Medina County

Multi-Hazard Mitigation Plan

2020

"Under the Federal Disaster Mitigation Act of 2000 (DMA 2000 or "the Act"), Medina 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 Medina County Multi-Hazard Mitigation plan includes six participating jurisdictions: Medina County, the City of Castroville, the City of Devine, the City of Hondo, the City of La Coste, and the City of Natalia.

2) Hazard Mitigation Plan History

Medina County was a participating jurisdiction in the Alamo Area Council of Governments Regional Mitigation Action Plan (AACOG Plan). The City of Castroville, the City of Devine, the City of Hondo, and the City of Natalia were also participants.

The original AACOG Plan was adopted in 2007, and an updated version was adopted in 2012.

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.

The AACOG Plan identified 14 hazards that affect the planning area including: Flooding (Flash and Riverine), Flooding (Dam and Levee Failure), Tornado, Tropical Systems and Hurricanes, Thunderstorms, Drought, Hail, Wildfire, Winter Storms, Geologic Hazards: Earthquakes and Sinkholes, Energy Pipeline Failure, Hazardous Materials (Transportation and Fixed), Pandemic (Human and Animal), and Terrorism.

Many of those hazards are not natural hazards and therefore aren't eligible for mitigation funding through any of FEMA's mitigation grant programs: BRIC, FMA, or HMGP. Manmade and technological hazards are better addressed in other plans, and won't be considered in this plan.

The Medina County Hazard Mitigation Plan is not an update of the AACOG plan.

Even though this plan will consider many of the hazards addressed in the AACOG plan, it is a new plan.

Table 1: Hazards Addressed

Hazard	Jurisdiction					
	Medina County	City of Castroville	City of Devine	City of Hondo	City of La Coste	City of Natalia
Flood	x	x	x	x	x	x
Hurricanes / Tropical Storms	x	x	x	x	x	x

Wildfire	x	x	x	x	x	x
Tornados	x	x	x	x	x	x
Drought	x	x	x	x	x	x
Riverine Erosion	x	x	x	x	x	x
Dam Failure	x	x	x	x	x	x
Earthquakes	x	x	x	x	x	x
Expansive Soils	x	x	x	x	x	x
Extreme heat	x	x	x	x	x	x
Hailstorms	x	x	x	x	x	x
Land Subsidence	x	x	x	x	x	x
Severe Winter Storms	x	x	x	x	x	x
Windstorms	x	x	x	x	x	x
Lightning	x	x	x	x	x	x

2. Planning Process

The Medina County Multi-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:

Table 2: Local Planning Team Representatives

Title	Jurisdiction
ACA - Grants	Medina County
Chief of Police	City of Hondo
Chief of Police	City of Natalia
Chief of Police	City of La Coste
Chief of Police	City of Castroville
County Judge	Medina County
EMC	Medina County
EMC / Public Works	City of Devine
Floodplain Administrator	Medina County

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 3: Plan Schedule

Planning Tasks	Timeline																								
	2018					2019												2020							Completed
	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	
Organize Resources and Identify Planning Team																									
Create Outreach Strategy																									
Review Community Capabilities																									
Conduct Risk Assessment																									
Identify Mitigation Goals and Actions																									
Develop Action Plan for Implementation																									
Identify Plan Maintenance Procedures																									
Review Plan Draft																									
Submit Plan to State and FEMA																									
Adopt Plan																									
	Meetings																								
Planning Team																									8/28/2018 1/8/2019 10/23/2019
Public Outreach																									8/28/2018 1/8/2019 10/23/2019
Stakeholder Outreach																									January – February 2019

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 4: Planning Team Data Sources

Data Source	Data Incorporation	Purpose
City of Castroville Building Code Adoption Ordinance	Building code requirements	Identifying building code requirements and opportunities to increase ordinance enforcement to reduce hazard impacts.
City of Castroville Abandoned Vehicles Ordinance	Abandoned vehicles 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 Castroville Annexation Ordinance	City of Castroville plan for future growth and development	Identifying locations of expected growth, future development types, and land use changes
City of Castroville Comprehensive Plan	City of Castroville plan for future growth and development	Identifying locations of expected growth, future development types, and land use changes
City of Castroville Building Code Adoption Ordinance	Building code requirements	Identifying building code requirements and opportunities to increase ordinance enforcement to reduce hazard impacts.
City of Castroville Drought Contingency Plan	Local drought controls	Identify opportunities to increase drought controls and opportunities for water conservation to reduce drought's impact.
City of Castroville Flood Damage Prevention Ordinance	Flood damage prevention building requirements	Identifying building requirements and restrictions for structures in the floodplain
City of Castroville Nuisance 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 Castroville Subdivision Ordinance	Subdivision requirements and restrictions	Identifying development restrictions to limit future hazard exposure
City of Castroville Unsafe Building Abatement Ordinance	Building maintenance requirements	Identifying building condition requirements and opportunities to increase ordinance enforcement to reduce hazard impacts.
City of Castroville Mobile Homes and Trailers Ordinance	Mobile and trailer requirements	Identify opportunities to reduce hazard risks for manufactured homes
City of Castroville Zoning Ordinance and Zoning Map	Zoning requirements and restrictions	Identifying zone locations and restrictions to limit future hazard exposure

City of Devine Building Code Adoption Ordinance	Building code requirements	Identifying building code requirements and opportunities to increase ordinance enforcement to reduce hazard impacts.
City of Devine Offenses and Misc. Provisions Ordinance	Offense 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 Devine Flood Damage Prevention Ordinance	Flood damage prevention building requirements	Identifying building requirements and restrictions for structures in the floodplain
City of Devine Mobile Homes Ordinance	Mobile home requirements	Identify opportunities to reduce hazard risks for mobile homes
City of Devine Subdivision Ordinance	Subdivision requirements and restrictions	Identifying development restrictions to limit future hazard exposure
City of Devine Zoning Ordinance	Zoning requirements and restrictions	Identifying zone locations and restrictions to limit future hazard exposure
City of Hondo Flood Damage Prevention Ordinance	Flood damage prevention building requirements	Identifying building requirements and restrictions for structures in the floodplain
City of Hondo Offenses and Nuisances Ordinance	Offense and 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 Hondo Building Code Adoption Ordinance	Building code requirements	Identifying building code requirements and opportunities to increase ordinance enforcement to reduce hazard impacts.
City of Hondo Subdivision Ordinance	Subdivision requirements and restrictions	Identifying development restrictions to limit future hazard exposure
City of Hondo Substandard Buildings Ordinance	Unsafe building 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 Hondo Zoning Ordinance and Zoning Map	Zoning requirements and restrictions	Identifying zone locations and restrictions to limit future hazard exposure
City of La Coste Building Code Adoption Ordinance	Building code requirements	Identifying building code requirements and opportunities to increase ordinance enforcement to reduce hazard impacts.
City of La Coste Flood Damage Prevention Ordinance	Flood damage prevention building requirements	Identifying building requirements and restrictions for structures in the floodplain
City of La Coste Manufactured and Mobile Housing Ordinance	Manufactured and mobile housing requirements	Identify opportunities to reduce hazard risks for manufactured and mobile housing
City of La Coste Subdivision Ordinance	Subdivision requirements and restrictions	Identifying development restrictions to limit future hazard exposure
City of La Coste Zoning Ordinance	Zoning requirements and restrictions	Identifying zone locations and restrictions to limit future hazard exposure
City of Natalia Flood Damage Prevention Ordinance	Flood damage prevention building requirements	Identifying building requirements and restrictions for structures in the floodplain
City of Natalia Manufactured Housing Ordinance	Manufactured housing requirements	Identify opportunities to reduce hazard risks for manufactured housing
City of Natalia Building Code Adoption Ordinance	Building code requirements	Identifying building code requirements and opportunities to increase ordinance enforcement to reduce hazard impacts.
City of Natalia Drought Management Plan	Local drought controls	Identify opportunities to increase drought controls and opportunities for water conservation to reduce drought's impact.

City of Natalia Nuisance 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 Natalia Zoning Ordinance	Zoning requirements and restrictions	Identifying zone locations and restrictions to limit future hazard exposure
City of Natalia Subdivision Ordinance	Subdivision requirements and restrictions	Identifying development restrictions to limit future hazard exposure
City of Natalia Unsafe Structures Ordinance	Unsafe structure definitions and building maintenance requirements	Identifying building condition requirements and opportunities to increase ordinance enforcement to reduce hazard impacts.
Medina County Flood Damage Prevention Ordinance	Flood damage prevention building requirements	Identifying building requirements and restrictions for structures in the floodplain
Federal Emergency Management Agency (FEMA) DFIRM Flood Zones	Flood zone maps	GIS mapping of flood zones
International Building Code	Building standards and best practices	Identifying opportunities to improve structural resiliency by updating current building codes.
National Climatic Data Center (NCEI)	Hazard occurrences	Previous event occurrences, damage dollars, and mapping for all hazards
National Dam Inventory	Dam information	High-hazard dam list
National Flood Insurance Program	NFIP Policy and Loss Data	Identifying NFIP policies in force, paid losses, and repetitive and severe repetitive loss property data.
State of Texas Hazard Mitigation Plan 2013 Update	Hazard Descriptions	Official descriptions of hazards and their potential impacts
Texas Forest Service-Texas Wildfire Risk Assessment Summary Report	Wildfire Threat and Urban Interface	Mapping and wildfire vulnerability data
Texas State Data Center	Population and demographics	Population counts, parcel data, and land use data
Medina County 2013 CHAMPS Report	Natural hazard data	Review previously compiled natural hazard histories.
Medina County Appraisal Data	Population and demographics	Population counts, parcel data, and land use data

Additional information sources included: USDA Census of Agriculture, United States Geological Survey, Vaisala, and specific details about previous natural hazard events from planning team participants. 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. In many cases of non-participation, the title listed is reflective of the office the planning team tried to contact:

Table 5: Local Stakeholders Contacted

Stakeholder	Title	Participated
Bandera County	Emergency Management Coordinator	N
Frio County	Emergency Management Coordinator	Y
Atascosa County	Emergency Management Coordinator	N
Bexar County	Emergency Management Coordinator	N

Area stakeholders were contacted by phone and email. In an effort to increase participation, each stakeholder was contacted at least twice. Area stakeholders who chose to participate provided important supplemental input and information that helped shape mitigation strategies for each hazard, in particular by making the planning team aware of hazard areas that had not been previously identified.

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 28, 2018. 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 reviewed each jurisdiction's capability assessment.

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

The second planning team meeting was held on January 8, 2019. To stay on schedule, the planning team needed to meet four objectives: Finalize the hazards list, collect relevant ordinances and plans, review and refine the critical facilities list, and identify area stakeholders. The meeting closed by selecting the process to identify new 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 October 23rd, 2019. 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 July 10th, 2020.

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 posted on the County website at least 72 hours in advance, and flyers were posted in public locations, including county and city facilities.

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 third meeting. The public was also given an opportunity to review and comment on the completed draft posted at public facilities during a two-week public comment period before it was submitted on July 10th, 2020 for the formal review process.

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 6: Maintenance Responsibility

Title	Jurisdiction
ACA - Grants	Medina County
Chief of Police	City of Hondo
Chief of Police	City of Natalia
Chief of Police	City of La Coste

Chief of Police	City of Castroville
County Judge	Medina County
EMC	Medina County
EMC / Public Works	City of Devine
Floodplain Administrator	Medina County

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. Medina 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.

5) Plan Monitoring

The Medina County Emergency Management Coordinator (EMC) will be responsible for the overall continued coordination and monitoring of the mitigation plan in its entirety, including but not limited to the planning process, risk assessment, strategy, and the actions assigned for each hazard. The agency or department identified above in Table 6 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 in its entirety, including but not limited to the planning process, risk assessment, strategy, and the actions:

- 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 in 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. Determining Risk

1) Risk Assessment

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

Likelihood of Future Events is measured based on a hazard's expected frequency of occurrence in light of its previous frequency. Each hazard's likelihood of future events 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 Parcel Count and Potential Damage Values

Table 7: Estimated Values by Location

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Medina County	38,424	**$6,125,177,720**
City of Castroville	1,561	**$274,273,930**
City of Devine	2,068	**$196,879,980**
City of Hondo	3,461	**$366,485,590**
City of La Coste	1,057	**$75,514,700**
City of Natalia	1,396	**$59,833,190**

3) Distribution of Vulnerable Populations

The planning team identified a set of indicators it could use to identify each jurisdiction's vulnerable population. The indicators include demographic data like age and income, as well as geographic data including the location of low income or subsidized housing units,

concentrations of manufactured and mobile homes, and concentrations of homes in substandard condition.

A) Age and Income

The populations of each jurisdiction were broken down into 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 8: Vulnerable Populations by Jurisdiction

Jurisdiction	Estimated Vulnerable Population Totals		
	Young[1]	Elderly[2]	Extremely Low-Income Households (≤ $25,000 Annually)[3]
Medina County	11,495	7,346	3,411
City of Castroville	552	729	209
City of Devine	1,422	674	442
City of Hondo	2,045	1,014	525
City of La Coste	295	227	135
City of Natalia	425	224	207

B) Distribution of Vulnerable Populations

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 vulnerable populations map is based on a social vulnerability index created specifically for the planning area. The index considers six relevant Census Block Group-level factors: poverty rate, population of residents 65 years old and older, population of residents younger than 18, the population of residents without a high school diploma or GED, the population of residents with a low English proficiency, and the number of homes constructed before 1980.

To create the index, each factor is re-scaled by assigning the largest population in each category a score of 1. The remaining population counts for each category are then given a score based

[1] Table B01001, 2012-2016 ACS, Ages 0-17 totals (both male and female).
[2] Table B01001, 2012-2016 ACS, Ages 65+ totals (both male and female).
[3] https://www.huduser.gov/portal/datasets/il/il2018/2018summary.odn - Family of 4 income ≤ $25,100 – For clarity and approximate alignment with ACS data rounded to nearest $1,000.
Household Income in the Past 12 Months (In 2016 Inflation-Adjusted Dollars) from Table B19001, 2012-2016 ACS.

the ratio of the relevant population to the largest population. Once each factor has a re-scaled score, the scores for each factor are totaled to create an overall index number for each Census Block Group. The vulnerable populations map is representative of each Census Block Group's overall vulnerability, based on the six factors outlined above, relative to the other Census Block Groups in the planning area.

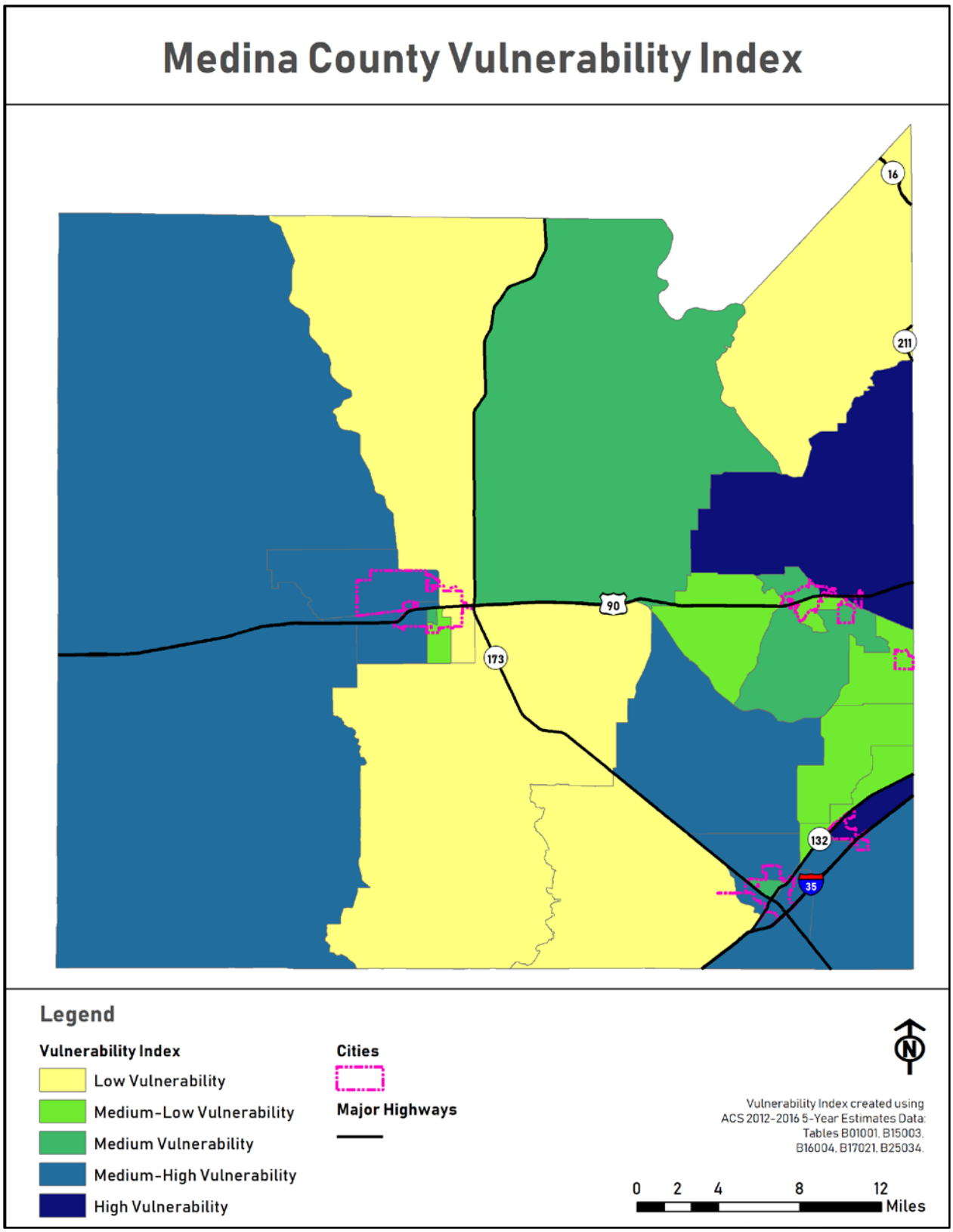


Figure 1: Medina County Vulnerability Index

C) Low Income and Subsidized Housing

There are two low-income apartment complexes in the City of Castroville that offer 119 affordable rentals. Housing Choice Vouchers are accepted at the Village Apartments, but neither of the complexes are rent-subsidized.

The City of Devine is the only city with a housing authority. The Devine Housing Authority operates 70 low-rent public housing units at the Rosewood Apartments. Another apartment complex offers 37 affordable rentals for senior citizens.

There are three affordable apartment complexes in the City of Hondo that offer 180 affordable apartments for rent. Approximately 40 apartments are income-based rentals, and there are 40 Project-based Section 8 subsidized apartments.

Additional low-income housing units are provided throughout the County and participating jurisdictions by other entities.

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.

D) Housing Type and Condition

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

Manufactured / Mobile Homes

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, floods, tornados, droughts, and windstorms.

Mobile and manufactured homes can be found throughout Medina County. As Table 9 shows, almost a third of the housing units in Medina County are mobile homes. The City of Natalia has the highest percentage of mobile homes in Medina County, with almost half of their housing stock being mobile homes.

Table 9: Number and Percentage of Mobile Homes in Medina County

	Total housing units	Total housing units - Mobile home	Total housing units - Mobile home %
Medina County	18,089	5,490	30.3%
Castroville	1,143	54	4.7%
Devine	1,684	61	3.6%
Hondo	2,539	422	16.6%
La Coste	490	171	34.9%

Natalia	570	233	40.9%

City of Castroville

According to the Castroville Comprehensive Plan, properties zoned for manufactured housing are primarily located west of FM 471 and away from the main city center. There are three mobile home parks in Castroville: Riverside Mobile Home Park off FM 471 and two unnamed mobile home parks to the west of Castroville Elementary School.

The City of Castroville is also home to two RV parks: Hidden View RV Park on FM 471, and Castroville RV Park, located next to Castroville Regional Park.

City of Devine

The City of Devine is home to two mobile home parks: Devine Trailer Park and Colonial Park. There are manufactured homes/mobile homes located throughout Devine.

City of Hondo

The City of Hondo is home to two mobile home parks: Jackson Mobile Home Park and Countryside Mobile Home & RV Park. There are other manufactured homes/mobile homes located throughout Hondo, mostly on the edges of the City.

Hondo is also home to several RV Parks: Countryside Mobile Home & RV Park, Ramblin Rec RV Park, and the 5B RV Park.

City of La Coste

The City of La Coste is home to one mobile home park: La Coste Village. There are other manufactured/mobile homes located throughout the community.

City of Natalia

The City of Natalia is home to one mobile home park: Ross Mobile Home Park. There are other manufactured/mobile homes located throughout the community.

Homes in Substandard Condition

The jurisdictions have determined that homes in sub-standard condition, regardless of structure type, 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.

Table 10 shows the percentage of housing units in Medina County and the participating jurisdictions that were built after 1990, built before 1990, and built before 1970. While sub-standard conditions of housing units are not necessarily indicative of age, housing units that were built decades ago may not be able to withstand hazardous events due to updates in building codes and standards. In Medina County, a little more than half of all the housing units in the county were built before 1990; making them nearly 30 years old or older. In fact, in all of the jurisdictions, more than half of all of the housing units were built before 1990. In addition, at least a quarter of all housing units in each jurisdiction were built before 1970, making them almost 50 years old or older.

Table 10: Housing Unit Age in Medina County and Jurisdictions[4]

	Total housing units	Percentage Built after 1990	Percentage Built before 1990	Percentage Built before 1970
Medina County	18,089	48%	52%	27%
Castroville	1,143	31%	69%	38%
Devine	1,684	19%	81%	61%
Hondo	2,539	34%	66%	37%
La Coste	490	37%	63%	33%
Natalia	570	37%	63%	29%

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.

[4] Table DP04: Selected Housing Characteristics. ACS 2012-2016 5 Year Estimates.

4. 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.

1) Flood History

The planning team relied on data from the National Centers for Environmental Information (NCEI) and the Medina County 2013 CHAMPS report to develop a flood history for the County and each participating jurisdiction. The data gathered reflects the most up-to-date flood data available for each jurisdiction at the time of writing.

Table 11: Medina County Flood History

Location	Date Range	Flood Events	Flood Type	Local Fatalities	Local Injuries	Local Property Damage $2018	Local Crop Damage $2018
Medina County	10/28/1960 - 8/21/2016	89	Flood, Flash Flood, N/A	4	59	$52,496,349	$195,661,125

Table 12: City of Castroville Flood History

Location	Date Range	Flood Events	Flood Type	Local Fatalities	Local Injuries	Local Property Damage $2018	Local Crop Damage $2018
Castroville	3/29/2004 - 5/14/2010	5	Flash Flood, N/A	0	0	$185,975	$0

Table 13: City of Devine Flood History

Location	Date Range	Flood Events	Flood Type	Local Fatalities	Local Injuries	Local Property Damage $2018	Local Crop Damage $2018
Devine	7/7/2007 - 5/23/2015	3	Flash Flood	0	0	$0	$0

Table 14: City of Hondo Flood History

Location	Date Range	Flood Events	Flood Type	Local Fatalities	Local Injuries	Local Property Damage $2018	Local Crop Damage $2018
Hondo	6/2/1996 - 5/24/2015	7	Flash Flood, Flood	0	0	$61,016	$0

Table 15: City of La Coste Flood History

Location	Date Range	Flood Events	Flood Type	Local Fatalities	Local Injuries	Local Property Damage $2018	Local Crop Damage $2018
La Coste	2/21/1998 - 4/15/2010	2	Flash Flood	0	0	$4,638	$0

Table 16: City of Natalia Flood History

Location	Date Range	Flood Events	Flood Type	Local Fatalities	Local Injuries	Local Property Damage $2018	Local Crop Damage $2018
Natalia	9/8/2010	2	Flash Flood	0	0	$0	$0

A) National Flood Insurance Program

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

All participating jurisdictions have adopted and enforce flood damage prevention ordinances in their respective jurisdictions.

Medina County

Medina County has a staff floodplain administrator/environmental health investigator. All new residential construction must be elevated to at least 18 inches above the base flood elevation. All nonresidential construction also needs to be elevated to 18 inches above the base flood elevation or, if below the base flood elevation, needs to be constructed to be watertight. Manufactured homes in zones A, A1-30, AH, and AE on the County's FIRMs are required to be elevated to 18 inches above the base flood elevation and securely anchored to resist flotation, collapse, and lateral movement.

City of Castroville

The City of Castroville has designated the city administrator to be the floodplain administrator. The City also requires all new residential construction to be elevated to one foot above the base flood elevation. All nonresidential construction also needs to be elevated to one foot above the base flood elevation or, if below the base flood elevation, needs to be constructed to be watertight. Manufactured homes in zones A, A1-30, AH, and AE on the City's FIRM are required to be elevated and securely anchored to resist flotation, collapse, and lateral movement.

City of Devine

The City of Devine has designated the city administrator to be the floodplain administrator. The City also requires all new residential construction to be elevated to one foot above the base flood elevation. All nonresidential construction also needs to be elevated to one foot above the base flood elevation or, if below the base flood elevation, needs to be constructed to be watertight. Manufactured homes in zones A, A1-30, AH, and AE on the City's FIRM are required to be elevated and securely anchored to resist flotation, collapse, and lateral movement.

City of Hondo

The City of Hondo has designated the city manager/code enforcement supervisor as the floodplain administrator. All new residential construction is required to be elevated to or above the base flood elevation. All nonresidential construction also needs to be elevated to or above the base flood elevation or, if below the base flood elevation, needs to be constructed to be watertight. Manufactured homes in zones A, A1-30, AH, and AE on the City's FIRM are required to be elevated and securely anchored to resist flotation, collapse, and lateral movement.

City of La Coste

The City of La Coste has designated the city administrator or their designated agent to be the floodplain administrator. The City also requires all new residential construction to be elevated to one foot above the base flood elevation. All nonresidential construction also needs to be elevated to one foot above the base flood elevation or, if below the base flood elevation, needs to be constructed to be watertight. Manufactured homes in zones A, A1-30, AH, and AE on the City's FIRM are required to be elevated and securely anchored to resist flotation, collapse, and lateral movement.

City of Natalia

The City of Natalia has designated the city administrator to be the floodplain administrator. All new residential construction is required to be elevated to or above the base flood elevation. All nonresidential construction also needs to be elevated to or above the base flood elevation or, if below the base flood elevation, needs to be constructed to be watertight. Manufactured homes in zones A, A1-30, AH, and AE on the City's FIRM are required to be elevated and securely anchored to resist flotation, collapse, and lateral movement.

Each participating jurisdiction is responsible for enforcing floodplain management regulations and ensuring regulations meet the minimum NFIP requirements.

Their respective floodplain management ordinances and any future updates will guide each jurisdiction as it continues to comply with NFIP requirements through local permitting, inspection, and recordkeeping, especially for new and substantially redeveloped construction. Each jurisdiction will continue to encourage residents to purchase flood insurance to reduce their flood risk.

The current FIRM maps covering Medina County and the participating jurisdictions became effective on April 3, 2012.

The flood mitigation actions outlined in Chapter 19 below were developed with flood mitigation and NFIP compliance in mind. Public awareness in particular will be an ongoing effort in each participating jurisdiction to reduce future losses due to flooding, and it will continue even after recommended corrective actions have been implemented.

As of August 31, 2018, there are 268 NFIP policies in force in Medina County, with a total of $234,831.00 paid in premiums. There are 33 NFIP policies in the City of Castroville. There are 33 NFIP policies in the City of Devine. There are 70 NFIP policies in the City of Hondo. There are 5 NFIP policies in the City of La Coste. There are 16 NFIP policies in the City of Natalia. The remaining 111 NFIP policies are in other areas of the County.

Table 17 shows the NFIP Claims and Payments that have been made for properties in Medina County as of August 31, 2018.

Table 17: NFIP Claims and Payments

Jurisdiction Name	Total Losses	Closed Losses	Open Losses	Losses Closed Without Payment	Total Payments
Medina County	41	37	0	5	$1,488,985
City of Castroville	13	10	0	3	$389,754
City of Devine	7	4	0	3	$32,932
City of Hondo	16	10	0	6	$305,750
City of La Coste	4	4	0	0	$238,683
City of Natalia	3	2	0	1	$71,394

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.

In Medina County, there are two repetitive loss properties responsible for four paid claims worth $78,021.09. Both properties are classified as “SINGLE FMLY.”

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.

According to the best information available, there are no severe repetitive loss properties in Medina County or any of the participating jurisdictions.

2) Likelihood of Future Events

In the case of the FEMA 100-year floodplain, there's a 1% annual chance, and in the 500-year floodplain it's a 0.02% annual chance. The likelihood of a 100-year flood event is therefore occasional. The likelihood of a 500-year flood event is therefore unlikely.

However, based on the frequency of previous flood events, every jurisdiction can expect to experience some type of flooding that may or may not meet the definition of a 100-year or 500-year event on a more regular basis.

Given the frequency of previous flood events, it is probable that Medina County will experience a flood event in the next year, meaning an event is highly likely.

In the Cities of Castroville, Devine, Hondo, La Coste, and Natalia, previous flood history indicates that a future flood event is occasional, meaning that one is possible in the next five years.

3) Extent

Throughout Medina County and the participating jurisdictions, the worst flood events have been associated with major riverine flooding. The National Weather Service (NWS) has produced flood scenarios[5] that identify infrastructure vulnerable to flooding as local rivers and creeks enter the flood stage. The primary source of flooding, the Medina River, enters the flood stage at 1,064.2', the moderate flood stage at 1,065', and the major flood stage at 1,069'.

The worst flooding events in Medina County and the participating jurisdictions have inflicted as high as $20,281,349.52[6] in property damages. Crop damages during the worst flooding in Medina County and the participating jurisdictions have been as high as $185,012,236.78[7]. The worst flood events in Medina County and the participating jurisdictions have caused up to 50 injuries and one fatality[8]. The worst flooding throughout the County and the participating jurisdictions has been estimated at 8' deep or deeper[9]. The flood record for the Medina River at Medina Lake is 1,082.42 feet, which occurred July 5, 2002. It is the highest level reached since recordkeeping began in 1905.

[5] https://water.weather.gov/ahps2/hydrograph.php?wfo=ewx&gage=mdlt2
[6] Incident date: 6/22/1997, Medina County 2013 CHAMPS Report, Adjusted for inflation to $2018
[7] Incident date: 6/3/1987, Medina County 2013 CHAMPS Report, Adjusted for inflation to $2018
[8] Medina County CHAMPS Report and NOAA Weather Data
[9] https://spectrumlocalnews.com/tx/san-antonio/news/2018/09/24/10-families-displaced-at-rv-park-after-saturday-rain

Flood magnitude is typically measured by depth of flood water in feet or inches. Future flood events in Medina County and the participating jurisdictions may meet previous worst-case 8' flood depths.

4) Location and Impact

A) Location

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. Mandatory flood insurance purchase requirements and floodplain management standards apply in Zone A5.

Roughly 16.7% (142,865.93 acres out of 854,603.05) of Medina County is in the FEMA 100-year floodplain. In contrast, roughly 83.2% (711,012.74 acres out of 854,603.05) of Medina County is in the FEMA 500-year floodplain. Nearly all of Medina County is in FEMA Special Flood Hazard Areas.

The FEMA 100-year floodplain covers 11.4% (203.55 acres out of 1,777.95) of the total land area within Castroville's jurisdiction. The FEMA 500-year floodplain covers 88.5% (1,572.87 acres out of 1,777.95) of the total land area within Castroville's jurisdiction.

The FEMA 100-year floodplain covers 5.9% (122.21 acres out of 2,064.90) of the total land area within Devine's jurisdiction. The FEMA 500-year floodplain covers 94% (1,940.49 acres out of 2,064.90) of the total land area within Devine's jurisdiction.

The FEMA 100-year floodplain covers 13.4% (837.38 acres out of 6,242.84) of the total land area within Hondo's jurisdiction. The FEMA 500-year floodplain covers 86.5% (5,400.11 acres out of 6,242.84) of the total land area within Hondo's jurisdiction.

The FEMA 100-year floodplain covers 40.6% (164.26 acres out of 404.87) of the total land area within La Coste's jurisdiction. The FEMA 500-year floodplain covers 59.3% (240.25 acres out of 404.87) of the total land area within La Coste's jurisdiction.

The FEMA 100-year floodplain covers 6.4% (56.65 acres out of 891.79) of the total land area within Natalia's jurisdiction. The FEMA 500-year floodplain covers 93.5% (834.23 acres out of 891.79) of the total land area within Natalia's jurisdiction.

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. Nearly every type of land use found in Medina County can be found in both the FEMA 100-year and FEMA 500-year floodplains.

The following figures detail the location of FEMA Special Flood Hazard Areas in the participating jurisdictions that have them. The figures also illustrate the location and primary land use type of each parcel (to the extent parcel information is available for the participating jurisdictions) located within a FEMA Special Flood Hazard Area.

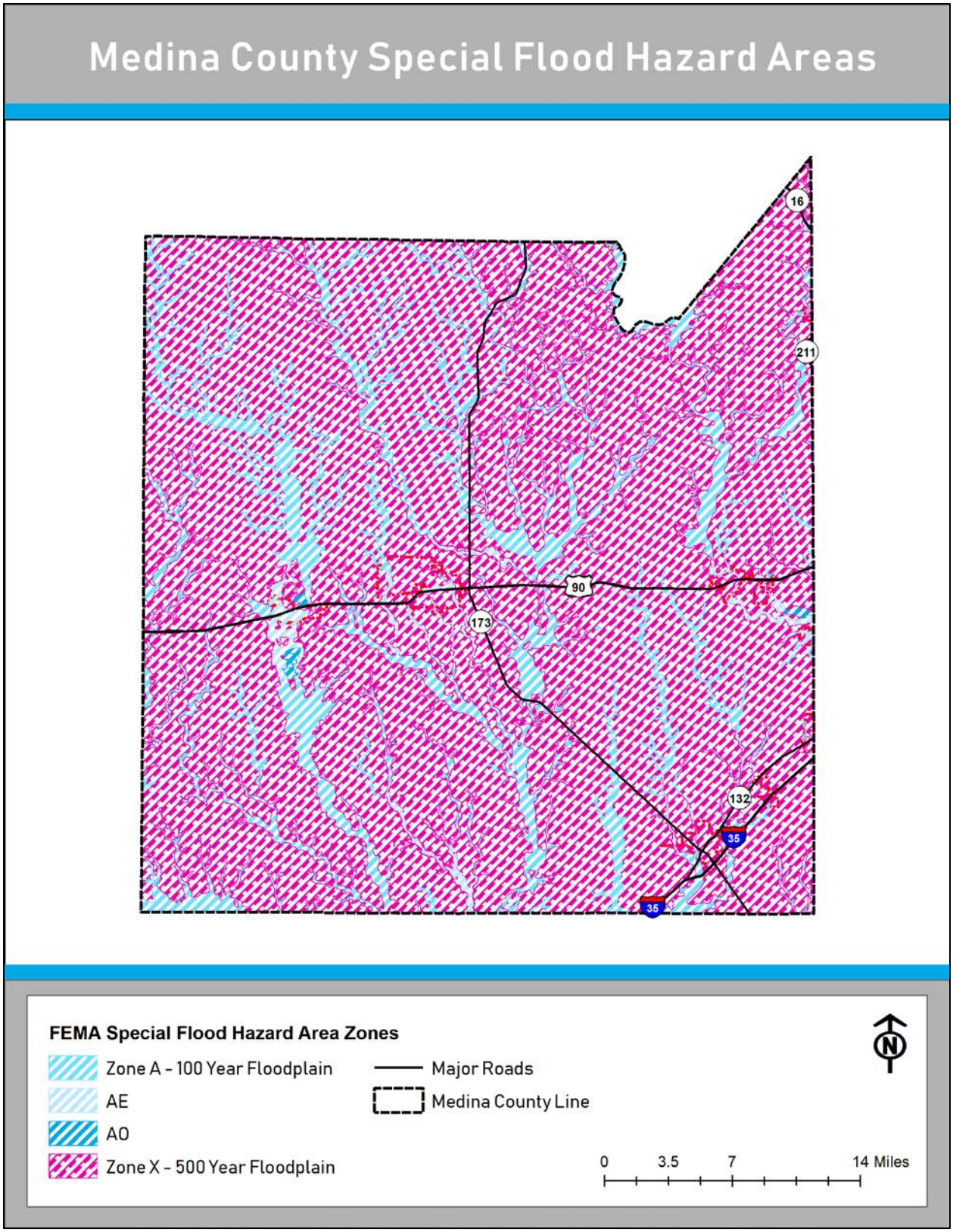


Figure 2: Medina County FEMA 100-Year Floodplain, Designated Floodway, and 500-Year Floodplain

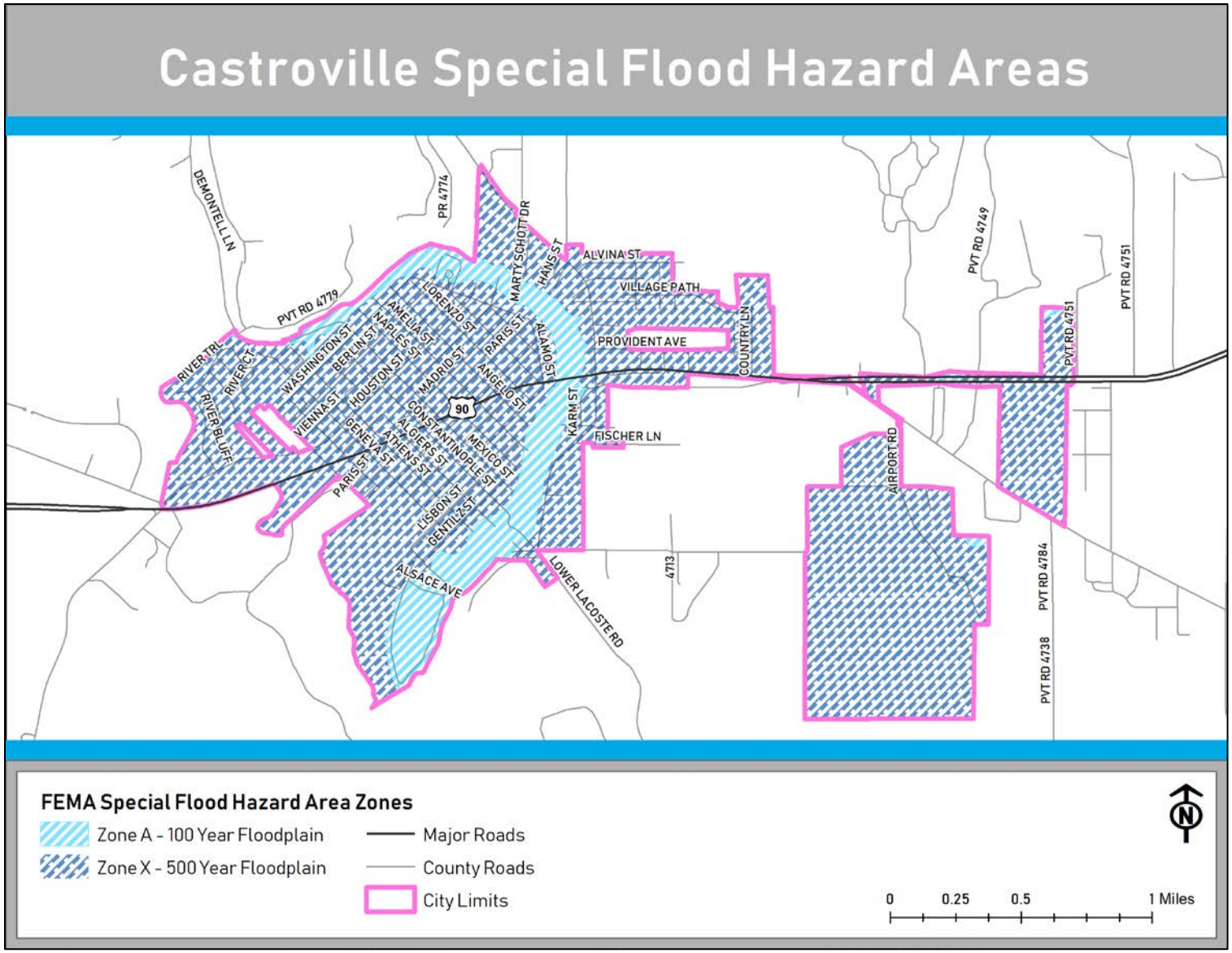


Figure 3: City of Castroville FEMA 100-Year and 500-Year Floodplain

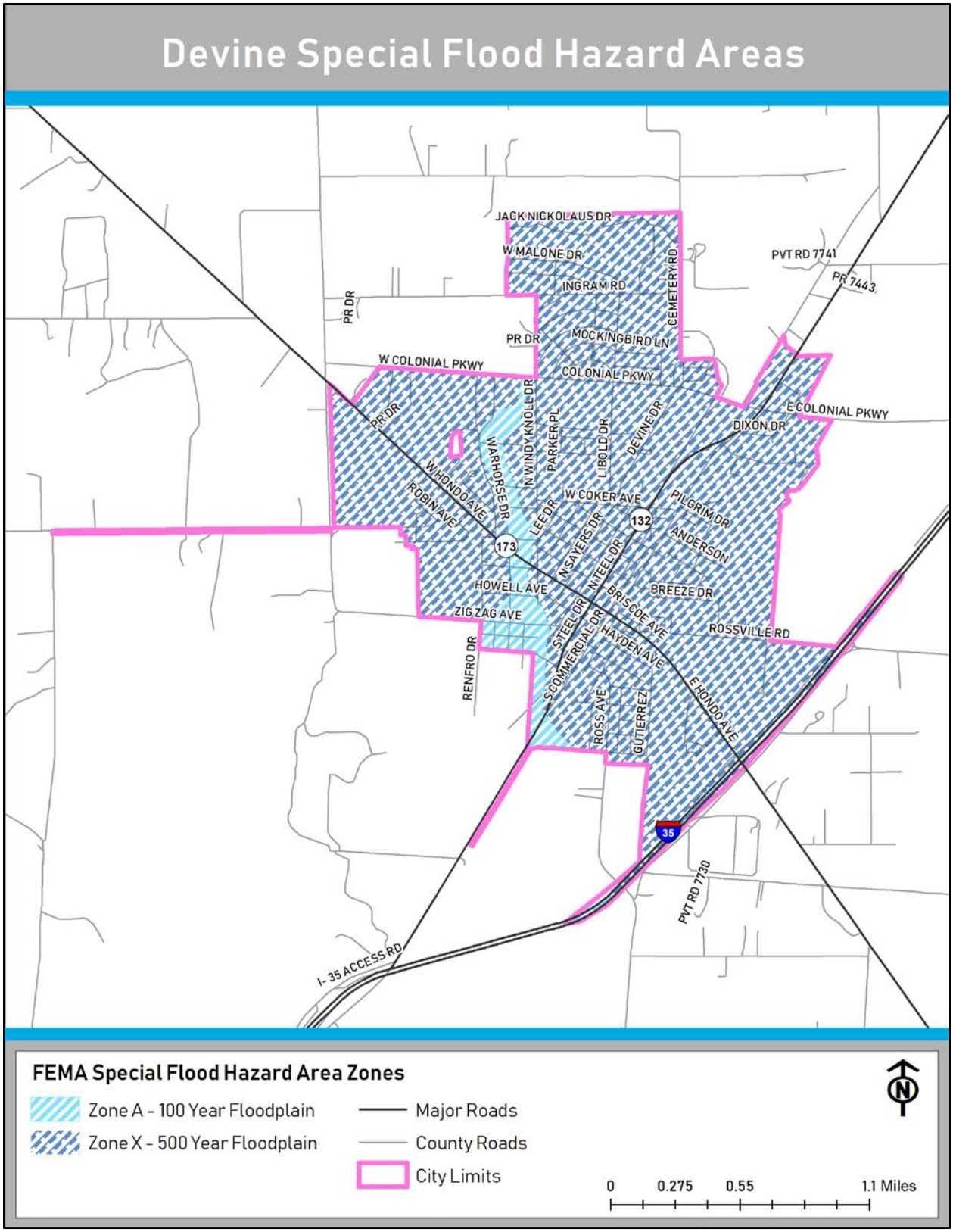


Figure 4: City of Devine FEMA 100-Year and 500-Year Floodplain

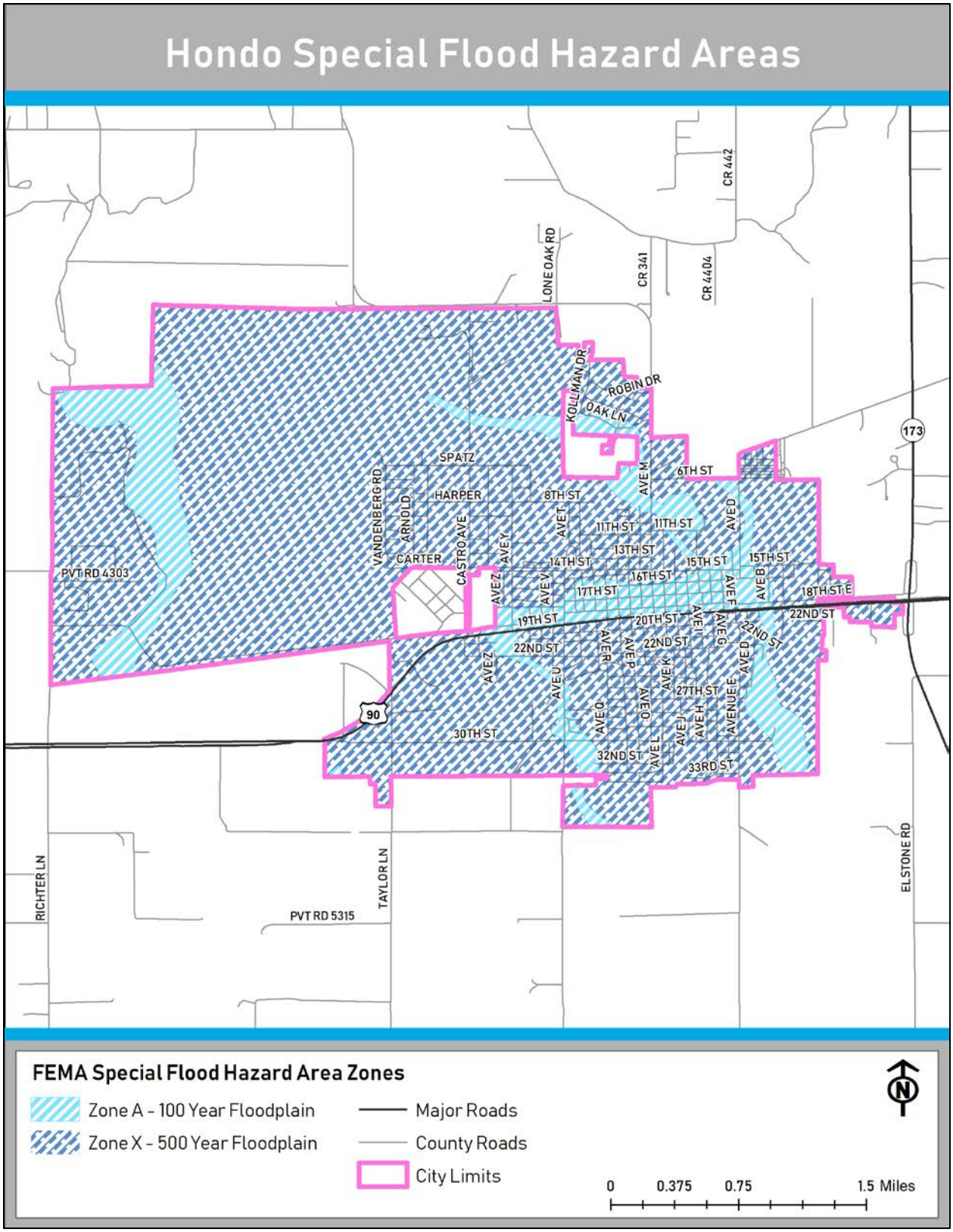


Figure 5: City of Hondo FEMA 100-Year and 500-Year Floodplain

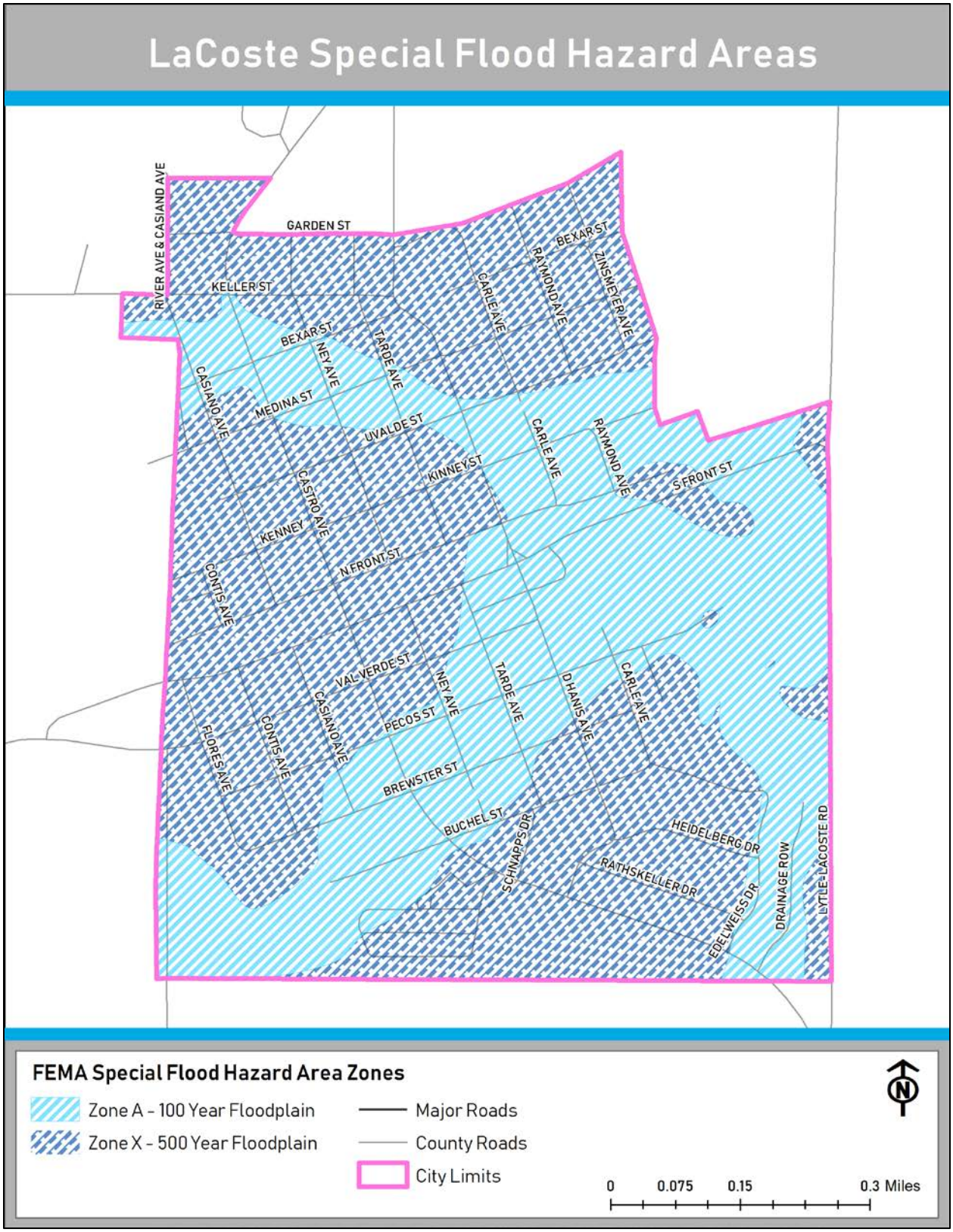


Figure 6: City of La Coste FEMA 100-Year and 500-Year Floodplain

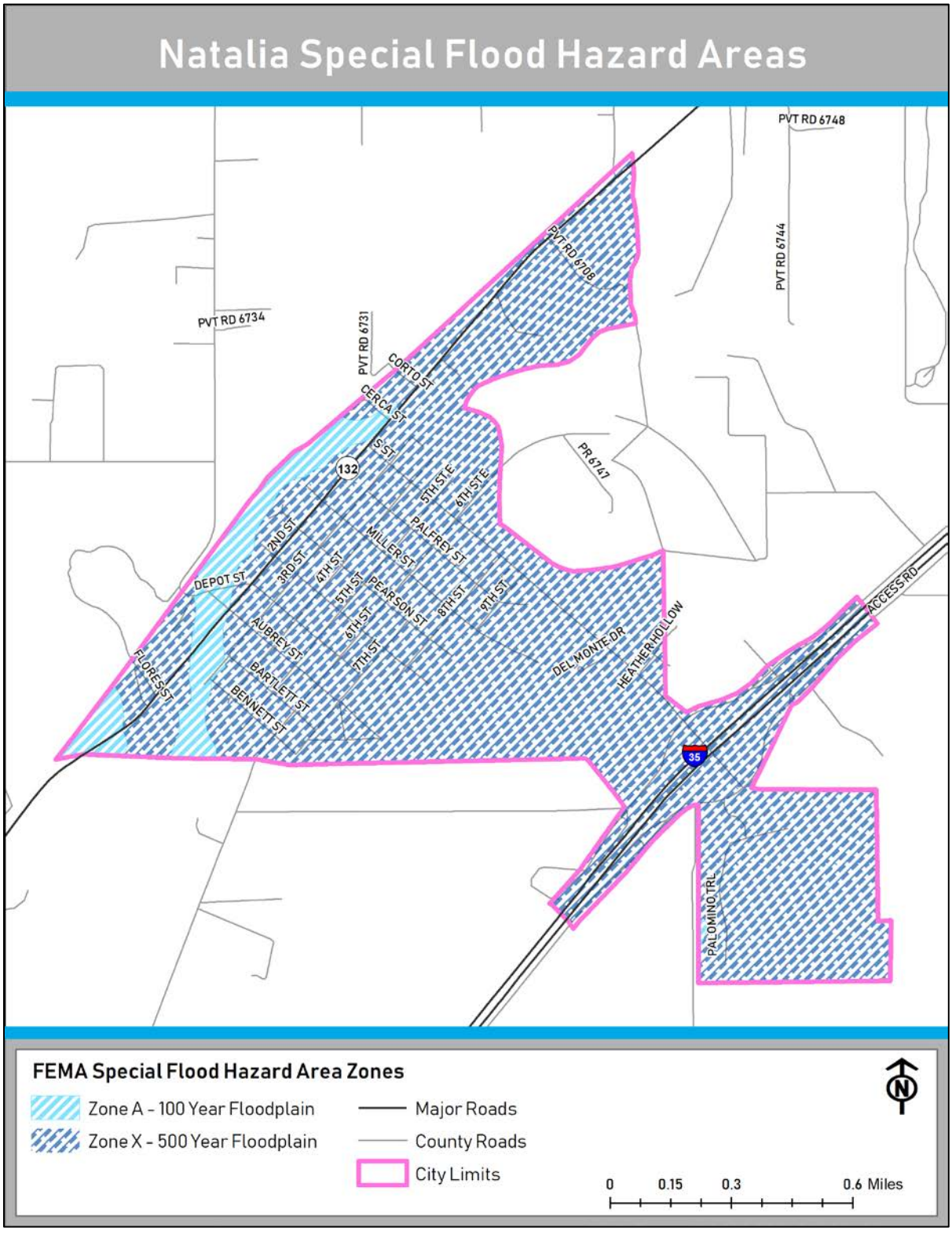


Figure 7: City of Natalia FEMA 100-Year and 500-Year Floodplain

B) Impact

Although the likelihood of a FEMA 100-year flood event remains occasional, 1% in any given year, the floodplain crosses all of Medina 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. Residents outside of the participating jurisdictions are evenly distributed throughout the county. Flooding in the County's Census Designated Places will impact more residents than flooding in less developed parts of the County. Residents in unincorporated Medina County may temporarily lose power due to downed power lines. Motorists and residents throughout the County may be left stranded and needing rescue. Affected structures may be flooded, damaged by floodborne contaminants, damaged by debris flow, or even completely washed away. Crops may be damaged or destroyed. Estimated damage totals to vulnerable parcels affected during a 100-year flood event may meet the totals outlined in Tables 18-23 below.

Despite the unlikely probability of a so-called 500-year flood, 0.02% in any given year, the danger isn't negligible. Moreover, the relatively 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. Parts of the County may temporarily lose power due to downed power lines. Motorists and residents may be left stranded and needing rescue. Affected structures may be flooded, damaged by floodborne contaminants, damaged by debris flow, or even completely washed away. Crops may be damaged or destroyed. A 500-year flood event is expected to affect a larger area and more structures than a 100-year flood. Estimated damage totals to vulnerable parcels affected during a 500-year flood event may meet the totals outlined in Tables 18-23 below.

5) Vulnerability

A) Population

As described in Section 3 of Chapter 3 above, Medina 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 flood.

Residents of mobile / manufactured housing are of particular concern. These structures are never considered safe during a flood, and depending on tie-down methods, may threaten surrounding structures.

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

B) Critical Facilities

The planning team identified 88 critical facilities spread across the County and participating jurisdictions. Almost all 88 are located in a known FEMA Special Flood Hazard Area (SFHA): the 500-year floodplain. Only one is located within the 100-year floodplain – the Devine Waste Water Treatment Plant. Due to their location in a FEMA SFHA, these critical facilities are considered especially vulnerable to flooding:

Table 18: Medina County Critical Facilities Vulnerable to Flooding

Medina County
Castroville City Hall
Castroville Elementary
Castroville Municipal Airport
Castroville Police Department
Castroville Public Library
Castroville VFD
City of Devine Water Well (Bain)
City of Devine Water Well (Edwards #1)
City of Devine Water Well (Edwards #2)
City of Devine Water Well (Harrison)
City of Devine Water Well (LC Martin)
Community EMS Inc
Dancing Bear Ranch Community Center
Devine City Emergency Operations Center
Devine City Offices
Devine City Water Tower
Devine Community Center
Devine Daep School
Devine EMS
Devine Football Field Ground Storage
Devine High School
Devine Intermediate School
Devine Middle School
Devine Municipal Airport
Devine Police Department

Devine VFD
Devine Waste Water Treatment Plant
Devine Water Tower
D'Hanis School
D'Hanis VFD
Driscoll Public Library
Hondo City Hall
Hondo High School
Hondo Municipal Airport
Hondo Police Department
Hondo Public Library
Hondo VFD Station 1
Hondo VFD Station 2
John J Ciavarra Elementary
La Coste City Hall
La Coste Elementary
La Coste Helicopter Landing Pad
La Coste Municipal Waste-Water Treatment Plant
La Coste Municipal Well #1
La Coste Municipal Well #2
La Coste Police Department
La Coste Records & Vehicle Storage
La Coste VFD
Lytle High School
McDowell Middle School
Medina County Annex
Medina County Constable Pct 1
Medina County Constable Pct 2
Medina County Constable Pct 3
Medina County Constable Pct 4
Medina County Courthouse
Medina County Emergency Operations Center
Medina County EMS ESD #4
Medina County Jail
Medina County Sheriff's Office
Medina Lake VFD Station 2
Medina Regional Hospital
Medina Valley High School
Medina Valley Middle School
Meyer Elementary
Mico VFD - Base Station
Natalia City Hall
Natalia Early Childhood Center
Natalia Elementary
Natalia High School
Natalia Junior High

Natalia Police Department
Natalia Veteran's Memorial Library
Natalia VFD
Newell E Woolls Intermediate
Potranco Elementary
Public Safety Radio Tower - Castroville
Public Safety Radio Tower - Devine Police
Public Safety Radio Tower - D'Hanis
Public Safety Radio Tower - Hondo
Public Safety Radio Tower - Natalia
Public Safety Radio Tower - New Dunlay
South Texas Rural Health Services, Inc Devine Medical
South Texas Rural Health Services, Inc Hondo Medical
St. Louis Braden Keller Community Center
Yancey VFD

A) Vulnerable Infrastructure

According to scenarios[10] generated by the National Weather Service (NWS) the following infrastructure is at risk:

On Hondo Creek[11], when the creek reaches 12 feet, there is minor lowland flooding on Farm to Market 462 at several low water crossings. At 14 feet, there will be major flooding entering the floodplains to the left and right of the main Hondo Creek channel approaching Highway 90 east of Hondo and Highway 173 north of Hondo. Several low water crossings on Farm to Market 462 will also be flooded. At 17 feet, Highway 90 floods with flow hundreds of yards wide in three sections near Hondo. Highway 173 floods north and south of Hondo. Farm to market 462 is closed at several low crossings. Finally, at 18 feet, one to two miles of Highway 90 east of Hondo would be flooded with a small section at the bridge above water. The area east of the bridge would be under several feet of water. There would be damage to the Southern Pacific Railway. Highway 173 would be flooded north and south of Hondo. Farm to Market 473 would be flooded in several places.

On the Medina River Dam at Medina Lake[12], when the dam reaches a crest of 1,070 feet, there will be many homes flooded downstream near La Coste.

On the Medina River near La Coste[13], when the river reaches 12 feet, low water crossings and bridges will flood. At 15 feet, the Medina River RV Park on CR 4714 will receive minor flooding. At 17 feet, there will be major flooding at the Medina River RV Park and all campers will need to

[10] http://water.weather.gov/ahps2/hydrograph.php?wfo=ewx&gage=gnlt2
[11] https://water.weather.gov/ahps2/hydrograph.php?wfo=ewx&gage=kwht2
[12] https://water.weather.gov/ahps2/hydrograph.php?wfo=ewx&gage=mdlt2
[13] https://water.weather.gov/ahps2/hydrograph.php?wfo=ewx&gage=lact2

be either evacuated ahead of time or relocated to higher ground. At 24 feet, there will be disastrous flooding affecting homes near La Coste, as well as flooding bridges and roads. At 32 feet, the bottom of the Farm to Market 471 bridge will flood. Many houses near La Coste will flood up to the roof line. Flooding make roads and bridges extremely hazardous to motorists.

B) Vulnerable Parcels

Parcels vulnerable to flooding have been identified by their complete or partial location within the FEMA 100-year floodplain and the FEMA 500-year floodplain.

Table 19: Vulnerable Parcels by Flood Zone in Medina County

Jurisdiction	Total Parcels	Estimated Potential Damage Value
FEMA 100-Year Flood Zone A		
Medina County	**9,242**	**$2,239,904,905**
FEMA 500-Year Flood Zone		
Medina County	**35,935**	**$5,928,884,655**

Table 20: Vulnerable Parcels by Flood Zone in the City of Castroville

Jurisdiction	Total Parcels	Estimated Potential Damage Value
FEMA 100-Year Flood Zone A		
Castroville	**170**	**$39,302,950**
FEMA 500-Year Flood Zone		
Castroville	**1,555**	**$273,462,890**

Table 21: Vulnerable Parcels by Flood Zone in the City of Devine

Jurisdiction	Total Parcels	Estimated Potential Damage Value
FEMA 100-Year Flood Zone A		

Devine	**190**	**$14,468,240**
FEMA 500-Year Flood Zone		
Devine	**1,972**	**$190,823,590**

Table 22: Vulnerable Parcels by Flood Zone in the City of Hondo

Jurisdiction	Total Parcels	Estimated Potential Damage Value
FEMA 100-Year Flood Zone A		
Hondo	**795**	**$64,018,980**
FEMA 500-Year Flood Zone		
Hondo	**2,921**	**$336,747,330**

Table 23: Vulnerable Parcels by Flood Zone in the City of La Coste

Jurisdiction	Total Parcels	Estimated Potential Damage Value
FEMA 100-Year Flood Zone A		
La Coste	**431**	**$26,110,270**
FEMA 500-Year Flood Zone		
La Coste	**788**	**$64,923,880**

Table 24: Vulnerable Parcels by Flood Zone in the City of Natalia

Jurisdiction	Total Parcels	Estimated Potential Damage Value
FEMA 100-Year Flood Zone A		
Natalia	**97**	**$3,529,590**
FEMA 500-Year Flood Zone		

Natalia	**1,423**	**$62,396,810**

5. 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. These are relative terms, because lower category storms can sometimes inflict greater damage than higher category storms, depending on where they strike and the particular hazards they bring. In fact, tropical storms can also produce significant damage and loss of life, mainly due to flooding.

The ingredients for a hurricane include a pre-existing weather disturbance, warm tropical oceans, moisture, and relatively light winds aloft. If the right conditions persist long enough, they can combine to produce the violent winds, incredible waves, torrential rains, and floods associated with this phenomenon.

1) Hurricanes / Tropical Storms History

The planning team relied on data from the National Centers for Environmental Information (NCEI) and the Medina County 2013 CHAMPS report to develop a hurricane history for the County and each participating jurisdiction. The data gathered reflects the most up-to-date hurricane and tropical storm data available for each jurisdiction. All data is reported at the County level, but because of every jurisdiction's proximity to each other, the countywide data is considered representative of local hurricane and tropical storm impacts.

Table 25: Medina County Hurricane History

Hurricane & Tropical Storm Events	Date	Hurricane Category	Maximum Wind Speed	Local Fatalities	Local Injuries	Local Rainfall Inches	Local Property Damage	Local Crop Damage
Hurricane Carla	9/8/1961	4	175	0	4	-	$3,787,879	$3,787,879
Hurricane Cindy	9/16/1963	1	80	0	0	-	$937,500	$93,750
Hurricane Beulah	9/8/1967	3	109	0	1	-	$15,217,391	$7,608,699
Hurricane Beulah	9/18/1967			0	1	-	$5,000,000	$500,000
Tropical Storm Candy	6/18/1968		70	0	1	-	$5,756,579	$575,658

Hurricane Celia	7/31/1970	3	125	0	6	-	$3,837,719	$394,144
Hurricane Fern	9/9/1971		90	0	0	-	$452,977	$452,977
Hurricane Allen	8/9/1980	3	115	0	0	-	$14,697,651	$1,469,765

NOAA Data
CHAMPS Data
Reported by Both

2) Likelihood of Future Events

Hurricanes occur in seasonal patterns between June 1 and November 30. Based on historical frequency of hurricanes and tropical storms in Medina County and the participating jurisdictions outlined above, the likelihood of a hurricane or tropical storm affecting any or all of the participating jurisdictions is occasional, meaning an event is possible in the next five 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 26: 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+

The worst hurricanes and tropical storms in Medina County and the participating jurisdictions have measured as high as Category 4 on the Saffir-Simpson scale, dropped up to 8 1/4" in rainfall, injured up to 13 people, and caused property and crop damages in excess of $22.8 million respectively.

Future hurricanes and tropical storms may meet previous worst-case Category 4 storms in terms of strength, rainfall, flooding, damage dollars, injuries, and deaths.

4) Location and Impact

A) Location

Location is often referred to in terms of Tier I and II counties, designated by the Texas Department of Insurance (TDI) for windstorm insurance purposes, to represent differing levels of loss exposure to coastal counties and adjacent counties. Tier I are those counties adjacent to the Gulf of Mexico and Tier II are those counties adjacent to Tier I counties.

Medina County is neither. However, the County and all participating jurisdictions are located within 200 miles of the Gulf coast. Although tropical storm and hurricane effects begin to diminish as they move inland, the winds alone from Hurricane Harvey reached as far as 140 miles from the eye of the storm. The County and all participating jurisdictions are considered especially susceptible to indirect impacts from hurricanes and tropical storms including high winds and flooding.

Tropical storms and hurricanes vary tremendously in terms of size, location, intensity and duration. According to the Medina County 2013 CHAMPS Report, Medina County's proximity to the coast places it among the mid-top 20% of all Texas counties in terms of recorded hurricane and tropical storm impacts including damage dollars, injuries, and deaths.

B) Impact

The planning team determined that Medina County is uniformly exposed to tropical storms and hurricanes.

Impacts from a hurricane or tropical Storm in Medina 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, people may be injured or killed.

5) Vulnerability

A) Population

As described in Section 3 of Chapter 3 above, Medina 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.

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) Critical Infrastructure – I-35

Interstate Highway 35 is a TxDOT-designated major hurricane evacuation route for Southern Texas.

Flooding along this route 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 88 critical facilities spread across the County and participating jurisdictions. Because of Medina County's proximity to the Gulf Coast, the planning team determined that all critical facilities, no matter their jurisdictional location, are equally vulnerable to a hurricane or tropical storm.

Table 27: Critical Facilities Vulnerable to Tropical Storms and Hurricanes and Potential Impacts

Critical Facilities	Potential Tropical Storm/Hurricane Impacts									
	Loss of Power	Flying Debris	Uprooted Trees	Flooding	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
Castroville City Hall	x	x	x	x	x	x	x	x	x	x
Castroville Elementary	x	x		x	x	x	x	x	x	x
Castroville Municipal Airport	x	x		x	x			x	x	x
Castroville Police Department	x	x	x	x	x	x	x	x	x	x
Castroville Public Library	x	x	x	x	x		x	x	x	x
Castroville VFD	x	x	x	x	x			x	x	x
City of Devine Water Well (Bain)	x	x	x		x	x		x	x	x
City of Devine Water Well (Edwards #1)	x	x	x		x	x		x	x	x
City of Devine Water Well (Edwards #2)	x	x	x		x	x		x	x	x
City of Devine Water Well (Harrison)	x	x	x		x	x		x	x	x
City of Devine Water Well (LC Martin)	x	x	x		x	x		x	x	x
Community EMS Inc	x	x	x	x	x	x	x	x	x	x
Dancing Bear Ranch Community Center	x	x	x	x	x		x	x	x	x
Devine City Emergency Operations Center	x	x	x	x	x			x	x	x
Devine City Offices	x	x	x	x	x			x	x	x
Devine City Water Tower	x	x	x			x		x	x	x
Devine Community Center	x	x	x	x	x		x	x	x	x
Devine Daep School	x	x	x	x	x		x	x	x	x
Devine EMS	x	x		x	x			x	x	x
Devine Football Field Ground Storage		x	x			x		x	x	x
Devine High School	x	x		x	x	x	x	x	x	x
Devine Intermediate School	x	x	x	x	x	x	x	x	x	x
Devine Middle School	x	x		x	x		x	x	x	x
Devine Municipal Airport	x	x		x	x			x	x	x
Devine Police Department	x	x	x	x	x			x	x	x

Devine VFD	x	x		x	x			x	x	x
Devine Waste Water Treatment Plant	x	x	x	x	x	x	x	x	x	x
Devine Water Tower		x	x			x		x	x	x
D'Hanis School	x	x		x	x		x	x	x	x
D'Hanis VFD	x	x		x	x	x	x	x	x	x
Driscoll Public Library	x	x	x	x	x		x	x	x	x
Hondo City Hall	x	x	x	x	x	x	x	x	x	x
Hondo High School	x	x	x	x	x		x	x	x	x
Hondo Municipal Airport	x	x		x	x			x	x	x
Hondo Police Department	x	x	x	x	x		x	x	x	x
Hondo Public Library	x	x	x	x	x		x	x	x	x
Hondo VFD Station 1	x	x	x	x	x			x	x	x
Hondo VFD Station 2	x	x		x	x			x	x	x
John J Ciavarra Elementary	x	x	x	x	x	x	x	x	x	x
La Coste City Hall	x	x	x	x	x	x	x	x	x	x
La Coste Elementary	x	x		x	x			x	x	x
La Coste Helicopter Landing Pad		x	x	x						
La Coste Municipal Waste-Water Treatment Plant	x	x	x	x	x	x	x	x	x	x
La Coste Municipal Well #1		x	x					x	x	x
La Coste Municipal Well #2	x	x	x					x	x	x
La Coste Police Department	x	x	x	x	x			x	x	x
La Coste Records & Vehicle Storage	x	x	x	x		x	x	x	x	x
La Coste VFD	x	x	x	x	x			x	x	x
Lytle High School	x	x		x	x		x	x	x	x
McDowell Middle School	x	x	x	x	x	x	x	x	x	x
Medina County Annex	x	x		x	x			x	x	x
Medina County Constable Pct 1	x	x	x	x	x	x	x	x	x	x
Medina County Constable Pct 2	x	x	x	x	x	x	x	x	x	x
Medina County Constable Pct 3	x	x		x	x			x	x	x
Medina County Constable Pct 4	x	x	x	x	x	x	x	x	x	x
Medina County Courthouse	x	x	x	x	x	x	x	x	x	x

Medina County Emergency Operations Center	x	x		x	x			x	x	x
Medina County EMS ESD #4	x	x		x	x			x	x	x
Medina County Jail	x	x		x	x			x	x	x
Medina County Sheriff's Office	x	x		x	x			x	x	x
Medina Lake VFD Station 2	x	x	x	x	x			x	x	x
Medina Regional Hospital	x	x	x	x	x		x	x	x	x
Medina Valley High School	x	x	x	x	x		x	x	x	x
Medina Valley Middle School	x	x	x	x	x	x	x	x	x	x
Meyer Elementary	x	x	x	x	x	x	x	x	x	x
Mico VFD - Base Station	x	x	x	x	x			x	x	x
Natalia City Hall	x	x	x	x	x	x	x	x	x	x
Natalia Early Childhood Center	x	x	x	x	x	x	x	x	x	x
Natalia Elementary	x	x	x	x	x		x	x	x	x
Natalia High School	x	x		x	x			x	x	x
Natalia Junior High	x	x	x	x	x		x	x	x	x
Natalia Police Department	x	x		x	x	x	x	x	x	x
Natalia Veteran's Memorial Library	x	x	x	x	x	x		x	x	x
Natalia VFD	x	x	x	x	x	x		x	x	x
Newell E Woolls Intermediate	x	x	x	x	x			x	x	x
Potranco Elementary	x	x	x	x	x		x	x	x	x
Public Safety Radio Tower - Castroville	x	x	x	x	x			x	x	x
Public Safety Radio Tower - Devine Police	x	x	x			x		x	x	x
Public Safety Radio Tower - D'Hanis	x	x		x	x			x	x	x
Public Safety Radio Tower - Hondo	x	x	x	x	x			x	x	x
Public Safety Radio Tower - Natalia	x	x	x	x	x			x	x	x
Public Safety Radio Tower - New Dunlay	x	x	x	x	x			x	x	x
South Texas Rural Health Services, Inc Devine Medical	x	x		x	x	x	x	x	x	x
South Texas Rural Health Services, Inc Hondo Medical	x	x		x	x	x	x	x	x	x
St. Louis Braden Keller Community Center	x	x	x	x	x			x	x	x
St. Louis Catholic Elementary School - Castroville	x	x	x	x	x	x	x	x	x	x
Yancey VFD	x	x	x	x	x			x	x	x

D) Vulnerable Parcels

Central Appraisal District data was used to estimate potential damage values for each participating jurisdiction. Given the broad nature of vulnerability, damage values were calculated on the jurisdictional level.

Table 28: Estimated Potential Damage Values by Jurisdiction

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Medina County	38,424	**$6,125,177,720**
City of Castroville	1,561	**$274,273,930**
City of Devine	2,068	**$196,879,980**
City of Hondo	3,461	**$366,485,590**
City of La Coste	1,057	**$75,514,700**
City of Natalia	1,396	**$59,833,190**

6. 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. The wildfire disaster cycle begins when homes are built adjacent to wildland areas. When what would have been rural wildfires occur, they advance through all available fuels, which can include homes and structures.

1) Wildfire History

The Texas A&M Forest Service Wildfire Risk Assessment Portal provides wildfire data on fires that occurred between 2005 – 2015. To establish each jurisdiction's wildfire history, the planning team reviewed the fire department reported as the primary responder to each fire. Fires were counted toward each jurisdiction when the jurisdiction's fire department responded. All other responders were counted toward Medina County.

The following wildfire histories for each jurisdiction reflect the most current wildfire data available.

Table 29: Medina County Wildfire History

Location	Date Range	Acres Burned	Wildfire Events	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Medina County	12/26/2005 - 9/24/2015	0 - 1,800	305	-	-	-	-

Table 30: City of Castroville Wildfire History

Location	Date Range	Acres Burned	Wildfire Events	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Castroville	1/14/2006 – 2/23/2015	0 - 3,300	99	-	-	-	-

Table 31: City of Devine Wildfire History

Location	Date Range	Acres Burned	Wildfire Events	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018

Devine	1/1/2005 – 11/3/2015	0 - 600	343	-	-	-	-

Table 32: City of Hondo Wildfire History

Location	Date Range	Acres Burned	Wildfire Events	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Hondo	1/1/2006 - 4/20/2006	0 - 600	10	-	-	-	-

Table 33: City of La Coste Wildfire History

Location	Date Range	Acres Burned	Wildfire Events	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
La Coste	1/1/2008 – 1/19/2009	0 - 75	20	-	-	-	-

The City of Natalia Volunteer Fire Department was not recorded as a responding department to wildfires, according to the TxWRAP data. However, the planning team determined that wildfires have occurred in the City of Natalia, based on public knowledge of wildfires as well as fire incidents submitted to Texas Fire Incident Reporting System (TEXFIRS). The maps as shown below in Figure 8 and Figure 9 also shows historical wildfire occurrences happening in both Medina County and in or near the City of Natalia from 2005-2015.

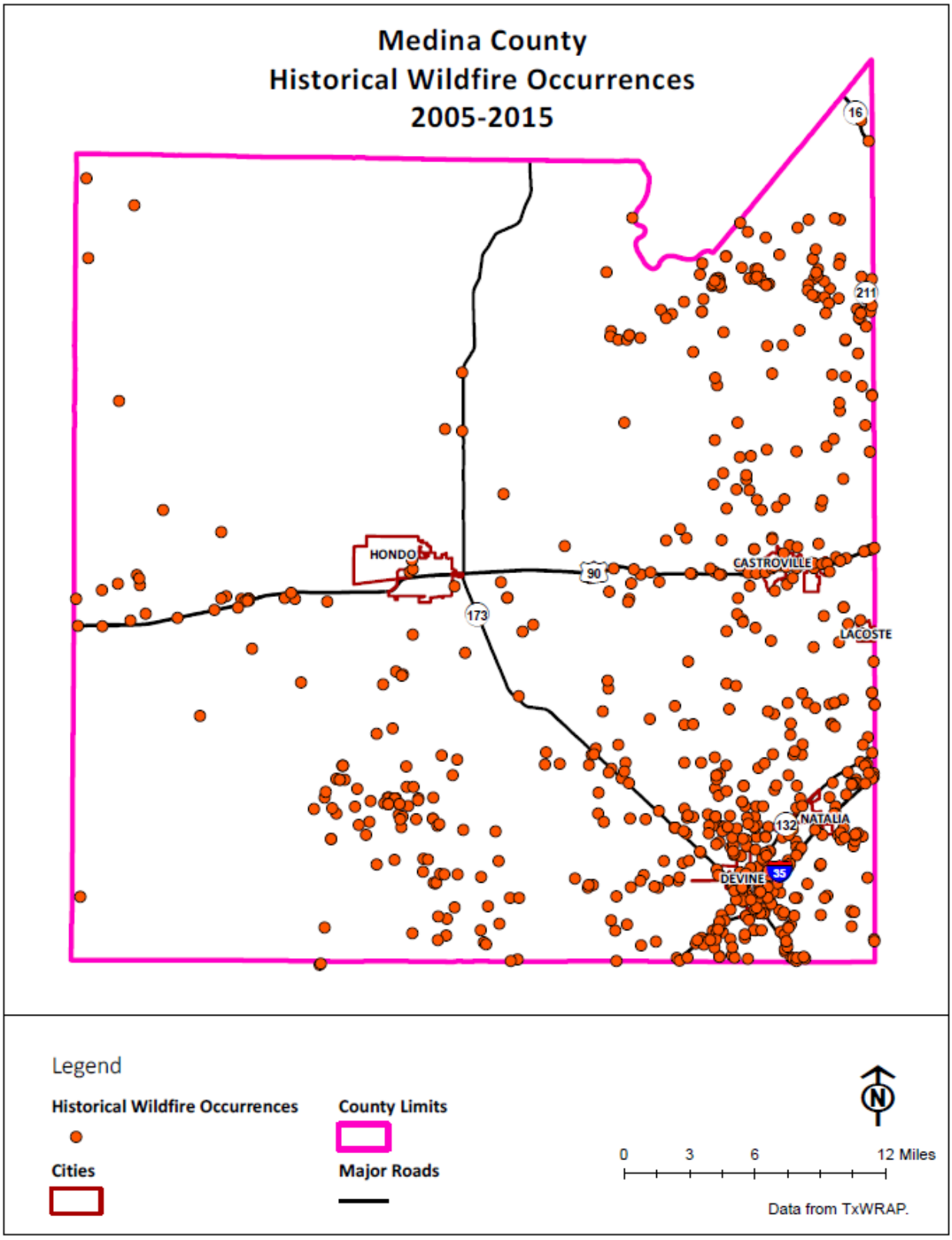


Figure 8: Medina County TxWRAP Historical Wildfire Occurrences 2005-2015

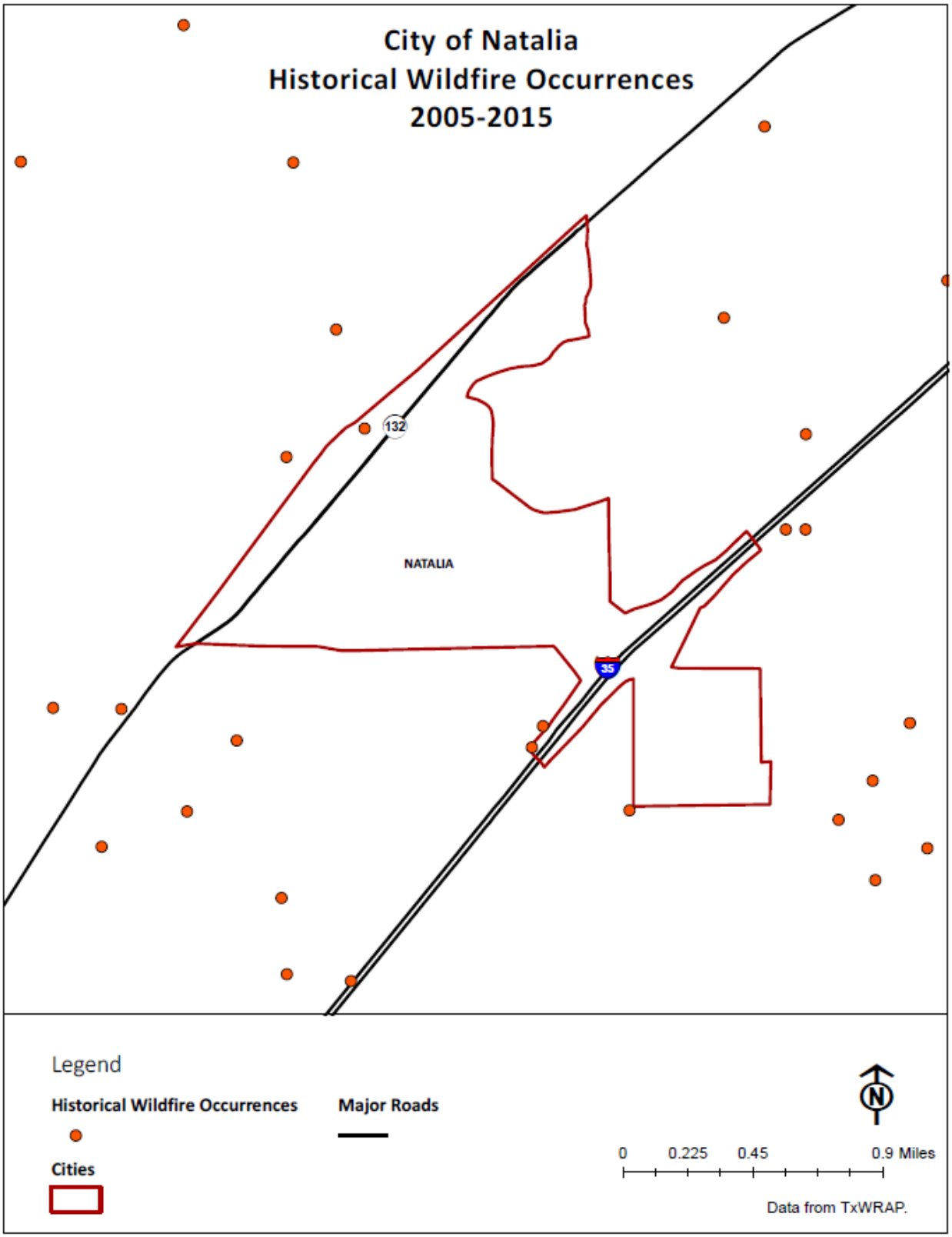


Figure 9: City of Natalia TxWRAP Historical Wildfire Occurrences 2005-2015

Previous wildfires have cumulatively burned 21,584.49 acres in Medina County and the participating jurisdictions. The largest reported fire burned 3,300 acres.

No damage dollars, neither structural nor agricultural, were reported for any of the wildfire events in any of the participating jurisdictions.

2) Likelihood of Future Events

A) Medina County

According to the data, fire departments respond to 30 or more wildfires per year in greater Medina County. Given prior frequency of wildfire events, a wildfire event in Medina County is highly likely, meaning an event is probable within the next year.

B) City of Castroville

According to the data, the City of Castroville responds to eleven or more wildfires per year. Given prior frequency of wildfire events, a wildfire event in the City of Castroville is highly likely, meaning an event is probable within the next year.

C) City of Devine

According to the data, the City of Devine responds to 34 or more wildfires per year. Given prior frequency of wildfire events, a wildfire event in the City of Devine is highly likely, meaning an event is probable within the next year.

D) City of Hondo

According to the data, the City of Hondo responds to 10 or more wildfires per year. Given prior frequency of wildfire events, the likelihood of a wildfire is considered highly likely, meaning an event is probable within the next year.

E) City of La Coste

According to the data, the City of La Coste responds to 20 or more wildfires per year. Given prior frequency of wildfire events, the likelihood of a future event is highly likely, meaning an event is probable within the next year.

F) City of Natalia

While there is no history of recorded wildfires in the City of Natalia according to TxWRAP data, based on the history of the other jurisdictions, the likelihood of a future wildfire event is highly likely, meaning an event is probable within the next year.

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, Medina County and the participating jurisdictions are rated between Class 1 and Class 5.

Table 34: Characteristic Fire Intensity Scale[14]

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 Texas A&M Forest Service data, the average fire in Medina County and the participating jurisdictions is a Class C event.

Table 35: National Wildfire Coordinating Group Size Class of Fire[15]

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
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

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

Previous wildfires in Medina County and the participating jurisdictions have ranged between Class 1 and Class 5 on the Characteristic Fire Intensity Scale, with flames up to 30’ in length, and between Class A and Class F 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 Medina County burned 3,300 acres.

Future fire events in Medina County and the participating jurisdictions may meet previous worst-case Class F (NWCGSCF) and Class 5 (FIS) wildfires in terms of intensity, 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.

I. Medina County Location

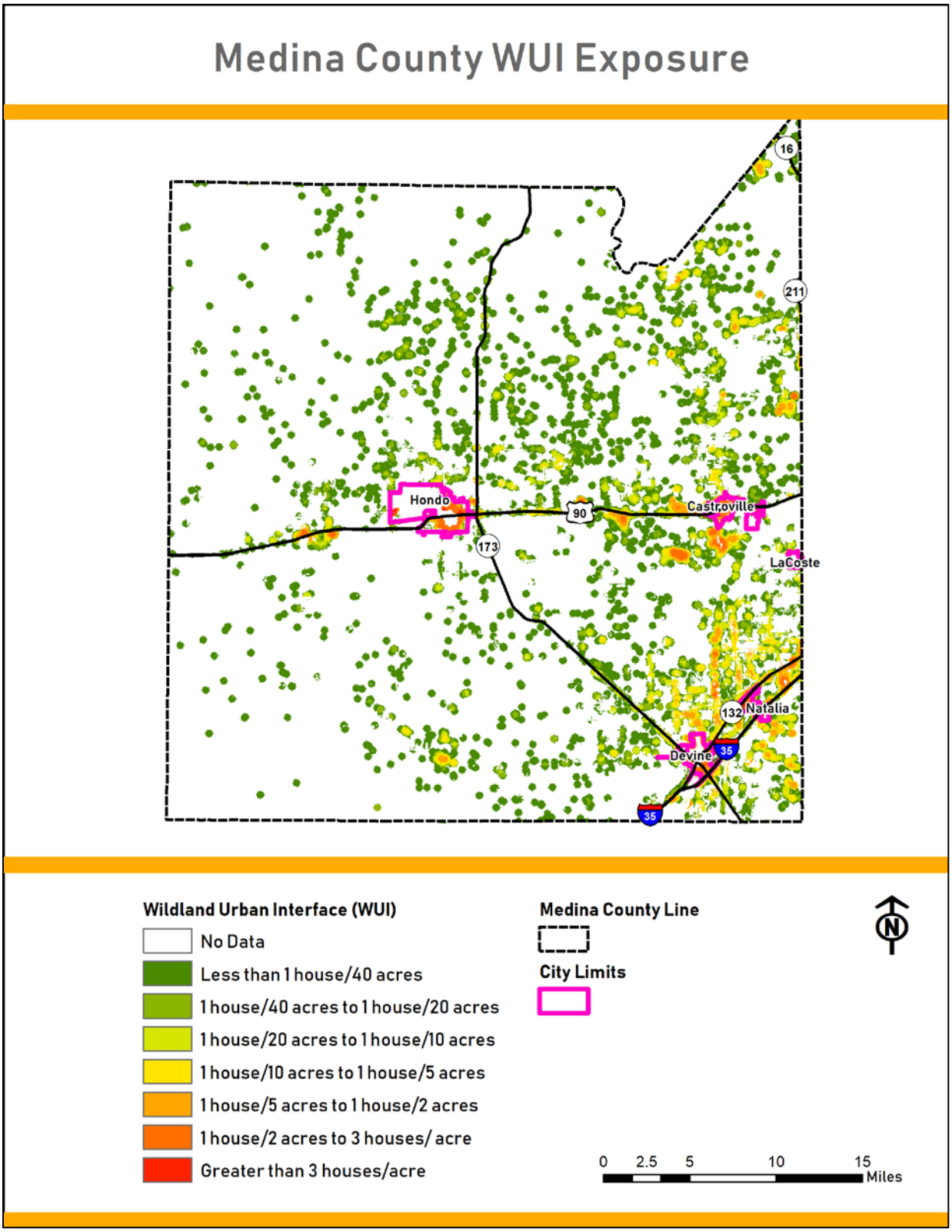


Figure 10: Medina County Wildland Urban Interface

II. City of Castroville Location

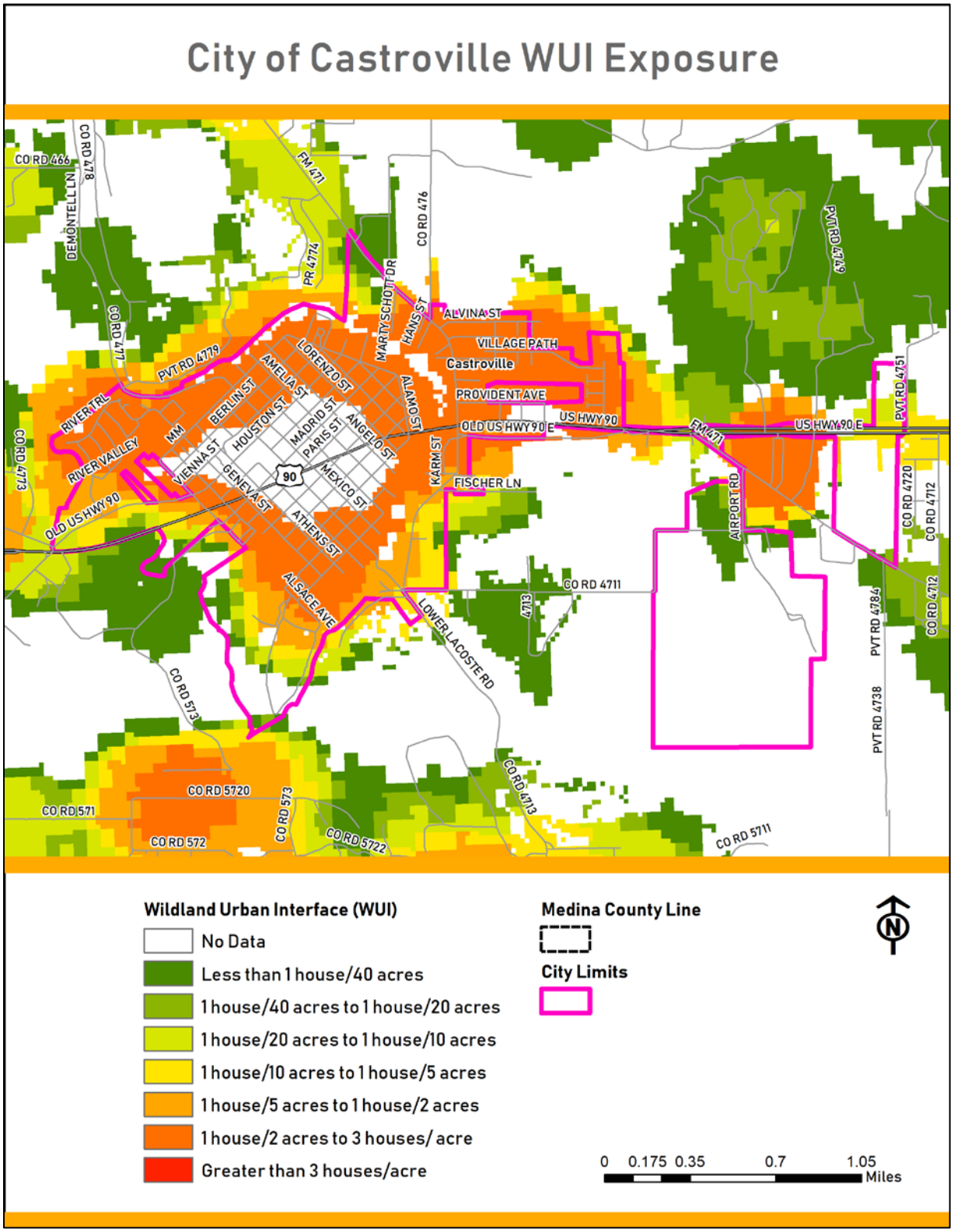


Figure 11: City of Castroville Wildland Urban Interface

III. City of Devine Location

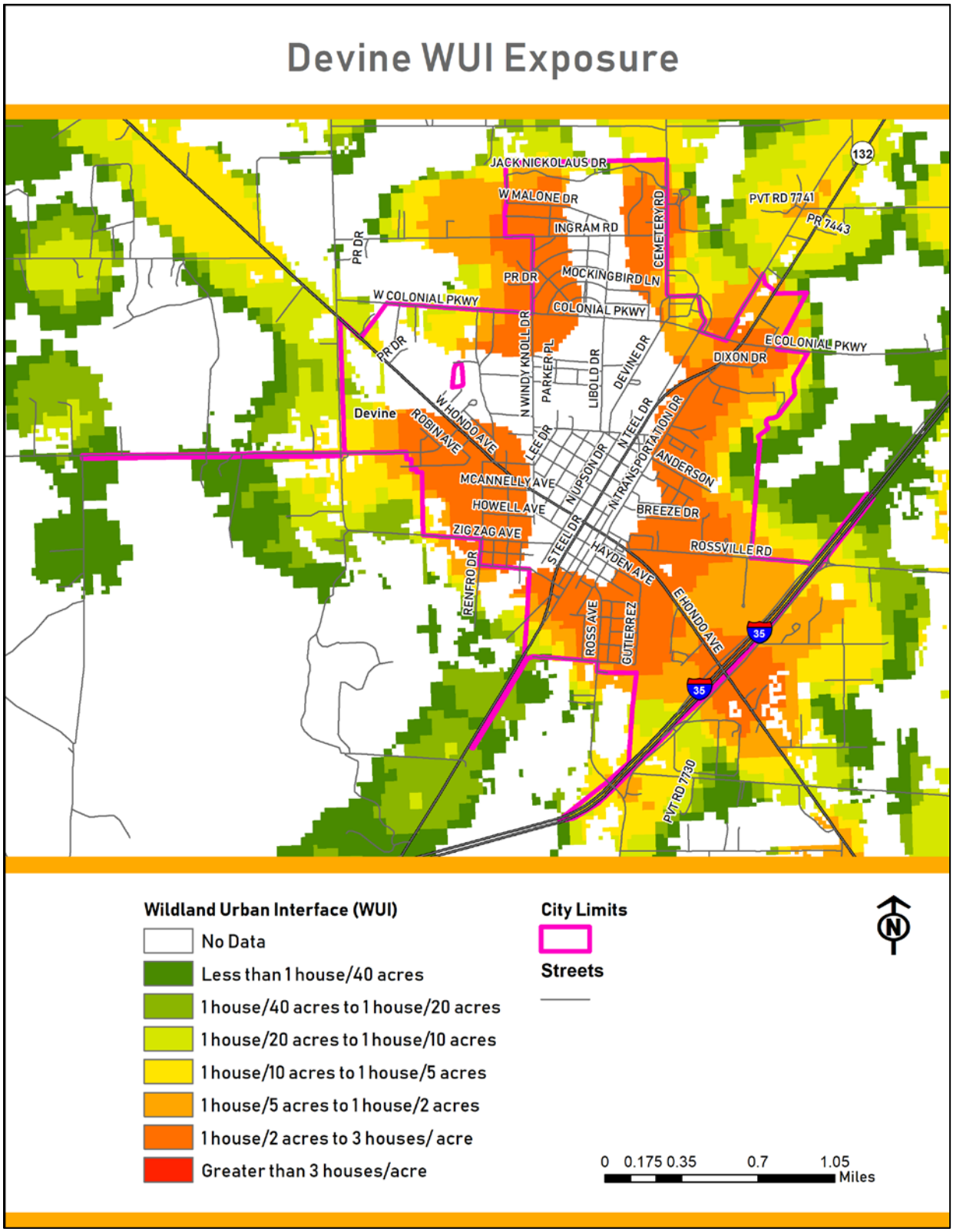


Figure 12: City of Devine Wildland Urban Interface

IV. City of Hondo Location

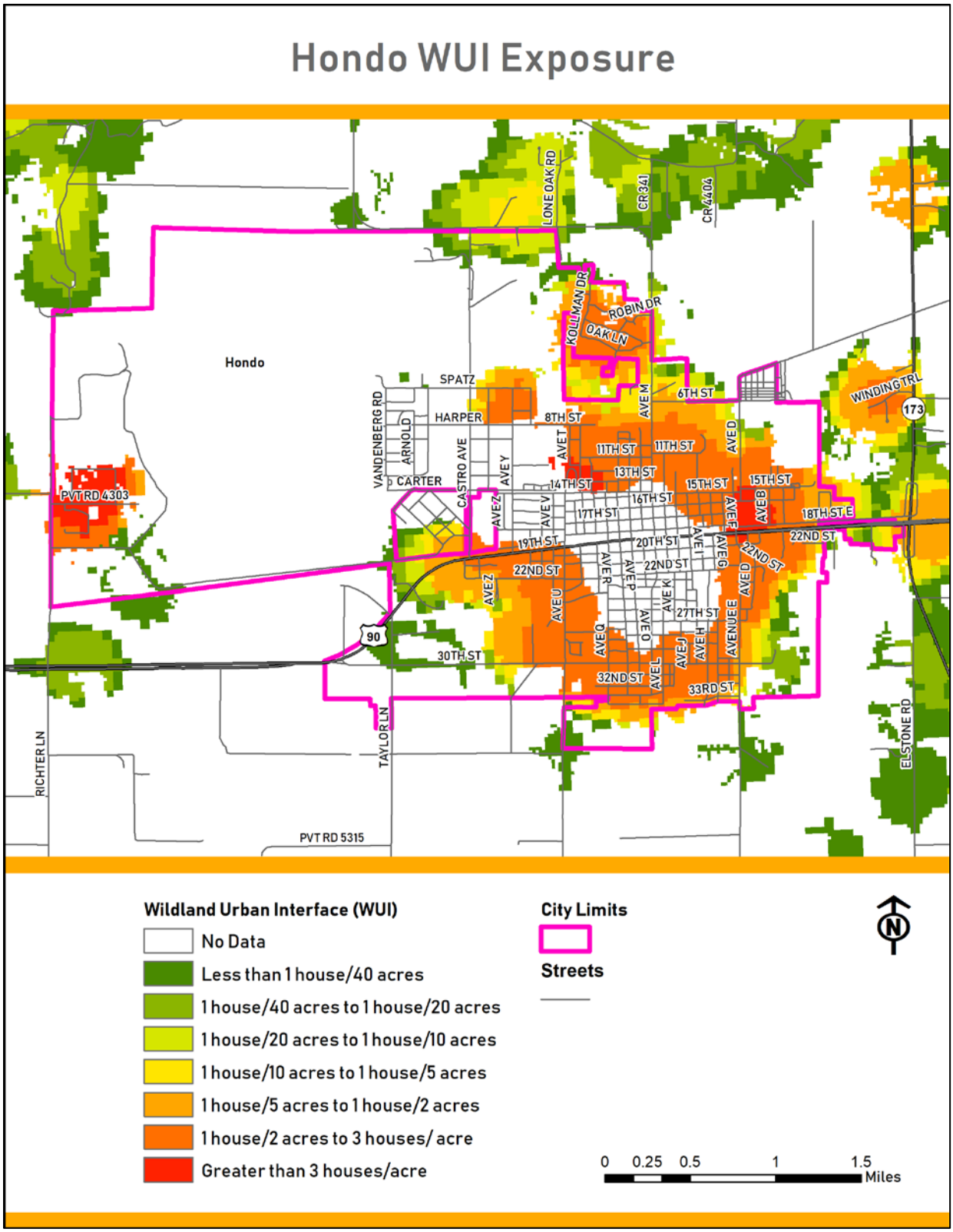


Figure 13: City of Hondo Wildland Urban Interface

V. City of La Coste Location

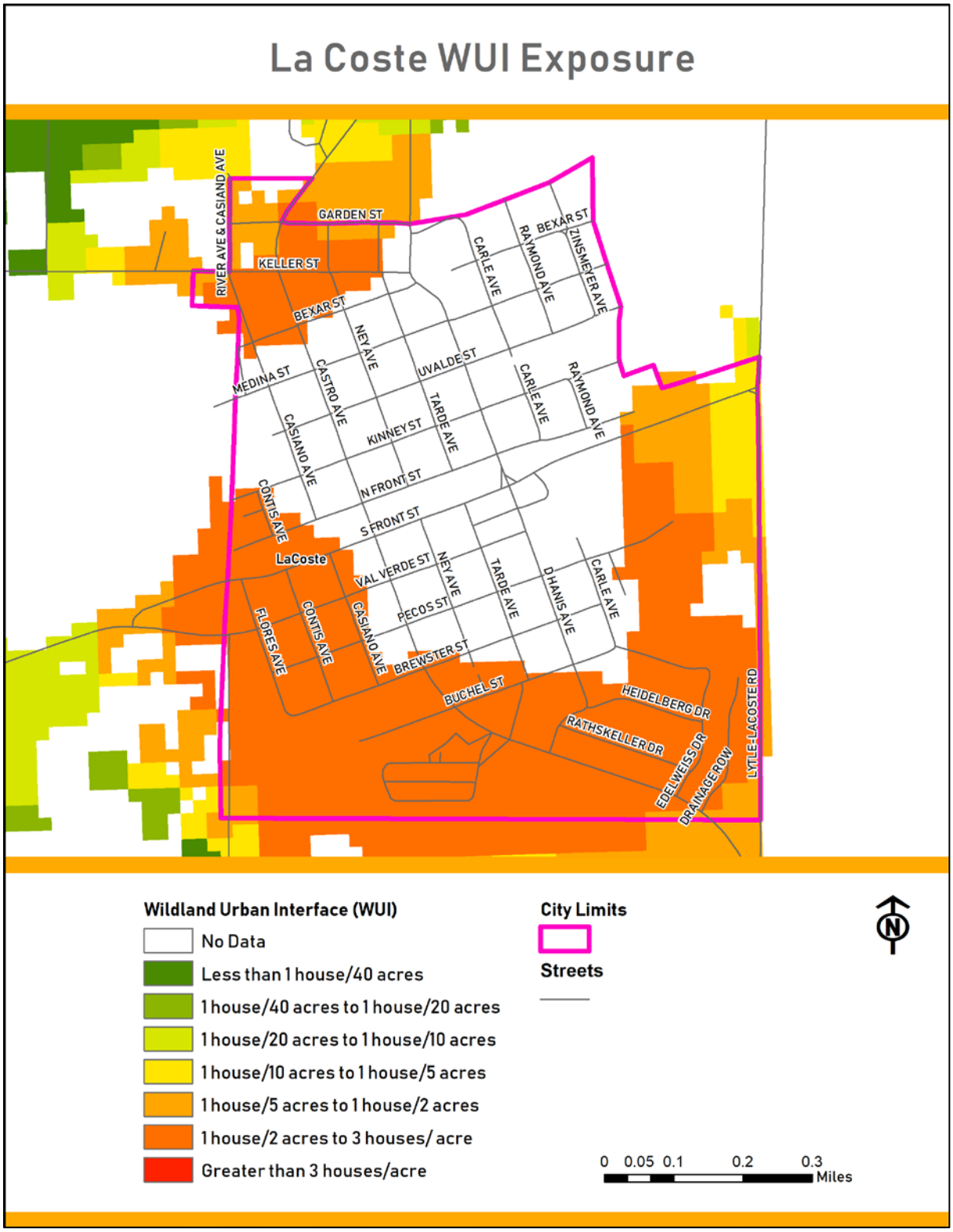


Figure 14: City of La Coste Wildland Urban Interface

VI. City of Natalia

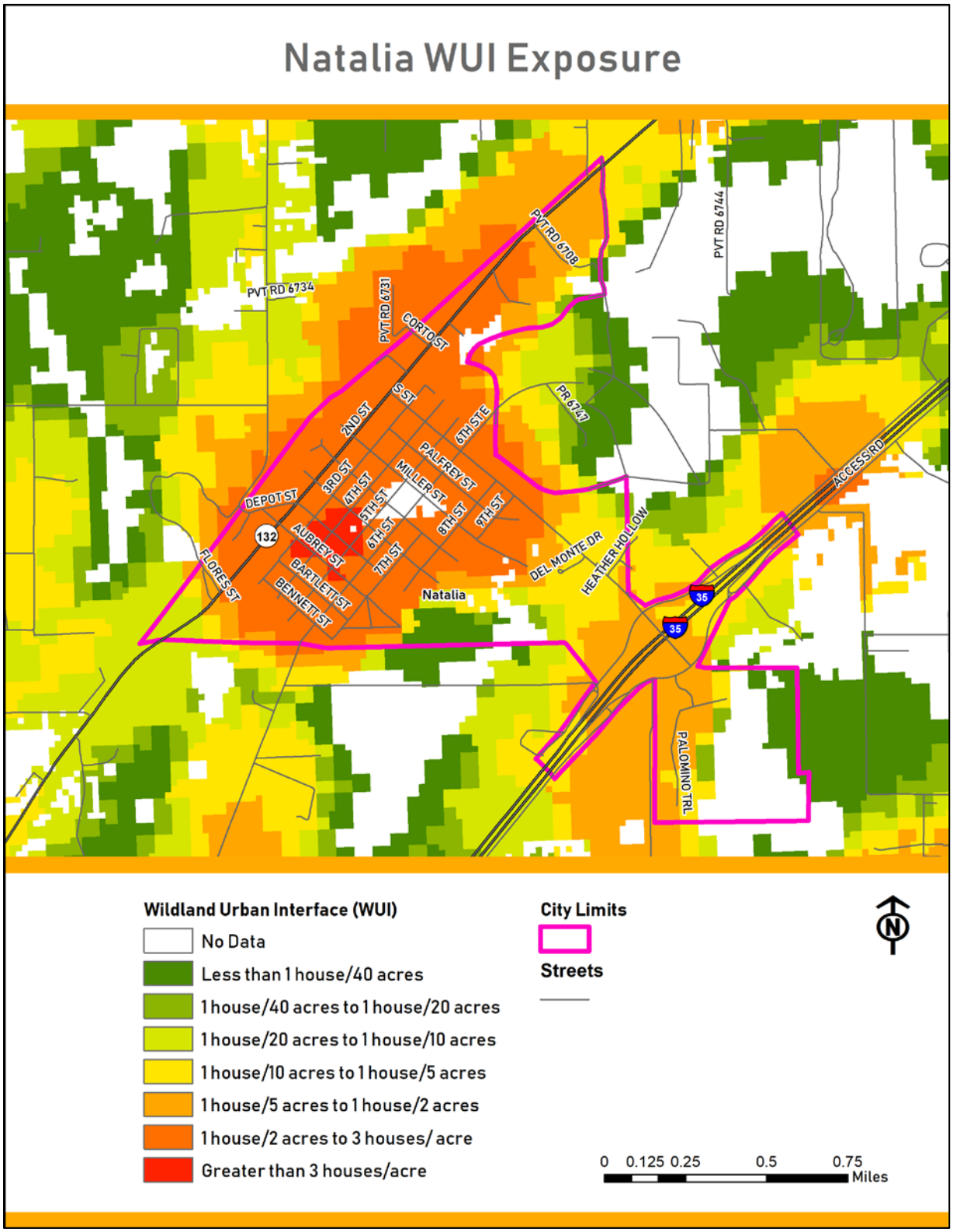


Figure 15: City of Natalia Wildland Urban Interface

B) Impact

Impacts from a wildfire in Medina County and the participating jurisdictions may include but are not limited to: crop damage or destruction, damaged or destroyed agricultural, residential, commercial, 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 Section 3 of Chapter 3 above, Medina 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 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[16]. 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.

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

B) Critical Facilities

There are 88 critical facilities located throughout the County and participating jurisdictions. Of those 88 critical facilities, 33 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.

Table 36: Critical Facilities Vulnerable to Wildfire and Potential Impacts

Medina County	**Potential Wildfire Impacts**				
	Destruction	Partial Destruction	Heat Damage	Smoke Damage	Water Damage
Castroville City Hall	X	X	X	X	X
Castroville Police Department	X	X	X	X	X
City of Devine Water Well (Edwards #2)	X	X	X	X	X
City of Devine Water Well (LC Martin)	X	X	X	X	X
Community EMS Inc	X	X	X	X	X
Devine EMS	X	X	X	X	X
Devine Middle School	X	X	X	X	X
Devine Municipal Airport	X	X	X	X	X
Devine Waste Water Treatment Plant	X	X	X	X	X
D'Hanis School	X	X	X	X	X
D'Hanis VFD	X	X	X	X	X
La Coste Municipal Waste-Water Treatment Plant	X	X	X	X	X
La Coste Municipal Well #1	X	X	X	X	X
La Coste Municipal Well #2	X	X	X	X	X
La Coste VFD	X	X	X	X	X
Lytle High School	X	X	X	X	X
Medina County Annex	X	X	X	X	X
Medina County Constable - Precinct 2	X	X	X	X	X
Medina County EMS ESD #4	X	X	X	X	X
Medina Regional Hospital	X	X	X	X	X

Medina Valley Middle School	X	X	X	X	X
Meyer Elementary	X	X	X	X	X
Mico VFD - Base Station	X	X	X	X	X
Natalia City Hall	X	X	X	X	X
Natalia Early Childhood Center	X	X	X	X	X
Natalia Elementary	X	X	X	X	X
Natalia High School	X	X	X	X	X
Natalia Junior High	X	X	X	X	X
Natalia Police Department	X	X	X	X	X
Natalia Veteran's Memorial Library	X	X	X	X	X
Natalia VFD	X	X	X	X	X
Newell E Woolls Intermediate	X	X	X	X	X
Public Safety Radio Tower - Medina - D'Hanis - frq - N/A	X	X	X	X	X
Public Safety Radio Tower - Medina - New Dunlay - frq - N/A	X	X	X	X	X
South Texas Rural Health Services, Inc Hondo Medical	X	X	X	X	X
Yancey VFD	X	X	X	X	X

C) Vulnerable Parcels

Table 37: Medina County Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
Medina County	**26,439**	**$4,178,228,300**

Table 38: City of Castroville Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
Castroville	1,231	$214,113,700

Table 39: City of Devine Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
Devine	1,210	$128,074,550

Table 40: City of Hondo Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
Hondo	1,990	$199,835,330

Table 41: City of La Coste Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
La Coste	423	$26,535,830

Table 42: City of Natalia Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
Natalia	**1,396**	**$59,833,190**

7. 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 the National Climatic Data Center, there were 34 tornados in Medina County between 1958 – 2015. All but seven preceded the 2007 switch to the EF scale. The location of each tornado wasn't recorded for most events. No tornados have been recorded in any participating jurisdiction since 2015.

Table 43: Medina County Tornado History

Location	Date Range	Tornado Events	F / EF Magnitude Range	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Medina County	5/2/1958 - 4/7/2002	22	F0 - F3	3	9	$8,013,199	$4,157,636

Table 44: City of Castroville Tornado History

Location	Date Range	Tornado Events	F / EF Magnitude Range	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Castroville	8/11/2003	1	F1	0	0	$4,116	$0

Table 45: City of Devine Tornado History

Location	Date Range	Tornado Events	F / EF Magnitude Range	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Devine	8/11/2003	1	F1	0	0	$4,116	$0

Table 46: City of Hondo Tornado History

Location	Date Range	Tornado Events	F / EF Magnitude Range	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018

Hondo	10/12/2001 - 10/30/2015	5	F2 EF0	0	25	$28,722,516	$71,142

Table 47: City of La Coste Tornado History

Location	Date Range	Tornado Events	F / EF Magnitude Range	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
La Coste	5/19/2000	1	F0	0	0	$14,634	$0

Table 48: City of Natalia Tornado History

Location	Date Range	Tornado Events	F / EF Magnitude Range	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Natalia	2/25/1998 - 3/19/2012	3	F0-F1 EF1	0	0	$0	$147,198

2) Likelihood of Future Events

Based on the frequency of previous tornados in Medina 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

Before 2007, the Fujita Scale was used for rating tornado strength. The Fujita Scale is based on damage intensity instead of wind speed, with estimated wind speed ranges based on the extent of observed damage.

Table 49: Fujita Scale

Fujita Scale			
Enhanced Fujita Category	Wind Speed (MPH)	Character	Potential Damage
Zero (F0)	40-72	Weak	Light Damage. Some damage to chimneys; branches broken off trees, shallow-rooted trees uprooted, sign boards damaged.
One (F1)	73-112	Weak	Moderate damage. Roof surfaces peeled off; mobile homes pushed foundations or overturned; moving autos pushed off road.
Two (F2)	113-157	Strong	Considerable damage. Roofs torn from frame houses; mobile homes demolished; boxcars pushed over; large

			trees snapped or uprooted; light objects become projectiles.
Three (F3)	158-206	Strong	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.
Four (F4)	207-260	Violent	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
Five (F5)	260-318	Violent	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.

Adopted after 2007, 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 considers how most structures are designed, and is thought to be an accurate representation of the surface wind speeds in the most violent tornados.

Table 50: Enhanced Fujita Scale[17]

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.

[17] Texas State Hazard Mitigation Plan, 2013 Update.

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, five EF0 tornados, one EF1 tornado, and one EF2 tornado have been recorded. In terms of property damages inflicted, the worst reported tornado in Medina County and the participating jurisdictions caused the $2018 equivalent of $4,157,636[18] in property damages after adjusting for inflation. There was no magnitude data for that tornado. That same tornado caused the same amount of crop damage in $2018 dollars. Previous tornados have injured up to 34 people and killed three people.

Future tornados may meet previous worst-case F3 tornados, which would be considered either an EF3 to EF4 on the current scale, in terms of total damage dollars inflicted and the number residents injured or killed.

4) Location and Impact

A) Location

Tornados are not constrained by any distinct geographic boundary. Tornados can occur across all participating jurisdictions, and 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

Tornadoes 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.

[18] Estimated property damages in 1961 were $3,787,879.

A) Population

As described in Section 3 of Chapter 3 above, Medina 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 and Infrastructure

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. Given tornados' 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 tornado if that damage affects the facility's ability to reopen and resume normal business right away.

Table 51: Critical Facilities Vulnerable to Tornados and Potential Impacts

Critical Facilities	Potential Tornado Impacts									
	Loss of Power	Flying Debris	Uprooted Trees	Flooding	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
Castroville City Hall	x	x	x	x	x	x	x	x	x	x
Castroville Elementary	x	x		x	x	x	x	x	x	x
Castroville Municipal Airport	x	x		x	x			x	x	x
Castroville Police Department	x	x	x	x	x	x	x	x	x	x
Castroville Public Library	x	x	x	x	x		x	x	x	x
Castroville VFD	x	x	x	x	x			x	x	x
City of Devine Water Well (Bain)	x	x	x		x	x		x	x	x
City of Devine Water Well (Edwards #1)	x	x	x		x	x		x	x	x
City of Devine Water Well (Edwards #2)	x	x	x		x	x		x	x	x
City of Devine Water Well (Harrison)	x	x	x		x	x		x	x	x
City of Devine Water Well (LC Martin)	x	x	x		x	x		x	x	x
Community EMS Inc	x	x	x	x	x	x	x	x	x	x
Dancing Bear Ranch Community Center	x	x	x	x	x		x	x	x	x
Devine City Emergency Operations Center	x	x	x	x	x			x	x	x
Devine City Offices	x	x	x	x	x			x	x	x
Devine City Water Tower	x	x	x			x		x	x	x
Devine Community Center	x	x	x	x	x		x	x	x	x
Devine Daep School	x	x	x	x	x		x	x	x	x
Devine EMS	x	x		x	x			x	x	x
Devine Football Field Ground Storage		x	x			x		x	x	x
Devine High School	x	x		x	x	x	x	x	x	x
Devine Intermediate School	x	x	x	x	x	x	x	x	x	x
Devine Middle School	x	x		x	x		x	x	x	x
Devine Municipal Airport	x	x		x	x			x	x	x
Devine Police Department	x	x	x	x	x			x	x	x

Devine VFD	x	x		x	x			x	x	x
Devine Waste Water Treatment Plant	x	x	x	x	x	x	x	x	x	x
Devine Water Tower		x	x			x		x	x	x
D'Hanis School	x	x		x	x		x	x	x	x
D'Hanis VFD	x	x		x	x	x	x	x	x	x
Driscoll Public Library	x	x	x	x	x		x	x	x	x
Hondo City Hall	x	x	x	x	x	x	x	x	x	x
Hondo High School	x	x	x	x	x		x	x	x	x
Hondo Municipal Airport	x	x		x	x			x	x	x
Hondo Police Department	x	x	x	x	x		x	x	x	x
Hondo Public Library	x	x	x	x	x		x	x	x	x
Hondo VFD Station 1	x	x	x	x	x			x	x	x
Hondo VFD Station 2	x	x		x	x			x	x	x
John J Ciavarra Elementary	x	x	x	x	x	x	x	x	x	x
La Coste City Hall	x	x	x	x	x	x	x	x	x	x
La Coste Elementary	x	x		x	x			x	x	x
La Coste Helicopter Landing Pad		x	x	x						
La Coste Municipal Waste-Water Treatment Plant	x	x	x	x	x	x	x	x	x	x
La Coste Municipal Well #1		x	x					x	x	x
La Coste Municipal Well #2	x	x	x					x	x	x
La Coste Police Department	x	x	x	x	x			x	x	x
La Coste Records & Vehicle Storage	x	x	x	x		x	x	x	x	x
La Coste VFD	x	x	x	x	x			x	x	x
Lytle High School	x	x		x	x		x	x	x	x
McDowell Middle School	x	x	x	x	x	x	x	x	x	x
Medina County Annex	x	x		x	x			x	x	x
Medina County Constable Pct 1	x	x	x	x	x	x	x	x	x	x
Medina County Constable Pct 2	x	x	x	x	x	x	x	x	x	x
Medina County Constable Pct 3	x	x		x	x			x	x	x
Medina County Constable Pct 4	x	x	x	x	x	x	x	x	x	x
Medina County Courthouse	x	x	x	x	x	x	x	x	x	x

Medina County Emergency Operations Center	x	x		x	x			x	x	x
Medina County EMS ESD #4	x	x		x	x			x	x	x
Medina County Jail	x	x		x	x			x	x	x
Medina County Sheriff's Office	x	x		x	x			x	x	x
Medina Lake VFD Station 2	x	x	x	x	x			x	x	x
Medina Regional Hospital	x	x	x	x	x		x	x	x	x
Medina Valley High School	x	x	x	x	x		x	x	x	x
Medina Valley Middle School	x	x	x	x	x	x	x	x	x	x
Meyer Elementary	x	x	x	x	x	x	x	x	x	x
Mico VFD - Base Station	x	x	x	x	x			x	x	x
Natalia City Hall	x	x	x	x	x	x	x	x	x	x
Natalia Early Childhood Center	x	x	x	x	x	x	x	x	x	x
Natalia Elementary	x	x	x	x	x		x	x	x	x
Natalia High School	x	x		x	x			x	x	x
Natalia Junior High	x	x	x	x	x		x	x	x	x
Natalia Police Department	x	x		x	x	x	x	x	x	x
Natalia Veteran's Memorial Library	x	x	x	x	x	x		x	x	x
Natalia VFD	x	x	x	x	x	x		x	x	x
Newell E Woolls Intermediate	x	x	x	x	x			x	x	x
Potranco Elementary	x	x	x	x	x		x	x	x	x
Public Safety Radio Tower - Castroville	x	x	x	x	x			x	x	x
Public Safety Radio Tower - Devine Police	x	x	x			x		x	x	x
Public Safety Radio Tower - D'Hanis	x	x		x	x			x	x	x
Public Safety Radio Tower - Hondo	x	x	x	x	x			x	x	x
Public Safety Radio Tower - Natalia	x	x	x	x	x			x	x	x
Public Safety Radio Tower - New Dunlay	x	x	x	x	x			x	x	x
South Texas Rural Health Services, Inc Devine Medical	x	x		x	x	x	x	x	x	x
South Texas Rural Health Services, Inc Hondo Medical	x	x		x	x	x	x	x	x	x
St. Louis Braden Keller Community Center	x	x	x	x	x			x	x	x
St. Louis Catholic Elementary School - Castroville	x	x	x	x	x	x	x	x	x	x
Yancey VFD	x	x	x	x	x			x	x	x

C) Vulnerable Parcels

Table 52: Parcels Vulnerable to Tornados

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Medina County	38,424	**$6,125,177,720**
City of Castroville	1,561	**$274,273,930**
City of Devine	2,068	**$196,879,980**
City of Hondo	3,461	**$366,485,590**
City of La Coste	1,057	**$75,514,700**
City of Natalia	1,396	**$59,833,190**

8. 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. A secondary hazard to drought is wildfire because dying vegetation serves as a prime ignition source. Therefore, a heat wave combined with a drought is a very dangerous situation.

Table 53: 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.

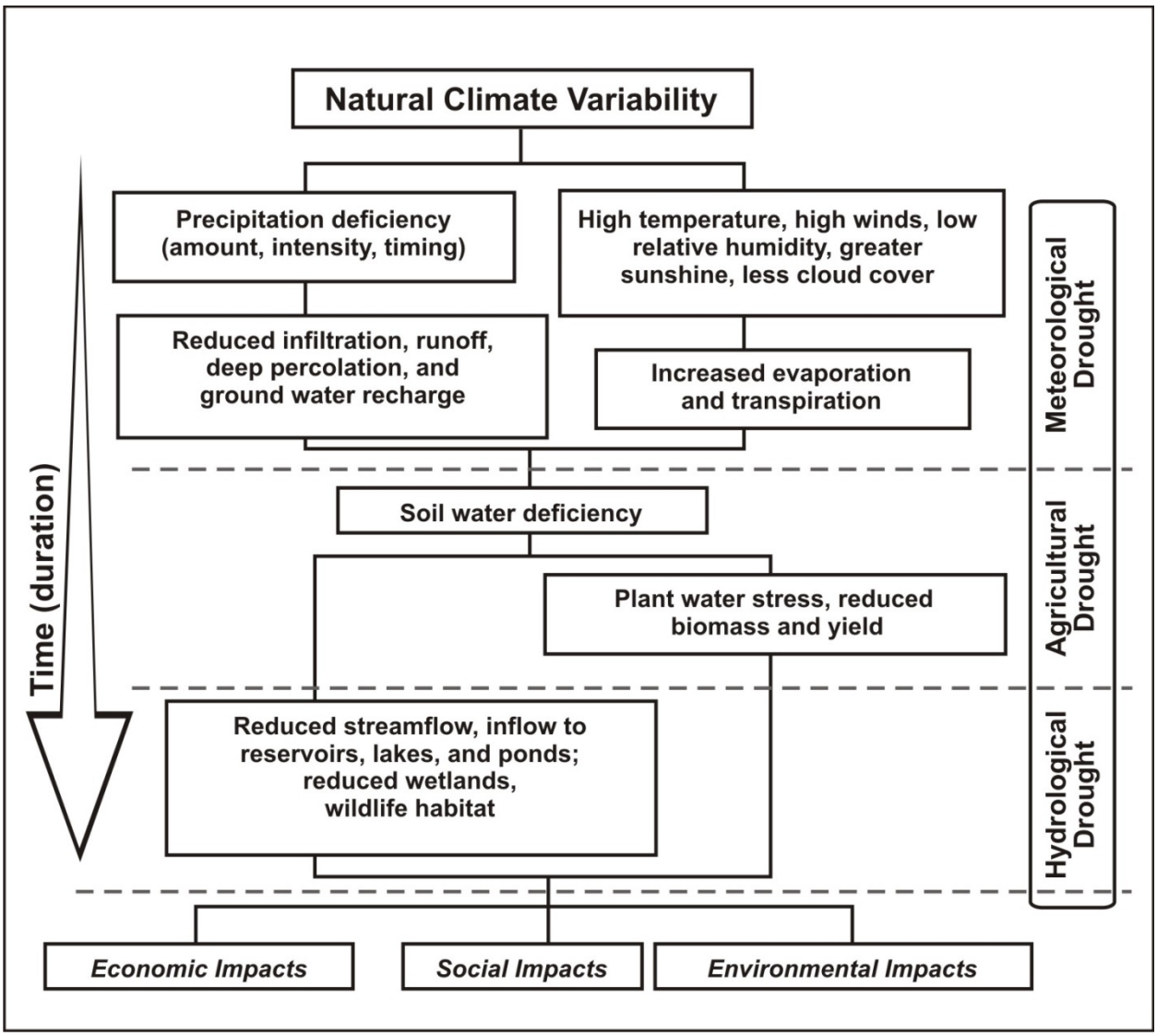


Figure 16: Sequence of Drought Occurrence and Impacts for Commonly Accepted Drought Types[19]

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

1) Drought History

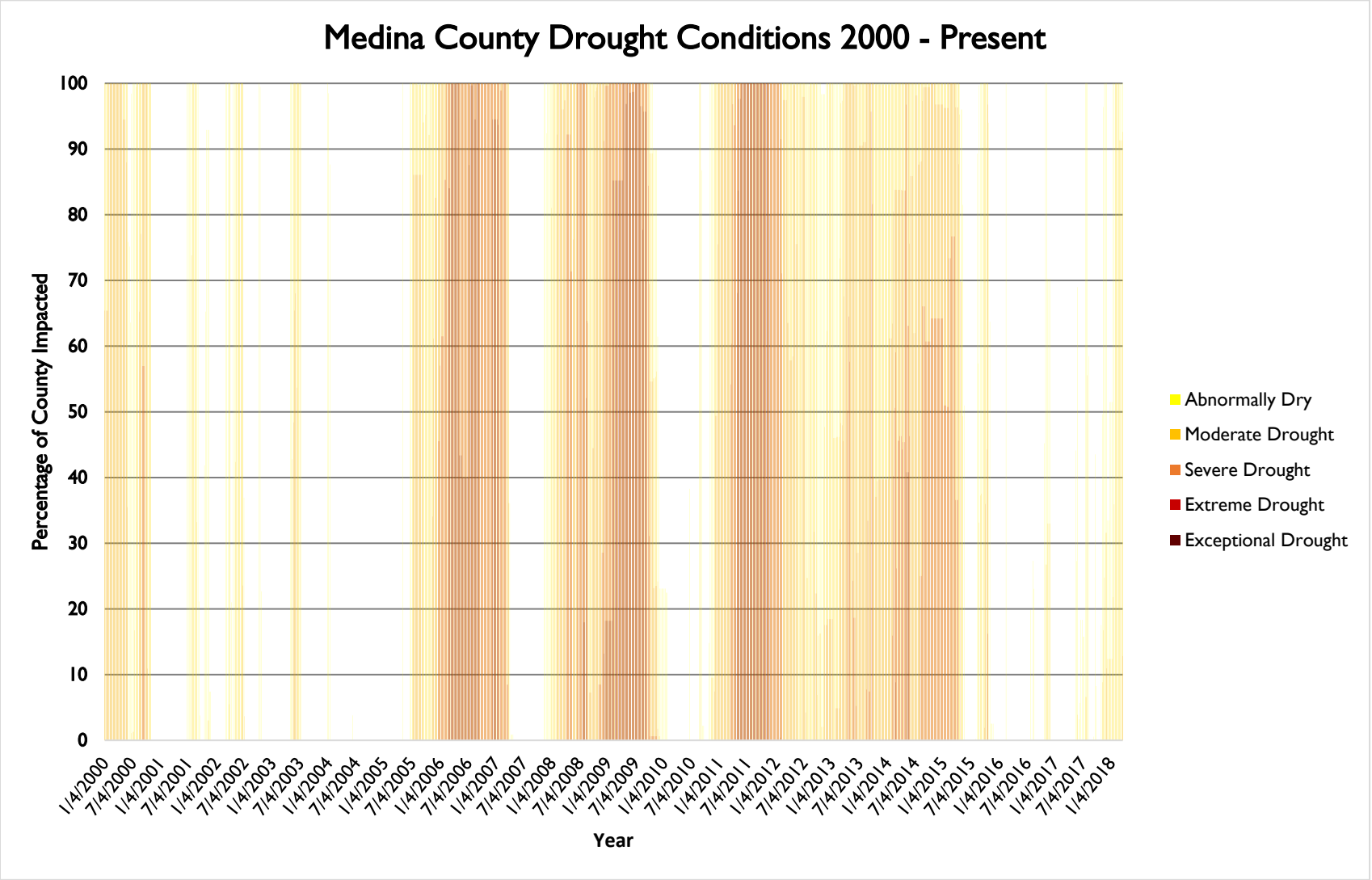


Figure 17: Medina County Drought History

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 individual cities is available, it's possible to use the data in Figure 17 to infer when the participating jurisdictions previously experienced drought conditions due to the fact that the conditions impacted 100% of the county. According to the data, Medina County and the participating jurisdictions have regularly experienced drought conditions since 2000, especially between 2005 – 2007, 2008 – 2009, and 2011 – 2015.

According to the Medina County 2013 CHAMPS Report, drought conditions on October 1, 1996 caused $1,067,126 in property damages and $2,134,252 in crop damages adjusted to $2018. The report also identifies $2018 adjusted property and crop damages of over $10.7 million and $21.6 million respectively between May 1996 and May 1997.

There are no recorded injuries or deaths due to drought in Medina County or the participating jurisdictions.

2) Likelihood of Future Events

Based on historical drought in Texas and Medina County, it is likely that a future drought will affect Medina County and the participating jurisdictions, meaning an event affecting any or all of the participating jurisdictions is probable in the next three years, and a major drought every 20 years.

3) Extent

Since 2000, Medina County has regularly experienced county-wide droughts classified as periods ranging from abnormal dryness to exceptional drought. At multiple times, the entire County, including all participating jurisdictions, 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 54: 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 55: Palmer Drought Category Descriptions[20]

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

Medina County recorded its worst drought in recent history between January 2011 and July 2015. Between October 2010 and March 2015, the percentage of the County considered

[20] www.droughtmonitor.unl.edu

abnormally dry or worse never dropped below 95%. From July 2011 until January 2012, 100% of the County was in exceptional drought.

According to the Medina County 2013 CHAMPS Report, since 1977, the worst droughts in Medina County and the participating jurisdictions have inflicted up to $10,745,344 in property damages and $21,987,757 in crop damages.

Future drought events may meet previous worst-case D4 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 all participating jurisdictions.

B) Impact

General impacts may include water shortage, risk to public safety due to wildfire risk increases, respiratory impacts to the public due to affected air quality, and degradation of fish and wildlife habitat.

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

The City of Castroville has a Drought Contingency Plan. The plan describes six stages of water restrictions ranging from voluntary conservation to a prohibition of activities. Each stage is triggered by changes in the level of water demand relative to the safe operating capacity of the City's water supply facilities or the occurrence of a water supply emergency.

The City of Natalia has a Drought Management Plan. The plan describes five stages of water restrictions ranging from voluntary conservation to a prohibition of activities. Each stage is triggered by changes in the level of water demand relative to the safe operating capacity of the City's water supply facilities or the occurrence of a water supply emergency.

5) Vulnerability

Because drought has the potential to impact every jurisdiction equally, all improved property and the entire population is exposed to this hazard. Foundations of all buildings are vulnerable; however, older structures or those built under less stringent foundation code requirements are most vulnerable. Critical infrastructure like water and wastewater lines, roads, and railroads are also vulnerable. 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.

A) Population

As described in Section 3 of Chapter 3 above, Medina 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 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.

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 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 hospitals 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 56: Critical Facilities Vulnerable to Drought and Potential Impacts

Medina County	Potential Drought Impacts	
	Structural Damage	Economic Damages
Castroville City Hall	x	
Castroville Elementary	x	
Castroville Municipal Airport	x	
Castroville Police Department	x	
Castroville Public Library	x	
Castroville VFD	x	
City of Devine Water Well (Bain)	X	x
City of Devine Water Well (Edwards #1)	X	x
City of Devine Water Well (Edwards #2)	X	x
City of Devine Water Well (Harrison)	X	x
City of Devine Water Well (LC Martin)	x	x
Community EMS Inc	x	
Dancing Bear Ranch Community Center	x	
Devine City Emergency Operations Center	x	
Devine City Offices	x	
Devine City Water Tower	x	x
Devine Community Center	x	
Devine Daep School	x	
Devine EMS	x	
Devine Football Field Ground Storage	x	
Devine High School	x	
Devine Intermediate School	x	
Devine Middle School	x	
Devine Municipal Airport	x	
Devine Police Department	x	
Devine VFD	x	
Devine Waste Water Treatment Plant	x	x
Devine Water Tower	x	x
D'Hanis School	x	
D'Hanis VFD	x	
Driscoll Public Library	x	
Hondo City Hall	x	
Hondo High School	x	
Hondo Municipal Airport	x	

Hondo Police Department	x	
Hondo Public Library	x	
Hondo VFD Station 1	x	
Hondo VFD Station 2	x	
John J Ciavarra Elementary	x	
La Coste City Hall	x	
La Coste Elementary	x	
La Coste Helicopter Landing Pad	x	
La Coste Municipal Waste-Water Treatment Plant	x	x
La Coste Municipal Well #1	x	x
La Coste Municipal Well #2	x	x
La Coste Police Department	x	
La Coste Records & Vehicle Storage	x	
La Coste VFD	x	
Lytle High School	x	
McDowell Middle School	x	
Medina County Annex	x	
Medina County Constable Pct 1	x	
Medina County Constable Pct 2	x	
Medina County Constable Pct 3	x	
Medina County Constable Pct 4	x	
Medina County Courthouse	x	
Medina County Emergency Operations Center	x	
Medina County EMS ESD #4	x	
Medina County Jail	x	
Medina County Sheriff's Office	x	
Medina Lake VFD Station 2	x	
Medina Regional Hospital	x	
Medina Valley High School	x	
Medina Valley Middle School	x	
Meyer Elementary	x	
Mico VFD - Base Station	x	
Natalia City Hall	x	
Natalia Early Childhood Center	x	
Natalia Elementary	x	
Natalia High School	x	
Natalia Junior High	x	
Natalia Police Department	x	
Natalia Veteran's Memorial Library	x	

Natalia VFD	x	
Newell E Woolls Intermediate	x	
Potranco Elementary	x	
Public Safety Radio Tower - Castroville	x	
Public Safety Radio Tower - Devine Police	x	
Public Safety Radio Tower - D'Hanis	x	
Public Safety Radio Tower - Hondo	x	
Public Safety Radio Tower - Natalia	x	
Public Safety Radio Tower - New Dunlay	x	
South Texas Rural Health Services, Inc Devine Medical	x	
South Texas Rural Health Services, Inc Hondo Medical	x	
St. Louis Braden Keller Community Center	x	
St. Louis Catholic Elementary School - Castroville	x	
Yancey VFD	x	

C) Vulnerable Parcels and Infrastructure

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

Table 57: Parcels Vulnerable to Drought

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Medina County	38,424	**$6,125,177,720**
City of Castroville	1,561	**$274,273,930**
City of Devine	2,068	**$196,879,980**
City of Hondo	3,461	**$366,485,590**
City of La Coste	1,057	**$75,514,700**
City of Natalia	1,396	**$59,833,190**

Agricultural Production

According to the USDA 2012 Census of Agriculture[21], the total market value of agricultural products sold, including direct sales, in Medina County was $115,519,000. Between 1995 and 2017[22], $49,493,456 in indemnities was paid to farmers in Medina County. That is roughly $2,249,702.54 per year. Although the proportion of indemnities paid to cover losses due to drought isn't identifiable, given Medina 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 individual participating jurisdictions

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

[22] https://farm.ewg.org/cropinsurance.php?fips=48325&summpage=SUMMARY

9. Riverine Erosion

Riverine erosion is the removal of a volume of sediment from a stream reach. However, in riverine areas, a stream reach can be stable and still migrate back and forth. Channel instability occurs when natural or man-induced processes lead to excessive erosion or deposition. Therefore, when a stream migrates laterally but maintains its dimensions, pattern, and profile, stability is achieved even though the river is "active" and moves across the floodplain. A reach experiencing such lateral migration is considered to be "eroding," and thus has a riverine erosion hazard area. Such stream migration due to erosion can threaten buildings and infrastructure.

Property damaged by flood inundation can sometimes be considered a total loss, but property damaged by riverine erosion is not only destroyed, the land itself may be completely washed away leaving no chance to rebuild, let alone recover any property contents.

1) Erosion History

According to the local planning team, the participating jurisdictions experience varying riverine erosion rates. During flash flooding, erosion rates may be even higher.

The planning team determined that at least one riverine erosion has occurred annually in Medina County and the jurisdictions addressing the hazard.

2) Likelihood of Future Occurrence

Given the ongoing nature of riverine erosion, a future event in the jurisdictions addressing the hazard is highly likely, meaning ongoing riverine erosion is probable in the next year.

3) Extent

Unlike the flood inundation zones identified in FEMA FIRM maps, riverine erosion hazards are not necessarily proportional to the peak flood discharge. Catastrophic losses may result from larger flood events; smaller, more frequent events; or from the cumulative effects of a series of smaller storms.

In fluvial geomorphic terms, a stream or river is described as a system, consisting of the stream itself, and the water that flows in it, and the sediment that is eroded from it, deposited in it, or transported through it; along with the watershed around the stream, from which water and sediment are conveyed to the stream. If climatic conditions and land use on the watershed stay about the same, a stream tends to reach a more or less stable state, known as dynamic equilibrium, when large and abrupt changes in the characteristics of the stream do not occur under normal conditions. If the material (sediment) and energy (from flowing water) inputs to

the stream change, however, then the system has to adjust to the changed conditions, until a new state of dynamic equilibrium is reached[23].

Riverine erosion magnitude is typically measured by tons/acre lost. According to a report[24] produced by the Texas Department of Water Resources (now Texas Water Development Board) the annual gully and streambank erosion rates in Medina County and the participating jurisdictions range from 0.00 – 1.67 tons/acre.

4) Location and Impact

A) Location

As shown in Figure 18 below, Medina County and the participating jurisdictions contain many potential sources of riverine erosion that are spread fairly evenly throughout the county. Since erosion can occur gradually over time or suddenly, even areas that are adjacent to seasonal or occasional streams may be vulnerable to the hazard. All of the participating jurisdictions have rivers or streams that are all considered equally vulnerable to the hazard.

[23] http://manualzz.com/doc/29211055/by-asfpm-riverine-erosion-hazards-working-group-february-...
[24] https://www.twdb.texas.gov/publications/reports/numbered_reports/doc/R268/R268_opt.pdf

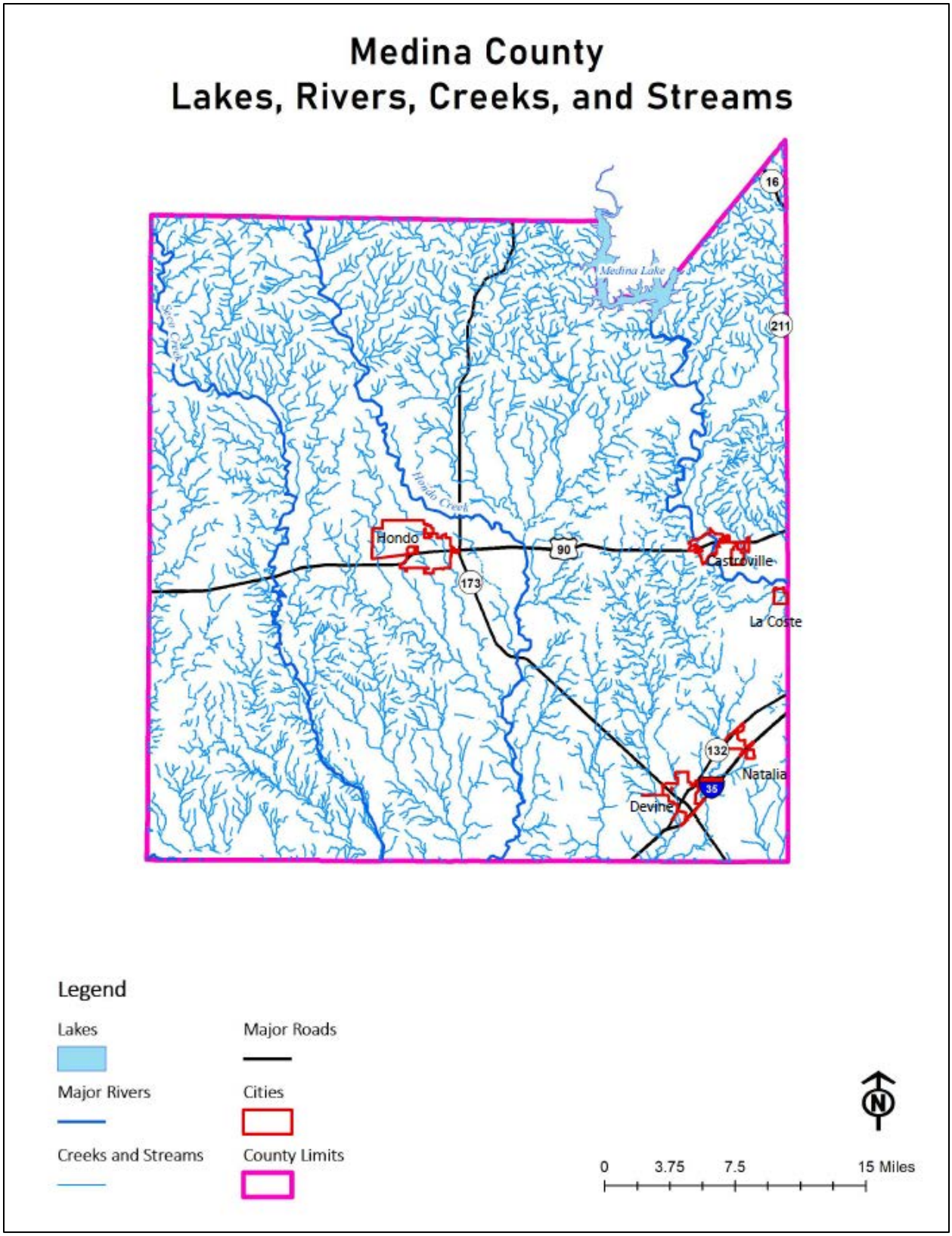


Figure 18: Potential Locations for Riverine Erosion

The planning team has also identified specific areas where a potential erosion event could cause especially significant damages, both in terms of property losses and fatalities, as well as to the local economy by limiting the movement of goods through the county. These locations are shown below.

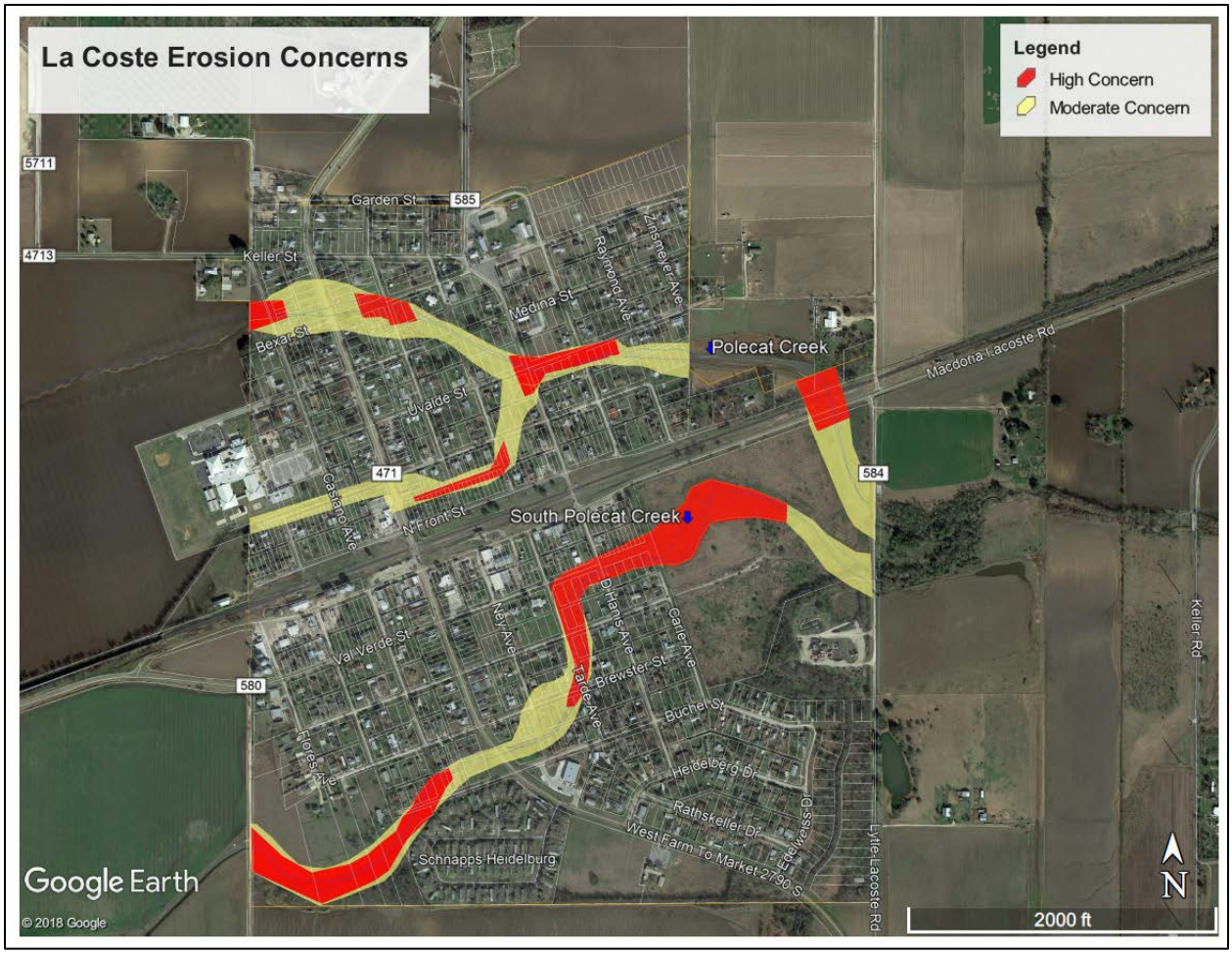


Figure 19: City of La Coste - Potential Erosion Locations of Greatest Concern

B) Impact

The impacts of erosion may include but are not limited to decreasing property values, the partial or complete loss of structures, loss of land area and the ability to rebuild damaged or destroyed structures, economic losses to agricultural operations due to land and structure loss, economic losses due to limited movement of goods through the county, damage to local infrastructure including, water and wastewater lines, roads and bridges.

5) Vulnerability

The unpredictable nature of riverine erosion means that any parcel containing a creek or stream, even if water only flows occasionally, may be vulnerable to the hazard. As shown in Figure 18 above, the majority of parcels in Medina County and the participating jurisdictions are considered vulnerable to the hazard.

The planning team identified 88 critical facilities spread across the County and participating jurisdictions. Almost all 88 are located in a known FEMA Special Flood Hazard Area (SFHA): the 500-year floodplain. Only one is located within the 100-year floodplain – the Devine Waste Water Treatment Plant. Due to their location in a FEMA SFHA, these critical facilities are considered especially vulnerable to riverine erosion:

Table 58: Medina County Critical Facilities Vulnerable to Riverine Erosion

Medina County
Castroville City Hall
Castroville Elementary
Castroville Municipal Airport
Castroville Police Department
Castroville Public Library
Castroville VFD
City of Devine Water Well (Bain)
City of Devine Water Well (Edwards #1)
City of Devine Water Well (Edwards #2)
City of Devine Water Well (Harrison)
City of Devine Water Well (LC Martin)
Community EMS Inc
Dancing Bear Ranch Community Center
Devine City Emergency Operations Center
Devine City Offices
Devine City Water Tower
Devine Community Center
Devine Daep School
Devine EMS
Devine Football Field Ground Storage
Devine High School
Devine Intermediate School
Devine Middle School
Devine Municipal Airport
Devine Police Department
Devine VFD
Devine Waste Water Treatment Plant
Devine Water Tower
D'Hanis School

D'Hanis VFD
Driscoll Public Library
Hondo City Hall
Hondo High School
Hondo Municipal Airport
Hondo Police Department
Hondo Public Library
Hondo VFD Station 1
Hondo VFD Station 2
John J Ciavarra Elementary
La Coste City Hall
La Coste Elementary
La Coste Helicopter Landing Pad
La Coste Municipal Waste-Water Treatment Plant
La Coste Municipal Well #1
La Coste Municipal Well #2
La Coste Police Department
La Coste Records & Vehicle Storage
La Coste VFD
Lytle High School
McDowell Middle School
Medina County Annex
Medina County Constable Pct 1
Medina County Constable Pct 2
Medina County Constable Pct 3
Medina County Constable Pct 4
Medina County Courthouse
Medina County Emergency Operations Center
Medina County EMS ESD #4
Medina County Jail
Medina County Sheriff's Office
Medina Lake VFD Station 2
Medina Regional Hospital
Medina Valley High School
Medina Valley Middle School
Meyer Elementary
Mico VFD - Base Station
Natalia City Hall
Natalia Early Childhood Center
Natalia Elementary
Natalia High School
Natalia Junior High
Natalia Police Department
Natalia Veteran's Memorial Library
Natalia VFD
Newell E Woolls Intermediate

Potranco Elementary
Public Safety Radio Tower - Castroville
Public Safety Radio Tower - Devine Police
Public Safety Radio Tower - D'Hanis
Public Safety Radio Tower - Hondo
Public Safety Radio Tower - Natalia
Public Safety Radio Tower - New Dunlay
South Texas Rural Health Services, Inc Devine Medical
South Texas Rural Health Services, Inc Hondo Medical
St. Louis Braden Keller Community Center
Yancey VFD

10. Dam/Levee Failure

Dam failure is defined as a systematic failure of the dam structure resulting in the uncontrolled release of water, often resulting in floods that could exceed the 100-year flood plain boundaries. Dam failure can cause mass fatalities, mass structural damage and/or a cascading potential if a populated area is located below the dam structure.

1) Dam Failure History

According to the best information available, there is no history of dam failure in Medina County and the participating jurisdictions. They haven't previously addressed the hazard. However, there have been times in the past when Medina Lake Dam came close to potential failure.[25]

The jurisdictions have elected to address this hazard because of the possibility that dam failure may become a local issue within the current planning period.

2) Likelihood of Future Occurrence

Given the lack of a prior dam failure in the participating jurisdictions, dam failure is considered unlikely, meaning that an event is possible in the next 10 years.

3) Extent

A way to consider the hazard extent is to use the storage capacity behind the dam to estimate the ground surface that would be covered with a foot of water.

An acre-foot is 325,851 gallons and would cover one acre of land with a foot of water. A 1,000 acre-foot body of water could cover 40 acres with an average depth of 25 feet, and the volume of 1,000 acre-feet is approximately 326 million gallons of water.

Dam hazard potential is also measured by the likelihood of dam failure or negligent management to cause loss of human life. There are three levels of classification: High Hazard, Significant Hazard, and Low Hazard.

Table 59: Dam Failure Extent Classification

Hazard Potential Classification	Loss of Human Life	Dam Storage Capacity
Low	None Expected	Less than 10,000 acre-feet

[25] https://www.myplainview.com/news/article/Medina-Dam-almost-gave-way-Medina-River-still-a-8747618.php

Significant	Probable (1-6)	Between 10,000 – 100,000 acre-feet
High	Loss of Life Expected (7 or more)	100,000 acre-feet or more

There are 33 dams in Medina County and the participating jurisdictions; eight are government-owned, and 25 are privately owned.

Table 60: National Inventory of Dams in Medina County

Dam	Owner Type	Storage Capacity in Acre/Feet	Location	
			Latitude	Longitude
Parker Creek Lake Dam	Local Government	6,987	29.443	-99.2529
Chacon Dam	Local Government	2,312	29.2365	-98.8738
Medina Lake Dam	Local Government	327,250	29.5403	-98.934
Medina Diversion Lake Dam	Local Government	3,900	29.5105	-98.901
San Geronimo Creek Recharge Dam	Local Government	307	29.5348	-98.8073
Midde Verde Recharge Dam	Local Government	159	29.5031	-99.1003
Pearson Dam	Local Government	1,759	29.2807	-98.8749
Seco Creek Recharge Dam	Local Government	50	29.5168	-99.3977
Collins Lake Dam	Private	494	29.2738	-99.2426
Geo Wilson Lake No 1 Dam	Private	120	29.2048	-99.0905
Twin Lake Estates West Lake Dam	Private	165	29.218	-98.8158
Farley Clara Dam	Private	210	29.1949	-99.3497
Geo Wilson Lake No 2 Dam	Private	1,500	29.2083	-99.0988
Richardson Lake Dam	Private	340	29.2035	-99.306
Mumme Lake Dam	Private	300	29.2886	-99.2264
East Elm Trib Dam 1	Private	170	29.2236	-99.4041
TX No Name No 5 Dam	Private	146	29.3614	-99.287
Primos Lake Dam	Private	120	29.3333	-99.3028
Gabe Lake Dam	Private	150	29.3905	-98.9222
Leinweber Lake Dam	Private	220	29.3167	-99.0026

Wilson Lake Dam	Private	320	29.0895	-99.1983
Twin Lake Estates East Lake Dam	Private	260	29.2199	-98.8102
Frio Trib Dam 1	Private	115	29.171	-99.3957
McWilliams & Wimberley Dev Corp Dam	Private	592	29.27	-99.0483
Shuchart Lake Dam	Private	66	29.5205	-98.8447
Bader Lake Dam	Private	64	29.3393	-99.0137
New Langford Lake Dam	Private	68	29.6098	-99.0315
Goeth Lake Dam	Private	480	29.2579	-98.8951
Jones Lake Dam	Private	140	29.3801	-98.9972
Kemmy Dam	Private	90	29.6238	-99.2102
Peacock Lake Dam	Private	100	29.2572	-99.2507
Morris Dam	Private	131	29.6086	-99.0982
Faseler Lake Dam	Private	107	29.1636	-99.2165

It is each dam owner's responsibility to ensure that their dam is in compliance with the Texas Commission on Environmental Quality's [26](TCEQ) regulations regarding emergency action plans. Additionally, each dam owner required to have an emergency action plan must know and be prepared to take the actions outlined in their emergency action plan, should their dam begin to fail.

Dam owners are not required to share or publicize their emergency action plans with anyone other than TCEQ. Medina County and the participating jurisdictions are not aware of an emergency action plan for any dam other than Medina Lake Dam.

The dams in Medina County pose an unknown threat. Given its storage capacity of 327,250 acre/ft, a breach or total failure at Medina Lake Dam would likely be catastrophic due to the volume of water that could be released and the proximity of downstream development. However, Medina County and the participating jurisdictions must claim a data deficiency at this time because they don't have access to data showing expected inundation areas or peak discharge rates for any of the dams in the County. An action will be added to Chapter 19 to remedy this data deficiency. Vulnerability for the jurisdictions is unknown at this time.

[26] https://www.tceq.texas.gov/compliance/investigation/damsafetyprog.html
For the most up-to-date information, contact TCEQ directly.

4) Location and Impact

A) Dam Location

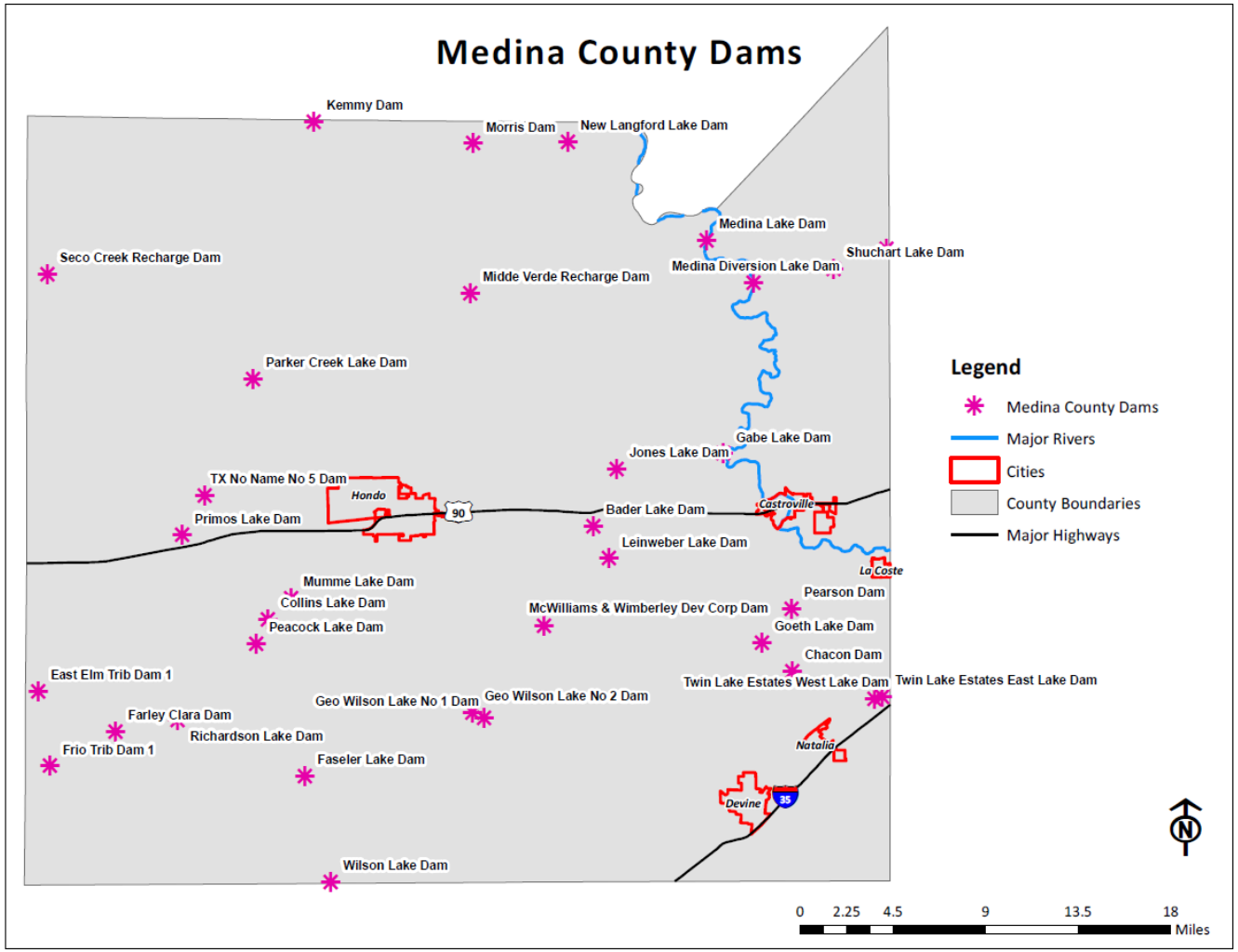


Figure 20: Medina County Dam Locations

Medina Lake Dam

According to the expired Alamo Area Council of Governments Regional Mitigation Action Plan, the Downstream/Lower Elevation Area of Potential 1 Foot Inundation (in acres covered) for Medina Lake Dam in the event of a breach could be 327,250 acres. Figure 21 shows the potential inundation area if a breach at the Choke Canyon Dam were to occur. It is likely that the inundation area would be equal to or greater than the 100-year flood zone.

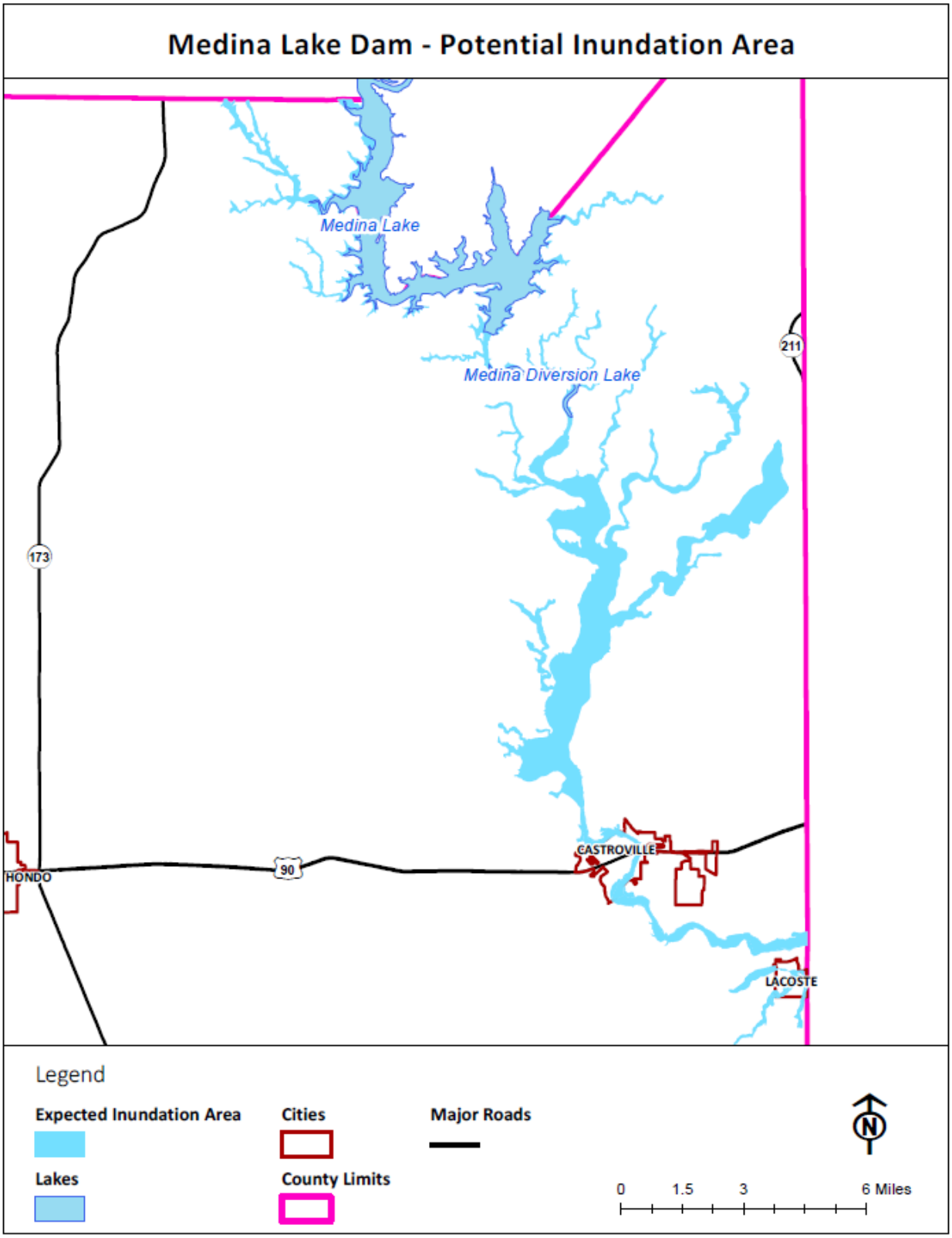


Figure 21: Medina Lake Dam Potential Inundation Area

B) Impact

Structures at risk of dam failure may be flooded, damaged by floodborne contaminants, damaged by debris flow, or even completely washed away. If Medina Lake Dam were to fail, in addition to the impacts listed above, injury and loss of life would be expected.

Additionally, the remainder of the County may experience indirect impacts from a dam failure including but not limited to: increased demand for public assistance, the need to establish temporary shelters, interruptions to the local economy that relies on lake access and associated tourism, interruptions to the local economy if major thoroughfares, including rail lines, are blocked, damaged, or destroyed, as well as negative health impacts due to increased stress brought on by traumatic events.

Both the City of Castroville and the City of LaCoste are downstream of Medina Lake Dam, and a dam failure would likely be catastrophic to these two jurisdictions in terms of damages, injuries, and even deaths.

11. Earthquake

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

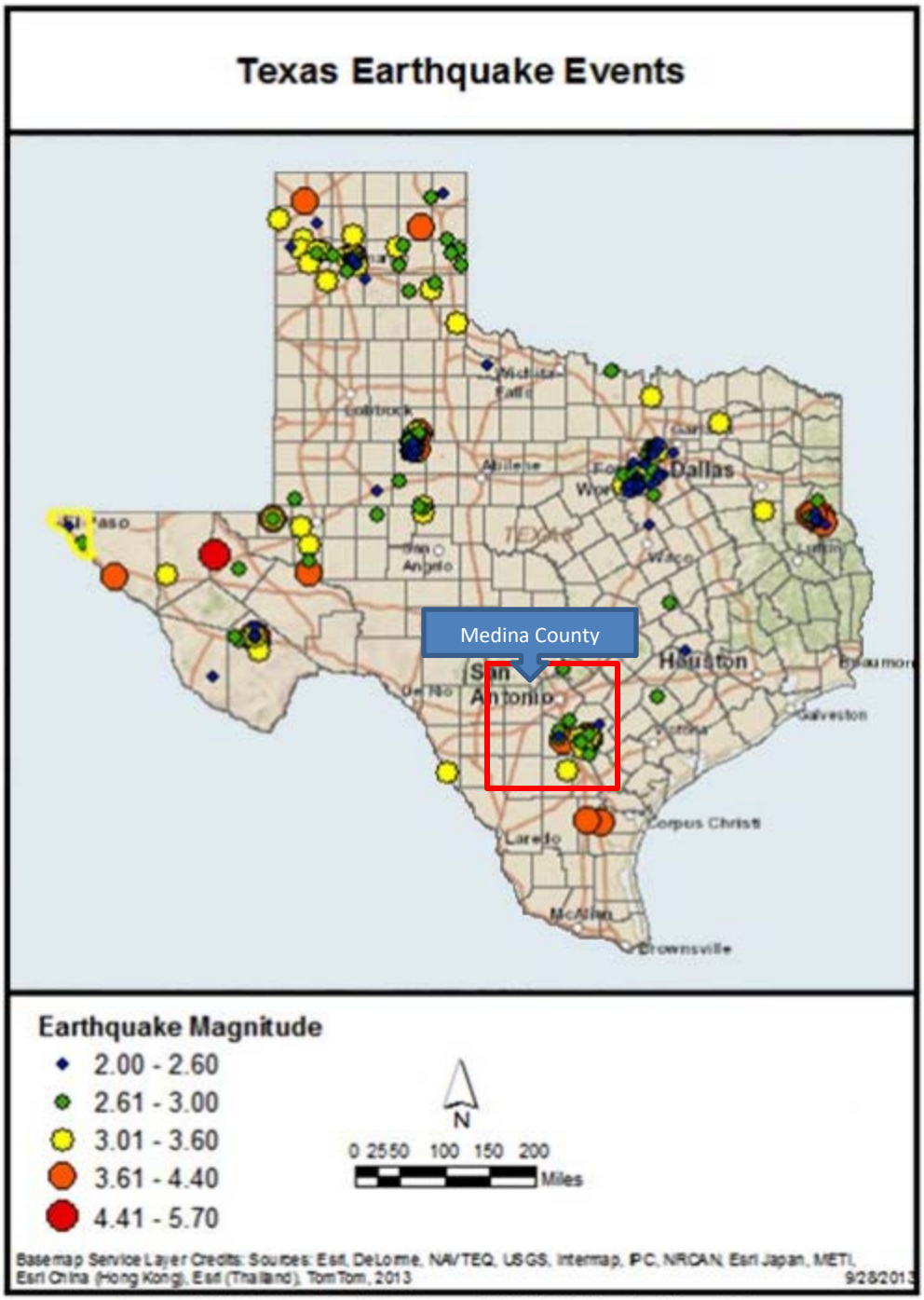
A quake with magnitude 3 may do no more than startle people and rattle dishes within a one-square mile region. However, a magnitude 7 would be felt by people over the entire State of Texas, and could do significant damage to buildings, bridges, and dams over a considerable region.

1) Earthquake History

According to the best information available, there has never been an earthquake in Medina County.

However, according to the map from the State of Texas Hazard Mitigation Plan in Figure 22, there have been earthquakes recorded just southeast of Medina County between 1973 to 2012. In 2018, a 3.5 magnitude earthquake was recorded in Atascosa County, which borders Medina County on its southeast boundary[27].

[27] https://texasalmanac.com/topics/media/notable-earthquakes-shake-texas-occasion



Source: *United States Geological Survey (USGS) Earthquake Hazards Program*

Figure 22: Texas Earthquake History Map[28]

[28] http://tdem.wpengine.com/wp-content/uploads/2019/08/txHazMitPlan.pdf

The jurisdictions elected to address this hazard because of the possibility that earthquakes may become a more significant issue during the current planning period.

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 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 61: 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 62: 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 Medina County doesn't have any known earthquake history, and the closest earthquakes inflicted minimal, if any, damages, earthquake frequency appears to be rising across Texas. A future earthquake affecting Medina County and the participating jurisdictions is expected to be similar in strength to the ones that occurred in nearby Atascosa County, up to a 3.5 on the Richter Magnitude Scale or less than a III (Slight) on the Modified Mercalli Intensity Scale.

4) Location and Impact

A) Location

Earthquakes have no distinct geographic boundary in Medina County. Earthquakes can equally affect all jurisdictions addressing the hazard.

B) Impact

Impacts may include structural damages to buildings of all types. Road networks that pass through the participating jurisdictions 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 in Section 3 of Chapter 3 above, 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 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

Earthquakes don't recognize geographic boundaries. All critical facilities, no matter their jurisdictional location, are equally vulnerable to earthquakes.

Table 63: Critical Facilities Vulnerable to Earthquakes

Medina County	Potential Earthquake Impacts			
	Structural Damage	Water / Wastewater Line Damages	Increased Demand for Services	Economic Damages
Castroville City Hall	x	x	x	
Castroville Elementary	x	x	x	
Castroville Municipal Airport	x	x	x	
Castroville Police Department	x	x	x	
Castroville Public Library	x	x	x	
Castroville VFD	x	x	x	
City of Devine Water Well (Bain)	x	x		x
City of Devine Water Well (Edwards #1)	x	x		x
City of Devine Water Well (Edwards #2)	x	x		x
City of Devine Water Well (Harrison)	x	x		x
City of Devine Water Well (LC Martin)	x	x		x
Community EMS Inc	x	x	x	
Dancing Bear Ranch Community Center	x	x	x	
Devine City Emergency Operations Center	x	x	x	
Devine City Offices	x	x	x	x
Devine Community Center	x	x	x	x
Devine Daep School	x	x	x	
Devine EMS	x	x	x	
Devine High School	x	x	x	
Devine Intermediate School	x	x	x	
Devine Middle School	x	x	x	
Devine Municipal Airport	x	x	x	
Devine Police Department	x	x	x	
Devine VFD	x	x	x	
D'Hanis School	x	x	x	
D'Hanis VFD	x	x	x	
Driscoll Public Library	x	x	x	
Hondo City Hall	x	x	x	x
Hondo High School	x	x	x	
Hondo Municipal Airport	x	x	x	
Hondo Police Department	x	x	x	
Hondo Public Library	x	x	x	
Hondo VFD Station 1	x	x	x	
Hondo VFD Station 2	x	x	x	
John J Ciavarra Elementary	x	x	x	
La Coste City Hall	x	x	x	x
La Coste Elementary	x	x	x	
La Coste Helicopter Landing Pad	x		x	x
La Coste Municipal Waste-Water Treatment Plant	x	x	x	x

La Coste Municipal Well #1	x	x	x	
La Coste Municipal Well #2	x	x	x	
La Coste Police Department	x	x	x	
La Coste Records & Vehicle Storage	x			
La Coste VFD	x	x	x	
Lytle High School	x	x	x	
McDowell Middle School	x	x	x	
Medina County Annex	x	x	x	
Medina County Constable Pct 1	x	x	x	
Medina County Constable Pct 2	x	x	x	
Medina County Constable Pct 3	x	x	x	
Medina County Constable Pct 4	x	x	x	
Medina County Courthouse	x	x	x	
Medina County Emergency Operations Center	x	x	x	
Medina County EMS ESD #4	x	x	x	
Medina County Jail	x	x	x	
Medina County Sheriff's Office	x	x	x	
Medina Lake VFD Station 2	x	x	x	
Medina Regional Hospital	x	x	x	
Medina Valley High School	x	x	x	
Medina Valley Middle School	x	x	x	
Meyer Elementary	x	x	x	
Mico VFD - Base Station	x	x	x	
Natalia City Hall	x	x	x	x
Natalia Early Childhood Center	x	x	x	
Natalia Elementary	x	x	x	
Natalia High School	x	x	x	
Natalia Junior High	x	x	x	
Natalia Police Department	x	x	x	
Natalia Veteran's Memorial Library	x	x	x	
Natalia VFD	x	x	x	
Newell E Woolls Intermediate	x	x	x	
Potranco Elementary	x	x	x	
Public Safety Radio Tower - Castroville	x	x	x	
Public Safety Radio Tower - D'Hanis	x	x	x	
Public Safety Radio Tower - Hondo	x	x	x	
Public Safety Radio Tower - Natalia	x	x	x	
Public Safety Radio Tower - New Dunlay	x	x	x	
South Texas Rural Health Services, Inc Devine Medical	x	x	x	
South Texas Rural Health Services, Inc Hondo Medical	x	x	x	
St. Louis Braden Keller Community Center	x	x	x	

St. Louis Catholic Elementary School - Castroville	x	x	x	
Yancey VFD	x	x	x	

C) Vulnerable Parcels and Infrastructure

All structures within the participating jurisdictions addressing the hazard 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 64: Estimated Potential Damage Values in Each Jurisdiction

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Medina County	38,424	**$6,125,177,720**
City of Castroville	1,561	**$274,273,930**
City of Devine	2,068	**$196,879,980**
City of Hondo	3,461	**$366,485,590**
City of La Coste	1,057	**$75,514,700**
City of Natalia	1,396	**$59,833,190**

Water and Wastewater Systems

Water and wastewater systems rely on underground pipe networks to function properly. During earthquakes, as the ground shifts, these pipes become vulnerable to cracks and breaks.

Damage to water and wastewater systems may be severe enough exceed a jurisdiction's ability to immediately fund repairs without outside assistance.

Homes that rely on septic tanks or other onsite sewage facilities (OSSF) may become uninhabitable if the lines connecting them become damaged and cannot be repaired quickly.

Delays returning water and wastewater systems to normal functionality may require the participating jurisdictions to provide emergency alternatives.

Road and Railroad Networks

Earthquakes may damage road and railroad networks in various ways. As the soil shifts, roadbeds and railroad beds may subside. In the case of railroads, subsidence may lead to failure.

The Union Pacific railroad in Medina County primarily runs east to west, parallel to US 90; the Union Pacific railroad also has a line running north-south through the southeastern corner of the County, parallel to Interstate 35. The east-west line passes through the City of Hondo and the City of La Coste. The north-south line runs through the cities of Devine and Natalia. The Martin Marietta Railroad is a short line railroad connecting to the Union Pacific railroad line between the City of Hondo and the City of D'Hanis that connects to a facility. Damages to any rail line, especially those in the City of Hondo and the City of La Coste, could be catastrophic if they were to cause a derailment.

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 I-35 would create the greatest impact in Medina County and the participating jurisdictions because the interstate also function as a hurricane evacuation route.

Interstate 35 passes through southeastern Medina County, near the City of Devine and the City of Natalia.

12. 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

Neither Medina County nor the participating jurisdictions have a documented history of damages caused by expansive soils.

The participating jurisdictions consider this to be a data deficiency.

To remedy the deficiency, the jurisdictions have proposed a mitigation action in Chapter 16 that will create a study to track instances of damages due to expansive soils and begin developing a comprehensive history of the hazard and its effects.

2) Likelihood of Future Events

Given the lack of an officially recorded hazard history in Medina County and the participating jurisdictions, 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 65: ASTM D4729-11 Expansive Soils Index (in %)

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

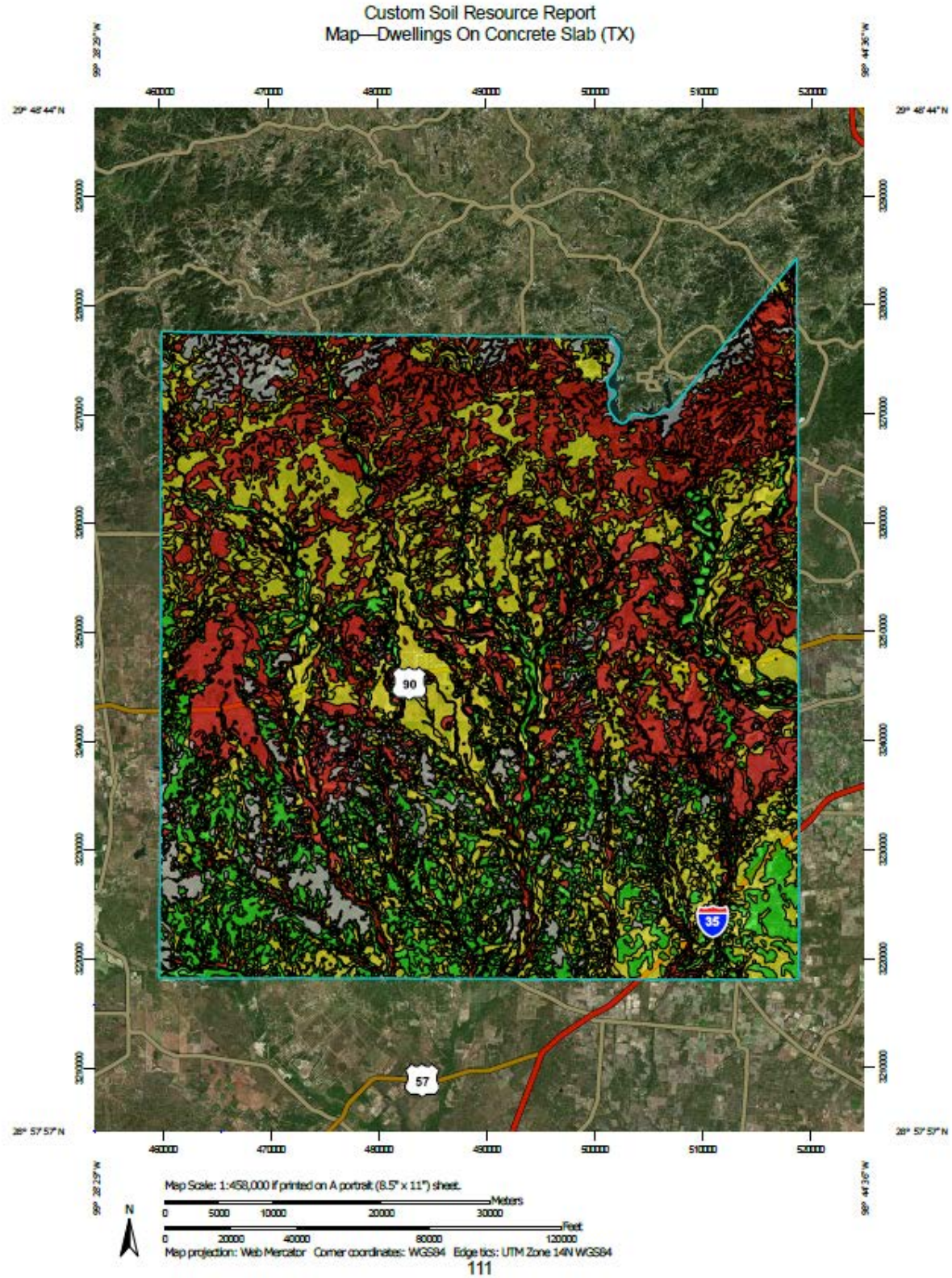
The participating jurisdictions lack the information to create an Expansive Soils Index as shown in Table 64 and have instead decided to rely on the county-wide soil studies produced by the United States Department of Agriculture (USDA), Soil Conservation Service[29] as well as the USDA's Web Soil Survey[30] 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 Medina County soils for the construction of both residential dwellings on concrete slab and small commercial buildings.

[29]https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/texas/TX325/0/Medina.pdf
[30] http://websoilsurvey.nrcs.usda.gov/app/

As shown in Figure 23 below, over one-third (38.6%) of Medina County contains soils that are "Somewhat Limited" for the construction of dwellings on concrete slab, the State's most prevalent dwelling foundation. Additionally, a significant portion (35.2%) of the County's soils, most heavily concentrated in the northern half of the County, are considered "Very Limited" for the construction of dwellings on concrete slab.

Figure 23: Medina 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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

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:
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: Medina County, Texas
Survey Area Data: Version 16, Nov 7, 2017

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

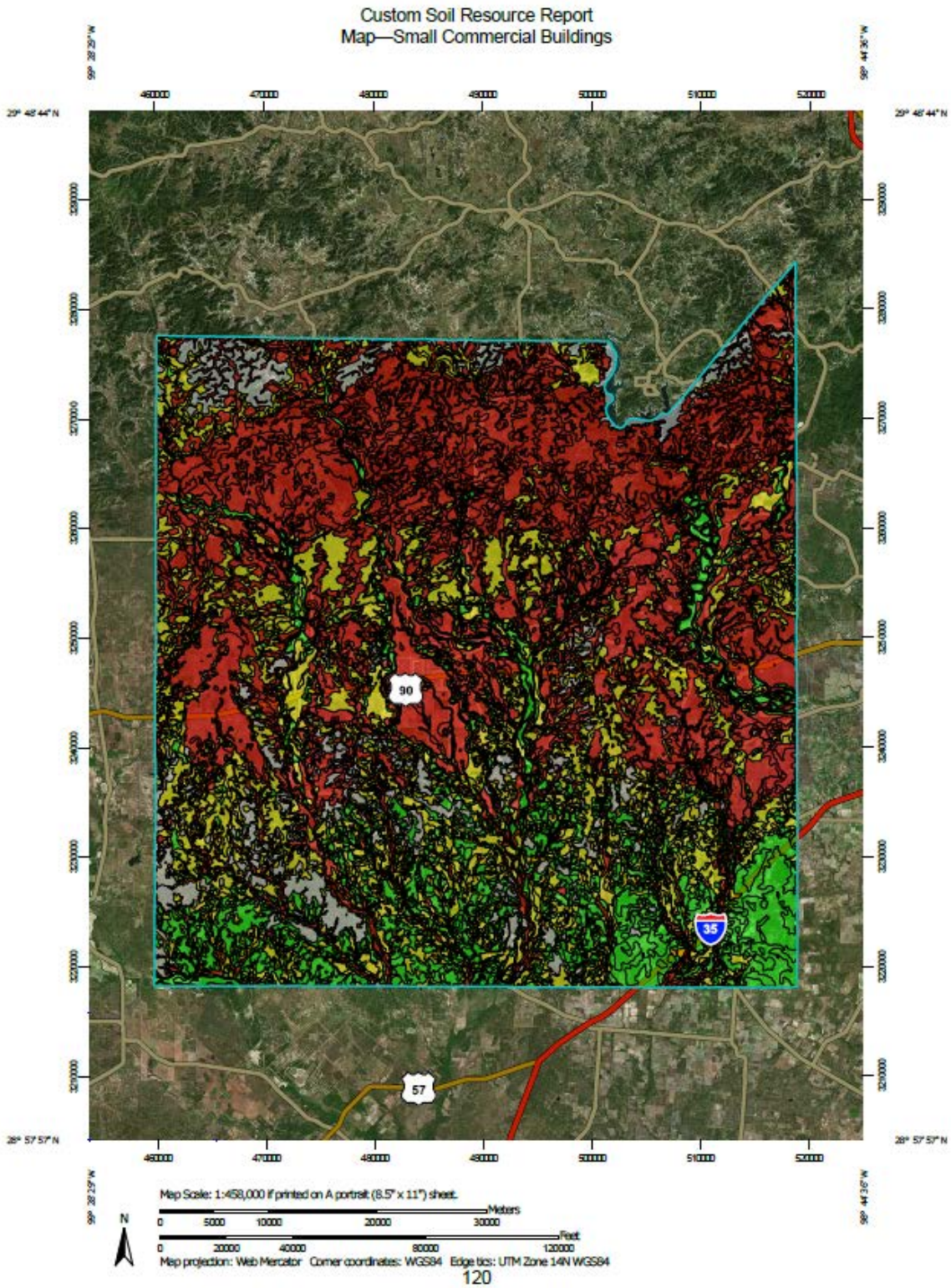
Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

As shown in Figure 24 below, almost half of Medina County and the participating jurisdictions are comprised of soils that are “Very Limited” (48.9% 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 primarily concentrated in the northern half of Medina County.

Figure 24: Medina County Soil Ratings for the Construction of Small Commercial Buildings



120

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

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:
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: Medina County, Texas
Survey Area Data: Version 16, Nov 7, 2017

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

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

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

Medina County and the participating jurisdictions are exposed to expansive soils to varying degrees based on both soil type and building type, as shown in Figure 23 and Figure 24 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 66: Medina County Critical Facilities Vulnerable to Expansive Soils

Medina County Critical Facilities
Castroville City Hall
Castroville Elementary
Castroville Municipal Airport
Castroville Police Department
Castroville Public Library

Castroville VFD
City of Devine Water Well (Bain)
City of Devine Water Well (Edwards #1)
City of Devine Water Well (Edwards #2)
City of Devine Water Well (Harrison)
City of Devine Water Well (LC Martin)
Community EMS Inc
Dancing Bear Ranch Community Center
Devine City Emergency Operations Center
Devine City Offices
Devine City Water Tower
Devine Community Center
Devine Daep School
Devine EMS
Devine Football Field Ground Storage
Devine High School
Devine Intermediate School
Devine Middle School
Devine Municipal Airport
Devine Police Department
Devine VFD
Devine Waste Water Treatment Plant
Devine Water Tower
D'Hanis School
D'Hanis VFD
Driscoll Public Library
Hondo City Hall
Hondo High School
Hondo Municipal Airport
Hondo Police Department
Hondo Public Library
Hondo VFD Station 1
Hondo VFD Station 2
John J Ciavarra Elementary
La Coste City Hall + Police Department
La Coste Helicopter Landing Pad
La Coste Municipal Waste-Water Treatment Plant
La Coste Municipal Well #1
La Coste Municipal Well #2

La Coste Records & Vehicle Storage
Lacoste Elementary
LaCoste VFD
Lytle High School
McDowell Middle School
Medina County Annex
Medina County Constable Pct 1
Medina County Constable Pct 2
Medina County Constable Pct 3
Medina County Constable Pct 4
Medina County Courthouse
Medina County Emergency Operations Center
Medina County EMS ESD #4
Medina County Jail
Medina County Sheriff's Office
Medina Lake VFD Station 2
Medina Regional Hospital
Medina Valley High School
Medina Valley Middle School
Meyer Elementary
Mico VFD - Base Station
Natalia City Hall
Natalia Early Childhood Center
Natalia Elementary
Natalia Ground Storage Tanks
Natalia High School
Natalia Junior High
Natalia Police Department
Natalia Veteran's Memorial Library
Natalia VFD
Natalia Water Well Sites
Newell E Woolls Intermediate
Potranco El
Public Safety Radio Tower - Castroville
Public Safety Radio Tower - Devine Police
Public Safety Radio Tower - D'Hanis
Public Safety Radio Tower - Hondo
Public Safety Radio Tower - Natalia
Public Safety Radio Tower - New Dunlay

South Texas Rural Health Services, Inc Devine Medical
South Texas Rural Health Services, Inc Hondo Medical
St. Louis Braden Keller Community Center
St. Louis Catholic Elementary School - Castroville
Yancey VFD

B) Vulnerable Structures

Table 67: Expansive Soils Vulnerability

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Medina County	38,424	**$6,125,177,720**
City of Castroville	1,561	**$274,273,930**
City of Devine	2,068	**$196,879,980**
City of Hondo	3,461	**$366,485,590**
City of La Coste	1,057	**$75,514,700**
City of Natalia	1,396	**$59,833,190**

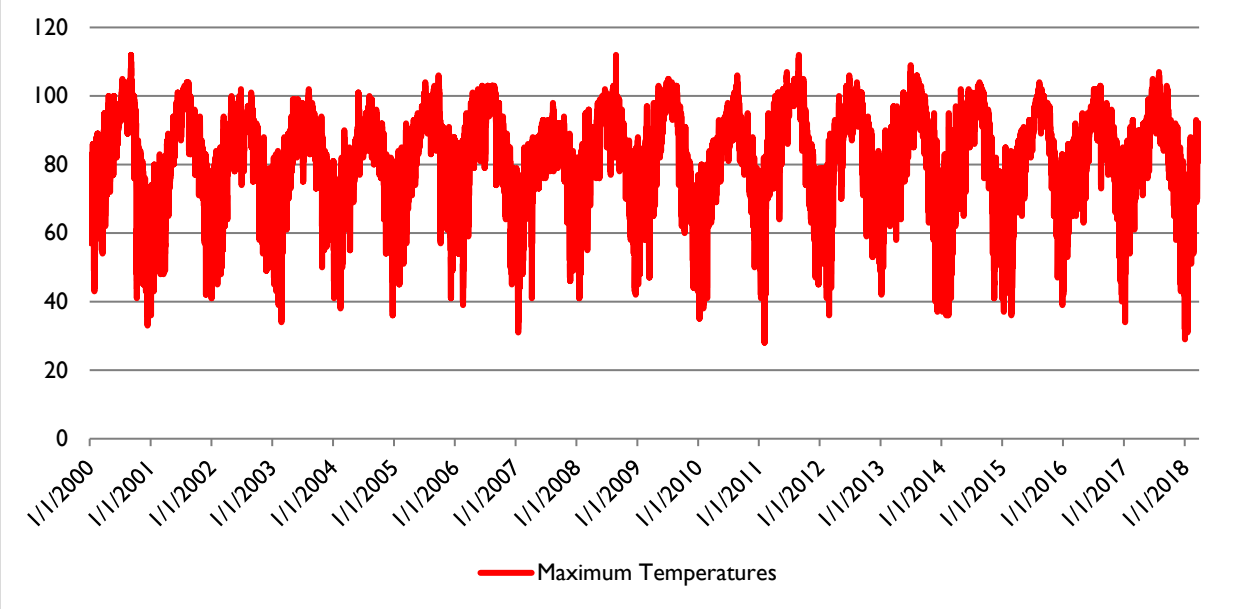
13. Extreme Heat

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[31]. 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



[31] http://www.bt.cdc.gov/disasters/extremeheat/heat_guide.asp

Figure 25: Maximum Recorded Daily Temperature 2000-2017[32]

Between January 2000 and January 2018, Medina County and the participating jurisdictions experienced 1077 days with a maximum temperature of 100˚F or hotter and 978 days where the combination of humidity and moderate-to-high temperatures warranted a heat advisory, if not an extreme heat warning.

Extreme heat data is recorded at the county level. However, given the nature of extreme heat and the proximity of all jurisdictions to each other, every jurisdiction 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 Events

Based on historic weather data, extreme heat in Medina County and the participating jurisdictions is highly likely, meaning an event affecting any or all of the participating 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 26. This index measures how hot it feels outside when humidity is combined with high temperatures.

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

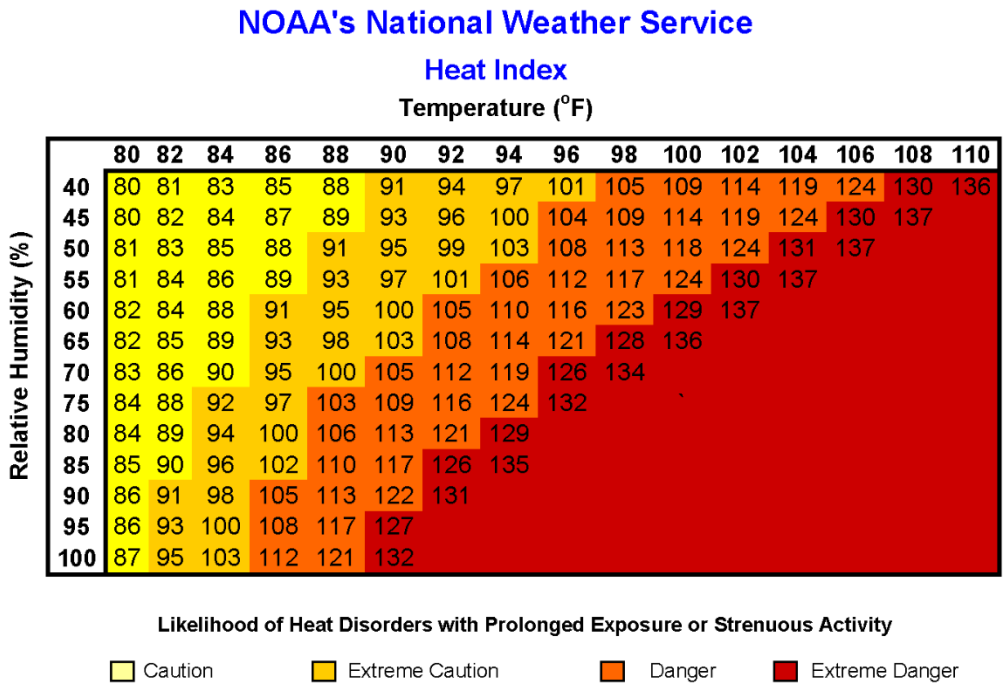


Figure 26: NOAA's NWS Heat Index Chart[33]

The extent scale in Figure 26 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 in Table 68: Heat Intensity .

Table 68: Heat Intensity

Intensity	Description
Heat Advisory	Extreme heat index making it feel hot, typically between 105˚F to 110˚F for 3 hours

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

	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 67%[34], 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 an NWS Heat Advisory.

Between 2000 and 2018, Medina County and the participating jurisdictions experienced 978 days with highs of 89˚F or hotter and overnight lows of 75˚F or hotter. Based on the NWS descriptions in Table 68 above and the average daily humidity level, these days likely warranted a heat advisory.

The hottest temperature recorded in Medina County in the recent past, 112˚F, was reached on September 5, 2000 and again on August 29, 2011. Based on the NWS descriptions in Table 68 above, at least nine of the 978 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.

According to the Medina County 2013 CHAMPS Report, the worst extreme heat events occurred in 1980. The 1980 event resulted in one injury and $14,698 in property damages and $1,469,765 in crop damages adjusted to $2018.

Future extreme heat events may meet the heat index requirements for issuing an Excessive Heat Warning as described in the Heat Intensity scale in Table 68 above. The hottest temperatures in Medina County and the participating jurisdictions may meet the current record temperature of 112˚F.

4) Location and Impact

A) Location – All Jurisdictions

Extreme heat has no distinct geographic boundary. Extreme heat can occur across the entire planning area and uniformly affect all participating jurisdictions.

[34] Used San Antonio Average, closest to County - https://www.currentresults.com/Weather/Texas/humidity-annual.php

B) Impact – All Jurisdictions

The potential impact of excessive summer heat is normally minor, resulting in few, if any, injuries. No property or crop damage specifically tied to extreme heat events has been recorded in any of the participating jurisdictions in over 15 years. No deaths related to extreme heat have ever been reported in the participating jurisdictions. However, based on the hazard's potential, in the worst cases, especially if combined with drought conditions, the hazard may inflict property or crop damages, and it can even be deadly. Any shutdown of facilities due to extreme heat is expected to be temporary.

5) Vulnerability

A) Population

As described in Section 3 of Chapter 3 above, Medina County and the participating jurisdictions are home to many vulnerable residents. Vulnerable populations 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. 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.

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[35] 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

The following hailstorm histories for each jurisdiction reflect the most current hailstorm data available. No hailstorms are known to have occurred in any participating jurisdiction more recently than those listed below.

Table 69: Medina County Hailstorm History

Location	Date Range	Hailstorm Events	Hail Diameter Range in inches	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Medina County	6/21/1963 - 5/28/2016	61	0.75 - 4.5	0	2	$7,243,761	$2,499,581

Table 70: City of Castroville Hailstorm History

Location	Date Range	Hailstorm Events	Hail Diameter Range in inches	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Castroville	2/26/1998 - 5/17/2016	9	0.75 - 1.75	0	0	$418,728	$138,855

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

Table 71: City of Devine Hailstorm History

Location	Date Range	Hailstorm Events	Hail Diameter Range in inches	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Devine	5/27/1997 - 4/1/2016	9	0.75 - 2.75	0	0	$15,460,491	$77,302

Table 72: City of Hondo Hailstorm History

Location	Date Range	Hailstorm Events	Hail Diameter Range in inches	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Hondo	4/30/1993 - 6/4/2017	30	0.75 - 4.5	0	0	$1,132,125	$282,457

Table 73: City of La Coste Hailstorm History

Location	Date Range	Hailstorm Events	Hail Diameter Range in inches	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
La Coste	4/2/2000	1	1.75	0	0	$0	$0

Table 74: City of Natalia Hailstorm History

Location	Date Range	Hailstorm Events	Hail Diameter Range in inches	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Natalia	5/5/2006 - 3/26/2009	4	1 - 1.75	0	0	$0	$0

2) Likelihood of Future Events

Based on its history of hailstorms, a hailstorm in Medina County is highly likely, meaning that an event is probable within the next year.

The hailstorm history in the City of Hondo suggests that a hailstorm in the City is likely, meaning that an event is probable within the next three years.

The limited history or lack of hailstorm history in the cities of Castroville, Devine, La Coste, and Natalia suggests that a hailstorm in any of those jurisdictions is occasional, meaning one is possible in the next five years.

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 75 was developed by combining data from National Centers for Environmental Information (NCEI) and the Tornado and Storm Research Organization (TORRO).

Table 75: Hailstorm Intensity[36,37]

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[38]	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

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

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

According to NCEI data, the worst hailstorms in Medina County and the participating jurisdictions have produced hail up to 4.5" in diameter, H10 on the Hailstorm Intensity Scale, inflicted over $3.3 million in reported property damages, and injured two people. No fatalities were reported in Medina County or any of the participating jurisdictions.

Future hailstorms may meet previous worst-case H10 storms in terms of hailstone size, damage dollars inflicted, and the number of residents injured or killed.

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. Each jurisdiction is 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 Section 3 of Chapter 3 above, Medina 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

Due to the presence of structures with flat roofs and the increased vulnerability a flat roof creates, the presence of older structures that have not been hardened against hailstorms, and / or the presence of metal buildings that may be more susceptible to hail, the following critical facilities were determined to be especially vulnerable to hailstorms:

Table 76: Critical Facilities Vulnerable to Hailstorms and Potential Impacts

Critical Facilities	Potential Hailstorm Impacts		
	Damaged or Destroyed Roof	Damaged Windows	Water damage due to Physical Damages
Castroville City Hall	x	x	x
Castroville Elementary	x	x	x
Castroville Police Department	x	x	x
Community EMS Inc	x	x	x
Devine High School	x	x	x
Devine Intermediate School	x	x	x
D'Hanis VFD	x	x	x
Hondo City Hall	x	x	x
John J Ciavarra Elementary	x	x	x
La Coste City Hall	x	x	x
La Coste Police Department	x	x	x
La Coste Records & Vehicle Storage	x	x	x
McDowell Middle School	x	x	x
Medina County Constable Pct 1	x	x	x
Medina County Constable Pct 2	x	x	x
Medina County Constable Pct 4	x	x	x
Medina County Courthouse	x	x	x
Medina Valley Middle School	x	x	x
Meyer Elementary	x	x	x
Natalia City Hall	x	x	x
Natalia Early Childhood Center	x	x	x
Natalia Police Department	x	x	x
South Texas Rural Health Services, Inc Devine Medical	x	x	x
South Texas Rural Health Services, Inc Hondo Medical	x	x	x
St. Louis Catholic Elementary School - Castroville	x	x	x

C) Vulnerable Structures

Every structure is vulnerable to damage from hail. Commercial structures with flat roofs are especially vulnerable due to the increased exposure that flat roofs create. Commercial structures with flat roofs are present in every participating jurisdiction. However, the potential estimated damage value will be based on all parcels in the participating jurisdictions.

Table 77: All Parcels Vulnerable to Hailstorms

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Medina County	38,424	**$6,125,177,720**
City of Castroville	1,561	**$274,273,930**
City of Devine	2,068	**$196,879,980**
City of Hondo	3,461	**$366,485,590**
City of La Coste	1,057	**$75,514,700**
City of Natalia	1,396	**$59,833,190**

15. 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

None of the participating jurisdictions 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. Moving forward, each jurisdiction addressing the hazard 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 Medina County, 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 any of the jurisdictions addressing the hazard 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 will probably be less than 1' per year.

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

4) Location and Impact

A) Location – All Jurisdictions

Land subsidence has no distinct geographic boundary. Land subsidence may occur across the entire planning area. The hazard can uniformly affect all jurisdictions addressing the hazard.

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 addressing the hazard 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 78: Medina County Critical Facilities Vulnerable to Land Subsidence

Medina County Critical Facilities
Castroville City Hall
Castroville Elementary
Castroville Municipal Airport
Castroville Police Department
Castroville Public Library
Castroville VFD
City of Devine Water Well (Bain)
City of Devine Water Well (Edwards #1)
City of Devine Water Well (Edwards #2)
City of Devine Water Well (Harrison)
City of Devine Water Well (LC Martin)
Community EMS Inc
Dancing Bear Ranch Community Center
Devine City Emergency Operations Center
Devine City Offices
Devine City Water Tower
Devine Community Center
Devine Daep School
Devine EMS
Devine Football Field Ground Storage
Devine High School
Devine Intermediate School
Devine Middle School
Devine Municipal Airport
Devine Police Department
Devine VFD
Devine Waste Water Treatment Plant
Devine Water Tower
D'Hanis School
D'Hanis VFD
Driscoll Public Library
Hondo City Hall
Hondo High School
Hondo Municipal Airport
Hondo Police Department
Hondo Public Library
Hondo VFD Station 1
Hondo VFD Station 2

John J Ciavarra Elementary
La Coste City Hall + Police Department
La Coste Helicopter Landing Pad
La Coste Municipal Waste-Water Treatment Plant
La Coste Municipal Well #1
La Coste Municipal Well #2
La Coste Records & Vehicle Storage
Lacoste Elementary
LaCoste VFD
Lytle High School
McDowell Middle School
Medina County Annex
Medina County Constable Pct 1
Medina County Constable Pct 2
Medina County Constable Pct 3
Medina County Constable Pct 4
Medina County Courthouse
Medina County Emergency Operations Center
Medina County EMS ESD #4
Medina County Jail
Medina County Sheriff's Office
Medina Lake VFD Station 2
Medina Regional Hospital
Medina Valley High School
Medina Valley Middle School
Meyer Elementary
Mico VFD - Base Station
Natalia City Hall
Natalia Early Childhood Center
Natalia Elementary
Natalia Ground Storage Tanks
Natalia High School
Natalia Junior High
Natalia Police Department
Natalia Veteran's Memorial Library
Natalia VFD
Natalia Water Well Sites
Newell E Woolls Intermediate
Potranco El

Public Safety Radio Tower - Castroville
Public Safety Radio Tower - Devine Police
Public Safety Radio Tower - D'Hanis
Public Safety Radio Tower - Hondo
Public Safety Radio Tower - Natalia
Public Safety Radio Tower - New Dunlay
South Texas Rural Health Services, Inc Devine Medical
South Texas Rural Health Services, Inc Hondo Medical
St. Louis Braden Keller Community Center
St. Louis Catholic Elementary School - Castroville
Yancey VFD

B) Vulnerable Parcels

Table 79: Land Subsidence Vulnerability

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Medina County	38,424	**$6,125,177,720**
City of Castroville	1,561	**$274,273,930**
City of Devine	2,068	**$196,879,980**
City of Hondo	3,461	**$366,485,590**
City of La Coste	1,057	**$75,514,700**
City of Natalia	1,396	**$59,833,190**

16. 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 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

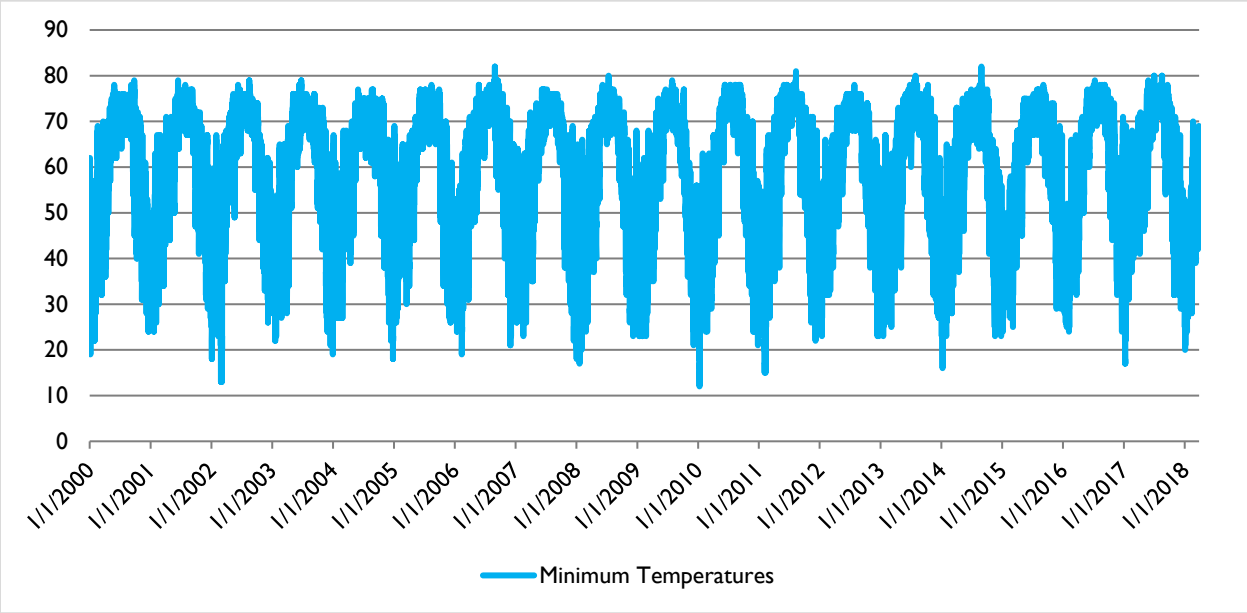


Figure 27: Minimum Recorded Daily Temperature, 2000-2018[39]

Between 2000 and 2017, Medina County experienced 1,011 days with a minimum temperature of 32˚F or colder. At least eight of those days had a maximum temperature of 32˚F or below.

During the same timeframe, the coldest temperature recorded was 12˚F on January 9, 2010.

Table 80: Medina County Severe Winter Weather Hazard History

Location	Date Range	Winter Weather Events	Event Type	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Medina County	1/9/1962 - 12/7/2017	17	Winter Weather or Winter Storm	0	0	$466,500	$2,739,066

Severe winter weather data is recorded at the county level. However, given the nature of severe winter weather and the proximity of all jurisdictions to each other, every jurisdiction experienced the same severe winter weather events. No severe winter weather has been recorded in any jurisdiction since 2017.

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

2) Likelihood of Future Events

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

3) Extent

Table 81 below displays the magnitude of severe winter storms. The wind-chill factor is further described in Figure 28. 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 81: Winter Weather Extent Scale[40]

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.
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.

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

Wind Chill Advisory[41]	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[42]	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

[41] https://www.osha.gov/dts/weather/winter_weather/windchill.html
[42] https://www.osha.gov/dts/weather/winter_weather/windchill.html

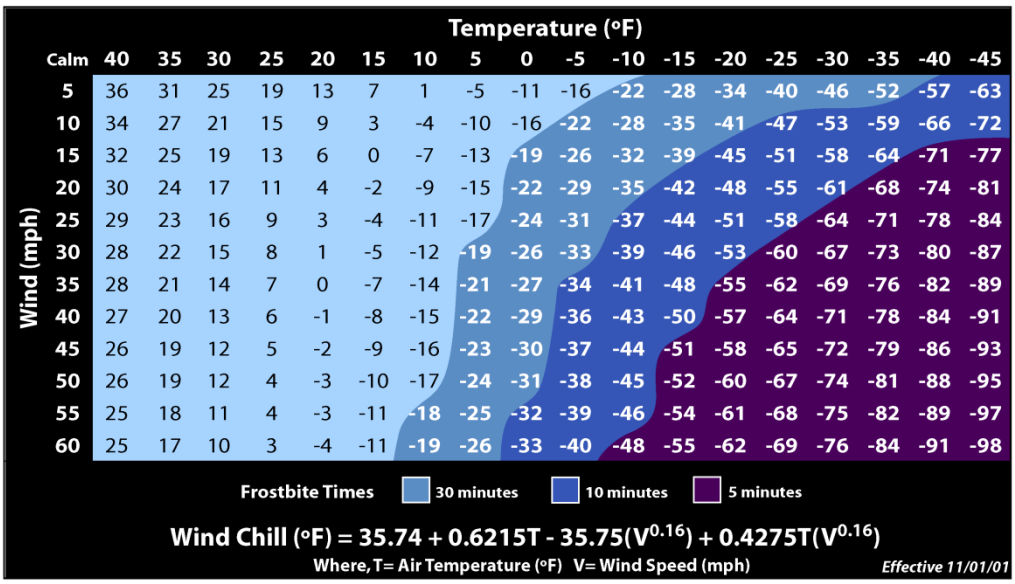


Figure 28: NWS Wind Chill Index

According to the Medina County 2013 CHAMPS Report, the most damaging winter storms have inflicted over $160,000 in property damages and crop damages. The most recent winter storm to inflict damages in the County occurred in 2007. Property damages for that storm totaled $79,321. Severe winter weather isn't known to have caused any injuries or deaths in any jurisdiction in Medina County.

Future winter storm events in Medina County and the participating jurisdictions may see temperatures meet the lowest recently recorded temperature, 12˚F, see snow accumulation of 1.7", or see ice accumulation of 1/8". Additionally, these future events may meet previous ones in terms of 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 the entire planning area and uniformly affect all participating 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 Medina County and the participating

jurisdictions, drivers, 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 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 those young, elderly, and low-income residents as identified in Section 3 of Chapter 3 above. Although no deaths related to severe winter storms have been reported in the participating jurisdictions, in the worst cases, the hazard has the potential to be deadly.

Severe winter storms will likely cause only minor property damage and minimal disruption to the quality of life in the participating jurisdictions.

Depending on when the event happens, a severe winter storm may damage or destroy crops.

5) Vulnerability

While all of the participating jurisdictions are exposed to extreme temperatures, existing buildings, infrastructure, and critical facilities are not considered vulnerable to significant damage caused by severe winter storm events. This determination was made based on the expectation that most roofs can support 20 lbs. / square foot of snow[43]. The worst snow storm in any participating jurisdiction dropped 1.7". Although it's not impossible[44] 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 1/8", 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 young, elderly, and low-income residents identified in Section 3 of Chapter 3 above, may feel greater impacts from severe winter weather due to those populations' limited ability to properly address the hazard.

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

[44] 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.

Any shutdown of critical facilities due to severe winter weather is expected to be temporary. However, based on the proximity of trees and powerlines on their properties, the following critical facilities may be at a higher risk of losing power due to falling limbs.

Table 82: Critical Facilities Vulnerable to Winter Storms

Critical Facilities	Potential Severe Winter Storm Impacts
	Falling Tree Limbs
Castroville City Hall	x
Castroville Police Department	x
Castroville Public Library	x
Castroville VFD	x
City of Devine Water Well (Bain)	x
City of Devine Water Well (LC Martin)	x
Community EMS Inc	x
Dancing Bear Ranch Community Center	x
Devine City Emergency Operations Center	x
Devine City Offices	x
Devine Community Center	x
Devine Daep School	x
Devine Intermediate School	x
Devine Police Department	x
Driscoll Public Library	x
Hondo City Hall	x
Hondo High School	x
Hondo Police Department	x
Hondo Public Library	x
Hondo VFD Station 1	x
John J Ciavarra Elementary	x
La Coste City Hall	x
La Coste Police Department	x
La Coste Records & Vehicle Storage	x
La Coste Helicopter Landing Pad	x
La Coste VFD	x
McDowell Middle School	x
Medina County Constable Pct 1	x
Medina County Constable Pct 2	x
Medina County Constable Pct 4	x
Medina County Courthouse	x

Medina Lake VFD Station 2	x
Medina Regional Hospital	x
Medina Valley High School	x
Medina Valley Middle School	x
Meyer Elementary	x
Mico VFD - Base Station	x
Natalia City Hall	x
Natalia Early Childhood Center	x
Natalia Elementary	x
Natalia Junior High	x
Natalia Veteran's Memorial Library	x
Natalia VFD	x
Newell E Woolls Intermediate	x
Potranco Elementary	x
Public Safety Radio Tower - Castroville	x
Public Safety Radio Tower - Devine Police	x
Public Safety Radio Tower - Hondo	x
Public Safety Radio Tower - Natalia	x
Public Safety Radio Tower - New Dunlay	x
St. Louis Braden Keller Community Center	x
St. Louis Catholic Elementary School - Castroville	x
Yancey VFD	x

17. Windstorm

A windstorm[45] 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 1963 – 2017, the most recently recorded windstorm in any jurisdiction, Medina County and the participating jurisdictions experienced damaging high winds with gusts up to 100 mph on 85 separate occasions not related to a Hurricane or Tropical Storm event.

Table 83: Medina County Windstorm History

Location	Date Range	Windstorm Events	Windspeed MPH Range	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Medina County	6/21/1963 - 2/19/2017	36	Not Reported - 80	0	16	$3,555,558	$281,595

Table 84: City of Castroville Windstorm History

Location	Date Range	Windstorm Events	Windspeed MPH Range	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Castroville	4/15/1994 - 8/12/2015	6	Not Reported - 90	0	0	$2,139,384	$85,022

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

Table 85: City of Devine Windstorm History

Location	Date Range	Windstorm Events	Windspeed MPH Range	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Devine	5/18/1995 - 6/4/2017	7	Not Reported - 52	0	0	$15,640,788	$80,610

Table 86: City of Hondo Windstorm History

Location	Date Range	Windstorm Events	Windspeed MPH Range	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Hondo	6/23/1994 - 6/4/2017	33	Not Reported - 100	0	15	$3,977,413	$214,415

Table 87: City of La Coste Windstorm History

Location	Date Range	Windstorm Events	Windspeed MPH Range	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
La Coste	5/12/1997 - 5/10/2013	2	Not Reported - 52	0	0	$10,818	$0

Table 88: City of Natalia Windstorm History

Location	Date Range	Windstorm Events	Windspeed MPH Range	Fatalities	Injuries	Property Damage $2018	Crop Damage $2018
Natalia	5/9/2006	1	70	0	0	$125,003	$0

2) Likelihood of Future Events

Medina County has experienced a damaging windstorm roughly once every two years. Given the frequency of past events, a damaging windstorm in the future is likely, meaning that an event is probable in the next three years.

The cities of Castroville and Devine have experienced a damaging windstorm roughly once every three or four years. Given the frequency of past events, the likelihood of a damaging windstorm is considered occasional, meaning that an event is possible in the next five years.

The City of Hondo has experienced a damaging windstorm roughly every year. Given the frequency of past events, a damaging windstorm in the future is highly likely, meaning that an event is probable in the next year.

The City of La Coste has experienced a damaging windstorm roughly once every 8 years. The City of Natalia has not experienced any damaging windstorms since 2006. Given the infrequency of past events in both jurisdictions, a damaging windstorm in the future is unlikely, meaning that an event is possible in the next ten years.

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 89: Beaufort Wind Scale[46]

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

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

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 visibility	Slight structural damage occurs, slate blows off roofs
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 Medina County and the participating jurisdictions have ranged up to a 12 on the Beaufort Wind Scale.

Adjusted for inflation to $2018, the most devastating windstorms have inflicted up to $1,067,126 in property damages and $2,134,252 in agricultural damages.

No windstorm in any of the participating jurisdictions has caused any injuries or deaths.

Future windstorms may meet previous worst-case Force 11 events in terms of wind speed, damage dollars inflicted, and residents injured or killed.

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 Section 3 of Chapter 3 above, Medina 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 90: Critical Facilities Vulnerable to Windstorms and Potential Impacts

Critical Facilities	Potential Windstorm Impacts									
	Loss of Power	Flying Debris	Uprooted Trees	Flooding	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
Castroville City Hall	x	x	x	x	x	x	x	x	x	x
Castroville Elementary	x	x		x	x	x	x	x	x	x
Castroville Municipal Airport	x	x		x	x			x	x	x
Castroville Police Department	x	x	x	x	x	x	x	x	x	x
Castroville Public Library	x	x	x	x	x		x	x	x	x
Castroville VFD	x	x	x	x	x			x	x	x
City of Devine Water Well (Bain)	x	x	x		x	x		x	x	x
City of Devine Water Well (Edwards #1)	x	x	x		x	x		x	x	x
City of Devine Water Well (Edwards #2)	x	x	x		x	x		x	x	x
City of Devine Water Well (Harrison)	x	x	x		x	x		x	x	x
City of Devine Water Well (LC Martin)	x	x	x		x	x		x	x	x
Community EMS Inc	x	x	x	x	x	x	x	x	x	x
Dancing Bear Ranch Community Center	x	x	x	x	x		x	x	x	x
Devine City Emergency Operations Center	x	x	x	x	x			x	x	x
Devine City Offices	x	x	x	x	x			x	x	x
Devine City Water Tower	x	x	x			x		x	x	x
Devine Community Center	x	x	x	x	x		x	x	x	x
Devine Daep School	x	x	x	x	x		x	x	x	x
Devine EMS	x	x		x	x			x	x	x
Devine Football Field Ground Storage		x	x			x		x	x	x
Devine High School	x	x		x	x	x	x	x	x	x
Devine Intermediate School	x	x	x	x	x	x	x	x	x	x
Devine Middle School	x	x		x	x		x	x	x	x
Devine Municipal Airport	x	x		x	x			x	x	x
Devine Police Department	x	x	x	x	x			x	x	x

Devine VFD	x	x		x	x			x	x	x
Devine Waste Water Treatment Plant	x	x	x	x	x	x	x	x	x	x
Devine Water Tower		x	x			x		x	x	x
D'Hanis School	x	x		x	x		x	x	x	x
D'Hanis VFD	x	x		x	x	x	x	x	x	x
Driscoll Public Library	x	x	x	x	x		x	x	x	x
Hondo City Hall	x	x	x	x	x	x	x	x	x	x
Hondo High School	x	x	x	x	x		x	x	x	x
Hondo Municipal Airport	x	x		x	x			x	x	x
Hondo Police Department	x	x	x	x	x		x	x	x	x
Hondo Public Library	x	x	x	x	x		x	x	x	x
Hondo VFD Station 1	x	x	x	x	x			x	x	x
Hondo VFD Station 2	x	x		x	x			x	x	x
John J Ciavarra Elementary	x	x	x	x	x	x	x	x	x	x
La Coste City Hall	x	x	x	x	x	x	x	x	x	x
La Coste Elementary	x	x		x	x			x	x	x
La Coste Helicopter Landing Pad		x	x	x						
La Coste Municipal Waste-Water Treatment Plant	x	x	x	x	x	x	x	x	x	x
La Coste Municipal Well #1		x	x					x	x	x
La Coste Municipal Well #2	x	x	x					x	x	x
La Coste Police Department	x	x	x	x	x			x	x	x
La Coste Records & Vehicle Storage	x	x	x	x		x	x	x	x	x
La Coste VFD	x	x	x	x	x			x	x	x
Lytle High School	x	x		x	x		x	x	x	x
McDowell Middle School	x	x	x	x	x	x	x	x	x	x
Medina County Annex	x	x		x	x			x	x	x
Medina County Constable Pct 1	x	x	x	x	x	x	x	x	x	x
Medina County Constable Pct 2	x	x	x	x	x	x	x	x	x	x
Medina County Constable Pct 3	x	x		x	x			x	x	x
Medina County Constable Pct 4	x	x	x	x	x	x	x	x	x	x
Medina County Courthouse	x	x	x	x	x	x	x	x	x	x

Medina County Emergency Operations Center	x	x		x	x			x	x	x
Medina County EMS ESD #4	x	x		x	x			x	x	x
Medina County Jail	x	x		x	x			x	x	x
Medina County Sheriff's Office	x	x		x	x			x	x	x
Medina Lake VFD Station 2	x	x	x	x	x			x	x	x
Medina Regional Hospital	x	x	x	x	x		x	x	x	x
Medina Valley High School	x	x	x	x	x		x	x	x	x
Medina Valley Middle School	x	x	x	x	x	x	x	x	x	x
Meyer Elementary	x	x	x	x	x	x	x	x	x	x
Mico VFD - Base Station	x	x	x	x	x			x	x	x
Natalia City Hall	x	x	x	x	x	x	x	x	x	x
Natalia Early Childhood Center	x	x	x	x	x	x	x	x	x	x
Natalia Elementary	x	x	x	x	x		x	x	x	x
Natalia High School	x	x		x	x			x	x	x
Natalia Junior High	x	x	x	x	x		x	x	x	x
Natalia Police Department	x	x		x	x	x	x	x	x	x
Natalia Veteran's Memorial Library	x	x	x	x	x	x		x	x	x
Natalia VFD	x	x	x	x	x	x		x	x	x
Newell E Woolls Intermediate	x	x	x	x	x			x	x	x
Potranco Elementary	x	x	x	x	x		x	x	x	x
Public Safety Radio Tower - Castroville	x	x	x	x	x			x	x	x
Public Safety Radio Tower - Devine Police	x	x	x			x		x	x	x
Public Safety Radio Tower - D'Hanis	x	x		x	x			x	x	x
Public Safety Radio Tower - Hondo	x	x	x	x	x			x	x	x
Public Safety Radio Tower - Natalia	x	x	x	x	x			x	x	x
Public Safety Radio Tower - New Dunlay	x	x	x	x	x			x	x	x
South Texas Rural Health Services, Inc Devine Medical	x	x		x	x	x	x	x	x	x
South Texas Rural Health Services, Inc Hondo Medical	x	x		x	x	x	x	x	x	x
St. Louis Braden Keller Community Center	x	x	x	x	x			x	x	x
St. Louis Catholic Elementary School - Castroville	x	x	x	x	x	x	x	x	x	x
Yancey VFD	x	x	x	x	x			x	x	x

B) Vulnerable Parcels

Table 91: Parcels Vulnerable to Windstorms

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Medina County	38,424	**$6,125,177,720**
City of Castroville	1,561	**$274,273,930**
City of Devine	2,068	**$196,879,980**
City of Hondo	3,461	**$366,485,590**
City of La Coste	1,057	**$75,514,700**
City of Natalia	1,396	**$59,833,190**

18. 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[47] each year in the United States.

1) Lightning History

There was no historical lightning data or property and crop damages associated with lightning recorded for Medina County and the participating jurisdictions.

2) Likelihood of Future Events

Lightning is especially associated with thunderstorms. Despite the lack of officially 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[48], much of Medina County, including the cities of Castroville, Devine, Hondo, La Coste, and Natalia can expect between six and 12 lightning flashes per square mile per year. The rest of the County can expect to see between 0.75 and 1.5 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 Medina County and all participating jurisdictions may experience lightning events between LAL 1 and LAL 5. Dry thunderstorms, LAL 6, are not expected.

Table 92: Lightning Activity Levels[49]

Lightning Activity Level (LAL)
Activity levels are valuable guidance tools to aid in the preparation for possible fire initiation from cloud-to-ground lightning.

[47] http://www.lightningsafety.noaa.gov/victims.shtml
[48] http://www.vaisala.com/VaisalaImages/Lightning/avg_fd_2005-2014_CONUS_2mi_grid.png
[49] Source: http://www.prh.noaa.gov/hnl/pages/LAL.php

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.	

There was no property damage, crop damage, fatalities, or injuries reported as a result of lightning strikes in Medina County or any of the participating jurisdictions.

Future events may meet previous intensity levels, damage dollars inflicted, fatalities, and the number of residents injured.

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[50] 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 93: Critical Facilities Vulnerable to Lightning and Potential Impacts

Critical Facilities	Potential Lightning Impacts			
	Physical Damage	Electrical Damage	Data Damage or Loss	Fire
Castroville City Hall	x	x	x	x
Castroville Elementary	x	x	x	x
Castroville Police Department	x	x	x	x
Castroville Public Library	x	x	x	x
Castroville VFD	x	x	x	x
Community EMS Inc	x	x	x	x
Dancing Bear Ranch Community Center	x	x	x	x
Devine City Emergency Operations Center	x	x	x	x
Devine City Offices	x	x	x	x
Devine Community Center	x	x	x	x
Devine Daep School	x	x	x	x
Devine EMS	x	x	x	x
Devine High School	x	x	x	x
Devine Intermediate School	x	x	x	x
Devine Middle School	x	x	x	x
Devine Police Department	x	x	x	x
Devine VFD	x	x	x	x
Devine Waste Water Treatment Plant	x	x	x	x
D'Hanis School	x	x	x	x
D'Hanis VFD	x	x	x	x
Driscoll Public Library	x	x	x	x
Hondo City Hall	x	x	x	x
Hondo High School	x	x	x	x
Hondo Police Department	x	x	x	x

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

Hondo Public Library	x	x	x	x
Hondo VFD Station 1	x	x	x	x
Hondo VFD Station 2	x	x	x	x
John J Ciavarra Elementary	x	x	x	x
La Coste City Hall	x	x	x	x
La Coste Elementary	x	x	x	x
La Coste Helicopter Landing Pad	x			
La Coste Municipal Waste-Water Treatment Plant	x	x	x	x
La Coste Municipal Well #1	x			x
La Coste Municipal Well #2	x	x		
La Coste Police Department	x	x	x	x
La Coste Records & Vehicle Storage	x	x	x	x
La Coste VFD	x	x	x	x
Lytle High School	x	x	x	x
McDowell Middle School	x	x	x	x
Medina County Annex	x	x	x	x
Medina County Constable Pct 1	x	x	x	x
Medina County Constable Pct 2	x	x	x	x
Medina County Constable Pct 3	x	x	x	x
Medina County Constable Pct 4	x	x	x	x
Medina County Courthouse	x	x	x	x
Medina County Emergency Operations Center	x	x	x	x
Medina County EMS ESD #4	x	x	x	x
Medina County Jail	x	x	x	x
Medina County Sheriff's Office	x	x	x	x
Medina Lake VFD Station 2	x	x	x	x
Medina Regional Hospital	x	x	x	x
Medina Valley High School	x	x	x	x
Medina Valley Middle School	x	x	x	x
Meyer Elementary	x	x	x	x
Mico VFD - Base Station	x	x	x	x
Natalia City Hall	x	x	x	x
Natalia Early Childhood Center	x	x	x	x
Natalia Elementary	x	x	x	x
Natalia High School	x	x	x	x
Natalia Junior High	x	x	x	x
Natalia Police Department	x	x	x	x
Natalia Veteran's Memorial Library	x	x	x	x
Natalia VFD	x	x	x	x
Newell E Woolls Intermediate	x	x	x	x
Potranco Elementary	x	x	x	x
Public Safety Radio Tower - Castroville	x	x	x	x
Public Safety Radio Tower - Devine Police	x	x	x	x

Public Safety Radio Tower - D'Hanis	x	x	x	x
Public Safety Radio Tower - Hondo	x	x	x	x
Public Safety Radio Tower - Natalia	x	x	x	x
Public Safety Radio Tower - New Dunlay	x	x	x	x
South Texas Rural Health Services, Inc Devine Medical	x	x	x	x
South Texas Rural Health Services, Inc Hondo Medical	x	x	x	x
St. Louis Braden Keller Community Center	x	x	x	x
St. Louis Catholic Elementary School - Castroville	x	x	x	x
Yancey VFD	x	x	x	x

A) Vulnerable Parcels

Table 94: Parcels Vulnerable to Lightning

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Medina County	38,424	**$6,125,177,720**
City of Castroville	1,561	**$274,273,930**
City of Devine	2,068	**$196,879,980**
City of Hondo	3,461	**$366,485,590**
City of La Coste	1,057	**$75,514,700**
City of Natalia	1,396	**$59,833,190**

19. Mitigation Strategy

1) Capability Assessment

Medina County and the participating jurisdictions have shown themselves to be highly capable, especially in terms of implementing hazard 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. 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 95: Capability Assessment by Jurisdiction

Medina County **Administrative, Financial, Regulatory, and Technical Abilities**
Emergency Management
Economic Development
Floodplain Management
Road and Bridge Management
Tax Collection
Grant Writing
General Budgeting
Capital Improvement Program (CIP) Funding
Community Development Block Grant (CDBG) Funding
State and Federal Grant Funding

City of Castroville **Administrative, Financial, Regulatory, and Technical Abilities**
Floodplain Management
Subdivision
Comprehensive Planning
Building Code Enforcement
Nuisance Abatement
Substandard Structures Abatement

Drought Contingency Planning
Economic Development
Tax Collection
Grant Writing
General Budgeting
Capital Improvement Program (CIP) Funding
Community Development Block Grant (CDBG) Funding
State and Federal Grant Funding

City of Devine **Administrative, Financial, Regulatory, and Technical Abilities**
Floodplain Management
Subdivision
Building Code Enforcement
Nuisance Abatement
Substandard Structures Abatement
Economic Development
Tax Collection
Grant Writing
General Budgeting
Capital Improvement Program (CIP) Funding
Community Development Block Grant (CDBG) Funding
State and Federal Grant Funding

City of Hondo **Administrative, Financial, Regulatory, and Technical Abilities**
Floodplain Management
Subdivision
Building Code Enforcement
Nuisance Abatement
Substandard Structures Abatement
Zoning
Economic Development
Tax Collection
Grant Writing

General Budgeting
Capital Improvement Program (CIP) Funding
Community Development Block Grant (CDBG) Funding
State and Federal Grant Funding

City of La Coste Administrative, Financial, Regulatory, and Technical Abilities
Floodplain Management
Subdivision
Building Code Enforcement
Economic Development
Tax Collection
Grant Writing
General Budgeting
Capital Improvement Program (CIP) Funding
Community Development Block Grant (CDBG) Funding
State and Federal Grant Funding

City of Natalia Administrative, Financial, Regulatory, and Technical Abilities
Subdivision
Zoning: Building Code Enforcement
Floodplain Management
Drought Contingency Plan
Nuisance Abatement
Economic Municipal Development
Grant Writing
General Budgeting
Capital Improvement Program
Community Development Block Grant (CDBG) Funding
State and Federal Grant Funding

2) Goals and Objectives Overview

The hazard analysis has shown that Medina 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 goals in this plan update are similar to the goals listed in the plan that expired in 2007. They have been expanded to include public services, public infrastructure, economic impacts, civic resources, and cultural resources as priorities in addition to reducing loss of life, injury, property damage, and preservation of natural resources. 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

A) 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 the Texas Department of Emergency Management's (TDEM) 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.

B) 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.

Incorporation and Integration Opportunities and Processes

Each jurisdiction has its own established process for integrating new actions, codes, ordinances, plans, and studies into its existing capabilities.

None of the participating jurisdictions undertook any actions to formally incorporate the previous plan into their normal operations. Instead, they relied on the plan itself, and pursued projects as funding and other resources became available.

The planning team will ensure that each jurisdiction's various departments continue to integrate hazard mitigation actions into their day-to-day processes. Opportunities for future integration are outlined below in Table 96.

Table 96: Plan Integration

Department	All Departments	Commissioners' Court, Road and Bridge, County Judge's Office, Mayor's Office, Council, Public Works, Economic Development, Zoning	Planning, Zoning, Economic Development, Public Works, Mayor's Office, Floodplain Manager	County Judge's Office, Mayor's Office	County Judge's Office, Mayor's Office, Chief of Fire Department,	County Judge's Office, Mayor's Office	County Judge's Office, Floodplain Manager, Mayor's Office
Activity	Annual Budget	Capital Improvement Projects (CIPs)	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 Capital Improvement Projects (CIPs). Ensure CIPs are consistent with mitigation actions, National Flood Insurance Program (NFIP) compliance, and any new land use development.	Review existing floodplain and land use controls to ensure that long term goals are consistent with actions in the HMAP.	Utilize newspapers, 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 BRIC, 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							
Medina County	X	X	X	X	X	X	X
City of Castroville	X	X	X	X	X	X	X
City of Devine	X	X	X	X	X	X	X
Hondo	X	X	X	X	X	X	X
La Coste	X	X	X	X	X	X	X
Natalia	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 97 below.

Table 97: Integration Process

Jurisdiction	Integration Process
Medina County	After considering integrating mitigation actions with the activities outlined in Table 96 above, mitigation actions will be presented, considered, and formally adopted by the County Commissioners' Court and County Judge. Medina County will also use the Medina 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 Castroville	After considering integrating mitigation actions with the activities outlined in Table 96 above, mitigation actions will be presented, considered, and formally adopted by the City Council and Mayor. The City of Castroville will also use the Medina 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 Devine	After considering integrating mitigation actions with the activities outlined in Table 96 above, mitigation actions will be presented, considered, and formally adopted by the City Council and Mayor. The City of Devine will also use the Medina 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 Hondo	After considering integrating mitigation actions with the activities outlined in Table 96 above, mitigation actions will be presented, considered, and formally adopted by the City Council and Mayor. The City of Hondo will also use the Medina 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 La Coste	After considering integrating mitigation actions with the activities outlined in Table 96 above, mitigation actions will be presented, considered, and formally adopted by the City Council and Mayor. The City of La Coste will also use the Medina 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 Natalia	After considering integrating mitigation actions with the activities outlined in Table 96 above, mitigation actions will be presented, considered, and formally adopted by the City Council and Mayor. The City of Natalia will also use the Medina County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.

C) 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. Medina 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.

All Jurisdictions

Mitigation Action	Conduct Dam/Levee Failure Studies
Objective	This action will be used to address the Dam Failure data deficiency. Medina County and the Cities will work with local dam/levee owners to conduct relevant studies to identify peak flow rates and expected inundations in the event of local dam failures.
Hazard	Dam/Levee Failure
Priority	Medium
Estimated Cost	$50,000 per study
Potential Funding Source (s)	Medina County, Cities, FEMA PDM, FEMA HMGP
Responsible Department	Office of Emergency Management, Commissioners' Court, Flood Plain Administrator, City Councils, Public Works Departments, City Administrations
Implementation Schedule	Short Term – 1 - 5 Years
Target	Existing and future population and infrastructure

Medina County

Medina County has identified the following mitigation actions to address its natural hazard vulnerabilities. The County plans to implement the actions as funding becomes available.

Multi-Hazard Actions

Mitigation Action	Public Education & Outreach
Objective	Develop newsletter to residents and business owners to educate and inform them of area hazards and protection and mitigation steps they can take to protect their lives and property.
Hazard	Flood, Hurricanes/Tropical Storms, Wildfire, Tornado, Drought, Riverine Erosion, Dam Failure, Earthquakes, Expansive Soils, Extreme Heat, Hailstorms, Land Subsidence, Severe Winter Storms, Windstorms, Lightning
Priority	Moderate
Estimated Cost	$100,000
Potential Funding Source (s)	Medina County, FEMA BRIC, FEMA HMGP
Responsible Department	Office of Emergency Management, Commissioners Court
Implementation Schedule	Pending funding - 1-2 years

Target	Existing and future population

Mitigation Action	**Install Generator/Alternative Power Source**
Objective	Install Generator/Alternative power source at critical facilities.
Hazard	Flood, Hurricanes/Tropical Storms, Wildfire, Tornado, Riverine Erosion, Dam Failure, Earthquakes, Extreme Heat, Hailstorms, Land Subsidence, Severe Winter Storms, Windstorms, Lightning
Priority	High
Estimated Cost	$25,000-$50,000 per portable generator $70,000-$200,000 per fixed generator
Potential Funding Source (s)	Medina County, HMGP Grants
Responsible Department	Office of Emergency Management, Sheriff's Office, Commissioners Court
Implementation Schedule	Pending Funding - 2-5 years
Target	Existing infrastructure

Mitigation Action	**Erosion Protection/Soil Stabilization**
Objective	This action proposes installing erosion protection/soil stabilization for drainage ditches and around culverts, including but not limited to applying calcium soil stabilizers to affected areas.
Hazard	Flood, Riverine Erosion, Expansive Soils
Priority	Low
Estimated Cost	$250,000 - $1,500,000
Potential Funding Source (s)	Medina County, HMGP Grants, TWDB
Responsible Department	Office of Emergency Management, Commissioners Court, Flood Plain Administrator
Implementation Schedule	Pending Funding - 5-10 years
Target	Existing and future population and infrastructure

Mitigation Action	**Obtain GIS Capabilities for Planning & Project Coordination**

Objective	This action proposes to obtain GIS capabilities for hazard mitigation planning and project coordination and includes, hardware, software, and training.
Hazard	Flood, Hurricanes/Tropical Storms, Wildfire, Tornado, Riverine Erosion, Dam Failure, Earthquakes, Extreme Heat, Hailstorms, Land Subsidence, Severe Winter Storms, Windstorms, Lightning
Priority	Moderate
Estimated Cost	$75,000
Potential Funding Source (s)	Medina County, FEMA BRIC, FEMA HMGP
Responsible Department	Office of Emergency Management, Sheriff's Office, Commissioners Court
Implementation Schedule	Pending Funding - 1-3 years
Target	Existing and future population and infrastructure

Mitigation Action	**Implement Tree Trimming Program**
Objective	This action will develop and implement a tree trimming program to minimum the amount of debris generated during national hazard events.
Hazards	Floods, Hurricanes/Tropical Storms, Wildfire, Tornados, Windstorms, Lightning
Priority	High
Estimated Cost	$100,000 – $200,000
Potential Funding Source(s)	Medina County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners' Court
Implementation Schedule	1-5 years
Target	Existing and future population and infrastructure

Mitigation Action	**Hardware and Software Technology**
Objective	To have hardware and technology available to communicate readily with local, state and national emergency organizations during a natural occurring hazardous event, including but not limited to portable digital warning signs, NOAA weather radios, radio repeaters, etc.
Hazard	Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Dam/Levee Failure, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm, Lightning
Priority	High

Estimated Cost	$5,000 - $35,000.00
Potential Funding Source (s)	Medina County, Cities, FEMA BRIC, FEMA HMGP
Responsible Department	Office of Emergency Management, Commissioners Court, Flood Plain Administrator
Implementation Schedule	1-5 Years
Target	Current and future infrastructure

Mitigation Action	**Document Hazard Occurrences**
Objective	This action will document occurrences of hazards within the next five years to address deficiencies in the data.
Hazard	Earthquake, Riverine/Inland Erosion, Expansive Soil, Land Subsidence
Priority	High
Estimated Cost	More than $100,000
Potential Funding Source(s)	Medina County, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB, TCEQ
Responsible Department(s)	Office of Emergency Management
Implementation Schedule	5 Years
Target	Existing and future population and infrastructure

Single Hazard Actions

Mitigation Action	**New Drainage Analysis to Update/Revise Flood Maps**
Objective	This action proposes performing a new drainage analysis for the community to update/revise Flood Maps to better identify areas subject to this Hazard.
Hazard	Flood
Priority	Moderate
Estimated Cost	$750,000 -$1,500,000
Potential Funding Source (s)	Medina County, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT, TWDB
Responsible Department	Flood Plain Administrator
Implementation Schedule	Pending Funding - 5-10 years
Target	Existing and future infrastructure

Mitigation Action	Lightning/Surge Protection for Critical Facilities
Objective	This action proposes installing surge protection at critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High
Estimated Cost	$150,000 - $400,000
Potential Funding Source (s)	Medina County, FEMA BRIC, FEMA HMGP
Responsible Department	Office of Emergency Management, Sheriff's Office, Commissioners Court
Implementation Schedule	Pending Funding - 2-4 years
Target	Existing infrastructure

Mitigation Action	Hailstorm Protection for Critical Facilities
Objective	This action proposes to install protective covers over equipment, machinery, vehicle/equipment storage areas, and building windows at all public facilities to prevent damage by hailstorms.
Hazard	Hailstorm
Priority	Low
Estimated Cost	$50,000-$250,000
Potential Funding Source (s)	Medina County, HMGP Grants
Responsible Department	Office of Emergency Management, Sheriff's Office, Commissioners Court
Implementation Schedule	Pending Funding - 2-5 years
Target	Existing and future infrastructure

Mitigation Action	Construct Storm Drainage Infrastructure
Objective	This action proposes constructing new storm drainage infrastructure and / or improving existing infrastructure to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	High

Estimated Cost	Greater than $2,000,000
Potential Funding Source (s)	Medina County, FEMA FMA, FEMA BRIC, FEMA HMGP
Responsible Department	Office of Emergency Management, Commissioners Court, Flood Plain Administrator
Implementation Schedule	5 Years
Target	Existing and future infrastructure

Mitigation Action	**Local Flood Warning System**
Objective	This action will prioritize areas to install a Local Flood Warning System and flood monitors using FEMA Special Flood Hazard Area maps and supplemental maps generated as part of flood mitigation planning process.
Hazard	Flood
Priority	High
Estimated Cost per Jurisdiction	More than $500,000
Potential Funding Source (s)	Medina County, FEMA BRIC, FEMA HMGP, TWDB, TCEQ
Implementation Responsibility	Office of Emergency Management, Commissioners' Court, Flood Plain Administrator
Implementation Schedule	12 months, pending funding availability
Target	Existing and future infrastructure

City of Castroville

City of Castroville has identified the following mitigation actions to address its natural hazard vulnerabilities. The City plans to implement the actions as funding becomes available.

Multi-Hazard Actions

Mitigation Action	**Install Generator/Alternative Power Source**
Objective	Install Generator/Alternative power source at critical facilities to help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages.
Hazard	Flood, Hurricanes/Tropical Storms, Wildfire, Tornado, Riverine Erosion, Dam Failure, Earthquakes, Extreme Heat, Hailstorms,

	Land Subsidence, Severe Winter Storms, Windstorms, Lightning
Priority	High
Estimated Cost	$25,000-$50,000 per portable generator $70,000-$200,000 per fixed generator
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works
Implementation Schedule	Pending Funding - 2 years
Target	Existing infrastructure

Mitigation Action	**Add Water Storage Tanks and Pumps**
Objective	This action proposes installing additional water storage tanks & pumps.
Hazard	Drought, Wildfire
Priority	High
Estimated Cost	$450,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works
Implementation Schedule	Pending Funding
Target	2-4 years

Mitigation Action	**Erosion Protection/Soil Stabilization**
Objective	This action proposes installing erosion protection/soil stabilization for drainage ditches and around culverts.
Hazard	Flood, Riverine Erosion
Priority	Low
Estimated Cost	$250,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA
Responsible Department	Public Works
Implementation Schedule	Pending Funding - 5-10 years

Target	Existing and future population and infrastructure

Mitigation Action	**Document Hazard Occurrences**
Objective	This action will document occurrences of hazards within the next five years to address deficiencies in the data.
Hazard	Earthquake, Riverine/Inland Erosion, Expansive Soil, Land Subsidence
Priority	High
Estimated Cost	More than $100,000
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB, TCEQ
Responsible Department(s)	Administration, Public Works
Implementation Schedule	5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Add Municipal Water Well**
Objective	This action proposes performing a study and other necessary planning to determine a suitable location for drilling an additional municipal water well.
Hazard	Drought, Wildfire
Priority	Moderate
Estimated Cost	$15,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Administrative/City Engineer
Implementation Schedule	Pending Funding - 2-3 years
Target	Existing and future population and infrastructure

Mitigation Action	**Obtain GIS Capabilities for Planning & Project Coordination**
Objective	This action proposes to obtain GIS capabilities for hazard mitigation planning and project coordination and includes, hardware, software, and training.
Hazard	All Hazards
Priority	Moderate
Estimated Cost	$15,000

Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Administration
Implementation Schedule	Pending Funding - 1-3 years
Target	Existing and future population and infrastructure

Mitigation Action	**Public Education & Outreach**
Objective	Develop newsletter to residents and business owners to educate and inform them of area hazards and protection and mitigation steps they can take to protect their lives and property.
Hazard	Flood, Hurricanes/Tropical Storms, Wildfire, Tornado, Drought, Riverine Erosion, Dam Failure, Earthquakes, Expansive Soils, Extreme Heat, Hailstorms, Land Subsidence, Severe Winter Storms, Windstorms, Lightning
Priority	Moderate
Estimated Cost	$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Administration / Utility
Implementation Schedule	Pending funding - 1-2 years
Target	Existing and future population

Mitigation Action	**Hardware and Software Technology**
Objective	To have hardware and technology available to communicate readily with local, state and national emergency organizations during a natural occurring hazardous event, including but not limited to portable digital warning signs, NOAA weather radios, radio repeaters, etc.
Hazard	Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Dam/Levee Failure, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	$10,000 - $50,000.00
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP

Responsible Department	Administration / Utility
Implementation Schedule	1-5 Years
Target	Current and future infrastructure

Mitigation Action	**Implement Tree Trimming Program**
Objective	This action will develop and implement a tree trimming program to minimum the amount of debris generated during national hazard events.
Hazards	Floods, Hurricanes/Tropical Storms, Wildfire, Tornados, Windstorms, Lightning
Priority	High
Estimated Cost	$10,000 – $50,000
Potential Funding Source(s)	County, City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works
Implementation Schedule	Short Term 1-5 years
Target	Existing and future population and infrastructure

Mitigation Action	**Harden Facilities**
Objective	Hardening facilities for safety and resilience including but not limited to reinforcing building foundations, upgrading or adding shatter proof or resistant film to all glazing, building walls around exposed fuel tanks and cylinders, building protective walls, shielding roof mounted equipment, use of bracing and tie down clips to building roofs.
Hazard	Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Riverine Erosion, Dam Failure, Expansive Soil, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm
Priority	High
Estimated Cost	Greater than $125,000.00
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Administration, Public Works
Implementation Schedule	5-10 years
Target	Existing and planned infrastructure

Single Hazard Actions

Mitigation Action	Construct Storm Drainage Infrastructure
Objective	This action proposes constructing new storm drainage infrastructure and / or improving existing infrastructure to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	High
Estimated Cost	Greater than $1,000,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Mayor's Office, City Administrators Office, Chief of Police Office, Public Works Directors Office; Medina County Judge & Commissioners Court, Medina County Emergency Management Office
Implementation Schedule	5 Years
Target	Existing and future infrastructure

Mitigation Action	Create and Adopt a Riverine Erosion Control Master Plan
Objective	This action will develop and implement a master plan to limit riverine erosion.
Hazard	Riverine Erosion
Priority	Medium
Estimated Cost	$10,000 - $100,000
Potential Funding Source (s)	City, FEMA HMGP
Responsible Department	Administration, Public Works
Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future infrastructure

Mitigation Action	Develop and Implement a New Drought Ordinance/Drought Contingency Plan
Objective	To re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new drought ordinance/drought contingency plan.
Hazard	Drought
Priority	Medium
Estimated Cost	Less than $10,000

Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Administration, Public Works
Implementation Schedule	Short Term – 1-5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Replace Current Landscaping with Drought Resistant Plant Varieties**
Objective	This action's goal is to limit water consumption at City facilities by replacing existing landscaping with more drought resistant types. 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 $20,000
Potential Funding Source (s)	City, Texas Parks and Wildlife, Keep Texas Beautiful, FEMA BRIC, FEMA HMGP
Responsible Department	Administration, Public Works
Implementation Schedule	Short Term – 1-5 Years
Target	Existing and future infrastructure

Mitigation Action	**Review Special Flood Hazard Area Boundaries**
Objective	This action proposes a re-evaluation of existing special flood hazard areas boundaries in order to gauge accuracy and identify potential changes to reduce future damages during flood events.
Hazard	Flood
Priority	High
Estimated Cost	Less than $20,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, TCEQ
Responsible Department	Administration, Public Works
Implementation Schedule	1-5 Years

Target	Existing and planned infrastructure

Mitigation Action	**Hailstorm Protection for Public Facilities**
Objective	This action proposes to install protective covers over equipment, machinery, vehicle/equipment storage areas, and building windows at all public facilities to prevent damage by hailstorms
Hazard	Hailstorm
Priority	Medium
Estimated Cost	$40,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works
Implementation Schedule	Pending Funding - 2-3 years
Target	Existing and current infrastructure

Mitigation Action	**Lightning/Surge Protection for Public Facilities**
Objective	This action proposes installing surge protection at all critical/public facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High
Estimated Cost	$250,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works
Implementation Schedule	Pending Funding - 2 years
Target	Existing and future infrastructure

Mitigation Action	**Wet-Proof Wastewater System**

Objective	This action proposes “wet-proofing” components of the Wastewater Treatment Plant and sewer lines to minimize/prevent infiltration of storm/flood waters.
Hazard	Flood
Priority	High
Estimated Cost	$200,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Public Works
Implementation Schedule	Pending Funding - 2-4 years
Target	Existing infrastructure

Mitigation Action	**New Drainage Analysis to Update/Revise Flood Maps**
Objective	This action proposes performing a new drainage analysis for the community to update/revise Flood Maps to better identify areas subject to this Hazard.
Hazard	Flood
Priority	Moderate
Estimated Cost	$50,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA
Responsible Department	Administration
Implementation Schedule	Pending Funding - 5-10 years
Target	Existing and future infrastructure and population

City of Devine

The City of Devine has identified the following mitigation actions to address its natural hazard vulnerabilities. The City plans to implement the actions as funding becomes available.

Multi-Hazard Actions

Mitigation Action	**Public Education & 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, developing a newsletter to residents and

	business owners to educate and inform them of area hazards and protection and mitigation steps they can take to protect their lives and property, etc…
Hazard	Flood, Hurricanes/Tropical Storms, Wildfire, Tornados, Drought, Riverine Erosion, Dam Failure, Earthquakes, Expansive Soils, Extreme Heat, Hailstorms, Land Subsidence, Severe Winter Storms, Windstorms, Lightning
Priority	Moderate
Estimated Cost	$10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA
Responsible Department	City Administration / Utility
Implementation Schedule	1 – 2 years
Target	Existing and future population

Mitigation Action	**Personnel Training and Education**
Objective	To develop a plan of action and instruction for all City employees.
Hazard	Flood, Hurricanes/Tropical Storms, Wildfire, Tornados, Drought, Riverine Erosion, Dam Failure, Earthquakes, Expansive Soils, Extreme Heat, Hailstorms, Land Subsidence, Severe Winter Storms, Windstorms, Lightning
Priority	Moderate
Estimated Cost	$30,000.00
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City of Devine and Office of Emergency Management
Implementation Schedule	1 – 3 years
Target	Existing and future employees of the City of Devine and governing body

Mitigation Action	**Install Generator/Alternative Power Source**
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages.

Hazard	Flood, Hurricanes/Tropical Storms, Wildfire, Tornados, Dam Failure, Earthquakes, Extreme Heat, Hailstorms, Severe Winter Storms, Windstorms, Lightning
Priority	High
Estimated Cost	$60,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FMA
Responsible Department	City of Devine Public Works
Implementation Schedule	1 year
Target	Existing and future population and infrastructure

Mitigation Action	**Document Hazard Occurrences**
Objective	This action will document occurrences of hazards within the next five years to address deficiencies in the data.
Hazard	Riverine/Inland Erosion, Expansive Soil, Land Subsidence
Priority	High
Estimated Cost	More than $100,000
Potential Funding Source(s)	City of Devine, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB, TCEQ
Responsible Department(s)	City of Devine Public Works
Implementation Schedule	5 Years
Target	Existing and future population and infrastructure

Single Hazard Actions

Mitigation Action	**Lightning Protection for Infrastructure**
Objective	Install protective devices that are able to withstand lightning strikes, preventing damage to electronic devices and other critical electronic components.
Hazard	Lightning
Priority	High
Estimated Cost	$500,000.00
Potential Funding Source(s)	City of Devine, FEMA BRIC, FEMA HMGP
Responsible Department	City of Devine Public Works
Implementation Schedule	1-10 years
Target	Current and future Infrastructure Sites

Mitigation Action	Develop and Implement a New Drought Ordinance/Drought Contingency Plan
Objective	To re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new drought ordinance/drought contingency plan.
Hazard	Drought
Priority	Medium
Estimated Cost	Less than $10,000
Potential Funding Source(s)	City of Devine, FEMA BRIC, FEMA HMGP
Responsible Department	City Administration
Implementation Schedule	Short Term – 1-5 Years
Target	Existing and future population and infrastructure

City of Hondo

The City of Hondo has identified the following mitigation actions to address its natural hazard vulnerabilities. The City plans to implement the actions as funding becomes available.

Multi-Hazard Actions

Mitigation Action	Public Education & Outreach
Objective	Develop newsletter to residents and business owners to educate and inform them of area hazards and protection and mitigation steps they can take to protect their lives and property.
Hazard	Flood, Hurricanes/Tropical Storms, Wildfire, Tornados, Drought, Riverine Erosion, Dam Failure, Earthquakes, Expansive Soils, Extreme Heat, Hailstorms, Land Subsidence, Severe Winter Storms, Windstorms, Lightning
Priority	Moderate
Estimated Cost	$25,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City Administration
Implementation Schedule	Pending funding - 1-2 years
Target	Existing and future population

Mitigation Action	Harden Facilities
Objective	Hardening facilities for safety and resilience including but not limited to reinforcing building foundations, upgrading or adding shatter proof or resistant film to all glazing, building walls around exposed fuel tanks and cylinders, building protective walls, shielding roof mounted equipment, use of bracing and tie down clips to building roofs.
Hazard	Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Riverine Erosion, Dam Failure, Expansive Soil, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm
Priority	High
Estimated Cost	Greater than $125,000.00
Potential Funding Source (s)	City, FEMA FMA, FEMA BRIC, FEMA HMGP
Responsible Department	City Administration, Public Works, Code Compliance
Implementation Schedule	1-5 years
Target	Existing and planned infrastructure

Mitigation Action	Hardware and Software Technology
Objective	To have hardware and technology available to communicate readily with local, state and national emergency organizations during a natural occurring hazardous event, including but not limited to portable digital warning signs, NOAA weather radios, radio repeaters, etc.
Hazard	Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Dam/Levee Failure, Extreme Heat, Hailstorm, Severe Winter Storm, Windstorm, Lightning
Priority	High
Estimated Cost	$5,000 - $35,000.00
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City Administration, IT
Implementation Schedule	1-5 Years
Target	Current and future infrastructure

Mitigation Action	Implement Tree Trimming Program
Objective	This action will develop and implement a tree trimming program to minimum the amount of debris generated during national hazard events.
Hazards	Floods, Hurricanes/Tropical Storms, Wildfire, Tornados, Windstorms, Lightning
Priority	High
Estimated Cost	$10,000 – $50,000
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City Administration, Public Works, Code Compliance
Implementation Schedule	Short Term - 1-5 years
Target	Existing and future population and infrastructure

Mitigation Action	Install Generator/Alternative Power Source
Objective	Install Generator/Alternative power source at public facilities
Hazard	Flood, Hurricanes/Tropical Storms, Wildfire, Tornado, Riverine Erosion, Dam Failure, Earthquakes, Extreme Heat, Hailstorms, Severe Winter Storms, Windstorms, Lightning
Priority	High
Estimated Cost	$400,000
Potential Funding Source (s)	City, FEMA HMGP
Responsible Department	City Administration, Public Works, Code Compliance
Implementation Schedule	Pending Funding - 1-3 years
Target	Existing infrastructure

Mitigation Action	Document Hazard Occurrences
Objective	This action will document occurrences of hazards within the next five years to address deficiencies in the data.

Hazard	Dam Failure, Riverine/Inland Erosion, Expansive Soil, Land Subsidence
Priority	High
Estimated Cost	More than $100,000
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB, TCEQ
Responsible Department(s)	City Administration, Public Works, Code Compliance
Implementation Schedule	5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Add Water Storage Tanks and Pumps**
Objective	This action proposes installing additional water storage tanks & pumps.
Hazard	Drought, Wildfire
Priority	High
Estimated Cost	$450,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City Administration, Public Works, Code Compliance
Implementation Schedule	Pending Funding - 2-4 years
Target	Existing and future infrastructure

Mitigation Action	**Erosion Protection/Soil Stabilization**
Objective	This action proposes installing erosion protection/soil stabilization for drainage ditches and around culverts.
Hazard	Flood, Riverine Erosion
Priority	Low
Estimated Cost	$450,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City Administration, Public Works, Code Compliance
Implementation Schedule	Pending Funding - 5-10 years
Target	Existing and future population and infrastructure

Mitigation Action	**Obtain GIS Capabilities for Planning & Project Coordination**

Objective	This action proposes to obtain GIS capabilities for hazard mitigation planning and project coordination and includes, hardware, software, and training.
Hazard	Flood, Hurricanes/Tropical Storms, Wildfire, Tornado, Drought, Riverine Erosion, Dam Failure, Earthquakes, Expansive Soils, Extreme Heat, Hailstorms, Land Subsidence, Severe Winter Storms, Windstorms, Lightning
Priority	Moderate
Estimated Cost	$100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City Administration, IT
Implementation Schedule	Pending Funding - 1-3 years
Target	Existing and future population and infrastructure

Single Hazard Actions

Mitigation Action	**New Drainage Analysis to Update/Revise Flood Maps**
Objective	This action proposes performing a new drainage analysis for the community to update/revise Flood Maps to better identify areas subject to this Hazard.
Hazard	Flood
Priority	Moderate
Estimated Cost	$150,000
Potential Funding Source (s)	City, FEMA HGMP, FEMA BRIC, FEMA FMA
Responsible Department	City Administration, Public Works, Code Compliance
Implementation Schedule	Pending Funding - 4-7 years
Target	Existing and future infrastructure and population

Mitigation Action	**Wet-Proof Wastewater System**
Objective	This action proposes “wet-proofing” components of the Wastewater Treatment Plant and sewer lines to minimize/prevent infiltration of storm/flood waters.
Hazard	Flood
Priority	High
Estimated Cost	$400,000
Potential Funding Source (s)	City, FEMA HMGP, FEMA BRIC, FEMA FMA

Responsible Department	City Administration, Public Works, Code Compliance
Implementation Schedule	Pending Funding - 2-4 years
Target	Existing and future infrastructure

Mitigation Action	**Lightning/Surge Protection for Public Facilities**
Objective	This action proposes installing surge protection at all public/critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High
Estimated Cost	$500,000
Potential Funding Source (s)	City, FEMA HMGP, FEMA BRIC
Responsible Department	City Administration, Public Works, Code Compliance
Implementation Schedule	Pending Funding - 2-4 years
Target	Existing and future infrastructure

Mitigation Action	**Hailstorm Protection for Public Facilities**
Objective	This action proposes to install protective covers over equipment, machinery, vehicle/equipment storage areas, and building windows at all public/critical facilities to prevent damage by hailstorms.
Hazard	Hailstorm
Priority	Low
Estimated Cost	$200,000
Potential Funding Source (s)	City, FEMA HMGP, FEMA BRIC
Responsible Department	City Administration, Public Works, Code Compliance
Implementation Schedule	Pending Funding - 2-3 years
Target	Existing and future infrastructure and population

Mitigation Action	**Review Special Flood Hazard Area Boundaries**

Objective	This action proposes a re-evaluation of existing special flood hazard areas boundaries in order to gauge accuracy and identify potential changes to reduce future damages during flood events.
Hazard	Flood
Priority	High
Estimated Cost	Less than $10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB, TCEQ
Responsible Department	City Administration, Code Compliance
Implementation Schedule	1-5 Years
Target	Existing and future infrastructure and population

Mitigation Action	**Replace Current Landscaping with Drought Resistant Plant Varieties**
Objective	This action's goal is to limit water consumption at County facilities by replacing existing landscaping with more drought resistant types. 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 $75,000
Potential Funding Source(s)	City, Texas Parks and Wildlife, Keep Texas Beautiful, FEMA BRIC, FEMA HMGP
Responsible Department	City Administration, Public Works, Code Compliance
Implementation Schedule	Short Term – 1-5 Years
Target	Existing and future infrastructure

Mitigation Action	**Develop and Implement a New Drought Ordinance/Drought Contingency Plan**
Objective	To re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new drought ordinance/drought contingency plan.
Hazard	Drought
Priority	Medium

Estimated Cost	Less than $10,000
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City Administration, Public Works, Code Compliance
Implementation Schedule	Short Term – 1-5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Create and Adopt a Riverine Erosion Control Master Plan**
Objective	This action will develop and implement master plan to limit riverine erosion.
Hazard	Riverine Erosion
Priority	Medium
Estimated Cost	$100,000 - $400,000
Potential Funding Source(s)	City, FEMA HMGP
Responsible Department	City Administration, Public Works, Code Compliance
Implementation Schedule	Short Term - 1-5 Years
Target	Existing and future infrastructure

Mitigation Action	**Construct Storm Drainage Infrastructure**
Objective	This action proposes constructing new storm drainage infrastructure and / or improving existing infrastructure to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	High
Estimated Cost	Greater than $1,000,000
Potential Funding Source(s)	City, FEMA FMA, FEMA BRIC, FEMA HMGP
Responsible Department	City Administration, Public Works, Code Compliance
Implementation Schedule	5 Years
Target	Existing and future infrastructure

City of La Coste

The City of La Coste has identified the following mitigation actions to address its natural hazard vulnerabilities. The City plans to implement the actions as funding becomes available.

Multi-Hazard Actions

Mitigation Action	Public Education & 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, developing a newsletter to residents and business owners to educate and inform them of area hazards and protection and mitigation steps they can take to protect their lives and property, etc…
Hazard	Flood, Hurricanes/Tropical Storms, Wildfire, Tornados, Drought, Riverine Erosion, Dam Failure, Earthquakes, Expansive Soils, Extreme Heat, Hailstorms, Land Subsidence, Severe Winter Storms, Windstorms, Lightning
Priority	Medium
Estimated Cost	$10,000
Potential Funding Source(s)	City, FEMA Corps, FEMA BRIC, FEMA HMGP, FMA
Responsible Department	City Administration / Utility
Implementation Schedule	1 – 2 years
Target	Existing and future population

Mitigation Action	Install Generator/Alternative Power Source
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages.
Hazard	Flood, Hurricanes/Tropical Storms, Wildfire, Tornados, Dam Failure, Earthquakes, Extreme Heat, Hailstorms, Severe Winter Storms, Windstorms, Lightning
Priority	High
Estimated Cost	$60,000
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FMA
Responsible Department	City of La Coste Public Works
Implementation Schedule	1 year
Target	Existing and future population and infrastructure

Mitigation Action	Add Water Storage Tanks and Pumps

Objective	This action proposes installing additional water storage tanks & pumps at critical facilities in order to increase capacity for hazards.
Hazard	Drought, Wildfire
Priority	High
Estimated Cost	$450,000
Potential Funding Source(s)	City, FEMA HMGP, FEMA BRIC
Responsible Department	City of La Coste Public Works
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Add Municipal Water Well**
Objective	This action proposes performing a study and other necessary planning to determine a suitable location for drilling an additional municipal water well.
Hazard	Drought, Wildfire
Priority	Medium
Estimated Cost	$15,000
Potential Funding Source(s)	City, FEMA HMGP, FEMA BRIC, FEMA FMA
Responsible Department	City Administration, City Engineer
Implementation Schedule	2 - 3 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Obtain GIS Capabilities for Planning & Project Coordination**
Objective	This action proposes to obtain GIS capabilities for hazard mitigation planning and project coordination and includes hardware, software, and training.
Hazard	Flood, Hurricanes/Tropical Storms, Wildfire, Tornados, Dam Failure, Earthquakes, Extreme Heat, Hailstorms, Severe Winter Storms, Windstorms, Lightning
Priority	Medium
Estimated Cost	$15,000
Potential Funding Source(s)	City, FEMA HMGP, FEMA BRIC, FEMA FMA
Responsible Department	City Administration

Implementation Schedule	1 - 3 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Document Hazard Occurrences**
Objective	This action will document occurrences of hazards within the next five years to address deficiencies in the data.
Hazard	Riverine Erosion, Expansive Soils, Land Subsidence
Priority	High
Estimated Cost	More than $100,000
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB, TCEQ
Responsible Department(s)	City of La Coste Public Works
Implementation Schedule	5 Years
Target	Existing and future population and infrastructure

Single Hazard Actions

Mitigation Action	**New Drainage Analysis to Update/Revise Flood Maps**
Objective	This action proposes performing a new drainage analysis for the community to update/revise Flood Maps to better identify areas subject to this Hazard; last study completed in September 1977.
Hazard	Flood
Priority	Medium
Estimated Cost	$50,000
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB, TCEQ, UGRA
Responsible Department	City Administration
Implementation Schedule	5-10 years
Target	Existing and future infrastructure

Mitigation Action	**Erosion Protection/Soil Stabilization**
Objective	This action proposes installing erosion protection/soil stabilization for drainage ditches and around culverts.
Hazard	Riverine Erosion
Priority	Low
Estimated Cost	$250,000

Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA
Responsible Department	City of La Coste Public Works
Implementation Schedule	Pending Funding
Target	5-10 years

Mitigation Action	**Wet-Proof Wastewater System**
Objective	This action proposes “wet-proofing” components of the Wastewater Treatment Plant and sewer lines to minimize/prevent infiltration of storm/flood waters.
Hazard	Flood
Priority	High
Estimated Cost	$200,000
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA
Responsible Department	City of La Coste Public Works
Implementation Schedule	2 – 4 years
Target	Existing and future infrastructure

Mitigation Action	**Lightning/Surge Protection for Critical Facilities**
Objective	This action proposes installing surge protection at all critical facilities to prevent damage to critical electronic devices including but not limited to: computers, servers, audio/visual equipment, laboratory equipment, and appliances.
Hazard	Lightning
Priority	High
Estimated Cost	$150,000
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City of La Coste Public Works
Implementation Schedule	2 – 3 years
Target	Existing and future infrastructure

Mitigation Action	**Hailstorm Protection for Critical Facilities**

Objective	This action proposes to install protective covers over equipment, machinery, vehicle/equipment storage areas, and building windows at all critical facilities to prevent damage by hailstorms.
Hazard	Hailstorm
Priority	Low
Estimated Cost	$40,000
Potential Funding Source(s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	City of La Coste Public Works
Implementation Schedule	2 - 3 years
Target	Existing and future infrastructure

City of Natalia

The City of Natalia has identified the following mitigation actions to address its natural hazard vulnerabilities. The City plans to implement the actions as funding becomes available.

Multi-Hazard Actions

Mitigation Action	**Employ Educational Training**
Objective	This action will create a program to educate our employees, government officials and agents, about specific mitigation actions for all hazards, including but not limited to the adoption, participation, and implementation of programs and plans in compliance with National Incident Management Systems (NIMS), and the National Flood Insurance Programs (NFIP).
Hazards	Floods, Hurricanes/Tropical Storms, Wildfire, Tornados, Drought, Dam/Levee Failures, Riverine Erosion, Earthquakes, Expansive Soils, Extreme Heat, Hailstorms, Land Subsidence, Windstorms, Lightning, Drainage
Priority	High
Estimated Cost	$10,000 – $50,000
Potential Funding Source(s)	County, City, CDBG Funds, FEMA, HMGP, MDD Funds, other State/Federal Funding eligible
Responsible Department	City of Natalia: Mayors Office, City Administrators Office, Chief of Police Office, Public Works Directors Office; Medina County Judge & Commissioners Court, Medina County Emergency Management Office
Implementation Schedule	Short Term 1-5 years
Target	Existing and future employment

Mitigation Action	Educational Outreach
Objective	This action will create a program to educate the public about specific mitigation action plans for all hazards, including but not limited to participation in NFIP, Wildfire Fuels Reduction, Structural Hardening, etc.…
Hazards	Floods, Hurricanes/Tropical Storms, Wildfire, Tornados, Drought, Dam/Levee Failures, Riverine Erosion, Earthquakes, Expansive Soils, Extreme Heat, Hailstorms, Land Subsidence, Windstorms, Severe Winter Storms, Lightning
Priority	High
Estimated Cost	$0 - 10,000
Potential Funding Source(s)	County, City, CDBG Funds, FEMA, HMGP, MDD Funds, other State/Federal Funding eligible
Responsible Department	City of Natalia: Mayors Office, City Administrators Office, Chief of Police Office, Public Works Directors Office; Medina County Judge & Commissioners Court, Medina County Emergency Management Office
Implementation Schedule	Short Term 1-5 years
Target	Existing and future population

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	Floods, Hurricanes/Tropical Storms, Wildfire, Tornados, Dam Failure, Earthquakes, Extreme Heat, Hailstorms, Severe Winter Storms, Windstorms, Lightning
Priority	High
Estimated Cost	$10,000 – $25,000
Potential Funding Source(s)	County, City, CDBG Funds, FEMA HMGP, other State/Federal Funding eligible
Responsible Department	City of Natalia: Mayors Office, City Administrators Office, Chief of Police Office, Public Works Directors Office; Medina County Emergency Management Office
Implementation Schedule	Short Term 1-5 years
Target	Existing and future population and infrastructure

Mitigation Action	Implement Tree Trimming Program
Objective	This action will develop and implement a tree trimming program to minimum the amount of debris generated during national hazard events.

Hazards	Floods, Hurricanes/Tropical Storms, Wildfire, Tornados, Windstorms, Lightning
Priority	High
Estimated Cost	$10,000 – $50,000
Potential Funding Source(s)	County, City, FEMA BRIC, FEMA HMGP
Responsible Department	City of Natalia: Mayors Office, City Administrators Office, Chief of Police Office, Public Works Directors Office; Medina County Emergency Management Office
Implementation Schedule	Short Term 1-5 years
Target	Existing and future population and infrastructure

Mitigation Action	**Develop and Install a Geographical Information System (GIS)/Data Sharing**
Objective	This action will develop and implement a data management program that provides inventory of existing facilities, utilities, infrastructure, drainage and floodways and allows analysis to find areas most at risk for hazards, through an accessible database system for key departments and agency use.
Hazards	Floods, Hurricanes/Tropical Storms, Wildfire, Tornados, Dam/Levee Failures, Riverine Erosion, Earthquakes, Expansive Soils, Hailstorms, Land Subsidence, Windstorms, Lightning
Priority	High
Estimated Cost	$25,000 – $250,000
Potential Funding Source(s)	County, City, FEMA HMGP
Responsible Department	City of Natalia: Mayors Office, City Administrators Office, Chief of Police Office, Public Works Directors Office; Medina County Judge & Commissioners Court; Medina County Emergency Management Office; Utility Companies; Texas Dept of Transportation; Emergency Services: Police, Fire and EMS
Implementation Schedule	Short Term 1-10 years
Target	Existing and future population and infrastructure

Mitigation Action	**Document Hazard Occurrences**
Objective	This action will document occurrences of hazards within the next five years to address deficiencies in the data.
Hazard	Earthquake, Riverine Erosion, Expansive Soils, Land Subsidence
Priority	High

Estimated Cost	More than $100,000
Potential Funding Source(s)	County, City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB, TCEQ
Responsible Department(s)	City of Natalia: Mayors Office, City Administrators Office, Chief of Police Office, Public Works Directors Office; Medina County Emergency Management Office
Implementation Schedule	5 Years
Target	Existing and future population and infrastructure

Single Hazard Actions

Mitigation Action	**Construct Storm Drainage Infrastructure**
Objective	This action proposes constructing new storm drainage infrastructure and / or improving existing infrastructure to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	High
Estimated Cost	Greater than $1,000,000
Potential Funding Source(s)	City, FEMA FMA, FEMA BRIC, FEMA HMGP
Responsible Department	City of Natalia: Mayors Office, City Administrators Office, Chief of Police Office, Public Works Directors Office; Medina County Judge & Commissioners Court, Medina County Emergency Management Office
Implementation Schedule	5 Years
Target	Existing and future infrastructure

Mitigation Action	**Replace Current Landscaping or Plant Future Landscaping with Drought Resistant Plant Varieties**
Objective	This action's goal is to limit water consumption at City facilities by replacing existing landscaping with more drought resistant types, and making any future landscaping at all public and critical facilities drought-resistant. 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 $20,000
Potential Funding Source (s)	City, Texas Parks and Wildlife, Keep Texas Beautiful, FEMA BRIC, FEMA HMGP

Responsible Department	City of Natalia: Mayors Office, City Administrators Office, Public Works Directors Office
Implementation Schedule	Short Term – 1-5 Years
Target	Existing and future infrastructure