2024 Kleberg County

Multi-Hazard Mitigation Plan

"Under the Federal Disaster Mitigation Act of 2000 (DMA 2000 or "the Act"), Kleberg 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 2024 Kleberg County Hazard Mitigation Action Plan (HMAP) is an update of the County's most recent 2018 plan that expired in March 2023. The 2018 plan previously included Kenedy County as a participating jurisdiction, however the jurisdiction is not a participant for the Plan Update. As of now, this 2024 Hazard Mitigation Action Plan Update includes two participating jurisdictions: Kleberg County and the City of Kingsville.

2) Hazards to be Addressed

Previously, the expired 2018 HMAP identified 13 natural hazards facing the County: hurricanes/tropical storms, drought, hailstorm, flooding, tornados, windstorms, wildfire, severe winter storm, extreme heat, expansive soils, dam failure, lightning, and coastal erosion.

The mitigation planning regulation of the Disaster Mitigation Act[1] requires that mitigation plans be reviewed and updated every five years to maintain eligibility for mitigation grant funding. As part of this plan, Kleberg County will develop a schedule to ensure that its hazard mitigation plan is regularly updated.

The 2024 Kleberg County Hazard Mitigation Action Plan update will address the following 13 natural hazards identified in the State of Texas' 2018 Hazard Mitigation Plan as threats throughout the state. Each participating jurisdiction will address the following natural hazards listed below in Table 1.

[1] 44 CFR §201.6(d)(3)

Table 1: List of Hazards Addressed

Hazard	Jurisdiction	
	Kleberg County	City of Kingsville
Flooding	X	X
Hurricanes, Tropical Storms, and Depressions	X	X
Wildfire	X	X
Tornados	X	X
Drought	X	X
Extreme Cold	X	X
Extreme Heat	X	X
Hailstorm	X	X
Winter Storm	X	X
Severe Winds	X	X
Lightning	X	X
Additional Optional Hazards		
Coastal Erosion	X	
Inland Erosion		
Land Subsidence		
Earthquakes		
Expansive Soils		
Dam / Levee Failure	X	X

Omission Statements

Kleberg County and the participating jurisdictions will not be addressing the following hazards: Inland Erosion, Land Subsidence, Earthquakes, and Expansive Soils. The City of Kingsville will not be addressing Coastal Erosion, only Kleberg County will profile this natural hazard. The history of impacts for all the omitted hazards have been negligible (or non-existent), therefore the County and participating jurisdictions expects that future impacts will be negligible as well. The County and participating jurisdictions do not anticipate applying for grant funding to address any of them.

2. Planning Process

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

Table 2: Local Planning Team Representatives

Title	Jurisdiction
County Judge	Kleberg County
Chief of Staff	
Mayor	City of Kingsville
City Manager	
Fire/EMC Chief	

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

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

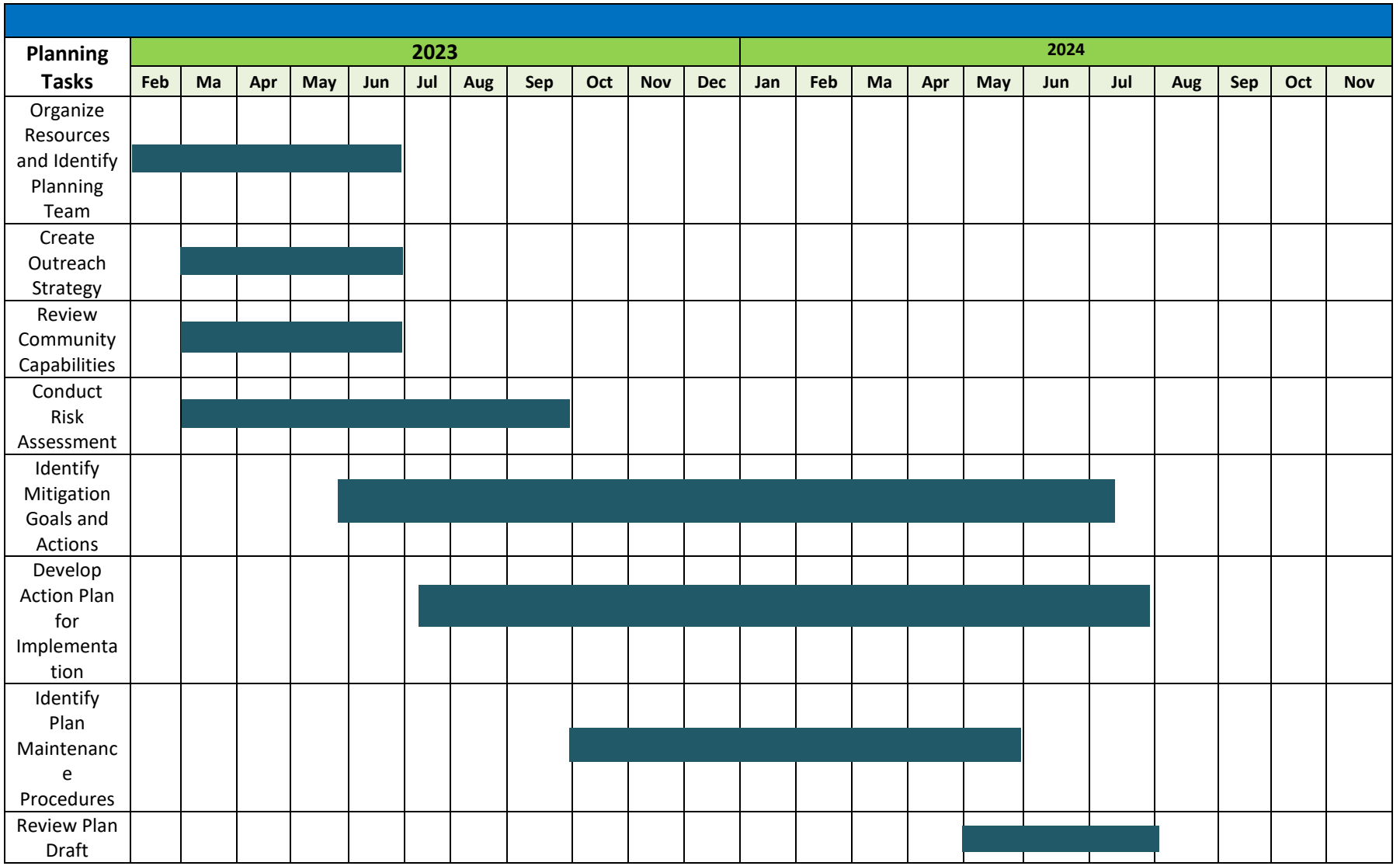
1. Providing technical assistance and necessary data to the HMPT.
2. Scheduling, coordinating, and facilitating community meetings.
3. Providing necessary materials for public planning meetings.
4. Collecting and analyzing data.
5. Developing mitigation goals and implementation strategies.
6. Preparing 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 efforts.

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

Table 3: Plan Schedule



Submit Plan to State and FEMA																						
Adopt Plan																						
MEETINGS																						
Planning Team		3/07/2023	4/25/2023																			
Public Outreach – Online Surveys																						
Stakeholder Outreach																						

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
National Centers for Environmental Information (NCEI)	Hazard occurrences	Previous event occurrences, damage dollars, and mapping for all hazards
National Oceanic and Atmospheric Administration (NOAA)	Historic Weather Data	Previous event occurrences, damage dollars, and mapping for all hazards
Kleberg and Kenedy Counties and City of Kingsville Multi-Hazard Mitigation Plan, 2018-2023	Previous planning approach, hazards addressed, and mitigation actions	Previous planning team representatives, plan maintenance, hazard histories, and mitigation actions
State of Texas Hazard Mitigation Plan 2018 Update	Hazard Descriptions	Official descriptions of hazards and their potential impacts
Federal Emergency Management Agency (FEMA) Flood Zones	Flood Zones maps	GIS mapping of flood zones
Kleberg County Appraisal District Data	Property values and parcel counts	Population counts, parcel data, and land use data
National Inventory of Dams	Dam information	Identity high-hazard or significant risk dams
Kingsville Chamber of Commerce/Economic Development	Housing and Development information	Identify growth in the City and surrounding areas
City of Kingsville Flood Damage Prevention Ordinance	Flood damage prevention requirements	Identifying building requirements and restrictions for structures in the floodplain
City of Kingsville Drought Contingency Plan	Local drought controls	Identify opportunities to increase drought controls and opportunities for water conservation to reduce drought's impact

Additional information sources included: U.S. Census Data, 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
Kenedy County	Emergency District Services #1 Coordinator	N
Brooks County	Emergency Management Coordinator	N
Nueces County	Emergency Management Coordinator	N
Jim Wells County	Emergency Management Coordinator	N
UnitedWay of the Coastal Bend	Vice President of Community Impact	Y
Area Agency on Aging	Director	N
Texas A&M AgriLife Extension	Kleberg County Extension Agent – Agriculture & Natural Resources	N
Texas A&M AgriLife Extension	Kleberg County Extension Agent – Family & Community Health	N
Kingsville Chamber of Commerce	President/CEO	Y

Area stakeholders were contacted by phone and email. Each stakeholder was contacted at least twice in an effort to increase participation. Local Academia, businesses, and community based/ non-profit organizations were contacted to reach a diverse group of stakeholders. Those organizations included the Texas A&M AgriLife Extension, the local Area Agency on Aging, UnitedWay of the Coastal Bend, Chamber of Commerce, and others. These organizations focus on multiple community needs such as education, food, health and safety, and financial stability. Area stakeholders who chose to participate provided important supplemental input and information that helped shape mitigation strategies for each hazard, by making the planning team aware of actions neighboring communities were successful in implementing, and what actions they think should take priority.

2) Project Meetings

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

The first local planning team meeting was held virtually on March 7, 2023. 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 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. At the end of the meeting, planning team members were tasked with compiling relevant data, including city

ordinances; court orders and regulations; identifying critical facilities; and providing a status update on previous mitigation actions.

The second planning team meeting was held virtually on April 25, 2023. To stay on schedule, the planning team needed to meet the following objectives: Finalize the hazards list, collect relevant ordinances and plans, review and refine the critical facilities list, and identify area stakeholders, as well as review possible mitigation actions and potential eligible projects for each participant. The planning team discussed and identified new mitigation actions, discussed changes to the plan drafts, and agreed to work on completing all deliverables for the plan. Additional work was done over email in preparation for submitting the plan for official review in August, 2024.

3) Public Input

Members of the public were invited to participate in two public comment periods to provide input and feedback during the planning process, both comment periods were held virtually. The first public comment period took place during the beginning of April 2023. A Microsoft Form survey was posted to the County website for a period of two weeks for members of the public to fill out. A newspaper ad was placed to announce to the public the opportunity to provide input via online survey. In an effort to reach the widest audience possible, especially socially vulnerable populations, the County and participating jurisdictions actively announced the online survey through newspaper ads, on their own websites, and social media. Stakeholders who support vulnerable populations were also provided with a link to the survey and encouraged to share it with their community. The planning team appreciated receiving responses to the survey which helped inform them when identifying and prioritizing new mitigation actions for this plan update. The survey received 22 anonymous responses.

<u>The survey asked nine questions</u>:

1. Where do you live?
2. Do you own or rent?
3. Which hazards do you believe impact the County and/or participating cities the most? Please select all that apply (multiple choice answer).
4. Which of the above hazards have affected you directly within the past five years? Please select all that apply (multiple choice answer).
5. How have you been affected by the hazards selected above? (Open-ended question)
6. Have you taken any actions to reduce your risk to these hazards? If so, what actions have you taken? (Open-ended question)
7. Which of the following mitigation project types do you believe local government agencies should focus on to reduce disruptions of services and to strengthen the community? Please check all that apply (multiple choice answer).

8. Do you have any other thoughts or concerns relating to the Hazard Mitigation Plan? (Open-ended question)
9. What is the best means of communication for you? Please select all that apply (multiple choice answer).

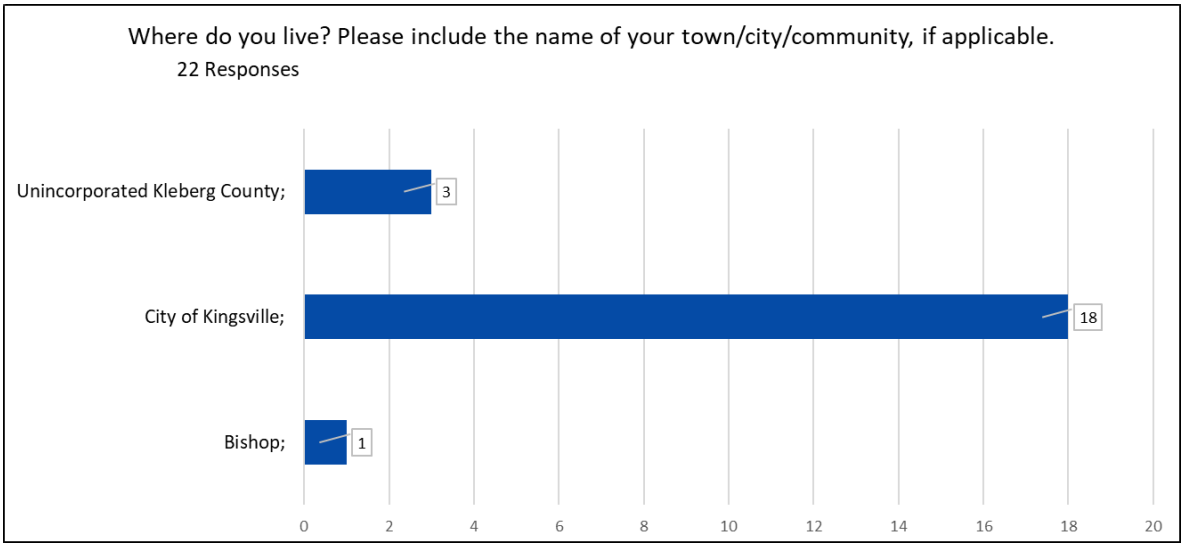


Figure 1: Survey Responses for Question 1

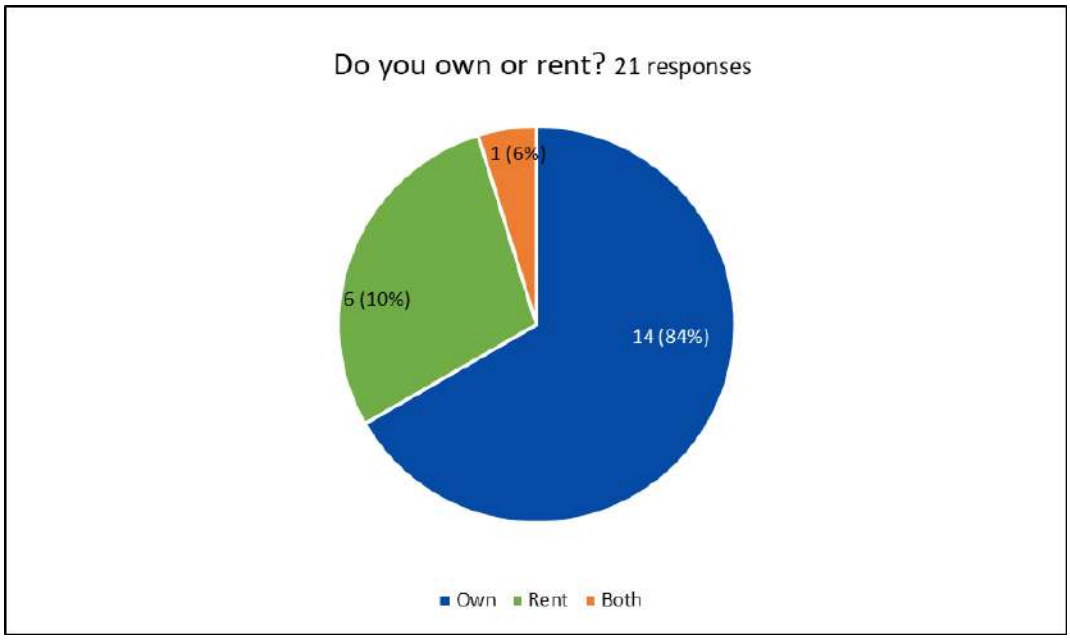


Figure 2: Survey Responses for Question 2

As Figure 1 above shows, the majority of the respondents live in the City of Kingsville. About 84% of respondents own their home as shown in Figure 2.

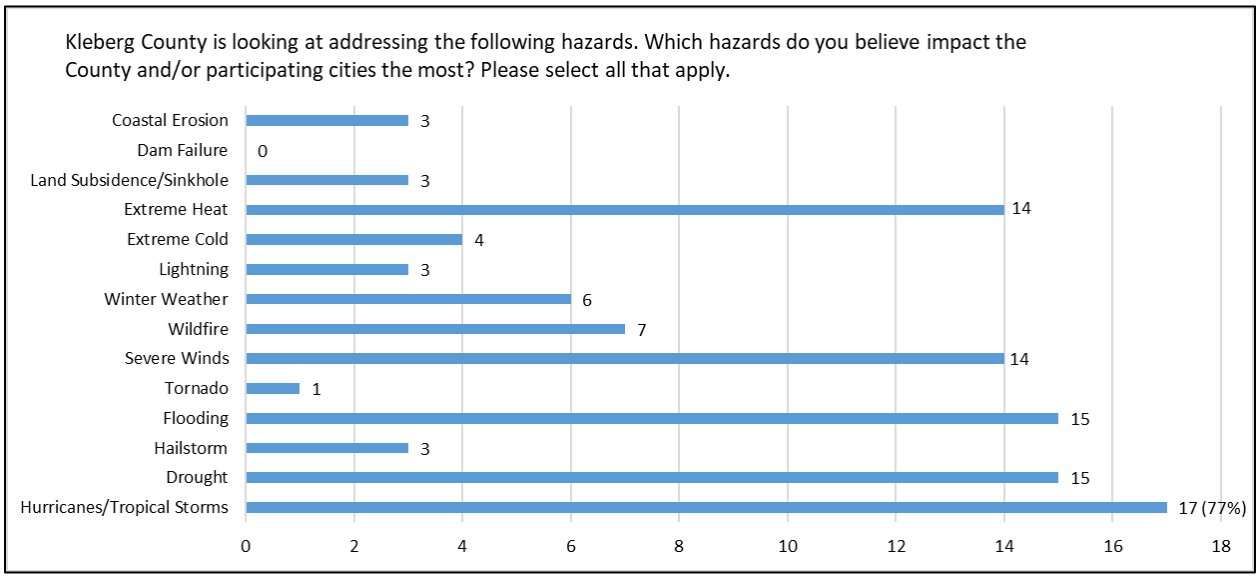


Figure 3: Survey Response for Question 3

The chart in Figure 3 above shows the breakdown of responses for survey question three. The answer choices included Hurricanes/Tropical Storms/Depressions, Drought, Hailstorm, Flooding, Tornado, Severe Winds, Wildfire, Winter Weather, Lightning, Extreme Cold, Extreme Heat, Land Subsidence/Sinkholes, Coastal Erosion, and Dam Failure.

Of the hazards addressed, Hurricanes/Tropical Storms, Drought, Flood, Severe Winds, and Extreme Heat ranked the highest out of all the hazards addressed in the plan, with each choice getting more than or about 50% of the votes.

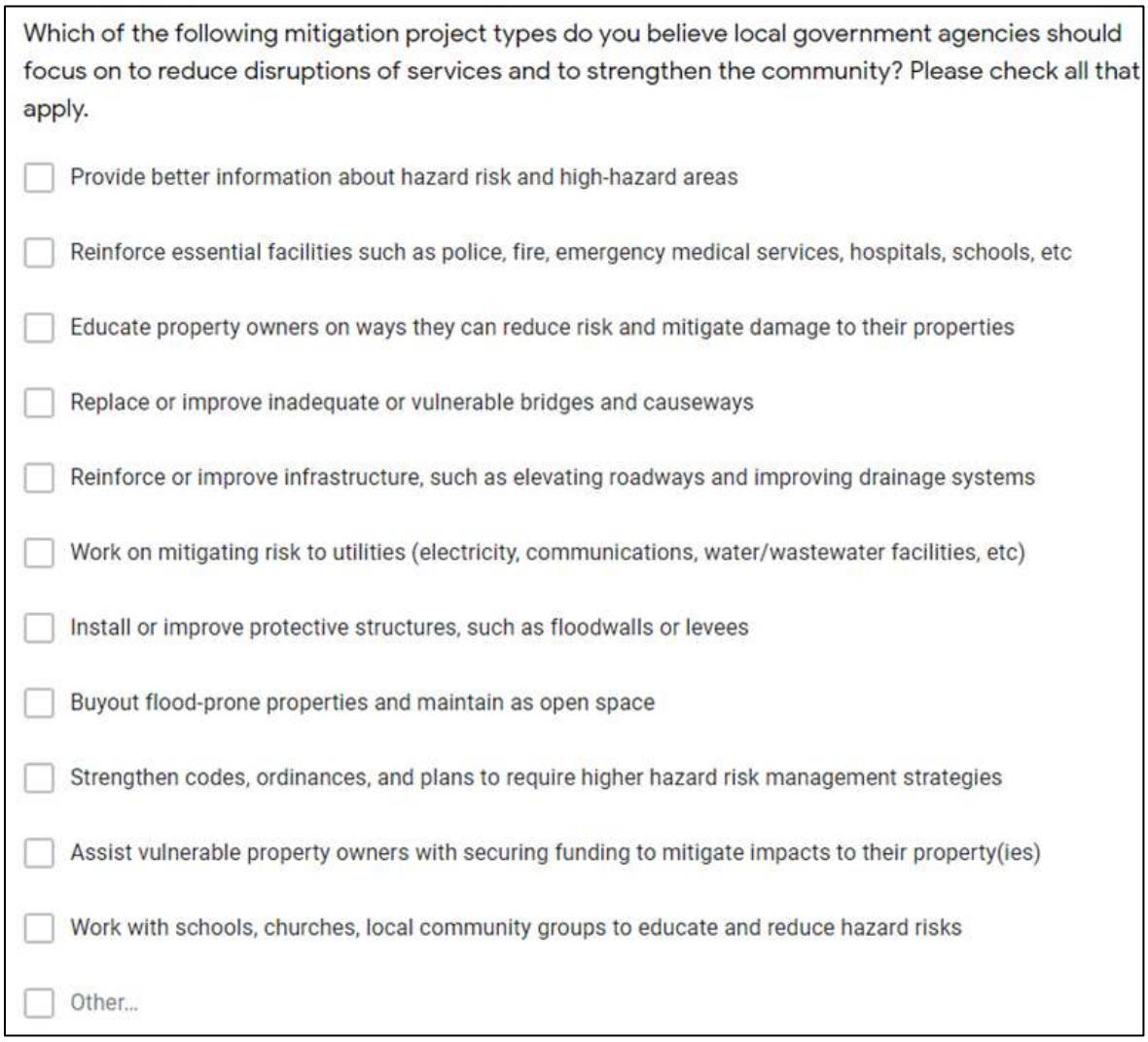


Figure 4: Survey Choices for Question 7

Figure 4 shows the choices for Question 7: Which of the following mitigation project types do you believe local government agencies should focus on to reduce disruptions of services and to strengthen the community? Please check all that apply. Respondents could choose from 11 answers such as “Provide better information about hazard risk and high-hazard areas,” “Reinforce or improve infrastructure, such as elevating roadways and improving drainage systems,” “Install or improve protective structures, such as floodwalls or levees,” or input their own answer.

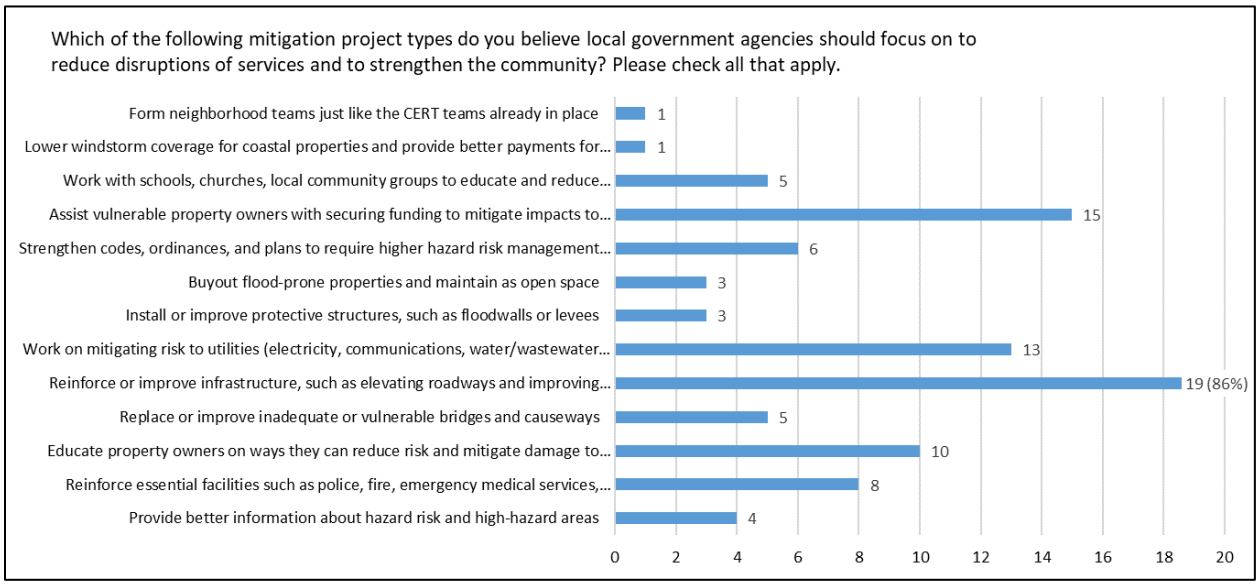


Figure 5: Response Breakdown for Question 7

Figure 5 shows the breakdown of responses to Question 7. The most popular answer was "Reinforce or improve infrastructure, such as elevating roadways and improving drainage systems" with 86% of respondents voting for it. Other suggestions that respondents shared in the survey include the need for lower windstorm coverage for coastal properties and additional/improved neighborhood teams (similar to CERT).

The second public comment period took place in August 2024. A copy of the in-progress plan draft was posted to the County website for two weeks for the public to review and comment or provide suggestions. This public comment period was advertised in the newspaper and shared on social media.

4) Plan Maintenance

The hazard mitigation action 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 actions are implemented efficiently. The departments or persons identified for each jurisdiction include but are not limited to:

Table 6: Maintenance Responsibility

Title	Jurisdiction	Agency or Department
County Judge	Kleberg County	County Judge's Office
Chief of Staff		
Mayor	Kingsville	City Council
City Manager		City Council
Fire/EMC Chief		Emergency Management Department

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.

Considering 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. Kleberg County and the participating jurisdictions will provide notice to the public through announcements in the local paper, fliers posted at City and County offices, and on the County's and each participant's website and/or social media accounts.

5) Plan Monitoring

The Kleberg County Chief of Staff 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 Chief of Staff 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.

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 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 Chief of Staff 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. The planning team will evaluate the causes of the shortcoming in the event that a mitigation project fails to meet its goal. 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 Chief of Staff 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.

The approved plan will be hosted on the County website to allow the public to view and provide feedback during the 5-year lifespan of the plan.

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 Chief of Staff 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 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 terms of 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.

Vulnerability risk of each hazard has risen as population fluctuates in conjunction with new development and growth in the County. Since the 2017 HMAP, the population in Kleberg County has remained steady with an increase of an addition of 681 housing units. The City of Kingsville has experienced a similar population and local development as the County. The City of Kingsville has planned a large 230-home subdivision development, with numerous other plans for future housing developments that range from the teens to 60 plus. The Kingsville Chamber of Commerce conducted a housing study demonstrating a demand for 35 to 55 new, single-family housing for purchase every year. Additionally, the study identified a demand for 50-70 new homes for rent each year and 100 to 150 multi-family units for rent every 4 to 5 years. The overall increase in local development increases the local vulnerability of the County and City of Kingsville to the natural hazards addressed in this Plan update. Furthermore, the effects of climate change have increased the frequency and intensity of hazard events. Since the previous plan, Kleberg County has experienced multiple damaging winter weather and hurricane/tropical storm events. The worst winter weather event (2011) caused more than $100,000 in property damage, while the most recent tropical storm event (2021) caused significant coastal flooding and rainfall.

Climate change is expected to exacerbate hazard events in the future, which may affect population migration, land use development, and the habitability of certain areas in the future. However, it is not certain how these climatic effects will intersect with population migration patterns and land use changes. In the case of Kleberg County and its participating jurisdictions, the severity and frequency of winter weather, hurricane/tropical storm, and even coastal erosion events may prompt construction of appropriate infrastructure to address these threats as well as related land use changes. Additionally, the population may consider relocation if appropriate measures are not taken.

Major Disaster Declarations

The following table outlines all major disaster declarations that have occurred in Kleberg County since the 2018 HMAP.

Kleberg County Major Disaster Declarations		
Disaster	**Incident Period**	**Declaration Date**
DR-4586 Texas Severe Winter Storm	February 11, 2021 – February 21, 2021	February 19, 2021
DR-4485 Texas Covid-19 Pandemic	January 20, 2020 – May 11, 2023	March 25, 2020
DR-4332 Hurricane Harvey	August 23, 2017 – September 15, 2017	August 25, 2017

2) Distribution of Property by Housing Density and Potential Damage Values

Table 7: Estimated Values by Location [2]

Category	Kleberg County[3]	City of Kingsville
Total Housing Units	13,875	11,593
Housing Unit Density (per square mile[4])	15.34 units/sq. mi	834.03 units/sq. mi
Median Housing Value[5]	$98,000	$92,000
Estimated Value of Housing Units[6]	$1.36 billion	$1.066 billion

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,

[2] Source: U.S. Census 2020 American Community Survey 5-Year Estimates.
[3] Table B25001 2021 5-Year ACS Housing unit information for Kleberg County includes totals for cities and unincorporated areas.
[4] Area in square mile respective to each jurisdiction
[5] Table B25077 2021 5-Year ACS
[6] Total value of housing units derived from median value multiplied by number of units.

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

Age, Disability, and Income

The populations of each jurisdiction were broken down into four categories: young residents, elderly residents, disabled 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: Age, Disability, and Poverty Level Percentages by Jurisdiction [7]

Demographic Category	Kleberg County	City of Kingsville	Texas	U.S.
Total Population	58,133	25,415	28,862,581	329,725,481
Population Under Age 5[8]	6.5%	6.4%	6.8%	5.9%
Population Over Age 65	13%	9.31%	12.5%	16%
Disability Status[9]	13.7%	12.8%	11.4%	12.6%
Individuals Below Poverty Level[10]	28.6%	31.3%	14.0%	12.6%

Distribution of Vulnerable Populations

The following vulnerable populations maps are 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 on 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.

[7] Source: U.S. Census 2021 American Community Survey 5-Year Estimates
[8] Table S0101, Age and Sex, 2021 ACS 5-Year Estimates
[9] Table S1810, Disability Characteristics. The U.S. Census defines a person as having a work disability if one or more of the following conditions are met:
1. Persons with a health problem or disability which prevents them from working or which limits the kind or amount of work they can do
2. Persons who have retired or left a job for health reasons
3. Persons currently not in the labor force because of a disability.
4. Persons who did not work at all in the previous year because of illness or disability
5. Under 65 years old and covered by Medicare in previous year.
6. Under 65 years old and received Supplemental Security Income (SSI) in previous year.
7. Received VA disability income in previous year.
[10] Table DP03, Selected Economic Characteristics, 2021 ACS 5-Year Estimates

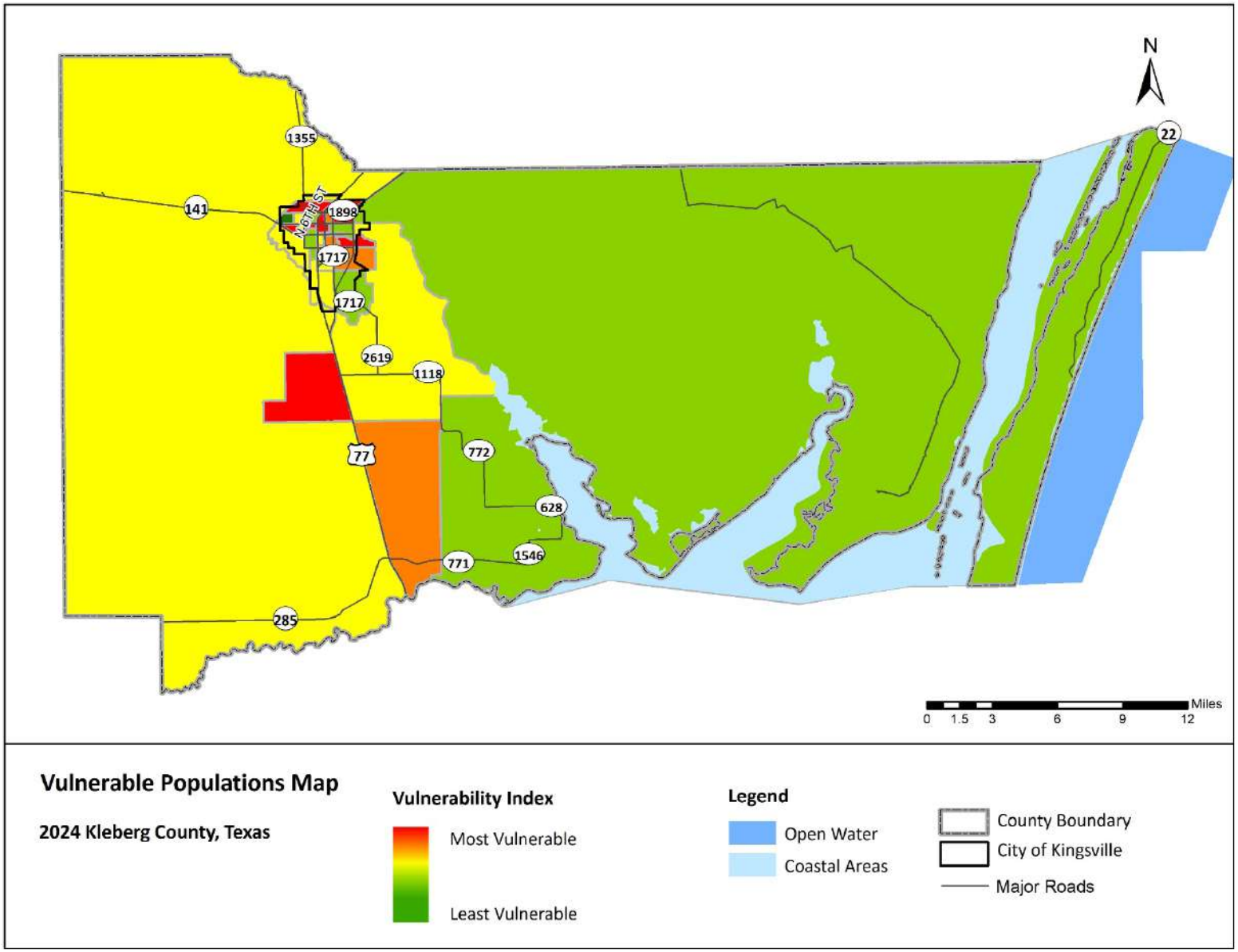


Figure 6: Kleberg County Social Vulnerability Index

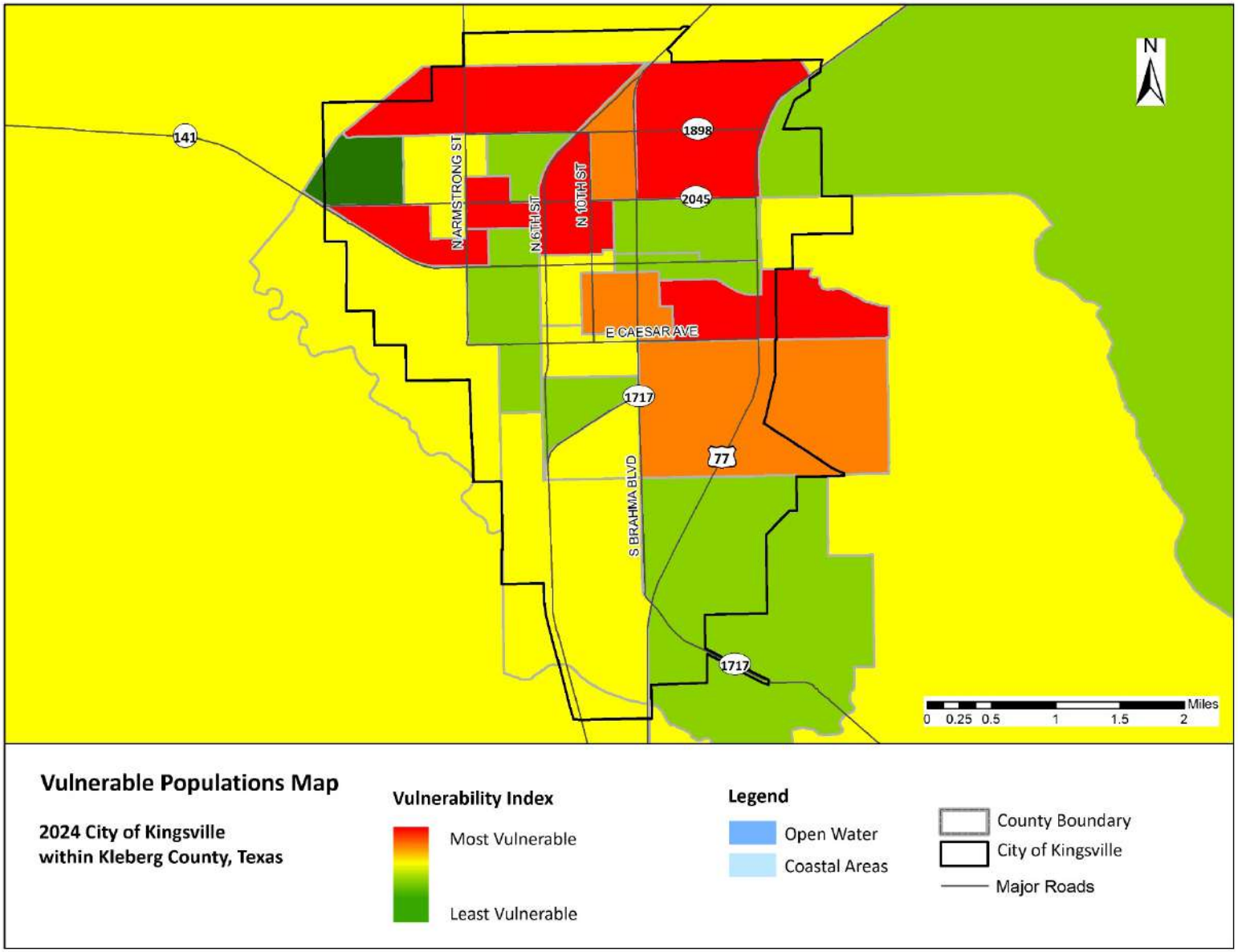


Figure 7: City of Kingsville Social Vulnerability Index

Low Income and Subsidized Housing

Low-income residents in Kleberg County are primarily served through rental assistance programs and low-income housing. The Kingsville Housing Authority is the primary operator of low-income housing within the County[11]. There are ten affordable apartment communities offering 733 units in Kleberg County, the majority of which are within the City of Kingsville. Furthermore, there are 357 low-income apartments that do not offer direct rental assistance but are still considered affordable for low-income families[12].

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.

Housing Type and Condition

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

I. 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 severe winds.

Mobile and manufactured homes can be found throughout Kleberg County, including several RV parks. These parks' populations fluctuate on a seasonal basis. Due to the express portability of RVs, most of these structures are expected to evacuate ahead of hazard events with significant warning times. However, RVs may not have enough time to evacuate ahead of less predictable hazard events like tornados.

Locations with clusters of three or more mobile / manufactured homes, including named mobile home parks, are shown in Figure 10 below.

[11] Affordable Housing Online, 2021. https://affordablehousingonline.com/housing-authorities/Texas
[12] Affordable Housing Online, 2021. https://affordablehousingonline.com/housing-search/Texas/Kleberg-County#summary

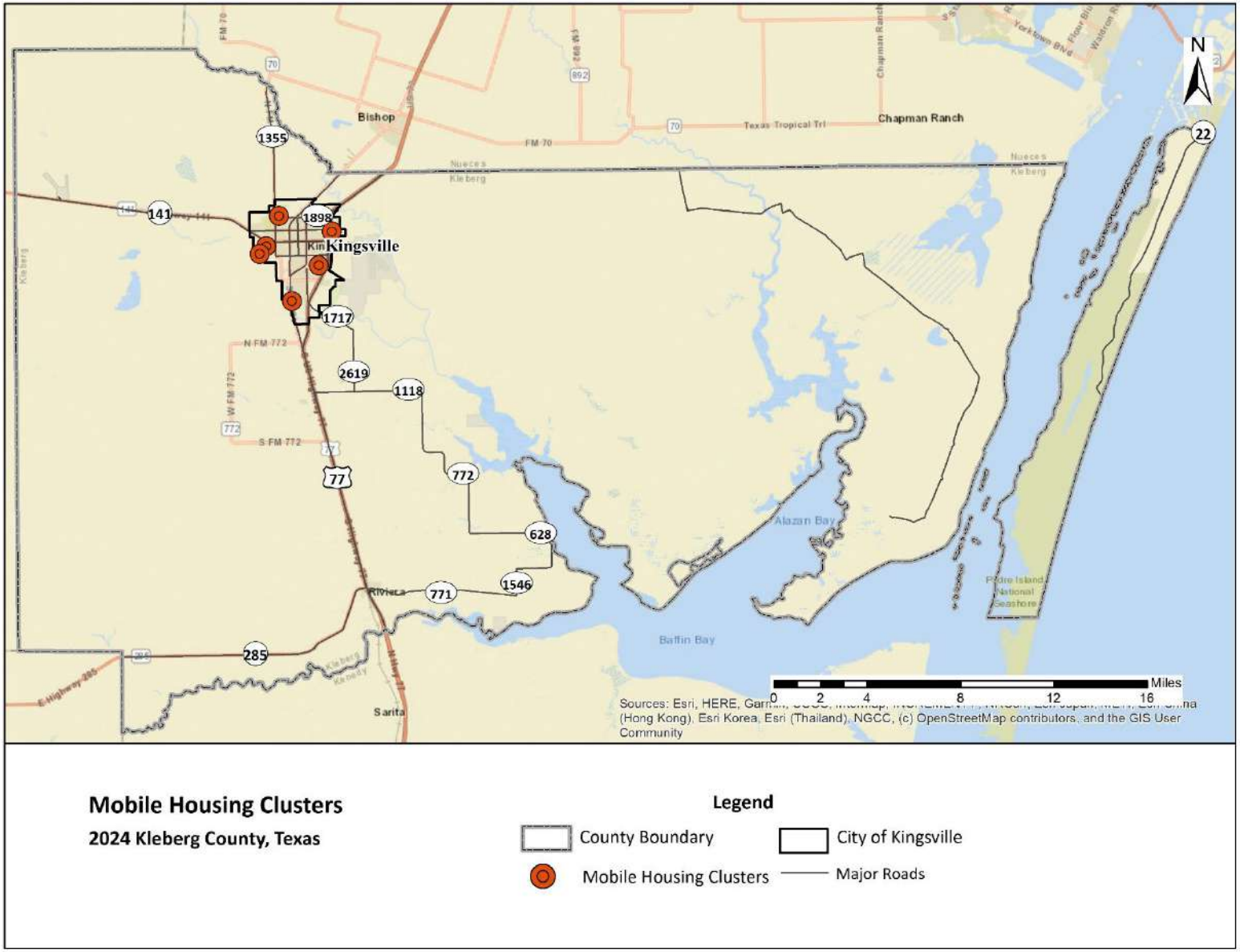


Figure 8: Mobile and Manufacturing Clusters in Kingsville County and the Participating Jurisdiction

II. 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 windowpanes
- cracked masonry, brick, or mortar surfaces
- missing or damaged roof shingles
- small rust spots on mobile homes

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. Floods

According to the National Oceanic and Atmospheric Administration, flood is defined as an overflow of water onto normally dry land. The inundation of a normally dry area caused by rising water in an existing waterway, such as a river, stream, or drainage ditch. Ponding of the water at or near the point where the rain fell. Flooding is a longer-term event than flash flooding: it may last days or weeks.

Flash flood is defined as a flood caused by heavy or excessive rainfall in a short period of time, generally less than 6 hours. Flash floods are usually characterized by raging torrents after heavy rains that rip through riverbeds, urban streets, or mountain canyons sweeping everything before them. They can occur within minutes or a few hours of excessive rainfall. They can also occur even if no rain has fallen, for instance after a levee or dam has failed, or after a sudden release of water by a debris or ice jam[13].

1) Flood History

The planning team relied on data from the National Centers for Environmental Information (NCEI) to develop a flood history for the County and each participating jurisdiction.

According to Kleberg County's 2018 HMAP, the County and jurisdictions addressing the hazard recorded 71 flood events between 1960 and 2016. The 2018 plan recorded about $17.84 million in property damages during that time period, adjusted to $2024. The 2018 plan found that the probability of flood occurrences is likely.

The following tables identify the most comprehensive list available of flood events and associated damages in the participating jurisdictions from 2017 to present. No participating jurisdiction has recorded a flood event more recently than November 2022.

Table 9: Kleberg County Recent Flood History

Location	Date Range	Number of Flood Events	Flood Types	Local Fatalities	Local Injuries	Local Property Damage $2024	Local Crop Damage $2024
County wide	10/7/2017 - 5/19/2021	10	Coastal Flood, Flash Flood	0	0	$115,594.00	$0

[13] https://www.weather.gov/mrx/flood_and_flash

Table 10: City of Kingsville Recent Flood History

Location	Date Range	Number of Flood Events	Flood Types	Local Fatalities	Local Injuries	Local Property Damage $2024	Local Crop Damage $2024
Citywide	5/19/2021-11/1/2022	5	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. Kleberg County and the City of Kingsville are listed as participating NFIP communities in the FEMA Community Status Book Report.

Kleberg County does not currently have a Flood Damage Prevention Ordinance in place. Mitigation actions have been added to Chapter 17 to address NFIP compliance for the County.

The City of Kingsville has adopted and enforced a flood damage prevention ordinance in their jurisdiction and adopted their current FIRM on 3/17/2014. The City of Kingsville's Flood Damage Prevention Ordinance designates the City Engineer as the Floodplain Administrator responsible for implementing its floodplain management regulations and ensuring regulations meet or exceed the minimum NFIP requirements. Floodplain management ordinances and any future updates will guide the jurisdiction as it continues to comply with NFIP requirements through permitting, inspection, and recordkeeping, especially for new and substantially redeveloped construction. The permitting process, presented to the floodplain administrator, may include plans showing location, dimension, and elevation of proposed landscape alterations, existing and proposed structures, and the location of the foregoing in relation to areas of the special flood hazard. Additionally, information including elevation of new and substantially improved structures, nonresidential structures, floodproofing, certificates from registered professional engineers, watercourse or natural drainage alterations, and records are required. General standards for all new construction or substantial improvements require prevention of floatation, collapse or lateral movement and practices that minimize flood damage.

The flood mitigation actions outlined in Chapter 17 below were developed with flood mitigation and NFIP compliance in mind. Public engagement will be an ongoing effort in each participating jurisdiction to reduce future losses due to flooding and will continue even after recommended corrective actions have been implemented.

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. According to the best information available, there are three RL properties in unincorporated Kleberg County

and are single family residences; meanwhile, there were fifteen RL properties in the City of Kingsville and fourteen are residential properties, while on is a non-residential property.

A severe repetitive loss (SRL) 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 three SRL properties in the City of Kingsville and all are single-family residences.

2) Likelihood of Future Events

In the case of the FEMA 100-year floodplain there is a 1% annual chance, while in the 500-year floodplain there is a 0.02% annual chance. Thus, the likelihood of a 100-year flood event is occasional and the likelihood of a 500-year flood event is 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.

The local planning team determined it is probable that Kleberg County and the City of Kingsville will experience a flood event in the next three years, meaning an event is likely.

3) Extent

Flood magnitude is generally measured by depth of flood waters in feet or inches. Throughout Kleberg County and City of Kingsville, the worst flood events have been associated with flooding due to combinations of heavy rainfall, flash flooding, and riverine flooding. The flood event in 2021 involved over 13" of heavy rainfall, which produced flooded city streets and highway intersections resulting in multiple street closures and stranded vehicles[14]. This event caused vehicular and infrastructure damage, with multiple homeowners reporting about 2' to 4' of flood waters[15]. Furthermore, the worst flooding events in Kleberg County have inflicted as high as $115,594 in property damages, adjusted to $2024[16].

Future worst-case flood events in Kleberg County and the participating jurisdictions may meet or exceed previous worst-case 4' flood depths.

4) Location and Impact

The maps below were developed to demonstrate potential risk areas of Zones A/AE and Zones X). Roughly 19% (108,990 acres out of 578,873) of Kleberg County is in the FEMA 100-year floodplain. In contrast, about 81% (470,829 acres out of 578,873) of Kleberg County is in the FEMA 500-year floodplain.

[14] Incident date: 5/19/2021 NOAA Data

[15] https://www.kristv.com/news/local-news/some-kingsville-homes-flood-others-spared-by-inches

[16] Incident date: 6/07/2022 NOAA Data

A) Location

I. Kleberg County

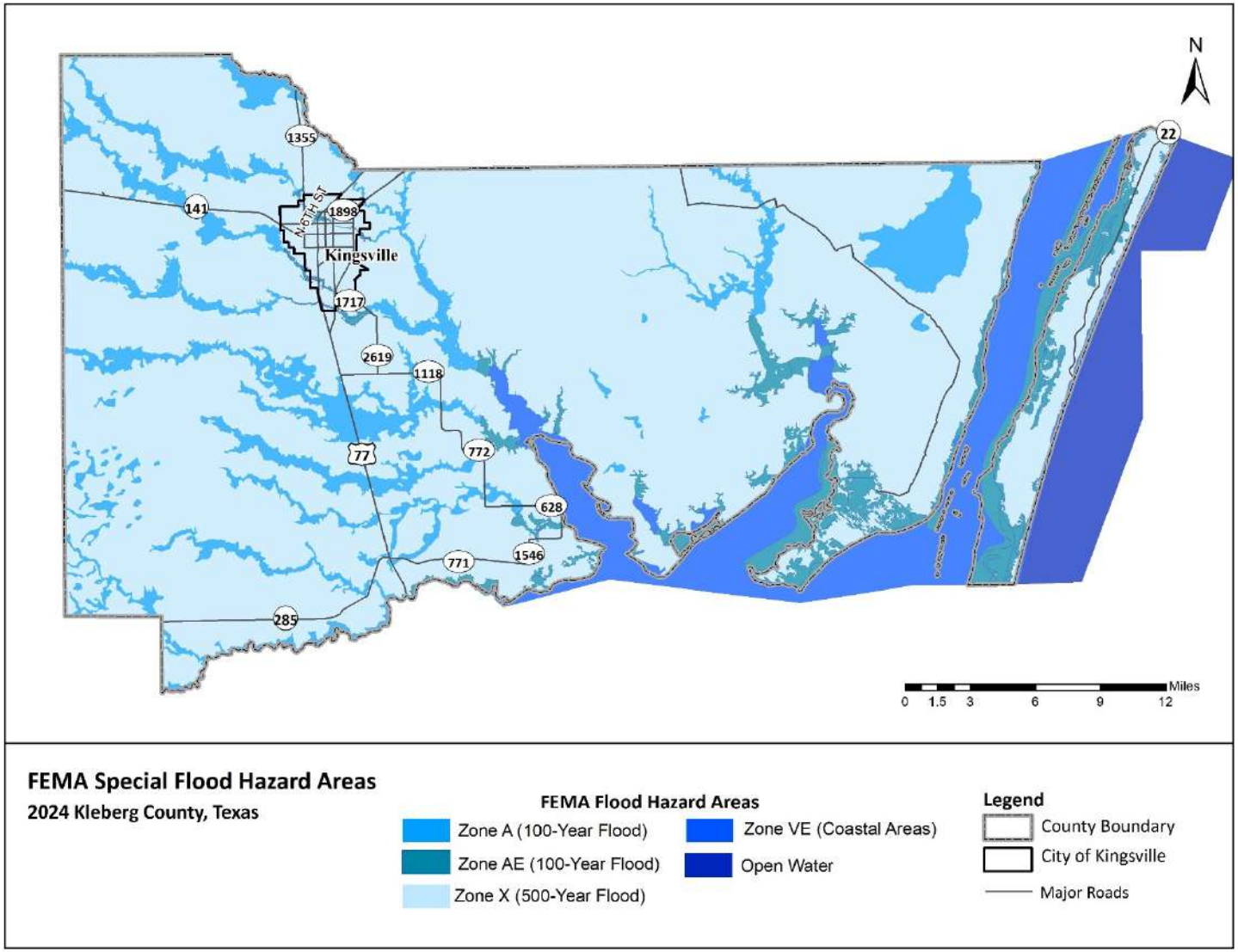


Figure 9: Kleberg County FEMA Special Flood Hazard Areas (SFHA)

II. City of Kingsville

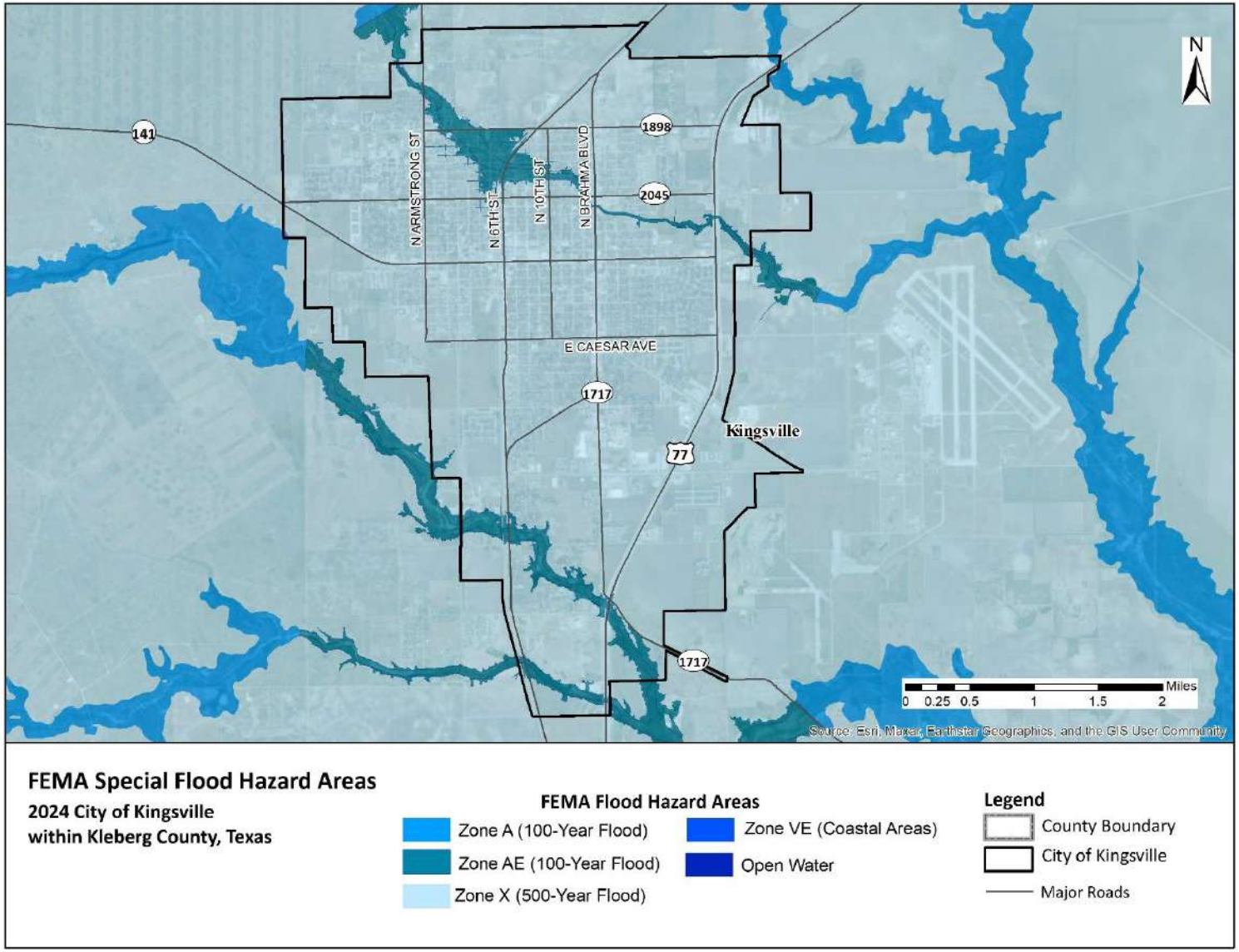


Figure 10: City of Kingsville FEMA SFHA

B) Impact

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

Residents in the participating jurisdictions 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 foodborne 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 12 through 13.

Despite the unlikely probability of a so-called 500-year flood, 0.02% in any given year, the danger is not 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 within the 500-year flood zones. Similar to 100-year flood events, 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 flood borne 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 500-year flood event may meet the totals outlined in Tables 12 - 15.

In addition to flooding's direct effects, the participating jurisdictions may be subject to indirect effects. These may include but aren't limited to loss of power, limited travel due to flooded and/or washed-out roads, and limited access to nearby emergency care centers.

5) Vulnerability

A) Population

As described in Section 3 of Chapter 3 above, Kleberg County and the participating jurisdiction 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 damage, injuries, or loss of life.

B) Critical Facilities

The planning team identified 83 critical facilities spread across the County and the City of Kingsville. All 83 critical facilities were located in a known FEMA Special Flood Hazard Area (SFHA); therefore, all critical facilities are considered vulnerable to flooding and have been listed below.

Table 11: Kleberg County & Jurisdictions Critical Facilities Vulnerable to Flooding

Jurisdiction	Critical Facilities
Kleberg County	Kleberg County Courthouse
	CHRISTUS Spohn Hospital Kleberg
	Kleberg County Jail
	Coastal Bend College
	Kleberg County Nursing and Rehabilitation
	HEB Grocery
	NAS Kingsville
	Human Services Department
	Ricardo Water Supply
	Ricardo ISD
	Ricardo Volunteer Fire Department
	Elevated Storage Tank
	Riviera ISD/Kaufer High School
	Baffin Bay Water Supply Corporation
	Justice of the Peace Pct. 3
	Justice of the Peace Pct. 4
	Kleberg County Airport
	Justice of the Peace Pct. 1
	Justice of the Peace Pct. 2
	Super Wal-Mart
	U.S. Border Patrol Station
	Texas Highway Patrol DPS
	TxDOT Regional Office
	Texas A&M University
	Fresenius Kidney Care Bay Area Dialysis Center
	Bay Area Dialysis Services
	Riviera Water Supply
	Lowe's
	McCoy's

	Tractor Supply Company
City of Kingsville	Zarsky's
	City of Kingsville City Hall
	CHRISTUS Spohn Hospital Kleberg
	Memorial Middle School
	AD Harvey Elementary School
	Perez Elementary School
	Harrel Elementary School
	Alice GK Kleberg Elementary School
	Kingsville Police Department
	Coastal Bend College
	Kleberg County Nursing and Rehabilitation
	Kingsville Water Department
	H.M. King High School
	Kleberg County Human Services Department
	John S. Gillett Intermediate School
	Elevated Storage Tank
	Fire Station 1
	Fire Station 2
	Texas A&M University - Kingsville
	Kingsville Nursing and Rehabilitation Center
	Water Well #14 and Ground Storage Tank
	Water Well #19 and Ground Storage Tank
	Ground Storage Tank, and Elevated Storage Tank
	Water Well #21 and Ground Storage Tank
	Water Well #22 and Ground Storage Tank
	Water Well #23 and Ground Storage Tank
	Water Well #24 and Ground Storage Tank
	Water Well #25 and Ground Storage Tank
	STWA Water Well and Ground Storage Tank
	North Wastewater Treatment Plant
	South Wastewater Treatment Plant
	Kingsville PD West (Old Dr. Pepper Plant)
	Outdoor Tornado Warning Siren
	Outdoor Tornado Warning Siren

	Outdoor Tornado Warning Siren
	Outdoor Tornado Warning Siren
	Tourism Office
	Kingsville Record
	Post Office
	Emergency Operation Center
	Santa Gertrudis School
	Academy High School
	Jubilee Academy
	Landfill
	Dick Kleberg Park
	L.E. Ramey Golf Course
	East Water Tower
	West Water Tower
	South Water Tower
	Sage Lift Station
	17th & Lee St Lift Station
	Carlos Truan Lift Station
	General Cavazos Lift Station
	Golf Course Rd Lift Station
	South Creek Lift Station
	1717 & Hwy 77 Lift Station
	Trant Lift Station
	May Lift Station

C) Vulnerable Parcels[17]

The planning team developed a parcel inventory estimate to identify potential damage values during a flood event. 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. Actual damages will vary based on the location and extent of flooding.

[17] County Parcel Count Includes All Parcels in Kleberg County

Table 12: Vulnerable Parcels by Flood Zone in Kleberg County

Jurisdiction	Total Parcels	Estimated Potential Damage Value
FEMA 100-Year Flood Zone A		
Countywide	**1,582**	**$262,066,676**
FEMA 500-Year Flood Zone X		
Countywide	**13,001**	**$2,107,211,363**

Table 13: Vulnerable Parcels by Flood Zone in the City of Kingsville

Jurisdiction	Total Parcels	Estimated Potential Damage Value
FEMA 100-Year Flood Zone A		
Citywide	**445**	**$25,396,532**
FEMA 500-Year Flood Zone X		
Citywide	**8,754**	**$1,005,290,087**

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

"Climate change may cause river floods to become larger or more frequent than they used to be in some places yet become smaller and less frequent in other places. As warmer temperatures cause more water to evaporate from the land and oceans, changes in the size and frequency of heavy precipitation events may in turn affect the size and frequency of river flooding."[18]

[18] https://www.epa.gov/climate-indicators/climate-change-indicators-river-flooding

5. Hurricanes, Tropical Stom, and Tropical Depression

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

1) Hurricanes / Tropical Storms History

The planning team relied on data from the National Centers for Environmental Information (NCEI), National Climatic Data Center, and local news reports to the history of hurricanes and tropical storms throughout the County and participating jurisdiction.

According to Kleberg County's 2018 HMAP, the County and participating jurisdiction reported 19 previous occurrences between 1961 and 2010. There was about $61.6 million in property damages during this time, adjusted to $2024. There were no fatalities reported, however 13 injuries were reported during the 1961 through 1968 events. The 2018 HMAP noted that Kleberg County and the participating jurisdiction have unlikely frequency of hurricane occurrences.

NCEI data shows that the participants experienced three hurricane events since the 2018 HMAP, Hurricane Harvey (2017), Hurricane Hanna (2020), Tropical Storm/Hurricane Nicholas (2021). During these, Kleberg County received heavy rains and major flooding which impacted homes, roads, and businesses; additionally, utility poles were damages and power lines were blown which caused power outages throughout the County.

[19] https://www.noaa.gov/education/resource-collections/weather-atmosphere/hurricanes

Table 14: Historical Hurricanes & Tropical Storms that affected Kleberg County and the Participating Jurisdiction

Location		Date Range	Category Range	Maximum Wind Speed Range	Local Fatalities	Local Injuries	Local Property Damage $2024	Local Crop Damage $2024
Countywide	Hurricane Harvey	8/25/2017	Tropical Storm	39 – 73 MPH	0	0	$12,205.04	$40,867,307
	Tropical Storm/Hurricane Hanna	7/25/2020	TS/ Hurricane (Cat 1)	20 – 90 MPH	0	0	$57,797	$0
	Tropical Storm/Hurricane Nicholas	9/13/2021	Tropical Storm	39 – 73 MPH	0	0	$0	$0

2) Likelihood of Future Occurrence

Hurricanes occur in seasonal patterns between June 1 and November 30. Based on the historical frequency of hurricane events in Kleberg County and the City of Kingsville outlined above, the likelihood of a future event affecting any of the participating jurisdictions is occasional, that is a hurricane 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 15: 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 known to have affected Kleberg County and the participating jurisdiction have been as intense as Category 4 with sustained wind gusts reaching 155 MPH. Along the coast, storm surge has been as high as 4’. Overall, previous hurricanes and tropical storms have

inflicted the inflation adjusted equivalent of over $61 million in property damages and over $38 million in crop damages, and they've injured up to 6 people in a single event.

Future hurricanes affecting the participating jurisdictions may meet previous worst-case Category 4 events in terms of storm strength, storm surge, damage inflicted, flooding, injuries, and even death.

4) Location and Impact

A) Location

Location is often referred to in terms of Tier I, II, and III counties, designated by the Texas State Office of Risk Management[20] for property insurance purposes, to represent differing levels of loss exposure to coastal counties and adjacent counties. Tier I counties are those adjacent to the Gulf of Mexico and Tier II counties are those typically adjacent to Tier I counties. Tier III counties are typically those adjacent to Tier II counties. Kleberg County is a Tier I county.

As a Tier 1 county, all of Kleberg County and its participating jurisdiction are in direct threat of tropical storms and hurricanes, including associated flooding and high winds. Typically, the effects of tropical storms and hurricanes begin to diminish as they move inland. However, tropical storms and hurricanes vary tremendously in terms of size, location, intensity, and duration as historically seen throughout the area.

B) Impact

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

5) Vulnerability

A) Population

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

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

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 Facilities

The planning team identified 83 critical facilities spread across Kleberg County and participating jurisdictions. Because of Kleberg County's status as a Tier 1 County, all critical facilities, no matter their jurisdictional location, are susceptible to a hurricane / tropical storm event. The following critical facilities and infrastructure in each jurisdiction are expected to play particularly important roles in a hurricane or tropical storm recovery process.

Table 16: Kleberg County Critical Facilities Vulnerable to Hurricanes and Tropical Storms

Jurisdiction	Critical Facilities	Potential Hurricane Impacts								
		Loss of Power	Flying Debris	Uprooted Trees	Flooding Due to Physical Damages	Damaged or Destroyed Roofs	Damaged or Broken Windows	Wind Damage	Injuries	Death
Kleberg County	Kleberg County Courthouse	X	X	X	X	X	X	X	X	X
	CHRISTUS Spohn Hospital Kleberg	X	X	X	X	X	X	X	X	X
	Kleberg County Jail	X	X	X	X	X	X	X	X	X
	Coastal Bend College	X	X	X	X	X	X	X	X	X
	Kleberg County Nursing and Rehabilitation	X	X	X	X	X	X	X	X	X
	HEB Grocery	X	X					X	X	
	NAS Kingsville	X	X		X	X		X	X	X
	Human Services Department	X	X	X	X	X	X	X	X	X
	Ricardo Water Supply	X	X	X	X		X	X	X	
	Ricardo ISD	X	X	X	X	X	X	X	X	X
	Ricardo Volunteer Fire Department	X	X	X	X	X	X	X	X	X
	Elevated Storage Tank	X	X						X	
	Riviera ISD/Kaufer High School	X	X	X	X	X	X	X	X	X
	Baffin Bay Water Supply Corporation	X	X		X		X	X	X	x
	Justice of the Peace Pct. 3	X	X	X	X	X	X	X	X	X
	Justice of the Peace Pct. 4	X	X	X	X	X	X	X	X	X
	Kleberg County Airport	X	X		X	X	X	X	X	X
	Justice of the Peace Pct. 1	X	X	X	X	X	X	X	X	X
	Justice of the Peace Pct. 2	X	X	X	X	X	X	X	X	X
	Super Wal-Mart	X	X	X	X	X	X	X	X	X
	U.S. Border Patrol Station	X	X	X	X	X	X	X	X	X
	Texas Highway Patrol DPS	X	X	X	X	X	X	X	X	X
	TxDOT Regional Office	X	X	X	X	X	X	X	X	X
	Texas A&M University - Kingsville	X	X	X	X	X	X	X	X	X

	Fresenius Kidney Care Bay Area Dialysis Center	x	x	x	x	x	x	x	x	x
	Bay Area Dialysis Services	x	x	x	x	x	x	x	x	x
	Riviera Water Supply/Waste Water Treatment	x	x						x	
	Lowe's	x	x	x	x	x	x	x	x	x
	McCoy's	x	x	x	x	x	x	x	x	x
	Tractor Supply Company	x	x	x	x	x	x	x	x	x
City of Kingsville	Zarsky's	x	x	x	x	x	x	x	x	x
	City of Kingsville City Hall	x	x	x	x	x	x	x	x	x
	CHRISTUS Spohn Hospital Kleberg	x	x	x	x	x	x	x	x	x
	Memorial Middle School	x	x	x	x	x	x	x	x	x
	AD Harvey Elementary School	x	x	x	x	x	x	x	x	x
	Perez Elementary School	x	x	x	x	x	x	x	x	x
	Harrel Elementary School	x	x	x	x	x	x	x	x	x
	Alice GK Kleberg Elementary School	x	x	x	x	x	x	x	x	x
	Kingsville Police Department	x	x	x	x	x	x	x	x	x
	Coastal Bend College	x	x	x	x	x	x	x	x	x
	Kingsville Water Department	x	x	x	x	x	x	x	x	x
	H.M. King High School	x	x	x	x	x	x	x	x	x
	Kleberg County Human Services Department	x	x	x	x	x	x	x	x	x
	John S. Gillett Intermediate School	x	x	x	x	x	x	x	x	x
	Elevated Storage Tank	x	x						x	
	Fire Station 1	x	x	x	x	x	x	x	x	x
	Fire Station 2	x	x	x	x	x	x	x	x	x
	Texas A&M University - Kingsville	x	x	x	x	x	x	x	x	x
	Kingsville Nursing and Rehabilitation Center	x	x	x	x	x	x	x	x	x
	Water Well #14 and Ground Storage Tank	x	x						x	
	Water Well #19 and Ground Storage Tank	x	x						x	
	Ground Storage Tank, and Elevated Storage Tank	x	x						x	
	Water Well #21 and Ground Storage Tank	x	x						x	

	Water Well #22 and Ground Storage Tank	X	X						X	
	Water Well #23 and Ground Storage Tank	X	X						X	
	Water Well #24 and Ground Storage Tank	X	X						X	
	Water Well #25 and Ground Storage Tank	X	X						X	
	STWA Water Well and Ground Storage Tank	X	X						X	
	North Wastewater Treatment Plant	X	X						X	
	South Wastewater Treatment Plant	X	X						X	
	Kingsville PD West (Old Dr. Pepper Plant)	X	X	X	X	X	X	X	X	X
	Outdoor Tornado Warning Siren	X	X					X	X	
	Outdoor Tornado Warning Siren	X	X					X	X	
	Outdoor Tornado Warning Siren	X	X					X	X	
	Outdoor Tornado Warning Siren	X	X					X	X	
	Tourism Office	X	X	X	X	X	X	X	X	X
	Kingsville Record	X	X	X	X	X	X	X	X	X
	Post Office	X	X	X	X	X	X	X	X	X
	Emergency Operation Center	X	X	X	X	X	X	X	X	X
	Santa Gertrudis School	X	X	X	X	X	X	X	X	X
	Santa Gertrudis Academy High School	X	X	X	X	X	X	X	X	X
	Jubilee Academy	X	X	X	X	X	X	X	X	X
	Landfill		X					X		
	Dick Kleberg Park	X	X	X	X	X	X	X	X	X
	L.E. Ramey Golf Course		X	X	X			X		
	East Water Tower	X	X					X	X	
	West Water Tower	X	X					X	X	
	South Water Tower	X	X					X	X	
	Sage Lift Station	X	X					X	X	
	17th & Lee St Lift Station	X	X					X	X	
	Carlos Truan Lift Station	X	X					X	X	
	General Cavazos Lift Station	X	X					X	X	
	Golf Course Rd Lift Station	X	X					X	X	

	South Creek Lift Station	x	x					x	x	
	1717 & Hwy 77 Lift Station	x	x					x	x	
	Trant Lift Station	x	x					x	x	
	May Lift Station	x	x					x	x	

C) Critical Infrastructure

There are two major hurricane evacuation routes that run through Kleberg County, State Highway 141 and 285[21]. State Highway 141 meets U.S. Route 77 east of City of Kingsville and runs west for 16 miles out from the County.

State Highway 285 begins in the City of Riviera and meets U.S. Route 77, this evacuation route runs west for 13 miles across out from the County.

Flooding on either of these routes 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.

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 17: Estimated Potential Damage Values by Jurisdiction

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Kleberg County	**14,604**	**$2,348,451,007**
City of Kingsville	9,185	$1,029,694,959

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

“Climate change is expected to affect tropical cyclones by increasing sea surface temperatures, a key factor that influences cyclone formation and behavior. The U.S. Global Change Research

[21] https://ftp.txdot.gov/pub/txdot-info/trv/evacuation/corpus.pdf

Program and the Intergovernmental Panel on Climate Change[22] project that tropical cyclones will become more intense over the 21st century, with higher wind speeds and heavier rains."[23]

[22] https://science2017.globalchange.gov; www.ipcc.ch/report/ar5/wg1

[23] https://www.epa.gov/climate-indicators/climate-change-indicators-tropical-cyclone-activity#ref1

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.[24]

1) Wildfire History

The Texas A&M Forest Service Wildfire Risk Assessment Portal provides wildfire data on fires that occurred as recently as 2020. Additional data came from local planning team members.

The 2018 Kleberg County HMAP utilized Texas A&M Forest Service Wildfire Risk Assessment Portal data to identify 122 wildfire ignitions throughout the County between 2005 and 2015. The 2018 plan also reported 16 wildfire events from 2005 and 2013.

According to the NOAA, there were two reports of wildfire events in January 2018, there were no reports of deaths, injuries, nor property or crop damages. There were no wildfire events reported within the City of Frankston since the previous 2018 Plan. None of the participating jurisdictions have data available on fires past 2020, though it is likely that some small fires have gone unreported.

The following tables show the wildfire history of each participant as recorded by the Texas A&M Forest Service from 2010 to present.

Table 18: Kleberg County Recent Wildfire History

Location	Date Range	Number of Wildfire Events	Range of Acres Burned	Total Acres Burned
Countywide	01/29/2016 – 02/07/2020	35	.01 - 5,000	12,743.44

Table 19: City of Kingsville Recent Wildfire History

Location	Date Range	Number of Wildfire Events	Range of Acres Burned	Total Acres Burned
Kingsville	03/03/2006 – 03/04/2006	2	0 - 1	1

[24] 2018 State of Texas Hazard Mitigation Plan

Furthermore, the NOAA reported two wildfire events from March 30th, 2022, through April 1st, 2022 within Kleberg County. This wildfire event began southwest of the City of Kingsville and burned about 51,566 acres throughout the County, as well as portions of Jim Wells County.

2) Likelihood of Future Events

Although the County and City of Kingsville have not recorded a wildfire since 2022, given the prior frequency of wildfire events, a wildfire event in any of the jurisdictions addressing the hazard is likely, meaning an event is probable within the next three years.

3) Extent

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

Table 20: Characteristic Fire Intensity Scale [25]

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.

[25] https://www.texaswildfirerisk.com

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 and NOAA data, the average fire in Kleberg County and the participating jurisdiction is a Class E event.

Table 21: National Wildfire Coordinating Group Size Class of Fire [26]

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

Future fire events in Kleberg County and the participating jurisdictions may meet previous worst-case Class E (NWCGSCF) and Class 4 (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 determined to be either partially or completely vulnerable to wildfire based on Texas WRAP's Wildland Urban Interface boundaries.

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

[26] http://www.nwcg.gov/term/glossary/size-class-of-fire

I. Kleberg County Location

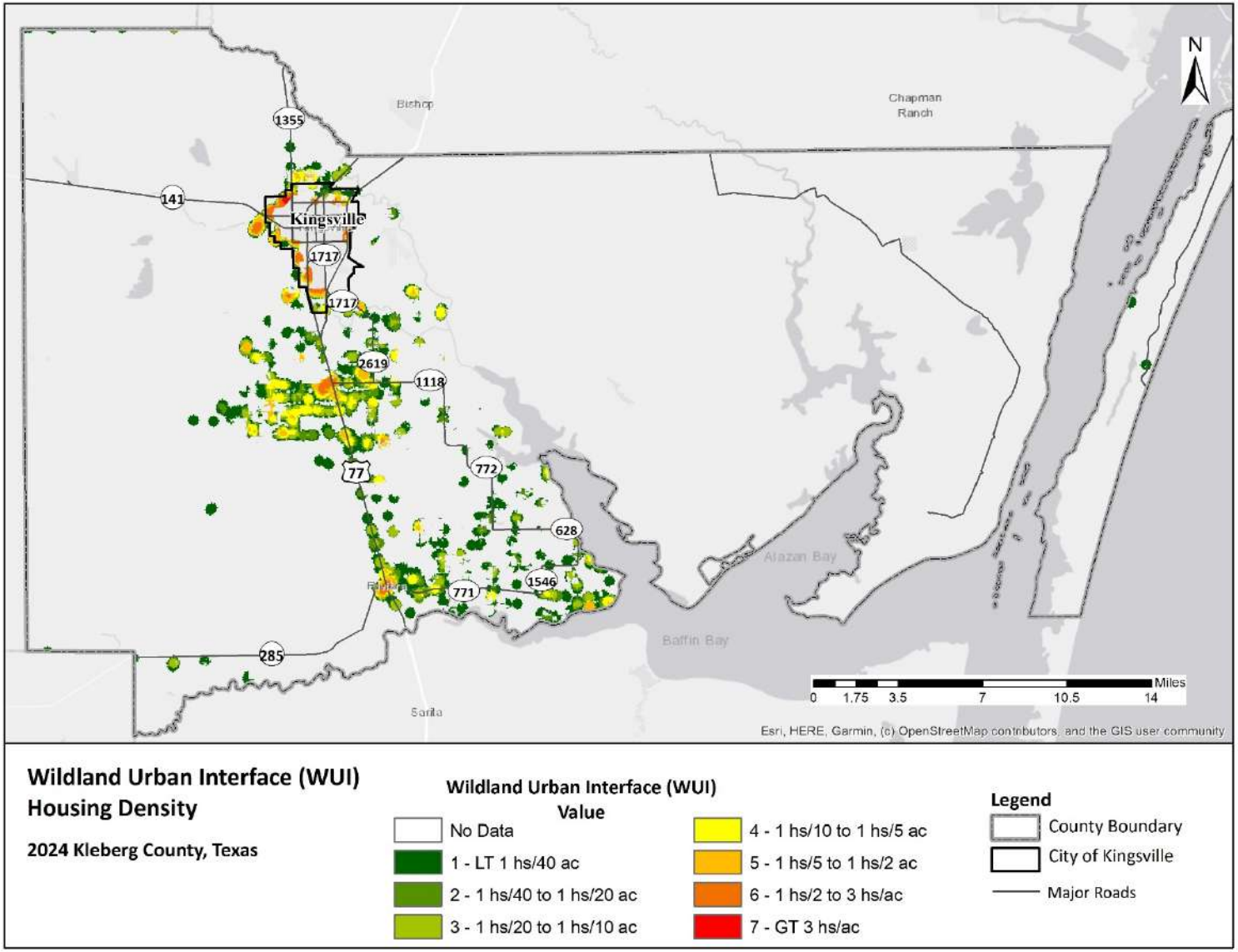


Figure 11: Kleberg County Wildland Urban Interface

II. City of Kingsville

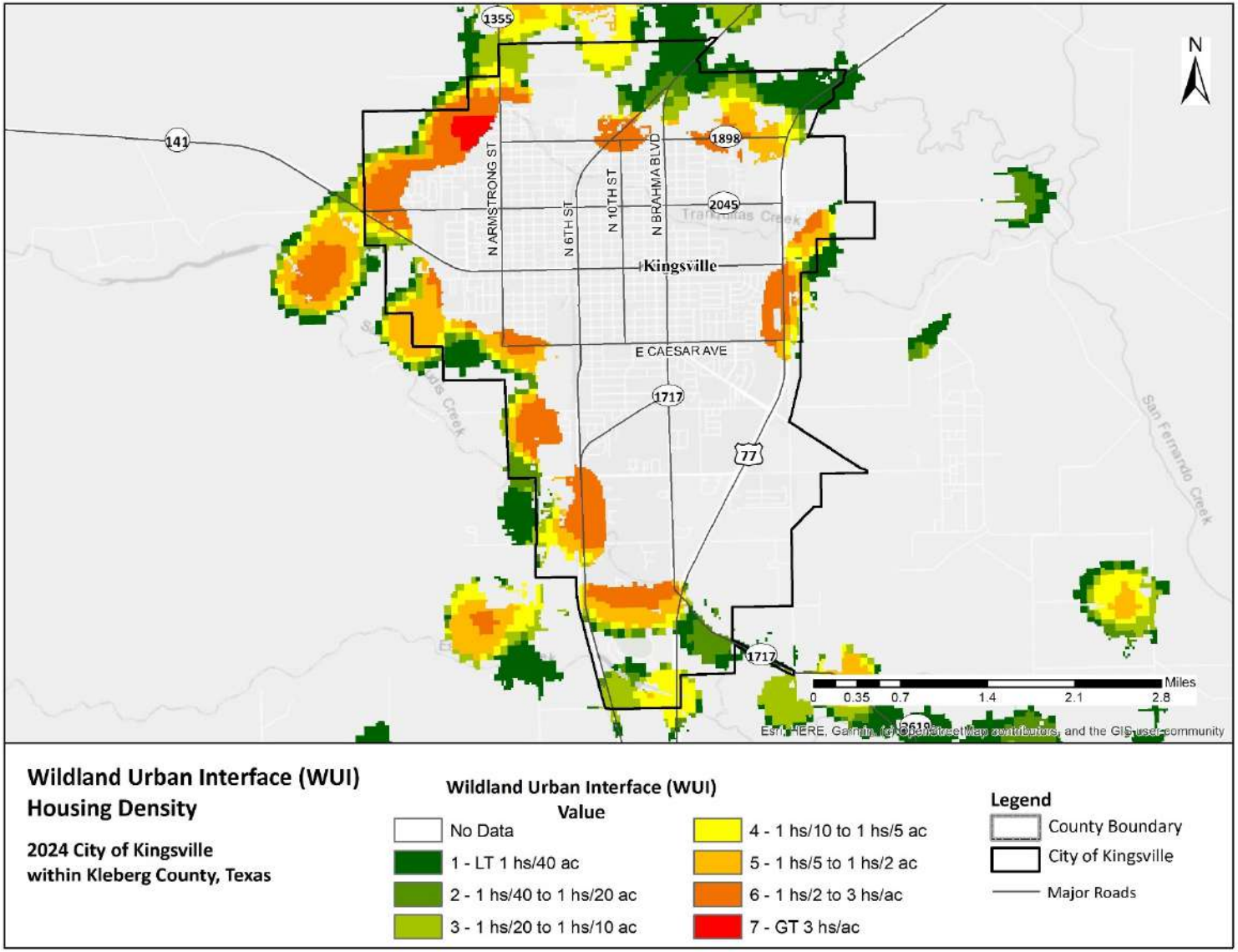


Figure 12: City of Kingsville Wildland Urban Interface (WUI)

B) Impact

Impacts from a wildfire in Kleberg 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, Kleberg 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 wildfire.

Residents of mobile homes, specifically those built before HUD's Manufactured Housing and Standards requirements were introduced in 1976, are of particular concern[27]. 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.

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

B) Critical Facilities

There are 83 critical facilities located throughout the County and the participating jurisdiction. 19 of the 83 critical facilities are located within 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 22: Critical Facilities Vulnerable to Wildfire and Potential Impacts

Jurisdiction	Critical Facilities	Potential Wildfire Impacts				
		Destruction	Partial Destruction	Heat Damage	Smoke Damage	Water Damage
Kleberg County	Human Services Department	X	X	X	X	X
	Ricardo Water Supply	X	X	X	X	X
	Ricardo ISD	X	X	X	X	X
	Ricardo Volunteer Fire Department	X	X	X	X	X
	Elevated Storage Tank	X	X			X
	Justice of the Peace Pct. 3	X	X	X	X	X
	Justice of the Peace Pct. 1	X	X	X	X	X
	Texas Highway Patrol DPS	X	X	X	X	X
	TxDOT Regional Office	X	X	X	X	X
	Riviera Water Supply/Waste Water Treatment	X	X	X	X	X
City of Kingsville	Kingsville Water Department	X	X	X	X	X
	Water Well #23 and Ground Storage Tank	X	X			X
	Water Well #25 and Ground Storage Tank	X	X			X
	South Wastewater Treatment Plant	X	X	X	X	X
	Tourism Office	X	X	X	X	X
	Emergency Operation Center	X	X	X	X	X
	Santa Gertrudis School	X	X	X	X	X
	Dick Kleberg Park	X	X	X	X	X
	South Creek Lift Station	X	X			X
	1717 & Hwy 77 Lift Station	X	X			X

C) Vulnerable Parcels

Table 23: Parcels Vulnerable to Wildfire

Jurisdiction	Total	Estimated Potential Damage Value
Kleberg County	**5,095**	**$709,878,783**
City of Kingsville	**1,393**	**$187,500,617**

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

"Research shows that changes in climate create warmer, drier conditions, leading to longer and more active fire seasons. Increases in temperatures and the thirst of the atmosphere due to climate change have increased aridity of forest fuels during the fire season. These drivers were found to be responsible for over half the observed decrease in the moisture content of fuels in western U.S. forests from 1979 to 2015, and the doubling of forest fire burned area over the period 1984 to 2015. For much of the U.S. West, projections show that an average annual 1 degree C temperature increase would increase the median burned area per year by as much as 600%.[28]

[28] https://www.noaa.gov/noaa-wildfire/wildfire-climate-connection#:~:text=Research%20shows%20that%20changes%20in,fuels%20during%20the%20fire%20season. https://www.c2es.org/content/wildfires-and-climate-change/#:~:text=For%20much%20of%20the%20U.S.,in%20some%20types%20of%20forests.

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 destruction of buildings.

1) Tornado History

In the 2018 HMAP, Kleberg County and the participating jurisdiction reported 30 tornados between 1950 and 2016.

The following tables identify tornado events and associated damages in Kleberg County and the participating jurisdiction from 2000 to present, as reported in the NCEI database. According to the best information available, there have been no tornado events recorded in Kleberg County or either participating jurisdiction since 2016.

Table 24: Kleberg County Tornado History (2000 – 2023)

Location	Date Range	Number of Tornados	F / EF Magnitude Range	Fatalities	Injuries	Property Damage $2024	Crop Damage $2024
Countywide	4/06/2004 – 5/13/2016	4	EF0 - F0	0	0	$0	$0

Table 25: City of Kingsville Tornado History (2000 – 2023)

Location	Date Range	Number of Tornados	F / EF Magnitude Range	Fatalities	Injuries	Property Damage $2024	Crop Damage $2024
Citywide	4/17/2010 – 5/31/2016	6	EF0 – EF1	0	0	$4,369,628.53	$0

2) Likelihood of Future Events

The likelihood of future tornados will be determined in consideration of all tornados in Kleberg County. Tornado events in Kleberg County are considered an occasional hazard given the frequency of previous tornados in the County and City of Kingsville, meaning one is possible in the next five 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 26: Fujita Scale

Fujita Scale			
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 27: Enhanced Fujita Scale [29]

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

The most recent tornados in Kleberg County and the participating jurisdiction have been classified as EF0 - EF1 on the Enhanced Fujita Scale. Kleberg County sits within Zone III (200 mph winds) according to the IIBEC's wind speed map [30]. Future tornados in the County and the participating jurisdictions may meet up to EF5 on the Enhanced Fujita Category.

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, and loss of power. Crops may be damaged or destroyed. Pets and livestock

[29] Texas State Hazard Mitigation Plan, 2018 Update.
[30] https://iibec.org/giving-tornadoes-their-due/

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.

A) Population

As described in Section 3 of Chapter 3 above, Kleberg County and the participating jurisdiction 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 may 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 28: Critical Facilities Vulnerable to Tornados and Potential Impacts

Jurisdiction	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
Kleberg County	Kleberg County Courthouse	X	X	X	X	X	X	X	X	X	X
	CHRISTUS Spohn Hospital Kleberg	X	X	X	X	X	X	X	X	X	X
	Kleberg County Jail	X	X	X	X	X	X	X	X	X	X
	Coastal Bend College	X	X	X	X	X	X	X	X	X	X
	Kleberg County Nursing and Rehabilitation	X	X	X	X	X	X	X	X	X	X
	HEB Grocery	X	X	X	X	X	X	X	X	X	X
	NAS Kingsville	X	X	X	X	X	X	X	X	X	X
	Human Services Department	X	X	X	X	X	X	X	X	X	X
	Ricardo Water Supply	X	X						X		
	Ricardo ISD	X	X	X	X	X	X	X	X	X	X
	Ricardo Volunteer Fire Department	X	X	X	X	X	X	X	X	X	X
	Elevated Storage Tank	X	X						X		
	Riviera ISD/Kaufer High School	X	X	X	X	X	X	X	X	X	X
	Baffin Bay Water Supply Corporation	X	X	X	X	X	X	X	X	X	X
	Justice of the Peace Pct. 3	X	X	X	X	X	X	X	X	X	X
	Justice of the Peace Pct. 4	X	X	X	X	X	X	X	X	X	X
	Kleberg County Airport	X	X	X	X	X	X	X	X	X	X
	Justice of the Peace Pct. 1	X	X	X	X	X	X	X	X	X	X
	Justice of the Peace Pct. 2	X	X	X	X	X	X	X	X	X	X
	Super Wal-Mart	X	X	X	X	X	X	X	X	X	X
	U.S. Border Patrol Station	X	X	X	X	X	X	X	X	X	X
	Texas Highway Patrol DPS	X	X	X	X	X	X	X	X	X	X
	TxDOT Regional Office	X	X	X	X	X	X	X	X	X	X
	Texas A&M University - Kingsville	X	X	X	X	X	X	X	X	X	X
	Fresenius Kidney Care Bay Area Dialysis Center	X	X	X	X	X	X	X	X	X	X

	Bay Area Dialysis Services	X	X	X	X	X	X	X	X	X	X
	Riviera Water Supply/Waste Water Treatment	X	X	X	X	X	X	X	X	X	X
	Lowe's	X	X	X	X	X	X	X	X	X	X
	McCoy's	X	X	X	X	X	X	X	X	X	X
	Tractor Supply Company	X	X	X	X	X	X	X	X	X	X
City of Kingsville	Zarsky's	X	X	X	X	X	X	X	X	X	X
	City of Kingsville City Hall	X	X	X	X	X	X	X	X	X	X
	CHRISTUS Spohn Hospital Kleberg	X	X	X	X	X	X	X	X	X	X
	Memorial Middle School	X	X	X	X	X	X	X	X	X	X
	AD Harvey Elementary School	X	X	X	X	X	X	X	X	X	X
	Perez Elementary School	X	X	X	X	X	X	X	X	X	X
	Harrel Elementary School	X	X	X	X	X	X	X	X	X	X
	Alice GK Kleberg Elementary School	X	X	X	X	X	X	X	X	X	X
	Kingsville Police Department	X	X	X	X	X	X	X	X	X	X
	Coastal Bend College	X	X	X	X	X	X	X	X	X	X
	Kingsville Water Department	X	X	X	X	X			X	X	X
	H.M. King High School	X	X	X	X	X	X	X	X	X	X
	Kleberg County Human Services Department	X	X	X	X	X	X	X	X	X	X
	John S. Gillett Intermediate School	X	X	X	X	X	X	X	X	X	X
	Elevated Storage Tank	X	X						X		
	Fire Station 1	X	X	X	X	X	X	X	X	X	X
	Fire Station 2	X	X	X	X	X	X	X	X	X	X
	Texas A&M University - Kingsville	X	X	X	X	X	X	X	X	X	X
	Kingsville Nursing and Rehabilitation Center		X						X		
	Water Well #14 and Ground Storage Tank	X	X						X		
	Water Well #19 and Ground Storage Tank	X	X						X		

	Ground Storage Tank, and Elevated Storage Tank	X	X						X		
	Water Well #21 and Ground Storage Tank	X	X						X		
	Water Well #22 and Ground Storage Tank	X	X						X		
	Water Well #23 and Ground Storage Tank	X	X						X		
	Water Well #24 and Ground Storage Tank	X	X						X		
	Water Well #25 and Ground Storage Tank	X	X						X		
	STWA Water Well and Ground Storage Tank	X	X						X		
	North Wastewater Treatment Plant	X	X	X	X	X	X	X	X	X	X
	South Wastewater Treatment Plant	X	X	X	X	X	X	X	X	X	X
	Kingsville PD West (Old Dr. Pepper Plant)										
	Outdoor Tornado Warning Siren	X	X						X		
	Outdoor Tornado Warning Siren	X	X						X		
	Outdoor Tornado Warning Siren	X	X						X		
	Outdoor Tornado Warning Siren	X	X						X		
	Tourism Office										
	Kingsville Record										
	Post Office										
	Emergency Operation Center										
	Santa Gertrudis School										
	Santa Gertrudis Academy High School										
	Jubilee Academy										
	Landfill		X		X	X			X		
	Dick Kleberg Park				X	X				X	X
	L.E. Ramey Golf Course	X	X		X	X			X	X	X

	East Water Tower	X	X						X		
	West Water Tower	X	X						X		
	South Water Tower	X	X						X		
	Sage Lift Station	X	X						X		
	17th & Lee St Lift Station	X	X						X		
	Carlos Truan Lift Station	X	X						X		
	General Cavazos Lift Station	X	X						X		
	Golf Course Rd Lift Station	X	X						X		
	South Creek Lift Station	X	X						X		
	1717 & Hwy 77 Lift Station	X	X						X		
	Trant Lift Station	X	X						X		
	May Lift Station	X	X						X		

C) Vulnerable Parcels

Table 29: Parcels Vulnerable to Tornados

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Kleberg County	**14,604**	**$2,348,451,007**
City of Kingsville	9,185	$1,029,694,959

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

"Scientists must attempt to predict how climate change might affect the individual weather 'ingredients' that support the development of supercell thunderstorms (the type that produce tornadoes). These weather ingredients are:

- warm, moist air;
- an unstable atmosphere; and
- wind at different levels moving in different directions at different speeds, a phenomenon known as wind shear.

Some studies predict that climate change could provide the opportunity for more severe thunderstorms to form. However, this does not necessarily mean that more tornadoes will occur, especially since only about 20 percent of supercell thunderstorms produce tornadoes."[31]

[31] https://education.nationalgeographic.org/resource/tornadoes-and-climate-change/

8. Drought

Drought is defined as the consequence of a natural reduction in the amount of precipitation expected over an extended period, usually a season or more in length.[32]

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 30: Drought Classifications

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

[32] 2018 State of Texas Hazard Mitigation Plan

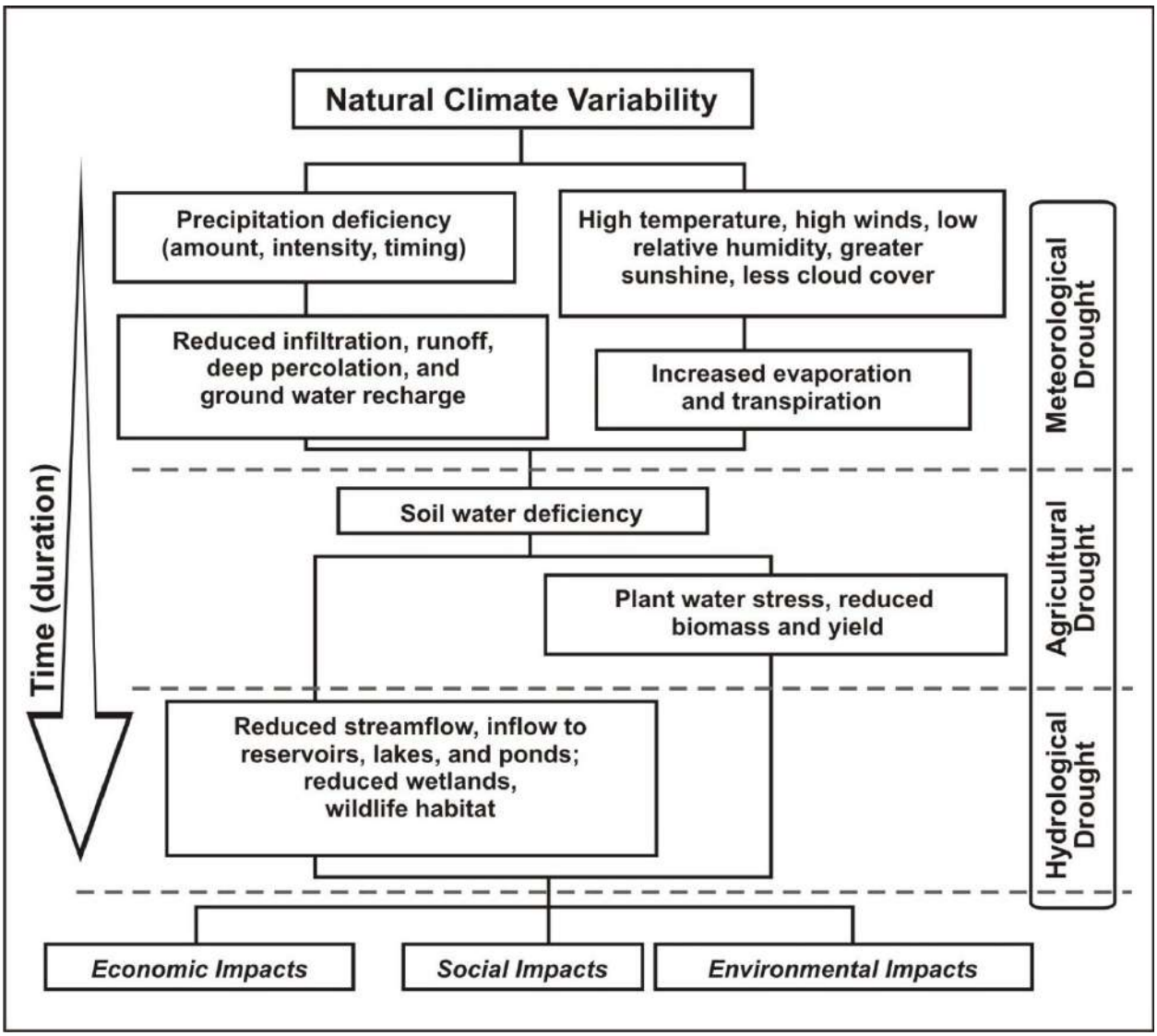


Figure 13: Sequence of Drought Occurrence and Impacts for Commonly Accepted Drought Types[33]

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

1) Drought History[34]

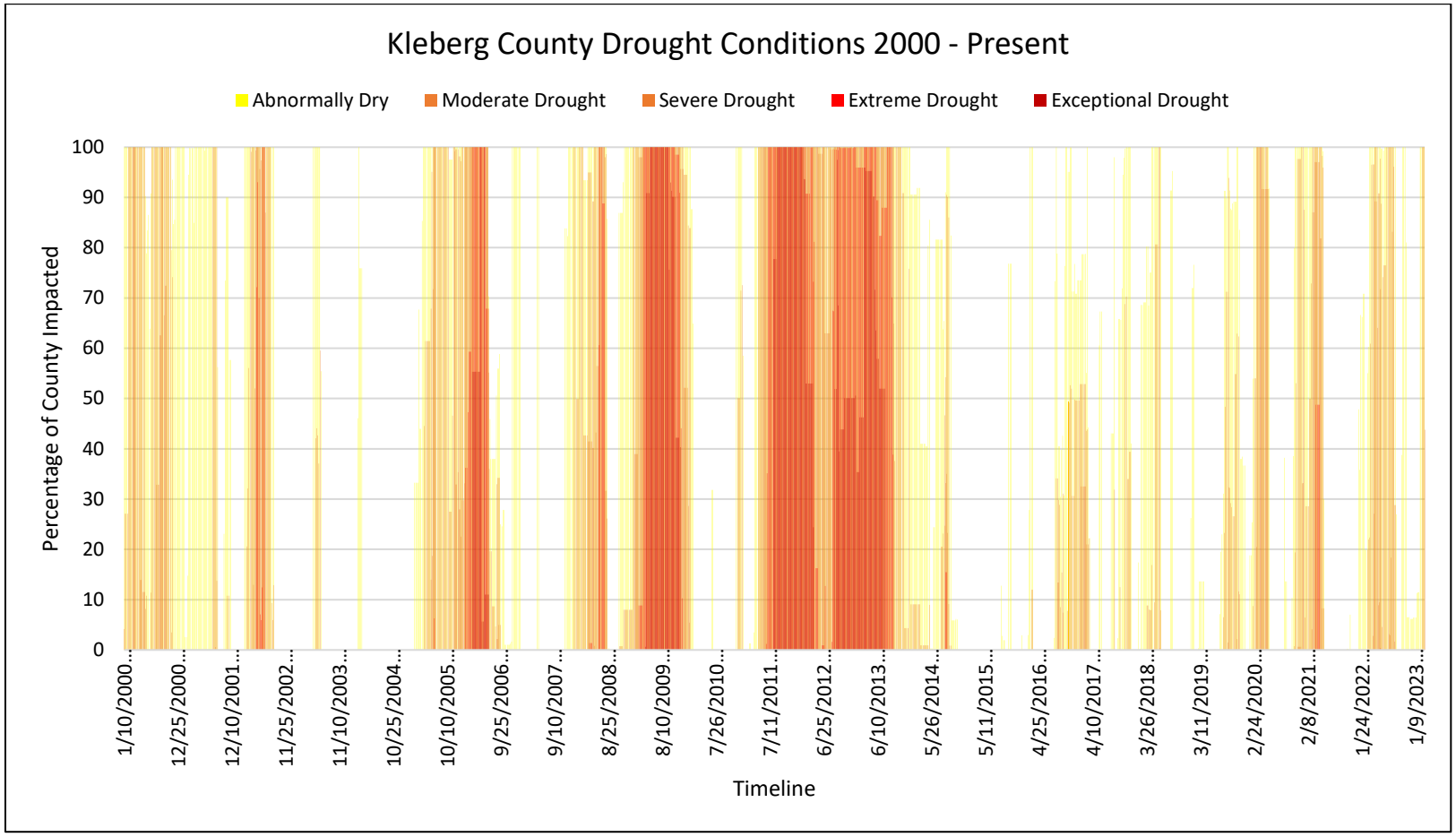


Figure 14: Kleberg County Drought History

[34] Source: United States Drought Monitor https://droughtmonitor.unl.edu/Data.aspx

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 14 to infer when the participating jurisdictions addressing the hazard previously experienced drought conditions due to the fact that the conditions impacted 100% of the county. According to the data, Kleberg County and the participating jurisdiction have regularly experienced drought conditions since 2000.

The following table identifies drought events and associated damages in Kleberg County and the participating jurisdiction since the previous plan, as reported in the NCEI database. Over the last 13 years, there have been 47 drought events recorded by the National Oceanic and Atmospheric Administration (NOAA) as seen in the table above.

Table 31: Kleberg County Drought History

Location	Date Range	Number of Drought Events	Fatalities	Injuries	Property Damage $2024	Crop Damage $2024
Countywide	1/01/2010 – 8/01/2022	47	0	0	$0	$0

2) Likelihood of Future Events

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

3) Extent

Since 2000, Kleberg County has regularly experienced county-wide droughts classified as periods ranging from abnormal dryness to exceptional drought. Between 2010 and 2012, the entire County, including all participating jurisdictions, was in a state of extreme or exceptional drought, the most severe drought categories.

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

Table 32: Palmer Drought Index

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

Table 33: Palmer Drought Category Descriptions[35]

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, Kleberg County and the participating jurisdiction 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 Index but will intensify with duration and ongoing lack of precipitation. Future drought events may reach the intensity of D4 on the Palmer Drought Index.

[35] www.droughtmonitor.unl.edu

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, along with other supply shortages.

Kleberg County does not have a drought contingency plan.

The City of Kingsville adopted its current Drought Contingency Plan in June 2023. The plan describes five stages of water restrictions ranging from voluntary conservation to prohibition of activities and water allocation. 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. 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.

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, Kleberg County and the participating jurisdiction 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 companies 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.

Table 34: Critical Facilities Vulnerable to Drought and Potential Impacts

Jurisdiction	Critical Facilities	Potential Drought Impacts	
		Increased Demand for Services	Economic Damages
Kleberg County	Kleberg County Courthouse	X	X
	CHRISTUS Spohn Hospital Kleberg	X	X
	Kleberg County Jail	X	X
	Coastal Bend College	X	X
	Kleberg County Nursing and Rehabilitation	X	X
	HEB Grocery	X	X
	NAS Kingsville	X	X
	Human Services Department	X	X
	Ricardo Water Supply	X	X
	Ricardo ISD	X	X
	Ricardo Volunteer Fire Department	X	X
	Elevated Storage Tank	X	X
	Riviera ISD/Kaufer High School	X	X
	Baffin Bay Water Supply Corporation	X	X
	Justice of the Peace Pct. 3	X	X
	Justice of the Peace Pct. 4	X	X
	Kleberg County Airport	X	X
	Justice of the Peace Pct. 1	X	X
	Justice of the Peace Pct. 2	X	X
	Super Wal-Mart	X	X
	U.S. Border Patrol Station	X	X
	Texas Highway Patrol DPS	X	X
	TxDOT Regional Office	X	X
	Texas A&M University - Kingsville	X	X
	Fresenius Kidney Care Bay Area Dialysis Center	X	X

	Bay Area Dialysis Services	X	X
	Riviera Water Supply/Waste Water Treatment	X	X
	Lowe's	X	X
	McCoy's	X	X
	Tractor Supply Company	X	X
City of Kingsville	Zarsky's	X	X
	City of Kingsville City Hall	X	X
	CHRISTUS Spohn Hospital Kleberg	X	X
	Memorial Middle School	X	X
	AD Harvey Elementary School	X	X
	Perez Elementary School	X	X
	Harrel Elementary School	X	X
	Alice GK Kleberg Elementary School	X	X
	Kingsville Police Department	X	X
	Coastal Bend College	X	X
	Kingsville Water Department	X	X
	H.M. King High School	X	X
	Kleberg County Human Services Department	X	X
	John S. Gillett Intermediate School	X	X
	Elevated Storage Tank	X	X
	Fire Station 1	X	X
	Fire Station 2	X	X
	Texas A&M University - Kingsville	X	X
	Kingsville Nursing and Rehabilitation Center	X	X
	Water Well #14 and Ground Storage Tank	X	X
	Water Well #19 and Ground Storage Tank	X	X
	Ground Storage Tank, and Elevated Storage Tank	X	X
	Water Well #21 and Ground Storage Tank	X	X

	Water Well #22 and Ground Storage Tank	X	X
	Water Well #23 and Ground Storage Tank	X	X
	Water Well #24 and Ground Storage Tank	X	X
	Water Well #25 and Ground Storage Tank	X	X
	STWA Water Well and Ground Storage Tank	X	X
	North Wastewater Treatment Plant	X	X
	South Wastewater Treatment Plant	X	X
	Kingsville PD West (Old Dr. Pepper Plant)	X	X
	Outdoor Tornado Warning Siren	X	X
	Outdoor Tornado Warning Siren	X	X
	Outdoor Tornado Warning Siren	X	X
	Outdoor Tornado Warning Siren	X	X
	Tourism Office	X	X
	Kingsville Record	X	X
	Post Office	X	X
	Emergency Operation Center	X	X
	Santa Gertrudis School	X	X
	Santa Gertrudis Academy High School	X	X
	Jubilee Academy	X	X
	Landfill		
	Dick Kleberg Park	X	X
	L.E. Ramey Golf Course	X	X
	East Water Tower	X	X
	West Water Tower	X	X
	South Water Tower	X	X
	Sage Lift Station	X	X
	17th & Lee St Lift Station	X	X
	Carlos Truan Lift Station	X	X

	General Cavazos Lift Station	X	X
	Golf Course Rd Lift Station	X	X
	South Creek Lift Station	X	X
	1717 & Hwy 77 Lift Station	X	X
	Trant Lift Station	X	X
	May Lift Station	X	X

C) Vulnerable Parcels

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 35: Parcels Vulnerable to Drought

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Kleberg County	**14,604**	**$2,348,451,007**
City of Kingsville	9,185	$1,029,694,959

I. Agricultural Production

According to the USDA 2017 Census of Agriculture[36], the total market value of agricultural products sold, including direct sales, in Kleberg County was $52,783,000. About $120,859,299 in indemnities was paid to farmers in Kleberg County between 1995 and 2021[37]. That is roughly $4,648,435 per year. Although the proportion of indemnities paid to cover losses due to drought isn't identifiable, given Kleberg 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 to due drought for the individual participating jurisdictions.

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

"As average temperatures have risen because of climate change, the Earth's water cycle has sped up through an increase in the rate of evaporation from soil and transpiration from plants.

[36] https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_County_Level/Texas/st48_2_0001_0001.pdf
[37] https://farm.ewg.org/cropinsurance.php?fips=48000&summpage=IN_REGPAGE

An increase in evapotranspiration makes more water available in the air for precipitation, but contributes to drying over some land areas, leaving less moisture in the soil. As the climate continues to change, many historically wet areas are likely to experience increased precipitation and increased risk of flooding, while historically dry areas are likely to experience less precipitation and increased risk of drought."[38]

[38] https://www.epa.gov/climate-indicators/climate-change-indicators-drought

9. Extreme Cold

Extreme cold can happen anywhere in the state, although its levels can range extensively. In the panhandle extreme cold means days below zero Fahrenheit while in the Rio Grande Valley it means reaching temperatures below freezing.[39] Extreme cold is an issue any time winter temperatures drop significantly below normal and make staying warm and safe a challenge.

Extreme cold can accompany winter weather, but it can also be independent of those storms. For that reason, the impacts of extreme cold are presented here separately from the impacts of winter weather.

1) Extreme Cold History

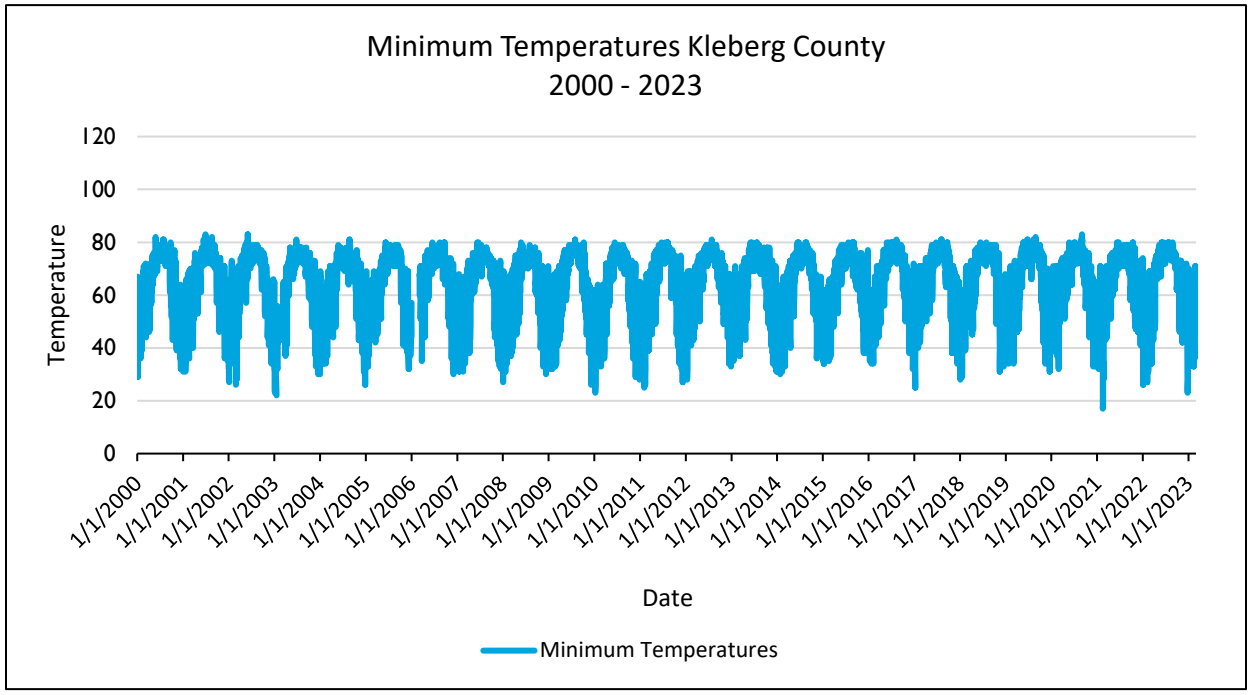


Figure 15: Minimum Recorded Daily Temperature 2000-2023[40]

Kleberg County and City of Kingsville addressing the hazard have not previously included extreme cold in their mitigation plan as a standalone hazard. Prior to the 2018 update of the State of Texas mitigation plan, extreme cold was considered part of the severe winter storm hazard.

Between 2000 and 2023, Kleberg County experienced 114 days with a minimum temperature of 32˚F or colder. At least 2 of those days had a maximum temperature of 32˚F or below. During the same timeframe, the coldest temperature recorded was 17˚F on February 15, 2021. Temperature data is recorded at the county level. However, given the nature of extreme cold

[39] 2018 State of Texas Hazard Mitigation Plan

[40] Source: National Centers for Environmental Information, https://www.ncdc.noaa.gov/cdo-web/datasets

and the proximity of all jurisdictions to each other, the jurisdictions addressing the hazard experienced the same extreme cold events. The following table shows the only events recorded in the NCEI database from 2000 – 2023, although it is likely that more events have gone unreported.

Table 36: Kleberg County Extreme Cold History

Location	Date Range	Number of Extreme Cold Events	Fatalities	Injuries	Property Damage $2024	Crop Damage $2024
Countywide	1/08/2010	1	0	0	$0	0

During these extreme cold events, Kleberg County and the participating jurisdiction experienced freezing temperatures with long durations of cold spells leading to power outages and issues with water pressures. The risk of frozen pipe bursts is high for homes and critical facilities.

2) Likelihood of Future Occurrence

Based on historic weather data, extreme cold in Kleberg County and the participating jurisdictions is occasional, meaning an event affecting any or all the participating jurisdictions is probable in the next five years.

3) Extent

The magnitude or intensity of an extreme cold event is measured according to temperature in relation to wind speed. The relationship is referred to as the "Wind Chill," and is depicted in Figure 16.

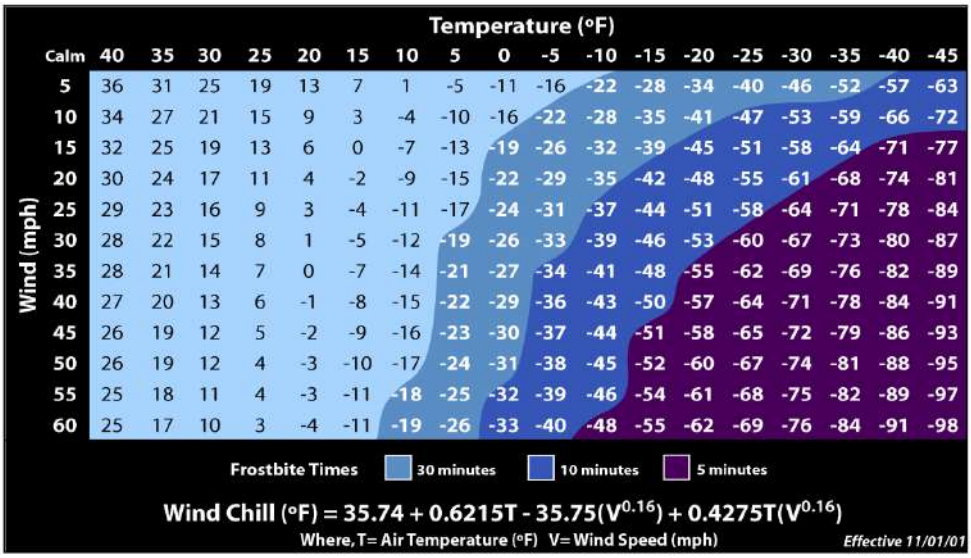


Figure 16: NOAA's NWS Wind Chill Index

Wind chill temperature is a measurement of how cold the wind makes the air feel to the human body. Since wind can dramatically accelerate heat loss from the body, a 20° day could feel just as cold as a calm day with 0° temperatures. The Wind Chill Chart factors the wind chill; it is not applicable in calm winds or when the temperature is over 50°.

The coldest temperatures in Kleberg County and the participating jurisdiction may meet the current record temperature of 17˚F. Future extreme cold events may be as intense, long-lasting, and dangerous as previous ones.

4) Location and Impact

A) Location

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

B) Impact

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

5) Vulnerability

A) Population

As described in Section 3 of Chapter 3 above, Kleberg County and the participating jurisdictions are home to many vulnerable residents. Areas with concentrations of young, elderly, and low-income residents may feel greater impacts from extreme cold due to those populations' limited ability to properly address the hazard. Deficiencies may include but aren't limited to lack of heating in their homes or vehicles, lack of access to heated public spaces during the coldest part of the day or night, and frozen pipes that may jeopardize access to drinking water, and in the worst cases, lead to severe structural damage that can render a home unlivable. The consequences for these populations' exposure to extreme cold may include but are not limited to complications for those suffering from hypertension, hypothyroidism, and diabetes, as well as exhaustion, hypothermia, trench foot, or death.

B) Critical Facilities

While all the jurisdictions are exposed to extreme temperatures, existing buildings, infrastructure, and critical facilities were historically not considered vulnerable to damages significant enough to interrupt or stop normal operations. However, damage to existing buildings and infrastructure, caused by winter weather and extreme cold in recent years, has shown exceptions to long held assumptions about the threat of these hazards. Therefore, all critical facilities are potentially vulnerable to the impacts noted in Section 4B of this chapter.

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

"Stretching of the Arctic polar vortex—a strong band of winds in the stratosphere surrounding the North Pole— has increased with Arctic amplification and is linked with extreme cold across parts of Asia and North America. Climate change is favorable for increasing Arctic polar vortex stretching events.[41] When the Arctic polar vortex is strong and stable, the polar air remains in place over the North Pole; when the polar vortex weakens or stretches, extremely cold air can dip south. Results show that stronger Arctic polar vortex conditions are decreasing in

[41] https://cpo.noaa.gov/Divisions-Programs/Earth-System-Science-and-Modeling/MAPP

frequency, while weaker Arctic polar vortex conditions and stretching disruptions are increasing in frequency for October through February."[42]

[42] https://cpo.noaa.gov/Divisions-Programs/Communication-Education-and-Engagement/CEE-News/ArtMID/8293/ArticleID/2369/Research-Links-Extreme-Cold-Weather-in-the-United-States-to-Arctic-Warming

10. Extreme Heat

Extreme heat is defined as a combination of very high temperatures and, usually, exceptionally humid conditions.[43] 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[44]. Extreme heat kills more people than hurricanes, floods, tornados, and lightning combined, according to the National Weather Service. In 2001, 300 deaths were caused by excessive heat exposure.

1) Extreme Heat History

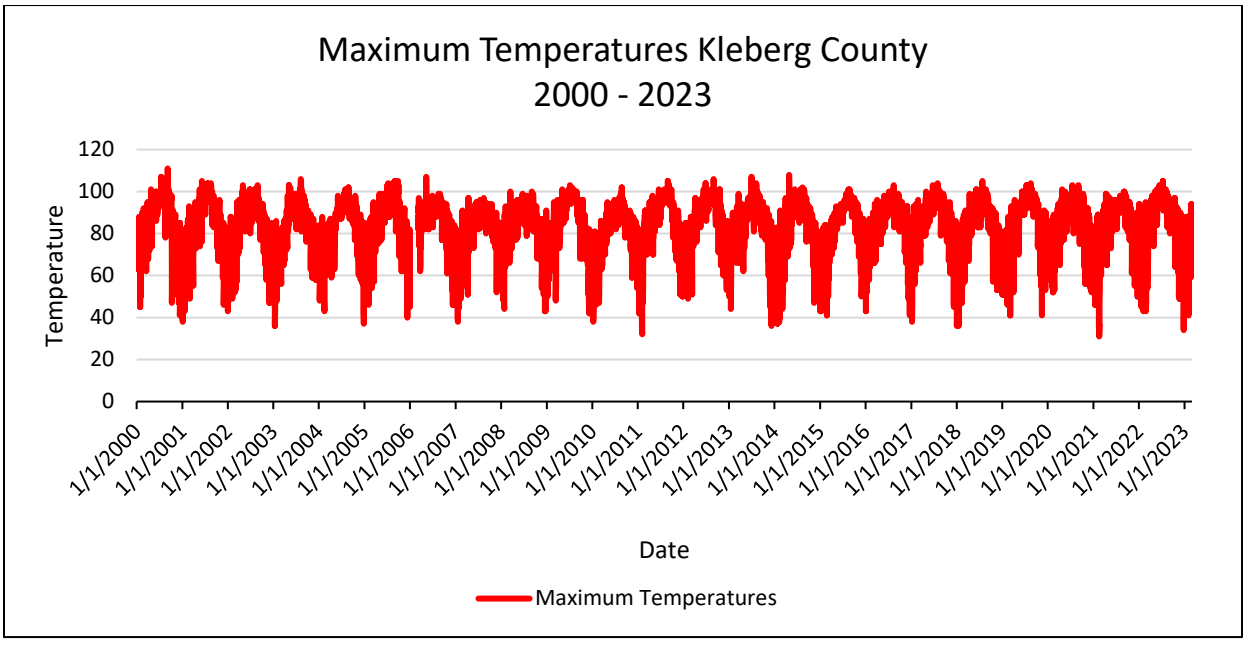


Figure 17: Maximum Recorded Daily Temperature 2000-2023[45]

[43] 2018 State of Texas Hazard Mitigation Plan
[44] http://www.bt.cdc.gov/disasters/extremeheat/heat_guide.asp
[45] Source: National Centers for Environmental Information, https://www.ncdc.noaa.gov/cdo-web/datasets

In the 2018 HMAP, Kleberg County and the participating jurisdiction reported 278 days with a maximum temperature of 100˚F or hotter from 2000 – 2017. The 2018 HMAP also reported that it is highly likely Kleberg County, and its jurisdictions, will experience extreme heat with urban areas possibly being at greater risk than within rural areas.

Between 2000 to 2023, Kleberg County and the participating jurisdiction experienced 320 days with a maximum temperature of 100˚F or hotter and 1,886 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, it is assumed that all jurisdictions experienced the same extreme heat events. The following table shows the only events recorded in the NCEI database from 2000 – 2023, although it is likely that more events have gone unreported.

Table 37: Kleberg County Extreme Heat History

Location	Date Range	Number of Extreme Heat Events	Fatalities	Injuries	Property Damage $2024	Crop Damage $2024
Countywide	6/21/2021	1	0	0	$0	0

2) Likelihood of Future Events

Based on historic weather data, extreme heat in Kleberg County and the participating jurisdiction 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 30. This index measures how hot it feels outside when humidity is combined with high temperatures.

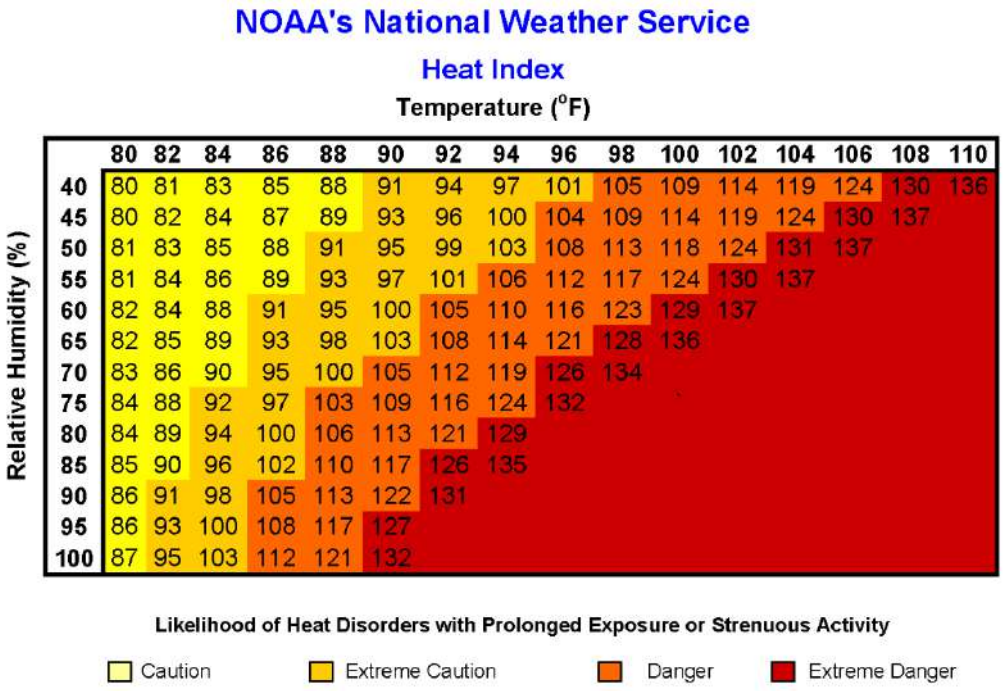


Figure 18: NOAA's NWS Heat Index Chart[46]

The extent scale in Figure 18 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 Figure 18.

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

Table 38: Heat Intensity

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

Given an estimated daily average relative humidity level of 76%[47], 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 2023, Kleberg County and the participating jurisdiction experienced 1,886 days with highs of 89˚F or hotter and overnight lows of 75˚F or hotter. Based on the NWS descriptions in Figure 18 above, and the average daily humidity level, these days likely warranted a heat advisory.

The hottest temperature recorded in Kleberg County in the recent past, 111˚F, was reached on September 6, 2000. Based on the NWS descriptions in Table 46 above, at least 10 of the 294 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.

Future extreme heat events may meet the heat index requirements for issuing an Excessive Heat Warning as described in the Heat Intensity scale in Figure 18 above. The hottest temperatures in Kleberg County and the participating jurisdictions may meet the current record temperature of 111˚F. Future extreme heat events may be as intense, long-lasting, and dangerous as previous ones.

[47] Used Corpus Christi Average, closest to County - https://www.currentresults.com/Weather/Texas/humidity-annual.php

4) Location and Impact

A) Location

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

B) Impact

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. No deaths related to extreme heat have ever been reported in the participating jurisdictions. However, in worst case scenarios, this hazard may inflict severe or deadly property or crop damage based on the hazard's potential, especially if combined with drought conditions. Electrical grid failure, power outages, and damage to critical roadways are potential impacts. 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, Kleberg County and the participating jurisdiction 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 were historically not considered vulnerable to damages significant enough to interrupt or stop normal operations. However, damages to existing building and infrastructure as a result of extended periods of extreme heat and record high temperatures in recent years has shown exceptions to long held assumptions about the threat of extreme heat. Therefore, all critical facilities are potentially vulnerable to the impacts noted in Section 4B of this Chapter.

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a

hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

"Record-setting daily temperatures, heat waves, and cold spells are a natural part of day-to-day variation in weather. As the Earth's climate warms overall, however, heat waves are expected to become more frequent and more intense. Higher heat index values (which combine temperature and humidity to describe perceived temperature) are expected to increase discomfort and aggravate health issues."[48]

[48] https://www.epa.gov/climate-indicators/climate-change-indicators-high-and-low-temperatures
https://science2017.globalchange.gov/

11. Hailstorm

Hail is a form of solid precipitation. It consists of balls or irregular lumps of ice, each of which is called a hailstone. Hailstones usually measure between 5 millimeters (0.2 in) and 15 centimeters (6 in) in diameter. Hail is possible within most thunderstorms as it is produced by cumulonimbus clouds. Hail formation requires environments of strong, upward motion of air, similar to tornadoes, and lowered heights of the freezing level. In the mid-latitudes, hail forms near the interiors of continents, while in the tropics, it tends to be confined to high elevations. Any thunderstorm which produces hail that reaches the ground is known as a hailstorm. Hailstorms can happen anywhere in the state of Texas.

Hailstones form by colliding with super cooled water drops. Super cooled water will freeze on contact with ice crystals, frozen raindrops, dust, or some other nuclei. The storm's updraft blows the forming hailstones up the cloud. As the hailstone ascends it passes into areas of the cloud where the concentration of humidity and super cooled water droplets varies. When the hailstone moves into an area with a high concentration of water droplets, it captures the latter and acquires a translucent layer. Should the hailstone move into an area where water vapor is mostly available, it acquires a layer of opaque white ice.

The hailstone will keep rising in the thunderstorm until its mass can no longer be supported by the updraft. It then falls toward the ground while continuing to grow, based on the same processes, until it leaves the cloud. It will later begin to melt as it passes into air that is above freezing temperature.[49]

1) Hailstorm History

The 2018 HMAP reported that Kleberg County and the participating jurisdiction experienced 79 hail events between 1968 and 2016, with hail size ranging from .75 and 4.5 inches in diameter. The 2018 HMAP also recorded over $900,000 in property damages during that time, adjusted to $2024. Historically, the County reported highly likely probability of hailstorms, particularly in association with seasonal patterns during the spring and early fall.

The following tables identify the most comprehensive list available of hailstorm events and associated damages in Kleberg County and the participating jurisdiction from 2017 to present. No participating jurisdiction has recorded a hailstorm more recently than what is listed below.

[49] 2018 State of Texas Hazard Mitigation Plan

Table 39: Kleberg County Hailstorm History

Location	Date Range	Number of Hailstorms	Hail Diameter in inches	Fatalities	Injuries	Property Damage $2024	Crop Damage $2024
Countywide	6/06/2019	1	1”	0	0	$11,702.01	$0

According to the best information available, there have been no hail events within the unincorporates areas of Kleberg County since the 2018 HMAP.

2) Likelihood of Future Events

Based on the history of hailstorms and likelihood of unreported events, a hailstorm in Kleberg County and the participating jurisdiction is likely, meaning that an event is probable within the next three 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 hailstorm. 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 damage per year. The scale showing intensity categories in Table 40 was developed by combining data from National Climatic Data Center (NCDC) and the Tornado and Storm Research Organization (TORRO).

Table 40: Hailstorm Intensity[50, 51]

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[52]	0.80-1.20	Nickel – Half dollar	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored

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

H4	Severe	1.2-1.6	Half dollar – Ping pong ball	Widespread glass damage and vehicle bodywork damage
H5	Destructive	1.6-2.0	Ping pong ball – hen egg	Wholesale destruction of glass, damage to tiled roofs, and significant risk of injuries
H6	Destructive	2.0-2.4	Hen egg – tennis ball	Bodywork of grounded aircraft dented, and brick walls pitted
H7	Destructive	2.4-3.0	Tennis ball – Baseball	Severe roof damage and risk of serious injuries
H8	Destructive	3.0-3.5	Hockey puck	Severe damage to aircraft bodywork
H9	Super Hailstorms	3.5-4.0	Softball	Extensive structural damage could cause fatal injuries
H10	Super Hailstorms	4.0+	Greater than softball-sized	Extensive structural damage could cause fatal injuries

According to NCEI data and the 2018 HMAP, the worst hailstorms in Kleberg County and the participating jurisdictions have produced hail up to 2.75" in diameter, H7 on the Hailstorm Intensity Scale.

Future hailstorms may meet previous worst-case H7 storms in terms of strength, intensity, 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 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 in the participating jurisdictions are considered exposed to this hazard and could potentially be impacted.

5) Vulnerability

A) Population

As described in Section 3 of Chapter 3 above, Kleberg County and the participating jurisdiction are home to many vulnerable residents. Increased vulnerability may be due to many factors including but not limited to age, 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 damage, 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 damage, injuries, or loss of life.

B) Critical Facilities

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. Thus, the following critical facilities were determined to be especially vulnerable to hailstorms due to the presence of structures with flat roofs and its increased vulnerability.

Table 41: Critical Facilities Vulnerable to Hailstorms and Potential Impacts

Jurisdiction	Critical Facilities	Potential Hailstorm Impacts		
		Damaged or Destroyed Roof	Damaged Windows	Water damage due to Physical Damages
Kleberg County	Kleberg County Courthouse	X	X	X
	CHRISTUS Spohn Hospital Kleberg	X	X	X
	Kleberg County Jail	X	X	X
	Coastal Bend College	X	X	X
	Kleberg County Nursing and Rehabilitation	X	X	X
	HEB Grocery	X	X	X
	NAS Kingsville	X	X	X
	Human Services Department	X	X	X
	Ricardo Water Supply	X	X	X
	Ricardo ISD	X	X	X
	Ricardo Volunteer Fire Department	X	X	X
	Elevated Storage Tank			
	Riviera ISD/Kaufer High School	X	X	X
	Baffin Bay Water Supply Corporation	X	X	X
	Justice of the Peace Pct. 3	X	X	X
	Justice of the Peace Pct. 4	X		X
	Kleberg County Airport	X		X
	Justice of the Peace Pct. 1	X	X	X
	Justice of the Peace Pct. 2	X	X	X
	Super Wal-Mart	X		X

	U.S. Border Patrol Station	X	X	X
	Texas Highway Patrol DPS	X		X
	TxDOT Regional Office			X
	Texas A&M University - Kingsville	X	X	X
	Fresenius Kidney Care Bay Area Dialysis Center	X	X	X
	Bay Area Dialysis Services	X	X	X
	Riviera Water Supply/Waste Water Treatment	X	X	X
	Lowe's	X	X	X
	McCoy's	X	X	X
	Tractor Supply Company	X	X	X
City of Kingsville	Zarsky's	X	X	X
	City of Kingsville City Hall	X	X	X
	CHRISTUS Spohn Hospital Kleberg	X	X	X
	Memorial Middle School	X	X	X
	AD Harvey Elementary School	X	X	X
	Perez Elementary School	X	X	X
	Harrel Elementary School	X	X	X
	Alice GK Kleberg Elementary School	X	X	X
	Kingsville Police Department	X	X	X
	Coastal Bend College	X	X	X
	Kingsville Water Department			X
	H.M. King High School	X	X	X
	Kleberg County Human Services Department	X	X	X
	John S. Gillett Intermediate School	X	X	X
	Elevated Storage Tank			
	Fire Station 1	X	X	X
	Fire Station 2	X	X	X
	Texas A&M University - Kingsville	X	X	X
	Kingsville Nursing and Rehabilitation Center	X	X	X
	Water Well #14 and Ground Storage Tank			
	Water Well #19 and Ground Storage Tank			
	Ground Storage Tank, and Elevated Storage Tank			
	Water Well #21 and Ground Storage Tank			

	Water Well #22 and Ground Storage Tank			
	Water Well #23 and Ground Storage Tank			
	Water Well #24 and Ground Storage Tank			
	Water Well #25 and Ground Storage Tank			
	STWA Water Well and Ground Storage Tank			
	North Wastewater Treatment Plant	X	X	X
	South Wastewater Treatment Plant	X	X	X
	Kingsville PD West (Old Dr. Pepper Plant)	X	X	X
	Outdoor Tornado Warning Siren			X
	Outdoor Tornado Warning Siren			X
	Outdoor Tornado Warning Siren			X
	Outdoor Tornado Warning Siren			X
	Tourism Office	X	X	X
	Kingsville Record	X	X	X
	Post Office	X	X	X
	Emergency Operation Center	X	X	X
	Santa Gertrudis School	X	X	X
	Santa Gertrudis Academy High School	X	X	X
	Jubilee Academy	X	X	X
	Landfill			
	Dick Kleberg Park			X
	L.E. Ramey Golf Course			X
	East Water Tower			X
	West Water Tower			X
	South Water Tower			X
	Sage Lift Station			
	17th & Lee St Lift Station			
	Carlos Truan Lift Station			
	General Cavazos Lift Station			
	Golf Course Rd Lift Station			
	South Creek Lift Station			
	1717 & Hwy 77 Lift Station			
	Trant Lift Station			
	May Lift Station			

C) Vulnerable Commercial Structures

Every structure is vulnerable to damage from hail. However, commercial structures with large and/or flat roofs are especially vulnerable due to the increased exposure that large and/or flat roofs create. According to the Texas State Comptroller's 2022 Appraisal District Ratio Study, Kleberg County has commercial real property valued at $217,168,268[53].

D) Vulnerable Parcels

Table 42: All Parcels Vulnerable to Hailstorms

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Kleberg County	**14,604**	**$2,348,451,007**
City of Kingsville	9,185	$1,029,694,959

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

"As a result of anthropogenic warming, it is generally anticipated that low-level moisture and convective instability will increase, raising hailstorm likelihood and enabling the formation of larger hailstones; the melting height will rise, enhancing hail melt and increasing the average size of surviving hailstones."[54]

[53] https://comptroller.texas.gov/data/property-tax/ratio-study/2022/

[54] https://www.nature.com/articles/s43017-020-00133-9

12. Winter Storms

Winter storms are defined by extreme winter weather through heavy concentrations heavy snow and blizzards, sleet, ice storms (or freezing rain), frost/freeze or a mix of these. Winter storms can down trees, cause widespread power outages, damage property, and cause fatalities and injuries. The effect of winter storms on Texas is quite disruptive compared to other regions that normally experience winter storms.

A heavy snowfall for the State is an accumulation of four or more inches of snow in a 12-hour period. This amount of snow accumulation usually occurs in the northern half of the state and in the higher elevations of West Texas. South of the line from Del Rio to Port Arthur snow is rare.

Blizzards are the most perilous of all winter storms, characterized by low temperatures and strong winds of more than 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.

An ice storm occurs when rain falls out of the warm 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. Damage can occur with half an inch of rain freezing on trees and utility wires; the damage increases if there are high winds. Based on this, an icing event is categorized an ice storm at half an inch.[55]

1) Winter Storm History

In the 2018 HMAP, Kleberg County and City of Kingsville reported one major winter storm event throughout the County that occurred on December 22, 1989. These events caused $3.98 million in property damage throughout the county, adjusted to $2024. The 2018 plan found that the frequency of occurrences of severe winter storms is occasional, with an event probable in the next five years.

NCEI data shows that Kleberg County experienced seven winter storm events between January 2004 and February 2021. None are reported to have caused any injuries or fatalities; however, some property damage was reported. The most recent winter weather event was Winter Storm Uri in February 2021. During that event, Kleberg County and surrounding areas received significant ice accumulations (up to a quarter of an inch) and freezing rain ice accretion. During such events, water supply, tree limbs, transportation, and power lines are potentially impacted due to the weight of accumulated snow and ice. The following table represents all recorded events between since the previous HMAP for the County and City of Kingsville.

[55] 2018 State of Texas Hazard Mitigation Plan

Table 43: Kleberg County Severe Winter Storm History

Location	Date Range	Number of Severe Winter Storms	Winter Storm Types	Fatalities	Injuries	Property Damage $2024	Crop Damage $2024
County wide	12/24/2004 – 2/16/2021	7	Winter Weather, Frost/Freeze, Heavy Snow, Ice	0	0	$163,513	$0

2) Likelihood of Future Events

Future winter storms in Kleberg County and the City of Kingsville are considered likely due to the significant impacts of the historic winter weather, meaning an event affecting any or all participating jurisdictions is probable in the next three years.

3) Extent

The table below displays the magnitude of winter storms.

Table 44: Winter Weather Extent Scale [56]

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".

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

Sleet Advisory	Issued for accumulating sleet of 1/4" to 1". Because sleet usually occurs with other precipitation types, a winter weather advisory will almost always be used in such cases.
Winter Weather Advisory	Issued for a winter weather event in which there is more than one hazard present, but all precipitation is expected to remain below warning criteria. For example, it would be issued if 2 inches of snow were expected with a small amount of sleet mixing in at times.
Wind Chill Advisory[57]	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[58]	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

Based on previous winter storm events, future storms in Kleberg County and the City of Kingsville may see ice accumulation of up to .25".

[57] https://www.osha.gov/dts/weather/winter_weather/windchill.html
[58] https://www.osha.gov/dts/weather/winter_weather/windchill.html

4) Location and Impact

A) Location

Winter storms have no distinct geographic boundary. Winter storms can occur across the entire planning area and uniformly affect all participating jurisdictions.

B) Impact

The potential impact of a severe winter storm is normally minor, resulting in few, if any, injuries. 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.

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 winter storm may damage or destroy crops.

5) Vulnerability

A) Population

As described in Section 3 of Chapter 3 above, Kleberg County and the participating jurisdictions are home to many vulnerable residents. Areas with concentrations of young, elderly, and low-income residents may feel greater impacts from severe winter weather due to those populations' limited ability to properly address the hazard. Deficiencies may include but aren't limited to lack of heating in their homes or vehicles, lack of access to heated public spaces during the coldest part of the day or night, and frozen pipes that may jeopardize access to drinking water, and in the worst cases, lead to severe structural damage that can render a home unlivable. The consequences for these populations' exposure to severe winter weather can include but are not limited to complications for those suffering from hypertension, hypothyroidism, and diabetes, as well as exhaustion, hypothermia, trench foot, or death.

B) Critical Facilities

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 45: Critical Facilities Vulnerable to Winter Storms

Jurisdiction	Critical Facilities	Potential Severe Winter Storm Impacts
		Falling Tree Limbs
Kleberg County	Kleberg County Courthouse	X
	CHRISTUS Spohn Hospital Kleberg	X
	Kleberg County Jail	X
	Coastal Bend College	X
	Kleberg County Nursing and Rehabilitation	X
	HEB Grocery	X
	NAS Kingsville	X
	Human Services Department	X
	Ricardo Water Supply	X
	Ricardo ISD	X
	Ricardo Volunteer Fire Department	X
	Elevated Storage Tank	X
	Riviera ISD/Kaufer High School	X
	Baffin Bay Water Supply Corporation	X
	Justice of the Peace Pct. 3	X
	Justice of the Peace Pct. 4	X
	Kleberg County Airport	X
	Justice of the Peace Pct. 1	X
	Justice of the Peace Pct. 2	X
	Super Wal-Mart	X
	U.S. Border Patrol Station	X
	Texas Highway Patrol DPS	X
	TxDOT Regional Office	X
	Texas A&M University - Kingsville	X
	Fresenius Kidney Care Bay Area Dialysis Center	X
	Bay Area Dialysis Services	X
	Riviera Water Supply/Waste Water Treatment	X
	Lowe's	X
	McCoy's	X
	Tractor Supply Company	X
City of Kingsville	Zarsky's	X
	City of Kingsville City Hall	X
	CHRISTUS Spohn Hospital Kleberg	X
	Memorial Middle School	X
	AD Harvey Elementary School	X

	Perez Elementary School	X
	Harrel Elementary School	X
	Alice GK Kleberg Elementary School	X
	Kingsville Police Department	X
	Coastal Bend College	X
	Kingsville Water Department	X
	H.M. King High School	X
	Kleberg County Human Services Department	X
	John S. Gillett Intermediate School	X
	Elevated Storage Tank	X
	Fire Station 1	X
	Fire Station 2	X
	Texas A&M University - Kingsville	X
	Kingsville Nursing and Rehabilitation Center	X
	Water Well #14 and Ground Storage Tank	X
	Water Well #19 and Ground Storage Tank	X
	Ground Storage Tank, and Elevated Storage Tank	X
	Water Well #21 and Ground Storage Tank	X
	Water Well #22 and Ground Storage Tank	X
	Water Well #23 and Ground Storage Tank	X
	Water Well #24 and Ground Storage Tank	X
	Water Well #25 and Ground Storage Tank	X
	STWA Water Well and Ground Storage Tank	X
	North Wastewater Treatment Plant	X
	South Wastewater Treatment Plant	X
	Kingsville PD West (Old Dr. Pepper Plant)	X
	Outdoor Tornado Warning Siren	X
	Outdoor Tornado Warning Siren	X
	Outdoor Tornado Warning Siren	X
	Outdoor Tornado Warning Siren	X
	Tourism Office	X
	Kingsville Record	X
	Post Office	X
	Emergency Operation Center	X
	Santa Gertrudis School	X
	Santa Gertrudis Academy High School	X
	Jubilee Academy	X
	Landfill	
	Dick Kleberg Park	X
	L.E. Ramey Golf Course	X
	East Water Tower	X
	West Water Tower	X
	South Water Tower	X

	Sage Lift Station	X
	17th & Lee St Lift Station	X
	Carlos Truan Lift Station	X
	General Cavazos Lift Station	X
	Golf Course Rd Lift Station	X
	South Creek Lift Station	X
	1717 & Hwy 77 Lift Station	X
	Trant Lift Station	X
	May Lift Station	X

C) Infrastructure

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[59]. The worst snowstorm in any participating jurisdiction dropped up to a maximum of 7". Although it's not impossible[60] 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 1" of snow. Considering the worst ice storms in the participating jurisdictions cause ice accumulations of .5", it's unlikely, but not impossible, that an ice storm causing structural ice accumulations of less than 4" will cause significant structural damages.

However, significant damages may be incurred indirectly. Examples include, but are not limited to, trees and limbs that fall after being overburdened with snow or ice, building strikes due to vehicles losing traction on snow or ice-covered roads, and power outages that affect building temperature regulation and allow pipes to freeze and burst.

D) Vulnerable Parcels

Table 46: All Parcels Vulnerable to Winter Storms

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Kleberg County	**14,604**	**$2,348,451,007**
City of Kingsville	9,185	$1,029,694,959

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

[60] 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.

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

"Warmer temperatures cause more water to evaporate from the land and oceans, which leads to more precipitation, larger storms, and more variation in precipitation in some areas. In general, a warmer climate causes more of this precipitation to fall in the form of rain instead of snow. Some places, however, could see more snowfall if temperatures rise but still remain below the freezing point, or if storm tracks change. Areas near large lakes might also experience more snowfall as lakes remain unfrozen for longer periods, allowing more water to evaporate. In contrast, other areas might experience less snowfall as a result of wintertime droughts."[61]

[61] https://www.epa.gov/climate-indicators/climate-change-indicators-snowfall

13. Windstorms

Windstorms are classified as any wind that is strong enough to cause at least light damage to trees and buildings, which 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. Although tornados and tropical cyclones also produce wind damage, they are usually classified separately.

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 can cause widespread damage and landscape devastation.[62]

1) Windstorm History

In the 2018 HMAP, Kleberg County and the City of Kingsville recorded 63 windstorm events from 1968 and 2016. There was one fatality associated with a windstorm event in 1986 and six injuries between 1974 and 1979. The 2018 HMAP also recorded about $49.89 million in property damages during that time, adjusted to $2024. Historically, the County reported likely probability of damaging windstorms.

The following tables identify the most comprehensive list available of severe wind events and associated damages in Kleberg County and the City of Kingsville from 2017 to present. No participating jurisdiction has recorded a severe wind event more recently than 2022.

Table 47: Kleberg County Severe Wind History

Incidents	Date Range	Windstorm Events	Windspeed Range (Knots)	Fatalities	Injuries	Property Damage $2024	Crop Damage $2024
Countywide	5/16/2019 – 5/22/2022	7	52	0	0	$13,746.53	$0

Table 48: City of Kingsville Windstorm History

Incidents	Date Range	Windstorm Events	Windspeed Range (Knots)	Fatalities	Injuries	Property Damage $2024	Crop Damage $2024
Citywide	5/6/2019 – 5/24/2022	4	52 - 78	0	0	$603,604.32	$0

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

2) Likelihood of Future Events

Given the frequency of past events in all jurisdictions, a damaging severe wind event in the future is highly likely, meaning that an event is probable in the next year.

3) Extent

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

Table 49: Beaufort Wind Scale [63]

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

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

			spindrift, foam blown in streaks	
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 windstorm events in Kleberg County and the City of Kingsville have ranged up to 12 on the Beaufort Wind Scale. No recent severe windstorm events in any of the participating jurisdictions have caused any injuries, deaths, or crop damage. Future severe wind events may meet previous worst-case Force 12 events in terms of strength and intensity of wind speed.

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 damage 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, Kleberg 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

Certain critical facilities and infrastructure in each jurisdiction may be particularly vulnerable to severe wind similar to hurricane and tornado events. 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 damage. 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 50: Critical Facilities Vulnerable to Windstorm and Potential Impacts

Jurisdiction	Critical Facilities	Potential Severe Wind 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
Kleberg County	Kleberg County Courthouse	X	X	X	X	X	X	X	X	X	X
	CHRISTUS Spohn Hospital Kleberg	X	X	X	X	X	X	X	X	X	X
	Kleberg County Jail	X	X	X	X	X	X	X	X	X	X
	Coastal Bend College	X	X	X	X	X	X	X	X	X	X
	Kleberg County Nursing and Rehabilitation	X	X	X	X	X	X	X	X	X	X
	HEB Grocery	X	X	X	X	X	X	X	X	X	X
	NAS Kingsville	X	X	X	X	X	X	X	X	X	X
	Human Services Department	X	X	X	X	X	X	X	X	X	X
	Ricardo Water Supply	X	X	X	X	X	X	X	X	X	X
	Ricardo ISD	X	X	X	X	X	X	X	X	X	X
	Ricardo Volunteer Fire Department	X	X	X	X	X	X	X	X	X	X
	Elevated Storage Tank	X	X	X						X	
	Riviera ISD/Kaufer High School	X	X	X	X	X	X	X	X	X	X
	Baffin Bay Water Supply Corporation	X	X	X	X	X	X	X	X	X	X
	Justice of the Peace Pct. 3	X	X	X	X	X	X	X	X	X	X
	Justice of the Peace Pct. 4	X	X	X	X	X	X	X	X	X	X
	Kleberg County Airport	X	X	X	X	X	X	X	X	X	X
	Justice of the Peace Pct. 1	X	X	X	X	X	X	X	X	X	X
	Justice of the Peace Pct. 2	X	X	X	X	X	X	X	X	X	X
	Super Wal-Mart	X	X	X	X	X	X	X	X	X	X
	U.S. Border Patrol Station	X	X	X	X	X	X	X	X	X	X
	Texas Highway Patrol DPS	X	X	X	X	X	X	X	X	X	X
	TxDOT Regional Office	X	X	X	X	X	X	X	X	X	X
	Texas A&M University - Kingsville	X	X	X	X	X	X	X	X	X	X

	Fresenius Kidney Care Bay Area Dialysis Center	X	X	X	X	X	X	X	X	X	X
	Bay Area Dialysis Services	X	X	X	X	X	X	X	X	X	X
	Riviera Water Supply/Waste Water Treatment	X	X	X	X	X	X	X	X	X	X
	Lowe's	X	X	X	X	X	X	X	X	X	X
	McCoy's	X	X	X	X	X	X	X	X	X	X
	Tractor Supply Company	X	X	X	X	X	X	X	X	X	X
City of Kingsville	Zarsky's	X	X	X	X	X	X	X	X	X	X
	City of Kingsville City Hall	X	X	X	X	X	X	X	X	X	X
	CHRISTUS Spohn Hospital Kleberg	X	X	X	X	X	X	X	X	X	X
	Memorial Middle School	X	X	X	X	X	X	X	X	X	X
	AD Harvey Elementary School	X	X	X	X	X	X	X	X	X	X
	Perez Elementary School	X	X	X	X	X	X	X	X	X	X
	Harrel Elementary School	X	X	X	X	X	X	X	X	X	X
	Alice GK Kleberg Elementary School	X	X	X	X	X	X	X	X	X	X
	Kingsville Police Department	X	X	X	X	X	X	X	X	X	X
	Coastal Bend College	X	X	X	X	X	X	X	X	X	X
	Kingsville Water Department	X	X	X	X	X	X	X	X	X	X
	H.M. King High School	X	X	X	X	X	X	X	X	X	X
	Kleberg County Human Services Department	X	X	X	X	X	X	X	X	X	X
	John S. Gillett Intermediate School	X	X	X	X	X	X	X	X	X	X
	Elevated Storage Tank	X	X	X					X	X	X
	Fire Station 1	X	X	X	X	X	X	X	X	X	X
	Fire Station 2	X	X	X	X	X	X	X	X	X	X
	Texas A&M University - Kingsville	X	X	X	X	X	X	X	X	X	X
	Kingsville Nursing and Rehabilitation Center	X	X	X	X	X	X	X	X	X	X
	Water Well #14 and Ground Storage Tank	X	X	X					X	X	

	Water Well #19 and Ground Storage Tank	X	X	X					X	X	
	Ground Storage Tank, and Elevated Storage Tank	X	X	X					X	X	
	Water Well #21 and Ground Storage Tank	X	X	X					X	X	
	Water Well #22 and Ground Storage Tank	X	X	X					X	X	
	Water Well #23 and Ground Storage Tank	X	X	X					X	X	
	Water Well #24 and Ground Storage Tank	X	X	X					X	X	
	Water Well #25 and Ground Storage Tank	X	X	X					X	X	
	STWA Water Well and Ground Storage Tank	X	X	X					X	X	
	North Wastewater Treatment Plant	X	X	X	X	X	X	X	X	X	X
	South Wastewater Treatment Plant	X	X	X	X	X	X	X	X	X	X
	Kingsville PD West (Old Dr. Pepper Plant)	X	X	X	X	X	X	X	X	X	X
	Outdoor Tornado Warning Siren	X	X	X	X	X			X		
	Outdoor Tornado Warning Siren	X	X	X	X	X			X		
	Outdoor Tornado Warning Siren	X	X	X	X	X			X		
	Outdoor Tornado Warning Siren	X	X	X	X	X			X		
	Tourism Office	X	X	X	X	X	X	X	X	X	X
	Kingsville Record	X	X	X	X	X	X	X	X	X	X
	Post Office	X	X	X	X	X	X	X	X	X	X
	Emergency Operation Center	X	X	X	X	X	X	X	X	X	X
	Santa Gertrudis School	X	X	X	X	X	X	X	X	X	X
	Santa Gertrudis Academy High School	X	X	X	X	X	X	X	X	X	X
	Jubilee Academy	X	X	X	X	X	X	X	X	X	X
	Landfill					X			X	X	

	Dick Kleberg Park	X	X	X	X	X			X	X	X
	L.E. Ramey Golf Course	X	X	X	X	X			X	X	X
	East Water Tower	X	X	X	X	X			X	X	
	West Water Tower	X	X	X	X	X			X	X	
	South Water Tower	X	X	X	X	X			X	X	
	Sage Lift Station	X	X	X					X	X	
	17th & Lee St Lift Station	X	X	X					X	X	
	Carlos Truan Lift Station	X	X	X					X	X	
	General Cavazos Lift Station	X	X	X					X	X	
	Golf Course Rd Lift Station	X	X	X					X	X	
	South Creek Lift Station	X	X	X					X	X	
	1717 & Hwy 77 Lift Station	X	X	X					X	X	
	Trant Lift Station	X	X	X					X	X	
	May Lift Station	X	X	X					X	X	

C) Vulnerable Parcels

Table 51: Parcels Vulnerable to Windstorms

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Kleberg County	**14,604**	**$2,348,451,007**
City of Kingsville	9,185	$1,029,694,959

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

"The Arctic has warmed more than lower latitudes, and as a result the temperature difference between the mid-latitudes and the polar regions has become reduced, which has changed the path of the northern hemisphere jet stream so that it now moves north and south over a greater range of latitudes. As the atmosphere continues to warm, we expect to see much deeper north-south waves, which will cause a slowing down, or even blocking, of the jet stream. This could result in weather systems that persist for much longer than would be considered normal over any particular region."[64]

"Another recent study found that there will be regional and seasonal variability in winds in the United States as carbon dioxide levels increase: by 2100, wind speeds will decrease over most of the western U.S. and the East Coast, but the central U.S. will see an increase."[65]

[64] https://ugc.berkeley.edu/background-content/wind/#:~:text=The%20global%20atmospheric%20circulation%20pattern,by%20transporting%20heat%20and%20water.
[65] https://e360.yale.edu/features/global-stilling-is-climate-change-slowing-the-worlds-wind#:~:text=Another%20recent%20study%20found%20that,U.S.%20will%20see%20an%20increase.

14. Lightning

Lightning is a massive electrostatic discharge between electrically charged regions within clouds, or between a cloud and the Earth's surface.[66]

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 about 20 people[67] each year in the United States.

1) Lightning History

According to NCEI data, Kleberg County and the City of Kingsville have not experienced any lightning events since the 2018 HMAP. However, lightning events often go unreported, so it is likely that events have occurred since the last plan. Kleberg County and the City of Kingsville reported 2 lightning events, one in 1969 and the other in 1973.

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[68], most of Kleberg County can expect about 2 to 5 lightning flashes per square miles 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 Kleberg County and the City of Kingsville may experience LAL 2 lightning events. Dry thunderstorms, LAL 6, are not expected.

[66] 2018 State of Texas Hazard Mitigation Plan

[67] https://www.weather.gov/safety/lightning-victims

[68] https://www.vaisala.com/sites/default/files/documents/WEA-MET-Annual-Lightning-Report-2020-B212260EN-A.pdf; Pg. 15

Table 52: Lightning Activity Levels[69]

Lightning Activity Level (LAL)		
Activity levels are valuable guidance tools to aid in the preparation for possible fire initiation from cloud-to-ground lightning.		
LAL	Cloud and Storm Development	Lightning Strikes per 15 Minutes
1	No thunderstorms.	-
2	Cumulus clouds are common but only a few reaches 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.	

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.

[69] Source: http://www.prh.noaa.gov/hnl/pages/LAL.php

5) Vulnerability

According to the Lightning Protection Institute, it is a myth[70] 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 53: Critical Facilities Vulnerable to Lightning and Potential Impacts

Jurisdiction	Critical Facilities	Potential Lightning Impacts			
		Physical Damage	Electrical Damage	Data Damage or Loss	Fire
Kleberg County	Kleberg County Courthouse	x	x	x	x
	CHRISTUS Spohn Hospital Kleberg	x	x	x	x
	Kleberg County Jail	x	x	x	x
	Coastal Bend College	x	x	x	x
	Kleberg County Nursing and Rehabilitation	x	x	x	x
	HEB Grocery	x	x	x	x
	NAS Kingsville	x	x	x	x
	Human Services Department	x	x	x	x
	Ricardo Water Supply	x	x	x	x
	Ricardo ISD	x	x	x	x
	Ricardo Volunteer Fire Department	x	x	x	x
	Elevated Storage Tank	x			x
	Riviera ISD/Kaufer High School	x	x	x	x
	Baffin Bay Water Supply Corporation	x	x	x	x
	Justice of the Peace Pct. 3	x	x	x	x
	Justice of the Peace Pct. 4	x	x	x	x
	Kleberg County Airport	x	x	x	x
	Justice of the Peace Pct. 1	x	x	x	x
	Justice of the Peace Pct. 2	x	x	x	x
	Super Wal-Mart	x	x	x	x
	U.S. Border Patrol Station	x	x	x	x
	Texas Highway Patrol DPS	x	x	x	x
	TxDOT Regional Office	x	x	x	x
	Texas A&M University - Kingsville	x	x	x	x
	Fresenius Kidney Care Bay Area Dialysis Center	x	x	x	x
	Bay Area Dialysis Services	x	x	x	x

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

	Riviera Water Supply/Waste Water Treatment	x	x	x	x
	Lowe's	x	x	x	x
	McCoy's	x	x	x	x
	Tractor Supply Company	x	x	x	x
City of Kingsville	Zarsky's	x	x	x	x
	City of Kingsville City Hall	x	x	x	x
	CHRISTUS Spohn Hospital Kleberg	x	x	x	x
	Memorial Middle School	x	x	x	x
	AD Harvey Elementary School	x	x	x	x
	Perez Elementary School	x	x	x	x
	Harrel Elementary School	x	x	x	x
	Alice GK Kleberg Elementary School	x	x	x	x
	Kingsville Police Department	x	x	x	x
	Coastal Bend College	x	x	x	x
	Kingsville Water Department	x	x	x	x
	H.M. King High School	x	x	x	x
	Kleberg County Human Services Department	x	x	x	x
	John S. Gillett Intermediate School	x	x	x	x
	Elevated Storage Tank	x			
	Fire Station 1	x	x	x	x
	Fire Station 2	x	x	x	x
	Texas A&M University - Kingsville	x	x	x	x
	Kingsville Nursing and Rehabilitation Center	x	x	x	x
	Water Well #14 and Ground Storage Tank	x			x
	Water Well #19 and Ground Storage Tank	x			x
	Ground Storage Tank, and Elevated Storage Tank	x			x
	Water Well #21 and Ground Storage Tank	x			x
	Water Well #22 and Ground Storage Tank	x			x
	Water Well #23 and Ground Storage Tank	x			x
	Water Well #24 and Ground Storage Tank	x			x
	Water Well #25 and Ground Storage Tank	x			x
	STWA Water Well and Ground Storage Tank	x			
	North Wastewater Treatment Plant	x	x	x	x
	South Wastewater Treatment Plant	x	x	x	x
	Kingsville PD West (Old Dr. Pepper Plant)	x	x	x	x
	Outdoor Tornado Warning Siren	x	x		x
	Outdoor Tornado Warning Siren	x	x		x
	Outdoor Tornado Warning Siren	x	x		x
	Outdoor Tornado Warning Siren	x	x		x
	Tourism Office	x	x	x	x
	Kingsville Record	x	x	x	x
	Post Office	x	x	x	x

	Emergency Operation Center	x	x	x	x
	Santa Gertrudis School	x	x	x	x
	Santa Gertrudis Academy High School	x	x	x	x
	Jubilee Academy	x	x	x	x
	Landfill	x			x
	Dick Kleberg Park	x	x	x	x
	L.E. Ramey Golf Course	x	x	x	x
	East Water Tower	x	x		x
	West Water Tower	x	x		x
	South Water Tower	x	x		x
	Sage Lift Station	x			x
	17th & Lee St Lift Station	x			x
	Carlos Truan Lift Station	x			x
	General Cavazos Lift Station	x			x
	Golf Course Rd Lift Station	x			x
	South Creek Lift Station	x			x
	1717 & Hwy 77 Lift Station	x			x
	Trant Lift Station	x			x
	May Lift Station	x			x

B) Vulnerable Parcels

Table 54: Parcels Vulnerable to Lightning

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Kleberg County	**14,604**	**$2,348,451,007**
City of Kingsville	9,185	$1,029,694,959

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

"New research from the University of California, Berkeley, found warming conditions would result in 50% more lightning strikes by the end of the century. The scientists found lightning strikes would increase by about 12% for every 1C of warming."[71]

[71] https://romps.berkeley.edu/papers/pubdata/2014/lightning/guardian.pdf

15. Dam Failure

A dam is defined as any barrier, wall, or embankment, along with its abutments and appurtenant works, constructed for the purpose of storing water or other liquid material either temporarily or permanently. The term dam failure means that the dam is overtopped or fails to operate in the manner for which it was designed. A catastrophic failure would be a breach that would allow the dam's reservoir to suddenly drain. Dam failure can occur with little or no warning, or it can be an anticipated event. 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 History

Neither Kleberg County nor the City of Kingsville have documented histories of damage caused by dam failure; However, the planning team has determined that the hazard has the ability to affect structures and infrastructure in these jurisdictions. The remaining jurisdictions have no history of dam failure, have no dams nearby, or no high hazard dams nearby and will not be profiling the hazard.

The five dams of concern are known as the Dairy Barn Lake Dam, Dick Kleberg Park Dam, Escondido Lake Dam, Tranquitas Lake Dam, and Tulosa Lake Dam. The Dairy Barn Lake Dam is privately-owned, built in 1937 with a maximum storage of 4,922 acre-feet, and has primary purposes as fire protection and stock/fish/wildlife pond. The Dick Kleberg Park Dam in publicly owned by Kleberg County, built in 1968 with maximum storage of 85 acre-feet, and is considered a recreational dam. The Escondido Lake Dam is privately owned, built in 1938 with a maximum storage 2,000 acre-feet, and has primary purposes as fire protection and stock/fish/wildlife pond. The Tranquitas Lake Dam is privately owned, built in 1938 with a maximum storage of 25,406 acre-feet, and has primary purposes as fire protection and stock/fish/wildlife pond. The Tulosa Lake Dam is privately owned, built in 1938 with a maximum storage of 1,064 acre-feet, and has a primary purpose for water supply.

2) Likelihood of Future Occurrences

Given the lack of a prior dam or levee failure in the participating jurisdictions, dam / levee failure is considered unlikely, meaning that 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

FEMA's classification system for dam failures is a simple and straight-forward three tier system. It is based on whether there is any probability of a loss of human life, and whether there is a

large economic, environmental, or lifeline loss. The low hazard potential classification is used for failures that will not result in any loss of human life, and the economic, environmental, and lifeline losses are low and generally limited to the dam owner. The significant hazard potential classification is used for failures that will not result in any loss of human life, but the economic, environmental, and lifeline losses would have a great impact on the community. The high hazard potential classification is used when the dam failure will cause the loss of at least one human life, regardless of what the economic, environmental, and lifeline losses are. 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.

Table 55: Dam Failure Extent Classification

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

The majority of the dams in Kleberg County are considered low hazard as they hold less than 10,000 acre-feet of water, and no loss of life is expected should any fail. Tranquitas Lake Dam is considered significant due to its capacity of 25,406 acre-feet, and loss of life is probable should it fail. Due to the low hazard nature of dams in the County, High Hazard Potential Dam (HHPD) risk will not be covered.

Although the dams are considered low hazard, Kleberg County and the City of Kingsville chose to profile them due to their proximity to the jurisdiction and their age.

The Dairy Barn Lake Dam's storage capacity is 4,922 acre-feet. If a failure of this dam were to occur, approximately 196.88 acres of land could be inundated with an average depth of 25 feet.

The Dick Kleberg Park Dam's storage capacity is 85 acre-feet. If a failure of this dam were to occur, approximately 3.4 acres of land could be inundated with an average depth of 25 feet.

The Escondido Lake Dam's storage capacity is 2,000 acre-feet. If a failure of this dam were to occur, approximately 80 acres of land could be inundated with an average depth of 25 feet.

The Tranquitas Lake Dam's storage capacity is 25,406 acre-feet. If a failure of this dam were to occur, approximately 1,016.24 acres of land could be inundated with an average depth of 25 feet.

The Tulosa Lake Dam's storage capacity is 1,045,000 acre-feet. If a failure of this dam were to occur, approximately 42.56 acres of land could be inundated with an average depth of 25 feet.

4) Location and Impact

A) Location

The figures below show the location of all dams of concern within the County, as well as their potential inundation zones.

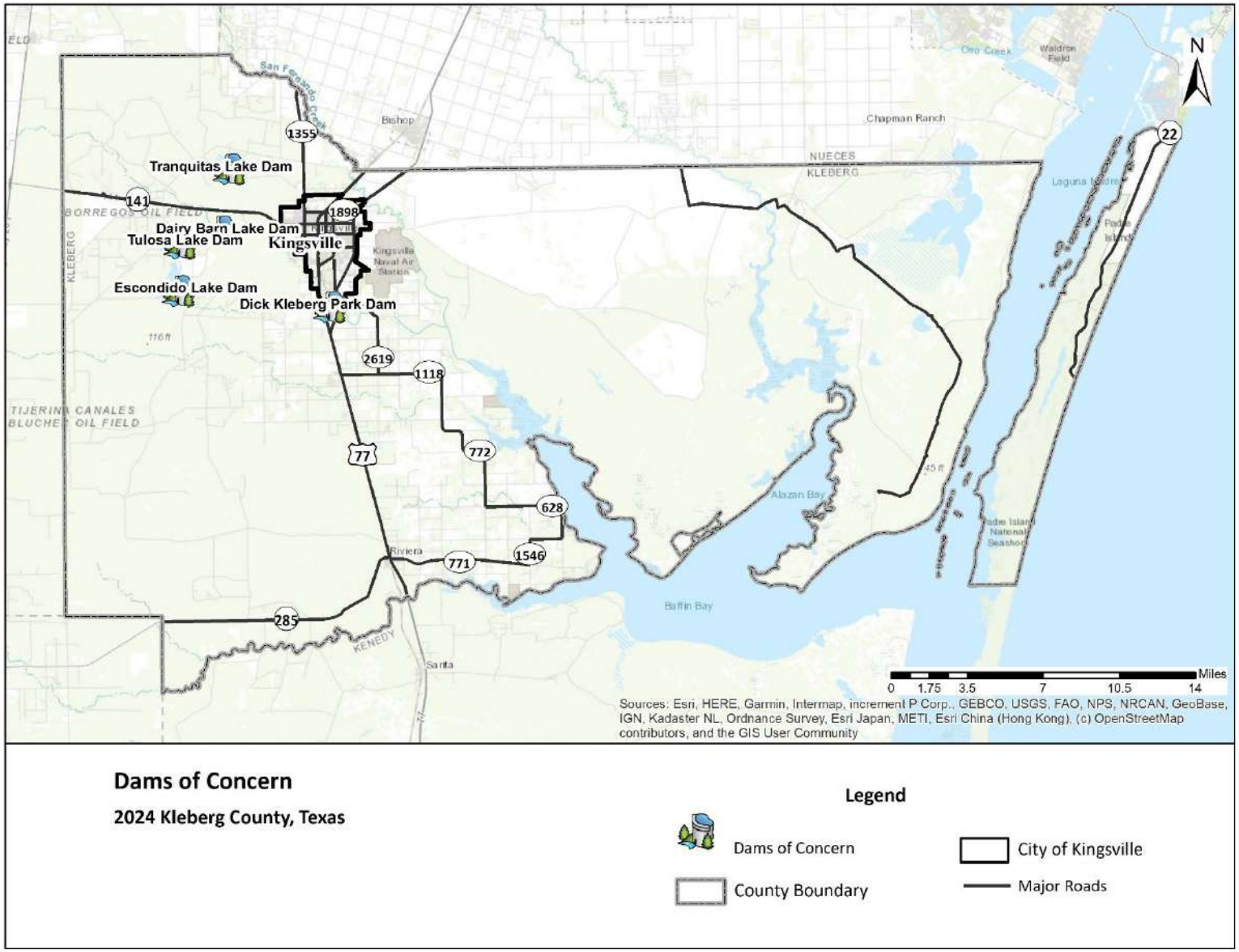


Figure 20: Dams of Concern in Kleberg County

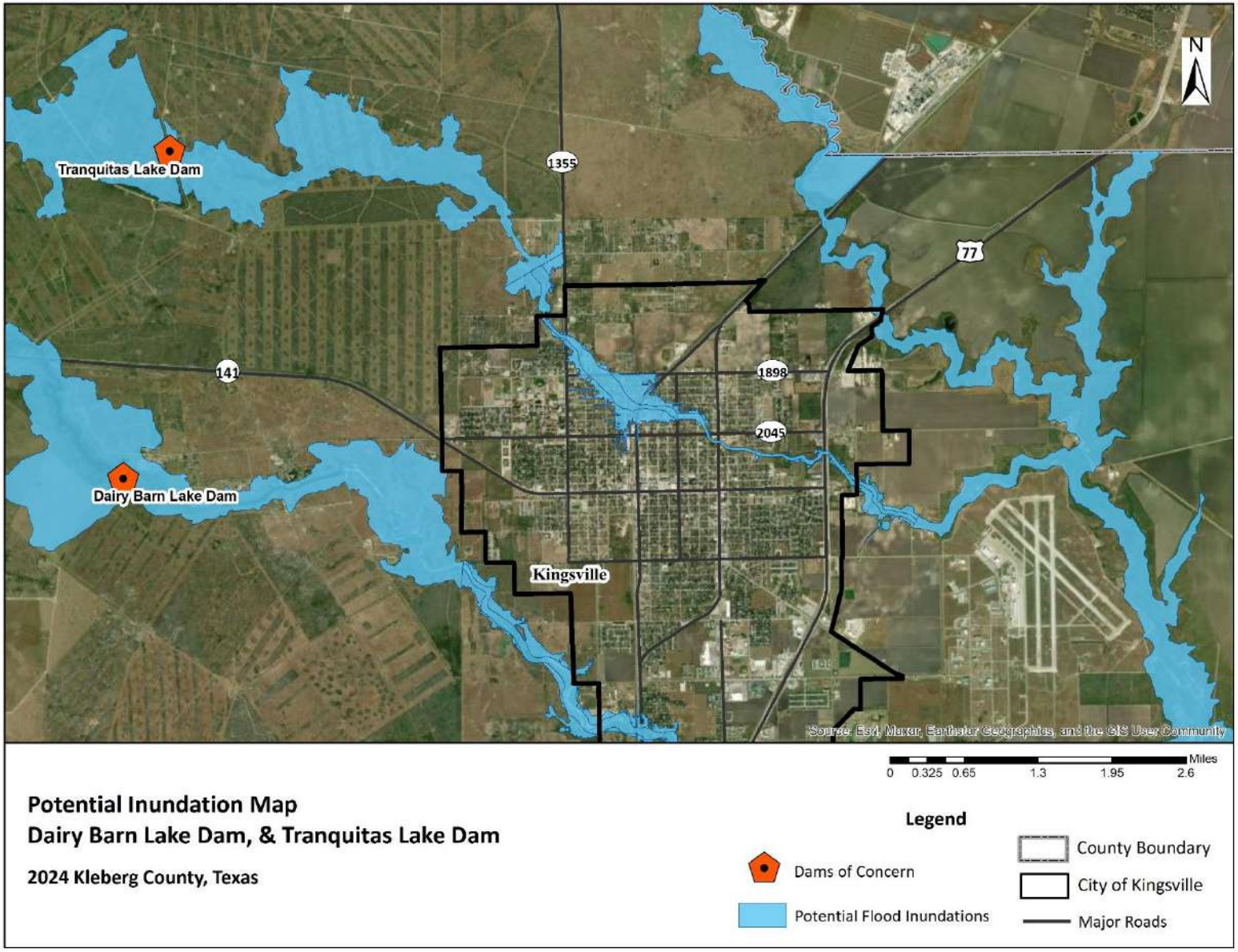


Figure 21: Potential Flood Inundations for Dams of Concern

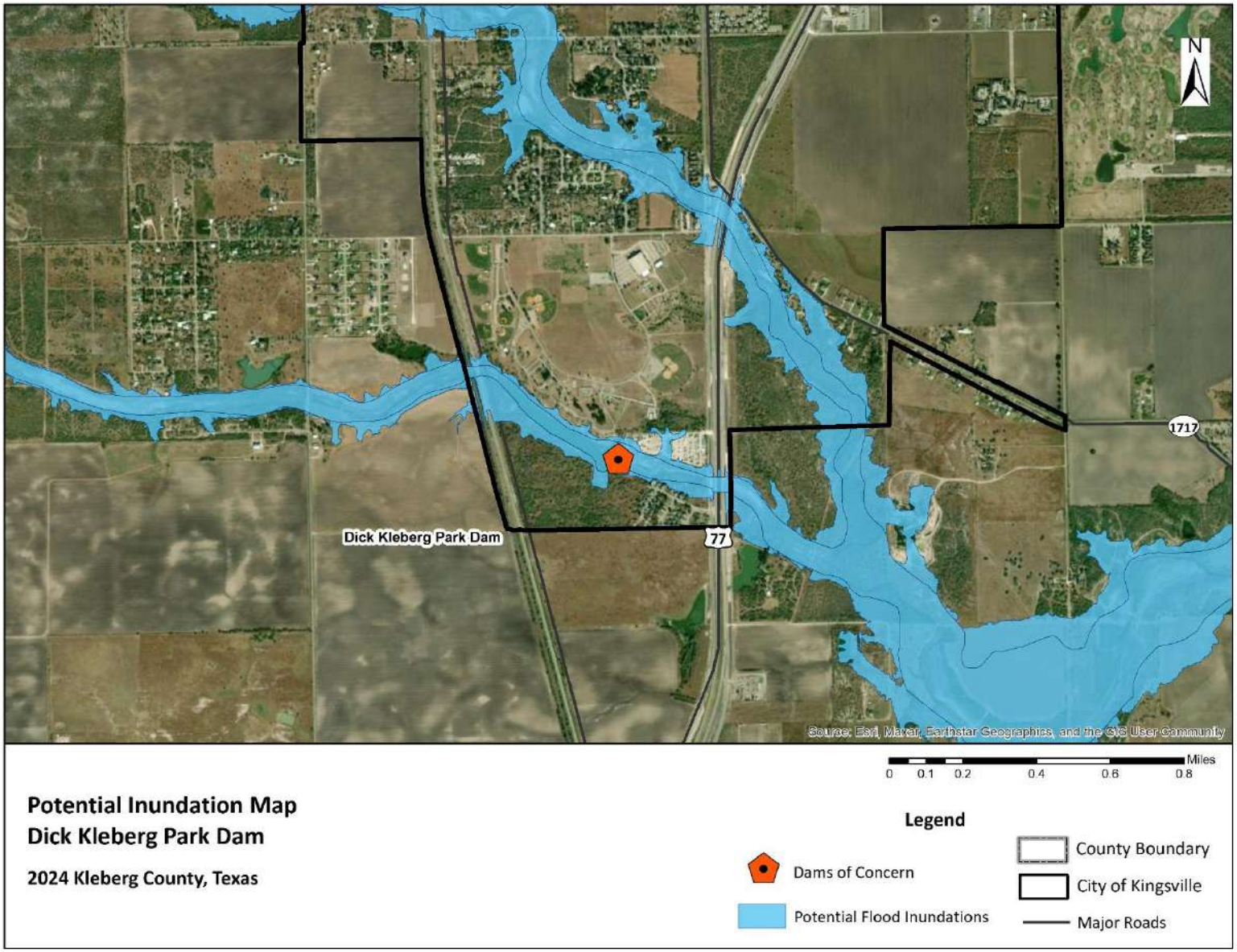


Figure 22: Potential Flood Inundations for Dams of Concern

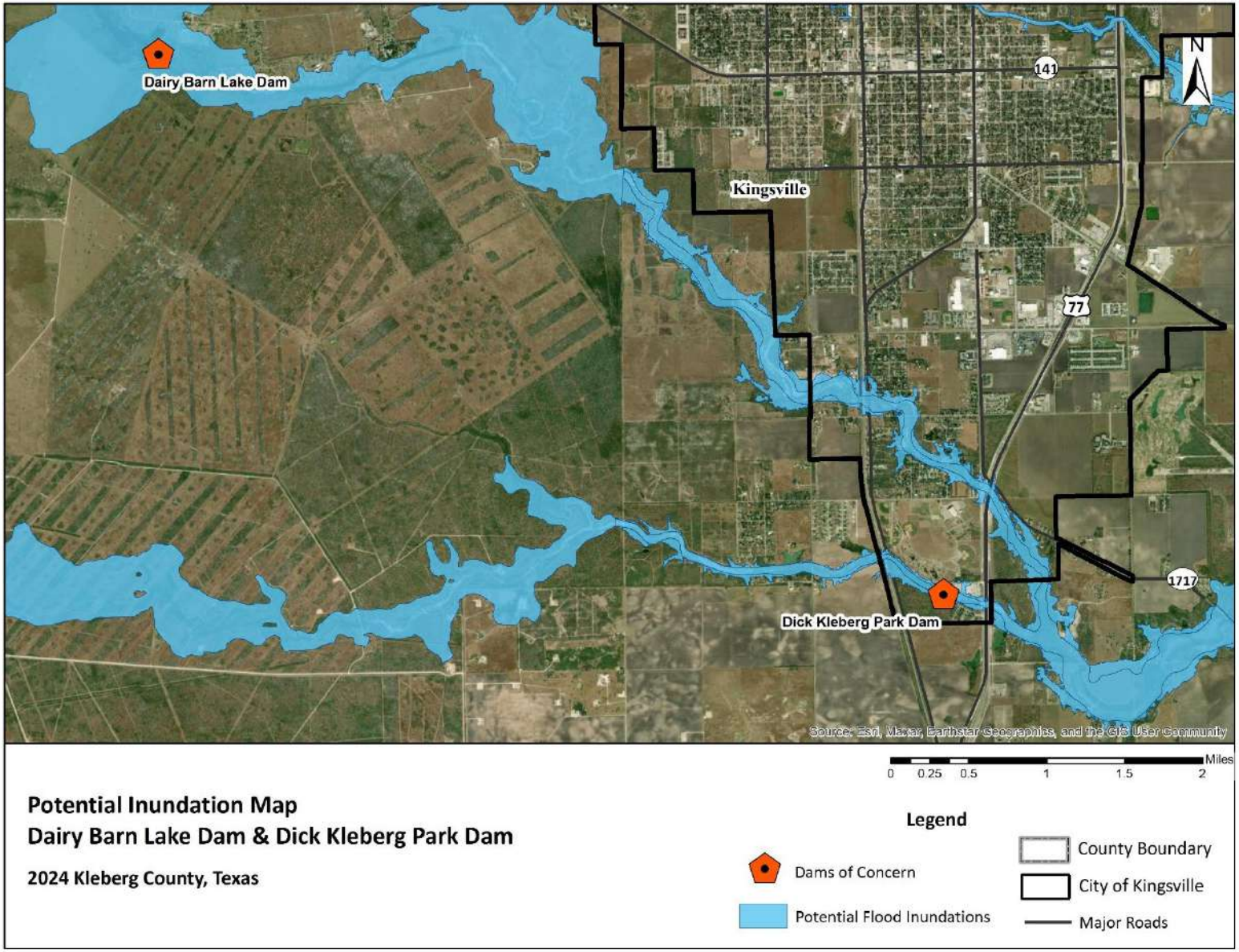


Figure 23: Potential Flood Inundations for Dams of Concern

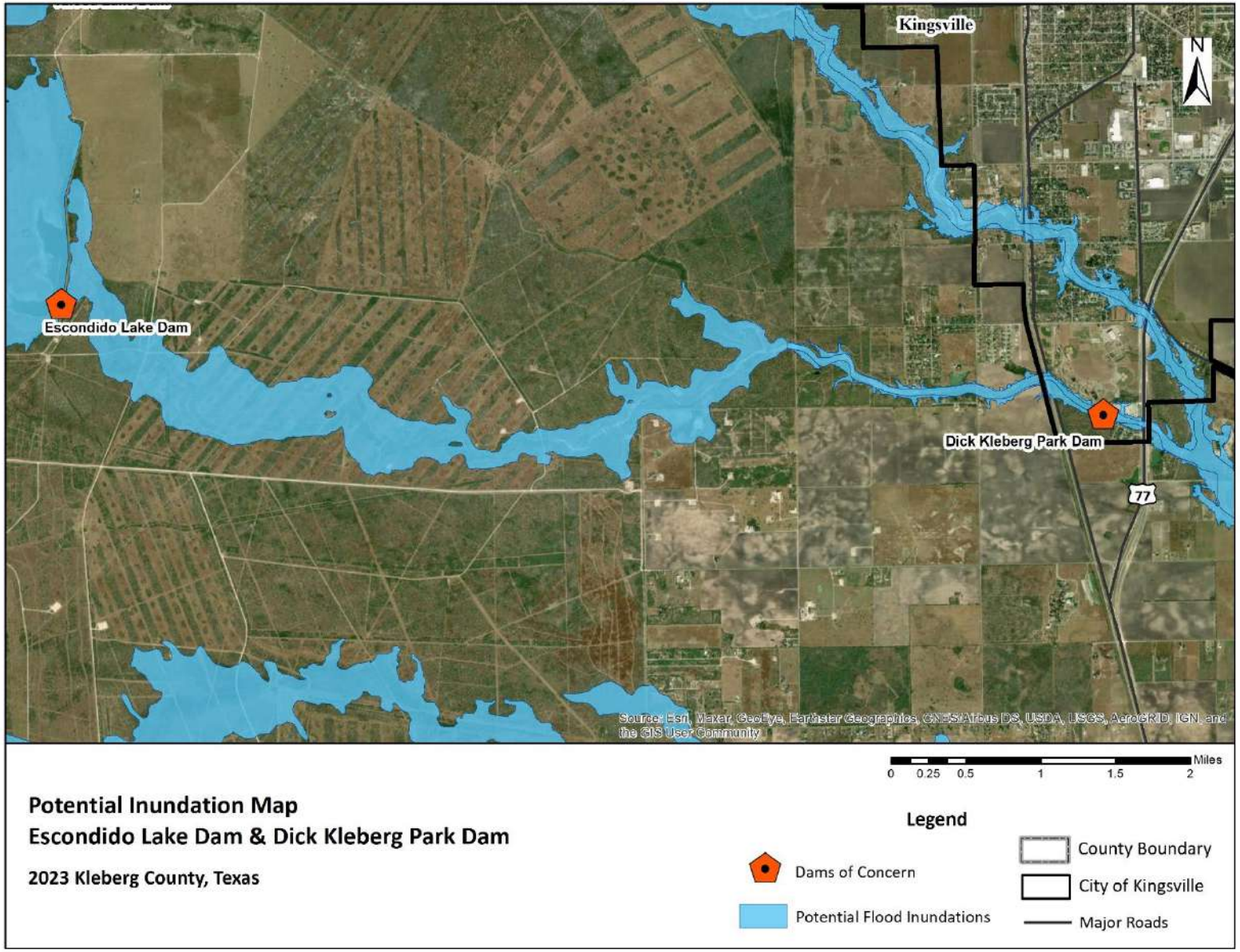


Figure 24: Potential Flood Inundations for Dams of Concern

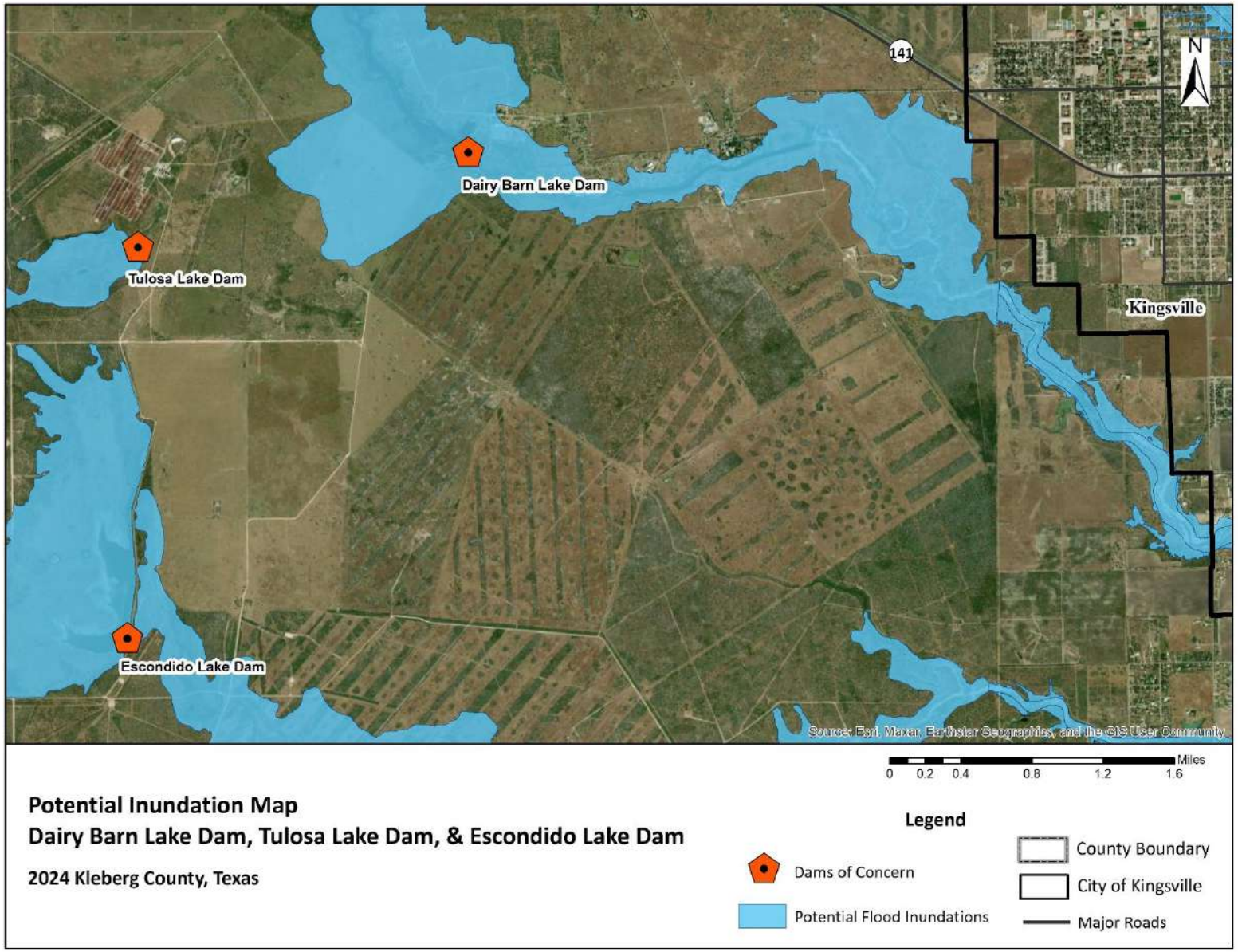


Figure 25: Potential Flood Inundations for Dams of Concern

B) Impact

Structures at risk of dam failure may be flooded, damaged by floodborne contaminants, damaged by debris flow, or even completely washed away. Although no loss of life to dam failure is expected in Kleberg County, under the right conditions injury or loss of life are possible.

5) Vulnerability

A) Population

All dams in the County are low hazard with small storage capacity. Therefore, negative impacts on the population are unlikely.

B) Critical Facilities

Out of the 83 critical facilities identified in the County and the City of Kingsville, 6 fall within a potential inundation zone.

Table 56: Critical Facilities Vulnerable to Dam Failure

Critical Facilities
Riviera ISD/Kaufer High School
Alice GK Kleberg Elementary School
Water Well #22 and Ground Storage Tank
Outdoor Tornado Warning Siren
17th & Lee Lift Station
1717 & Hwy 77 Lift Station

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

Climate change could affect the safety of all dam structures, including large and small dams and earthen or concrete dams. Specifically, significant changes in a region's climate, such as increased incidence of extreme temperatures and the increased frequency of heavy precipitation, could seriously impact the integrity and viability of dams.

16. Coastal Erosion

Coastal erosion is a hydrologic hazard defined as the wearing away of land and loss of beach, shoreline, or dune material because of natural coastal processes or manmade influences. Erosion is measured as a rate of change in the position or displacement of a shoreline over a period of time. Short-term erosion typically results from periodic natural events, such as wave action, storm surges and wind. Long-term erosion is a result of repetitive occurrences of this type and of severe storm and flooding events.

Erosion can affect natural and built environments. Impacts depend on topography, soils, building types and construction materials. Coastal erosion can affect natural systems, coastal food supplies, tourism industry, and small-town viability. When sea water infiltrates freshwater wetlands, they can die, removing key habitats for animals and a protective buffer for nearby communities.

At 367 miles, Texas has one of the longest coastlines in the United States. It also has some of the highest rates of coastal erosion.[72]

1) Coastal Erosion History

Individual occurrences of coastal erosion are not recorded, rather, annual rates are estimated as shown below under Section 3 of this Chapter. According to the Texas Shoreline Change Project of the Bureau of Economic Geology,[73] between 2000 – 2019 Kleberg County experienced between .79 feet to 3.38 feet of loss along their coastline per year.

The planning team has determined that at least one coastal erosion event occurs annually in Kleberg County. The City of Kingsville will not be profiling coastal erosion as their boundaries are inland and/or they own no property or facilities on the coast, and therefore face no impact.

[72] 2018 State of Texas Hazard Mitigation Plan
[73] https://coastal.beg.utexas.edu/shorelinechange2019/

2) Probability

Given the ongoing nature of coastal erosion, the probability of an event in Kingsville County is highly likely, meaning ongoing coastal erosion is probable in the next year.

3) Extent

Coastal erosion is measured by feet of shoreline lost in any given year. Texas has some of the highest coastal erosion rates in the country. Research shows that 64%[74] of the Texas Gulf Coast is eroding at an average rate of about 6' per year. As a whole, the Texas coast is eroding at an average rate of 2.3' per year. In the worst cases, areas may lose 30' or more per year. Ongoing coastal erosion may meet or exceed worst case estimates of up to 30' of erosion per year.

4) Location and Impact

A) Location

Direct impacts from coastal erosion are expected to primarily effect the areas along the shoreline depicted below:

[74] http://www.glo.texas.gov/coast/coastal-management/coastal-erosion/index.html

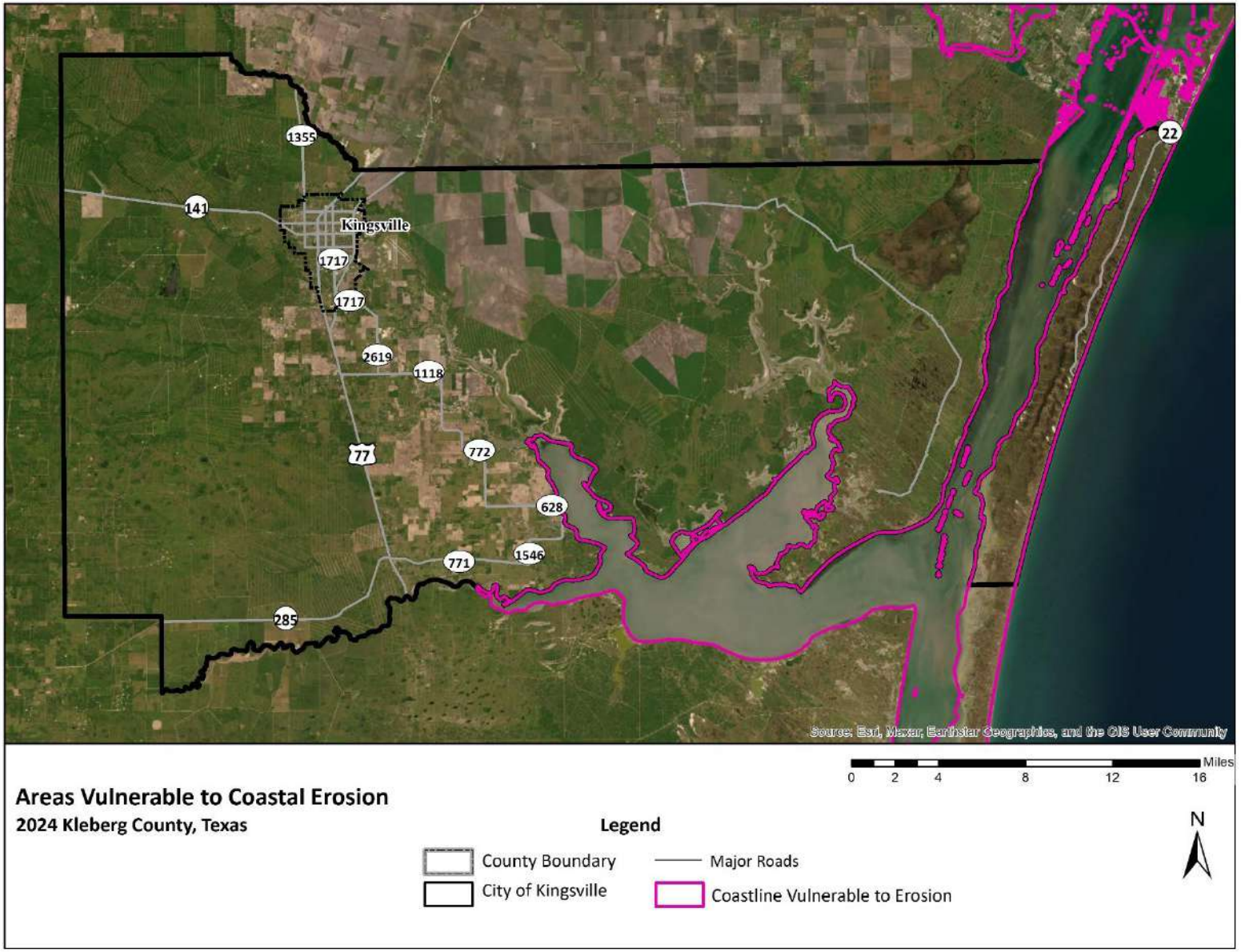


Figure 26: Areas Subject to Coastal Erosion in Kleberg County

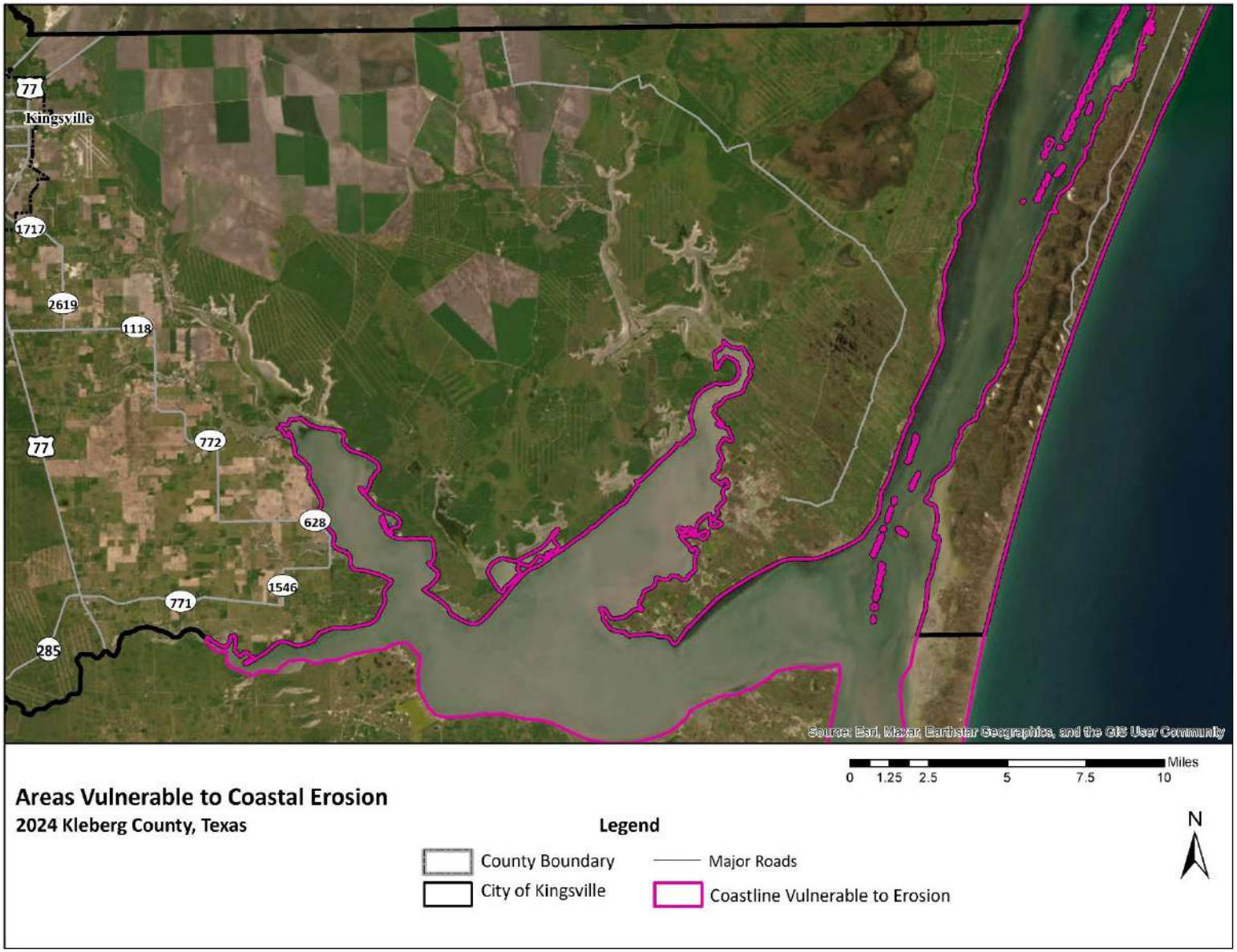


Figure 27: Areas Subject to Coastal Erosion in Kleberg County

B) Impact

The impacts of erosion may include but are not limited to decreasing property values, the partial or complete loss of structures adjacent to the coast, economic losses to agricultural operations, damage to local infrastructure including roads, bridges, and piers, and increased damage from tropical storms and hurricanes.

5) Vulnerability

A) Critical Facilities

There are 83 critical facilities in Kleberg County and the City of Kingsville. Vulnerability to coastal erosion was determined based on proximity to the coastline in that only critical facilities within 100 yards of the coastline were deemed vulnerable. There are no critical facilities located within these vulnerable areas.

B) Vulnerable Parcels

Table 57: Parcels Vulnerable to Coastal Erosion

Jurisdiction	Parcel Count	Estimated Potential Damage Value
Kleberg County	**571**	**$221,324,983**

6) Climate Change

Climate change is described as a significant change in either the average state of the climate or in its variability over an extended period. Climate change in and of itself is not necessarily a hazard, but it may increase the frequency and/or intensity of identified hazards over time. Climate change could affect communities in a variety of ways, but it is currently unclear what extent the impacts will have on the Planning Area. It is anticipated that hazard-causing events will fluctuate due to climate change over time. As new information and new models are developed, a climate change Risk Assessment may be enhanced to measure and assess these impacts more accurately.

"More storms and higher seas from climate change create more winds, waves, and floods, leading to coastal erosion. Hurricanes can wash away sandy barrier islands, leaving coastlines and islands unprotected from future storm surges. Waves and winds can carry away beach sand little by little, shrinking scenic beaches and exposing human infrastructure to tides and storms. Beaches in South Carolina, Virginia, Louisiana, and Texas have lost more than two meters of shoreline a year over the last century, with costal erosion estimates for much of the country expected to increase in coming decades."[75]

[75] https://www.usgs.gov/media/images/coastal-erosion-more-severe-under-climate-change#:~:text=Detailed%20Description,unprotected%20from%20future%20storm%20surges.

17. Mitigation Strategy

1) Capability Assessment

Kleberg County and the City of Kingsville 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. At this time, all jurisdictions could improve their hazard mitigation capabilities through the following efforts: budgeting for mitigation actions and support, passing policies and procedures to implement mitigation actions, adopting, and implementing stricter mitigation regulations, approving the hiring, and training of staff for mitigation activities, and approving mitigation updates and additions to existing plans as new needs are recognized. The participating cities could further improve their capabilities by creating and adopting regularly updated comprehensive plans.

Table 58: Capability Assessment by Jurisdiction

Kleberg County Administrative, Financial, Regulatory, and Technical Abilities
Floodplain Management
Emergency Management
Mutual Aid Agreement (with VFD)
Road and Bridge Management
Comprehensive Planning
Economic Development
Grant Writing
General Budgeting
CDBG Funding
State and Federal Grant Funding

City of Kingsville Administrative, Financial, Regulatory, and Technical Abilities
Floodplain management
Emergency Management
Drought Contingency Planning
Subdivision
Zoning
Building Code Enforcement
Nuisance Abatement
Substandard Structures Abatement

Water Conservation Planning
Road and Bridge Management
Comprehensive Planning
Economic Development
Grant Writing
General Budgeting
CDBG Funding
State and Federal Grant Funding

A) Building Codes

Table 59: Building Codes Per Jurisdictions

Jurisdiction	Codes	Description
Kleberg County	ICC – International Building Codes	The County defers to the State of Texas, which recommends the International Building Codes. The County has no enforcement in place.
Kingsville	ICC – International Building Codes	The City of Kingsville has adopted the 2018 International Building Codes, including Residential Code, Plumbing Code, Mechanical Code, Fuel Gas Code, Energy Code, and Electrical Code.

2) Incorporation and Integration of Existing Capabilities and Hazard Mitigation

As previously outlined, the planning team reviewed a range of codes, ordinances, and other planning mechanisms that have been adopted by the participating jurisdictions. The planning team's goal was to understand how these existing capabilities might affect mitigation actions in terms of implementation and enforcement, as well as identify opportunities for future integration.

Table 60: Plan Integration

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

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 61 below.

Table 61: Integration Process

Jurisdiction	Integration Process
Kleberg County	After considering integrating mitigation actions with the activities outlined in Table 60 above, mitigation actions will be presented, considered, and formally adopted by the County Commissioners' Court and County Judge. The County will also use the Kleberg 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 Kingsville	After considering integrating mitigation actions with the activities outlined in Table 60 above, mitigation actions will be presented, considered, and formally adopted by the council and mayor. The City of Kingsville will also use the Kleberg County Hazard Mitigation Plan as a technical reference and data source for identified and future mitigation actions, as well as future planning processes.

A) Past Integration – 2018 Plan

Each jurisdiction has its own established process for integrating new actions, codes, ordinances, plans, and studies into its existing capabilities. Currently, integration of the previous 2018 HMAP into other planning mechanisms within the County and participating jurisdiction is unknown. Therefore, new tracking measures may be implemented to ensure future staff are aware of plan integration moving forward. The planning team will ensure that each jurisdiction's various departments continue to integrate hazard mitigation actions into their day-to-day processes.

3) Goals and Objectives Overview

The hazard analysis has shown that Kleberg County and the City of Kingsville 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 and objectives in this plan reflect the overarching priorities identified by the communities and are similar to the goals listed in the 2018 HMAP. 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.

4) 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.

5) 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.

6) Mitigation Action Plan

A) Mitigation Action Prioritization

The planning team members have identified at least one mitigation action per natural hazard. After review, the planning team has determined that the jurisdiction's priorities remain the same. For this update, action items were identified and prioritized in consideration of the following criteria:

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

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

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

B) Mitigation Action Status – 2018 HMAP

In addition to reviewing existing codes, ordinances, and planning studies, the planning team also examined the status of each mitigation action identified in the 2018 plan.

Mitigation actions marked as abandoned are no longer considered relevant as written to the participating jurisdictions. Deferred and in progress actions are indicated with an asterisk (*) in the new actions tables in Chapter 17, Section 6C.

Table 62: Previous Mitigation Actions – All Jurisdictions

Kleberg County Mitigation Actions Status		
Hazards Addressed	**Mitigation Actions**	**Status**
Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Coastal Erosion, Dam Failure, Expansive Soils, Extreme Heat, Hailstorm, Severe Winter Storms, Windstorms, Lightning	Educational Outreach	*In Progress*
Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Coastal Erosion, Dam Failure, Expansive Soils, Extreme Heat, Hailstorm, Severe Winter Storms, Windstorms, Lightning	Install NOAA Weather Radios in Participating Jurisdictions Facilities	*In Progress*
Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Dam Failure, Hailstorms, Severe Winter Storms, Windstorms, Lightning	Limit Debris Generated During Hazard Events	*In Progress*
Hurricane / Tropical Storm, Tornado, Coastal Erosion, Hailstorms, Windstorms	Hardening to Protect Participating Jurisdiction Owned Facilities, Exposed Equipment, and Utilities, and Coastline	*In Progress*
Flood	Channel Enlargement and Rectification of Existing Streams	*In Progress*
Flood	Assist Residents with Repetitive Loss Property Buyouts or Elevation	*In Progress – Deferred to Plan Update*
Flood	Implement Drainage Projects pending Funding	*In Progress*
Flood	Flood Detention Reservoir Construction	*In Progress*
Flood	Floodwater Diversion	*In Progress*
Wildfire	Wildfire Fuels Reduction	*In Progress*
Wildfire	Enforce existing Burn Bans and consider development and enforcement of new Burn Ban strategies	*In Progress*
Drought	Enforce existing Drought Management Plan Ordinances and consider	*Deferred to Plan Update*

	development and implementation of new Drought Contingency Plans	
Drought	Plant drought resistant vegetation on participating jurisdictions' properties to limit water consumption	*Abandoned: Low priority/ lack of administrative capacity/ manpower/ funding*
Dam Failure	Develop and Implement Dam Failure Contingency Plan	*Deferred to Plan Update*
Dam Failure	Determine Inundation Depth caused by failure of Dairy Barn Lake Dam	*Abandoned: Dam is on King Ranch property; King Ranch responsibility (not County Responsibility)*
Expansive Soils	Apply Soil Stabilizers to Expansive Soil Areas	*Abandoned: Determined not to be applicable*
Extreme Heat	Set up Cooling Centers in Existing Participating Jurisdictions' Facilities	*In Progress*
Lightning	Install Surge Protection for all Participating Jurisdiction-Owned Critical Electronic Devices	*In Progress*

City of Kingsville Mitigation Actions Status		
Hazards Addressed	**Mitigation Actions**	**Status**
Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Dam Failure, Extreme Heat, Hailstorm, Severe Winter Storms, Windstorms, Lightning	Educational Outreach	*In Progress*
Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Drought, Dam Failure, Extreme Heat, Hailstorm, Severe Winter Storms, Windstorms, Lightning	Install NOAA Weather Radios in Participating Jurisdictions Facilities	*Deferred to Plan Update*
Flood, Hurricane / Tropical Storm, Wildfire, Tornado, Dam Failure, Hailstorms, Severe Winter Storms, Windstorms, Lightning	Limit Debris Generated During Hazard Events	*In Progress*
Hurricane / Tropical Storm, Tornado, Hailstorms, Windstorms	Hardening to Protect Participating Jurisdiction Owned Facilities, Exposed Equipment, and Utilities, and Coastline	*Deferred to Plan Update*

Flood	Channel Enlargement and Rectification of Existing Streams	*Deferred to Plan Update*
Flood	Assist Residents with Repetitive Loss Property Buyouts or Elevation	*Deferred to Plan Update*
Flood	Implement Drainage Projects pending Funding	*Deferred to Plan Update*
Flood	Flood Detention Reservoir Construction	*Deferred to Plan Update*
Flood	Floodwater Diversion	*Deferred to Plan Update*
Wildfire	Wildfire Fuels Reduction	*In Progress*
Wildfire	Enforce existing Burn Bans and consider development and enforcement of new Burn Ban strategies	*In Progress*
Drought	Enforce existing Drought Management Plan Ordinances and consider development and implementation of new Drought Contingency Plans	*Deferred to Plan Update*
Drought	Plant drought resistant vegetation on participating jurisdictions' properties to limit water consumption.	*Abandoned: Low priority/ lack of administrative capacity/ manpower/ funding*
Dam Failure	Develop and Implement Dam Failure Contingency Plan	*Deferred to Plan Update*
Dam Failure	Determine Inundation Depth caused by failure of Dairy Barn Lake Dam	*Deferred to Plan Update*
Expansive Soils	Apply Soil Stabilizers to Expansive Soil Areas	*Abandoned: Determined not to be applicable*
Extreme Heat	Set up Cooling Centers in Existing Participating Jurisdictions' Facilities	*Completed*
Lightning	Install Surge Protection for all Participating Jurisdiction-Owned Critical Electronic Devices	*In Progress*

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, thus applying for funding doesn't guarantee that funds will

be received. Budget constraints will remain the determining factor for how and when each action is implemented.

i. *Kleberg County*

The following mitigation action items may indicate an asterisk (*****) in the case the new actions reflect actions that were deferred from the previous 2018 HMAP. The following mitigation action items may indicate an asterisk (*) in the case the new actions reflect actions that were deferred from the previous 2018 HMAP. Actions marked with a grey heading are not mitigation actions but are included in the HMAP for the County to reference in future planning endeavors.

Multi-Hazard Actions

Mitigation Action	Educational Outreach *
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc.
Hazard	Hurricane/Tropical Storm, Flood, Drought, Extreme Heat, Hailstorm, Winter Weather, Coastal Erosion
Priority	Medium
Estimated Cost	Less than $10,000 per hazard
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB, GLO
Responsible Department	Commissioners' Court
Implementation Schedule	1 - 5 Years
Target	Existing and future population

Mitigation Action	Implement a Tree Trimming Program *
Objective	This action will develop and implement a tree trimming program to reduce loose / dead tree limbs that may cause damage during a hazard event.
Hazard	Hurricane/Tropical Storm, Wildfire, Tornado
Priority	Low
Estimated Cost	$10,000 - $500,0000
Potential Funding Source(s)	County, FEMA PDM, FEMA HMGP

Responsible Department	Commissioners' Court, Fire Department
Implementation Schedule	1 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Set up Cooling and Heating Centers *
Objective	The action's goal is to increase resilience by limiting vulnerable populations' exposure to extreme weather by creating new or opening existing facilities as cooling centers or warming centers.
Hazard	Extreme Heat, Extreme Cold, Winter Weather
Priority	Medium
Estimated Cost	$10,000 to $100,000
Potential Funding Source (s)	County, FEMA PDM, FEMA HMGP
Responsible Department	County Commissioners' Court
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Install and/or Purchase Back Up Power Generators *
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Hurricane/Tropical Storm, Tornado, Lightning, Extreme Heat, Extreme Cold, Winter Weather
Priority	Medium
Estimated Cost	More than $100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than $100,000 Each for Portable Generators
Potential Funding Source (s)	County, FEMA PDM, FEMA HMGP
Responsible Department	Commissioners' Court
Implementation Schedule	5 Years
Target	Existing infrastructure

Mitigation Action	Install and Expand Warning Systems/Weather Radio *
Objective	Warning systems will help limit local vulnerability to hazards by giving residents an opportunity to take shelter before one occurs.
Hazard	Hurricane/Tropical Storm, Flood
Priority	High
Estimated Cost	$1,000 - $100,000 per device
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners' Court
Implementation Schedule	Short Term – 1 - 5 Years
Target	Existing and future population

Mitigation Action	Construct Community Safe Rooms or Shelters*
Objective	The action's goal is to provide a place of temporary refuge and or supply distribution location for the vulnerable public before and after events. This action proposes constructing new or retrofitting existing structures to serve as a safe room.
Hazard	Hurricane/Tropical Storm, Tornado
Priority	High
Estimated Cost	Greater than $100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners' Court
Implementation Schedule	Short Term: 1 - 2 Years
Target	Existing and future population and infrastructure

Mitigation Action	Install Impact and Wind-resistant Windows and Doors at Public Facilities
Objective	This action proposes hardening facilities. Hardening will include adding impact and wind-resistant doors and windows at critical and public facilities in the City.
Hazard	Hurricane/Tropical Storm, Tornados, Windstorm
Priority	Low
Estimated Cost	$100,000
Potential Funding Source(s)	City of Emory, FEMA BRIC, FEMA HMGP
Responsible Department	City Administration, Mayor and City Council
Implementation Schedule	5 Years

Target	Existing infrastructure

Mitigation Action	Harden Facilities *
Objective	This action proposes hardening facilities. Hardening will include but is not limited to increasing thermal insulation, upgrading and/or adding shatter-resistant films to all glazing, installing impact and wind-resistant windows and doors, installing shutters, building protective walls around exposed gas tanks and cylinders, shielding roof-mounted equipment, building seawalls in areas vulnerable to coastal erosion.
Hazard	Hurricane/Tropical Storm, Coastal Erosion
Priority	High
Estimated Cost	Greater than $100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners' Court
Implementation Schedule	Greater than 5 Years
Target	Existing infrastructure

Single Hazard Actions

Mitigation Action	Construct/Upgrade Storm Drainage Infrastructure
Objective	This action proposes constructing new and/or widening storm drainage infrastructure to reduce the potential impacts of future flood events. Including but not limited to increasing capacity of ditches, culverts, detention ponds.
Hazard	Flood
Priority	Medium
Estimated Cost	More than $1,000,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Commissioner's Court, Mayor and Council, Planning Department
Implementation Schedule	2 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Purchase Portable or Permanent Pumps
Objective	This action proposes purchasing portable or permanent pumps that can be deployed as needed to reduce the potential impacts of future flood events.
Hazard	Flood
Priority	Low
Estimated Cost	More than $250,000
Potential Funding Source(s)	County, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Commissioner's Court
Implementation Schedule	0 - 5 Years
Target	Existing infrastructure

Mitigation Action	Develop and Implement a New Water Conservation Ordinance*
Objective	Kleberg County will re-evaluate all existing water conservation and reduction measures to identify strengths and weaknesses in order to develop and enforce a new water conservation ordinance.
Hazard	Drought
Priority	Medium
Estimated Cost	Less than $10,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT
Responsible Department	Commissioners' Court
Implementation Schedule	1 - 2 Years
Target	Existing and future infrastructure

Mitigation Action	Replace Water Fixtures with Low Flow Units
Objective	To limit water consumption at County-owned and maintained facilities, the County will adopt a policy of replacing water fixtures with low flow units.

Hazard	Drought
Priority	Low
Estimated Cost	More than $10,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioners' Court
Implementation Schedule	3 - 5 Years
Target	Existing and Future infrastructure

Mitigation Action	**Wildfire Fuels Reduction in Wildland Urban Interface***
Objective	This action will develop and implement a program to identify and prioritize lands in the Wildland Urban Interface (WUI) in need of fuels reduction and then reduce or remove wildfire fuels through various methods as appropriate.
Hazard	Wildfire
Priority	Low
Estimated Cost	More than $100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT
Responsible Department	Commissioners' Court, Fire Department
Implementation Schedule	2 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	**Develop and Implement a New Drought Contingency Plan**
Objective	Re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new or updated drought contingency plan.
Hazard	Drought
Priority	High

Estimated Cost	Less than $100,000
Potential Funding Source(s)	County, FEMA BRIC, FEMA HMGP
Responsible Department(s)	Commissioners' Court
Implementation Schedule	1 - 2 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Develop and Implement a New Tie-Down Ordinance for Manufactured / Mobile Homes, Temporary Buildings, and Unrestrained Advertisement Signs**
Objective	The jurisdiction will re-evaluate all existing tie-down measures to identify strengths and weaknesses in order to develop and enforce a new tie-down ordinance.
Hazard	Windstorms
Priority	Low
Estimated Cost	Less than $10,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP, CDBG-MIT
Responsible Department	Commissioners' Court
Implementation Schedule	1 – 2 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Install Surge Protection and Grounding Systems to Protect Electronic Assets**
Objective	This action will install surge protection and/or grounding systems at all County 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	Medium
Estimated Cost	$1,000 - $100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP

Responsible Department	Commissioners' Court
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Conduct Dam Failure Studies
Objective	This action proposes conducting dam failure studies to determine potential inundation area and HHPD risks.
Hazard	Dam/Levee Failure
Priority	Medium
Estimated Cost	More than $100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA HMGP
Responsible Department	Commissioner's Court
Implementation Schedule	2 - 5 Years
Target	Existing and future infrastructure

Mitigation Action	Restrict Development in Areas Prone to Coastal Erosion*
Objective	Willacy County will re-evaluate all construction restrictions to identify strengths and weaknesses in order to produce a new ordinance that will reduce potential flood impacts due to coastal erosion by restricting development in areas that may be subject to inundation due to coastal erosion.
Hazard	Coastal Erosion
Priority	Medium
Estimated Cost	Less than $10,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT
Responsible Department	Commissioners' Court
Implementation Schedule	1 - 5 Years

Target	Existing and future infrastructure

Mitigation Action	**Develop and Implement Coastal Estuary Programs to Restore Coastline***
Objective	Kleberg County will work with area agencies and local stakeholders to develop and implement a coastal estuary program to help restore coastline lost to erosion, including, but not limited to barrier island and marsh restoration efforts.
Hazard	Coastal Erosion
Priority	Medium
Estimated Cost	More than $100,000
Potential Funding Source (s)	County, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT
Responsible Department	Commissioners' Court
Implementation Schedule	2 - 5 Years
Target	Existing and future infrastructure

ii. City of Kingsville

The following mitigation action items may indicate an asterisk (*****) in the case the new actions reflect actions that were deferred from the previous 2017 HMAP. The following mitigation action items may indicate an asterisk (*) in the case the new actions reflect actions that were deferred from the previous 2018 HMAP. Actions marked with a grey heading are not mitigation actions but are included in the HMAP for the County to reference in future planning endeavors.

Multi-Hazard Actions

Mitigation Action	Educational Outreach *
Objective	This action will create a program to educate the public about specific mitigation actions for all hazards, including but not limited to participation in Wildfire Fuels Reduction, Tornado Saferooms, Structural Hardening, etc.
Hazard	Hurricane/Tropical Storm, Flood, Wildfire, Tornado, Drought, Extreme Cold, Extreme Heat, Hailstorm, Winter Storms, Windstorms, Lightning, Dam Failure
Priority	Medium
Estimated Cost	Less than $10,000 per hazard
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB, GLO
Responsible Department	Commissioner's Court, Mayor & Council, Emergency Management, Police Department, Fire Department
Implementation Schedule	1 - 5 Years
Target	Existing and future population

Mitigation Action	Implement a Tree Trimming Program *
Objective	This action will develop and implement a tree trimming program to reduce loose / dead tree limbs that may cause damage during a hazard event.
Hazard	Wildfire, Tornado, Windstorms
Priority	Medium
Estimated Cost	$10,000 - $500,0000
Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP
Responsible Department	Planning, Ordinance, Emergency Management, Public Works
Implementation Schedule	1 - 5 Years

Target	Existing and future infrastructure

Mitigation Action	Construct Storm Drainage Infrastructure *
Objective	This action proposes constructing new and/or widening storm drainage infrastructure to reduce the potential impacts of future flood events. Including but not limited to increasing capacity of ditches, culverts, detention ponds.
Hazard	Flooding, Hurricanes/Tropical Storms
Priority	Medium
Estimated Cost	More than $100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, FEMA FMA, TWDB
Responsible Department	Mayor & Council, Planning
Implementation Schedule	2 - 5 Years
Target	Existing infrastructure

Mitigation Action	Install and/or Purchase Back Up Power Generators *
Objective	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not limited to lift stations, pumps, and communications infrastructure.
Hazard	Hailstorm, Lightning
Priority	Medium
Estimated Cost	More than $100,000 Each for Fixed Generators, Including Associated Engineering Costs. Less than $100,000 Each for Portable Generators
Potential Funding Source (s)	City, FEMA PDM, FEMA HMGP
Responsible Department	Mayor and Council, Emergency Management
Implementation Schedule	5 Years
Target	Existing infrastructure

Mitigation Action	Install Impact and Wind-resistant Windows and Doors at Public Facilities
Objective	This action proposes hardening facilities. Hardening will include adding impact and wind-resistant doors and windows at critical and public facilities.
Hazard	Tornados, Windstorms
Priority	Low
Estimated Cost	$100,000
Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP
Responsible Department	Mayor and Council, Planning, Ordinance, Emergency Management, Fire Department
Implementation Schedule	1 - 5 Years
Target	Existing infrastructure

Single Hazard Actions

Mitigation Action	Install Automated Flood Warning System
Objective	An automated flood warning system will help limit local vulnerability to floods by giving residents an opportunity to take shelter before an event occurs.
Hazard	Flooding
Priority	Medium
Estimated Cost	Less than $10,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Planning, Ordinance, Emergency Management
Implementation Schedule	1 - 5 Years
Target	Existing and future population

Mitigation Action	Construct/Establish Community Safe Rooms or Shelters
Objective	The action's goal is to provide a place of temporary refuge and or supply distribution location for the vulnerable public before, after, and during Hurricane/Tropical Storm and Tornado events. This action proposes constructing new or retrofit existing structures to serve as a safe room.
Hazard	Hurricane/Tropical Storm
Priority	Medium

Estimated Cost	Greater than $100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP
Responsible Department	Mayor and Council, Public Works
Implementation Schedule	1 – 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Create Drainage Master Plan
Objective	This action proposes creating a drainage master plan for the City, in conjunction with the County, that will provide the City with a comprehensive planning document that provides basic information and necessary guidance for the county-wide drainage system, including but not limited to an H&H study.
Hazard	Flood
Priority	Medium
Estimated Cost	Less than $100,000
Potential Funding Source (s)	City, County, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT
Responsible Department	Mayor & Council, Planning, Ordinance
Implementation Schedule	5 Years
Target	Existing and future infrastructure

Mitigation Action	Develop and Implement a New Drought Contingency Plan *
Objective	Re-evaluate all existing drought control measures to identify strengths and weaknesses in order to develop and enforce a new or updated drought contingency plan.
Hazard	Drought
Priority	Medium
Estimated Cost	Less than $10,000
Potential Funding Source(s)	City, FEMA PDM, FEMA HMGP
Responsible Department(s)	Public Works
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	Develop and Implement a New Water Conservation Ordinance *
Objective	Jurisdiction will re-evaluate all existing water conservation and reduction measures to identify strengths and weaknesses in

	order to develop and enforce a new water conservation ordinance.
Hazard	Drought
Priority	Medium
Estimated Cost	Less than $10,000
Potential Funding Source (s)	City, FEMA PDM, FEMA HMGP
Responsible Department	Public Works
Implementation Schedule	1 - 5 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Replace Water Fixtures with Low Flow Units**
Objective	This action's goal is to limit water consumption at City-owned and maintained facilities by replacing traditional water fixtures with low flow units.
Hazard	Drought
Priority	Low
Estimated Cost	$10,000 - $100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA HMGP, GLO
Responsible Department	Building Code and Ordinance
Implementation Schedule	Medium Term: 3-5 Years
Target	Existing and Future infrastructure

Mitigation Action	**Develop and Implement a New Tie-Down Ordinance for Manufactured / Mobile Homes, Temporary Buildings, and Unrestrained Advertisement Signs**
Objective	The City will re-evaluate all existing tie-down measures to identify strengths and weaknesses in order to develop and enforce a new tie-down ordinance.
Hazard	Windstorms
Priority	Low
Estimated Cost	Less than $100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT
Responsible Department	Building Code
Implementation Schedule	0 – 2 Years
Target	Existing and future population and infrastructure

Mitigation Action	Channel Enlargement and Rectification of Existing Streams *
Objective	This action will excavate existing channels to provide additional flood-carrying capacity through channel enlargement and rectification of existing streams.
Hazard	Flood
Priority	Medium
Estimated Cost	More than $100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT, TCEQ
Responsible Department	Emergency Management
Implementation Schedule	0 – 2 Years
Target	Existing and future population and infrastructure

Mitigation Action	Assist Residents with Repetitive Loss Property Buyouts or Elevation *
Objective	This action will attempt to buyout or elevate repetitive loss properties in the participating jurisdictions in order to eliminate recurring flooding on these properties.
Hazard	Flood
Priority	Medium
Estimated Cost	More than $100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT, TCEQ
Responsible Department	Emergency Management
Implementation Schedule	0 – 2 Years
Target	Existing and future population and infrastructure

Mitigation Action	Flood Detention Reservoir Construction *
Objective	The action will create flood detention reservoirs to temporarily impound upstream floodwaters for later release when downstream conditions permit.
Hazard	Flood
Priority	Medium
Estimated Cost	More than $100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT, TCEQ
Responsible Department	Emergency Management
Implementation Schedule	0 – 2 Years
Target	Existing and future population and infrastructure

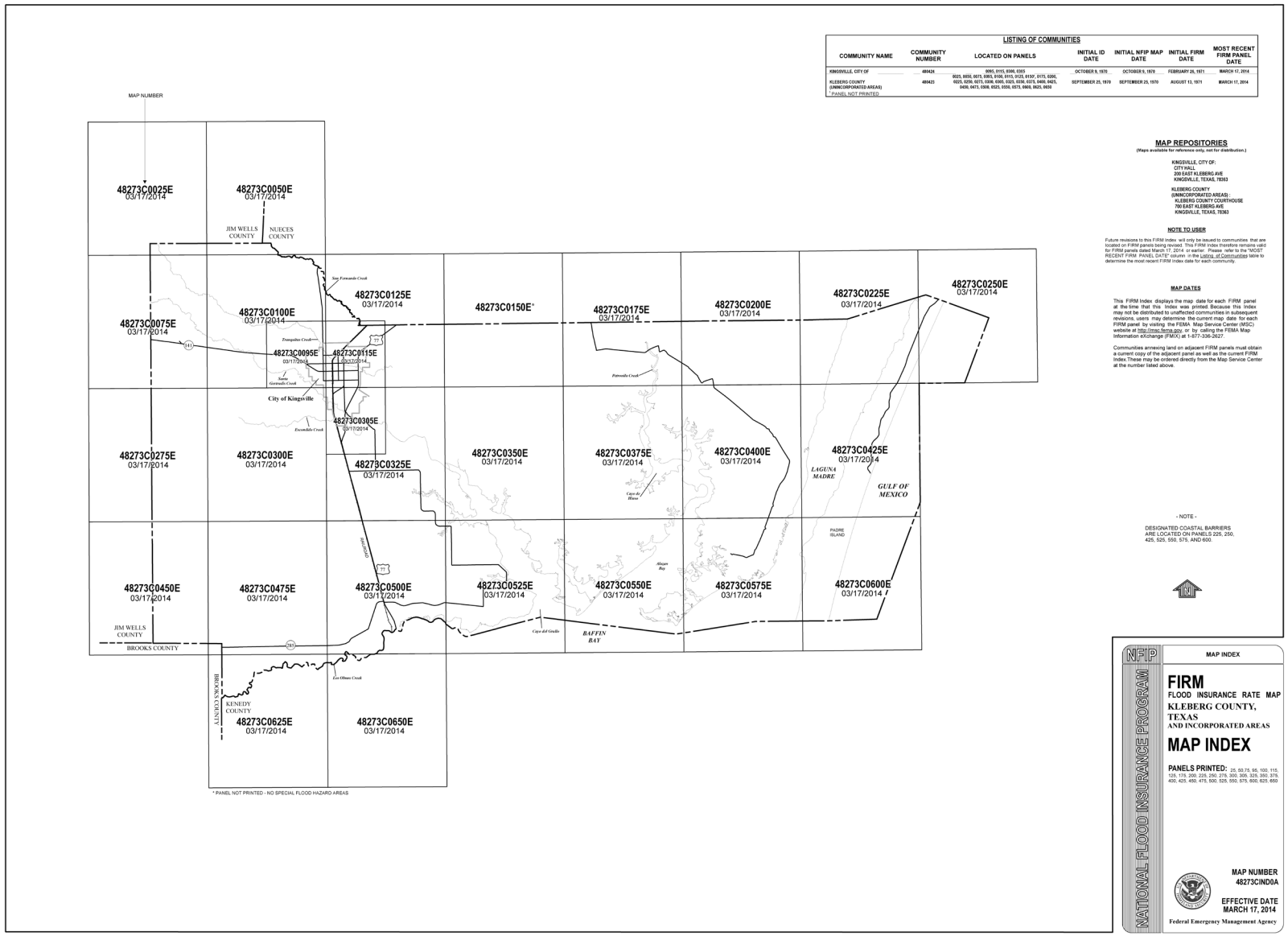
Mitigation Action	Floodwater Diversion *
Objective	This action will divert floodwaters from flood zones or common overflowing rivers through the construction of new

	channels to convey flood flows to adjacent streams or around the area to be protected.
Hazard	Flood
Priority	Medium
Estimated Cost	More than $100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT, TCEQ
Responsible Department	Emergency Management
Implementation Schedule	0 – 2 Years
Target	Existing and future population and infrastructure

Mitigation Action	**Develop and Implement Dam Failure Contingency Plan ***
Objective	This action will develop and implement a dam failure contingency plan for the City of Kingsville.
Hazard	Dam Failure
Priority	Medium
Estimated Cost	More than $100,000
Potential Funding Source (s)	City, FEMA BRIC, FEMA FMA, FEMA HMGP, CDBG-MIT, TCEQ
Responsible Department	Emergency Management
Implementation Schedule	0 – 2 Years
Target	Existing and future population and infrastructure

Appendix A – FIRM

Below are the most recent FIRMs for Kleberg County.



LISTING OF COMMUNITIES

COMMUNITY NAME	COMMUNITY NUMBER	LOCATED ON PANELS	INITIAL ID DATE	INITIAL NFIP MAP DATE	INITIAL FIRM DATE	MOST RECENT FIRM PANEL DATE
KINGSVILLE, CITY OF	480424	0095, 0115, 0100, 0303	OCTOBER 9, 1970	OCTOBER 9, 1970	FEBRUARY 20, 1971	MARCH 17, 2014
KLEBERG COUNTY (UNINCORPORATED AREAS)	480423	0025, 0050, 0075, 0095, 0100, 0115, 0125, 0150*, 0175, 0200, 0225, 0250, 0275, 0300, 0305, 0325, 0350, 0375, 0400, 0425, 0450, 0475, 0500, 0525, 0550, 0575, 0600, 0625, 0650	SEPTEMBER 25, 1970	SEPTEMBER 25, 1970	AUGUST 13, 1971	MARCH 17, 2014

* PANEL NOT PRINTED

MAP REPOSITORIES

(Maps available for reference only, not for distribution.)

KINGSVILLE, CITY OF:
CITY HALL
200 EAST KLEBERG AVE
KINGSVILLE, TEXAS, 78363

KLEBERG COUNTY
(UNINCORPORATED AREAS) :
KLEBERG COUNTY COURTHOUSE
700 EAST KLEBERG AVE
KINGSVILLE, TEXAS, 78363

NOTE TO USER

Future revisions to this FIRM Index will only be issued to communities that are located on FIRM panels being revised. This FIRM Index therefore remains valid for FIRM panels dated March 17, 2014 or earlier. Please refer to the "MOST RECENT FIRM PANEL DATE" column in the Listing of Communities table to determine the most recent FIRM Index date for each community.

MAP DATES

This FIRM Index displays the map date for each FIRM panel at the time that this Index was printed. Because this Index may not be distributed to unaffected communities in subsequent revisions, users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center (MSC) website at http://msc.fema.gov, or by calling the FEMA Map Information eXchange (FMIX) at 1-877-336-2627.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

- NOTE -

DESIGNATED COASTAL BARRIERS ARE LOCATED ON PANELS 225, 250, 425, 525, 550, 575, AND 600.

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

MAP INDEX

FIRM
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY, TEXAS
AND INCORPORATED AREAS

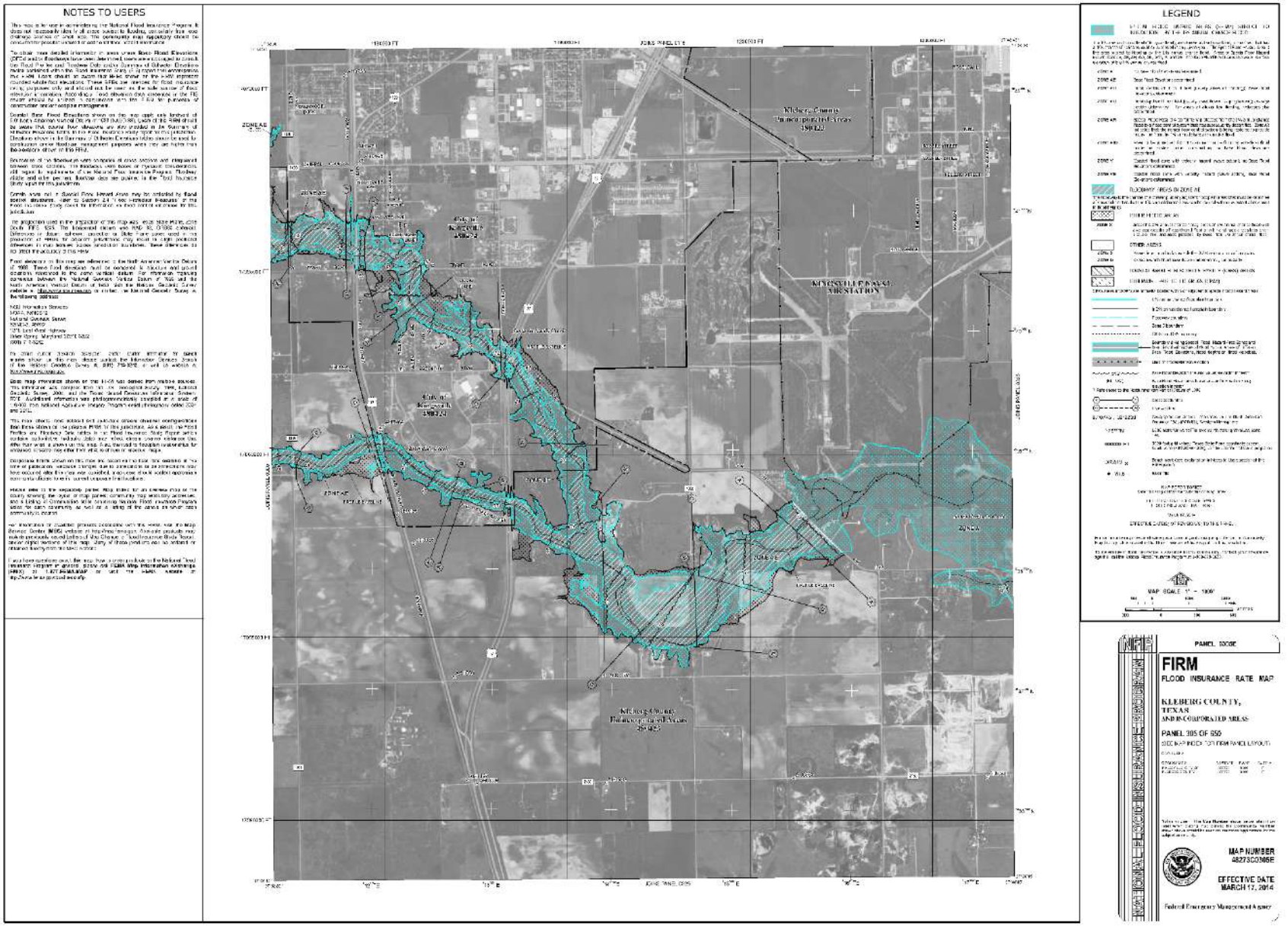
MAP INDEX

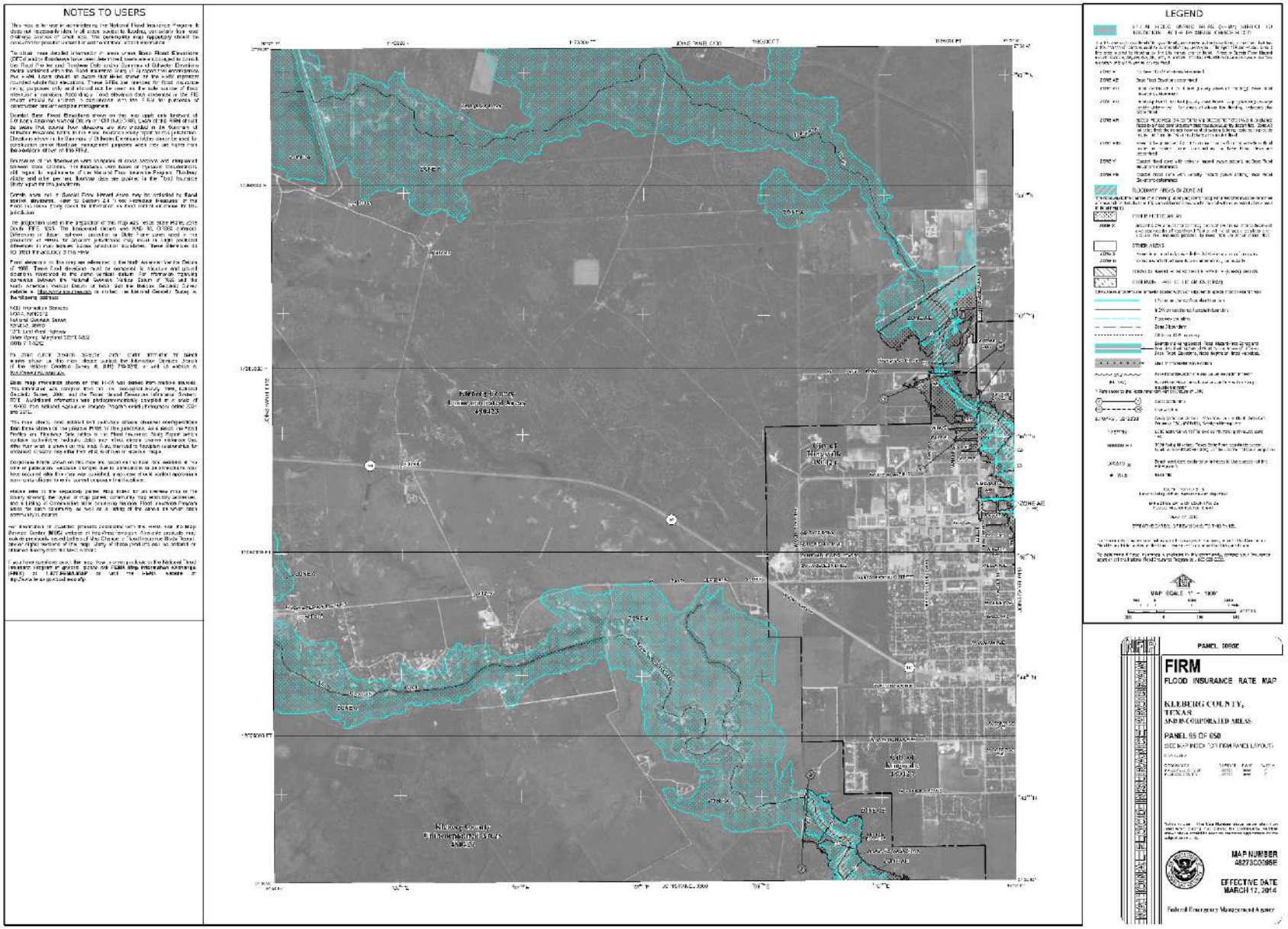
PANELS PRINTED: 25, 50,75, 95, 100, 115, 125, 175, 200, 225, 250, 275, 300, 305, 325, 350, 375, 400, 425, 450, 475, 500, 525, 550, 575, 600, 625, 650

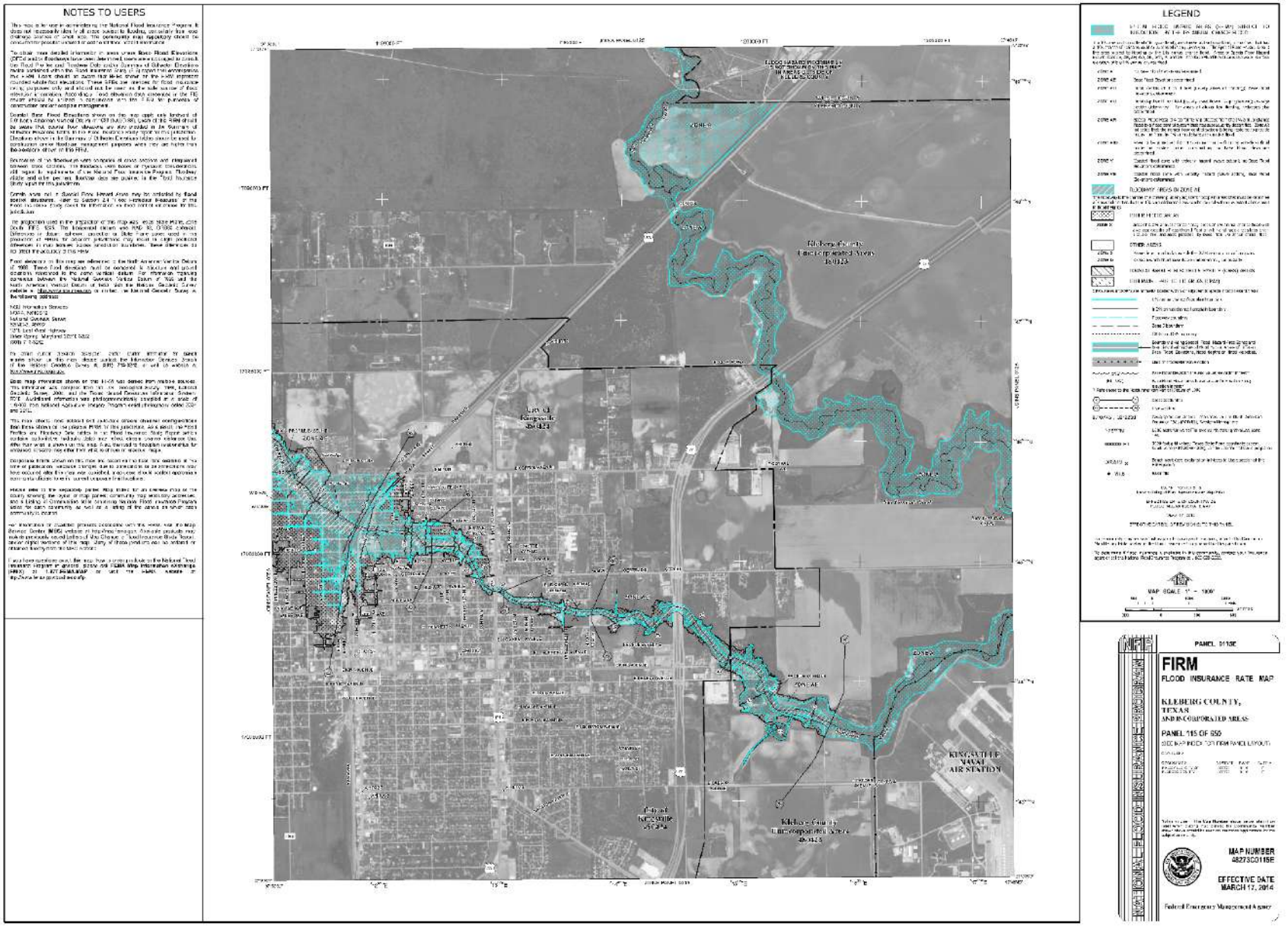
MAP NUMBER
48273CIND0A

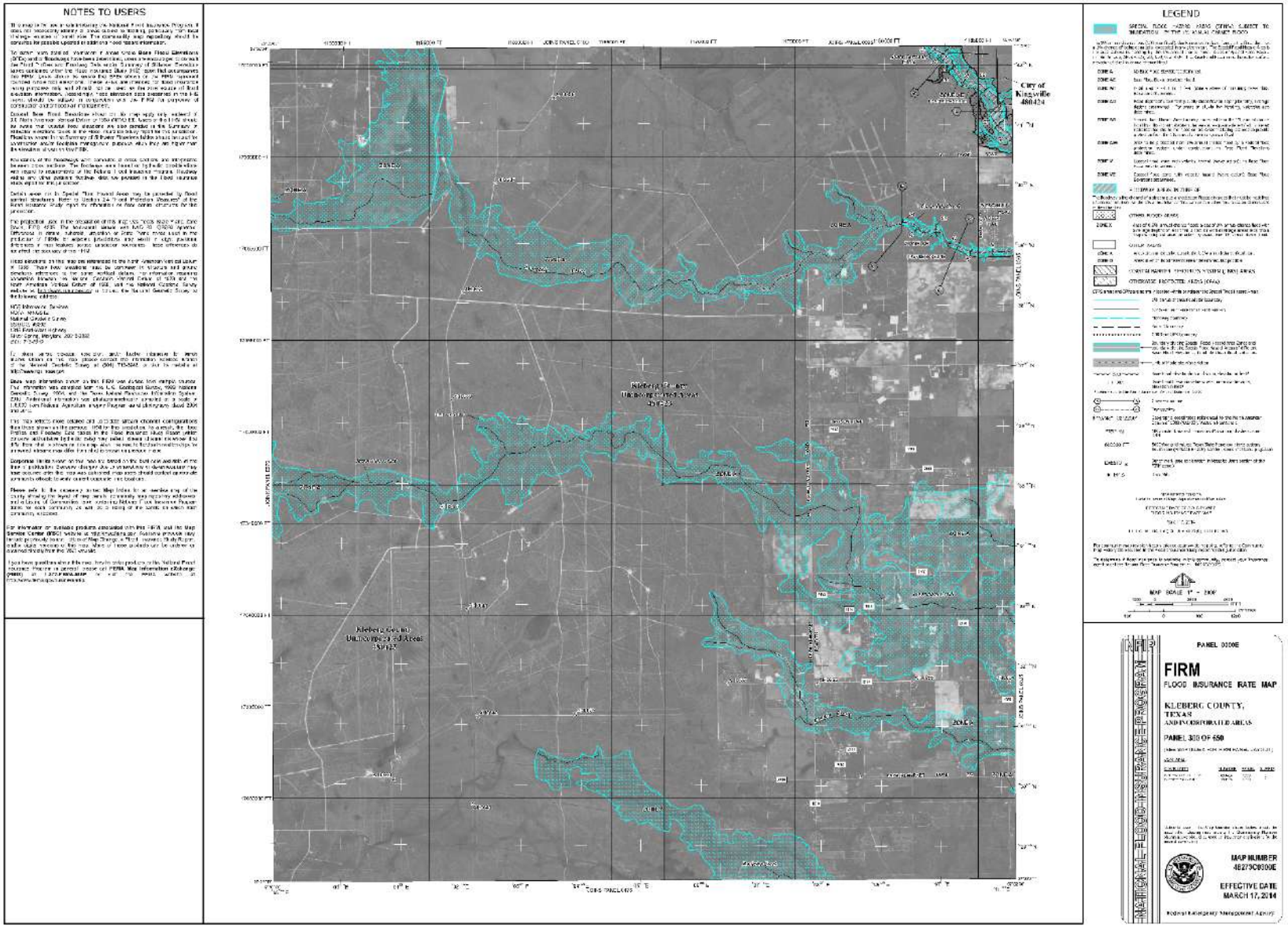
EFFECTIVE DATE
MARCH 17, 2014

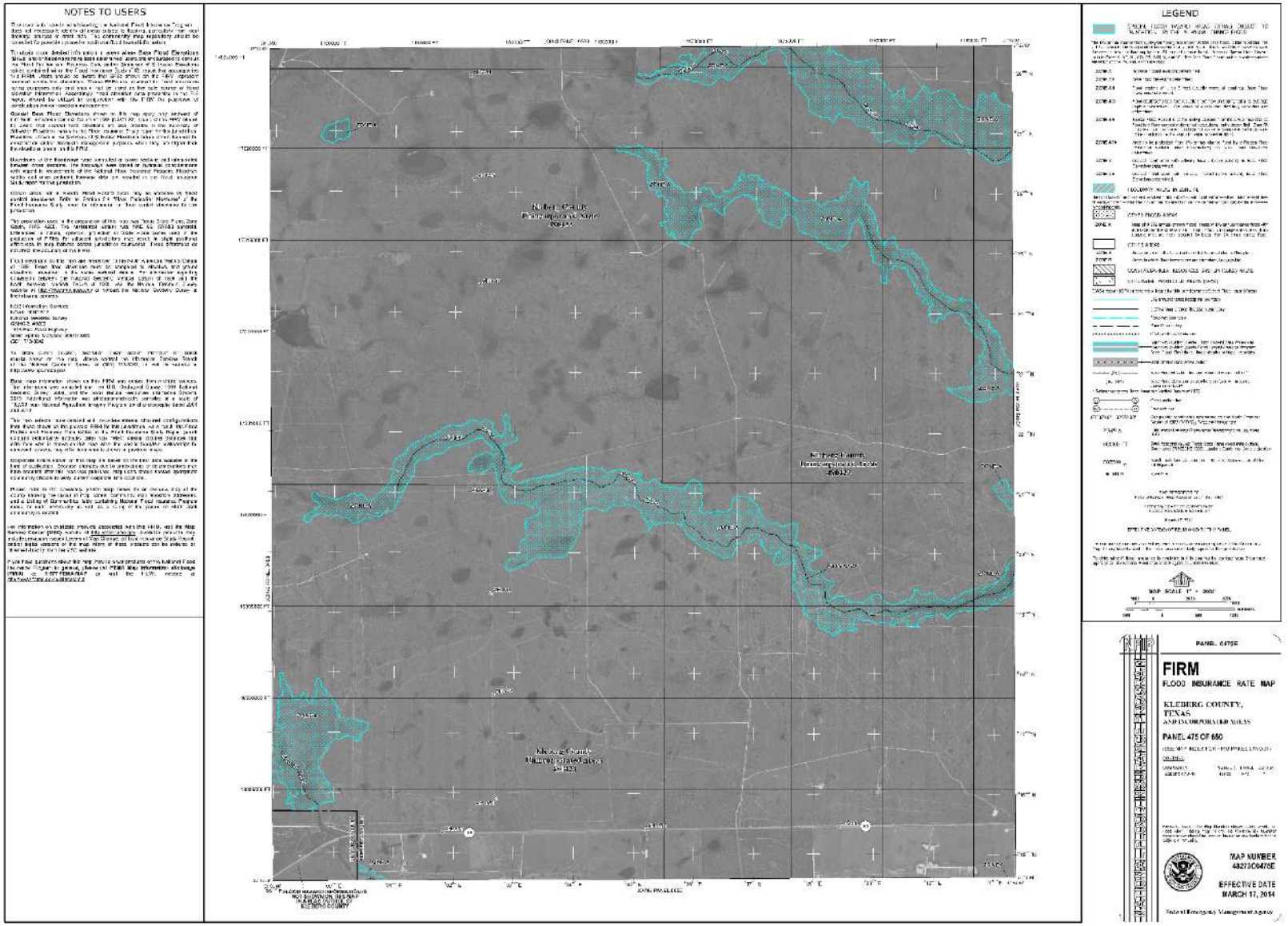
Federal Emergency Management Agency


NOTES TO USERS
LEGEND
FIRM
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY, TEXAS AND INCORPORATED AREAS
PANEL 305 OF 850
MAP NUMBER 48273C0305E
EFFECTIVE DATE MARCH 17, 2014
Federal Emergency Management Agency


NOTES TO USERS
LEGEND
PANEL 0095E
FIRM
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY, TEXAS AND INCORPORATED AREAS
PANEL 95 OF 850
MAP NUMBER 48273C0095E
EFFECTIVE DATE MARCH 17, 2014
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM


NOTES TO USERS
LEGEND
Kleberg County Unincorporated Areas
480124
City of Kingsville
480125
Kleberg County Unincorporated Areas
480125
KINGSVILLE NAVAL AIR STATION
MAP SCALE 1" = 1000'
PANEL 0115E
FIRM
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY, TEXAS AND INCORPORATED AREAS
PANEL 115 OF 850
MAP NUMBER 48273C0115E
EFFECTIVE DATE MARCH 17, 2014
Federal Emergency Management Agency


NOTES TO USERS
LEGEND
City of Kingsville
480424
Kleberg County
Unincorporated Areas
480423
FIRM
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY,
TEXAS
AND INCORPORATED AREAS
PANEL 300 OF 650
PANEL 0300E
MAP NUMBER
48273C0300E
EFFECTIVE DATE
MARCH 17, 2014
NATIONAL FLOOD INSURANCE PROGRAM


NOTES TO USERS
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FLOOD INSURANCE RATE MAP
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AND INCORPORATED AREAS
PANEL 475 OF 650
MAP NUMBER
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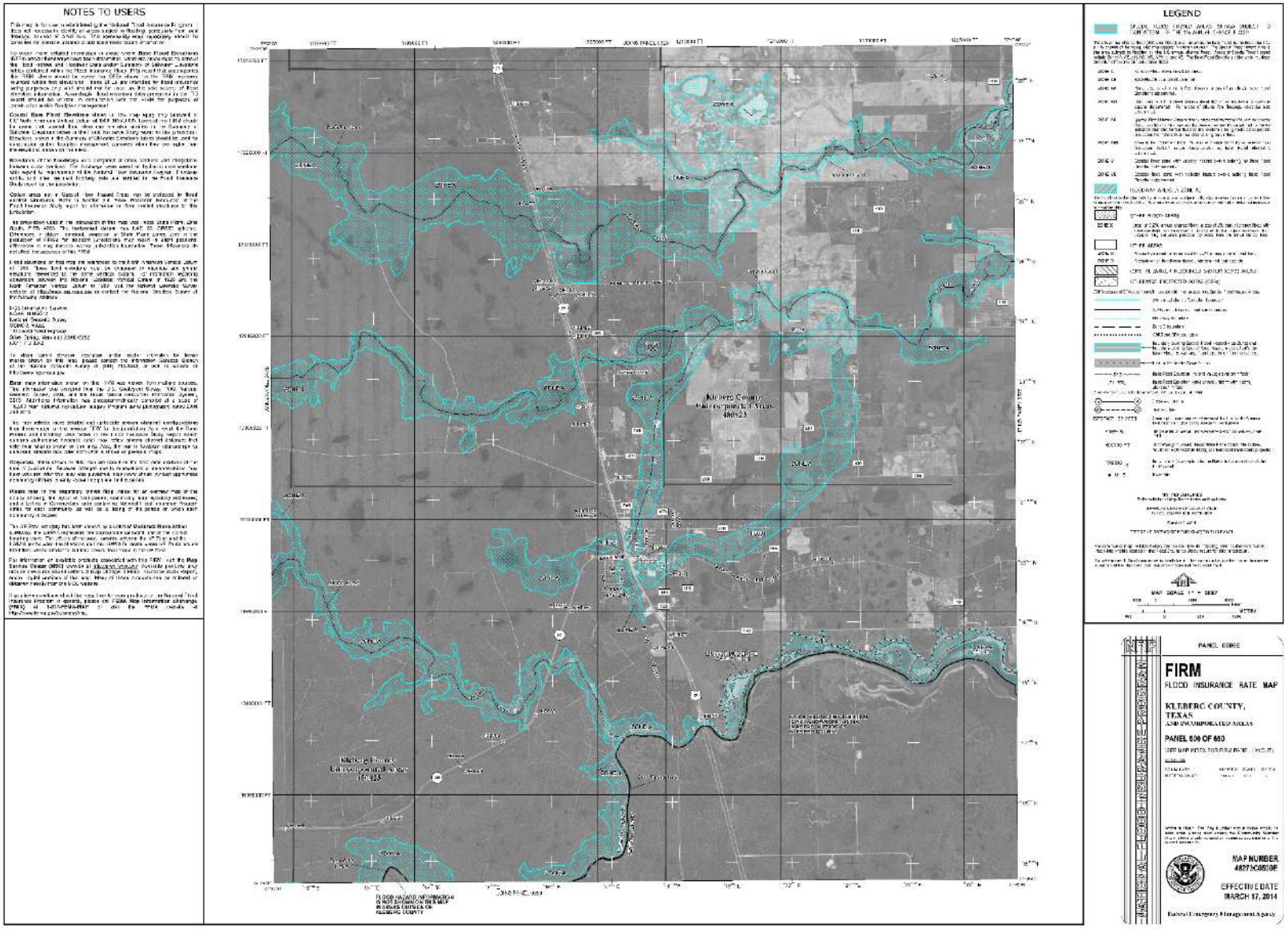
EFFECTIVE DATE
MARCH 17, 2014
Federal Emergency Management Agency


NOTES TO USERS
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KLEBERG COUNTY, TEXAS
AND INCORPORATED AREAS
PANEL 800 OF 850
MAP NUMBER
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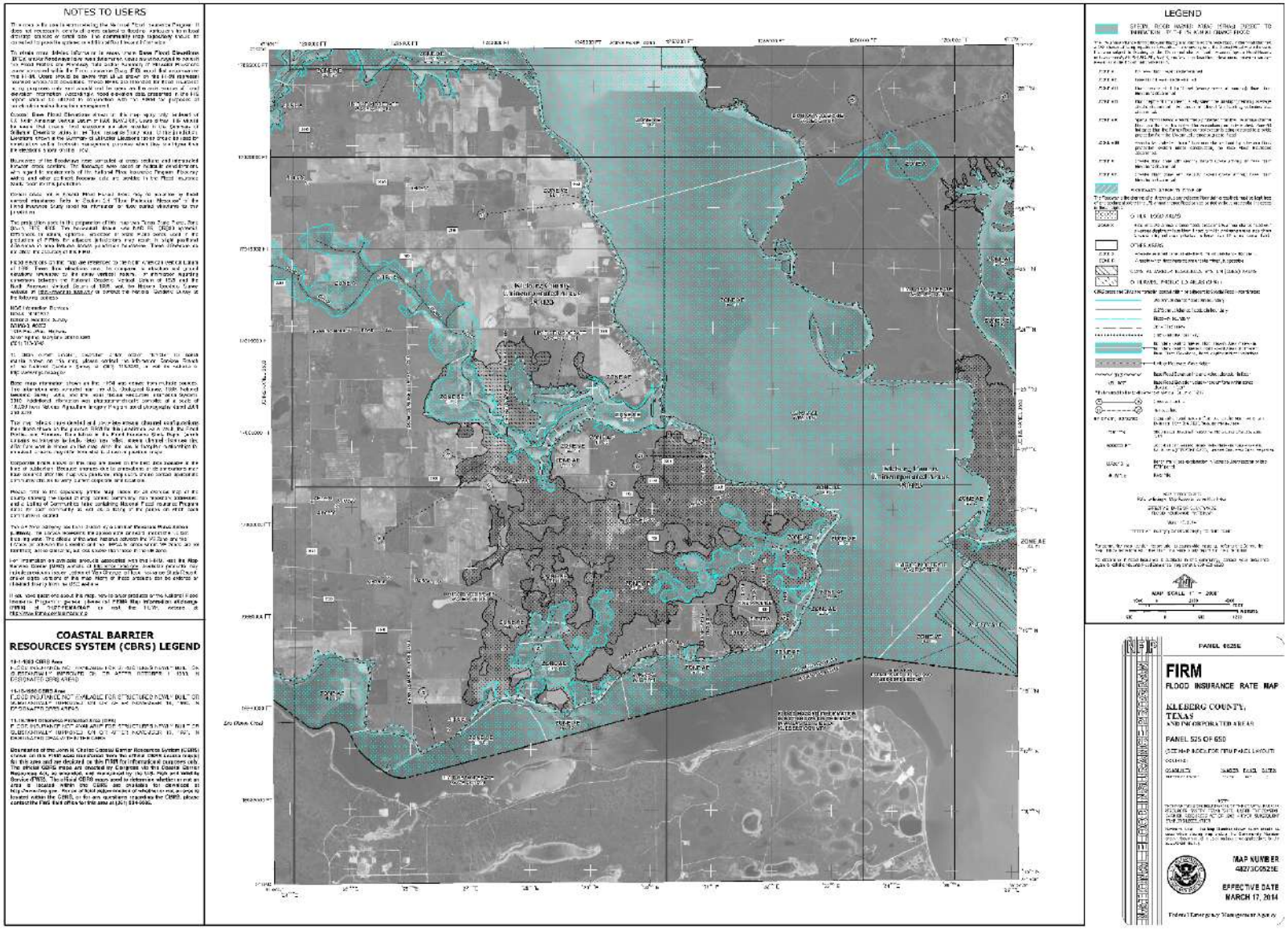
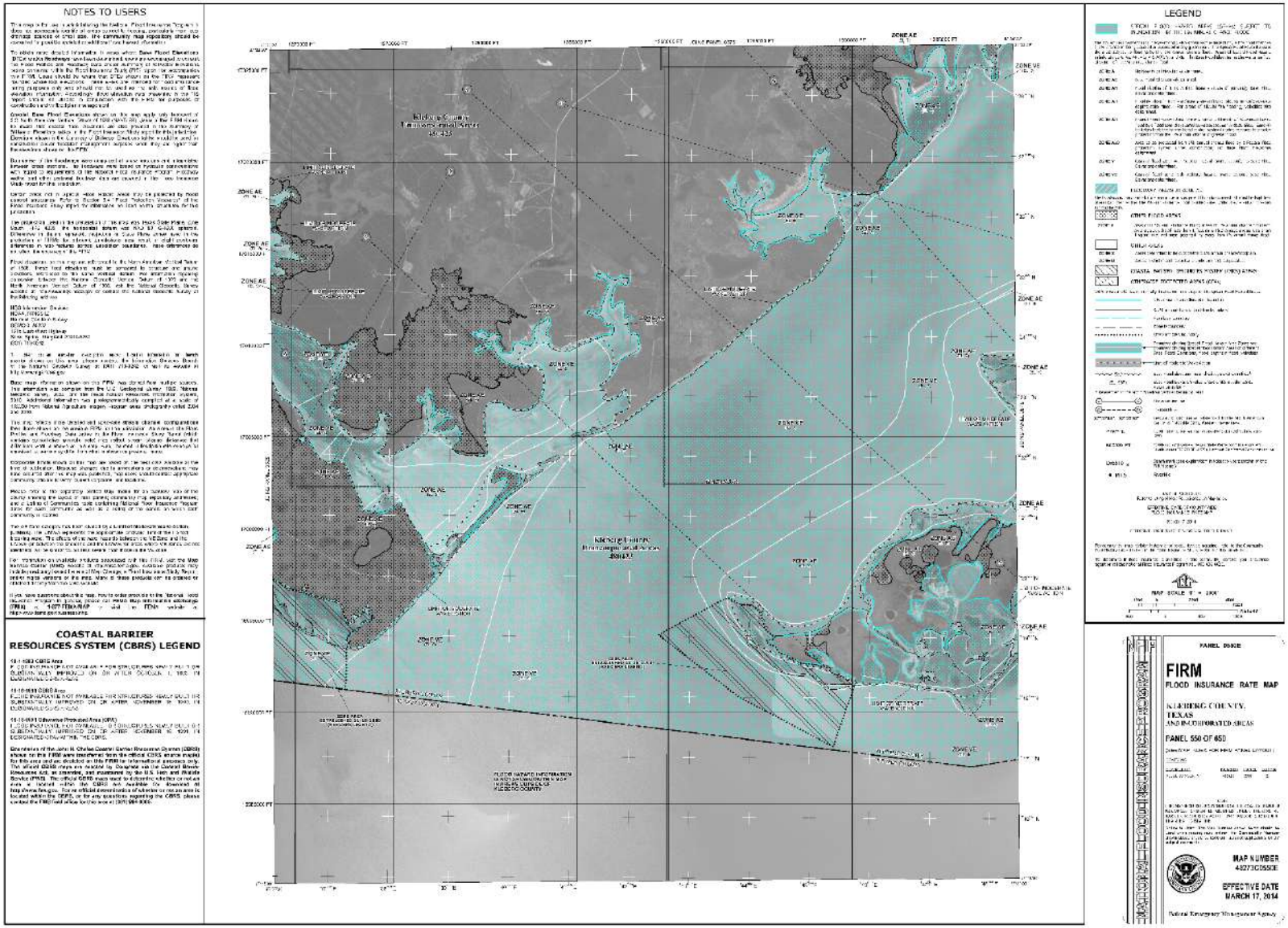
EFFECTIVE DATE
MARCH 17, 2014
Federal Emergency Management Agency


NOTES TO USERS
COASTAL BARRIER
RESOURCES SYSTEM (CBRS) LEGEND
LEGEND
FIRM
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY,
TEXAS
AND INCORPORATED AREAS
PANEL 525 OF 650
MAP NUMBER
48273C0525E
EFFECTIVE DATE
MARCH 17, 2014


NOTES TO USERS
COASTAL BARRIER RESOURCES SYSTEM (CBRS) LEGEND
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FIRM
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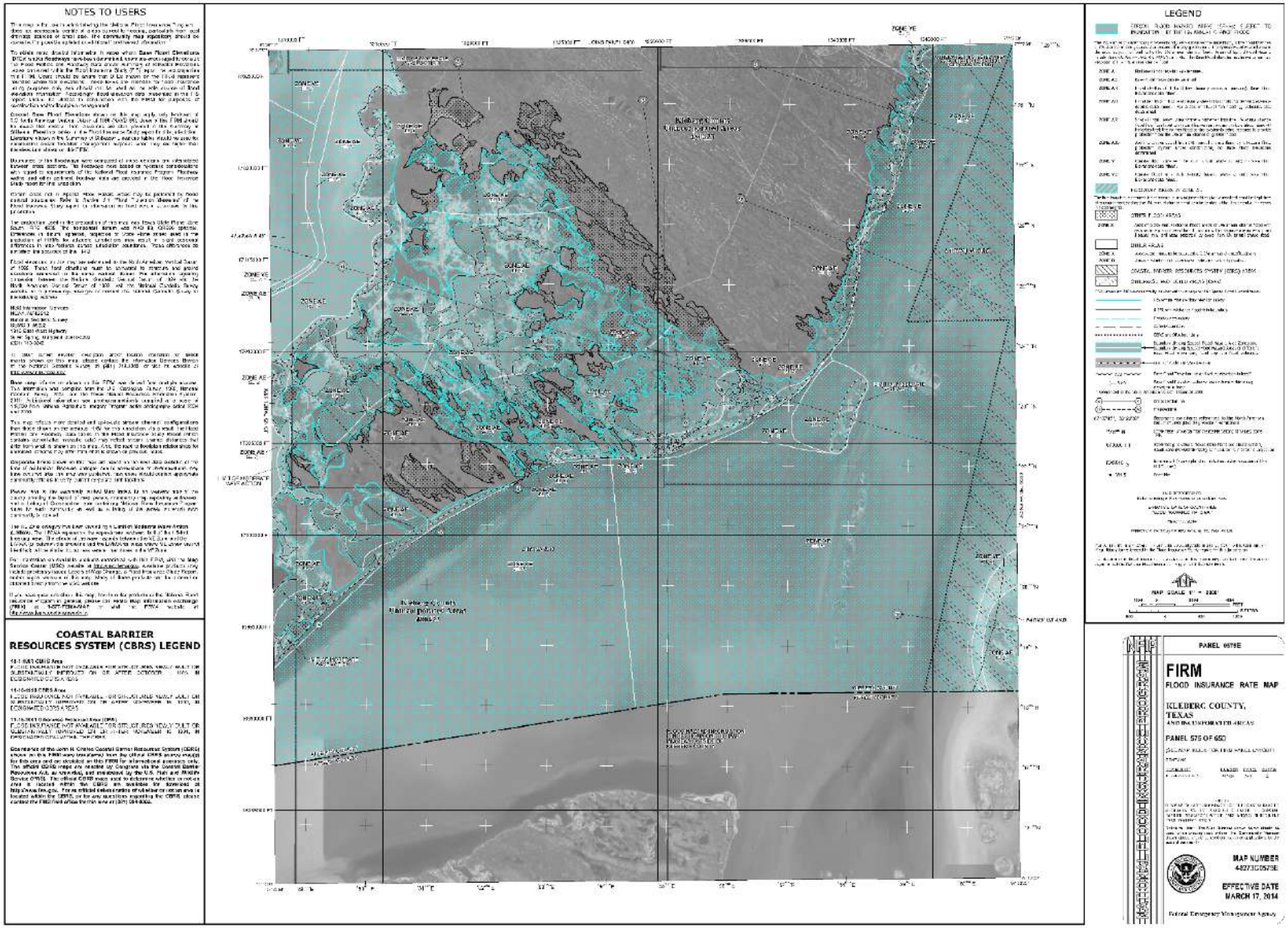
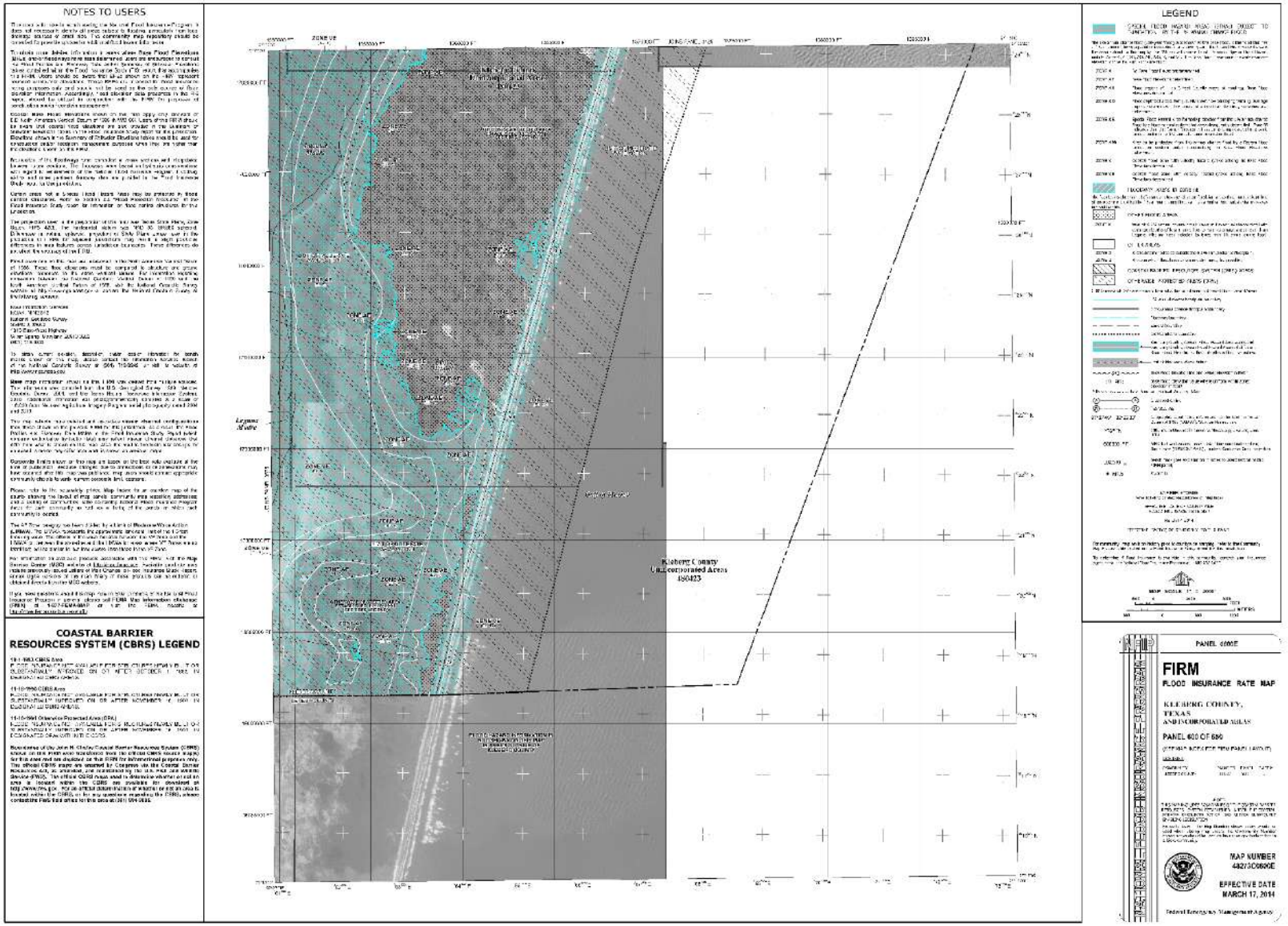
KLEBERG COUNTY, TEXAS AND INCORPORATED AREAS
PANEL 550 OF 650
MAP NUMBER
48273C0550E
EFFECTIVE DATE
MARCH 17, 2014


NOTES TO USERS
COASTAL BARRIER
RESOURCES SYSTEM (CBRS) LEGEND
LEGEND
FIRM
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY,
TEXAS
AND INCORPORATED AREAS
PANEL 575 OF 650
PANEL 0575E
MAP NUMBER
48273C0575E
EFFECTIVE DATE
MARCH 17, 2014
Federal Emergency Management Agency


NOTES TO USERS
COASTAL BARRIER
RESOURCES SYSTEM (CBRS) LEGEND
LEGEND
FIRM
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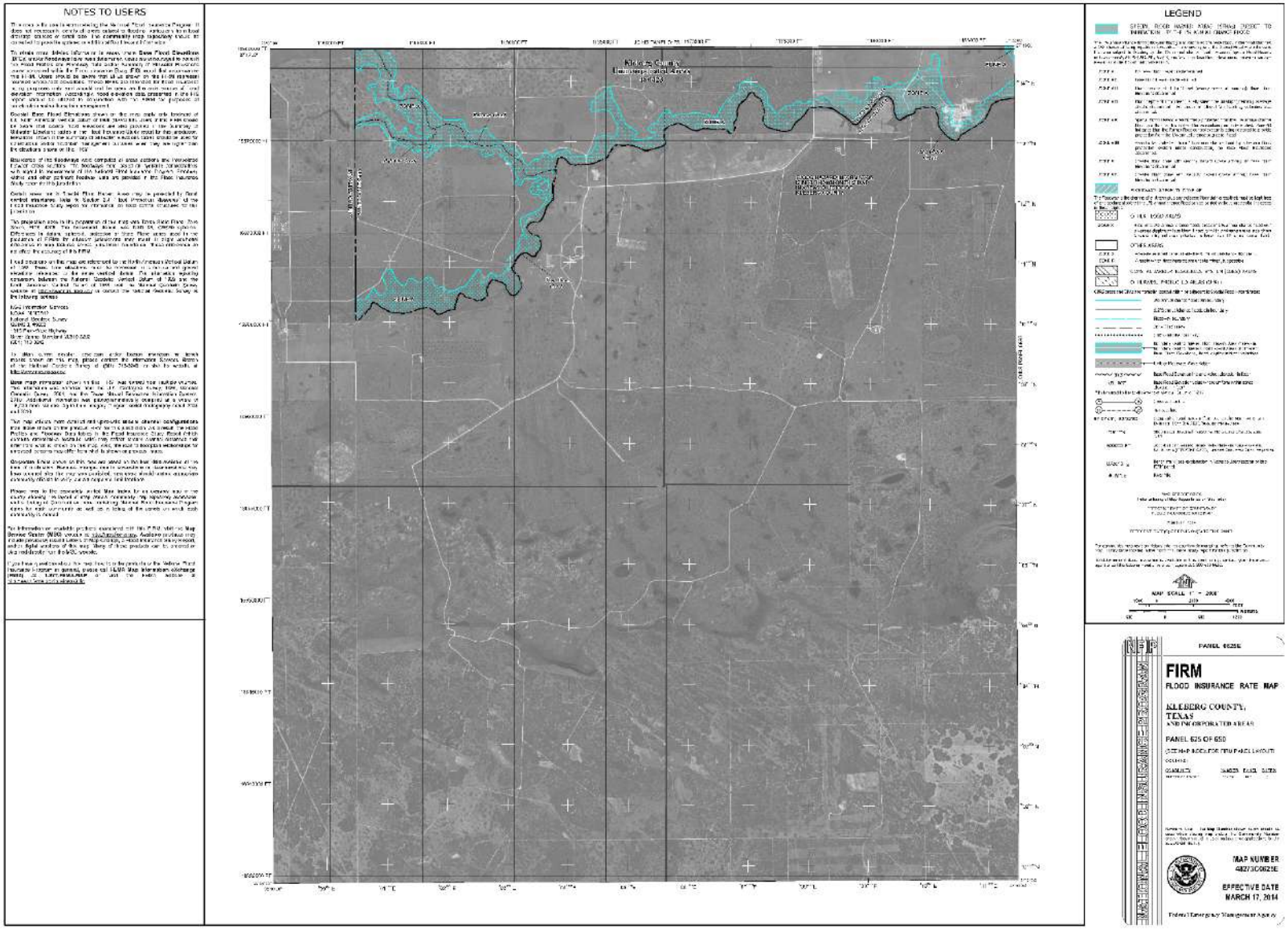
KLEBERG COUNTY,
TEXAS
AND INCORPORATED AREAS
PANEL 600 OF 650
MAP NUMBER
48273C0600E
EFFECTIVE DATE
MARCH 17, 2014
Kleberg County
Unincorporated Areas
480423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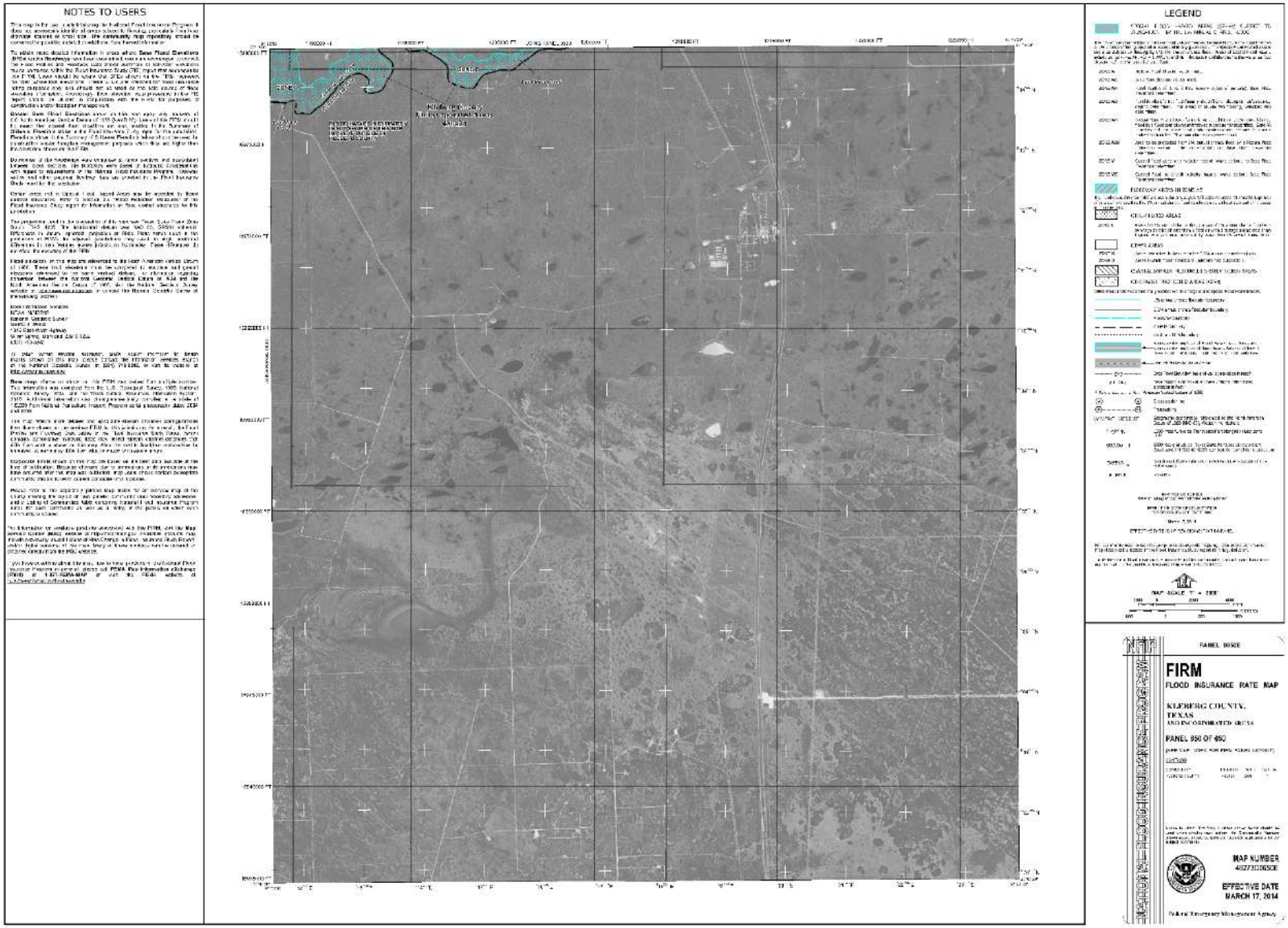
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY, TEXAS
AND INCORPORATED AREAS
PANEL 625 OF 650
MAP NUMBER
48273C0625E
EFFECTIVE DATE
MARCH 17, 2014
Federal Emergency Management Agency


NOTES TO USERS
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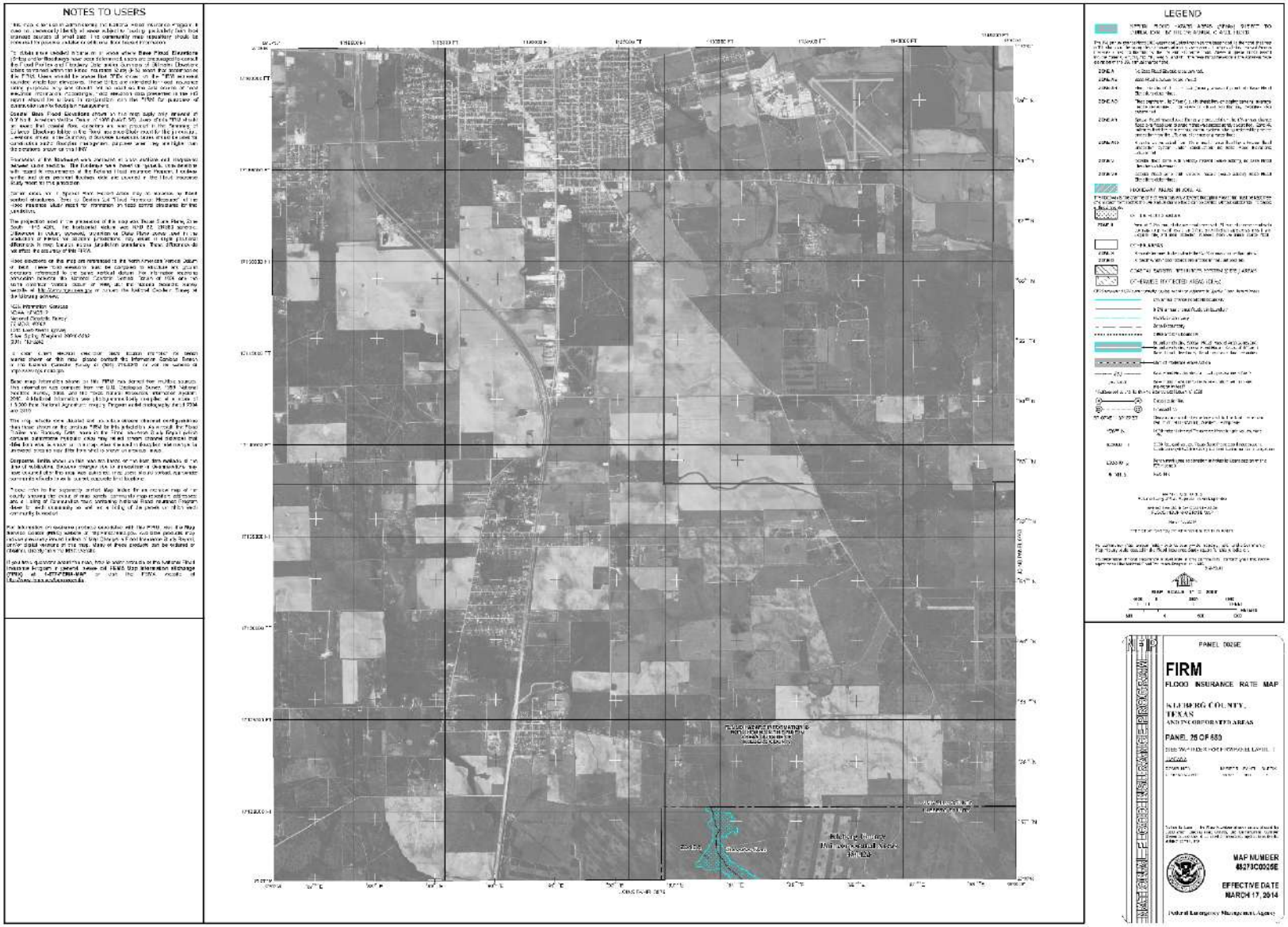
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY, TEXAS
AND INCORPORATED AREAS
PANEL 950 OF 650
MAP NUMBER
48273C0950E
EFFECTIVE DATE
MARCH 17, 2014
Federal Emergency Management Agency


NOTES TO USERS
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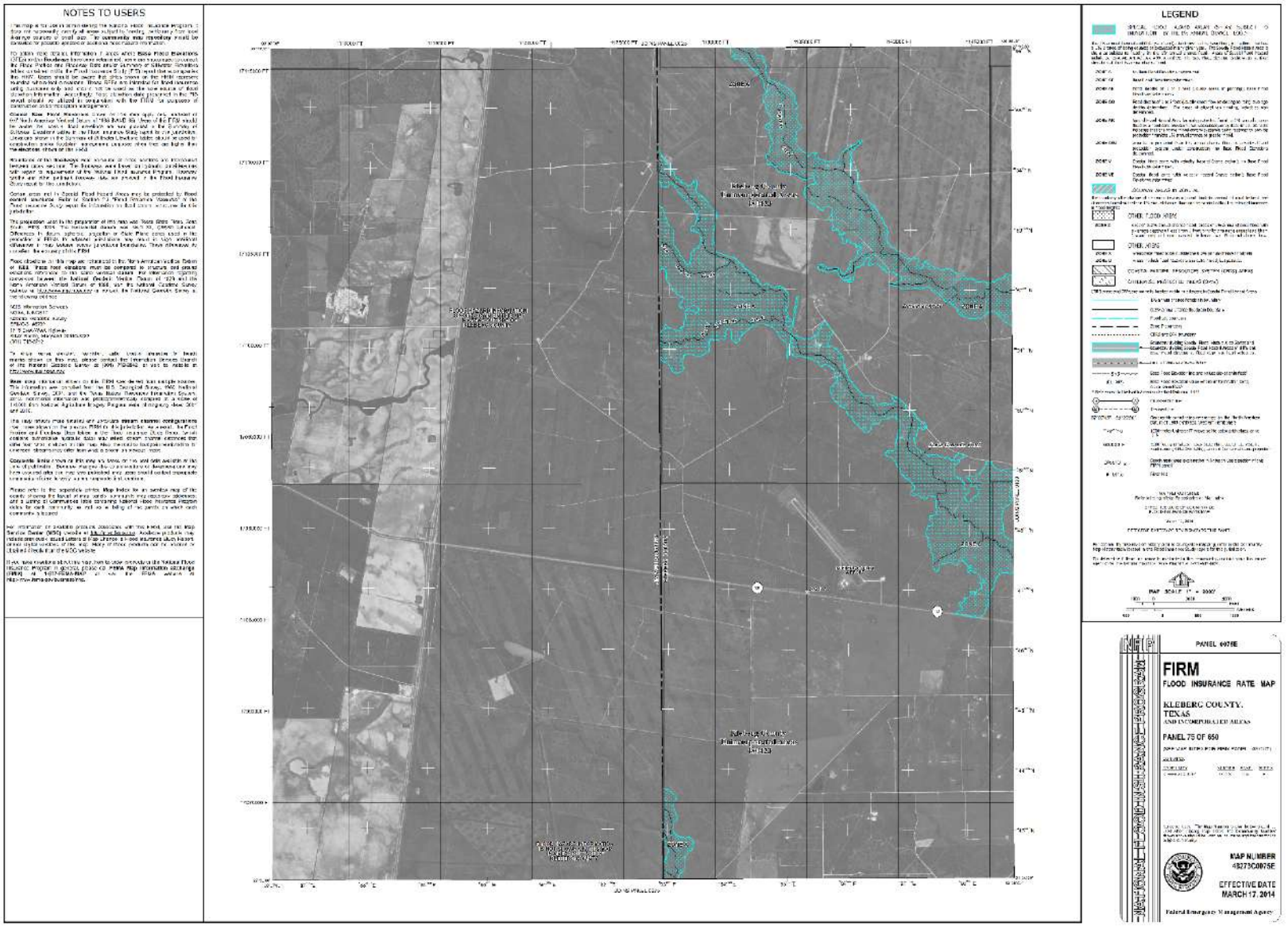
KLEBERG COUNTY, TEXAS
AND INCORPORATED AREAS
PANEL 26 OF 650
MAP NUMBER
48273C0026E
EFFECTIVE DATE
MARCH 17, 2014
Federal Emergency Management Agency


NOTES TO USERS
LEGEND
PANEL 0050E
FIRM
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY, TEXAS
AND INCORPORATED AREAS
PANEL 50 OF 450
MAP NUMBER
48273C0050E
EFFECTIVE DATE
MARCH 17, 2014
Federal Emergency Management Agency


NOTES TO USERS
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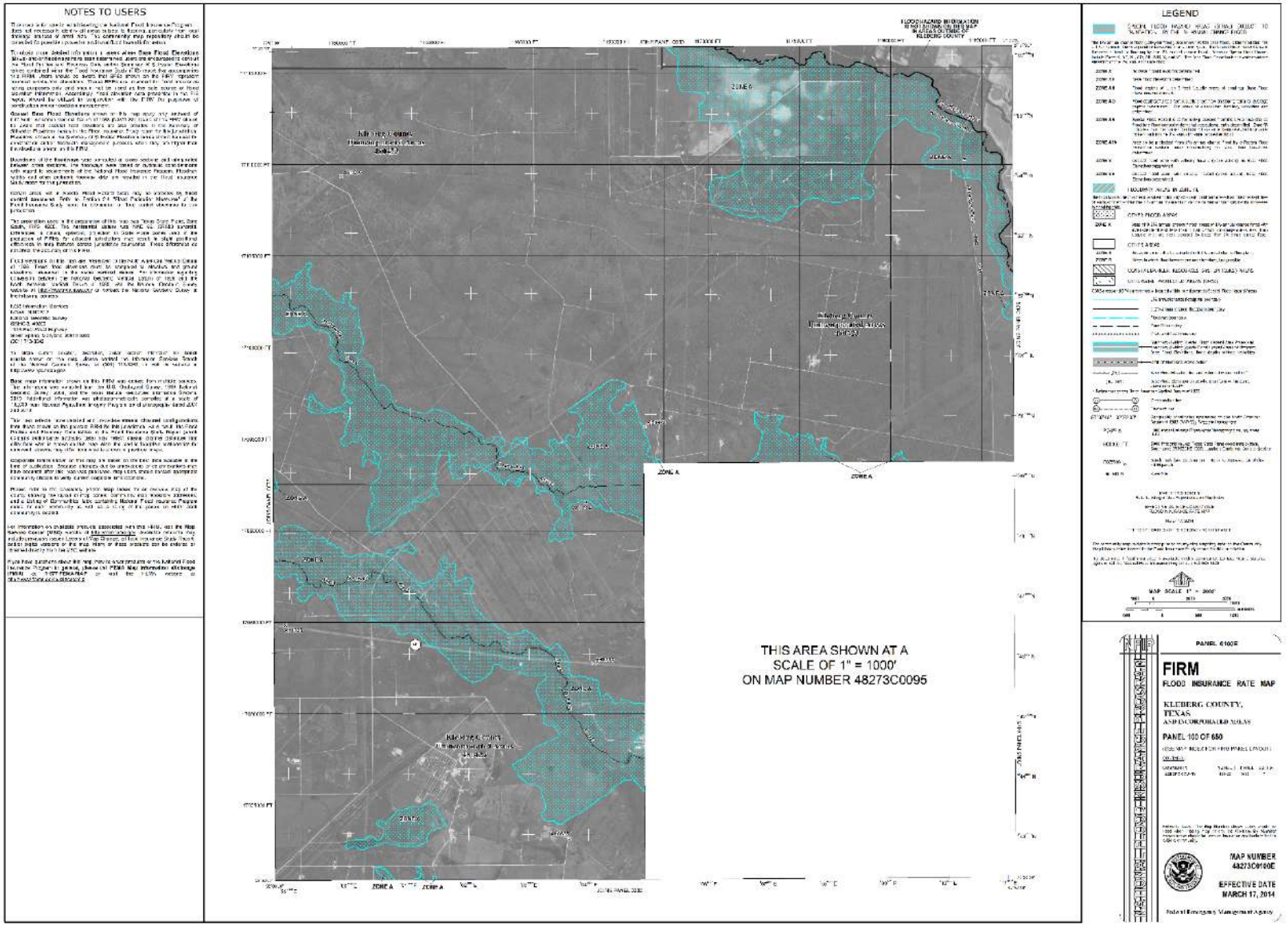
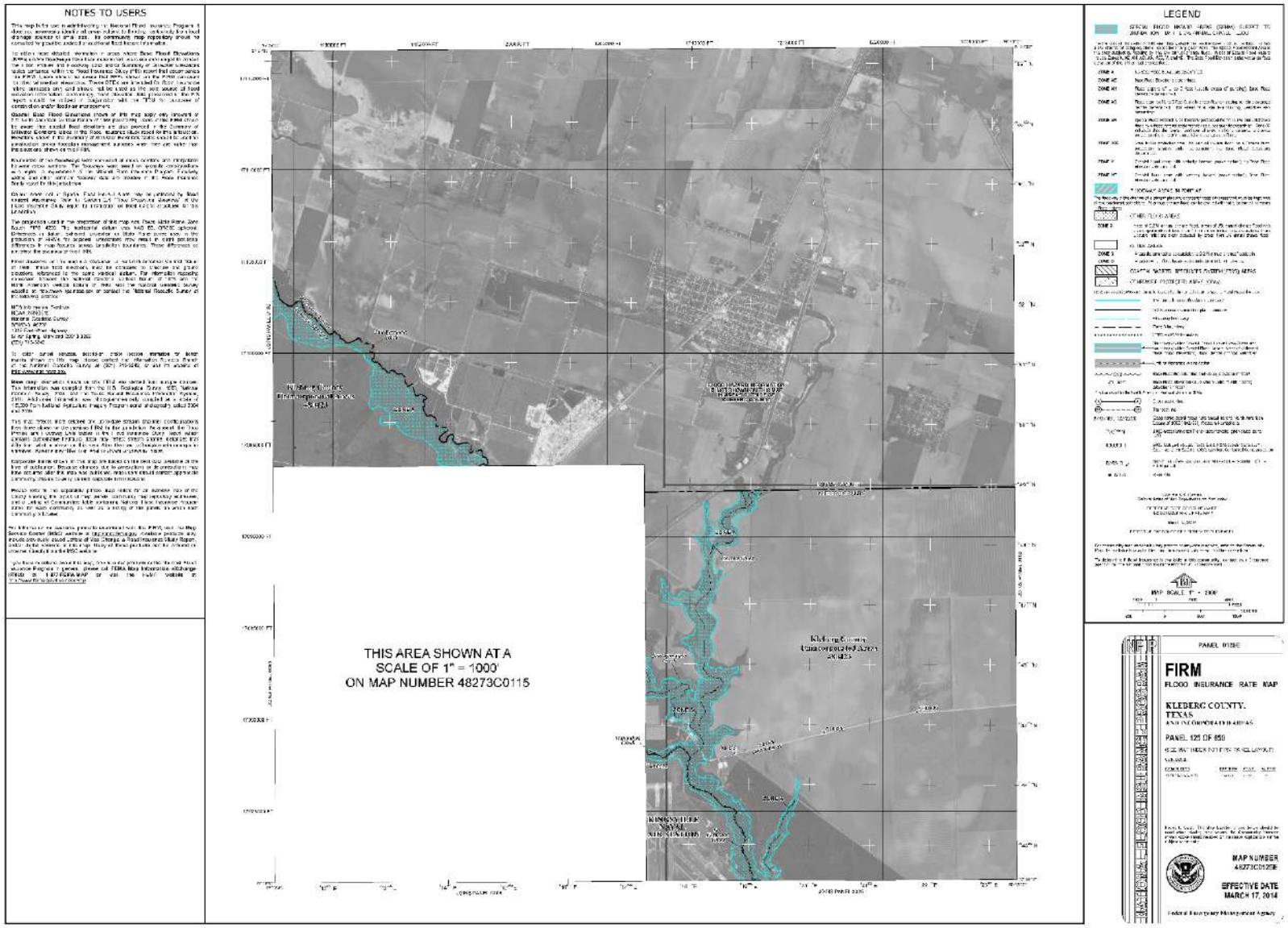
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY, TEXAS
AND INCORPORATED AREAS
PANEL 75 OF 650
MAP NUMBER
48273C0075E
EFFECTIVE DATE
MARCH 17, 2014
Federal Emergency Management Agency


NOTES TO USERS
LEGEND
THIS AREA SHOWN AT A
SCALE OF 1" = 1000'
ON MAP NUMBER 48273C0095
FIRM
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY,
TEXAS
AND INCORPORATED AREAS
PANEL 100 OF 650
MAP NUMBER
48273C0100E
EFFECTIVE DATE
MARCH 17, 2014
Federal Emergency Management Agency


NOTES TO USERS
LEGEND
THIS AREA SHOWN AT A
SCALE OF 1" = 1000'
ON MAP NUMBER 48273C0115
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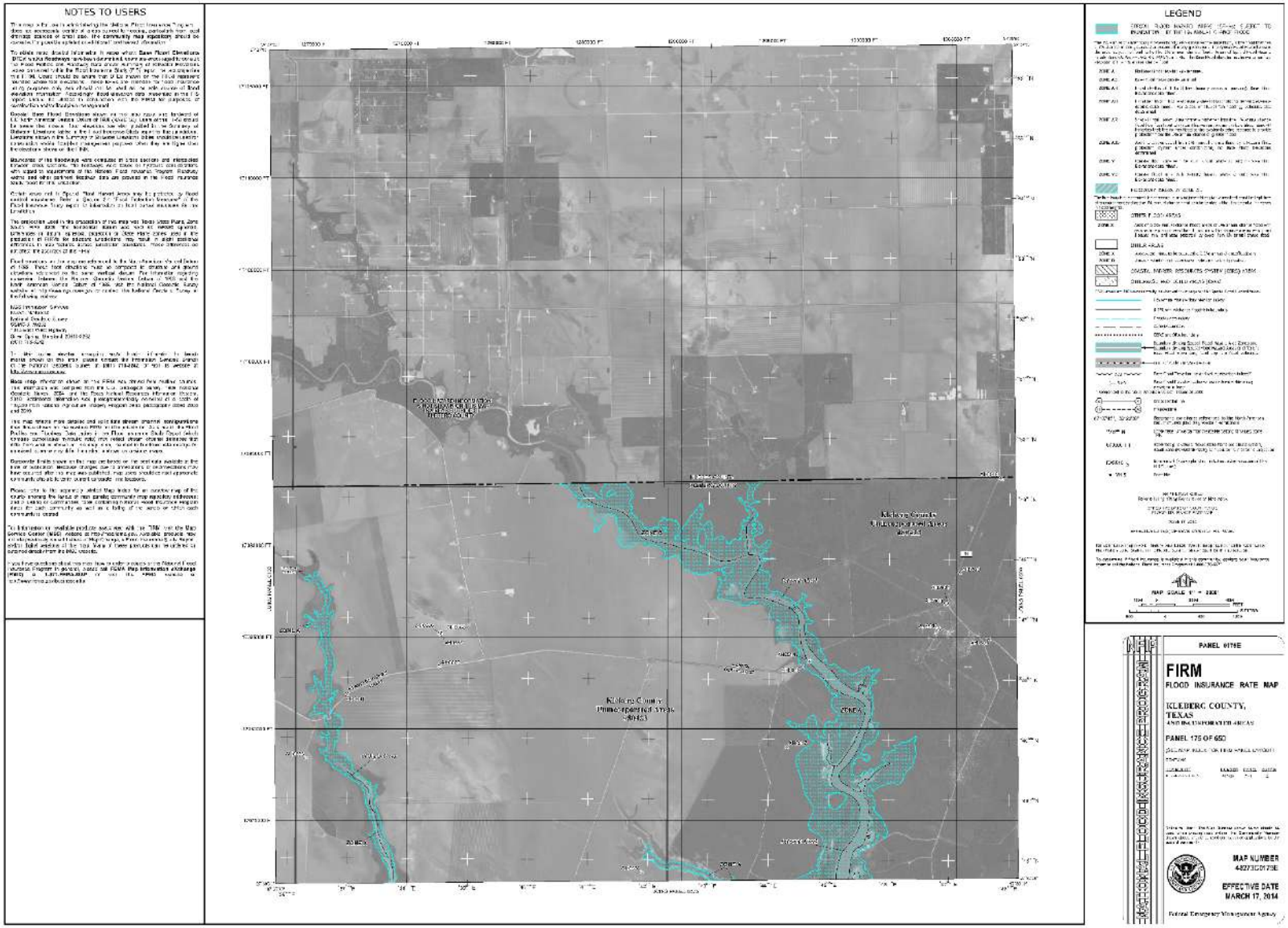
FIRM
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY,
TEXAS
AND INCORPORATED AREAS
PANEL 125 OF 650
MAP NUMBER
48273C0125E
EFFECTIVE DATE
MARCH 17, 2014


NOTES TO USERS
LEGEND
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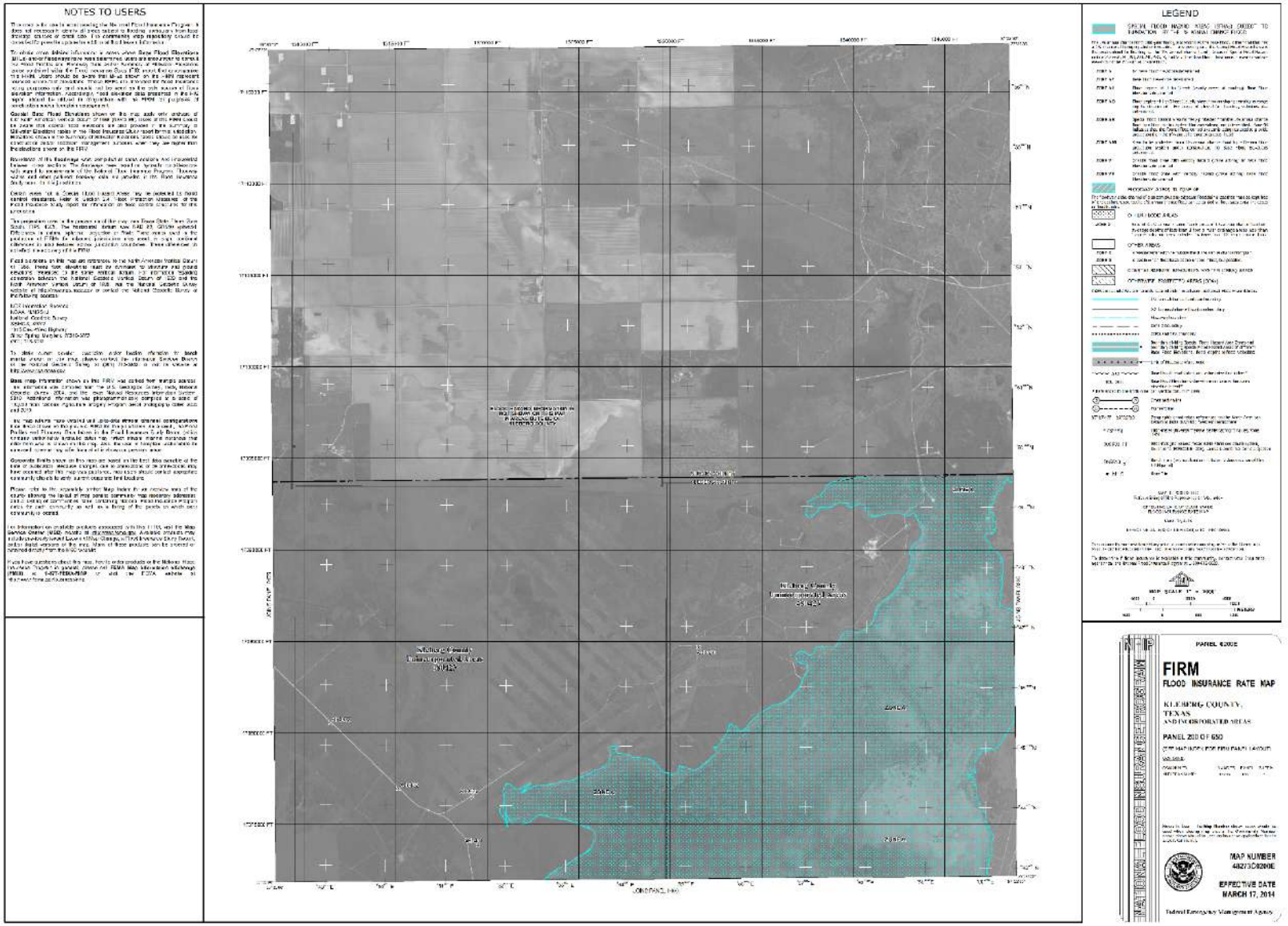
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY, TEXAS
AND INCORPORATED AREAS
PANEL 175 OF 650
MAP NUMBER
48273C0175E
EFFECTIVE DATE
MARCH 17, 2014
Federal Emergency Management Agency


NOTES TO USERS
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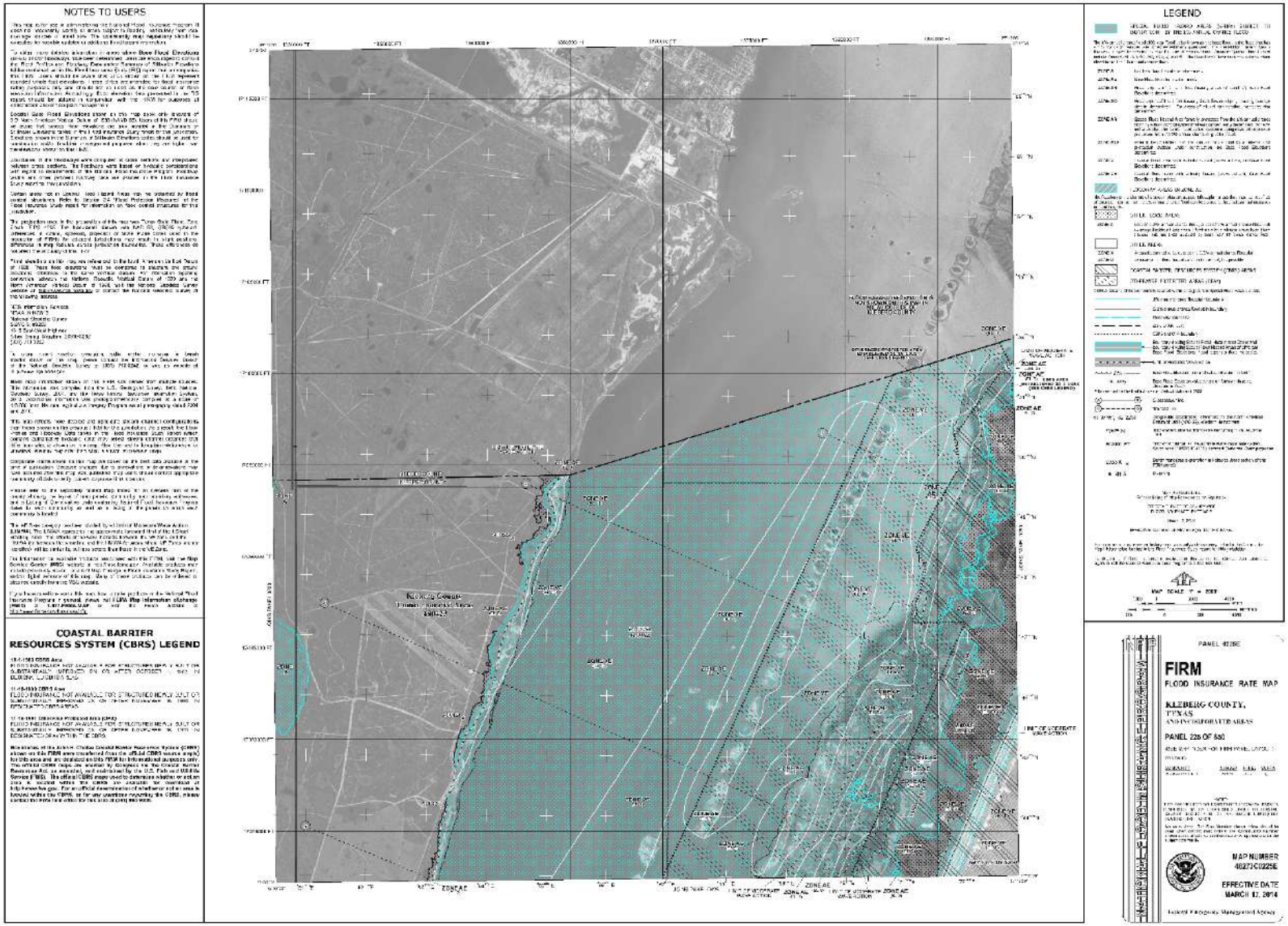
KLEBERG COUNTY, TEXAS AND INCORPORATED AREAS
PANEL 200 OF 650
MAP NUMBER 48273C0200E
EFFECTIVE DATE MARCH 17, 2014
Federal Emergency Management Agency


NOTES TO USERS
COASTAL BARRIER RESOURCES SYSTEM (CBRS) LEGEND
LEGEND
FIRM
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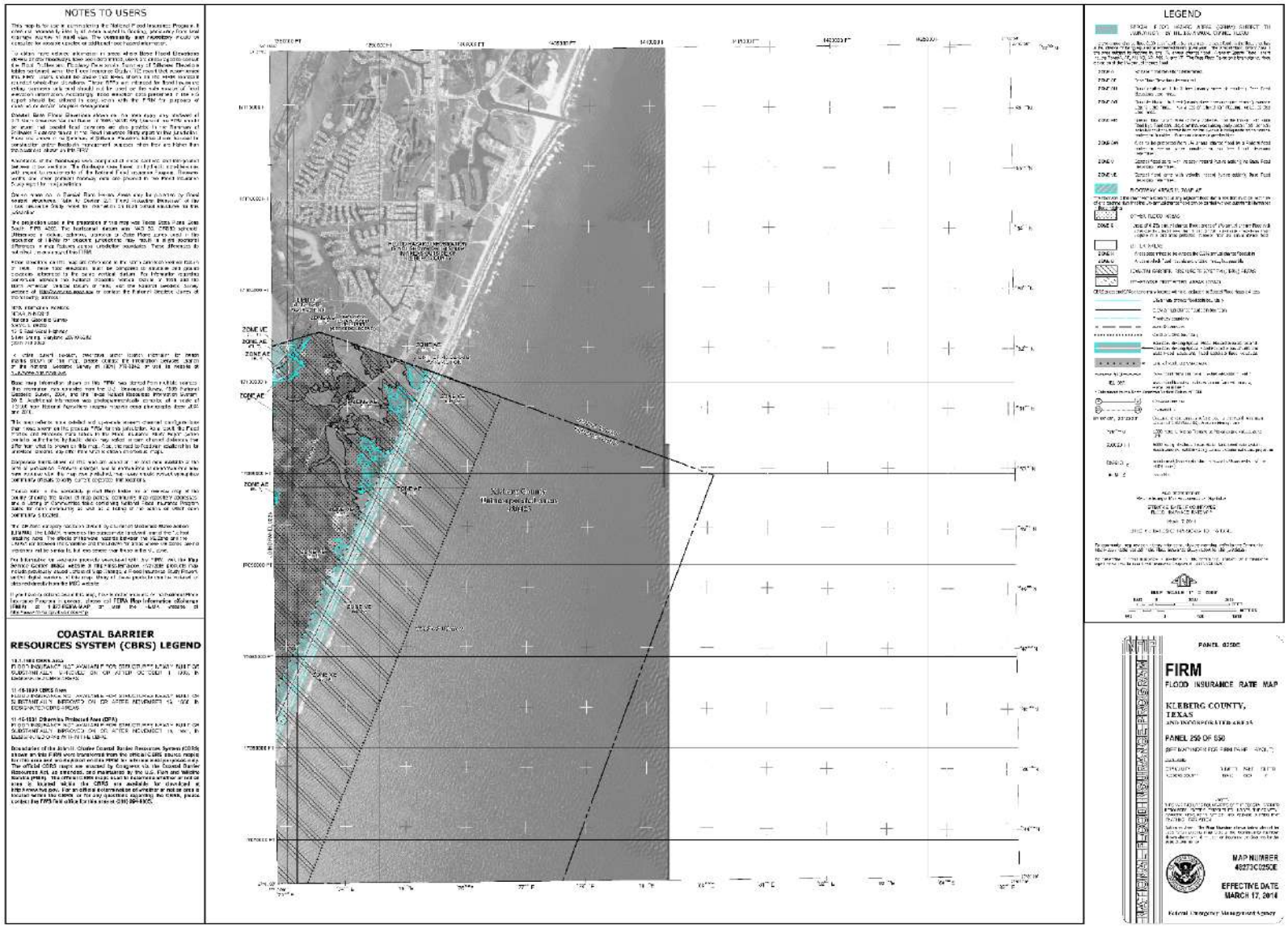
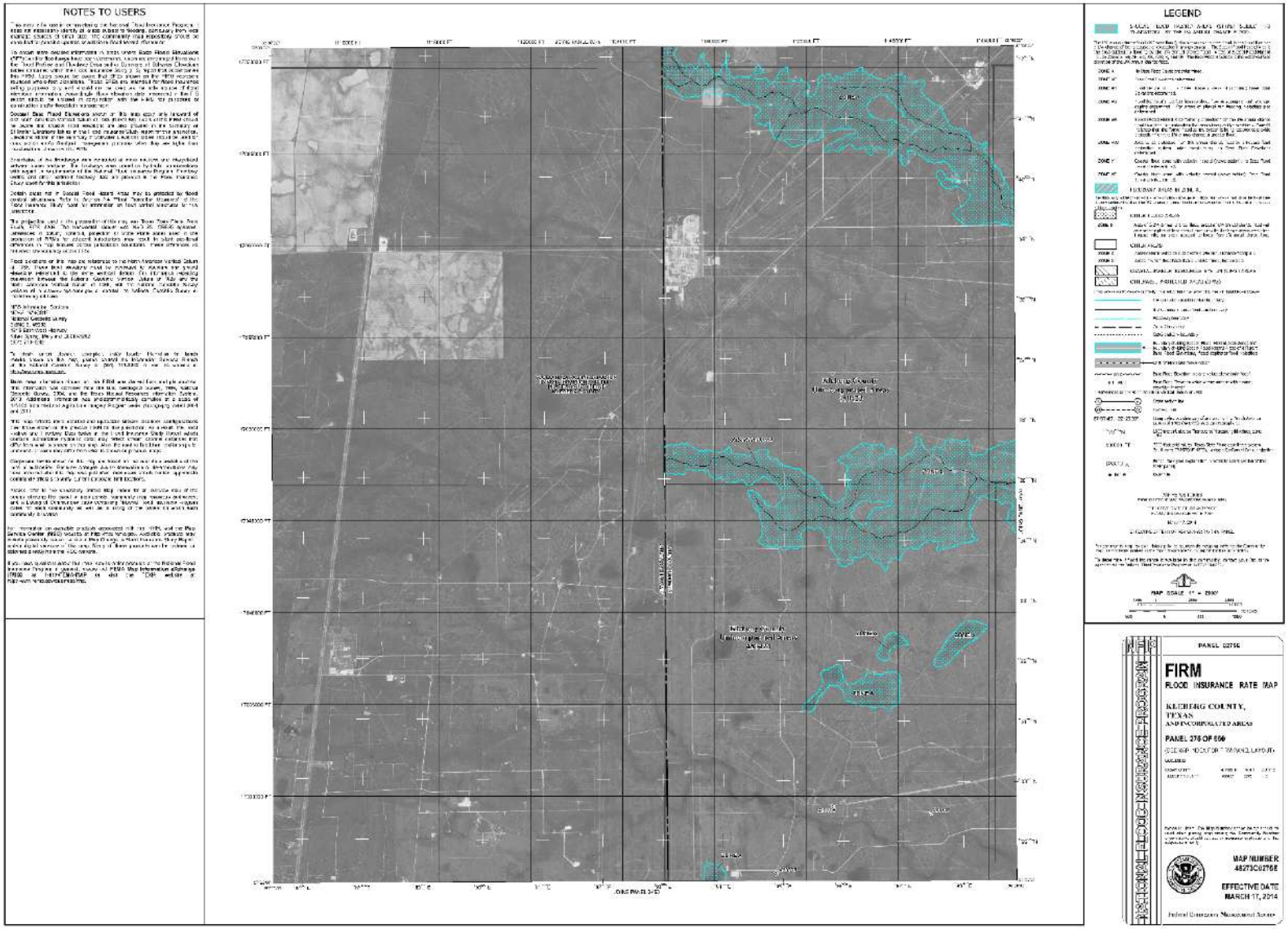
KLEBERG COUNTY, TEXAS AND INCORPORATED AREAS
PANEL 225 OF 650
MAP NUMBER 48273C0225E
EFFECTIVE DATE MARCH 17, 2014
Federal Emergency Management Agency


NOTES TO USERS
COASTAL BARRIER RESOURCES SYSTEM (CBRS) LEGEND
LEGEND
FIRM
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY, TEXAS
AND INCORPORATED AREAS
PANEL 250 OF 650
MAP NUMBER
48273C0250E
EFFECTIVE DATE
MARCH 17, 2014
Federal Emergency Management Agency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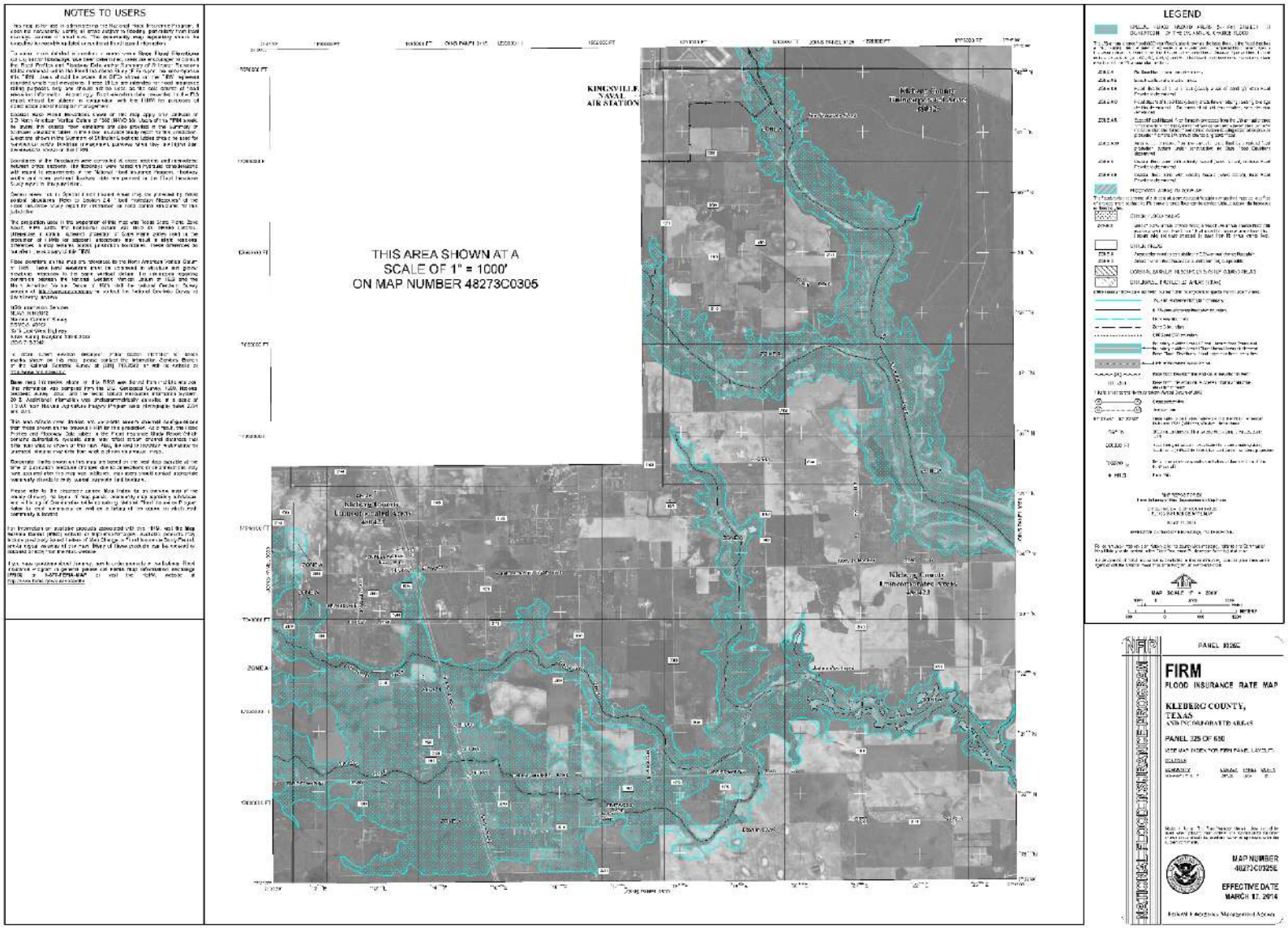
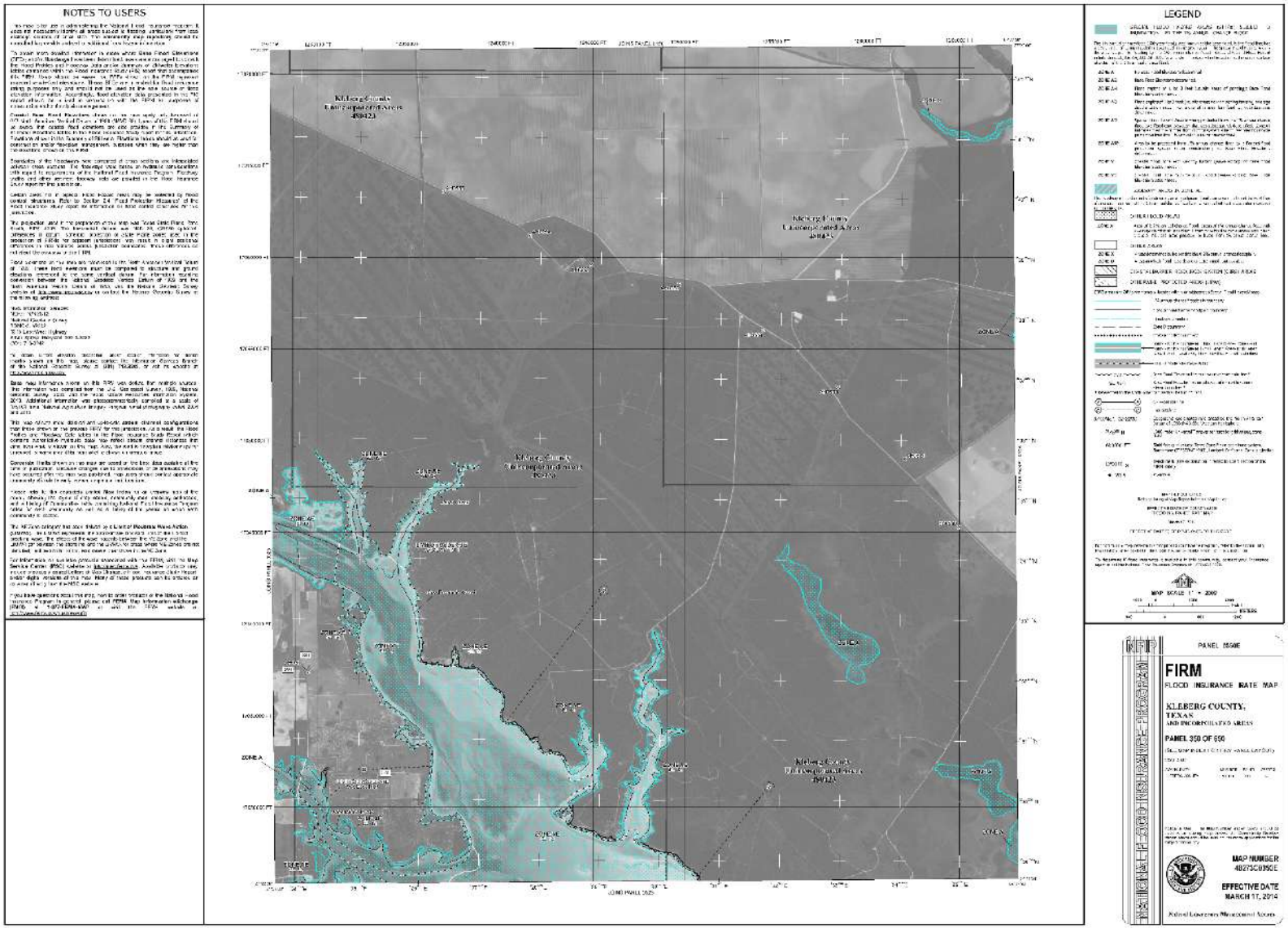
KLEBERG COUNTY, TEXAS AND INCORPORATED AREAS
PANEL 275 OF 600
MAP NUMBER 48273C0275E
EFFECTIVE DATE MARCH 17, 2014


NOTES TO USERS
THIS AREA SHOWN AT A
SCALE OF 1" = 1000'
ON MAP NUMBER 48273C0305
KINGSVILLE
NAVAL
AIR STATION
LEGEND
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY,
TEXAS
AND INCORPORATED AREAS
PANEL 325 OF 650
MAP NUMBER
48273C0325E
EFFECTIVE DATE
MARCH 17, 2014


NOTES TO USERS
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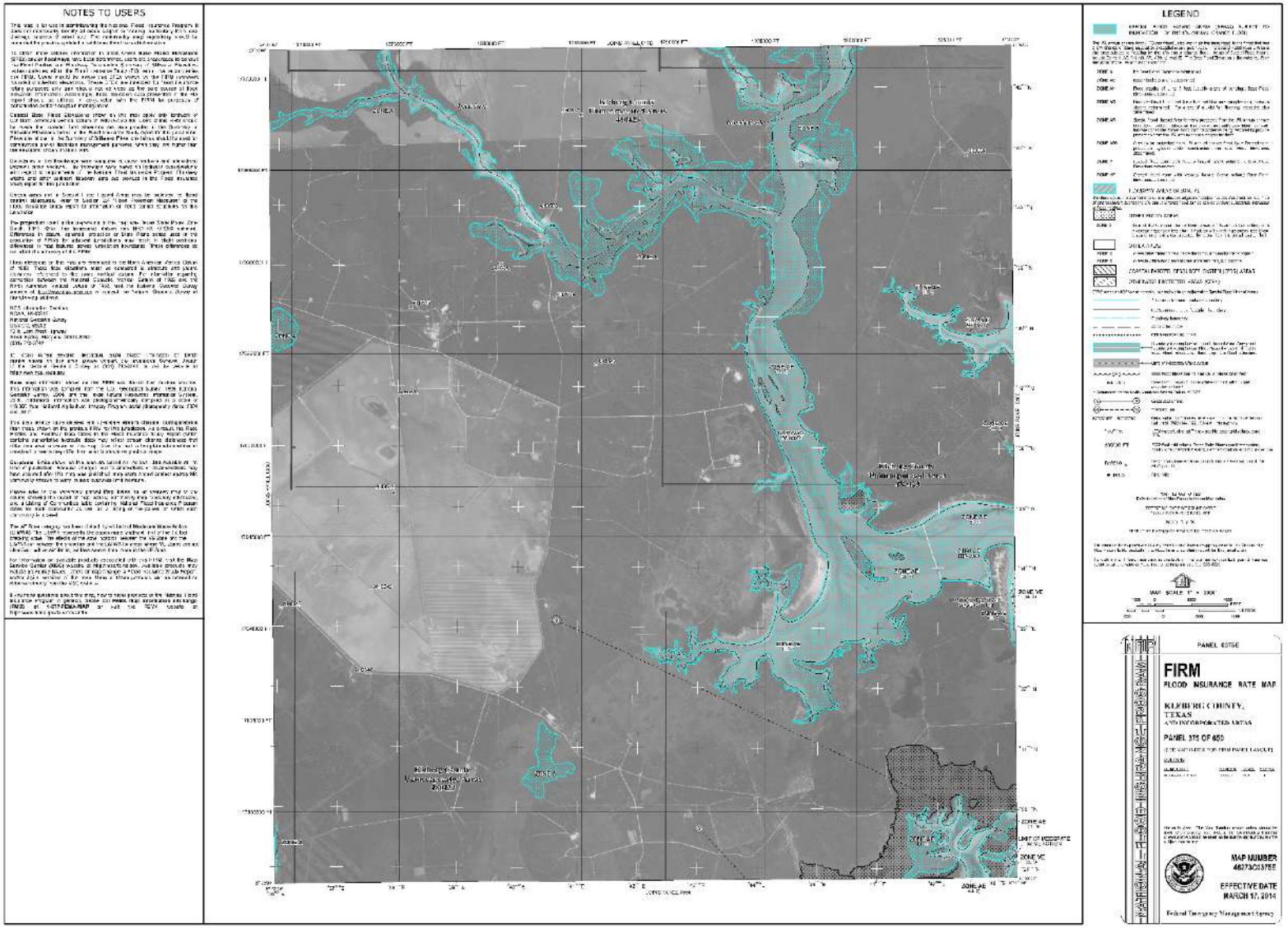
KLEBERG COUNTY, TEXAS
AND INCORPORATED AREAS
PANEL 350 OF 650
MAP NUMBER
48273C0350E
EFFECTIVE DATE
MARCH 17, 2014
NATIONAL FLOOD INSURANCE PROGRAM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AND INCORPORATED AREAS
PANEL 375 OF 650
MAP NUMBER
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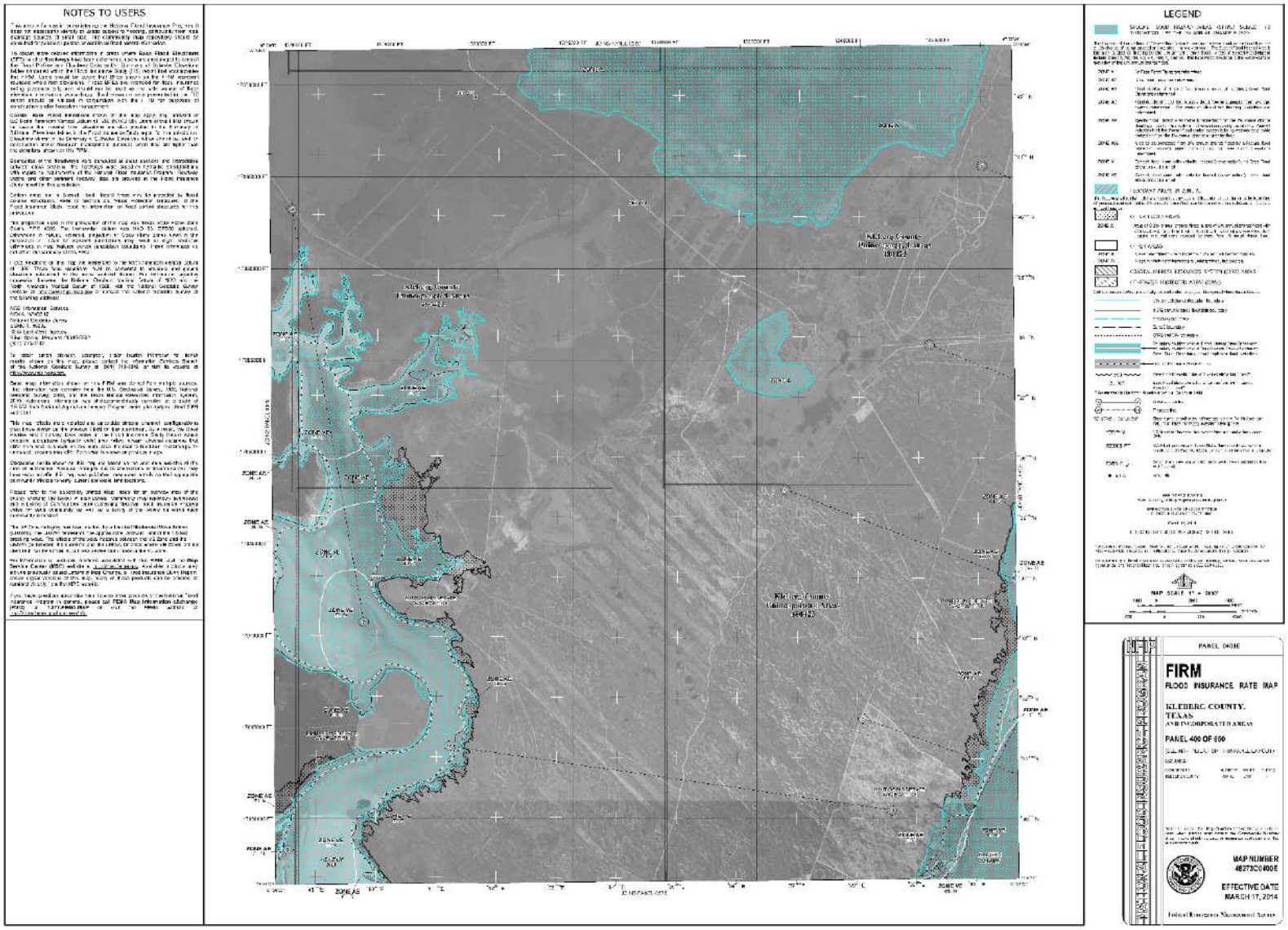
EFFECTIVE DATE
MARCH 17, 2014
Federal Emergency Management Agency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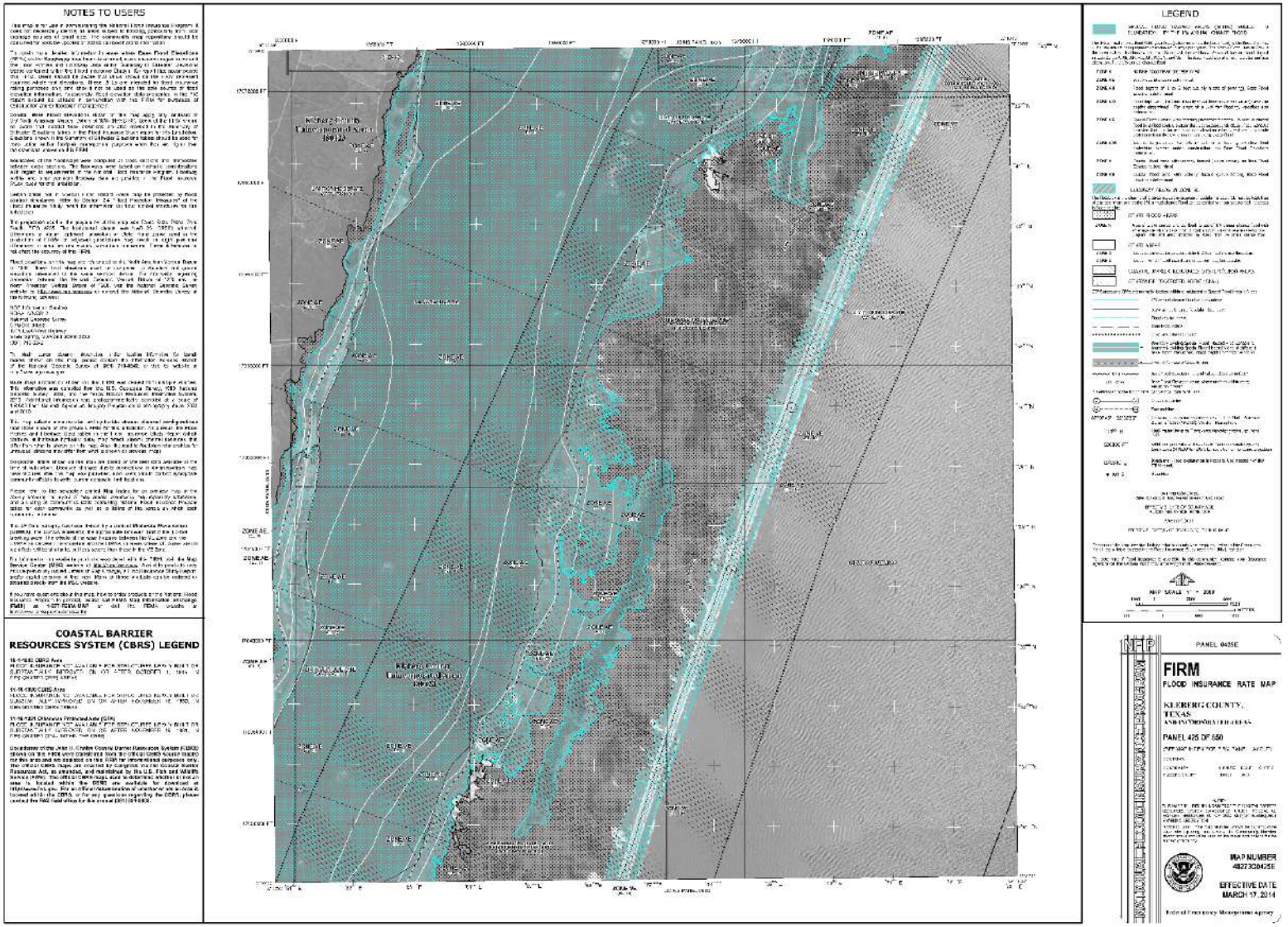
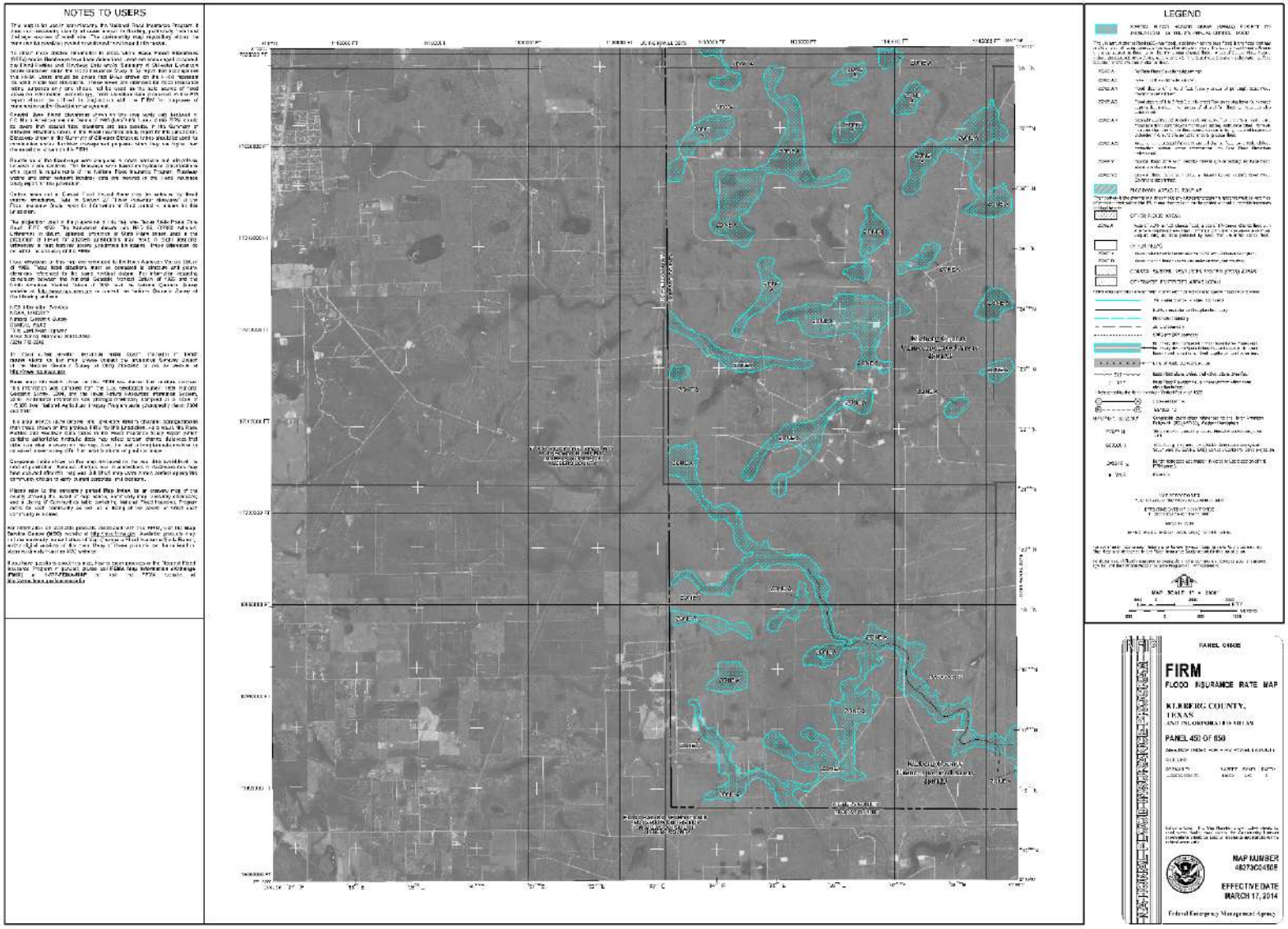
KLEBERG COUNTY, TEXAS
AND INCORPORATED AREAS
PANEL 400 OF 600
MAP NUMBER
48273C0400E
EFFECTIVE DATE
MARCH 17, 2014


NOTES TO USERS
COASTAL BARRIER RESOURCES SYSTEM (CBRS) LEGEND
LEGEND
FIRM
FLOOD INSURANCE RATE MAP
KLEBERG COUNTY, TEXAS AND INCORPORATED AREAS
PANEL 425 OF 650
MAP NUMBER
48273C0425E
EFFECTIVE DATE
MARCH 17, 2014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KLEBERG COUNTY, TEXAS
AND INCORPORATED AREAS
PANEL 450 OF 850
MAP NUMBER
48273C0450E
EFFECTIVE DATE
MARCH 17, 2014
Federal Emergency Management Agency