$495	$0	$1,972	$0
5/8/1980		10:15 AM	F1	0	1	$25,000	$0	$73,249	$0
5/8/1980				0	1	$4,959	$0	$14,528	$0
6/15/1980									
6/15/1980				0	0	$24,792	$0	$72,640	$0
8/9/1980		3:25 PM	F0	0	0	$25,000	$0	$73,249	$0
8/9/1980				0	0	$4,959	$0	$14,528	$0
5/29/1981		5:15 PM	F0	0	0	$25,000	$0	$66,399	$0
5/29/1981				0	0	$4,949	$0	$13,144	$0
8/30/1981		4:10 PM	F1	0	0	$250,000	$0	$663,993	$0
8/30/1981				0	0	$49,490	$0	$131,443	$0
6/6/1983		12:25 PM	F0	0	0	$30	$0	$72	$0
9/16/1988		9:00 PM	F1	0	0	$250,000	$0	$510,203	$0
9/16/1988				0	0	$50,094	$0	$102,233	$0
9/24/1991		8:25 PM	F1	0	0	$25,000	$0	$44,315	$0
2/23/1994	Skidmore		F0	0	0	$0	$0	$0	$0
2/23/1994				0	0	$249	$0	$406	$0
2/23/1994	Beeville	4:39 AM	F1	0	5	$500,000	$0	$814,534	$0
2/23/1994				0	5	$49,836	$0	$81,185	$0
9/16/1996	Tynan	5:05 PM	F1	0	0	$0	$0	$0	$0
11/15/2001	Beeville	3:53 AM	F0	0	0	$0	$0	$0	$0
11/15/2001	Beeville	3:53 PM	F0	0	0	$0	$0	$0	$0
11/15/2001	Beeville	3:53 PM	F1	0	0	$0	$0	$0	$0
11/15/2001	Mineral	4:36 PM	F1	0	0	$0	$0	$0	$0
9/8/2002	Beeville	2:06 AM	F0	0	0	$0	$0	$0	$0
12/30/2002	Beeville	5:15 PM	F0	0	0	$0	$0	$0	$0
3/13/2007	Blanconia	6:51 PM	EF0	0	0	$0	$0	$0	$0
6/2/2010	Tynan	9:52 PM	EF1	0	0	$20,000	$0	$22,144	$0
5/10/2012	Pawnee	2:56 PM	EF0	0	0	$0	$0	$0	$0
5/10/2012	Pawnee	2:58 PM	EF0	0	0	$0	$0	$0	$0
5/10/2012	Pawnee	3:02 PM	EF0	0	0	$0	$0	$0	$0

NOAA Version

CHAMPS Version

Reported by Both

As shown above, most tornado data doesn't include the location of the event. At this time, no tornadic data for Coastal Bend College has been recorded. However, given its location in the City of Beeville, and the city's history of tornados, Coastal Bend College is equally vulnerable.

No tornados have been recorded in Bee County or either participating jurisdiction since 2012.

2) Likelihood of Future Occurrence

Based on the frequency of previous tornados in Bee County and the participating jurisdictions, a future event that may impact any or all of them is likely, meaning one is probable in the next three years.

3) Extent

The Enhanced Fujita Scale, or EF Scale, is the scale for rating the strength of tornados via the damage they cause. Six categories from zero to five represent increasing degrees of damage. The scale takes into account how most structures are designed, and is thought to be an accurate representation of the surface wind speeds in the most violent tornados.

Table 25: Enhanced Fujita Scale[42]

Enhanced Fujita (EF) Scale		
Enhanced Fujita Category	Wind Speed (MPH)	Potential Damage
EF0	65-85	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	86-110	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	200+	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yds.); high-rise buildings have significant structural deformation; incredible phenomena will occur.

Previous tornados ranged in strength from F0 to F3 on the Fujita Scale. Since the switch to the updated scale, only EF0 and EF1 tornados have been recorded. The worst reported tornado in Bee County and the participating jurisdictions didn't receive and F-rating. However, after

[42] Texas State Hazard Mitigation Plan, 2013 Update

adjusting for inflation, it inflicted nearly $4 million each in property and crop damages, and it injured four people. An F1 tornado in 1994 injured 5 people.

In the last 5 years, the County and participating jurisdictions have seen three EF0 tornados that have inflicted no officially recorded damages.

Future tornados in the participating jurisdictions may meet or exceed previous worst-case F3 (now EF3) ones in terms of total damage dollars inflicted, the number residents injured, and may even be fatal.

4) Location and Impact

A) Location

Tornados are not constrained by any distinct geographic boundary. Tornados can occur across all participating jurisdictions, and they may freely cross from one jurisdiction into another.

B) Impact

Impacts from a tornado may include but are not limited to damaged or destroyed personal property including vehicles, damaged or destroyed agricultural, residential, commercial, and industrial buildings. Crops may be damaged or destroyed. Pets and livestock may be injured or killed by tornados or flying debris. Pets and livestock may escape due to damaged or destroyed structures and fences.

In the worst cases, tornados may cause injuries and/or be deadly.

5) Vulnerability

Tornados have the potential to impact the entire planning area. All existing and future buildings, critical facilities, critical infrastructure, improved property, and the population of the participating jurisdictions are considered vulnerable to this hazard.

A) Population

As described in the narrative, as well as Table 10 and Figures 2-7, in Section 3 of Chapter 4 above, Bee County and the participating jurisdictions are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The participating jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a tornado.

Residents of mobile / manufactured homes are of particular concern. These structures are never considered safe during a tornado.

Residents of sub-standard structures are also of particular concern. Structures in sub-standard condition ahead of a tornado, whether due to structural damages, missing windows or doors, holes in exterior walls or the roof, may be less safe during a tornado than structures in standard condition.

Existing structural weaknesses, due to housing type or existing damages, may lead to compounded damages, injuries, or loss of life.

B) Critical Facilities

Certain critical facilities and infrastructure in each jurisdiction may be particularly vulnerable to tornados. These facilities have been identified for reasons including: the number of people who use the facility or infrastructure, the facility's role in providing basic services to begin the cleanup process and get the jurisdictions running again, and the facility's ability to offer goods and materials residents will need to resume normalcy as quickly as possible.

The selected critical facilities are built from a variety of materials with varying levels of resistance to tornadic damages. Additionally, their varying ages mean they weren't constructed to uniform building standards. Older buildings in downtown Beeville, and especially those on the National Register of Historic Places, may be particularly vulnerable.

Given tornados' violent nature, the facilities identified below may experience increased levels of vulnerability to the hazard. Damage to any of these facilities may have a disproportionately negative impact on each jurisdiction's recovery from a tornado if that damage affects the facility's ability to reopen and resume normal business right away. Additionally, any loss of culturally important facilities may have negative effects in the community beyond the simple loss of the facility itself.

Table 26: Bee County Critical Facilities Vulnerable to Tornados

Bee County	Building Type	Potential Tornado Impacts								
		Loss of Power	Flying Debris	Uprooted Trees	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
Bee County Expo Center	Government Facility	x	x	x	x	x	x	x	x	x
Blanconia VFD	Emergency Services	x	x	x	x	x	x	x	x	x
Medio Creek Bridge (Normanna Bridge)	Government Facility		x	x				x		
Normanna Post Office	Post Office	x	x	x	x	x	x	x	x	x
Pawnee Elementary / Pawnee Junior High School	School	x	x	x	x	x	x	x	x	x
Pawnee Post Office	Post Office	x	x	x	x	x	x	x	x	x
Pawnee VFD	Emergency Services	x	x		x	x	x	x	x	x
Pettus - Tuleta VFD	Emergency Services	x	x	x	x	x	x	x	x	x
Pettus Elementary School	School	x	x	x	x	x	x	x	x	x
Pettus High School	School	x	x	x	x	x	x	x	x	x
Pettus Post Office	Post Office	x	x		x	x	x	x	x	x
Pettus Station (Electricity)	Electrical Facility	x	x					x	x	x
Skidmore Post Office	Post Office	x	x	x	x	x	x	x	x	x
Skidmore Station (Electricity)	Electrical Facility	x	x					x	x	x
Skidmore VFD	Emergency Services	x	x	x	x	x	x	x	x	x
Skidmore Water Supply Corp.	Water System Facility	x	x	x	x	x	x	x	x	x
Skidmore-Tynan Elementary / Junior High School / High School	School	x	x	x	x	x	x	x	x	x
Clem and Bettie Stoltzfus Community Center	Cultural Institution	x	x	x	x	x	x	x	x	x
Tuleta Post Office	Post Office	x	x	x	x	x	x	x	x	x
Tynan Post Office	Post Office	x	x	x	x	x	x	x	x	x
Tynan VFD	Emergency Services	x	x	x	x	x	x	x	x	x
Tynan Water Supply Corp.	Water System Facility	x	x	x	x	x	x	x	x	x

Structures on the National Register of Historic Places

Table 27: City of Beeville Critical Facilities Vulnerable to Tornados

City of Beeville	Building Type	Potential Tornado Impacts								
		Loss of Power	Flying Debris	Uprooted Trees	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
A.C. Jones High School	School	x	x	x	x	x	x	x	x	x
Bee County Courthouse	Government Facility	x	x	x	x	x	x	x	x	x
Bee County Library (Praeger Building)	Cultural Institution	x	x	x	x	x	x	x	x	x
Bee County Sheriff	Emergency Services	x	x	x	x	x	x	x	x	x
Bee County Tax Assessor Building	Government Facility	x	x	x	x	x	x	x	x	x
Beeville Art Museum	Cultural Institution	x	x	x	x	x	x	x	x	x
Beeville City Hall	Government Facility	x	x	x	x	x	x	x	x	x
Beeville Community Center	Cultural Institution	x	x	x	x	x	x	x	x	x
Beeville First National Bank	Commercial Facility	x	x	x	x	x	x	x	x	x
Beeville Municipal Airport	Government Facility	x	x	x	x	x	x	x	x	x
Beeville Police Department	Emergency Services	x	x	x	x	x	x	x	x	x
Beeville Post Office	Post Office	x	x	x	x	x	x	x	x	x
Beeville Station (Electricity)	Electrical Facility	x	x	x	x	x	x	x	x	x
Beeville Utility Department / Water System Facility	Water System Facility	x	x	x	x	x	x	x	x	x
Beeville Wastewater Treatment Plant	Wastewater System Facility	x	x	x	x	x	x	x	x	x
Beeville Water System Elevated Water Storage Tank	Water System Facility		x	x				x		
Beeville Water System Elevated Water Storage Tank	Water System Facility		x	x				x		
Beeville Water System Elevated Water Storage Tank	Water System Facility		x	x				x		
Beeville Water System Facility	Water System Facility	x	x	x	x	x	x	x	x	x
Beeville Water System Facility	Water System Facility	x	x	x	x	x	x	x	x	x
C. M. Smitty Smith Central Fire Station	Emergency Services	x	x	x	x	x	x	x	x	x
Chase Field	Government Facility	x	x	x	x	x	x	x	x	x
Christus Spohn Hospital Beeville	Medical Services Facility	x	x	x	x	x	x	x	x	x
Coastal Plains Community Center	Cultural Institution	x	x	x	x	x	x	x	x	x
Faden-McKeown-Chambliss Elementary School	School	x	x	x	x	x	x	x	x	x

Hampton-Moreno-Dugat Early Childhood Center	School	x	x	x	x	x	x	x	x	x	
H-E-B Pharmacy	Medical Services Facility	x	x	x	x	x	x	x	x	x	
IBC Beeville	Commercial Facility	x	x	x	x	x	x	x	x	x	
La Amistad Adult Care & Activity Center	Cultural Institution	x	x	x	x	x	x	x	x	x	
Lott-Canada School (Coastal Bend College Lott-Canada Facility)	School	x	x	x	x	x	x	x	x	x	
Moore's City Drug	Medical Services Facility	x	x		x	x	x	x	x	x	
Moreno Junior High School	School	x	x	x	x	x	x	x	x	x	
Prosperity Bank Beeville	Commercial Facility	x	x	x	x	x	x	x	x	x	
R.A. Hall Elementary School	School	x	x	x	x	x	x	x	x	x	
Rialto Theater	Cultural Institution	x	x	x	x	x	x	x	x	x	
Schulz & Wroten Pharmacy Inc.	Medical Services Facility	x	x		x	x	x	x	x	x	
Texas Department of Criminal Justice, Garza East Unit	Government Facility	x	x		x	x	x	x	x	x	
Texas Department of Criminal Justice, Garza West Unit	Government Facility	x	x		x	x	x	x	x	x	
Texas Department of Criminal Justice, William G. McConnell Unit	Government Facility	x	x		x	x	x	x	x	x	
Thomas Jefferson Intermediate School	School	x	x	x	x	x	x	x	x	x	
Wal Mart / Pharmacy	Medical Services Facility	x	x		x	x	x	x	x	x	
Walgreens	Medical Services Facility	x	x		x	x	x	x	x	x	
Woodridge Nursing and Rehabilitation Center	Medical Services Facility	x	x	x	x	x	x	x	x	x	

Structures on the National Register of Historic Places

Table 28: Coastal Bend College Critical Facilities Vulnerable to Tornados

Coastal Bend College	Building Type	Potential Tornado Impacts								
		Loss of Power	Flying Debris	Uprooted Trees	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
Robert J. Beasley Jr. Building	Administration	x	x	x	x	x	x	x	x	x
Fred C. Latchman Jr. Academic Building	Academic	x	x	x	x	x	x	x	x	x
Fred C. Latchman Jr. Science Building	Academic	x	x	x	x	x	x	x	x	x
Central Plant Building	Utility	x	x	x	x	x	x	x	x	x
R.W. Dirks Student Services Building	Administration	x	x	x	x	x	x	x	x	x

C) Vulnerable Structures

Table 29: Structures Vulnerable to Tornados

	Bee County		City of Beeville		Coastal Bend College	
Building Type	Count	Potential Damage Value	Count	Potential Damage Value	Count	Potential Damage Value
Residential	11,337	$1,124,708,000	5,848[43]	$580,169,536[44]	5	$6,743,450[45]
Commercial	482	$171,063,000	195[46]	$69,042,801.61[47]	-	-
Industrial	109	$43,074,000	44	$17,385,113.30	-	-
Agricultural	43	$5,865,000	17	$2,367,174.85	-	-
Religious	51	$25,017,000	21	$10,097,120.76	-	-
Governmental	35	$20,935,000	14	$8,449,583.20	-	-
Educational	20	$43,906,000	8	$17,720,917.13	30	$40,460,699
Total	**12,077**	**$1,434,568,000**	**6,147**	**$705,232,247**	**35**	**$47,204,149**

[43] Estimated count based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[44] Estimated value based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[45] Estimated as a percentage of total property value.
[46] Estimated count based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.
[47] Estimated value based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.

9. Drought

Drought is defined as the consequence of a natural reduction in the amount of precipitation expected over an extended period of time, usually a season or more in length.

Droughts are one of the most complex natural hazards to identify because it is difficult to determine their precise beginning or end. In addition, droughts can lead to other hazards such as extreme heat and wildfires. Their impact on wildlife and area farming is enormous, often killing crops, grazing land, edible plants and even in severe cases, trees.

Table 30: Drought Classifications

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

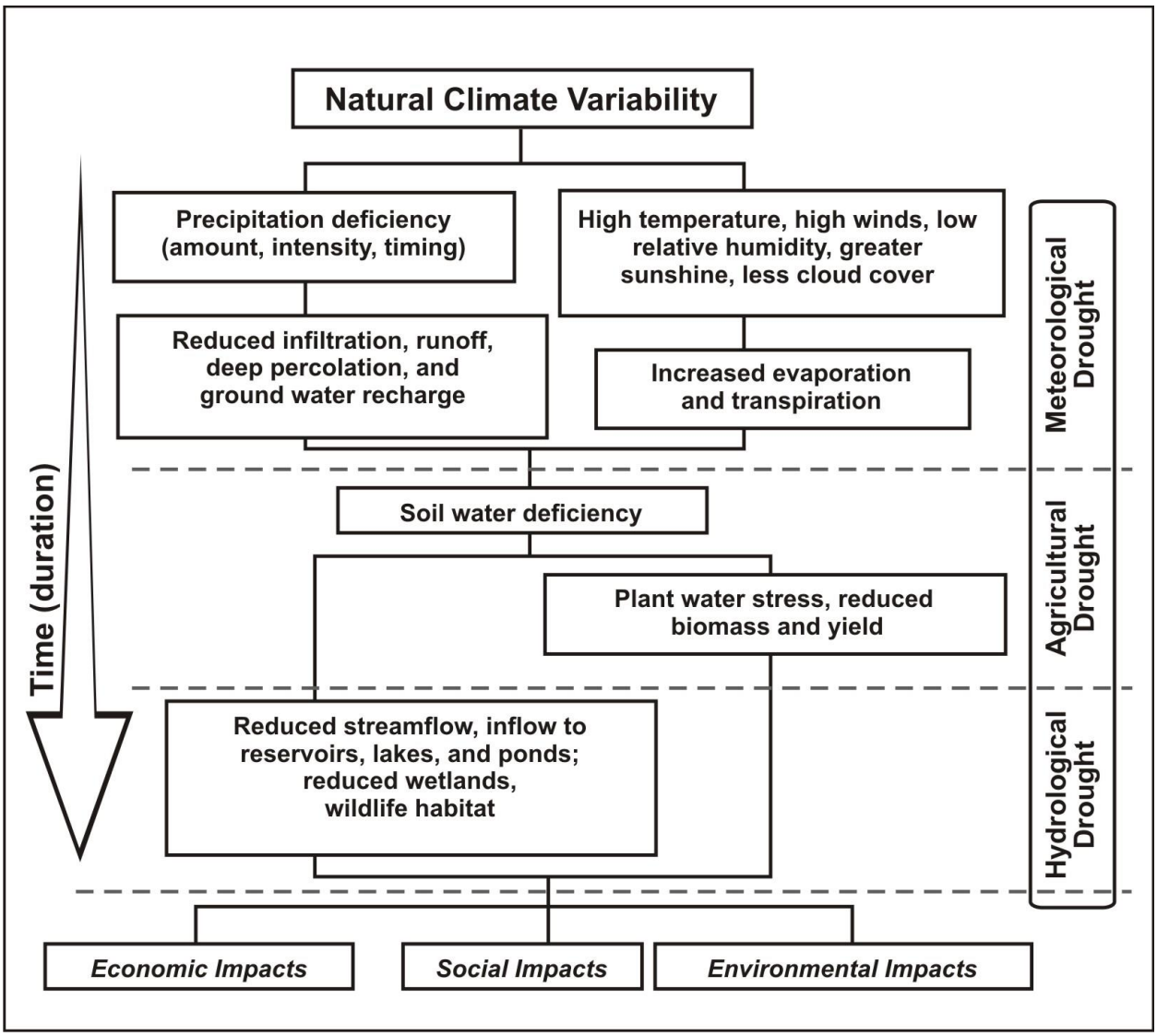

Figure 15: Sequence of Drought Occurrence and Impacts for Commonly Accepted Drought Types[48]

[48] Source: National Drought Mitigation Center, University of Nebraska-Lincoln, http://drought.unl.edu/DroughtBasics/TypesofDrought.aspx

1) Drought History

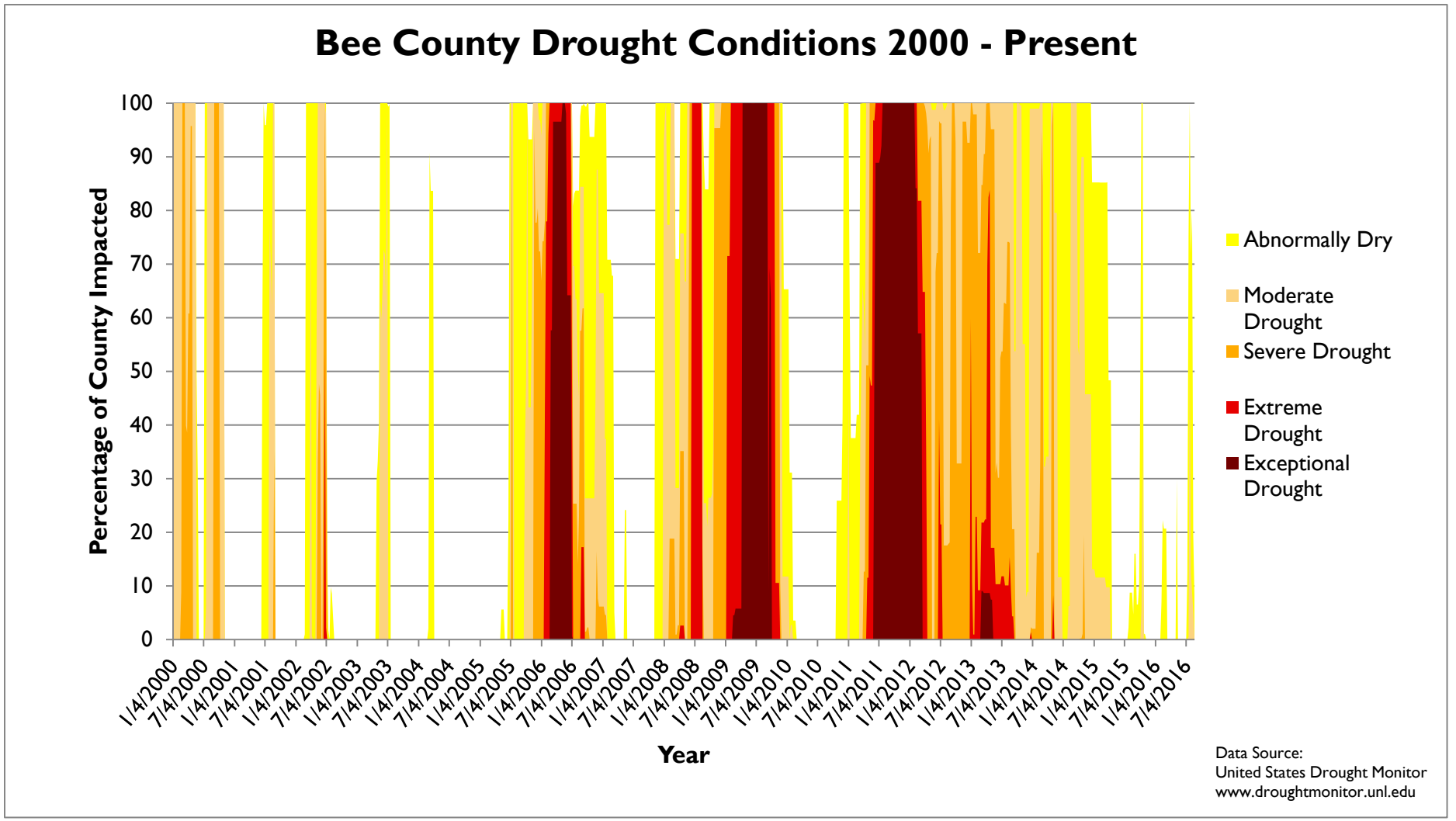

Figure 16: Bee County Drought History

Drought history is recorded at the county level. However, the data is measured by the percentage of the county affected by drought. Although no specific data regarding drought's occurrences in the City of Beeville or Coastal Bend College is reported, it's possible to use the data in Figure 16 to infer when all jurisdictions previously experienced drought conditions due to the fact that the conditions impacted 100% of the county.

According to the data, all three jurisdictions have experienced drought conditions on a nearly annual basis during the last 10 years.

The planning team collected additional drought history from the Bee County 2013 CHAMPS Report. It included the following information about droughts that occurred over 25 years ago:

Table 31: Bee County 2013 CHAMPS Report Drought Data

Date	Time	Hazard	Fatalities	Injuries	Property Damage	Crop Damage	Property Damage $2016	Crop Damage $2016
5/1/1977	-	Drought	0	0	$6,970	$69,704	$27,769	$277,697
7/1/1989	-	Drought	0	0	$0	$17,153,297	$0	$33,397,469

NOAA Version

CHAMPS Version

Reported by Both

2) Likelihood of Future Occurrence

Based on historical drought in Texas and Bee County, the likelihood of future drought affecting the participating jurisdictions is likely, with an event probable in the next three years, and a major drought every 20 years.

3) Extent

Over the last 10 years, Bee County has regularly experienced county-wide droughts classified as periods ranging from abnormal dryness to exceptional drought. At multiple times, the entire County, including the City of Beeville and Coastal Bend College, has been in exceptional drought, the most severe drought category.

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

Table 32: Palmer Drought Index

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

Table 33: Palmer Drought Category Descriptions[49]

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

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

Based on the historical occurrences of drought, Bee County and all participating jurisdictions should anticipate experiencing droughts ranging from abnormally dry to exceptional drought or D0 to D4 based on the Palmer Drought Category. Given varying conditions, droughts may start

[49] www.droughtmonitor.unl.edu

on the low end of the Palmer Drought Category, but will intensify with duration and an ongoing lack of precipitation.

Bee County experienced an extended period of drought between 2011 and 2015. Throughout that time, drought conditions ranged from abnormally dry to exceptional drought, and the worst period lasted from June 2011 through April 2012. Between July 2011 and January 2012, 100% of the County was in exceptional drought, D4. Previously, between April and September 2009, 100% of the County was in exceptional drought, D4.

Since 1977, the worst droughts in Bee County and the participating jurisdictions have inflicted up to $27,769[50] in property damages and $33,397,469 [51] in crop damages. Droughts have been as intense as D4, exceptional drought, on the Palmer Drought Category scale. Future drought events may meet or exceed previous droughts in terms of intensity, duration, and total damage dollars inflicted.

4) Location and Impact

A) Location

Drought has no distinct geographic boundary. Drought can occur across Bee County and the participating jurisdictions.

B) Impact

Infrastructural impacts may include damage to the foundations of agricultural, residential, commercial, and industrial buildings. Road networks that pass through the County and participating jurisdictions may be damaged to the point of failure as the ground shifts and shrinks. The participating jurisdictions' water and wastewater systems may fail due to cracks and breaks in underground tanks and pipe networks.

Economic impacts may include: increased prices for food, unemployment for farm workers and ranch hands, and reduced tax revenues because of reduced supplies of agriculture products and livestock that are dependent on rainfall.

The City of Beeville adopted its current Drought Contingency Plan in June 2009. The plan describes four stages of water restrictions ranging from voluntary conservation to a prohibition of irrigation and washing vehicles. It also establishes parameters for water rationing to households, multi-family units, and commercial and industrial customers triggered by drought measures as determined by the water level in the City's primary reservoir, Lake Corpus Christi.

5) Vulnerability

Because drought has the potential to impact the every jurisdiction equally, all improved property and the entire population is exposed to this hazard. Foundations of all buildings are

[50] Event date: 5/1/1977, damage dollars adjusted to $2016
[51] Event date: 7/1/1989, damage dollars adjusted to $2016

vulnerable; however, older structures, especially those in downtown Beeville, or those built under less stringent foundation code requirements are most vulnerable. Critical infrastructure like water and wastewater lines and roads are also vulnerable.

A) Population

As described in the narrative, as well as Table 10 and Figures 2-7, in Section 3 of Chapter 4 above, Bee County and the City of Beeville are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a drought.

Lower income populations who may not have the resources to buy large quantities of bottled water in the event of a shortage may be more vulnerable than other populations.

Residents of sub-standard structures are also of particular concern. Structures in sub-standard condition ahead of a drought may be more likely to suffer additional damages, including irreparable damage to building foundations as soils shift and shrink. Depending on their financial means, these residents may require additional assistance recovering from drought-caused damages.

B) Critical Facilities

In addition to triggering various components of participating jurisdictions' Drought Contingency plans, drought conditions may affect local critical facilities. Area fire departments may see increased demand for controlling wildland fire due to dry conditions. Drought is likely to require increased output from the local power company, AEP, in order to keep up with electrical demand. Depending on factors like time of year, temperature, and duration, increased electrical demand may cause brownouts that would impact critical facilities like Christus Spohn Hospital and local nursing homes. Structural damage to all critical facilities, based on the rarity of previous instances of structural damage, is expected to be limited. However, in the worst cases such damage is possible, and may include cracked building foundations, damages to water and wastewater lines that serve the facilities, and in certain cases, these physical damages may create economic damages for the broader community.

Table 34: Bee County Critical Facilities Vulnerable to Drought

Bee County	Building Type	Potential Drought Impacts			
		Structural Damage	Water / Wastewater Line Damages	Increased Demand for Services	Economic Damages
Bee County Expo Center	Government Facility	x	x		x
Blanconia VFD	Emergency Services	x	x	x	
Medio Creek Bridge (Normanna Bridge)	Government Facility	x			

Normanna Post Office	Post Office	x	x		
Pawnee Elementary / Pawnee Junior High School	School	x	x		
Pawnee Post Office	Post Office	x	x		
Pawnee VFD	Emergency Services	x	x	x	
Pettus - Tuleta VFD	Emergency Services	x	x	x	
Pettus Elementary School	School	x	x		
Pettus High School	School	x	x		
Pettus Post Office	Post Office	x	x		
Pettus Station (Electricity)	Electrical Facility	x		x	x
Skidmore Post Office	Post Office	x	x		
Skidmore Station (Electricity)	Electrical Facility	x		x	x
Skidmore VFD	Emergency Services	x	x	x	
Skidmore Water Supply Corp.	Water System Facility	x	x	x	x
Skidmore-Tynan Elementary / Junior High School / High School	School	x	x		
Clem and Bettie Stoltzfus Community Center	Cultural Institution	x	x	x	
Tuleta Post Office	Post Office	x	x		
Tynan Post Office	Post Office	x	x		
Tynan VFD	Emergency Services	x	x	x	
Tynan Water Supply Corp.	Water System Facility	x	x	x	x

Structures on the National Register of Historic Places

Table 35: City of Beeville Critical Facilities Vulnerable to Drought

City of Beeville	Building Type	Potential Drought Impacts			
		Structural Damage	Water / Wastewater Line Damages	Increased Demand for Services	Economic Damages
A.C. Jones High School	School	x	x		
Bee County Courthouse	Government Facility	x	x		
Bee County Library (Praeger Building)	Cultural Institution	x	x	x	
Bee County Sheriff	Emergency Services	x	x		
Bee County Tax Assessor Building	Government Facility	x	x		x
Beeville Art Museum	Cultural Institution	x	x	x	
Beeville City Hall	Government Facility	x	x		
Beeville Community Center	Cultural Institution	x	x	x	
Beeville First National Bank	Commercial Facility	x	x		x

Beeville Municipal Airport	Government Facility	x	x		
Beeville Police Department	Emergency Services	x	x		
Beeville Post Office	Post Office	x	x		
Beeville Station (Electricity)	Electrical Facility	x		x	x
Beeville Utility Department / Water System Facility	Water System Facility	x	x	x	x
Beeville Wastewater Treatment Plant	Wastewater System Facility	x	x	x	x
Beeville Water System Elevated Water Storage Tank	Water System Facility	x	x	x	x
Beeville Water System Elevated Water Storage Tank	Water System Facility	x	x	x	x
Beeville Water System Elevated Water Storage Tank	Water System Facility	x	x	x	x
Beeville Water System Facility	Water System Facility	x	x	x	x
Beeville Water System Facility	Water System Facility	x	x	x	x
C. M. Smitty Smith Central Fire Station	Emergency Services	x	x	x	
Chase Field	Government Facility	x	x		x
Christus Spohn Hospital Beeville	Medical Services Facility	x	x	x	
Coastal Plains Community Center	Cultural Institution	x	x	x	
Faden-McKeown-Chambliss Elementary School	School	x	x		
Hampton-Moreno-Dugat Early Childhood Center	School	x	x		
H-E-B Pharmacy	Medical Services Facility	x	x		x
IBC Beeville	Commercial Facility	x	x		x
La Amistad Adult Care & Activity Center	Cultural Institution	x	x	x	
Lott-Canada School (Coastal Bend College Lott-Canada Facility)	School	x	x		
Moore's City Drug	Medical Services Facility	x	x		x
Moreno Junior High School	School	x	x		
Prosperity Bank Beeville	Commercial Facility	x	x		x
R.A. Hall Elementary School	School	x	x		
Rialto Theater	Cultural Institution	x	x		x
Schulz & Wroten Pharmacy Inc.	Medical Services Facility	x	x		x
Texas Department of Criminal Justice, Garza East Unit	Government Facility	x	x		
Texas Department of Criminal Justice, Garza West Unit	Government Facility	x	x		
Texas Department of Criminal Justice, William G. McConnell Unit	Government Facility	x	x		

Thomas Jefferson Intermediate School	School	x	x		
Wal Mart / Pharmacy	Medical Services Facility	x	x		x
Walgreens	Medical Services Facility	x	x		x
Woodridge Nursing and Rehabilitation Center	Medical Services Facility	x	x	x	

Structures on the National Register of Historic Places

Table 36: Coastal Bend College Critical Facilities Vulnerable to Drought

Coastal Bend College	Building Type	Potential Drought Impacts			
		Structural Damage	Water / Wastewater Line Damages	Increased Demand for Services	Economic Damages
Robert J. Beasley Jr. Building	Administration	x	x	x	x
Fred C. Latchman Jr. Academic Building	Academic	x	x	x	x
Fred C. Latchman Jr. Science Building	Academic	x	x	x	x
Central Plant Building	Utility	x	x	x	x
R.W. Dirks Student Services Building	Administration	x	x	x	x

C) Vulnerable Structures and Infrastructure

Given drought's geographic reach, all structures within the participating jurisdictions are equally vulnerable to the hazard. However, given the limited structural damage inflicted by previous droughts, future structural damages are expected to be similarly limited.

Table 37: Estimated Potential Damage Values in Bee County[52]

	Bee County		City of Beeville		Coastal Bend College	
Building Type	Count	Potential Damage Value	Count	Potential Damage Value	Count	Potential Damage Value
Residential	11,337	$1,124,708,000	5,848[53]	$580,169,536[54]	5	$6,743,450[55]
Commercial	482	$171,063,000	195[56]	$69,042,801.61[57]	-	-
Industrial	109	$43,074,000	44	$17,385,113.30	-	-
Agricultural	43	$5,865,000	17	$2,367,174.85	-	-
Religious	51	$25,017,000	21	$10,097,120.76	-	-
Governmental	35	$20,935,000	14	$8,449,583.20	-	-
Educational	20	$43,906,000	8	$17,720,917.13	30	$40,460,699
Total	**12,077**	**$1,434,568,000**	**6,147**	**$705,232,247**	**35**	**$47,204,149**

[52] Property values based on Bee County 2013 CHAMPS Report.
[53] Estimated count based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[54] Estimated value based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[55] Estimated as a percentage of total property value.
[56] Estimated count based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.
[57] Estimated value based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.

I. Water and Wastewater Systems

Water and wastewater systems rely on underground pipe networks and storage tanks to function properly. During extreme droughts, as the ground shifts and shrinks, these pipes and tanks become vulnerable to cracks and breaks. Within greater Bee County, the water and wastewater systems in Pawnee, Tulsita, Pettus, Tuleta, Normanna, Skidmore, and Tynan serve the largest numbers of residents.

The City of Beeville has its own water and wastewater system.

Damage to water and wastewater systems, especially during a drought, may be severe enough exceed a jurisdiction's ability to immediately fund repairs without outside assistance. Delays to returning these systems to normal functionality will require the participating jurisdictions to provide emergency alternatives.

II. Road Networks

Drought conditions may damage road networks in various ways. Depending on usage and temperature, as soil shifts and shrinks, roadbeds may subside. A combination of shifting ground, high temperatures, and heavy usage may cause asphalt roads to become rutted.

Although surface streets may be most vulnerable to drought's effects due to variations in street construction requirements throughout the county and participating jurisdictions, damages to US 181 would create the greatest impact in Bee County and the participating jurisdictions. US 181 is a hurricane evacuation route. The highway runs the length of Bee County, and it passes through the City of Beeville.

III. Agricultural Production

According to the USDA 2012 Census of Agriculture[58], the total market value of agricultural products sold, including direct sales, in Bee County was $26,044,000. Between 1995 and 2014[59], $59,168,650 in indemnities was paid to farmers in Bee County. That is roughly $2,958,433 per year. Although the proportion of indemnities paid to cover losses due to drought isn't identifiable, given Bee County's recent drought history, it is likely that at least some of the dollars paid were related to drought-caused damages.

Given agriculture's role in the County, drought-caused losses will have impacts beyond any individual and may lead to contraction in the wider economy. However, because the data is recorded at the county level, there is no specific information regarding agricultural losses due to drought for the City of Beeville.

[58]https://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/Texas/st48_2_002_002.pdf

[59] https://farm.ewg.org/cropinsurance.php?fips=48047&summpage=SUMMARY

10. Earthquake

Earthquakes are defined as a shaking or trembling of the earth that is volcanic or tectonic in origin.

A quake with magnitude 3 may do no more than startle people and rattle dishes within a one-square mile region. However, a magnitude 7 would be felt by people over the entire State of Texas, and could do significant damage to buildings, bridges, and dams over a considerable region.

1) Earthquake History

According to the best information available, there has been one earthquake in Bee County. None have affected the City of Beeville or Coastal Bend College.

Within the last 30 years there have been 2 additional earthquakes near Bee County, the City of Beeville, and Coastal Bend College. The earthquakes have ranged in magnitude from 3.0 to 4.1.

Bee County, the City of Beeville, and Coastal Bend College elected to address this hazard because of the possibility that earthquakes may become a more significant issue within the current planning period.

Table 38: Bee County and surrounding area Earthquakes

Date	Location	Magnitude
4/9/1993	13 mi. northeast of Pawnee	4.1
5/16/1993	15 mi. northeast of Pawnee	3.0
12/21/2010	2 mi. northeast of Pawnee in Bee County	3.0

2) Likelihood of Future Occurrence

Given the proximity but infrequency of earthquakes in the surrounding area, an earthquake that could affect any or all of the participating jurisdictions is unlikely, meaning that one is possible in the next 10 years.

3) Extent

Earthquake strength is generally measured on the Richter Magnitude Scale. The Modified Mercalli Intensity Scale for Earthquakes provides an additional means of describing an earthquake's effects.

Table 39: Richter Magnitude Scale

Magnitude	Earthquake Effects	Estimated number each year
2.5 or less	Usually not felt, but can be recorded by seismograph.	900,000
2.5 to 5.4	Often felt, but only causes minor damage.	30,000
5.5 to 6.0	Slight damage to buildings and other structures.	500
6.1 to 6.9	May cause a lot of damage in very populated areas.	100
7.0 to 7.9	Major earthquake. Serious damage.	20
8.0 or greater	Great earthquake. Can totally destroy communities near the epicenter.	One every 5 to 10 years.

Table 40: Modified Mercalli Intensity Scale for Earthquakes

Scale	Intensity	Description of Effects	Corresponding Richter Scale Magnitude
I	Instrumental	Detected only by seismographs	
II	Feeble	Some people feel it	<4.2
III	Slight	Felt by people resting, like a truck rumbling by	
IV	Moderate	Felt by people walking	
V	Slightly Strong	Sleepers awake; church bells ring	<4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves	<5.4
VII	Very Strong	Mild alarm; walls crack; plaster falls	<6.1

VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open	<6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread	<7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes, and cables destroyed; general triggering of other hazards	<8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves	>8.1

Although only Bee County has any known earthquake history, and the earthquakes in the surrounding vicinity inflicted minimal, if any, damages, earthquake frequency appears to be rising. A future earthquake affecting Bee County and the participating jurisdictions is expected to be similar in strength to those that have occurred near Pawnee, up to 4.0 on the Richter Magnitude Scale or less than a II-feeble on the Modified Mercalli Intensity Scale.

However, future earthquakes may meet or exceed previous ones in terms of strength and damages.

4) Location and Impact

A) Location

Earthquakes have no distinct geographic boundary in Bee County, the City of Beeville, or Coastal Bend College. Earthquakes can occur across all three jurisdictions.

B) Impact

Impacts may include structural damages to buildings of all types. Road networks that pass through the County, the City of Beeville, and Coastal Bend College may be damaged to the point of failure as the ground shifts. Water and wastewater systems may fail due to cracks and breaks in underground tanks and pipe networks.

5) Vulnerability

A) Population

As described in the narrative, as well as Table 10 and Figures 2-7, in Section 3 of Chapter 4 above, Bee County and the City of Beeville are home to many vulnerable residents. Increased

vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from an earthquake.

Structures in substandard condition ahead of an earthquake may be more likely to suffer additional damages, including irreparable foundation or structural damages as the ground shifts. Depending on their means, these residents may require additional assistance recovering from earthquake-caused damages.

B) Critical Facilities

The planning team identified 70 critical facilities spread across the County and participating jurisdictions. Because earthquakes don't recognize geographic boundaries, all critical facilities, no matter their jurisdictional location, are equally vulnerable to earthquakes.

Table 41: Bee County Critical Facilities Vulnerable to Earthquakes

Bee County	Building Type	Potential Earthquake Impacts			
		Structural Damage	Water / Wastewater Line Damages	Increased Demand for Services	Economic Damages
Bee County Expo Center	Government Facility	x	x		x
Blanconia VFD	Emergency Services	x	x	x	
Medio Creek Bridge (Normanna Bridge)	Government Facility	x			
Normanna Post Office	Post Office	x	x		
Pawnee Elementary / Pawnee Junior High School	School	x	x		
Pawnee Post Office	Post Office	x	x		
Pawnee VFD	Emergency Services	x	x	x	
Pettus - Tuleta VFD	Emergency Services	x	x	x	
Pettus Elementary School	School	x	x		
Pettus High School	School	x	x		
Pettus Post Office	Post Office	x	x		
Pettus Station (Electricity)	Electrical Facility	x		x	x
Skidmore Post Office	Post Office	x	x		
Skidmore Station (Electricity)	Electrical Facility	x		x	x
Skidmore VFD	Emergency Services	x	x	x	
Skidmore Water Supply Corp.	Water System Facility	x	x	x	x
Skidmore-Tynan Elementary / Junior High School / High School	School	x	x		
Clem and Bettie Stoltzfus Community Center	Cultural Institution	x	x	x	
Tuleta Post Office	Post Office	x	x		

Tynan Post Office	Post Office	x	x		
Tynan VFD	Emergency Services	x	x	x	
Tynan Water Supply Corp.	Water System Facility	x	x	x	x

Structures on the National Register of Historic Places

Table 42: City of Beeville Critical Facilities Vulnerable to Earthquakes

City of Beeville	Building Type	Potential Earthquake Impacts			
		Structural Damage	Water / Wastewater Line Damages	Increased Demand for Services	Economic Damages
A.C. Jones High School	School	x	x		
Bee County Courthouse	Government Facility	x	x		
Bee County Library (Praeger Building)	Cultural Institution	x	x	x	
Bee County Sheriff	Emergency Services	x	x		
Bee County Tax Assessor Building	Government Facility	x	x		x
Beeville Art Museum	Cultural Institution	x	x	x	
Beeville City Hall	Government Facility	x	x		
Beeville Community Center	Cultural Institution	x	x	x	
Beeville First National Bank	Commercial Facility	x	x		x
Beeville Municipal Airport	Government Facility	x	x		
Beeville Police Department	Emergency Services	x	x		
Beeville Post Office	Post Office	x	x		
Beeville Station (Electricity)	Electrical Facility	x		x	x
Beeville Utility Department / Water System Facility	Water System Facility	x	x	x	x
Beeville Wastewater Treatment Plant	Wastewater System Facility	x	x	x	x
Beeville Water System Elevated Water Storage Tank	Water System Facility	x	x	x	x
Beeville Water System Elevated Water Storage Tank	Water System Facility	x	x	x	x
Beeville Water System Elevated Water Storage Tank	Water System Facility	x	x	x	x
Beeville Water System Facility	Water System Facility	x	x	x	x
Beeville Water System Facility	Water System Facility	x	x	x	x
C. M. Smitty Smith Central Fire Station	Emergency Services	x	x	x	
Chase Field	Government Facility	x	x		x
Christus Spohn Hospital Beeville	Medical Services Facility	x	x	x	
Coastal Plains Community Center	Cultural Institution	x	x	x	
Faden-McKeown-Chambliss	School	x	x		

Elementary School					
Hampton-Moreno-Dugat Early Childhood Center	School	x	x		
H-E-B Pharmacy	Medical Services Facility	x	x		x
IBC Beeville	Commercial Facility	x	x		x
La Amistad Adult Care & Activity Center	Cultural Institution	x	x	x	
Lott-Canada School (Coastal Bend College Lott-Canada Facility)	School	x	x		
Moore's City Drug	Medical Services Facility	x	x		x
Moreno Junior High School	School	x	x		
Prosperity Bank Beeville	Commercial Facility	x	x		x
R.A. Hall Elementary School	School	x	x		
Rialto Theater	Cultural Institution	x	x		x
Schulz & Wroten Pharmacy Inc.	Medical Services Facility	x	x		x
Texas Department of Criminal Justice, Garza East Unit	Government Facility	x	x		
Texas Department of Criminal Justice, Garza West Unit	Government Facility	x	x		
Texas Department of Criminal Justice, William G. McConnell Unit	Government Facility	x	x		
Thomas Jefferson Intermediate School	School	x	x		
Wal Mart / Pharmacy	Medical Services Facility	x	x		x
Walgreens	Medical Services Facility	x	x		x
Woodridge Nursing and Rehabilitation Center	Medical Services Facility	x	x	x	

Structures on the National Register of Historic Places

Table 43: Coastal Bend College Critical Facilities Vulnerable to Earthquakes

Coastal Bend College	Building Type	Potential Earthquake Impacts			
		Structural Damage	Water / Wastewater Line Damages	Increased Demand for Services	Economic Damages
Robert J. Beasley Jr. Building	Administration	x	x	x	x
Fred C. Latchman Jr. Academic Building	Academic	x	x	x	x
Fred C. Latchman Jr. Science Building	Academic	x	x	x	x
Central Plant Building	Utility	x	x	x	x

R.W. Dirks Student Services Building	Administration	x	x	x	x

C) Vulnerable Structures and Infrastructure

All structures within Bee County and the participating jurisdictions are equally vulnerable to earthquakes. However, given the lack of structural damage inflicted by previous nearby events, future structural damages are expected to be similarly limited.

Table 44: Estimated Potential Damage Values[60]

	Bee County		City of Beeville		Coastal Bend College	
Building Type	Count	Potential Damage Value	Count	Potential Damage Value	Count	Potential Damage Value
Residential	11,337	$1,124,708,000	5,848[61]	$580,169,536[62]	5	$6,743,450[63]
Commercial	482	$171,063,000	195[64]	$69,042,801.61[65]	-	-
Industrial	109	$43,074,000	44	$17,385,113.30	-	-
Agricultural	43	$5,865,000	17	$2,367,174.85	-	-
Religious	51	$25,017,000	21	$10,097,120.76	-	-
Governmental	35	$20,935,000	14	$8,449,583.20	-	-
Educational	20	$43,906,000	8	$17,720,917.13	30	$40,460,699
Total	**12,077**	**$1,434,568,000**	**6,147**	**$705,232,247**	**35**	**$47,204,149**

[60] Property values based on Bee County 2013 CHAMPS Report.
[61] Estimated count based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[62] Estimated value based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[63] Estimated as a percentage of total property value.
[64] Estimated count based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.
[65] Estimated value based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.

Water, Wastewater, and Pipelines

Water, wastewater, and pipeline systems rely on underground storage tanks and pipe networks to function properly. During strong earthquakes these tanks and pipes may become vulnerable to cracks and breaks.

Damage to water and wastewater systems may be severe enough exceed participating jurisdictions' ability to immediately fund repairs without outside assistance. Delays to returning these systems to normal functionality will require emergency alternatives.

Road Networks

Earthquakes may damage road networks in various ways. Depending on an earthquake's strength, roadbeds may subside, crack, or become disjointed. Damages may be severe enough to exceed the participating jurisdictions' ability to immediately fund repairs without outside assistance.

11. Expansive Soils

Expansive soils are defined as soils and soft rock that tend to swell or shrink due to changes in moisture content. Changes in soil volume present a hazard primarily to structures built on top of expansive soils.

Expansive soils (bentonite, smectite, or other reactive clays) expand when the soil particles attract water, and can shrink when the clay dries. Expansive soil can grow to as much as 15 times its original size, thus causing severe damage. Sidewalks, roads, and residential and commercial buildings may be lifted causing cracks and distortion.

It is differential expansion that causes damage. If the entire area under a foundation or road maintained the same moisture content, the entire structure would rise uniformly, and there would be no damage. Residential construction generally has more problems than commercial, but both experience significant losses. The foundation type most prevalent in Texas, slab on grade, is also the most susceptible to damage from expansive clays.

1) Expansive Soils History

None of the participating jurisdictions has a documented history of damages caused by expansive soils. However, the planning team has determined that the hazard is known to affect structures and infrastructure in the jurisdictions. Moving forward, the jurisdictions will make an effort to track instances of damages due to expansive soils to begin developing a comprehensive history of the hazard and its effects.

2) Likelihood of Future Occurrence

Given the lack of an officially recorded hazard history in Bee County, the City of Beeville, and Coastal Bend College, it's difficult to attempt to estimate the likelihood of future expansive soils hazards events.

However, in light of the jurisdictions' histories of heavy rainfalls and periods of drought, conditions that lead clay-filled soils to expand and contract respectively, it may be fair to say that a future expansive soils event is unlikely, meaning one is possible in the next 10 years.

As information on the hazard is gathered more closely moving forward, its likelihood will be revised accordingly.

3) Extent

According to the State of Texas Mitigation Plan Update 2013, determining the extent of the expansive soils hazard requires measuring a soil's swelling potential or volumetric swell. To test the soil for these properties, the State outlined the following procedure:

> Soil material is disaggregated and passed through the #4 sieve and then brought to approximately the optimum moisture content (as determined by American Society for

Testing and Materials [ASTM-D-1557]). The optimum moisture content equates to approximately 80 to 85% of saturation. After setting for 6 to 30 hours, the moisture-conditioned soil is compacted into a 4-in diameter mold. The moisture content is then adjusted, if necessary, to bring the sample to 50% saturation. A 144 psf surcharge is applied and the sample is wetted and monitored for 24 hours, measuring the volumetric swell. The Expansion Index is calculated as follows:

$EI = 100 \times \Delta h \times F$

Where Δh = percent swell and F = fraction passing No. 4 sieve

The following "ratings" can be accepted examples expected for "extent" when a risk is identified as Expansive Soils:

Table 45: ASTM D4729-11 Expansive Soils Index (in %)

0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High

Due to the lack of recorded instances of expansive soil events, the jurisdictions estimate the hazard's extent to be medium on the Expansive Soils Index as shown in Table 45 above.

To help inform their hazard extent estimate, Bee County, the City of Beeville, and Coastal Bend College have relied on the county-wide soil studies produced by the United States Department of Agriculture (USDA), Soil Conservation Service[66] as well as the USDA's Web Soil Survey [67]data. The Web Soil Survey in particular offers both soil maps and USDA guidance on soil suitability for various types of development.

For the purposes of this plan, the jurisdictions have decided to consider the ratings of Bee County soils for the construction of both residential dwellings on concrete slab and small commercial buildings.

As shown in Figure 17 below, virtually all of Bee County contains soils that are "Somewhat Limited" for the construction of dwellings on concrete slab, the State's most prevalent dwelling foundation. Additionally, areas throughout the County, most heavily concentrated to the northwest around Pawnee, are considered "Very Limited" for the construction of dwellings on concrete slab.

[66] https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/texas/TX025/0/bee.pdf
[67] http://websoilsurvey.nrcs.usda.gov/app/

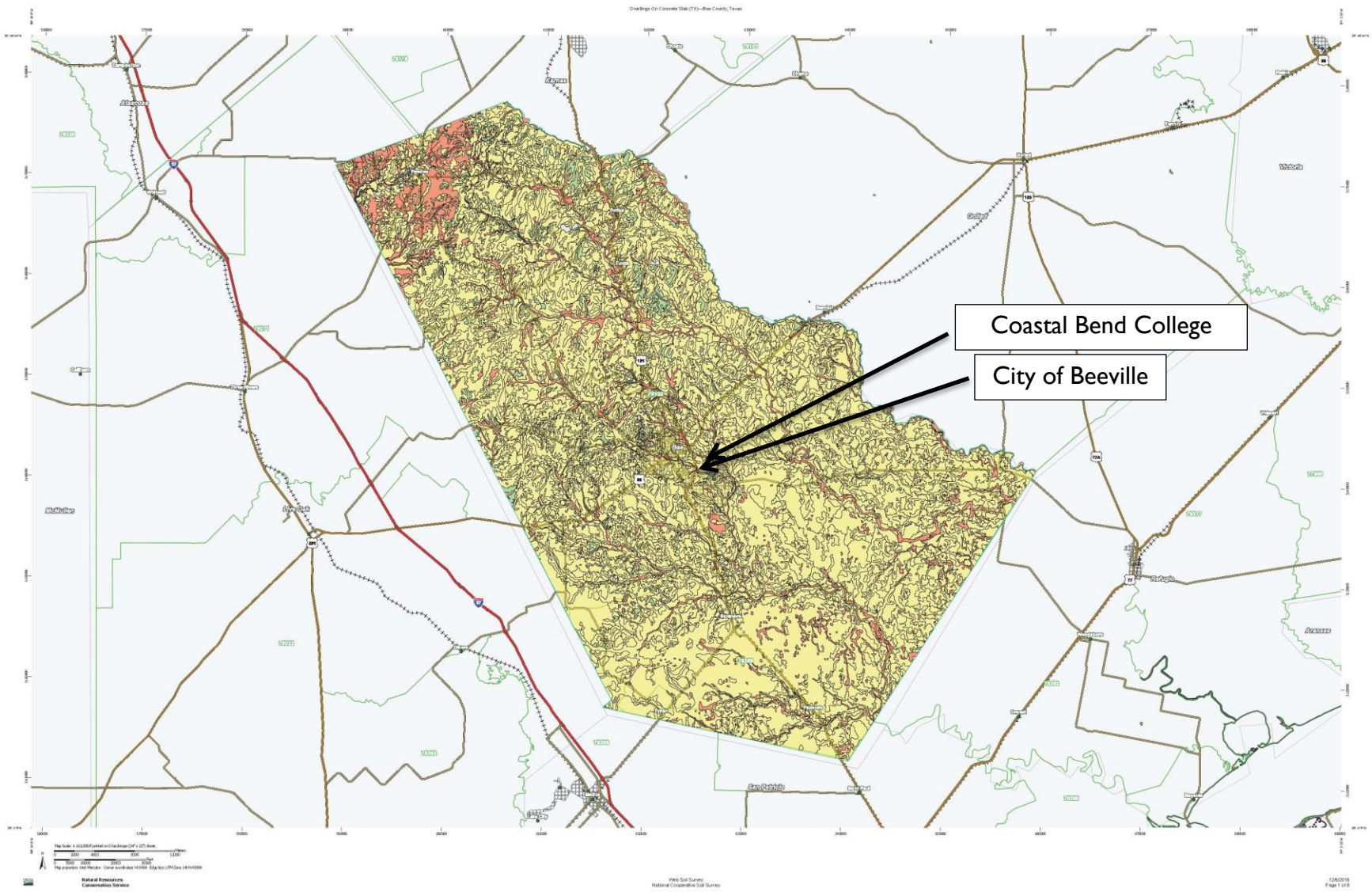

Figure 17: Bee County Soil Ratings for the Construction of Dwellings on Concrete Slab

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Political Features
- States
- Counties
- Cities
- Postal Code
- PLSS Township and Range
- PLSS Section

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Bee County, Texas
Survey Area Data: Version 13, Sep 21, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

As shown in Figure 18 below, Bee County is essentially divided between soils that are "Somewhat Limited" (74% of the County) or "Very Limited" (24% of the County) for the construction of small commercial buildings, defined as structures less than three stories high, without basements, and constructed on foundations consisting of spread footings or reinforced concrete built on undisturbed soil at a depth of 2' or at the depth of maximum frost penetration, whichever is deeper.

The areas considered very limited for the construction of small commercial buildings are concentrated in northwest Bee County near Pawnee. They are also concentrated in the area between Tynan, Beeville, and Skidmore.

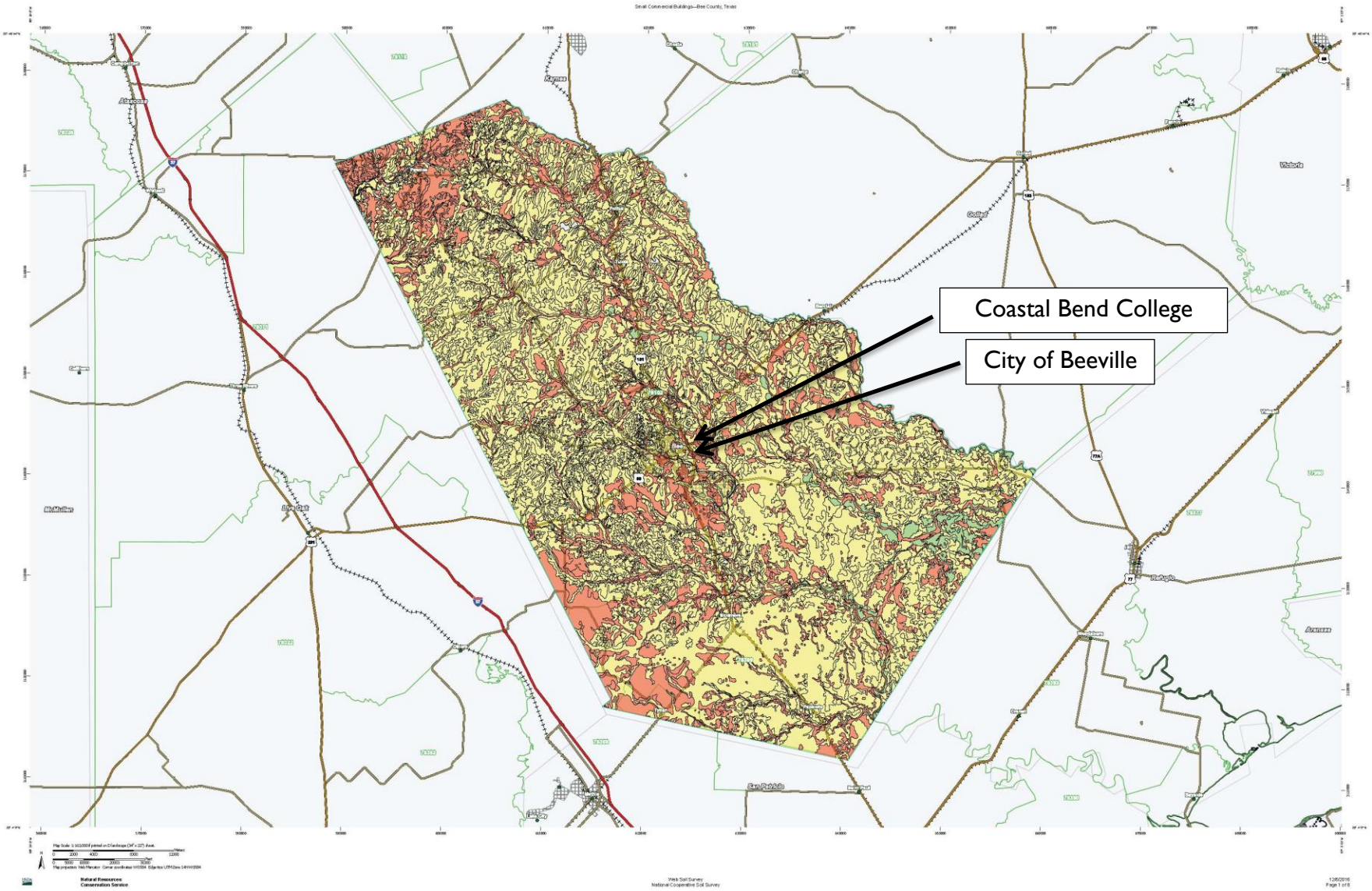

Figure 18: Bee County Soil Ratings for the Construction of Small Commercial Buildings

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Very limited
- Somewhat limited
- Not limited
- Not rated or not available

Political Features

- States
- Counties
- Cities
- Postal Code
- PLSS Township and Range
- PLSS Section

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Bee County, Texas
Survey Area Data: Version 13, Sep 21, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

4) Location and Impact

A) Location – All Jurisdictions

As shown in the maps above, expansive soils exist across the County, and have the potential to affect all participating jurisdictions. Areas within each jurisdiction may be more affected by expansive soils depending on both building location and building type.

B) Impact – All Jurisdictions

The potential impact of expansive soils in the jurisdictions is unknown at this time. Future hazard events are expected to result in few, if any, injuries.

However, as outlined in the State of Texas Mitigation Plan Update 2013, the combination of expansive soils and Texas homebuilders' propensity for installing concrete slab foundations, often results in cracked foundations that can literally halve a home's value. In such cases, economic losses are not limited to those borne by the homeowner. Instead, halved property values result in lower property values, and therefore, lower property tax revenues.

Potential ripple effects make it difficult to estimate how wide-reaching expansive soils' impact could be. Under the right circumstances, expansive soils may wreak havoc on local economies by depleting homeowners' bank accounts and decimating municipal budgets. In the worst cases, building owners may choose to walk away, rather than make costly repairs, thus saddling local governments with abandoned properties and the incumbent challenges they pose.

5) Vulnerability

Bee County and the City of Beeville are exposed to expansive soils to varying degrees based on both soil type and building type, as shown in Figures 17-18 above. At this time, given the combination of the hazard's ability to inflict unpredictable damages, the lack of officially reported data, and the diversity of building ages, types, and foundations in each participating jurisdiction, it's unfeasible to identify which buildings, infrastructure, and critical facilities are vulnerable to damages significant enough to interrupt or stop normal operations. Therefore, all are considered equally vulnerable to the hazard.

A) Critical Facilities

Table 46: Bee County Critical Facilities Vulnerable to Expansive Soils

Facility	Type
Bee County Expo Center	Government Facility
Blanconia VFD	Emergency Services
Medio Creek Bridge (Normanna Bridge)	Government Facility
Normanna Post Office	Post Office
Pawnee Elementary / Pawnee Junior High School	School

Pawnee Post Office	Post Office
Pawnee VFD	Emergency Services
Pettus - Tuleta VFD	Emergency Services
Pettus Elementary School	School
Pettus High School	School
Pettus Post Office	Post Office
Pettus Station (Electricity)	Electrical Facility
Skidmore Post Office	Post Office
Skidmore Station (Electricity)	Electrical Facility
Skidmore VFD	Emergency Services
Skidmore Water Supply Corp.	Water System Facility
Skidmore-Tynan Elementary / Junior High School / High School	School
Clem and Bettie Stoltzfus Community Center	Cultural Institution
Tuleta Post Office	Post Office
Tynan Post Office	Post Office
Tynan VFD	Emergency Services
Tynan Water Supply Corp.	Water System Facility

Structures on the National Register of Historic Places

Table 47: City of Beeville Critical Facilities Vulnerable to Expansive Soils

Facility	Type
A.C. Jones High School	School
Bee County Courthouse	Government Facility
Bee County Library (Praeger Building)	Cultural Institution
Bee County Sheriff	Emergency Services
Bee County Tax Assessor Building	Government Facility
Beeville Art Museum	Cultural Institution
Beeville City Hall	Government Facility
Beeville Community Center	Cultural Institution
Beeville First National Bank	Commercial Facility
Beeville Municipal Airport	Government Facility
Beeville Police Department	Emergency Services
Beeville Post Office	Post Office

Beeville Station (Electricity)	Electrical Facility
Beeville Utility Department / Water System Facility	Water System Facility
Beeville Wastewater Treatment Plant	Wastewater System Facility
Beeville Water System Elevated Water Storage Tank	Water System Facility
Beeville Water System Elevated Water Storage Tank	Water System Facility
Beeville Water System Elevated Water Storage Tank	Water System Facility
Beeville Water System Facility	Water System Facility
Beeville Water System Facility	Water System Facility
C. M. Smitty Smith Central Fire Station	Emergency Services
Chase Field	Government Facility
Christus Spohn Hospital Beeville	Medical Services Facility
Coastal Plains Community Center	Cultural Institution
Faden-McKeown-Chambliss Elementary School	School
Hampton-Moreno-Dugat Early Childhood Center	School
H-E-B Pharmacy	Medical Services Facility
IBC Beeville	Commercial Facility
La Amistad Adult Care & Activity Center	Cultural Institution
Lott-Canada School (Coastal Bend College Lott-Canada Facility)	School
Moore's City Drug	Medical Services Facility
Moreno Junior High School	School
Prosperity Bank Beeville	Commercial Facility
R.A. Hall Elementary School	School
Rialto Theater	Cultural Institution
Schulz & Wroten Pharmacy Inc.	Medical Services Facility
Texas Department of Criminal Justice, Garza East Unit	Government Facility
Texas Department of Criminal Justice, Garza West Unit	Government Facility
Texas Department of Criminal Justice, William G. McConnell Unit	Government Facility
Thomas Jefferson Intermediate School	School
Wal Mart / Pharmacy	Medical Services Facility
Walgreens	Medical Services Facility
Woodridge Nursing and Rehabilitation Center	Medical Services Facility

Structures on the National Register of Historic Places

Table 48: Coastal Bend College Critical Facilities Vulnerable to Expansive Soils

Coastal Bend College	Building Type
Robert J. Beasley Jr. Building	Administration
Fred C. Latchman Jr. Academic Building	Academic
Fred C. Latchman Jr. Science Building	Academic
Central Plant Building	Utility
R.W. Dirks Student Services Building	Administration

B) Vulnerable Structures

Table 49: Expansive Soils Vulnerability

PTAD classification	Property type	Parcel Count	Market value
A	Single Family Homes	6,967	$471,145,820
B	Multi Family Homes	79	$19,743,500
C	Vacant Land	2,759	$21,141,090
D1	Qualified Open Space "Ag" Land	5,531	$47,625,750
D2	Non-Qualified "Ag" Land	875	$19,641,050
E	Farm/Ranch Improvements	1,817	$152,498,730
F1	Commercial Real Property	696	$107,063,770
F2	Industrial Real Property	16	$339,135,280
G	Oil/Gas/Minerals	9,185	$184,064,790
J	Utilities	545	$261,396,320
L1	Commercial Personal Property	756	$54,304,500
L2	Industrial Personal Property	310	$173,490,780
M1	Mobile Homes	683	$7,862,290
S	Dealer's Special Inventory	10	$7,969,660
X	Exempt Property	2,471	$79,074,540
TOTAL		**32,700**	**$1,946,157,870**

12. Extreme Heat

Extreme heat is defined as summertime temperatures that are substantially hotter and/or more humid than average for a given location at that time of year. Humid conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air near the ground.

Although heat can damage buildings and facilities, it presents a more significant threat to the safety and welfare of citizens. The major human risks associated with severe summer heat include: heat cramps; sunburn; dehydration; fatigue; heat exhaustion; and heat stroke. The most vulnerable population to heat casualties are children and the elderly or infirm, who frequently live on low fixed incomes and cannot afford to run air-conditioning on a regular basis. This population is sometimes isolated, with no immediate family or friends to look out for their wellbeing.

Severe summer heat is an invisible killer. Although a heat wave does not happen with the spectacle of other hazards such as tornados and floods, the National Center for Environmental Health reports that extreme heat caused 7,415 heat-related deaths in the United States from 1999 to 2010[68]. Extreme heat kills more people than hurricanes, floods, tornados and lightning combined, according to the National Weather Service. In 2001, 300 deaths were caused by excessive heat exposure.

1) Extreme Heat History

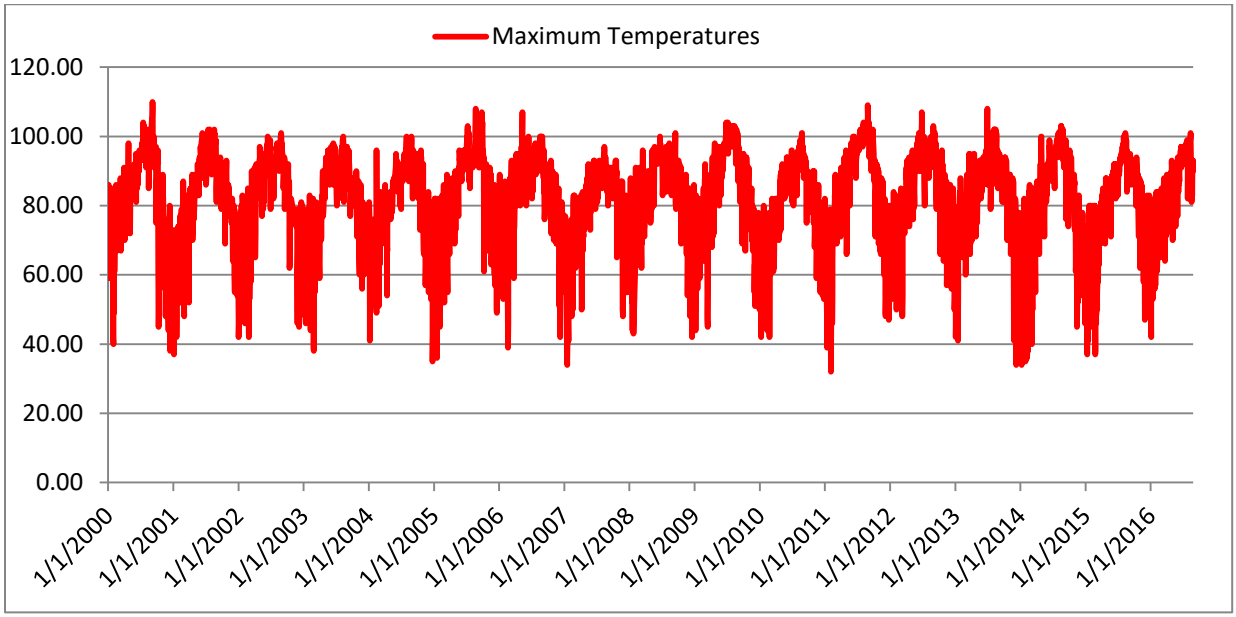

Figure 19: Maximum Recorded Daily Temperature 2000-2016[69]

[68] http://www.bt.cdc.gov/disasters/extremeheat/heat_guide.asp
[69] *Source: National Climatic Data Center, https://www.ncdc.noaa.gov/cdo-web/datasets*

Between January, 2000 and February, 2016, Bee County, the City of Beeville, and Costal Bend College experienced 245 days with a maximum temperature of 100˚F or hotter and nearly 500 days where the combination of humidity and moderate-to-high temperatures warranted a heat advisory, if not an excessive heat warning.

Extreme heat data is recorded at the county level. However, given the nature of extreme heat, both jurisdictions experienced the same extreme heat events. No damage dollars for any extreme heat event have been recorded in any participating jurisdiction in over 15 years.

2) Likelihood of Future Occurrence

Based on historic weather data, the likelihood of extreme heat in all three jurisdictions is highly likely, meaning an event affecting any or all jurisdictions is probable in the next year.

3) Extent

The magnitude or intensity of an extreme heat event is measured according to temperature in relation to the percentage of humidity. According to the National Oceanic Atmospheric Administration (NOAA), this relationship is referred to as the "Heat Index," and is depicted in Figure 20. This index measures how hot it feels outside when humidity is combined with high temperatures.

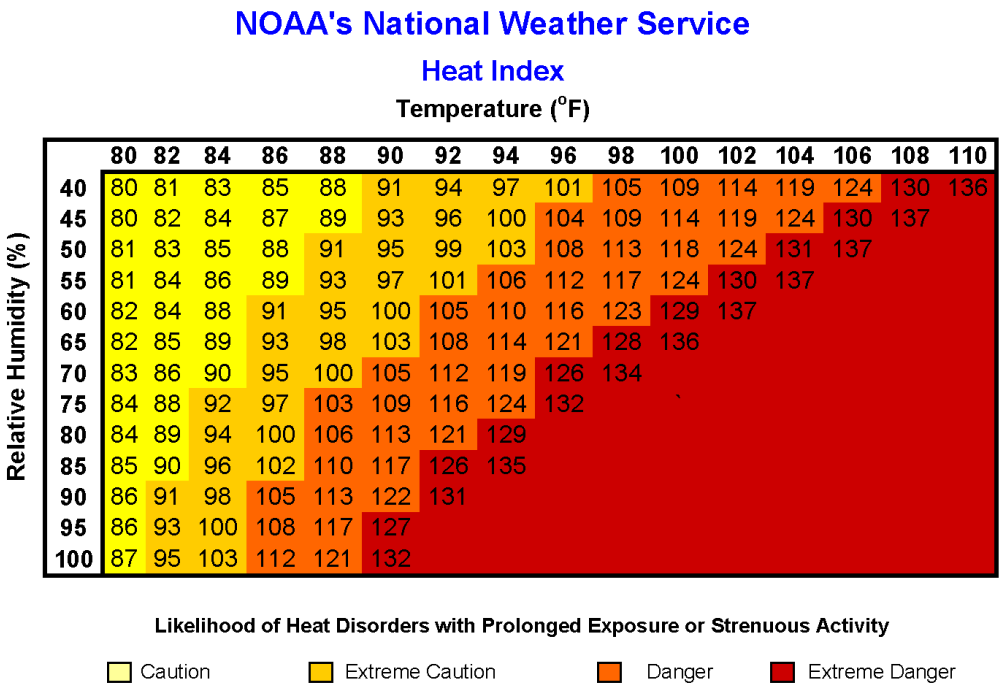

Figure 20: NOAA's NWS Heat Index Chart[70]

[70] http://www.nws.noaa.gov/om/heat/ht-images/heatindexchart.png

The extent scale in Figure 20 displays varying degrees of caution depending on the relative humidity combined with the temperature. For example, when the temperature is below 90˚F, caution should be exercised if the humidity level is at or above 40 percent.

The shaded zones on the chart indicate varying symptoms or disorders that could occur depending on the magnitude or intensity of the event. "Caution" is the first level of intensity where fatigue due to heat exposure is possible. "Extreme Caution" indicates that sunstroke, muscle cramps or heat exhaustion are possible, whereas a "Danger" level means that these symptoms are likely. "Extreme Danger" indicates that heat stroke is likely.

The National Weather Service (NWS) initiates alerts based on the Heat Index as shown Table 50.

Table 50: Heat Intensity

Intensity	Description
Heat Advisory	Extreme heat index making it feel hot, typically between 105˚F to 110˚F for 3 hours or more during the day and at or above 75˚F at night.
Excessive Heat Warning	Extreme heat index making it feel very hot, typically above 105˚F for 3 hours or more during the day and at or above 80˚F at night.

Given an estimated daily average relative humidity level of 75%[71], highs as low as 89˚F can produce a heat index temperature of 106˚F. The combination of high humidity and moderate temperatures creates an environment that reaches the Danger Zone on NOAA's Heat Index Chart, and may trigger a NWS Heat Advisory.

Between 2000 and 2016, all three jurisdictions experienced 489 days with highs of 89˚F or hotter and overnight lows of 75˚F or hotter. Based on the NWS descriptions in Table 50 above, and the average daily humidity level, these days likely warranted a heat advisory.

The hottest temperature recorded in Bee County in the recent past, 110˚F, was reached on September 6, 2000. Based on the NWS descriptions in Table 50 above, at least 10 of the 489 heat advisory days warranted an excessive heat warning based on daytime highs, the average daily humidity level, and overnight lows not falling below 80˚F.

[71] https://www.currentresults.com/Weather/Texas/humidity-annual.php

According to the Bee County 2013 CHAMPS Report, in July 1980, extreme heat injured one person and inflicted the inflation adjusted equivalent of $15,456 in property damages and $1,545,521 in crop damages.

Future extreme heat events may meet or exceed the heat index requirements for issuing an Excessive Heat Warning as described in the Heat Intensity scale in Table 50 above. The hottest temperatures in all participating jurisdictions may meet or exceed the County's current record temperature of 110˚F. Future extreme heat events may be more intense, last longer, and cause more casualties and fatalities than previous ones.

4) Location and Impact

A) Location – All Jurisdictions

Extreme heat has no distinct geographic boundary. Extreme heat can occur across Bee County, the City of Beeville, and Coastal Bend College and uniformly affect all jurisdictions.

B) Impact – All Jurisdictions

The potential impact of excessive summer heat is normally minor, resulting in few, if any, injuries. Although no deaths related to extreme heat have been reported in the participating jurisdictions, in the worst cases, the hazard has the potential to be deadly.

Extreme heat will likely cause only minor property damage and minimal disruption to the quality of life in the participating jurisdictions. Any shutdown of facilities due to extreme heat is expected to be temporary.

5) Vulnerability

A) Population

Vulnerable populations, as described in the narrative, as well as Table 10 and Figures 2-7, in Section 3 of Chapter 4 above, may feel greater impacts from extreme heat due to these populations' limited ability to properly address the hazard due to deficiencies including but not limited to: lack of air conditioning in their homes or vehicles, lack of access to air conditioned public spaces during the hottest part of the day, insufficient numbers of box or ceiling fans, or lack of access to other means of cooling.

At Coastal Bend College, students, faculty, and staff will experience vulnerability to extreme heat as they travel between buildings or participate in outdoor activities, especially at the school's outdoor athletic facilities like its walking trail and tennis courts.

The consequences for these populations' exposure to extreme heat can include but are not limited to: heat cramps, sunburn, dehydration, fatigue, heat exhaustion, heat stroke, or death.

B) Critical Facilities

While all of the jurisdictions are exposed to extreme temperatures, existing buildings, infrastructure, and critical facilities are not considered vulnerable to damages significant enough to interrupt or stop normal operations. Therefore, any estimated property losses associated with the hazard are anticipated to be minimal across the area.

13. Land Subsidence

Land subsidence is defined as the loss of surface elevation due to the removal of subsurface support. It can range from broad, regional lowering of the land surface to localized, full-blown collapses. Land subsidence occurs in different areas with different soil types for different reasons.

1) Land Subsidence History

Neither Bee County nor the City of Beeville has a documented history of damages caused by land subsidence. However, the planning team has determined that the hazard is known to affect structures and infrastructure in the jurisdictions, primarily in the form of sinkholes. Moving forward, both jurisdictions will make an effort to track instances of damages due to land subsidence to begin developing a comprehensive history of the hazard and its effects.

2) Likelihood of Future Occurrence

Given the lack of an officially recorded hazard history in Bee County and the City of Beeville, it's difficult to attempt to estimate the likelihood of future land subsidence events.

However, based on the planning team's assessment, it may be fair to say that a future land subsidence event in either participating jurisdiction is unlikely, meaning one is possible in the next 10 years.

As information on the hazard is gathered more closely moving forward, its likelihood will be revised accordingly.

3) Extent

The magnitude or intensity of a land subsidence event is measured by the depth of land loss. Land subsidence can range from as little as 1' to well over 100'. In the case of sinkholes, width is also a consideration. The sinkholes in Wink, Texas, two of the worst in the State, have diameters of 300' and 900'.

According to information the planning team put together, land subsidence events near Bee County and the participating jurisdictions have been as deep as 12' and as wide as 21'.

In addition to considering their depth and width, sinkholes may expand over time. Although the sinkhole near Bee County and the City of Beeville has been filled in, the sinkholes in Wink expand [72]at the rate of nearly 2" per year.

Generally, land subsidence will likely cause only minor property damage and minimal disruption to the quality of life in the participating jurisdictions.

[72] http://blog.smu.edu/research/2016/06/13/geohazard-giant-sinkholes-near-west-texas-oil-patch-towns-are-growing-as-new-ones-lurk/

However, future worst-case sinkhole depths may exceed 12', widths may exceed 21', and if a future sinkhole can't be filled in, its expansion rates could meet or exceed 2" per year. Regardless of future sinkhole depth, width, and expansion rates, land loss, total destruction, injuries, and death may result from future sinkhole and land subsidence events.

4) Location and Impact

A) Location – All Jurisdictions

Land subsidence has no distinct geographic boundary. Land subsidence may occur across Bee County, the City of Beeville, and Coastal Bend College. The hazard can uniformly affect all jurisdictions.

B) Impact – All Jurisdictions

The impact of land subsidence is normally minor, resulting in few, if any, injuries. Although no deaths related to land subsidence have been reported in either jurisdiction, in the worst cases, the hazard has the potential to be deadly.

Land subsidence may occur slowly over long periods of time, or it can occur rapidly in the form of a sinkhole. Therefore, estimated property losses associated with the hazard are generally anticipated to be minimal, but they have the potential to be total.

Land subsidence may result in damaged building foundations as well as damaged infrastructure including: pipelines, roadways, and sidewalks. These damages may require extensive repair work. In the case of local infrastructure, damages may impede normal business operations and incur repair costs beyond any participating jurisdiction's immediate ability to fund them quickly.

If a sinkhole opens, the damage can be immediate and devastating. Sinkholes may lead to the collapse and complete destruction of nearby structures and infrastructure. Sinkholes can be deadly, especially if they occur along roadways or in commercial centers. In the case of sinkholes, repairing damaged structures and infrastructure may be cost prohibitive. Associated demolition and reconstruction costs may exceed any property owner's or participating jurisdiction's financial capacity and may result in the structure or infrastructure being abandoned, saddling the local jurisdiction with any associated costs and challenges.

5) Vulnerability

All jurisdictions are equally exposed to land subsidence. However, given the lack of officially reported historical damage data, it's not possible to specifically identify which buildings, infrastructure, and critical facilities are vulnerable to damages significant enough to interrupt or stop normal operations. The unpredictable nature of the hazard adds an additional layer of complication, and it makes identifying differences in vulnerability impossible at this time. Therefore, all are considered equally vulnerable to land subsidence.

As information on the hazard is gathered more closely moving forward, local vulnerability will be revised accordingly.

A) Critical Facilities

Table 51: Bee County Critical Facilities Vulnerable to Land Subsidence

Facility	Type
Bee County Expo Center	Government Facility
Blanconia VFD	Emergency Services
Medio Creek Bridge (Normanna Bridge)	Government Facility
Normanna Post Office	Post Office
Pawnee Elementary / Pawnee Junior High School	School
Pawnee Post Office	Post Office
Pawnee VFD	Emergency Services
Pettus - Tuleta VFD	Emergency Services
Pettus Elementary School	School
Pettus High School	School
Pettus Post Office	Post Office
Pettus Station (Electricity)	Electrical Facility
Skidmore Post Office	Post Office
Skidmore Station (Electricity)	Electrical Facility
Skidmore VFD	Emergency Services
Skidmore Water Supply Corp.	Water System Facility
Skidmore-Tynan Elementary / Junior High School / High School	School
Clem and Bettie Stoltzfus Community Center	Cultural Institution
Tuleta Post Office	Post Office
Tynan Post Office	Post Office
Tynan VFD	Emergency Services
Tynan Water Supply Corp.	Water System Facility

Structures on the National Register of Historic Places

Table 52: City of Beeville Critical Facilities Vulnerable to Land Subsidence

Facility	Type
A.C. Jones High School	School

Bee County Courthouse	Government Facility
Bee County Library (Praeger Building)	Cultural Institution
Bee County Sheriff	Emergency Services
Bee County Tax Assessor Building	Government Facility
Beeville Art Museum	Cultural Institution
Beeville City Hall	Government Facility
Beeville Community Center	Cultural Institution
Beeville First National Bank	Commercial Facility
Beeville Municipal Airport	Government Facility
Beeville Police Department	Emergency Services
Beeville Post Office	Post Office
Beeville Station (Electricity)	Electrical Facility
Beeville Utility Department / Water System Facility	Water System Facility
Beeville Wastewater Treatment Plant	Wastewater System Facility
Beeville Water System Elevated Water Storage Tank	Water System Facility
Beeville Water System Elevated Water Storage Tank	Water System Facility
Beeville Water System Elevated Water Storage Tank	Water System Facility
Beeville Water System Facility	Water System Facility
Beeville Water System Facility	Water System Facility
C. M. Smitty Smith Central Fire Station	Emergency Services
Chase Field	Government Facility
Christus Spohn Hospital Beeville	Medical Services Facility
Coastal Plains Community Center	Cultural Institution
Faden-McKeown-Chambliss Elementary School	School
Hampton-Moreno-Dugat Early Childhood Center	School
H-E-B Pharmacy	Medical Services Facility
IBC Beeville	Commercial Facility
La Amistad Adult Care & Activity Center	Cultural Institution
Lott-Canada School (Coastal Bend College Lott-Canada Facility)	School
Moore's City Drug	Medical Services Facility
Moreno Junior High School	School
Prosperity Bank Beeville	Commercial Facility
R.A. Hall Elementary School	School
Rialto Theater	Cultural Institution
Schulz & Wroten Pharmacy Inc.	Medical Services Facility

Texas Department of Criminal Justice, Garza East Unit	Government Facility
Texas Department of Criminal Justice, Garza West Unit	Government Facility
Texas Department of Criminal Justice, William G. McConnell Unit	Government Facility
Thomas Jefferson Intermediate School	School
Wal Mart / Pharmacy	Medical Services Facility
Walgreens	Medical Services Facility
Woodridge Nursing and Rehabilitation Center	Medical Services Facility

Structures on the National Register of Historic Places

Table 53: Coastal Bend College Critical Facilities Vulnerable to Land Subsidence

Coastal Bend College	Building Type
Robert J. Beasley Jr. Building	Administration
Fred C. Latchman Jr. Academic Building	Academic
Fred C. Latchman Jr. Science Building	Academic
Central Plant Building	Utility
R.W. Dirks Student Services Building	Administration

B) Vulnerable Structures

Table 54: Land Subsidence Vulnerability

PTAD classification	Property type	Parcel Count	Market value
A	Single Family Homes	6,967	$471,145,820
B	Multi Family Homes	79	$19,743,500
C	Vacant Land	2,759	$21,141,090
D1	Qualified Open Space "Ag" Land	5,531	$47,625,750
D2	Non-Qualified "Ag" Land	875	$19,641,050
E	Farm/Ranch Improvements	1,817	$152,498,730
F1	Commercial Real Property	696	$107,063,770
F2	Industrial Real Property	16	$339,135,280
G	Oil/Gas/Minerals	9,185	$184,064,790

J	Utilities	545	$261,396,320
L1	Commercial Personal Property	756	$54,304,500
L2	Industrial Personal Property	310	$173,490,780
M1	Mobile Homes	683	$7,862,290
S	Dealer's Special Inventory	10	$7,969,660
X	Exempt Property	2,471	$79,074,540
TOTAL		**32,700**	**$1,946,157,870**

14. Hailstorm

Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere and subsequent cooling of the air mass. Frozen droplets gradually accumulate into ice crystals until they fall as precipitation that is round or irregularly shaped masses of ice. The size[73] of hailstones is a direct result of the size and severity of the storm.

High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a byproduct of heating on the Earth's surface. Higher temperature gradients above Earth's surface result in increased suspension time and hailstone size.

Texas officials estimate that up to 40 percent of all homeowners' insurance claims in the state result from hail damage.

1) Hailstorm History

Table 55: Hailstorm History

Location	Date	Time	Hail Diameter in inches	Fatalities	Injuries	Property Damage	Crop Damage	Property Damage $2016	Crop Damage $2016
-	3/21/1956	8:40 AM	0.75	0	0	$0	$0	$0	$0
-	3/6/1957	5:25 PM	1	0	0	$0	$0	$0	$0
-	5/12/1969	4:00 PM	0.75	0	0	$0	$0	$0	$0
-	5/12/1969			0	0	$494	$494	$3,247	$3,247
-	4/25/1973	6:20 PM	1	0	0	$0	$0	$0	$0
-	4/26/1973	1:30 AM	1.75	0	0	$0	$0	$0	$0
-	4/7/1976	9:10 PM	2	0	0	$0	$0	$0	$0
-	10/29/1979	11:05 PM	0.75	0	0	$0	$0	$0	$0
-	5/1/1980	6:00 PM	1.5	0	0	$0	$0	$0	$0
-	5/1/1980			0	0	$4,959	$49,584	$14,528	$145,279
-	5/15/1980	2:35 AM	0.75	0	0	$0	$0	$0	$0
-	5/15/1980	11:05 PM	1.75	0	0	$0	$0	$0	$0
-	5/15/1980			0	0	$4,959	$49,584	$14,528	$145,279
-	5/16/1980	4:15 AM	1	0	0	$0	$0	$0	$0
-	5/16/1980			0	0	$0	$49,584	$0	$145,279
-	5/29/1981	4:15 PM	1	0	0	$0	$0	$0	$0
-	5/29/1981			0	0	$49,490	$49,490	$131,443	$131,443
-	11/19/1982	2:40 PM	1.5	0	0	$0	$0	$0	$0
-	5/8/1985	8:20 PM	2.5	0	0	$0	$0	$0	$0
-	3/13/1986	5:20 PM	1.75	0	0	$0	$0	$0	$0
-	4/12/1986	6:15 PM	1.75	0	0	$0	$0	$0	$0
-	4/18/1988	6:15 AM	1.75	0	0	$0	$0	$0	$0
-	4/1/1992	11:00 AM	0.75	0	0	$0	$0	$0	$0
-	4/1/1992			0	0	$5,013	$0	$8,626	$0
-	5/28/1992	6:00 PM	1.75	0	0	$0	$0	$0	$0
-	5/28/1992	6:15 PM	1.75	0	0	$0	$0	$0	$0
-	2/23/1994	4:27 AM	1.75	0	0	$5,000	$0	$8,145	$0
-	2/23/1994			0	0	$249	$0	$406	$0
Weimer	4/15/1994	8:30 PM	1.5	0	0	$0	$0	$0	$0
Sheridan	4/15/1994	9:20 PM	1.5	0	0	$0	$0	$0	$0
Beeville	5/13/1994	3:30 PM	1.75	0	0	$5,000	$50,000	$8,145	$81,453
Pettus	4/10/1995	11:45 PM	1.75	0	0	$0	$0	$0	$0
Beeville	4/22/1995	8:20 PM	0.75	0	0	$0	$0	$0	$0
Papalote	6/3/1996	6:30 PM	0.75	0	0	$0	$0	$0	$0
Beeville	8/14/1996	4:05 PM	0.75	0	0	$0	$0	$0	$0
Pettus	4/4/1997	11:00 PM	1.75	0	0	$0	$0	$0	$0
Tynan	4/26/1997	4:05 AM	0.75	0	0	$0	$0	$0	$0
Skidmore	5/24/1997	7:15 PM	0.75	0	0	$0	$0	$0	$0
Beeville	6/17/1997	4:50 PM	1	0	0	$0	$0	$0	$0

[73] As of January 5, 2010, the national minimum size for severe hail increased from ¾" to 1".

Beeville	6/19/1997	3:37 PM	1.25	0	0	$0	$0	$0	$0
Beeville	10/30/1997	6:00 PM	1	0	0	$0	$0	$0	$0
Skidmore	1/22/1998	10:31 AM	0.75	0	0	$0	$0	$0	$0
Beeville	1/31/1998	1:38 PM	0.75	0	0	$0	$0	$0	$0
Pawnee	2/12/1998	6:15 PM	0.75	0	0	$0	$0	$0	$0
Beeville	2/12/1998	7:00 PM	1.75	0	0	$0	$0	$0	$0
Pawnee	2/21/1998	6:23 PM	0.75	0	0	$0	$0	$0	$0
Pettus	2/26/1998	3:15 AM	0.75	0	0	$0	$0	$0	$0
Tuleta	3/7/1998	11:20 PM	0.75	0	0	$0	$0	$0	$0
Beeville	6/15/1998	3:30 PM	1.75	0	0	$0	$0	$0	$0
Beeville	6/15/1998	4:20 PM	0.75	0	0	$0	$0	$0	$0
Pettus	1/2/1999	12:35 AM	0.75	0	0	$0	$0	$0	$0
Normanna	5/18/1999	12:30 AM	0.75	0	0	$0	$0	$0	$0
Beeville	3/28/2001	11:23 AM	0.75	0	0	$0	$0	$0	$0
Mineral	11/15/2001	4:36 PM	1.75	0	0	$0	$0	$0	$0
Normanna	11/15/2001	4:36 PM	0.88	0	0	$0	$0	$0	$0
Pettus	11/15/2001	6:25 PM	1	0	0	$0	$0	$0	$0
Beeville	5/17/2002	3:50 PM	0.75	0	0	$0	$0	$0	$0
Skidmore	12/12/2002	6:50 AM	0.75	0	0	$0	$0	$0	$0
Papalote	12/12/2002	7:10 AM	1.5	0	0	$0	$0	$0	$0
Tuleta	12/23/2002	8:00 PM	0.75	0	0	$0	$0	$0	$0
Beeville	3/26/2003	12:30 AM	0.75	0	0	$0	$0	$0	$0
Skidmore	4/2/2004	3:25 PM	1.75	0	0	$0	$0	$0	$0
Beeville	11/23/2004	8:30 PM	1	0	0	$0	$0	$0	$0
Pettus	5/29/2005	5:30 PM	1.75	0	0	$0	$0	$0	$0
Normanna	3/13/2007	6:44 PM	1	0	0	$0	$0	$0	$0
(NIR)NAS Chase FLD B	3/13/2007	7:45 PM	0.75	0	0	$0	$0	$0	$0
Normanna	3/26/2009	1:00 PM	1	0	0	$0	$0	$0	$0
Skidmore	3/26/2009	2:08 PM	0.75	0	0	$0	$0	$0	$0
Yougeen	6/3/2009	8:30 PM	0.88	0	0	$0	$0	$0	$0
Beeville	3/29/2012	5:22 PM	1	0	0	$25,000	$0	$26,289	$0
Beeville	3/29/2012		1	0	0	$25,000	$0	$26,289	$0
Beeville	3/29/2012	5:29 PM	1	0	0	$10,000	$0	$10,515	$0
Beeville	3/29/2012		1	0	0	$10,000	$0	$10,515	$0
Beeville Muni Arpt	5/10/2012	4:48 PM	1.75	0	0	$25,000	$0	$26,289	$0
Beeville Muni Arpt	5/10/2012			0	0	$25,000	$0	$26,289	$0
Beeville	5/10/2012	5:10 PM	1.75	0	0	$100,000	$0	$105,154	$0
Beeville	5/10/2012			0	0	$100,000	$0	$105,154	$0
Beeville	2/23/16	2:26 AM	1.75	0	0	$0	$0	$0	$0

NOAA Version
CHAMPS Version
Reported by Both

Coastal Bend College hasn't recorded an individual history of hailstorms. However, given the College's location within the Beeville city limits, it's likely that hailstorms occurring in the City also affected the college.

There haven't been any recorded hailstorms in any participating jurisdiction since 2016.

2) Likelihood of Future Occurrence

Based on the participating jurisdictions' hailstorm history, as well as the knowledge that both hailstorms and hailstorm damages have likely been underreported, the planning team has determined that future hailstorm events are highly likely, meaning that an event is probable in every jurisdiction within the next year. Previous hailstorms have affected all jurisdictions in every month of the year except September. Warning time for a hailstorm is generally minimal or there is no warning.

3) Extent

The severity of hail events ranges based on the size of the hail, wind speed, and the number and types of structures in the path of the hail storm. Storms that produce high winds in addition to hail are most damaging and can result in numerous broken windows and damaged siding.

When hail breaks windows, water damage from accompanying rains can also be significant. A major hailstorm can easily cause damage running into the millions of dollars. Nationwide hail is responsible for over $1 billion in property and crop damages per year. The scale showing intensity categories in Table 56 was developed by combining data from National Climatic Data Center (NCDC) and the Tornado and Storm Research Organization (TORRO). Damaging hail in Bee County and the participating jurisdictions has ranged in size from H2 to H7.

Table 56: Hailstorm Intensity[74,75]

Size Code	Intensity Category	Size (Diameter in inches)	Descriptive Term	Typical Damage
H0	Hard Hail	Up to 0.33	Pea	No damage
H1	Potentially Damaging	0.33-.060	Mothball	Slight damage to plants and crops
H2	Significant	.060-.080	Penny	Significant damage to fruit, crops, and vegetation
H3	Severe[76]	0.80-1.20	Nickel – Half dollar	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	1.2-1.6	Half dollar – Ping pong ball	Widespread glass damage and vehicle bodywork damage
H5	Destructive	1.6-2.0	Ping pong ball – hen egg	Wholesale destruction of glass, damage to tiled roofs, and significant risk of injuries
H6	Destructive	2.0-2.4	Hen egg – tennis ball	Bodywork of grounded aircraft dented and brick walls pitted
H7	Destructive	2.4-3.0	Tennis ball – Baseball	Severe roof damage and risk of serious injuries
H8	Destructive	3.0-3.5	Hockey puck	Severe damage to aircraft bodywork
H9	Super Hailstorms	3.5-4.0	Softball	Extensive structural damage could cause fatal injuries
H10	Super Hailstorms	4.0+	Greater than softball-sized	Extensive structural damage could cause fatal injuries

[74] http://www1.ncdc.noaa.gov/pub/data/cmb/extremes/scec/reports/SCEC-Hail-Guide.pdf
[75] http://www.torro.org.uk/hscale.php
[76] Hail must be 1" or larger to be classified as severe

According to NCDC data and Bee County's 2013 CHAMPS Report, the worst hailstorms in all jurisdictions have produced hail up to 2 ½" in diameter, H7 on the Hailstorm Intensity Scale. Adjusted for inflation, the worst individual hailstorms have inflicted the equivalent of over $131,000 in reported property damages and over $145,000 in crop damages.

Future hailstorm intensity in Bee County, the City of Beeville, and Coastal Bend College may meet or exceed previous worst-case events (H7 on the Hailstorm Intensity Scale) in terms of hailstone size, damage dollars inflicted, and the number of residents injured or worse.

4) Location and Impact

A) Location

Hailstorms vary in terms of size, location, intensity and duration but are considered frequent occurrences in the planning area. Bee County, the City of Beeville, and Coastal Bend College are uniformly exposed to hail events just as each is uniformly exposed to the thunderstorms that typically produce the hail events.

B) Impact

The severity of a hailstorm's impact is considered to be limited since they generally result in injuries treatable with first aid, shut down critical facilities and services for 24 hours or less, and less than ten percent of affected properties are destroyed or suffer major damage. All existing and future buildings, facilities, and populations are in the participating jurisdictions are considered to be exposed to this hazard and could potentially be impacted

5) Vulnerability

A) Population

As described in the narrative, as well as Table 10 and Figures 2-7, in Section 3 of Chapter 4 above, Bee County and the participating jurisdictions are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

Since hailstorms arise with little to no warning, the participating jurisdictions recognize that vulnerable populations may primarily need additional help recovering from a hailstorm.

Residents of sub-standard structures are of particular concern. Structures in sub-standard condition ahead of a hailstorm, whether due to structural damages, missing windows or doors, holes in exterior walls or the roof, may sustain more damages than structures in standard condition.

Existing weaknesses, especially those related to the condition of a structure's roof, due to housing type or existing damages, may lead to compounded damages, injuries, or loss of life.

B) Critical Facilities

Because hailstorms don't recognize geographic boundaries, all critical facilities, no matter their jurisdictional location, are equally vulnerable to hailstorms.

However, due to their flat roofs and the increased vulnerability a flat roof creates the following critical facilities were determined to be especially vulnerable to hailstorms:

Table 57: Bee County Critical Facilities Vulnerable to Hailstorms

Bee County	Building Type	Potential Hailstorm Impacts			
		Damaged Roof	Destroyed Roof	Damaged Windows	Water damage due to Physical Damages
Bee County Expo Center	Government Facility	x	x	x	x
Medio Creek Bridge (Normanna Bridge)	Government Facility	x	x	x	x
Pawnee Elementary / Pawnee Junior High School	School	x	x	x	x
Pettus Station (Electricity)	Electrical Facility				x
Skidmore Post Office	Post Office	x	x	x	x
Skidmore Station (Electricity)	Electrical Facility				x
Tuleta Post Office	Post Office	x	x	x	x

Structures on the National Register of Historic Places

Table 58: City of Beeville Critical Facilities Vulnerable to Hailstorms

City of Beeville	Building Type	Potential Hailstorm Impacts			
		Damaged Roof	Destroyed Roof	Damaged Windows	Water damage due to Physical Damages
A.C. Jones High School	School	x	x	x	x
Bee County Courthouse	Government Facility	x	x	x	x
Bee County Library (Praeger Building)	Cultural Institution	x	x	x	x
Bee County Sheriff	Emergency Services	x	x	x	x
Bee County Tax Assessor Building	Government Facility	x	x	x	x
Beeville City Hall	Government Facility	x	x	x	x
Beeville Community Center	Cultural Institution	x	x	x	x
Beeville First National Bank	Commercial Facility	x	x	x	x
Beeville Police Department	Emergency Services	x	x	x	x
Beeville Post Office	Post Office	x	x	x	x
Beeville Utility Department / Water System Facility	Water System Facility	x	x	x	x
Beeville Wastewater Treatment Plant	Wastewater System Facility	x	x	x	x

Beeville Water System Facility	Water System Facility	x	x	x	x
Beeville Water System Facility	Water System Facility	x	x	x	x
C. M. Smitty Smith Central Fire Station	Emergency Services	x	x	x	x
Chase Field	Government Facility	x	x	x	x
Christus Spohn Hospital Beeville	Medical Services Facility	x	x	x	x
Faden-McKeown-Chambliss Elementary School	School	x	x	x	x
H-E-B Pharmacy	Medical Services Facility	x	x	x	x
Moore's City Drug	Medical Services Facility	x	x	x	x
Prosperity Bank Beeville	Commercial Facility	x	x	x	x
R.A. Hall Elementary School	School	x	x	x	x
Rialto Theater	Cultural Institution	x	x	x	x
Schulz & Wroten Pharmacy Inc.	Medical Services Facility	x	x	x	x
Texas Department of Criminal Justice, William G. McConnell Unit	Government Facility	x	x	x	x
Thomas Jefferson Intermediate School	School	x	x	x	x
Wal Mart / Pharmacy	Medical Services Facility	x	x	x	x
Walgreens	Medical Services Facility	x	x	x	x
Woodridge Nursing and Rehabilitation Center	Medical Services Facility	x	x	x	x

Structures on the National Register of Historic Places

Table 59: Coastal Bend College Critical Facilities Vulnerable to Hailstorms

Coastal Bend College	Building Type	Potential Hailstorm Impacts			
		Damaged Roof	Destroyed Roof	Damaged Windows	Water damage due to Physical Damages
Robert J. Beasley Jr. Building	Administration	x	x	x	x
Fred C. Latchman Jr. Academic Building	Academic	x	x	x	x
Fred C. Latchman Jr. Science Building	Academic	x	x	x	x
Central Plant Building	Utility	x	x	x	x
R.W. Dirks Student Services Building	Administration	x	x	x	x

C) Vulnerable Structures

Although every structure is vulnerable to damage from hail, due to often having flat roofs and the increased exposure that flat roofs create, the County's 482 commercial buildings, most significantly concentrated in the City of Beeville, but spread throughout both jurisdictions, are expected to sustain more damages than other infrastructure. In contrast, all of Coastal Bend College's structures have flat roofs, and all are considered vulnerable to hailstorms.

Table 60: Structures Vulnerable to Hailstorms

	Bee County		City of Beeville		Coastal Bend College	
Building Type	Count	Potential Damage Value	Count	Potential Damage Value	Count	Potential Damage Value
Residential	11,337	$1,124,708,000	5,848[77]	$580,169,536[78]	5	$6,743,450[79]
Commercial	482	$171,063,000	195[80]	$69,042,801.61[81]	-	-
Industrial	109	$43,074,000	44	$17,385,113.30	-	-
Agricultural	43	$5,865,000	17	$2,367,174.85	-	-
Religious	51	$25,017,000	21	$10,097,120.76	-	-
Governmental	35	$20,935,000	14	$8,449,583.20	-	-
Educational	20	$43,906,000	8	$17,720,917.13	30	$40,460,699
Total	**12,077**	**$1,434,568,000**	**6,147**	**$705,232,247**	**35**	**$47,204,149**

[77] Estimated count based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[78] Estimated value based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[79] Estimated as a percentage of total property value.
[80] Estimated count based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.
[81] Estimated value based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.

15. Severe Winter Storm

A severe winter storm is defined by extreme cold and heavy concentrations of snowfall or ice. Texas is disrupted more severely by severe winter storms than are regions that experience severe winter weather more frequently.

The types of severe winter storms which Texans are most familiar with are snowstorms, blizzards, cold waves and ice storms.

Snowfall with an accumulation of four or more inches in a 12-hour period is considered a heavy snowfall. Snowfall of any amount is rare south of a line from Del Rio to Port Arthur, and it is this rarity of event, coupled with a lack of preparedness for such an event, that creates a severe weather condition.

Blizzards are the most perilous of all winter storms, characterized by low temperatures and strong winds in excess of 35 mph, bearing large amounts of blowing or drifting snow. Blizzards take a terrible toll on livestock and people caught in the open. In Texas, blizzards are most likely to occur in the Panhandle and South Plains Regions.

The passage of a winter cold front with a drastic drop in temperature heralds the arrival of a cold wave, usually referred to as a "blue north'er."

An ice storm occurs when rain falls out of the warm and moist upper layers of the atmosphere into a cold and dry layer near the ground. The rain freezes on contact with the cold ground and accumulates on exposed surfaces. If a half inch of rain freezes on trees and utility wires, damage can occur, especially if accompanied by high winds, thus half an inch is used as the criteria before an icing event is categorized as an "ice storm."

1) Severe Winter Storm History

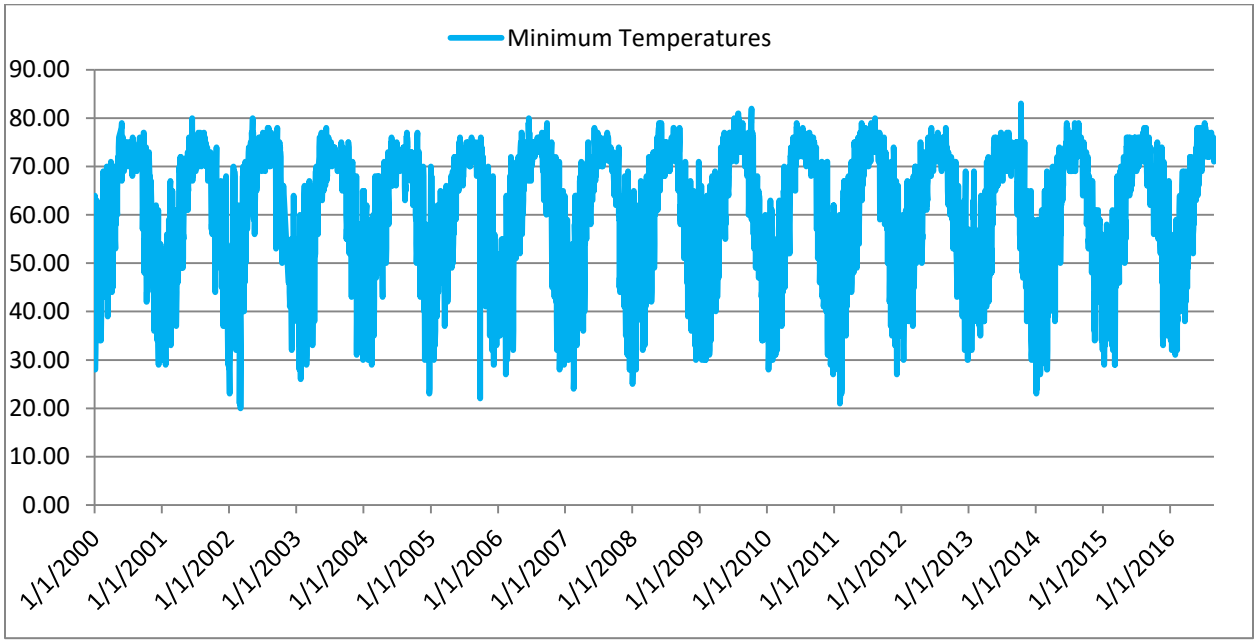

Figure 21: Minimum Recorded Daily Temperature, 2000-2016[82]

Between 2000 and 2016, Bee County and the participating jurisdictions experienced 161 days with a minimum temperature of 32˚F or colder. One of those days had a maximum temperature of 32˚F.

During the same timeframe, the coldest temperature recorded was 20˚F on March 4, 2002.

Table 61: Severe Winter Storm History

Date	Time	Hazard	Fatalities	Injuries	Property Damage	Crop Damage	Property Damage $2016	Crop Damage $2016
1/9/1962		Winter Storm	0	0	$19,420	$19,420	$155,252	$155,252
12/10/1972		Winter Storm	0	0	$198	$0	$1,144	$0
1/8/1973		Winter Storm	0	0	$1,999	$199,857	$10,868	$1,086,733
12/9/1978		Winter Storm	0	0	$0	$17,137	$0	$63,455
3/2/1980		Winter Storm	0	0	$0	$52,749	$0	$154,552
3/18/1980		Winter Storm	0	0	$0	$5,275	$0	$15,456
4/14/1980		Winter Storm	0	0	$0	$5,275	$0	$15,456
1/12/1985		Winter Storm	0	0	$7,277	$0	$16,328	$0
3/29/1987		Winter Storm	0	0	$0	$35,938	$0	$76,378

[82] Source: National Climatic Data Center, https://www.ncdc.noaa.gov/cdo-web/datasets

4/3/1987		Winter Storm	0	0	$0	$172	$0	$366
2/4/1989		Winter Storm	0	0	$5,653	$5,653	$11,007	$11,007
12/22/1989		Winter Storm	0	0	$1,604,664	$1,604,664	$3,124,280	$3,124,280
12/24/2004		Winter Weather	0	0	$0	$0	$0	$0
1/16/2007	6:30 PM	Winter Weather	0	0	$0	$0	$0	$0
2/3/2011	6:00 PM	Ice Storm	0	0	$0	$0	$0	$0
12/7/2013	8:00 PM	Winter Weather	0	0	$100,000	$0	$103,636	$0
1/24/2014	1:00 AM	Ice Storm	0	0	$100,000	$0	$101,982	$0

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Reported by Both

Severe winter weather data is recorded at the county level. However, given the nature of severe winter weather, all jurisdictions experienced the same severe winter weather events. No damage dollars for any severe winter weather event have been recorded in any jurisdiction since 2014.

2) Likelihood of Future Occurrence

Because it is likely that more winter storms have occurred than have been officially reported, the likelihood for winter storms occurring in all jurisdictions is occasional, meaning an event affecting any or all of Bee County, the City of Beeville, and Coastal Bend College is possible in the next five years.

3) Extent

Table 62 below displays the magnitude of severe winter storms. The wind-chill factor is further described in Figure 22. The wind chill index was developed by the National Weather Service. It neither addresses temperatures above 40°F nor wind speeds below 5 mph.

Table 62: Winter Weather Extent Scale[83]

Frost Advisory*	Issued when nighttime minimum temperatures are expected to range from 33°F to 36°F in the growing season.
Freeze Warning*	Issued when nighttime minimum temperatures are expected to reach 32°F or lower in the growing season. They are usually issued to highlight the first few freezes of the fall, or unusually late freezes in the spring. *A Freeze Watch is issued when these conditions may be met 12 to 48 hours in the future.*
Snow Advisory	Issued when accumulating snow of 2 to 4 inches is expected. An advisory may still be warranted if lesser accumulations will produce travel difficulties, especially early in the winter season.

[83] Source: National Weather Service Weather Forecast Office; Norman, Oklahoma. http://www.srh.noaa.gov/oun/?n=spotter-wwa-definitions

Blowing Snow Advisory	Issued when blowing snow is expected to occasionally reduce visibilities to 1/4 mile or less with winds generally 25 to 34 mph. The event should last at least 3 hours.
Snow and Blowing Snow Advisory	Issued when winds of 25 to 34 mph are expected to be accompanied by falling snow and blowing snow, occasionally reducing the visibility to 1/4 mile or less. The event should last at least 3 hours
Freezing Rain / Drizzle Advisory	Issued for freezing rain when ice accumulations are expected to cause travel problems, but not exceed 1/4".
Sleet Advisory	Issued for accumulating sleet of 1/4" to 1". Because sleet usually occurs with other precipitation types, a winter weather advisory will almost always be used in such cases.
Winter Weather Advisory	Issued for a winter weather event in which there is more than one hazard present, but all precipitation is expected to remain below warning criteria. For example, it would be issued if 2 inches of snow were expected with a small amount of sleet mixing in at times.
Wind Chill Advisory[84]	Issued when wind chill temperatures are expected to be a significant inconvenience to life with prolonged exposure, and, if caution is not exercised, could lead to hazardous exposure.
Wind Chill Warning[85]	Issued when wind chill temperatures are expected to be hazardous to life within several minutes of exposure.
Ice Storm Warning	Issued when a period of freezing rain is expected to produce ice accumulations of 1/4" or greater, or cause significant disruptions to travel or utilities.
Heavy Sleet Warning	Issued when a period of sleet is expected to produce ice accumulations of 1" or greater, or cause significant disruptions to travel or utilities.
Heavy Snow Warning	Issued when snow is expected to accumulate 4 inches or more in 12 hours, or 6 inches or more in 24 hours.
Winter Storm Warning	Issued for a winter weather event in which there is more than one hazard present, and one of the warning criteria listed above is expected to be met. For example, it would be issued if 5 inches of snow were expected in 12 hours, with some sleet mixing in at times. It is commonly issued for heavy snow with strong winds of 25-34 mph that will cause blowing and drifting of the snow. *A Winter Storm Watch is issued when these conditions may be met 12 to 48 hours in the future.*
Blizzard Warning	Issued for sustained wind or frequent gusts greater than or equal to 35 mph accompanied by falling and/or blowing snow, frequently reducing visibility to less than 1/4 mile for three hours or more. *A Blizzard Watch is issued when these conditions may be met 12 to 48 hours in the future.*

* - Non-precipitation watch / warning / advisory

[84] https://www.osha.gov/dts/weather/winter_weather/windchill.html
[85] https://www.osha.gov/dts/weather/winter_weather/windchill.html

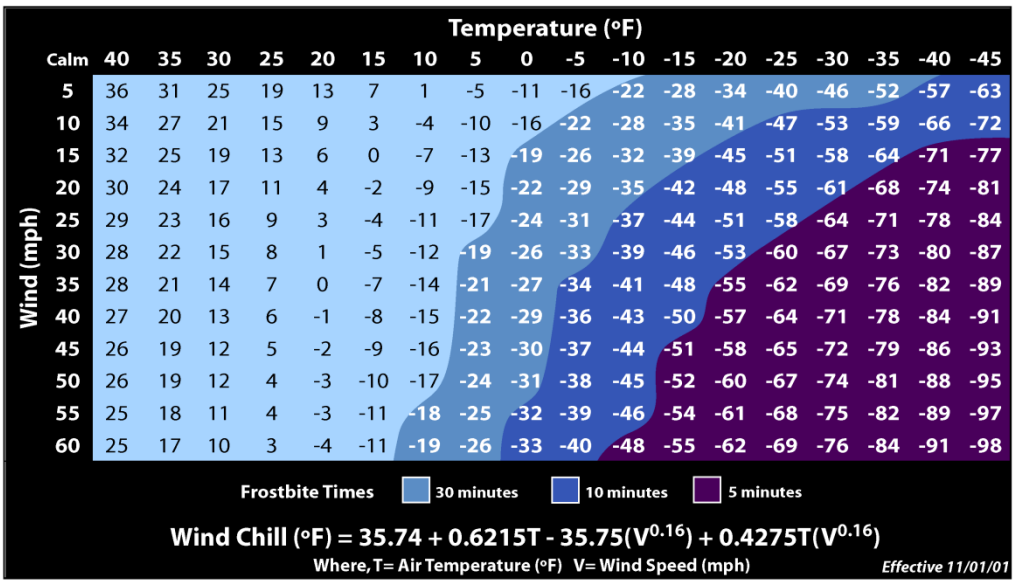

Figure 22: NWS Wind Chill Index

According to the Bee County 2013 CHAMPS Report, the worst severe winter storms have inflicted up to $3,124,280[86] in both property damages and crop damages in a single event. In 2004, snow depth reached up to 10". The worst ice storms in the participating jurisdictions have seen accumulation of less than ½" of ice.

Future winter storm events in all jurisdictions may see temperatures drop below the County's lowest recently recorded temperature, 20˚F, have snow accumulation of 10" or more, or have ice accumulation of ½" or more. Additionally, these future events may exceed previous ones in terms duration and the number of residents injured or worse.

4) Location and Impact

A) Location – All Jurisdictions

Severe winter weather has no distinct geographic boundary. Severe winter weather can occur across Bee County, the City of Beeville, and Coastal Bend College and uniformly affect all jurisdictions.

B) Impact – All Jurisdictions

The potential impact of a severe winter storm is normally minor, resulting in few, if any, injuries. Because of the rarity of winter storm events in the participating jurisdictions, drivers,

[86] Event date: 12/22/1989, damage dollars adjusted to $2016

especially those unfamiliar with or unable to drive in icy conditions, may be at the highest risk of crashing their vehicle and sustaining injuries.

Beyond accidents caused by icy conditions, severe winter weather has the potential to cause widespread power outages. Trees and other vegetation that grow along or near power lines and utility lines, especially along US 181 in greater Bee County, the area bounded by US 181 Business and N. Archer St. to the west and east and E. Inez St. and E. Houston St. to the north and south in Beeville, and the segment of Charco Rd. in front of Coastal Bend College, can become overburdened by ice and snow accumulation. Falling limbs or trees can easily take down power and utility lines. Neglected vegetation is especially at risk of failure due to increased weight loads. Power outages can create a cascading effect depending on residents' ability to heat their homes without electricity, especially for the vulnerable residents are identified in Section 3 of Chapter 4, Table 10, and Figures 2 – 7 above. Although no deaths related to severe winter storms have been reported in either jurisdiction, in the worst cases, the hazard has the potential to be deadly.

Beyond power outages and car accidents, severe winter storms will likely cause only minor property damage and minimal disruption to the quality of life in the participating jurisdictions. Any shutdown of facilities due to severe winter weather is expected to be temporary. Depending on when the event happens, a severe winter storm may damage or destroy crops, primarily in unincorporated Bee County.

5) Vulnerability

While all three jurisdictions are exposed to extreme temperatures, existing buildings, infrastructure, and critical facilities are not considered vulnerable to direct damages significant enough to interrupt or stop normal operations. This determination was made based on the expectation that most roofs can support 20 lbs. / square foot of snow[87]. The worst snow storm in any participating jurisdiction dropped 10" or the equivalent of about 5 lbs. / square foot. Although it's not impossible[88] for that much snow to cause structural damage, given that the snow weight is well below the threshold where damage is likely, structural damages are not expected. Additionally, 1" of ice is roughly equivalent in weight per square foot to 10" of snow. Considering the worst ice storms in the participating jurisdictions cause ice accumulations of ½", it's unlikely, but not impossible, that an ice storm causing structural ice accumulations of less than 4" will cause significant structural damages. Therefore, estimated property losses associated are anticipated to be minimal across the area.

Areas with concentrations of vulnerable residents as described in Section 3 of Chapter 4, Table 10, and Figures 2 – 7 above, may feel greater impacts from severe winter weather due to those

[87] https://disastersafety.org/freezing-weather/prevent-roof-collapse-homes/

[88] https://www.fema.gov/media-library-data/7d8c55d1c4f815edf3d7e7d1c120383f/FEMA957_Snowload_508.pdf - The weight of a foot a snow can vary widely based on how wet the snow is, between 3 and 21 lbs. per square foot. However, wet snow primarily affects the East Coast, Pacific Northwest, and southwestern Alaska.

residents' limited ability to properly address the hazard, especially during extended power outages caused by snow or ice accumulation.

At Coastal Bend College, students, faculty, and staff will experience vulnerability to severe winter storms as they travel between buildings or participate in outdoor activities, especially at the school's outdoor athletic facilities like its walking trail and tennis courts.

16. Windstorm

A windstorm[89] is classified as any wind that is strong enough to cause at least light damage to trees and buildings, and may or may not be accompanied by precipitation. Wind speeds during a windstorm typically exceed 41 knots. Damage can be attributed to gusts or longer periods of sustained winds.

Windstorms may last for just a few minutes when caused by downbursts from thunderstorms, or they may last for hours (and even several days) when they result from large-scale weather systems. A windstorm that travels in a straight line and is caused by the gust front (the boundary between descending cold air and warm air at the surface) of an approaching thunderstorm is called a derecho. Derechos are capable of causing widespread damage and landscape devastation.

1) Windstorm History

Between 1960 – 2013 Bee County and the participating jurisdictions experienced damaging high winds with gusts up to 87 mph on 63 separate occasions not related to a Hurricane or Tropical Storm event. Windstorms have caused damage in the greater county and in the City of Beeville. Although no specific data regarding windstorm damages at Coastal Bend College is available, given its location in the City of Beeville, the College is believed to have sustained physical damages during previous windstorms. No windstorms have been recorded in any participating jurisdiction since 2013.

[89] https://www.britannica.com/science/windstorm

Table 63: Windstorm History

Location	Date	Time	Hazard	Windspeed MPH	Fatalities	Injuries	Property Damage	Crop Damage	Property Damage $2016	Crop Damage $2016
	5/23/1960	12:00 PM	Thunderstorm Wind	52	0	0	$0	$0	$0	$0
	2/5/1961	11:20 AM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	6/1/1962	8:00 AM	Thunderstorm Wind	59	0	0	$0	$0	$0	$0
	4/30/1963	1:30 AM	Thunderstorm Wind	80	0	0	$0	$0	$0	$0
	2/9/1966	11:30 PM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	9/16/1968	8:00 PM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	9/17/1968		Thunderstorm Wind		0	0	$49,735	$0	$345,468	$0
	9/17/1968	3:15 AM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	5/12/1969	4:00 PM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	7/16/1969	2:45 PM	Thunderstorm Wind	50	0	0	$0	$0	$0	$0
	6/30/1975	2:21 PM	Thunderstorm Wind	51	0	0	$0	$0	$0	$0
	8/31/1976	1:19 PM	Thunderstorm Wind	54	0	0	$0	$0	$0	$0
	5/1/1980	6:00 PM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	5/8/1980		Thunderstorm Wind		0	1	$49,584	$49,584	$145,460	$145,460
	5/8/1980	10:07 AM	Thunderstorm Wind	51	0	0	$0	$0	$0	$0
	5/15/1980		Thunderstorm Wind		0	7	$495,841	$0	$1,454,601	$0
	5/15/1980	11:15 PM	Thunderstorm Wind	67	0	0	$0	$0	$0	$0
	5/21/1980		Thunderstorm Wind		0	0	$49,584	$0	$145,460	$0
	5/21/1980	6:00 AM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	6/15/1980		Thunderstorm Wind		0	0	$24,792	$0	$72,730	$0
	7/28/1980		Thunderstorm Wind		0	0	$4,959	$0	$14,546	$0
	7/28/1980	7:00 PM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	5/29/1981	4:30 PM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	4/1/1983		Thunderstorm Wind		0	0	$17,073	$0	$41,435	$0

	9/18/1983		Thunderstorm Wind		0	0	$49,511	$0	$120,162	$0
	9/18/1983	10:30 PM	Thunderstorm Wind	87	0	0	$0	$0	$0	$0
	11/22/1983		Thunderstorm Wind		0	0	$170,727	$17,072	$414,354	$41,435
	2/26/1984		Thunderstorm Wind		0	0	$4,950	$14,999	$11,516	$34,896
	7/2/1984		Thunderstorm Wind		0	0	$4,950	$0	$11,516	$0
	7/2/1984	2:50 PM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	8/8/1984		Thunderstorm Wind		0	0	$4,950	$0	$11,516	$0
	8/8/1984	1:30 PM	Thunderstorm Wind	56	0	0	$0	$0	$0	$0
	9/10/1985		Thunderstorm Wind		0	0	$5,021	$0	$11,280	$0
	9/10/1985	12:56 PM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	5/10/1986	9:30 AM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	6/12/1986		Thunderstorm Wind		0	0	$50,123	$0	$110,550	$0
	6/12/1986	1:15 PM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	2/27/1987	8:45 PM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	5/31/1987	7:30 PM	Thunderstorm Wind	0	0	0	$0	$0		$0
	11/16/1987		Thunderstorm Wind		0	0	$4,995	$0	$10,630	$0
	11/16/1987	6:25 AM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	4/29/1988	6:30 PM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	6/3/1988	1:20 AM	Thunderstorm Wind	60	0	0	$0	$0	$0	$0
	6/3/1988	2:18 AM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	3/28/1991	9:15 PM	Thunderstorm Wind	52	0	0	$0	$0	$0	$0
	6/16/1991	10:30 PM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
	6/23/1991	4:37 PM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
Beeville	5/9/1993	11:30 PM	Thunderstorm Wind	0	0	0	$50,000	$5,000	$83,643	$8,364
Normanna	5/18/1993	11:53 AM	Thunderstorm Wind	0	0	0	$0	$50,000	$0	$83,643
Beeville	5/18/1993	11:53 AM	Thunderstorm Wind	0	0	0	$50,000	$0	$83,643	$0
Blanco	2/23/1994	4:25 AM	Thunderstorm Wind	0	0	0	$500,000	$50,000	$815,550	$81,555

	4/15/1994		Thunderstorm Wind		0	0	$498,354	$4,984	$812,866	$8,129
Countywide	4/15/1994	8:30 PM	Thunderstorm Wind	0	0	0	$5,000,000	$50,000	$8,155,499	$81,555
Western Harris	5/13/1994	3:55 PM	Thunderstorm Wind	0	0	0	$0	$0	$0	$0
Berclair	6/20/1996	8:50 PM	Thunderstorm Wind	50	0	0	$0	$0	$0	$0
Skidmore	8/24/1996	5:55 PM	Thunderstorm Wind	50	0	0	$0	$0	$0	$0
Skidmore	5/15/1997	8:15 PM	Thunderstorm Wind	55	0	0	$0	$0	$0	$0
Beeville	5/27/1997	8:45 PM	Thunderstorm Wind	50	0	0	$0	$0	$0	$0
Beeville	6/19/1997	3:37 PM	Thunderstorm Wind	50	0	0	$0	$0	$0	$0
Tynan	9/11/1997	3:15 PM	Thunderstorm Wind	50	0	0	$0	$0	$0	$0
Beeville	2/18/1998	10:30 PM	Thunderstorm Wind	50	0	0	$0	$0	$0	$0
Beeville	5/12/1999	4:00 AM	Thunderstorm Wind	50	0	0	$0	$0	$0	$0
Beeville	7/23/2000	8:00 PM	Thunderstorm Wind	55	0	0	$0	$0	$0	$0
Beeville	6/22/2001	5:00 PM	Thunderstorm Wind	50	0	0	$0	$0	$0	$0
Beeville	6/22/2001	5:25 PM	Thunderstorm Wind	50	0	0	$0	$0	$0	$0
Tynan	9/9/2003	1:50 PM	Thunderstorm Wind	50	0	0	$0	$0	$0	$0
Pettus	8/10/2005	5:30 PM	Thunderstorm Wind	50	0	0	$0	$0	$0	$0
Beeville	8/10/2005	5:45 PM	Thunderstorm Wind	50	0	0	$0	$0	$0	$0
	3/26/2007		Thunderstorm Wind		0	0	$4,990	$0	$5,818	$0
Beeville	3/26/2007	8:00 PM	Thunderstorm Wind	61	0	0	$5,000	$0	$5,829	$0
Tynan	3/10/2008	12:39 PM	Thunderstorm Wind	52	0	0	$1,000	$0	$1,123	$0
	3/26/2009		Thunderstorm Wind		0	0	$25,029	$0	$28,202	$0
Olmos	3/26/2009	1:50 PM	Thunderstorm Wind	70	0	0	$25,000	$0	$28,169	$0
(NIR)NAS Chase FLD B	8/25/2011	2:15 PM	Thunderstorm Wind	52	0	0	$0	$0	$0	$0
Beeville	8/25/2011	2:20 PM	Thunderstorm Wind	43	0	0	$5,000	$0	$5,373	$0
	3/20/2012		Thunderstorm Wind		0	0	$10,000	$0	$10,529	$0
Beeville	3/20/2012	3:20 AM	Thunderstorm Wind	50	0	0	$10,000	$0	$10,529	$0
	6/26/2012		Thunderstorm Wind		0	0	$10,000	$0	$10,529	$0
Beeville MUNI ARPT	6/26/2012	7:45 PM	Thunderstorm Wind	52	0	0	$10,000	$0	$10,529	$0

Skidmore	2/6/2013	8:27 AM	Thunderstorm Wind	61	0	0	$15,000	$0	$15,565	$0
Clareville	4/29/2013	4:30 PM	Thunderstorm Wind	50	0	0	$0	$0	$0	$0
Beeville MUNI ARPT	7/27/2013	5:05 PM	Thunderstorm Wind	50	0	0	$5,000	$0	$5,188	$0
Beeville MUNI ARPT	7/27/2013	5:19 PM	Thunderstorm Wind	52	0	0	$0	$0	$0	$0

NOAA Version

CHAMPS Version

Reported by Both

2) Likelihood of Future Occurrence

Given the frequency of windstorm events in Bee County and the participating jurisdictions, the likelihood of a damaging windstorm in the future is highly likely, meaning that an event affecting any or all of the participating jurisdictions is probable in the next year.

3) Extent

The generally accepted extent scale for wind events is the Beaufort Wind Scale. The following table lists categories, measurement, classification, and appearance descriptions.

Table 64: Beaufort Wind Scale[90]

Beaufort Wind Scale				
Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 feet becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 feet taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 feet, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-20 feet, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (13-20 feet) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance felt walking against wind
9	41-47	Strong Gale	High waves (20 feet), sea begins to roll, dense streaks of foam, spray may reduce	Slight structural damage occurs, slate blows off roofs

[90] Source: www.spc.noaa.gov/faq/tornado/beaufort.html

			visibility	
10	48-55	Storm	Very high waves (20-30 feet) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high (30-45 feet) waves, foam patches cover sea, visibility more reduced	
12	64+	Hurricane	Air filled with foam, waves over 45 feet, sea completely white with driving spray, visibility greatly reduced	

The worst windstorms in Bee County and the participating jurisdictions have ranged from 1 to 12 on the Beaufort Wind Scale.

With winds up to 87 MPH, or a 12 on the Beaufort Wind Scale, the strongest windstorms in Bee County and the participating jurisdictions have reached hurricane-level speeds.

The single most devastating wind event inflicted $5,000,000 in property damages on April 15, 1994. Adjusted for inflation to $2016, that's over $8 million in property damages. On May 8, 1980 a windstorm inflicted the $2016 equivalent of $145,000 in crop damages. Neither storm's history includes a measurement of the wind speed.

Future windstorms may meet or exceed previous worst-case events (12 on the Beaufort Wind Scale) in terms of wind speed and damage dollars inflicted.

4) Location and Impact

A) Location

Windstorms are not constrained by any distinct geographic boundary. Windstorms can occur across all participating jurisdictions.

B) Impact

Impacts from a windstorm may include but are not limited to damaged or destroyed personal property including vehicles, damaged or destroyed agricultural, residential, commercial, and industrial buildings. Crops may be damaged or destroyed. Pets and livestock may be injured or killed by flying debris. Pets and livestock may escape due to damaged or destroyed structures and fences.

In the worst cases, windstorms may cause injuries and/or be deadly.

5) Vulnerability

Windstorms have the potential to impact all participating jurisdictions. Therefore, each jurisdiction is equally exposed to the hazard. Improved property, critical facilities, critical infrastructure, and the entire population are considered vulnerable to windstorms.

Based on windstorm data collected for the participating jurisdictions, windstorms primarily damage physical structures. However, there is no uniformity with respect to the type of structures that have been damaged by windstorms in any of the participating jurisdictions. Windstorm damages can be directly caused by the wind itself, flying debris, and falling trees, or indirectly by damages like power outages.

A) Population

As described in the narrative, as well as Table 10 and Figures 2-7, in Section 3 of Chapter 4 above, Bee County and the participating jurisdictions are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to: age, physical ability, financial means, housing type, and housing condition. Many of these vulnerabilities often overlap.

The participating jurisdictions recognize that vulnerable populations may need additional help preparing for and recovering from a windstorm.

Residents of mobile / manufactured homes are of particular concern. These structures may not be safe during a windstorm.

Residents of sub-standard structures are also of particular concern. Structures in sub-standard condition ahead of a windstorm, whether due to structural damages, missing windows or doors, holes in exterior walls or the roof, may be less safe during a windstorm than structures in standard condition.

Existing structural weaknesses, due to housing type or existing damages, may lead to compounded damages, injuries, or loss of life.

B) Critical Facilities

Similar to hurricanes and tornados, certain critical facilities and infrastructure in each jurisdiction may be particularly vulnerable to windstorms. These facilities have been identified for reasons including: the number of people who use the facility or infrastructure, the facility's role in providing basic services to begin the cleanup process and get the jurisdictions running again, and the facility's ability to offer goods and materials residents will need to resume normalcy as quickly as possible. The selected critical facilities are built from a variety of materials with varying levels of resistance to wind damages. Additionally, their varying ages mean they weren't constructed to uniform building standards. Given wind's potentially violent nature, these facilities may experience increased levels of vulnerability to the hazards. Damage to any of these facilities may have a disproportionately negative impact on each jurisdiction's

recovery from a windstorm if that damage affects the facility's ability to reopen and resume normal business right away.

Table 65: Bee County Critical Facilities

Bee County	Building Type	Potential Windstorm Impacts								
		Loss of Power	Flying Debris	Uprooted Trees	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
Bee County Expo Center	Government Facility	x	x	x	x	x	x	x	x	x
Blanconia VFD	Emergency Services	x	x	x	x	x	x	x	x	x
Medio Creek Bridge (Normanna Bridge)	Government Facility		x	x				x		
Normanna Post Office	Post Office	x	x	x	x	x	x	x	x	x
Pawnee Elementary / Pawnee Junior High School	School	x	x	x	x	x	x	x	x	x
Pawnee Post Office	Post Office	x	x	x	x	x	x	x	x	x
Pawnee VFD	Emergency Services	x	x		x	x	x	x	x	x
Pettus - Tuleta VFD	Emergency Services	x	x	x	x	x	x	x	x	x
Pettus Elementary School	School	x	x	x	x	x	x	x	x	x
Pettus High School	School	x	x	x	x	x	x	x	x	x
Pettus Post Office	Post Office	x	x		x	x	x	x	x	x
Pettus Station (Electricity)	Electrical Facility	x	x					x	x	x
Skidmore Post Office	Post Office	x	x	x	x	x	x	x	x	x
Skidmore Station (Electricity)	Electrical Facility	x	x					x	x	x
Skidmore VFD	Emergency Services	x	x	x	x	x	x	x	x	x
Skidmore Water Supply Corp.	Water System Facility	x	x	x	x	x	x	x	x	x
Skidmore-Tynan Elementary / Junior High School / High School	School	x	x	x	x	x	x	x	x	x
Clem and Bettie Stoltzfus Community Center	Cultural Institution	x	x	x	x	x	x	x	x	x
Tuleta Post Office	Post Office	x	x	x	x	x	x	x	x	x
Tynan Post Office	Post Office	x	x	x	x	x	x	x	x	x
Tynan VFD	Emergency Services	x	x	x	x	x	x	x	x	x
Tynan Water Supply Corp.	Water System Facility	x	x	x	x	x	x	x	x	x

Structures on the National Register of Historic Places

Table 66: City of Beeville Critical Facilities

City of Beeville	Building Type	Potential Windstorm Impacts								
		Loss of Power	Flying Debris	Uprooted Trees	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
A.C. Jones High School	School	x	x	x	x	x	x	x	x	x
Bee County Courthouse	Government Facility	x	x	x	x	x	x	x	x	x
Bee County Library (Praeger Building)	Cultural Institution	x	x	x	x	x	x	x	x	x
Bee County Sheriff	Emergency Services	x	x	x	x	x	x	x	x	x
Bee County Tax Assessor Building	Government Facility	x	x	x	x	x	x	x	x	x
Beeville Art Museum	Cultural Institution	x	x	x	x	x	x	x	x	x
Beeville City Hall	Government Facility	x	x	x	x	x	x	x	x	x
Beeville Community Center	Cultural Institution	x	x	x	x	x	x	x	x	x
Beeville First National Bank	Commercial Facility	x	x	x	x	x	x	x	x	x
Beeville Municipal Airport	Government Facility	x	x	x	x	x	x	x	x	x
Beeville Police Department	Emergency Services	x	x	x	x	x	x	x	x	x
Beeville Post Office	Post Office	x	x	x	x	x	x	x	x	x
Beeville Station (Electricity)	Electrical Facility	x	x	x	x	x	x	x	x	x
Beeville Utility Department / Water System Facility	Water System Facility	x	x	x	x	x	x	x	x	x
Beeville Wastewater Treatment Plant	Wastewater System Facility	x	x	x	x	x	x	x	x	x
Beeville Water System Elevated Water Storage Tank	Water System Facility		x	x				x		
Beeville Water System Elevated Water Storage Tank	Water System Facility		x	x				x		
Beeville Water System Elevated Water Storage Tank	Water System Facility		x	x				x		
Beeville Water System Facility	Water System Facility	x	x	x	x	x	x	x	x	x
Beeville Water System Facility	Water System Facility	x	x	x	x	x	x	x	x	x
C. M. Smitty Smith Central Fire Station	Emergency Services	x	x	x	x	x	x	x	x	x
Chase Field	Government Facility	x	x	x	x	x	x	x	x	x
Christus Spohn Hospital Beeville	Medical Services Facility	x	x	x	x	x	x	x	x	x
Coastal Plains Community Center	Cultural Institution	x	x	x	x	x	x	x	x	x
Faden-McKeown-Chambliss Elementary School	School	x	x	x	x	x	x	x	x	x

Hampton-Moreno-Dugat Early Childhood Center	School	x	x	x	x	x	x	x	x	x
H-E-B Pharmacy	Medical Services Facility	x	x	x	x	x	x	x	x	x
IBC Beeville	Commercial Facility	x	x	x	x	x	x	x	x	x
La Amistad Adult Care & Activity Center	Cultural Institution	x	x	x	x	x	x	x	x	x
Lott-Canada School (Coastal Bend College Lott-Canada Facility)	School	x	x	x	x	x	x	x	x	x
Moore's City Drug	Medical Services Facility	x	x		x	x	x	x	x	x
Moreno Junior High School	School	x	x	x	x	x	x	x	x	x
Prosperity Bank Beeville	Commercial Facility	x	x	x	x	x	x	x	x	x
R.A. Hall Elementary School	School	x	x	x	x	x	x	x	x	x
Rialto Theater	Cultural Institution	x	x	x	x	x	x	x	x	x
Schulz & Wroten Pharmacy Inc.	Medical Services Facility	x	x		x	x	x	x	x	x
Texas Department of Criminal Justice, Garza East Unit	Government Facility	x	x		x	x	x	x	x	x
Texas Department of Criminal Justice, Garza West Unit	Government Facility	x	x		x	x	x	x	x	x
Texas Department of Criminal Justice, William G. McConnell Unit	Government Facility	x	x		x	x	x	x	x	x
Thomas Jefferson Intermediate School	School	x	x	x	x	x	x	x	x	x
Wal Mart / Pharmacy	Medical Services Facility	x	x		x	x	x	x	x	x
Walgreens	Medical Services Facility	x	x		x	x	x	x	x	x
Woodridge Nursing and Rehabilitation Center	Medical Services Facility	x	x	x	x	x	x	x	x	x

Structures on the National Register of Historic Places

Table 67: Coastal Bend College Critical Facilities

Coastal Bend College	Building Type	Potential Windstorm Impacts								
		Loss of Power	Flying Debris	Uprooted Trees	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
Robert J. Beasley Jr. Building	Administration	x	x	x	x	x	x	x	x	x

Fred C. Latchman Jr. Academic Building	Academic	x	x	x	x	x	x	x	x	x
Fred C. Latchman Jr. Science Building	Academic	x	x	x	x	x	x	x	x	x
Central Plant Building	Utility	x	x	x	x	x	x	x	x	x
R.W. Dirks Student Services Building	Administration	x	x	x	x	x	x	x	x	x

C) Vulnerable Structures

Table 68: Structures Vulnerable to Windstorms

	Bee County		City of Beeville		Coastal Bend College	
Building Type	Count	Potential Damage Value	Count	Potential Damage Value	Count	Potential Damage Value
Residential	11,337	$1,124,708,000	5,848[91]	$580,169,536[92]	5	$6,743,450[93]
Commercial	482	$171,063,000	195[94]	$69,042,801.61[95]	-	-
Industrial	109	$43,074,000	44	$17,385,113.30	-	-
Agricultural	43	$5,865,000	17	$2,367,174.85	-	-
Religious	51	$25,017,000	21	$10,097,120.76	-	-
Governmental	35	$20,935,000	14	$8,449,583.20	-	-
Educational	20	$43,906,000	8	$17,720,917.13	30	$40,460,699
Total	**12,077**	**$1,434,568,000**	**6,147**	**$705,232,247**	**35**	**$47,204,149**

[91] Estimated count based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[92] Estimated value based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[93] Estimated as a percentage of total property value.
[94] Estimated count based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.
[95] Estimated value based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.

17. Lightning

Lightning is a massive electrostatic discharge between electrically charged regions within clouds, or between a cloud and the Earth's surface.

Lightning damage can result in electrocution of humans and animals; vaporization of materials along the path of the strike; fire caused by the high temperature produced by the strike; and sudden power surges that can damage electrical and electronic equipment. Millions of dollars of direct and indirect damages result from lightning strikes on electric utility substations and distribution lines. While property damage is the major hazard associated with lightning, it should be noted that lightning strikes kill nearly 50 people [96]each year in the United States.

1) Lightning History

According to data from the NCDC and the Bee County 2013 CHAMPS Report, a lightning event on March 26, 2009 caused $22,507, adjusted for inflation, in property damages.

Table 69: Lightning History

Date	Time	Hazard	Fatalities	Injuries	Property Damage	Crop Damage	Property Damage $2016	Crop Damage $2016
12/3/1973		Lightning	0	0	$159	$0	$862	$0
5/28/1992		Lightning	0	0	$0	$50	$86	$0
3/26/2009	1:45 PM	Lightning	0	0	$20,000	$0	$22,507	$0
3/26/2009		Lightning	0	0	$20,000	$0	$22,507	$0

NOAA Version

CHAMPS Version

Reported by Both

Lightning occurs in the City of Beeville. However, no lightning event data detailing fatalities, injuries, or damages for the City is available.

Lightning occurs on the Coastal Bend College campus. However, no lightning event data detailing fatalities, injuries, or damages for the Coastal Bend College campus is available.

No lightning-inflicted property or crop damage dollars have been recorded in Bee County or the participating jurisdictions since 2009.

[96] http://www.lightningsafety.noaa.gov/victims.shtml

2) Likelihood of Future Occurrence

Lightning is especially associated with thunderstorms. Despite the lack of reported instances of lightning-caused damages, a lightning event is highly likely, meaning an event affecting any or all of the participating jurisdictions is probable in the next year. According to information from VAISALA[97], all of Bee County, including the City of Beeville and Coastal Bend College, can expect between 6 and 12 lightning flashes per square mile per year.

3) Extent

The extent for lightning can be expressed in terms of the number of strikes within an interval. Given the lack of lightning history data, it is expected that Bee County and all participating jurisdictions may experience lightning events between LAL 1 and LAL 5. Dry thunderstorms, LAL 6, are not expected.

Table 70: Lightning Activity Levels[98]

Lightning Activity Level (LAL)		
Activity levels are valuable guidance tools to aid in the preparation for possible fire initiation from cloud-to-ground lightning.		
LAL	Cloud and Storm Development	Lightning Strikes per 15 Minutes
1	No thunderstorms.	-
2	Cumulus clouds are common but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent.	1-8
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground, and lightning is infrequent.	9-15
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common and lightning is frequent.	16-25
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent and intense.	25+
6	Similar to LAL 3 except thunderstorms are dry.	

Adjusted for inflation, the worst lightning events to affect Bee County and the participating jurisdictions have inflicted up to $22,507 in property damages.

[97] http://www.vaisala.com/VaisalaImages/Lightning/avg_fd_2005-2014_CONUS_2mi_grid.png
[98] Source: http://www.prh.noaa.gov/hnl/pages/LAL.php

Future events may meet or exceed previous intensity levels, damage dollars inflicted, including damages to crops and livestock, and the number of residents injured or worse.

4) Location and Impact

A) Location

Lightning strikes have no distinct geographic boundary. Lightning can occur across each participating jurisdiction.

B) Impact

Impacts from lightning in all jurisdictions may include but are not limited to loss of power due to electrical surges, damaged or destroyed personal property including computers and other electronics, damaged or destroyed agricultural, residential, commercial, and industrial buildings. Crops may be damaged or destroyed. Livestock may be injured or killed by lightning. In the worst cases, lightning may cause injuries or even loss of life.

5) Vulnerability

According to the Lightning Protection Institute, it is a myth[99] that lightning always strikes the tallest objects. Given lightning's indiscriminate nature, it is impossible to identify buildings that are at an increased risk of being struck by lightning. All existing and future buildings, critical facilities, critical infrastructure, improved property, and the population are exposed to this hazard. However, structures without adequate lightning protection and those with large concentrations of electronic equipment like computers, servers, and printers, are most vulnerable, as are locations that may have outside crowds during a lightning event.

A) Critical Facilities

Table 71: Bee County Critical Facilities

Bee County	Building Type	Potential Lightning Impacts			
		Physical Damage	Electrical Damage	Data Damage or Loss	Fire
Bee County Expo Center	Government Facility	x	x		x
Blanconia VFD	Emergency Services	x	x	x	x
Normanna Post Office	Post Office	x	x		x
Pawnee Elementary / Pawnee Junior High School	School	x	x	x	x
Pawnee Post Office	Post Office	x	x		x
Pawnee VFD	Emergency Services	x	x	x	x
Pettus - Tuleta VFD	Emergency Services	x	x	x	x
Pettus Elementary School	School	x	x	x	x
Pettus High School	School	x	x	x	x
Pettus Post Office	Post Office	x	x		x
Pettus Station (Electricity)	Electrical Facility	x	x		x

[99] http://lightning.org/wp-content/uploads/2015/06/LPI_lightning_infographic_2015.jpg

Skidmore Post Office	Post Office	x	x		x
Skidmore Station (Electricity)	Electrical Facility	x	x		x
Skidmore VFD	Emergency Services	x	x	x	x
Skidmore Water Supply Corp.	Water System Facility	x	x	x	x
Skidmore-Tynan Elementary / Junior High School / High School	School	x	x	x	x
Clem and Bettie Stoltzfus Community Center	Cultural Institution	x	x	x	x
Tuleta Post Office	Post Office	x	x		x
Tynan Post Office	Post Office	x	x		x
Tynan VFD	Emergency Services	x	x	x	x
Tynan Water Supply Corp.	Water System Facility	x	x	x	x

Table 72: City of Beeville Critical Facilities

City of Beeville	Building Type	Potential Lightning Impacts			
		Physical Damage	Electrical Damage	Data Damage or Loss	Fire
A.C. Jones High School	School	x	x	x	x
Bee County Courthouse	Government Facility	x	x	x	x
Bee County Library (Praeger Building)	Cultural Institution	x	x	x	x
Bee County Sheriff	Emergency Services	x	x	x	x
Bee County Tax Assessor Building	Government Facility	x	x	x	x
Beeville City Hall	Government Facility	x	x	x	x
Beeville Community Center	Cultural Institution	x	x		x
Beeville First National Bank	Commercial Facility	x	x	x	x
Beeville Police Department	Emergency Services	x	x	x	x
Beeville Post Office	Post Office	x	x	x	x
Beeville Station (Electricity)	Electrical Facility	x	x		x
Beeville Utility Department / Water System Facility	Water System Facility	x	x	x	x
Beeville Wastewater Treatment Plant	Wastewater System Facility	x	x	x	x
Beeville Water System Facility	Water System Facility	x	x	x	x
Beeville Water System Facility	Water System Facility	x	x	x	x
C. M. Smitty Smith Central Fire Station	Emergency Services	x	x	x	x
Christus Spohn Hospital Beeville	Medical Services Facility	x	x	x	x
Coastal Plains Community Center	Cultural Institution	x	x		x
Faden-McKeown-Chambliss Elementary School	School	x	x	x	x
Hampton-Moreno-Dugat Early Childhood Center	School	x	x		x
IBC Beeville	Commercial Facility	x	x	x	x
La Amistad Adult Care & Activity Center	Cultural Institution	x	x		x
Lott-Canada School (Coastal Bend College Lott-Canada Facility)	School	x	x	x	x

Moreno Junior High School	School	x	x	x	x
Prosperity Bank Beeville	Commercial Facility	x	x	x	x
R.A. Hall Elementary School	School	x	x	x	x
Thomas Jefferson Intermediate School	School	x	x	x	x
Woodridge Nursing and Rehabilitation Center	Medical Services Facility	x	x		x

Structures on the National Register of Historic Places

Table 73: Coastal Bend College Critical Facilities

Coastal Bend College	Building Type	Potential Lightning Impacts			
		Physical Damage	Electrical Damage	Data Damage or Loss	Fire
Robert J. Beasley Jr. Building	Administration	x	x	x	x
Fred C. Latchman Jr. Academic Building	Academic	x	x	x	x
Fred C. Latchman Jr. Science Building	Academic	x	x	x	x
Central Plant Building	Utility	x	x	x	x
R.W. Dirks Student Services Building	Administration	x	x	x	x

B) Vulnerable Structures

Table 74: Structures Vulnerable to Lightning

	Bee County		City of Beeville		Coastal Bend College	
Building Type	Count	Potential Damage Value	Count	Potential Damage Value	Count	Potential Damage Value
Residential	11,337	$1,124,708,000	5,848[100]	$580,169,536[101]	5	$6,743,450[102]
Commercial	482	$171,063,000	195[103]	$69,042,801.61[104]	-	-
Industrial	109	$43,074,000	44	$17,385,113.30	-	-
Agricultural	43	$5,865,000	17	$2,367,174.85	-	-
Religious	51	$25,017,000	21	$10,097,120.76	-	-
Governmental	35	$20,935,000	14	$8,449,583.20	-	-
Educational	20	$43,906,000	8	$17,720,917.13	30	$40,460,699
Total	**12,077**	**$1,434,568,000**	**6,147**	**$705,232,247**	**35**	**$47,204,149**

[100] Estimated count based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[101] Estimated value based on proportion of Beeville households to Bee County households derived from 2010-2014 ACS Table S1101
[102] Estimated as a percentage of total property value.
[103] Estimated count based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.
[104] Estimated value based on proportion of Beeville population to Bee County population derived from 2010-2014 ACS Table B01003. Applies to all building types excluding residential.

18. Mitigation Strategy

1) Capability Assessment

Bee County and the participating jurisdictions have shown themselves to be highly capable, especially in terms of implementing hazard mitigation actions. Of the three participating jurisdictions, two participated in the previous CBMAP plan. Each of these jurisdictions completed, or is in the process of completing, many of the actions recommended in the CBMAP plan.

In addition to reviewing previous actions and the steps taken to implement them, the planning team reviewed existing regulatory capabilities and opportunities for establishing new capabilities and enhancing existing ones. Bee County could improve its hazard mitigation efforts by adopting a drought ordinance or drought contingency plan. The City of Beeville could improve its hazard mitigation efforts by adopting updated subdivision and zoning ordinances that prohibit future construction in hazard areas. The City could also consider requiring enhanced construction techniques to limit vulnerability to hazards like tropical storms and hurricanes or requiring specific building materials [105]and techniques to limit vulnerability to hazards like wildfire. All jurisdictions can improve their capabilities by: budgeting for mitigation actions and support, passing policies and procedures to implement mitigation actions, adopting and implementing stricter building regulations, approving the hiring and training of staff for mitigation activities, and approving mitigation action updates and additions to existing plans as new needs are recognized.

Table 75: Capability Assessment by Jurisdiction

Bee County **Administrative, Financial, Regulatory, and Technical Abilities**
Floodplain Management
Emergency Management
Economic Development
Road and Bridge Management
Tax Collection
Grant Writing

[105] http://www.ewp.asn.au/library/downloads/ewpaa_fire_resistance.pdf

General Budgeting
CIP Funding
CDBG Funding
State and Federal Grant Funding

City of Beeville Administrative, Financial, Regulatory, and Technical Abilities
Floodplain Management
Emergency Management
Subdivision
Zoning
Building Code Enforcement
Nuisance Abatement
Substandard Structures Abatement
Drought Contingency Planning
Comprehensive Planning
Economic Development
Tax Collection
Grant Writing
General Budgeting
CIP Funding
CDBG Funding
State and Federal Grant Funding

Coastal Bend College Administrative, Financial, Regulatory, and Technical Abilities
Emergency Planning
Facilities Management
Tax Collection
Grant Writing
General Budgeting
CIP Funding
CDBG Funding
State and Federal Grant Funding

2) Goals and Objectives Overview

The hazard analysis has shown that Bee County and the participating jurisdictions are at risk of multiple natural hazards. The following goals and objectives take a broad approach to improving outcomes before, during, and after these anticipated natural hazard events.

The mitigation actions the County and participating jurisdictions have selected are designed to address specific hazard-related issues in support of achieving the desired goals and objectives.

3) Long-term vision

The hazard mitigation plan must strike a balance between identifying long-term goals and objectives and prioritized mitigation actions that may be addressed sooner, depending on funding availability and local priorities. The result is that certain goals and objectives don't have a corresponding mitigation action. Instead, by taking the long view, the local planning team has created a framework that can be developed as the plan is updated over time.

4) Goals

A) Goal 1: To reduce loss of life and injury to persons

Objective 1.1
Improve the delivery and effectiveness of warning messages

Objective 1.2
Preserve public and private emergency response capability (9-1-1, law enforcement, fire services, emergency medical services, hospitals).

Objective 1.3
Utilize available mitigation measures to prevent or reduce life-threatening impacts of natural hazards.

Objective 1.4
Reduce obstacles to timely and safe evacuation of flood hazard areas.

Objective 1.5
Reduce vulnerability of individuals living in mobile homes / manufactured housing.

Objective 1.6
Reduce life or health threatening impacts on individuals with special physical care requirements.

Objective 1.7
Reduce secondary impacts to health and safety from cascading effects.

B) Goal 2: To reduce disruptions to essential public services and infrastructure

Objective 2.1
Minimize disruption to and enhance rapid restoration of utilities.

Objective 2.2
Minimize disruption to and enhance rapid restoration of essential transportation infrastructure.

Objective 2.3
Minimize disruption to governmental, educational, and other institutions providing services to the public.

C) Goal 3: To reduce economic impacts to individuals, businesses, and area institutions

Objective 3.1
Increase home and business owner investment in available mitigation measures for private property.

Objective 3.2
Increase home and business owner participation in appropriate insurance programs.

Objective 3.3
Increase public and private sector development and use of operations continuity strategies.

Objective 3.4
Utilize available mitigation measures to prevent or reduce economic losses from natural hazards.

Objective 3.5
Reduce vulnerability of existing development by encouraging property owners to participate in buy-out or flood-proofing opportunities.

Objective 3.6
Reduce vulnerability of future development by utilizing available planning and structural standards.

D) Goal 4: To reduce losses to civic, cultural, and environmental resources

Objective 4.1
Protect public investment in community-owned facilities and infrastructure through appropriate structural, non-structural, and financial methods.

Objective 4.2
Reduce future losses to the non-profit sector through participation in available mitigation opportunities.

Objective 4.3
Reduce vulnerability of historically or culturally significant structures.

Objective 4.4
Minimize environmental impacts from cascading effects.

5) Mitigation Action Plan

Mitigation Action Prioritization

The planning team members have identified at least two mitigation actions per natural hazard. Action items were identified and prioritized in consideration of the following criteria:

1) Life safety and property protection improvements
2) Cost effectiveness – do the action's future benefits exceed its implementation costs
3) Technical feasibility – is the action reasonable given its technical requirements
4) Political acceptability
5) Administrative capabilities and legal authorities for implementation
6) Funding availability
7) The action's environmental impacts
8) The action's social acceptability
9) The action's ability to reduce risk to more than one hazard
10) The ease of implementation
11) The availability of a local champion
12) The action's relationship to other community objectives

In addition to considering an action's cost effectiveness as described above, the planning team considered TDEM's Cost-Effectiveness, Environmental Soundness and Technical Feasibility requirements as they relate to construction projects. Mitigation actions relating to physical infrastructure will meet the State's standards as outlined below:

A) Any state government construction project, regardless of potential funding source, has to be cost effective, technically feasible and meet all of the appropriate federal, state, and local environmental laws and regulations before it is started.
B) State government projects funded by Federal Mitigation Grant Programs administered by TDEM have to meet specific criteria related to cost effectiveness, environmental soundness and technical feasibility. These are outlined in the applicable FEMA grant program guidance for that particular funding program.

Incorporation and Integration of Existing Capabilities and Hazard Mitigation

As previously outlined, the planning team reviewed a range of codes, ordinances, and planning studies that have been adopted by the participating jurisdictions. The planning team's goal was to understand how these existing capabilities might affect mitigation actions in terms of implementation and enforcement. As part of its effort, the planning team examined how each jurisdiction implemented the mitigation actions outlined in the CBMAP plan.

Table 76: Previous Mitigation Action Incorporation with Existing Departments and Capabilities by Jurisdiction

Bee County **Previous Mitigation Action Incorporation**
Emergency management and Road and Bridge Department projects are in the process of mitigating flooding at the Silver Creek Bridge.
Emergency Management and Road and Bridge Department projects are in the process of mitigating flooding in areas adjacent to Medio Creek near Pettus.
Emergency management and Road and Bridge Department projects are in the process of mitigating flooding along C.R. 628 by installing a new box culvert.

City of Beeville **Previous Mitigation Action Incorporation**
Pending funding, Emergency Management and the Street Department have identified a project to mitigate flooding along Poesta Creek.

Coastal Bend College **Previous Mitigation Action Incorporation**
N/A

Each jurisdiction has its own established process for integrating new actions, codes, ordinances, plans, and studies into its existing capabilities. The planning team will ensure that each jurisdiction's various departments continue to integrate hazard mitigation actions into their day-to-day processes.

Table 77: Plan Integration

Department	All Departments	Commissioners' Court, Road and Bridge, Mayor's Office, Council, Public Works, Economic Development, Zoning, College Board of Trustees, Physical Plant	Planning, Zoning, Economic Development, Public Works, Mayor's Office, Floodplain Manager, College Board of Trustees, Physical Plant	Office of Emergency Management, Mayor's Office, Coastal Bend College News and Media Center	Office of Emergency Management, Mayor's Office, Chief of Fire Department, College President's Office, Physical Plant	Office of Emergency Management, Mayor's Office, College President's Office	Office of Emergency Management, Floodplain Manager, Mayor's Office, Physical Plant

Activity	Annual Budget	Capital Improvement Projects	Comprehensive Master Plan	Public Involvement	Emergency Operations	Grant Application	Floodplain Management
Time Frame	Quarterly/ Annual workshops	Bi-annually	Every 10 Years	As Needed	Annually	Annual Funding Cycles	Annually
Integration Process	Discuss integration of medium and high priority actions with Commissioners' Court, Council, or Schoolboard (as appropriate) concerning feasibility, potential funding sources, and a preliminary cost benefit review.	Discuss inclusion of mitigation actions with CIPs. Ensure CIPs are consistent with mitigation actions, NFIP compliance, and any new land use development.	Review existing floodplain and land use controls to insure that long term goals are consistent with actions in the HMAP.	Utilize jurisdictional web sites, social media, and other forms of advertising to make announcements of any periodic review activities concerning potential amendments or updating of the HMAP	Review prevention and protection projects for continued relevance. Ensure appropriate actions and information are included in the Emergency Operation Plan.	Review and update mitigation actions as necessary based on funding opportunities available through FEMA PDM, FEMA HMGP, and other grant funding sources.	Update and maintain floodplain information including but not limited to: maps, construction practices, permitting, and NFIP compliance.
Jurisdiction							
Bee County	x	x		x	x	x	x
City of Beeville	x	x	x	x	x	x	x
Coastal Bend College	x	x	x	x	x	x	x

Each mitigation action below outlines the following requirements: the identified responsible department head or delegate will research all relevant information to confirm the action's feasibility and prioritization, will formulate a plan of action, and will confirm funding sources and identify any fiscal liabilities associated with the mitigation action.

As part of each jurisdiction's commitment to transparency, all relevant information, including but not limited to that described above and in each action's description, will be presented to the public before the action is formally adopted for implementation. After public notification, the integration process will resemble the one outlined in Table 78 below.

Table 78: Integration Process

Jurisdiction	Integration Process
Bee County	After considering integrating mitigation actions with the activities outlined in Table 77 above, mitigation actions will be presented, considered, and formally adopted by the County Commissioners' Court and County Judge. Bee County will also use the Bee County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.
City of Beeville	After considering integrating mitigation actions with the activities outlined in Table 77 above, mitigation actions will be presented, considered, and formally adopted by the council and mayor. The City of Beeville will also use the Bee County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.
Coastal Bend College	After considering integrating mitigation actions with the activities outlined in Table 77 above, mitigation actions will be presented, considered, and approved for implementation by the Physical Plant Director, College President's Office, and Board of Trustees. Coastal Bend College will use the Bee County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.

6) Mitigation Actions by Jurisdiction and by Hazard

Each jurisdiction has selected actions that were identified as high or medium priority and that are in line with TDEM's recommended mitigation actions. However, many of the mitigation actions below are dependent upon outside grant funding for implementation. For all actions likely to require grant funding, potential sources have been identified. However, grant funding is awarded on a competitive basis, so applying for funding doesn't guarantee that funds will be received. Bee County and the participating jurisdictions have a successful history of applying for and receiving grant funding to implement physical infrastructure actions. Budget constraints will remain the determining factor for how and when each action is implemented.

A) All Jurisdictions

All three jurisdictions plan to implement the following actions. The actions are divided among those that will address multiple hazards and those that will address single hazards. Implementation for all actions is dependent upon funding availability.

Multi-Hazard Actions

Mitigation Action	**Educational Outreach**
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in NFIP, Wildfire Fuels Reduction, Structural Hardening, etc…
Hazards – All Jurisdictions	Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Earthquake, Expansive Soils, Extreme Heat, Hailstorms, Land Subsidence, Severe Winter Storms, Windstorms, Lightning
Hazard – Costal Bend College Only	Flood
Priority	High
Estimated Cost	Less than $10,000 per hazard
Potential Funding Source(s)	County, City, CBC Funds, FEMA Corps, FEMA PDM, FEMA HMGP, FMA
Responsible Department(s)	Bee County Judge & Commissioners' Court Bee County Office of Emergency Management City of Beeville Mayor's Office, City Manager's Office Coastal Bend College President's Office & Board of Trustees
Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future population

Mitigation Action	**Implement a Tree Trimming Program**
Objective	This action will develop and implement a tree trimming program to minimize the amount of debris generated during natural hazard events.
Hazards	Hurricane / Tropical Storm, Wildfire, Tornado, Hailstorms, Severe Winter Storms, Windstorms
Priority	High
Estimated Cost	$10,000 - $100,0000
Potential Funding Source(s)	County, City, CBC, FEMA Corps, FEMA PDM, FEMA HMGP

Responsible Department(s)	Bee County Judge & Commissioners' Court Bee County Office of Emergency Management City of Beeville Mayor's Office, City Manager's Office Coastal Bend College President's Office & Board of Trustees
Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future infrastructure

Mitigation Action	**Install Backup Generators**
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages.
Hazards – All Jurisdictions	Hurricanes / Tropical Storms, Tornados, Extreme Heat, Severe Winter Storms, Windstorms, Lightning
Hazard – Costal Bend College Only	Flood
Priority	High
Estimated Cost	Less than $10,000
Potential Funding Source (s)	County, City, College, FEMA PDM, FEMA HMGP, FMA
Responsible Department	Bee County Judge & Commissioners' Court Bee County Office of Emergency Management City of Beeville Mayor's Office, City Manager's Office Coastal Bend College, Physical Plant Director
Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Construct Community Safe Rooms**
Objective	The action's goal is to minimize local population vulnerability to hurricanes / tropical storms, tornados, and windstorms.
Hazards	Hurricanes / Tropical Storms, Tornados, Windstorms
Priority	Medium
Estimated Cost	Greater than $100,000
Potential Funding Source (s)	County, City, College, FEMA PDM

Responsible Department	Bee County Judge & Commissioners' Court Bee County Office of Emergency Management City of Beeville Mayor's Office, City Manager's Office Coastal Bend College, Physical Plant Director
Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Install Warning Systems**
Objective	Warning systems will help limit local vulnerability to natural hazards by giving residents an opportunity to take shelter ahead of a hazard event.
Hazards – All Jurisdictions	Hurricanes / Tropical Storms, Tornados, Hailstorms, Severe Winter Storms, Windstorms, Lightning
Hazard – Costal Bend College Only	Flood
Priority	High
Estimated Cost	$1,000 - $15,000 per device
Potential Funding Source (s)	County, City, College FEMA PDM, FEMA HMGP, FMA
Responsible Department	Bee County Judge & Commissioners' Court Bee County Office of Emergency Management City of Beeville Mayor's Office, City Manager's Office Coastal Bend College, Physical Plant Director
Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future population

Mitigation Action	**Harden Facilities**
Objective	This action proposes hardening facilities. Hardening will include but is not limited to reinforcing building foundations, upgrading and/or adding shatter-resistant films to all glazing, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, and adding bracing and tie-down clips to building roofs.
Hazards	Earthquakes, Hailstorms
Priority	High
Estimated Cost	Greater than $100,000
Potential Funding Source (s)	County, City, College, FEMA PDM, FEMA FMA

Responsible Department	Bee County Judge & Commissioners' Court Bee County Office of Emergency Management City of Beeville Mayor's Office, City Manager's Office Coastal Bend College, Physical Plant Director
Implementation Schedule	Long Term - Greater than 5 Years
Target	Existing infrastructure

Single-Hazard Actions

Mitigation Action	**Wildfire Fuels Reduction**
Objective	This action will develop and implement a program to identify and prioritize lands in need of fuels reduction and then reduce or remove wildfire fuels through various methods as appropriate.
Hazard	Wildfire
Priority	High
Estimated Cost	$10,000 - $100,000
Potential Funding Source (s)	County, City, College, FEMA PDM, FEMA HMGP
Responsible Department	Bee County Judge & Commissioners' Court Bee County Office of Emergency Management City of Beeville Mayor's Office, City Manager's Office Coastal Bend College, Physical Plant Director
Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future infrastructure

Mitigation Action	**Develop and Implement a New Drought Ordinance**
Objective	Each jurisdiction will re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new drought ordinance.
Hazard	Drought
Priority	Medium
Estimated Cost	Less than $10,000
Potential Funding Source (s)	County, City, College
Responsible Department	Bee County Judge & Commissioners' Court Bee County Office of Emergency Management City of Beeville Mayor's Office, City Manager's Office Coastal Bend College, Physical Plant Director

Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Plant drought resistant vegetation on County, City, and College properties to limit water consumption.**
Objective	To limit water consumption at jurisdiction-owned and maintained facilities, each jurisdiction will adopt a policy of replanting landscaping with drought tolerant plant varieties. To the extent possible, landscaping will be replanted on an as-needed basis, as opposed to an immediate replanting of all landscaping.
Hazard	Drought
Priority	Medium
Estimated Cost	Less than $10,000
Potential Funding Source (s)	County, City, College, Texas Parks and Wildlife, Keep Texas Beautiful, FEMA PDM, FEMA HMGP
Responsible Department	Bee County Judge & Commissioners' Court Bee County Office of Emergency Management City of Beeville Mayor's Office, City Manager's Office Coastal Bend College, Physical Plant Director
Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future infrastructure

Mitigation Action	**Update Building and Road Construction Requirements**
Objective	This action will update building and road construction requirements to include techniques and materials that mitigate against expansive soils.
Hazard	Expansive Soils
Priority	Medium
Estimated Cost	Less than $10,000
Potential Funding Source (s)	County, City, College, FEMA PDM, FEMA HMGP
Responsible Department	Bee County Judge & Commissioners' Court Bee County Office of Emergency Management City of Beeville Mayor's Office, City Manager's Office Coastal Bend College, Physical Plant Director
Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future infrastructure

Mitigation Action	Set up Cooling Centers in Existing Facilities
Objective	The action's goal is to increase extreme heat resilience by limiting vulnerable populations' exposure to extreme heat.
Hazard	Extreme Heat
Priority	Medium
Estimated Cost	Less than $10,000
Potential Funding Source (s)	County, City, College, FEMA PDM, FEMA HMGP
Responsible Department	Bee County Judge & Commissioners' Court Bee County Office of Emergency Management City of Beeville Mayor's Office, City Manager's Office Coastal Bend College, Physical Plant Director
Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future population

Mitigation Action	Create and Adopt an Ordinance that Outlines Requirements for Filling Sinkholes
Objective	This action will develop and implement an ordinance to establish requirements for properly filling in sinkholes.
Hazard	Land Subsidence
Priority	Medium
Estimated Cost	Less than $10,000
Potential Funding Source (s)	County, City, College
Responsible Department	Bee County Judge & Commissioners' Court Bee County Office of Emergency Management City of Beeville Mayor's Office, City Manager's Office Coastal Bend College, Physical Plant Director
Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future infrastructure

Mitigation Action	Create a Program to Relocate Structures in Sinkhole-prone Areas
Objective	This action will develop and implement a program to relocate structures out of sinkhole-prone areas to less hazardous ones.
Hazard	Land Subsidence
Priority	Medium

Estimated Cost	Less than $10,000 to establish program. Relocation costs will vary by structure.
Potential Funding Source (s)	County, City, College, FEMA PDM, FEMA HMGP
Responsible Department	Bee County Judge & Commissioners' Court Bee County Office of Emergency Management City of Beeville Mayor's Office, City Manager's Office Coastal Bend College, Physical Plant Director
Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future infrastructure

B) Coastal Bend College

Coastal Bend College has identified the following additional mitigation actions to address its natural hazard vulnerabilities. The College plans to implement the actions as funding becomes available.

Mitigation Action	**Create and Implement a Program to Identify Critical Functions Performed at Critical Facilities to Mitigate Future Disruption due to Natural Hazard Events**
Objective	This action proposes creating and implementing a program to identify the most important functions performed at each critical facility and to execute mitigation actions to limit functional interruption due to natural hazard events.
Hazard	Hurricanes / Tropical Storms, Tornados, Windstorms, Lightning
Priority	High
Estimated Cost	Greater than $100,000
Potential Funding Source (s)	County, City, Coastal Bend College, FEMA PDM, FEMA FMA
Responsible Department	Coastal Bend College, Physical Plant Director
Implementation Schedule	Long Term - Greater than 5 Years
Target	Existing infrastructure

Mitigation Action	**Install Surge Protection and Grounding Systems to Protect Electronic Assets**
Objective	This action proposes installing grounding systems and surge protection throughout the Coastal Bend College campus to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Windstorms, Lightning
Priority	High
Estimated Cost	Greater than $10,000
Potential Funding Source (s)	Coastal Bend College, FEMA PDM, FEMA FMA
Responsible Department	Coastal Bend College, Physical Plant Director
Implementation Schedule	Short Term - 1-5 Years
Target	Existing infrastructure

Appendix A: Bee County Flood Mitigation Plan

As noted above, Bee County and the City of Beeville developed a standalone flood mitigation plan. For reference, that plan is included below.

Bee County Flood Mitigation Plan

2017

"Under the Federal Disaster Mitigation Act of 2000 (DMA 2000 or "the Act"), Bee County is required to have a Federal Emergency Management Agency ("FEMA") - approved Local Hazard Mitigation Plan ("the Plan") in order to be eligible for certain pre- and post-disaster mitigation funds. Adoption of this Plan by the County, and approval by FEMA will serve the dual objectives of providing direction and guidance on implementing hazard mitigation in Bee County, and qualify the County to obtain federal assistance for hazard mitigation. Solely to help achieve these objectives, the Plan attempts to systematically identify and address hazards that can affect the County. Nothing in this Plan is intended to be an admission, either expressed or implied, by or on behalf of the County, of any County obligation, responsibility, duty, fault or liability for any particular hazard or hazardous condition, and no such County obligation, responsibility, duty, fault or liability should be inferred or implied from the Plan, except where expressly stated."

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1. Introduction and Background

Hazard Mitigation Plan History

The Bee County Flood Mitigation Plan has two participating jurisdictions: Bee County and the City of Beeville. However, unincorporated Bee County is home to eight (8) non-self-governing population centers: Pawnee, Tulsita, Pettus, Tuleta, Normanna, Blue Berry Hill, Skidmore, and Tynan. These Census Designated Places (CDP) are home to the densest concentrations of County residents outside of the City of Beeville. They have also been home to some of the County's worst flooding. Bee County chose to detail the floodplain location in each CDP at the end of Subsection D in Section 7 of the plan.

Bee County and the City of Beeville are participating jurisdictions in the *Coastal Bend Mitigation Action Plan* (CBMAP).

In May of 2002, the City of Corpus Christi submitted an application for a mitigation planning grant on behalf of itself, Kleberg, Nueces, and San Patricio counties. In July 2003, Aransas, Bee, Jim Wells, and Live Oak Counties were added to the project. The initial version of CBMAP received final FEMA approval in October 2006.

The mitigation planning regulation of the Disaster Mitigation Act[106] requires that mitigation plans be reviewed and updated every five years to maintain eligibility for mitigation grant funding. During 2009, the Coastal Bend Council of Governments (CBCOG) applied for and received a grant to update the plan. The current version of the CBMAP was approved by FEMA on September 27, 2012.

The CBMAP plan identifies seven hazards that impact the seven-county planning area, including flooding. However, according to the CBMAP plan no spatial data was available at that time to address the flooding hazards present in Bee County or the City of Beeville. Flood-related spatial data for both is available now. The Bee County Flood Mitigation Plan will use that and other data to identify the flood risk within Bee County and the City of Beeville by determining the existing flood vulnerability and the potential impact of future flood events.

The Bee County Flood Mitigation Plan shares its fundamental principles with the CBMAP plan:

[106] 44 CFR §201.6(d)(3)

Table 79: Fundamental Principles of the National Mitigation Strategy[107]

Fundamental Principles of the National Mitigation Strategy
1. Risk reduction measures ensure long-term economic success for the community as a whole rather than short-term benefits for special interests.
2. Risk reduction measures for one natural hazard must be compatible with risk reduction measures for other natural hazards.
3. Risk reduction measures must be evaluated to achieve the best mix for a given location.
4. Risk reduction measures for natural hazards must be compatible with risk reduction measures for technological hazards and vice versa.
5. All mitigation is local.
6. Disaster costs and the impacts of natural hazards can be reduced by emphasizing proactive mitigation before emergency response; both pre-disaster (preventive) and post disaster (corrective) mitigation is needed.
7. Hazard identification and risk assessment are the cornerstones of mitigation.
8. Building new Federal-State-Local partnerships and public-private partnerships is the most effective means of implementing measures to reduce the impacts of natural hazards.
9. Those who knowingly choose to assume greater risk must accept responsibility for that choice.
10. Risk reduction measures for natural hazards must be compatible with the protection of natural and cultural resources.

[107] Coastal Bend Mitigation Action Plan, p. 2

Purpose

Mitigation means sustained action taken to reduce or eliminate long-term risk to people and property from hazards and their effects. Mitigation distinguishes actions that have a long-term impact from those that are more closely associated with preparedness for, immediate response to, and short-term recovery from a specific event.

The main purpose of the flood mitigation plan is reducing future losses in Bee County and the City of Beeville by identifying mitigation strategies based on an analysis of risk, including both an assessment of flood hazard and vulnerability. The plan's mitigation strategies seek to identify potential loss-reduction opportunities; however, implementation of the strategies will be constrained to some extent by the future availability of funding in the context of other community priorities. It is unrealistic to expect that all future losses can be entirely eliminated. It is realistic to strive over coming decades to build more disaster-resistant and resilient communities in Bee County and the City of Beeville, as part of an overall "sustainable development" approach.

Planning Process

The Bee County Flood Plan includes two jurisdictions: Bee County and the City of Beeville. Representatives to the local planning team were suggested during the Bee County Commissioners Court meeting on August 24, 2015. Bee County contacted the suggested team members, and worked with the City of Beeville to select their representatives to the planning team. The planning team consisted of members representing the following offices and departments:

Table 80: Local Planning Team Members

Jurisdiction	Agency or Department	Title	Phone Number
Bee County	Office of Emergency Management	Emergency Management Coordinator	361-621-1567
Bee County	Community Affairs Department	Floodplain Administrator	361-621-1553
Bee County	Commissioners Court	Bee County Commissioner	361-621-1550
Bee County	Road and Bridge Department	Road Administrator	361-319-9576
City of Beeville	Public Works Department	Director	361-362-4497

Each local planning team member worked to collect and provide the input and information necessary to develop the flood mitigation strategy. Planning team members established a schedule with specific goals and meeting dates over the nine-month planning period.

Table 81: Planning Schedule

Proposed Timeline	October	November	December	January	February	March	April	May	June	Actual Completion
Organize Resources and Identify Planning Team										October
Create Outreach Strategy										October
Review Community Capabilities										January
Conduct Risk Assessment										April
Identify Mitigation Goals and Actions										April
Develop Action Plan for Implementation										June
Identify Plan Maintenance Procedures										June
Review Final Draft										June
Submit Plan to State and FEMA										July
Adopt Plan									-	June 2017

Meetings										
Local Contact										8/24/2015 5/23/2016
Planning Team										10/22/2015 3/18/2016 6/22/2015
Public Outreach										10/22/2015 3/18/2016 6/22/2015
Stakeholder Outreach										April

A. Project Meetings

The planning team met on three separate occasions. Additional communication was regularly carried out via email and over the phone.

The first planning team meeting was held on October 22, 2015. During this meeting, the planning team reviewed existing flood hazard data, including local flood-related documents, ordinances, and incident information compiled by a previous Floodplain Administrator, and reviewed FEMA repetitive loss (RL) and severe repetitive loss (SRL) data. In the case of RL and SRL data, the team determined the data was not representative of all known repeatedly damaged properties in the County. The discrepancy between FEMA data and local knowledge suggested a gap in NFIP coverage as well as a potential mitigation action. The planning team reviewed previous flood mitigation actions, including pursuing Increased Cost of Compliance funding to relocate and / or elevate structures in the floodplain.

The team agreed to use the existing data as the foundation for its flood risk assessment and ongoing researching into flood extent, impact, and vulnerability.

At the end of the meeting, planning team members agreed to compile relevant data, including county and city ordinances, begin identifying local stakeholders, and begin identifying critical facilities.

The second planning team meeting was held on March 18, 2016. Prior to the meeting, planning team members were provided with a meeting agenda and additional information about the meeting's scope based on the information the team had gathered between meetings.

To stay on schedule, the planning team needed to meet four objectives: Review and tentatively approve the local stakeholder list, review and tentatively approve the critical facilities list, complete the community capability assessment, review previous mitigation actions, whether or not they were implemented and successful, and review an overview of potential future mitigation actions appropriate to the natural hazards identified in the first planning team meeting. The planning team met all four objectives.

The final planning team meeting was held on June 22, 2016. During this meeting, planning team members reviewed the initial complete draft. The team discussed formatting issues, adjusting the mitigation action prioritizations, and next steps in the planning process, specifically submitting the plan for formal review.

Stakeholders

In an effort to solicit participation, area stakeholders were contacted at least twice by phone or email. Stakeholders contacted during the planning process included the following offices and departments in Bee County and neighboring counties:

Table 82: Stakeholders Contacted During Planning Process

Beeville Main Street Program Program Director 361-358-4641 x 235	**Live Oak County** Floodplain Administrator 361-449-2733
Bee County Farm Service Agency County Executive Director 361-358-3343	**Natural Resources Conservation Service** Beeville Office 361-358-1178
Bee County Groundwater Conservation District Manager 361-449-7017	**San Patricio County** Floodplain Administrator 361-387-3563
Chase Field Industrial Complex Bee Development Authority 361-358-2023	**San Patricio County Drainage District** Manager 361-364-4268
Coastal Bend College Director, Physical Plant 361-354-2559, 361-350-0066	**Texas A&M Beeville Station** 361-358-6390
Coastal Bend Council of Governments Emergency Management Planner 361-523-9447	**Texas A&M AgriLife Extension** County Extension Agent, Ag and Natural Resources 361-621-1552
Goliad County Floodplain Administrator 361-645-1729	**TxDOT** Beeville Office Maintenance Supervisor 361-358-3178
Karnes County Floodplain Administrator 830-780-3511, 830-780-3461	**US Army Corps of Engineers** Floodplain Management Services 409-766-3032

With the exception of Coastal Bend College and TxDOT, all stakeholders contacted by the planning team participated by directing the team to a better resource or by providing important information about the various approaches to flood mitigation that they have implemented or tried to implement in their own jurisdictions. Stakeholder participation helped shape the

mitigation strategy. In particular, their input helped guide the planning team toward achievable mitigation actions and away from those shown to be less feasible.

Public Input

Members of the public were invited to attend three public hearings to provide input and feedback during the planning process. Public hearings were held on October 22, 2015, March 18, 2016, and June 22, 2016.

Each public hearing was advertised in the local paper at least 72 hours in advance, and flyers were posted in public locations and Bee County offices. To encourage public participation, each meeting started at 5:00 PM.

Members of the public were given the opportunity to review an in-progress draft of the plan at the second hearing. The public was also given an opportunity to review and comment on the initial completed draft ahead of the third public hearing. In total, the public had two opportunities to review the in-progress plan and express their views and provide input before it was submitted to the formal review process.

Despite planning team efforts to generate public interest and collect input, only one member of the public attended the first public hearing, no members of the public attended subsequent hearings, and no members of the public offered comments on the plan drafts during the planning process.

Plan Development

The local planning team reviewed the following documents during the planning process:

Table 83: Plan Data Sources and Incorporation

Data Source	Data Incorporation	Purpose
National Climatic Data Center (NCDC)	Hazard occurrences	Previous event occurrences, damage dollars, and mapping for all hazards
Federal Emergency Management Agency (FEMA) DFIRM Flood Zones	Flood zone maps	GIS mapping of flood zones
State of Texas Hazard Mitigation Plan 2013 Update	Hazard Descriptions	Official descriptions of hazards and their potential impacts
Texas State Data Center	Population and demographics	Population counts, parcel data, and land use data
National Flood Insurance Program	NFIP Policy and Loss Data	Identifying NFIP policies in force, paid losses, and repetitive and severe repetitive loss property data.
Coastal Bend Mitigation Action Plan	Previous planning approach, hazards addressed, and mitigation actions	Previous planning team representatives, plan maintenance, and mitigation actions
Bee County Appraisal Data	Population and demographics	Population counts, parcel data, and land use data
City of Beeville Zoning Ordinance	Zoning requirements and restrictions	Identifying zone locations and restrictions to limit future hazard exposure

Bee County Subdivision Ordinance	Subdivision requirements and restrictions	Identifying development restrictions to limit future hazard exposure
City of Beeville Subdivision Ordinance	Subdivision requirements and restrictions	Identifying development restrictions to limit future hazard exposure
Bee County Flood Damage Prevention Ordinance	Flood damage prevention building requirements	Identifying building requirements and restrictions for structures in the floodplain
City of Beeville Flood Damage Prevention Ordinance	Flood damage prevention building requirements	Identifying building requirements and restrictions for structures in the floodplain

Additional information sources including FEMA, the National Climatic Data Center, the United States Geological Survey, the United States Army Corps of Engineers, the United States Census, the Texas State Data Center, and others are noted throughout the plan.

Plan Monitoring, Evaluation, and Update

The hazard mitigation plan is not a static document. As conditions change and mitigation actions are implemented, the plan will need to be updated to reflect new and changing conditions in each jurisdiction.

The planning team has identified specific departments to oversee action implementation in each jurisdiction. The planning team has also identified potential funding sources and an implementation timeframe for each mitigation action. The expected timeframes will be an important component in determining whether or not actions are implemented efficiently. The departments or persons identified for each jurisdiction include but are not limited to:

Table 84: Plan Monitoring Responsibilities

Jurisdiction	Agency or Department	Title	Phone Number
Bee County	Office of Emergency Management	Emergency Management Coordinator	361-621-1567
Bee County	Community Affairs Department	Floodplain Administrator	361-621-1553
Bee County	Road and Bridge Department	Road Administrator	361-319-9576
City of Beeville	Public Works Department	Director	361-362-4497

Within one year of adoption of this plan, each department or agency will review and, as appropriate, integrate implementation of their respective mitigation actions with their existing internal plans and policies relating to capital improvements, land use, design and construction, and emergency management.

On a biannual basis, representatives from each jurisdiction serving as the planning team will evaluate progress on implementing the plan's mitigation actions. The planning team will review departmental / agency findings, public input, and future development plans to evaluate the effectiveness and appropriateness of the plan.

In light of changing funding sources, hazard vulnerability, and local mitigation priorities, the planning team will identify changes to plan goals and priorities for their respective jurisdictions, and they will report their findings to the rest of the planning team. It will be the planning team's responsibility to identify relevant reasons for delay or obstacles to completing the plan's mitigation actions, along with recommended strategies to overcome any deficiencies.

Any significant change to the plan, including but not limited to changing mitigation actions, abandoning mitigation actions, or pursuing new mitigation actions, will require the County and participating jurisdictions to provide opportunities for the public to make its views and concerns known. Bee County and the participating jurisdictions will provide notice to the public through announcements in the local paper, fliers posted at city hall, and on the city's website.

B. Plan Monitoring

The Bee County Floodplain Manager, the Emergency Management Coordinator (EMC), and the City of Beeville's Director of Public Works will be responsible for the overall continued coordination and monitoring of the flood mitigation plan and the mitigation actions. The agencies and departments identified above in shall serve as the responsible party for each respective jurisdiction. The plan monitoring worksheet outlined below will serve as the basis for revision of the plan.

At a minimum, the mitigation plan will be reviewed by the Floodplain Coordinator, EMC, and planning team representatives from each jurisdiction quarterly, during budget workshops, and as other plans are being developed or revised including: comprehensive plans, capital improvement project plans, and emergency plans.

To execute the monitoring requirement, the Floodplain Administrator will produce a plan monitoring worksheet to be completed by each jurisdiction's representative. The worksheet will identify and track the following for each mitigation action: the expected implementation schedule, setbacks or delays, changes to the local risk assessment, changes in jurisdictional capabilities, and current and future opportunities for integration with other local plans.

Regularly monitoring the plan implementation process in each participating jurisdiction will ensure that every component of the plan gets reviewed for potential amendments.

After adoption of this plan, it will be posted to each participating jurisdiction's website or Facebook page, and a printed copy will be available for review at the City of Beeville's City Hall and at the Bee County Office of Emergency Management. The goal is to create the opportunity for constant and continued feedback from local officials, stakeholders, and the general public.

Plan Evaluation

Proper evaluation will measure the progress and effectiveness of the mitigation actions identified in the plan. On a bi-annual basis the Floodplain Administrator, in coordination with the EMC, will use the following criteria, along with additional metrics as necessary, to assess the effectiveness of the plan:

- Do the specified goals and objectives still address current and expected conditions?
- Has the nature, magnitude, and/or risk of the flood hazard changed?
- Have there been changes in land development that the plan needs to address?

- Are available resources suitable for implementing the plan?
- Is funding budgeted or available to successfully implement prioritized mitigation actions?
- Are there opportunities in the local budgeting process or local, state, and national grant funding cycles to increase funding to implement mitigation actions?

Other steps will include site visits to completed mitigation projects to measure and ensure their success. In the event that a mitigation project fails to meet its goal, the planning team will evaluate the causes of the shortcoming. The planning team will use their assessment to amend the project, allocate additional resources to achieve the desired outcome, or replace the project with a more appropriate project.

The Floodplain Administrator and EMC will also work to implement any additional revisions required to ensure that the plan is in full compliance with federal regulations and state statutes.

Plan Update

The plan is designed to address a five-year period. In accordance with 44CFR Section 201.6, it will be updated every five years to maintain compliance with state and federal regulations. However, at least every two years from the date of approval, and quarterly on the fifth and final year of the plan, the Floodplain Administrator, EMC, and the planning team will thoroughly review any significant changes in the County that might impact the plan.

During the update process, the planning team will do the following: collect data on recent flood events, record how each flood event impacted Bee County and the City of Beeville during the preceding years, and determine whether or not implemented mitigation actions produced the desired outcomes.

Additional considerations will include but are not limited to: changes in local development, changes in exposure to flood hazards, the development of new mitigation capabilities or techniques, and revisions to state or federal legislation.

The update process will provide continued opportunity for the public and elected officials to determine which actions succeeded, failed, or are no longer relevant. It is also an opportunity to identify recent losses due to flooding and to consider whether or not any of those losses could have been avoided.

Bee County Profile

C. Location and Characteristics

Bee County is located within the Coastal Bend Region of Texas. Corpus Christi is the largest urban area in the region. Other large nearby urban areas include San Antonio and Laredo.

In contrast with the majority of the Coastal Bend Region which is located within the Gulf Prairies and Marshes ecoregion, Bee County is located in the South Texas Plains ecoregion. The area has an average annual rainfall of between 20 – 32 inches. Monthly rainfall is typically lowest during the winter months and highest during spring and fall.

Bee County is located in the San Antonio – Nueces River Basin. There are four watersheds in the County: Mission, Aransas, Atascosa, and Lower Nueces.

Population

Data from the 2010 Census and the 2010-2014 ACS survey provides estimated populations for the participating jurisdictions, including data related to vulnerable populations.

Table 85: Vulnerable Populations

Jurisdiction	Total Estimated Population[108]	Estimated Vulnerable Population Totals	
		Elderly (Over 65)[109]	Low Income (≤ $25,000)[110]
Bee County	32,462	3,436	7,370
City of Beeville	13,102	1,545	4,137

Land Use

Most existing land use in Bee County can be classified as agricultural or open space. Major land development is limited to Beeville and the Census Designated Places[111] in Bee County. Land use varies between each, but no land use is unique to any. The overall breakdown of land use in Beeville and the eight Census Designated Places is shown by type, number of acres, and percentage of total acres in Figure 2 below.

[108] Table B01003, 2010-2014 ACS
[109] Table DP-1, 2010 Census, used to estimate current 65+ population
[110] Table S1901, 2010-2014 ACS, used to estimate low-income population
[111] Pawnee, Tulsita, Pettus, Tuleta, Normanna, Blue Berry Hill, Skidmore, Tynan

Land Use by Type in Beeville and Bee County Census Designated Places

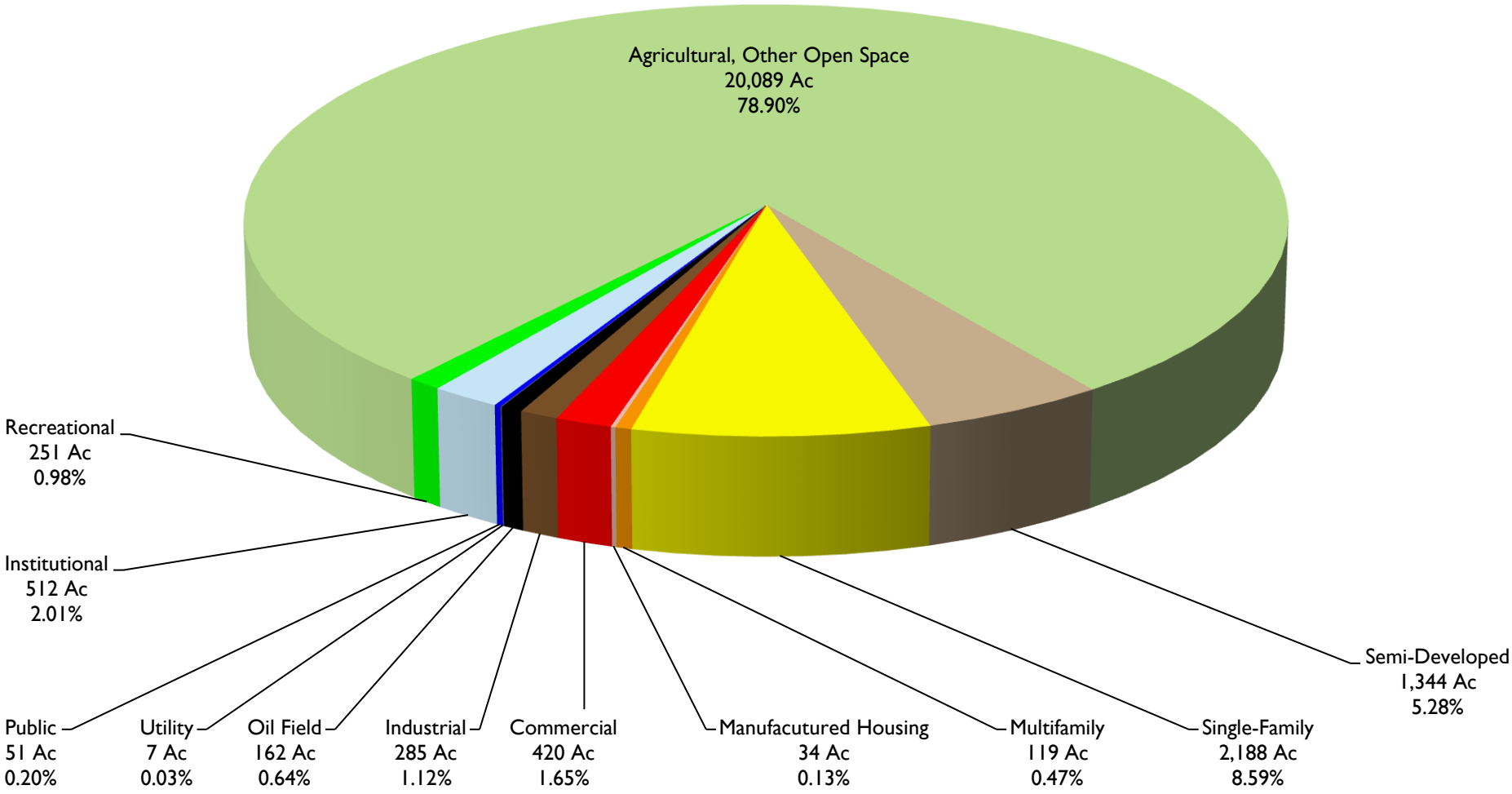

Figure 23: Land Use in Beeville and Bee County Census Designated Places

Economy

I. Largest Industries in Bee County

Tables 2 and 3 and Figure 3 list establishment, taxable sales, and employment data. The tables show that:

- Agriculture sustains the largest number of employment establishments in Bee County, followed by Retail Trade and the Accommodation and Food Service industries.

Table 86: Primary Bee County Establishments[112]

Industry	# Establishments County
Agriculture Operations	696
Retail Trade	280
Accommodation and Food Services	89
Other Services (except Public Administration)	88

Table 87: Primary City of Beeville Establishments

Industry	# Establishments City
Agriculture Operations	-
Construction	27
Retail Trade	156
Accommodation and Food Services	68

- According to the Texas Workforce Commission, average weekly wages in Bee County in the third quarter of 2015 were lower than average weekly wages in the Coastal Bend Workforce Development Area and the State.

Table 88: 3rd Quarter 2015 Average Weekly Wages

[112] Source: Texas State Comptroller. Note: Comptroller does not collect information for establishments not subject to sales taxes; therefore, some financial institutions, franchise establishments, and similar organizations are not included; Comptroller also undercounts agriculture operations, so those are sourced from the most recent USDA data (http://quickstats.nass.usda.gov)

	Bee County	Coastal Bend WDA	Texas
Average Weekly Wage (all industries)	$744	$832	$1,003

Source: Texas Workforce Commission, Tracer quarterly employment and wages

- Agriculture typically employs 17% of workers in Bee County. The Retail Trade industry and Health Care / Social Assistance industries each employ 11% of workers in Bee County. Mining / Quarrying / Oil and Gas Extraction employs 8% of workers in Bee County and is the third largest industry in terms of employment.

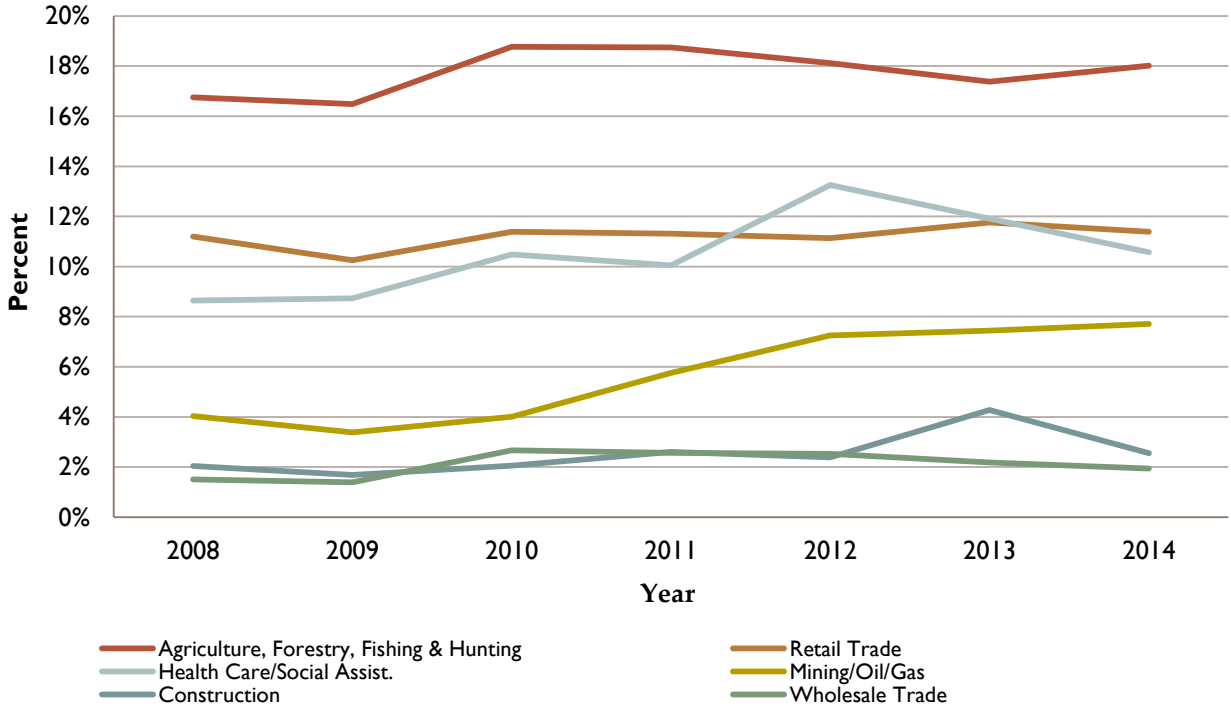

Figure 24: Percent of Employees by Industry (Bee County, 2008 - 2014)

As compared to the State and the U.S., Bee County appears to have specializations in agriculture, forestry, fishing, and hunting; mining, quarrying, oil and gas extraction; retail trade; accommodation and food services; and other services, except public administration.

Location quotients (LQ)[113] are used to detect the presence of an industry cluster. The calculation determines whether the local economy has a greater share of each industry than

[113] The LQ is calculated by dividing the percentage of employees in an industry in the County by the percentage of employees in that industry in the larger regions. Data for small cities is not available for direct comparison.

expected when compared to a reference economy. The Bureau of Labor Statistics determines share based on employment by industry. When an industry's LQ is less than 1.0, businesses/residents have a lesser share of employment than the comparison area. When the LQ is greater than 1.0, businesses/residents have a greater share of employment in that industry than the comparison area. The direction of change in an industry's LQ over time indicates whether that industry is growing in that location or declining. LQs greater than 1.0 are highlighted in Table 4.

Table 89: Industry Concentrations[114]

	2004		2009		2014	
Bee County Employment Compared to:						
	TX	**U.S.**	**TX**	**U.S.**	**TX**	**U.S.**
Agriculture, forestry, fishing and hunting	2.1	1.65	2.23	1.45	3	1.75
Mining, quarrying, oil and gas extraction	3.6	14.7	3.16	12.8	4	17.54
Utilities	0.8	0.94	0.73	0.8	0.5	0.57
Construction	0.7	0.73	0.54	0.69	0.6	0.8
Manufacturing	0.5	0.41	0.25	0.22	0.7	0.65
Wholesale trade	0.5	0.54	0.53	0.61	0.5	0.4
Retail trade	1.4	1.39	1.7	1.7	1.4	1.42
Professional and technical services	ND	ND	0.43	0.41	0.5	0.51
Management of companies and enterprises	ND	ND	ND	ND	0.2	0.13
Administrative and waste services	0.6	0.61	ND	ND	0.1	0.14
Educational services	ND	ND	ND	ND	ND	ND
Healthcare and social assistance	ND	ND	ND	ND	ND	ND
Transportation and warehousing	0.3	0.34	0.94	1.07	0.3	0.33
Information	0.6	0.58	0.75	0.7	0.9	0.83
Finance and insurance	0.8	0.8	0.68	0.69	0.6	0.6
Real estate and rental and leasing	0.6	0.65	0.7	0.79	0.5	0.58
Arts, entertainment, and recreation	0.9	0.69	1.04	0.76	0.7	0.46
Accommodation and food services	1.2	1.29	1.39	1.43	1.3	1.36
Other services, except public administration	1.6	1.44	1.28	1.09	1.5	1.35

Location of Work

Roughly 78%[115] of Bee County residents work within the county. However, according to 2010 – 2014 ACS survey estimates, 57% of Bee County residents commute longer than 20 minutes to and from work.

[114] Bureau of Labor Statistics Location Quotient Calculator (http://data.bls.gov/location_quotient)

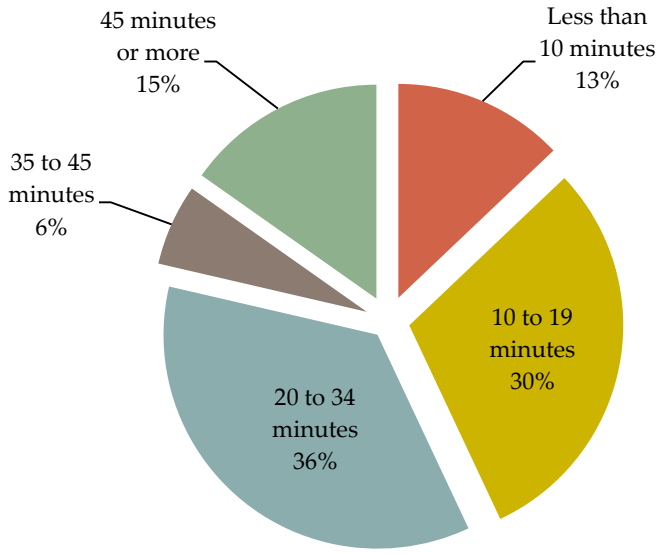

Figure 25: Travel Time to Work

Expected Development Trends

At this time, the majority of future commercial and residential development in Bee County is likely to be concentrated in the City of Beeville. Many of the City's prime commercial areas are located along major thoroughfares that crisscross the FEMA designated floodway and the FEMA 100-Year and FEMA 500-Year floodplains. In addition to being subject to flooding, these commercial areas are likely to experience additional impacts due to potentially limited ingress and egress during and after flood events. The challenge moving forward will be continuing to limit development in the floodplain without negatively impacting the local economy.

[115] 2010 – 2014 ACS Survey Table S0801

Risk Assessment

D. Floods

According to the Texas State Hazard Mitigation Plan, Floods are defined as:

> [T]he accumulation of water within a water body and the overflow of excess water into adjacent floodplain lands.
>
> In hydrologic analysis, runoff is that portion of rainfall which, in combination with other factors, contributes to the stream flow of any surface drainage way. When runoff exceeds the carrying capacity of the stream or drainage, flooding occurs. Runoff is a product of two major groups of factors, climate and physiographic. Climatic factors may include precipitation, evaporation, transpiration and interception. Physiographic factors would include the characteristics of the watershed such as size, shape and slope of the basin's drainage area, the general land use within the basin. Average annual runoff decreases unevenly moving east to west across Texas, the localized variations based on these factors listed above.
>
> When surface water runoff enters into streams, rivers, or dry creek beds, riverine flooding conditions occur whenever the water carrying capacity of the water channel is compromised by excess runoff.
>
> If the local basin drainage area is relatively flat, shallow, slow-moving floodwater can last for days. In drainage areas with substantial slope, or the channel is narrow and confined, rapidly moving and extreme high water conditions, called a flash flood, can occur.

Flood **History**

Bee County

The National Climatic Data Center has data on 51 reported flood events that occurred across Bee County, including the City of Beeville, between 1996 and 2013, the most recently recorded flood event. Of the 51 events, three were related to rainfall associated with hurricanes, and 46 were classified as Flash Floods. Twenty-one of the 51 events led to local street and highway flooding, including US 181, a Texas Department of Transportation (TxDOT)-designated major hurricane evacuation route for Corpus Christi. During ten of the 51 flood events, at least one rescue operation was carried out. The floods on July 4, 2007 required 20 people to be rescued from stranded vehicles and flooded homes. Adjusted for inflation, flood damages in Bee County have ranged as high as $515,132.

When available, the National Weather Service's "Storm Data and Unusual Weather Phenomena" reports provided additional storm information and descriptions. FEMA disaster declaration records[116] show that between 1967 – 2010 two flood-specific disasters were declared in Bee County. The first occurred on 9/18/1971 (DR-313) and the second on 7/4/2002 (DR-1425).

Nearly all of the County's high water marks were set in 1967 by Hurricane Beulah (DR-232), a Category 3 hurricane. The storm dropped 27.38 inches of rain between September 20 – 24. Pettus was inundated with between three and five feet of flood water. Five people drowned during the storm, there was flood-related structural damage, and transportation was non-existent because the highways were submerged. Flood-specific damages the resulted from Hurricane Beulah aren't available. However, adjusted for inflation to $2016, the hurricane inflicted the equivalent of $15,593,633 in property damages.

City of Beeville

Of the 51 flood events reported by the NCDC in Bee County between 1996 – 2013, 14 occurred in the City of Beeville. The most recent reported flood was in 2012. Every flooding event was due to flash flooding. There haven't been any flood-related deaths or injuries. Adjusted for inflation to $2016, flood damages for a single event have ranged as high as $57,877.

National Flood Insurance Program

The National Flood Insurance Program (NFIP) is administered by FEMA to provide flood insurance coverage to then nation. As of December 31, 2015, there are 130 NFIP policies in force in unincorporated Bee County covering property worth $31,189,600. There are 167 NFIP policies in force in the City of Beeville covering property worth $31,325,800. As of December 31, 2015 there have been 48 paid NFIP claims since January 1, 1978 totaling $1,524,579.01.

A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling ten-year period, since 1978. There are five RL properties in the Bee County Community and one RL property in the City of Beeville Community. According to the NFIP data, the five RL properties in Bee County are classified as single family, and the RL property in the City of Beeville is classified as non-residential.

The RL properties in the Bee County Community accounted for 15 losses with payments totaling $477,785.13. The RL property in the City of Beeville Community accounted for two losses with payments totaling $11,406.85.

[116] FEMA Disaster Declarations Summary – Open Government Dataset, https://www.fema.gov/media-library/assets/documents/28318

A severe repetitive loss property is: "a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding $5,000 and with cumulative amount of such claims payments exceeding $20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property. There no validated severe repetitive loss properties in either the Bee County Community or the City of Beeville Community.

The County and the City of Beeville have both adopted and enforce flood damage prevention ordinances that require building permits and approval of their respective floodplain administrators before new construction or substantial improvements can begin on any structure located within FEMA special flood hazard areas. At this time, neither ordinance requires mandatory freeboard above the base flood elevation. The County's ability to regulate land use is limited. However, Bee County's Subdivision Ordinance references its floodplain ordinance requirements, and informs developers of additional permitting requirements. The Bee County Floodplain Administrator continues to encourage residents to purchase flood insurance to reduce their flood risk.

Probability

Probability is a measure of the likelihood a hazard event will occur in a given year. Typically, events with less than a 1% probability of occurrence in the next year or a recurrence interval of greater than every 100 years are classified as unlikely. Events with a 1% to 10% probability of occurrence in the next year or a recurrence interval of 11 to 100 years are classified as occasional. Events with a 10% to 90% probability of occurrence in the next year or a recurrence interval of 1 to 10 years are classified as likely. Events with a 90% to 100% probability of occurrence in the next year or a recurrence interval of less than1 year are classified as highly likely.

In the case of the FEMA 100-year flood, there's a 1% chance of an event in the next year, and for the 500-year flood, it's a 0.02% chance of an event in the next year. The probability of a 100-year flood event in both Bee County and the City of Beeville is therefore occasional. The probability of a 500-year flood event in both Bee County and the City of Beeville is therefore unlikely.

Location

Although the plan is designed to examine flood risk on a County-wide scale, the population within Bee County is known to cluster is specific areas, most notably the City of Beeville. When identifying flood location, in addition to reviewing FEMA special flood hazard areas at the County level, the planning team decided to pay special attention to FEMA special flood hazard areas within each Census Designated Place in the County.

Bee County

Roughly 13% (74,185 acres out of 563,410) of Bee County is in the FEMA 100-year floodplain. In contrast, less than 1/10 of 1% (509 acres out of 563,410) of Bee County is in the identified FEMA 500-year floodplain. Every type of land use found in Bee County can be found in both the FEMA 100-year and FEMA 500-year floodplains. Figures 10 – 18 will more specifically illustrate the location of the FEMA 100-year and 500-year floodplains as they relate to land use in the County's Census Designated Places.

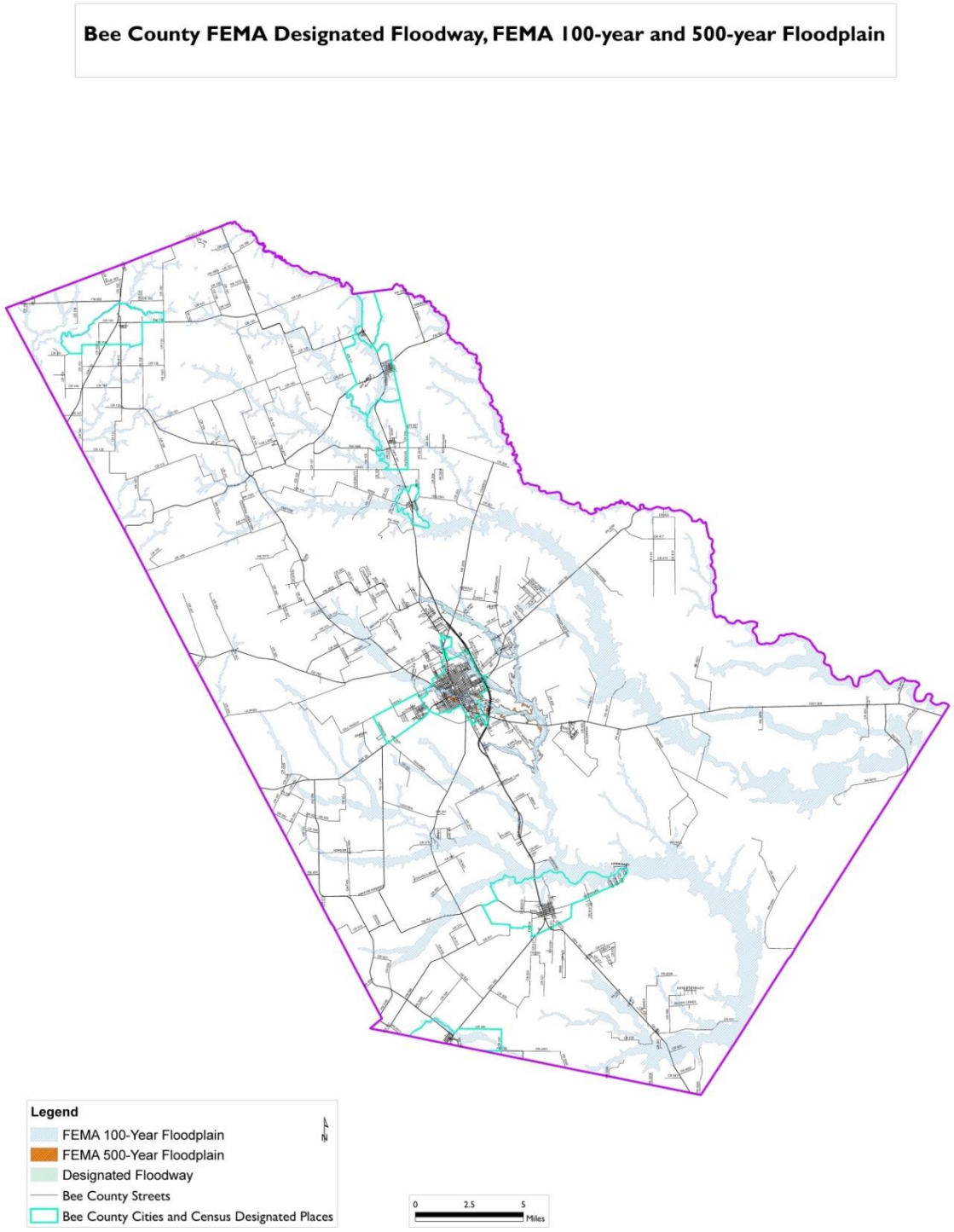

Figure 26: Bee County Designated Floodway, FEMA 100-Year and 500-Year Floodplain

Zone

The 74,185 acres of FEMA 100-year floodplain within Bee County are classified as either Zone A or Zone AE.

According to FEMA, Zone A covers areas that are subject to inundation by the 1-percent-annual-chance (100-year) flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevation (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply in Zone A[117]. Within Bee County, 70,419 floodplain acres out of 74,185 are classified as Zone A.

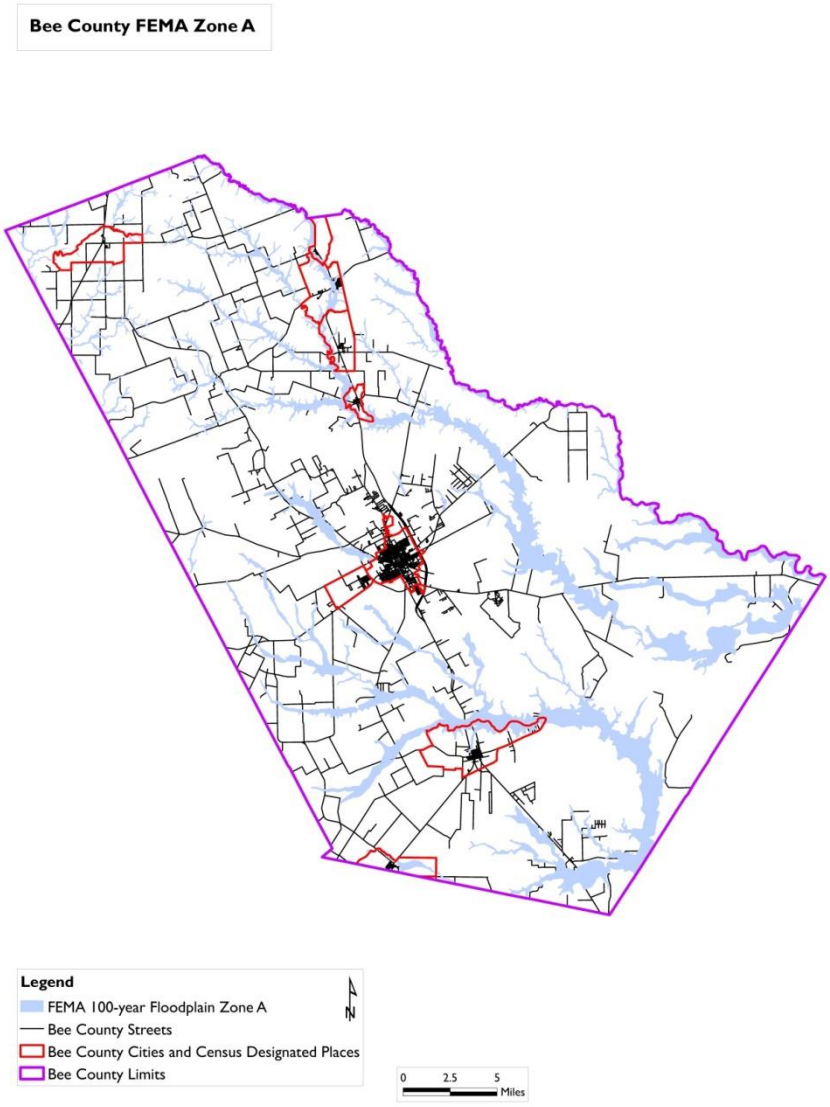

Figure 27: FEMA Zone A

[117] https://www.fema.gov/zone

Zone AE, in contrast, covers areas subject to inundation by the 1-percent-annual-chance (100-year) flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply[118]. Within Bee County, 3,766 acres out of 74,185 are classified as Zone AE. Base Flood Elevation slopes from northwest to south east and ranges from a high of 274 feet to a low of 157 feet.

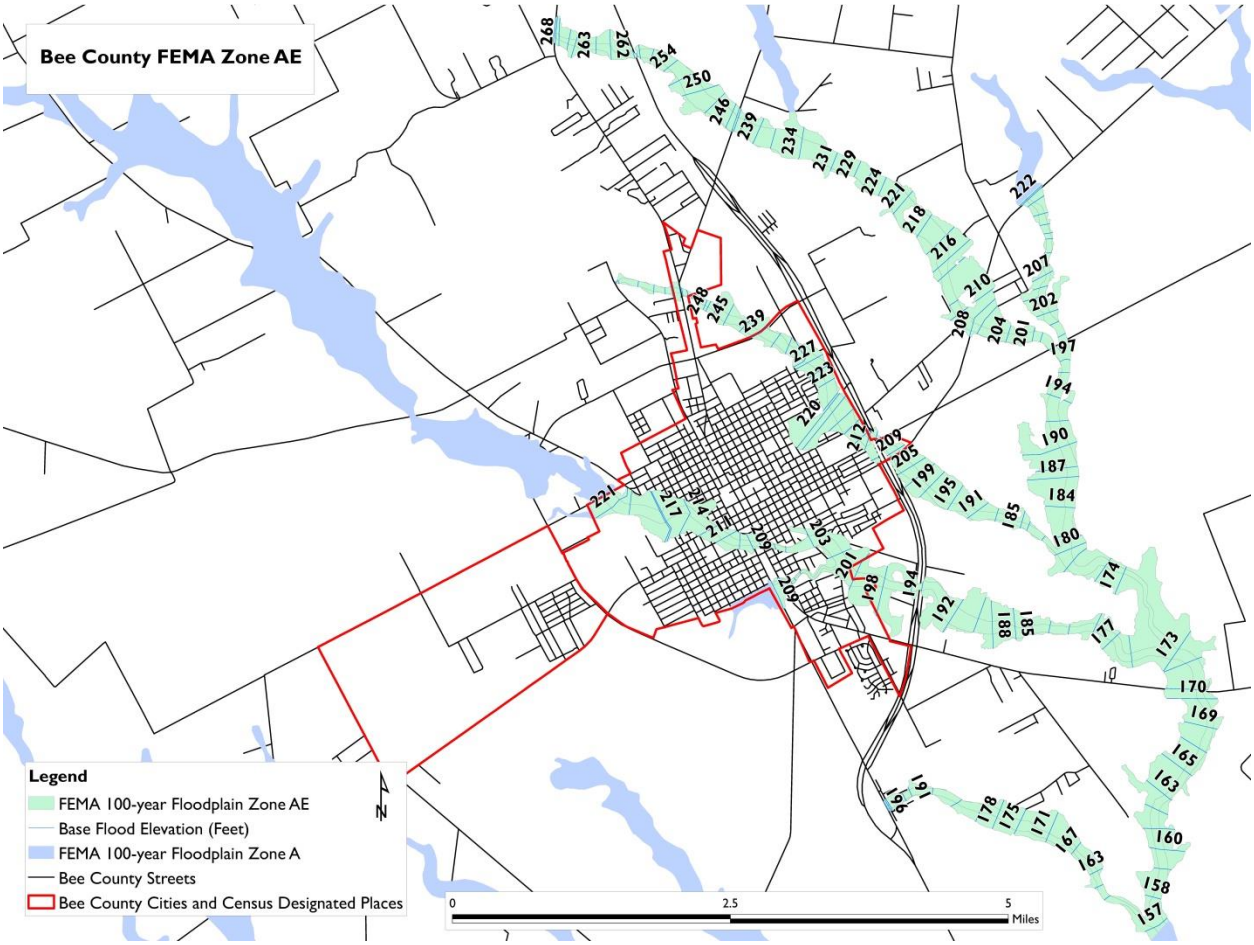

Figure 28: FEMA Zone AE

[118] http://www.fema.gov/zone-ae-and-a1-30#

There are 509 acres in the FEMA 500-year floodplain. Every acre within the 500-year floodplain in Bee County is designated Zone X. However, Zone X is divided into two categories, and the only way to distinguish the two is by their visual representation on a Flood Insurance Rate Map (FIRM). When Zone X represents areas within the 500-year floodplain on a FIRM, it has a dot matrix fill. When Zone X represents areas determined to be outside the 0.2% annual chance floodplain on a FIRM, there is no fill.

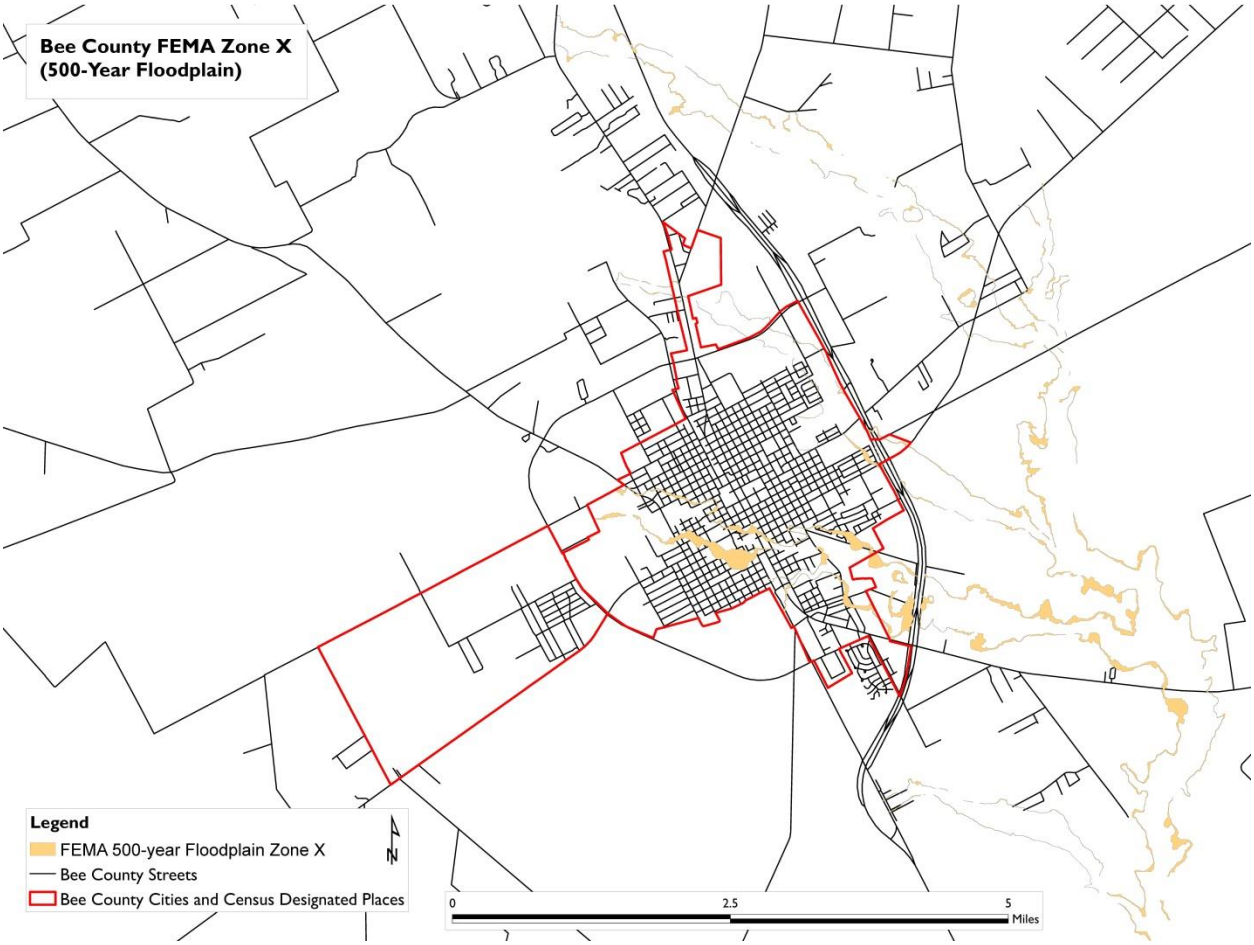

Figure 29: FEMA 500-Year Floodplain Zone X

Residents living outside of the FEMA Special Flood Hazard Areas described above should not assume their property will not be subject to flooding. As the saying goes, "where it rains, it floods."

City of Beeville

The FEMA 100-year floodplain covers 18% (695 acres out of 3,956) of the total land area within Beeville's city limits. Every type of land use found in Beeville is represented in the FEMA 100-year floodplain.

The FEMA 500-year floodplain covers 3.5% (138 acres out of 3,956) of the total land area within Beeville's city limits. FEMA 500-year floodplain boundaries extend beyond the FEMA 100-year floodplain boundaries. However, the distribution of 500-year floodplain boundaries varies based on changes in topography and elevation. Every type of land use found in Beeville is represented in the FEMA 500-year floodplain.

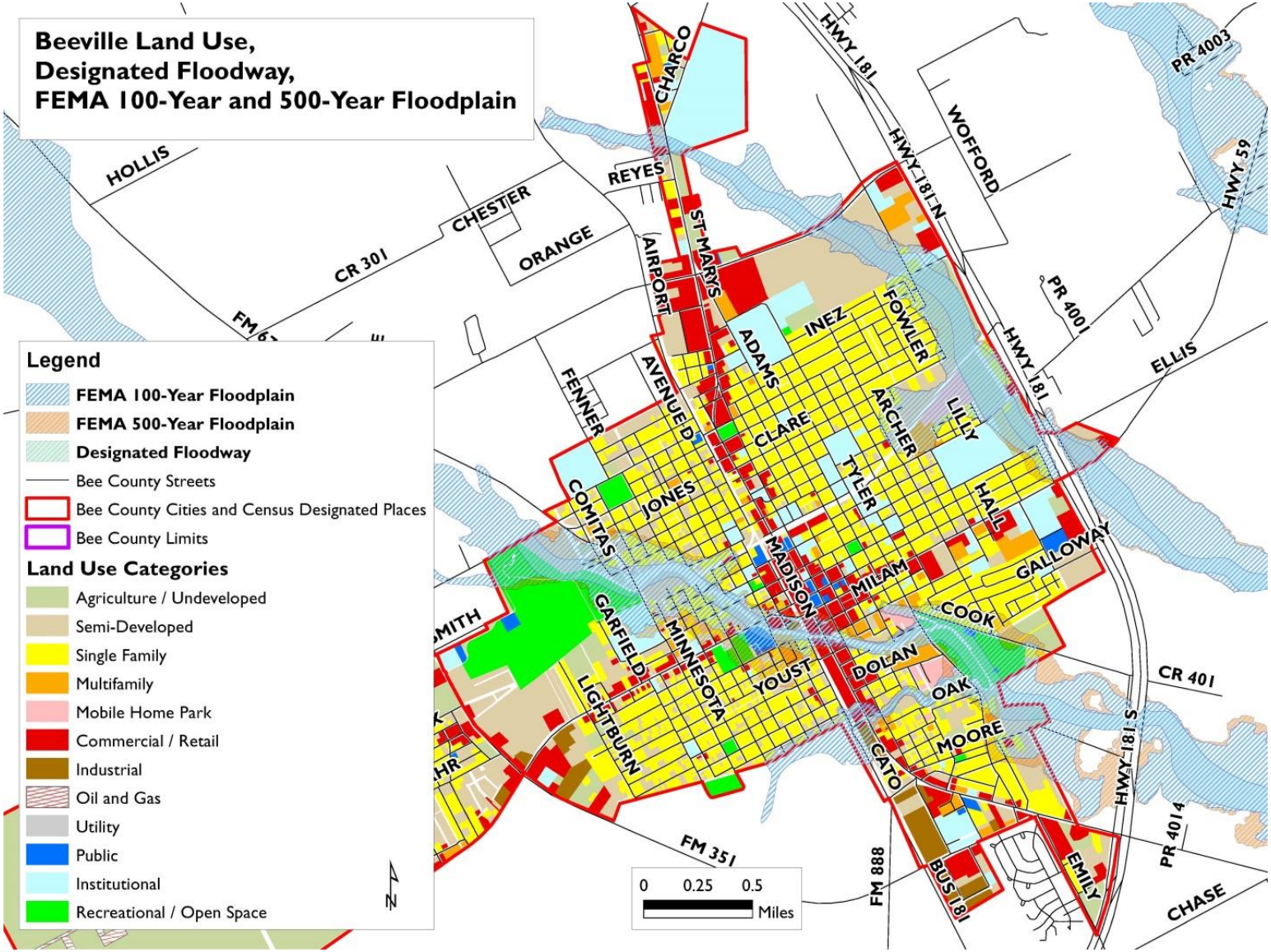

Figure 30: City of Beeville Land Use, Designated Floodway, FEMA 100-Year and 500-Year Floodplain

Floodplain Location by Census Designated Places

As previously mentioned, these Census Designated Places (CDP) are home to the densest concentrations of County residents outside of the City of Beeville. Bee County chose to examine the floodplain location in each CDP in closer detail.

Pawnee

In Pawnee the floodplain covers 6% (191 acres out of 3,358) of the total land area within the Census Designated Place boundaries.

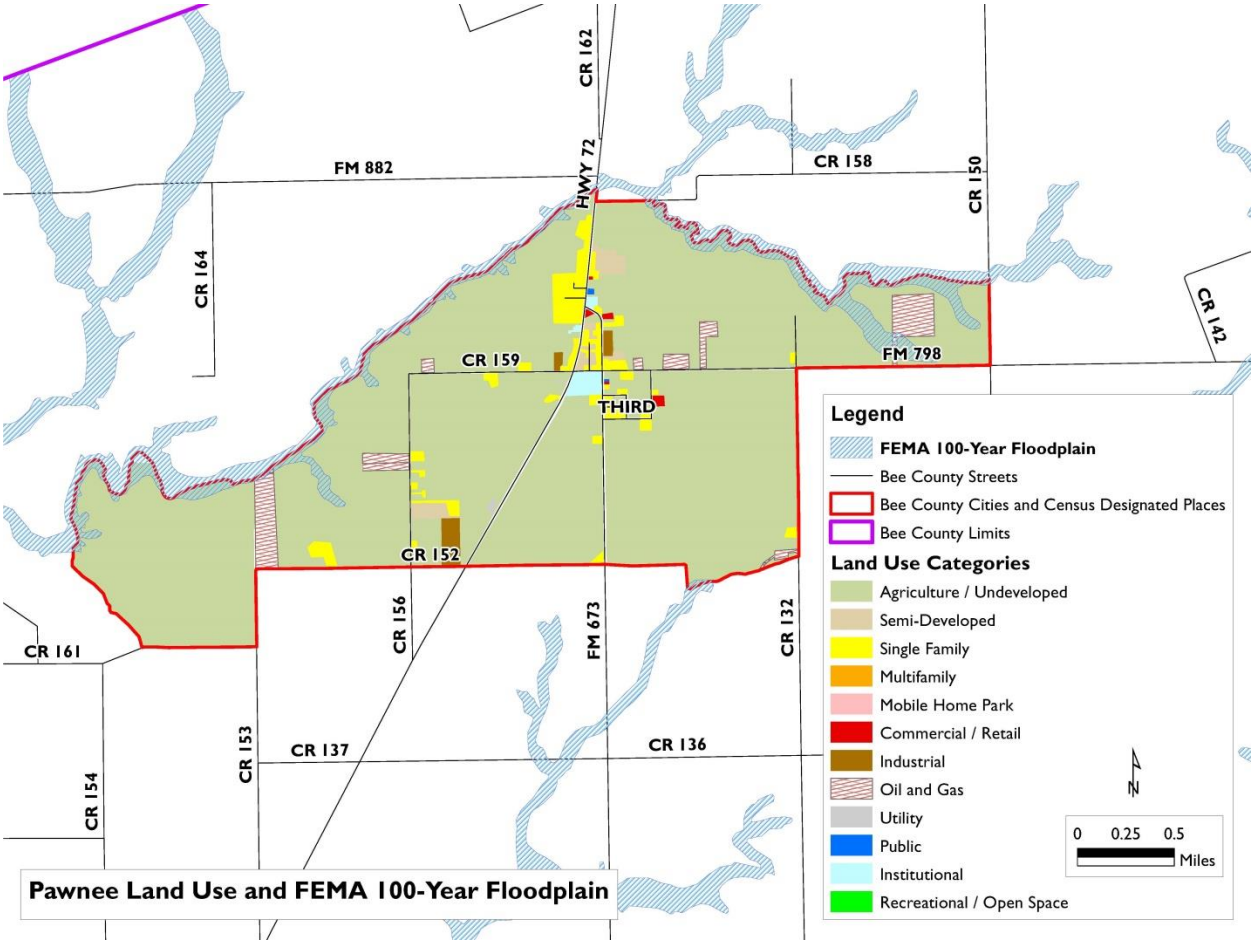

Figure 31: Pawnee Land Use and FEMA 100-Year Floodplain

Tulsita

In Tulsita the floodplain covers 15% (185 acres out of 1,241) of the total land area within the Census Designated Place boundaries.

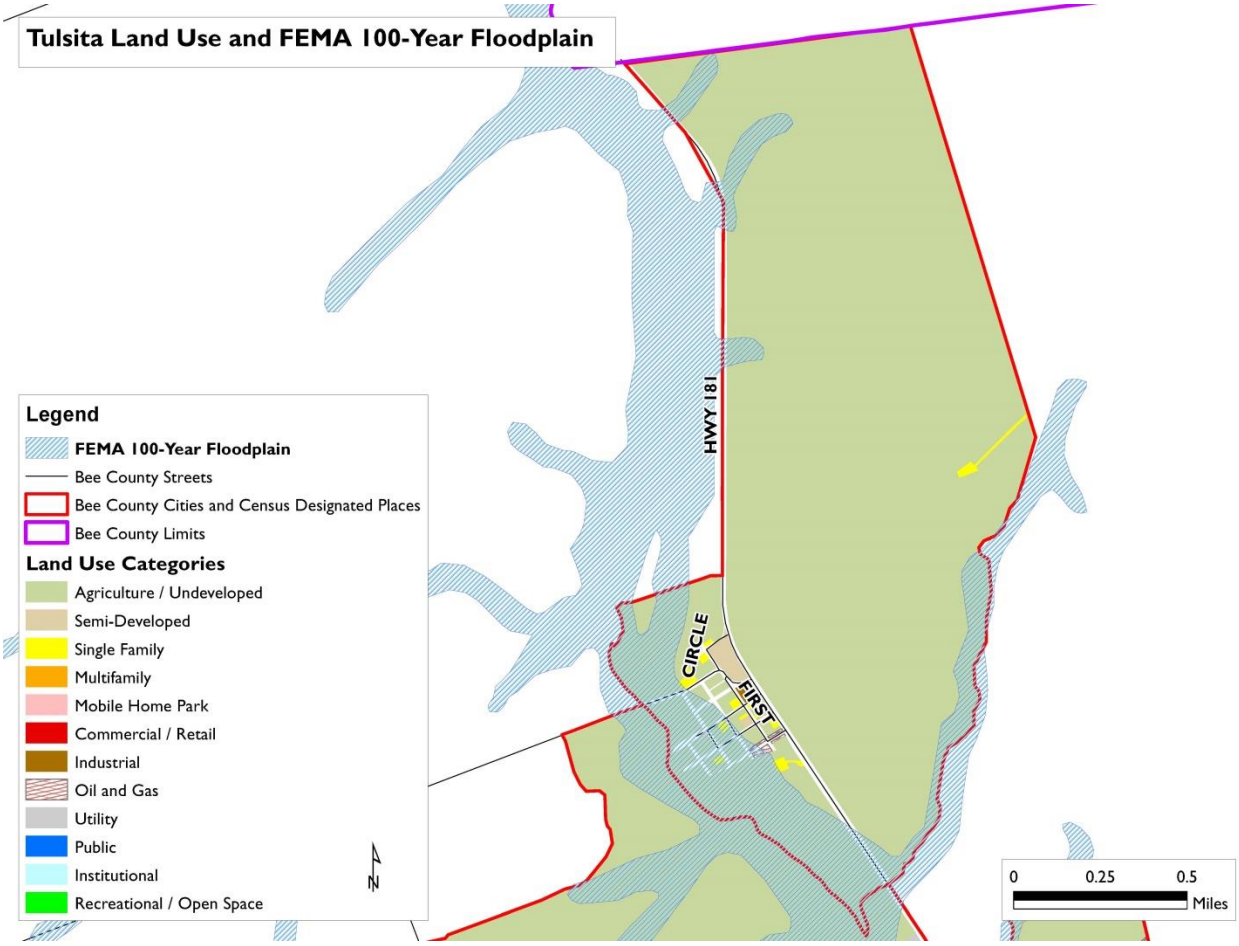

Figure 32: Tulsita Land Use and FEMA 100-Year Floodplain

Pettus

In Pettus the floodplain covers 25% (946 acres out of 3,728) of the total land area within the Census Designated Place boundaries. Every type of land use found in Pettus is represented in the floodplain.

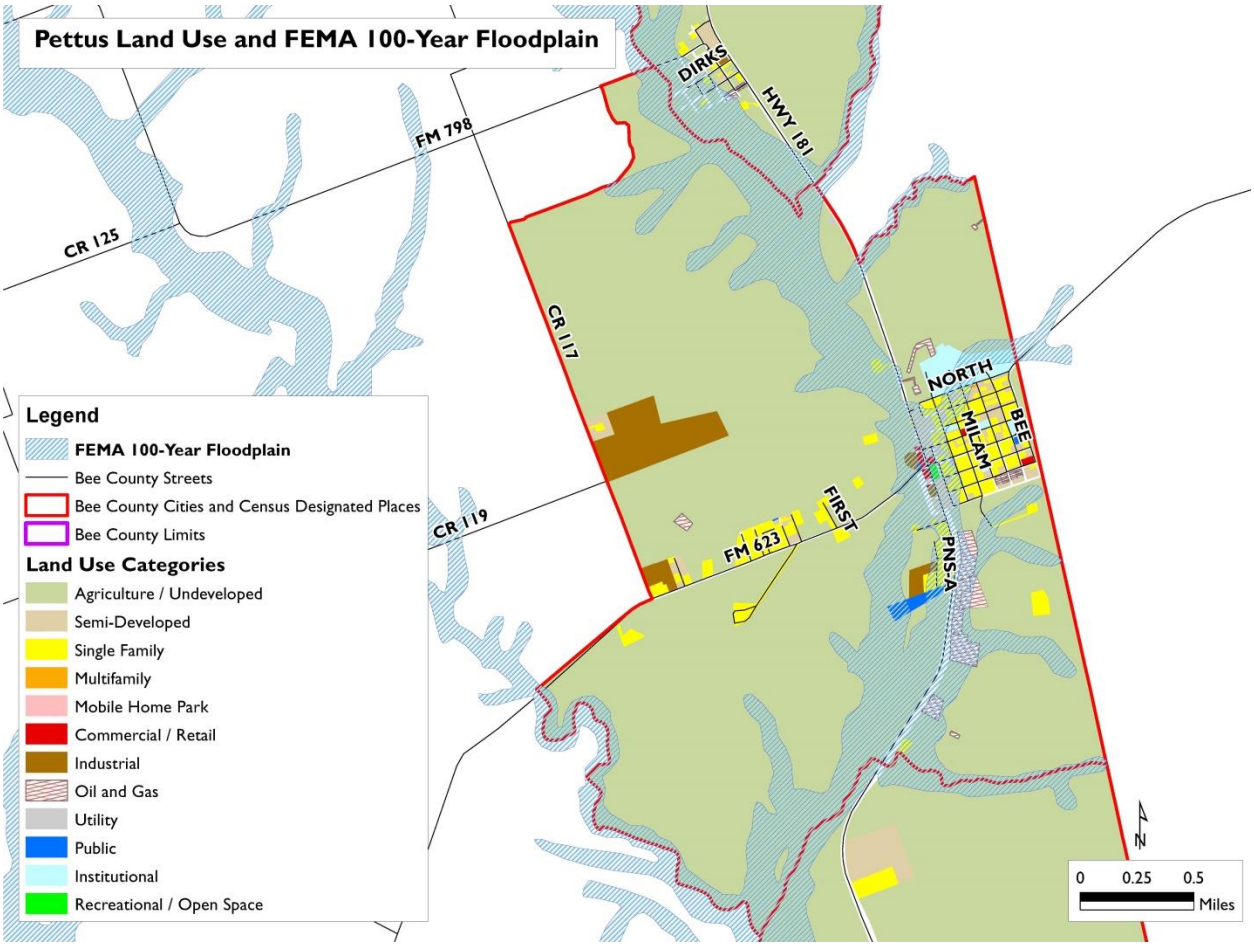

Figure 33: Pettus Land Use and FEMA 100-Year Floodplain

Tuleta

In Tuleta the floodplain covers 15% (427 acres out of 2863) of the land area within the Census Designated Place boundaries.

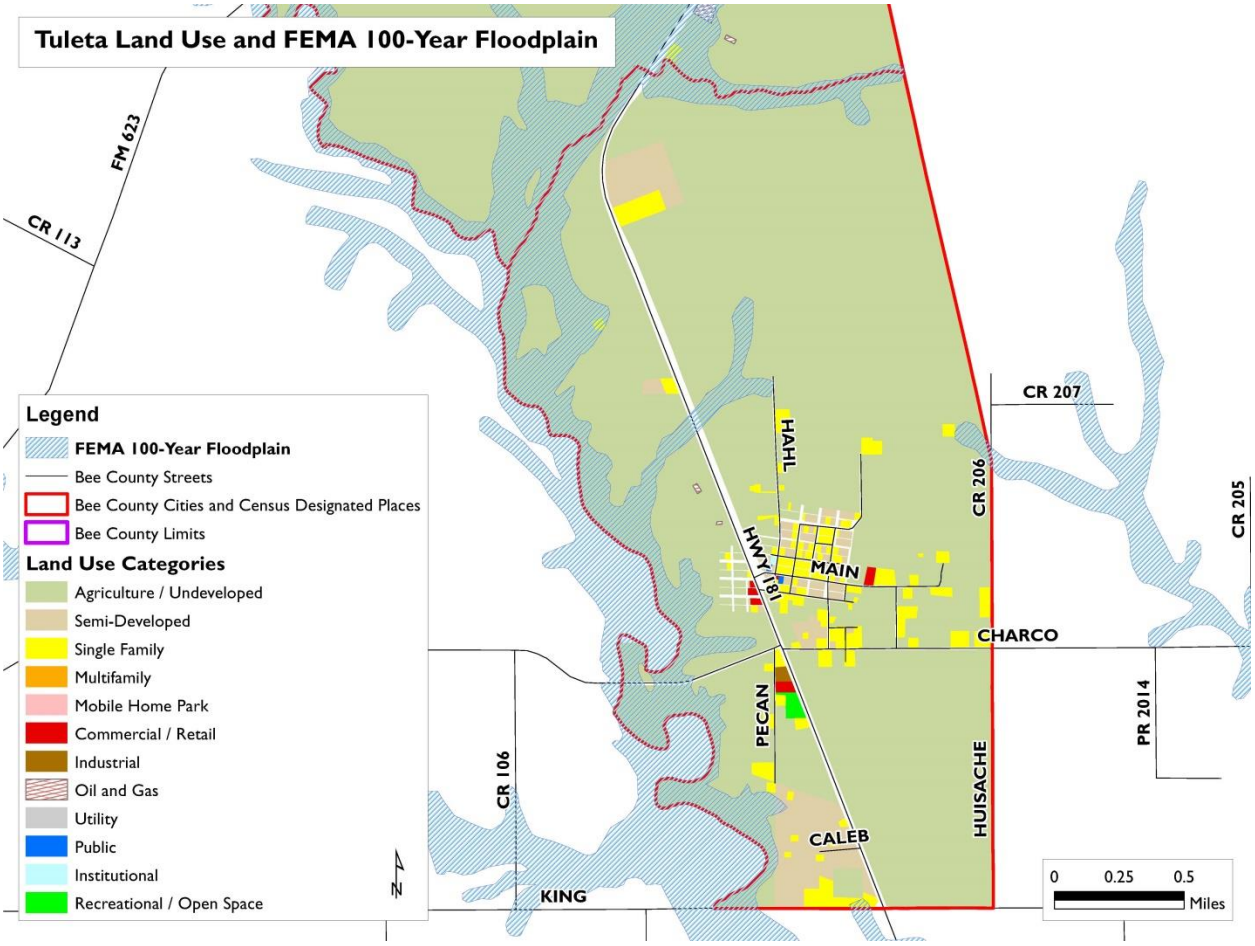

Figure 34: Tuleta Land Use and FEMA 100-Year Floodplain

Normanna

In Normanna the floodplain covers 33% (281 acres out of 862) of the land area within the Census Designated Place boundaries.

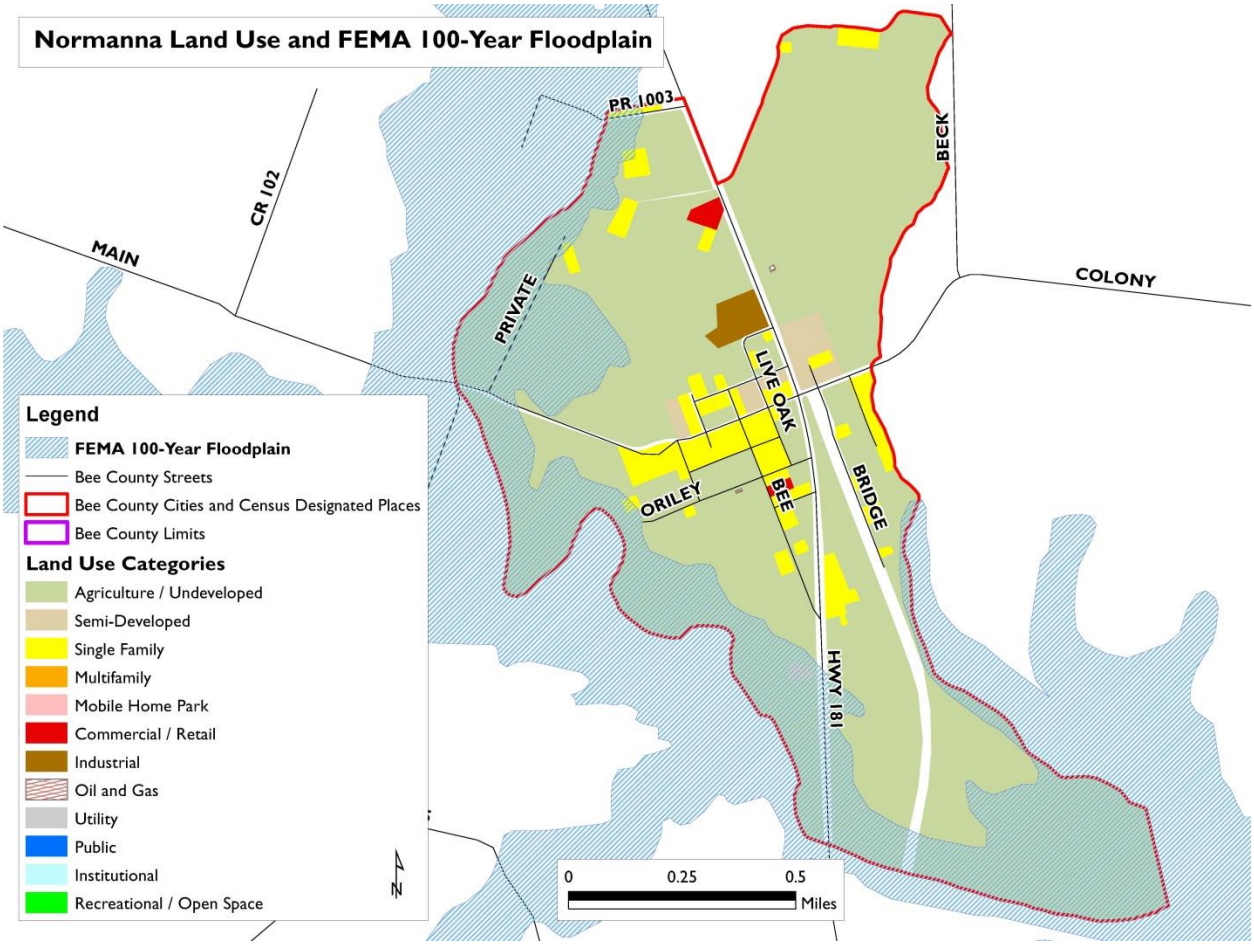

Figure 35: Normanna Land Use and FEMA 100-Year Floodplain

Blue Berry Hill

There is no identified special flood hazard area within Blue Berry Hill's Census Designated Place boundaries.

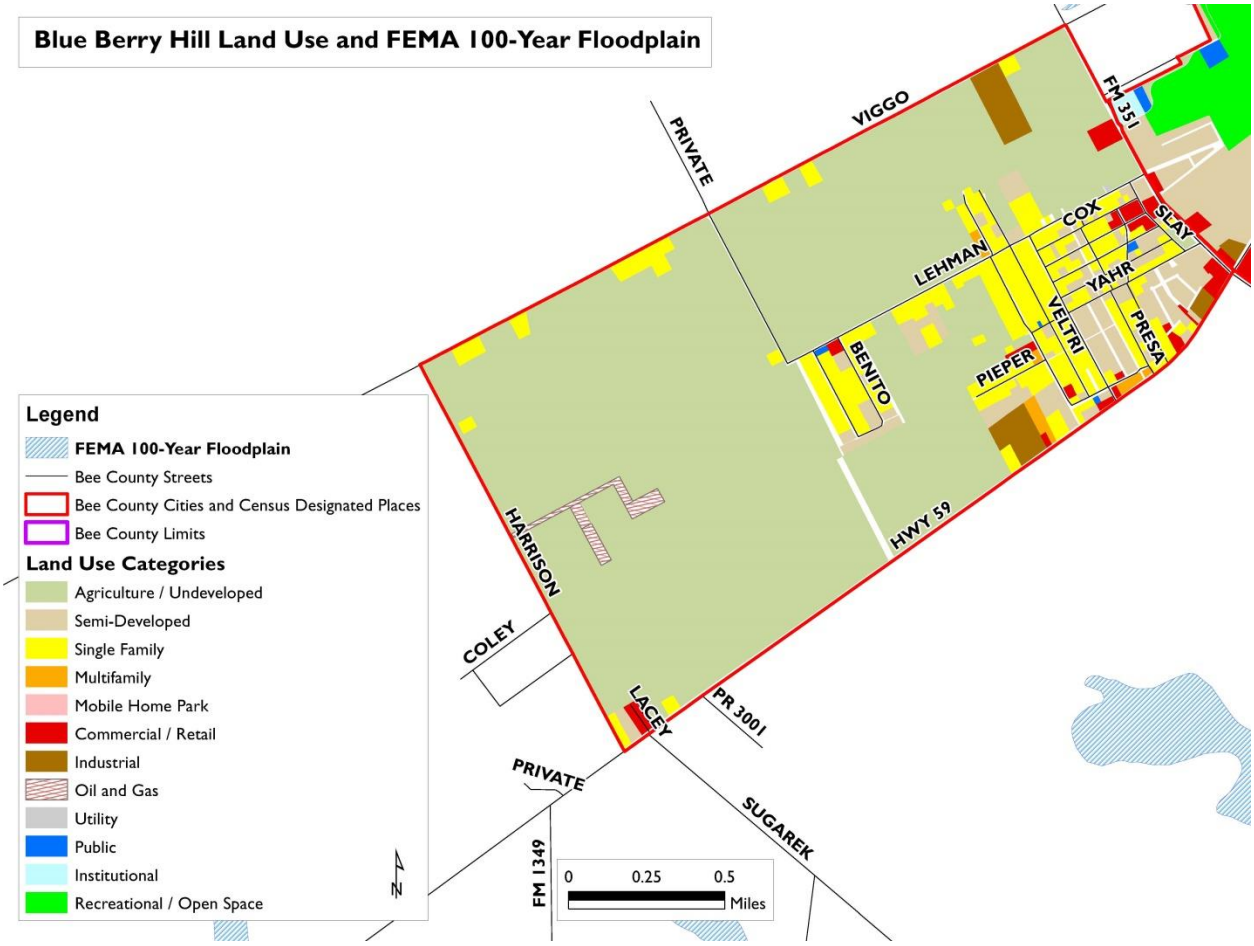

Figure 36: Blue Berry Hill Land Use and FEMA 100-Year Floodplain

Skidmore

In Skidmore the floodplain covers 20% (1,353 acres out of 6,749) of the land area within the Census Designated Place boundaries.

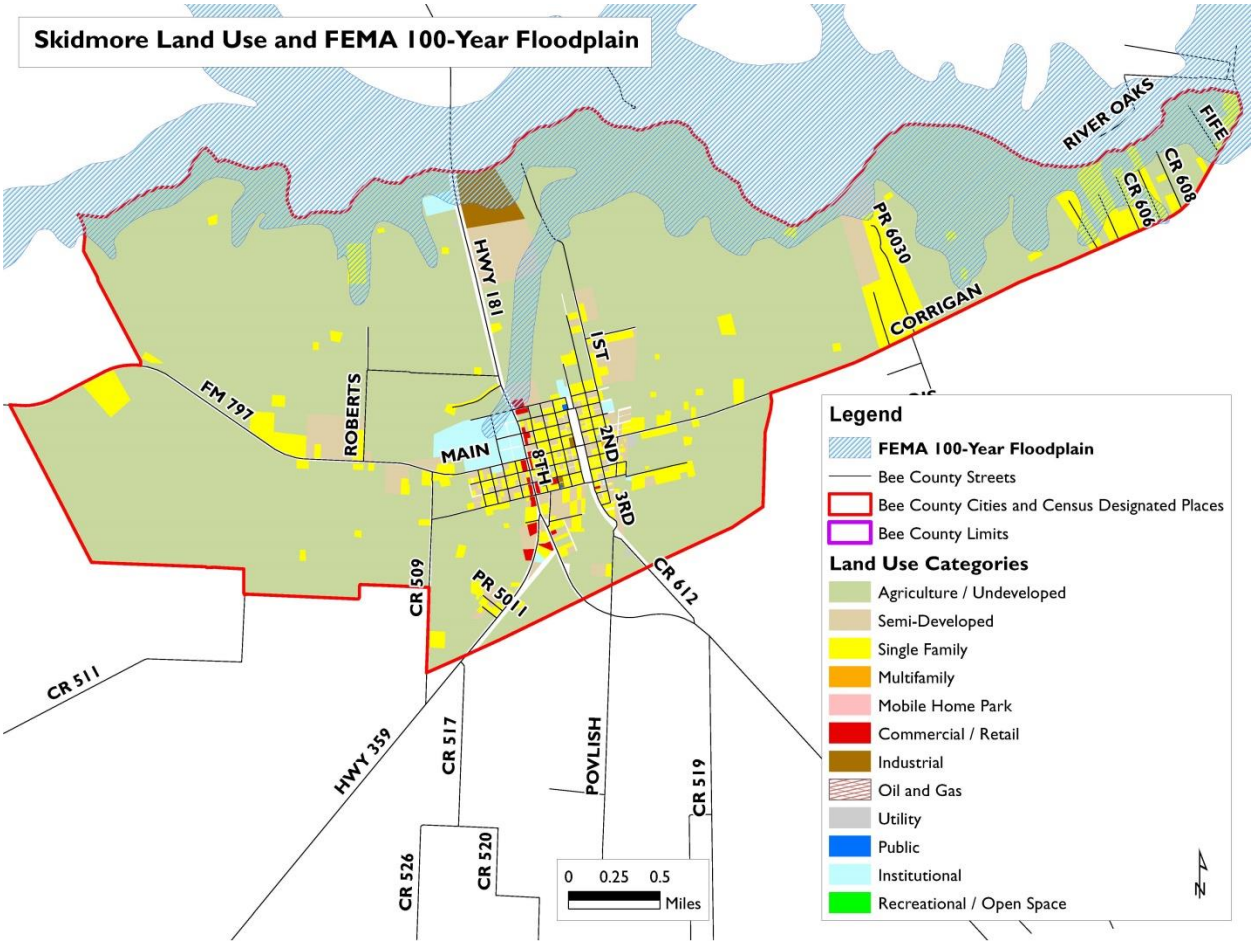

Figure 37: Skidmore Land Use and FEMA 100-Year Floodplain

Tynan

In Tynan the floodplain covers 22% (489 acres out of 2,213) of the land area within the Census Designated Place boundaries.

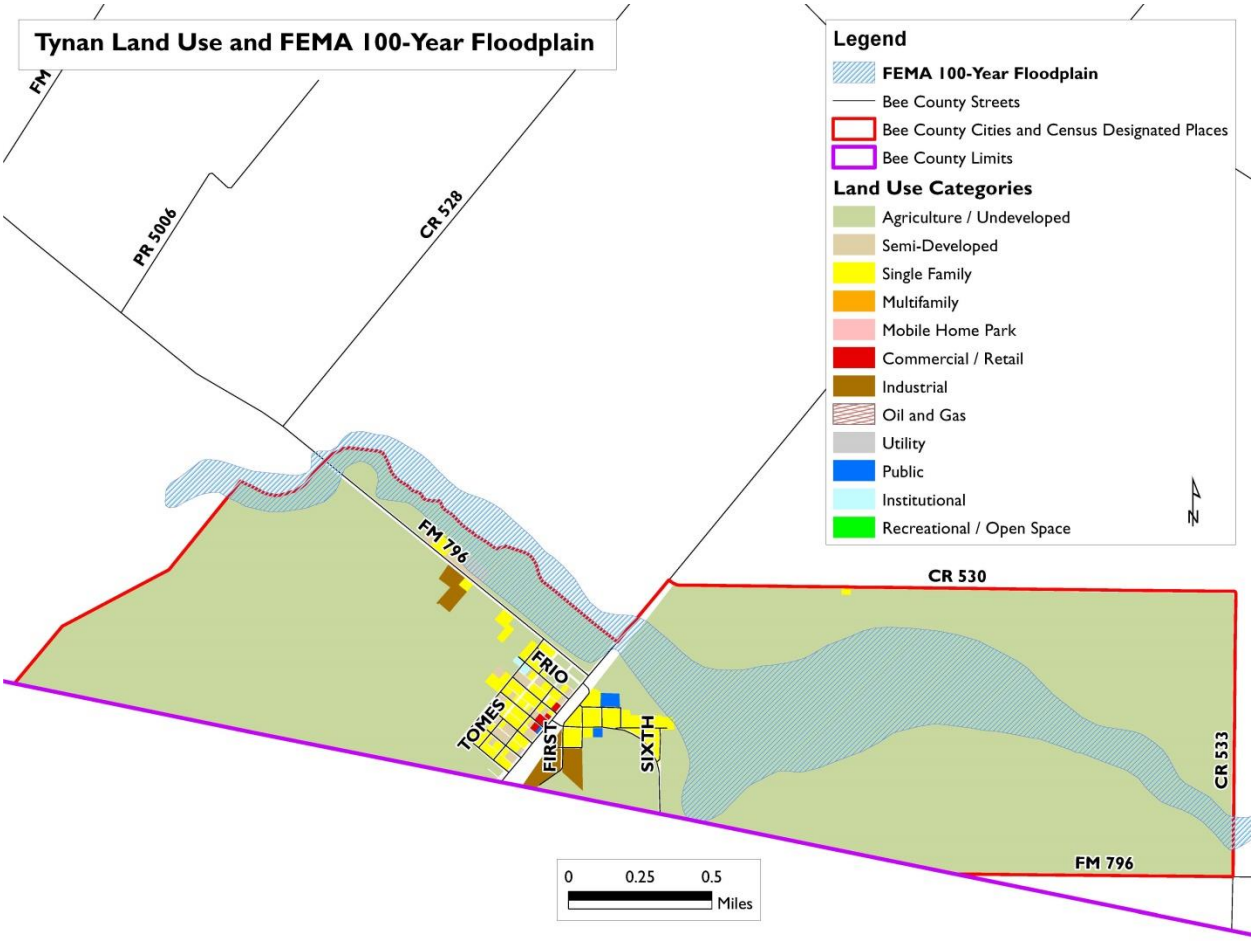

Figure 38: Tynan Land Use and FEMA 100-Year Floodplain

Extent

Extent is the strength or magnitude of a hazard. The magnitude of a flood event is typically designated by its return period. For this analysis, the primary focus is the FEMA 100-year floodplain because it's the standard used by the NFIP.

The FEMA 100-year floodplain designates areas within Bee County and the City of Beeville that have a 1% chance of a flood event with a magnitude expected to be equaled or exceeded once on average during any 100-year period. However, despite the name and its significance, areas within the FEMA 100-year floodplain may flood more or less frequently over any given time period.

The FEMA 500-year floodplain designates areas that have a 0.02% chance of a flood event with a magnitude expected to be equaled or exceeded once on average during any 500-year period. Like the FEMA 100-year floodplain, areas within the FEMA 500-year floodplain may flood more or less frequently over any given time period.

Five hundred-year floodplain data is currently only available for the City of Beeville and the area immediately south, southeast of the City.

As previously mentioned, during Bee County's worst flood on record, Pettus, including US 181, was inundated with between three and five feet of floodwater. Based on the collected information, future flood events could meet or exceed flood depths of 5' in certain areas.

In the City of Beeville, the worst floods have caused street closures, required rescues for stranded drivers, and inflicted physical damages. The extent of the floodwater can be as deep as 24". As mentioned, adjusted for inflation to $2016, damages for a single flood event have ranged as high as $57, 877. The extent of future flood events may meet or exceed previous flood depths and damage dollars.

Impact

Impact considers the community assets, including population and the number, types, and values of various property or infrastructure, that may be subject to a flood event.

Although the probability of a FEMA 100-year flood event remains occasional, 1% in any given year, the floodplain crosses all of Bee County's major thoroughfares, potentially limiting travel across, within, and around the County. The impact of a FEMA 100-year flood event will vary depending on the location, size of the affected area, and number of structures affected.

Despite the unlikely probability of a so-called 500-year flood, 0.02% in any given year, the danger isn't negligible. Moreover, the limited information on the 500-year flood zone should not be interpreted to mean that a 500-year flood will only occur in the areas depicted in the 500-year flood zone on the County's NFIP maps. A 500-year flood event is expected to affect a larger area and more structures than a 100-year flood.

Critical Facilities and Infrastructure

Critical facilities are critical because of their special function, size, service area, or unique role. Moreover, damage to critical facilities brings increased negative impact to the community beyond the importance of the critical facility itself. The planning team identified 64 critical facilities. Forty-three are located in the City of Beeville and the rest are located throughout the County.

Color Scheme
Cultural Institutions
Electrical Facilities
Emergency Services
Government Facilities
Medical Services
Post Offices
Schools
Wastewater System Facilities
Water System Facilities

Structures on the National Register of Historic Places

Facility	Address	Location	Zip Code	Phone Number
A.C. Jones High School	1902 N. Adams St.	Beeville	78102	361-362-6000
Bee County Courthouse	105 W. Corpus Christi St.	Beeville	78102	361-362-3242
Bee County Library (Praeger Building)	110 W. Corpus Christi St.	Beeville	78102	361-362-4901
Bee County Sheriff's	1511 E. Toledo	Beeville	78102	361-362-3221
Beeville Art Museum	401 E. Fannin St.	Beeville	78102	361-358-8615
Beeville City Hall	400 N. Washington St.	Beeville	78102	361-358-4641
Beeville Community Center	111 E. Corpus Christi St.	Beeville	78102	361-358-4641
Beeville First National Bank	1400 E. Houston	Beeville	78102	361-358-1530
Beeville Municipal Airport	3201 US Hwy 59	Beeville	78104	361-358-0410

Beeville Police Department	402 N. Washington St.	Beeville	78102	361-358-8100
Beeville Post Office	111 N. St. Mary's St.	Beeville	78102	361-358-3727
Beeville Station (Electricity)	706 S. Buchanan	Beeville	78102	
Beeville Utility Department / Water System Facility	308 W. Cleveland St.	Beeville	78102	361-358-4641
Beeville Wastewater Treatment Plant	Moore St.	Beeville	78102	361-358-4641
Beeville Water System Elevated Water Storage Tank	Corner of Grenadier St. and Mussett St.	Beeville	78102	361-358-4641
Beeville Water System Elevated Water Storage Tank	Near W. Huntington St. and N. Madison Ave.	Beeville	78102	361-358-8100
Beeville Water System Elevated Water Storage Tank	Near Louise Dr. and Charco Rd. (3355)	Beeville	78102	361-358-8100
Beeville Water System Facility	Near US Bus 181 and 351	Beeville	78102	361-358-4641
Beeville Water System Facility	Near Cook Rd. and S. Archer St.	Beeville	78102	361-358-8100
C. M. Smitty Smith Central Fire Station	100 E. Cleveland St.	Beeville	78102	361-362-7609
Chase Field	2745 Byrd St.	Beeville	78102	361-358-2023
Christus Spohn Hospital Beeville	E 1500 Old Houston Hwy.	Beeville	78102	361-354-2000
Coastal Bend College	3800 Charco Rd.	Beeville	78102	361-358-2838
Coastal Plains Community Center	2808 Industrial Blvd.	Beeville	78102	361-358-8000
Faden-McKeown-Chambliss Elementary School	100 TJ Pfeil	Beeville	78102	361-362-6050
Hampton-Moreno-Dugat Early Childhood Center	2000 S. Mussett St.	Beeville	78102	361-362-6040
H-E-B Pharmacy	100 E. Houston St.	Beeville	78102	361-358-3737
IBC Beeville	802 E. Houston	Beeville	78102	361-358-3700
La Amistad Adult Care & Activity Center	403 N. Monroe St.	Beeville	78102	361-358-1650
Lott-Canada School (Coastal Bend College Lott-Canada Facility)	900 W. Corpus Christi St.	Beeville	78102	361-362-2633
Moore's City Drug	1000 E. Houston St.	Beeville	78102	361-358-2811
Moreno Junior High School	301 N. Minnesota St.	Beeville	78102	361-358-6262
Prosperity Bank Beeville	100 S. Washington	Beeville	78102	361-358-3612
R.A. Hall Elementary School	1100 W. Huntington St.	Beeville	78102	361-362-6060
Rialto Theater	112-114 N. Washington St.	Beeville	78102	361-362-5823
Schulz & Wroten Pharmacy Inc.	122 N. Washington St.	Beeville	78102	361-358-1150
Texas Department of Criminal Justice, Garza East Unit	4304 TX-202	Beeville	78102	361-358-9880

Texas Department of Criminal Justice, Garza West Unit	4250 TX-202	Beeville	78102	361-358-9890
Texas Department of Criminal Justice, William G. McConnell Unit	3001 Emily Dr.	Beeville	78102	361-362-2300
Thomas Jefferson Intermediate School	701 E. Hayes St.	Beeville	78102	361-362-6070
Wal Mart / Pharmacy	502 E. FM 351	Beeville	78102	361-358-4764
Walgreens	300 E. Houston St.	Beeville	78102	361-362-0469
Woodridge Nursing and Rehabilitation Center	600 Hillside Dr.	Beeville	78102	361-358-8880
Blanconia VFD	2441 N. Refugio	Blanconia	78377	361-362-3221
Medio Creek Bridge (Normanna Bridge)	CR 241	Normanna	78142	
Normanna Post Office	112 S. Bee St.	Normanna	78142	361-358-4893
Pawnee Elementary / Pawnee Junior High School	6229 FM 798	Pawnee	78145	361-456-7256
Pawnee Post Office	14132 FM 673	Pawnee	78145	361-456-7271
Pawnee VFD	14430 SH 72	Pawnee	78145	361-362-3221
Pettus - Tuleta VFD	708 E. Main	Pettus	78145	361-362-3221
Pettus Elementary School	500 N. May St.	Pettus	78146	361-375-2484
Pettus High School	500 N. May St.	Pettus	78146	361-375-2484
Pettus Post Office	114 FM 623 W	Pettus	78146	361-375-2299
Pettus Station (Electricity)	Near S. East St. and FM 623	Pettus	78146	
Skidmore Post Office	122 E. Patricio St.	Skidmore	78389	361-287-3479
Skidmore Station (Electricity)	848 Corrigan Rd.	Skidmore	78389	
Skidmore VFD	Corner of E. Refugio St. and N. 4th St.	Skidmore	78389	361-354-8034
Skidmore Water Supply Corp.	423 E. St. Mary's St.	Skidmore	78389	361-287-3433
Skidmore-Tynan Elementary / Junior High School / High School	224 W. Main St.	Skidmore	78389	361-287-3426
Clem and Bettie Stoltzfus Community Center	N. Hahl St.	Tuleta	78162	
Tuleta Post Office	123 Main St.	Tuleta	78162	361-375-2290
Tynan Post Office	508 SH 359	Tynan	78391	361-547-6352
Tynan VFD	200 BLK FM 796	Tynan	78391	361-362-3221
Tynan Water Supply Corp.	314 FM 796	Tynan	78391	361-547-0500

Six critical facilities were located within the FEMA 100-year floodplain, four of which are in greater Bee County and two of which, as identified below, are in the City of Beeville:

Medio Creek Bridge
Moreno Junior High School
Pettus Elementary School
Pettus Post Office
City of Beeville Wastewater Treatment Plant
City of Beeville Water System facility on Cook St. adjacent to South Tyler Park

United States Highway 181

United States Highway 181is a TxDOT-designated major hurricane evacuation route for Corpus Christi. The distance between the southernmost and northernmost points of US 181 in Bee County is roughly 43 miles. However, a significant stretch of US 181 is a divided highway, and the result is that each side of the divided highway has a slightly different exposure to the floodplain. Accounting for the division, there are actually 60 miles of highway that have been considered in relation to the FEMA 100-year and 500-year floodplains.

The equivalent of seven miles, about 12% of the total length of US 181 in Bee County, passes through the FEMA 100-year floodplain. The equivalent of only one-tenth of a mile passes through the 500-year floodplain. Despite efforts to mitigate flood events, there have been at least three significant flood events that impacted US 181 in the last 10 years:

On February 3, 2010, after an additional one to three inches fell on saturated ground, standing water estimated to be less than 6" deep was reported over the north and southbound lanes of US 181 between Skidmore and San Patricio.

On April 16, 2010, water covered the road at the intersection of US 181 and SH 359 in Skidmore, and water was flowing over US 181 between Skidmore and Papalote. Motorists were reported stranded with water up to their vehicles' doors, roughly 18" – 24" in depth.

On May 25, 2013, between seven and nine inches of rain fell in Bee County. Flood waters from Medio Creek forced road closures along US 181 at the intersection of FM 623 in Pettus and the intersection with FM 798 in Tulsita. Water depth was estimated between 12" – 24."

Vulnerable Structures

Vulnerable structures have been identified by their complete or partial location within the FEMA 100-year floodplain and the FEMA 500-year floodplain. Given the concentration of development, the City of Beeville is home to the highest concentration of vulnerable structures in the FEMA 100-year floodplain. Just over 35% of Bee County's vulnerable structures, 683, are located in the City of Beeville. Pettus is home to the next highest concentration of vulnerable structures (160) with 8% of the County's total. There are 11 vulnerable structures in Tulsita, 5 in Tuleta, 8 in Normanna, 63 in Skidmore, and 3 in Tynan. In total, the Census Designated Places in Bee County contain nearly 50% of all vulnerable structures located in the FEMA 100-year floodplain in the County.

Given the limited mapping of the FEMA 500-year floodplain, 91% of structures (284) vulnerable to a so-called 500-year flood are located in the City of Beeville.

Population Vulnerability

During Bee County's worst flood event five people drowned. There have not been any recorded flood-related deaths since then. However, according to official reports, recent floods have forced up to 20 rescues in a single event. Based on the ratio of flood events requiring at least one rescue to those that did not, the County estimates that 20% or more of future flood events may require at least one rescue operation. However, predicting future rescue operations, especially in terms of prepositioning local resources, is especially difficult because most recent rescues have involved stranded motorists in multiple locations. In addition to anticipated rescue operations, it is also possible that future flood events may be deadly, matching or even exceeding previous flood-related mortality totals.

Table 90: Vulnerable Structures

Type of Structure / Infrastructure	**Number of Structures in FEMA 100-Year floodplain**	
	Bee County	City of Beeville
Agriculture	383	5
Commercial	22	44
Industrial	13	10
Institutional	17	1
Multifamily	1	57
Oil and Gas	128	0
Public	3	13
Recreational	3	8
Single Family	673	532
Utility	4	1
Jurisdictional Total	**1247**	**671**

Total Structures in both Jurisdictions	**1918**

Type of Structure / Infrastructure	**Number of Structures in FEMA 500-Year floodplain**	
	Bee County	City of Beeville
Agriculture	4	0
Commercial	0	21
Industrial	5	0
Institutional	0	8
Multifamily	1	22
Public	0	4
Recreational	0	3
Single Family	19	226
Total	**29**	**284**
Total Structures in both Jurisdictions	**313**	

Total Estimated Value for all Vulnerable Structures	**$30,619,048**[119]
Adjusted Total Estimated Value for all Vulnerable Structures	**$122,476,192**[120]

[119] Based on Total Value data from Bee County Appraisal District, http://www.beecad.org/. However, data was only available for 554 out of 2,231 inventoried vulnerable structures.

[120] American Community Survey Table B25108 data for 2010-2014 estimates the total value of all owner-occupied housing units in Bee County to be $556,558,100, +/- $73,452,695. American Community Survey doesn't offer property value data for renter-occupied units or other types of structures. In light of the value ($62,515,400) of the 297 NFIP policies currently in place across Bee County, and the ACS's estimated $-value for owner-occupied housing units in Bee County, the adjusted estimated $-value for all vulnerable structures may need to be adjusted upward as more information becomes available.

The general location of vulnerable structures is illustrated in Figures 19 – 23.

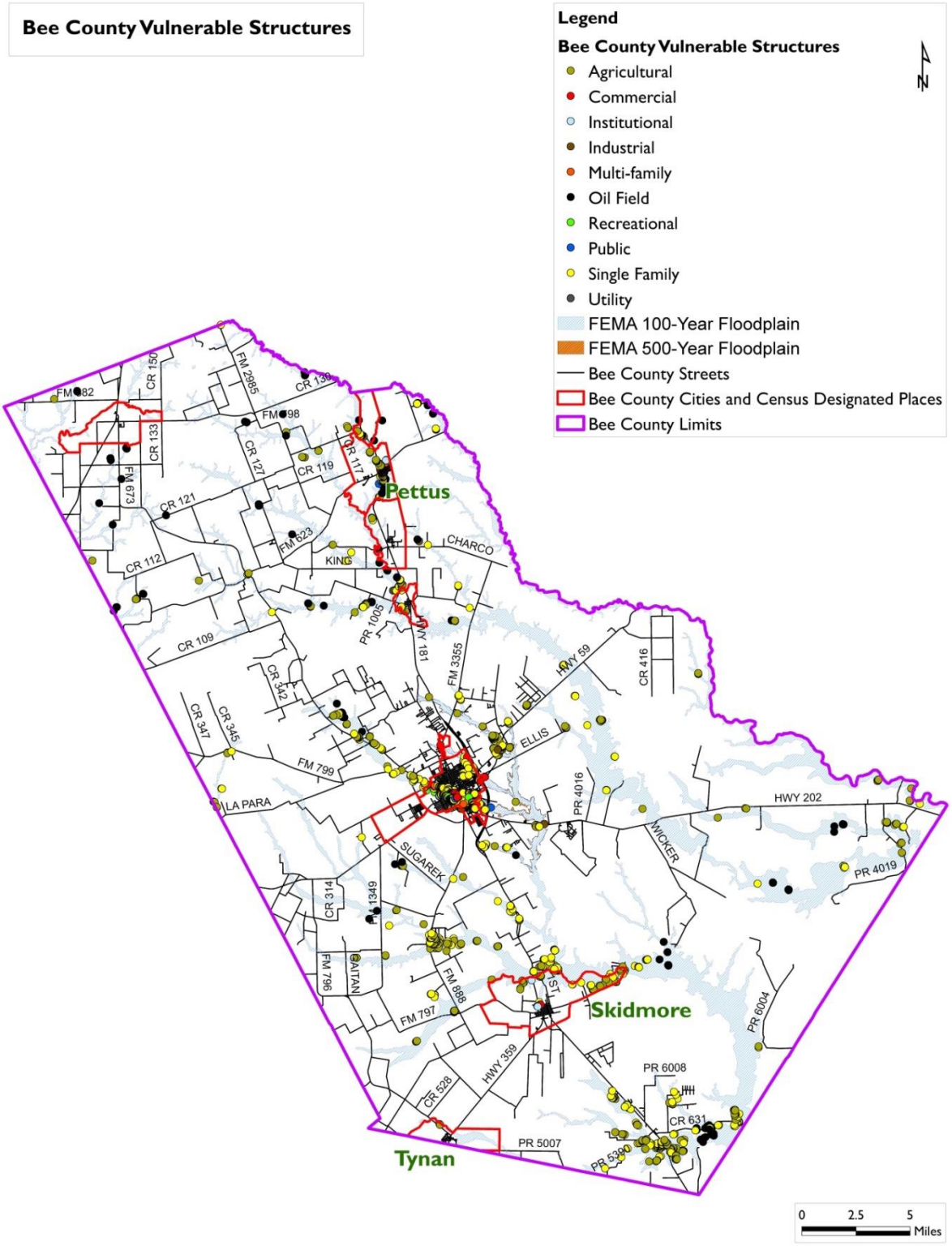

Figure 39: Bee County Vulnerable Structures

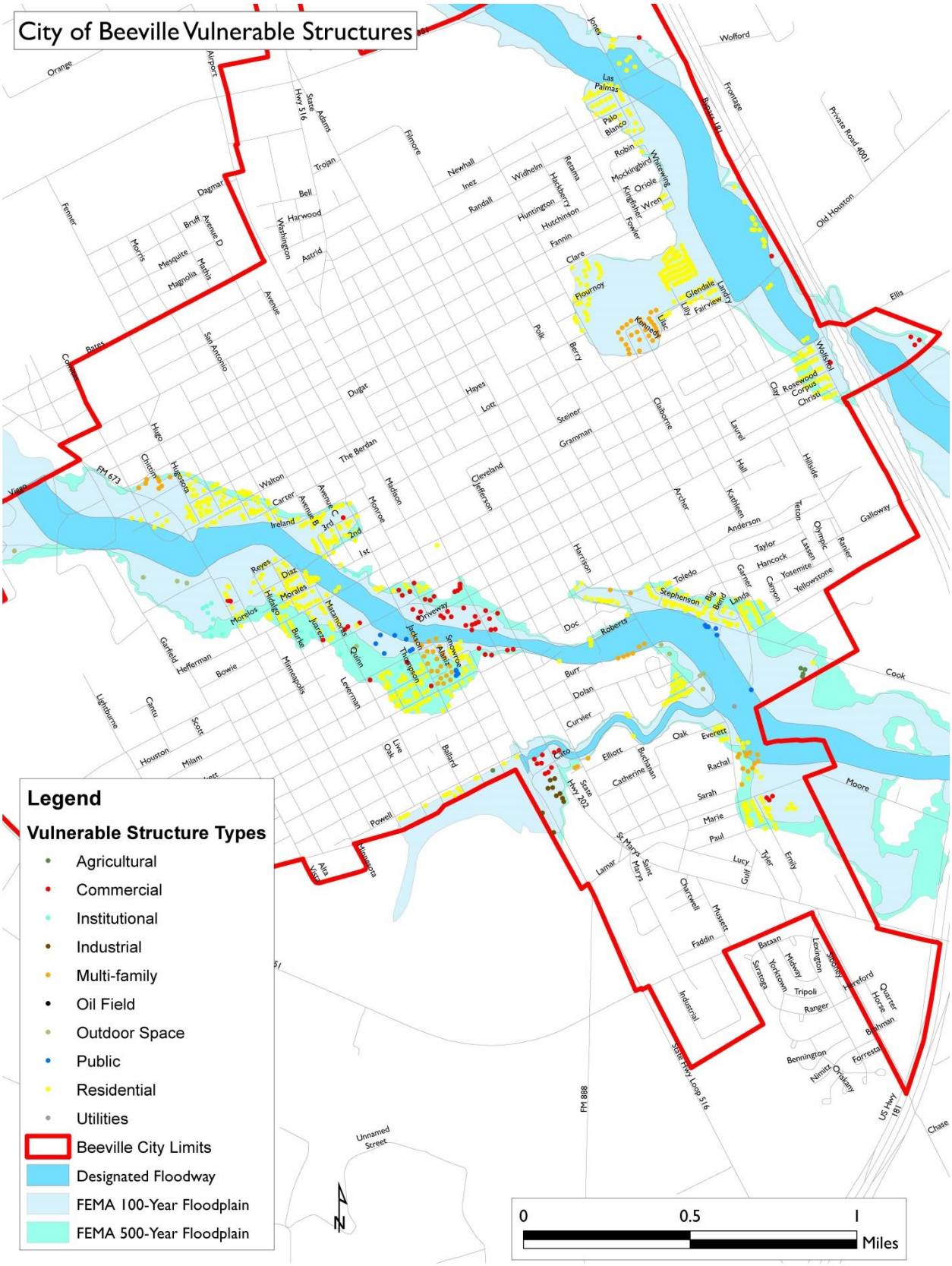

Figure 40: City of Beeville Vulnerable Structures

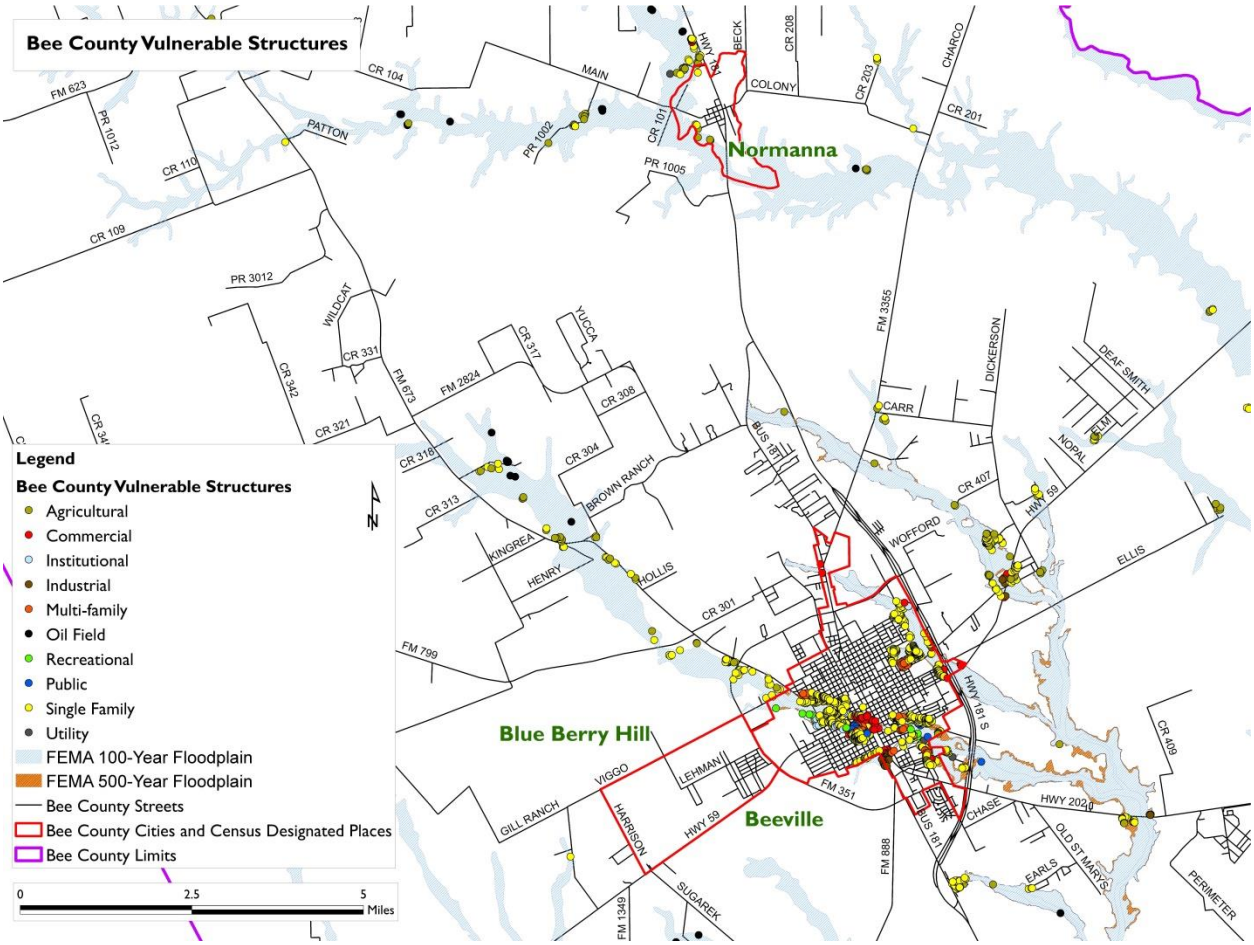

Figure 41: Normanna and Beeville Detail

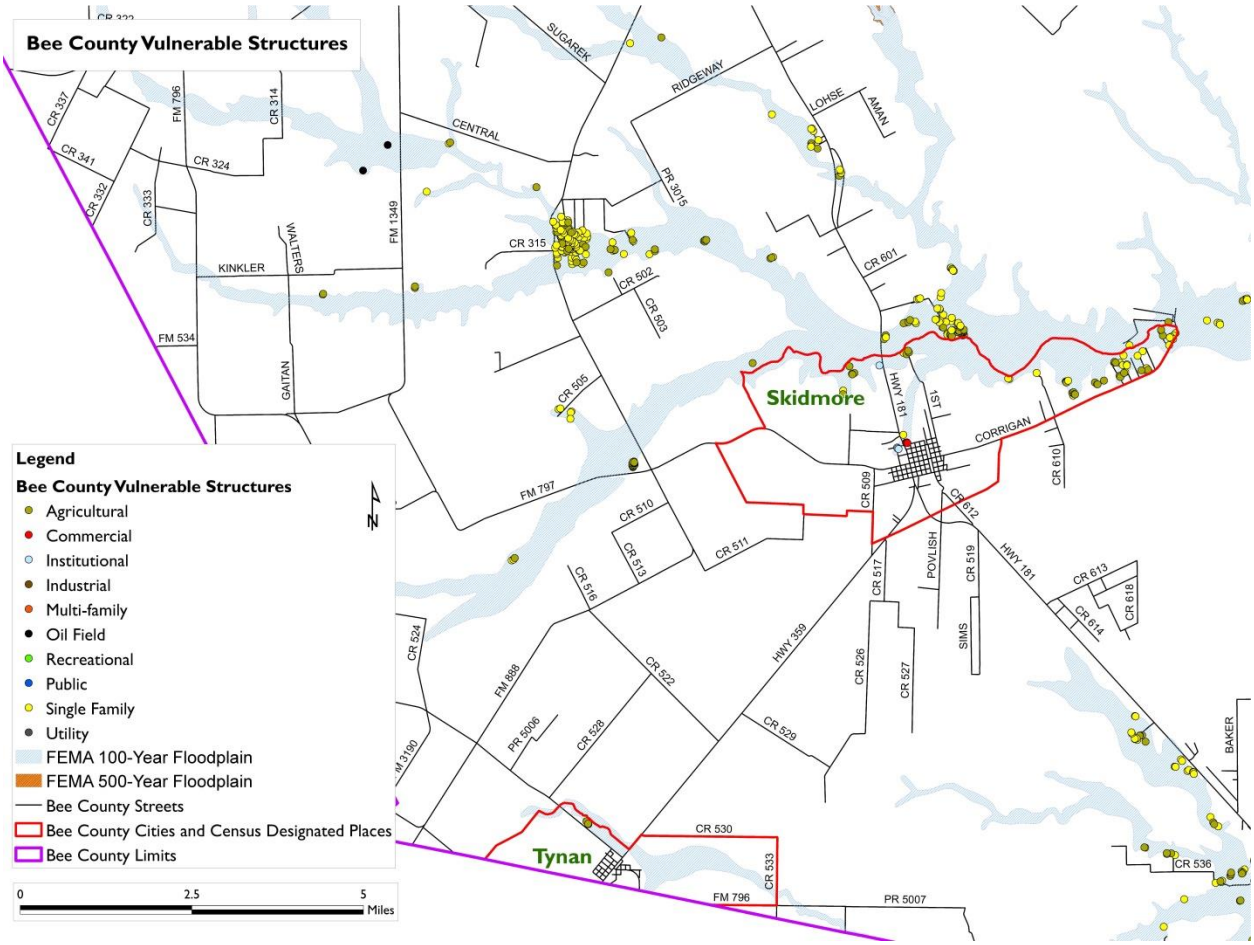

Figure 42: Skidmore and Tynan Detail

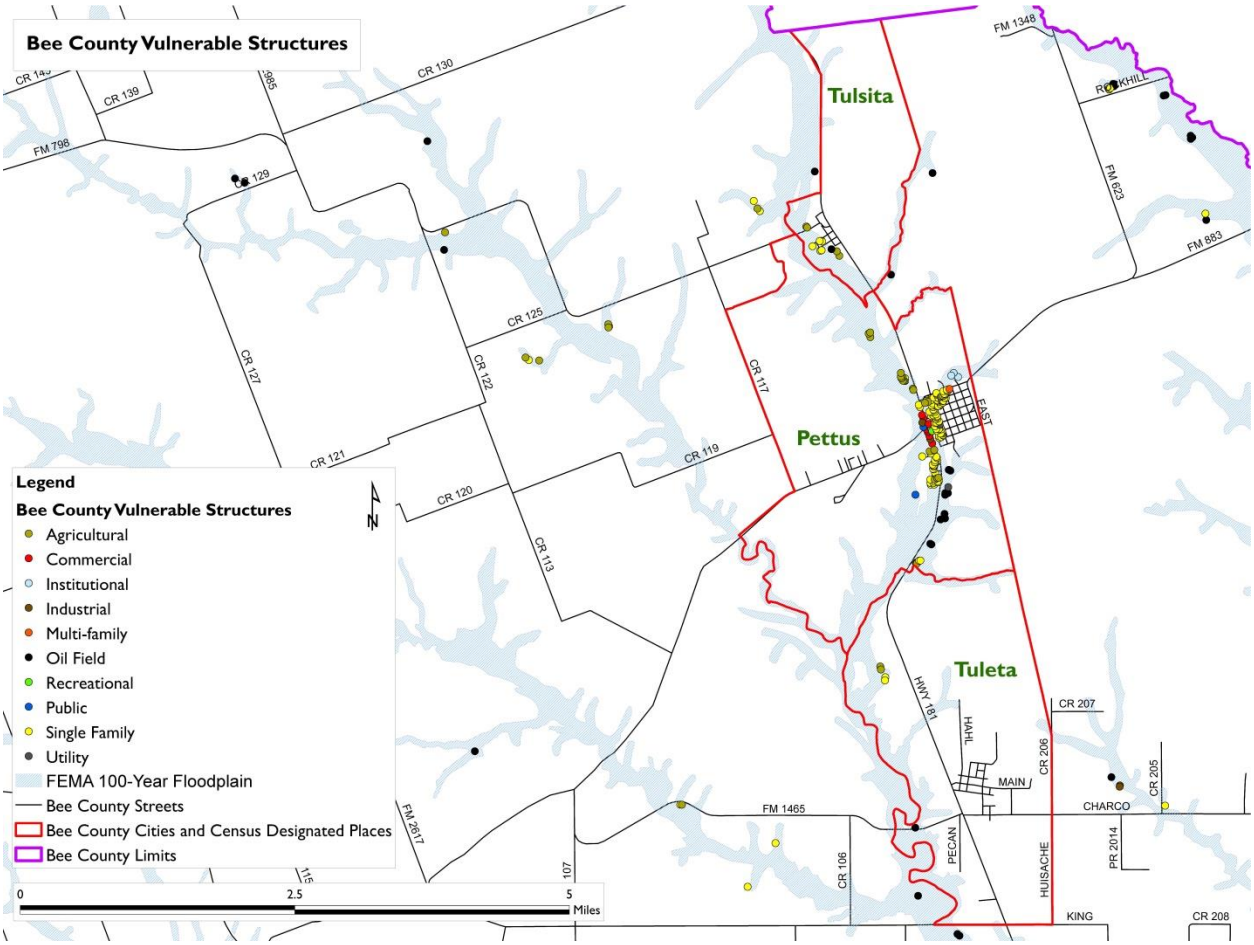

Figure 43: Tulsita, Pettus, and Tuleta Detail

Mitigation Strategy

E. Capability Assessment

Bee County and the City of Beeville have shown themselves to be highly capable, especially in terms of implementing flood mitigation actions.

In addition to reviewing previous actions and the steps taken to implement them, the planning team reviewed existing regulatory capabilities and opportunities for establishing new capabilities and enhancing existing ones. Bee County could improve its flood mitigation efforts by funding Certified Floodplain Manager training for its current floodplain manager and making certification a hiring requirement for future floodplain managers. At this time, the City of Beeville could improve its hazard mitigation efforts by adopting updated subdivision and zoning ordinances that prohibit future construction in the floodplain. Additional opportunities for both jurisdictions to improve capabilities include: budgeting for flood mitigation actions and support, passing policies and procedures to implement flood mitigation actions, adopting and implementing stricter flood mitigation regulations, approving the hiring and training of staff for flood mitigation activities, and approving flood mitigation updates and additions to existing plans as new needs are recognized.

Table 91: Capability Assessment by Jurisdiction

Bee County **Administrative, Financial, Regulatory, and Technical Abilities**
Floodplain Management
Emergency Management
Economic Development
Road and Bridge Management
Tax Collection
Grant Writing
General Budgeting
CIP Funding
CDBG Funding
State and Federal Grant Funding

City of Beeville **Administrative, Financial, Regulatory, and Technical Abilities**
Floodplain management
Emergency Management

Subdivision
Zoning
Building Code Enforcement
Nuisance Abatement
Substandard Structures Abatement
Drought Contingency Planning
Comprehensive Planning
Economic Development
Tax Collection
Grant Writing
General Budgeting
CIP Funding
CDBG Funding
State and Federal Grant Funding

As demonstrated by the previous level of success in terms of implementing recommended mitigation actions, each jurisdiction has its own established process for integrating new actions, codes, ordinances, plans, and studies. The planning team will ensure that each jurisdictions' various departments continue to integrate hazard mitigation actions into their day-to-day processes.

Table 92: Plan Integration

Department	All Departments	Commissioners' Court, Road and Bridge, Mayor's Office, Council, Public Works, Economic Development, Zoning, Schoolboard	Planning, Zoning, Economic Development, Public Works, Mayor's Office, Floodplain Manager	Office of Emergency Management, Mayor's Office, Chief of Fire Department, Superintendent's Office	Office of Emergency Management, Mayor's Office, Chief of Fire Department, Superintendent's Office	Office of Emergency Management, Mayor's Office, Superintendent's Office, Administrative Office	Floodplain Manager, Mayor's Office
Activity	Annual Budget	Capital Improvement Projects	Comprehensive Master Plan	Public Involvement	Emergency Operations	Grant Application	Floodplain Management
Time Frame	Quarterly/ Annual workshops	Bi-annually	Every 10 Years	As Needed	Annually	Annual Funding Cycles	Annually
Integration Process	Discuss integration of medium and high priority actions with Commissioners' Court, Council, or Schoolboard (as appropriate) concerning feasibility, potential funding sources, and a preliminary cost benefit review.	Discuss inclusion of mitigation actions with CIPs. Ensure CIPs are consistent with mitigation actions, NFIP compliance, and any new land use development.	Review existing floodplain and land use controls to insure that long term goals are consistent with actions in the HMAP.	Utilize jurisdictional web sites, social media, and other forms of advertising to make announcements of any periodic review activities concerning potential amendments or updating of the HMAP	Review prevention and protection projects for continued relevance. Ensure appropriate actions and information are included in the Emergency Operation Plan.	Review and update mitigation actions as necessary based on funding opportunities available through FEMA PDM, FEMA HMGP, and other grant funding sources.	Update and maintain floodplain information including but not limited to: maps, construction practices, permitting, and NFIP compliance.

Jurisdiction							
Bee County	x	x		x	x	x	x
City of Beeville	x	x	x	x	x	x	x

Goals and Objectives Overview

The flood hazard analysis has shown that Bee County is at risk of future flood events. The following goals and objectives take a broad approach to improving outcomes before, during, and after flood events. In contrast, the mitigation actions the County has selected are designed to address specific flood-related issues in support of achieving the desired goals and objectives.

II. Long-term vision

The flood mitigation plan must strike a balance between identifying long-term goals and objectives and prioritized mitigation actions that may be addressed sooner, depending on funding availability and local priorities. By taking the long view, the local planning team has created a framework that can be developed as the plan is updated over time.

Goals

Goal 1: To reduce loss of life and injury to persons

Objective 1.1
Improve the delivery and effectiveness of warning messages

Objective 1.2
Preserve public and private emergency response capability (9-1-1, law enforcement, fire services, emergency medical services, hospitals).

Objective 1.3
Utilize available mitigation measures to prevent or reduce life-threatening impacts of natural hazards.

Objective 1.4
Reduce obstacles to timely and safe evacuation of flood hazard areas.

Objective 1.5
Reduce vulnerability of individuals living in mobile homes / manufactured housing.

Objective 1.6
Reduce life or health threatening impacts on individuals with special physical care requirements.

Objective 1.7
Reduce secondary impacts to health and safety from cascading effects.

Goal 2: To reduce disruptions to essential public services and infrastructure

Objective 2.1
Minimize disruption to and enhance rapid restoration of utilities.

Objective 2.2
Minimize disruption to and enhance rapid restoration of essential transportation infrastructure.

Objective 2.3
Minimize disruption to governmental, educational, and other institutions providing services to the public.

Goal 3: To reduce economic impacts to individuals, businesses, and area institutions

Objective 3.1
Increase home and business owner investment in available mitigation measures for private property.

Objective 3.2
Increase home and business owner participation in NFIP program.

Objective 3.3
Increase public and private sector development and use of operations continuity strategies.

Objective 3.4
Utilize available mitigation measures to prevent or reduce economic losses from flooding.

Objective 3.5
Reduce vulnerability of existing development by encouraging property owners to participate in buy-out or flood-proofing opportunities.

Objective 3.6
Reduce vulnerability of future development by utilizing available planning and structural standards.

Goal 4: To reduce losses to civic, cultural, and environmental resources

Objective 4.1
Protect public investment in community-owned facilities and infrastructure through appropriate structural, non-structural, and financial methods.

Objective 4.2
Reduce future losses to the non-profit sector through participation in available mitigation opportunities.

Objective 4.3
Reduce vulnerability of historically or culturally significant structures.

Objective 4.4
Minimize environmental impacts from cascading effects.

Mitigation Actions Identification and Evaluation

III. Identification Process

The first step in the mitigation action identification process was considering previous mitigation actions directly or indirectly related to flood mitigation, specifically those outlined in the CBMAP plan: BE-03, BE-04, BE-05, and BE-06.

Action BE-03
Also known as the Silver Creek Bridge Project, BE-03 was selected to minimize disruption to and enhance rapid restoration of essential transportation infrastructure. It received medium-level priority. Bee County Road and Bridge and the Bee County Office of Emergency Management were listed as the lead agencies. The estimated cost was $250,000, and expected funding sources included TxDOT and Federal Mitigation Grants. The project was given a two-to-three-year timeline. This project was modified to a span bridge, and is currently pending.

Action BE-04
Also known as the C.R. 628 Box Culvert Project, BE-04 was selected to minimize disruption to and enhance rapid restoration of essential transportation infrastructure. It received medium-level priority. Bee County Road and Bridge and the Bee County Office of Emergency Management were listed as the lead agencies. The estimated cost was $70,200, and expected funding sources included TxDOT and Federal Mitigation Grants. The project was given a two-to-three-year timeline. This project is underway, but it remains incomplete.

Action BE-05
Also known as the Emergency Warning System Project, BE-05 was selected to improve the delivery and effectiveness of warning systems and to reduce obstacles to timely and safe evacuation of hazard areas. It received medium-level priority. The Bee County Office of Emergency Management was listed as the lead agency. The estimated cost was $20,000, and expected funding sources included the County, the Emergency Management Performance Grant Program, and the Texas Department of Rural Affairs. The project was given a six-month timeline. This project remains incomplete. This plan is recommending a replacement project.

Action BE-06
Also known as the Poesta and Medio Creek Drainage Project, BE-06 was selected to minimize disruption to and enhance rapid restoration of essential transportation infrastructure. It received medium-level priority. The Beeville Street Department was listed as the lead agency.

The estimated cost was $900,000, and expected funding sources included the City of Beeville, a possible bond issue, and Federal grants. Pending funding, this project remains incomplete.

Evaluation

The first level of mitigation action evaluation took place in three realms: planning team meetings, public hearings, and stakeholder outreach. These initial evaluations were especially helpful to the planning team in terms of identifying actions that are currently infeasible due to political, economic, or technical reasons.

In particular, projects requiring access to private land were deemed impractical at this time. For that reason, waterway maintenance through regular brush and debris removal and increasing participation in the National Resource Conservation Service's Conservation Reserve Program are not among the plan's recommended mitigation actions.

To complete the next level of the mitigation action selection process, the planning team identified specific problems to be addressed, evaluated alternative solutions, determined which goals and objectives would be achieved, estimated costs, and assessed local capabilities, including potential funding sources, to implement each action. The planning team prioritized each action by reviewing the following criteria:

1. Life Safety
2. Property Protection
3. Cost Effectiveness
4. Technical Feasibility
5. Political Feasibility
6. Legal Authority
7. Funding Availability
8. Environmental Impact
9. Social Feasibility
10. Administrative Capacity
11. Reduced Risk to Additional Hazards
12. Speed of Implementation
13. Existing Agency or Departmental Advocate
14. Relation to Community Objectives

An overall evaluation of an action item's expected benefits versus costs was also considered during action item identification and prioritization. Items with estimated benefits that outweighed expected costs were generally given favorable consideration over those action items with negative benefit-cost ratios.

The planning team identified six (6) mitigation projects. These projects are new, and none has secured funding at this time. To bring these projects to fruition, the planning team and the identified lead agencies in each jurisdiction will work together to identify and pursue local and grant funding opportunities. The mitigation projects are outlined in Table 13 below.

Mitigation Actions

With one exception, all mitigation actions will be pursued by Bee County and the City of Beeville.

The following option will only be pursued by the County: Construct New Hurricane Resistant Critical Public Safety Communications Site to Improve First Responder Communication Capabilities

Each action identifies the jurisdictional agencies and departments that will be responsible for implementation in the "Implementation Responsibility" line of each action's description.

Table 93: Mitigation Actions in Priority Order for Bee County and the City of Beeville

Mitigation Action	Local Flood Warning System
Objective	Bee County and the City of Beeville will prioritize areas to install a Local Flood Warning System using FEMA Special Flood Hazard Area maps and supplemental maps generated as part of its flood mitigation planning process.
Hazard	Flood
Priority	High
Estimated Cost per Jurisdiction	More than $100,000
Potential Funding Source (s)	Bee County, City of Beeville, FEMA PDM, FEMA HMGP, FEMA FMA, TWDB, TCEQ
Implementation Responsibility	City of Beeville City Manager, City of Beeville Public Works Department, Consulting Engineer Bee County Judge's Office, Bee County Commissioners' Court, Bee County Road and Bridge Department, Consulting Engineer, Bee County Floodplain Administrator, Bee County Emergency Management Coordinator
Implementation Schedule	12 months, pending funding availability
Target	Existing and future infrastructure

Mitigation Action	LAWS Hazard Alert System
Objective	This project will place at least one LAWS system at every school campus throughout the City of Beeville and Bee County. The County will also work to place at least one LAWS system in every Census Designated Place in the County.
Hazard	Flood

Priority	High
Estimated Cost per Jurisdiction	$10,000 - $100,000
Potential Funding Source (s)	Bee County, City of Beeville, FEMA PDM, FEMA HMGP, FEMA FMA, TWDB, TCEQ
Implementation Responsibility	City of Beeville City Manager, City of Beeville Public Works Department Bee County Judge's Office, Bee County Commissioners' Court, Bee County Floodplain Administrator, Bee County Emergency Management Coordinator
Implementation Schedule	36 months, pending funding availability
Target	Existing and future population

Mitigation Action	**Construct New Hurricane Resistant Critical Public Safety Communications Site to Improve First Responder Communication Capabilities**
Objective	This action will install a TIA-222G-rated 400-foot self-support solid steel tower to provide county-wide communication capabilities for first responders.
Hazard	Flood
Priority	High
Estimated Cost	More than $100,000
Potential Funding Source (s)	Bee County, FEMA PDM, FEMA HMGP, FEMA FMA, TWDB, TCEQ
Implementation Responsibility	Judge's Office, Commissioners' Court, Consulting Engineer, Emergency Management Coordinator
Implementation Schedule	36 months, pending funding availability
Target	Existing and future population

Mitigation Action	**Install NOAA Weather Radios in Bee County and City of Beeville Facilities**
Objective	An indoor warning system will help ensure everyone's safety ahead of flood events. To that end, the County and City will install a NOAA weather radio in every County-owned and City-owned facility that is occupied on a full time basis.
Hazard	Flood
Priority	High
Estimated Cost per Jurisdiction	Less than $10,000
Potential Funding Source (s)	Bee County, City of Beeville, FEMA PDM, FEMA HMGP, FEMA

	FMA, TWDB, TCEQ
Implementation Responsibility	City of Beeville City Manager, City of Beeville Public Works Department Bee County Judge's Office, Bee County Commissioners' Court, Bee County Emergency Management Coordinator
Implementation Schedule	12 months, pending funding availability
Target	Existing and future population

Mitigation Action	**Educational Outreach**
Objective	This action will create a program to educate the public about specific mitigation actions for flooding, including but not limited to participation in NFIP.
Hazard	Flood
Priority	High
Estimated Cost per Jurisdiction	Less than $10,000
Potential Funding Source(s)	Bee County, City of Beeville, FEMA PDM, FEMA HMGP, FEMA FMA, TWDB, TCEQ
Implementation Responsibility	City of Beeville City Manager Bee County Floodplain Administrator, Bee County Emergency Management Coordinator
Implementation Schedule	12 months, pending funding availability
Target	Existing and future population

Mitigation Action	**Repetitive Loss Property Structure Elevation**
Objective	Bee County and the City of Beeville will work with repetitive loss properties owners to pursue structure elevations to decrease the effects of future flood events.
Hazard	Flood
Priority	High
Estimated Cost per Jurisdiction	More than $100,000
Potential Funding Source (s)	Bee County, City of Beeville, FEMA PDM, FEMA HMGP, FEMA FMA, TWDB, TCEQ

Implementation Responsibility	City of Beeville City Manager, City of Beeville Public Works Department, Consulting Engineer Bee County Judge's Office, Bee County Commissioners' Court, Bee County Road and Bridge Department, Consulting Engineer, Bee County Floodplain Administrator, Bee County Emergency Management Coordinator
Implementation Schedule	36 months, pending funding availability
Target	Existing infrastructure