Frio River Flood in Pleasanton, May 2015

Region 13 – Final Nueces Regional Flood Plan

Texas Water Development Board

January 10, 2023

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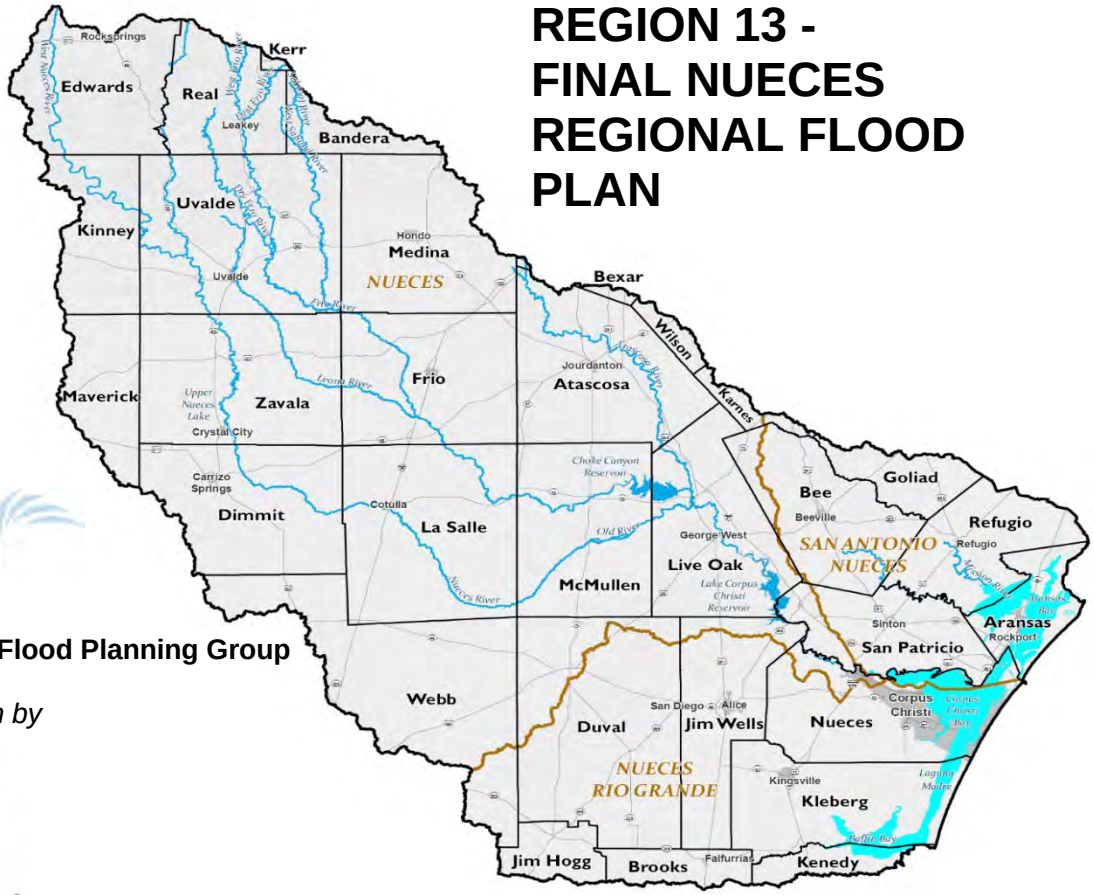
JANUARY 10, 2023

REGION 13 - FINAL NUECES REGIONAL FLOOD PLAN



Prepared for

Texas Water Development Board

Prepared by

Nueces Regional Flood Planning Group

With Administration by

Nueces River Authority

With Technical assistance by

HDR | Freese and Nichols | Blanton & Associates | LRPR Laura Raun Public Relations

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Nueces Regional Flood Planning Group
2023 Final Nueces Regional Flood Plan

Mr. Lj Francis, Chairman*

Mr. Larry Dovalina, Vice- Chairman*

Ms. Shanna Owens, Counties*

Ms. Julie Lewey, River Authorities*

Ms. Debra Barrett, Agriculture*

Unavailable at time of signing

Mr. David Baker, Electric Generating Utilities

Ms. Lauren Hutch- Williams, Environmental

Mr. JR Ramirez, Water Utilities

Mr. Andy Rooke, Small Business

Mr. Larry Thomas, Flood Districts

Mr. Robert Williams, Public

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Voting Members

Member Name	Interest Category	Organization
LJ Francis (Chairman)	Municipalities	Consultant
Larry Dovalina (Vice-Chairman)	Water Utilities	City of Cotulla
Shanna Owens (Secretary)	Counties	San Patricio County DEMS
Julie Lewey	River Authorities	Nueces River Authority
Debra Barrett	Agricultural	Barrett Ag
Lauren Williams	Environmental	The Nature Conservancy
Jeffery Pollack (resigned)	Industries	Port of Corpus Christi
Robert Williams	Public	Mayor, Jourdanton
Andrew Rooke	Small Business	F.B Rooke & Sons
JR Ramirez	Water Utilities	Wintergarden GCD
David Baker	Electric Generating Utilities	City of Hondo
Larry Thomas	Flood Districts	Bandera County River Authority

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Nelda Barrera	Texas Department of Agriculture
Kendria Ray	Texas State Soil and Water Conservation Board
Simone Sanders	General Land Office
Joel Anderson	Texas Commission on Environmental Quality
Patrick McGinn	Liaison to San Antonio RFPG and Rio Grande RFPG
Dave Mauk	Liaison from the San Antonio RFPG

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Region 13- Final Nueces Regional Flood Plan

January 2023

This Regional Flood Plan is released for planning purposes on January 10, 2023, by HDR Engineering, Inc., 8404 Indian Hills Dr., Omaha, NE 68114, Texas Registered Firm F-754 and the following individuals presented below.

Bryan Martin, P.E.
HDR Engineering, Inc.

Kristine S. Shaw, P.E.
HDR Engineering, Inc.

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Acknowledgements

Special thanks to Sky Lewey (1958-2022), who served as Resource Protection and Education Director for the Nueces River Authority for 22 years and was a dedicated member of the Nueces (Region 13) Regional Flood Planning Group. Her dedication and advocacy of river protection, riparian issues, and flood planning leaves a permanent legacy in the Nueces River Basin for which we are truly grateful. Tribute to Sky Jones-Lewey - Wimberley Valley Watershed Association (https://wimberleywatershed.org).

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Nueces River Authority

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Corpus Christi, Texas 78401
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January 10, 2023

Mr. Jeff Walker
Executive Administrator
Texas Water Development Board
Attention: Flood Planning
P.O. Box 13231
1700 North Congress Avenue Suite 610B
Austin, Texas 78701

Re: Submittal of Region 13- Final Nueces Regional Flood Plan

Dear Mr. Walker:

The 2023 Regional Flood Plan for the Nueces Basin Regional Flood Planning Area was approved and adopted at the December 12, 2022 meeting of the Region 13 Regional Flood Planning Group. The Plan was developed in accordance with Texas Water Code and 31 TAC Chapters 361 and 362 and is complete. The technical report and data were prepared in accordance with Executive Administrator specifications and conforms with the guidance principles in 31 TAC 362.3, as discussed in Chapter 10. The Regional Flood Plan adequately provides for the preservation of life and property and the development of water supply sources, where applicable.

The Nueces Regional Flood Planning Group met all requirements under the Texas Open Meetings Act and Public Information Act in accordance with 31 TAC Chapter 357 during development of the 2023 Regional Flood Plan.

Appendix D of the Plan includes all written and oral comments received pursuant to 31 TAC 361.S0(c), including those submitted by TWDB, and responses to each comment including revisions made to the Final Plan or why changes were not warranted.

The following additional materials are submitted with the 2023 Regional Flood Plan, with electronic files uploaded according to TWDB directives:

- Two (2) double-sided hard copies and two (2) electronic copies (one in searchable PDF and one in Microsoft Word format). One (1) electronic copy of files on which the plan is based (e.g., spreadsheets, maps).
- An executive summary that contains less than 20 pages.
- Electronic excel versions using the templates provided by the TWDB in Exhibit C
- A set of Arc-GIS compatible data constituting a single file geodatabase of feature classes.
- Models for each recommended FMP in accordance with TWDB Exhibit D.

Sincerely,

John Byrum
Executive Director, Nueces River Authority

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Table of Contents

Figures

Tables

Appendices

List of Abbreviations

2D	two-dimensional
ACE	annual chance event
ARPA	2021 American Rescue Plan Act
ATSDR	Agency for Toxic Substances and Disease Registry
BCA	benefit-cost analysis
BCR	benefit-cost ratio
BFE	base flood elevation
BIL	Bipartisan Infrastructure Law
BLE	Base Level Engineering
BMP	best management practice
BRIC	Building Resilient Infrastructure and Communities
CAP	Continuing Authorities Program
CCR	Choke Canyon Reservoir
CDBG-DR	Community Development Block Grant – Disaster Recovery
CDBG-MIT	Community Development Block Grant
CDC	Centers for Disease Control and Prevention
CIP	capital improvement project
CTP	Cooperating Technical Partners
CWMS	Corps Water Management System
CWSRF	Clean Water State Revolving Fund
DD	drainage district
DEM	digital elevation model
Dfund	Texas Water Development Fund
DHS	U.S. Department of Homeland Security
EAP	emergency action plan
EAS	Emergency Alert System
EPA	U.S. Environmental Protection Agency
EWP	Emergency Watershed Protection
FAFDS	First American Flood Data Services
FCD	flood control district
FEMA	Federal Emergency Management Agency
FIF	Flood Infrastructure Fund
FIM	flood inundation mapping
FIRM	Flood Insurance Rate Map
FIS	flood insurance study
FMA	Flood Mitigation Assistance
FME	flood management evaluation
FMP	flood mitigation project
FMS	flood management strategy
FRMP	Flood Risk Management Program

FWSD	fresh water supply district
GIS	geographic information systems
GLO	Texas General Land Office
HDR	HDR Engineering, Inc.
HMAP	hazard mitigation action plan
HUC	hydrologic unit code
HUD	U.S. Department of Housing and Urban Development
IIJA	2021 Infrastructure Investment and Jobs Act
HEC-RAS	Hydrologic Engineering Center-River Analysis System
HEC-HMS	Hydrologic Engineering Center-Hydrologic Modeling System
HEC-RTS	Hydrologic Engineering Center-Real Time Simulation
HHPD	Rehabilitation of High Hazard Potential Dam Grant Program
HMGP	Hazard Mitigation Grant Program
IPCC	Intergovernmental Panel on Climate Change
LCC	Lake Corpus Christi
LID	low income development
LOMR	Letter of Map Revision
LOS	level of service
LWC	low water crossing
msl	mean sea level
MUD	municipal utility district
NBI	National Bridge Inventory
NFHL	National Flood Hazard Layer
NFIP	National Flood Insurance Program
NFPR	Nueces Flood Planning Region
NFWF	National Fish and Wildlife Foundation
NOAA	National Oceanic and Atmospheric Administration
NRC	National Research Council
NRCS	Natural Resources Conservation Service
NRFP	Nueces Regional Flood Plan
NRFPG	Nueces Regional Flood Planning Group
NWS	National Weather Service
O&M	operation and maintenance
OCR	off-channel reservoir
PA	Public Assistance
RFC	River Forecast Center
RFP	regional flood plan
RFPG	Regional Flood Planning Group
RSLR	relative sea level rise
SFHA	Special Flood Hazard Area
SFP	state flood plan

SLC	sea level change
SLFRF	State and Local Fiscal Recovery Funds
SLR	sea level rise
STORM	Safeguarding Tomorrow through Ongoing Risk Mitigation
SVI	Social Vulnerability Index
SWCD	soil and water conservation district
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TDA	Texas Department of Agriculture
TDEM	Texas Division of Emergency Management
TFMA	Texas Floodplain Management Association
TNRIS	Texas Natural Resources Information System
TPWD	Texas Parks & Wildlife Department
TSSWCB	Texas State Soil and Water Conservation Board
TWDB	Texas Water Development Board
TxCDBG	Community Development Block Grant Program for Rural Texas
TxDOT	Texas Department of Transportation
UWCD	Underground Water Conservation District
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
WCID	water control and improvement district
WRDA	Water Resource Development Act

Executive Summary

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Executive Summary

ES.1 General Description of the Region

In 2019, the Texas Legislature adopted changes to the Texas Water Code Section (§)16.061 that established the regional and state flood planning process. Regional flood plans (RFPs) for 15 flood planning regions across the state will be compiled in the 2024 state flood plan (SFP). The SFP will be updated every five years. The Texas Water Development Board (TWDB) is charged with overseeing the development of the regional and state flood plans. The RFPs are due to TWDB by January 10, 2023.

TWDB appointed a regional flood planning group (RFPG) for each region and provided them funding to prepare their regional plans. The Nueces River Authority is the sponsor for the Nueces regional flood plan (NRFP). HDR Engineering (HDR) is the technical consultant for the NFPR flood planning effort. The Nueces Regional Flood Planning Group (NRFPG) is comprised of stakeholders from various interest groups, which include the public, counties, municipalities, industries, agriculture, environment, small business, electric-generating utilities, river authorities, water districts, water utilities, and flood districts. The members of the NRFPG for the first flood planning cycle are listed in Table ES-1 and Table ES-2.

Table ES-1. NRFPG Voting Membership

Member Name	Interest Category	Organization
LJ Francis (Chairman)	Municipalities	Consultant
Larry Dovalina (Vice-Chairman)	Water Utilities	City of Cotulla
Shanna Owens (Secretary)	Counties	San Patricio County DEMS
Julie Lewey	River Authorities	Nueces River Authority
Debra Barrett	Agricultural	Barrett Ag
Lauren Williams	Environmental	The Nature Conservancy
Jeffery Pollack (resigned)	Industries	Port of Corpus Christi
Robert Williams	Public	Mayor, Jourdanton
Andrew Rooke	Small Business	F.B Rooke & Sons
JR Ramirez	Water Utilities	Wintergarden GCD
David Baker	Electric Generating Utilities	City of Hondo
Larry Thomas	Flood Districts	Bandera County River Authority

Table ES-2. NRFPG Non-Voting Membership

Member Name	Agency
Tressa Olsen	Texas Water Development Board
Jim Tolan	Texas Parks and Wildlife Department
Brian Hurtuk	Texas Division of Emergency Management
Nelda Barrera	Texas Department of Agriculture
Kendria Ray	Texas State Soil and Water Conservation Board
Simone Sanders	General Land Office
Joel Anderson	Texas Commission on Environmental Quality
Patrick McGinn	Liaison to San Antonio RFPG and Rio Grande RFPG
Dave Mauk	Liaison from the San Antonio RFPG

This RFP has been developed according to 39 guiding principles per Texas Administrative Code (TAC) 362.3. The overarching goal of the RFP is “to protect against the loss of life and property”. A detailed summary of how this RFP specifically addresses each guiding principle is included in Chapter 10.

The NFPR, also referred to as Region 13, encompasses the entirety of the Nueces River basin and borders the San Antonio River basin (Region 12) to the north and the Lower Rio Grande basin (Region 15) to the south (See Figure ES-1). The planning area spans 24,094 square miles and is diverse in nature. The basin includes five of the 10 major ecosystems identified in Texas and is primarily represented by the south Texas plains ecosystem with the Edwards Plateau dominant in the upper basin and the gulf prairies and marshes dominant along the coast. The major water bodies are represented by Nueces River and its principal tributaries of the Frio and Atascosa rivers. Nueces River feeds into Corpus Christi Bay. The basin includes two major reservoirs, Choke Canyon and Lake Corpus Christi.

The NFPR was sub-divided into four subregions to facilitate stakeholder engagement amongst the basin’s varying geographic areas (see Figure ES-2).

The planning area includes 31 counties, 57 municipalities, and 50 other government entities. The basin is largely rural in nature with a population of 1,140,000 in 2020. Corpus Christi is the major population center in the basin with a population of 325,000 in 2020. Other nearby population centers include Laredo and San Antonio. The region is expected to grow to 1,516,000 or by 33% between 2020 and 2050. This growth is anticipated to be focused near the major population centers of Corpus Christi, Laredo, and San Antonio.

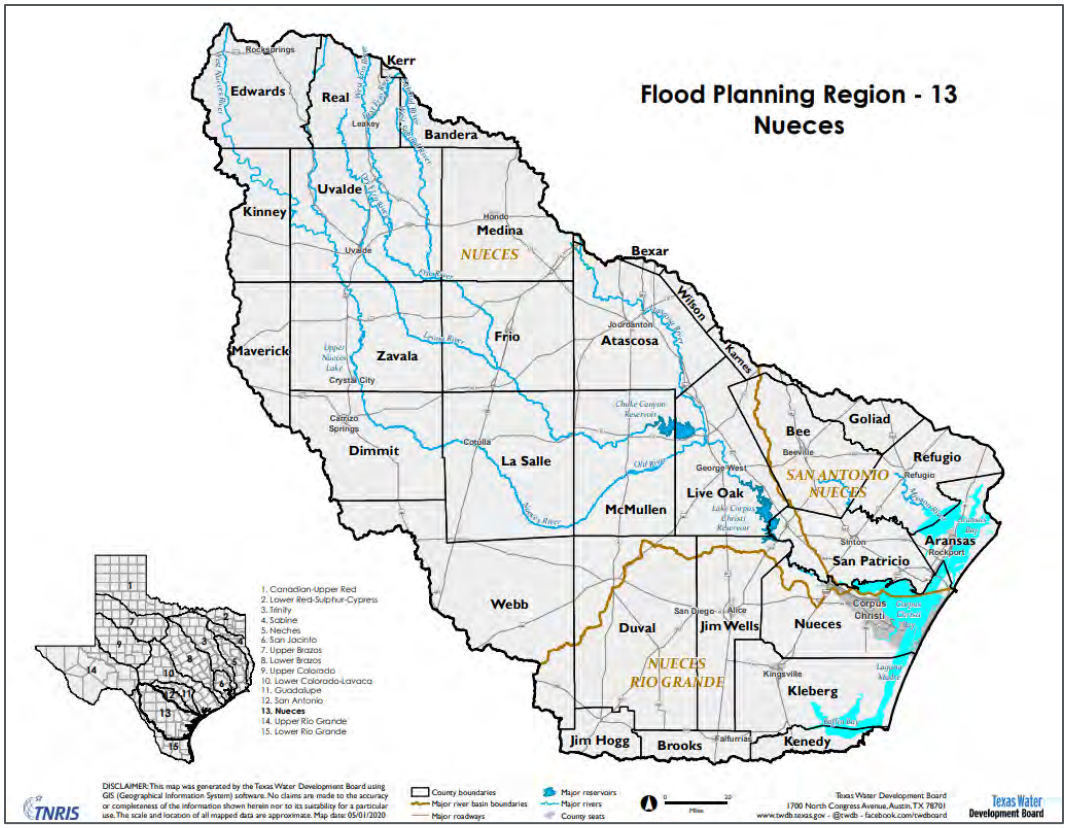


Figure ES-1. Nueces (Region 13) Flood Planning Region

Existing Infrastructure Assessment

The NRFP collected information on natural features and constructed major infrastructure and added this information to a geographic information system (GIS) geodatabase. This infrastructure was assessed as functional, non-functional, and deficient. Multiple dams were identified as non-functional (14) or deficient (22) per TCEQ Dam Safety program. One stormwater pump station in Aransas Pass assessed as non-functional. Being the first RFP, the condition of most constructed major infrastructure is still unknown and will be further described and assessed in future RFPs.

ES.2 Flood Risk Analysis

The flood plan determined the existing and future condition flood risk. The total flood risk is comprised of three components: hazard, exposure, and vulnerability. Hazard defines the location, magnitude, and frequency of flooding. Exposure defines who and what might be harmed. Vulnerability identifies vulnerable communities and critical facilities.

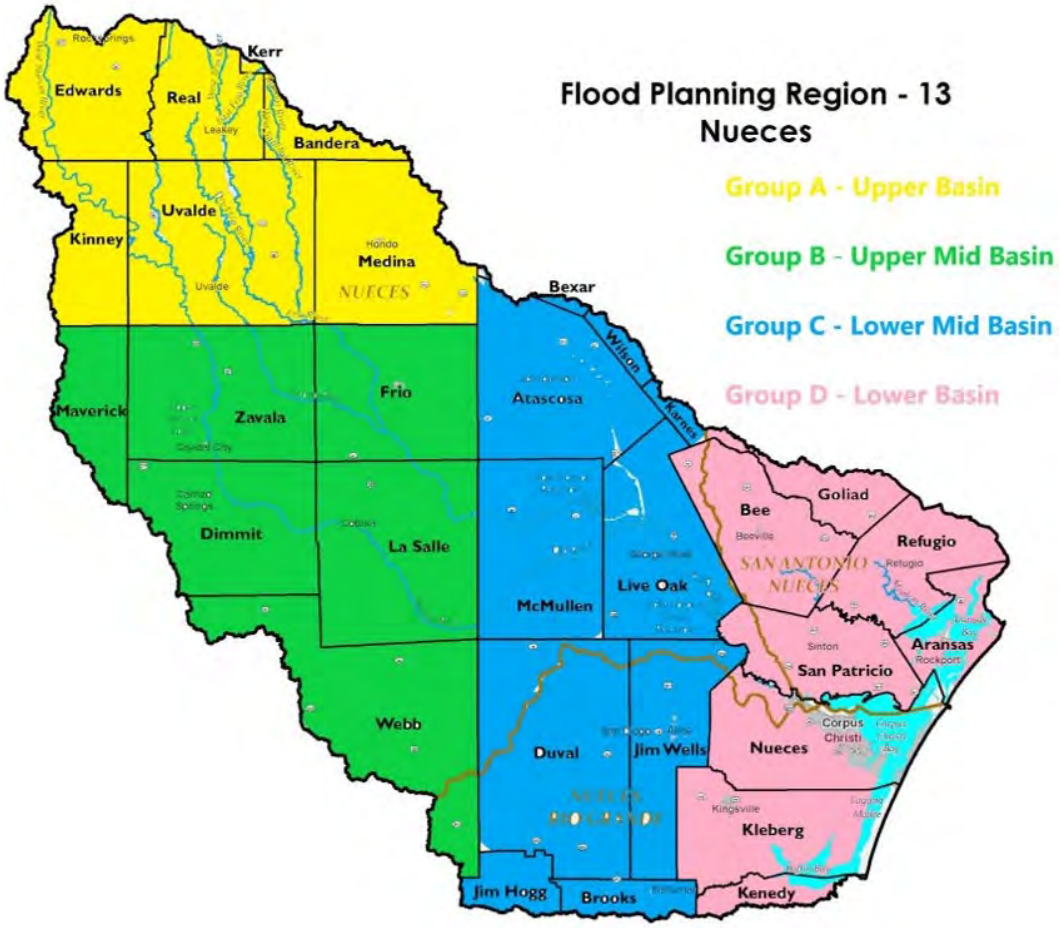


Figure ES-2. Nueces Flood Planning Area and Sub-Regions

Flood Hazard

The flood hazard is defined as the 1% and 0.2% annual flood risk inundation boundaries (i.e., 100-year and 500-year storm event floodplains) and known flood-prone areas. In total, 4,578 or 19.0% of all land in the basin is at risk of the 1% annual chance flood inundation in existing conditions with 71% of the 1% inundation occurring as the result of riverine flooding. This risk grows to 5,865 square miles or 24.3% of all land in the basin, for the 0.2% annual chance flood inundation.

Inundation Boundary Models

The flood inundation boundaries are defined for the entire region using best available data, including detailed and approximate modeling and mapping data. Detailed models used for inundation mapping include National Flood Hazard Layer (NFHL), Letters of Map Revision (LOMRs), and other project specific models. Other detailed models available and used for flood warning purposes include the U.S. Army Corps of Engineers' (USACE) Nueces and San Diego models and the U.S. Geological Survey's (USGS) Sabinal model. However, most of the basin is based on approximate data. Approximate flood inundation boundary data includes Base Level Engineering (BLE),

NFHL approximate, First American Flood Data Services (FAFDS), and Draft Cursory Floodplain Data. BLE is estimated to be available for the entire basin by 2023 per the TWDB BLE status viewer. See Figure ES-3 for source of flood inundation boundaries used in the NRFP.

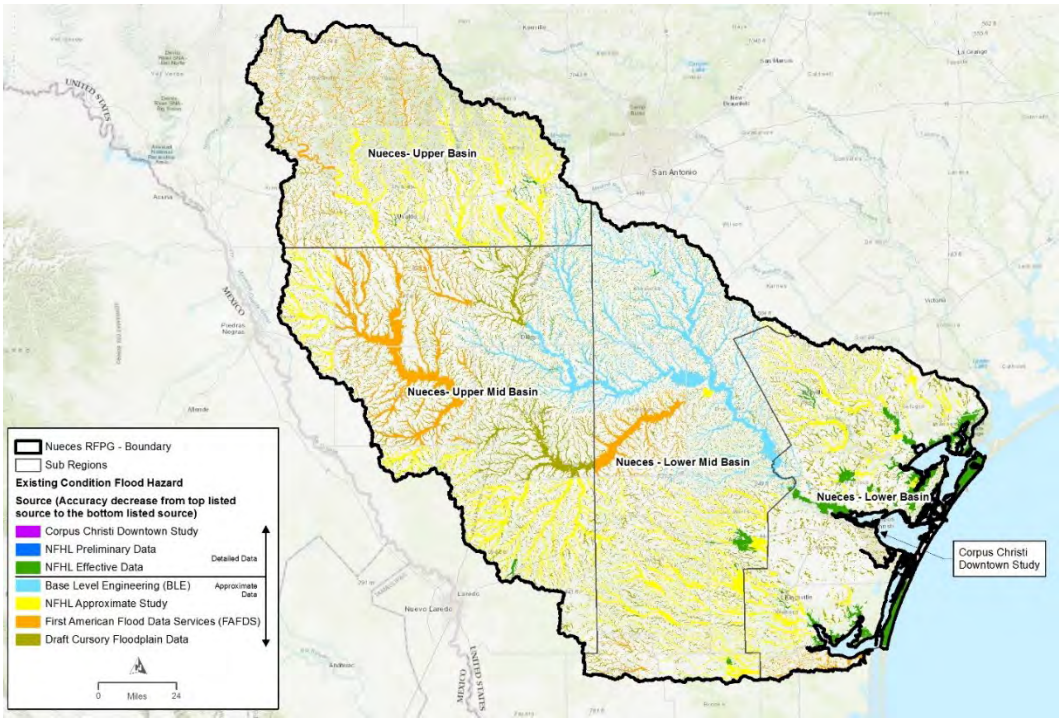


Figure ES-3. Source of Flood Modeling and Mapping Data (Map 5A)

Inundation Boundary Gaps

Many areas of the basin had no floodplain inundation maps (La Salle and Frio counties) prior to the regional flood planning efforts. Many other areas have potentially inaccurate or old mapping performed prior to 2010 (Edwards, Real, Kinney, Zavala, Dimmit, McMullen, Jim Hogg, and Kenedy). Other areas have mapping based on old rainfall data that differs from new rainfall data by more than 30% (Maverick, Uvalde, Bandera, Medina, Webb, Bee, Brooks, and Goliad). See Figure ES-4 for inundation boundary gaps.

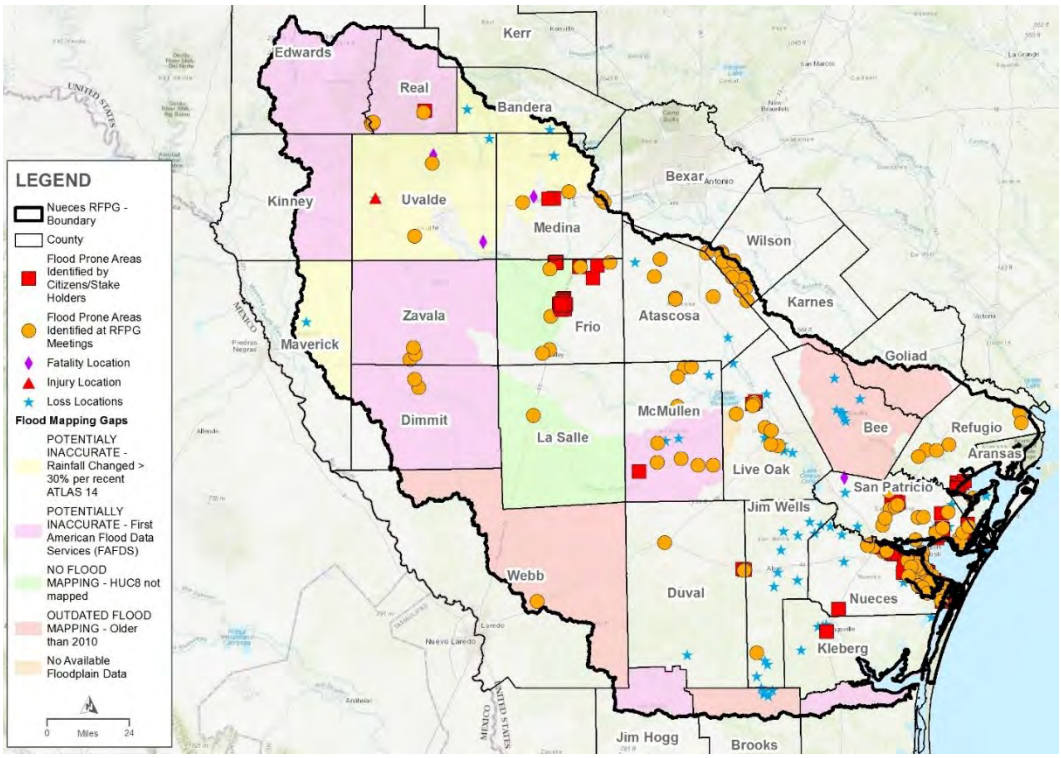


Figure ES-4. Inundation Boundary Gaps and Known Flood Prone Areas (Map 5C)

Additional Known Flood-Prone Areas

Additional known flood-prone areas were determined from historical flood data, local knowledge, and from low water crossing (LWC) data obtained from the Texas Natural Resources Information System (TNRIS). This data is depicted on a per county basis in Appendix B23 – Flood Hazard Risk, Flood Risk Score, and Recommended Flood Mitigation Actions.

- Historical data was gathered from the USGS, National Weather Service (NWS), and the Federal Emergency Management Agency (FEMA), and included information on property damage, fatalities, and injuries because of flooding. The most damaging flood event in the Nueces Basin was Hurricane Harvey, which caused $4.3 billion in damages in 2017.
- Local knowledge of flood-prone areas was obtained through public and stakeholder outreach, which involved posting an interactive online public comment map on the Nueces River Authority's Region 13 website, holding four subregional meetings during May of 2021, and performing additional outreach in February and March of 2022 where three subregional meetings and 20 interviews with stakeholders were held. The available flood hazard information was made available to the public at the June 28, 2021, NRFPG meeting to identify additional flood hazards that may not have been identified in the initial maps. A total of 274 flood-prone points from local knowledge were obtained for use in the NRFP (see Figure ES-5).

- Approximately 576 LWCs were identified from various sources but predominately from TNRIS LWC data.

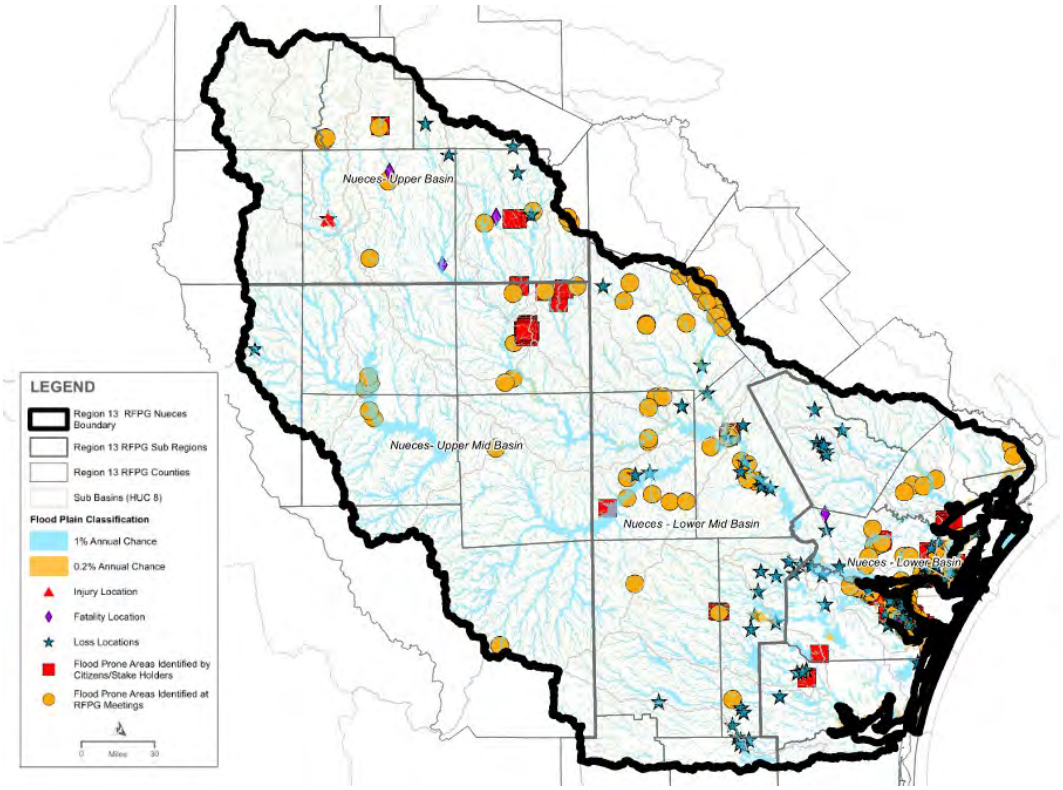


Figure ES-5. Additional Known Flood-Prone Areas

Future Condition Analysis

A future condition flood risk analysis was performed to approximate the flood hazard extents projected in 30 years' time, or the year 2050, based on a "no-action" scenario. In future conditions, an additional 51 square miles of land or 4,629 square miles (19.2% of all land in basin) is anticipated to be at risk of the 1% annual chance flood inundation as compared to existing conditions. This total grows to 5,912 square miles (24.5% of all land in basin) for the 0.2% annual chance flood inundation.

Inland Future Condition

Population growth over the next 30 years is considered a significant factor in the future conditions flood risk for the Nueces Region's riverine systems. A horizontal floodplain buffer was applied for areas with projected high growth, which for this flood plan were limited to areas surrounding cities and other concentrated populated areas.

Coastal Future Condition

Relative sea level rise is also considered a significant factor in the future condition flood risk along the coastline. Based on best available data from the National Oceanic and Atmospheric Administration's (NOAA) Global & Regional Sea Level Rise Scenarios for

the United States (2022 update), a 1.1-foot relative sea level rise was adopted by the region on June 27, 2022, for the 2050 relative sea level rise condition. This sea level rise will be used to apply an appropriate horizontal buffer for the existing 1% annual chance (100-year) and 0.2% annual chance (500-year) storm event flood inundation boundaries. Due to timing, the future coastal conditions were not applied in this draft plan but will be implemented in the revised plan.

Exposure Flood Analyses

In existing conditions, 61,000 structures, a population of 137,000, 3,200 miles of roadway, 5,400 roadway crossings, and 390 square miles of agricultural land are at potential risk of flooding from the 1% annual chance storm event. In future conditions, this risk is anticipated to grow to 78,000 structures, a population of 191,000, 3,500 miles of roadway, 5,500 roadway crossings, and 400 square miles of agricultural land. However, this does not include the potential for construction of new structures built in the floodplain in areas with unregulated development in the floodplain.

Hot spots for structural flooding in both the existing and future conditions include (1) the City of Corpus Christi, including Robstown; (2) the Rockport, Ingleside, and Port Aransas area; (3) cities in the lower basin, including Alice, Sinton, Kingsville, Falfurrias, and Beeville; (4) areas along the Nueces River from the City of Three Rivers to Corpus Christi; and (5) cities in the upper basin, including Crystal City, Knippa, D'Hanis, Uvalde, Hondo, Pearsall, Devine, Sabinal, and Dilley. Flood exposure for existing conditions is shown in Figure ES-6.

Vulnerability Analysis

Social Vulnerability Index (SVI) values from the Centers for Diseases Control and Prevention (CDC) were used to identify communities that may be less resilient and need more support before, during, or after disasters. SVI values were provided for all structures located in the region and an evaluation undertaken to determine where vulnerable structures are at flood risk in the basin. Additionally, the location of critical facilities at risk of flooding was also evaluated. Critical facilities include schools, hospitals, police stations, and fire stations. The analysis determined that 430 critical facilities are at risk of 1% annual chance storm event flood inundation. This increases to 560 critical facilities at risk in the future condition. Hot spots for structural flooding in vulnerable areas is shown in Figure ES-7. Not all hot spots for flood exposure are also hot spots for flood vulnerability, as some areas are considered more resilient. The most vulnerable areas to flood risk in both existing and future conditions are Corpus Christi, Robstown, Alice, and Crystal City. Other vulnerable areas to flood risk include Kingsville, Sinton, Falfurrias, Dilley, Pearsall, Devine, Uvalde, and Knippa.

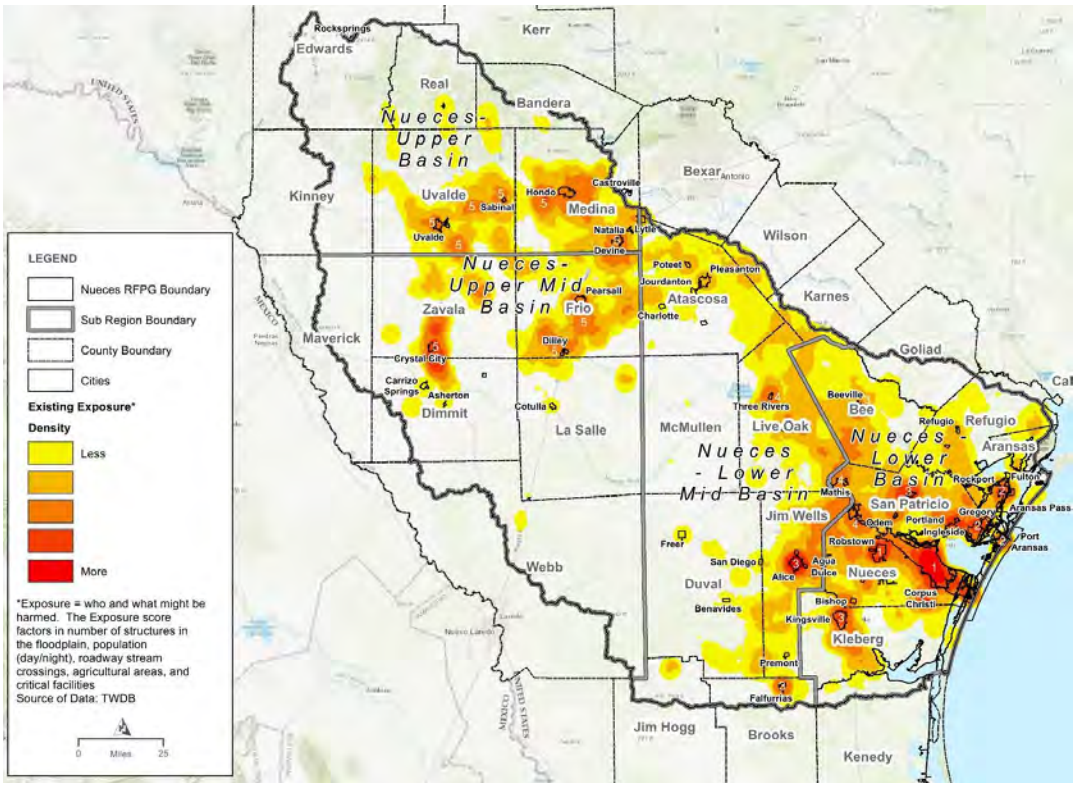


Figure ES-6. Existing Condition Exposure Heat Map (Map 6)

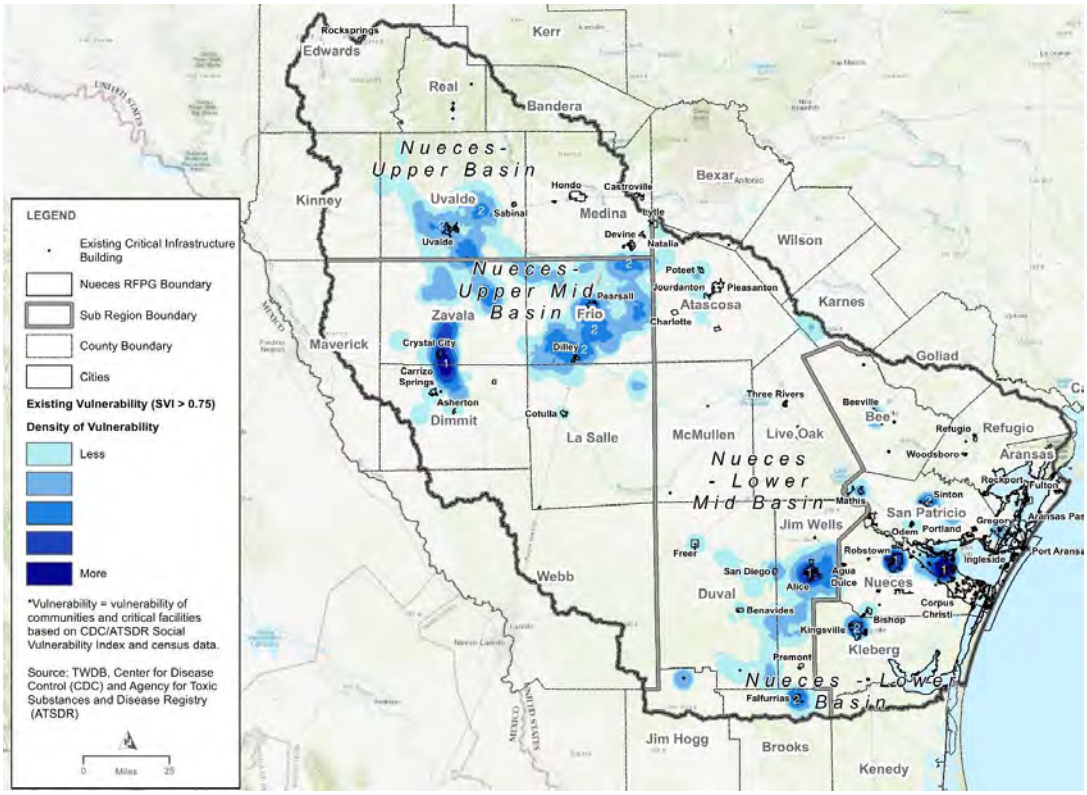


Figure ES-7. Existing Condition Vulnerability Heat Map and Location of Critical Infrastructure (Map 7)

ES.3 Floodplain Management Practices and Flood Protection Goals

Evaluation and Recommendation on Floodplain Management Practices

One of the goals of the NRFP is to evaluate and make recommendations on forward-looking floodplain management, land use, and economic practices. These practices play a key role in preventing the creation of additional flood risk in the future.

Extent of Local Regulations and Development Codes

A survey of entities with flood-related authority was conducted during the regional flood planning and confirmed 13 of 31 counties (42%) and 12 of 57 cities (21%) have floodplain management regulations. Of these, 11 counties and 11 cities were found to have moderate or strong floodplain management practices and enforcement (see Figure ES-8).

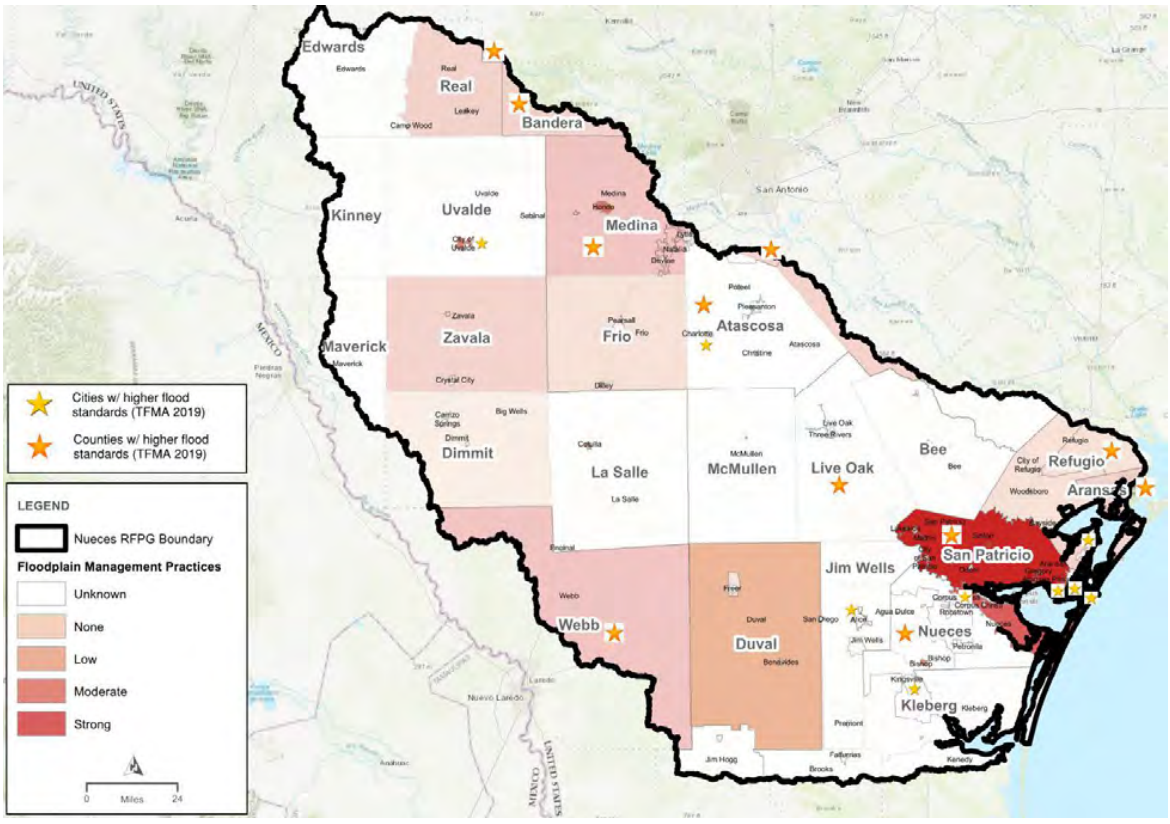


Figure ES-8. Degree of Floodplain Management Standards (Map 13)

Most entities with flood-related authority have minimum floodplain management regulations while adoption of higher floodplain management standards is less common. These elements are discussed further below.

Minimum Floodplain Management Standards

Minimum floodplain management regulations include compliance with Texas Water Code § 16.3145 and FEMA's National Flood Insurance Program (NFIP) participation. Section 16.3145 requires the adoption of necessary ordinances or orders for a city or county to be eligible for participation in the NFIP. NFIP participation is a wide-spread practice in the Nueces Basin with 85 of 86 reporting cities and counties participating.

Higher Floodplain Management Standards

Higher floodplain management standards can include an assortment of practices to further reduce flood risk above and beyond minimal standards. The Texas Floodplain Management Association (TFMA) produced a guide for higher standards in 2018 that describes 32 higher standard practices that, if implemented, would reduce flood risks. According to the TFMA 2019 higher standard survey, 10 counties and 9 municipalities in the basin have adopted higher standards. This list includes the counties of Aransas, Atascosa, Bandera, Bexar, Kerr, Live Oak, Medina, Nueces, Refugio, and San Patricio and the cities of Alice, Aransas Pass, Charlotte, Corpus Christi, Ingleside, Kingsville, Port Aransas, Rockport, and Uvalde.

Recommended Floodplain Practices

The NRFPG does not have the authority to enact or enforce floodplain management, land use, or other infrastructure design standards. Thus, the NRFPG aims to encourage implementation of recommended floodplain practices by local entities in the region with flood-related authority.

Of the high-standard practices, the implementation of freeboard requirements was listed as the single most effective means for reducing flood risks. Freeboard is the standard for placing the first floor of a structure above the elevation of the calculated 1% annual chance (100-year) storm event flood level to allow for nature's uncertainty and future changes in the watershed that will increase flood levels.

The NRFPG recommends minimum finished floor elevations be set 1 foot above base flood elevations (BFEs; i.e., 1% annual chance storm event flood levels) or above local ordinances, whichever is higher, in the basin. The NRFPG strongly encourages cities and counties in the Nueces Basin to actively consider minimum 2 feet above base flood elevations, consistent with upcoming 2025 FEMA ordinances. Such higher standards build more resilience for the homeowners in the future. The NRFPG did not adopt region-specific minimum floodplain management, land use, or other standards that impact flood-risk that each entity in the flood planning region must adopt prior to inclusion of any of their flood mitigation actions in the regional flood plan.

Implementation of this recommendation along with defining accurate floodplain limits through the development of detailed hydrologic and hydraulic models and mapping in areas of anticipated high development and population growth is the best approach to

address future development and population growth and to limit exposure of new development to the existing and future flood hazard.

Other high-standard practices that should be considered include participation in the NFIP's Community Rating System (CRS), requiring new development to mitigate adverse impacts to other properties throughout the watershed, providing standards and restrictions for the placement of fill or development activity in a floodplain, and the use of setbacks, which limit use/development areas along waterways.

Floodplain mitigation studies in the Nueces Basin are encouraged to consider natural systems and beneficial functions of floodplains, including flood peak attenuation and ecosystem services when identifying projects to reduce flood risk. Flood mitigation design approaches that work together with natural floodplain patterns is advised. Most natural flood mitigation features, including floodplains, are in need of maintenance and can be improved with land use management.

Floodplain Mitigation and Floodplain Management Goals

The regional flood plan developed short- and long-term goals with the objective to protect against the loss of life and property. The short-term goals have a target date of 10 years or 2033 and the long-term goals a target date of 30 years or 2053. These goals identify specific and achievable flood mitigation and floodplain management goals that, when implemented, will demonstrate progress towards the overarching objective to project life and property. The NRFPG formed a sub-committee to discuss floodplain priorities and prepare the goals for NRFPG consideration. The following 10 flood mitigation and floodplain management goals are defined under four major categories.

Protect against loss of life caused by flooding

1. Improve safety at LWCs
2. Reduce risks at high-hazard dams
3. Implement flood warning systems and improve regional data collection

Protect against property damage caused by flooding

4. Perform flood mapping evaluations and update floodplain maps
5. Reduce the number of structures within the 1% annual chance floodplain

Floodplain management

6. Prepare minimum flood management standards
7. Implement nature-based practices through land conservation and restoration programs
8. Develop public information campaign

Funding

9. Increase funding for maintenance of drainage systems
10. Identify funding for community outreach and for permit support

These goals were discussed during the September 27, 2021, NRFPG meeting, and comments received with a public comment period remaining open for 30 days after the meeting. The goals, if implemented, would not remove all potential flood risks and thus residual risks remain.

ES.4 Flood Mitigation Needs Analysis

The regional plan performed an assessment and identified flood mitigation needs. This analysis identified where the greatest flood risk knowledge gaps exist and where known flood risk and flood mitigation needs are located within the NFPR. This analysis resulted in information that guided the identification of recommended flood mitigation actions.

Greatest Flood Risk and Flood Mitigation Needs

The areas of greatest known flood risk and flood mitigation needs in the NFPR are defined as areas with elevated levels of risk to property and life. The level of risk is defined by looking at the location and magnitude of flooding from the 1% (100-year) and 0.2% (500-year) annual chance flood event (flood hazard), who and what may be harmed (flood exposure), and what communities and critical facilities may be vulnerable (flood vulnerability).

An analysis of known flood risk data was performed based on 627 hydrologic unit code (HUC)-12 individual watersheds. The flood risk data related to property damage and life loss risk was evaluated for each watershed in the basin. This included assigning weighting percentages to data on historical property damage, historical life loss, property damage in terms of exposure and vulnerability, and life loss potential at LWCs and downstream of hydraulically inadequate or deficient potential hazardous dams. As a result of this analysis, each watershed was assigned a score of 0 to 5 with no risk represented by a score of zero and the highest risk represented by a score of 5 (see Figure ES-9).

Greatest Flood Risk Knowledge Gaps

The greatest flood risk knowledge gap considered the following three conditions:

- Where the flood inundation boundaries are either not defined or considered inaccurate. Without accurate flood inundation boundaries, the existing flood risk is not well understood; therefore, controlling future risk through floodplain management regulations is difficult. The availability of detailed modeling and mapping in the basin is very limited in the Nueces Basin, as shown in Figure 2-4. Detailed modeling is generally only available for Nueces County, select watersheds along the coast, the City of Cotulla, downtown Corpus Christi, along Nueces River from Corpus Christi up to near Choke Canyon, City of San Diego, and along Sabinal River upstream of Utopia.

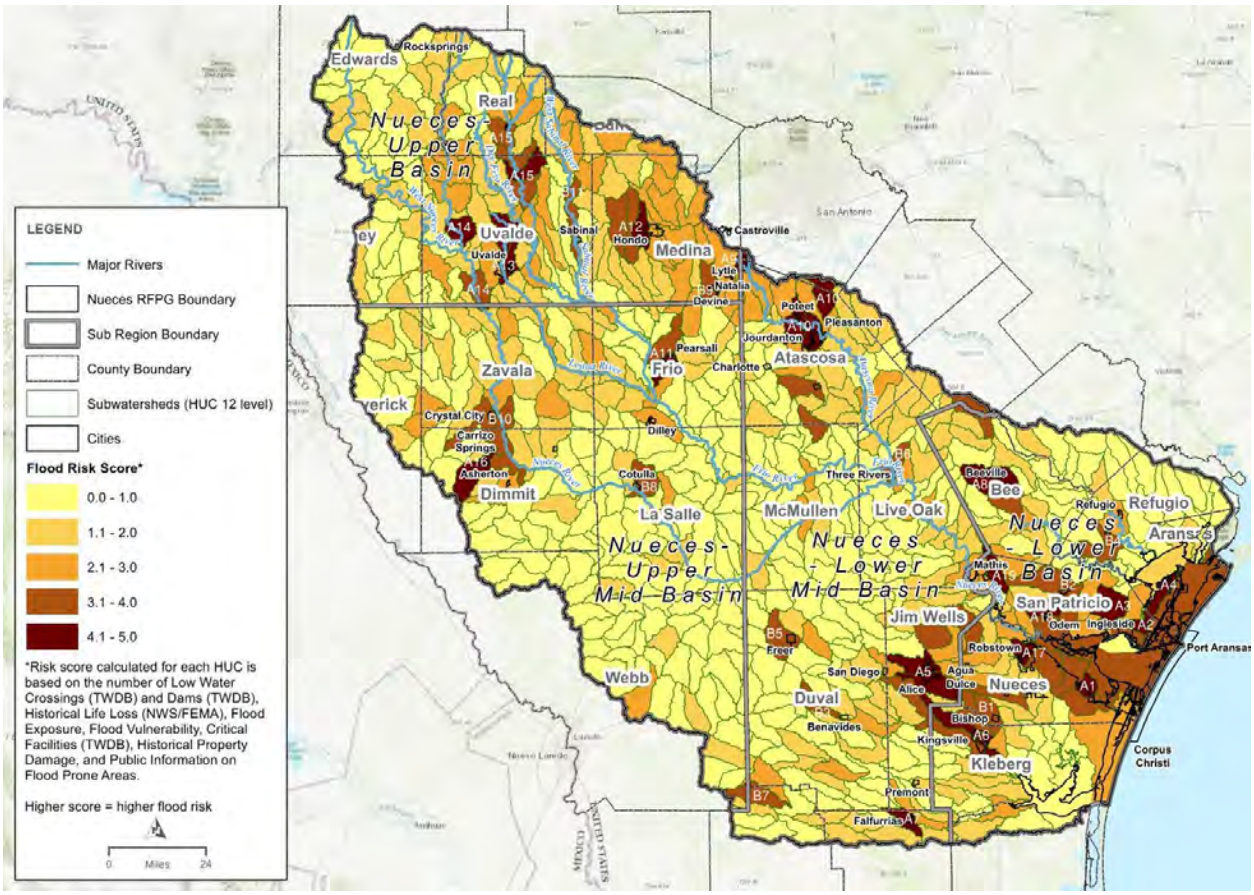


Figure ES-9. Overall Flood Risk per HUC 12 Watershed (Map 15)

- Where flood studies or projects have not occurred in the recent past or are on-going. Flood studies are used to identify existing and future flood risks and often recommend mitigation or corrective solutions to reduce those risks. Without a flood study, it is difficult to implement actionable steps to reduce flood risk. For the NFPR, generally, flood studies have occurred or are occurring for counties near the coast. Major flood studies include the General Land Office (GLO) Regional Flood Study, and various county-wide flood studies for the counties of Duval, San Patricio, Nueces, Jim Wells, Kleberg, and Bee. A list of 93 proposed and on-going flood mitigation projects for cities, counties, and Texas Department of Transportation (TxDOT) were also considered.
- Where flood management practices do not exist or are not effectively enforced. Without effective flood management practices new development activity may place additional property and population in flood hazard areas. There are many potential gaps in flood management practices, as shown in Figure 3-1. Moderate to strong floodplain practices tend to be prevalent for entities with flood-related authority located near the high growth areas of Corpus Christi, Laredo, and San Antonio.

These three gap considerations were overlaid with the areas of greatest known flood risk and flood mitigation needs as shown in Figure 4-3, Figure 4-4, and Figure 4-5. Then the greatest flood risk areas were listed in Table 4-2 with indication of whether the areas are located within exposure/vulnerability hot spots and the three knowledge gap areas. This table summarizes the greatest flood mitigation needs in the basin and can be used to prioritize future investments in detailed hydrologic and hydraulic models, flood studies, and enhancement of flood management practices.

ES.5 Identification, Evaluation, and Recommendation of Flood Mitigation Actions

The regional flood planning efforts identified, evaluated, and recommended flood management actions, which include flood mitigation projects (FMPs), flood management evaluations (FMEs), and flood management strategies (FMSs). Flood management actions were identified to reduce the risk identified in the existing and future condition flood risk analyses, to address flood mitigation and floodplain management goals, and to address the greatest flood risk and flood mitigation needs.

An FME is a proposed flood study of a specific, flood-prone area that is needed to assess flood risk and/or determine whether there are potentially feasible FMSs or FMPs. An FMP is a proposed project, either structural or non-structural, that has non-zero capital costs or other non-recurring costs and, when implemented, will reduce flood risk and mitigate flood hazards to life or property. Identifying FMPs is one of the primary objectives of the NRFP. A FMS is a proposed plan to reduce flood risk or mitigate flood hazards to life or property and typical includes flood mitigation education and outreach, buyout programs, and flood management regulations.

Identification of Flood Mitigation Actions

The NRFPG developed a proposed process to identify and select flood mitigation actions. The process was developed by a subcommittee and presented and approved by the NRFPG at the September 27, 2021, regional flood planning meeting. To identify flood mitigation actions, a review of previous relevant flood studies was conducted, stakeholder outreach was conducted, and an evaluation performed to determine additional studies needed to address the greatest known flood risk, flood mitigation needs, and unmet floodplain mitigation and floodplain management goals. A list of 14 prior relevant studies were reviewed, which included many regional hazard mitigation action plans and other flood-related master plans. Stakeholder outreach included subregional meetings in May 2021, additional subregional meetings in March 2022, and individual stakeholder interviews in February through April of 2022. Overall, a total of 243 flood mitigation actions were identified and determined to meet TWDB requirements, of which four are FMPs, 179 are FMEs, and 60 are FMSs. The lower

basin represents most flood mitigation actions and comprises 118 of the total 243 flood mitigation actions identified.

Areas identified as high risk but lacking flood studies or projects, mapping, and floodplain management to address the flood risk include City of Falfurrias, City of Pearsall, City of Devine, and Crystal City.

Recommended flood studies to address goals included basin-wide studies of LWCs, basin-wide identification of high hazard dams and risk assessment, basin-wide early flood warning system, floodplain map updates for areas of high need, a strategy to address basin-wide minimum flood management standards, an assessment of flood mitigation and performance of nature-based solutions, a study on scaling up nature based solutions in the basin to support community resilience and enhance flood and hazard mitigation planning, and a basin-wide flood public information campaign.

Evaluation and Recommendation of Flood Mitigation Actions

While there is an abundant need across the Nueces Region and the State of Texas for data collection, strategy implementation, and project construction to reduce or remove risk of flooding, not every flood mitigation action can be recommended in the NRFP or included in the SFP. The NRFPG considered recommendations on flood mitigation actions through a multi-step process. The NRFPG created a Technical Subcommittee tasked with establishing a selection methodology, implementing the evaluation and selection process, and reporting their findings and recommendations back to the NRFPG for formal approval. The methodology included screening all potential flood mitigation actions considering TWDB requirements for inclusion in the flood plan and any other additional considerations established by the Technical Subcommittee. The reasons for not recommending a particular flood mitigation action were clearly documented as part of the evaluation and recommendation process.

On May 6, 2022, the NRFPG voted to recommend FMEs, FMPs, and FMSs as presented. This meeting was held in accordance with the requirements of the RFPG bylaws, the Texas Open Meetings Act, and the general requirements of the Texas Water Code and the flood planning process.

Recommended Flood Management Evaluations (FME)

The NRFPG identified and evaluated a total of 179 potential FMEs. Of these studies, 163 were recommended, representing a combined total of $282,331,000 of flood management evaluation need across the region. From these evaluations, it is forecasted that approximately $931,821,000 in construction of flood mitigation projects will be required to be refined in the Revised Plan. Overall, the recommended FMEs represent over 12,800 square miles of land development and potential drainage improvements and provides substantial coverage of those portions of the flood planning region that are severely impacted by the 1% and 0.2% annual chance storm events.

Recommendation of Flood Mitigation Projects (FMP)

Four potential FMPs were included in the preliminary FMP list. Of these four projects, one project was determined to be an ongoing project with dedicated funding, so was removed from consideration. The remaining three projects continued through the screening process described in Section 5.2.3.3. Due to the high level of detail required for consideration as an FMP, none of the three potentially feasible projects were determined to have enough detail available for evaluation and recommendation as an FMP. The potentially feasible FMPs do not provide a quantifiable level of service benefit, or a no negative impact determination at their current stage. Although not recommended as FMPs, these three projects have potential to be beneficial projects with further study and development through feasibility studies and preliminary engineering. Therefore, the project descriptions were modified and they were added to the FME list.

While no FMP was selected for consideration in Task 5, Task 12 will consist of performing identified potential FMEs and evaluating flood risk reduction solutions, including feasibility studies and preliminary engineering, to identify, evaluate, and recommend additional potentially feasible FMPs. These will be included in the 2023 Revised RFP.

Recommendation of Flood Management Strategies (FMS)

The NRFPG identified and evaluated a total of 60 potential FMSs. Of these projects, 40 were recommended, representing a combined total cost of $20,285,650. A variety of FMS types were identified for the Nueces Region. Generally, these FMSs recommend broad regional strategies and initiatives. Some strategies encourage and support communities and municipalities to actively participate within the NFIP. Other FMSs recommend the establishment and implementation of public awareness and educational programs to better inform communities of the risks associated with flood waters. Additional FMSs promote preventive maintenance programs to optimize the efficiency of existing stormwater management infrastructure, recommend the development of a stormwater management manual to encourage best management practices (BMPs), or promote the establishment of community-wide flood warning systems. These FMSs support several of the regional floodplain management and flood mitigation goals established.

ES.6 Impact and Contribution of the Regional Flood Plan

The RFP evaluates the impacts and contributions of implementing the plan would have on reducing flood risks and on water supply development.

Impacts of Regional Flood Plan

Impacts are determined before and after RFP implementation of recommended flood mitigation actions relative to existing and future flood risk. The comparison of before and after RFP implementation estimates both how much the region's existing flood risk will be reduced through implementation of the plan as well as how much additional, future flood risk (that might otherwise arise if no changes are made to floodplain policies etc.) will be avoided through RFP implementation, including recommended changes/improvements to the region's floodplain management policies.

The evaluation estimates the implementation of recommended FMSs could benefit 48,400 exposed structures, 120,000 people, 1,200 square miles, 95 LWCs, and 308 critical facilities at risk in the future 1% annual chance flood hazard. An independent evaluation of FMEs was performed and estimates the implementation of recommended FMEs would benefit 61,000 exposed structures, 142,000 people, 15,000 acres of agricultural land, 500 critical facilities, 670 miles of roadway, and 180 LWCs at risk in the future 1% annual chance flood hazard.

By implementing the RFP, the existing floodplain management standards identified in Chapter 3 will be leveraged and will have basis to bolster and expand local regulations to protect future life and structures from high flood risk events.

Contributions to and Impacts on Water Supply Development and the State Water Plan

Flood mitigation actions were reviewed to determine whether impacts to water supply/availability exists. A coordinated effort with representatives from multiple regional water planning groups occurred to identify water management strategies that could be impacted. Those regional water planning groups include Region N (Coastal Bend), Region L (South Central Texas), and Region M (Rio Grande). The NRFPG identified four flood mitigation actions on June 27, 2022, that have benefits related to water supply development. These include a two-way pipeline between Choke Canyon Reservoir and Lake Corpus Christi, a Nueces off-channel reservoir with or without ASR configuration, sediment removal at Lake Corpus Christi, and a Nueces River Diversion from the Nueces River to Choke Canyon Reservoir. There are no anticipated negative impacts from these four recommended FMSs on water supply, water availability, or projects in the state water plan.

ES.7 Flood Response Information and Activities

Flood response information was gathered through stakeholder outreach to flood-related authorities in the Nueces Basin. Flood response activities, preparedness, response, and recovery measures are summarized for the various entities in the basin. The plan also summarizes state and federal agency roles in flood response support and provides a description of various means by which data is collected and disseminated in a flood

event. This information is provided to help others in the basin develop flood response and recovery programs. Note the NRFP only summarizes the nature and types of flood response preparations in the basin, including recovery, but does not perform analyses or other activities related to planning for disaster response or recovery.

ES.8 Administrative, Regulatory, and Legislative Recommendations

The NRFP provides administrative, regulatory, or other recommendations for inclusion in the 2023 NRFP. These recommendations were developed by a subcommittee and presented and adopted by the NRFPG on May 16, 2022. Overall, 19 recommendations were provided within the categories of administration, regulatory/policy, and legislation. The recommendations are provided in detail in Chapter 8 - Nueces Basin Recommendations. Recommendations generally addressed a variety of needs and issues, including facilitating public outreach; improving coordination; addresses funding deficiencies for a variety of needs such as road and bridge improvements, maintenance, nature-based incentive programs, public information campaigns; improving flood mitigation practices to consider nature-based solutions; adopting higher standard regulations for buildings; addressing socioeconomic disadvantaged communities; empowering county governments over land development activities; enabling regional authorities; and addressing removal of debris/sediment deposited after storm events.

ES.9 Flood Infrastructure Financing Analysis

The NRFP describes common sources of local, state, and federal flood funding.

Local Funding

Local funding mechanisms identified include use of a general fund, bond program, permitting fees, dedicated stormwater or drainage fees, and special districts. The plan identifies two entities with dedicated drainage fees, which includes Corpus Christi and the City of Portland. The plan identified four special districts focused on drainage, which includes Nueces County Bishop Driscoll Drainage District 3, Nueces County Drainage and Conservation District 2, Refugio County Drainage District 1, and San Patricio County Drainage District.

State Funding

State funding for flood projects is primarily through TWDB and Texas State Soil and Water Conservation Board (TSSWCB). In the Nueces Basin, several counties and cities have received support from the TWDB Flood Infrastructure Fund (FIF) and many coastal communities have applied for FEMA grants. After the first SFP is adopted, only projects included in the most recently adopted state plan will be eligible for funding from the FIF.

Federal Funding

There are multiple avenues to receive federal funding through the various federal agencies, including FEMA, U.S. Department of Housing and Urban Development (HUD), USACE, U.S. Environmental Protection Agency (EPA), U.S. Department of Agriculture (USDA), and special appropriations. Recent special appropriations of note include the 2021 American Rescue Plan Act (ARPA) and the 2021 Infrastructure Investment and Jobs Act (IIJA), also called the Bipartisan Infrastructure Law (BIL). ARPA delivered $350 billion directly to local, state, and tribal governments through the Coronavirus State and Local Fiscal Recovery Funds (SLFRF). And BIL authorized over $1 trillion for infrastructure spending across the U.S. and provides a significant infusion of resources over the next several years into existing federal financial assistance programs. Note, the recent federal special provision ARPA and BIL funding has not yet been allocated and made available for flood mitigation studies and projects that would be eligible under the state flood plan.

Overall Need for Funding

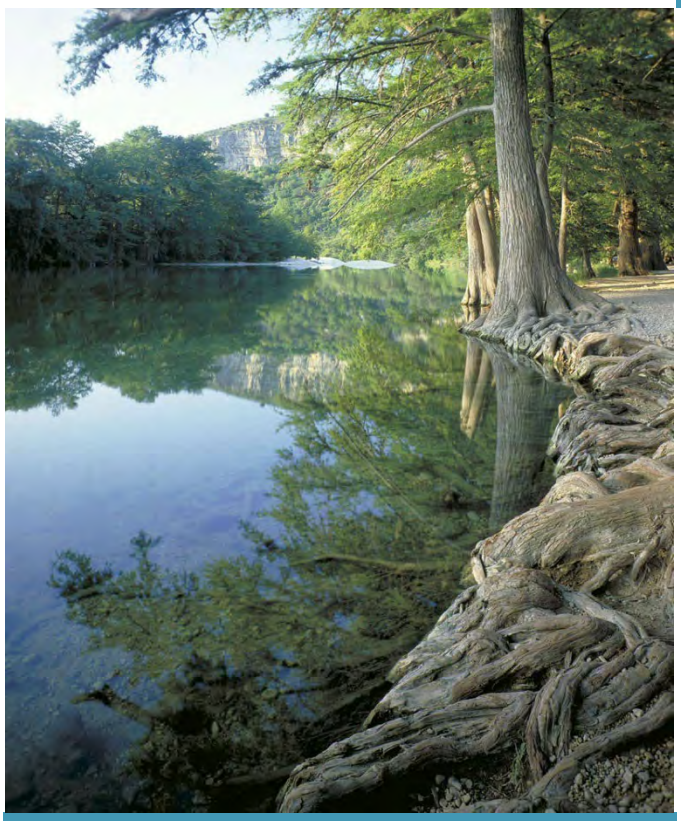
Overall, there is a total of $302,616,650 needed to implement the recommended FMEs and FMSs in the NRFP. From the total cost, it is projected that $284,766,485 in state and federal funding is needed.

ES.10 Adoption of Plan and Public Participation

The NRFPG met all requirements under the Texas Open Meetings Act and Public Information Act during development of the NRFP. The NRFP incorporated public participation from the onset. This included opportunities at all regional flood planning group meetings for the public to comment on any aspect of the plan or planning process, press releases and notices of public meetings, and a dedicated website for NRFPG information.

The NRFPG submitted an approved, draft RFP to the TWDB on August 1, 2022. A public in-person hearing for the draft plan was held on September 26, 2022, at 11:00 a.m. at the McMullen County Emergency Management Office and a public virtual hearing for the draft plan was held on September 26, 2022, at 6:30 p.m. via a zoom meeting. Comments received on the draft plan and responses to comments were approved by the NRFPG on December 12, 2022, and are included in Appendix D.

The NRFPG approved this final RFP on December 12, 2022, for submittal to the TWDB.



Chapter 1 – Planning Area Description

31 TAC § 361.30, 361.31, and 361.32

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1 Planning Area Description

The 31-county Nueces Region (Region 13) has an area of 24,094 square miles (15,420,000 acres), approximately 9.0% of the state's land area (Figure 1-1). The region is bound to the north by the Texas Water Development Board (TWDB) Flood Planning Region 12 (San Antonio), and to the south by TWDB Flood Planning Region 15 (Lower Rio Grande). In 2020, this region had a population of approximately 1,140,000.

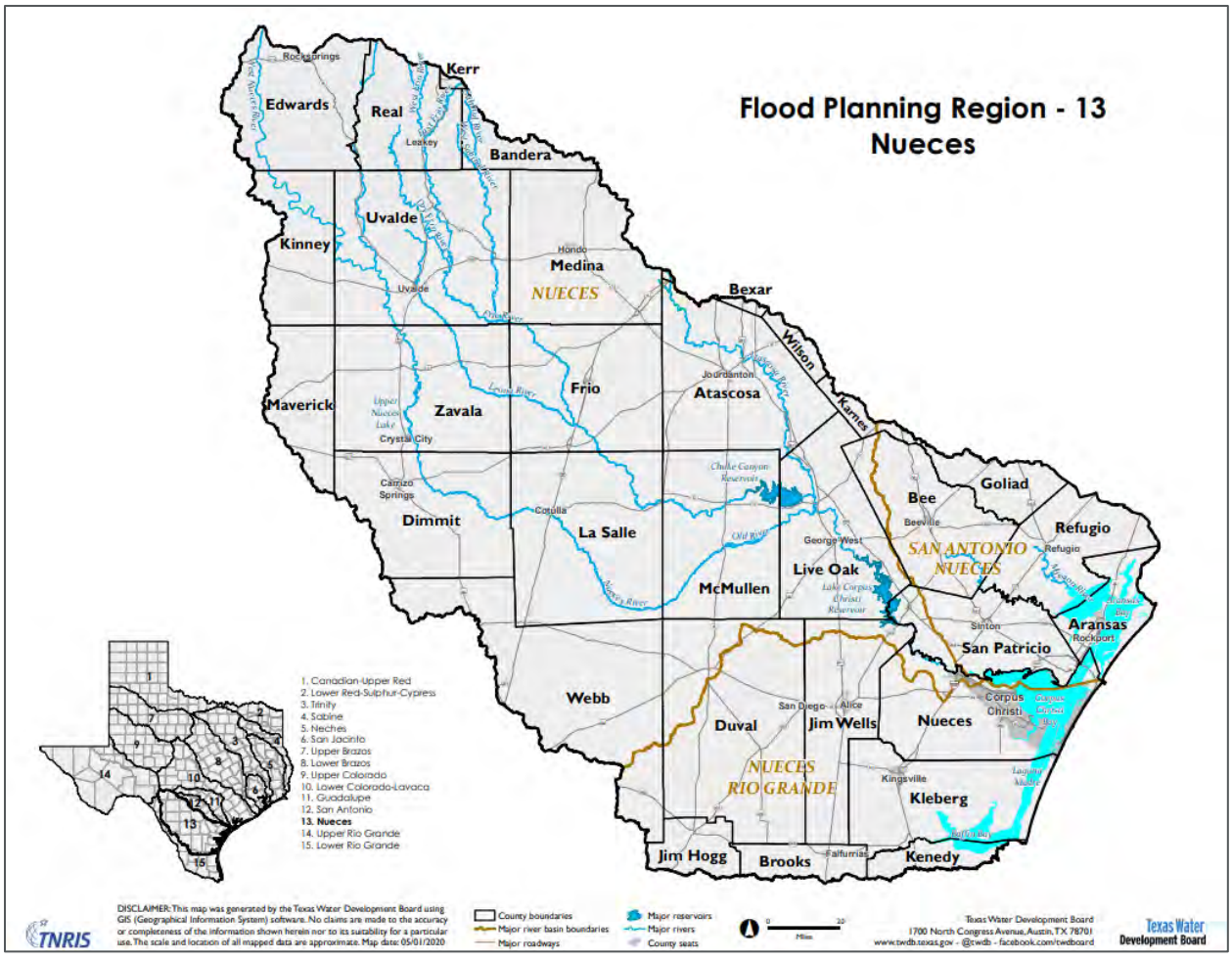

Figure 1-1. Nueces (Region 13) Flood Planning Region

1.1 Background

In 2019, the Texas Legislature and Governor Abbott adopted changes to Texas Water Code §16.061 that established a regional and state flood planning process and identified 15 flood planning regions across the state to coincide with major river basins. Information from each of the 15 regional flood plans (RFPs) will be compiled in the *2024 State Flood Plan*. The TWDB was charged with overseeing the development of each regional plan and compiling the state flood plan. The TWDB was also charged with

providing funding for investments in flood science and mapping efforts to support plan development.

This investment and planning efforts represent an important step in flood planning in Texas, because

- flood risks, impacts, and mitigation costs have never been assessed at a statewide level for Texas;
- flood risks pose a serious threat to lives and livelihoods across the state; and
- much of the flood risk in Texas is unmapped or based on out-of-date maps.

RFPs must be based on the best available science, data, models, and flood risk mapping. When complete, the plans will focus both on reducing existing risk to life and property and on enhancing floodplain management to avoid increasing flood risk in the future. The first RFP must be submitted to the TWDB by January 10, 2023. The TWDB will then compile these regional plans into a single statewide flood plan and will present it to the Legislature in 2024. An updated version of the state flood plan will be due every five years thereafter.

The TWDB has appointed a regional flood planning group (RFPG) for each region and has provided them with funding to prepare their plans. The TWDB administers the regional flood planning process through a contract with the planning group's sponsor selected by the RFPG. The Nueces Flood Planning Region (NFPR) sponsor is the Nueces River Authority. The Texas Legislature also allocated funding to be distributed by the TWDB for procuring technical assistance to develop the RFPs. HDR Engineering (HDR) was selected through a competitive process to serve as the technical consultant for the NFPR flood planning effort.

Stakeholders residing in and representing various interest categories were appointed for each region to provide representation and lead a bottom-up approach to developing the 2023 RFP. The RFPG's responsibilities include directing the work of the technical consultant; soliciting and considering public input; identifying specific flood risks; and identifying and recommending flood management evaluations, strategies, and projects to reduce risk in their regions. To ensure diverse perspectives are included, members represent a wide variety of stakeholders potentially affected by flooding. The following interest categories are included.

1. Public
2. Counties
3. Municipalities
4. Industries
5. Agriculture
6. Environment
7. Small Business

8. Electric-generating utilities
9. River authorities
10. Water districts
11. Water utilities
12. Flood districts

The members of the Nueces RFPG (NRFPG) for the first flood planning cycle are listed in Table 1-1 and Table 1-2.

Table 1-1. NRFPG Voting Membership

Member Name	Interest Category	Organization
LJ Francis (Chairman)	Municipalities	Consultant
Larry Dovalina (Vice-Chairman)	Water Utilities	City of Cotulla
Shanna Owens (Secretary)	Counties	San Patricio County DEMS
Julie Lewey	River Authorities	Nueces River Authority
Debra Barrett	Agricultural	Barrett Ag
Lauren Williams	Environmental	The Nature Conservancy
Jeffery Pollack (resigned)	Industries	Port of Corpus Christi
Robert Williams	Public	Mayor, Jourdanton
Andrew Rooke	Small Business	F.B Rooke & Sons
JR Ramirez	Water Utilities	Wintergarden GCD
David Baker	Electric Generating Utilities	City of Hondo
Larry Thomas	Flood Districts	Bandera County River Authority

Table 1-2. NRFPG Non-Voting Membership

Member Name	Agency
Tressa Olsen	Texas Water Development Board
Jim Tolan	Texas Parks and Wildlife Department
Brian Hurtuk	Texas Division of Emergency Management
Nelda Barrera	Texas Department of Agriculture
Kendria Ray	Texas State Soil and Water Conservation Board
Simone Sanders	General Land Office
Joel Anderson	Texas Commission on Environmental Quality
Patrick McGinn	Liaison to San Antonio RFPG and Rio Grande RFPG
Dave Mauk	Liaison from the San Antonio RFPG

1.2 Goal and Purpose of the 2023 Nueces (Region 13) Regional Flood Plan

All regional flood plans are to be developed according to 39 guiding principles (see 31 Texas Administrative Code [TAC] 362.3). The 2023 Nueces (Region 13) RFP focuses on identifying both existing and future condition flood risks within the Nueces basin; evaluating flood hazard exposure to life and property; identifying and evaluating potentially feasible flood management strategies and flood mitigation projects; presents recommended strategies and projects that minimize residual flood risk; and provides effective and economical management of flood risk to people, properties, and communities, and associated environmental benefits amongst other information.

1.3 Nueces Flood Planning Region Overview

1.3.1 Government Entities within Nueces Flood Planning Region

The following 31 counties were considered in the development of the Nueces RFP.

- Aransas County
- Atascosa County
- Bandera County
- Bee County
- Bexar County
- Brooks County
- Dimmit County
- Duval County
- Edwards County
- Frio County
- Goliad County
- Jim Hogg County
- Jim Wells County
- Karnes County
- Kenedy County
- Kerr County
- Kinney County
- Kleberg County
- La Salle County
- Live Oak County
- Maverick County
- McMullen County
- Medina County
- Nueces County
- Real County
- Refugio County
- San Patricio County
- Uvalde County
- Webb County
- Wilson County
- Zavala County

The following 57 municipalities were considered in the development of the Nueces RFP.

- Agua Dulce
- Alice
- Aransas Pass
- Asherton
- Bayside
- Beeville
- Benavides
- Big Wells
- Bishop
- Camp Wood
- Carrizo Springs
- Charlotte
- Christine
- Crystal City
- Devine
- Dilley
- Driscoll
- Encinal
- Falfurrias
- Freer
- Fulton
- George West
- Gregory
- Hondo
- Ingleside
- Ingleside on the Bay
- Lake City
- Lakeside
- Leakey
- Lytle
- Mathis
- Natalia
- Odem
- Orange Grove
- Pearsall
- Petronila
- Pleasanton
- Port Aransas
- Portland
- Refugio
- Robstown
- Rockport
- Rocksprings
- Sabinal
- San Diego
- San Patricio
- Sinton
- Taft
- Three Rivers
- Uvalde
- Woodsboro

- Corpus Christi
- Cotulla
- Jourdanton
- Kingsville
- Poteet
- Premont

The following 50 other government entities were considered by the Nueces RFPG in the development of the Nueces RFP.

- Guadalupe-Blanco River Authority
- Lower Colorado River Authority
- Nueces River Authority
- San Antonio River Authority
- Upper Guadalupe River Authority
- Bexar-Medina-Atascosa Counties Water Control and Improvement District (WCID) 1
- Alamo Area Council of Governments
- Alice Water Authority
- Aransas County Municipal Utility District (MUD 1)
- Aransas County Navigation District
- Aransas County WCID 1
- Bandera County River Authority
- Beeville Water Supply District
- Canyon Regional Water Authority
- Coastal Bend Council of Governments
- Corpus Christi Downtown Management District
- Duval County Conservation & Reclamation District
- Escondido Watershed District
- Freer WCID
- Golden Crescent Regional Planning Commission
- Hondo Creek Watershed Improvement District
- Jim Hogg County WCID 2
- Jim Wells County Fresh Water Supply District (FWSD) 1
- Lamar Improvement District
- Medina County WCID 2
- Middle Rio Grande Development Council
- Nueces County Bishop Driscoll Drainage District 3
- Nueces County Drainage & Conservation District 2
- Nueces County WCID 3
- Nueces County WCID 4
- Nueces County WCID 5
- Padre Island Gateway Municipal Management District
- Pettus MUD
- Port of Corpus Christi Authority
- Refugio County Drainage District 1
- Refugio County Navigation District
- Refugio County WCID 2
- Rio Grande Regional Water Authority
- Riviera WCID
- San Diego MUD 1
- San Patricio County Drainage District
- San Patricio County MUD 1
- San Patricio County Navigation District 1
- San Patricio MWD
- South Texas Development Council
- South Texas Water Authority
- Three Rivers Water District
- Zavala County WCID 1

- Maverick County WCID 1
- McMullen County WCID 1

1.3.2 Nueces Flood Planning Region Subregions

The NFPR is sub-divided into four subregions, as shown in Figure 1-2, to facilitate stakeholder engagement amongst the basin's varying geographic areas.

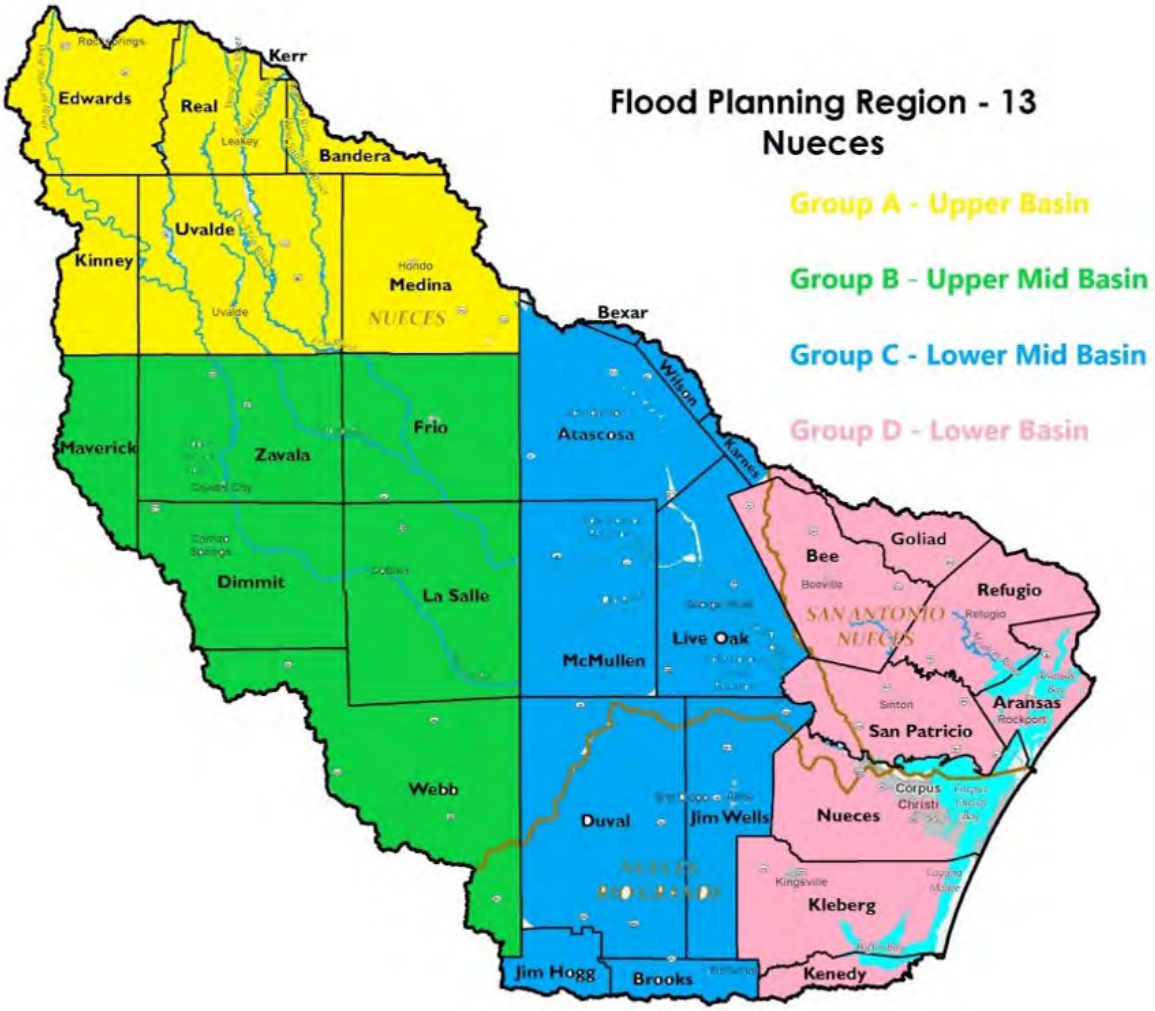

Figure 1-2. Nueces Flood Planning Area and Sub-Regions

1.3.3 Major Water Bodies

The NFPR includes an area that drains to Nueces River and associated tributaries. Nueces River rises in two forks in Edwards and Real counties and flows 315 miles to Nueces Bay on the Gulf near Corpus Christi. Principal tributaries of the Nueces are the Frio and Atascosa rivers. Nueces River feeds the Nueces Estuary, which includes Corpus Christi Bay and its western and southern extensions in Nueces Bay and Oso Bay. The Nueces Estuary spans 106,990 acres and is separated from the Gulf of

Mexico by Mustang Island. The Nueces Estuary also receives freshwater from Oso Creek via Oso Bay.

The NFPR also includes coastal areas north and south of the Nueces River basin. This includes the area that drains to the Mission River, which is formed by the confluence of Blanco and Medio creeks and runs southeast for 24 miles to its mouth at Mission Bay, an inlet of Copano Bay and subsequently Aransas Bay. And the NFPR includes the area that drains to the upper Laguna Madre Estuary. San Fernando Creek provides freshwater inflow into this estuary through Baffin Bay.

The NFPR contains the following major reservoirs.

- **Choke Canyon Reservoir** – This reservoir is located along Frio River four miles west of Three Rivers in Live Oak County. The Bureau of Reclamation built the reservoir in 1982 and the City of Corpus Christi and the Nueces River Authority own and operate it for municipal water supply and recreational purposes. According to a TWDB 2012 survey, Choke Canyon has a storage capacity of 662,821 acre-feet with a drainage area above the dam of 4,667 square miles. (TWDB, 2022)
- **Lake Corpus Christi (Live Oak)** – This reservoir is located along Nueces River four miles west of Mathis at the intersection of Live Oak, San Patricio, and Jim Wells County lines. The reservoir was originally built in 1929 and reconstructed in 1955. The City of Corpus Christi owns and operates the dam for municipal water supply and recreational purposes. According to a TWDB 2012 survey the reservoir has a capacity of 254,732 acre-feet with a drainage area above the dam of 16,656 square miles. (TWDB, 2022)
- **Upper Nueces Lake** – This reservoir is also known as the Upper Dam and is located along Nueces River six miles north of Crystal City in Zavala County. The reservoir was originally built in 1926 and was reconstructed in 1948. Zavala and Dimmit counties' Water Improvement District No.1 own and operate the dam for irrigational, recreational, and water supply purposes. The current storage capacity is estimated at 5,200 acre-feet with a drainage area above the dam of 2,160 square miles. (TWDB, 2022)

1.3.4 Major Ecosystems

The NFPR includes five of the 10 ecosystems identified by Texas Parks and Wildlife Department (TPWD) (Figure 1-3). NFPR ecoregions primarily consist of the Gulf Prairies and Marshes, South Texas Plains, and Edwards Plateau with slivers of the Post Oak Savanah and Blackland Prairie.

1.3.4.1 Gulf Coast Prairie

The Gulf Coast Prairies and Marshes region is a near-level, slowly drained plain less than 150 feet in elevation, dissected by streams and rivers flowing into the Gulf of Mexico. The region includes barrier islands along the coast, salt grass marshes surrounding bays and estuaries, remnant tallgrass prairies, oak parklands and oak mottes scattered along the coast, and tall woodlands in the river bottomlands. Average annual rainfall varies from 30 to 50 inches per year distributed fairly uniformly throughout the year. The growing season is usually more than 300 days, with high humidity and warm temperatures. Soils are acidic sands and sandy loams, with clays occurring primarily in the river bottoms. Native vegetation consists of tallgrass prairies and live oak woodlands. Brush species such as mesquite and acacias are more common now than in the past. Although much of the native habitat has been lost to agriculture and urbanization, the region still provides important habitat for migratory birds and spawning areas for fish and shrimp. (TPWD, 2022)

1.3.4.2 South Texas Plains

The South Texas Brush Country is characterized by plains of thorny shrubs and trees and scattered patches of palms and subtropical woodlands in the Rio Grande Valley. The plains were once covered with open grasslands and a scattering of trees, and the valley woodlands were once more extensive. Today, the primary vegetation consists of thorny brush such as mesquite, acacia, and prickly pear mixed with areas of grassland. The average annual rainfall of 20 to 32 inches increases from west to east. Average monthly rainfall is lowest during winter, and highest during spring (May or June) and fall (September). Summer temperatures are high, with very high evaporation rates. Soils of the region are alkaline to slightly acidic clays and clay loams. The deeper soils support taller brush, such as mesquite and spiny hackberry, whereas short, dense brush characterizes the shallow caliche soils. Although many land changes have occurred in this region, the brush country remains rich in wildlife and a haven for many rare species of plants and animals. It is home for semi-tropical species that occur in Mexico, grassland species that range northward, and desert species commonly found in the Trans-Pecos. Livestock grazing and crop production are the principal agricultural land uses. (TWDB, 2022)

1.3.4.3 Edwards Plateau

The Edwards Plateau region comprises an area of central Texas commonly known as the Texas Hill Country. It is a land of many springs, stony hills, and steep canyons. The region is home to a whole host of rare plants and animals found nowhere else on earth. Average annual rainfall ranges from 15 to 34 inches. Rainfall is highest in May or June and September. Soils of the Edwards Plateau are usually shallow with a variety of surface textures. They are underlain by limestone. Elevations range from slightly less than 100 feet to over 3,000 feet above sea level. Several river systems dissect the

surface, creating a rough and well-drained landscape. The limestone of the Edward's Plateau is honeycombed with thousands of caves. Beneath the eastern edge of the Plateau lies a hidden world of underground lakes known as the Edwards Aquifer. This precious water resource also is home to a number of curious creatures, such as the blind salamander. Today, the Edwards Plateau is characterized by grasslands, juniper/oak woodlands, and plateau live oak or mesquite savannah. Open grasslands and savannahs were more common in pre-settlement times than they are today. Ranching is the primary agricultural industry in the region. (TPWD, 2022)

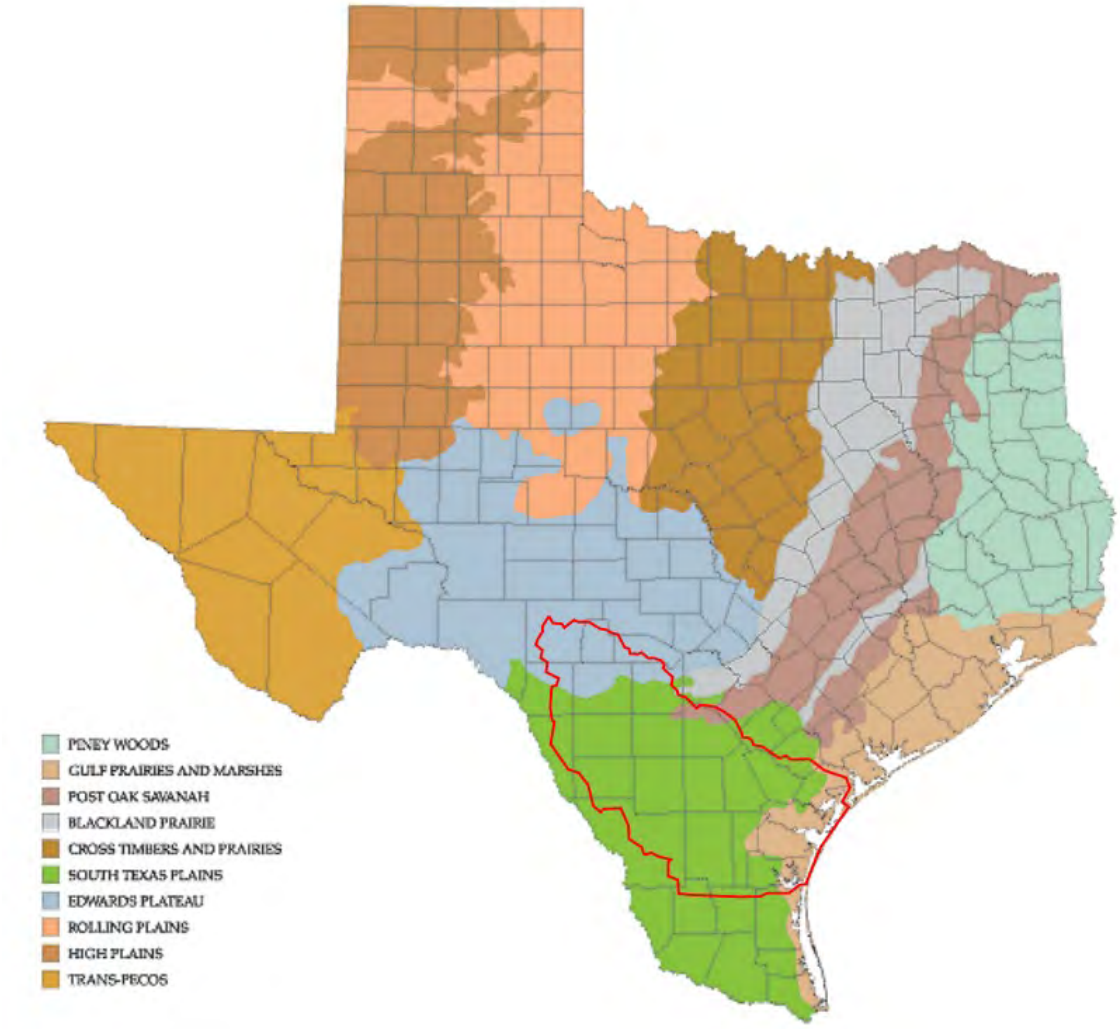

Figure 1-3. Region 13 Ecoregions (Source: Gould)

1.3.5 Land Use and Vegetative Cover

The NFPR is predominately rural with large areas of low to medium development intensity limited to the Corpus Christi metropolitan area. Pastures and cultivated crops are the predominant use of working lands across the NFPR. The land and vegetative cover align closely with the various ecoregions within the NFPR as shown in Figure 1-4 and Figure 1-5.

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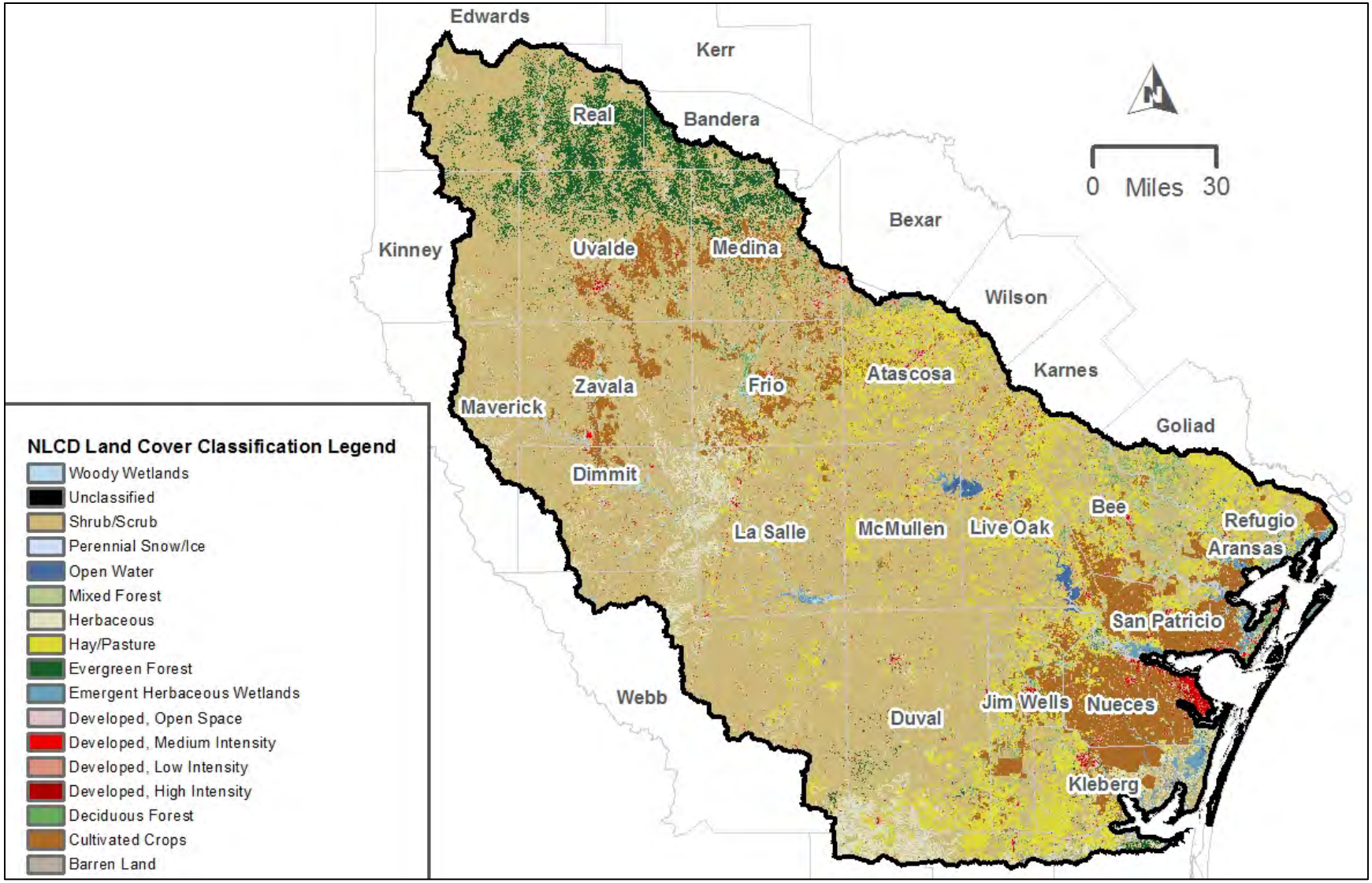

Figure 1-4. Land Cover (NLCD)

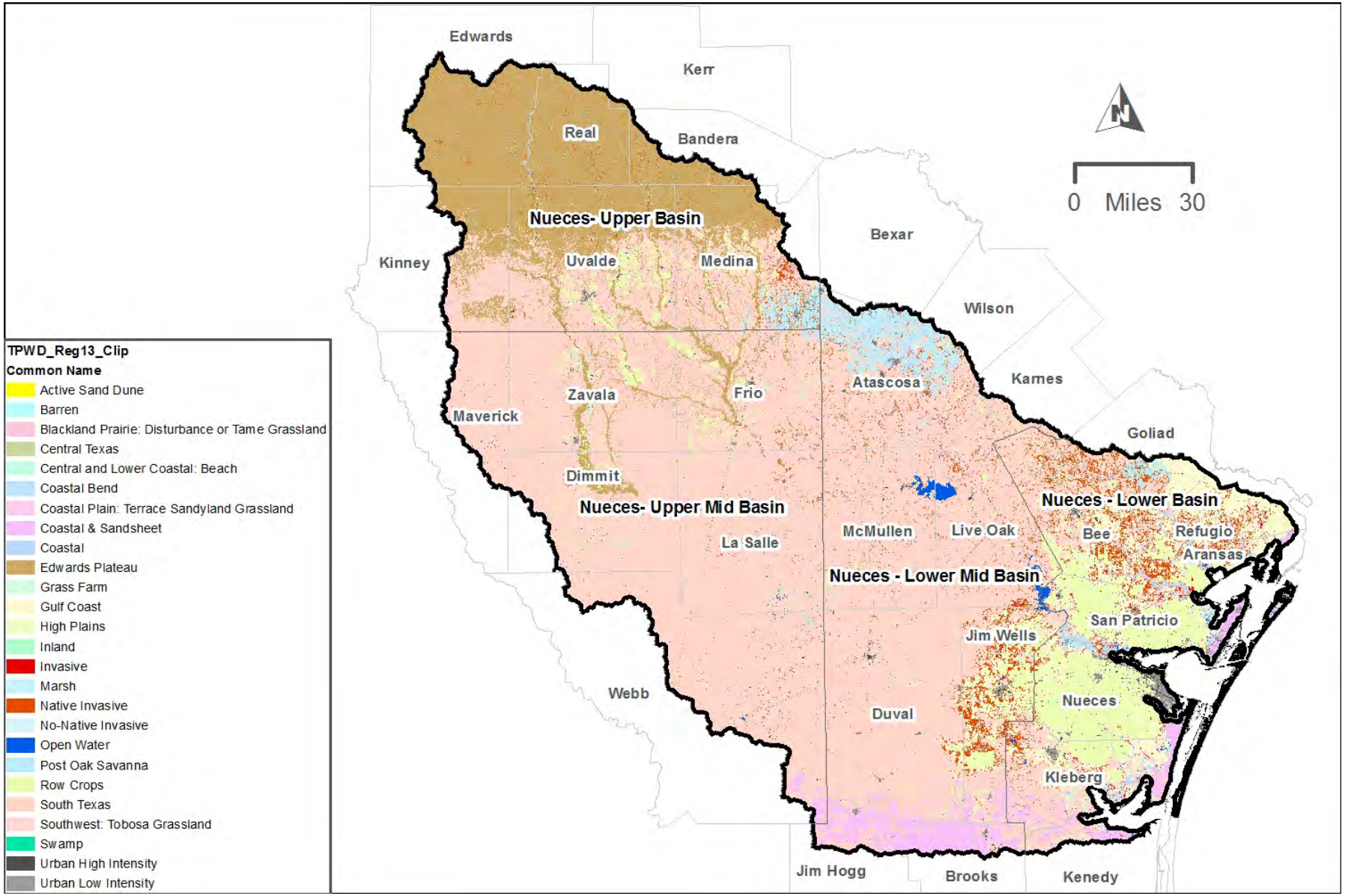

Figure 1-5. Vegetation Cover (TPWD)

1.3.6 Conservation Lands

The NFPR contains Conservation Lands to enable landowners to protect natural resources for future generations while maintaining private ownership. Conservation Lands in the NFPR are predominately located in the Edwards Plateau region as shown in Figure 1-6.

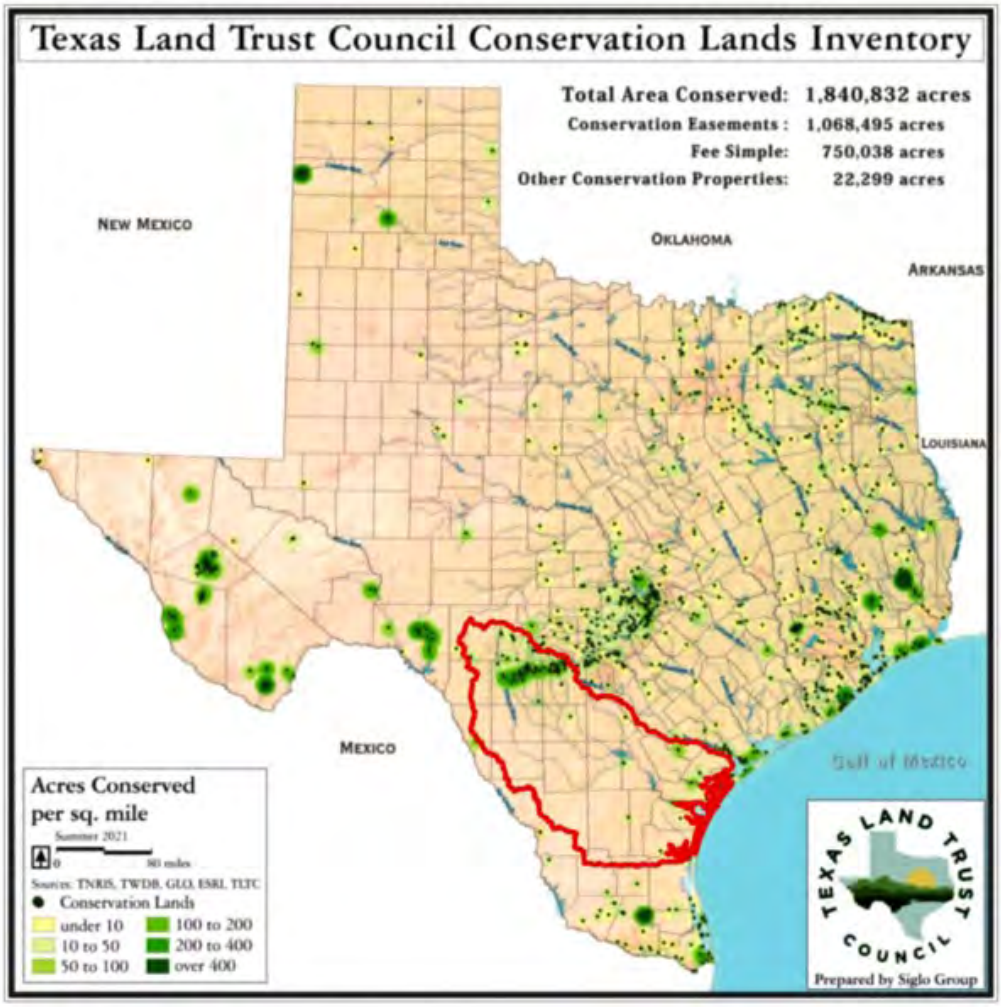

Figure 1-6. Conservation Lands Inventory (Texas Land Trust Council, 2021)

1.4 Social and Economic Character

1.4.1 Population Most at Risk of Flood Impacts

Population data for 2020 and 2050 was obtained from a query of the 2021 Regional Water Plan Data. The population in the NRPR was estimated at 1,140,000 in 2020. The basin is largely rural in nature with the City of Corpus Christi being the only major population center within the basin. The City of Corpus Christi had a population of roughly 325,000 in 2020 or roughly 30% of the total basin population. Most of the population resides in the lower basin as shown in Table 1-3. Other highly populated areas of the basin are near the population centers of Laredo (Webb County) and San

Antonio (Medina, Atascosa, Wilson, and Bexar counties) which are included in the Lower Rio Grande (Region 15) and San Antonio (Region 12) regions respectively. Future growth near these major cities will impact the population in the basin.

Overall, the region is expected to grow by 33% between 2020 and 2050 to a population of about 1,516,000. Most of this growth is expected to occur within areas of redevelopment or new development in or near cities (Figure 1-7).

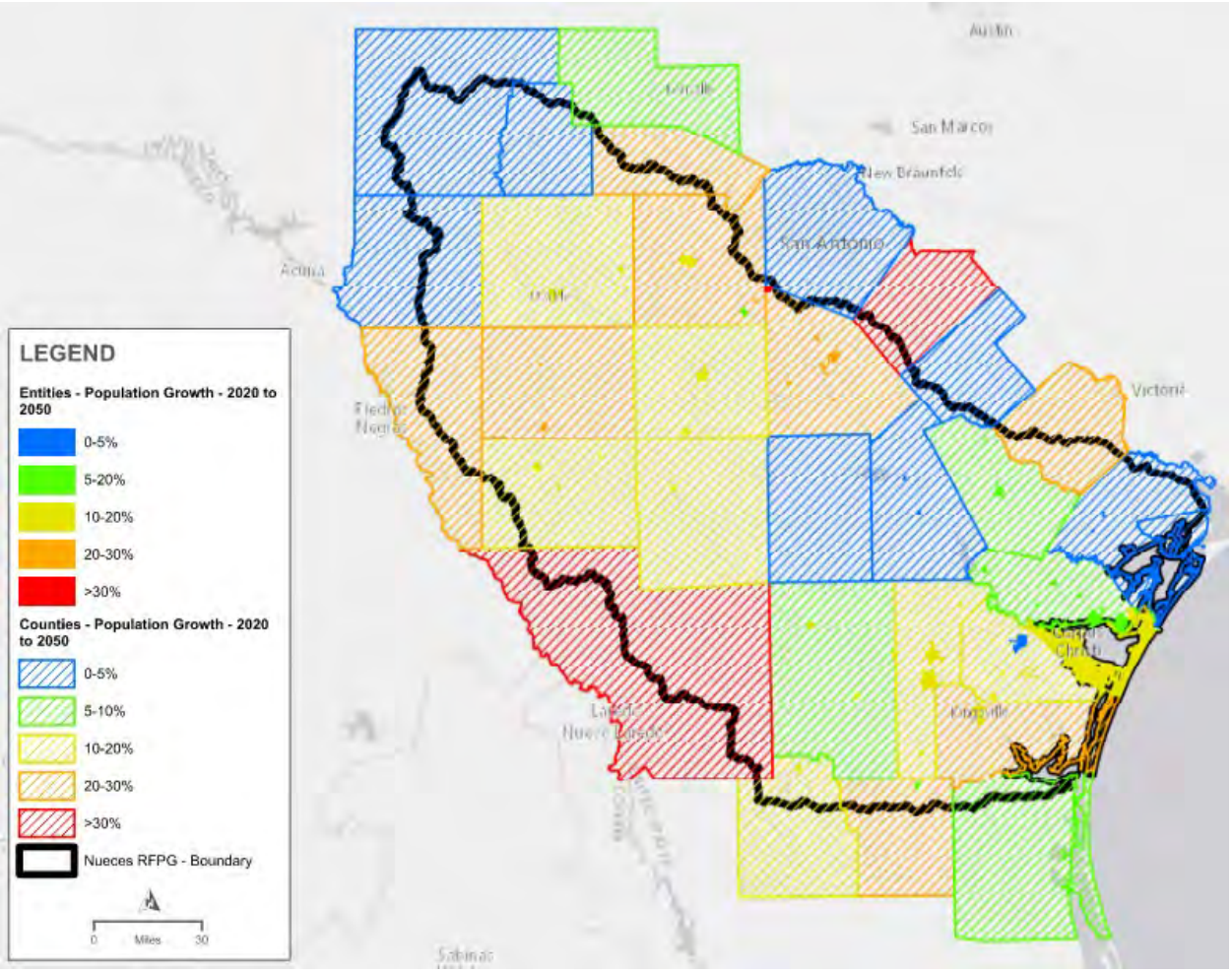

Figure 1-7. Projected Population Growth (2020 to 2050)

There are five cities projected to grow by at least 20% between 2020 and 2050 (See Table 1-3).

Table 1-3. Cities with highest projected growth rate, 2020-2050

Cities	2020	2050	% Growth
Lytle	4,150	5,532	33%
Jourdanton	4,829	6,626	37%
Poteet	3,871	5,022	30%
Pleasanton	11,142	14,454	30%
Crystal City	8,063	9,880	23%

There are three counties projected to grow by at least 30% between 2020 and 2050 (See Table 1-4).

Table 1-4. Counties with highest projected growth rate, 2020-2050

Counties	2020	2050	% Growth
Webb	318,028	464,960	46%
Wilson	54,266	79,044	46%
Atascosa	52,574	68,210	30%

The upper mid-basin represents the youngest population with the lowest median household income, lowest percent of higher education, and highest percent of population living below the poverty line (See Table 1-5).

Table 1-5. Demographics of the Various Nueces Sub-Regions

Demographic Category	Upper Basin	Upper Mid Basin	Lower Mid Basin	Lower Basin
Population (percent of entire basin)	9%	7%	17%	67%
Median Age	39	33	38	37
Median Household Income	$51,000	$36,000	$48,000	$53,000
Education – Bachelors+	17%	11%	14%	21%
Lives Below Poverty Line	15%	27%	20%	18%

The greatest risk of flood impacts is for areas experiencing population growth and for areas with limited resiliency due to limited resources. Without proper flood ordinances, population growth and associated developments are more likely to increase flood risks to life and property.

1.4.2 Economic Activity and Sectors Most at Risk of Flood Impacts

Economic activity and sectors most at risk of flooding include the following.

- **Real Estate** – Buildings located in areas susceptible to flood inundation are at risk of flood damage. The Nueces basin has roughly 61,000 buildings located within the existing 1% annual chance (100-year) floodplain.
- **Transportation** - Floods can cause roadways and bridges to be temporarily impassible for extended periods and can potentially cause long-term closures from wash outs and structural failures. The Nueces basin has roughly 3,200 miles of roadway segments and 5,400 roadway crossings located in the existing 1% annual chance floodplain.
- **Tourism** – The coastal waters and pristine waters of the upper basin support a robust tourism industry. Storm surges along the coast or flash flooding in the upper basin have caused the loss of housing and businesses that support the tourism industry.
- **Agriculture** – Agriculture by its nature is often located near waterways and thus susceptible to flood impacts. Agriculture development in proximity to deep, fast moving, and/or long-standing flood inundation areas are highly susceptible to flood impacts. The Nueces basin has roughly 390 square miles of agriculture areas within the existing 1% annual chance floodplain.

1.4.3 Development Most at Risk of Flood Impacts

Development most at risk of flood impacts include the following.

- **Development in low-lying gulf prairie and marsh lands located along the coast.** These areas are very flat and are inundated for long periods of time during and after flood events. Large portions of Nueces and San Patricio counties, as well as other areas along the coastline are within high growth areas and within these gulf prairie and marsh lands.
- **Unregulated development can potentially put existing and new buildings in harm's way.** Several high growth areas within the basin lack floodplain management practices and enforcement of regulations to mitigate future flooding events.
- **Roadway crossings of waterways are susceptible to damage from stormwater debris, erosion, and hydraulic forces.** There are roughly 5,400 roadway crossings of floodplains in the Nueces basin. Of these, 576 roadway crossings are considered low water crossings. Most of the low water crossings and many more other crossings are at high risk of flood impacts. Refer to Section 2.1.1.1 for further information on low water crossings.

1.5 Flood Prone Areas and Types of Major Flood Risks

Flood prone areas in the region generally include the following types of major flood risks.

- **Riverine Flooding** - Areas at risk of flooding when rivers and creeks come out of their banks. These areas are often included in 1% and 0.2% annual chance floodplains. Of particular high risk are existing and future development and populations located along the major rivers such as the Nueces, Frio, and Atascosa.
- **Coastal Flooding** - Areas at risk of flooding when sea water surges inland from tropical storm events. These areas are often included in 1% and 0.2% annual chance floodplains along coastlines. Of particular high risk are existing and future developments located within the low-lying areas of the gulf prairies and marshes.
- **Pluvial Flooding** – Areas at risk of flooding when extreme rainfall creates a flood independent of an overflowing water body. Pluvial flooding is caused when the ground is over saturated and/or drainage systems are overflowed and the excess water (surface water) cannot be absorbed or drained away.
    - **Urban Flooding** – A form of pluvial flooding that includes areas where local storm drain infrastructure is inadequate and flooding frequently occurs. These areas are often identified by residents as known frequent flood problem areas. Of particular high risk are existing and future developments planned and built without proper consideration of local drainage patterns.
- **Flash Flooding** – A form of riverine or pluvial flooding is particularly dangerous in the upper basin where flash flooding of low water crossings and low-lying areas can occur with little warning. Of particular high risk are campgrounds located in low-lying, frequently-flooded areas, and frequently traveled low water crossings.

Flood-prone areas in the region are identified in the flood plan by the following.

- **Areas within the 1% and 0.2% annual chance flood inundation boundaries.** These boundaries were defined for all waterways for both existing and future conditions with contributing drainage areas larger than one square mile for the entire basin.
- **Known low water crossings.** Low water crossings are considered potential flood-prone areas due to their inherent life-loss risk during flood conditions. Low water crossings are defined where a creek crosses a road that is low enough to be subject to frequent flooding during storm events or during a 50% annual chance (2-year) storm event.

- **Areas where residents and officials have reported past flooding.** Subregional meetings, interviews with officials, and an on-line public comment map were used to obtain information on known flood prone areas.
- **Areas where past flood damages, injuries, and deaths were recorded.** Historical flood data information was obtained and reviewed from the National Weather Service (NWS), the Federal Emergency Management Agency (FEMA), and the U.S. Geological Survey (USGS).

The flood prone areas are best identified by referring to the flood hazard, exposure, and vulnerability maps. These maps are fully described in Chapter 2 of the flood plan.

1.6 Key Historical Flood Events

Historical flood data is compiled from news reports of historical flood events, USGS gage records, NWS flood data, and FEMA flood damages. Table 1-6 summarizes the major historical flood events in the NFPR. A detailed summary of all key historical flood events and data obtained is included in Appendix C1 – Historic Flood Event Data.

Table 1-6. Major Historical Flood Events

Flood Event	Short Description
2017 Hurricane Harvey	64 injuries and 2 fatalities, $4.28 billion in damages in the Nueces Basin
2003 Flash Floods	Flash floods in northwestern counties of the Nueces Basin
2002 Frio River Flood	Record stages for middle basin parts near Tilden
1998 Flash Flood Real County	2 fatalities in Real County
1997 Flash Flood in Medina, Bandera, and Goliad Counties	4 fatalities across Medina, Bandera, and Goliad Counties.
1996 Nueces Flood	Record peak stage of the Nueces River near Uvalde
1971 Hurricane Edith and Fern	Historic flooding in the lower counties of the Nueces Basin
1967 Hurricane Beulah	41 fatalities, $1 billion of damage, and thousands of people lost their homes
1935 Nueces and West Nueces Flood	The earliest documented major flood in the Nueces River Basin
1932 Frio and Nueces Flood	The highest peak stage in the Frio River at Concan and the second highest recorded peak stage in the Nueces River near Uvalde.

1.7 Engagement of Political Subdivisions with Flood-Related Authority

The NRFPG compiled a list of existing political subdivisions within the NFPR that have flood-related authorities or responsibilities and identified a point of contact for each entity based on the FEMA Community Contact Report (dated February 12, 2021), and additional information provided by the Nueces River Authority. HDR developed a floodplain management survey about existing practices and sent it to the identified contacts. Survey results and follow-up correspondence confirmed that 13 of 31 counties and 12 of 57 cities with flood-related authority have floodplain management regulations. Of these, 11 counties and 11 cities have moderate/strong floodplain management practices and moderate/high levels of enforcement on these regulations. Additionally, eight counties and nine cities have been identified to have adopted higher floodplain management standards. These actively engaged counties and cities tend to be located near the high population and growth centers of Corpus Christi, San Antonio, and Laredo. For detailed information refer to Chapter 3, which fully describes floodplain management practices for the basin.

1.8 Extent of Local Regulation and Development Codes

Using policies and regulations to reduce the exposure of people and properties to flood risk are forms of non-structural flood control. By encouraging or requiring communities to avoid developing in flood-prone areas altogether, or to take precautions such as increasing building elevation, preserving overflow areas through buffering, and avoiding sensitive natural areas such as wetlands, communities can reduce the likelihood and extent of damages to existing and new development. Local regulations and development codes pertaining to flooding include the following.

- **Floodplain Ordinances** – Floodplain ordinances regulate development and the impact new development has on a community's floodplain. Community regulations are typically based on FEMA-provided flood hazard information but can be based on other local sources of data as well. Participation in the NFIP requires a community to have adopted a floodplain ordinance with minimum requirements established by FEMA.
- **Building Standards** – Building standards may include considerations for structures located within a floodplain, including minimum finish floor elevations and flood proofing requirements. NFIP requirements also set standards for property owners seeking to renovate structures in a floodplain, including those that experience repetitive or severe flood losses.
- **Drainage Design Standards** – Adopted drainage design standards set the minimum standards for stormwater management that must be met prior to the

approval of construction plans. Drainage criteria in the region are typically adopted by municipalities but are also used by counties.

- **Zoning and Land Use Policies** – Planning and zoning ordinances regulate acceptable types of land uses within a community to promote appropriate development, safety, and general welfare. Some communities use zoning and land use ordinances to establish open space requirements, conservation easements, and minimum setbacks from creeks and wetlands to preserve floodplain function and promote sustainable and resilient development.
- **Local and Regional Flood Plans** – Local and regional flood plans analyze a community's flood risk and present how that entity will improve its resiliency. Drainage master plans describe a community's physical and institutional planning environment and establish interjurisdictional roles and responsibilities when many drainage entities are present. Capital improvement plans (CIPs) identify capital project alternatives for an entity, provide economic analysis for alternatives, and often rank alternatives based on feasibility.
- **NFIP's Community Rating System (CRS)** - Credits community efforts beyond meeting minimum NFIP standards. The CRS provides 19 public information and floodplain management activities. Of which, a community must conduct elevation certificates and conduct floodplain management planning if in a designated repetitive loss community. All other activities are optional for participation in CRS. However, the program awards points and assigns a rating class on a scale of 1 to 10 based on participation in the various activities. Then the CRS assigns the percent discount for a community based on the determined rate class (i.e., a rate class of 7 correlates with a discount of 15% for property owners in a Special Flood Hazard Area).

As described in Section 1.7, local regulations related to flood management are strongest near major population centers and generally lacking for the remainder of the basin, which is rural in nature. The exposure analysis performed in this regional plan indicates that approximately 61,000 and 78,000 structures are in the existing and future 1% annual chance floodplains, respectively. However, this does not include the possibility of additional structures being built in the floodplain over the next 30 years. Thus, improving floodplain mapping and strengthening local regulations and development codes is key to reducing the future flood risk. One of the most effective regulations to reduce flood risk is to enact freeboard requirements on new structures. The NRFPG is strongly encouraging cities and counties in the Nueces Basin to actively consider requiring minimum finished floor elevations be set 2 feet above base flood elevations or above local ordinances, whichever is higher, in the basin. Extent of local regulations and development codes are presented in further detail in Chapter 3.

1.9 Agricultural and Natural Resources Impacted by Flooding

In the Nueces basin, cultivated crops are widespread within the coastal prairie and marsh area and pasture/hay land use is also widespread in the lower basin and in Atascosa County (see Figure 1-4 and Figure 1-5).

Flooding or excess precipitation can delay and reduce crop harvest, and erosion of sediment and nutrients downstream result in complete or partial crop loss. The impact that flooding has on farming depends on factors, including crop type, stage of the growing or harvesting season when the flood event occurs, and the magnitude of flooding. The numerous crop types grown in the Nueces basin region have varying degrees of resiliency to excess precipitation and prolonged standing water. Permanent crops, such as trees, tend to be more resilient to excess precipitation and standing water than row crops, such as corn or cotton. Heavy rain before planting can delay planting or prevent planting for the season. In addition, flooding damages can occur after a crop, like cotton or hay, has been harvested but not bailed or processed. But floods can also have a positive impact on farming as floods contribute to the fertility of agricultural lands.

Ranching activities in the region are also impacted by flooding. Livestock can be swept away, drowned, or injured by flash floods. After a flood, livestock can be particularly susceptible to certain types of parasites and diseases. Excessive rain may cause an increase in vectors, including flies and mosquitos, and cases of foot rot, which is a foot disease of cattle, sheep, and goats. Flood events can cause delays in building back livestock herds. Flood damages to livestock silage can reduce livestock head counts.

The Nueces region contains numerous natural resources that can be impacted by flood events. As with livestock, wildlife can be injured or killed by flash floods. Severe flood conditions can degrade stream health and impact ecosystems in the region.

In some ways, flooding can be a benefit for fields, wetlands, riparian areas if limited in depth, duration, and velocity. However, typically, in this region where flash floods are common, flooding causes erosion of sediment and nutrients, which can cause nutrient overgrowth and algal blooms in water bodies and nutrient deficiencies in agricultural producing lands.

1.10 Existing Local and Regional Flood Plans

A list of previous flood studies considered by the NRFPG to be relevant to the development of the RFP are fully described in Appendix C2 – List of Previous Flood Studies. Table 1-7 lists the names and publication years of these plans.

Table 1-7. List of Previous and Relevant Studies

Previous and Relevant Studies	Year
Coastal Texas Protection and Restoration Feasibility Study	2021
Lower Nueces River Watershed Protection Plan	2020
Atascosa-McMullen Multi-Jurisdictional Hazard Mitigation Action Plan	2020
Coastal Resiliency Master Plan	2019
Bandera County River Authority and Groundwater District Flood Plan	2019
The City of Alice & Jim Wells County Multi-Hazard Mitigation Plan	2018
San Patricio County Hazard Mitigation Action Plan	2018
Aransas County Multi-Jurisdictional Floodplain Management Plan	2017
Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan	2017
Nueces County Multi-Jurisdictional Hazard Mitigation Action Plan	2017
Hazard Identification, Risk Assessment (HIRA) and Consequence Analysis	2014
A Joint Erosion Response Plan for Nueces County and the City of Corpus Christi	2012
Coastal Bend Mitigation Action Plan	2012
Potential for Bed-Material Entrainment in selected Streams of the Edwards Plateau	2008

1.11 Existing Infrastructure

Background knowledge of the NFPR's existing natural and structural flood infrastructure provides context in identifying strategies and flood planning recommendations throughout the planning process. This section details the major natural flood mitigation features and constructed flood infrastructure in the NRFP area.

The general location, description, level of service, functionality, deficiency, and owning/operating entities for each identified natural flood mitigation features and constructed major flood infrastructure are summarized at length in Appendix A1 – TWDB Table 1 – Existing Flood Infrastructure Table and the GIS geodatabase. Features and infrastructure included, as applicable, are summarized in Table 1-8.

Additional information about significant or deficient/non-functioned features or infrastructure are detailed in subsequent sections as necessary.

- **Functional** infrastructure is defined as serving its intended design level of service.

- **Non-functional** infrastructure is defined as not providing its intended or design level of service.
- **Deficient** infrastructure is defined as constructed or natural features in poor structural or non-structural condition in need of replacement, restoration, or rehabilitation.

Table 1-8. List of Natural Features and Constructed Major Infrastructure

Flood Infrastructure	Definition	Description	Non-Functional / Deficient
Natural Features			
Rivers, Tributaries	Rivers are large natural waterways that carry water to an ocean or inland sea. Tributaries are natural waterways that flow into larger rivers or other bodies of water.	Added from National Hydrography Dataset (NHD)	Functional
Functioning Floodplains	A functioning floodplain are areas adjacent to rivers, ponds, lakes, and oceans that are periodically flooded at different points in time.	Added floodplains from the Texas Water Development Board (TWDB) compiled 'flood quilt', and other detailed studies.	Functional
Wetlands	A wetland is an area of land that is either covered by water or saturated with water.	Added from National Wetland Inventory	Functional
Sinkholes	A sinkhole is a cavity in the ground, especially in limestone bedrock, caused by water erosion and providing a route for surface water to disappear underground.	Added 23 from NHD and HDR Engineering, Inc. (HDR), many others not defined	Functional
Alluvial Fans	An alluvial fan is a fan-shaped mass of alluvium deposited as the flow of a river decreases in velocity.	None identified.	Not applicable

Flood Infrastructure	Definition	Description	Non-Functional / Deficient
Playa Lakes	A playa lake are often round hollows in the ground that only contains water occasionally.	None identified.	Not applicable
Vegetated Dunes	Vegetated dunes are sand dunes that are somewhat stabilized by plants roots.	Undefined – Geospatial dataset unavailable for dunes in Texas	Not applicable
Constructed Major Infrastructure			
Levees	A levee is an embankment built to contain, control, or divert the flow of water to provide protection from temporary flooding.	Added 8 levees from the National Levee Database. The following major levees are included: City of Three Rivers Levee; City of San Diego Levee; City of Alice Levee; City of Corpus Christi Levee – located west of Port of Corpus Christi Southside; City of Bishop Levee; Levee northwest of Aransas Pass, and south of State Highway 188; City of Aransas Pass Levee – Located on both sides of Port Aransas Causeway, along Redfish Bay; and Aransas National Wildlife Refuge Levee – Located on east side of St. Charles Bay.	Unknown
Sea Barriers, Walls, and Revetments	Sea barriers, walls, and revetments provide an erected structure to prevent the sea from encroaching on or eroding an area of land.	City of Corpus Christi has 2 noted sea walls – one protecting downtown, and another on Padre Island south of Packery Channel.	Functional

Flood Infrastructure	Definition	Description	Non-Functional / Deficient
Tidal Barrier and Gates	A tidal barrier typically spans an estuary, bay, river, or other sea inlet and contains gates that can open and close.	City of Corpus Christi and City of Aransas Pass have tidal barriers or gates that are put in place when tidal surges are expected due to tropical storms.	Functional
Stormwater Tunnels	A stormwater tunnel is a long pipe or box culvert that is typically installed deep underground.	None known	Unknown
Stormwater Canals	A stormwater canal is an artificial constructed above ground waterway used to convey water for irrigation.	A total of 362 miles of stormwater canals were identified within the Nueces Flood Planning Region (NFPR) according to the National Hydrography Dataset (NHD) by USGS.	Unknown
Dams that provide Flood Protection	A flood protection dam is defined as any barrier designed to runoff which has a height greater than six feet. This does not include railroad or roadway embankments.	A total of 501 dams were identified within the Nueces Flood Planning Region (NFPR) according to the National Inventory of Dams. Of this total, 23 flood control dams were constructed and are operated by the Natural Resources Conservation Service (NRCS), and 116 dams are regulated by the Texas Commission on Environmental Quality's (TCEQ) Dam Safety Program.	Of the TCEQ regulated dams, 14 are hydraulically inadequate or non-functional and 22 are in poor condition or deficient. Data from TCEQ and NRCS

Flood Infrastructure	Definition	Description	Non-Functional / Deficient
Detention and Retention Ponds	A detention pond is a man-made basin which holds runoff temporarily to attenuate peak flood flows. A retention pond serves a similar function but typically holds water all year round.	City of Ingleside has a regional detention pond (Whitney Lake Marsh Wildlife Refuge)	Functional
Storm Drain Systems	A storm drain system is a collection of inlets and pipes or box culverts that collect and convey runoff to a nearby waterway. Only major storm drain systems are to be identified in plan, not individual storm drains and inlets.	Major systems included for the City of Corpus Christi and the City of Ingleside	Unknown
Weirs	A weir is a control structure set to raise the level of water upstream or to regulate its flow.	None known	Unknown
Low water Crossings	Low water crossings (LWCs) are defined where a creek crosses a road that is low enough to be subject to frequent flooding during storm events or during a 50% annual chance (2-year) storm event.	548 LWCs were identified from TWDB HUB low water crossing data dated May 2021 22 LWCs were identified from available TxDOT data to be subject to frequent flooding. 6 LWCs were identified from the City of Beeville to be subject to frequent flooding. No other LWCs were identified during this first planning cycle.	Unknown

Flood Infrastructure	Definition	Description	Non-Functional / Deficient
Bridges	A bridge is a roadway structure that spans a waterway and includes all bridges and culverts spanning over 20'.	Added 2,706 bridges and culverts over 20' wide on public roads from National Bridge Inventory databased maintained by the Federal Highway Administration (FHWA).	Unknown
Stormwater Pump Stations	A stormwater pump station provides pump(s) to lift collected stormwater runoff from a sump to a higher discharge point.	City of Corpus Christi has 2 pump stations in the downtown area, and the City of Aransas Pass noted 1 pump station.	Corpus Christi – Functional; Aransas Pass – Non-Functional due to inability to handle flood flows and prevent flooding

1.12 Proposed or Ongoing Flood Mitigation Projects

See Appendix A2 – TWDB Table 2 – Summary of Proposed or Ongoing Flood Mitigation Projects. This list includes 93 projects currently under construction, being implemented, or with dedicated funding to construction, the source of funding, and expected year of completion. The list includes numerous drainage improvement studies and projects for various cities and counties and includes multiple Texas Department of Transportation (TxDOT) bridge replacement and drainage projects, as identified from TxDOT's Project Tracker (txdot.gov). Figure 1-8 below depicts major proposed or ongoing flood mitigation projects.

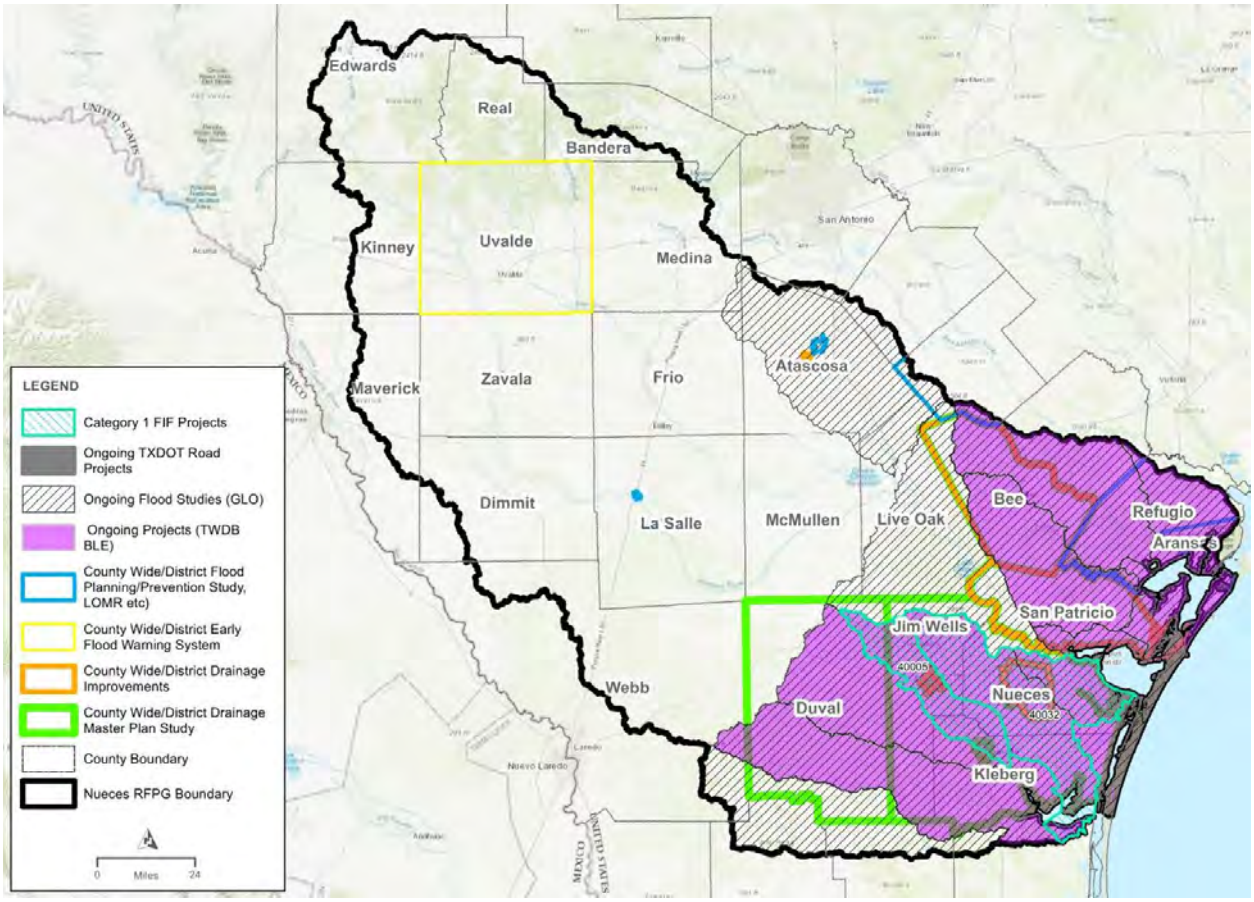

Figure 1-8. Major Flood Studies and On-Going Flood Studies/Projects (Map 2)

Major flood studies and on-going projects relevant to the NFPR include the following:

- General Land Office Regional Flood Study for the Nueces-San Antonio-Guadalupe-Lavaca-Colorado Study Basin
- Various County Drainage Master Plans, County-wide Drainage Improvement Projects, Early Flood Warning Systems, and Flood Prevention Studies (Duval, San Patricio, Nueces, Jim Wells, Kleberg, and Bee Counties)
- TWDB Base Level Engineering (BLE) Projects

- TWDB FIF funded on-going projects, as listed in Table 1-9. The various FIF categories represent the following:
  - Category 1 - flood protection planning grants for watersheds no smaller than HUC-10
  - Category 2 - planning, acquisition, design, construction, and rehabilitation type projects
  - Category 3 – federal award matching funds
  - Category 4 – measures immediately effective in protecting life and property
- Potential TWDB FIF funded projects, as listed in Table 1-10.

Table 1-9. TWDB FIF Funded On-Going Projects

TWDB Project #/ Category	Authority	Project Name	Project Description
40005 Cat-1	Alice	Master Drainage Study	H&H Modeling, conceptual engineering design, cost/benefit analysis, and plan for flood early warning system
40011 Cat-1	Karnes County	Flood Protection Planning Study	Study to update floodplain models and maps for high priority streams, flood problem areas, and to develop mitigation alternatives.
40030 Cat-2	Jourdanton	Main Street Drainage Project	Proposed improvements to improve roadside ditches and construct new channels in City's downtown area
40032 Cat-1	Nueces County	Regional Drainage Master Plan Study	Prepare basin-wide hydrologic models and limited-detailed hydraulic models in the Baffin Bay and South Corpus Christi watersheds, develop flood mitigation solutions for drainage problem areas, and conduct benefit/cost analysis.

TWDB Project #/ Category	Authority	Project Name	Project Description
40052 Cat-2	Nueces County DCD#2	Casa Blanca Drainage Improvements	Project includes drainage improvements to the existing Ruben Chavez S. Ditch and other downstream ditch improvements to mitigate potential flooding along the ditch and in the Casa Blanca subdivision.
40064 Cat-4	Uvalde County	Self-Supporting Tower for Early Warning System	The installation of the tower will provide sustainability to the Uvalde County Flood Early Warning System
40071 Cat-4	Nueces County DCD#2	Flood Early Warning System (FEWS)	Install 12-15 FEWS Stations in locations known to have repeated flooding.
40084 Cat-2	Cotulla	Flood Planning Study for LOMR	Defined AE flood hazard zone and floodway for the City of Cotulla.
40092 Cat-2	Nueces County DCD#2	Bosquez Rd. / Avenue J Drainage Improvements	Drainage improvements to improve drainage conditions at Robstown High School, Bluebonnet Subdivision, Hwy 44, and further downstream.
40093 Cat-2	Nueces County DCD#2	Ditch “A” and Bluebonnet Drainage Improvements	Drainage improvements at Ditch “A” and the Bluebonnet subdivision.
40117 Cat-2	Nueces River Authority	Green Lake Outfall System and Gregory Diversion Ditch	Project to address flooding issues in the Green Lake Drainage Basin and includes Green Lake dam and channel improvements, Gregory flood relief channel improvements, and Portland drainage improvements.

TWDB Project #/ Category	Authority	Project Name	Project Description
40135 Cat-2	Kingsville	Drainage Master Plan – Location 7 Improvements	Drainage improvements in the Location 7 drainage basin to relieve flooding along Pasadena Drive and in the Glover Park Subdivision in the southwest side of the City.
40142 Cat-2	Kingsville	Drainage Master Plan – Location 1	Drainage improvements in the Location 1 drainage basin to relieve flooding in Fairview Heights and San Jose Estates subdivisions in the northeast side of the city.
40143 Cat-2	Kingsville	Drainage Master Plan – Location 3	Drainage improvements in the Location 3 drainage basin to relieve flooding in Forest Park 2 subdivision on the east side of the city.
40144 Cat-2	Kingsville	Drainage Master Plan – Location 4	Drainage improvements in the Location 4 drainage basin to relieve flooding in Sarita Park 4/5, and Southmore Acres subdivision on the south-central side of the city.
40192 Cat-2	Kingsville	Drainage Master Plan – Location 8	Drainage improvements on Paulson Falls Drive to improve surface water drainage.

Table 1-10. TWDB FIF Proposed Projects

Abridged App #	Entity Name	Project Name
13606	Bee County	Medio Creek Flood Control Improvements
13605	Bee County	Master Drainage Planning Study
13819	Nueces County DCD#2	Flood Early Warning System
13818	Nueces County DCD#2	Master Drainage Planning Study
13558	Pleasanton	Atascosa Flood Prevention Project
13533	Kingsville	Location 2
13536	Kingsville	Location 5
13537	Kingsville	Location 6
13540	Kingsville	Location 9
13639	Aransas Pass	Stormwater Pump Station #3 (Euclid)
13627	Alice	Pintas Creek at Sunset Dr. & Virginia St. Drainage Improvements
13653	Alice	Master Drainage Planning Study
13608	Driscoll	Master Drainage Planning Study

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Chapter 2 – Flood Risk Analysis

31 TAC § 361.33 and 361.34

Frio River flood in Tilden, July 2002

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2 Flood Risk Analyses

The objective of this chapter is to describe the existing and future condition flood risks. The overall flood risk is determined by defining the flood hazard, exposure, and vulnerability risk as follows and shown in Figure 2-1 below:

- **Hazard** - Determine the location, magnitude, and frequency of flooding;
- **Exposure** - Identify who and what might be harmed within the region; and
- **Vulnerability** - Identify vulnerabilities of communities and critical facilities.

Figure 2-1. Flood Risk Analysis (Source: TWDB Exhibit C Technical Guidelines)

The above information forms the basis for establishing priorities in subsequent planning tasks, to identify areas that need flood management evaluations (FMEs), and to efficiently deploy resources.

2.1 Existing Condition Flood Risk Analyses

2.1.1 Existing Condition Flood Hazard Analysis

The objective of this section is to identify and compile a comprehensive outlook of existing condition flood hazards in the region, including riverine flooding, urban flooding, coastal flooding, and possible flood-prone areas of risks. This effort and the resulting maps are not regulatory in nature but are, instead, intended to gather and present a single, coherent, continuous set of best available information on actual flood risk throughout the region.

To achieve the above objective an existing condition flood hazard analysis was performed to determine the location and magnitude of both 1% annual chance and 0.2% annual chance flood events for the entire region using best available data, including detailed and approximate modeling and mapping data. The process of defining the existing condition flood hazard is as follows:

- **Data Collection** - Collect data and conduct analyses sufficient to characterize the existing conditions for the planning area
- **Availability of Detailed Model Results** - Identify areas where hydrologic and hydraulic model results are already available and summarize the information including the age of the map and modeling information for each area
- **Best Available Data** - Use best available data, hydrologic and hydraulic models for each area
- **Flood Hazard Maps** - Prepare a map showing areas having an annual likelihood of inundation of more than 1% and 0.2%, the areal extent of this information, and sources of flooding for each area
- **Gap Analysis** - Prepare a map showing gaps in inundation boundary mapping and identify known flood-prone areas based on location of hydrologic features, historic flooding and/ or local knowledge

2.1.1.1 Data Collection

Data was collected to obtain best available flood inundation boundaries and to obtain information on additional known flood prone areas. This information is used to determine the existing flood hazard.

Flood Inundation Boundaries

The Texas Water Development Board (TWDB) provided the floodplain quilt, which consists of multiple layers of data from various sources available throughout the state to "quilt" together a single flood hazard dataset. The floodplain quilt does not typically include localized flooding or complex urban flooding problems. Additionally, the Nueces Regional Water Planning Group (NRFPG) obtained inundation boundaries from various entities in the basin and identified known flood-prone areas from stakeholder and public comments.

Additional Known Flood-Prone Areas

Additional known flood-prone areas were determined from historical flood data, local knowledge, and from low water crossing data.

Historical Flood Data

The NRFPG compiled historical flood data from United Stated Geologic Survey (USGS) gage records, National Weather Service (NWS) flood data, publications on historical flood events, and Federal Emergency Management Agency (FEMA) flood damages. This data includes information on past property damage, fatalities, and injuries because of flooding. This information is presented in Appendix C1 – Historic Flood Event Data.

Local Knowledge

Four subregional meetings (one for each subregion) were held May 17 through May 20, 2021, to introduce the regional flood planning process and gather local knowledge of flood-prone areas, flood mitigation projects, and needs. The NRFPG received information on 44 flood-prone areas from these initial meetings. Additionally, an interactive on-line public comment map was posted on the Nueces River Authority's Region 13 website (Home - Nueces Regional Flood Planning Group (Region 13) (https:/www.nueces-rfpg.org)) to allow stakeholders and citizens the opportunity to identify flood-prone areas for consideration in the regional flood plan (RFP).

The NRFPG presented available flood hazard data from the "floodplain quilt", local knowledge, and historical flood data to the public at the June 28, 2021 RFPG meeting. The purpose of this public meeting was to identify additional flood hazards that may have not been identified in the initial maps. Additional flood prone areas were received via the interactive geographic information systems (GIS) map and added to the flood hazard data. The interactive map comment period was open from April through September 2021 and gathered an additional 143 comments on flood-prone areas, which when combined with the initial May 2021 roadshows increased the known flood-prone area total to 187.

Additional outreach was performed in February, March, and April of 2022. Three subregional meetings were held: Mid-basin meeting on March 8 in Cotulla, upper basin on March 21 in Leakey, and Lower basin on March 22 in Sinton. Overall, nine counties, eight cities, one drainage district, the National Weather Service, USGS, and Texas A&M University attended. At the regional meetings, the NRFPG presented the latest updates of the development of the RFP and recorded stakeholders' highest flood-related needs. The NRFPG also sent out an interview request to all entities with flood-related authority in February of 2022 to gain further information on highest flood-related needs, high flood risk areas, and ongoing and potential flood-related projects and studies. Through this effort, 20 interviews with various communities were conducted. Stakeholders' input at the regional meetings and interviews were recorded in detail, discussed afterwards, and incorporated into the RFP. As a result of the additional outreach, the total number of obtained flood-prone points grew by 87 to total 274. The flood-prone points are shown for the entire basin in Figure 2-2 and can be seen in detail on a county level in Appendix B23 – Flood Hazard Risk, Flood Risk Score, and Recommended Flood Mitigation Actions County Maps.

Low Water Crossings

Low water crossings (LWCs) are considered potential flood-prone areas due to their inherent life-loss risk during flood conditions. A total of 576 LWCs were identified within the basin (See Section 1.11 for more information on how LWCs were defined and identified). Note this is not an exhaustive list of all known LWCs. For this first planning

cycle, the community feedback on flood-prone points is used to identify any additional flood-prone and hazardous LWCs. LWC locations are shown later in the Flood Hazard Map section (Section 2.1.2.4) and associated Figure 2-9 through Figure 2-12. These are also viewable in the county flood hazard maps in Appendix B23 – Flood Hazard Risk, Flood Risk Score, and Recommended Flood Mitigation Actions.

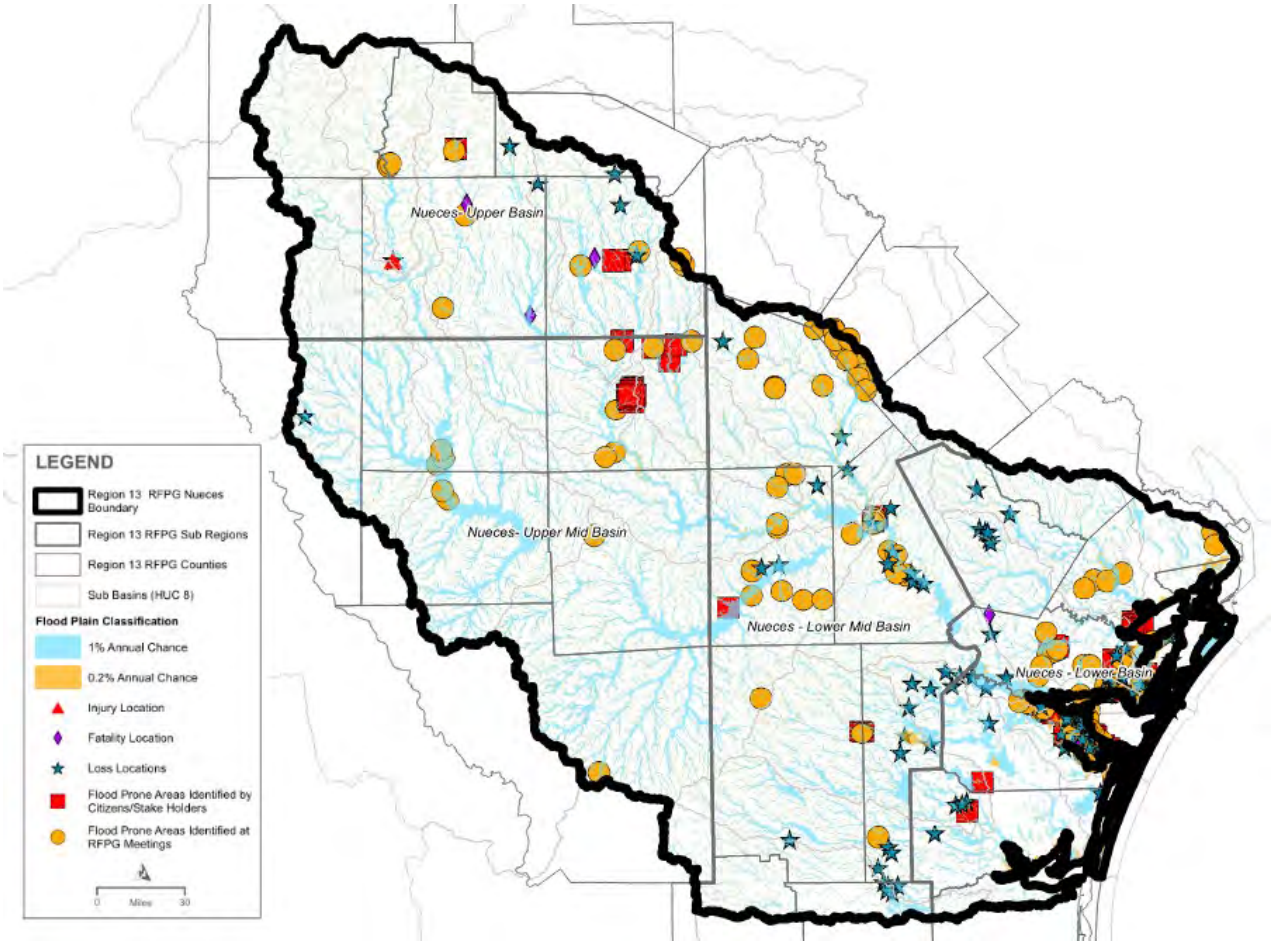


Figure 2-2. Additional Known Flood-Prone Areas

2.1.1.2 Availability of Detailed Model Results

The location of existing available hydrologic and hydraulic model results for mapping are shown for the Nueces Basin in Figure 2-3. Only the National Flood Hazard Layer (NFHL) preliminary and effective data are considered flood mapping data available on a regional scale and based on detailed hydrologic and hydraulic models. The availability of detailed hydrologic and hydraulic models is depicted in Figure 2-4. The remainder of the basin, minus several localized detailed models, are considered approximate model results, which means the models were developed using efficient means for large areas and lack detailed information and development. For example, approximate models may not consider features like roadways that alter flow patterns and may not fully represent natural features like small tributaries and water bodies. Approximate model results include Base Level Engineering (BLE), First American Flood Data Services (FAFDS),

Cursory Floodplain Data, and NFHL approximate sources. Most of the basin is based on approximate data. BLE modeling and mapping is projected to be completed for all watersheds in the Nueces basin by the end of Fiscal Year 2023 per TWDB's BLE status viewer.

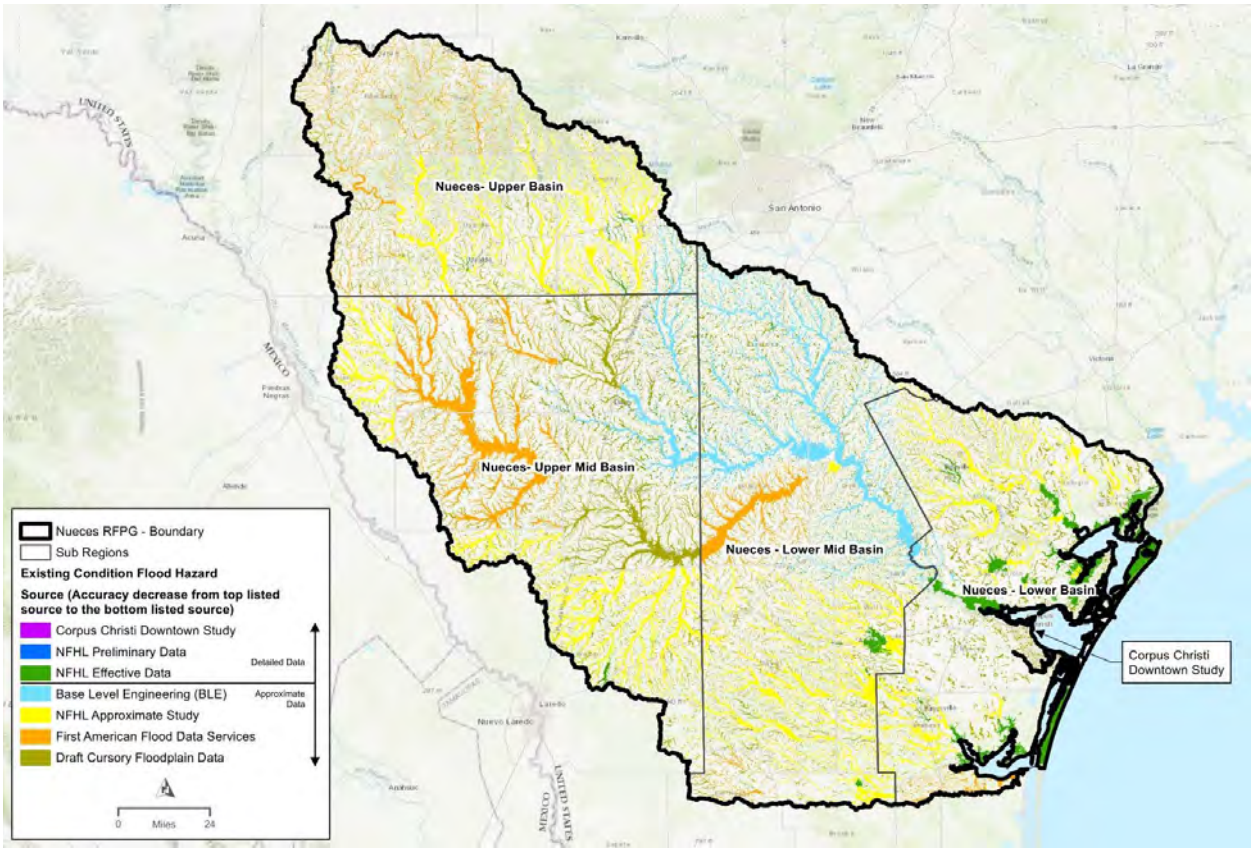


Figure 2-3. Source of Flood Modeling and Mapping Data (Map 5A)

List of Detailed Models

The list of detailed models with brief descriptions are provided below:

NFHL Pending – This data is comprised of the most recent detailed and approximate studies and are pending release as an Effective FIRM.

NFHL Preliminary – This data maps the 1% and 0.2% annual chance storm events and has been issued for public review and awareness of proposed change. Preliminary models available for Nueces County.

NFHL Effective Models (Detailed Study Areas only) – This data has flood hazard information that includes detailed studies (Flood Zones AE, AO, AH, and VE) and is the current effective FIRM. This data includes Letter of Map Revision (LOMR) information that was effective when obtained.

Corpus Christi Downtown Detailed Study Model – Two-dimensional (2D) hydraulic model of the seclusion area performed by HDR in 2016 for the salt flats levee system in downtown Corpus Christi.

Cotulla LOMR Model – Provides a detailed Hydrologic Engineering Center-River Analysis System (HEC-RAS) model used for a 2022 LOMR for the City of Cotulla.

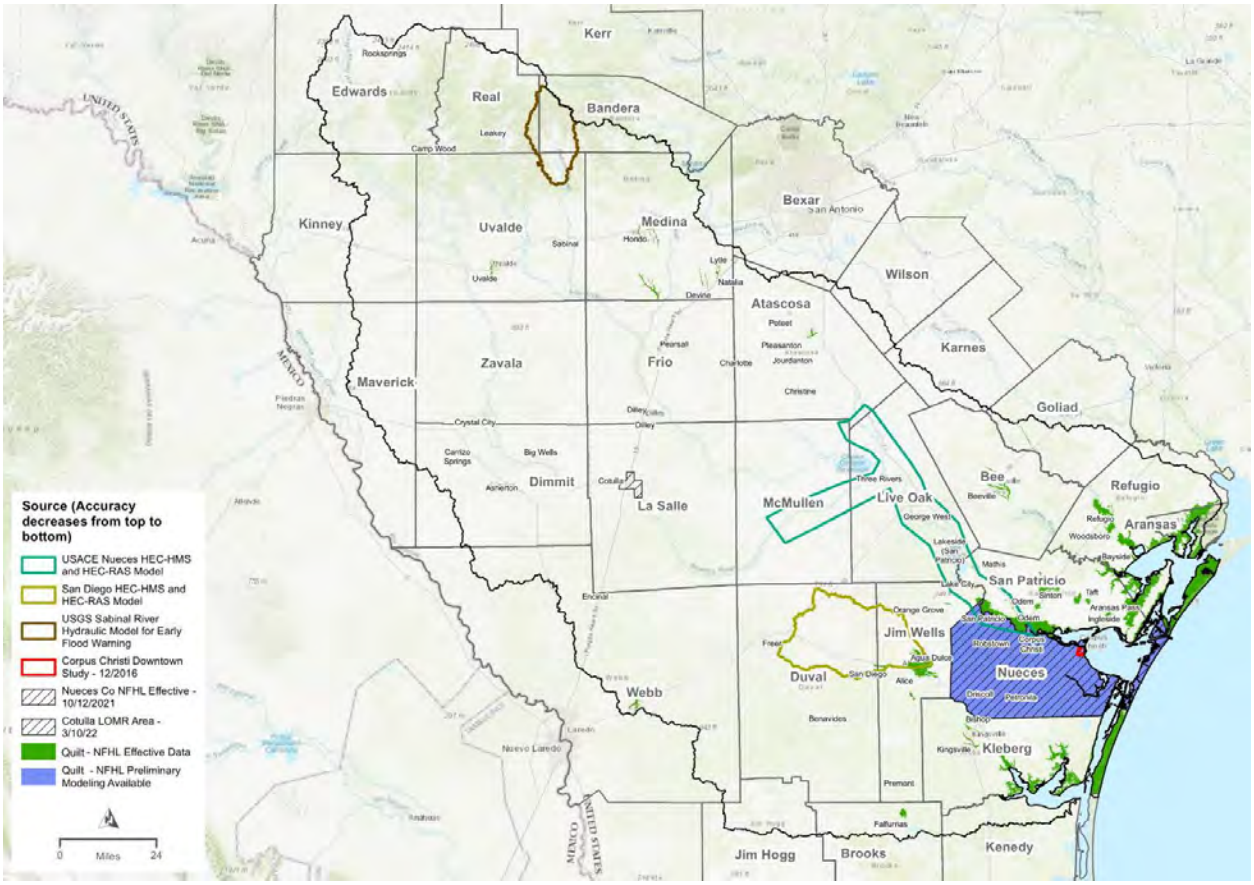


Figure 2-4. Detailed Hydrologic and Hydraulic Model Availability (Map 22)

List of Approximate Models

Base Level Engineering (BLE) – BLE is an efficient modeling and mapping approach that is considered an approximate study and meant to compliment the current effective Flood Insurance Rate Map (FIRM) where applicable. BLE results were provided in the TWDB floodplain quilt as shown in Figure 2-3. Recently, 2021 BLE model results were received for the Laguna Madre area with all watersheds in the Nueces basin scheduled for completion by the end of Fiscal Year 2023 per TWDB's BLE status viewer.

NFHL Effective Data (Approximate Study Areas only) – This data has flood hazard information that includes approximate studies (i.e. Flood Zone A) on the effective FIRM map.

FAFDS – This data contains digitized flood hazard information from previously published FIRMs and FISs and is not available on the NFHL. Available for portions of McMullen, Dimmit, Zavala, and Frio counties.

Draft Cursory Floodplain Data – Draft Cursory Floodplain Data was provided in July of 2021 for the 1% annual chance flood event. The Draft Cursory Floodplain Data was

based on a 30-meter digital elevation model (DEM). This data was used for areas with no other floodplain information.

Cursory Floodplain Data - The Cursory Floodplain Data was provided in December of 2021 and provides 1% and 0.2% annual chance flood inundation boundaries. This model is based on Atlas 14 rainfall data and available laser altimeter datasets (Lidar) to produce a 3-meter ground surface grid for final mapping. Due to large processing requirements and timing of the draft 2023 RFP schedule, the Cursory Floodplain Data was not incorporated into the 2023 Region 13- Nueces RFP. Cursory Floodplain Data is intended for use for areas with no available flood mapping data until the BLE data becomes available.

Other Available Detailed Hydrologic and Hydraulic Models in the Nueces not used for Mapping

U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Center-Hydrologic Modeling System (HEC-HMS) 4.2 model - This hydrologic model encompasses the entire Nueces basin and is part of the Corps Water Management System (CWMS) and is used to develop a real-time simulation (HEC-RTS [Hydrologic Engineering Center-Real Time Simulation]) for watershed stakeholders. The model includes 102 sub-basins, 84 stream routings, 84 junctions, 36 calibration gages and two reservoirs (Choke Canyon and Lake Corpus Christi). Calibration/validation events include July 2002 and June/July 2007 and October 2018. This model, the extent of which is shown in Figure 2-5, is currently under development.

Figure 2-5. USACE HEC-HMS Model Extents (Source: USACE, 2021)

USACE's Nueces River HEC-RAS 5.0.6 Model - This model is also a part of the USACE CWMS for Nueces River and consists of a 1D steady/unsteady model, which includes portions of Atascosa River, Frio River downstream of Choke Canyon, and Nueces River from Tilden down to Odem (between Lake Corpus Christi and Corpus Christi Bay). This model was not used to map the 1% or 0.2% annual chance flood inundation boundaries. This model, the extent of which is shown in Figure 2-4 and Figure 2-6, is currently under development.

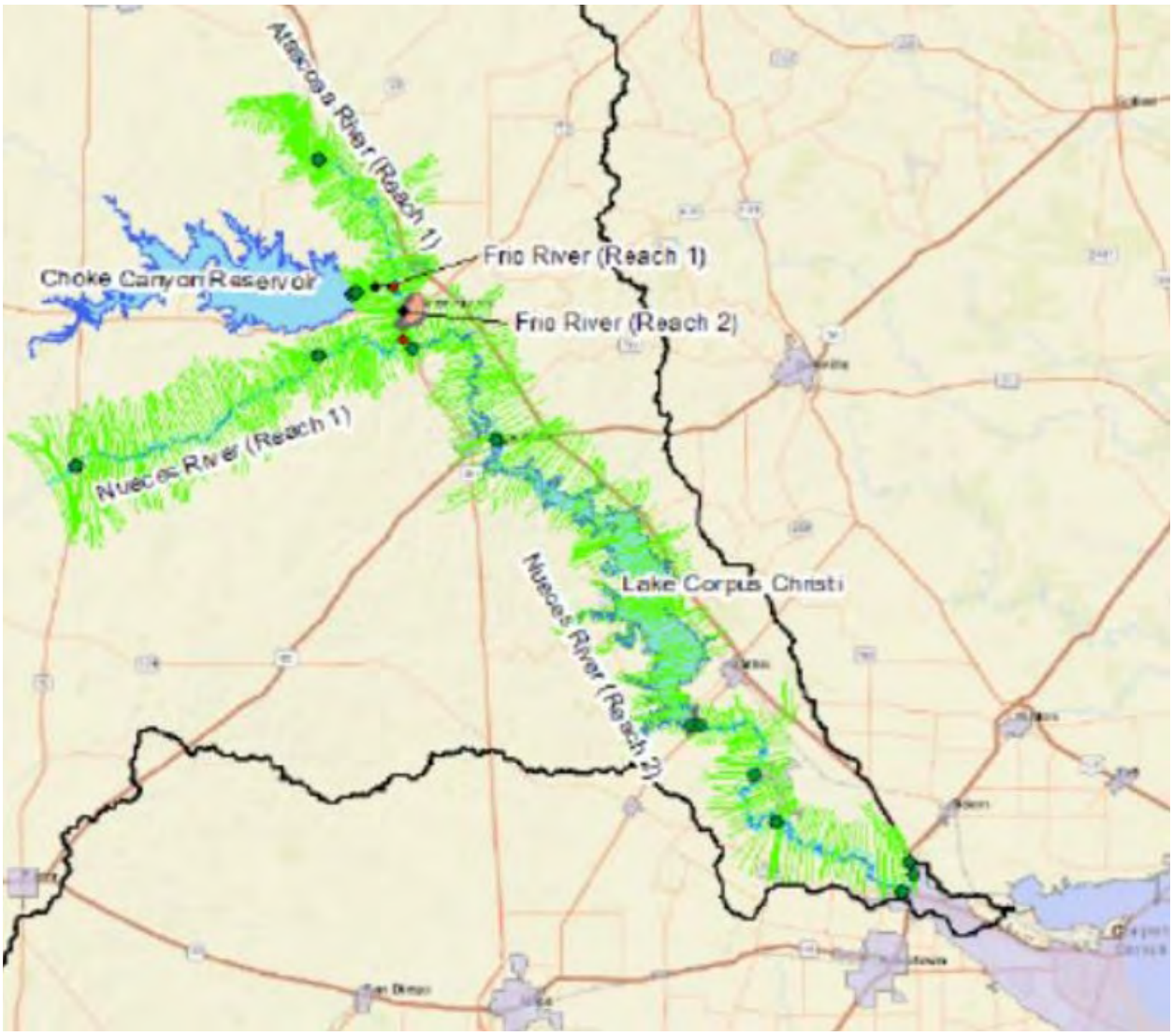


Figure 2-6. USACE Nueces HEC-RAS Model Extents (Source: USACE, 2021)

USACE San Diego HEC-HMS and HEC-RAS models - These models include the main stem of San Diego Creek, in Duval and Jim Wells Counties near Alice, San Diego, and Freer. San Diego Creek, Amargosa Creek, Chiltipin Creek, Muerto Creek, Res de Enmedio, Rosita Creek, San Fernando Creek, Toro Creek, and Lake Alice are modeled. This model was not used to map the 1% or 0.2% annual chance flood inundation boundaries. This model, the extent of which is shown in Figure 2-4 and Figure 2-7, is currently under development.

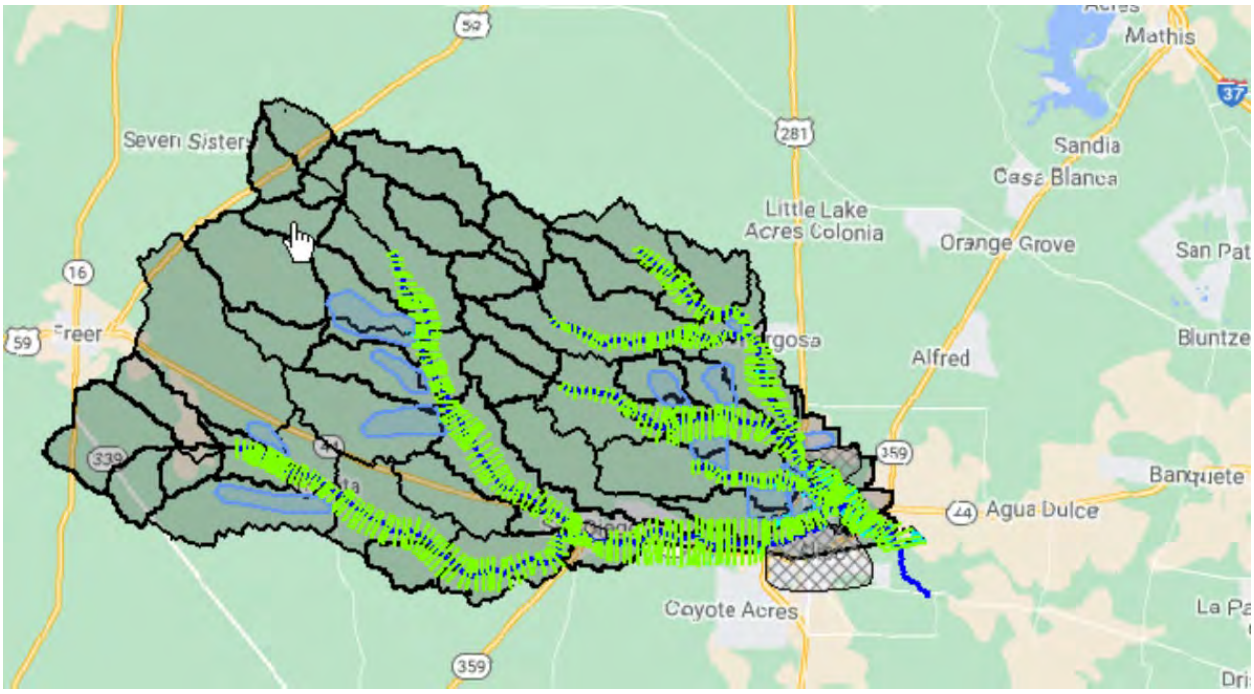


Figure 2-7. USACE San Diego Model Extents (Source USACE, 2021)

USGS Sabinal Flood Warning Model – This model is being developed for the purposes of flood warning and was not used to map the 1% and 0.2% flood inundation boundary. This model, the extent of which is shown in Figure 2-4 and Figure 2-8, is currently under development.

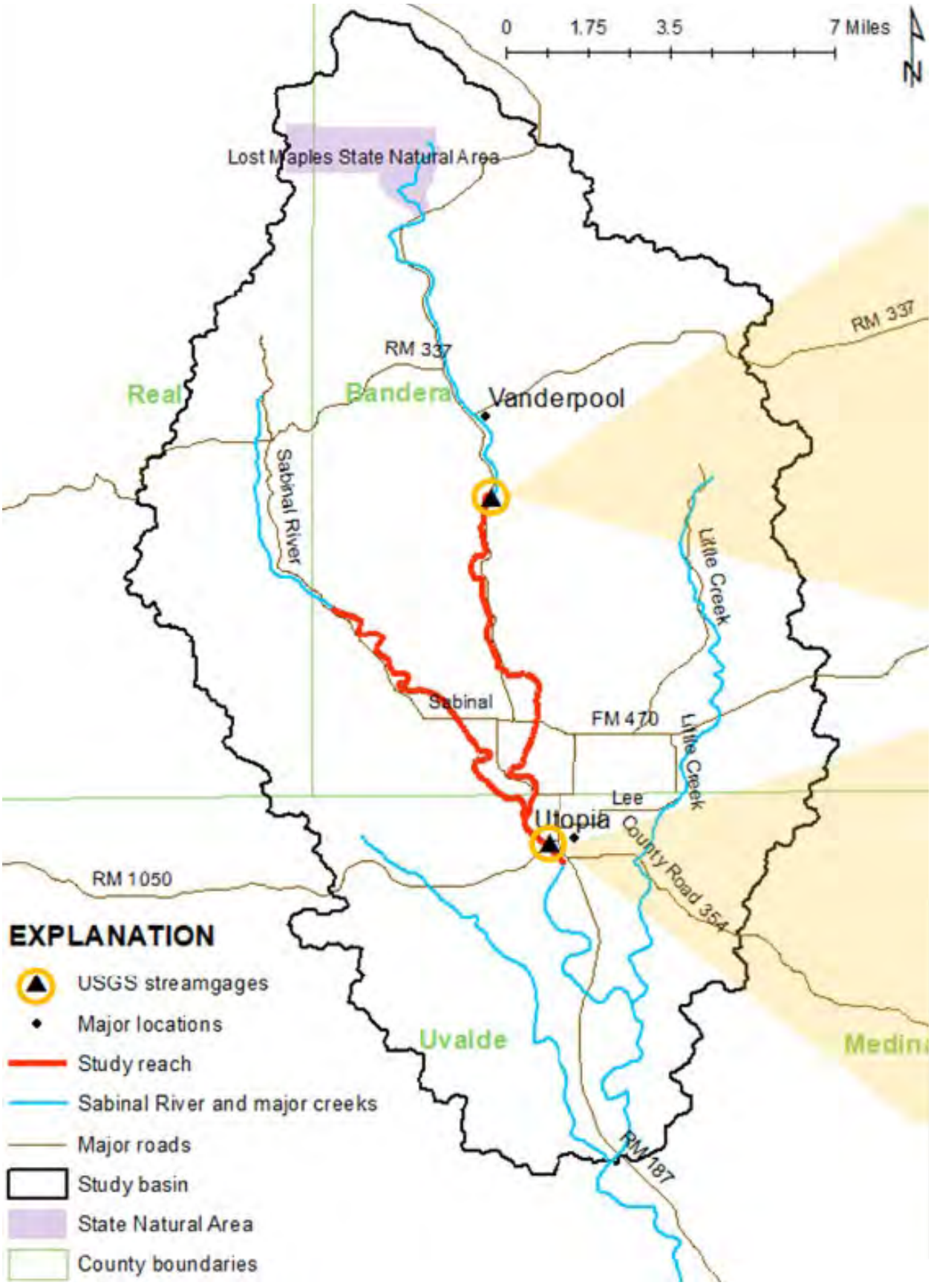


Figure 2-8. Sabinal Model Extents (Source USGS)

2.1.1.3 Best Available Data

The quality of available modeling and mapping data was assessed based on its date and level of detail in development. More detailed floodplain coverages supersede less detailed floodplain coverages for the same location. The best available information was used in the plan to define the extents of the 1% and 0.2% annual chance flood event boundaries. The following list shows the various flood inundation data sets used in order of highest to lowest accuracy.

Detailed Data Sets

1. Inundation boundaries produced by governmental entities through detailed modeling
    a. Corpus Christi Downtown Study
    b. Cotulla LOMR (to be added in the Revised 2023 Region 13- Nueces RFP)
2. NFHL Effective and Preliminary Data

Approximate Data Sets

3. BLE
4. NFHL Approximate Study Areas
5. FAFDS
6. Cursory Floodplain Data
7. Draft Cursory Floodplain Data
8. Additional Known Flood Prone Areas

More recent and accurate Cursory Floodplain Data has been received but not implemented into the inundation boundaries at this time due to their large data processing requirements and the timing of this initial plan. The new Cursory Floodplain Data has 30-meter modeling and 3-meter mapping accuracy and uses Atlas 14 rainfall data. Complete BLE coverage of the basin is anticipated by the end of 2023, which will provide higher accuracy floodplain coverage than other available approximate data sets.

2.1.1.4 Flood Hazard Maps

Areal Extent of 1% and 0.2% Annual Likelihood of Inundation

The 1% and 0.2% annual chance flood inundation boundaries were defined for all waterways with contributing drainage areas larger than 1 square mile for the entire basin. This complete coverage was due in part to the availability of Draft Cursory Floodplain Data flood inundation boundaries for the entire basin. The most accurate inundation boundaries were applied when multiple inundation data sets were available.

A large portion of the regional flood planning area contains approximately 1% annual chance flood inundation boundaries but no 0.2% annual chance flood inundation boundaries (i.e., NFHL approximate study areas or lower accuracy data). Thus, for these areas, the 0.2% annual chance flood inundation boundary had to be estimated for approximate areas by buffering the 1% annual chance inundation boundary by 100 feet

to each side. This 100-foot buffer was approximated by evaluating portions of the region that had available detailed studies that defined both the 1% and 0.2% annual chance flood inundation boundary using a similar offset between the 1% and 0.2% annual chance flood inundation boundary.

The existing condition 1% and 0.2% annual chance flood inundation boundaries are provided in the geodatabase (i.e., ExFldHazard) and shown in Figure 2-9 through Figure 2-12 and on a county level basis in Appendix B23 – Flood Hazard Risk, Flood Risk Score, and Recommended Flood Mitigation Actions County Maps.

Source of Flooding

The source or type of flooding can be riverine; pluvial, including urban flooding; or coastal flooding. The various sources of flooding are further defined below. Riverine and pluvial flooding are the primary sources of the 1% and 0.2% inundation boundaries shown in the flood hazard maps, except for flood hazard areas located along the coastline subject to storm surge inundation. Flood hazard areas identified as flood prone were identified from local knowledge of flood prone areas and typically are representative of pluvial or urban flooding. The type of flooding for the 1% annual chance floodplain are shown in xx for the various subregions.

- Riverine Flooding – This type of flooding is caused by bank overtopping when the flow capacity of rivers and streams is exceeded locally. The rising water levels generally originate from high-intensity rainfall creating soil saturation and large volumes of runoff either locally and/or in upstream watershed areas.
- Pluvial Flooding including Urban Flooding – Pluvial flooding occurs when heavy rainfall collects on the landscape. Urban flooding is caused when the inflow of stormwater in urban areas exceeds the capacity of drainage systems to infiltrate stormwater into the soil or to carry it away.
- Coastal Flooding – This type of flooding occurs when normally dry, low-lying land is flooded by seawater.

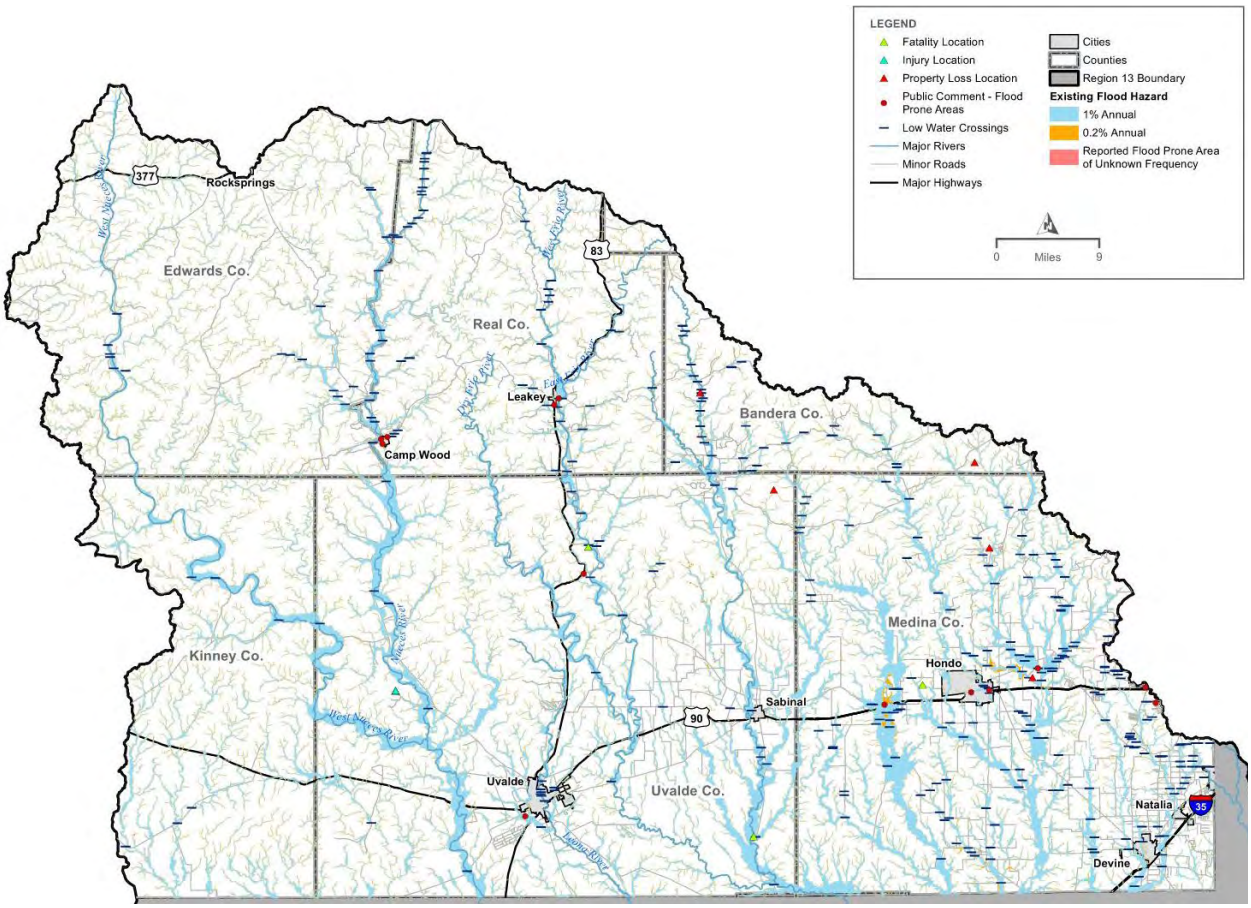


Figure 2-9. Flood Hazard Areas and Source of Flooding in the Upper Nueces Basin (Map 4A)

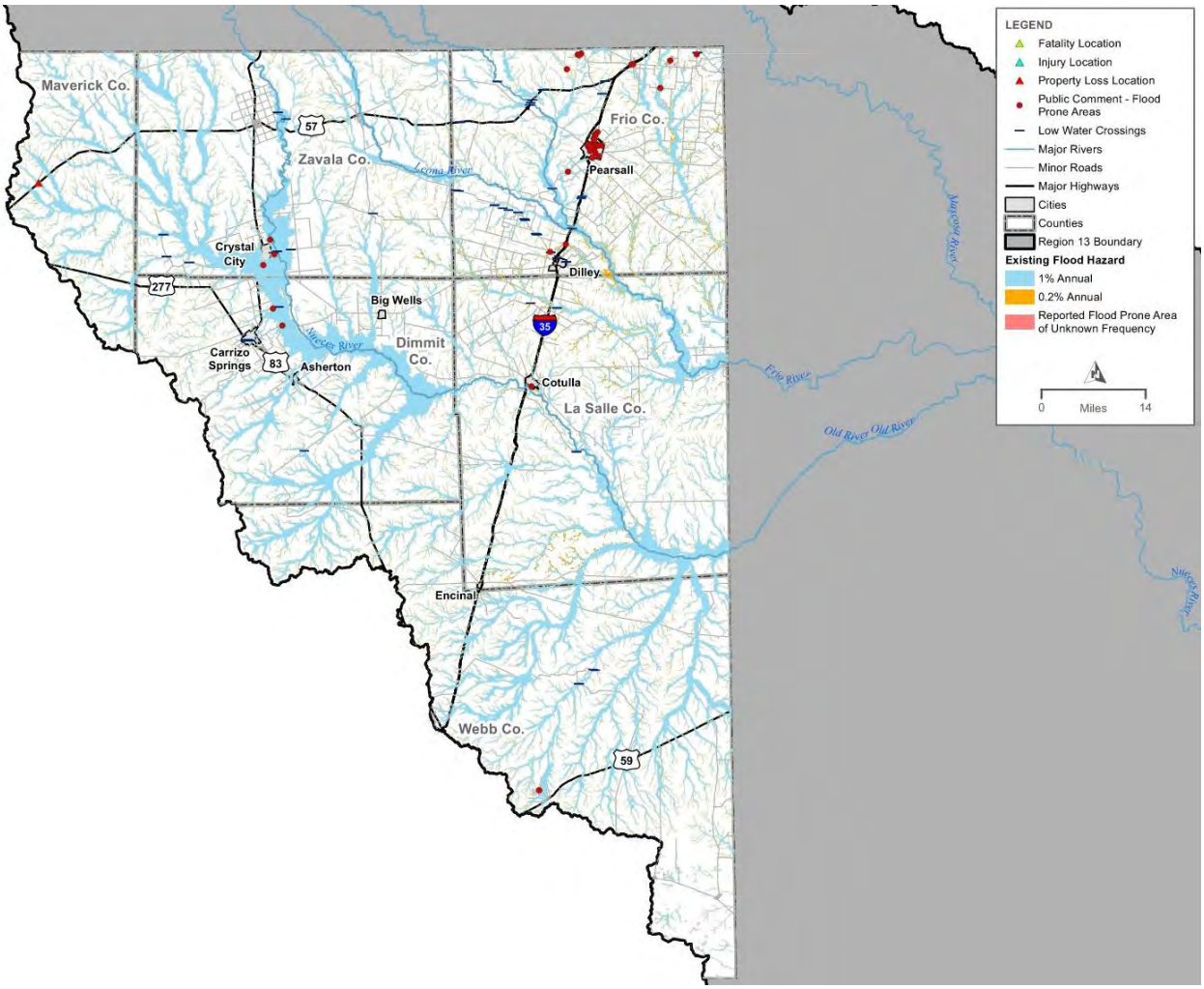


Figure 2-10. Flood-Hazard Areas and Source of Flooding in the Upper Mid-Nueces Basin (Map 4B)

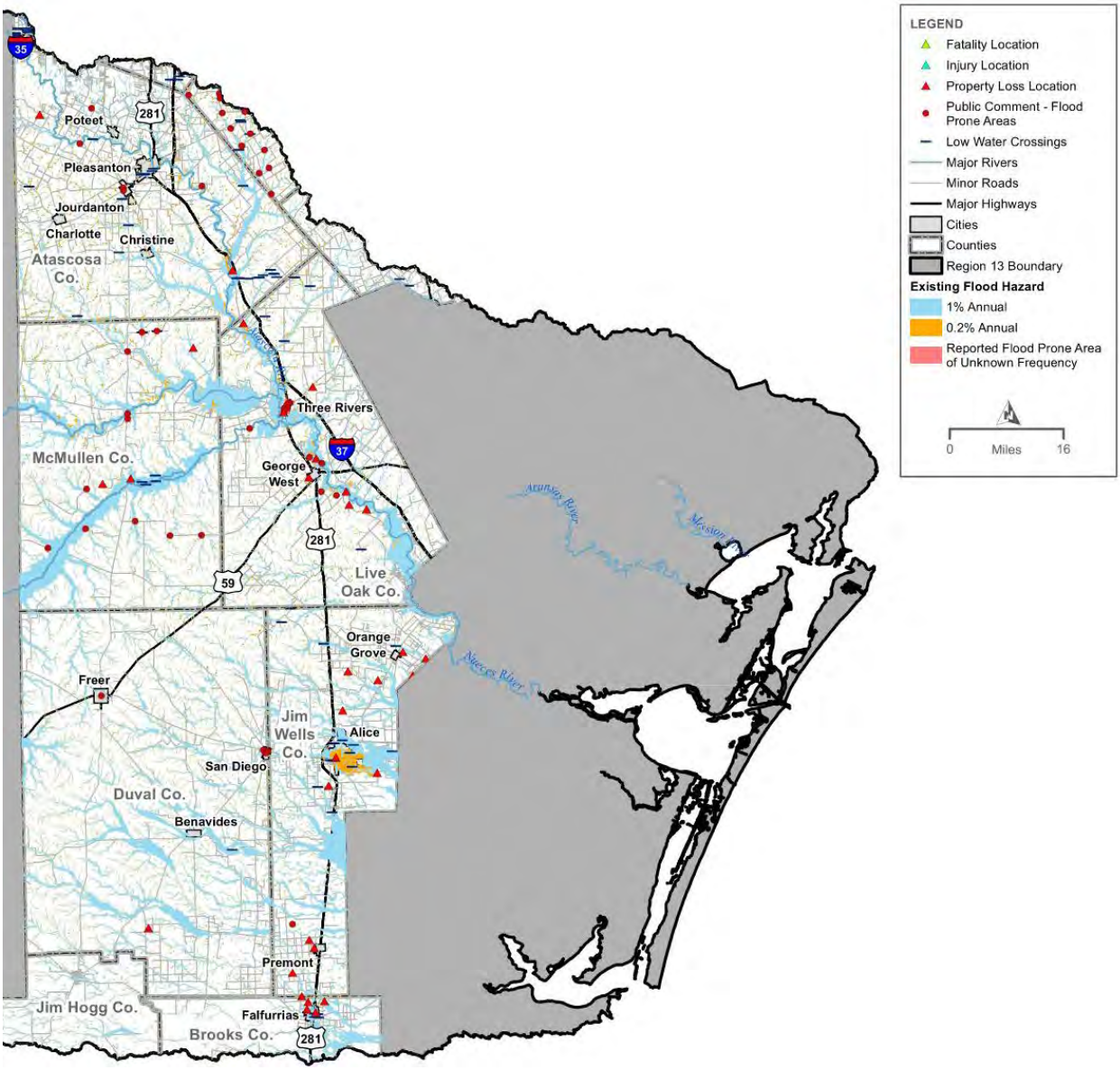


Figure 2-11. Flood Hazard Areas and Source of Flooding in the Lower Mid-Nueces Basin (Map 4C)

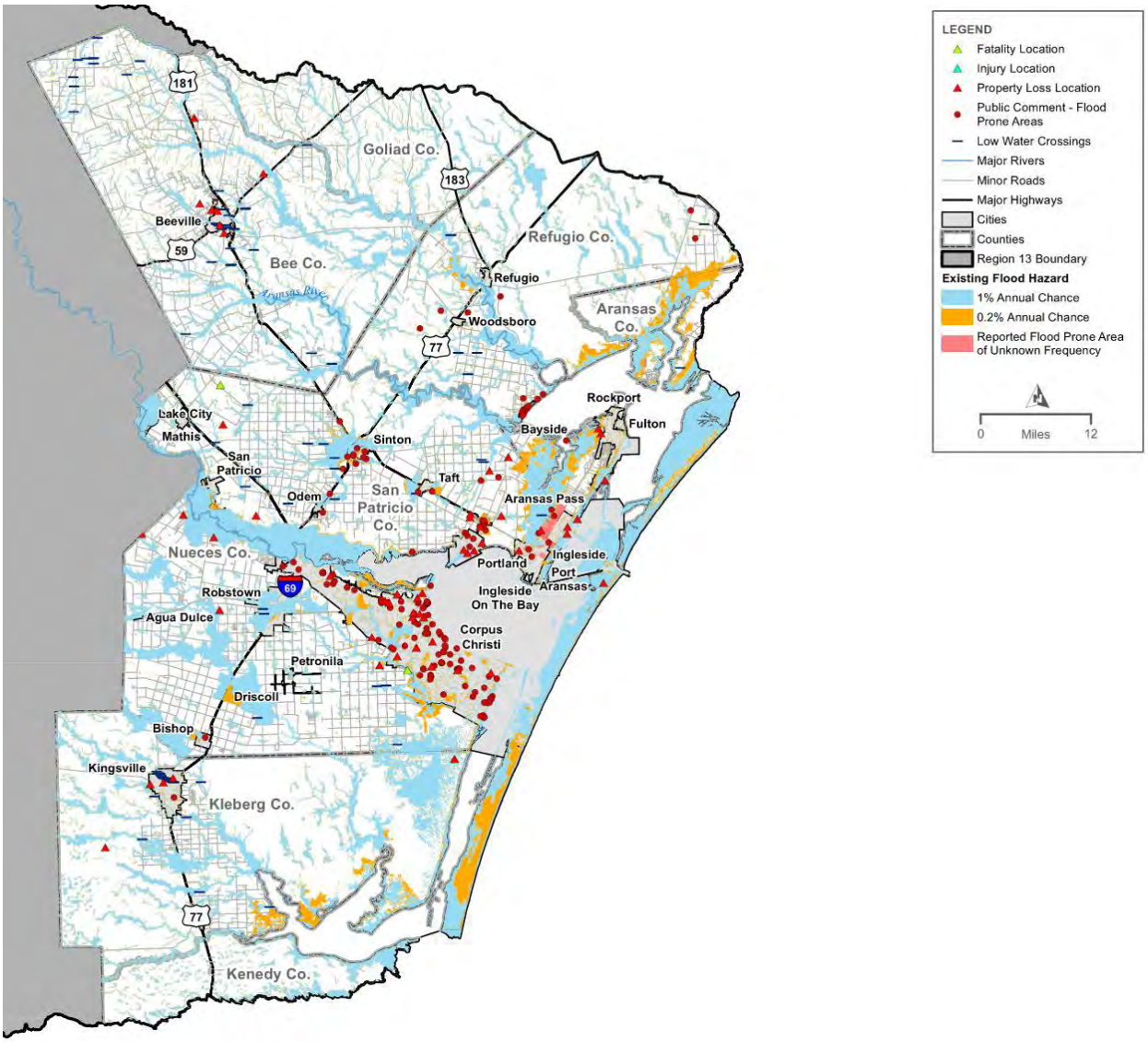


Figure 2-12. Flood Hazard Areas and Source of Flooding in the Lower Nueces Basin (Map 4D)

2.1.1.5 Gap Analysis

The map in Figure 2-13 shows remaining gaps in flood risk inundation boundary mapping relative to identified known flood-prone areas based on the location of hydrologic features, historic flooding, and/or local knowledge for areas that lack modeling and mapping. The map identifies areas with clearly outdated modeling and/or mapping, the absence of modeling and/or mapping, and areas with modeling and/or mapping that require updates. Areas that require updates include areas with significant rainfall frequency data changes. The gap analysis reviews conflicting or overlapping datasets to determine which is considered “best available” for each area within the region. The gaps can be used to recommend potential FMEs.

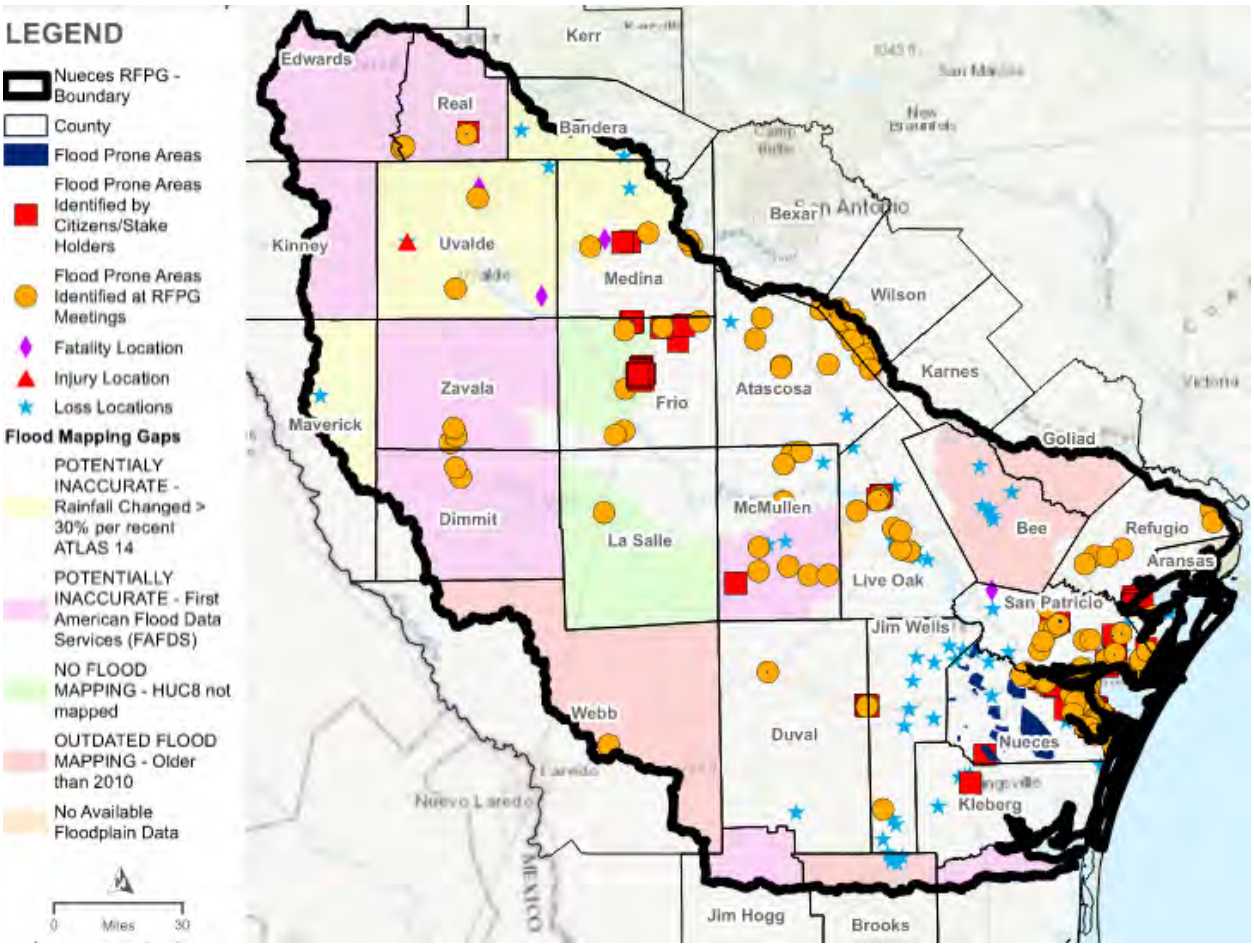


Figure 2-13. Inundation Boundary Gaps and Known Flood Prone Areas (Map 5C)

The following counties, as shown in Figure 2-13, have been identified as having no flood inundation maps available for at least a portion of the counties:

- La Salle
- Frio

The following counties, as shown in Figure 2-13, have been identified as having potentially inaccurate maps due to outdated mapping (includes FAFDS mapping):

- Mapping occurring prior to the year 2000.
  - Edwards
  - Real
  - Kinney
  - Zavala
  - Dimmit
  - McMullen
  - Jim Hogg
  - Kenedy
- Mapping occurring prior to the year 2010.

- Webb
- Brook
- Bee

The following counties, as shown in Figure 2-13 and Figure 2-14, have been identified as having potentially inaccurate maps due to new rainfall data published in 2018, which increased rainfall by more than 30%.

- Maverick
- Kinney
- Edwards
- Real
- Uvalde
- Bandera
- Medina

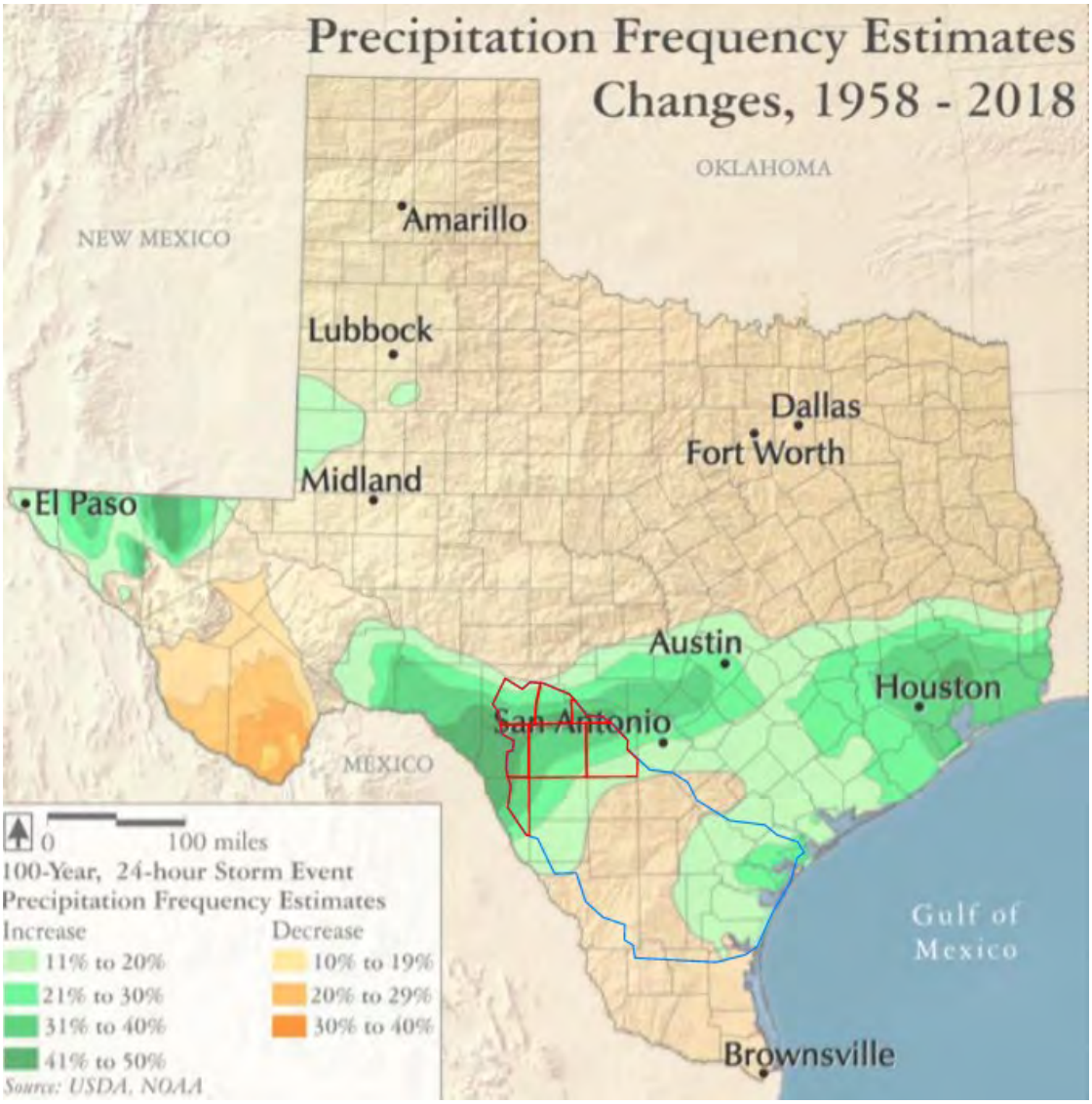


Figure 2-14. Percent Change of Precipitation Frequency Estimates (USDA, NOAA)

2.1.1.6 Existing Condition - Total Land Area at Flood Risk

This flood hazard analysis summarizes total area and agricultural area within the 1% and 0.2% annual chance flood risk, which is summarized by county in Appendix A3 – TWDB Table 3 – Existing Condition Flood Risk Summary Table. Total land area within the Nueces Flood Planning region at risk of 1% annual chance flood inundation is summarized by county and flood risk type (riverine, pluvial, and coastal) in Figure 2-15. In total, 4,578 square miles of land (19.0% of all land in the basin) is at risk of 1% annual chance flood inundation, with 71% of the inundation occurring as the result of riverine flooding. An additional 1,287 square miles is at risk of 0.2% annual chance flood inundation. The total land at risk of 1% or 0.2% annual chance flood inundation is 5,865 square miles (24.3% of all land in the basin).

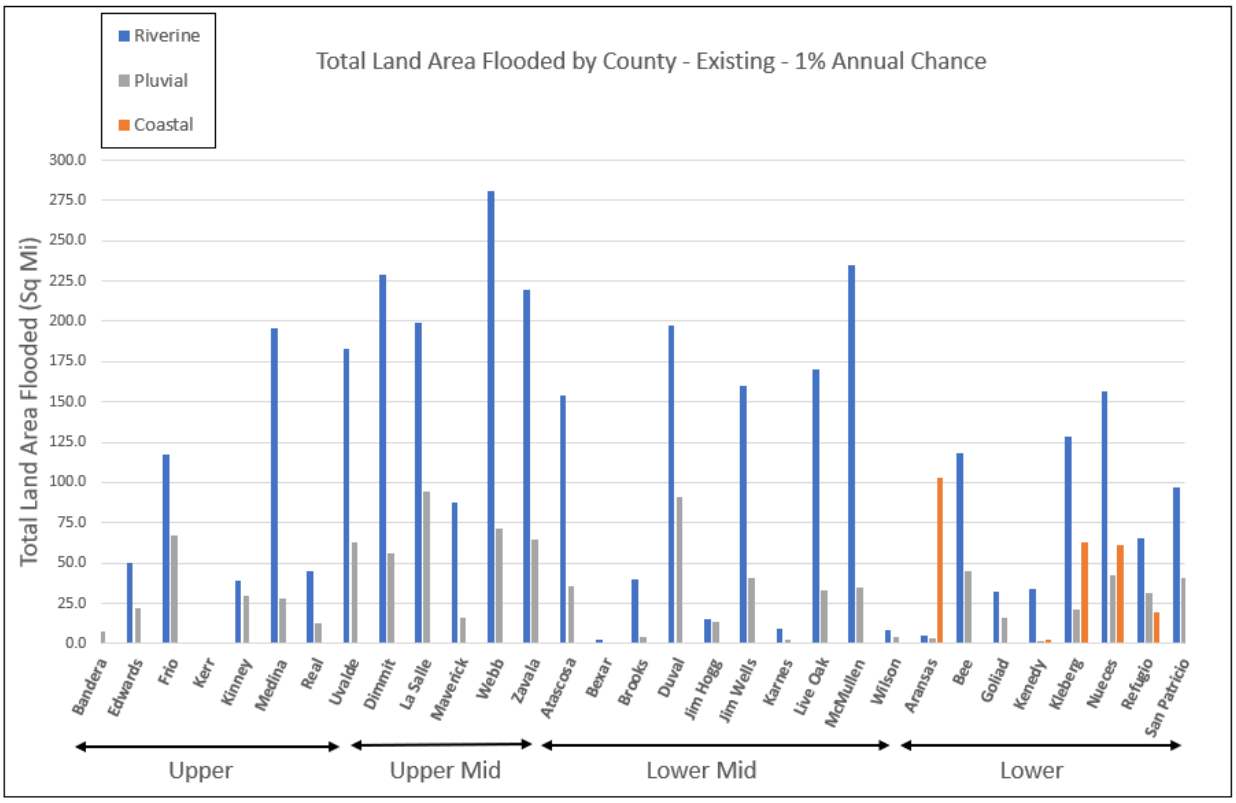


Figure 2-15. Total Land Area at Flood Risk of 1% annual chance storm by Type, County - Existing Condition

2.1.2 Existing Flood Exposure Analyses

2.1.2.1 Analysis of Existing Development within Existing Flood Hazard

The existing flood exposure analyses is a high-level, region-wide, GIS-based analyses to identify who and what might be harmed by flooding. This includes identifying all structures located within both the 1% and 0.2% annual chance flood event and possible flood prone area boundaries, as defined in the existing flood hazard analysis in Section 2.1.1.

The existing condition flood exposure analysis indicated roughly 61,000 structures and a population of 137,000 at potential risk of flooding from the 1% annual chance flood event. This grows to 98,000 structures and a population of 223,000 at potential risk of flooding from the 0.2% annual chance flood event. A heat map was produced to illustrate where these structures are generally clustered in the Nueces Flood Planning Region, as shown in Figure 2-16. From this analysis, several hot spots for flood exposure appear to be:

(1) the City of Corpus Christi area, including Robstown

(2) the Rockport, Ingleside, and Port Aransas areas

(3) cities in the lower basin including Alice, Sinton, Kingsville, Falfurrias, and Beeville

(4) areas along the Nueces River from the City of Three Rivers to Corpus Christi

(5) cities in the upper basin, including Crystal City, Knippa, D'Hanis, Uvalde, Hondo, Pearsall, Devine, Sabinal, and Dilley

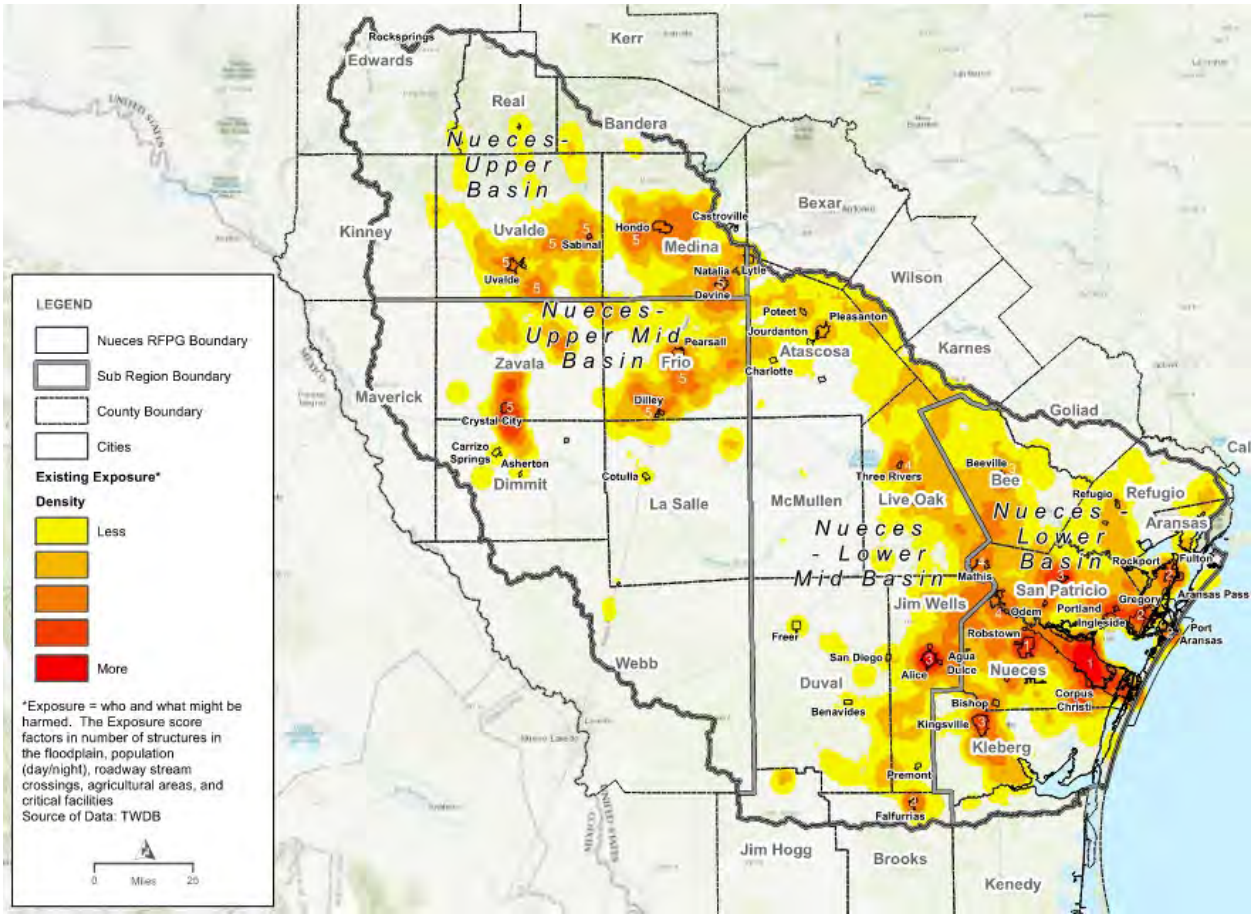


Figure 2-16. Existing Condition Exposure Analysis (Map 6)

2.1.2.2 Proposed Flood Mitigation Projects

This existing flood exposure analysis did not include any flood mitigation projects with dedicated construction funding and scheduled for completion prior to adoption of the next state flood plan.

2.1.2.3 Non-accredited Levees and Dams

This existing flood exposure analysis assumes existing levees or dams are in place and providing flood protection as shown in the best available flood hazard maps. This assumption was made due to data limitations associated with this being the first flood plan. Future flood plan updates should further consider non-accredited levees and dams in the exposure analysis.

2.1.2.4 Flood Exposure to Property, Population, and Infrastructure

See Appendix A3 – TWDB Table 3 – Existing Condition Flood Risk Summary Table, which provides on a county basis the number of structures, population, roadway stream crossings, roadway segments, agricultural areas, and critical facilities located in the 1%and 0.2% annual chance flood risk, and in the possible flood prone areas. The flood exposure analysis includes a determination of day and night population estimates that are located within the flood hazard areas with the higher of the day or night estimate used in estimating the population in the floodplain or flood-prone area.

2.1.2.5 Expected Loss of Function

The exposure analysis indicates that approximately 61,000 structures are at potential risk of flooding from a 1% annual chance storm event. Flooding of structures can cause temporary and/or permanent loss of use and can damage the structural elements through hydrostatic and hydrodynamic loads pushing against the building and its foundation. At a minimum flooded structures incur damage to building materials.

The exposure analysis indicates that approximately 3,200 miles of roadway and 5,400 roadway crossings are at risk of flooding from the 1% annual chance storm event. These roadways have the potential to be impassible for an extended period depending on the depth of flooding. Flooding of roadways can potentially leave populations stranded and inaccessible to emergency services during a time of distress.

2.1.3 Existing Vulnerability Analysis

The objective of this analysis is to identify critical infrastructure amongst the items identified in the existing condition flood exposure analysis and to compute Social Vulnerability Index (SVI) values for each structure identified during the flood exposure analysis. The SVI values were obtained from the U.S. Centers for Disease Control and Prevention (CDC), which calculates SVI using 15 U.S. census variables as shown in

Figure 2-17 to help local officials identify communities that may need support before, during, or after disasters (https://www.atsdr.cdc.gov/placeandhealth/svi/index.html).

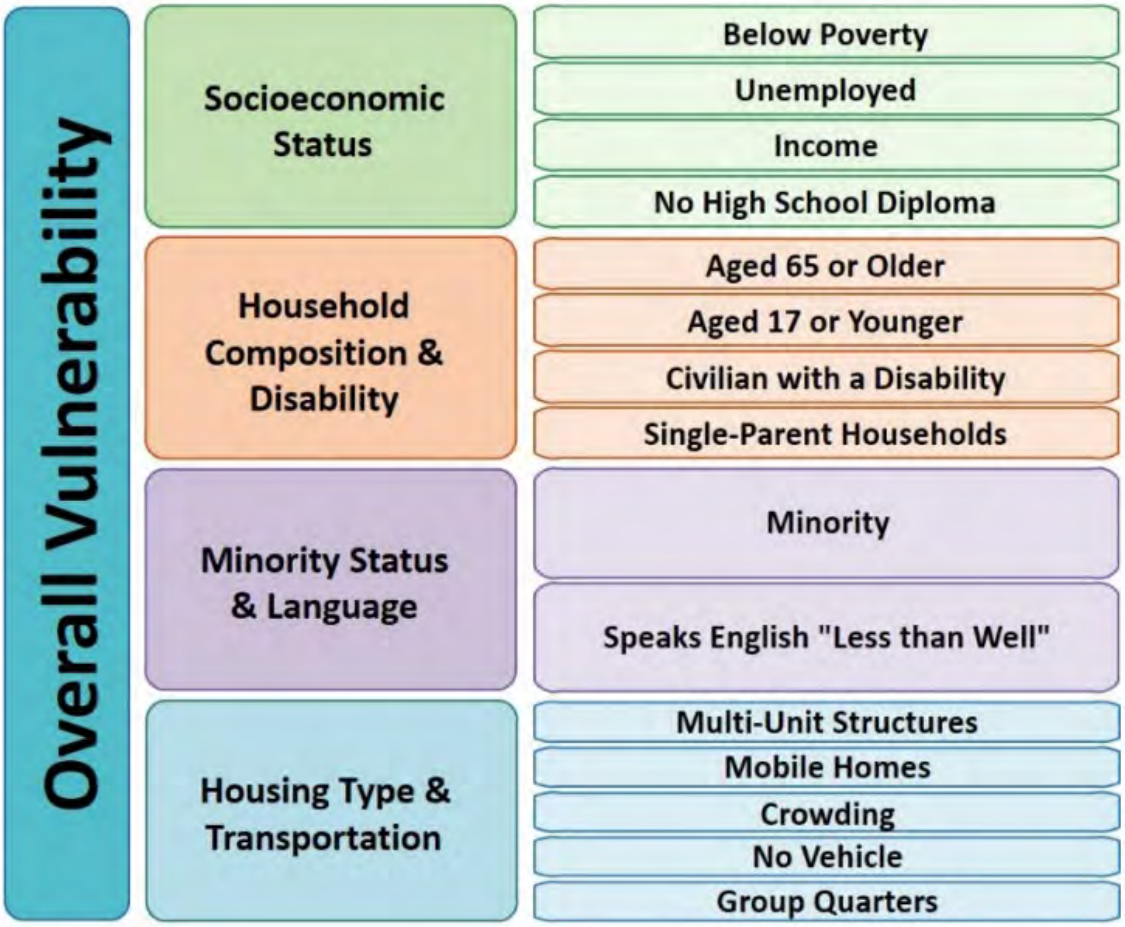


Figure 2-17. SVI Variables (CDC SVI 2018)

SVI is intended as the proxy for resilience for this planning cycle. The higher the SVI, the higher the vulnerability. The TWDB provided building data with SVI values for use in this analysis. An assigned SVI value over 0.75 for any given structure is consider vulnerable in this analysis.

2.1.3.1 Vulnerability of Critical Facilities

Critical infrastructure includes any schools (K-12), hospitals, police stations, and fire stations in the region. The flood vulnerability analysis identified approximately 445 critical facilities in the 1% annual chance flood inundation. Figure 2-18 shows the location of critical infrastructure in the region most vulnerable to flooding. Appendix A3 – TWDB Table 3 – Existing Condition Flood Risk Summary Table provides the number of critical facilities identified on a per county basis.

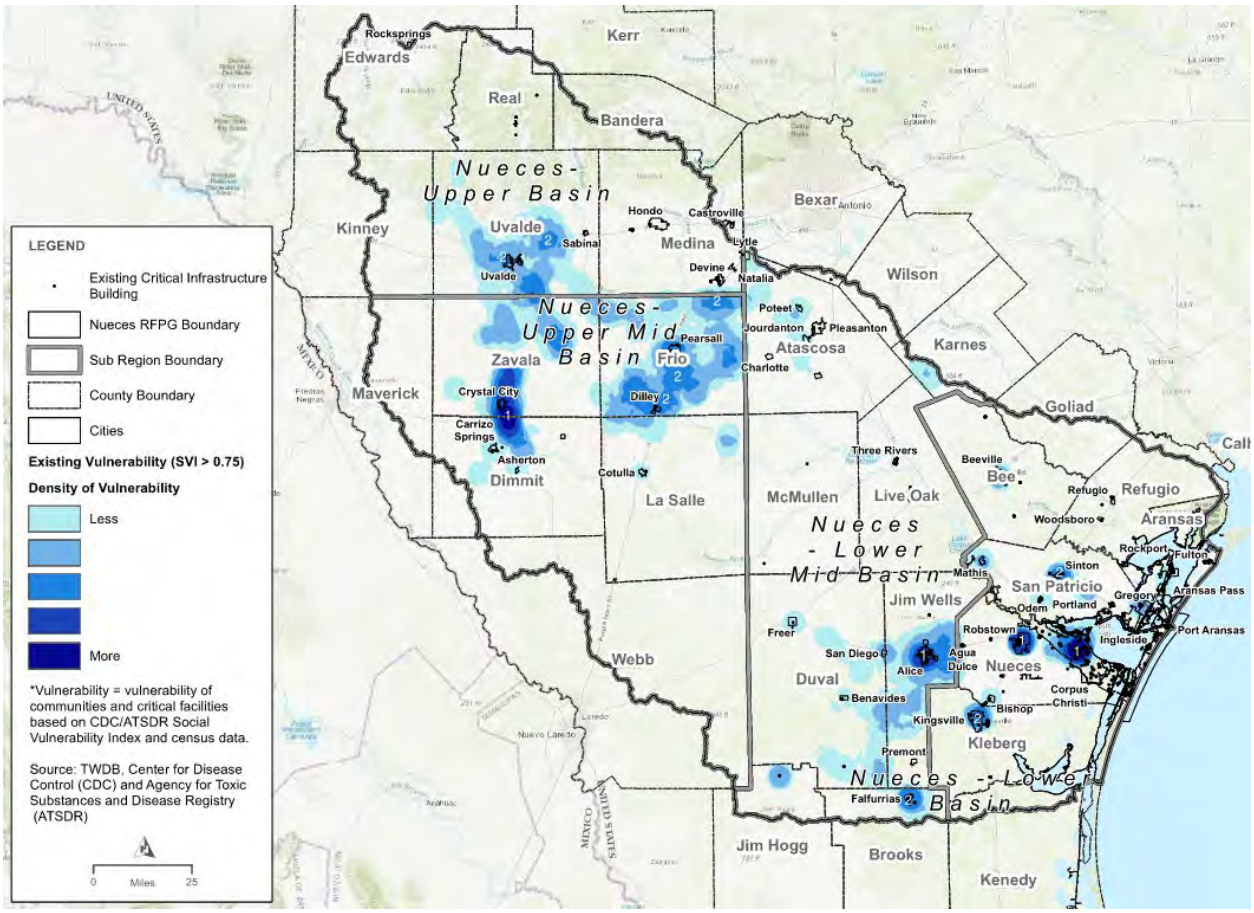


Figure 2-18. Existing Condition Vulnerability Heat Map and Location of Critical Infrastructure

2.1.3.2 Resilience of Communities Located in Flood-prone Areas

The average SVI of features in floodplain or flood-prone areas per county is provided in Appendix A3 – TWDB Table 3 – Existing Condition Flood Risk Summary Table**.** Locations of high SVI areas located in floodplains or flood-prone areas are shown in Figure 2-17.

(1) Most vulnerable areas - Corpus Christi and Robstown area, City Alice, and Crystal City

(2) Other vulnerable areas - Kingsville, Sinton, Falfurrias, Dilley, Pearsall, Devine, Uvalde, and Knippa.

2.2 Future Conditions Flood Risk Analysis

A future condition flood risk analysis was performed to approximate the flood hazard extents projected in 30 years' time or the year 2050. The future condition analysis also defines the additional flood exposure and vulnerability risk.

2.2.1 Future Condition Flood Hazard Analysis

2.2.1.1 Projected Population and Development Trends and Practices

Chapter 1 discusses projected population and development trends and practices. The population of the Nueces basin is expected to grow from 1.14 million in 2020 to 1.52 million in 2050. New land development and population increases are projected to be the largest near the major population centers of the Cities of Corpus Christi, San Antonio, and Laredo. Other high growth areas by percent growth include the cities of Jourdanton, Lytle, Poteet, Pleasanton, and Crystal City, and the counties of Webb, Wilson, and Atascosa.

Population growth generally correlates to an increase in urbanization. This, in turn, leads to an increase in impervious ground cover as land use changes. Unmitigated, urbanized areas will increase watershed rainfall runoff leading to higher water surface elevations in the region's rivers, creeks, and channels during extreme rainfall events. New land development could potentially place new structures in the floodplain or flood-prone areas, especially in areas with limited flood plain regulations and enforcement.

Population growth over the next 30 years is considered a significant factor in the future conditions flood risk for the Nueces Region's riverine systems. However, for the coastal regions, population growth and the associated additional impervious cover is not considered to influence the future inundation conditions. The relative sea level rise (RSLR), which considers multiple factors such as climate change, land subsidence, and glacial melting, was the primary factor in the coastal areas.

2.2.1.2 Identification of Future Condition Flood Risk

When developing a predicative assessment for future conditions flood risk, the TWDB contract scope requires that each region consider two major factors: unmitigated population increase and climate change. The following is a list of potential factors that can influence future flood conditions:

- Precipitation increases due to climate change
- Rising sea levels
- Land subsidence
- Population growth and associated development increases (impervious cover)
- Natural stream migration changes to existing waterways
- Implementation of constructed drainage infrastructure

The Nueces Region includes a significant coastal area, that has different flood patterns and drainage challenges as compared to inland, riverine areas. Thus, the future condition flood risk is determined using separate approaches for inland riverine areas and for coastal areas. The following sections describe the approaches used for each.

2.2.1.3 Inland Riverine Future Conditions

For the 2020 to 2023 planning cycle, the development of the future flood hazard for riverine systems (inland areas) is dependent on population growth and a corresponding horizontal floodplain buffer applied. This inland approach was established due to the lack of available detailed floodplain data and hydrologic/hydraulic models.

The horizontal floodplain buffers, summarized in Table 2-1, were developed to approximate the increase in the 1% and 0.2% annual chance flood inundation boundaries, based on population increases projected from 2020 to 2050 from TWDB 2021 Regional Water Plan data. Population increases are applied, as appropriate, to the existing 1% and 0.2% annual chance boundaries to obtain the future condition boundaries surrounding cities and concentrated populated areas.

Table 2-1. Future Condition Buffers based on Estimated Population Increase

Estimated	Estimated, corresponding buffer in floodplain width (ft)	
	1% Annual Chance Event	0.2% Annual Chance Event
0%	0	0
1%	5	5
5%	20	15
10%	40	30
15%	60	45
25%	100	75
50%	200	150

Horizontal buffers were established by estimating the anticipated water surface increase due to increased development and determining the corresponding horizonal floodplain increase based on available LiDAR terrain for several areas throughout the watershed, including the upper hill county, minor/major tributaries and rivers through the watershed, and conveyance systems near cities.

Population growth projections outside of concentrated areas within the remaining county regions were determined using the same 2021 Regional Water Plan population information. These populations are the remaining counts beyond the cities and districts within each respective county. Based on projected population density increases within the county regions, it was determined that maximum increases were less than 20 people per square mile. Based on these assessments, it is estimated that no floodplain increases attributed to population growth will occur outside the city areas; therefore, they show no change. Future 1% and 0.2% annual chance floodplain areas within the

county regions, outside of cities or populated areas, are assumed to match the existing floodplain limits.

2.2.1.4 Coastal Future Conditions

Relative sea level change is estimated on best available existing data. The following data sources are currently available and reviewed for this task.

- *National Research Council (NRC) (1987) Responding to Changes in Sea Level: Engineering Implications* – The NRC study developed sea level rise (SLR) / change (SLC) scenarios. This study was leveraged by USACE and National Oceanic and Atmospheric Administration (NOAA) and is the main resource for all present-day estimates
- National Oceanic and Atmospheric Administration (*NOAA) 2017 – Global & Regional Sea Level Rise Scenarios for the United States (TR NOS CO-OPS 083)* – NOAA has developed a tool to calculate the approximate SLR computed from the most recent Intergovernmental Panel on Climate Change (IPCC) and modified NRC projections. NOAA computed five scenarios including “high,” “intermediate-high,” “intermediate,” “intermediate-low,” and “low.” These SLR scenarios are presented in Figure 2-19. This data can be extrapolated from graphs and applied to a digital terrain model.
- *NOAA 2022 – Sea Level Rise Technical Report - Update to 2017 report and data.*
- *U.S. Army Corp of Engineers (USACE) 2013 - Incorporating Sea Level Change in Civil Works Programs (ER 1100-2-8162)* – This source provides design guidelines for incorporating the direct and indirect physical effects of projected future sea level change across the project life cycle in managing, planning, engineering, designing, constructing, operating, and maintaining USACE projects and systems of projects.
- *USACE Sea-Level Change Curve Calculator (Version 2021.12)* – The USACE developed a tool to calculate the approximate SLR for three scenarios including “high”, “intermediate”, and “low”.
- *General Land Office (GLO) Coastal Texas Protection and Restoration Feasibility Study Final Report (2021) (Coastal Texas Study)* - Uses the NOAA 2017 data and prepared inundation mapping for entire coast of Texas. The inundation mapping is based on various scenarios, including: 1% and 0.2% annual chance storm events modeled and future conditions with no mitigation (i.e., a “no action”) scenarios available for years 2035 and 2085.

Both NOAA and USACE SLR estimates are computed from the same sources resulting in similar scenarios. For reference, a comparison of SLR categories is shown in Table 2-2 with brief descriptions of background assumptions.

Table 2-2. Comparison of NOAA and USACE Sea Level Rise Scenarios

NOAA Scenarios	USACE Scenarios	Description
Low	Low	Linear historic sea level rise.
Intermediate-Low	Intermediate	NRC Curve I – Moderate Greenhouse Gas Emission
Intermediate	-	NRC Curve I – High Greenhouse Gas Emission
Intermediate-High	High	NRC Curve III – Moderate Glacier Melt
High	-	NRC Curve III – High Glacier Melt

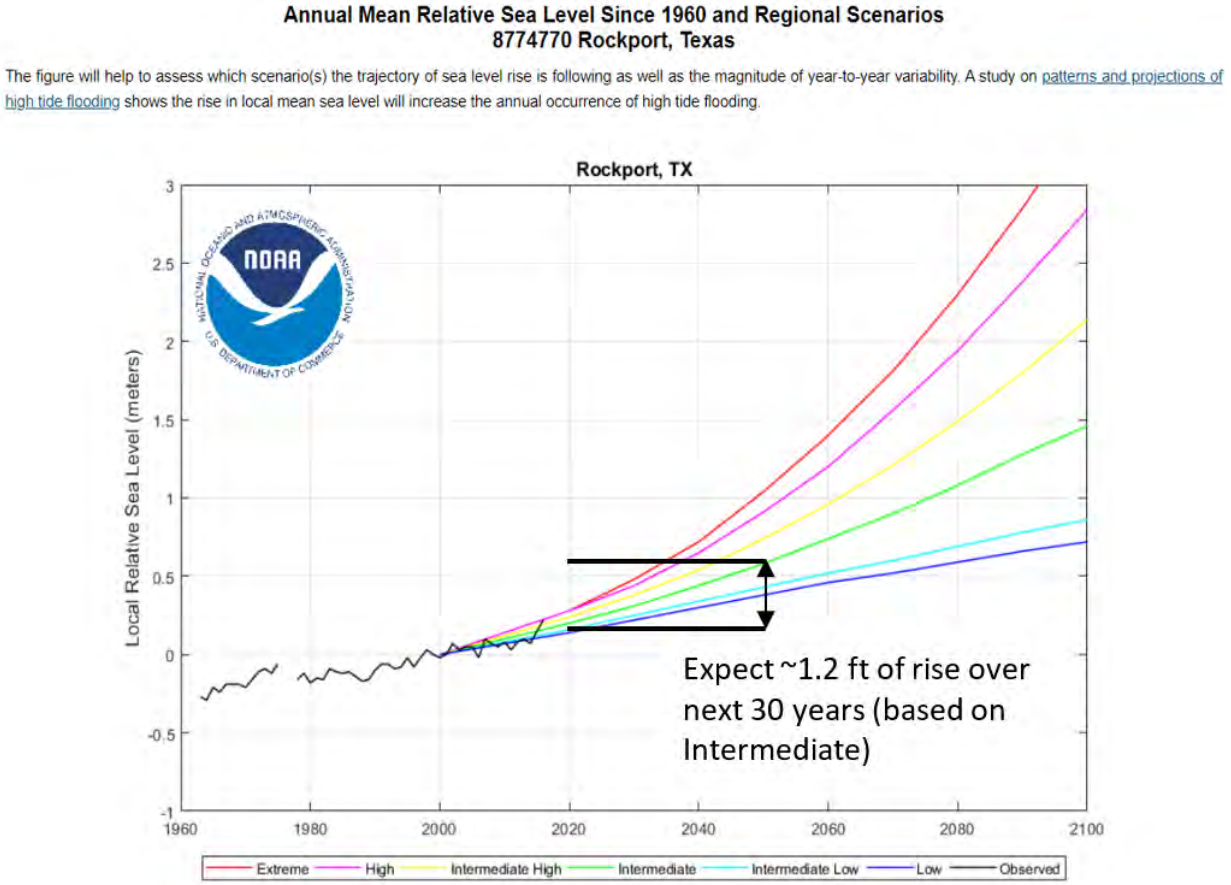


Figure 2-19. NOAA 2017 – Annual Mean Relative Sea Level Scenarios – Rockport, TX

NOAA's *Global & Regional Sea Level Rise Scenarios for the United States* (2017 with 2022 update) provides the most relevant technical data related to SLR. When considering the various scenarios of SLR, the "intermediate-low" scenario has a high likelihood of occurrence based on predicted outcomes and includes scientifically reasonable considerations for increased greenhouse gas emissions, ocean thermal

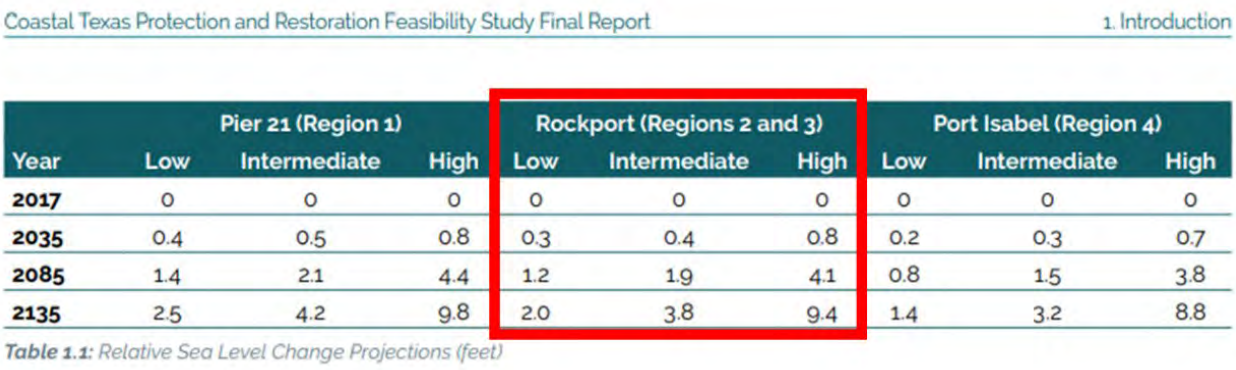
expansion, and land-based subsidence/uplift. However, the "intermediate" scenario is the most typical scenario selected for design. It includes considerations for past observed sea level trends and global effects due to moderate increases in greenhouse gas emissions. Table 2-3 compares the NOAA and USACE data to understand what the expected SLR is for the Nueces Region at the 30-year projected time frame.

Table 2-3. Water Surface Elevation Increase (ft) projected from 2020 to 2050

NOAA Scenarios	USACE Scenarios	USACE 2013[1]	NOAA 2017[2]	NOAA 2022[2]	Description
Intermediate-Low	Intermediate	0.7	0.9	1.0	NRC Curve I
Intermediate	-	-	1.2	1.1	
Intermediate-High	High	1.5	1.6	1.3	NRC Curve II

1. https://cwbi-app.sec.usace.army.mil/rccslc/slcc_calc.html
2. https://coast.noaa.gov/slr/

GLO's 2021 *Coastal Texas Protection and Restoration Feasibility Study Final Report* (Coastal Texas Study) used the NOAA 2017 data to prepare inundation mapping for the entire coast of Texas for several different scenarios and various projections into the future (see Figure 2-20). None of the modeled scenarios precisely match the 30-year projection required by the RFP. However, the Year 2035 "high" and Year 2085 "low" scenarios result in similar SLR values as was predicted by the NOAA 2022 intermediate and intermediate-low scenarios.



Coastal Texas Protection and Restoration Feasibility Study Final Report 1. Introduction

	Pier 21 (Region 1)			Rockport (Regions 2 and 3)			Port Isabel (Region 4)		
Year	Low	Intermediate	High	Low	Intermediate	High	Low	Intermediate	High
2017	0	0	0	0	0	0	0	0	0
2035	0.4	0.5	0.8	0.3	0.4	0.8	0.2	0.3	0.7
2085	1.4	2.1	4.4	1.2	1.9	4.1	0.8	1.5	3.8
2135	2.5	4.2	9.8	2.0	3.8	9.4	1.4	3.2	8.8

Table 1.1: *Relative Sea Level Change Projections (feet)*

Figure 2-20. Coastal Texas Study Relative Sea Level Change Projections

The future coastal conditions flood hazard methodologies were discussed at the March 28, 2022 NRFPG meeting. Advantages and disadvantages of each methodology were presented for consideration, including NOAA and Coastal Texas data sources. The NRFPG approved use of the Year 2085 "low" model data for Rockport, Texas, from the Coastal Texas Study to use for development of the 2023 Nueces RFP. This model data assumes a 1.2-foot SLR. This is similar to the NOAA 2022 intermediate sea level rise of 1.1 foot. However, the Coastal Texas Year 2085 "low" model projection data was later

found not to be available for use in the 2023 Nueces RFP. In lieu of using the Coastal Texas data, **the NRFPG proposes using the NOAA 2022 intermediate SLR of 1.1 foot and applying an appropriate offset to the existing 1% and 0.2% annual chance coastal flood inundation boundaries**.

To determine and apply an appropriate offset, the Nueces Region Coastal Zone is divided into five coastal zones as listed below and shown in Figure 2-21.

- Baffin Bay
- Baffin Bay – Bluff
- Corpus Christi
- Copano
- Barrier Island – Back Bay

The regions are divided by their primary river systems and then further divided based on observed topography. For instance, a sharp increase in elevation near the waterline was noted in the Baffin Bay – Bluff cross-sections.

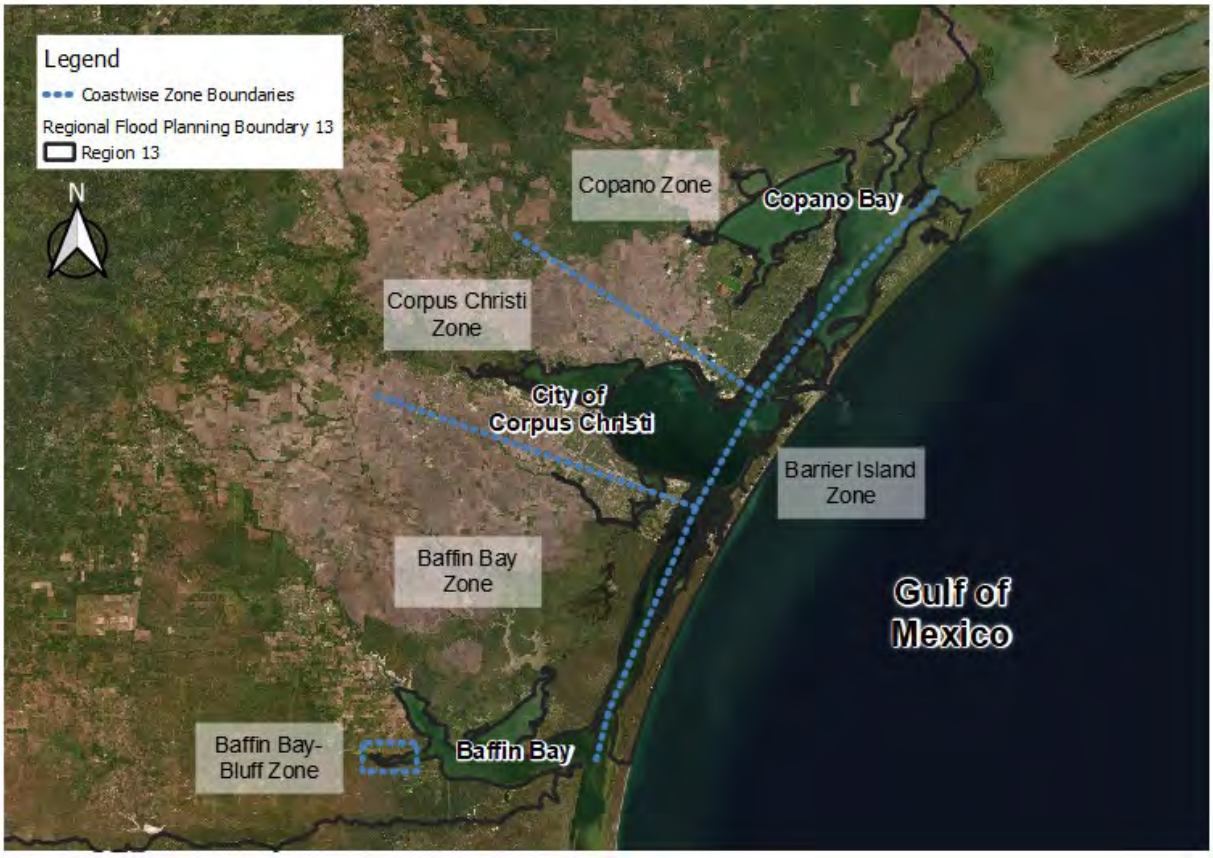


Figure 2-21. Coastal Zones used for applied Future Sea-Rise Buffer

Using the NOAA 2022 “intermediate” SLR estimate, a horizontal buffer was computed using the best available terrain data from transects of the coast to determine the average overland slope in each zone (see Table 2-4). The average overland slope for SLR was limited specifically to the coastal areas and does not include overland slopes

further inland. All slopes were calculated from the waters line heading inland. The Barrier Island Zone slope was measured for the back bay, extending from the bay towards the Gulf of Mexico. This adjustment was made because the coastal dune system on the Gulf of Mexico side is considered bluffs for this analysis and the horizontal buffer is negligible. Based on the 1.1-foot vertical SLR and the average overland slope in each region, a horizontal buffer was calculated. This horizontal buffer is applied to the existing conditions 1% and 0.2% flood hazard layer within the Coastal Zone to become the future conditions flood hazard layer. However, due to the timing of the development of the above future coastal condition approach described above, the future coastal horizontal buffer is not applied to the future condition flood hazard layer in this first regional flood plan.

Table 2-4. Sea Level Rise Buffer Estimate

Buffer	Baffin Bay Zone	Baffin Bay - Bluff Zone	Corpus Christi Zone	Copano Zone	Barrier Island – Back Bay Zone
Average Overland Slope (%)	0.34%	2.40%	1.92%	0.16%	0.27%
Estimated Zonal Sea Level Rise Buffer (feet)	324	46	57	688	407

2.2.1.5 Changes to Existing Floodplain Functionality

Floodplains function in natural and beneficial ways by (1) providing storage and conveyance of stormwater, and (2) reducing flood velocities and flood peaks, wind and wave impacts, and soil erosion and sedimentation. Due to the lack of data, no anticipated changes to the existing floodplain functionality are included in this draft 2023 Nueces RFP.

2.2.1.6 Sedimentation in Flood Control Structures and Major Geomorphic Changes

Sedimentation in flood control structures results in the loss of floodplain storage and associated attenuation of flood flows. To understand the impacts on the future flood hazard from sedimentation detailed hydraulic modeling is required. Due to the lack of detailed modeling available in this first flood plan the impacts of sedimentation are not considered in the development of the future flood hazard.

River channels and their adjacent floodplains are dynamic systems that are in a constant state of flux and adjustment to changing patterns of streamflow, sediment loads, and riparian and aquatic ecosystems. Major geomorphic changes can include the migration of river meanders, or the widening or deepening of a river segment. Due to

the lack of data, no geomorphic changes in riverine or coastal systems are assumed in the development of the future flood hazard.

2.2.1.7 Completion of Flood Mitigation Projects

The completion of flood mitigation projects has the potential to reduce the future flood hazard. However, the future condition does not include the completion of any flood mitigation projects currently under construction or that already have dedicated construction funding. This is due to the lack of information for flood mitigation projects currently underway in the basin.

2.2.1.8 Future Condition Hydrologic and Hydraulic Model Results

No future condition hydrologic and hydraulic model results have been identified during this draft 2023 Nueces RFP.

2.2.1.9 Future Flood Hazard Mapping

The future condition 1% and 0.2% annual chance flood inundation boundaries are provided in the geodatabase (i.e., FutFldHazard) and depicted on a subregion level in Appendix B8 – TWDB Map 8 - Future Condition Flood Hazard.

2.2.1.10 Future Flood Mapping Gap Analysis

BLE inundation boundary mapping is estimated to be completed for the entire Nueces basin in 2023 according to TWDB's BLE status update viewer. BLE mapping is considered approximate; however, based on the schedule for completion, it is unavailable for 2023 Nueces RFP consideration. No additional detailed modeling and mapping projects can be confirmed for inclusion in the future flood hazard risk layers. Thus, the future flood condition gap boundaries are assumed to be the same as the existing condition gap boundaries (refer to Figure 2-13).

2.2.1.11 Future Condition - Total Land Area at Flood Risk

This flood hazard analysis summarizes total area and agricultural area within the 1% and 0.2% annual chance flood risk under future conditions, which is summarized by county in Appendix A4 – TWDB Table 5 – Future Condition Flood Risk Summary Table. Total land area within the Nueces Flood Planning region at risk of 1% annual chance flood inundation under future conditions is summarized by county and flood risk type (riverine, fluvial, and coastal) in Figure 2-22. In total, 4,629 square miles of land (19.2% of all land in basin) is at risk of 1% annual chance flood inundation under future conditions, an increase of 51 square miles from existing conditions. An additional 1,283 square miles is at risk of 0.2% annual chance flood inundation. The total land at risk of 1% or 0.2% annual chance flood inundation is 5,912 square miles of land (24.5% of all land in basin).

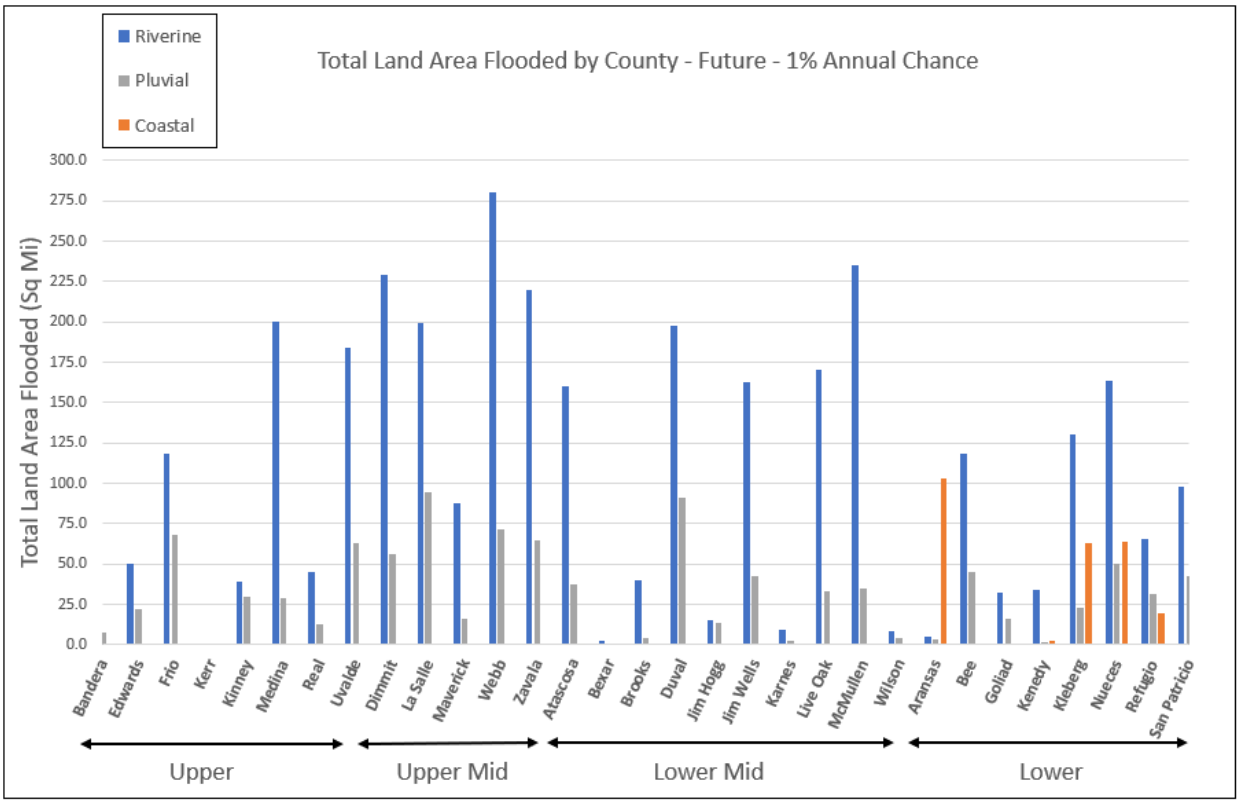


Figure 2-22. Total Land Area at Flood Risk of 1% annual chance storm by Type, County - Future Condition

2.2.2 Future Flood Exposure Analyses

The future flood exposure analysis is a high-level, region-wide, GIS-based analysis to identify who and what might be harmed by flooding. This includes identifying all structures located within both the 1% and 0.2% annual chance flood event and possible flood-prone area boundaries, as defined in the future flood hazard analysis. For additional details, see Appendix A4 – TWDB Table 5 – Future Condition Flood Risk Summary Table, which includes a summary of the land area, number of structures, population, roadway segments and crossings, agriculture area, and critical facilities that are exposed to the future condition 1% and 0.2% annual chance flood risk and possible flood-prone areas.

The future flood exposure analysis indicated approximately 78,000 structures and a population of 191,000 at potential risk of flooding from the 1% annual chance flood event, which is 17,000 more structures than in the existing condition. This grows to 112,000 structures and a population of

The existing condition flood exposure analysis indicated roughly 61,000 structures and a population of 137,000 at potential risk of flooding from the 1% annual chance flood event. This grows to 98,000 structures and a population of 283,000 at potential risk of flooding from the 0.2% annual chance flood event.

However, this does not include the potential construction of new structures built in the floodplain. A heat map illustrates where these structures are generally clustered in the Nueces Flood Planning Region (NFPR), as shown in Figure 2-23. The location of hot spots for flood exposure are similar to those identified in existing conditions.

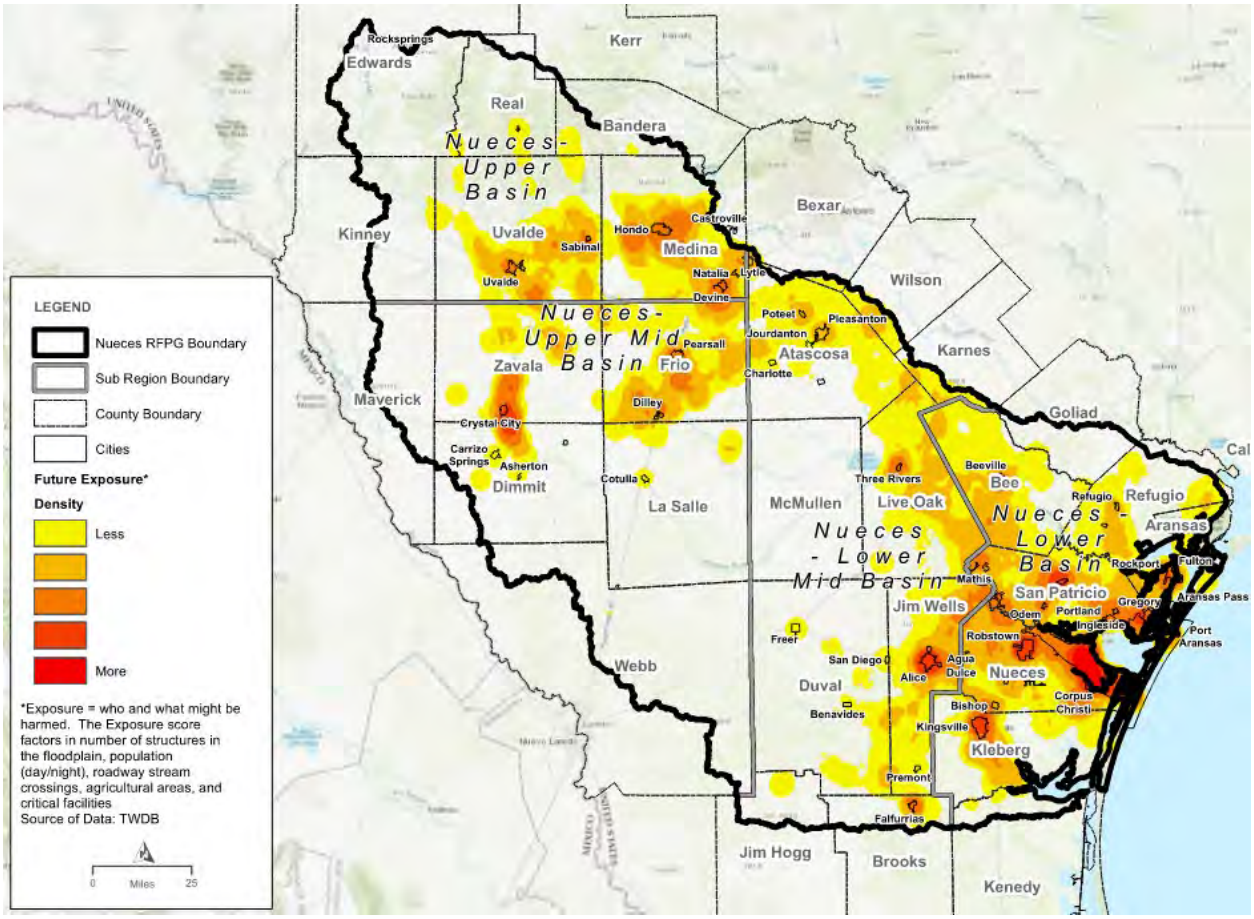


Figure 2-23. Future Condition Exposure Analysis (Map 11)

2.2.3 Future Vulnerability Analysis

The objective of this analysis is to identify critical infrastructure amongst the items identified in the future flood exposure analysis and to compute SVI for each structure identified during the flood exposure analysis.

2.2.3.1 Vulnerabilities of Critical Facilities

The future flood vulnerability analysis identified approximately 642 critical facilities in the 1% annual chance flood inundation. This is an increase of approximately 197 critical facilities when compared to existing conditions. This analysis does not include the potential construction of new critical facilities built in the floodplain. A heat map illustrates where these structures are generally clustered in the NFPR (Figure 2-24).

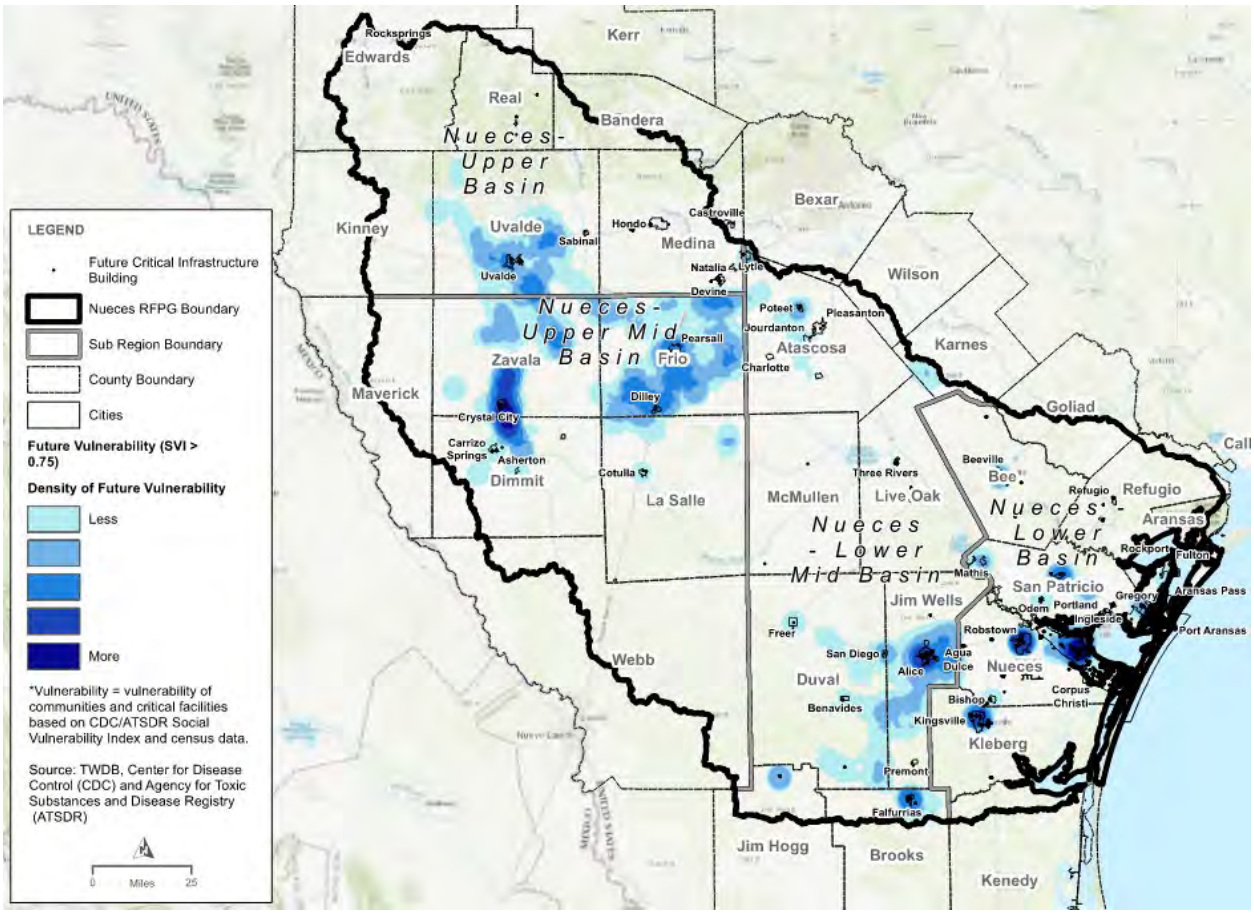


Figure 2-24. Future Condition Vulnerability Heat Map (Map 12)

2.2.3.2 Resilience of Communities in Flood-Prone Areas

Natural disasters, such as flooding, can pose a threat to the community's health and wellbeing. A number of factors, including socioeconomic, access to hospital systems, and crowded housing among others affects a community's resilience and ability to recover. The SVI developed by the CDC and Agency for Toxic Substances and Disease Registry (ATSDR) is a tool that uses U.S. census data to determine the social vulnerability by census tract. This information is then compiled into a database to help emergency response planners and public officials identify and map areas that are most likely to need support before, during, and following a flood event or natural disaster. The average SVI for the future condition floodplain or flood-prone areas per county is provided in Appendix A4 – TWDB Table 5 – Future Condition Flood Risk Summary Table**.** Locations of high SVI areas located in floodplains or flood prone areas are shown in Figure 2-24. The most vulnerable areas to flood risk are similar to those identified in the existing condition.

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Chapter 3 – Floodplain Management Practices and Flood Protection Goals

31 TAC § 361.35, 361.36

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3 Floodplain Management Practices and Flood Protection Goals

The goal of this task is for regional flood planning groups (RFPGs) to

- evaluate and make recommendations on forward-looking floodplain management, land use, and economic practices, and
- define overarching flood mitigation and floodplain management goals to protect against the loss of life and property, including specific and achievable short-term (10-year) and long-term (30-year) goals.

These two goals are addressed in the following sections on Floodplain Management Practices and Goals.

3.1 Evaluation and Recommendations on Floodplain Management Practices

Floodplain management, land use, infrastructure design, and other practices play a key role in identifying and reducing risk and impact that flooding causes to life and property, specifically in preventing the creation of additional flood risk in the future. This section considers current floodplain management practices, evaluates how best to address future development and population growth, and provides recommendations regarding forward-looking floodplain management strategies for inclusion in the Regional Flood Plan.

3.1.1 Current Floodplain Management Practices

3.1.1.1 Entities with Flood-Related Authority

Entities identified as having flood-related authority in the region are listed in Appendix A5 – TWDB Table 6 – Existing Floodplain Management Practices. The list includes 31 counties, 57 cities, and 46 districts with flood-related authority.

3.1.1.2 Outreach to Entities with Flood Authority

A Current Floodplain Management Practices and Goal survey was sent to floodplain stakeholders and administrators representing Nueces Region entities with flood-related authority on June 17, 2021. As of June 14, 2022, 32 of 134 entities had completed the survey on existing floodplain practices. Specifically, 15 counties of 31, 12 municipalities of 57, and 5 of 46 other government entities responded to the survey. The survey results are summarized in Appendix C3 – Floodplain Management Practices and Goal Survey Results. Entities that responded to the survey include the following.

- Aransas County
- Bandera County
- Bexar County
- City of Beeville
- City of Bishop
- City of Corpus Christi
- City of Cotulla La Salle County
- City of Gregory
- City of Hondo
- City of Ingleside
- City of Ingleside on the Bay
- City of Leakey
- City of Port Aransas
- City of Portland
- City of Sinton
- City of Uvalde
- Dimmit County
- Duval County
- Duval County Conservation / Reclamation District
- Frio County
- Karnes County
- Kerr County
- McMullen County Water Control and Improvement District (WCID) #1
- Medina County
- Real County
- Refugio County
- San Patricio County
- San Patricio County Drainage District
- Uvalde County Underground Water Conservation District (UWCD)
- Webb County
- Wilson County
- Zavala County

The survey gathered information on the use of various floodplain practices typically employed by entities in the Nueces Basin with flood authority. This information is summarized for each entity listed in the Existing Floodplain Management Practices Summary Table. Floodplain management regulations are common with 25 of the 32 cities and counties that responded to the flood practice survey. Descriptions and details of floodplain management practices in the Nueces Basin are described in further detail in the sections below.

3.1.1.3 Minimum Floodplain Management Regulations

Minimum floodplain management regulations include compliance with Texas Water Code Section 16.3145 and FEMA's National Flood Insurance Program (NFIP) participation.

- Texas Water Code Section 16.3145 requires a city or county to adopt the necessary ordinances or orders for the city or county to be eligible to participate in the NFIP. This practice is common with 23 of the 28 reporting cities and counties complying with this requirement.
- NFIP participation is voluntary and is based at a minimum on a community's agreement to adopt and enforce the Federal standards for building within a Special Flood Hazard Area (SFHA). In exchange the FEMA makes flood

insurance available. NFIP participation is a wide-spread practice in the Nueces Basin with 85 of 86 reporting cities and counties participating.

3.1.1.4 Higher Floodplain Management Standards

Higher floodplain management standards can include an assortment of practices to further reduce flood risk above and beyond minimal standards. The Texas Floodplain Management Association (TFMA) produced a guide for higher standards in 2018 that describes 32 higher standard practices that if implemented would reduce flood risks (https://www.tfma.org/page/documents-reports).

Of these practices, the implementation of freeboard requirements was listed as the single most effective means for reducing flood risks. Freeboard is the standard for placing the first floor of a structure above the elevation of the calculated 1% annual chance flood level to allow for nature's uncertainty and future changes in the watershed that will increase flood levels.

TFMA's 2018 Higher Standards Survey identified 368 entities across Texas and 19 entities in the Nueces Basin that have adopted higher standards. These include 10 counties: Aransas, Bandera, Bexar, Kerr, Live Oak, Medina, Nueces, Refugio, San Patricio, and Webb. The remaining nine are municipalities: Alice, Aransas Pass, Charlotte, Corpus Christi, Ingleside, Kingsville, Port Aransas, Rockport, and Uvalde. In general, many entities in the lower basin and those near San Antonio and Laredo have adopted higher standards.

Most of the entities in the Nueces Basin identified in the TFMA survey results have adopted freeboard requirements of greater than 1 foot above the existing base flood elevation (BFE), with Rockport and Aransas County adopting 1.5 feet above the existing BFE, with Uvalde and San Patricio County adopting 2.0 feet above the existing BFE, and Bandera County adopting 3 feet above the existing BFE. Multiple entities (5) have 1 foot above fully developed BFE requirements. For further information see Appendix C4 – TFMA Higher Standard Survey Results for the Nueces Basin.

NFIP's Community Rating System (CRS) credits community efforts beyond meeting minimum NFIP standards. For the Nueces Basin only, Corpus Christi has been identified as a CRS community with a rate class of 7. For more information on CRS see Section 1.8.

3.1.1.5 Degree of Floodplain Management Practices

Existing floodplain management practices are generally described as none, low, moderate, and strong, as defined below and displayed in Table 3-1 and Figure 3-1.

- None – no floodplain management practices in place
- Low – regulations meet the minimum NFIP standards

- Moderate – Some higher standards, such as freeboard, detention requirements, or fill restrictions
- Strong – Significant regulations that exceed NFIP standard with enforcement, or community belongs to the Community Rating System.

Table 3-1. Level of Floodplain Management Standards

Floodplain Management Practice	Entity Response	Counties (31 total)	Municipalities (57 total)	Other (46 total)
Floodplain Management Practices (Strong/Moderate/Low/None)	Strong	3	5	2
	Moderate	8	6	0
	Low	3	2	1
	None	1	0	1
	Unknown	16	44	42

Entities with strong flood management practices are generally concentrated near the large population growth urban areas of Corpus Christi, San Antonio, and Laredo. The locations that lack floodplain management practices generally consist of more rural counties in historically low population growth areas.

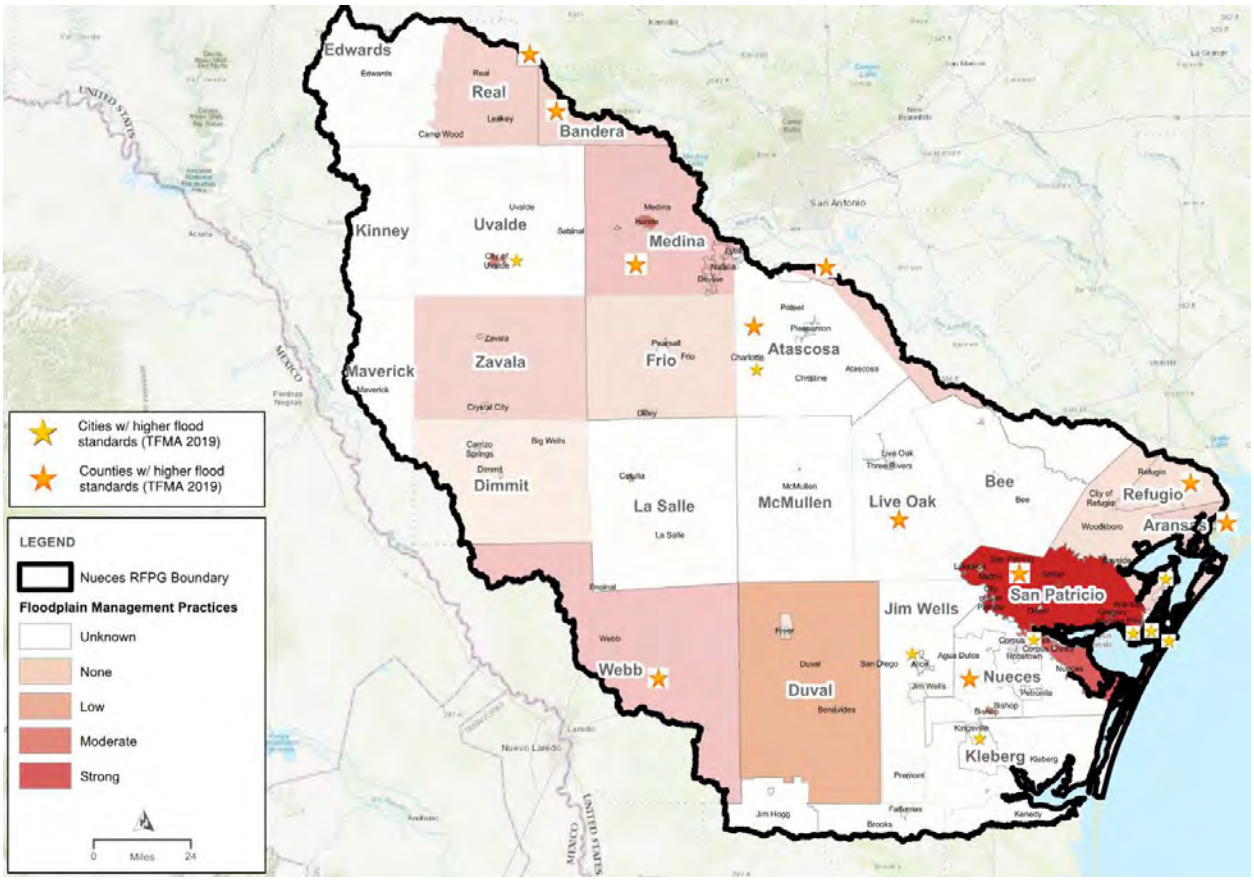

Figure 3-1. Level of Floodplain Management Standards

3.1.1.6 Level of Enforcement of Floodplain Management Practices

- The level of enforcement varies among entities from none to high, as defined below and displayed in Table 3-2 and Figure 3-2.
- High – actively enforces the entire ordinance, performs many inspections throughout building construction process, issues fines, violations, and Section 1316s where appropriate, and enforces substantial damage and substantial improvement. Note: Section 1316 of the National Flood Insurance Act of 1968 provides for the denial of flood insurance coverage for any property determined to be in violation of State or local floodplain management regulations.
- Moderate – enforces much of the ordinance, performs limited inspections and is limited in issuance of fines and violations.
- Low – provides permitting of development in the floodplain, may not perform inspections, may not issue fines or violations.
- None – does not enforce floodplain management practices

Table 3-2. Level of Enforcement Practices

Floodplain Management	Entity	Counties	Municipalities	Other
Level of Enforcement of Practices (High/Moderate/Low/None)	High	3	5	2
	Moderate	8	6	0
	Low	3	2	1
	None	1	0	1
	Unknown	16	44	42

Similar to the strength of flood plain practices, levels of enforcement (shown in Figure 3-2), are strongest near the high growth urban areas of Corpus Christi, San Antonio, and Laredo.

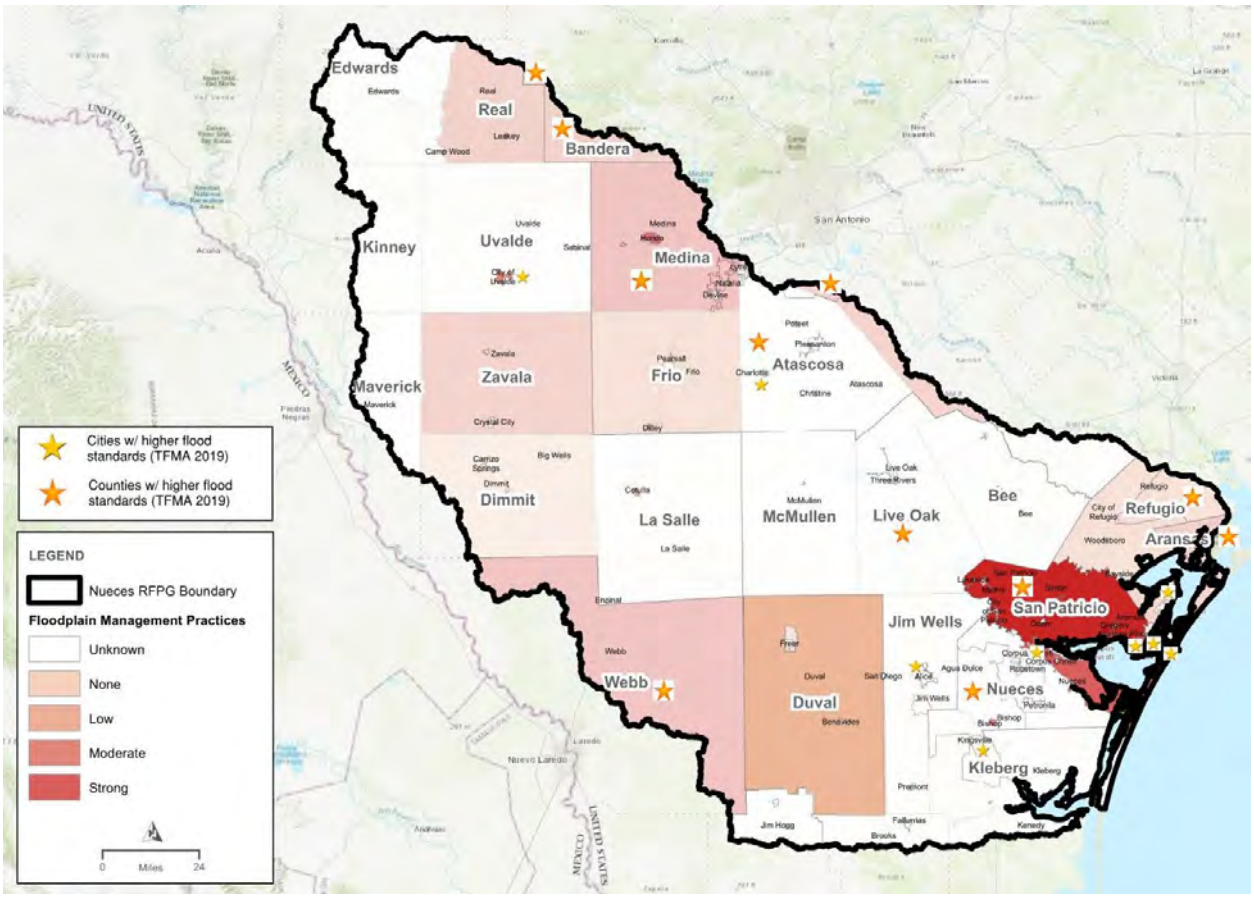

Figure 3-2. Level of Enforcement in Areas with Established Floodplain Management Practices

3.1.1.7 Stormwater or Drainage Fee

The existence of a stormwater or drainage fee is uncommon. Only the City of Portland reported to have this type of fee. The city issues a $3 drainage utility fee on each monthly utility bill for city services. The fee was established in 2004 and is intended to finance needed drainage system improvements such as curb, gutter, and associated storm inlet reconstruction as part of major street maintenance and improvement programs throughout the City.

3.1.2 How to Address Future Development and Population Growth

The future exposure analysis, summarized in Chapter 2, identified approximately 73,000 structures at potential risk of flooding from the 1% annual chance floodplain. This analysis did not include the potential for new structures to be added to the floodplain as development occurs. New development is anticipated in the Nueces Basin, especially for areas located near the large urban areas of San Antonio, Laredo, and Corpus Christi.

The best approach to address future development and population growth is to limit exposure of new development to the existing and future flood hazard. This can be accomplished by pro-actively

(1) defining accurate floodplain limits through the development of detailed hydrologic and hydraulic models and mapping in areas of anticipated high development and population growth, and

(2) adopting freeboard requirements in these high growth areas to require finished floor elevations of structures to be located safely above the 1% annual chance floodplain elevations.

Implementing higher standards beyond freeboard requirements should also be considered to further reduce the future flood risk to life and property. Some of the more effective higher standards for consideration include:

- No Adverse Impact – Requires new development to mitigate adverse impacts to other properties throughout the watershed.
- Floodplain Fill/Use Standards – Provide standards and restrictions for the placement of fill or development activity in a floodplain.
- Setbacks – provides a limited use/development area along waterways.

Land development in upstream areas is apt to increase runoff in downstream areas by encroaching on riparian areas that diminishes the capacity of streams to store flood waters during storm events. The NRFPG recommends that cities and counties consider ordinances for land developers to consider flood mitigation measures to reduce future flood risk.

3.1.3 Recommended Strategy for Floodplain Management

The NRFPG does not have the authority to enact or enforce floodplain management, land use, or other infrastructure design standards. Thus, the NRFPG aims to encourage implementation of recommended floodplain practices by local entities in the region with flood-related authority.

The NRFPG has recommended the following floodplain management standard for the region for consideration by Nueces basin counties, cities, and others with flood administrating authority:

Finished floor of structures should be a minimum of 1 foot above base flood elevations (BFE) (i.e. 1% annual chance or 100-year) or based on local ordinances, whichever is higher. The NRFPG strongly encourages cities and counties in the Nueces Basin to actively consider a minimum 2 feet above base flood elevations, consistent with upcoming 2025 FEMA ordinances. Such higher standards build more resilience and reduces future flood risk for homeowners. The standards are based on available data, to be updated based on Atlas 14 data when available.

Implementation of this recommendation along with defining accurate floodplain limits through the development of detailed hydrologic and hydraulic models and mapping in areas of anticipated high development and population growth is the best approach to address future development and population growth and to limit exposure of new development to the existing and future flood hazard. BLE mapping is in progress and will become available for the entire Nueces Basin in 2023. Although not regulatory in nature, the BLE will provide comprehensive and updated floodplain mapping information. The NRFPG encourages cities and counties in the Nueces Basin to consider adoption of flood ordinances that regulate to the best available data, such as BLE and FEMA floodplains.

Other high-standard practices that should be considered include participation in the NFIP's CRS, requiring new development to mitigate adverse impacts to other properties throughout the watershed, providing standards and restrictions for the placement of fill or development activity in a floodplain, and the use of setbacks, which limit use/development areas along waterways.

Floodplain mitigation studies in the Nueces Basin are encouraged to consider natural systems and beneficial functions of floodplains, including flood peak attenuation and ecosystem services when identifying projects to reduce flood risk. Flood mitigation design approaches that work together with natural floodplain patterns is advised. Most natural flood mitigation features, including floodplains, are in need of maintenance and can be improved with land use management.

Flood management agencies should carefully consider protecting existing streams, riparian areas, and floodplains when considering channelization projects. If channelization is necessary, a two-stage channel with a low-flow channel and a floodplain allows for the continued transport of sediment, habitat for aquatic wildlife, and can reduce maintenance (Rosgen 1996).

As basic flood delineation models become available, building more sophisticated hydrologic and hydraulic models that include soil absorption, geologic porosity, plant interception, and other variables that slow flows or convey surface water below ground can help to provide a deeper understanding of water quality improvements and ground water recharge potential to assess benefits of nature-based solutions.

The NRFPG did not choose to adopt region-specific, minimum floodplain management, land use, or other standards that impact flood-risk, that each entity in the flood planning region must adopt prior to inclusion of any of their Flood Mitigation Evaluations, Strategies, or Projects in the Regional Flood Plan.

3.2 Floodplain Mitigation and Floodplain Management Goals

This section defines specific and achievable flood mitigation and management short- and long-term goals. These goals were developed with the objective "to protect against the loss of life and property", as set forth in the Guidance Principles in 31 Texas Administrative Code (TAC) §362.3. The short- and long-term goals identify specific and achievable flood mitigation and floodplain management goals that, when implemented, will demonstrate progress towards this overarching objective.

A subcommittee formed by NRFPG members[1] met on August 25 and September 8, 2021, to discuss floodplain priorities and prepare proposed short-term (10-year) and long-term (30-year) goals for RFPG consideration. During the September 27, 2021 RFPG meeting, comments were received and addressed on floodplain management standard and goals and the comment period remained open for 30 days after the meeting. On November 3, 2021, RFPG members, Sky Lewey and Lauren Hutch Williams, participated in a call with HDR Engineering, Inc. (HDR) to provide additional comments on nature-based goals.

The NRFPG defined 10 overarching flood mitigation and floodplain management goals as summarized in Table 3-3**.** Each goal includes both specific and achievable short-term and long-term goals. Short-term goals were set for a duration of 10-years with a target year of 2033 and long-term goals were set for a duration of 30-years with a target year of 2053. The 10 goals were developed to prepare the Nueces Basin for flooding for the following four categories and 10 sub-categories:

- Protect against loss of life caused by flooding
    - Improve safety at low water crossings
    - Reduce risks at high-hazard dams
    - Implement flood warning systems and improve regional data collection
- Protect against property damage caused by flooding
    - Perform flood mapping evaluations and update floodplain maps
    - Reduce the number of structures within the 1% annual chance floodplain
- Floodplain management
    - Prepare minimum flood management standards
    - Nature-based practices through land conservation and restoration programs
    - Develop public information campaign
- Funding

[1] The Region 13 floodplain management practices and goals subcommittee consisted of Larry Dovalina, Andy Rooke, Larry Thomas, and Jim Tolan.

- Increase funding for maintenance of drainage systems
- Identify funding for community outreach and for permit support

A more detailed table of the goals is provided in Appendix A6 – TWDB Table 11 – Flood Mitigation and Floodplain Management Goals. This table includes additional columns to describe the residual risk of each goal and to describe how each goal will be measured. The residual risk represents the amount of remaining risk that would be expected if the floodplain mitigation and management goals are fully achieved. Any flood risk not avoided or reduced through meeting a goal will remain as a residual risk. Note it is not possible to protect against all potential flood risks.

Table 3-3. Nueces Region Floodplain Goals

Region 13 Draft Floodplain Goals		10 Year	30 Year
Protect against loss of life caused by flooding			
1	Improve Safety at **Low Water Crossings** through Structural Improvements or Warning Systems	Conduct an inventory of low water crossings (LWCs), characterize risk, and rank LWCs to prioritize those with high risk. Prepare a large-scale public outreach campaign to include "Turn Around Don't Drown" signage at LWCs or roadways aimed at reducing loss of life. Address top 30% of high-risk, LWCs through mitigation or warning systems.	Address 80% of high-risk LWC identified in the study.
2	Rehabilitate, Remove, or Replace Deficient **High Hazard Dams** as Identified by the Texas Commission on Environmental Quality (TCEQ) Dam Safety Regulation Program	Conduct a comprehensive study to identify all deficient high-hazard dams in the 31-county region. Remove or rehabilitate the top 30% high-hazard dams.	Remove or rehabilitate 100% deficient high-hazard dams.
3	Improve regional coordination, data collection/sharing of flood events and impacts, and **implement flood warning systems**	Develop (or expand) a successful flood management program on a regional-scale to cover 20% of the data gap area(s) identified in the 2023 plan. Prepare large-scale public outreach to include "Turn Around Don't Drown" campaigns aimed at reducing loss of life.	Develop (or expand) a successful flood management program on a regional-scale to cover 80% of the data gap area(s) identified in the 2023 plan.

Region 13 Draft Floodplain Goals		10 Year	30 Year
Protect against property damage caused by flooding			
4	Perform **flood mapping evaluations and update floodplain maps** and flood hazard data.	Develop maps to Base Level Engineering (BLE) or National Flood Hazard Layer (NFHL)-level accuracy for 60% of the basin that does not currently have accurate mapping. Identify structures and buildings in the NFHL-Detailed Study Areas with elevations less than 1 foot above base flood elevation (BFE).	Develop accurate maps to NFHL-level accuracy for 100% of the basin. Identify structures and buildings in the NFHL-Detailed Study Areas with elevations less than 1 foot above BFE.
5	**Reduce the number of structures within NFHL-Detailed Study Area** and Existing Floodplain with 1% annual chance flood risk.	Identify structures within existing floodplain with 1% annual chance flood risk for 60% of the basin. Prepare a list of high-hazard buildings based on function, critical function, repetitive loss, or other community-related importance, summarize, and distribute results to affected floodplain management entities. Reduce the number of high hazard structures within the 1% existing floodplain by 10% for existing structures and identify new structures for targeting with 30-year goal.	Identify structures within existing floodplain with 1% annual chance flood risk for 100% of the basin, including areas that have been updated with more accurate mapping. Prepare a list of high-hazard buildings based on function, critical function, repetitive loss, or other community-related importance, summarize, and distribute results to affected floodplain management entities. Reduce the number of high-hazard structures within the 1% existing floodplain by 50%.

Region 13 Draft Floodplain Goals		10 Year	30 Year
Floodplain management			
6	Prepare **minimum flood management standards**, including identifying operations and maintenance best practices to maintain drainage structures including remove gravel and sediment deposition to mitigate future flooding impacts.	Provide minimum flood standard recommendation(s) adopted by the NRFPG to floodplain administrators and community leaders, to include: Finished floor of structures are to be constructed a minimum of 1 foot above BFE 100-year or based on local ordinances, whichever is more stringent. The NRFPG strongly encourages cities and counties in the Nueces Basin to actively consider minimum 2 foot above base flood elevations, consistent with upcoming 2025 FEMA ordinances. The standards are based on available data, to be updated with Atlas 14 and/or TWDB BLE data when available. Achieve 30% voluntary adoption of the RFPG minimum standards by counties/cities. Define and recommend additional minimum flood standards for regional support towards implementation, as study results become available. Increase the number of communities adopting higher standards beyond NFIP requirements to 50% of counties and 30% of communities (current is 26% counties and 17% communities). Provide advocacy on the regional and state level to ensure that all communities across the region share a base-level of floodplain management support by 2030.	Achieve 100% voluntary adoption of RFPG minimum standards by counties/cities, including additional minimum flood standards defined during studies conducted through 2033 (10 year). Increase the number of communities adopting higher standards beyond NFIP requirements to 100% of counties and 100% of communities.

Region 13 Draft Floodplain Goals		10 Year	30 Year
7	Increase **nature-based practices through land conservation and restoration programs** and participation in landowner incentive programs to encourage voluntary land stewardship practices to manage floodwaters, slow runoff and dissipate flood energy to include riparian, wetland, forest, upland, and other habitat protection programs.	Identify existing areas noted for conservation, restoration, and/or habitat protection, and develop a strategy for expanding these programs and/or identifying high success areas for riparian/wetland/forest conservation, restoration, and upland protection programs to enhance flood mitigation benefits. Identify preferred areas in Nueces Basin to expand federal and state land protection programs, and other programs that provide incentives for voluntary land conservation and restoration. Preserve 35% of undeveloped riparian corridor mileage and protect 25% of acreage within the 100-year floodplain through voluntary, local, state, or federal land conservation programs.	Work with local leadership to implement nature-based riparian, wetland, and upland conservation and/or restoration programs for 40% of the high success areas identified. Preserve 80% of undeveloped riparian corridor mileage and protect 50% of acreage within the 100-year floodplain through voluntary, local, state, or federal land conservation programs.
8	Develop **public information campaign** to increase community knowledge of rules and regulations, flood-prone areas, and importance of protecting floodplains from encroachment	Identify local, subregional workgroups aligned with flooding issues. Develop public information campaign templates with relevant flood-related communications for 20% of the Nueces Region.	Develop public information plan campaigns with relevant flood-related communications for 80% of the Nueces Region area.
Funding			
9	Increase dedicated **funding sources to provide maintenance** of drainage and culvert systems (both structural and non-structural solutions) to divert flood flows and identify structural improvements causing flooding issues to remove/rectify.	Increase dedicated funding sources, including state-funding opportunities to support operations and maintenance (O&M) for 20% of the communities and 30% counties in the Nueces Region.	Develop dedicated funding sources, including state-funding opportunities, to support O&M for 80% of the communities and 90% counties in the Nueces Region.

Region 13 Draft Floodplain Goals		10 Year	30 Year
10	Identify **funding, resources, and technical training** for floodplain districts, managers, administrators or designees to enhance technical capacity for identifying floodplain projects, community outreach, and permitting support to verify new projects meet floodplain development requirements.	Identify dedicated funding sources, including state-funding opportunities for 20% of the communities and 30% counties in the Nueces Region. Develop a strategy for public engagement on flood-related issues, including a list of flood mitigation funding programs and potential opportunities for communities to participate in programs to support flood risk reduction (such as the Federal Emergency Management Agency's (FEMA) Community Rating System) to serve as a template for rural and underserved communities by 2030.	Develop dedicated funding sources, including state-funding opportunities for 80% of the communities and 90% counties in the Nueces Region.

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Chapter 4 – Assessment and Identification of Flood Mitigation Needs

31 TAC § 361.37

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4 Assessment and identification of Flood Mitigation Needs

This chapter identifies 1) the greatest flood risk knowledge gaps and known flood risks (Section 4.1), and 2) presents the technical memorandum submitted to the Texas Water Development Board (TWDB) in December 2021 (Section 4.2). The identification and evaluation of potential flood management evaluations (FMEs), potentially feasible flood management strategies (FMSs), and flood mitigation projects (FMPs) are described in Chapter 5. Collectively, FMEs, FMSs, and FMPs are referred to in the regional flood plan (RFP) as flood mitigation actions.

4.1 Flood Mitigation Needs Analysis

The flood mitigation needs analysis identifies where the greatest flood risk knowledge gaps exist and where known flood risk and flood mitigation needs are located within the Nueces Flood Planning Region (NFPR). This information guides the identification of flood mitigation actions.

4.1.1 Greatest Known Flood Risk and Flood Mitigation Needs

The areas of greatest known flood risk and flood mitigation needs in the NFPR are defined as areas with elevated levels of risk to property and life. The level of risk is defined by looking at the location and magnitude of flooding from the 1% and 0.2% annual chance flood event (flood hazard), who and what may be harmed (flood exposure), and what communities and critical facilities may be vulnerable (flood vulnerability). The details of the flood hazard, exposure, and vulnerability analyses are fully described in Chapter 2 – Flood Risk Analysis.

An analysis of known flood risk data was performed based on watershed boundaries. For the purposes of this analysis, a hydrologic unit code (HUC)-12 sized watershed was chosen. There are 627 HUC-12 watersheds in the NFPR, as shown in Figure 4-1.

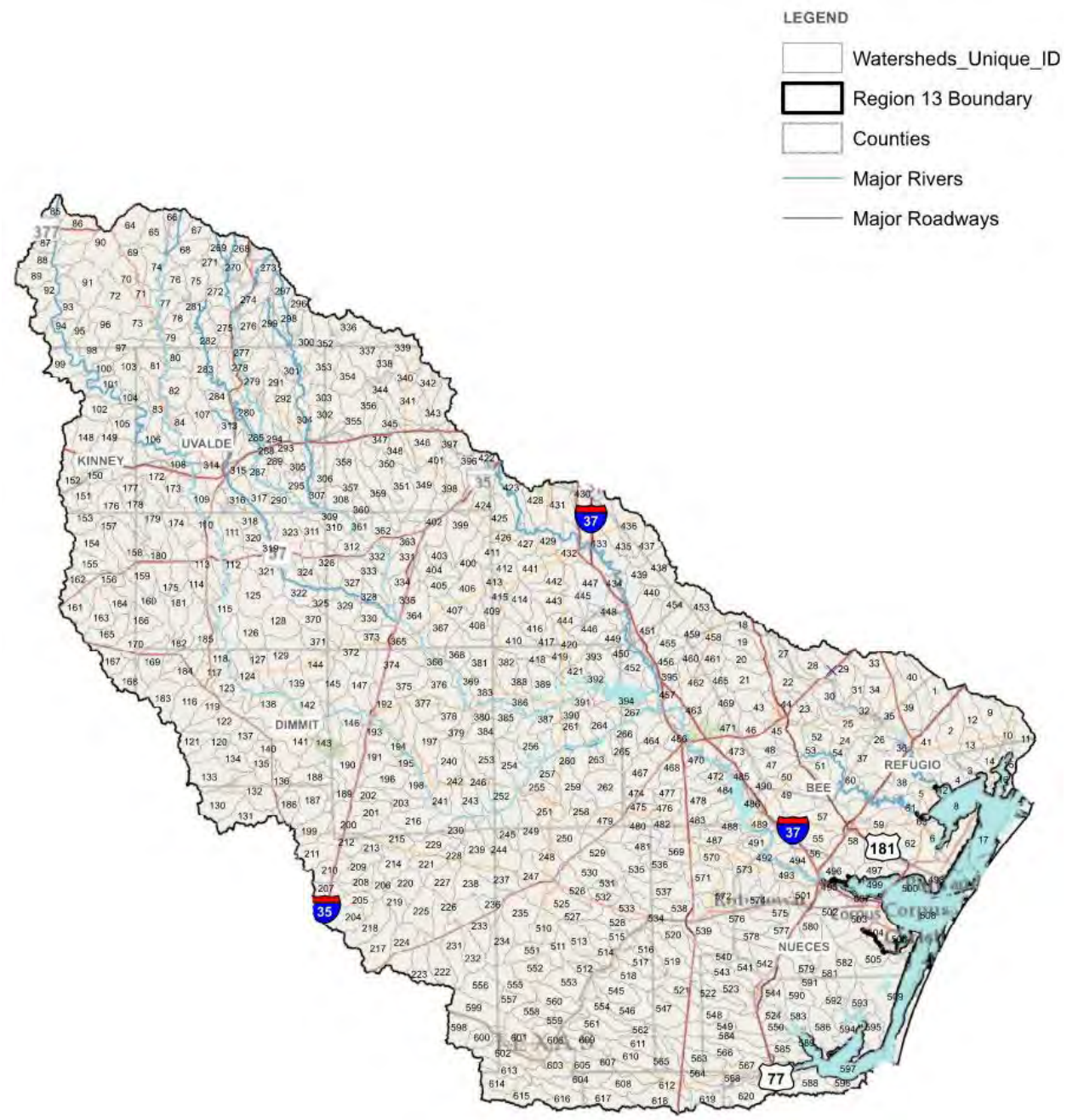

Figure 4-1. Nueces Flood Planning Area HUC 12 Watersheds

The flood risk data related to property damage and life loss risk was evaluated for each HUC-12 watershed in the basin. The various flood risk data categories are listed below with descriptions and assigned weighting percentage applied for each category provided.

- Historical Property Damage (15%) – Property damage data provided by the National Weather Service (NWS), the Federal Emergency Management Agency (FEMA), the U.S. Geological Survey (USGS), and local knowledge of flood-prone areas.

- Historical Life Loss (15%) – Flood fatality and injury data collected by the NWS since 1996.
- Property Damage – Exposure (15%) – Exposure data representing the number of residential and commercial building structures located within the best available 1% and 0.2% annual chance flood inundation boundaries.
- Property Damage – Vulnerability (15%) – Vulnerability data representing the number of residential and commercial building structures identified in the "exposure" layer above within a high vulnerability area (i.e., Social Vulnerability Index (SVI) > 0.75%)
- Property Damage – Critical Facilities (15%) - Vulnerability data representing critical facilities, which includes: shelters, airports, Department of Defense military facilities, hospitals, schools (K-12), fire stations, and police stations identified in the 'exposure' layer above.
- Life Loss – Low Water Crossings (15%) - Data as provided by Texas Natural Resources Information System (TNRIS).
- Life Loss – Dams (10%) - Data representing potential hazardous dams that have been identified as either hydraulically inadequate or deficient by the Texas Commission on Environmental Quality (TCEQ).

The data points for each category were counted for each HUC-12 watershed and a score of 1 to 5 assigned based on the statistical relationship to all other HUC-12 watersheds. Then, each category was weighted in terms of property damage and life loss risk to obtain an overall score. Total scores were then adjusted by a scale factor so that the highest score is 5 on the 1 to 5 scale. See an example of this calculation in Table 4-1.*This page is intentionally blank.*

Table 4-1. Flood Risk Score Example Calculation (HUC12 121101060901, ID313)

Item	Historical Property Damage (Flood Prone Areas)	Historical Property Damage (Agency Data)	Historical Life Loss	Property Damage – Exposure (Buildings)	Property Damage – Vulnerability (Buildings)	Property Damage – Vulnerability (Critical Buildings)	Low Water Crossings	Life Loss (Dams)	Total Score	Scaled Score[1]
Count	0	0	0	174	84	4	6	0		
Percentile Rank	0	0	0	90%	93%	93%	96%	0%		
Unweighted Score (1-5)	0	0	0	5	5	5	5	0		
Weighted Percentage	7.5%	7.5%	15 %	15%	15%	15%	15%	10%	100%	
Weighted Score	0	0	0	0.75	0.75	0.75	0.75	0	3.00	4.29
1 – Scale score is equal to total score multiplied by the scale factor, which is the highest possible score (5) divided by the maximum score (3.5) (i.e. 3.00 x 5 / 3.5 = 4.29)										

See Figure 4-2 for flood risk scores for each HUC-12 watershed in the Nueces Basin. No risk is represented by a score of zero and the highest risk is represented by a score of 5. The flood risk category data point scores and total score for each HUC-12 watershed are presented in Appendix C6 – HUC-12 Flood Risk Data Score Table and on a county basin in Appendix B23 – Flood Hazard Risk, Flood Risk Score, and Recommended Flood Mitigation Actions.

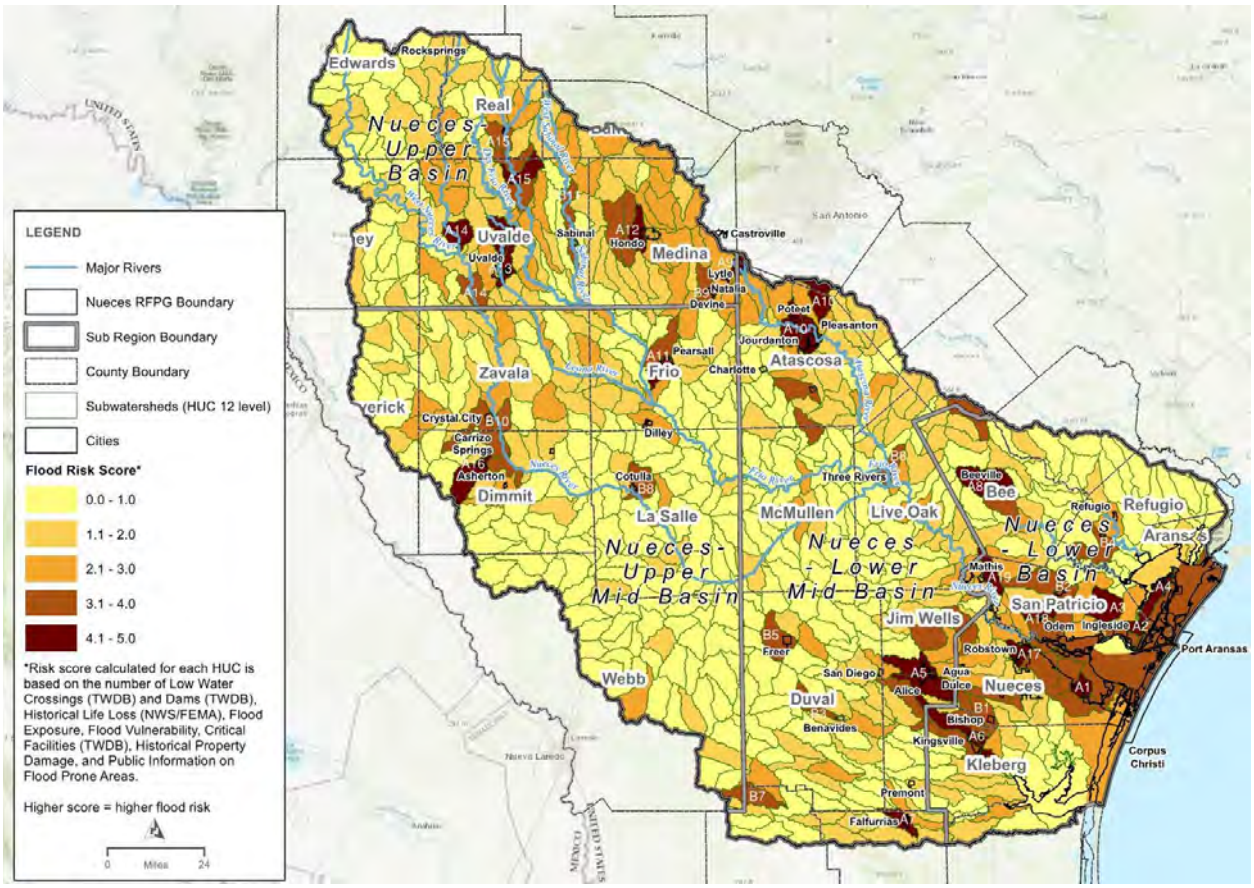

Figure 4-2. Overall Flood Risk per HUC-12 watersheds (Map 15)

Table 4-2 provides a listing of the greatest flood risk areas in relation to municipalities and counties and indicates if the greatest flood risk area is also located in exposure and vulnerability hot spots.

4.1.2 Greatest Flood Risk Knowledge Gaps

The greatest flood risk knowledge gaps for the NFPR are areas in the basin where the following conditions exist:

- Flood inundation boundaries are either not defined or considered inaccurate due to a lack of detailed modeling and mapping
- Flood studies and projects have not occurred in the recent past and are not on-going or proposed through funded projects

- Flood management practices do not exist or are not effectively enforced

4.1.2.1 Detailed Modeling and Mapping Gaps

Flood inundation boundaries are used to define the location and magnitude of flooding. Without accurate flood inundation boundaries, the existing flood risk is not well understood; therefore, controlling future risk through floodplain management regulations is difficult. Flood inundation boundaries based on recent detailed hydrologic and hydraulic models are considered accurate. These areas are shown in Figure 4-3.

Most of the basin does not have accurate flood mapping available and relies on approximate data. See Table 4-2 for a list of high-risk flood areas that are also located in the detailed flood modeling and mapping gap. Prioritizing investment in detailed hydrologic and hydraulic models in the gap areas with the highest overall flood risk is recommended.

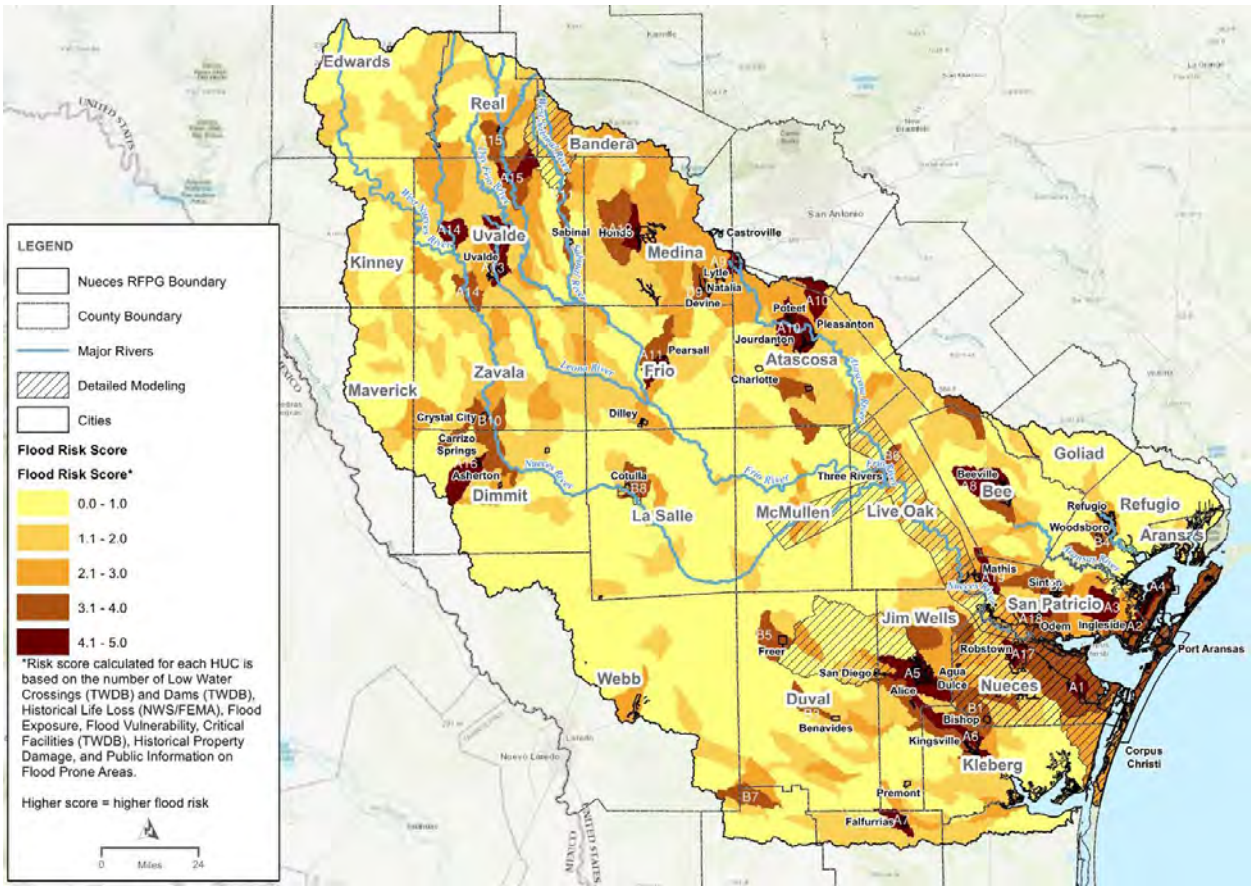

Figure 4-3. Accurate Modeling and Mapping Overlay with Overall Flood Risk (Map 14A)

4.1.2.2 Flood Studies and Projects Gaps

Flood studies are used to identify existing and future flood risks and often recommend mitigation or corrective solutions to reduce those risks. Without a flood study, it is difficult to implement actionable steps to reduce flood risk. For the NFPR, generally,

flood studies have occurred or are occurring for counties near the coast. Figure 4-4 overlays the overall flood risk map with locations where on-going or proposed flood studies / projects have been identified. High flood risk areas located in flood study / project gap areas have been identified in Table 4-2.

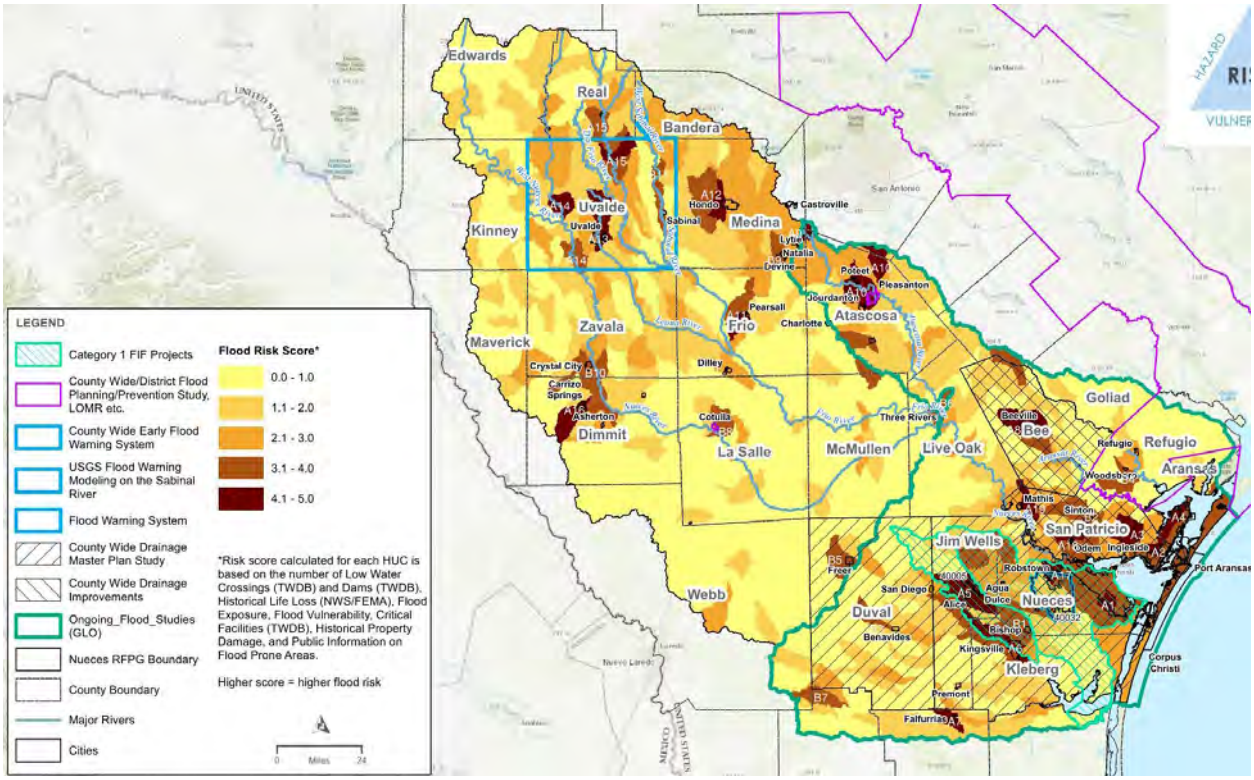

Figure 4-4. Flood Study / Project Overlay with Overall Flood Risk (Map 14B)

4.1.2.3 Floodplain Management Practice Gaps

Enacting floodplain management practices is effective in preventing activities that will result in increased flood risk in the future. Examples include requiring a floodplain permit for development activity in the floodplain and/or requiring building finished floor elevations to be one foot above the 1% annual chance flood elevation. Without floodplain management practices, it is difficult to control future flood risks. Figure 4-5 depicts the level of floodplain management practices and where higher floodplain standards are practiced in relation to the high flood risk areas. Areas of high flood risk in floodplain management gap areas are identified in Table 4-2 and generally include areas located away from the major population growth centers of Corpus Christi, San Antonio, and Laredo. Enhancement of flood management practices in areas with a high flood risk and a floodplain management gap (enforcement is low or none) is recommended.

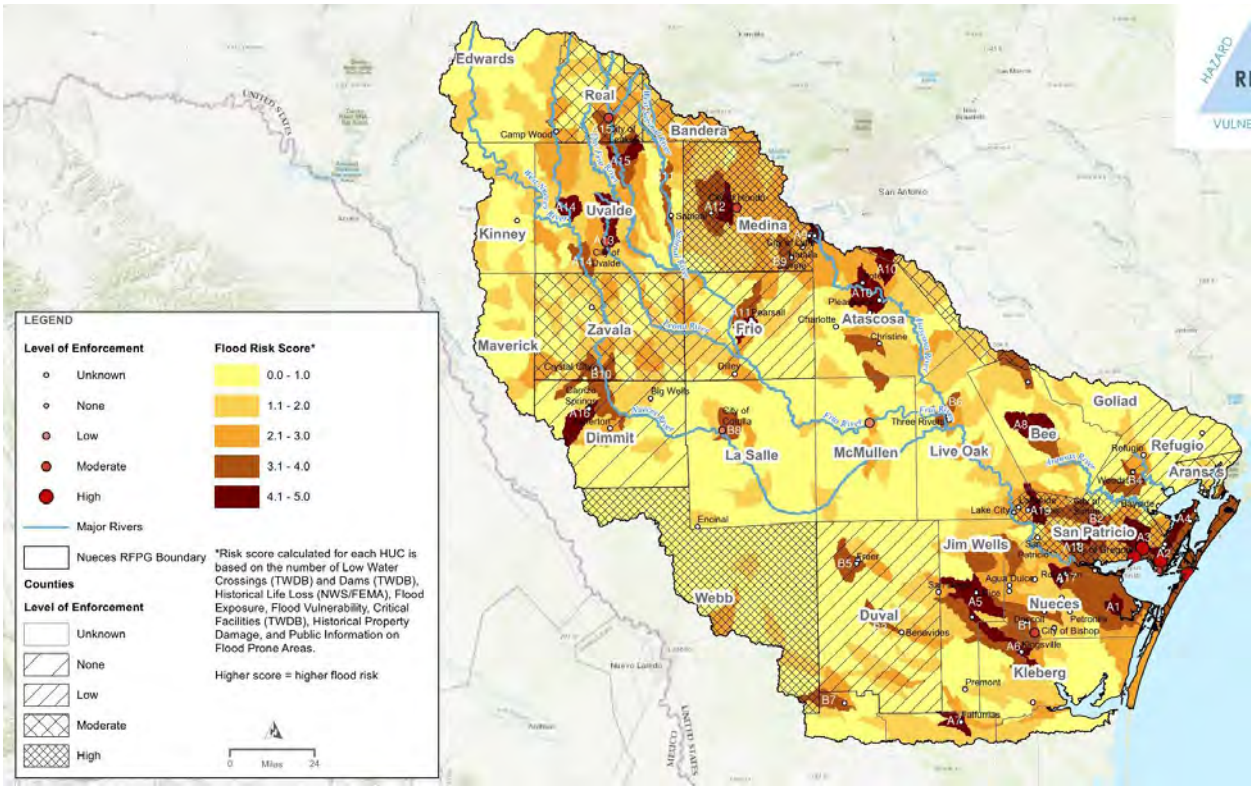

Figure 4-5. Floodplain Management Overlay with Overall Flood Risk (Map 14C)

4.1.2.4 Flood Mitigation Need Summary

The watershed areas with the highest flood risk scores are generally associated with populations located in or near cities or other unincorporated areas. Thus, areas with high flood risks were associated with these population centers in Table 4-2. Flood risk areas that have a flood score risk between 4 to 5 were grouped together to form a list of the highest risk areas. Similarly, flood risk areas that have a flood risk score between 3 to 4 were grouped together and considered high risk flood areas. Then, each flood risk area was evaluated to determine if the risk area is in a hot spot for exposure or vulnerability, as defined in Chapter 2. Further, each flood risk area was evaluated to determine if the risk area is in a knowledge gap area for detailed modeling and mapping, flood studies and projects, or floodplain management practices. The resulting table provides a list that represents the flood mitigation needs in the basin.

Table 4-2. Greatest Known Flood Risk Areas in Relation to Exposure/Vulnerability Hot Spots and Knowledge Gaps

Area ID	Area Description	Vulnerability Hot Spot	Exposure Hot Spot	Detailed Modeling Gap	Flood Study/Project Gap	Flood Management Gap
Highest Risk Areas (Score 4-5)						
A1	City of Corpus Christi	Y	Y	N	N	N
A2	Cities of Ingleside in San Patricio County	N	Y	N	N	N
A3	City of Gregory in San Patricio County	N	Y	N	N	N
A4	City of Rockport in Aransas County	N	Y	N	N	N
A5	City of Alice in Jim Wells County	Y	Y	N	N	N
A6	City of Kingsville in Kleberg County	Y	Y	N	N	N
A7	City of Falfurrias in Brooks County	Y	Y	Y	N[1]	Y
A8	City of Beeville in Bee County	N	Y	N	N	Y
A9	City of Lytle in Medina County	N	Y	Y	Y	N
A10	Pleasanton, Jourdanton, and Poteet area in Atascosa County	N	N	Y	Y[1]	N
A11	City of Pearsall in Frio County	Y	Y	Y	Y	Y
A12	Hondo area in Medina County	N	Y	N	Y	N
A13	City of Uvalde in Uvalde County	Y	Y	N	N[2]	N
A14	Area along Nueces River in western Uvalde County	N	N	Y	Y[2]	Y

Area ID	Area Description	Vulnerability Hot Spot	Exposure Hot Spot	Detailed Modeling Gap	Flood Study/Project Gap	Flood Management Gap
A15	Cities of Vanderpool and Utopia area along Frio River in Real and Uvalde Counties	N	N	Y	Y[2]	Y[3]
A16	City of Asherton in Dimmit County	N	N	Y	Y	Y
A17	City of Robstown in Nueces County	Y	Y	N	N	N
A18	City of Odem in San Patricio County	N	Y	N	N	N
A19	City of Mathis in San Patricio County	N	Y	N	N	N
High Risk Areas (Score 3-4)						
B1	City of Bishop in Nueces County	N	Y	N	N	N
B2	City of Sinton in San Patricio County	Y	Y	N	N	N
B3	City of Benavides in Duval County	N	N	Y	N	Y
B4	City of Woodsboro in Refugio County	N	N	N	N	N
B5	City of Freer	N	N	Y	N	Y
B6	City of Three Rivers in Live Oak County	N	Y	N	Y[1]	N
B7	City of Hebbronville in Jim Hogg County	N	N	Y	Y[1]	Y
B8	City of Cotulla	N	N	N	Y	Y

Area ID	Area Description	Vulnerability Hot Spot	Exposure Hot Spot	Detailed Modeling Gap	Flood Study/Project Gap	Flood Management Gap
B9	City of Devine in Medina County	Y	Y	Y	Y	N
B10	Crystal City in Zavala	Y	Y	Y	Y	N
B11	Sabinal River area in northeast Uvalde County and southwest Bandera County	N	N	N	Y	N

1. Located within GLO study area
2. Located within Uvalde Flood Warning System
3. Portion in Uvalde County potentially in a flood management gap area

4.2 Mid-Point Technical Memorandum

As an interim deliverable during development of the Nueces regional flood plan (NRFP), a technical memorandum was submitted to the TWDB on December 22, 2021, along with a geodatabase submittal. This technical memorandum provided a mid-point update on the following regional draft plan elements:

- Political Subdivisions with Flood-Related Authority
- Previous Relevant Flood Studies
- Inundation Boundaries for the existing and future flood hazard
- Additional flood-prone areas
- Availability of existing hydrologic and hydraulic models
- List of available flood-related models of most value
- Adopted flood mitigation and floodplain management goals
- Documented process to identify feasible projects and strategies
- Potential flood evaluations and potential feasible flood projects and strategies
- Identified flood projects and strategies determined infeasible

The NRFPG approved the technical memorandum for submittal to the TWDB on December 6, 2021. The technical memorandum is included in Appendix C5 – Mid-Point Technical Memorandum.

TWDB split out the geodatabase deliverable into two packages, due January 7, and March 7, 2022, respectively. The NRFPG submitted a single geodatabase along with the technical memorandum as part of the January 2022 deliverable and subsequent checklist acknowledging the March 2022 geodatabase deliverable for completion.

Frio River at Kenneth Arthur Crossing (Upper Nueces Basin)

Chapter 5 – Identification, Evaluation, and Recommendation of Flood Management Evaluations, Flood Management Strategies, and Associated Flood Mitigation Projects

31 TAC § 361.38 and § 361.39

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5 Identification, Evaluation, and Recommendation of Flood Management Evaluations, Flood Management Strategies, and Associated Flood Mitigation Projects

The objective of Chapter 5 is for regional flood planning groups (RFPGs) to evaluate and recommend identified flood mitigation actions, including flood management evaluations (FME), flood management strategies (FMS), and flood mitigation projects (FMP) for inclusion in the regional flood plan (RFP). This chapter summarizes and documents:

1. Process used to identify potential flood mitigation actions,
2. Evaluation and recommendation process to make final recommendations on the given flood mitigation action types,
3. Methodology used to assign costs to potential FMEs and potentially feasible FMSs and FMPs, and
4. Recommended FMEs, FMSs, and FMPs.

5.1 Identification of Potential FMEs, FMSs, and FMPs

The goal of this section is for the Nueces Regional Flood Planning Group (NRFPG) to identify and evaluate potential flood mitigation actions. This section builds on previous chapters with the ultimate objective of recommending flood mitigation actions that

- reduce the risk identified in the existing and future condition flood risk analyses,
- address flood mitigation and floodplain management goals, and
- address the greatest flood risk and flood mitigation needs.

5.1.1 Categorization of FMEs, FMSs, and FMPs

5.1.1.1 Flood Management Evaluation

An FME, by Texas Water Development Board (TWDB) definition, is “a proposed flood study of a specific, flood-prone area that is needed in order to assess flood risk and/or determine whether there are potentially feasible FMSs or FMPs.” There are three general categories of FMEs as described below. An FME may include any or all these study elements or phases:

- Flood hazard modeling and mapping / risk identification studies
- Flood mitigation alternatives analysis / feasibility studies

- Preliminary Engineering studies

5.1.1.2 Flood Mitigation Project

An FMP, by TWDB definition, is "a proposed project, either structural or non-structural, that has non-zero capital costs or other non-recurring costs and when implemented will reduce flood risk, mitigate flood hazards to life or property."

One of the primary objectives of the regional flood plan (RFP) is to identify and fund FMPs for implementation; therefore, identifying FMPs that meet state flood plan criteria and requirements for inclusion into the state flood plan (SFP) is a high priority. Per the TWDB rules, of the four common phases of emergency management shown in Figure 5-1, the regional flood planning process focuses primarily on mitigation projects but may also include preparedness projects. Flood preparedness, response, and recovery activities are discussed in Chapter 7.

*"The regional flood planning process will focus primarily on mitigation and may include preparedness with regard to **identifying and recommending FMPs by the RFPG**."*

Figure 5-1. Four Phases of Emergency Management

FMPs are further categorized as either structural or non-structural.

Structural FMPs are defined as building or modifying infrastructure to change flood characteristics to reduce flood risk. They are infrastructure projects with advanced analysis and 30% to 100% design development, including construction plans, specifications, and cost estimates. Structure FMPs include one or a combination of the following project types:

- Low water Crossings (LWCs) or Culvert/Bridge Improvements
- Channel Improvements
- Flood Detention
- Flood Walls/Levees

- Flood Diversion – Examples include diversion channels or diversion tunnels
- Storm Drain Improvements
- Dam Improvements
- Coastal Protections – Examples include coastal levees, dikes, and seawalls and often include beach erosion countermeasures such as riprap revetments. Coastal protections can also include green or hybrid solutions such as living shorelines and breakwaters.
- Nature-based Features – Examples include stream and coastal restorations, wetlands, natural channel design, other green infrastructure elements, and land preservation. TWDB strongly encourages the RFPG to consider nature-based flood risk reduction solutions in their overall approach.

Non-structural FMPs change the way people interact with flood risk and move people out of harm's way. These types of projects do not involve modifications to the watershed or flood infrastructure; therefore, they do not have negative impacts to adjacent areas or environmental impacts. Non-structural FMPs include one or a combination of the following project types:

- Flood Readiness and Resilience – Examples include flood response plans, evacuation plans, and emergency action plans
- Floodplain Evacuation – Examples include property acquisition / buyouts
- Flood Early Warning Systems – Examples include stream gauges and warning signals to more complex early flood warning systems that can forecast floods and warn large populations to evacuate
- Floodproofing – Examples include making structures watertight and elevation of individual structures
- Regulatory Requirements for Reduction of Flood Risk – Examples include floodplain development ordinances and drainage design criteria related to planning, zoning, land development, and building codes

5.1.1.3 Flood Mitigation Strategy

An FMS, by TWDB definition, is "a proposed plan to reduce flood risk or mitigate flood hazards to life or property". The RFPG should include as FMSs any proposed action that the group would like to identify, evaluate, and recommend that does not quality as either a FME or FMP. FMSs generally fall into the following categories:

- Flood mitigation education and outreach
- Buyout programs
- Flood management regulations

5.1.2 Identifying Potential FMEs, FMPs, and FMSs

The following steps were used to identify flood mitigation actions:

1. Define draft process for identifying and evaluating flood mitigation actions.
2. Extract potential flood mitigation actions from review of relevant flood studies.
3. Conducted initial stakeholder outreach to obtain information on flood mitigation actions.
4. Identify additional flood mitigation actions to address unmet greatest known flood needs and goals.
5. Perform initial screening and evaluation of flood mitigation actions to determine if actions meet minimum TWDB requirements.

5.1.2.1 Draft Process

TWDB requirements state that each RFPG is to develop and receive public comment on a "…proposed process to be used by the RFPG to identify and select flood management evaluations, flood mitigation strategies, and flood mitigation projects. This process is to be documented and such documentation is to be included in the draft and final adopted Regional Flood Plan."

At the NRFPG meeting on July 26, 2021, a Region 13 subcommittee was formed to develop a draft process. The Region 13 subcommittee included Debra Barrett, Lj Francis, Kendria Ray, and Lauren Hutch Williams, who met on August 23, 2021, to prepare recommendations for the NRFPG. The resulting recommendations of a draft process to be used by the RFPG to identify potentially feasible FMEs, FMSs and FMPs for the Nueces regional flood plan (NRFP) was approved at the September 27, 2021, regional flood planning meeting. The approved draft process is provided in Figure 5-2 and Figure 5-3.

Agenda Item #10. Proposed Process for Identifying Potential Flood Management Evaluations, Strategies, and Projects for the 2023 Nueces Regional Flood Plan

The process outlined below for identifying and selecting FMEs, FMSs, and FMPs was developed by the Region 13 subcommittee (consisting of Debra Barrett, Lj Francis, Kendria Ray, and Lauren Williams) on August 23rd for Nueces RFPG consideration at its Sept 27th meeting with public input.

1) The Nueces RFPG solicited public and stakeholder comments related to identifying potential FMEs, FMS, and FMPs, as follows:
    - Deploying a public comment map on the Region 13 website Home - Nueces Regional Flood Planning Group (Region 13) (nueces-rfpg.org), requesting feedback on flood-prone areas in the Nueces Basin. The comment map was open from April through August 2021. As of July 23rd, 185 comments on flood-prone areas were received.
    - A survey requesting information on proposed/ongoing flood projects was sent on June 18, 2021 to over 400 floodplain administrators and stakeholders in the Nueces Basin.
    - Direct outreach included four sub-regional meetings held May 17-20th, personal emails to floodplain administrators, and follow-up phone calls to selected municipalities to gather information on local and regional flood plans in the Nueces Basin and flood planning needs. As of August 17th, 32 entities had completed a survey on existing floodplain practices.
2) A subcommittee formed during the July 26th Nueces RFPG meeting consisted of voting and non-voting NRFPG members met on August 23rd to develop a draft process for identifying projects.
3) The Nueces RFPG will receive public comment at the September 27th meeting on the proposed process to be used to identify and select FMEs, FMSs, and FMPs.
4) Ongoing/proposed projects and flood-prone areas will be reviewed to identify project needs and data gaps.
5) Considering information provided by stakeholders, an initial screening of studies, projects and strategies will be performed based on the following metrics:
    - Addresses flood mitigation/ floodplain management goals adopted by the NRFPG
    - Prioritize emergency needs
    - Consider prevention projects to mitigate future flooding
    - Consider identified projects within a lens of potential impact to Agreed Order provisions
    - Indication regarding potential use of federal funds, TWDB, or other sources of funding and include a table of potential funding sources in the draft and final plan
    - Reduces flooding risk (benefits life and property) for drainage areas of 1 sq mile or more
    - Assess potential for including nature-based solutions and applicability
    - Unlikely to negatively affect a neighboring area (FMS or FMP only)
    - Reduces flood risk for 100-year storm event (1% annual chance of flood)(FMS or FMP only)
6) Using TWDB guidance (next page), a draft list of FMEs, FMSs, and FMPs will be compiled for consideration by the Nueces RFPG at its meeting in Oct/Nov 2021. Infeasible FMSs and FMPs will be identified, including primary reason for deeming infeasible.
7) A list of potential FMEs and potentially feasible FMS and FMPs identified by the NRFPG and infeasible FMSs and FMPs will be included in the Technical Memorandum due to TWDB in Jan 2022.
8) The Nueces RWPG will consider and submit a scope of work to the TWDB of FMEs, FMSs, and FMPs to be evaluated in the 2023 Nueces Regional Flood Plan.

Flood Management Evaluation (FME)- flood study of a specific flood prone area needed to assess risk
Flood Mitigation Project (FMP)- structural or non-structural project that when implemented will reduce flood risk, mitigate hazards to life or property. Includes nature-based solutions. 'No negative impact'
Flood Management Strategy (FMS)- proposed plan to reduce flood risk or mitigate flood hazards. Any action that a RFPG would like to evaluate and recommend that does not qualify as FME or FMP.

Figure 5-2. Process for Identifying Potential Flood Management Evaluations, Strategies, and Projects for the 2023 Nueces Regional Flood Plan

9) The process by which potentially feasible FMS are selected for evaluation in the 2023 Nueces Regional Flood Plan will be revisited and updated (if necessary) after submittal of the technical memorandum. A description of process will be included in draft and final plans.

TWDB guidance for designating FMEs/FMPs (from TWDB)

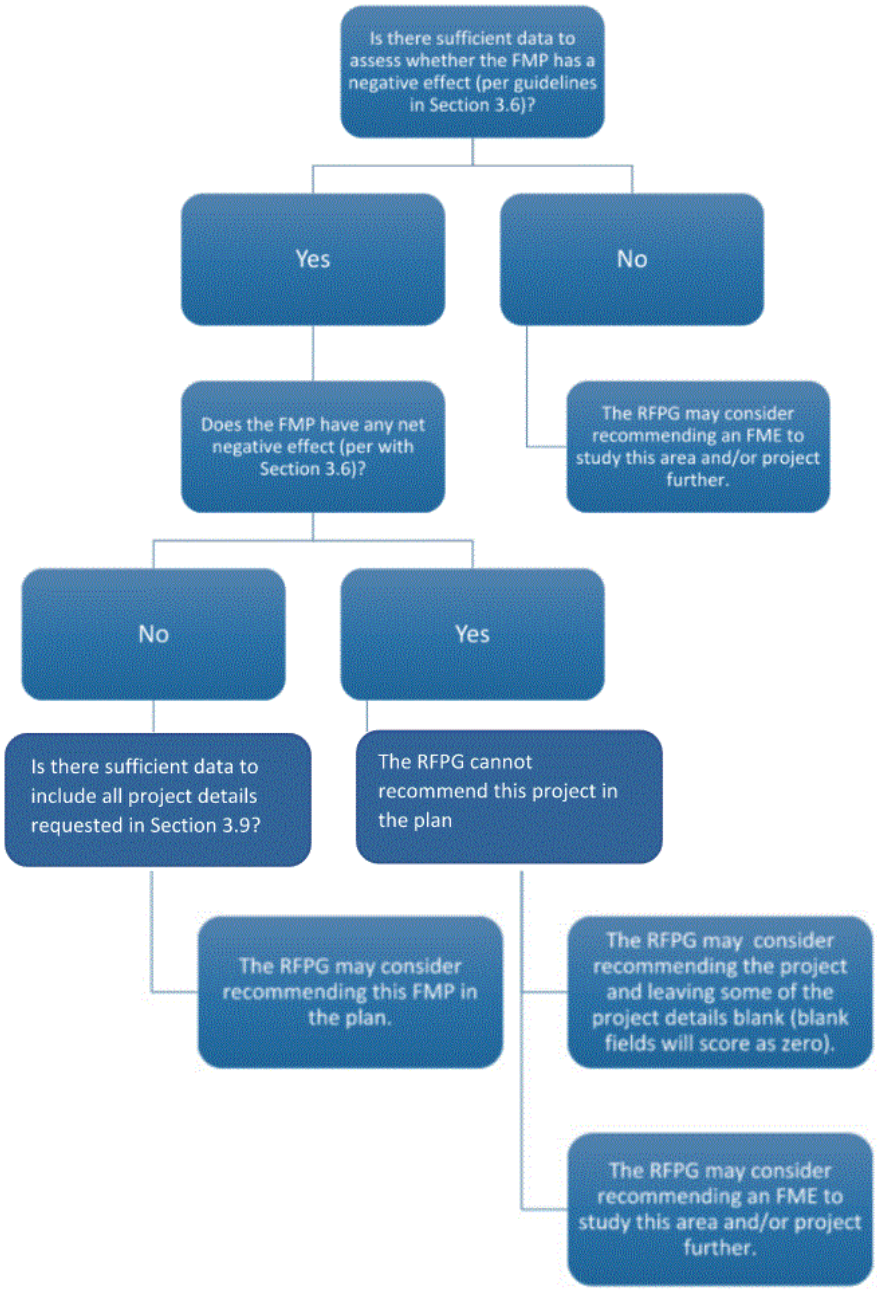

Figure 5-3: Process for Identifying Potential Flood Management Evaluations, Strategies, and Projects for the 2023 Nueces Regional Flood Plan (Continued)

5.1.2.2 Review of Relevant Flood Studies

A list of potential flood mitigation actions, derived from the review of previous relevant flood studies, are listed in Appendix C2 – List of Previous Flood Studies. These include multiple hazard mitigation plans, regional floodplain management plans, and other flood risk reduction type plans. All recommended FMEs were screened to ensure that they would not exactly duplicate the work of an ongoing TWDB Flood Infrastructure Fund (FIF) category 1 study. Although some recommended FMEs overlap with ongoing FIF category 1 studies, all recommended FMEs studies have different aims from the ongoing FIF category 1 studies. While some duplication of effort is inevitable between funded FMEs and the FIF category 1 studies, care should be taken to communicate with the sponsoring entity to minimize any duplication of work.

5.1.2.3 Stakeholder Outreach

Effective outreach to individuals with knowledge of known flood-prone areas and potential flood mitigation evaluations and projects was a key to developing the list of flood mitigation actions. Continuous efforts have been made since the start of the flood planning process to identify and engage those with flood-related authority in the basin. Four subregional meetings were held in May 2021 to introduce the regional flood planning process and to gather local knowledge of flood-prone areas, flood mitigation projects, and needs based on the pre-established subregional designed county groupings, shown previously in Figure 1-2.

In February 2022, the NRFPG reached out to county judges to further refine the stakeholder list of those with flood-related authority and knowledge, to identify flood plain contacts for county and city representation, and garner interest in upcoming stakeholder outreach. Stakeholders were contacted and 20 individual interviewers and three subregional meetings were held from February through April 2022. The list of flood mitigation actions previously identified were reviewed during the additional outreach to determine if any were under consideration or no longer needed, if the list was complete, and to obtain additional information.

Initial efforts to contact potential sponsors consisted of sending surveys to communities. These surveys contained projects associated with each community identified, giving the community an opportunity to communicate any projects that are no longer relevant or any projects that they are actively pursuing. These surveys were followed by calls to those same community contacts to inform communities of the survey and its purpose. To supplement this initial outreach effort, relationships previously developed with Nueces Region communities were leveraged to inform them of the NRFPG and its purpose and inform them of the previously sent survey to gather additional input. As in-person community outreach meetings took place, additional discussions and meetings occurred that further garnered community input regarding potential mitigation actions.

While these actions furthered the goal of receiving community feedback on what projects they wanted to pursue, not all communities were reached, and accordingly, the NRFPG decided that an affirmative willingness to sponsor a given action would not be a prerequisite for inclusion in the plan. As a result, all potential actions were considered for inclusion unless an entity had specifically declined to be listed as a sponsor and no other appropriate potential sponsor was identified. This approach was adopted for the following reasons.

1. It provides a conservative estimate of the flood mitigation need in the region.
2. It does not oblige an entity to sponsorship; it simply allows an entity to be eligible for funding if interest in and capacity to sponsor a project become evident within this planning cycle.

All sponsors associated with recommended actions were subsequently sent a survey to identify potential funding needs and sources for the actions listed in the plan. This effort is detailed in Chapter 9.

5.1.2.4 Identified Additional Flood Mitigation Actions to meet unmet Needs and Goals

A flood risk gap evaluation was performed in Chapter 4 to determine how the list of flood mitigation actions relate to the greatest known flood risk and mitigation needs and the regional goals. Areas identified as high risk but lacking flood studies or projects to address the flood mitigation need include:

- City of Falfurrias in Brooks County
- City Lytle in Medina County
- City of Three Rivers in Live Oak County
- Pleasanton, Jourdanton, and Poteet area in Atascosa County
- City of Dilley in Frio County
- City of Pearsall in Frio County
- Natalia and Devine area in Medina County
- Hondo area in Medina County
- City of Uvalde in Uvalde County
- Crystal City in Zavala County
- City of Asherton in Dimmit County
- Cities of Vanderpool and Utopia area along Frio River in Real and Uvalde County
- Area along Nueces River in western Uvalde County
- Webb County – Subdivision near I59 / Becerra Creek
- City of Cotulla
- City of Refugio
- City of Hebbronville
- Sabinal River are in northeast Uvalde County and southwest Bandera County

Potential flood mitigation evaluations were identified to provide flood studies for the list of high risk areas above.

A gap evaluation was also performed in Chapter 4 to determine how the list of flood mitigation actions relate to the floodplain mitigation and floodplain management goals presented in Chapter 3. The list of flood mitigation actions was found insufficient to achieve several of the Nueces Basin goals. Thus, additional studies were recommended as listed in Table 5-1 to help achieve Nueces basin goals while addressing areas of flood risk.

Table 5-1. Recommended Flood Studies to address Goals

Goal #	Name of Study	Potential Sponsor
1 – Low Water Crossings	Nueces Basin low water crossing study and upgrade prioritization	Nueces River Authority
2 – High Hazard Dams	Nueces Basin High Hazard Dam identification and risk assessment	Texas State Soil Conservation and Water Conservation Board (TSSWCB)
3 – Regional Coordination / Flood Warning Systems	Nueces Basin early flood warning system	Nueces River Authority
4 – Flood Map Updates	Nueces Basin Floodplain Map Updates	Nueces River Authority
6 – Min. Flood Standards	Nueces Basin Minimum Flood Management Standards	Nueces River Authority
7 – Nature Based Practices	Nueces Basin Assessment of Flood Mitigation and Performance of Nature-based Solutions (NBS)	The Nature Conservancy

Goal #	Name of Study	Potential Sponsor
7 – Nature Based Practices	Scaling Up Nature Based Solutions (NBS) in the Nueces Flood Planning Region to support community resilience and enhance flood and hazard mitigation planning	The Nature Conservancy
8 – Flood Public Information Campaign	Nueces Basin flood public information campaign	Nueces River Authority

5.1.2.5 RFPG Evaluation and Recommendation Process

The NRFPG considered recommendations on flood mitigation actions through a multi-step process. As documented in 5.1.2.3, the NRFPG created a Technical Subcommittee tasked with establishing a selection methodology, implementing the evaluation and selection process, and reporting their findings and recommendations back to the NRFPG for formal approval. The methodology included a screening of all potential flood mitigation actions considering TWDB requirements for inclusion in the RFP and any other additional considerations established by the Technical Subcommittee. The reasons for not recommending a particular flood mitigation action were reviewed by the NRFPG as part of the evaluation and recommendation process with reasons documented in the potential flood mitigation action tables attached to this plan (see Appendix A8).

The screening process for evaluating and recommending flood mitigation actions is summarized in Figure 5-4 for FMEs and in Figure 5-5 for FMPs and FMSs. These processes were primarily developed following the TWDB rules and requirements for inclusion in the plan. However, the TWDB left some evaluation criteria at the discretion of the RFPG and additional guidance was necessary prior to implementing the screening process. The main discretionary evaluation criteria are the level of service (LOS) to be provided by an FMP and the benefit-cost ratio (BCR) for the project. The TWDB recommends FMPs should minimally mitigate flood events associated with the 1% annual chance flood (100-year LOS). However, if a 100-year LOS is not feasible, the RFGP can document the reasons for its infeasibility and still recommend an FMP with a lower LOS. Similarly, the TWDB recommends that proposed actions have a BCR greater than one, but the RFPG may recommend FMPs with a BCR lower than one with proper justification.

On May 6, 2022, the NRFPG voted to recommend FMEs, FMPs, and FMSs as presented. This meeting was held in accordance with the requirements of the RFPG

bylaws, the Texas Open Meetings Act, and the general requirements of the Texas Water Code and the flood planning process.

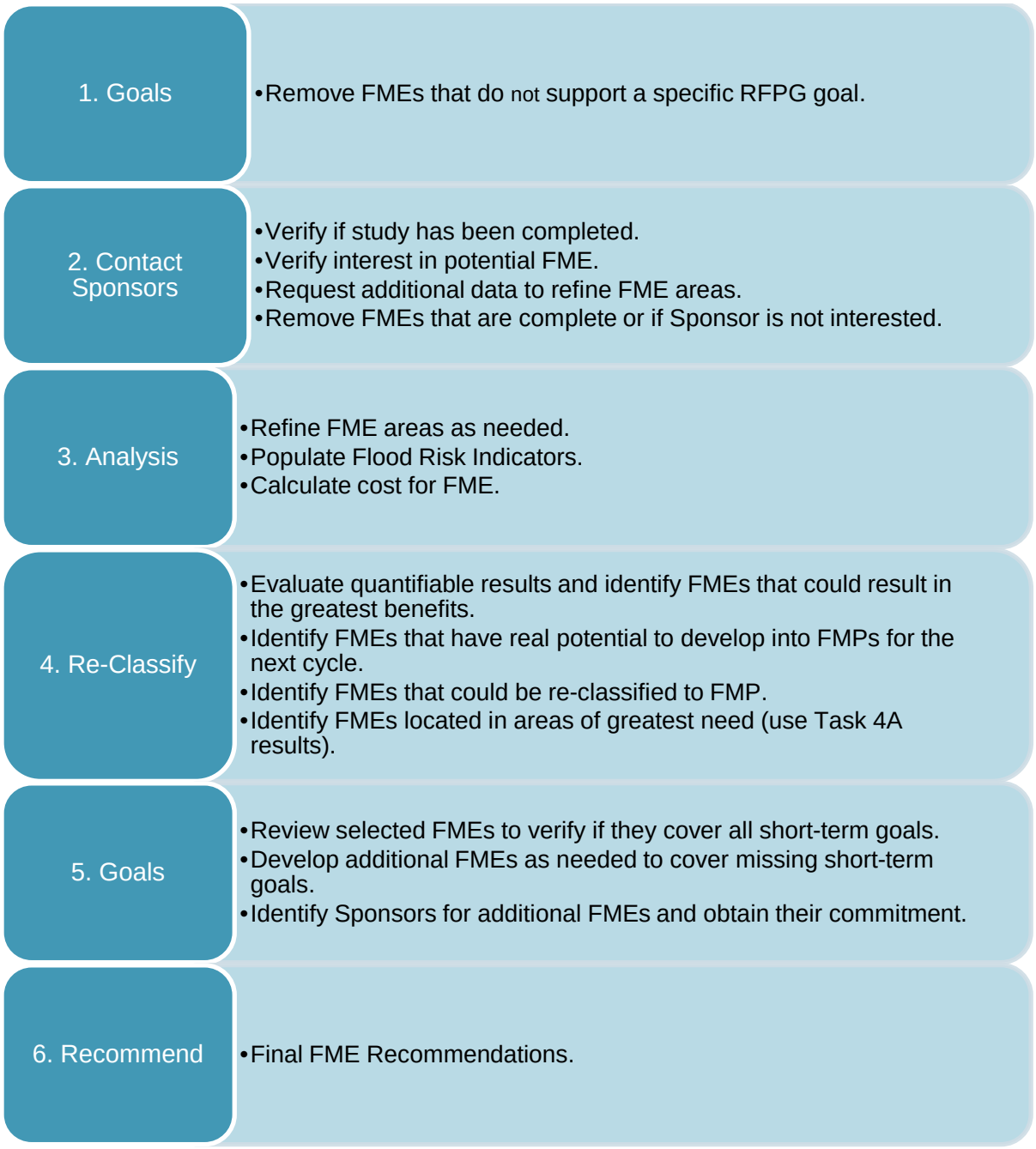

Figure 5-4: FME Screening Process

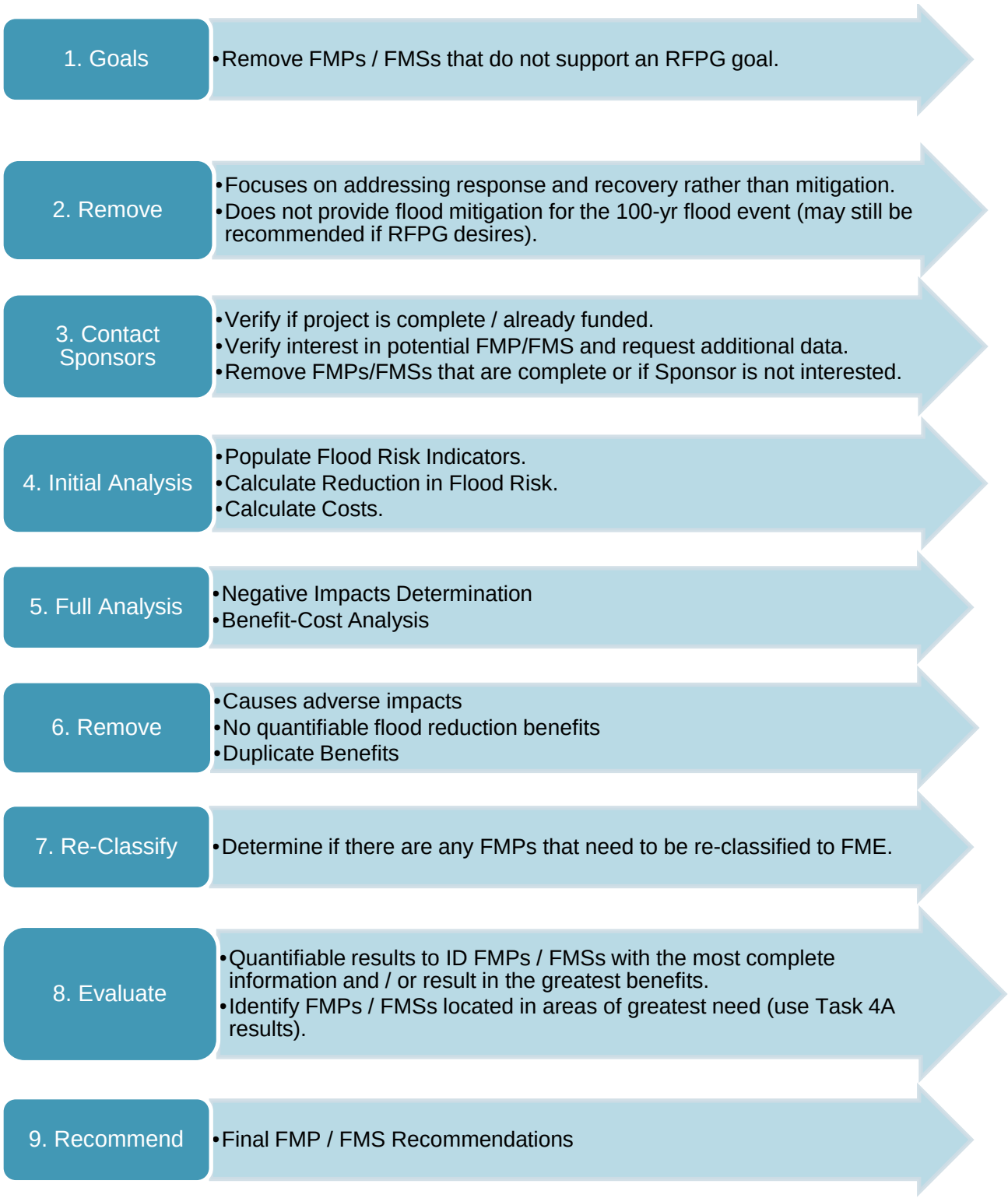

Figure 5-5:FMP and FMS Screening Process

5.1.2.6 Identification of FMPs, FMEs, and FMSs

The initial identification of flood mitigation actions was documented in the mid-point Technical Memorandum submitted in December 2021. At this mid-point, 366 flood mitigation actions were identified before initial screening was performed to determine compliance with TWDB requirements. This mid-point list was comprised of 232 FMPs, 65 FMEs, and 69 FMSs. The initial screening of flood mitigation actions removed 258 flood mitigation actions. The individual flood mitigation actions removed and the reason for their removal are documented in Appendix C7 – List of Removed Flood Mitigation Actions. Many more FMPs were reclassified to FMEs and numerous FMEs and FMSs were added as a result of the additional stakeholder outreach.

As a result of the initial evaluation process, a total of 243 flood mitigation actions were determined to meet TWDB requirements, of which four are FMPs, 179 are FMEs, and 60 are FMSs. The lower basin represents most of flood mitigation actions and comprises 118 of the total 243 flood mitigation actions identified. A breakdown of flood mitigation actions by type and subregion is provided in Figure 5-6. Refer to Appendix A7 – TWDB Table 12 – Potential Flood Management Evaluations Identified by RFPG**,** Appendix A8 – TWDB Table 13 – Potential Feasible Flood Mitigation Projects Identified By RFPG**,** and Appendix A9 – TWDB Table 14 – Potentially Feasible Flood Management Strategies Identified by RFPG.

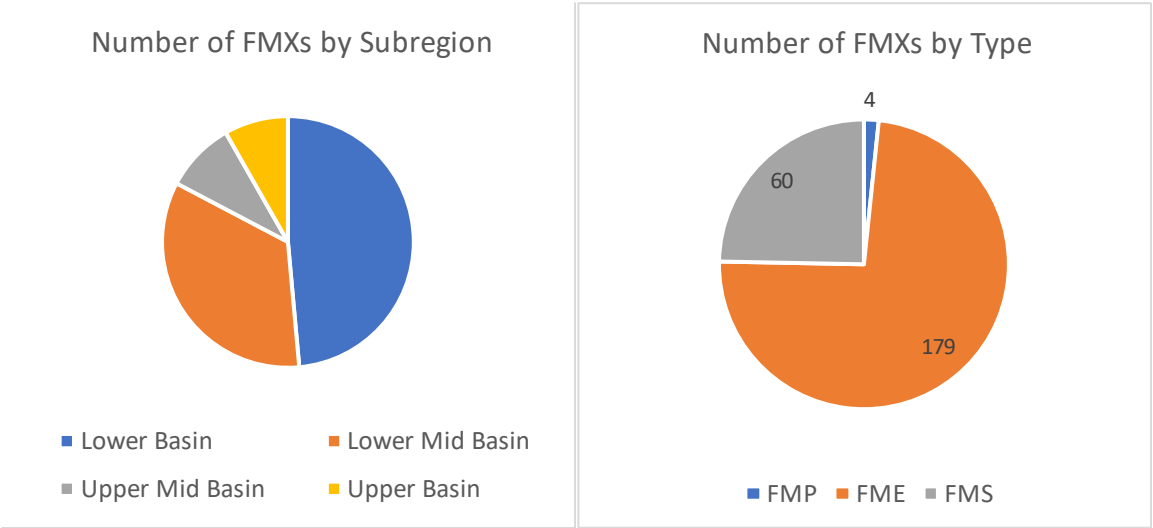

Figure 5-6. Breakdown of Flood Mitigation Actions by Type and Subregion

The identified flood mitigation actions were then screened for compliance with TWDB requirements and evaluated for inclusion into the NRFP. The screening process and the resulting recommended flood mitigation actions are described fully in the next section.

5.2 Evaluation and Recommendation of FMEs, FMSs, and FMPs

While there is an abundant need across the Nueces Region and the State of Texas for data collection, strategy implementation, and project construction to reduce or remove risk of flooding, not every flood mitigation action can be recommended in the RFP or included in the state flood plan (SFP). The NRFPG evaluated the identified flood mitigation actions, and based on the significant needs in the region, recommended all those that met the TWDB requirements and offered the greatest potential of reducing flood risks within the region, understanding that not all flood mitigation actions may be performed in the same planning cycle as they are identified. All recommendations considered alignment with NRFPG-adopted flood mitigation and floodplain management goals.

5.2.1 Flood Mitigation Action Costing Assumptions

To quantify the flood mitigation need within the Nueces Region, each flood mitigation action was assigned a cost. This was completed by leveraging the data available for each project and following a set of guidelines that promoted consistency while determining costs across multiple projects. Project cost estimates developed in or after September 2020 had the potential to be used directly, as it was assumed that these still provided an accurate representation of the projects' cost. For those projects that had cost estimates developed prior to September 2020, the project cost was escalated to an equivalent September 2020 dollar amount using Consumer Cost Index (CCI) values. To accommodate instances where flood mitigation action did not have project cost estimates available, a set of costing tables were developed based on action type and prevalent subcategories among the actions under review. The cost tables for FMEs and FMSs can be found in Appendix C8 – Supporting Costing Material for Flood Mitigation Actions. A table was not developed for FMPs as FMP costing was reliant upon escalating cost estimates provided by sponsors. Costing supporting materials such as factors used to derive September 2020 dollars from available cost estimates and calculators used to develop costs for Flood Mapping Updates and Dam Failure Analysis projects are also included in attached supporting costing material.

5.2.2 Flood Management Evaluations

5.2.2.1 Summary of Approach in Recommending FMEs

In considering potential FMEs for recommendation, the NRFPG sought to determine which FMEs would be most likely to result in identification of potentially feasible FMSs and FMPs in future planning cycles. Recommended FMEs were also required to demonstrate alignment with at least one regional floodplain management and flood

mitigation goal developed under Task 3. Finally, each recommended FME should identify and investigate at least one solution to mitigate the 1% annual chance flood. It is the intent that all FMEs with a hydrologic and hydraulic modeling component will evaluate multiple storm events, including the 1% annual chance flood. The exact solutions identified through performing these FMEs cannot be defined at this time. However, it is anticipated that an impact analysis will be performed for all alternatives and project benefits will be tabulated for the 1% annual chance flood to help inform any recommended alternatives and to define potentially feasible FMPs under this planning framework. Based on these TWDB requirements, the NRFPG identified two main reasons for recommending FMEs.

The first subset of recommended FMEs would result in increased flood risk modeling and mapping coverage across the region as they are implemented. These types of FMEs have two major implications for identifying potentially feasible FMSs and FMPs.

First, a current and comprehensive understanding of flood risk across the basin is necessary to identify high-risk areas for evaluation and development of flood risk reduction alternatives. Secondly, FMPs, and in some cases, FMSs, require a demonstrated potential reduction in flood risk to be recommended in the regional flood plan. For this metric to be assessed, hydrologic and hydraulic modeling must be available to compare existing and post-project floodplain boundaries to determine the flood risk reduction potential of a given project.

The second subset of recommended FMEs are project planning type FMEs. These FMEs are generally studies or preliminary designs to address a specific, known flood need. However, these flood mitigation actions currently lack some or all the detailed technical data necessary for evaluation and recommendation as an FMP such as demonstrating no adverse impacts, having a BCR greater than 1.0, or confirmation that the project provides mitigation for the 1% annual chance flood event. An example would be an existing study that identifies a potential drainage construction project but does not provide a no adverse impact analysis or statement. Completing these components as part of an FME will result in a potentially feasible FMP for consideration during future flood planning efforts. Sponsor input was a major driver for choosing not to recommend FMEs. FMEs that were indicated by the sponsor as being in progress, completed, or lacking interest to pursue were not recommended. Additionally, FMEs in close proximity to one another were combined into a single FME for recommendation due to overlapping goals or benefits.

5.2.2.2 Description and Summary of Recommended FMEs

The NRFPG identified and evaluated a total of 179 potential FMEs. Of these projects, 163 were recommended, representing a combined total of $282,331,000 of flood management evaluation need across the region. From these evaluations, it is

forecasted that approximately $931,821,000 in construction of flood mitigation projects will be enabled. Given the ongoing effort to further evaluate FMPs, these costs are not included in the flood infrastructure financing analysis (Chapter 9) and will be addressed in the Revised Plan that will be submitted to TWDB in July 2023. The number, types, and costs of FME projects recommended by the NRFPG are summarized in Table 5-2. A complete basin-wide table of FMEs is presented in Appendix A10 – TWDB Table 15 – Flood Management Evaluations Recommended by RFPG. County-based tables and maps of FMEs are presented in Appendix B23 – Flood Hazard Risk, Flood Risk Score, and Recommended Flood Mitigation Actions. Overall, the recommended FMEs represent over 12,800 square miles of development and potential drainage improvements and provides substantial coverage of those portions of the flood planning region that are severely impacted by the 1% and 0.2% annual chance flood events, as determined through analysis performed in Chapter 2.

Table 5-2: Summary of Recommended FMEs

FME Types	FME Descriptions	# of FMEs Identified	# of FMEs Recommended	Cost of Recommended FMEs	Estimated Cost of Construction[1]
Preparedness	Gauges, Barriers, Debris/ Vegetation Removal, and Channelization	4	2	**$550,000**	$0
Project Planning	Previously Identified Drainage Projects and Flood Studies	141	133	**$221,109,000**	$924,371,000
Watershed Planning	FIS Studies, Watershed Studies	23	19	**$56,739,000**	$0
Other	Property Acquisition and Buyout Programs	11	9	**$3,933,000**	$7,450,000
	Total	**179**	**163**	**$282,331,000**	$931,821,000

[1]Given the ongoing effort to further evaluate FMPs, these costs are not included in the flood infrastructure financing analysis (Chapter 9) and will be addressed in the Revised Plan in July 2023.

5.2.3 Flood Mitigation Projects

5.2.3.1 Summary of Approach in Recommending FMPs

For consideration as an FMP, a project must be defined in a sufficient level of detail to meet the technical requirements of the flood planning project Scope of Work and the associated Technical Guidelines developed by the TWDB. In summary, the RFPG must be able to demonstrate that each recommended FMP meets the following TWDB requirements:

1. The primary purpose is mitigation (response and recovery projects are not eligible for inclusion in the regional flood plan).
2. Supports at least one regional floodplain management and flood mitigation goal.
3. The FMP is a discrete project (not an entire capital program or drainage master plan).
4. Implementation of the FMP results in:
    a. Quantifiable flood risk reduction benefits
    b. No negative impacts to adjacent or downstream properties.
    c. No negative impacts to an entity's water supply
    d. No overallocation of a water source based on the water availability allocations in the most recently adopted State Water Plan.

In addition, the TWDB recommends that, minimally, FMPs should mitigate flood events associated with the 1% annual chance flood (100-year LOS). However, if a 100-year LOS is not feasible, the RFPG can document the reasons for its infeasibility and still recommend an FMP with a lower LOS.

Updated construction cost estimates and estimates of project benefits must also be available to define a BCR for each recommended FMP. The TWDB recommends that proposed projects have a BCR greater than one, but the RFPG may recommend FMPs with a BCR lower than one with proper justification.

The NRFPG considered for recommendation all potentially feasible FMPs that had the necessary data and detailed hydrologic and hydraulic modeling results available to populate these technical requirements. Pertinent details about the FMP evaluation are provided in the following section.

5.2.3.2 Description and Summary of Potentially Feasible FMPs

Four potential FMPs were included in the preliminary FMP list; a general description of the scope of work for each is provided below.

County Wide Early Flood Warning System (FMP 133000001):
The County Wide Early Flood Warning System project is focused on providing advanced warning ahead of impending flood events to residents of Uvalde County to provide residents time to prepare for flooding and accordingly minimize loss of life and property.

Bed-Material Entrainment in selected Streams of the Edwards Plateau (FMP 133000002):
The original understanding of the Bed-Material Entrainment in selected Streams of the Edwards Plateau project was that this potential FMP was to make improvements in the streams to prevent damage to low water crossings. However, further investigation determined the potential project was not as fully developed as originally believed. Therefore, this potential FMP was reassigned as a FME study to focus on developing a method to assess low water crossings on a site-by-site basis to determine the most appropriate method of reducing damage associated with entrained bed material.

Lamar Golf Course Drainage Easements (FMP 133000003):
The Lamar Golf Course Drainage Easements project consists of acquiring drainage easements through the existing Lamar Golf Course to facilitate future drainage infrastructure projects intended to reduce flooding on county roads within the area.

Southcentral Lamar Drainage Easement (FMP 133000004:
The Southcentral Lamar Drainage Easement project consists of acquiring drainage easements for a surface stormwater conveyance system extending from Southcentral Lamar (Bee Tree Circle) to Hwy 35 Bypass.

Of these four projects, one project (FMP 133000001) was determined to be an ongoing project with dedicated funding, so was removed from consideration. The remaining three projects continued through the screening process described in Section 5.2.3.3.

5.2.3.3 FMP Evaluation

Initial Evaluation

The scope of work for each FMP was evaluated to ensure that it would support at least one of the regional floodplain management and flood mitigation goals established in Chapter 3. The goals associated with each FMP are included in Appendix A6 – TWDB Table 11 – Flood Mitigation and Floodplain Management Goals. Based on a review of supporting information, it was determined that the primary purpose for each FMP is mitigation (rather than a response or recovery project), they are discrete projects, and they do not have any anticipated impacts to water supply or water availability allocations as established in the most recent adopted State Water Plan (TWDB, 2022 State Water Plan, Appendix B).

No Negative Impacts Determination

Each identified FMP must demonstrate that there would be no negative impacts on a neighboring area due to its implementation. No negative impact means that a project will not increase flood risk of surrounding properties. Using best available data, the increase in flood risk must be measured by the 1% annual chance event water surface elevation and peak discharge.

For the purposes of flood planning effort, the following requirements, per TWDB Technical Guidelines, should be met to establish no negative impact, as applicable:

1. Stormwater does not increase inundation in areas beyond the public right-of-way, project property, or easement
2. Stormwater does not increase inundation of storm drainage networks, channels, and roadways beyond design capacity
3. Maximum increase of 1D Water Surface Elevation must round to 0.0 feet (<0.05 ft) measured along the hydraulic cross-section
4. Maximum increase of 2D Water Surface Elevations must round to 0.3 feet (<0.35 ft) measured at each computation cell
5. Maximum increase in hydrologic peak discharge must be < 0.5% measured at computation nodes (sub-basins, junctions, reaches, reservoirs, etc.). This discharge restriction does not apply to a 2D overland analysis.

If negative impacts are identified, mitigation measures may be used to alleviate such impacts. Projects with design level mitigation measures already identified may be included in the regional flood plan and could be finalized at a later stage to conform to the “No Negative Impact” requirements prior to funding or execution of a project.

Furthermore, the RFPG has flexibility to consider and accept additional “negative impact” for requirements 1 through 5 based on engineer’s professional judgment and analysis given any affected stakeholders are informed and accept the impacts. This should be well-documented and consistent across the entire region. However, flexibility regarding negative impact remains subject to TWDB review.

The typical process for this determination is to perform a comparative assessment of pre- and post-project conditions for the 1% annual chance event (100-year flood) for each potentially feasible FMP based on their associated hydrologic and hydraulic models. The floodplain boundary extents, resulting water surface elevations, and peak discharge values would be compared at pertinent locations to determine if the FMP conforms to the no negative impacts requirements. This comparative assessment would be performed for the entire zone of influence of the FMP. **However, for the Nueces Region, none of the identified FMPs had models or reports to review to make no negative impacts determinations.**

Level of Service Evaluation

TWDB recommends that FMPs should mitigate flood events associated with the 1% annual chance flood (100-year LOS). Each of the potentially feasible Nueces Region FMPs could potentially reduce flood damages; however, documentation of a 100-year LOS could not be provided for any of the three potential FMPs. **None of the FMPs reviewed for the Nueces Region had models or reports available, and the nature of the proposed FMPs (primarily easement acquisition) did not allow for determination of a LOS that could be provided by the FMP**.

Benefit-Cost Analysis

Benefit-cost analysis (BCA) is the method by which the future benefits of a hazard mitigation project are determined and compared to its costs. The end result is a BCR, which is calculated by dividing the project's total benefits, quantified as a dollar amount, by its total costs. The BCR is a numerical expression of the relative "cost-effectiveness" of a project. A project is generally considered to be cost effective when the BCR is 1.0 or greater, indicating the benefits of a prospective hazard mitigation project are sufficient to justify the costs (FEMA, 2009). However, a BCR greater than 1.0 is not a requirement for inclusion in the RFP. The RFPG can decide to recommend a project with a lower BCR with appropriate justification. **Due to the nature of the potentially feasible FMPs in the Nueces region, it was determined that a BCR could not be assigned**.

Bed-Material Entrainment in selected Streams of the Edwards Plateau (FMP 133000002):
A study to develop a methodology for assessing low water crossings (LWCs) and ways to reduce damages associated with entrained bed material can lead to reduced maintenance costs and safer crossings, but without an understanding of the magnitude of anticipated benefits, a benefit cannot be accurately estimated at this stage.

Lamar Golf Course Drainage Easements (FMP 133000003) and Southcentral Lamar Drainage Easement (FMP 133000004):
While acquired easements can pave the way for future flood mitigation projects capable of realizing a real benefit, easement acquisition alone offers no readily quantifiable benefit until leveraged in a flood mitigation project.

Evaluation Results

Due to the high level of detail required for consideration as an FMP, no project was determined to have enough detail available for evaluation and potential recommendation as an FMP (see Table 5-3). The potentially feasible FMPs do not

provide a quantifiable LOS, benefit, or a no negative impact determination at their current stage.

Although not recommended as FMPs, these three projects have potential to be beneficial projects with further study and development through feasibility studies and preliminary engineering. Therefore, the project descriptions were modified, and they were added to the FME list.

Table 5-3: Summary of Recommended FMPs

FMP Type	FMP Description	# of FMPs Identified	# of FMPs Recommended	Total Cost of Recommended FMPs
Natural	Nature Based Solutions	1	0	$0
Preparedness	Flood Warning System	1	0	$0
Other	Easement Acquisitions	2	0	$0
	Total	**4**	**0**	**$0**

The required Project Details Spreadsheet, which will be used for evaluation and FMP ranking by the state, is not provided as there are no FMPs recommended.

While no FMP was selected for consideration in Task 5, Task 12 will consist of performing identified potential FMEs and evaluating flood risk reduction solutions, including feasibility studies and preliminary engineering, to identify, evaluate, and recommend additional potentially feasible FMPs. The FMEs to be performed and additional FMPs to be identified, evaluated, and recommended under this task are subject to RFPG approval. FMPs developed through Task 12 will be included in the 2023 Revised RFP.

5.2.4 Flood Management Strategies

5.2.4.1 Summary of Approach in Recommending FMSs

The approach for recommending FMSs adheres to similar requirements as the FMP process. However, due to the flexibility and varying nature of RFPG's potential use of FMSs, some of these requirements may not be applicable to certain types of FMSs. In general, the RFPG must be able to demonstrate that each recommended FMS meets the following TWDB requirements as applicable:

1. The primary purpose is mitigation (response and recovery projects are not eligible for inclusion in the regional flood plan).
2. Supports at least one regional floodplain management and flood mitigation goal.
3. Implementation of the FMS results in:

a. Quantifiable flood risk reduction benefits
b. No negative impacts to adjacent or downstream properties (a No Negative Impact certification is required)
c. No negative impacts to an entities water supply
d. No overallocation of a water source based on the water availability allocations in the most recently adopted State Water Plan.

In addition, the TWDB recommends that, at a minimum, FMSs should mitigate flood events associated with the 1% annual chance flood (100-year LOS). However, if a 100-year LOS is not feasible, the RFGP can document the reasons for its infeasibility and still recommend an FMS with a lower LOS.

Although each potentially feasible FMS must demonstrate that there would be no negative flood impacts on a neighboring area due to its implementation, there was no modeling available for the FMSs identified within this region, and therefore it could not be determined that there would be any reduction in flood risk or negative impacts to adjacent or downstream properties.

Multiple communities communicated an interest to pursue FMSs associated with Flood Management Standards and a Flood Public Information Campaign. Due to the number of communities expressing interest in these activities and the benefits associated with their uniform implementation across the region, it was determined that these FMSs would be more effectively executed at the regional level by the Nueces River Authority. Accordingly, community FMSs that fell under these two categories were not recommended, and instead the regional implementation of these FMSs was instead recommended.

5.2.4.2 Description and Summary of Recommended FMSs

A variety of FMS types were identified for the Nueces Region. Generally, these FMSs recommend broad regional strategies and initiatives. Some strategies encourage and support communities and municipalities to actively participate within the National Flood Insurance Program (NFIP). Other FMSs recommend the establishment and implementation of public awareness and educational programs to better inform communities of the risks associated with flood waters. Additional FMSs promote preventive maintenance programs to optimize the efficiency of existing stormwater management infrastructure, recommend the development of a stormwater management manual to encourage best management practices (BMPs), or promote the establishment of community-wide flood warning systems. These FMSs support several of the regional floodplain management and flood mitigation goals established in Chapter 3.

The NRFPG identified and evaluated a total of 60 potential FMSs. Of these projects, 40 were recommended, representing a combined total cost of $20,285,650. The number and types of projects recommended by the NRFPG are summarized in Table 5-4. The full list of FMSs and supporting technical data, including their flood risk reduction benefits as applicable, is included as Appendix A12 – TWDB Table 17 – Flood Management Strategies Recommended by RFPG. County-based tables and maps of FMSs are presented in Appendix B23 – Flood Hazard Risk, Flood Risk Score, and Recommended Flood Mitigation Actions.

Table 5-4 Summary of Recommended FMSs

FMS Types	FMS Descriptions	# of FMSs Identified	# of FMSs Recommended	Cost of Recommended FMSs
Education and Outreach	Turn Around, Don't Drown Campaigns; Flood Safety Education	17	9	$757,000
Flood Measurement and Warning	Flood Gauges, Early Alert Systems, Flood Warning Systems	10	4	$1,050,000
Property Acquisition and Structural Elevation	High Risk Property Acquisition, Acquisition of Open Space near Floodplain Areas	3	3	$10,700,000
Regulatory and Guidance	NFIP Participation, Stormwater Management Criteria Development, Floodplain Management Staff Acquisition and Training	17	17	$7,161,000
Infrastructure Projects	Maintenance of existing infrastructure, cost study of implementing infrastructure	8	2	$100,000
Other	Training, Floodplain Standard Adoption, Infrastructure Inspections	5	5	$517,650
	Total	**60**	**40**	**$20,285,650**

Flood gates at Lake Corpus Christi, May 2019

Chapter 6 – Impacts of Regional Flood Plan and Contributions to Water Supply Development and State Water Plan

31 TAC § 361.40 and 361.41

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6 Impacts of Regional Flood Plan and Contributions to Water Supply Development and State Water Plan

The objective of this chapter is to summarize the impacts and contributions of implementing the regional flood plan (RFP) would have on reducing flood risks and provide a region-wide summary and description of the contribution that the RFP would have on water supply development. In previous chapters, existing and future flood risks were determined based on 1% and 0.2% annual chance flood events within the Nueces Flood Planning Region (NFPR). In addition, an inventory and assessment of existing infrastructure, including major constructed infrastructure and natural features were compiled for use as a baseline. Flood mitigation needs were identified leading to recommendations of flood management evaluations and strategies, and flood mitigation projects. This chapter summarizes the positive benefits and negative effects of implementing the RFP and identifies impacts the RFP could have on water supply development and the State Water Plan.

6.1 Impacts of Regional Flood Plan

Impacts are determined before-and-after RFP implementation of recommended flood management evaluations (FME), flood management strategies (FMS), and flood mitigation projects (FMPs) relative to existing and future flood risk. These two comparisons may, for example, also indicate a percent change in flood risk, including flood exposure to vulnerable communities and critical infrastructure. The comparison before-and-after RFP implementation estimates both how much the region's existing flood risk will be reduced through implementation of the plan as well as how much additional, future flood risk (that might otherwise arise if no changes were made to floodplain policies etc.) will be avoided through flood management or mitigation activities. This in turn, will help guide the NFPR towards measuring the impacts of floodplain management goals described in Chapter 3 and additional changes/improvements to the region's floodplain management policies that might be necessary in the future.

This effort included:

- a region-wide summary of the relative reduction in flood risk that implementation of the RFP would achieve within the region including with regard to life, injuries, and property.

- a general description of the types of potential positive and negative socioeconomic or recreational impacts of the recommended FMSs and FMPs within the NFPR.
- a general description of the overall impacts of the recommended FMPs and FMSs in the Regional Flood Plan on the environment, agriculture, recreational resources, water quality, erosion, sedimentation, and navigation.

6.1.1 FMP Impacts

A total of four FMPs were identified in the NFPR. After evaluating these FMPs, these identified FMPs were determined to be ineligible because they already had funding, insufficient detail was available to determine level of service of project benefits, or information was lacking to confirm that the project when implemented would not negatively affect neighboring areas within or outside of the NFPR. The flood exposure for existing conditions is shown in Table 6-1. Since the NFPR has no recommended FMPs, flood exposure after FMP implementation and exposure reduction could not be quantified.

Table 6-1. Impacts Prior to and After FMP Implementation

Flood Exposure	Existing Conditions		After FMP Implementation		Exposure Reduction from FMPs	
	1% Annual Chance Event (ACE)	0.2% ACE	1% ACE	0.2% ACE	1% ACE	0.2% ACE
Exposed Structures	60,967	+37,197	N/A	N/A	N/A	N/A
Exposed Population	144,053	+100,356	N/A	N/A	N/A	N/A
Exposed Area (Square Miles)	4,578	+1,287	N/A	N/A	N/A	N/A
Exposed low water crossings (LWC)[1]	503	+23	N/A	N/A	N/A	N/A
Exposed Critical Facilities	445	461	N/A	N/A	N/A	N/A

N/A= Not applicable.

[1]Out of a total of 576 LWCs in the NFPR obtained from Texas Natural Resources Information System (TNRIS) and local government entities.

6.1.2 FMS Impacts

A total of 60 FMSs were identified in the NFPR. After evaluating these FMSs based on the Texas Water Development Board (TWDB) guidance, 40 were recommended. FMSs are defined by the Texas Administrative Code (TAC) as "a proposed plan to reduce flood risk or mitigate flood hazards to life or property." The types of FMSs recommended by the Nueces Regional Flood Planning Group (NRFPG) include updating flood ordinances, adding flood gages for monitoring, property buy-outs, implementing flood early warning systems, and other programs for which benefits are difficult to quantify with certainty.

For this evaluation, the impacts of implementing recommended FMSs were estimated in the form of flood protection for areas within the watershed that might benefit through implementation of the FMS. However, due to the nature of the FMSs, this may or may not correlate to a direct reduction in loss of life, injuries, and property according to the values indicated. To study the impact of the FMSs on the Region, the number of exposed structures, population square miles, LWCs and critical facilities that overlap the FMS polygons were summed and shown in Table 6-2. Presumably, the structures, population, LWC and critical facilities within the FMS polygons will benefit from the FMS, however it's impossible to know exactly what will benefit from an FMS unless a detailed impact analysis is performed. For example, an FMS to improve low water crossing signage may not improve the exposed structures within its boundaries. Therefore, the analysis in this section was meant to give a very rough and best-case estimate of the impact of the FMSs.

By implementing FMSs, up to 66% of structures may benefit and as many as 64% fewer people may be exposed to flood inundation. However, this may not necessarily correlate to removal from 0.2% annual chance flood inundation area since many of the FMSs are related to education campaigns or low water crossing signage. The NFPR exposed to flood risk may increase by as much as 26%. Exposed low water crossings could be reduced by up to 10%, and exposed critical facilities could be reduced by as much as 61% from 0.2% annual chance flood inundation after FMS implementation.

Table 6-2. Impacts Prior to and After FMS Implementation

Flood Exposure	Existing Conditions		Future Conditions (no RFP)		Future Conditions Unlikely to Benefit through FMSs		Benefitting from RFP FMSs	
	1% ACE	0.2% ACE	1% ACE	0.2% ACE	1% ACE	0.2% ACE	1% ACE	0.2% ACE
Exposed Structures	60,967	37,197	77,878	34,611	29,465	8,367	48,413	26,244
Exposed Population	144,053	100,356	198,915	94,363	79,021	25,809	119,894	68,554
Exposed Area (Square Miles)	4,578	1,287	4,629	1,283	3,426	966	1,203	317
Exposed LWC	503	23	509	526	414	522	95	4
Exposed Critical Facilities	445	384	642	493	334	109	308	384

6.1.3 FME Impacts

A total of 179 FMEs were identified in the NFPR. After evaluating these FMEs based on TWDB guidance, 163 were recommended. While compiling data during the baseline development of the RFP, the NRFPG identified many data gaps within the NFPR pertaining to areas of high flood risks that lacked floodplain management practices, flood management enforcement, detailed hydrologic and hydraulic models, and inundation mapping as described in Chapter 4. The lack of data leads people and structures to being potentially exposed to unnecessary flood hazards. FMEs were developed to address that exposure. In general, the FMEs include flood hazard modeling and mapping to identify flood risk, flood mitigation alternatives analysis and feasibility studies, and preliminary engineering studies among others.

To study the impact of the FMSs on the Region, the number of exposed structures, population square miles, LWCs and critical facilities that overlap the FME polygons were summed and shown in Table 6-3, similar to the analysis in The FMS impacts section 6.1.2. Presumably, the structures, population, LWC and critical facilities within the FME polygons will benefit from the FME, however it's impossible to know exactly what will benefit from an FME unless a detailed impact analysis is performed.

By reducing the number of square miles affected by flooding by implementing FMEs, the population living within those areas ultimately benefits with reductions in flood risk. Since the high flood risk areas could potentially be reduced by implementing recommended FMEs, the subsequent population that receives this benefit is estimated to be 61,029 (or 25% of the population that are inside the future 0.2% annual chance flood inundation area). The socioeconomic benefit to the population varies based upon location. Descriptions of those benefits are discussed below in Section 6.1.5. The estimated population in the 1% annual chance exceedance floodplain that could benefit with recommended FMEs is shown in Table 6-3. While the number of injuries and deaths prevented by implementing the plan is not quantifiable, the benefits are expected to be significant in terms of reducing flood risk for areas that are currently shown to be flood-prone. The benefits are achieved by improving the accuracy of inundation mapping and extent of flood hazard to reduce flood risk to structures, roads, and property (structural flood mitigation projects) and changing the way people interact with flood risk (non-structural flood mitigation projects and strategies) through regulatory improvements, education campaigns, and identifying areas of concern to address with structural or non-structural drainage and flood mitigation improvements.

Removing structures from short-term and long-term flood risk benefits communities who rely on those structures for residences, work, industry, and critical facilities. Critical facilities identified generally as municipal utilities and buildings, hospitals and care facilities, and schools are of special importance. Table 6-3 shows the estimated reduction in the number of structures and critical facilities by implementing the RFP.

Table 6-3. Exposures Benefitting from FMEs

Exposures	Number Benefitting from FMEs (1% ACE)
Structures	61,029
Population	142,133
Ag Land (Acres)	14,660
Critical Facilities	507
Road Length (miles)	665
Low water Crossings (LWCs)	183

6.1.4 Low Water Crossings and Impacted Roadways

Implementing FMSs and FMPs across the FPR will reduce the impact of existing low water crossings (LWCs). As projects are implemented over time, the number of LWCs will be reduced saving life and property. The total number of LWCs benefiting by implementing recommended FMSs in the NFPR is shown above in Table 6-2.

Flooded roadways also benefit from the NRFP being implemented. Roadways that are often closed due to flooding pose risks to life, property, and transportation in general.

6.1.5 Socioeconomic and Recreational Impacts

6.1.5.1 Socioeconomic

Socioeconomic impacts were taken into consideration while developing the NRFP to verify that flood reduction benefits were evenly distributed among all groups and balanced across the region. The NFPR has a diverse population with wide ranging economic levels. Disadvantaged socioeconomic populations have limited access to resources hindering response and recovery from flood events. As discussed in Chapter 1, the NFPR was divided into four subregions based on differences in socioeconomic, land characteristics, and types of flooding. Most of the population, over 82%, is in the lower half of the NFPR. Three of the basins are similar regarding median household income, households below the poverty line, and diversity, as shown in Table 6-4. The upper mid basin is the outlier with lower diversity, lower household income and a higher percentage of households below the poverty line. Zavala County, located in the upper mid basin, is also identified as the seventh poorest county in the country based on median household income.

Table 6-4. NFPR Socioeconomic Information

Basin	Population	Median Household Income	Households below Poverty Line	Diversity Index	Households
Upper	72,672	$50,821	15%	48%	24,807
Upper Mid	52,882	$36,235	27%	23%	16,407
Lower Mid	136,020	$48,122	20%	43%	46,382
Lower	535,465	$53,435	18%	51%	192,680

In developing the appropriate FMSs, FMPs, and FMEs, the NRFPG included goals to reduce impacts due to flood events and improve the lives of all socioeconomic groups, ensuring the most disadvantaged were well represented. Flood exposure and vulnerability analyses completed for the NFPR and described in Chapter 2 used socioeconomic indicators to identify vulnerabilities of communities and critical facilities that are most susceptible to high flood risk.

6.1.5.2 Recreation Impacts

Many parks located along water fronts are designed to be flooded periodically with minimal impact to infrastructure. Floodplains and wetlands can support recreation and

tourism. Flood control basins often include reservoirs, which are recreational and wildlife attractions. Choke Canyon Reservoir is a good example of this. Although not specifically identified in the NRFP, as FMSs and FMPs are implemented and structures in floodplains are removed, new opportunities become available for local sponsors to re-develop these lands for public benefit. These areas can be used for county parks and hiking and biking trails. The NRFPG encourages local flood administrative agencies to seek secondary benefits such as recreational opportunities in flood-prone areas and to support public education campaigns and clear signage indicating flood potential. While the NRFPG supports such repurposing of floodplain areas for recreation, no negative impacts to existing recreation activities in the Nueces Basin should be caused by these activities.

6.1.5.3 Floodplain Management Practices Impacts

By implementing the RFP, the existing floodplain management standards identified in Chapter 3 will be leveraged and have basis to bolster and expand local regulations to protect future life and structures from high flood risk events. Currently, there are sparse moderate to strong regulations and the additional future flood risks identified in Chapter 2 necessitate stronger floodplain management practices to reduce impacts to life, injury, or properties. The NRFPG has identified a minimum floodplain management standard throughout the region, as discussed in Chapter 3, and implementation of the RFP will provide more accurate flood inundation mapping to support communities as they align future floodplain management standards and ordinances to mitigate future risk exposure.

6.1.6 Overall Impacts of Recommended FMSs and FMPs on Environment, Agriculture, Water Quality, Erosion, Sedimentation, and Navigation

Flood risk management concepts to consider when evaluating FMSs and FMPs include the following[2]:

- Flood is a natural process that has many benefits to human and natural systems.
- Promoting some flooding as desirable and making room for water promotes native species, maintains vital ecosystem services, and reduces the chance of flooding elsewhere.
- Natural landscapes and watersheds provide flood mitigation functions that should be promoted, protected, enhanced, and restored.

[2] From Texas Parks and Wildlife, October 26, 2022.

- Prioritize risk reduction over flood control by focusing first on reducing loss of life and injury.
- Utilize limited resources fairly.
- Address flood risk using a portfolio approach to first implement non-structural (policy, land management, emergency management) followed by structural (grey and natural and nature-based) strategies.
- Criteria for assessing projects strategies should include a comprehensive suite of measures spanning economical, operational, societal, and environmental advantages and disadvantages. Assessments focusing on economics alone (number of buildings, acres) should be avoided.

Implementing the RFP provides numerous benefits associated to the primary purposes of FMSs, FMPs, and FMEs. The FMS benefits although not readily quantifiable, will protect the health and safety of the region by reducing flood risk through advanced flood warning systems, removing roads and structures from flooding, and providing officials the tools to properly manage flood prone areas.

The recommended FMSs in the NRFP are anticipated to have a beneficial impact on environment, agriculture, water quality, and erosion by providing additional data and understanding of flood events that will lead to implementation of flood mitigation projects that divert or address flood flows to reduce their impact. Several recommended FMSs are specifically identified to reduce erosion and sedimentation impacts. Flood projects should consider stream crossing designs that allow for sediment transport and passage of aquatic organisms and do not impound water.

The FMSs recommended in the NRFP are not anticipated to impact navigation.

No long-term impairment to designated water quality in the State Water Quality Management Plan is anticipated as a result of recommended FMS or FMPs.

The plan, when implemented, will not negatively affect neighboring areas located within or outside the flood planning region.

Several FMSs were identified to have a positive impact on water supply. They are described in the following section on water supply.

6.2 Contributions to and Impacts on Water Supply Development and the State Water Plan

According to TWDB guidance, RFPGs must include a regionwide summary of the contribution that the RFP would have to water supply. As part of this analysis, FMSs and FMPs were reviewed to determine whether impacts to water supply/availability exists. Impacts include contributions as well as reductions in water supply and

availability. These impacts as determined are sorted according to the following categories:

1. Involves directly impacting water supply volume available during drought of record which requires both availability and directly connecting supply to specific water user group(s)
2. Directly benefits water availability
3. Indirectly benefits water availability
4. Or has no anticipated impact on water supply

A coordinated effort with representatives from multiple regional water planning groups occurred to identify water management strategies that could be impacted. Those regional water planning groups include, Region N (Coastal Bend), Region L (South Central Texas), and Region M (Rio Grande). There are four FMS that were identified by the NRFPG on June 27, 2022, that have benefits related to water supply development. These strategies, with exception of a direct Nueces River diversion to Choke Canyon Reservoir (CCR) have been evaluated and included in Coastal Bend (Region N) Regional Water Plans. In order for the Nueces River diversion to CCR project to be included as a recommended FMS in the RFP, it must have an estimated annual water supply. This project, therefore, was not eligible for recommendation. The three FMS with water supply benefits that were recommended by the NRFPG are shown in Table 6-5. A map showing the location of these recommended FMSs in relation to the 1% annual chance flood inundation area is shown in Figure 6-1.

Table 6-5. FMS/FMP Contributions to Water Supply

Name	FMS/ FMP	Volume (AF/YR)	Impacts Water Supply Volume	Directly Benefits Water Availability	Indirectly Benefits Water Availability	No Impacts on Water Supply
Two-way pipeline (LCC-CCR)	FMS	Approx. 22,000 – 40,000	X			
Nueces Off Channel Reservoir	FMS	Approx. 30,000 – 48,000	X			
LCC Sediment Removal	FMS	Approx. 9,000	X			

AF-YR=acre-feet per year

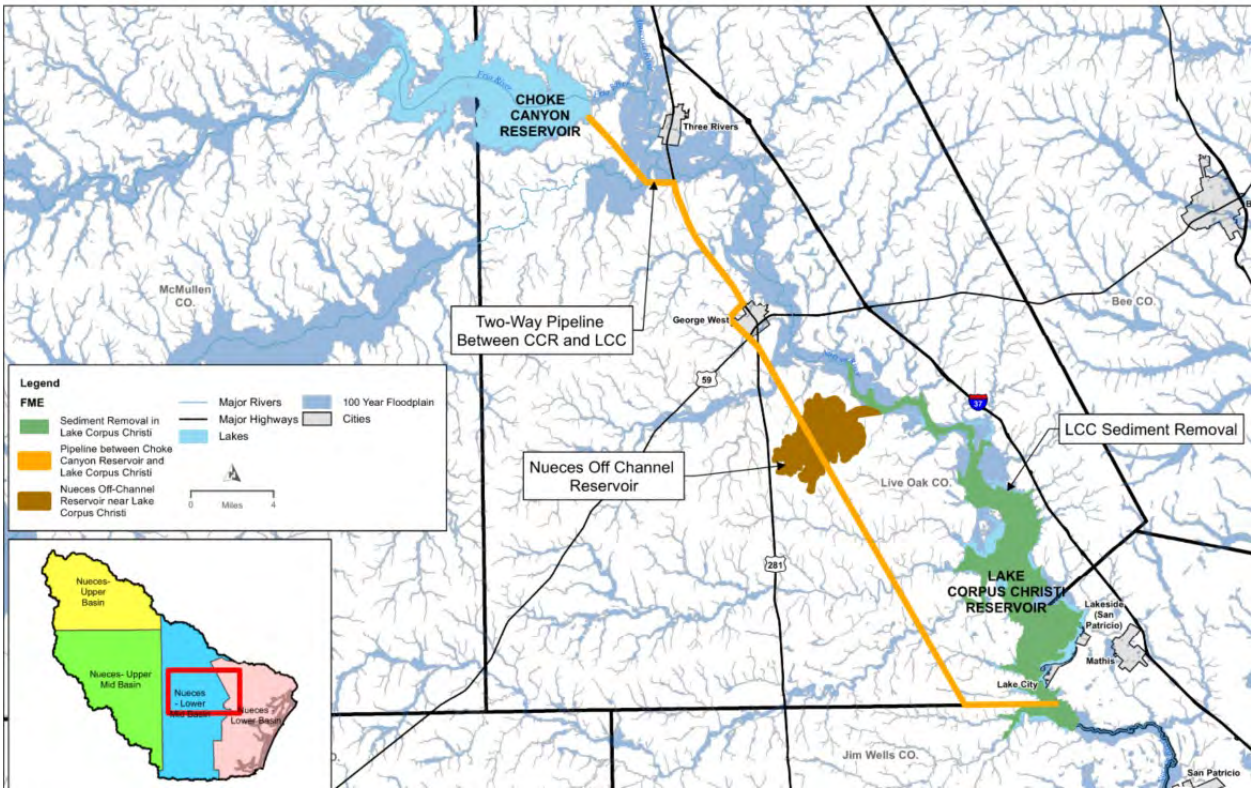

Figure 6-1 FMS Related to Water Supply

Two-way pipeline between Choke Canyon Reservoir (CCR) and **Lake Corpus Christi (LCC)** - The two-way pipeline has been recommended as a water management strategy in previous Coastal Bend (Region N) Regional Water Plans and State Water Plans. The groundwater – surface water interactions in the alluvial soils of the Gulf Coast aquifer between CCR to LCC are complex. The channel losses along this stretch of the river are considerable with amounts varying based on seasonal conditions. Losses are more pronounced during prolonged drought events. A two-way pipeline between CCR and LCC would mitigate the losses in the natural stream between the two reservoirs. The two-way pipeline provides operators the ability to balance water volumes in the two lakes to better make use of the extra capacity to store water in CCR while freeing up capacity in LCC to capture additional flood flows from the Atascosa and Nueces Rivers that converge at the City of Three Rivers. In extended drought periods, water can be moved from CCR to LCC minimizing losses while maximizing water supply for contracted users. Simulations for the historical period 1934-2003 concluded that this pipeline operation could provide a firm yield of approximately 22,000 – 40,000 acre-feet per year. This strategy was not recommended in the 2022 State Water Plan.

Nueces off-channel reservoir - The Nueces off-channel reservoir (OCR) has been recommended as a water management strategy in previous Coastal Bend (Region N) Regional Water Plans and State Water Plans. The OCR can serve to enhance the system yield of CCR and LCC while capturing water that would otherwise spill into LCC.

The OCR would be operated in conjunction with water levels at LCC to maximize the total volume of water stored. The capture of additional flood flow provides added protection against prolonged droughts ensuring water supply availability for contracted users. In addition to water supply, the OCR can simultaneously maintain the instream flows to the Nueces Bay and Estuary (B&E). Past studies show that, for a 280,000 acre-feet reservoir, the firm yield ranges from approximately 30,000 – 48,000 acre-feet per year. This strategy was not recommended in the 2022 State Water Plan.

Although it has not been studied previously, there may be additional benefits achieved through operation of the Nueces off-channel reservoir in conjunction with Aquifer Storage and Recovery (ASR). Such an ASR concept might include treating water from the Nueces off-channel reservoir and recharging aquifers in favorable hydrogeologic areas near treatment facilities for later recovery and use by local or regional water providers during drought or high seasonal water demand periods. In 2019, the Corpus Christi Aquifer Storage and Recovery Conservation District and the City of Corpus Christi conducted an ASR exploratory program in Nueces County using reclaimed water for industrial purposes and the results appear favorable up to yields of 18 MGD. Although this specific project would not be a candidate to use in conjunction with the Nueces off-channel reservoir, it was a recommended water management strategy in the 2021 Coastal Bend Regional Water Plan and 2022 State Water Plan. Additional studies would be needed to evaluate aquifers in proximity to the Nueces OCR and local water treatment plants, to further evaluate conjunctive use opportunities with the OCR and ASR.

Sedimentation Removal at LCC - Sediment accumulation in LCC has been discussed for decades. To address this issue, dredging of LCC was considered. This project was evaluated in the 2001 Coastal Bend (Region N) Regional Water Plan, but has not been re-evaluated or considered as a water management strategy in the most recent four planning cycles. In the 2001 Coastal Bend Regional Water Plan, it was estimated that approximately 163 million cubic yards (in situ volume) of sediment needs to be dredged to restore the storage capacity of LCC to 1959 conditions. The removal of sedimentation would free up capacity to store additional water and/or allow for more flood water capture. For water supply, the dredging program could provide a long-term yield (30-year) of approximately 9,000 acre-feet per year. This strategy was costly and presented disposal challenges.

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Chapter 7– Flood Response Information and Activities

31 TAC §361.42

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7 Flood Response Information and Activities

Texas Water Development Board (TWDB) guidance states that regional flood planning groups (RFPGs) are to summarize the nature and types of flood response preparations in the basin including recovery. It specifies, however, that RFPGs "shall not perform analyses or other activities related to planning for disaster response or recovery activities." The focus of this chapter is to present flood response information gathered through stakeholder outreach to flood-related authorities in the Nueces basin and provide general recommendations on flood response activities as a tool for others in the basin to use to develop flood response and recovery programs.

7.1 Types of Flooding in the Nueces Region

As discussed previously in Chapter 2 (Section 2.1.1.4), the three primary types of flooding in the Nueces Basin include riverine; pluvial, including urban flooding; and coastal flooding. In the 24,094-square-mile (15,420,000 acre) basin included in the Nueces Flood Planning Region (NFPR), the land surface elevation ranges from 2,400 feet mean sea level (msl) near Rocksprings in Edwards County to near sea-level (0 feet msl) in the coastal area near Corpus Christi. These elevation differences across the region and different soil types cause different types of flood risk. The NFPR was sub-divided into four subregions with this in mind, as shown in Figure 1-2. The upper basin is more prone to riverine flash floods; the upper and lower mid-basins are prone to riverine floods but are not flashy in nature like the upper basin; and the lower basin is more susceptible to coastal floods. Cities located in all subregions are prone to pluvial and urban flooding where inadequate local drainage is exceeded. This causes overtopping of drainage systems and flood flows to pool in the streets. Flash floods are caused by heavy rainfall over a relatively short period of time, resulting in flood water accumulating quickly that is powerful, extremely dangerous, and hampers mobility and emergency access for flood response. **Stormwater in the upper and lower mid-basin of the Nueces Region is typically conveyed through streets and engineered drainage features that were not effectively designed or maintained for effective flood control. Furthermore, many of these areas in the mid-basin have had inaccurate or no flood modeling or mapping to serve as a basis for flood mitigation. When such flood events occur, it is imperative that plans are in place to combat the effects of the flooding.**

7.2 The Nature and Types of Flood Response Preparations

There are four phases to emergency management:

- **Flood Mitigation:** The implementation of actions, including structural and non-structural solutions, to reduce flood risk to protect against the loss of life and property.
- **Flood Preparedness:** Actions, aside from mitigation, that are taken before flood events to prepare for flood response activities.
- **Flood Response:** Actions taken during and in the immediate aftermath of a flood event.
- **Flood Recovery:** Actions taken after a flood event involving repairs or other actions necessary to return to pre-event conditions.

Source: Federal Emergency Management Agency, 1998. IS-010 Emergency Management Institute: Animals in Disaster, Module A: Awareness and Preparedness

For example, when a severe rain event is projected to occur, steps are taken for **preparedness**: disaster preparedness plans are in place, drills and exercises are performed, an essential supply list is created, and potential vulnerabilities are assessed. During the **response** phase, disaster plans are implemented, search and rescue may occur, and low water crossing (LWC) barricades may be erected. In the **recovery** phase, evaluation of flood damage, rebuilding damaged structures, and removing debris occurs.

Mitigation is an important step of the four phases of emergency management. Hazard mitigation is defined as any sustained action taken to reduce or eliminate the continued risk to life and property from hazard events. It is an on-going process that seeks to break the cycle of damage and restoration in hazardous areas.

Flood mitigation is the primary focus of the regional flood planning process through the RFPG efforts to identify and recommend flood management evaluations (FMEs), flood management strategies (FMSs), and flood management projects (FMPs). The plan may also include FMEs, FMSs, and FMPs that focus on flood preparedness.

Examples of mitigation actions include regulatory requirements for reduction of flood risk, watershed planning, flood mapping updates, drainage infrastructure improvements,

property acquisition and relocation, or public outreach projects. Examples of preparedness actions include installing disaster warning systems, purchasing radio communications equipment, or conducting emergency response training.

7.3 Flood Response Activities for Local Entities in the Nueces Region

The Nueces Region's ability to prepare, respond, recover, and mitigate disaster events is determined by several factors. With a clear understanding of a community's capabilities, a recognition of the entities with whom coordination is key, and knowledge of the actions sustained to promote resiliency, the region can be better equipped to implement sound measures for flood mitigation and preparedness.

The purpose of flood risk management is to help prevent or reduce flood risk through either structural or non-structural means or a combination of the two. The responsibility for flood risk management is shared amongst federal, state, and local government agencies; private-sector stakeholders; and the general public.

The major responsibilities of the county governments in the 31 counties located within the NFPR include providing public safety, holding elections at every level of government, maintaining Texans' most important records; building and maintaining roads, bridges, and in some cases, county airports; providing emergency management services; providing health and safety services; collecting property taxes for the county and sometimes for other taxing entities; issuing vehicle registration and transfers; and registering voters.

Cities, or municipalities, generally take responsibility for parks and recreation services, police and fire departments, housing services, emergency medical services, municipal courts, transportation services (including public transportation), and public works (streets, sewers, signage, and so forth). There are 57 municipalities within the NFPR.

There are 50 "other" governmental entities within the NFPR that have various levels of flood management authority. These include associations that represent river authorities, water control improvement districts, drainage districts, member local governments, mainly cities and counties, that seek to provide cooperative planning, coordination, and technical assistance on issues of mutual concern that cross jurisdictional lines. River authorities or districts in Texas are public agencies established by the state legislature and given authority to develop and manage the waters of the state. The Nueces Region has five river authorities within its region that each have the power to conserve, store, control, preserve, use, and distribute the waters of a designated geographic region for the benefit of the public. A drainage district is a special purpose district created by the Texas Legislature and governed by County Commissioners Courts. It is a government

agency established to reduce the effects of flooding through improvement of drainage features. There are four drainage control districts in the NFPR.

These 138 total entities and/or political subdivisions in the NFPR described above and listed in Chapter 1 (Section 1.3.1) were considered during development of the 2023 Nueces Regional Flood Plan (NRFP). During plan development, it was determined that many of the “other” governmental entities do not actively engage in flood response activities, and instead support local county and municipalities in administering flood mitigation and response programs.

To examine the state of its flood preparedness, the Nueces Regional Flood Planning Group (NRFPG) obtained emergency management plans, hazard mitigation plans, and other regional and local flood planning studies from county and local jurisdictions. An emergency management plan is a course of action developed to mitigate the damage of potential events that could endanger an organization's ability to function. Such a plan should include measures that provide for the safety of personnel and, if possible, property and facilities.

Hazard mitigation planning reduces loss of life and property by minimizing the impact of disasters. It begins with state, regional, and local governments identifying natural disaster risks and vulnerabilities that are common in their area. After identifying these risks, they develop long-term strategies for protecting people and property from similar events. Mitigation plans are key to breaking the cycle of disaster damage and reconstruction. Having an up-to-date hazard mitigation action plan (HMAP) is key in assessing risk and in developing mitigation actions.

The NRFPG collected hazard mitigation plans, emergency management plans, and ordinances for local entities in the Nueces Region that covered 21 counties and 30 municipalities in the Nueces Basin, as shown in Table 7-1.

Table 7-1. Summary of Nueces Basin entities with flood hazard mitigation plans, flood management plans, and ordinances

Entity Name	Type of Entity	Level of Engagement (none, low, medium, high)	Ordinance Adopted	Ordinance date	Flood hazard, mitigation action, or emergency management plan	Flood hazard, mitigation action or emergency management plan	Floodplain management plan	Floodplain management plan date
Aransas County	County	Medium	X	2019	X	2017	X	2017
Atascosa County	County	--	X	2013	X	2020	--	--
Bandera County	County	Medium	X	2020	X	2014	--	--
Bee County	County	--	X	2010	X	2012	--	--
Bexar County	County	Medium	X	2007	X	2014	--	--
Duval County	County	Low	--	--	X	2020	--	--
Frio County	County	Low	X	2016	X	2018	--	--
Jim Wells County	County	--	--	--	X	2012	--	--
Karnes County	County	Medium	X	2010	--	--	--	--
Kerr County	County	Medium	X	2020	--	--	--	--
Kleberg County	County	--	--	--	X	2012	--	--
La Salle County	County	--	X	2008	--	--	--	--
Live Oak County	County	--	--	--	X	2012	--	--
Mcmullen County	County	--	X	2013	X	2020	--	--
Medina County	County	High	X	--	--	--	--	--
Nueces County	County	High	X	--	X	2017	--	--
Real County	County	Medium	X	--	--	--	--	--
Refugio County	County	Low	X	2014	X	2021	--	--
San Patricio County	County	High	X	2019	X	2012	--	--
Webb County	County	High	X	2019	X	--	--	--
Wilson County	County	Medium	X	2010	--	--	--	--
Agua Dulce	Municipality	--	--	--	X	2017	--	--
Alice	Municipality	--	X	2017	--	--	--	--
Aransas Pass	Municipality	--	X	--	X	2017	X	2017
Beeville	Municipality	Low	--	--	X	--	--	--
Bishop	Municipality	Medium	X	2001	X	2017	--	--
Charlotte	Municipality	--	X	2009	X	2020	--	--
Christine	Municipality	--	X	--	X	2020	--	--
Corpus Christi	Municipality	High	X	--	X	2017	--	--
Cotulla	Municipality	Low	X	--	--	--	--	--
Driscoll	Municipality	--	--	--	X	2017	--	--
Fulton	Municipality	--	X	--	X	2017	X	2017

Entity Name	Type of Entity	Level of Engagement (none, low, medium, high)	Ordinance Adopted	Ordinance date	Flood hazard, mitigation action, or emergency management plan	Flood hazard, mitigation action or emergency management plan	Floodplain management plan	Floodplain management plan date
Gregory	Municipality	High	X	2019	X	2018	--	--
Hondo	Municipality	Medium	X	--	--	--	--	--
Ingleside	Municipality	High	X	--	X	2018	--	--
Ingleside on the Bay	Municipality	Medium	X	--	X	2018	--	--
Jourdanton	Municipality	--	X	--	X	2020	--	--
Lytle	Municipality	--	X	--	X	2020	--	--
Mathis	Municipality	--	--	--	X	2018	--	--
Odem	Municipality	--	--	--	X	2018	--	--
Pearsall	Municipality	--	X	--	X	--	--	--
Petronila	Municipality	--	--	--	X	2017	--	--
Pleasanton	Municipality	--	X	--	X	2020	--	--
Port Aransas	Municipality	High	X	--	X	2017	--	--
Portland	Municipality	High	X	--	X	2018	--	--
Poteet	Municipality	--	--	--	X	2020	--	--
Robstown	Municipality	--	X	--	X	2017	--	--
Rockport	Municipality	--	X	2015	X	2017	X	2017
San Patricio	Municipality	--	--	--	X	2018	--	--
Sinton	Municipality	Medium	--	--	X	2018	--	--
Taft	Municipality	--	--	--	X	2018	--	--

7.4 Flood Preparedness Measures in the Nueces Flood Planning Region

Flood preparedness is the first line of action that an entity can take prior to the occurrence of a flood events to prepare for flood response. In the NFPR, flood preparedness measures were identified for 23 counties and 41 cities based on information gathered from local stakeholders with flood-related authority, internet queries, and previous local and regional flood plans. Table 7-2 lists the names of entities and their flood preparedness measures.

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Table 7-2. Flood Preparedness Measures for Entities in the Nueces Flood Planning Region

Entity Name	Type of Entity	*Flood Preparedness Measures*																		
		Develop management plan with regular updates	Public Information Plan/Officer	Prepare staging areas	Build flood early warning systems	Protect buildings against flood damage at initial construction	Master plan of all flood-related projects	Land use practices and policies to reduce future flooding	Have Floodplain Administrator	Have Emergency Management Coordinator	Develop evacuation plan	Storm/Stormwater management plan	Consider higher standards list	Subdivision regulations	Floodplain regulations	National Flood Insurance Program (NFIP) minimum requirements	Local Floodplain ordinance with higher standards (greater than NFIP)	Drainage Master Plan	Developed Flood Plan	Erosion Response Plan	Emergency Operations Plan
Aransas County	County	X	X	--	--	X	X	X	X	X	--	X	X	X	X	X	X	X	X	--	X
Atascosa County	County	--	--	--	--	--	--	--	X	X	--	--	X	X	--	--	--	--	--	--	X
Bandera County	County	--	--	--	X	--	--	--	X	--	--	--	--	X	X	X	--	--	X	--	--
Bee County	County	--	--	--	--	X	--	--	X	X	--	--	--	X	--	--	--	--	--	--	--
Bexar County	County	X	X	--	--	--	--	--	X	--	--	--	--	X	X	--	X	--	--	--	--
Duval County	County	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--	X
Frio County	County	--	--	--	--	--	--	--	X	--	--	--	--	X	X	X	--	--	--	--	X
Jim Wells County	County	--	--	--	--	--	--	--	--	X	--	--	--	X	--	--	--	--	--	--	--
Karnes County	County	--	--	--	--	X	--	--	X	X	--	--	--	X	X	--	X	--	--	--	X
Kerr County	County	--	--	--	--	X	--	--	X	--	--	--	X	X	X	X	--	--	--	--	--
Kleberg County	County	--	--	--	--	--	--	--	--	X	--	X	--	--	--	--	--	--	--	--	--
La Salle County	County	--	--	--	--	X	--	--	X	--	--	--	--	X	--	--	--	--	--	--	--
Live Oak County	County	--	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--
McMullen County	County	--	X	--	--	--	--	--	X	X	--	X	--	X	--	--	--	--	--	--	--
Medina County	County	--	--	--	--	X	--	--	X	--	--	--	X	X	X	X	X	--	--	--	--
Nueces County	County	--	--	--	--	--	--	X	X	X	--	X	--	--	--	--	--	X	X	X	X
Real County	County	--	--	--	X	--	--	--	X	--	--	--	--	X	X	X	--	--	--	--	--
Refugio County	County	--	--	--	--	X	--	--	X	X	--	--	--	X	X	--	--	--	--	--	X
San Patricio County	County	X	--	--	--	X	--	--	X	X	--	--	--	X	X	--	X	--	X	--	--
Uvalde County	County	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Webb County	County	--	--	--	--	X	--	--	X	--	--	--	--	X	X	--	X	--	--	--	--
Wilson County	County	--	--	--	--	--	--	--	X	X	--	--	--	X	X	--	X	--	--	--	X
Zavala County	County	--	--	--	--	--	--	--	--	--	--	--	--	X	X	--	X	--	--	--	--
Agua Dulce	Municipality	--	--	--	--	--	--	X	--	X	--	--	--	--	--	--	--	--	--	--	X
Alice	Municipality	--	--	--	--	--	--	--	X	X	--	--	X	--	--	--	--	--	--	--	--
Aransas Pass	Municipality	X	X	--	--	--	--	--	X	X	--	X	--	X	X	--	--	--	X	--	X
Bayside	Municipality	X	--	--	--	X	--	--	X	X	--	--	--	X	X	--	--	--	--	--	X

Entity Name	Type of Entity	*Flood Preparedness Measures*																		
		Develop management plan with regular updates	Public Information Plan/Officer	Prepare staging areas	Build flood early warning systems	Protect buildings against flood damage at initial construction	Master plan of all flood-related projects	Land use practices and policies to reduce future flooding	Have Floodplain Administrator	Have Emergency Management Coordinator	Develop evacuation plan	Storm/Stormwater management plan	Consider higher standards list	Subdivision regulations	Floodplain regulations	National Flood Insurance Program (NFIP) minimum requirements	Local Floodplain ordinance with higher standards (greater than NFIP)	Drainage Master Plan	Developed Flood Plan	Erosion Response Plan	Emergency Operations Plan
Beeville	Municipality	--	--	--	--	--	--	X	--	--	--	--	--	--	--	X	--	--	--	--	--
Benavides	Municipality	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--	X
Bishop	Municipality	--	--	--	--	X	--	X	X	X	--	X	--	X	X	X	--	--	X	--	X
Charlotte	Municipality	--	--	--	--	--	--	--	X	--	--	--	X	--	--	--	--	--	--	--	--
Christine	Municipality	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--	--
Corpus Christi	Municipality	--	--	--	--	--	--	X	X	X	--	X	--	X	X	--	X	--	--	X	X
Cotulla	Municipality	--	--	--	--	--	--	--	X	--	--	--	--	X	X	X	--	--	--	--	--
Driscoll	Municipality	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--	--
Freer	Municipality	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--	X
Fulton	Municipality	--	--	--	--	--	--	--	X	X	--	--	--	X	X	--	--	--	X	--	X
Gregory	Municipality	--	--	--	--	X	--	--	X	X	--	--	--	X	X	X	X	--	--	--	--
Hondo	Municipality	--	--	--	--	--	--	--	X	--	--	--	--	X	X	X	--	--	--	--	--
Ingleside	Municipality	--	--	--	--	--	--	--	X	X	--	--	X	X	X	--	X	--	--	--	--
Ingleside on the Bay	Municipality	--	--	--	--	--	--	--	X	X	--	--	--	--	--	X	--	--	--	--	--
Jourdanton	Municipality	--	X	--	--	--	--	--	X	X	--	--	--	X	--	--	--	--	--	--	--
Kingsville	Municipality	--	--	--	--	--	--	--	X	X	--	--	X	--	--	--	--	--	--	--	--
Lake City	Municipality	--	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--
Lakeside	Municipality	--	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--
Leakey	Municipality	--	--	--	--	--	--	--	--	--	--	--	--	X	X	X	--	--	--	--	--
Lytle	Municipality	--	--	--	--	--	--	--	X	X	--	--	--	X	--	--	--	--	--	--	--
Mathis	Municipality	--	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--
Odem	Municipality	--	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--
Petronila	Municipality	--	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	X
Pleasanton	Municipality	--	X	--	--	--	--	--	X	X	--	--	--	X	--	--	--	--	--	--	X
Port Aransas	Municipality	--	--	--	--	--	--	--	X	X	--	--	--	X	X	X	X	--	--	--	--
Portland	Municipality	--	--	--	--	--	--	--	X	X	--	--	--	X	X	--	X	--	--	--	--
Poteet	Municipality	--	--	--	--	--	--	--	--	X	--	--	--	X	--	--	--	--	--	--	--
Refugio	Municipality	X	--	--	--	X	--	--	X	X	--	--	--	X	X	--	--	--	--	--	X
Robstown	Municipality	--	--	--	--	--	--	X	X	X	--	--	--	--	--	--	--	--	--	--	X

Entity Name	Type of Entity	*Flood Preparedness Measures*																		
		Develop management plan with regular updates	Public Information Plan/Officer	Prepare staging areas	Build flood early warning systems	Protect buildings against flood damage at initial construction	Master plan of all flood-related projects	Land use practices and policies to reduce future flooding	Have Floodplain Administrator	Have Emergency Management Coordinator	Develop evacuation plan	Storm/Stormwater management plan	Consider higher standards list	Subdivision regulations	Floodplain regulations	National Flood Insurance Program (NFIP) minimum requirements	Local Floodplain ordinance with higher standards (greater than NFIP)	Drainage Master Plan	Developed Flood Plan	Erosion Response Plan	Emergency Operations Plan
Rockport	Municipality	X	X	--	--	X	X	X	X	X	--	X	X	X	X	X	X	X	X	--	X
Rocksprings	Municipality	X	X	--	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
San Diego	Municipality	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--	X
San Patricio	Municipality	--	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--
Sinton	Municipality	--	--	--	--	--	--	--	--	X	--	--	--	X	X	X	--	--	--	--	--
Taft	Municipality	--	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--
Uvalde	Municipality	--	--	--	--	--	--	--	X	--	--	--	--	X	X	--	X	--	--	--	--
Woodsboro	Municipality	X	--	--	--	X	--	--	X	X	--	--	--	X	X	--	--	--	--	--	X

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7.5 Flood Response and Recovery Measures in the Nueces Flood Planning Region

Flood response actions are actions taken during and in the immediate aftermath of a flood event. Flood recovery involves repair or other actions after a flood event to restore to pre-flood conditions. Table 7-3 lists the names of entities and their flood response and recovery measures.

Table 7-3. Flood Response and Recovery Measures for Entities in the Nueces Region

Entity Name	Type of Entity	*Flood Response and Recovery Measures*														
		High Water Marks	Contact Residents	Conducts evacuations (with Safety Precautions for Flood Responders)	Provides shelters during flood response	Closes flooded roads	Operates flood warning systems	Assess road and property damage	List and schedule repairs and replacements	Fire or police department responds	Pump out flooded areas	Emergency Operations Center (EOC) is activated	EOC to deploy necessary supplies	Field operation plan during flood event	Stream gage monitoring	Use Traffic Control Plan
Aransas County	County	X	X	--	--	--	X	X	--	--	--	--	X	--	--	--
Atascosa County	County	--	--	--	--	--		X	--	X	--	--	--	--	--	--
Bandera County	County	--	--	X	--	--	X	--	--	--	--	--	--	X	X	X
Frio County	County	--	--	--	--	--	--	--	--	X	--	--	--	--	--	--
Nueces County	County	--	--	--	--	--	X	X	X	--	--	--	--	--	--	--
Uvalde County	County	--	--	--	--	--	--	--	--	--	--	--	--	--	X	--
Agua Dulce	Municipality	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
Aransas Pass	Municipality	--	--	--	--	X	X	X	--	--	X	X	--	--	--	--
Beeville	Municipality	--	--	--	--	--	--	--	--	X	--	X	--	--	--	--
Bishop	Municipality	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
Corpus Christi	Municipality	--	--	--	--	X	X	X	X	--	X	X	--	--	--	--
Fulton	Municipality	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
Ingleside	Municipality	--	--	--	--	X	--	X	--	X	X	--	--	--	--	--
Pearsall	Municipality	--	--	--	--	--	--	--	--	X	--	--	--	--	--	--

Entity Name	Type of Entity	*Flood Response and Recovery Measures*														
		High Water Marks	Contact Residents	Conducts evacuations (with Safety Precautions for Flood Responders)	Provides shelters during flood response	Closes flooded roads	Operates flood warning systems	Assess road and property damage	List and schedule repairs and replacements	Fire or police department responds	Pump out flooded areas	Emergency Operations Center (EOC) is activated	EOC to deploy necessary supplies	Field operation plan during flood event	Stream gage monitoring	Use Traffic Control Plan
Petronila	Municipality	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--
Robstown	Municipality	--	--	X	--	--	X	--	--	--	--	--	--	--	--	--
Rockport	Municipality	--	--	--	--	X	X	X	X	X	X	--	--	--	--	--

7.6 State Agencies that Provide Flood Response Support

State agencies play an important role in flood response and can help provide support and resources for flood preparation activities.

The state hazard mitigation plan is an effective instrument to reduce losses by reducing the impact of disasters upon people and property. Although mitigation efforts cannot eliminate impacts of disastrous events, the plan endeavors to reduce the impacts of hazardous events to the greatest extent possible. The plan evaluates, profiles, and ranks natural and human-caused hazards affecting Texas as determined by frequency of event, economic impact, deaths, and injuries. The plan

- assesses hazard risk,
- reviews current state and local hazard mitigation and climate adaption capabilities, and
- develops strategies and identifies state agency (and other entities) potential actions to address needs.

Table 7-4 summarizes various state contributing entities and partners with a description of their role related to flood response. Specific activities related to the NFPG (Region 13) are also noted.

Table 7-4. State Agency Roles in Flood Response Activities

Agency	State or Federal	Role	Region 13 specific notes	Actions within Region 13
Texas General Land Office (GLO)	State	Restoring critical infrastructure and mitigating future damage through resilient community planning. More than $14 billion have been allocated for recovery and mitigation.	GLO Region 3 serves Aransas, Kenedy, Kleberg, Nueces, Refugio, and San Patricio Counties	Fulton Beach Road Projection (Aransas), Shell Point Ranch Wetlands Protection (Aransas), Lamar Beach Road Protection (Aransas), Flour Bluff Living Shoreline (Aransas), Newcomb's Point Shoreline Stabilization (Aransas), Little Bay Restoration Initiative (Aransas), Baffin Bay Watershed Monitoring and Management Plan (Kenedy, Kleberg), Tern Island and Triangle Tree Island Rookery Habitat Protection (Kleberg), Coastal Ben Gulf Barrier Island Conservation (Kleberg), Aransas National Wildlife Refuge Dagger Point Shoreline Preservation (Nueces), Portland Living Shoreline (Nueces), Nueces River Delta Shoreline Stabilization (Nueces, San Patricio), Guadalupe Delta Estuary Restoration (Refugio), Guadalupe River and Delta Wildlife Management Area Acquisition (Refugio), Indian Point Marsh Area Living Shoreline (San Patricio), Corus Christi Bay Wastewater, Stormwater Quality and Pollution Management Improvements (San Patricio)

Agency	State or Federal	Role	Region 13 specific notes	Actions within Region 13
Texas Water Development Board (TWDB)	State	Designated as the State National Flood Insurance Program (NFIP) Coordinating Agency for Texas. TWDB administers the state and regional flood planning process with the flood planning regions.	Not applicable	Not applicable
Texas Park and Wildlife Department (TPWD)	State	Texas Parks and Wildlife Game Wardens are often first on the scene to assist local law enforcement to search for and rescue victims of disasters - especially flood victims.	Not applicable	Not applicable
Texas Division of Emergency Management (TDEM)	State	Ensure the state and its local governments respond to and recover from emergencies and disasters and implement plans and programs to help prevent or lessen the impact of emergencies and disasters	Region 3 serves Aransas, Bee, Brooks, Dimmit, Duval, Edwards, Jim Hogg, Jim wells, Kenedy, Kinney, Kleberg, LaSalle, Live Oak, Maverick, Nueces Real, Refugio, San Patricio, Uvalde, Webb, and Zavala. Region 6 serves Atascosa, Bandera, Bexar, Frio, Goliad, Karnes, Kerr, McMullen, Medina, Wilson	Not applicable

Agency	State or Federal	Role	Region 13 specific notes	Actions within Region 13
Texas State Soil and Water Conservation Board (TSSWCB)	State	Works to ensure that the State's network of over 2,000 flood control dams are protecting lives and property by providing operation, maintenance, and structural repair grants to local government sponsors.	Flood control dams within Region 13 counties are eligible	Not applicable
Texas Department of Transportation (TxDOT)	State	TxDOT has been working with state and federal emergency planners to refine the evacuation process for emergencies such as hurricanes and flash floods	Evacuation routes have been refined for Corpus Christi, including Aransas Pass and Port Aransas	Evacuation routes include counties in Region 13
Texas Engineering Extension Service (TEEX)	State	Established to enhance the capabilities of emergency responders and local officials to prepare for, respond to, and recover from catastrophic events resulting from natural events, etc. TEEX is the sponsoring agency for Texas Task Force 1, which includes one of the country's most extensive water rescue program.	Not applicable	Not applicable

Dams and levees are owned and operated by individuals, private and public organizations, and the government. The responsibility for maintaining a safe dam resides with the owner. A dam failure resulting in an uncontrolled release of the reservoir can have a devastating effect on persons and property downstream. It is critical that dam owners are part of the flood planning process to ensure collaborative and cohesive flood planning.

There are 506 dams in the NFPR, and 116 of these dams are regulated by the Texas Commission on Environmental Quality (TCEQ's) Dam Safety Program. As part of the Dam Safety Program, owners of significant and high hazard dams are required to submit an Emergency Action Plan (EAP) to the TCEQ. Dam EAPs document responsibilities during flood response and identify the flood inundation area. Of the 116 TCEQ regulated dams, 28 have an EAP on file with TCEQ.

The NFPR also includes 23 flood control dams constructed and operated by the Natural Resources Conservation Service (NRCS). The NRCS dams are in Duval, Jim Wells, Uvalde, Atascosa, and Live Oak Counties. A preliminary evaluation was performed to categorize dam hazard using the following classification:

- High Hazard- There are structures in the downstream floodplain. A high hazard classification indicates that if the dam were to fail, there would be large consequences (such as loss of life), not that the dam is in a condition that is more likely to fail.
- Significant Hazard- There are no structures in the downstream floodplain, but there are up to two structures near the downstream floodplain.
- Low Hazard- There are no structures in or near the downstream floodplain.

Table 7-5 summarizes the NRCS flood control dams in the NFPR.

Table 7-5 NRCS Dams in the Nueces Basin - 2021

Hazard Potential	No of State Regulated Dams
High Hazard Potential	15
Significant Hazard Potential	2
Low Hazard Potential	4
Unknown*	2

*Dams not analyzed due to lack of readily available information. At this time, only 21 out of 23 NRCS regulated dams were evaluated.

7.7 Federal Agencies Flood Response Support

There are several federal agencies that provide support and resources for flood preparation activities.

The **Federal Emergency Management Agency (FEMA)** is an agency of the U.S. Department of Homeland Security (DHS). While on-the-ground support of disaster recovery efforts is a major part of FEMA's charter, the agency provides state and local governments with experts in specialized fields and funding for rebuilding efforts and relief funds for infrastructure by directing individuals to access low-interest loans, in conjunction with the Small Business Administration. FEMA also provides funds for training of response personnel throughout the United States and its territories as part of the agency's preparedness effort.

The **National Weather Service (NWS)** mission is to provide weather, water and climate data, forecasts, warnings, and impact-based decision support services for the protection of life and property and enhancement of the national economy. NWS provides flash flood indicators through watches, warnings, and emergency notices.

- Flash Flood WATCH is issued when conditions look favorable for flash flooding. A watch usually encompasses several counties. This is the time the public should start thinking about their plan of action and where they would go if water begins to rise.

- Flash Flood WARNING is issued when dangerous flash flooding is happening or will happen soon. A warning is usually a smaller, more specific area. This can be issued due to excessive heavy rain or a dam/levee failure. This is when the public must act quickly as flash floods are an imminent threat to them and their family. They may only have seconds to move to higher ground.

- Flash Flood EMERGENCY is issued for the exceedingly rare situations when extremely heavy rain is leading to a severe threat to human life and catastrophic damage from a flash flood is happening or will happen soon. Typically, emergency officials are reporting life threatening water rises resulting in water rescues/evacuations.

The NWS has developed a simplified, quick loading radar website called Local Standard Radar https://www.weather.gov/radar_lite to help emergency managers with flood preparations and notifications to residents.

The United States Geological Survey (USGS) obtains and monitors rainfall, water surface stage, and peak river flows; measures high water marks; and maintains stream gage stations that are vital in capturing flood data for future flood preparedness and flood mitigation programs. Using rainfall totals, intensity, and river stage response, the

USGS is able to estimate flow travel times for early flood warning. The USGS provided partnership cooperative funding with the Bandera County River Authority Groundwater District (BCRAGD) and TWDB to construct the Bandera County Texas Flood Early Warning System for Medina and Sabinal Rivers. This program aides in protection of human life, livestock, reduction of property damage, and overall public safety.

The **National Oceanic and Atmospheric Administration (NOAA)** is a scientific and regulatory agency within the U.S. Department of Commerce that forecasts weather, monitors oceanic and atmospheric conditions, charts the seas, conducts deep sea exploration, and manages fishing and protection of marine mammals and endangered species in the U.S. exclusive economic zone. NOAA provides historical data that can help communities determine their future probability of flood events and is key in the planning and mitigation process.

The **U.S. Corps of Engineers (USACE)** is responsible for a wide range of efforts in the United States, including addressing safety issues related to waterways, dams, and canals but also environmental protection, emergency relief, hydroelectric power, and much more. USACE composed of several districts and the NFPR includes both the Fort Worth District and Galveston District. The USACE Flood Risk Management Program (FRMP) works across the agency to focus the policies, programs and expertise of USACE toward reducing overall flood risk. This includes the appropriate use and resiliency of structures such as levees and floodwalls, as well as promoting alternatives when other approaches (e.g., land acquisition, flood proofing, etc.) reduce the risk of loss of life, reduce long-term economic damages to the public and private sector, and improve the natural environment. USACE is currently conducting flood and drainage studies within the NFPR, which are described in greater detail in Chapter 2.

Daily river forecasts are issued by **River Forecast Centers (RFCs)** using hydrologic models based on rainfall, soil characteristics, precipitation forecasts, and several other variables. Some RFCs also provide peak flow forecasts. A wide variety of users rely on these forecasts, including those in agriculture, hydroelectric dam operation, and water supply resources. The forecasts can provide essential information on the river levels and conditions.

7.8 Emergency Information

There are various means by which data can be collected and disseminated in a flood event. These include gauges to measure the current flood risk and communication systems to alert the public.

Two types of gauges used are rain gauges and stream gauges. A rain gauge is a meteorological instrument that measures precipitation in a given amount of time per unit area. It collects water falling on it and records the change over time in the rainfall depth.

Stream gauging is a technique used to measure the discharge, or the volume of water moving through a channel per unit time, of a stream. The height of water in the stream channel, known as a stage or gauge height, can be used to determine the discharge in a stream. Within the NFPG, there are 50 U.S. Geological Survey (USGS) stream gages.

In addition to the NWS, local news stations or radio stations are vital components in relaying real time information to local residents of inclement weather and flooding. They can also alert residents to low water crossing closings, dam or levee breaches, and other potential dangers. They can also issue flood watches, warnings, and emergency notifications.

An Emergency Alert System (EAS) is software that provides alert messages during an emergency. Messages can interrupt radio and television to broadcast emergency alert information. Messages cover a large geographic footprint. Emergency message audio/text may be repeated twice, but EAS activation interrupts programming only once, then regular programming continues.

A reverse 911 system allows an agency to pull up a map on a computer, define an area and send off a recorded phone message to each business or residence in that area. It can provide data to residents of flood dangers in their area.

School emergency alert systems are tools that allows schools to communicate quickly to staff, students, first responders, and others so that they can take appropriate action in the event of an emergency. Various versions of this tool are used in schools through the region from daycares to K-12 grade, as well as universities.

Chapter 8 – Administrative, Regulatory, and Legislative Recommendations

31 TAC § 361.43

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8 Administrative, Regulatory, and Legislative Recommendations

Texas Water Development Board (TWDB) guidelines state that regional flood planning groups (RFPGs) are to develop administrative, regulatory, or other recommendations for inclusion in the 2023 Regional Flood Plan (RFP). The Nueces Regional Flood Planning Group (NRFPG) formed a subcommittee at an open meeting on March 28, 2022, to consider legislative and regional policy recommendations. The subcommittee met on May 3 to discuss and develop recommendations, which were adopted by the NRFPG on May 16, 2022. The following are the Nueces Region's recommendations regarding these matters.

8.1 Administrative Recommendations

I. The NRFPG should play a role in facilitating public information/public education activities in the Nueces Basin and providing support to local public agencies to promote a wider understanding of state and regional flood issues and the importance of flood preparedness and long-range regional flood planning and mitigation.

II. The TWDB is encouraged to identify and eliminate barriers that prevent multi-jurisdictional, multi-county, or council of government-level areas from working together to provide regional flood mitigation solutions. For example, if a primary sponsor meets all administrative requirements but additional participating jurisdictions do not, allow the regional solution to remain in consideration for state funding.

III. The TWDB is encouraged to prepare a brief report that summarizes enforcement levels of floodplain ordinances for all cities and counties (where applicable) and includes guidance on tools and resources that are available to help communities improve the enforcement of floodplain standards.

IV. The NRFPG encourages counties and cities to consider drainage districts as a mechanism to manage flooding.

V. The TWDB should provide a funding mechanism for smaller communities to receive dedicated funding for studies / planning efforts to identify flood management strategies (FMSs), flood management evaluations (FMEs), and flood mitigation plans (FMPs), including both traditional, engineered flood mitigation projects and nature-based solutions. Most smaller communities do not have the resources to hire an engineer to complete these studies.

VI. The TWDB should use the project list in the adopted RFP and state flood plan (SFP) to help connect local communities to grant programs administered by federal or other state agencies (e.g., General Land Office, Federal Emergency Management Agency [FEMA], U.S. Army Corps of Engineers [USACE], U.S. Geological Survey [USGS], U.S. Department of Housing and Urban Development [HUD] Community Block Grant Programs, and others).

VII. The TWDB is encouraged to develop a roadmap on how state and federal agencies work together on flood preparedness, mitigation, response, and recovery activities to support counties, cities, and local floodplain administrators. In addition to the linkages between agencies, the roadmap should distinguish the roles of each agency, schedule of ongoing studies relevant to regional flood planning, how efforts are being coordinated, and other topics.

VIII. The TWDB is encouraged to consider use of hybrid approaches that blend structural engineered projects and nature-based solutions for flood mitigation:

   a. Incentivize voluntary buy out programs, turning previously flooded properties/neighborhoods into stormwater parks as an alternative to large-scale construction projects.

   b. Provide training to state agencies, local governments, engineers, planners in the use of natural floodplain preservation/conservation.

IX. The TWDB is encouraged to develop a compendium of resources identifying nature-based solutions for communities to use for flood mitigation purposes.

X. Public entities in the Nueces Flood Planning Region {NFPG; Region 13) are strongly encouraged to provide their share of continued funding for administrative support activities that facilitate NRFPG (Region 13) activities.

8.2 Regulatory/ Policy Recommendations

I. The Texas Legislature is urged to support adoption of 2015 or 2018 versions of the International Building Code and the International Residential Code as State Building Standards. This would improve Texas' eligibility for funding under the Building Resilient Infrastructure and Communities (BRIC) program. The FEMA 2015 International Building Code document[3] provides an excerpt of flood related provisions which ensures proper floodplain management practices are integrated with the building permit process. A key measure of the 2015

[3] https://www.fema.gov/sites/default/files/2020-07/2015_icodes_flood_provision.pdf

International Building Code is the requirement of one foot of freeboard for new buildings.

II. The Texas Legislature is urged to develop a program through the TWDB to provide support services to rural and socioeconomic disadvantaged communities to develop and maintain flood management activities. The TWDB could develop and provide a toolkit with guidance and templates on floodplain ordinances, minimum building standards, flood response plans, and other materials to support those with limited experience and flood management resources.

III. The NRFPG (Region 13) urges the legislature to provide implementation guidance to empower county governments to have greater regulatory control over land development activities, including land use plans, adoption of waterway set-backs to protect natural features that mitigate flooding, and/or levying stormwater drainage impact fees to maintain flood infrastructure if desired. Additionally, to provide funding support to local floodplain administrators to develop accurate inundation mapping, which is current absent in over 70% of the 31-county area in Region 13.

IV. The legislature is urged to encourage coordinated efforts between TWDB and FEMA on use of best data, rather than outdated FEMA maps, and;

V. Incorporate USGS flood inundation mapping (FIM) projects co-funded by the state with cost share from local communities.

8.3 Legislative Recommendations

I. The Texas Legislature is urged to continue funding the TWDB to provide support for state-mandated RFPG activities.

II. The Texas Legislature should consider enabling legislation to allow creation of a regional flood authority or funding to river authorities to administer a program to provide support to local floodplain administrators, counties and cities in the region, if needed on a voluntary basis.

III. The NRFPG (Region 13) urges the legislature to support policies to address Texas' flood risk needs and prepare for and respond to current and future flood conditions, including coordination of federal and state-level agency floodplain initiatives, including Texas Division of Emergency Management (TDEM), FEMA, and the Texas General Land Office (GLO) on a 5-year cycle for consideration by RFPGs.

IV. The NRFPG (Region 13) urges the legislature to support legislation to empower counties or Groundwater Conservation Districts with authority to protect natural

Aquifer Storage and Recovery features, like karst recharge and fracture zones, and sink holes that help mitigate flood intensity while transferring potential flood water into aquifers.

V. The Texas Legislature should continue to provide funding to state agencies for flood planning initiatives, including providing technical support and assistance to county and city floodplain administrators or designees to support development of building standards, permitting support to verify new projects meet floodplain development requirements, and training. These initiatives should prioritize solutions that do not rely on channel maintenance programs to reduce flood risk.

VI. The Texas Legislature is urged to make funds available through RFPGs to facilitate public information campaigns through local floodplain administrators and public entities to increase community knowledge of rules and regulations, flood-prone areas, and importance of protecting floodplains from encroachment.

VII. The Texas Legislature is urged to direct the Texas Commission on Environmental Quality (TCEQ) to work with Texas Parks and Wildlife, the Texas Department of Transportation (TXDOT), local road and bridge departments, and other state agencies to support removal of debris and/or sediment deposited from major flooding events to avoid creating new flood risk hazards.

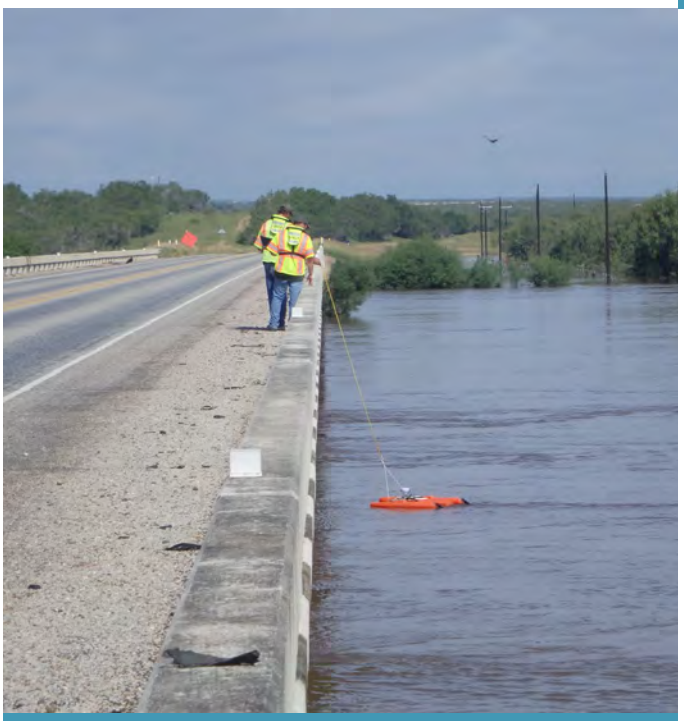
VIII. The Texas Legislature is urged to make funds available through the TWDB to establish a dedicated program to provide low-interest loans or grants to implement projects identified through local and TxDOT road and bridge assessment and remediation plans.

IX. The Texas Legislature is urged to support forward-thinking measures for our transportation system by requiring TxDOT to build to 1% annual chance (100-year) standards using the best available and most current flood maps and that such infrastructure will not increase downstream flooding nor damage riparian streamsides.

X. The Texas Legislature is urged to provide biennial appropriations to maintain the Flood Infrastructure Fund. Biennial appropriations to FIF will ensure that the state can continue to invest in FMPs included in the regional flood plans.

XI. The Texas Legislature is urged to make funds available through the TWDB to establish a dedicated program to provide funding for maintenance or engineering controls of drainage and culvert systems (both structural and non-structural nature-based solutions) to divert flood flows and identify and resolve structural improvements causing flooding issues.

XII. The Texas Legislature is urged to make funds available to support nature-based practices through land conservation, restoration programs, and participation in landowner incentive programs to encourage voluntary land stewardship practices to manage floodwaters by slowing runoff and dissipating flood energy to include riparian, wetland, forest, upland, and other habitat protection programs. Promote land coverage studies to effectively identify riparian corridors to protect for floodplain mitigation and erosion reduction. Additional low interest programs to support voluntary city and county buy-back of lands for county parks and flood mitigation should also be included.



Chapter 9 – Flood Infrastructure Financing Analysis

31 TAC § 361.44

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9 Flood Infrastructure Financing Analysis

The Texas Water Development Board (TWDB) requires that each regional flood planning group (RFPG) assess and report on how sponsors propose to finance recommended flood management evaluations (FME), flood management strategies (FMS), and flood mitigation projects (FMP). A primary aim of this survey effort is to understand the funding needs of local sponsors and propose what role the state should have in financing the recommended FMEs, FMSs, and FMPs.

Section 9.1 presents an overview of common sources of funding for flood mitigation planning, projects, and other flood management efforts. The methodology and results of the financing survey are presented in Section 9.2.

9.1 Sources of Funding for Flood Management Activities

Communities across the state use a variety of funding sources for their flood management efforts, including local, state, and federal sources. This section discusses some of the most common avenues of generating local funding and various state and federal financial assistance programs available to communities. Table 9-1. on the following page summarizes the local, state, and federal sources discussed in this chapter, and characterizes each by the following three key parameters: first, which state and federal agencies are involved, if applicable; second, whether they offer grants, loans, or both; and third, whether they are classified as regularly occurring opportunities or are only available after a disaster.

A combination of increased local capabilities and increased funding amounts and opportunities from the state and federal government will be required to meet the flood risk study and mitigation needs identified through this planning process. State funding will be particularly needed to provide access to funding for small, rural communities, incentivizing high-priority projects and project types, and improving access to and leveraging federal funding sources. Chapter 8 includes the Nueces Regional Flood Planning Group (NRFPG) recommendations for increasing local, regional, and state funding programs.

9.1.1 Local Funding

Overall, larger urban communities typically bear a greater percentage of the burden for funding flood- and stormwater-related activities in their jurisdictions than the smaller, more resource-limited communities, who are often are unable to generate a significant amount of funding for these activities.

This section primarily focuses on the funding mechanisms available to municipalities and counties, as a large majority of the FME, FMS, and FMP sponsors are these types

of entities. Special purpose districts are briefly discussed as there may be opportunities to create more of these types of districts in the region.

A community's general fund revenue (for cities or counties) stems from sales, property, and other taxes, and is typically the primary fund used by a government entity to support most departments and services such as police, fire, parks, trash collection, and local government administration. Due to the high demands on this fund for many local needs, there is often not a significant amount available for funding flood projects out of the general fund.

Table 9-1. Common Sources of Flood Funding in Texas

Source	Federal Agency	State Agency	Program Name	Grant (G)	Loan (L)	Post-Disaster (D)
Federal	EPA	TWDB	Clean Water State Revolving Fund (CWSRF)	G**	L	-
	FEMA	TWDB	Flood Mitigation Assistance (FMA)	G	-	-
	FEMA	TDEM	Building Resilient Infrastructure and Communities (BRIC)	G	-	-
	FEMA	TCEQ	Rehabilitation of High Hazard Potential Dam Grant Program (HHPD)	G	-	-
	FEMA	*TBD*	Safeguarding Tomorrow through Ongoing Risk Mitigation (STORM)	-	L	-
	FEMA	TDEM	Hazard Mitigation Grant Program (HMGP)	G	-	D
	FEMA	TDEM	Public Assistance (PA)	G	-	D
	HUD	GLO	Community Development Block Grant – Mitigation (CDBG-MIT)	G	-	D
	HUD	GLO	Community Development Block Grant Disaster Recovery Funds (CDBG-DR)	G	-	D
	HUD	TDA	Community Development Block Grant (TxCDBG) Program for Rural Texas	G	-	-
	NOAA	-	National Coastal Zone Management Program	-	-	-
	NFWF	-	National Coastal Resilience Fund	G	-	-

Source	Federal Agency	State Agency	Program Name	Grant (G)	Loan (L)	Post-Disaster (D)
	USACE	-	Partnerships with USACE, funded through Continuing Authorities Program (CAP), Water Resources Development Acts (WRDA), or other legislative vehicles*	-	-	-
	USDA	-	Watershed Protection and Flood Prevention Program	-	-	-
State	-	TWDB	Flood Infrastructure Fund (FIF)	G	L	-
	-	TWDB	Texas Water Development Fund (Dfund)	-	L	-
	-	TSSWCB	Structural Dam Repair Grant Program	G	-	-
	-	TSSWCB	Operation and Maintenance (O&M) Grant Program	G	-	-
	-	TSSWCB	Flood Control Dam Infrastructure Projects - Supplemental Funding	G	-	-
Local	-	-	General fund	-	-	-
	-	-	Bonds	-	-	-
	-	-	Stormwater or drainage utility fee	-	-	-
	-	-	Special-purpose district taxes and fees	-	-	-

*Opportunities to partner with USACE are not considered grant or loan opportunities, but shared
participation projects where USACE performs planning work and shares in the cost of construction.
**The CWSRF program offers principal forgiveness, which is similar to grant funding.

Dedicated fees such as stormwater or drainage fees are an increasingly popular tool for local flood-related funding, primarily in more urban areas. Municipalities can establish a stormwater utility (sometimes called a drainage utility), which is a legal mechanism used to generate revenue to finance a city's cost to provide and manage stormwater services. To provide these services, municipalities assess fees from users of the stormwater utility system. Impact fees, which are collected from development to cover a portion of the expense to expand stormwater systems necessitated by the new development, can also be used as a source of local funding for flood-related efforts. Of the 32 county and city entities in the Nueces Basin that responded to a survey sent out by the NRFPG, the City of Corpus Christi reported that it has a stormwater fund and the City of Portland has a stormwater utility fee to help fund projects.

Another source for local funding to support flood management efforts includes special districts. A special district is a political subdivision established to provide a single public service (such as water supply, drainage, or sanitation) within a specific geographic area. Examples of these special districts include water control and improvement districts (WCID), municipal utility districts (MUD), drainage districts (DD), and flood control districts (FCD). Each of the different types of districts are governed by different state laws, which specify the authorities and process for creation of a district. Districts can be created by various entities, from the Texas Legislature or the Texas Commission on Environmental Quality (TCEQ) to county commissioners' courts or city councils. Depending on the type of district, the districts may have the ability to raise revenue through taxes, fees, or issuing bonds to fund flood and drainage-related improvements within a district's area. There are four DDs in the Nueces Flood Planning Region (NFPR): Nueces County Bishop Driscoll Drainage District 3, Nueces County Drainage and Conservation District 2, Refugio County Drainage District 1, and San Patricio County Drainage District.

Lastly, municipalities and counties have the option to issue debt through general obligation bonds, revenue bonds, or certificates of obligation, which are typically paid back using any of the previously mentioned local revenue raising mechanisms. Overall, local governments have various options for raising revenue to support local flood-related efforts; however, each avenue presents its own unique challenges and considerations. It is important to note that municipalities have more authority to establish various revenue raising options in comparison to counties. Of the communities that do have access to local funding, the amount available is generally much lower than the total need, leading local communities to seek out state and federal financial assistance programs.

9.1.2 State Funding

Today, communities have a broader range of state and federal funding sources and programs available due to new grant and loan programs that didn't exist even five years ago. There are two primary state agencies currently involved in providing state funding for flood projects: the TWDB and the Texas State Soil and Water Conservation Board (TSSWCB). State and federal financial assistance programs discussed here are not directly available to homeowners and the general public. Local governments apply on behalf of their communities to receive and implement funding for flood projects in their jurisdiction. In the Nueces Basin, several counties and cities have received support from the TWDB Flood Infrastructure Fund (FIF) program and many coastal communities have applied for Federal Emergency Management Agency (FEMA) grants.

The TWDB's FIF[4] is a new funding program passed by the Texas Legislature and approved by Texas voters through a constitutional amendment in 2019. The program

[4] http://www.twdb.texas.gov/financial/programs/FIF/index.asp

provides financial assistance in the form of low or no interest loans and grants (cost match varies) to eligible political subdivisions for flood control, flood mitigation, and drainage projects. FIF rules allow for a wide range of flood projects, including structural and nonstructural projects, planning studies, and preparedness efforts such as flood early warning systems. After the first state flood plan (SFP) is adopted, only projects included in the most recently adopted state plan will be eligible for funding from the FIF. FMEs, FMSs, and FMPs recommended in this regional flood plan (RFP) will be included in the overall SFP and will be eligible for this funding source.

The TWDB also manages the Texas Water Development Fund (Dfund)[5] program, which is a state-funded streamlined loan program that provides financing for several types of infrastructure projects to eligible political subdivisions. This program enables the TWDB to fund projects with multiple eligible components (water supply, wastewater, or flood control) in one loan at low market rates. Financial assistance for flood control may include structural and nonstructural projects, planning efforts, and flood warning systems.

The TSSWCB[6] has three state-funded programs specifically for flood control dams: the Operation and Maintenance (O&M) Grant Program; the Flood Control Dam Infrastructure Projects - Supplemental Funding Program; and the Structural Repair Grant Program. The O&M Grant Program is a grant program for local soil and water conservation districts (SWCD) and certain co-sponsors of flood control dams. This program reimburses SWCDs 90% of the cost of an eligible operation and maintenance activity as defined by the program rules; the remaining 10% must be paid with non-state funding. The Flood Control Dam Infrastructure Projects - Supplemental Funding Program was newly created and funded in 2019 by the Texas Legislature. Grants are provided to local sponsors of flood control dams, including SWCDs, to fund the repair and rehabilitation of the flood control structures, to ensure dams meet safety criteria to adequately protect lives downstream. The Structural Repair Grant Program provides state grant funds to provide 95% of the cost of allowable repair activities on dams constructed by the United States Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS), including match funding for federal projects through the Dam Rehabilitation Program and the Emergency Watershed Protection (EWP) Program of the Texas NRCS.

9.1.3 Federal Funding

The federal governments play an important, sometimes critical role, particularly in the financing of large-scale flood mitigation projects and studies that would otherwise be beyond the capabilities of the state and local governments. Commonly used funding

[5] http://www.twdb.texas.gov/financial/programs/TWDF/index.asp

[6] https://www.tsswcb.texas.gov/index.php/programs/flood-control-program

programs administered by seven different federal agencies are discussed in this section. The funding for these programs originates from the federal government but for many of the programs, a state agency partner plays a key role in the management of the program. Each funding program has its own unique eligible applicants, eligible project types, requirements, and application and award timelines. A few examples of eligibility requirements for some of the federal grant programs are: requiring recipients of funding to participate in the National Flood Insurance Program (NFIP), requiring recipients to have an approved hazard mitigation plan, or requiring a project to have a benefit cost ratio (BCR) of 1.0 or greater. More information regarding each program and their unique eligibility requirements and award processes can be found at the links in this section.

9.1.3.1 Federal Emergency Management Agency

Common FEMA-administered federal flood-related funding programs include Flood Mitigation Assistance (FMA), Building Resilient Infrastructure and Communities (BRIC), Safeguarding Tomorrow through Ongoing Risk Mitigation (STORM), Rehabilitation of High Hazard Potential Dam (HHPD) Grant Program, Hazard Mitigation Grant Program (HMGP), the Public Assistance (PA) program, and the Cooperating Technical Partners (CTP) Program.

FMA[7] is a nationally competitive annual grant program that provides funding to states, local communities, federally recognized tribes, and territories. The TWDB administers[8] FMA in Texas. Funds can be used for projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the NFIP. Funding is typically a 75% federal grant with a 25% local match. Projects mitigating repetitive loss and severe repetitive loss properties may be funded through a 90% federal grant and 100% federal grant, respectively. FEMA's FMA program now includes a disaster initiative called Swift Current. The program was released as a pilot initiative in 2022 and explored ways to make flood mitigation assistance more readily available during disaster recovery. Similar to traditional FMA, the program mitigates repetitive losses and substantially damaged buildings insured under the NFIP.

The BRIC[9] is a new nationally competitive non-disaster annual grant program implemented in 2020. The program supports states, local communities, tribes, and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. The Texas Division of Emergency Management (TDEM) administers[10] BRIC in Texas. Funding is typically a 75% federal grant with a

[7] https://www.fema.gov/grants/mitigation/floods

[8] https://www.twdb.texas.gov/flood/grant/fma.asp

[9] https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities

[10] https://www.tdem.texas.gov/bric

25% local match. Small, impoverished communities may be funded through a 90% federal grant and 100% federal grant, respectively.

STORM[11] is a new revolving loan program enacted through federal legislation in 2021 to provide needed and sustainable funding for hazard mitigation projects. The program is designed to provide capitalization grants to states to establish revolving loan funds for projects to reduce risks from disaster, natural hazards, and other related environmental harm. At the time of the publication of this plan, the program does not yet appear to be operational and has not yet been implemented in Texas.

FEMA's HHPD[12], administered in Texas by TCEQ, provides technical, planning, design, and construction assistance in the form of grants for rehabilitation of eligible high hazard potential dams. The cost share requirement is typically no less than 35% state or local share.

Under the HMGP[13], FEMA provides funding to state, local, tribal, and territorial governments so they can rebuild from a recent disaster in a way that reduces, or mitigates, future disaster losses in their communities. TDEM administers[14] the program in Texas. Funding is typically a 75% federal grant with a 25% local match. While the program is associated with Presidential Disaster Declarations, the HMGP is not a disaster relief program for individual disaster victims or a recovery program that funds repairs to public property damaged during a disaster. The key purpose of HMGP is to ensure that the opportunity to take critical mitigation measures to reduce the risk of loss of life and property from future disasters is not lost during the reconstruction process following a disaster.

FEMA's PA[15] program provides supplemental grants to state, tribal, territorial, and local governments, and certain types of private non-profits following a declared disaster so communities can quickly respond to and recover from major disasters or emergencies through actions such as debris removal, life-saving emergency protective measures, and restoring public infrastructure. Funding cost share levels are determined for each disaster and are typically not less than 75% federal grant (25% local match) and typically not more than 90% federal grant (10% local match). In Texas, TDEM administers FEMA PA. In some situations, FEMA may fund mitigation measures as part of the repair of damaged infrastructure. Generally, mitigation measures are eligible if they directly reduce future hazard impacts on damaged infrastructure and are cost-

[11] https://www.congress.gov/bill/116th-congress/senate-bill/3418/all-info

[12] https://www.fema.gov/emergency-managers/risk-management/dam-safety/rehabilitation-high-hazard-potential-dams

[13] https://www.fema.gov/grants/mitigation/hazard-mitigation

[14] https://www.tdem.texas.gov/mitigation

[15] https://www.fema.gov/assistance/public

effective. Funding is limited to eligible damaged facilities located within PA-declared counties.

The CTP[16] program is an effort launched by FEMA in 1999 to increase local involvement in developing and updating Flood Insurance Rate Maps (FIRMs), Flood Insurance Study (FIS) reports, and associated geospatial data in support of FEMA's Risk Mapping, Assessment and Planning (Risk MAP) Program. To participate in the program, interested NFIP-participating communities, state or regional agencies, universities, territories, tribes, or nonprofits must complete training and execute a partnership agreement. Working with the FEMA regions, a program participant can develop business plans and apply for grants to perform eligible activities.

9.1.3.2 Housing and Urban Development

The U.S. Department of Housing and Urban Development (HUD) administers the following three federal funding programs: Community Development Block Grant – Disaster Recovery (CDBG-DR), Community Development Block Grant – Mitigation (CDBG-MIT), and Community Development Block Grant (TxCDBG) for Rural Texas.

Following a major disaster, Congress may appropriate funds to HUD under the CDBG-DR[17] program when there are significant unmet needs for long-term recovery. Appropriations for CDBG-DR are frequently very large, and the program provides 100% grants in most cases. The Texas General Land Office (GLO) administers[18] the CDBG-DR program in Texas. The special appropriation provides funds to the most impacted and distressed areas for disaster relief, long term-recovery, restoration of infrastructure, housing, and economic revitalization.

The GLO also administers[19] the CDBG-MIT program[20] in Texas. Eligible grantees can CDBG-MIT assistance in areas impacted by recent disasters to carry out strategic and high-impact activities to mitigate disaster risks with typically 100% grants. The primary feature differentiating CDBG-MIT from CDBG-DR is that unlike CDBG-DR, which funds recovery from a recent disaster to retore damaged services, systems, and infrastructure, CDBG-MIT funds are intended to support mitigation efforts to rebuild in a way which will lessen the impact of future disasters.

The TxCDBG[21] program provides annual grants on a formula basis to small, rural cities and to counties to develop viable communities by providing decent housing and suitable

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16 https://www.fema.gov/flood-maps/cooperating-technical-partners

17 https://www.hudexchange.info/programs/cdbg-dr/

18 https://recovery.texas.gov/disasters/index.html

19 https://recovery.texas.gov/mitigation/

20 https://www.hudexchange.info/programs/cdbg-mit/overview/

21 https://www.hud.gov/program_offices/comm_planning/cdbg

living environments, and expanding economic opportunities principally for persons of low- to moderate-income. Funds can be used for public facilities such as water and wastewater infrastructure, street and drainage improvements, and housing. In Texas, the Texas Department of Agriculture (TDA) administers[22] the TxCDBG program.

9.1.3.3 U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE)[23] works with non-federal partners (states, tribes, counties, or local governments) throughout the country to investigate water resources and related land problems and opportunities and, if warranted, develop civil works projects that would otherwise be beyond the sole capability of the non-federal partner(s). Partnerships are typically initiated or requested by the local community to their local USACE district office. Before any project or study can begin, USACE determines whether there is an existing authority under which the project could be considered, such as the Continuing Authorities Program (CAP)[24], or whether Congress must establish study or project authority and appropriate specific funding for the activity. New study or project authorizations are typically provided through periodic Water Resource Development Acts (WRDA) or via another legislative vehicle. Congress will not provide project authority until a completed study results in a recommendation to Congress of a water resources project, conveyed via a Report of the Chief of Engineers (Chief's Report) or Report of the Director of Civil Works (Director's Report). Opportunities to partner with USACE are not considered grant or loan opportunities, but shared participation projects where USACE performs planning work and shares in the cost of construction. USACE also has technical assistance opportunities, including Floodplain Management Services and the Planning Assistance to States program, available to local communities.

9.1.3.4 U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency's (EPA) Clean Water State Revolving Fund (CWSRF)[25] provides financial assistance in the form of loans with subsidized interest rates and opportunities for partial principal forgiveness for planning, acquisition, design, and construction of wastewater, reuse, and stormwater mitigation infrastructure projects. Projects can be structural or non-structural. Low Impact Development (LID) projects are also eligible. The TWDB administers the CWSRF in Texas.

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22 https://texasagriculture.gov/GrantsServices/RuralEconomicDevelopment/RuralCommunityDevelopmentBlockGrant(CDBG)/About.aspx

23 https://planning.erdc.dren.mil/toolbox/library/IWRServer/2019-R-02.pdf

24 https://www.swd.usace.army.mil/About/Directorates-Offices/Programs-Directorate/Planning-Division/CAP/

25 http://www.twdb.texas.gov/financial/programs/CWSRF/index.asp

9.1.3.5 U.S. Department of Agriculture

The USDA's NRCS provides technical and financial assistance to local government agencies through the following programs: EWP Program, Watershed Protection and Flood Prevention Program, Watershed Surveys and Planning, and Watershed Rehabilitation. The EWP[26] program, a federal emergency recovery program, helps local communities recover after a natural disaster by offering technical and financial assistance to relieve imminent threats to life and property caused by floods and other natural disasters that impair a watershed. The Watershed Protection and Flood Prevention Program helps units of federal, state, local and tribal government protect and restore watersheds; to prevent erosion, floodwater, and sediment damage; to further the conservation development, use and disposal of water; and to further the conservation and proper use of land in authorized watersheds. The focus of Watershed Surveys and Planning program is funding watershed plans, river basin surveys and studies, flood hazard analyses, and floodplain management assistance aimed at identifying solutions that use land treatment and nonstructural measures to solve resource problems. Lastly, the Watershed Rehabilitation Program helps project sponsors rehabilitate aging dams that are reaching the end of their design lives. This rehabilitation addresses critical public health and safety concerns. The USDA also offers various Water and Environmental grant and loan funding programs[27], which can be used for water and waste facilities, including stormwater facilities, in rural communities.

9.1.3.6 Special Appropriations

On occasion and when the need is large enough, Congress may appropriate funds for special circumstances such natural disasters or pandemics (COVID-19). A few examples of recent special appropriations from the federal government that can be used to fund flood-related activities are discussed in this section.

In 2021, the American Rescue Plan Act (ARPA) provided for a substantial infusion of resources to eligible state, local, territorial, and tribal governments to support their response to and recovery from the COVID-19 pandemic. Coronavirus State and Local Fiscal Recovery Funds (SLFRF), a part of ARPA, delivers $350 billion directly to state, local, and tribal governments across the country. Communities have significant flexibility to meet local needs within the eligible use categories, one of which includes improving stormwater facilities and infrastructure as an authorized use. Eligible entities may request their allocation of Coronavirus State and Local Fiscal Recovery Funds directly from the U.S. Department of Treasury.

Although not a direct appropriation to local governments like ARPA, the 2021 Infrastructure Investment and Jobs Act (IIJA), also called the Bipartisan Infrastructure

[26] https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewpp/

[27] https://www.rd.usda.gov/programs-services/water-environmental-programs

Law (BIL), authorizes over $1 trillion for infrastructure spending across the U.S. and provides for a significant infusion of resources over the next several years into existing federal financial assistance programs, including several of the flood funding programs discussed in this Chapter, as well as creating new programs.

Note, the recent federal special provision ARPA and BIL funding has not yet been allocated and made available for flood mitigation studies and projects that would be eligible under the state flood plan.

9.1.4 Barriers to Funding

Local communities encounter barriers to accessing or seeking funding sources for flood management activities, including lack of knowledge of funding sources, lack of expertise and staff time to apply for funding, and no local funds available for local match requirements. As opposed to some other types of infrastructure, flood projects do not typically generate revenue and many communities do not have steady revenue streams to fund flood projects, as discussed in Section 9.1.1. Consequently, communities struggle to generate funds for local match requirements or loan repayment. Complex or burdensome application or program requirements as well as prolonged timelines also act as barriers to accessing state and federal financial assistance programs. Of those communities able to overcome these barriers, apply for funding, and generate local resources for match requirements, the high demand for state and federal funding, particularly for grant opportunities, means that need outstrips supply, leaving many local communities without the resources they need to address flood risks.

9.2 Flood Infrastructure Financing Survey

This task required surveying local city and county officials to obtain information on how flood infrastructure projects were financed. The primary aim of this survey effort was to understand the funding needs of local sponsors and then propose what role the state should have in financing recommended FMEs, FMSs, and FMPs. For the NFPR, an initial survey was sent out by email in May 2021 to city/county representatives requesting information on their floodplain management and financing programs. Only four responses were received on the initial email outreach. This was due in part to outdated mailing lists due to staff changes and limited capacity of city/county personnel who often fill multiple organizational roles for the rural communities in the region. After emailing the initial survey, the consultant followed up from June 16 to August 10, 2021 with two rounds of targeted outreach via in-person meetings, phone calls and emails to sponsors to gather preliminary information on local funding mechanisms to support flood mitigation and management programs.

A total of 67 entities were contacted and 32 responses were received. This represents a response rate of about 50%, which is considered a high response rate given the conditions described previously. The most effective method of gathering information

from sponsor's on their flood financing plans was to contact them directly to set up a phone interview. Table 9-2 summarizes the 32 responses received by local sponsors on their funding mechanisms that could be used, at least partially, to finance recommended FMEs, FMSs, and FMPs. A recurring theme from the sponsor's is that limiting funding was available to conduct drainage studies, which is considered a precursor to identifying specific projects. Several communities in the Nueces Basin, however, have been successful at receiving TWDB Flood Infrastructure Financing grants or Texas Division of Emergency Management funding that have provided much needed support in characterizing flood prone areas so that meaningful projects can be identified to ameliorate flooding issues.

To assess the funding need for recommended FMEs, FMSs, and FMPs, estimated percentages of local investment and state or federal need were applied. For basin-wide programs sponsored by the Nueces River Authority or other non-county or city entities, 100% of the total project costs were estimated as being needed from state or federal sources. For municipalities with a population less than 2,000 and counties with a population of less than 2,500 or those that indicated in the survey that no funding was available for flood activities, 100% of the total project costs were estimated as being needed from state or federal sources. For the municipalities with a population more than 2,000 and counties with a population more than 2,500, it was estimated that 90% of total project costs are required from state and federal sources and 10% projected local investment unless survey responses received indicated that these entities had no funding. A high percentage of outside need is supported by discussions with stakeholders during outreach efforts for this plan, which confirmed that many communities, particularly smaller and more rural communities, do not have any local funding available for flood management activities and larger communities that did report having local funding indicated relatively little local funding available in relation to overall need.

Overall, there is a total of $302,616,650 needed to implement the recommended FMEs and FMSs in the NRFP. From the total cost, it is projected that $284,766,485 in state and federal funding is needed. Note the above costs are based on 2020 dollars and subject to change as new information is obtained and implementation timeframes are adjusted. Since most federal funding programs are dependent on availability or on project selection in a nationally competitive grant program, it is difficult to estimate how much federal funding may be available to implement these studies, strategies, and projects. It is conservatively estimated that as much as the full amount may be needed from state sources. This number does not represent the amount of funding needed to mitigate all risks in the region and solve flooding problems in their totality. This number simply represents the funding needs for the specific, identified studies, strategies, and projects in this cycle of regional flood planning. Future cycles of regional flood planning will continue to identify more projects and studies needed to further flood mitigation efforts in the NFPR.

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Table 9-2. Funding Sources for Flood Mitigation Projects

Entity Name	Type (County, Municipality, Other)	Funding Sources for Flood Mitigation Projects									
		Bond Program	Special Tax Districts	Permitting Fees	General Fund	Storm Water Fund	Storm Water Utility Fee	Ad Valorem Tax	Other	None	Unknown
Aransas County	County	X	X	X	-	-	-	-	-	-	-
Bandera County	County	-	-	X	-	-	-	-	-	-	-
Bexar County	County	-	-	X	X	-	-	-	-	-	-
City of Beeville	Municipality	-	-	-	X	-	-	-	-	-	-
City of Bishop	Municipality	-	-	-	-	-	-	-	-	X	-
City of Corpus Christi	Municipality	-	-	-	-	X	-	-	-	-	-
City of Cotulla La Salle County	Municipality	-	-	-	X	-	-	-	-	-	-
City of Gregory	Municipality	-	-	X	X	-	-	X	-	-	-
City of Hondo	Municipality	-	-	-	X	-	-	-	X	-	-
City of Ingleside	Municipality	X	-	-	X	-	-	-	-	-	-
City of Leakey	Municipality	-	-	-	X	-	-	-	-	-	-
City of Port Aransas	Municipality	-	-	-	X	-	-	-	-	-	-
City of Sinton	Municipality	-	-	-	X	-	-	-	-	-	-
City of Uvalde	Municipality	-	-	-	X	-	-	-	-	-	X
Dimmit County	County	-	-	-	-	-	-	-	-	-	X
Duval County	County	-	-	-	X	-	-	-	-	-	-
Duval County Conservation & Reclamation District	Other	-	-	-	-	-	-	-	-	X	-
Frio County	County	-	-	-	-	-	-	-	-	X	-
Karnes County	County	-	-	X	-	-	-	-	-	-	-
Kerr County	County	-	-	-	X	-	-	-	-	-	-
McMullen County WCID #1	Other	-	-	-	-	-	-	-	-	X	-
Medina County	County	-	-	X	-	-	-	-	-	-	-
City of Portland, Texas	Municipality	-	-	-	X	-	X	-	-	-	-
Real County	County	-	-	-	X	-	-	-	-	-	-
Refugio County	County	-	-	-	-	-	-	-	-	X	-
San Patricio County	County	-	-	-	X	-	-	-	-	-	-
San Patricio County Drainage District	Other	-	-	-	-	-	-	X	-	-	-
City of Ingleside on the Bay	Municipality	-	-	-	-	-	-	-	-	X	-
Uvalde County UWCD	Other	-	-	-	-	-	-	X	-	-	-

Entity Name	Type (County, Municipality, Other)	Funding Sources for Flood Mitigation Projects									
		Bond Program	Special Tax Districts	Permitting Fees	General Fund	Storm Water Fund	Storm Water Utility Fee	Ad Valorem Tax	Other	None	Unknown
Webb County	County	-	-	-	X	-	-	-	-	-	-
Wilson County	County	-	-	X	-	-	-	-	-	-	-
Zavala County	County	-	-	-	-	-	-	-	-	-	X

Chapter 10 - Public Participation and Plan Adoption

31 TAC § 361.21, 361.12(a)(4)

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10 Public Participation, Adoption, Submittal, and Approval of Regional Plan

10.1 Introduction

The objective of this chapter is to address public participation, public meetings, administrative and technical support activities necessary to complete and submit the draft and final regional flood plan (RFP) and to obtain Texas Water Development Board (TWDB) approval.

The Nueces Regional Flood Plan (NRFP) was adopted in accordance with Texas Administrative Code provisions related to regional flood planning and the guidance principles adopted in Title 31 Texas Administrative Code (TAC) §362.3.

The NRFP conforms with the 39 flood planning guidance principles delineated in 31 TAC §361.20 (31 TAC §362.3), including that the plan will not negatively affect a neighboring area. The guidance principles and the means by which these requirements are met are listed in Table 10-1, along with references to the RFP chapters, which are listed in Table 10-2. Furthermore, the NRFP was developed based on Texas Water Development Board (TWDB) guidance and adequately provides for the preservation of life and property and the development of water supply sources, where applicable. Appendix A includes full data tables requested by TWDB in Exhibit C in the digital submission.

Table 10-1. Title 31 TAC §362.3 Guidance Principles and the Means by which Requirement is Met in NRFP

Guidance Principle	Means by which Requirement is Met in RFP
(1) shall be a guide to state, regional, and local flood risk management policy;	The RFP is a guide with management goals in Chapter 3, management strategies in Chapter 5, and management and policy recommendations in Chapter 8.
(2) shall be based on the best available science, data, models, and flood risk mapping;	Best available information from a quality, coverage, and contemporary perspective were used in NRFP, for example in Chapter 2 analyses.

Guidance Principle	Means by which Requirement is Met in RFP
(3) shall focus on identifying both current and future flood risks, including hazard, exposure, vulnerability and residual risks; selecting achievable flood mitigation goals, as determined by each RFPG for their region; and incorporating strategies and projects to reduce the identified risks accordingly;	The NRFP examines current and future flood risk in Chapter 2, flood mitigation goals in Chapter 3, and strategies in Chapter 5. Maps show the areas of flood risks.
(4) shall, at a minimum, evaluate flood hazard exposure to life and property associated with 0.2% annual chance flood event (the 500-year flood) and, in these efforts, shall not be limited to consideration of historic flood events;	Flood hazard exposure is evaluated and presented in Chapter 2. Maps show the areas of flood risks associated with different percent annual chance flood event.
(5) shall, when possible and at a minimum, evaluate flood risk to life and property associated with 1% annual chance flood event (the 100-year flood) and address, through recommended strategies and projects, the flood mitigation goals of the RFPG (per item 2 above) to address flood events associated with a 1% annual chance flood event (the 100-year flood); and, in these efforts, shall not be limited to consideration of historic flood events;	Flood risks are evaluated and presented in Chapter 2, with recommended strategies and projects provided in Chapter 7 and Chapter 8.
(6) shall consider the extent to which current floodplain management, land use regulations, and economic development practices increase future flood risks to life and property and consider recommending adoption of floodplain management, land use regulations, and economic development practices to reduce future flood risk;	Floodplain management practices throughout the Nueces Region are mostly low as described in Chapter 3 (illustrated in Figure 3-1). Increased recognition of floodplains and accurate floodplain mapping is needed for most of the region to update flood risks.
(7) shall consider future development within the planning region and its potential to impact the benefits of flood management strategies (and associated projects) recommended in the plan;	Future development is considered in Chapter 2 and Chapter 3. The area in and near the City of Corpus Christi vicinity has the greatest potential for developmental pressures in flood prone areas needing management strategies.

Guidance Principle	Means by which Requirement is Met in RFP
(8) shall consider various types of flooding risks that pose a threat to life and property, including, but not limited to, riverine flooding, urban flooding, engineered structure failures, slow rise flooding, ponding, flash flooding, and coastal flooding, including relative sea level change and storm surge;	Various types of flooding risks that pose a threat to life and property, including, but not limited to, riverine flooding, urban flooding, engineered structure failures, slow rise flooding, ponding, playa flooding, and flash flooding, are considered in Chapter 2. Coastal flooding is not applicable in the Upper Colorado Region.
(9) shall focus primarily on flood management strategies and projects with a contributing drainage area greater than or equal to one square miles except in instances of flooding of critical facilities or transportation routes or for other reasons, including levels of risk or project size, determined by the RFPG;	Chapter 4 and Chapter 5 focus on flood management strategies and projects.
(10) shall consider the potential upstream and downstream effects, including environmental, of potential flood management strategies (and associated projects) on neighboring areas. In recommending strategies, RFPGs shall ensure that no neighboring area is negatively affected by the regional flood plan;	Consideration of neighboring area is described in Chapter 4 and Chapter 5. Strategies and projects are assessed to confirm negative impacts to surrounding areas would not occur.
(11) shall include an assessment of existing, major flood mitigation infrastructure and will recommend both new strategies and projects that will further reduce risk, beyond what existing flood strategies and projects were designed to provide, and make recommendations regarding required expenditures to address deferred maintenance on or repairs to existing flood infrastructure;	Infrastructure is evaluated in Chapter 4 and Chapter 5. The strategies and projects include many related to infrastructure. In fact, there may be too much focus on classical infrastructure controls and a need for more deliberation on alternative solutions. Chapter 9 examines the financing aspects.

Guidance Principle	Means by which Requirement is Met in RFP
(12) shall include the estimate of costs and benefits at a level of detail sufficient for RFPGs and sponsors of flood mitigation projects to understand project benefits and, when applicable, compare the relative benefits and costs, including environmental and social benefits and costs, between feasible options;	Costs drive most decision making and are discussed in most chapters, although Chapter 4, Chapter 5, and Chapter 9 present the most information on costs. For the most part, costs are likely underestimated for a variety of reasons, including lack of problem and solution definition, extent of flood damage, and inflation.
(13) shall provide for the orderly preparation for and response to flood conditions to protect against the loss of life and property and reduce injuries and other flood-related human suffering;	Preparation and response is described in Chapter 7.
(14) shall provide for an achievable reduction in flood risk at a reasonable cost to protect against the loss of life and property from flooding;	Like costs and benefits in Chapter 4 and Chapter 5, reasonable costs to achievable reduction in flood risk is considered.
(15) shall be supported by state agencies, including the TWDB, General Land Office, Texas Commission on Environmental Quality, Texas State Soil and Water Conservation Board, Texas Parks and Wildlife Department, and the Texas Department of Agriculture, working cooperatively to avoid duplication of effort and to make the best and most efficient use of state and federal resources;	Agency representation is addressed in Chapter 10, Public Participation.
(16) shall include recommended strategies and projects that minimize residual flood risk and provide effective and economical management of flood risk to people, properties, and communities, and associated environmental benefits;	Chapter 5 includes recommended strategies and projects.

Guidance Principle	Means by which Requirement is Met in RFP
(17) shall include strategies and projects that provide for a balance of structural and nonstructural flood mitigation measures, including projects that use nature-based features, that lead to long-term mitigation of flood risk;	Chapter 2 includes nature-based goals. Chapter 4 and Chapter 5 include strategies and projects that are labeled as other, which includes nature-based solutions. A variety of strategies and projects are included but balance could be improved in future planning.
(18) shall contribute to water supply development where possible;	Contributions and impacts to water supply development are assessed in Chapter 6. Due to the hydrology and landscape of the region, there is little potential to contribute or impact water supply development.
(19) shall also follow all regional and state water planning guidance principles (31 TAC 358.3) in instances where recommended flood projects also include a water supply component;	Contributions and impacts to water supply development are assessed in Chapter 6. Due to the hydrology and landscape of the region, there is little potential to contribute or impact water supply development.
(20) shall be based on decision-making that is open to, understandable for, and accountable to the public with full dissemination of planning results except for those matters made confidential by law;	The NRFP is based on the requirements of the TAC and the associated TWDB technical guidance documents.
(21) shall be based on established terms of participation that shall be equitable and shall not unduly hinder participation;	The RFP is based on the requirements of the TAC and the associated TWDB technical guidance documents. Chapter 10 directly addressed public participation.
(22) shall include flood management strategies and projects recommended by the RFPGs that are based upon identification, analysis, and comparison of all flood management strategies the RFPGs determine to be potentially feasible to meet flood mitigation and floodplain management goals;	The NRFPG worked directly with the technical consultant in the development of the NRFP as described in Chapter 1.
(23) shall consider land-use and floodplain management policies and approaches that support short- and long-term flood mitigation and floodplain management goals;	Land-use and floodplain management policies and approaches that support short- and long-term flood mitigation and floodplain management goals are addressed in Chapter 3

Guidance Principle	Means by which Requirement is Met in RFP
(24) shall consider natural systems and beneficial functions of floodplains, including flood peak attenuation and ecosystem services;	Chapter 3 includes natured-based goals like attenuation and ecosystem services within the category of environmental stewardship.
(25) shall be consistent with the National Flood Insurance Program (NFIP) and shall not undermine participation in nor the incentives or benefits associated with the NFIP;	This is a primary aspect of the goals and purpose of the RFP as stated in Chapter 1. The RFP is consistent with the NFIP.
(26) shall emphasize the fundamental importance of floodplain management policies that reduce flood risk;	Policies that reduce flood risk are a fundamental importance of the RFP and is specifically emphasize in Chapter 2.
(27) shall encourage flood mitigation design approaches that work with, rather than against, natural patterns and conditions of floodplains;	Chapter 3 includes natured-based goals to work with natural patterns and conditions within the category of environmental stewardship.
(28) shall not cause long-term impairment to the designated water quality as shown in the state water quality management plan as a result of a recommended flood management strategy or project;	Chapter 6 states there are no anticipated impacts to the State Water Quality Management Plan.
(29) shall be based on identifying common needs, issues, and challenges; achieving efficiencies; fostering cooperative planning with local, state, and federal partners; and resolving conflicts in a fair, equitable, and efficient manner;	These are part of the process for identifying the FME, FMS, and FMP lists as described in Chapter 5.
(30) shall include recommended strategies and projects that are described in sufficient detail to allow a state agency making a financial or regulatory decision to determine if a proposed action before the state agency is consistent with an approved regional flood plan;	Chapter 5 includes recommended strategies and projects.

Guidance Principle	Means by which Requirement is Met in RFP
(31) shall include ongoing flood projects that are in the planning stage, have been permitted, or are under construction;	Chapter 1 includes discussion about proposed and ongoing flood mitigation projects.
(32) shall include legislative recommendations that are considered necessary and desirable to facilitate flood management planning and implementation to protect life and property;	Legislative recommendations along with rationale are provided in Chapter 8.
(33) shall be based on coordination of flood management planning, strategies, and mitigation projects with local, regional, state, and federal agencies projects and goals;	These are part of the process for identifying the FME, FMS, and FMP lists with the NRFPG providing the coordination as described in Chapter 5.
(34) shall be in accordance with all existing water rights laws, including but not limited to, Texas statutes and rules, federal statutes and rules, interstate compacts, and international treaties;	The conclusion of Chapter 6 states there are no anticipated impacts to water rights.
(35) shall consider protection of vulnerable populations;	Flood risks to vulnerable populations are evaluated in Chapter 2 using the social vulnerability index. Vulnerability was then carried forward to the process for identifying FME, FMS, and FMP lists in Chapter 5.
(36) shall consider benefits of flood management strategies to water quality, fish and wildlife, ecosystem function, and recreation, as appropriate;	Chapter 4 recognizes the consideration of these additional benefits alongside the needs analysis results for developing strategies and projects.
(37) shall minimize adverse environmental impacts and be in accordance with adopted environmental flow standards;	Chapter 6 addresses minimizing adverse environmental impacts and meeting adopted environmental flow standards in the recommendations.
(38) shall consider how long-term maintenance and operation of flood strategies will be conducted and funded; and	Chapter 9 includes the consideration of conducting and funding O&M.

Guidance Principle	Means by which Requirement is Met in RFP
(39) shall consider multi-use opportunities such as green space, parks, water quality, or recreation, portions of which could be funded, constructed, and or maintained by additional, third-party project participants.	Chapter 4 recognizes the consideration of these additional opportunities alongside the needs analysis results for developing strategies and projects.

Table 10-2. NRFP Chapter by which Title 31 TAC §362.3 Provisions are Achieved

Regional Flood Plan (RFP) Chapter	General Content
1	Planning Area Description
2	Existing Condition Flood Risk Analyses Future Condition Flood Risk Analyses
3	Evaluation and Recommendations on Floodplain Management Practices Flood Mitigation and Floodplain Management Goals
4	Flood Mitigation Needs Analysis
5	Identification of Potential Flood Management Evaluations and Potentially Feasible Flood Management Strategies and Flood Mitigation Projects Evaluation and Recommendation of Flood Management Evaluations and Flood Management Strategies and Associated Flood Mitigation Projects
6	Impacts of Regional Flood Plan Contributions to and Impacts on Water Supply Development and the State Water Plan
7	Flood Response Information and Activities
8	Administrative, Regulatory, and Legislative Recommendations
9	Flood Infrastructure Financing Analysis
10	Public Participation and Plan Adoption

10.2 Public Involvement Program

The NRFPG met all requirements under the Texas Open Meetings Act and Public Information Act during development of the NRFP. The public involvement program was incorporated at the onset of the Nueces Regional Flood Planning Group (NRFPG) flood

planning process in order to maximize the opportunity for public review and input into the process of developing the flood plan as well as providing comments on the draft regional flood plan (RFP).

The public involvement program included:

- An opportunity at all regional flood planning group (RFPG) meetings for the public to comment on any aspect of the plan or planning process
- Press releases and notices of public meetings
- Dedicated website for NRFPG information (Home – Nueces Regional Flood Planning Group (Region 13) (https://nueces-rfpg.org))
- Public *In-Person* Hearing for draft RFP was held:

  Monday, September 26, 2022, 11 AM
  McMullen County Emergency Management Office
  306 Live Oak Street
  Tilden, Texas 78072

- Public *Virtual* Hearing for draft RFP was held:

  Monday, September 26, 2022, 6:30 – 7:30 PM
  Zoom Meeting: https://us02web.zoom.us/j/82662268207
  Dial by phone: 877 853 5257 US Toll-free
  Meeting ID: 826 6226 8207

The NRFPG conducted all business in meetings that were posted according to Texas Open Meetings Act and Public Information Act provisions. The plan was developed in accordance with Texas Administrative Code (TAC) public participation requirements specified in 31 TAC §357.12, §357.21, and §357.50(f).

Comments received on the draft RFP and responses to comments are included in Appendix D.

10.3 Coordination with Stakeholders

Information was provided by entities with floodplain management responsibilities located in the Nueces Flood Planning Region (NFPR) throughout development of the RFP. Three surveys were sent out to stakeholders during a period from March through December 2021 to gather input on local flood plans, ongoing flood projects, flood mitigation needs, and other information. An on-line interactive map was made available from May through December 2021 on the Region 13 website (Home – Nueces Regional Flood Planning Group (Region 13) (https://nueces-rfpg.org)) to gather public and stakeholder input on flood-prone areas. Individual interviews were set up with entities that we were able to successfully contact to discuss specific flooding concerns.

Representatives of flood planning entities within the NRFPG were also regularly notified of NRFPG meetings and subregional public informational meetings.

10.4 Nueces Regional Flood Planning Group Meetings

The NRFPG regularly met in accordance with the approved bylaws. The NRPWG met on a more frequent basis as needed in order to facilitate and direct the flood planning of the region. The following is a summary of the meetings:

Nueces - Region 13 RFPG Meetings

November 4, 2020	October 25, 2021
November 30, 2020	December 6, 2021
January 25, 2021	January 31, 2022
March 29, 2021	March 28, 2022
April 26, 2021	May 16, 2022
May 24, 2021	June 27, 2022
June 28, 2021	July 18, 2022
July 26, 2021	September 26, 2022
September 27, 2021	December 12, 2022

The NRFPG requested that the Texas Water Development Board (TWDB) execute the initial contract to develop the 2023 Nueces Regional Flood Plan (NRFP) on November 30, 2020. The NRFPG authorized the Nueces River Authority to publish a request for qualifications at its regular meeting on January 25, 2021.

The executive team met on February 8, 2021, and March 16, 2021, to discuss subgroups and technical consultant selection approach. Both of these meetings were open to the public.

The NRFPG selected HDR Engineering, Inc. (HDR) as the technical consultant for development for the NRFP on March 29, 2021.

On June 28, 2021, the NRFPG accepted public and stakeholder suggestions and recommendations on issues, provisions, projects, and strategies to consider during the 2023 flood planning cycle and development of the RFP.

The NRFPG also designated three subcommittees to expedite more specific work efforts and further increase the effectiveness and timeliness of the planning process. The following summarizes these subcommittee and respective meetings.

10.4.1 Floodplain Management Standards and Goals Subcommittee

- Subcommittee Members: Andrew Rooke, Larry Dovalina, Jim Tolan, and Larry Thomas

- Designated by NRFPG: July 26, 2021
- Subcommittee meetings: August 25, 2021, September 8, 2021, December 8, 2022

10.4.2 Process to Identify Potentially Feasible Flood Management Strategies and Flood Mitigation Projects

- Subcommittee Members: Debra Barrett, Lauren Williams, LJ Francis, and Kendria Ray
- Designated by NRFPG: July 26, 2021
- Subcommittee meeting: August 23, 2021

10.4.3 Legislative, Administrative and Policy Subcommittee

- Subcommittee Members: Britni Van Curan, Larry Dovalina, Laura Williams, Andy Rooke, and Lj Francis
- Designated by NRFPG: March 28, 2022
- Subcommittee meeting: May 3, 2022, with support by Larry Thomas and Luke Whitmire. Also, December 6, 2022.

The NRFPG approved the final RFP on December 12, 2022 for submittal to the TWDB.

10.5 Nueces- Region 13 Local Stakeholder Meetings

As described in previous chapters, four subregions were developed within the NFPR to distribute information and gather input on regional flood planning activities. There were two primary stakeholder outreach periods during development of the 2023 draft RFP to introduce the flood planning process, share flood information gathered, and seek local input for purposes of identifying flood mitigation projects to include in the NRFP. Local meetings were held at a location in close proximity to the sub-regions shown in Figure 10-1.

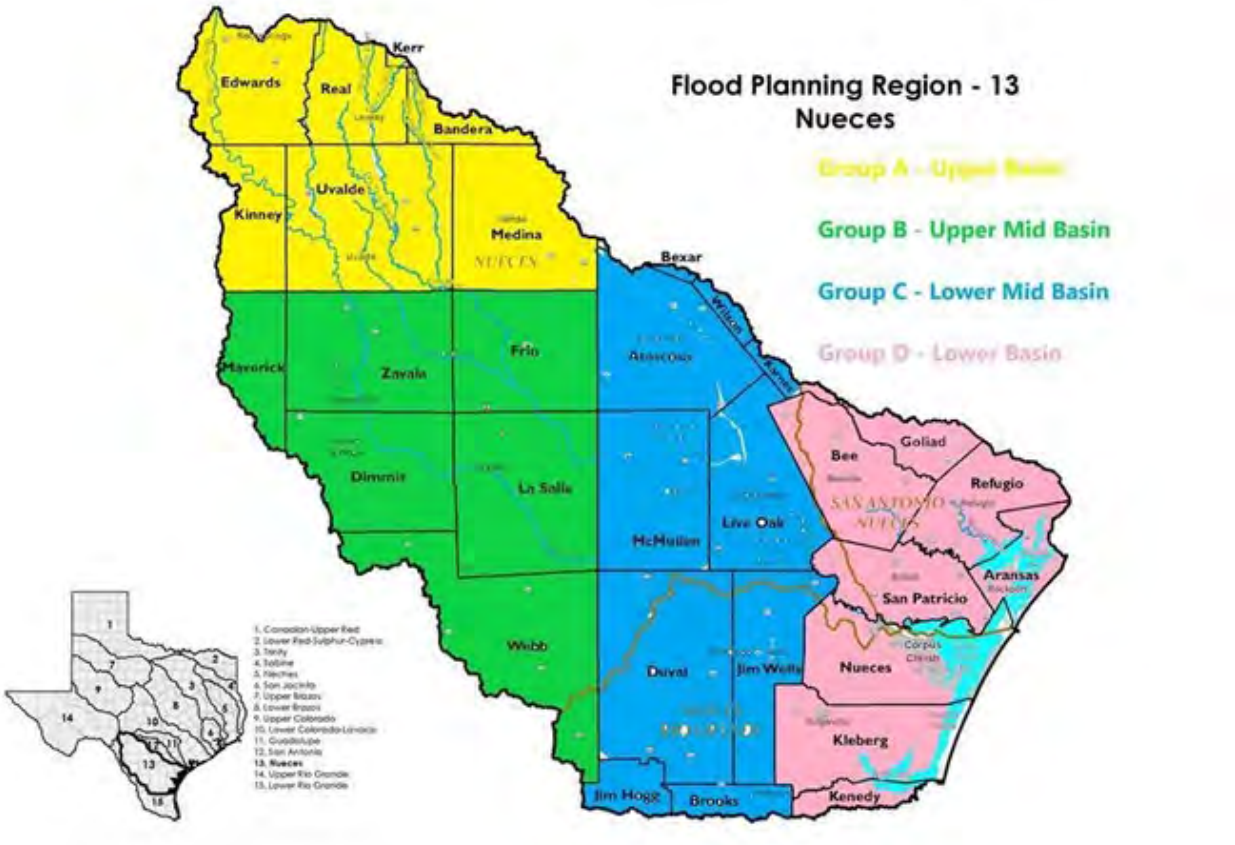

Figure 10-1. Four Subregions in the Nueces Region 13 Flood Planning Group Area

10.5.1 First Series of Sub-Regional Stakeholder Meeting to Introduce Planning Process and Gather Input on Flood-Prone Areas (from May 17- 20, 2021)

- Upper Basin (Group A)
  - Date: May 17, 2021
  - Location: Real County Courthouse
    146 US-83, Leakey
- Upper Mid Basin (Group B)
  - Date: May 19, 2021
  - Location: City of Cotulla
    Cotulla Convention Center, Cotulla
- Lower Mid Basin (Group C)
  - Date: May 18, 2021

  - Location: McMullen County
    306 Live Oak St, Tilden

- Lower Basin (Group D)
  - Date: May 20, 2021
  - Location: San Patricio County Courthouse
    400 W. Sinton St., Sinton

10.5.2 Second Series of Sub-Regional Stakeholder Meeting to Share Interim Flood Data Collected and Identify Flood Mitigation Projects (from March 8-22, 2022)

- Upper Basin (Group A)
  - Date: March 21, 2022
  - Location: Real County Courthouse
    146 US 83, Leakey TX
  - Attended by Edwards, Kinney, Real, and Medina counties, and cities of Rockspings, Hondo, and Leakey

- Upper Mid Basin (Group B) and Lower Mid Basin (Group C)
  - Date: March 8, 2022
  - Location: City of Cotulla
    Cotulla Convention Center
  - Attended by Zavala, Frio, McMullen, and Wilson counties, and cities of Pearsall, Cotulla, and Jourdanton

- Lower Basin (Group D)
  - Date: March 22, 2022
  - Location: San Patricio County Courthouse
    400 W. Sinton St., Sinton
  - Attended by San Patricio County, San Patricio Drainage District, cities of Beeville and Ingleside, the National Weather Service, USGS, and Texas A&M University

10.6 Regional Flood Planning Group Chairs Conference Calls and Meetings

The TWDB held conference call meetings with RFPG chairs to provide guidance and respond to issues regarding the planning process as described below:

- March 3, 2021 (10:30am – 12:00pm)
  - 1st Cycle Initial Grant Contracts
  - Working Conceptual Timeline
  - Regional Flood Planning Housekeeping and Reminders
  - Flood Data Update

- June 23, 2021 (2:30pm – 4:00pm)
  - 1st Planning Cycle Documents (2020-2023) webpage
  - Regional Flood Planning Group (RFPG) webpages
  - Chairs' feedback on webpages
  - Technical and Data Submittal Guidelines
  - Chairs' feedback on guidelines
  - Regional Flood Planning Grant Contracts and Subcontracts
  - Chairs' feedback on contracting and subcontracting process

- September 15, 2021 (1:30pm – 3:00pm)
  - Extension of Time to Complete Portions of Technical Memorandum
  - Additional Funding to Enhance First Regional Flood Plans

- December 8, 2021 (2:30pm – 4:00pm)
  - Summary from Technical Consultants' Conference Call
    - Emergency Need
    - Flood Management Strategies (FMS)

- March 2, 2022 (1:00pm – 2:30pm)
  - Future condition analysis - planning level analysis, not regulatory
  - Classification of FMEs/FMSs/FMPs in the Regional Flood Plan
  - FMP project details

- May 26, 2022 (2:00pm – 3:30pm)
  - Recap on Technical Consultants Conference Call
  - Public Notice Posting Requirements for Draft Regional Flood Plan
  - Amendment Process

10.7 Coordination with Other Regions

At each regional flood planning group meeting there was an agenda item for Patrick McGinn (Region 13 interregional liaison) to present updates from the San Antonio (Region 12) and Rio Grande (Region 15).

Several coordination calls between the NRFPG technical consultant and San Antonio (Region 12) RFPG and the Rio Grande (Region 15) RFPG consultants occurred during development of the draft RFP. Additional coordination was conducted with Region 12

for stakeholder outreach and sharing of information for Bandera, Medina, Bexar, Wilson, Karnes, and Goliad counties located in both regions.

10.8 Coordination with Other Entities

Frequent coordination calls occurred between the technical consultant and local county and city flood management officials to confirm flood concerns and plans.

Emails were sent to stakeholders in May 2021, August 2021, and January 2022 with follow-up phone calls to gather information on flood-prone areas, existing floodplain management practices, and community flood needs and projects. Three surveys were deployed to gather input, which were discussed at sub-regional meetings described above in Section 10.4 and NRFPG meetings.

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Appendix A1 – TWDB Table 1 – Existing Flood Infrastructure Table

This appendix is available for viewing on the Region 13 Nueces website (https://www.nueces-rfpg.org).

Appendix A2 – TWDB Table 2 – Summary of Proposed or Ongoing Flood Mitigation Projects

Appendix A.2
Summary of Proposed or Ongoing Flood Mitigation Projects

Existing Project ID	RFPG No.	RFPG Name	Project Name	Description	Counties	HUC8s	HUC12s	Watersheds	Project Status	Project Cost	Source of Funding	Dedicated Funding for Constr. (Y/N)	Expect. Year of Cmpltn	Anticipated Benefit
13000001	13	Nueces	County Wide Drainage Improvements	Green Lake Outfall System and Gregory Diversion Ditch	Nueces,Jim Wells,San Patricio,Aransas,Refugio,Bee,Live Oak	12100407,12110111,12110201,12100405			Ongoing	$ 11,841,990.00	TWDB FIF	Y		Green Lake Outfall System and Gregory Diversion Ditch
13000002	13	Nueces	County Wide Drainage Improvements	Medio Creek Flood Control Improvements	San Patricio,Refugio,Bee,Live Oak,Goliad,Karnes	12100406,12100407,12110111			Proposed	$ 3,473,313.00	TWDB FIF	Y		Medio Creek Flood Control Improvements
13000003	13	Nueces	County Wide Drainage Master Plan Study	Nueces County Regional Drainage Master Plan Study	Brooks,Kenedy,Kleberg,Nueces,Duval,Jim Wells,San Patricio,Aransas,Live Oak	12110111,12110201,12110204,12110205,12110206,12100405,12110202,12110203			Proposed	$ 2,137,500.00	TWDB FIF	Y		Nueces County Regional Drainage Master Plan Study
13000004	13	Nueces	County Wide Drainage Master Plan Study	Drainage Master Planning Study - Duval County	Brooks,Jim Hogg,Duval,Jim Wells,Webb,La Salle,McMullen,Live Oak	12110105,12110111,12110204,12110205,12110206			Ongoing	$ -	Unknown	Y	2022	Drainage Master Planning Study - Duval County
13000005	13	Nueces	County Wide Drainage Master Plan Study	Drainage Master Planning Study - San Patricio County	Nueces,Jim Wells,San Patricio,Aransas,Refugio,Bee,Live Oak	12100407,12110111,12110201,12100405			Ongoing	$ 13,941,120.00	TWDB FIF	Y		Drainage Master Planning Study
13000006	13	Nueces	County Wide Drainage Master Plan Study	Drainage Master Planning Study - Bee County	San Patricio,Refugio,Bee,Live Oak,Goliad,Karnes	12100406,12100407,12110111			Proposed	$ 2,000,000.00	TWDB FIF	Y		Drainage Master Planning Study
13000007	13	Nueces	County Wide Flood Planning/Prevention Study	Flood Planning/Prevention Study	Atascosa,Wilson,Bee,Live Oak,Goliad,Karnes	12100303,12100406,12110110,12110111			Ongoing	$ 618,750.00	TWDB FIF	Y		Flood Planning/Prevention Study
13000008	13	Nueces	County Wide Early Flood Warning System	Self-Supporting Tower for Early Warning System	Kinney,Uvalde,Medina,Bandera,Real,Edwards,Maverick,Zavala,Frio	12110101,12110102,12110103,12110104,12110106,12110107			Ongoing	$ 219,000.00	TWDB FIF	Y		Self-Supporting Tower for Early Warning System
13000010	13	Nueces	Others (Flood Prevention/Planning Study, LOMR etc)	GBRA Hazard Mitigation Plan Jurisdiction	Wilson,Bexar,Bandera,Kerr,San Patricio,Aransas,Refugio,Goliad,Karnes	12100303,12100201,12100404,12100406,12100407,12100403,12100405,12100302			Proposed	$ 78,500.00	TWDB FIF	Y		GBRA Hazard Mitigation Plan Jurisdiction
13000011	13	Nueces	Flood Warning System	Nueces County Drainage & Conservation District 2	Nueces	12110205,12110202	121102050506,121102050601,121102050604,121102050606,121102050603,121102050602,121102050607,121102020101,121102020102	13000532,13000553,13000558,13000559,13000560,13000561,13000563,13000611,13000613	Proposed	$ 465,500.00	TWDB FIF	Y		Nueces County Drainage & Conservation District 2
13000012	13	Nueces	County Wide Drainage Master Plan Study	Nueces County Drainage & Conservation District 2	Nueces	12110205,12110202	121102050506,121102050601,121102050604,121102050606,121102050603,121102050602,121102050607,121102020101,121102020102	13000532,13000553,13000558,13000559,13000560,13000561,13000563,13000611,13000613	Proposed	$ 2,137,500.00	TWDB FIF	Y		Nueces County Drainage & Conservation District 2

Appendix A.2
Summary of Proposed or Ongoing Flood Mitigation Projects

Existing Project ID	RFPG No.	RFPG Name	Project Name	Description	Counties	HUC8s	HUC12s	Watersheds	Project Status	Project Cost	Source of Funding	Dedicated Funding for Constr. (Y/N)	Expect. Year of Cmpltn	Anticipated Benefit
13000013	13	Nueces	County Wide Drainage Improvements	Nueces County Drainage & Conservation District 2 - Casa Blanca Drainage Improvements	Nueces	12110205,12110202	121102050506,121102050601,121102050604,121102050606,121102050603,121102050602,121102050607,121102020101,121102020102	13000532,13000553,13000558,13000559,13000560,13000561,13000563,13000611,13000613	Ongoing	$ 809,600.00	TWDB FIF	Y		Nueces County Drainage & Conservation District 2 - Casa Blanca Drainage Improvements
13000014	13	Nueces	County Wide Drainage Improvements	Nueces County Drainage & Conservation District 2 - Bosquez Rd. / Avenue J Drainage Improvements	Nueces	12110205,12110202	121102050506,121102050601,121102050604,121102050606,121102050603,121102050602,121102050607,121102020101,121102020102	13000532,13000553,13000558,13000559,13000560,13000561,13000563,13000611,13000613	Ongoing	$ 2,453,716.00	TWDB FIF	Y		Nueces County Drainage & Conservation District 2 - Bosquez Rd. / Avenue J Drainage Improvements
13000015	13	Nueces	County Wide Drainage Improvements	Nueces County Drainage & Conservation District 2 - Ditch “A” and Bluebonnet Drainage Improvements	Nueces	12110205,12110202	121102050506,121102050601,121102050604,121102050606,121102050603,121102050602,121102050607,121102020101,121102020102	13000532,13000553,13000558,13000559,13000560,13000561,13000563,13000611,13000613	Ongoing	$ 1,311,320.00	TWDB FIF	Y		Nueces County Drainage & Conservation District 2 - Ditch “A” and Bluebonnet Drainage Improvements
13000016	13	Nueces	Others (Flood Prevention/Planning Study, LOMR etc)	Atascosa Flood Prevention Project - Pleasanton	Atascosa	12110110	121101100205,121101100206	13000418,13000419	Proposed	$ 78,500.00	TWDB FIF	Y		Atascosa Flood Prevention Project - Pleasanton
13000017	13	Nueces	Drainage Master Plan Study	Drainage Master Plan - Location 1 - Kingsville	Kleberg	12110204	121102040206,121102040409,121102040205,121102040410,121102040407	13000483,13000497,13000502,13000515,13000517	Ongoing	$ 1,360,258.00	TWDB FIF	Y		Drainage Master Plan - Location 1 - Kingsville
13000018	13	Nueces	Drainage Master Plan Study	Drainage Master Plan - Location 2 - Kingsville	Kleberg	12110204	121102040206,121102040409,121102040205,121102040410,121102040407	13000483,13000497,13000502,13000515,13000517	Proposed	$ 3,600,000.00	TWDB FIF	Y		Drainage Master Plan - Location 2 - Kingsville
13000019	13	Nueces	Drainage Master Plan Study	Drainage Master Plan - Location 3 - Kingsville	Kleberg	12110204	121102040206,121102040409,121102040205,121102040410,121102040407	13000483,13000497,13000502,13000515,13000517	Ongoing	$ 1,457,419.00	TWDB FIF	Y		Drainage Master Plan - Location 3 - Kingsville
13000020	13	Nueces	Drainage Master Plan Study	Drainage Master Plan - Location 4 - Kingsville	Kleberg	12110204	121102040206,121102040409,121102040205,121102040410,121102040407	13000483,13000497,13000502,13000515,13000517	Ongoing	$ 1,846,064.00	TWDB FIF	Y		Drainage Master Plan - Location 4 - Kingsville
13000021	13	Nueces	Drainage Master Plan Study	Drainage Master Plan - Location 5 - Kingsville	Kleberg	12110204	121102040206,121102040409,121102040205,121102040410,121102040407	13000483,13000497,13000502,13000515,13000517	Proposed	$ 7,800,000.00	TWDB FIF	Y		Drainage Master Plan - Location 5 - Kingsville
13000022	13	Nueces	Drainage Master Plan Study	Drainage Master Plan - Location 6 - Kingsville	Kleberg	12110204	121102040206,121102040409,121102040205,121102040410,121102040407	13000483,13000497,13000502,13000515,13000517	Proposed	$ 230,000.00	TWDB FIF	Y		Drainage Master Plan - Location 6 - Kingsville

Appendix A.2
Summary of Proposed or Ongoing Flood Mitigation Projects

Existing Project ID	RFPG No.	RFPG Name	Project Name	Description	Counties	HUC8s	HUC12s	Watersheds	Project Status	Project Cost	Source of Funding	Dedicated Funding for Constr. (Y/N)	Expect. Year of Cmpltn	Anticipated Benefit
13000023	13	Nueces	Drainage Master Plan Study	Drainage Master Plan - Location 7 - Kingsville	Kleberg	12110204	121102040206,121102040409,121102040205,121102040410,121102040407	13000483,13000497,13000502,13000515,13000517	Ongoing	$ 1,360,258.00	TWDB FIF	Y		Drainage Master Plan - Location 7 - Kingsville
13000024	13	Nueces	Drainage Master Plan Study	Drainage Master Plan - Location 8 - Kingsville	Kleberg	12110204	121102040206,121102040409,121102040205,121102040410,121102040407	13000483,13000497,13000502,13000515,13000517	Proposed	$ 700,000.00	TWDB FIF	Y		Drainage Master Plan - Location 8 - Kingsville
13000025	13	Nueces	Drainage Master Plan Study	Drainage Master Plan - Location 9 - Kingsville	Kleberg	12110204	121102040206,121102040409,121102040205,121102040410,121102040407	13000483,13000497,13000502,13000515,13000517	Proposed	$ 5,600,000.00	TWDB FIF	Y		Drainage Master Plan - Location 9 - Kingsville
13000026	13	Nueces	Drainage Improvements	Stormwater Pump Station #3 (Euclid) - Aransas Pass	Nueces,San Patricio,Aransas	12100405,12110202	121004050400,121004050204,121102020200	13000592,13000596,13000608	Proposed	$ 6,000,000.00	TWDB FIF	Y	2023	Stormwater Pump Station #3 (Euclid) - Aransas Pass
13000027	13	Nueces	Drainage Improvements	Pintas Creek at Sunset Dr. & Virginia St. Drainage Improvements - Alice	Jim Wells	12110204	121102040404,121102040405	13000496,13000513	Proposed	$ 372,500.00	TWDB FIF	Y		Pintas Creek at Sunset Dr. & Virginia St. Drainage Improvements - Alice
13000028	13	Nueces	Others (Flood Prevention/Planning Study, LOMR etc)	Flood Planning Study for LOMR - Cotulla	La Salle	12110103,12110105	121101030705,121101050201	13000117,13000239	Ongoing	$ 149,500.00	TWDB FIF	Y		Flood Planning Study for LOMR - Cotulla
13000029	13	Nueces	Drainage Master Plan Study	Drainage Master Plan Study - Alice	Jim Wells	12110204	121102040404,121102040405	13000496,13000513	Proposed	$ 241,500.00	TWDB FIF	Y		Drainage Master Plan Study
13000030	13	Nueces	Drainage Improvements	Jourdanton Main Street Drainage Project	Atascosa	12110110	121101100206,121101100402,121101100405	13000419,13000427,13000428	Ongoing	$ 1,504,770.00	TWDB FIF	Y		Jourdanton Main Street Drainage Project
13000031	13	Nueces	Drainage Master Plan Study	Drainage Master Plan Study - Driscoll	Nueces	12110205	121102050604,121102050603	13000558,13000560	Proposed	$ 150,000.00	TWDB FIF	Y		Drainage Master Plan Study - Driscoll
13000032	13	Nueces	City of Alice: Virginia St. Area Drainage Project	GLO Disaster Mitigation Project	Jim Wells	12110204	121102040405	13000513	Proposed	$ 6,942,192.50	TX GLO	Y		Improve drainage to reduce the risk of flooding
13000033	13	Nueces	Jim Wells County: Rancho Alegre and Alice Acres Drainage and Detention Project	GLO Disaster Mitigation Project	Jim Wells	12110204	121102040409,121102040202,121102040405	13000497,13000498,13000513	Proposed	$ 9,650,296.00	TX GLO	Y		Improve drainage to reduce the risk of flooding
13000034	13	Nueces	City of Beeville Low Water Crossings Replacement Project	GLO Disaster Mitigation Project to replace three low water crossings (S. Tyler & Poesta, S, Tyler & Unnamed Ditch, and S. Jackson & Poesta Creek)	Bee	12100407	121004070101	13000032	Proposed	$ 3,844,490.00	TX GLO	Y		Improve drainage to reduce the risk of flooding
13000035	13	Nueces	City of Premont Drainage Improvements and Flood Mitigation Project	GLO Disaster Mitigation Project	Jim Wells	12110205	121102050402,121102050405	13000534,13000548	Proposed	$ 13,116,000.00	TX GLO	Y		Drainage Improvements and Flood Mitigation Project

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Summary of Proposed or Ongoing Flood Mitigation Projects

Existing Project ID	RFPG No.	RFPG Name	Project Name	Description	Counties	HUC8s	HUC12s	Watersheds	Project Status	Project Cost	Source of Funding	Dedicated Funding for Constr. (Y/N)	Expect. Year of Cmpltn	Anticipated Benefit
13000036	13	Nueces	Drainage Improvements Project	Drainage Improvements Project - Location 1 - Corral Street, Kingsville	Kleberg	12110204	121102040409,121102040407	13000497,13000517	Proposed	$ 3,333,333.00	TX GLO	Y		Rehbilitate Major Drainage Channels and Outfalls
13000037	13	Nueces	Drainage Improvements Project	Drainage Improvements Project - Location 2 - Kenedy Street, Kingsville	Kleberg	12110204	121102040206,121102040409,121102040205	13000483,13000497,13000502	Proposed	$ 3,333,333.00	TX GLO	Y		Rehbilitate Major Drainage Channels and Outfalls
13000038	13	Nueces	Drainage Improvements Project	Drainage Improvements Project - Location 3 - Johnston Street, Kingsville	Kleberg	12110204	121102040206,121102040409,121102040205	13000483,13000497,13000502	Proposed	$ 3,333,333.00	TX GLO	Y		Rehbilitate Major Drainage Channels and Outfalls
13000039	13	Nueces	Town of Refugio Wastewater Treatment and Drainage Project	Citywide Wastewater Treatment Plant and Drainage Project	Refugio	12100406	121004060301	13000022	Proposed	$ 12,112,636.00	TX GLO	Y		Citywide Wastewater Treatment Plant and Drainage Project
13000040	13	Nueces	Refugio County Hazard Mitigation Improvements Project	Hazard Mitigation Improvements Project	San Patricio,Aransas,Refugio,Bee,Goliad	12100303,12100404,12100406,12100407,12100405			Proposed	$ 6,910,131.00	TX GLO	Y		Hazard Mitigation Improvements Project
13000041	13	Nueces	San Patricio County Channel Outfall Drainage Improvement Project	Channel Outfall Drainage Improvement Project - Location 1 - Taft Site	San Patricio	12100407	121004070403,121004070305	13000043,13000044	Proposed	$ 7,717,591.00	TX GLO	Y		Channel Outfall Drainage Improvement
13000042	13	Nueces	San Patricio County Channel Outfall Drainage Improvement Project	Channel Outfall Drainage Improvement Project - Location 2 - Sinton Site	San Patricio	12100407	121004070303,121004070304	13000034,13000046	Proposed	$ 7,717,591.00	TX GLO	Y		Channel Outfall Drainage Improvement
13000043	13	Nueces	Improving Stormwater Management in Port Aransas	Improving Stormwater Management	Nueces	12110202	121102020200	13000608	Ongoing	$ 168,080.00	GLO CMP / City of Port Aransas	Y		Improving Stormwater Management
13000044	13	Nueces	Downtown Drainage Improvements Phase III - Project A	CoCC Downtown Study	Nueces	12110202	121102020107	13000615,13000618	Proposed	$ -	Unknown	N		Improving Stormwater Drainage
13000045	13	Nueces	Riparian Buffers	Voluntary vegetation management on private riparian lands. Riparian area vegetation is a key factor in reducing downstream flooding.	Kleberg,Nueces,Jim Wells,San Patricio,Aransas	12110111,12110201,12110204,12110205,12100405,12110202,12110203			Ongoing	$ -	NRCS	Y		Searching for a flood mitigation metric. Studies show increased water storage @ average 1 ac.ft. per mile or riparian enhancment
13000046	13	Nueces	BRIDGE REPLACEMENT - SALT BRANCH STR 2 ON FM 1358	TXDOT Road Project - 120601020	Live Oak	12110111	121101110106	13000454	Ongoing	$ 519,596.00	TXDOT	Y	2021	BRIDGE REPLACEMENT

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Existing Project ID	RFPG No.	RFPG Name	Project Name	Description	Counties	HUC8s	HUC12s	Watersheds	Project Status	Project Cost	Source of Funding	Dedicated Funding for Constr. (Y/N)	Expect. Year of Cmpltn	Anticipated Benefit
13000047	13	Nueces	BRIDGE REPLACEMENT - ON FM 882 STR3 SAN CHRISTOVAL CREEK	TXDOT Road Project - 099103013	Live Oak	12110110	121101100504	13000435	Proposed	$ 260,900.00	TXDOT	Y		BRIDGE REPLACEMENT
13000048	13	Nueces	CULVERT & STORM DRAINAGE WORK -.7 MI N. OF WEST SH 44	TXDOT Road Project - 037310009	Nueces	12110202	121102020102	13000613	Proposed	$ 1,500,000.00	TXDOT	Y		DRAINAGE IMPROVEMENTS
13000049	13	Nueces	BRIDGE REPLACEMENT - BEACH AVENUE	TXDOT Road Project - 010106095	Nueces	12110202	121102020200,121102020107	13000608,13000615,13000617,13000618,13000623	Proposed	$ 800,000,000.00	TXDOT	Y		BRIDGE REPLACEMENT
13000050	13	Nueces	DRAINAGE IMPROVEMENTS -CR 46	TXDOT Road Project - 037310008	Nueces	12110202	121102020102	13000613	Proposed	$ 60,000.00	TXDOT	Y		DRAINAGE IMPROVEMENTS
13000051	13	Nueces	BRIDGE REPLACEMENT - SULPHUR CREEK STR 1 ON FM 1358	TXDOT Road Project - 120601019	Live Oak	12110111	121101110106	13000454	Ongoing	$ 905,442.00	TXDOT	Y	2021	BRIDGE REPLACEMENT
13000052	13	Nueces	BRIDGE REPLACEMENT - AT SECCO CREEK	TXDOT Road Project - 059502024	Medina	12110107	121101070304	13000340	Proposed	$ 2,176,000.00	TXDOT	Y	2023	BRIDGE REPLACEMENT
13000053	13	Nueces	BRIDGE REPLACEMENT - AT ATASCOSA RIVER	TXDOT Road Project - 007313012	Atascosa	12110110	121101100308	13000413	Proposed	$ 5,195,540.00	TXDOT	Y		BRIDGE REPLACEMENT
13000054	13	Nueces	BRIDGE REPLACEMENT - AT HONDO CREEK	TXDOT Road Project - 084804049	Medina	12110107	121101070102	13000319	Proposed	$ 3,332,101.00	TXDOT	Y	2024	BRIDGE REPLACEMENT
13000055	13	Nueces	BRIDGE REPLACEMENT - AT MILL CREEK	TXDOT Road Project - 085504032	Bandera	12110106	121101060601	13000275	Ongoing	$ 1,456,894.00	TXDOT	Y	2021	BRIDGE REPLACEMENT
13000056	13	Nueces	BRIDGE REPLACEMENT - AT SAN FRANCISCO CREEK	TXDOT Road Project - 252001015	Medina	12110109	121101090103	13000380	Proposed	$ 861,900.00	TXDOT	Y	2024	BRIDGE REPLACEMENT
13000057	13	Nueces	BRIDGE REPLACEMENT - 4.70 MILES SOUTH OF FRIO COUNTY LINE	TXDOT Road Project - 001708113	La Salle	12110108	121101080205	13000370	Proposed	$ 5,500,000.00	TXDOT	Y		BRIDGE REPLACEMENT
13000058	13	Nueces	BRIDGE REPLACEMENT - 4.70 MILES SOUTH OF FRIO COUNTY LINE	TXDOT Road Project - 001708112	La Salle	12110108	121101080205	13000370	Proposed	$ 5,500,000.00	TXDOT	Y		BRIDGE REPLACEMENT
13000059	13	Nueces	BRIDGE REPLACEMENT - 1.52 MI E. OF SH 173	TXDOT Road Project - 264901035	Medina	12110107	121101070109	13000322	Proposed	$ 3,784,200.00	TXDOT	Y	2024	BRIDGE REPLACEMENT

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Existing Project ID	RFPG No.	RFPG Name	Project Name	Description	Counties	HUC8s	HUC12s	Watersheds	Project Status	Project Cost	Source of Funding	Dedicated Funding for Constr. (Y/N)	Expect. Year of Cmpltn	Anticipated Benefit
13000060	13	Nueces	BRIDGE REPLACEMENT - 1.80 MILES SOUTH OF UVALDE COUNTY LINE	TXDOT Road Project - 003702060	Zavala	12110103	121101030104	13000108	Proposed	$ 15,000,000.00	TXDOT	Y		BRIDGE REPLACEMENT
13000061	13	Nueces	BRIDGE REPLACEMENT - 5.208 MILES EAST OF FM 2691	TXDOT Road Project - 193702032	Zavala	12110104	121101040602	13000159	Ongoing	$ 6,886,071.00	TXDOT	Y	2022	BRIDGE REPLACEMENT
13000062	13	Nueces	USGS Flood Warning Modeling on the Sabinal River	Developing Flood Preparedness Toolsets Using Streamgaging and Flood Inundation Mapping	Uvalde,Bandera	12110106	121101060603,121101060604	13000298,13000308	Proposed	$ -	Unknown	N		Provides early warning to the region, densifies existing gage network, and provides additional river stage information
13000063	13	Nueces	City of Ingleside Morgan Avenue & Mooney Avenue Drainage Improvements	2,500 LF of drainage improvements, including improved channels and belowground concrete boxes. The project would also include easment acquisition and the crossing of both SH 361 and the UP Railroad and concrete outfall	San Patricio	12100405	121004050400,121004050204	13000592,13000596	Proposed	$ 3,500,000.00	Unknown	N	2030	Reduce risk of flooding to properties located along Mooney and Morgan Avenue from a point 2,300 LF West of Saunders Street to FM 361.
13000064	13	Nueces	City of Ingleside - Drainage Improvements - FM 1069 to McCampbell Slough	Easement Acquisition and the design and construction of 10,000 LF of drainage channels along FM 1069 and from Morgan Lane and Mooney Lane to McCambell Slough.	San Patricio	12100405	121004050204	13000596	Proposed	$ 750,000.00	Unknown	N	2030	Reduce Risk of Flooding to properties located East of FM 1069, between the intersection of McCullough Lane and FM 1069 and the intersection of Collins Lane and FM 1069.

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Existing Project ID	RFPG No.	RFPG Name	Project Name	Description	Counties	HUC8s	HUC12s	Watersheds	Project Status	Project Cost	Source of Funding	Dedicated Funding for Constr. (Y/N)	Expect. Year of Cmpltn	Anticipated Benefit
13000065	13	Nueces	City of ingleside - Wright Avenue Drainage Improvements	Easement Acquisition and constrution of two 700 LF eathern drainage channels between Wright Avenue and McCampbell Slough along with 2500 LF of channel widening from the existing hotel properties to the west and tie-in with McCampbell slough.	San Patricio	12100405	121004050204	13000596	Proposed	$ 400,000.00	Unknown	N	2025	Reduce Risk of Flooding to properties located between Wright Avenue and FM 1069.
13000066	13	Nueces	City of ingleside - Avenue B Drainage Channel Extension & Concrete Box Outfall	2,500 LF of stormwater utility replacement between Humble Avenue and Mustang Avenue, and 1,200 LF of stormwater utility replacement between Mustang Avenue and the Avenue B concrete lined channel.	San Patricio	12110201	121102010003	13000481	Proposed	$ 5,000,000.00	Unknown	N	2030	Reduce risk of flooding to properties located west of FM 1069, including portions of Ingleside ISD property, between West Main Avenue to South of Moore Avenue.
13000067	13	Nueces	William's Drive Drainage Improvements Phase 1 - Ennis Joslin to SPID	Ongoing. Currently in Permit phase. Will use IDIQ contract to complete the work.	Nueces	12110202	121102020106	13000609	Ongoing	$ -	Unknown	Y		Improves drainage to reduce the risk of flooding
13000068	13	Nueces	Houghton Subdivision Drainage Improvements	Construct underground and surface drainage improvements throughout the subdivision, including a trunk line along San Antonio Ave from Humble Street to the outfall into the existing Ave B Channel. Concrete line the Ave B Channel from the upstream end to t	San Patricio	12110201	121102010003	13000481	Ongoing	$ 3,900,000.00	Unknown	Y		Improves drainage to reduce the risk of flooding

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Existing Project ID	RFPG No.	RFPG Name	Project Name	Description	Counties	HUC8s	HUC12s	Watersheds	Project Status	Project Cost	Source of Funding	Dedicated Funding for Constr. (Y/N)	Expect. Year of Cmpltn	Anticipated Benefit
13000069	13	Nueces	4th Street Drainage Improvements (Ave A to Ave G/D)	Construction underground and surface drainage improvements along 4th Street from Avenue A to Avenue G. Improvements may extend as far as Avenue D.	San Patricio	12110201	121102010003	13000481	Ongoing	$ 2,500,000.00	Unknown	Y		Improves drainage to reduce the risk of flooding
13000070	13	Nueces	Refugio County Hazard Mitigation Improvements Project	This project improvements to the drainage system and increases water system resiliency in Woodsboro. The project includes the following: Addressing underground storm sewer drainage on Jeter St from Driscoll St to FM 1360 ditch, including inlets at street	Refugio	12100406	121004060303	13000025	Ongoing	$ 6,910,131.00	GLO	Y		Improves drainage to reduce the risk of flooding
13000071	13	Nueces	Citywide Wastewater Treatment Plant and Drainage Project	Improvements to the town's drainage system are slated to include the following: Building a new wastewater treatment plant adjacent to the existing plant above the floodplain, Installing lift station generators, Demolishing the existing elevated water	Refugio	12100406	121004060301	13000022	Ongoing	$ 12,112,636.00	GLO	Y		Improves drainage to reduce the risk of flooding

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Existing Project ID	RFPG No.	RFPG Name	Project Name	Description	Counties	HUC8s	HUC12s	Watersheds	Project Status	Project Cost	Source of Funding	Dedicated Funding for Constr. (Y/N)	Expect. Year of Cmpltn	Anticipated Benefit
13000072	13	Nueces	Green Lake Outfall Channel Extension	Minimize existing flooding problems and reduce flooded areas for the Cities of Gregory and Portland. This project would include acquisition of new drainage easements; new channel excavation; new multiple box culvert crossing with headwalls and concrete pl	San Patricio	12110201	121102010003	13000481	Ongoing	$ 12,000,000.00	TWDB	Y		Improves infrastructure to provide protection against floods
13000073	13	Nueces	Sinton South Ditch Channel Improvements	Primary purpose of project is to increase the outfall capacity of the existing Sinton South Ditch. Project would include widening and deepening the existing Sinton South Ditch; widening the existing railroad crossing adjacent to US HWY 181; concrete plati	San Patricio	12100407	121004070304	13000046	Ongoing	$ 7,500,000.00	CDBG-MIT	Y		Improves infrastructure to provide protection against floods
13000074	13	Nueces	Drainage Improvements to Outfall Channel - Lateral AJ	Primary purpose is to reduce the flooding footprint for the western half of Taft. The project proposes to widen and deepen the existing Main Lateral AJ; widen the existing railroad trestle at US HWY 181; concrete plate the ditch section through the US 181	San Patricio	12100407	121004070305	13000044	Ongoing	$ 8,262,000.00	CDBG-MIT	Y		Improves drainage to reduce the risk of flooding

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Existing Project ID	RFPG No.	RFPG Name	Project Name	Description	Counties	HUC8s	HUC12s	Watersheds	Project Status	Project Cost	Source of Funding	Dedicated Funding for Constr. (Y/N)	Expect. Year of Cmpltn	Anticipated Benefit
13000075	13	Nueces	Highland and Johnson Drainage Improvements	Localized street flooding due to an undersized pipe system and pavement falures due to the collapse of the storm drain pipe are the primary concerns, as well as the lack of storm drainage infrastructure upstream of South Saunders Street. Runoff is collect	San Patricio	12100405	121004050400	13000592	Ongoing	$ 787,595.00	CDBG-DR	Y		Improves drainage to reduce the risk of flooding
13000076	13	Nueces	Deberry, Saunders, and Greenwood Drainage Project	The existing 54-inch CMP ws observed to have failures at the joints, significant corrosion and collapsing at segments resulting in sediment blockage in the storm system that are obstructing conveyance of runoff. Also, the condition of ht econnecting pie s	San Patricio	12100405	121004050400	13000592	Ongoing	$ 2,199,892.00	CDBG-DR	Y		Improves drainage to reduce the risk of flooding
13000077	13	Nueces	CDBG DR Hurricane Harvey RecoveryDrainage Improvements	This project consists of the installation of drainage improvements to include 900 lf of concrete-lined channel, 963 lf of 8'x3' concrete box culvert, 1,656 lf of existing 42" RCP storm sewer line rehabilitation, asphalt pavement reconstruction, curb & gut	Aransas	12100405	121004050400	13000592	Ongoing	$ 2,032,335.00	CDBG-DR	Y	2023	Improves drainage to reduce the risk of flooding
13000078	13	Nueces	13th Street, W. Wilson Avenue and W. Nelson Avenue Drainage Improvements	This project consists of approximately 2,150 LF of 18", 24", and 42" RCP replacement, area drains, safety end treatments and full depth pavement repair.	San Patricio	12100405	121004050400	13000592	Ongoing	$ 475,167.00	CDBG-DR	Y		Improves drainage to reduce the risk of flooding

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Existing Project ID	RFPG No.	RFPG Name	Project Name	Description	Counties	HUC8s	HUC12s	Watersheds	Project Status	Project Cost	Source of Funding	Dedicated Funding for Constr. (Y/N)	Expect. Year of Cmpltn	Anticipated Benefit
13000079	13	Nueces	Wesley Seale Dam Instrumentation Improvements	Make improvements to the instrumentation system at Wesley Seale Dam. This project provides for improvements to the original instrumentation system including annual safety inspection, integration with O.N. Stevens WTP process controls, in response to prev	Jim Wells	12110111	121101110605,121101110701	13000466,13000467	Ongoing	$ 3,836,123.00	Unknown	Y		Improves infrastructure to provide protection against floods
13000080	13	Nueces	Wesley Seale Dam Side Seal Improvements	Make improvements to the side seals on the Wesley Seale Dam Spillway to maintain the spillway's integrity. The Wesley Seals Dam has 60 crest gates located in two separate spillways: the south spillway includes 27 gates and the north spillway includes 33	Jim Wells,San Patricio	12110111	121101110605,121101110701	13000466,13000467	Ongoing	$ 5,500,000.00	Unknown	Y		Improves infrastructure to provide protection against floods
13000081	13	Nueces	Salt Flats Levee Improvements	Rehabilitation and improvements to the Salt Flats Levee System	Nueces	12110202	121102020107	13000615,13000617	Ongoing	$ 903,679.00	Unknown	Y		Improves infrastructure to provide protection against floods
13000082	13	Nueces	Floodwall Upgrades at Science Museum and USACE Building	Construct a new bulkhead and the waterfront armoring against wave erosion. Project will also incorporate landscape features to enhance pedestrian circulation and experience.	Nueces	12110202	121102020107	13000615,13000623	Ongoing	$ 12,500,000.00	Unknown	Y		Improves infrastructure to provide protection against floods

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13000083	13	Nueces	La Volla Creek Drainage Improvements	The La Volla Creek Drainage Improvements program will consist of a 130-acre stormwater detention pond and new box culverts under North Padre Island Drive at the Airport Tributary #1.	Nueces	12110202	121102020103	13000614	Ongoing	$ 23,377,000.00	CDBG-DR, HMGP	Y		Improves drainage to reduce the risk of flooding
13000084	13	Nueces	BAHIA Bay Outfall	Improved outfall drainage structure under Hwy 35	Aransas	12100405	121004050400	13000592	Ongoing	$ -	ARPA	Y		Improves drainage to reduce the risk of flooding
13000085	13	Nueces	Holiday Beach West Drainage System Improvements	Revise road cross-section, adjust vertical alignment, and increase surface outfalls.	Aransas	12100405	121004050103	13000607	Ongoing	$ -	CDBG	Y	2023	Improves drainage to reduce the risk of flooding
13000086	13	Nueces	Shell Point Ranch Wetlands Protection	Texas Coastal Resiliency Master Plan - R3-5: Acquisition of approx 400 acres of coastal habitats and the southernmost extents of mima mounds at Shell Point Ranch. The acquisition also would mitigate flooding and storm surge damage to the area.	Aransas	12100405	121004050205,121004050103	13000607,13000627	Ongoing	$ 5,000,000.00	Unknown	Y		Improves nature-based flood mitigation
13000087	13	Nueces	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #13	St. Charles Bay Shoreline/Lamar Beach Road - the creation of a new habitat will provide erosion protection improvements	Aransas	12100405	121004050306	13000598	Ongoing	$ 5,800,000.00	FEMA	Y		Improves disaster preparation

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13000088	13	Nueces	Aransas County Flood Response Plan	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.1.f: A flood response plan that will identify outreach projects that can be utilized to implement a flood information program.	Nueces,San Patricio,Aransas,Refugio	12100404,12100407,12100403,12100405	121004040000,121004070404,121004070402,121004030200,121004050400,121004050203,121004050305,121004050204,121004050304,121004050306,121004050307,121004050308,121004050303,121004050205,121004050302,121004050102,121004050103,121004050500	13000026,13000028,13000592,13000594,13000595,13000596,13000597,13000598,13000599,13000600,13000602,13000603,13000606,13000607,13000627	Ongoing	$ -	Unknown	Y		Improves disaster preparation
13000089	13	Nueces	Aransas County Repetitive Loss Education Program	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.1.h: Send informational mailers to repetitive loss property owners about buyouts and other mitigation options.	Nueces,San Patricio,Aransas,Refugio	12100404,12100407,12100403,12100405	121004040000,121004070404,121004070402,121004030200,121004050400,121004050203,121004050305,121004050204,121004050304,121004050306,121004050307,121004050308,121004050303,121004050205,121004050302,121004050102,121004050103,121004050500	13000026,13000028,13000592,13000594,13000595,13000596,13000597,13000598,13000599,13000600,13000602,13000603,13000606,13000607,13000627	Ongoing	$ -	Unknown	Y		Improves disaster preparation
13000090	13	Nueces	Aransas County Coastal Erosion Response Plan	Aransas County Texas Multi-Jurisdisctinal Hazard Mitigation Action Plan - Action #9: Create an erosion response plan. New and existing buildings and infrastructure will benefit from coastal erosion protection	Nueces,San Patricio,Aransas,Refugio	12100404,12100407,12100403,12100405	121004040000,121004070404,121004070402,121004030200,121004050400,121004050203,121004050305,121004050204,121004050304,121004050306,121004050307,121004050308,121004050303,121004050205,121004050302,121004050102,121004050103,121004050500	13000026,13000028,13000592,13000594,13000595,13000596,13000597,13000598,13000599,13000600,13000602,13000603,13000606,13000607,13000627	Ongoing	$ 2,500.00	Unknown	N		Improves disaster preparation

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Existing Project ID	RFPG No.	RFPG Name	Project Name	Description	Counties	HUC8s	HUC12s	Watersheds	Project Status	Project Cost	Source of Funding	Dedicated Funding for Constr. (Y/N)	Expect. Year of Cmpltn	Anticipated Benefit
13000091	13	Nueces	Aransas County Educational Signage Program	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.1.e: Develop and install educatinal signage regarding flood safety to located along low areas of roadways likey to flood.	Nueces,San Patricio,Aransas,Refugio	12100404,12100407,12100403,12100405	121004040000,121004070404,121004070402,121004030200,121004050400,121004050203,121004050305,121004050204,121004050304,121004050306,121004050307,121004050308,121004050303,121004050205,121004050302,121004050102,121004050103,121004050500	13000026,13000028,13000592,13000594,13000595,13000596,13000597,13000598,13000599,13000600,13000602,13000603,13000606,13000607,13000627	Ongoing	$ 7,000.00	Unknown	Y		Improves disaster preparation
13000092	13	Nueces	Aransas Pass Flood Mitigation Policy	Incorporate higher floodplain management standards into City of Aransas Pass comprehensive plan update.	Nueces,San Patricio,Aransas	12100405,12110202	121004050400,121004050204,121102020200	13000592,13000596,13000608	Ongoing	$ 76,754.00	Unknown	Y		Improves disaster preparation
13000093	13	Nueces	Phase II Charlies Pasture Shoreline Bulkhead Repairs	COASTAL BEND MITIGATION ACTION PLAN - NU - 41: This project pertains to coastal erosion of the bulkheading along the Corpus Christi Ship Channel, and the Municipal Marina. Project intends to bolster ongoing bulkhead maintenance and repair activities.	Nueces	12110202	121102020200	13000608	Ongoing	$ 785,000.00	Unknown	N		Improves infrastructure to provide protection against floods

Appendix A3 – TWDB Table 3 – Existing Condition Flood Risk Summary Table

Appendix A.3
Existing Condition Flood Risk Summary Table (by county)

					1% Annual Chance Flood Risk										0.2% Annual Chance Flood Risk										Possible Flood Prone Areas								
	RFPG No.	RFPG Name	County	Area in Flood Planning Region (sqmi)	Area in Fldpln (sqmi)	Number of Struct in Fldpln	Residential Struct in Fldpln	Popul, (daytime)	Popul, (nightime)	Popul.	Rdway Crossings (#)	Rdways Segments (miles)	Agricul. Areas (sqmi)	Critical Facili. (#)	Area in Fldpln (sqmi)	Number of Struct in Fldpln	Residential Struct in Fldpln	Popul. (daytime)	Popul. (nightime)	Popul.	Rdway Crossings (#)	Rdways Segments (miles)	Agricult Areas (sqmi)	Critical Facil. (#)	Area (sqmi)	Number of Struct in Flood Prone Area	Residential Struct in in Flood Prone Area	Popul.	Rdway Crossings (#)	Rdways Segments (miles)	Agricul. Areas (sqmi)	Critical Facil. (#)	Avg SVI of features in fldpln or flood prone areas
1	13	Nueces	Aransas	244.8	111.3	3334	2828	4119	4790	4790	22	103.3	0.9	4	37.8	2749	2237	5918	4474	5918	6	88.3	3.3	13	0.9	246	236	228	0	8.9	0.1	0	0.506
2	13	Nueces	Atascosa	1199.0	189.7	1947	1498	3669	3442	3669	569	141.2	4.8	1	63.3	1229	983	1755	2025	2025	135	89.2	2.6	1	0.0	0	0	0	0	0.0	0.0	0	0.664
3	13	Nueces	Bandera	252.9	22.9	413	52	178	312	312	91	34.6	0.5	0	12.7	223	23	79	131	131	4	15.3	0.2	0	0.0	0	0	0	0	0.0	0.0	0	0.451
4	13	Nueces	Bee	878.8	163.2	1617	792	6275	4902	6275	327	113.1	16.3	27	45.3	673	358	1787	1127	1787	33	53.4	5.7	9	0.0	12	12	14	0	0.1	0.0	0	0.639
5	13	Nueces	Bexar	33.0	2.7	170	114	66	249	249	17	3.5	0.2	0	0.9	122	85	68	193	193	3	4.2	0.1	1	0.0	0	0	0	0	0.0	0.0	0	0.753
6	13	Nueces	Brooks	259.1	44.4	1942	1371	5293	3925	5293	69	74.6	0.9	34	8.9	85	24	116	113	116	0	15.1	0.2	3	0.0	0	0	0	0	0.0	0.0	0	0.931
7	13	Nueces	Dimmit	1143.8	284.8	524	178	522	728	728	180	88.2	7.4	2	51.7	174	71	234	265	265	11	21.0	0.5	3	0.0	0	0	0	0	0.0	0.0	0	0.971
8	13	Nueces	Duval	1795.1	287.9	1165	425	1421	1574	1574	293	129.9	5.4	8	95.0	433	156	397	585	585	18	54.8	1.7	2	0.0	3	2	17	0	0.1	0.0	0	0.831
9	13	Nueces	Edwards	899.2	71.7	175	26	6	88	88	216	49.9	0.2	0	47.9	115	21	3	39	39	23	29.4	0.0	0	0.0	0	0	0	0	0.0	0.0	0	0.471
10	13	Nueces	Frio	1129.2	184.6	549	175	933	885	933	237	107.7	15.2	1	64.2	337	111	296	647	647	49	55.8	6.6	1	0.4	417	345	1448	0	8.3	0.0	0	0.868
11	13	Nueces	Goliad	325.0	48.5	58	11	7	23	23	52	13.4	0.6	0	16.5	46	9	11	28	28	1	6.7	0.3	0	0.0	0	0	0	0	0.0	0.0	0	0.619
12	13	Nueces	Jim Hogg	266.7	28.6	812	540	1584	993	1584	29	23.5	0.0	2	11.2	194	131	274	300	300	0	9.0	0.0	0	0.0	0	0	0	0	0.0	0.0	0	0.918
13	13	Nueces	Jim Wells	867.9	201.4	2396	1144	8679	4579	8679	327	201.3	40.3	9	54.9	6667	5111	18959	16263	18959	25	167.5	9.5	47	0.0	0	0	0	0	0.0	0.0	0	0.715
14	13	Nueces	Karnes	104.2	12.3	14	8	5	6	6	69	9.1	1.0	0	4.5	10	5	1	4	4	13	5.9	0.5	0	0.0	0	0	0	0	0.0	0.0	0	0.746
15	13	Nueces	Kenedy	179.0	38.2	7	0	2	2	2	0	2.1	0.4	0	9.2	6	0	2	3	3	0	1.7	0.1	0	0.0	0	0	0	0	0.0	0.0	0	0.753
16	13	Nueces	Kerr	16.7	0.6	1	0	0	0	0	0	0.1	0.0	0	0.7	1	0	0	0	0	0	0.1	0.0	0	0.0	0	0	0	0	0.0	0.0	0	0.628
17	13	Nueces	Kinney	608.5	69.3	101	23	20	84	84	67	32.4	1.0	0	32.6	65	14	13	39	39	1	6.0	0.2	0	0.0	0	0	0	0	0.0	0.0	0	0.748
18	13	Nueces	Kleberg	904.7	212.3	1847	1457	5849	4302	5849	66	111.5	14.9	38	68.8	1671	1277	6195	4008	6195	1	71.4	5.0	34	0.0	0	0	0	0	0.1	0.0	0	0.678
19	13	Nueces	La Salle	1503.2	293.5	240	51	111	259	259	115	87.1	2.2	0	76.0	137	26	224	174	224	11	41.3	0.7	3	0.0	0	0	0	0	0.0	0.0	0	0.769
20	13	Nueces	Live Oak	1077.2	203.4	1936	1168	339	1355	1355	367	124.8	10.7	7	57.0	525	184	150	345	345	81	75.2	3.9	5	2.2	1377	505	2782	0	27.8	0.1	22	0.477
21	13	Nueces	Maverick	519.8	103.5	15	4	4	8	8	39	7.8	0.2	0	25.7	17	12	9	23	23	7	3.8	0.1	0	0.0	0	0	0	0	0.0	0.0	0	0.952
22	13	Nueces	McMullen	1162.5	270.0	339	90	56	103	103	183	39.5	3.8	0	59.8	142	43	32	73	73	24	25.7	0.3	2	0.0	0	0	0	0	0.3	0.0	0	0.619
23	13	Nueces	Medina	1137.2	224.4	3126	1612	3976	4704	4704	533	231.6	32.1	35	61.8	1158	638	2015	1700	2015	29	62.4	6.7	10	0.0	0	0	0	0	0.0	0.0	0	0.500
24	13	Nueces	Nueces	858.0	260.6	26919	22435	79791	69908	79791	231	706.5	118.4	240	50.9	15092	12821	50171	45508	50171	66	319.6	22.3	267	0.1	166	148	379	0	3.0	0.0	0	0.528
25	13	Nueces	Real	636.8	57.8	1109	285	366	662	662	322	81.7	0.2	5	34.2	489	129	195	351	351	14	30.8	0.1	1	0.0	0	0	0	0	0.4	0.0	0	0.529
26	13	Nueces	Refugio	679.2	115.9	481	255	337	458	458	69	50.6	10.0	4	36.2	352	157	697	466	697	11	43.3	6.9	9	0.1	0	0	0	1	2.2	0.0	0	0.629
27	13	Nueces	San Patricio	704.8	179.4	5572	4180	8123	10678	10678	158	287.6	48.3	23	38.4	3337	2528	7448	7835	7835	17	181.1	17.7	45	4.7	1370	1071	4222	0	38.4	0.3	10	0.569
28	13	Nueces	Uvalde	1558.5	245.7	2484	1136	2113	2314	2314	348	166.3	26.9	2	77.0	825	419	973	868	973	20	46.3	6.6	5	0.0	0	0	0	0	0.0	0.0	0	0.741
29	13	Nueces	Webb	1717.5	352.2	360	175	41	199	199	192	76.2	0.5	0	83.9	104	35	50	87	87	15	25.1	0.1	0	0.0	0	0	0	0	0.0	0.0	0	0.782
30	13	Nueces	Wilson	94.2	12.8	11	5	9	16	16	47	10.3	1.0	0	5.2	25	11	2	14	14	15	8.0	0.7	0	0.0	0	0	0	0	0.3	0.0	0	0.424
31	13	Nueces	Zavala	1295.3	284.1	1303	938	2649	3368	3368	147	105.2	28.4	3	55.0	194	111	209	314	314	9	21.5	3.0	0	0.0	0	0	0	0	0.0	0.0	0	0.966
	Total			**24051.7**	**4577.9**	**60967**	**42976**	**136543**	**124916**	**144053**	**5382**	**3214.5**	**392.870**	**445**	**1287.4**	**37197**	**27730**	**98283**	**88002**	**100356**	**642**	**1578.9**	**105.4**	**461**	**8.3**	**3591**	**2319**	**9090**	**1**	**89.9**	**0.5**	**32**	

Appendix A4 – TWDB Table 5 – Future Condition Flood Risk Summary Table

Appendix A.4

Future Condition Flood Risk Summary Table (by county)

					1% Annual Chance Flood Risk										0.2% Annual Chance Flood Risk										Possible Flood Prone Areas								
	RFPG No.	RFPG Name	County	Area in Flood Planning Region (sqmi)	Area in Fldpln (sqmi)	Number of Struct in Fldpln	Residential Struct in Fldpln	Popul, (daytime)	Popul, (nightime)	Popul.	Rdway Crossings (#)	Rdways Segments (miles)	Agricul. Areas (sqmi)	Critical Facili. (#)	Area in Fldpln (sqmi)	Number of Struct in Fldpln	Residential Struct in Fldpln	Popul. (daytime)	Popul. (nightime)	Popul.	Rdway Crossings (#)	Rdways Segments (miles)	Agricult Areas (sqmi)	Critical Facil. (#)	Area (sqmi)	Number of Struct in Flood Prone Area	Residential Struct in in Flood Prone Area	Popul.	Rdway Crossings (#)	Rdways Segments (miles)	Agricul. Areas (sqmi)	Critical Facil. (#)	Avg SVI of features in fldpln or flood prone areas
1	13	Nueces	Aransas	244.8	111.6	3495	2952	4352	5082	5082	23	105.9	0.9	4	37.8	2713	2221	5814	4419	5814	6	88.8	3.3	13	0.9	246	236	228	0	8.9	0.1	0	0.507
2	13	Nueces	Atascosa	1199.0	198.1	3182	2463	6450	5884	6450	595	175.8	5.1	6	62.9	1192	936	1510	1952	1952	118	86.0	2.6	4	0.0	0	0	0	0	0.0	0.0	0	0.666
3	13	Nueces	Bandera	252.9	22.9	413	52	178	312	312	91	34.6	0.5	0	12.7	223	23	79	131	131	4	15.3	0.2	0	0.0	0	0	0	0	0.0	0.0	0	0.451
4	13	Nueces	Bee	878.8	163.5	1721	862	6663	5116	6663	328	116.3	16.4	30	45.3	675	358	1552	1081	1552	32	53.8	5.7	8	0.0	12	12	14	0	0.1	0.0	0	0.640
5	13	Nueces	Bexar	33.0	2.8	187	123	72	265	265	18	4.0	0.2	0	0.9	123	88	68	200	200	3	4.1	0.1	1	0.0	0	0	0	0	0.0	0.0	0	0.752
6	13	Nueces	Brooks	259.1	44.7	1964	1383	5384	3996	5384	69	78.0	0.9	36	8.9	88	27	77	70	77	0	15.0	0.2	2	0.0	0	0	0	0	0.0	0.0	0	0.931
7	13	Nueces	Dimmit	1143.8	285.4	629	243	749	883	883	180	91.6	7.4	5	51.7	191	91	627	383	627	11	21.0	0.5	2	0.0	0	0	0	0	0.0	0.0	0	0.971
8	13	Nueces	Duval	1795.1	288.5	1313	525	1627	1789	1789	293	133.8	5.5	10	95.0	421	145	359	549	549	18	54.7	1.7	1	0.0	3	2	17	0	0.1	0.0	0	0.832
9	13	Nueces	Edwards	899.2	71.7	175	26	6	88	88	216	49.9	0.2	0	47.9	115	21	3	39	39	23	29.4	0.0	0	0.0	0	0	0	0	0.0	0.0	0	0.471
10	13	Nueces	Frio	1129.2	186.7	769	287	1175	1479	1479	243	117.2	15.5	2	64.1	324	112	397	614	614	45	56.3	6.7	0	0.4	345	290	1243	0	6.8	0.0	0	0.868
11	13	Nueces	Goliad	325.0	48.5	58	11	7	23	23	52	13.4	0.6	0	16.5	46	9	11	28	28	1	6.7	0.3	0	0.0	0	0	0	0	0.0	0.0	0	0.619
12	13	Nueces	Jim Hogg	266.7	29.0	974	663	1848	1266	1848	29	27.4	0.1	2	11.2	210	135	309	332	332	0	8.7	0.0	3	0.0	0	0	0	0	0.0	0.0	0	0.920
13	13	Nueces	Jim Wells	867.9	205.9	2989	1553	10066	5911	10066	334	224.8	41.6	12	54.1	6347	4868	18092	15523	18092	19	160.5	9.3	48	0.0	0	0	0	0	0.0	0.0	0	0.715
14	13	Nueces	Karnes	104.2	12.3	14	8	5	6	6	69	9.1	1.0	0	4.5	10	5	1	4	4	13	5.9	0.5	0	0.0	0	0	0	0	0.0	0.0	0	0.746
15	13	Nueces	Kenedy	179.0	38.2	7	0	2	2	2	0	2.1	0.4	0	9.2	6	0	2	3	3	0	1.7	0.1	0	0.0	0	0	0	0	0.0	0.0	0	0.753
16	13	Nueces	Kerr	16.7	0.6	1	0	0	0	0	0	0.1	0.0	0	0.7	1	0	0	0	0	0	0.1	0.0	0	0.0	0	0	0	0	0.0	0.0	0	0.628
17	13	Nueces	Kinney	608.5	69.3	101	23	20	84	84	67	32.4	1.0	0	32.6	65	14	13	39	39	1	6.0	0.2	0	0.0	0	0	0	0	0.0	0.0	0	0.748
18	13	Nueces	Kleberg	904.7	216.9	3289	2625	12174	8421	12174	66	142.8	15.5	74	68.5	1504	1129	4222	3520	4222	1	68.9	5.0	25	0.0	0	0	0	0	0.0	0.0	0	0.685
19	13	Nueces	La Salle	1503.2	294.2	330	90	201	353	353	116	92.0	2.3	0	75.9	131	23	215	170	215	11	40.9	0.7	4	0.0	0	0	0	0	0.0	0.0	0	0.769
20	13	Nueces	Live Oak	1077.2	203.5	1961	1191	346	1391	1391	367	124.9	10.7	7	57.0	519	178	149	337	337	81	75.3	3.9	5	2.2	1377	505	2782	0	27.8	0.1	22	0.477
21	13	Nueces	Maverick	519.8	103.5	15	4	4	8	8	39	7.8	0.2	0	25.7	17	12	9	23	23	7	3.8	0.1	0	0.0	0	0	0	0	0.0	0.0	0	0.952
22	13	Nueces	McMullen	1162.5	270.0	339	90	56	103	103	183	39.5	3.8	0	59.8	142	43	32	73	73	24	25.7	0.3	2	0.0	0	0	0	0	0.3	0.0	0	0.619
23	13	Nueces	Medina	1137.2	229.3	3625	1959	5352	5595	5595	538	254.0	33.3	43	61.4	1161	648	2113	2468	2468	27	61.6	6.7	10	0.0	0	0	0	0	0.0	0.0	0	0.501
24	13	Nueces	Nueces	858.0	278.0	37419	31619	116420	100347	116420	274	845.0	122.6	356	48.9	13276	11093	46667	39482	46667	43	312.9	22.1	297	0.1	132	119	328	0	2.5	0.0	0	0.522
25	13	Nueces	Real	636.8	57.8	1109	285	366	662	662	322	81.7	0.2	5	34.2	489	129	195	351	351	14	30.8	0.1	1	0.0	0	0	0	0	0.4	0.0	0	0.529
26	13	Nueces	Refugio	679.2	116.3	560	313	430	566	566	69	52.8	10.1	5	36.2	349	155	690	459	690	11	43.6	6.9	8	0.1	0	0	0	1	2.2	0.0	0	0.629
27	13	Nueces	San Patricio	704.8	183.6	6773	5195	10161	13579	13579	159	315.2	49.4	32	38.0	3080	2296	7822	7035	7822	17	180.9	17.6	52	4.4	1308	1027	4103	0	35.9	0.3	10	0.569
28	13	Nueces	Uvalde	1558.5	247.3	2687	1299	3819	2767	3819	348	170.5	27.1	10	77.0	861	432	883	844	883	20	46.8	6.6	6	0.0	0	0	0	0	0.0	0.0	0	0.741
29	13	Nueces	Webb	1717.5	352.2	360	175	41	199	199	192	76.3	0.5	0	83.9	104	35	50	87	87	15	25.1	0.1	0	0.0	0	0	0	0	0.0	0.0	0	0.782
30	13	Nueces	Wilson	94.2	12.8	11	5	9	16	16	47	10.3	1.0	0	5.2	25	11	2	14	14	15	8.0	0.7	0	0.0	0	0	0	0	0.3	0.0	0	0.424
31	13	Nueces	Zavala	1295.3	284.4	1408	1013	2821	3606	3606	147	108.2	28.4	3	55.0	203	110	324	458	458	9	22.0	3.0	1	0.0	0	0	0	0	0.0	0.0	0	0.966
	Total			**24051.7**	**4629.5**	**77878**	**57037**	**190804**	**169799**	**198915**	**5474**	**3537.2**	**402.3**	**642**	**1282.8**	**34611**	**25347**	**92287**	**80688**	**94363**	**589**	**1560.3**	**105.1**	**493**	**8.0**	**3423**	**2191**	**8715**	**1**	**85.3**	**0.5**	**32**	

Appendix A5 – TWDB Table 6 – Existing Floodplain Management Practices

Appendix A.5
Existing Floodplain Management Practices

Entity	Floodplain management regulations (Yes/No/Unknown)	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No)	NFIP Participant (Yes/No)	Higher Standards Adopted (Yes/ No)	Level of enforcement of practices (High/ Moderate/ Low/ None)	Web Link to entity regulations
Agua Dulce	Unknown	No	Yes	Unknown	Unknown	
Alamo Area Council of Governments	Unknown	No	No	Unknown	Unknown	
Alice	Unknown	No	Yes	Yes	Unknown	
Alice Water Authority	Unknown	No	No	Unknown	Unknown	
Aransas County	Yes	Yes	Yes	Yes	Moderate	https://www.aransascountytx.gov/main/docs/ordinances/OAmended%20Aransas%20County%20Floodplain%20Management%20Watershed%20Protection%20Order%20O-23-2019.pdf
Aransas County MUD 1	Unknown	No	No	Unknown	Unknown	
Aransas County Navigation District	Unknown	No	No	Unknown	Unknown	
Aransas County WCID 1	Unknown	No	No	Unknown	Unknown	
Aransas Pass	Unknown	No	Yes	Unknown	Unknown	
Asherton	Unknown	No	Yes	Unknown	Unknown	
Atascosa County	Unknown	No	Yes	Yes	Unknown	
Bandera County	Yes	Yes	Yes	No	Moderate	www.banderacounty.org
Bayside	Unknown	No	Yes	Unknown	Unknown	
Bee County	Unknown	No	Yes	Unknown	Unknown	
Beeville Water Supply District	Unknown	No	No	Unknown	Unknown	
Benavides	Unknown	No	Yes	Unknown	Unknown	
Bexar County	Yes	Yes	Yes	Yes	Moderate	
Bexar-Medina-Atascosa Counties WCID 1	Unknown	No	No	Unknown	Unknown	
Big Wells	Unknown	No	No	Unknown	Unknown	
Brooks County	Unknown	No	Yes	Unknown	Unknown	
Camp Wood	Unknown	No	Yes	Unknown	Unknown	
Canyon Regional Water Authority	Unknown	No	No	Unknown	Unknown	
Carrizo Springs	Unknown	No	Yes	Unknown	Unknown	
Charlotte	Unknown	No	Yes	Yes	Unknown	
Christine	Unknown	No	Yes	Unknown	Unknown	
City of Beeville	No	No	Yes	No	Low	
City of Bishop	Yes	Yes	Yes	No	Moderate	www.cityofbishoptx.com
City of Corpus Christi	Yes	Yes	Yes	Yes	High	https://library.municode.com/tx/corpus_christi/codes/code_of_ordinances?nodeId=PTIIITHCOOR_CH14DESE_ARTVFLHAPRCO
City of Cotulla	Yes	Yes	Yes	No	Low	municode
City of Gregory	Yes	No	Yes	No	High	
City of Hondo	Yes	Yes	Yes	No	Moderate	https://z2.franklinlegal.net/franklin/Z2Browser2.html?showset=hondoset&collection=hondo&doccode=z2Code_z20000462
City of Ingleside	Yes	Yes	Yes	Yes	High	https://library.municode.com/TX/ingleside/codes/code_of_ordinances?nodeId=PTIICICO_CH18BUBURE_ARTXFLMA&showChanges=true
City of Ingleside on the Bay	Yes	Yes	Yes	No	Moderate	www.inglesideonthebay.org
City of Leakey	Yes	No	Yes	No	Moderate	
City of Lytle	Unknown	No	Yes	Unknown	Unknown	
City of Port Aransas	Yes	Yes	Yes	No	High	https://library.municode.com/tx/port_aransas/codes/code_of_ordinances?nodeId=PTIIPOARCO_CH8FLDAPR

Appendix A.5
Existing Floodplain Management Practices

Entity	Floodplain management regulations (Yes/No/Unknown)	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No)	NFIP Participant (Yes/No)	Higher Standards Adopted (Yes/ No)	Level of enforcement of practices (High/ Moderate/ Low/ None)	Web Link to entity regulations
City of Portland	Yes	Yes	Yes	No	High	https://library.municode.com/tx/portland/codes/code_of_ordinances?nodeId=COOR_CH4BUGEBURE_ARTIIIFLDAPR_S4-30STAUFIFAPUME
City of Sinton	Yes	Yes	Yes	No	Moderate	sintontexas.org
City of Uvalde	Yes	Yes	Yes	No	Moderate	https://library.municode.com/tx/uvalde/codes/code_of_ordinances?nodeId=TIT15BUCO_CH15.48FLDAPR
Coastal Bend Council of Governments	Unknown	No	No	Unknown	Unknown	
Corpus Christi Downtown Management District	Unknown	No	No	Unknown	Unknown	
Crystal City	Unknown	No	Yes	Unknown	Unknown	
Devine	Unknown	No	Yes	Unknown	Unknown	
Dilley	Unknown	No	Yes	Unknown	Unknown	
Dimmit County	No	No	Yes	No	None	
Driscoll	Unknown	No	Yes	Unknown	Unknown	
Duval County	No	No	Yes	No	Low	www.co.duval.tx.us
Duval County Conservation & Reclamation District	No	No	No	No	None	
Edwards County	Unknown	No	Yes	Unknown	Unknown	
Encinal	Unknown	No	Yes	Unknown	Unknown	
Escondido Watershed District	Unknown	No	No	Unknown	Unknown	
Falfurrias	Unknown	No	Yes	Unknown	Unknown	
Freer	Unknown	No	Yes	Unknown	Unknown	
Freer WCID	Unknown	No	No	Unknown	Unknown	
Frio County	Yes	Yes	Yes	No	Low	
Fulton	Unknown	No	Yes	Unknown	Unknown	
George West	Unknown	No	Yes	Unknown	Unknown	
Golden Crescent Regional Planning Commission	Unknown	No	No	Unknown	Unknown	
Goliad County	Unknown	No	Yes	Unknown	Unknown	
Hondo Creek Watershed Improvement District	Unknown	No	No	Unknown	Unknown	
Jim Hogg County	Unknown	No	Yes	Unknown	Unknown	
Jim Hogg County WCID 2	Unknown	No	No	Unknown	Unknown	
Jim Wells County	Unknown	No	Yes	Unknown	Unknown	
Jim Wells County FWSD 1	Unknown	No	No	Unknown	Unknown	
Jourdanton	Unknown	No	Yes	Unknown	Unknown	
Karnes County	Yes	Yes	Yes	No	Moderate	
Kenedy County	Unknown	No	Yes	Unknown	Unknown	
Kerr County	Yes	Yes	Yes	Yes	Moderate	https://www.co.kerr.tx.us/engineer/floodplain.html
Kingsville	Unknown	No	Yes	Yes	Unknown	
Kinney County	Unknown	No	Yes	Unknown	Unknown	
Kleberg County	Unknown	No	Yes	Unknown	Unknown	
La Salle County	Unknown	No	Yes	Unknown	Unknown	

Appendix A.5
Existing Floodplain Management Practices

Entity	Floodplain management regulations (Yes/No/Unknown)	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No)	NFIP Participant (Yes/No)	Higher Standards Adopted (Yes/ No)	Level of enforcement of practices (High/ Moderate/ Low/ None)	Web Link to entity regulations
Lake City	Unknown	No	Yes	Unknown	Unknown	
Lakeside	Unknown	No	Yes	Unknown	Unknown	
Lamar Improvement District	Unknown	No	No	Unknown	Unknown	
Live Oak County	Unknown	No	Yes	Yes	Unknown	
Mathis	Unknown	No	Yes	Unknown	Unknown	
Maverick County	Unknown	No	Yes	Unknown	Unknown	
Maverick County WCID 1	Unknown	No	No	Unknown	Unknown	
McMullen County	Unknown	No	Yes	Unknown	Unknown	
McMullen County WCID #1	No	No	No	No	Low	
Medina County	Yes	Yes	Yes	Yes	High	medinacountytexas.org
Medina County WCID 2	Unknown	No	No	Unknown	Unknown	
Middle Rio Grande Development Council	Unknown	No	No	Unknown	Unknown	
Natalia	Unknown	No	Yes	Unknown	Unknown	
Nueces County	Unknown	No	Yes	Unknown	Unknown	
Nueces County Bishop Driscoll Drainage District 3	Unknown	No	No	Unknown	Unknown	
Nueces County Drainage & Conservation District 2	Unknown	No	No	Unknown	Unknown	
Nueces County WCID 3	Unknown	No	No	Unknown	Unknown	
Nueces County WCID 4	Unknown	No	No	Unknown	Unknown	
Nueces County WCID 5	Unknown	No	No	Unknown	Unknown	
Nueces River Authority	Unknown	No	No	Unknown	Unknown	
Odem	Unknown	No	Yes	Unknown	Unknown	
Orange Grove	Unknown	No	Yes	Unknown	Unknown	
Padre Island Gateway Municipal Management District	Unknown	No	No	Unknown	Unknown	
Pearsall	Unknown	No	Yes	Unknown	Unknown	
Petronila	Unknown	No	No	Unknown	Unknown	
Pettus MUD	Unknown	No	No	Unknown	Unknown	
Pleasanton	Unknown	No	Yes	Unknown	Unknown	
Port of Corpus Christi Authority	Unknown	No	No	Unknown	Unknown	
Poteet	Unknown	No	Yes	Unknown	Unknown	
Premont	Unknown	No	Yes	Unknown	Unknown	
Real County	Yes	Yes	Yes	No	Moderate	co.real.tx.us
Refugio	Unknown	No	Yes	Unknown	Unknown	
Refugio County	Yes	Yes	Yes	No	Low	
Refugio County Drainage District 1	Unknown	No	No	Unknown	Unknown	
Refugio County Navigation District	Unknown	No	No	Unknown	Unknown	
Refugio County WCID 2	Unknown	No	No	Unknown	Unknown	
Rio Grande Regional Water Authority	Unknown	No	No	Unknown	Unknown	
Riviera WCID	Unknown	No	No	Unknown	Unknown	
Robstown	Unknown	No	Yes	Unknown	Unknown	

Appendix A.5
Existing Floodplain Management Practices

Entity	Floodplain management regulations (Yes/No/Unknown)	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No)	NFIP Participant (Yes/No)	Higher Standards Adopted (Yes/ No)	Level of enforcement of practices (High/ Moderate/ Low/ None)	Web Link to entity regulations
Rockport	Unknown	No	Yes	Unknown	Unknown	
Rocksprings	Unknown	No	Yes	Unknown	Unknown	
Sabinal	Unknown	No	Yes	Unknown	Unknown	
San Diego	Unknown	No	Yes	Unknown	Unknown	
San Diego MUD 1	Unknown	No	No	Unknown	Unknown	
San Patricio	Unknown	No	Yes	Unknown	Unknown	
San Patricio County	Yes	Yes	Yes	No	High	https://www.twdb.texas.gov/financial/programs/EDAP/msr/doc/San_Patricio_Co_MSRs.pdf
San Patricio County Drainage District	No	No	No	No	High	co.san-patricio.tx.us
San Patricio County MUD 1	Unknown	No	No	Unknown	Unknown	
San Patricio County Navigation District 1	Unknown	No	No	Unknown	Unknown	
San Patricio MWD	Unknown	No	No	Unknown	Unknown	
South Texas Development Council	Unknown	No	No	Unknown	Unknown	
South Texas Water Authority	Unknown	No	No	Unknown	Unknown	
Taft	Unknown	No	Yes	Unknown	Unknown	
Three Rivers	Unknown	No	Yes	Unknown	Unknown	
Three Rivers Water District	Unknown	No	No	Unknown	Unknown	
Uvalde County	Unknown	No	Yes	Unknown	Unknown	
Uvalde County UWCD	No	Yes	No	No	High	
Webb County	Yes	Yes	Yes	No	High	https://www.webbcountytx.gov/Planning/
Wilson County	Yes	Yes	Yes	No	Moderate	http://www.co.wilson.tx.us/upload/page/2300/docs/Dawn/Ordinances/WC_Flood_Order_Final_10272010.pdf
Woodsboro	Unknown	No	Yes	Unknown	Unknown	
Zavala County	Yes	Yes	Yes	No	Moderate	http://co.zavala.tx.us
Zavala County WCID 1	Unknown	No	No	Unknown	Unknown	

Appendix A6 – TWDB Table 11 – Flood Mitigation and Floodplain Management Goals

Appendix A.6
Flood Mitigation and Floodplain Management Goals

Nueces Basin ID	Goal ID	Goal	Term of Goal	Target Year	Applicable To	Residual Risk	How will the Goal be Measured	Overarching Goal	Associated Goal IDs	Associated Goal IDs
1	13000001	Improve Safety at **Low Water Crossings** through Structural Improvements or Warning Systems	Other	2053	Entire RFPG	20% of high-risk LWC remaining	measured against Inventory of high risk LWCs	Protect against the loss of life	13000001, 13000002	1A/!B
1A	13000002	Conduct an inventory of low-water crossings (LWCs), characterize risk, and rank LWCs to prioritize those with high risk. Prepare a large-scale public outreach campaign to include "Turn Around Don't Drown" signage at LWCs or roadways aimed at reducing loss of life. Address top 30% of high-risk, LWCs through mitigation or warning systems.	Short Term (10 year)	2033	Entire RFPG	Lower 70% of high-risk LWC remaining	measured against Inventory of high risk LWCs	Protect against the loss of life	13000001, 13000003	1B
1B	13000003	Address 80% of high-risk LWC identified in the study.	Long Term (30 year)	2053	Entire RFPG	20% of high-risk LWC remaining	measured against Inventory of high risk LWCs	Protect against the loss of life	13000001, 13000002	1A
2	13000004	Rehabilitation, Removal or Replacement of Deficient **High Hazard Dams** as Identified by TCEQ Dam Safety Regulation Program	Other	2053	Entire RFPG	No residual risk in this category	measured against inventory of deficient high-hazard dams	Protect against the loss of life	13000004, 13000005	2A/2B
2A	13000005	Conduct a comprehensive study to identify all deficient high-hazard dams in the 31-county region. Remove or rehabilitate the top 30% high-hazard dams.	Short Term (10 year)	2033	Entire RFPG	Lower 70% of high-hazard dams remaing	measured against inventory of deficient high-hazard dams	Protect against the loss of life	13000004, 13000006	2B
2B	13000006	Remove or rehabilitate 100% deficient high-hazard dams.	Long Term (30 year)	2053	Entire RFPG	No residual risk in this category	measured against inventory of deficient high-hazard dams	Protect against the loss of life	13000004, 13000005	2A
3	13000007	Improve **regional coordination**, data collection/sharing of flood events and impacts, and implement flood warning systems	Other	2053	Entire RFPG	20% of the data gap unadressed	measured against number of counties in data gap area	Protect against the loss of life	13000007, 13000008	3A/3B
3A	13000008	Develop (or expand) a successful flood management program on a regional scale to cover 20% of the data gap area(s) identified in the 2023 plan. Prepare large-scale public outreach to include "Turn Around Don't Drown" campaigns aimed at reducing loss of life.	Short Term (10 year)	2033	Entire RFPG	80% of the data gap unadressed	measured against number of counties in data gap area	Protect against the loss of life	13000007, 13000009	3B
3B	13000009	Develop (or expand) a successful flood management program on a regional-scale to cover 80% of the data gap area(s) identified in the 2023 plan.	Long Term (30 year)	2053	Entire RFPG	20% of the data gap unadressed	measured against number of counties in data gap area	Protect against the loss of life	13000007, 13000008	3A
4	13000010	Perform **flood mapping evaluations and update floodplain maps** and flood hazard data.	Other	2053	Entire RFPG	No residual risk in this category	mesaured using HUC-12 watersheds, measured using building inventory in flood hazard	Property Damage	13000010, 13000011	4A/4B
4A	13000011	Develop maps to Base Level Engineering (BLE) or National Flood Hazard Layer (NFHL)-level accuracy for 60% of the basin that does not currently have accurate mapping. Identify structures and buildings in the NFHL-Detailed Study Areas with elevations less than 1 foot above base flood elevation (BFE).	Short Term (10 year)	2033	Entire RFPG	40% of the basin that still do not have accurate mapping remains.	mesaured using HUC-12 watersheds, measured using building inventory in flood hazard	Property Damage	13000010, 13000012	4B
4B	13000012	Develop accurate maps to NFHL-level accuracy for 100% of the basin. Identify structures and buildings in the NFHL-Detailed Study Areas with elevations less than 1 foot above BFE.	Long Term (30 year)	2053	Entire RFPG	No residual risk in this category	mesaured using HUC-12 watersheds, measured using building inventory in flood hazard	Property Damage	13000010, 13000011	4A
5	13000013	**Reduce the number of structures within NFHL-Detailed Study Area** and Existing Floodplain with 1% annual chance flood risk.	Other	2053	Entire RFPG	50% of high hazard structures remain.	measured against inventory of high-hazard buildings located within the floodplain.	Property Damage	13000013, 13000014	5A/5B
5A	13000014	Identify structures within existing floodplain with 1% annual chance flood risk for 60% of the basin. Prepare a list of high-hazard buildings based on function, critical function, repetitive loss, or other community-related importance, summarize, and distribute results to affected floodplain management entities. Reduce the number of high hazard structures within the 1% existing floodplain by 10% for existing structures and identify new structures for targeting with 30-year goal.	Short Term (10 year)	2033	Entire RFPG	40% of the structures within the existing floodplain unidentified. 90% of high hazard structures remain.	measured against inventory of high-hazard buildings located within the floodplain.	Property Damage	13000013, 13000015	5B
5B	13000015	Identify structures within existing floodplain with 1% annual chance flood risk for 100% of the basin, including areas that have been updated with more accurate mapping. Prepare a list of high-hazard buildings based on function, critical function, repetitive loss, or other community-related importance, summarize, and distribute results to affected floodplain management entities. Reduce the number of high-hazard structures within the 1% existing floodplain by 50%.	Long Term (30 year)	2053	Entire RFPG	50% of high hazard structures remain.	measured against inventory of high-hazard buildings located within the floodplain.	Property Damage	13000013, 13000014	5A

Nueces Basin ID	Goal ID	Goal	Term of Goal	Target Year	Applicable To	Residual Risk	How will the Goal be Measured	Overarching Goal	Associated Goal IDs	Associated Goal IDs
6	13000016	Prepare **minimum flood management standards**, including identifying operations and maintenance best practices to maintain drainage structures including remove gravel and sediment deposition to mitigate future flooding impacts.	Other	2053	Entire RFPG	No residual risk in this category	Measured against number of cities and counties with flood regulation related authority	Floodplain Management	13000016, 13000017	6A/6B
6A	13000017	Provide minimum flood standard recommendation(s) adopted by the NRFPG to floodplain administrators and community leaders, to include: Finished floor of structures are to be constructed a minimum of 1 foot above BFE 100-year or based on local ordinances, whichever is more stringent. The NRFPG strongly encourages cities and counties in the Nueces Basin to actively consider minimum 2 foot above base flood elevations, consistent with upcoming 2025 FEMA ordinances. The standards are based on available data, to be updated with Atlas 14 and/or TWDB BLE data when available. Achieve 30% voluntary adoption of the RFPG minimum standards by counties/cities. Define and recommend additional minimum flood standards for regional support towards implementation, as study results become available. Increase the number of communities adopting higher standards beyond NFIP requirements to 50% of counties and 30% of communities (current is 26% counties and 17% communities). Provide advocacy on the regional and state level to ensure that all communities across the region share a base-level of floodplain management support by 2030.	Short Term (10 year)	2033	Entire RFPG	70% cities/counties not adpoting minimum RFPG standards. 50% of counties and 70% communities not adopting higher standards.	Measured against number of cities and counties with flood regulation related authority	Floodplain Management	13000016, 13000018	6B
6B	13000018	Achieve 100% voluntary adoption of RFPG minimum standards by counties/cities, including additional minimum flood standards defined during studies conducted through 2033 (10 year). Increase the number of communities adopting higher standards beyond NFIP requirements to 100% of counties and 100% of communities.	Long Term (30 year)	2053	Entire RFPG	No residual risk in this category	Measured against number of cities and counties with flood regulation related authority	Floodplain Management	13000016, 13000017	6A
7	13000019	Increase **nature-based practices through land conservation and restoration programs** and participation in landowner incentive programs to encourage voluntary land stewardship practices to manage floodwaters, slow runoff and dissipate flood energy to include riparian, wetland, forest, upland, and other habitat protection programs.	Other	2053	Entire RFPG	60% of the high success areas unaddressed. 20% of undeveloped riparian corridor mileage and 50% of acreage unpreserved.	Measured by riparian corridor mileage and acreasge within the 100-year floodplain	Floodplain Management	13000019, 13000020	7A/7B
7A	13000020	Identify existing areas noted for conservation, restoration, and/or habitat protection, and develop a strategy for expanding these programs and/or identifying high success areas for riparian/wetland/forest conservation, restoration, and upland protection programs to enhance flood mitigation benefits. Identify preferred areas in Nueces Basin to expand federal and state land protection programs, and other programs that provide incentives for voluntary land conservation and restoration. Preserve 35% of undeveloped riparian corridor mileage and protect 25% of acreage within the 100-year floodplain through voluntary, local, state, or federal land conservation programs.	Short Term (10 year)	2033	Entire RFPG	65% of undeveloped riparian corridor mileage and 75% of acreage unpreserved.	Measured by riparian corridor mileage and acreasge within the 100-year floodplain	Floodplain Management	13000019, 13000021	7B
7B	13000021	Work with local leadership to implement nature-based riparian, wetland, and upland conservation and/or restoration programs for 40% of the high success areas identified. Preserve 80% of undeveloped riparian corridor mileage and protect 50% of acreage within the 100-year floodplain through voluntary, local, state, or federal land conservation programs.	Long Term (30 year)	2053	Entire RFPG	60% of the high success areas unaddressed. 20% of undeveloped riparian corridor mileage and 50% of acreage unpreserved.	Measured by riparian corridor mileage and acreasge within the 100-year floodplain	Floodplain Management	13000019, 13000020	7A
8	13000022	Develop **public information campaign** to increase community knowledge of rules and regulations, flood-prone areas, and importance of protecting floodplains from encroachment	Other	2053	Entire RFPG	20% of the region without public information plan campaigns	Present public information campaign results.	Floodplain Management	13000022, 13000023	8A/8B
8A	13000023	Identify local, subregional workgroups aligned with flooding issues. Develop public information campaign templates with relevant flood-related communications for 20% of the Nueces Region.	Short Term (10 year)	2033	Entire RFPG	80% of the region without public information plan campaigns	Present public information campaign results.	Floodplain Management	13000022, 13000024	8B
8B	13000024	Develop public information plan campaigns with relevant flood-related communications for 80% of the Nueces Region area.	Long Term (30 year)	2053	Entire RFPG	20% of the region without public information plan campaigns	Present public information campaign results.	Floodplain Management	13000022, 13000023	8A
9	13000025	Increase dedicated **funding sources to provide maintenance** of drainage and culvert systems (both structural and non-structural solutions) to divert flood flows and identify structural improvements causing flooding issues to remove/rectify.	Other	2053	Entire RFPG	Dedicated funding for 20% of the communities and 10% of the counties unadressed	Measuared against number of communities and counties w/ O&M funded	Funding	13000025, 13000026	9A/9B
9A	13000026	Increase dedicated funding sources, including state-funding opportunities to support operations and maintenance (O&M) for 20% of the communities and 30% counties in the Nueces Region.	Short Term (10 year)	2033	Entire RFPG	Dedicated funding for 80% of the communities and 70% of the counties unadressed	Measuared against number of communities and counties w/ O&M funded	Funding	13000025, 13000027	9B
9B	13000027	Develop dedicated funding sources, including state-funding opportunities, to support O&M for 80% of the communities and 90% counties in the Nueces Region.	Long Term (30 year)	2053	Entire RFPG	Dedicated funding for 20% of the communities and 10% of the counties unadressed	Measuared against number of communities and counties w/ O&M funded	Funding	13000025, 13000026	9A

Appendix A.6
Flood Mitigation and Floodplain Management Goals

Nueces Basin ID	Goal ID	Goal	Term of Goal	Target Year	Applicable To	Residual Risk	How will the Goal be Measured	Overarching Goal	Associated Goal IDs	Associated Goal IDs
10	13000028	Identify **funding**, resources, and technical training for floodplain districts, managers, administrators or designees to enhance technical capacity for identifying floodplain projects, community outreach, and permitting support to verify new projects meet floodplain development requirements.	Other	2053	Entire RFPG	Dedicated funding for 20% of the communities and 10% of the counties unadressed	Measuared against number of communities and counties w/ dedicated funding for floodplain administers and permit support	Funding	13000028, 13000029	10A/10B
10A	13000029	Identify dedicated funding sources, including state-funding opportunities for 20% of the communities and 30% counties in the Nueces Region. Develop a strategy for public engagement on flood-related issues, including a list of flood mitigation funding programs and potential opportunities for communities to participate in programs to support flood risk reduction (such as the Federal Emergency Management Agency's (FEMA) Community Rating System) to serve as a template for rural and underserved communities by 2030.	Short Term (10 year)	2033	Entire RFPG	Dedicated funding for 80% of the communities and 70% of the counties unadressed	Measuared against number of communities and counties w/ dedicated funding for floodplain administers and permit support	Funding	13000028, 13000030	10B
10B	13000030	Develop dedicated funding sources, including state-funding opportunities for 80% of the communities and 90% counties in the Nueces Region.	Long Term (30 year)	2053	Entire RFPG	Dedicated funding for 20% of the communities and 10% of the counties unadressed	Measuared against number of communities and counties w/ dedicated funding for floodplain administers and permit support	Funding	13000028, 13000029	10A

Appendix A7 – TWDB Table 12 – Potential Flood Management Evaluations Identified by RFPG

This Appendix is available for viewing on the Region 13 Nueces website (https://www.nueces-rfpg.org)

Appendix A8 – TWDB Table 13 – Potential Feasible Flood Mitigation Projects Identified By RFPG

This Appendix is available for viewing on the Region 13 Nueces website (https://www.nueces-rfpg.org)

Appendix A9 – TWDB Table 14 – Potentially Feasible Flood Management Strategies Identified by RFPG

This Appendix is available for viewing on the Region 13 Nueces website (https://www.nueces-rfpg.org)

Appendix A10 – TWDB Table 15 – Flood Management Evaluations Recommended by RFPG

Appendix A.10
Flood Management Strategies Recommended by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Assoc Goals	Counties	HUC8s	HUC12s	Watersheds	Study Type	FME Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need	Estimated Study Cost	Potential Funding Sources
131000005	13	Nueces	Others (Flood Prevention/Planning Study, LOMR etc)	Atascosa Flood Prevention Project - Pleasanton	13000013	Atascosa	12110110	121101100205,121101100206	13000418,13000419	Project Planning	7.6	Riverine, Urban,	13003117	00000096,00000255,00000290,13003117	Yes	$ 79,000	TWDB FIF
131000006	13	Nueces	Camp Wood City-wide Drainage Study	Camp Wood City-wide Drainage Study	13000012	Real	12110101	121101010401	13000052	Project Planning	0.5	Riverine, Urban,	13002625	00000015,00000268,00000290,13002625	Yes	$ 250,000	
131000007	13	Nueces	City of Hondo Drainage Master Plan and Flood Mitigation plan	City of Hondo Drainage Master Plan and Flood Mitigation plan	13000013	Medina	12110107	121101070109,121101070201,121101070202,121101070203,121101070204	13000322,13000325,13000329,13000330,13000333	Project Planning	28.4	Riverine, Urban,	13002953	00000005,00000255,00000290,13002953	Yes	$ 250,000	
131000008	13	Nueces	D'Hanis Flood Study	D'Hanis Flood Study needed from Leakey road show on 3/21/2022	13000010	Medina	12110107	121101070203,121101070304,121101070305	13000330,13000340,13000341	Watershed Planning	2.8	Riverine, Urban,	00000005	00000005,00000255,00000290,13000948	Yes	$ 250,000	
131000009	13	Nueces	Comprehensive Plan Update	Creation of Future Land Use Plan, Thoroughfare Plan, Site Plans for Planned Development, Parks Planning, Implementation	13000016	Medina	12110107	121101070109,121101070201,121101070202,121101070203,121101070204	13000322,13000325,13000329,13000330,13000333	Watershed Planning	28.4	Riverine, Urban,	13002953	00000005,00000255,00000290,13002953	Yes	$ 200,000	
131000010	13	Nueces	Flood mapping updates and hydrologic and hydraulic modeling	Scope would likely include updating the Hydrology and Hydraulic modeling for approximately 5 miles of study stream for the Hondo area. The goal would be to then use this data to apply to FEMA to update the flood mapping within the City and immediate area.	13000010	Medina	12110107	121101070109,121101070201,121101070202,121101070203,121101070204	13000322,13000325,13000329,13000330,13000333	Watershed Planning	28.4	Riverine, Urban,	13002953	00000005,00000255,00000290,13002953	Yes	$ 523,000	
131000011	13	Nueces	Drainage and Stormwater Master Plan	Restudy of the City's floodplain and creation of a holistic plan for the City's drainage and stormwater system. This data would then be used as a foundation to update the City's Subdivision Ordinance and Building Codes to mitigate future flood risks.	13000013	Medina	12110107	121101070109,121101070201,121101070202,121101070203,121101070204	13000322,13000325,13000329,13000330,13000333	Watershed Planning	28.4	Riverine, Urban,	13002953	00000005,00000255,00000290,13002953	Yes	$ 250,000	
131000012	13	Nueces	Emergency Management Plan and Flood Hazard Mitigation Plan	Creation of a plan for disaster preparedness to decrease repetitive losses, financial hardship and loss of life.	13000013	Medina	12110107	121101070109,121101070201,121101070202,121101070203,121101070204	13000322,13000325,13000329,13000330,13000333	Preparedness	28.4	Riverine, Urban,	13002953	00000005,00000255,00000290,13002953	Yes	$ 300,000	
131000013	13	Nueces	Feasibility Study for Regional detention	Create a feasibility study for Regional Detention areas to be incorporated into comprehensive drainage planning projects.	13000013	Medina	12110107	121101070109,121101070201,121101070202,121101070203,121101070204	13000322,13000325,13000329,13000330,13000333	Project Planning	28.4	Riverine, Urban,	13002953	00000005,00000255,00000290,13002953	Yes	$ 250,000	
131000014	13	Nueces	City of Natalia Floodplain Study	City wide flood study to evaluate floodplain.	13000010	Medina	12110109	121101090101	13000382	Watershed Planning	1.1	Riverine, Urban,	13002955	00000005,00000255,00000290,00000299,13002955	Yes	$ 48,000	
131000016	13	Nueces	Crystal City City-wide Drainage Study	Crystal City City-wide Drainage Study	13000010	Zavala	12110103,12110104	121101030207,121101040605	13000120,13000167	Watershed Planning	3.6	Riverine, Urban,	13003432	13000092,00000268,00000290,13003432	Yes	$ 250,000	
131000018	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - City of Pleasanton Action #10	reduce flooding and poor drainage by increasing maintenance of existing storm water system.	13000013	Atascosa	12110110	121101100205,121101100206	13000418,13000419	Project Planning	7.6	Riverine, Urban,	13003117	00000096,00000255,00000290,13003117	Yes	$ 3,150,000	
131000019	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #2	Conduct a countywide floodplain study and mapping to understand the limits of the 1% annual chance and 0.2% annual chance floodplain boundaries and their effects on the community, infrastructure and critical facilities.	13000011	Atascosa,Duval,Webb,La Salle,McMullen,Live Oak,Frio	12110105,12110108,12110109,12110110,12110111			Watershed Planning	1162.5	Riverine, Urban,	13000086	13000085,13000086,13000093,00000096,00000255,00000260,00000268,00000290,13000949,13001666	Yes	$ 450,000	
131000020	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #3	Study and prioritize low water crossing improvements	13000003	Atascosa,Duval,Webb,La Salle,McMullen,Live Oak,Frio	12110105,12110108,12110109,12110110,12110111			Project Planning	1162.5	Riverine, Urban,	13000086	13000085,13000086,13000093,00000096,00000255,00000260,00000268,00000290,13000949,13001666	Yes	$ 50,000	
131000021	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #5	Provide FEMA review of floodplain management criteria by ensuring that the community correct NRP program deficiencies and enforces existing ordinances that regular planning and development.	13000016	Atascosa,Duval,Webb,La Salle,McMullen,Live Oak,Frio	12110105,12110108,12110109,12110110,12110111			Project Planning	1162.5	Riverine, Urban,	13000086	13000085,13000086,13000093,00000096,00000255,00000260,00000268,00000290,13000949,13001666	Yes	$ 10,000	
131000022	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #9	Upgrade existing floodplain maps. Add new Atlas 14 rainfall frequency data.	13000013	Atascosa,Wilson,Medina,Bexar,La Salle,McMullen,Live Oak,Frio,Karnes	12110108,12110109,12110110,12100302			Watershed Planning	1214.9	Riverine, Coastal, Urban,	00000096	00000005,00000007,13000086,13000089,13000093,00000096,00000100,00000255,00000260,00000282,00000290,00000299,00000392,13002446,13003116,13003117,13003118,13003214,13003215	Yes	$ 250,000	
131000023	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #10	Upgrade existing floodplain maps. Add new Atlas 14 rainfall frequency data.	13000013, 13000021	Atascosa,Wilson,Medina,Bexar,La Salle,McMullen,Live Oak,Frio,Karnes	12110108,12110109,12110110,12100302			Watershed Planning	1214.9	Riverine, Coastal, Urban,	00000096	00000005,00000007,13000086,13000089,13000093,00000096,00000100,00000255,00000260,00000282,00000290,00000299,00000392,13002446,13003116,13003117,13003118,13003214,13003215	Yes	$ 850,000	

Appendix A.10
Flood Management Strategies Recommended by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Assoc Goals	Counties	HUC8s	HUC12s	Watersheds	Study Type	FME Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need	Estimated Study Cost	Potential Funding Sources
131000024	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - City of Charlotte Action #3	Implement a stormwater plan needing to identify and prioritize projects that will improve drainage in the areas in the city	13000013	Atascosa	12110109,12110110	121101090402,121101090404,121101100401	13000397,13000399,13000426	Project Planning	2.0	Riverine, Urban,	13003214	00000096,00000255,00000290,13003214	Yes	$ 350,000	
131000026	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - City of Christine Action #2	Improve drainage in certain areas of the city that are subject to flooding and conduct a study to identify deficiencies in current land development code for future developments.	13000013	Atascosa	12110110	121101100403,121101100405	13000417,13000428	Project Planning	1.8	Riverine, Urban,	13003215	00000096,00000255,00000290,13003215	Yes	$ 350,000	
131000027	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #12	Identify problem flooding areas within an area drainage study and implement a program to reduce citywide and localized flooding.	13000013	Atascosa	12110110	121101100206,121101100402,121101100405	13000419,13000427,13000428	Project Planning	3.5	Riverine, Urban,	13003116	00000096,00000255,00000290,13003116	Yes	$ 225,000	
131000028	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - City of Lytle Action #11	Develop a stormwater management plan and implement the structural and non-structural solutions to mitigate flooding.	13000013, 13000021	Atascosa,Medina,Bexar	12110110	121101100101	13000405	Project Planning	4.3	Riverine, Coastal, Urban,	13002446	00000005,00000007,00000096,00000255,00000282,00000290,00000299,13002446	Yes	$ 750,000	
131000029	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - City of Lytle Action #4	Enforcement of code and floodplain development is improving with meetings with new businesses.	13000016	Atascosa,Medina,Bexar	12110110	121101100101	13000405	Other	4.3	Riverine, Coastal, Urban,	13002446	00000005,00000007,00000096,00000255,00000282,00000290,00000299,13002446	Yes	$ 30,000	
131000031	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - City of Poteet Action #7	Study and implement findings of study to improve local drainage at Betty Louis and school drive	13000013	Atascosa	12110110	121101100203	13000416	Project Planning	1.7	Riverine, Urban,	13003118	00000096,00000255,00000290,13003118	Yes	$ 38,000	
131000032	13	Nueces	Gilliam Rd Drainage Improvements- FH#9	Install series of underground storm water lines and drop structures along Loma Vista Closed street and Gilliam road near Sewer Treatment Plant tying in to the existing Channel on FM1581.	13000013	Frio	12110106	121101061204	13000293	Project Planning	0.0	Urban,	13003230	13000093,00000255,00000290,13003230	Yes	$ 279,000	
131000033	13	Nueces	CR4001 and I-35 Access Road Drainage- FH#10	Install trapezoidal concrete channel and proposed culvert crossings at the driveways along south of IH-35 access at CR4001 tying into the existing drainage channel 1700 LF south of the intersection of IH-35 access at CR4001.	13000013	Frio	12110106	121101061204	13000293	Project Planning	0.0		13003230	13000093,00000255,00000290,13003230	Yes	$ 530,000	
131000037	13	Nueces	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Construct Storm Drainage Infrastructure (City of Alice)	This action proposes constructing new storm drainage infrastructure to reduce the potential impacts of future flood events.	13000013	Jim Wells	12110204	121102040404,121102040405	13000496,13000513	Project Planning	12.7	Riverine, Urban,	13003128	13000080,00000260,00000290,13001788,13003128	Yes	$ 159,000	
131000039	13	Nueces	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Conduct Dam / Levee Failure Studies (City of Alice)	The City of Alice will work with local dam / levee owners to conduct relevant studies to identify peak flow rates and expected inundations in the event of local dam failures	13000004	Jim Wells	12110204	121102040404,121102040405	13000496,13000513	Project Planning	12.7	Riverine, Urban,	13003128	13000080,00000260,00000290,13001788,13003128	Yes	$ 106,000	
131000040	13	Nueces	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Construct New Levees and Improve Existing System	This action proposes constructing new levees and improving existing ones to reduce the potential impacts of future flood events by reducing the likelihood of levee failure.	13000004	Jim Wells	12110204	121102040404,121102040405	13000496,13000513	Project Planning	12.7	Riverine, Urban,	13003128	13000080,00000260,00000290,13001788,13003128	Yes	$ 159,000	
131000041	13	Nueces	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Construct Storm Drainage Infrastructure (Jim Wells County)	This action proposes constructing new storm drainage infrastructure to reduce the potential impacts of future flood events.	13000013	Brooks,Kleberg, Nueces,Duval,Jim Wells,San Patricio,Live Oak	12110111,12110204,12110205,12110206			Project Planning	868.0	Riverine, Urban,	13000080	13000079,13000080,13000081,13000089,00000260,00000290,13000409,13000585,13000779,13000842,13001666,13001741,13001788,13003127,13003128,13003130,13003131	Yes	$ 159,000	
131000042	13	Nueces	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Purchase Portable Pumps	This action proposes purchasing portable pumps that can be deployed as needed to reduce the potential impacts of future flood events.	13000013	Brooks,Kleberg, Nueces,Duval,Jim Wells,San Patricio,Live Oak	12110111,12110204,12110205,12110206			Project Planning	868.0	Riverine, Urban,	13000080	13000079,13000080,13000081,13000089,00000260,00000290,13000409,13000585,13000779,13000842,13001666,13001741,13001788,13003127,13003128,13003130,13003131	Yes	$ 40,000	
131000043	13	Nueces	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Conduct Dam / Levee Failure Studies (Jim Wells County)	Jim Wells County will work with local dam / levee owners to conduct relevant studies to identify peak flow rates and expected inundations in the event of local dam failures.	13000004	Brooks,Kleberg, Nueces,Duval,Jim Wells,San Patricio,Live Oak	12110111,12110204,12110205,12110206			Project Planning	868.0	Riverine, Urban,	13000080	13000079,13000080,13000081,13000089,00000260,00000290,13000409,13000585,13000779,13000842,13001666,13001741,13001788,13003127,13003128,13003130,13003131	Yes	$ 689,000	
131000044	13	Nueces	Colorado Street Drainage Improvements- FH#1	Install series of underground storm water trunk lines and drop structures along Garcia Street and Colorado Street before outfalling in to trapezoidal channel on S. Puente Street.	13000013	Frio	12110106	121101061204	13000293	Project Planning	0.0	Urban,	13003230	13000093,00000255,00000290,13003230	Yes	$ 571,000	
131000045	13	Nueces	Trinity Street & N Cherry Street Drainage Improvements- FH#2	Install series of underground storm water trunk lines and drop structures along N Cherry street tying in to the existing 2-8'x7' concrete boxes on W San Antonio Street.	13000013	Frio	12110106	121101061204	13000293	Project Planning	0.0	Urban,	13003230	13000093,00000255,00000290,13003230	Yes	$ 1,218,000	

Appendix A.10
Flood Management Strategies Recommended by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Assoc Goals	Counties	HUC8s	HUC12s	Watersheds	Study Type	FME Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need	Estimated Study Cost	Potential Funding Sources
131000046	13	Nueces	W Comal St & FM 1581 Drainage Channel- FH#3	Install trapezoidal concrete channel and upsize existing culverts at the crossing on W Comal Street and W San Antonio street at FM1581 intersections.	13000013	Frio	12110106	121101061204	13000293	Project Planning	0.0	Urban,	13003230	13000093,00000255,00000290,13003230	Yes	$ 86,000	
131000047	13	Nueces	W Pena St and N Mulberry St Drainage Improvements- FH#4	Install series of underground storm water trunk lines and drop structures along Pena street and N Willow street tying into the existing 10'x4' concrete boxes on N Mulberry Street.	13000013	Frio	12110106	121101061204	13000293	Project Planning	0.0	Urban,	13003230	13000093,00000255,00000290,13003230	Yes	$ 529,000	
131000048	13	Nueces	Pearsall RV Park on Guadalupe Street Drainage Improvements- FH#5	Install underground storm water trunk lines and drop structures at the intersection of Powerplant Road and Guadalupe Street carrying drainage to avoid flooding before outfalling in to earthen swale on Powerplant Road.	13000013	Frio	12110106	121101061201	13000307	Project Planning	0.0		13003230	13000093,00000255,00000290,13003230	Yes	$ 367,000	
131000049	13	Nueces	Westview Apartment Detention Pond Underground Drainage- FH#6	Install series of underground storm water trunk lines and drop structures in the alley running along Colorado Street before tying in to the proposed drainage on Garcia Street.	13000013	Frio	12110106	121101061204	13000293	Project Planning	0.0	Urban,	13003230	13000093,00000255,00000290,13003230	Yes	$ 233,000	
131000050	13	Nueces	S Roosevelt Street and E Haynes Avenue Drainage- FH#7	Install series of underground storm water lines and drop structures along S Roosevelt Street and E Carter Street acquiring drainage easement of 27000 SF south west of S Roosevelt Street tying in to the existing earthen channel on S Oak Street.	13000013	Frio	12110106	121101061204	13000293	Project Planning	0.0	Urban,	13003230	13000093,00000255,00000290,13003230	Yes	$ 764,000	
131000051	13	Nueces	N Roosevelt Street and Chapparal Road Drainage- FH#8	Install series of underground storm water lines and drop structures on N Roosevelt Street acquiring drainage easement of 12500 SF north of intersection of S Roosevelt Street and Chapparal Road outfalling to existing earthen swale on Nail Road(CR2015).	13000013	Frio	12110109	121101090204	13000386	Project Planning	0.0	Urban,	13003230	13000093,00000255,00000290,13003230	Yes	$ 749,000	
131000052	13	Nueces	Jourdanton Drainage Improvements and Detention/Retention Ponds	Multiple detention ponds, drainage channel, box culverts improvements near Main St and Terrel Ave, Jourdanton	13000013	Atascosa	12110110	121101100402	13000427	Project Planning	0.1	Riverine, Urban,	13003116	00000096,00000255,00000290,13003116	Yes	$ 226,000	
131000053	13	Nueces	Las Animas Conveyance Infrastructure	Channel improvements to system near Las Animas Creek to improve conveyance - Upsize culverts on Palacios St and S Benavides St - Improve conveyance capacity under bridges on HWY 359 and HWY 339 - Procurement of easements and rights-of-ways	13000013	Duval	12110204	121102040103,121102040102,121102040105	13000484,13000489,13000490	Project Planning	4.1	Riverine, Urban,	13003410,13000079	13000079,00000260,13001666,13003410	Yes	$ 150,000	
131000054	13	Nueces	Benavides Main City Network	Improvements to the Drainage System in Central Benavides	13000013	Duval	12110204	121102040103,121102040102,121102040105	13000484,13000489,13000490	Project Planning	4.1	Riverine, Urban,	13003410,13000079	13000079,00000260,13001666,13003410	Yes	$ 150,000	
131000055	13	Nueces	Upsize Burch St Crossing	Increase the capacity on Burch Street by adding a second 36-inch culvert under the road. - Increase culvert capacity on Burch St and other undersized crossings - Channel improvements along the main earthen channel "	13000013	Duval	12110105,12110204	121101051001,121101051002,121102040301,121102040302	13000224,13000226,13000500,13000503	Project Planning	5.6	Urban,	13003411,13000079	13000079,00000260,00000290,13001665,13001666,13003411	Yes	$ 80,000	
131000056	13	Nueces	Northern San Diego Street Conveyance Improvement	Improvements to street overland drainage system - Curb and gutter replacement - Improve conveyance by road paving and regrading of prioritized streets "	13000013	Duval,Jim Wells	12110204	121102040304,121102040309,121102040310	13000505,13000508,13000509	Project Planning	1.7	Riverine, Urban,	13003127,13000079	13000079,13000080,00000260,00000290,13001666,13001741,13003127	Yes	$ 250,000	
131000057	13	Nueces	Northern San Diego Drainage Improvement Project	Drainage improvements to subsurface drainage systems - installation of new underground drainage infrastructure along Luby street; expansion and improvements to Dix Street System	13000013	Duval,Jim Wells	12110204	121102040404,121102040202,121102040304,121102040309,121102040310,121102040403,121102040405	13000496,13000498,13000505,13000508,13000509,13000512,13000513	Project Planning	26.2	Riverine, Urban,	13003127,13000079	13000079,13000080,00000260,00000290,13001666,13001741,13003127	Yes	$ 250,000	
131000058	13	Nueces	Realitos Drainage Improvements	Improvements to surface and subsurface infrastructure of Realitos Drainage System	13000013	Duval	12110205	121102050306,121102050305,121102050307	13000522,13000550,13000551	Project Planning	4.7	Riverine, Urban,	13000079	13000079,00000260,13001666	Yes	$ 150,000	
131000059	13	Nueces	Concepcion Drainage Improvements	Improvements to drainage infrastructure in Concepcion	13000013	Duval	12110205	121102050204,121102050307,121102050401	13000521,13000551,13000552	Project Planning	4.2	Riverine, Urban,	13000079	13000079,00000260,13001666	Yes	$ 150,000	
131000060	13	Nueces	Improvements to Drainage Connectivity along Railroad	Improvement to underground drainage system to increase capacity and improve conveyance on railroad under-crossings and on sections of Highway 44 to improve stormwater drainage from north to south	13000013	Duval,Jim Wells	12110204	121102040404,121102040309,121102040310,121102040405	13000496,13000508,13000509,13000513	Project Planning	0.2	Riverine, Urban,	13003127,13000079	13000079,13000080,00000260,00000290,13001666,13001741,13003127	Yes	$ 250,000	
131000061	13	Nueces	Improvements to San Diego Levee Outfall System	Improvements to outfall structures and appurtenances along San Diego Levee System	13000013	Duval,Jim Wells	12110204	121102040304,121102040309,121102040310	13000505,13000508,13000509	Project Planning	0.1	Riverine,	13003127,13000079	13000079,13000080,00000260,00000290,13001666,13001741,13003127	Yes	$ 250,000	
131000062	13	Nueces	Southern San Diego Drainage Improvement Project	New underground stormwater collection system along Collins Street, including interconnections between existing and new infrastructure.	13000013	Duval,Jim Wells	12110204	121102040404,121102040202,121102040304,121102040309,121102040310,121102040403,121102040405	13000496,13000498,13000505,13000508,13000509,13000512,13000513	Project Planning	26.2	Riverine, Urban,	13003127,13000079	13000079,13000080,00000260,00000290,13001666,13001741,13003127	Yes	$ 250,000	
131000063	13	Nueces	Lattas Creek Improvements	Concrete line Lattas Creek to improved drainage capacity.	13000013	Jim Wells	12110204	121102040405	13000513	Project Planning	1.3	Riverine, Urban,	13003128	13000080,00000260,00000290,13001788,13003128	Yes	$ 150,000	
131000064	13	Nueces	Burnt Boot Creek Drainage Improvement Project	Two-phase project to improve drainage at Burnt Boot Creek in Devine, TX.	13000013	Medina	12110109	121101090103	13000380	Project Planning	0.0	Riverine,	13003378	00000005,00000255,00000290,13003378	Yes	$ 506,000	

Appendix A.10
Flood Management Strategies Recommended by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Assoc Goals	Counties	HUC8s	HUC12s	Watersheds	Study Type	FME Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need	Estimated Study Cost	Potential Funding Sources
131000065	13	Nueces	Uvalde City-wide Drainage Study	Uvalde City-wide Drainage study to further define existing flood risk and to recommend flood risk reduction measures.	13000013	Uvalde	12110106	121101060904,121101060903,121101060901,121101060902	13000278,13000285,13000316,13000317	Watershed Planning	7.3	Riverine, Urban,	13002952	13000001,00000268,00000290,13002952,13003452	Yes	$ 250,000	
131000066	13	Nueces	Martin Branch Drainage Study	Martin Branch Drainage Study to evaluate existing flood risk for multiple roadway crossings and potential structural flooding along Martin Branch, just north of Dilley	13000013	Frio	12110106,12110108	121101061106,121101061205,121101080205,121101080102	13000281,13000318,13000370,13000375	Watershed Planning	10.1	Riverine, Urban,	13000093	13000093,00000255,00000290,13003073,13003452	Yes	$ 150,000	
131000067	13	Nueces	City of Falfurrias City-Wide Flood Study	City wide flood study to evaluate floodplain is required in the City of Falfurrias.	13000013	Brooks	12110205,12110206	121102050404,121102060304	13000556,13000569	Project Planning	2.8	Riverine,	13003038	00000073,00000260,13003038,13003452	Yes	$ 250,000	
131000068	13	Nueces	William's Drive Drainage Improvements Phase 2 - Lexington to Ennis Joslin	Study to determine appropriate alternatives to increase capacity of existing William's Ditch from Lexington Road to Ennis Joslin Road.	13000012	Nueces	12110202	121102020106	13000609	Project Planning	0.0	Riverine, Urban,	13002900	13000078,00000260,00000290,13000409,13002900	Yes	$ 138,000	
131000069	13	Nueces	William's Drive Drainage Improvements Phase 3 - Rodd Field to Lexington	Study to determine appropriate alternatives to increase capacity of existing William's Ditch from Rodd Field Road to Lexington Road, as well as to acquire Right of Way (ROW) at William's Drive to implement these drainage improvements.	13000014	Nueces	12110202	121102020106	13000609	Project Planning	0.0	Riverine, Urban,	13002900	13000078,00000260,00000290,13000409,13002900	Yes	$ 293,000	
131000070	13	Nueces	Downtown Rockport Drainage Study	Design and conduct an engineering study to address flooding in downtown Rockport	13000014	Aransas	12100405	121004050400	13000592	Project Planning	0.2	Riverine, Coastal,	13003451	00000083,00000260,13000381,13000586,13003451	Yes	$ 1,090,000	
131000071	13	Nueces	Easement Outfall Loop 70 & Shell Ridge Rd	Purchase Drainage easement and construct outfall ditch south of Church St.	13000010	Aransas	12100405	121004050400	13000592	Project Planning	0.0	Coastal,	13003451	00000083,00000260,13000586,13003451	Yes	$ 250,000	
131000072	13	Nueces	Rockport County Club Lakes	RCC Lakes - Upgrade drainage system and increase the capacity of the lakes within the Rockport County Club	13000014	Aransas	12100405	121004050400	13000592	Project Planning	0.1	Urban,	13003451	00000083,00000260,13000586,13003451	Yes	$ 62,000	
131000073	13	Nueces	Poesta Creek Drainage Improvements	Poesta creek drainage project. Complete concrete lining of drainage ditch from St. Marys to Hwy 181. A portion of the project has been completed from Adams street to South Jackson.	13000014	Bee	12100407	121004070101	13000032	Project Planning	0.2	Riverine,	13002711	13000087,00000260,13001488,13002711	Yes	$ 169,000	
131000074	13	Nueces	Ave A 4th Street Extension	Secure drainage ROWs along Ave. A near 4th to South of 6th St. Design underground and/or open channel system improve drainage. This section of Avenue A has is often inundated by heavy rains due to poor drainage, cutting off access to area residences.	13000013	San Patricio	12110201	121102010003	13000481	Project Planning	0.0	Urban,	13002930	13000081,00000260,00000290,13000409,13000585,13000586,13002930	Yes	$ 750,000	
131000075	13	Nueces	Avenue B Drainage Channel Extension and Outfall Improvements	Storm sewer replacement between Humble Ave. and Mustang Ave.as well as between Mustang Ave. and Ave. B channel. Improvements from 5th St., 6th St., 7th St., and 8th St. into the improved Ave. B channel, and downstream channel excavation.	13000013	San Patricio	12110201	121102010003	13000481	Project Planning	0.1	Riverine, Urban,	13002930	13000081,00000260,00000290,13000409,13000585,13000586,13002930	Yes	$ 750,000	
131000076	13	Nueces	Ave A & 8th St Drainage Improvements	Drainage improvements along Avenue A from south of 6th Street, south to 8th Street, and west along 8th Street to the existing drainage channel.	13000014	San Patricio	12110201	121102010003	13000481	Project Planning	0.0		13002930	13000081,00000260,00000290,13000409,13000585,13000586,13002930	Yes	$ 231,000	
131000077	13	Nueces	Wright Avenue Drainage Improvements	Easement Acquisition and construction of two channels between Wright Ave. and McCampbell Slough; channel widening from the north side of the existing hotel properties to the west and tie-in with McCampbell slough. Addresses Nystrom Property area flooding.	13000014	San Patricio	12100405	121004050204	13000596	Project Planning	0.0	Riverine,	13002930	13000081,00000260,00000290,13000409,13000585,13000586,13002930	Yes	$ 60,000	
131000078	13	Nueces	Airport Rd - Recurring Flooding & Project Location	Improved drainage to reduce disruptions due to flooding in the vicinity of the Live Oak County Airport. The area surrounding the airport is subject to flood inundation, thereby cutting off access to the airport and also on the future runway extension.	13000014	Live Oak	12110111	121101110204	13000472	Project Planning	0.1	Riverine, Urban,	13000089	13000089,00000260,00000290	Yes	$ 13,000	
131000079	13	Nueces	Drainage improvements at Mission River Park in Refugio	Reduce flooding at Mission River Park in Refugio.	13000013	Refugio	12100406	121004060301	13000022	Project Planning	0.0	Riverine,	13003123	00000084,00000260,00000291,00000714,00000758,13003123	Yes	$ 100,000	
131000080	13	Nueces	Humble Channel Drainage Improvements & Ditch Extension	Reduce flooding in the residential area of Ingleside located to the east of Emory Bellard Dr. via improvements to Humble Channel Outfall, installation of crossings at Emory Ballard Dr., acquisition of easements, and excavation of new drainage ditches.	13000014	San Patricio	12110201	121102010003	13000481	Project Planning	0.1	Coastal, Urban,	13000585	13000081,00000260,00000290,13000409,13000585,13000586,13002930	Yes	$ 281,000	
131000081	13	Nueces	Drainage Improvements to Outfall Channel - Lateral AN	Reduce flooding in NE part of Taft. The project will widen and deepen the Main Lateral AN; replace bridge crossings at FM 631, CR 102, CR 77, and CR 81; and armor the ditch section between FM 693 and CR 102 to improve runoff through this section of ditch.	13000014	San Patricio	12100407	121004070403	13000043	Project Planning	0.1	Riverine, Urban,	13000585	13000081,00000260,00000290,13000409,13000585,13000586,13002882	Yes	$ 760,000	

Appendix A.10
Flood Management Strategies Recommended by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Assoc Goals	Counties	HUC8s	HUC12s	Watersheds	Study Type	FME Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need	Estimated Study Cost	Potential Funding Sources
131000082	13	Nueces	Drainage Improvements & Ditch Extension for Outfall Channel - Lateral AS	Reduce flooding in northern residential area of Gregory. Project includes drainage easement acquisition and excavation, culvert installation at FM 3284, CR 106, and FM 136, excavation of Main Lateral AS, armoring of ditch sections prone to erosion.	13000014	San Patricio	12100407,12100405	121004070403,121004050203	13000043,13000594	Project Planning	0.1	Riverine, Urban,	13000585	13000081,00000260,00000290,13000409,13000585,13000586,13002558	Yes	$ 871,000	
131000083	13	Nueces	Fulton Drainage Master Plan	New stormwater master plan that includes a capital improvement plan	13000014	Aransas	12100405	121004050400,121004050204	13000592,13000596	Watershed Planning	1.3	Riverine, Coastal, Urban,	13003450	00000083,00000260,13000381,13000586,13003450,13003451	Yes	$ 188,000	
131000084	13	Nueces	Euclid Stormwater Pump Station Improvements	Pump house is at risk of notable damage due to hurricane winds and flooding during large rain events, and it's capacity is undersized for peak flood flows. Improvements needed to improve maintenance access, flood resiliency, and to facilitate more pumps.	13000014, 13000016	San Patricio	12100405	121004050400	13000592	Project Planning	0.0	Coastal, Urban,	13002735	13000081,00000260,00000290,13000409,13000576,13000585,13000586,13002735	Yes	$ 900,000	
131000085	13	Nueces	Modify Pump Station Outfalls	Modify outfalls of pump station that pump into Aransas Bay at Murray, Morgan, Lamar, Corpus Christi and 1st St. Raise outfall so above sea level to reduce backwater effect on the system.	13000014	Aransas	12100405	121004050400	13000592	Project Planning	0.0	Coastal,	13003451	00000083,00000260,13000381,13000586,13003451	Yes	$ 327,000	
131000086	13	Nueces	Oso Creek Channel Bottom Rectification and Green Infrastructure	Planning and Design for Oso Creek and it's contributing channels to remove channel bottom irregularities, study inclusion of green infrastructure BMPS, improve conveyance and capacity, implement soil stabilization near infrastructure, remove debris.	13000014	Nueces	12110202	121102020106,121102020104,121102020105,121102020103	13000609,13000610, 13000612,13000614	Project Planning	1.6	Riverine, Coastal,	13002900	13000078,00000260,00000290,13000409,13002900	Yes	$ 4,751,000	TWDB Loan
131000087	13	Nueces	Brawner Outfall Improvements	Inspect the Brawner Outfall system and assess needed repairs, design improvements, and construct necessary repairs and upgrades to accommodate future flows to prevent flooding and improve water quality.	13000014, 13000020	Nueces	12110202	121102020200,121102020106	13000608,13000609	Project Planning	0.0	Coastal, Urban,	13002900	13000078,00000260,00000290,13000409,13002900	Yes	$ 459,000	
131000088	13	Nueces	Greenwood WWTP Flood Mitigation and Emergency Generator	Greenwood Wastewater Treatment Plant improvements include site grading, piping, floodway improvements, plant structure flood walls, new effluent pump station, and two electrical generators. Scope includes design and construction.	13000013	Nueces	12110202	121102020103	13000614	Project Planning	0.0	Riverine,	13002900	13000078,00000260,00000290,13000409,13002900	Yes	$ 2,126,000	
131000089	13	Nueces	Wesley Seale Dam Inspection	This project is for the detailed inspection of the Wesley Seale Dam structure and system components.	13000014	Jim Wells,San Patricio	12110111	121101110605,121101110701	13000466,13000467	Project Planning	0.0	Riverine,	13002900	13000080,13000081,00000260,00000290,13000409,13000585	Yes	$ 375,000	
131000090	13	Nueces	Corpus Christi Police Headquarters Flood Proofing	COASTAL BEND MITIGATION ACTION PLAN - NU - 33 - The automatic generator transfer switch is located in a control room on the ground floor of the building, which is in an area vulnerable to street flooding. Project intends to elevate power transfer switch.	13000005	Nueces	12110202	121102020106	13000609,13000618	Project Planning	0.0	Other,	13002900	13000078,00000260,00000290,13000409,13001739,13002900	Yes	$ 7,000	
131000091	13	Nueces	Upper Tule Storm Drain System	Install storm drainage system with capacity to reduce current flooding and capacity for future development.	13000013	Aransas	12100405	121004050400,121004050204	13000592,13000596	Project Planning	0.6	Urban,	00000083	00000083,00000260,13000586,13003451	Yes	$ 2,000,000	
131000092	13	Nueces	601 Racine Street Easement & Outfall Project	Acquire drainage easements in natural wetlands and construct new outfalls.	13000014	Aransas	12100405	121004050400	13000592	Project Planning	0.0	Urban,	00000083	00000083,00000260,13000586,13003451	Yes	$ 75,000	
131000093	13	Nueces	Club Lake Drainage Channel	Construct drainage channel from Club Lake to FM 1069. Most easements have been acquired; still negotiating with one property owner and condemnation likely required for another property	13000020	Aransas	12100405	121004050204	13000596	Project Planning	0.0	Riverine, Coastal,	00000083	00000083,00000260	Yes	$ 300,000	
131000094	13	Nueces	Holiday Beach East Drainage System Improvement	Construct outfall east to Aransas Wildlife Refuge and construct outfall west to HWY 35 Bypass. Construct culvert under Hwy 35 Bypass. Improve drainage channel from Hwy 35 Bypass to Copano Bay.	13000014	Aransas	12100405	121004050103	13000607	Project Planning	0.0	Riverine, Coastal,	00000083	00000083,00000260,13000727	Yes	$ 300,000	
131000095	13	Nueces	Sparks Colony Drainage Improvements	Construct drainage channel from Rattlesnake Point Road to Bailey Ranch. Project partially constructed, but easements still needed from two property owners.	13000014	Aransas	12100405	121004050204	13000596	Project Planning	0.0	Riverine, Coastal,	00000083	00000083,00000260	Yes	$ 225,000	
131000096	13	Nueces	Lee Road Drainage Improvements	Secure drainage easements and construct drainage channel from Lee Road to Hwy 35-BUS.	13000014	Aransas	12100405	121004050400	13000592	Project Planning	0.0	Riverine, Coastal,	00000083	00000083,00000260	Yes	$ 150,000	
131000097	13	Nueces	Mohawk Ave Drainage Improvements	Construct drainage channel to connect existing ponds (supported by property owner)	13000014	Aransas	12100405	121004050400	13000592	Project Planning	0.0	Riverine, Coastal,	00000083	00000083,00000260	Yes	$ 300,000	
131000098	13	Nueces	Nell Road Drainage Improvements	Construct drainage channel from Nell Road to outfall (route undefined).	13000014	Aransas	12100405	121004050400	13000592	Project Planning	0.0	Riverine,	00000083	00000083,00000260	Yes	$ 150,000	

Appendix A.10
Flood Management Strategies Recommended by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Assoc Goals	Counties	HUC8s	HUC12s	Watersheds	Study Type	FME Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need	Estimated Study Cost	Potential Funding Sources
131000099	13	Nueces	Mack Road Drainage Improvements	Construct drainage channel from Hwy 35 Bypass to Port Bay. Easements needed from three property owners.	13000014	Aransas	12100405	121004050400	13000592	Project Planning	0.0	Riverine, Coastal,	00000083	00000083,00000260	Yes	$ 300,000	
131000100	13	Nueces	Bee Road Drainage Improvements	Construct drainage channel from Hwy 35 Bypass to Port Bay. Easements needed from three property owners	13000014	Aransas	12100405	121004050204	13000596	Project Planning	0.0	Riverine, Coastal,	00000083	00000083,00000260	Yes	$ 225,000	
131000101	13	Nueces	Stormwater Master Plan #1 - North of Parkview between Starlight and Sunset Outfall Pipe	Positive drainage to Parkview Place to be improved by minor site regrading, grate inlet installation, and installation of RCP along Sunset Drive, as well as the alley that runs parallel to the West. Alley drainage improvement to connect to existing inlet.	13000014	San Patricio	12110201	121102010003	13000481	Project Planning	0.0		13003248	13000081,00000260,00000290,13000409,13000585,13000586,13003248	Yes	$ 11,000	
131000102	13	Nueces	Stormwater Master Plan #2 - North of Parkview between Sunset and Woodhaven Outfall Pipe	Positive drainage to Parkview Place to be improved by minor site regrading, grate inlet installation, and installation of RCP along Woodhaven Drive. Improvement to be connected to existing storm pipe via junction box.	13000014	San Patricio	12110201	121102010003	13000481	Project Planning	0.0	Riverine, Urban,	13003248	13000081,00000260,00000290,13000409,13000585,13000586,13002930,13003248	Yes	$ 7,000	
131000103	13	Nueces	Stormwater Master Plan #3 - North of Post Oak between Starlight and Sunset Outfall	Positive drainage to Post Oak Drive to be improved by minor site regrading along alley between Starlight Drive and Sunset Drive.	13000014	San Patricio	12110201	121102010003	13000481	Project Planning	0.0		13003248	13000081,00000260,00000290,13000409,13000585,13003248	Yes	$ 4,000	
131000104	13	Nueces	Stormwater Master Plan #4 - North of Post Oak between Sunset and Woodhaven Outfall	Positive drainage to Post Oak Drive and Retama Drive to be improved by minor site regrading, grate inlet installation, and installation of RCP along alley between Woodhaven Drive and Sunset Drive. Improvements to connect to existing inlet.	13000014	San Patricio	12110201	121102010003	13000481	Project Planning	0.0		13003248	13000081,00000260,00000290,13000409,13000585,13003248	Yes	$ 11,000	
131000105	13	Nueces	Stormwater Master Plan #5 - North of Ebony between Starlight and Sunset Outfall	Positive drainage to Ebony Street to be improved by minor site regrading, grate inlet installation, and installation of RCP along alley between Starlight Drive and Sunset Drive. Site regrade and installation of RCP will also take place on Ebony Street.	13000014	San Patricio	12110201	121102010003	13000481	Project Planning	0.0		13003248	13000081,00000260,00000290,13000409,13000585,13003248	Yes	$ 12,000	
131000106	13	Nueces	Stormwater Master Plan #6 - Live Oak/Ebony and Woodhaven Improvements and Outfall	Ponding to be reduced by minor regrading, installation of new standpipes with low flow outlets, and implementation of sediment filters around existing inlets. Installation of RCB along Live Oak St. and RCP along Woodhaven Dr. and Ebony Dr. to be included.	13000014	San Patricio	12110201	121102010003	13000481	Project Planning	0.0	Coastal,	13003248	13000081,00000260,00000290,13000409,13000585,13003248	Yes	$ 44,000	
131000107	13	Nueces	Stormwater Master Plan #7 - Bayshore East Channel and Culvert Improvements	Positive drainage from stormwater ditch to bay to be improved by site and channel regrading and installation of RCP to provide direct outfalls for low lying areas to the bay.	13000014	San Patricio	12110201	121102010003,121102010005	13000481,13000482	Project Planning	0.0	Coastal,	13003248	13000081,00000260,00000290,13000409,13000585,13002900,13003248	Yes	$ 47,000	
131000108	13	Nueces	Stormwater Master Plan #8 - Bayshore East Outfall	Positive drainage from stormwater ditch to bay to be improved by site and channel regrading and installation of RCP to provide direct outfalls for low lying areas to the bay.	13000014	San Patricio	12110201	121102010003,121102010005	13000481,13000482	Project Planning	0.0	Coastal,	13003248	13000078,13000081,00000260,00000290,13000409,13000585,13002900,13003248	Yes	$ 14,000	
131000109	13	Nueces	Stormwater Master Plan #9 - Bayshore Court Outfall	Positive drainage from stormwater ditch to bay to be improved by site and channel regrading and installation of RCP to provide direct outfalls for low lying areas to the bay.	13000014	San Patricio	12110201	121102010003	13000481	Project Planning	0.0	Coastal,	13003248	13000081,00000260,00000290,13000409,13000585,13003248	Yes	$ 14,000	
131000111	13	Nueces	FM1356 Channel Improvements	Increase the capacity of the channel just north of Paulson Falls. This is one of the main entrances to the naval air station.	13000007	Kleberg	12110204	121102040206,121102040409,121102040410	13000483,13000497,13000515	Project Planning	0.0	Riverine, Urban,	13002378	13000077,00000260,13000779,13002378	Yes	$ 100,000	
131000112	13	Nueces	Paulson Falls Subdivision Detention Pond Improvements	Paulson Falls Subdivision has detention ponds, but the berm has deteriorated.	13000014	Kleberg	12110204	121102040206	13000483	Project Planning	0.0	Urban,	13002378	13000077,00000260,13000779,13002378	Yes	$ 100,000	
131000113	13	Nueces	Lang Road Drainage Ditch and Outfall	This is the location of a future project a drainage ditch is needed to alleviate flooding created by increased development. The ditch would run south from Lang Road to the bay.	13000014	San Patricio	12110201	121102010002	13000480	Project Planning	0.0	Coastal, Urban,	13003233	13000081,00000260,00000290,13000409,13000585,13000586,13003233	Yes	$ 100,000	
131000114	13	Nueces	Madison St Low Water Crossing Replacement Project	Madison St Low Water crossing replacement	13000014	Bee	12100407	121004070101	13000032	Project Planning	0.0	Riverine,	13002711	13000087,00000260,13001488,13002711	Yes	$ 192,000	
131000115	13	Nueces	County Road 6- North Carreta Creek Drainage Improvements	Restoration project to bring this section of North Carreta creek (located between CR6 and Meadowbrook Road) back to its original elevation as built by USDA Soil Conservation Service in 1960. Located in Bishop, TX.	13000003	Nueces	12110204	121102040408	13000516	Project Planning	0.0	Riverine,	13000078	13000078,00000260,00000290,13000409,13000779,13002388	Yes	$ 100,000	
131000116	13	Nueces	Tierra Grande Subdivision Drainage Improvements Feasibility Study	Hydrological and Hydraulic Study to provide drainage solutions to reduce flooding within the subdivision due to existing hydrological flow patterns from regional, upgradient, and local runoff drainage areas flowing toward the center of the subdivision.	13000020	Nueces	12110205,12110202	121102050607,121102020102	13000563,13000613	Watershed Planning	0.8	Urban,	13000078, Town of Tierra Grande	13000078,00000260,00000290,13000409,13000940,13002390	Yes	$ 250,000	

Appendix A.10
Flood Management Strategies Recommended by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Assoc Goals	Counties	HUC8s	HUC12s	Watersheds	Study Type	FME Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need	Estimated Study Cost	Potential Funding Sources
131000117	13	Nueces	Aransas National Wildlife Refuge Dagger Point Shoreline Preservation	Texas Coastal Resiliency Master Plan - R3-3 Project would install a living shoreline using breakwaters. This project would help protect the shoreline along Dagger Pointas well as nearby critical habitat and public infrastructure.	13000014	Aransas	12100404	121004040000		Project Planning	0.1		Coastal Bend Bays and Estuaries Program, U.S. Fish and Wildlife Service, Aransas National Wildlife Refuge, U.S. Department of the Interior	00000083,00000260,00000264,00000291	Yes	$ 398,000	
131000118	13	Nueces	Nueces River Delta Shoreline Stabilization	Texas Coastal Resiliency Master Plan - R3-15 The project would include the construction of breakwaters along approximately 3,900 linear feet of shoreline at the Nueces River Delta to dissipate wave energy that is causing estuarine wetland loss	13000020	Nueces,San Patricio	12110201	121102010001,121102010004	13000479,13000624	Project Planning	0.0	Coastal,	Coastal Bend Bays and Estuaries Program, Texas General Land Office	13000078,13000081,00000260,00000290,13000409,13000585,13002900	Yes	$ 536,000	
131000119	13	Nueces	Silver Creek Bridge	COASTAL BEND MITIGATION ACTION PLAN - BE - 03 Silver Creek Rd. Build a 26 ft. wide by 100 ft. long bridge 100. The low water crossing at Silver Creek Rd., across silver creek, floods during and after heavy rains, trapping approximately 30 residents.	13000021	Bee	12100407	121004070203	13000037	Project Planning	0.0	Riverine,	13000087	13000087,00000260	Yes	$ 47,000	
131000120	13	Nueces	Redfish Bay Protection and Enhancement	Coastal Texas Protection and Restoration Feasibility Study - SP1 Restoration of the Dagger, Ransom, and Stedman Island complex via introduction of breakwater and supporting reefballs along the backside of Redfish Bay and on the bayside of the islands.	13000001	Nueces,San Patricio	12100405	121004050400	13000592	Project Planning	5.8	Riverine, Coastal,	Texas General Land Office	13000078,13000081,00000260,00000290,13000409,13000576,13000585,13000586,13000981,13002735	Yes	$ 51,613,000	TX GLO
131000121	13	Nueces	Pelican Cove Sea Gate Replacement	Improve the Pelican Cove sea gates for easier installment & removal. To prevent rising water into the City, existing huge metal gates are lowered into concrete frames with a 10 ton crane. Post storm surge, high water levels make gate removal difficult.	13000019, 13000020	San Patricio	12100405	121004050400	13000592	Project Planning	0.0	Coastal,	13002735	13000081,00000260,00000290,13000409,13000576,13000585,13000586,13002735	Yes	$ 47,000	
131000122	13	Nueces	Port Aransas Nature Preserve Stabilization and Restoration	Repair of ship channel revetment breaches on northern Mustang Island; Constructing living shoreline near the ship channel; Rebuilding marsh/wetland habitat; Repair of Charlie's Pasture bulkhead; and Permitting this site for elevation via dredged material.	13000013	Nueces	12110202	121102020200	13000608	Project Planning	3.5	Riverine, Coastal,	13003368,13000409	13000078,00000260,00000290,13000409,13000981,13002900,13003368	Yes	$ 680,000	
131000123	13	Nueces	Conn Brown Harbor Bulkhead Improvements	Install bulkheads at Conn Brown Harbor to protect new and existing buildings and infrastructure.	13000020	Nueces,San Patricio,Aransas	12100405	121004050400	13000592	Project Planning	0.0	Riverine, Coastal,	13002735	13000078,13000081,00000083,00000260,00000290,13000409,13000576,13000585,13000586,13000981,13002735	Yes	$ 164,000	Regular Department Budget; Future Bond, USACE Continuing Authorities, FEMA
131000124	13	Nueces	City of Three Rivers City-Wide Drainage Study	City of Three Rivers City-Wide Drainage Study. Study to specifically focus on flood risk in the Hackberry Creek and Frio River watershed.	13000016, 13000021	Live Oak	12110108,12110111	121101080506,121101110101	13000349,13000444	Watershed Planning	1.5	Riverine, Urban,	13002540	13000089,00000260,00000290,13000851,13002540	Yes	$ 250,000	
131000125	13	Nueces	County Wide Drainage Master Plan Study	Drainage Master Planning Study - Bee County	13000011	San Patricio,Refugio, Bee,Live Oak,Goliad,Karnes	12100406,12100407,12110111			Watershed Planning	878.8	Riverine, Urban,	13000087	13000087,13000089,00000090,00000095,00000255,00000260,00000264,00000282,00000290,13000409,13000585,00000714,00000758,13001487,13001488,13002711	Yes	$ 500,000	
131000126	13	Nueces	Beeville City-wide Drainage Study	Beeville City-wide Drainage Study	13000011	Bee	12100407	121004070102,121004070101,121004070103	13000029,13000032, 13000033	Watershed Planning	6.4	Riverine, Urban,	13002711	13000087,00000260,13001488,13002711	Yes	$ 250,000	
131000128	13	Nueces	Citywide Stormwater Drainage Improvements - Gregory	Improving TXDOT road drainage ditches & railroad undercrossings conveyance; armor ditch crossing US-181 and I-35 (South of city); city ditch restoration; expand stormwater network to unserved residential areas; maintenance of curbs, gutters, and inlets	13000013, 13000026	Nueces,Jim Wells,San Patricio,Aransas, Refugio,Bee,Live Oak	12100407,12110111,12110201,12100405			Project Planning	704.8	Riverine, Coastal, Urban,	13002558	00000260,00000290,00000291,13000081,13000409,13000585,13000586,13000972,13002864,13002882,13003233,13003412	Yes	$ 250,000	

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FME ID	RFPG No.	RFPG Name	FME Name	Description	Assoc Goals	Counties	HUC8s	HUC12s	Watersheds	Study Type	FME Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need	Estimated Study Cost	Potential Funding Sources
131000130	13	Nueces	Portland Stream Gauges	San Patricio County Hazard Mitigation Action Plan - City of Portland, Action #5 Identify and install stream and rain gauges at critical sites, upgrade gauges at established sites where necessary, coordinate installation requests.	13000013	Nueces,San Patricio	12100407,12110201	121004070403,121102010002,121102010003,121102010005,121102010004	13000043,13000480,13000481,13000482,13000624	Project Planning	15.1	Riverine, Coastal, Urban,	13003233	13000078,13000081,00000260,00000290,13000409,13000585,13000586,13002900,13003233	Yes	$ 2,000	
131000131	13	Nueces	Citywide Stormwater Drainage Improvements - Taft	Expanding the current stormwater network in residential areas. Reconstructing/regrading the roads to allow water to flow in the natural drainage direction instead of ponding.	13000007	San Patricio	12100407	121004070403,121004070305	13000043,13000044	Project Planning	1.7	Riverine, Coastal, Urban,	13002882	13000081,00000260,00000290,13000409,13000585,13000586,13002882	Yes	$ 150,000	
131000132	13	Nueces	City of Taft Flood Study	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #6 Complete a comprehensive flood study for FEMA flood mapping. Adopt higher floodplain development standards, above th e minimum required based on the results of the flood stud y.	13000014	San Patricio	12100407	121004070403,121004070305	13000043,13000044	Watershed Planning	1.7	Riverine, Coastal, Urban,	13002882	13000081,00000260,00000290,13000409,13000585,13000586,13002882	Yes	$ 82,000	
131000133	13	Nueces	Webb County Becerra Creek Headwater Flood Study	Flood study to define existing flood risk and potential flood risk reduction projects for subdivisions located in the vicinity of Highway 59.	13000007, 13000010	Webb	12110105	121101050601	13000180	Watershed Planning	5.1	Riverine, Urban,	00000082	00000082,00000276,00001609,13003452	Yes	$ 120,000	
131000134	13	Nueces	Aransas County Flood Response Plan	Aransas County Multi-Jurisdictional Floodplain Management Plan - Action 3.1.f: A flood response plan that will identify outreach projects that can be utilized to implement a flood information program.	13000014	Nueces,San Patricio,Aransas, Refugio	12100404,12100407,12100403,12100405	121004040000,121004070404,121004070402,121004030200,121004050400,121004050203,121004050305,121004050204,121004050304,121004050306,121004050307,121004050308,121004050303,121004050205,121004050302,121004050102,121004050103,121004050500	13000026,13000028,13000592,13000594,13000595,13000596,13000597,13000598,13000599,13000600,13000602,13000603,13000606,13000607,13000627	Other	281.8	Riverine, Coastal, Urban,	00000083	13000078,13000081,00000083,00000084,00000260,00000264,00000290,00000291,13000381,13000409,13000576,13000585,13000586,13000714,13000727,00000758,13000881,13000981,13001044,00001608,13002735,13002900,13003368,13003450,13003451	Yes	$ 50,000	Unknown
131000135	13	Nueces	Purchase Land Behind Aransas Pass Levees	Purchase land behind levees to prevent people from building in a floodplain area. This will allow the City to use this land for preventing further flooding.	13000024	San Patricio,Aransas	12100405	121004050400	13000592	Other	0.4	Riverine, Coastal,	13002735	13000078,13000081,00000083,00000260,00000290,13000409,13000576,13000585,13000586,13002735	Yes	$ 82,000	HMGP, Regular Department Budget, FMA, USACE, Emergency Response.
131000136	13	Nueces	San Patricio County Repetitive Loss Property Reduction	San Patricio County Hazard Mitigation Action Plan - San Patricio County, County Wide, Action #1: Identify and implement actions such as flood proofing, elevation, acquisition, relocation, and retrofitting to reduce risk for repetitive loss properties.	13000020	Nueces,Jim Wells,San Patricio,Aransas, Refugio,Bee,Live Oak	12100407,12110111,12110201,12100405			Other	704.8	Riverine, Coastal, Urban,	13000081	00000260,00000290,00000291,13000081,13000409,13000585,13000586,13000972,13002864,13002882,13003233,13003412	Yes	$ 795,000	
131000137	13	Nueces	Aransas Pass Homeowner Buyout Program	Develop and implement a buyout program. The purpose is to buy out land owners in areas that have had repeated monetary lose due to storm flooding.	13000013, 13000021	Nueces,San Patricio,Aransas	12100405,12110202	121004050400,121004050204,121102020200	13000592,13000596,13000608	Other	52.4	Riverine, Coastal, Urban,	13002735	13000078,13000081,00000083,00000260,00000290,13000409,13000576,13000585,13000586,13000981,13002735,13002900,13002930,13003368	Yes	$ 82,000	Regular Department Budget, HMGP, FMA
131000138	13	Nueces	Sinton Repetitive Loss Property Reduction	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #13: Identify and implement feasible actions to reduce risk for r epetitive loss properties.	13000015, 13000021	San Patricio	12100407	121004070302,121004070303,121004070304	13000031,13000034,13000046	Other	3.0	Riverine, Urban,	13002864	13000081,00000260,00000290,13000409,13000585,13002864	Yes	$ 159,000	
131000139	13	Nueces	Drainage Improvements - FM 1069 to McCampbell Slough	Easement Acquisition and the design and construction of 10,000 LF of drainage channels along FM 1069 and from Morgan Lane and Mooney Lane to McCampbell Slough. Addresses the flood prone Mooney-Vickery area.	13000013	San Patricio	12100405	121004050204	13000596	Project Planning	0.0	Riverine, Urban,	13002930	13000081,00000260,00000290,13000409,13000585,13000586,13002930	Yes	$ 113,000	
131000140	13	Nueces	Morgan Avenue & Mooney Avenue Drainage Improvements	2,500 LF of improved channels and below ground concrete boxes. The project would also include easement acquisition and the crossing of both SH 361 and the UP Railroad and concrete outfall. Addresses the flood prone Mooney-Morgan area.	13000014	San Patricio	12100405	121004050400,121004050204	13000592,13000596	Project Planning	0.0	Urban,	13002930	13000081,00000260,00000290,13000409,13000576,13000585,13000586,13002930	Yes	$ 525,000	
131000141	13	Nueces	Outfall No. 10	Hazard mitigation drainage improvements for the City of Port Aransas. Outfall 10 is 3 5'x2' RCBs and extends Southwest from the Northwest end of Howard Blvd to a nearby basin.	13000014	Nueces	12110202	121102020200	13000608	Project Planning	0.3	Riverine, Coastal,	13003368	13000078,00000260,00000290,13000409,13000981,13003368	Yes	$ 130,000	
131000142	13	Nueces	Outfall No. 9	Hazard mitigation drainage improvements for the City of Port Aransas. The outfall has a 8'x3' RCB extending West from HWY 361 to an existing basin, 441 ft. North of the HWY 361 and Access Road 1A intersection.	13000014	Nueces	12110202	121102020200	13000608	Project Planning	0.4	Riverine, Coastal,	13003368	13000078,00000260,00000290,13000409,13000981,13003368	Yes	$ 198,000	

Appendix A.10
Flood Management Strategies Recommended by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Assoc Goals	Counties	HUC8s	HUC12s	Watersheds	Study Type	FME Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need	Estimated Study Cost	Potential Funding Sources
131000143	13	Nueces	Outfall No. 5	Hazard mitigation drainage improvements for the City of Port Aransas. The outfall is composed of two 48" RCPs and extend West from HWY 361 to a nearby basin. Outfall is 361 ft. South of Mustang Blvd and HWY 361 intersection.	13000014	Nueces	12110202	121102020200	13000608	Project Planning	0.3	Riverine, Coastal,	13003368	13000078,00000260,00000290,13000409,13000981,13002900,13003368	Yes	$ 12,000	
131000144	13	Nueces	Outfall No. 2	Hazard mitigation drainage improvements for the City of Port Aransas. Outfall 2 is a trapezoidal channel and goes northwest from SH 361 to an existing basin. Outfall is approximately 5.7 miles SSW of Aransas along SH 361.	13000014	Nueces	12110202	121102020200	13000608	Project Planning	0.3	Coastal,	13003368	13000078,00000260,00000290,13000409,13000981,13002900,13003368	Yes	$ 48,000	
131000145	13	Nueces	Fulton West Drainage Improvements	Collection System Improvements include inlets, drain pipes, manholes or junction boxes, collection swales, and connection of the system to existing major drainage outfalls.	13000014	Aransas	12100405	121004050400	13000592	Project Planning	0.1	Urban,	13003450	00000083,00000260,13000586,13003450,13003451	Yes	$ 450,000	
131000146	13	Nueces	Fulton East Drainage Improvements	Collection system improvements include collection swales, inlets, drain pipes, manholes or junction boxes, and collection of the system to existing major drainage outfalls or the construction of new outfalls.	13000014	Aransas	12100405	121004050400	13000592	Project Planning	0.4	Riverine, Coastal, Urban,	13003450	00000083,00000260,13000381,13000586,13003450,13003451	Yes	$ 900,000	
131000147	13	Nueces	Town of Fulton Palmetto Outfall Improvements	New storm drain pipes, inlets, and channel improvements with new outfall structure to Aransas Bay. Reduce frequency of roadway flooding and risk of property flooding in Southern Fulton, Northern Rockport, and Rockport CC/Tulle Creek area	13000014	Aransas	12100405	121004050400	13000592	Project Planning	0.3	Riverine, Coastal, Urban,	13003450	00000083,00000260,13000586,13003450,13003451	Yes	$ 1,500,000	
131000148	13	Nueces	Kinney St. Pump Station Inlet Modifications	It is recommended that modifications be made to increase the size and capacity of the inlet to the Kinney Street Pump Station.	13000014	Nueces	12110202	121102020106	13000609,13000622	Project Planning	0.0	Urban,	13002900	13000078,00000260,00000290,13000409,13002900	Yes	$ 117,000	
131000149	13	Nueces	Power St. Pump Station Improvements	Improvements to the inlet of Power Street Power Station will improve upstream drainage hydraulics throughout the basin. It is proposed to widen the inlet as much as possible to reduce headloss at the Power Station Inlet.	13000014, 13000026, 13000027	Nueces	12110202	121102020106	13000609,13000618	Project Planning	0.0	Urban, Other,	13002900	13000078,00000260,00000290,13000409,13002900	Yes	$ 201,000	
131000150	13	Nueces	12th Street Drainage Improvements	Construct drainage channel from 12th St to Bee Tree Circle and increase capacity of drainage structure under Bee Tree Circle.	13000014, 13000026, 13000027	Aransas	12100405	121004050306,121004050103	13000598,13000607	Project Planning	0.0		13002900	00000083,00000260	Yes	$ 150,000	
131000151	13	Nueces	Aransas County Drainage Improvements - Henderson Street Property - Project 4	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #28: Precinct 3 - Henderson Street Property - Project 4. Reduce flood risk to buildings and infrastructure by making improvements to the County drainage system	13000014	Aransas	12100405	121004050400	13000592	Project Planning	0.0	Urban,	00000083	00000083,00000260,13000586,13003451	Yes	$ 176,000	
131000152	13	Nueces	San Patricio County Hazard Mitigation Action Plan - City of Mathis, Action #9	Equip manholes with water tight covers/inflow guards; Raise sewage lift stations electrical systems above BFE; Floodproof sewage treatment plants in flood hazard areas	13000014	San Patricio	12110111	121101110702,121101110603,121101110701	13000445,13000462, 13000467	Project Planning	2.0	Riverine, Urban,	13003251	13000081,00000260,00000290,13000409,13000585,13003251	Yes	$ 477,000	
131000153	13	Nueces	Cove Harbor Bulkhead Construction	Cove Harbor Bulkhead Construction	13000013	Aransas	12100405	121004050400	13000592	Project Planning	0.0	Riverine, Coastal,	13000381	00000083,00000260,13003451	Yes	$ 2,453,000	
131000154	13	Nueces	Kleberg County Drainage Improvement Study	COASTAL BEND MITIGATION ACTION PLAN - KL - 13: Improve drainage to county roads, Pcts 1 & 3, heavy rains cause road flooding and standing water to ditches. The overflow of stormwater has produced some flooding to residential homes and properties.	13000016, 13000021	Kleberg	12110204,12110205	121102040206,121102040205,121102050106	13000483,13000502, 13000520	Project Planning	0.1	Riverine, Urban,	13000077	13000077,00000260,13000779,13002378	Yes	$ 49,000	
131000155	13	Nueces	Citywide Stormwater Drainage Improvements - Odem	Drainage issues at railroad undercrossings caused by neighborhood development.	13000013	San Patricio	12110201	121102010001	13000479	Project Planning	0.0		13003412	13000081,00000260,00000290,13000409,13000585,13000586,13003412	Yes	$ 100,000	
131000156	13	Nueces	Expanding Drainage System to Odem HS Area	Expanding and improving drainage network to Odem HS area and constructing a detention basin	13000014	San Patricio	12110201	121102010001	13000479	Project Planning	0.0	Riverine, Urban,	13003412	13000081,00000260,00000290,13000409,13000585,13000586,13003412	Yes	$ 100,000	
131000157	13	Nueces	Improvements to Doyle Drainage Basin	Improvement to outfall into Nueces bay; increase conveyance capacity of ditches.	13000014	San Patricio	12110201	121102010002	13000480	Project Planning	0.1	Riverine, Coastal, Urban,	13003233	13000081,00000260,00000290,13000409,13000585,13000586,13003233	Yes	$ 100,000	
131000158	13	Nueces	Channel Outfall Drainage Improvement Project	Improving outfall structures to Chiltipin Creek	13000014	San Patricio	12100407	121004070304	13000046	Project Planning	0.0	Riverine,	13002864	13000081,00000260,00000290,13000409,13000585,13002864	Yes	$ 150,000	
131000159	13	Nueces	Citywide Stormwater Drainage Improvements - Sinton	Improving drainage on ditches along TXDOT roads and conveyance on railroad undercrossings.	13000014	San Patricio	12100407	121004070304	13000046	Project Planning	0.0	Riverine,	13002864	13000081,00000260,00000290,13000409,13000585,13002864	Yes	$ 200,000	
131000160	13	Nueces	Expanding Drainage System to Newly Developed Areas	Expanding the citywide drainage system to include the newly developed residential areas	13000014	San Patricio	12100407	121004070304	13000046	Project Planning	0.1	Riverine,	13002864	13000081,00000260,00000290,13000409,13000585	Yes	$ 150,000	

Appendix A.10
Flood Management Strategies Recommended by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Assoc Goals	Counties	HUC8s	HUC12s	Watersheds	Study Type	FME Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need	Estimated Study Cost	Potential Funding Sources
131000161	13	Nueces	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #15	Clean and repair stormwater drains. Upgrade undersized stormwater drains.	13000014	San Patricio	12100407	121004070302,121004070303,121004070304	13000031,13000034,13000046	Project Planning	3.0	Riverine, Urban,	13002864	13000081,00000260,00000290,13000409,13000585,13002864	Yes	$ 477,000	
131000162	13	Nueces	Aransas County Griffith Street Drainage Improvements	Aransas County Griffith Street Drainage Improvements	13000013	Aransas	12100405	121004050204	13000596	Project Planning	0.2	Riverine, Urban,	00000083	00000083,00000260	Yes	$ 97,000	
131000163	13	Nueces	Aransas County Drainage Improvements - Southeast 35 - Project 2	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #25: Precinct 1/1A - Southeast 35 - Project 2. Reduce flood risk to buildings and infrastructure by making improvements to the County drainage system	13000014	Aransas	12100405	121004050400	13000592	Project Planning	1.0	Riverine, Coastal, Urban,	00000083	00000083,00000260,00000290	Yes	$ 27,000	
131000164	13	Nueces	Aransas County Drainage Improvements - Southeast 35 - Project 1	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #26: Precinct 1/1A - Southeast 35 - Project 1. Reduce flood risk to buildings and infrastructure by making improvements to the County drainage system	13000014	Aransas	12100405	121004050400,121004050204	13000592,13000596	Project Planning	3.2	Riverine, Coastal, Urban,	00000083	00000083,00000260,13003451	Yes	$ 40,000	
131000165	13	Nueces	Aransas County Drainage Improvements - Project 3	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #62: Master Plan - Drainage Improvements - Project 3 - Market St (FM1069) at SH 35 Bypass, Hickory & Steart	13000014	Aransas	12100405	121004050400,121004050204	13000592,13000596	Project Planning	0.3	Urban,	00000083	00000083,00000260,13000586,13003451	Yes	$ 231,000	
131000166	13	Nueces	Nueces Delta Preserve Project - Land Acquisition	This master plan envisions that the delta land identified here will likely become part of the Nueces Delta Preserve via voluntary coordination with private landowners.	13000014	San Patricio	12110111	121101110705,121101110707,121102010001,121102010002,121102010004	13000447,13000448,13000479,13000480,13000624	Other	22.2	Riverine, Coastal,	Coastal Bend Bays and Estuaries Program	13000078,13000081,00000260,00000290,13000409,13000585,13002900	Yes	$ 1,635,000	
131000170	13	Nueces	Nueces Off-Channel Reservoir near Lake Corpus Christi	The Nueces OCR at the proposed location could be operated to capture water that would otherwise spill from LCC while still maintaining freshwater inflows to the Nueces Bay and Estuary (B&E) and could potentially reduce flood events downstream of LCC.	13000013	Live Oak	12110111	121101110301,121101110302	13000474,13000475	Project Planning	9.1	Riverine, Urban,	13000089	13000089,00000260,00000290,13003452	Yes	$ 65,673,000	
131000171	13	Nueces	Sediment Removal in Lake Corpus Christi	The accumulation of sediment in Lake Corpus Christi is a long-term concern. The 2001 Costal Bend Regional Water Plan studied a water supply option that involved the dredging of Lake Corpus Christi.	13000013	Jim Wells,San Patricio,Live Oak	12110111	121101110505,121101110304,121101110405,121101110604,121101110603,121101110605,121101110701,121101110602,121101110301,121101110302,121101110303,121101110305	13000440,13000455,13000459,13000461,13000462,13000466,13000467,13000470,13000474,13000475,13000476,13000478	Project Planning	31.2	Riverine,	13000089	13000080,13000081,13000089,00000260,00000290,13000409,13000585,13003249,13003250,13003452	Yes	$ 2,536,000	
131000172	13	Nueces	Diversion from the Nueces River to Choke Canyon	Rent large, high capacity mobile diesel pumps to pump water from Nueces River to Choke Canyon during flood events.	13000013	Live Oak	12110105,12110108	121101051206,121101080505	13000198,13000354	Project Planning	0.1	Riverine, Urban,	13000089	13000089,00000260,00000290,13003452	Yes	$ 11,702,000	
131000173	13	Nueces	Pipeline between Choke Canyon Reservoir and Lake Corpus Christi	A 2001 study showed that losses in the natural streams between CCR and LCC could possibly be prevented by a transmission pipeline. The pipeline can also provide flood mitigation benefits with a two-way operation via pumping.	13000013	Jim Wells,San Patricio,Live Oak	12110105,12110108,12110111	121101051206,121101080505,121101110505,121101110101,121101110202,121101110405,121101110603,121101110605,121101110601,121101110204,121101110206,121101110301,121101110302	13000198,13000349,13000354,13000440,13000444,13000450,13000459,13000462,13000466,13000468,13000472,13000473,13000474,13000475	Project Planning	1.0	Riverine, Urban,	13000089	13000080,13000089,00000260,00000290,13003096,13003452	Yes	$ 40,739,000	
131000174	13	Nueces	Nueces Basin early flood warning system	Develop Flood Preparedness Toolsets Using Streamgaging and Flood Inundation Mapping to develop a basin wide early flood warning system.	13000009	Atascosa,Wilson,Kinney,Uvalde,Medina,Bexar,Bandera,Real,Edwards,Kerr,Brooks,Kenedy,Jim Hogg,Kleberg,Nueces,Duval,Jim Wells,San Patricio,Webb,Aransas,Refugio,Dimmit,La Salle,McMullen,Bee,Live Oak,Goliad,Maverick,Zavala,Frio,Karnes				Preparedness	24051.8	Riverine, Coastal, Urban, Other,	00000290	13000001,00000005,00000007,00000011,00000015,00000021,00000022,00000073,00000074,00000076,13000077,13000078,13000079,13000080,13000081,00000082,00000083,00000084,13000085,13000086,13000087,13000089,00000090,00000091,13000092,13000093,00000095,00000096,000	No	$ 250,000	

Appendix A.10
Flood Management Strategies Recommended by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Assoc Goals	Counties	HUC8s	HUC12s	Watersheds	Study Type	FME Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need	Estimated Study Cost	Potential Funding Sources
131000175	13	Nueces	Nueces Basin low water crossing study and upgrade prioritization	Conduct an inventory of low water crossings (LWC), characterize risk, and rank low water crossings to prioritize those with high risk. Prepare a large scale public outreach campaign aimed at reducing loss of life. Address top 30% of high risk LWC.	13000002	Atascosa,Wilson, Kinney,Uvalde, Medina,Bexar,B andera,Real,Edw ards,Kerr,Brooks ,Kenedy,Jim Hogg,Kleberg,Nu eces,Duval,Jim Wells,San Patricio,Webb,A ransas,Refugio,D immit,La Salle,McMullen, Bee,Live Oak,Goliad,Mav erick,Zavala,Frio, Karnes				Project Planning	24051.8	Riverine, Coastal, Urban, Other,	00000290	13000001,00000005,000000 07,00000011,00000015,000 00021,00000022,00000073, 00000074,00000076,130000 77,13000078,13000079,130 00080,13000081,00000082, 00000083,00000084,130000 85,13000086,13000087,130 00089,00000090,00000091, 13000092,13000093,000000 95,00000096,000	No	$ 700,000	
131000176	13	Nueces	Nueces Basin High Hazard Dam identification and risk assessment	The region currently has 116 TCEQ regulated dams. Of these, 7 are 'non-functional' and 9 are 'deficient'. This study would identify all deficient high hazard dams in the region and recommend the removal or rehabilitation of the most high hazard dams.	13000004	Atascosa,Wilson, Kinney,Uvalde, Medina,Bexar,B andera,Real,Edw ards,Kerr,Brooks ,Kenedy,Jim Hogg,Kleberg,Nu eces,Duval,Jim Wells,San Patricio,Webb,A ransas,Refugio,D immit,La Salle,McMullen, Bee,Live Oak,Goliad,Mav erick,Zavala,Frio, Karnes				Project Planning	24051.8	Riverine, Coastal, Urban, Other,	00000290	13000001,00000005,000000 07,00000011,00000015,000 00021,00000022,00000073, 00000074,00000076,130000 77,13000078,13000079,130 00080,13000081,00000082, 00000083,00000084,130000 85,13000086,13000087,130 00089,00000090,00000091, 13000092,13000093,000000 95,00000096,000	No	$ 1,355,000	
131000178	13	Nueces	Nueces Basin Assessment of Flood Mitigation and Performance of Nature-based Solutions (NBS)	Basin-wide analysis on the flood mitigation value of select nature-based solutions (NBS) at a variety of scales and land use types, looking for consistent, accurate, and broadly applicable methods to quantify flood mitigation benefits of NBS.	13000019	Atascosa,Wilson, Kinney,Uvalde, Medina,Bexar,B andera,Real,Edw ards,Kerr,Brooks ,Kenedy,Jim Hogg,Kleberg,Nu eces,Duval,Jim Wells,San Patricio,Webb,A ransas,Refugio,D immit,La Salle,McMullen, Bee,Live Oak,Goliad,Mav erick,Zavala,Frio, Karnes				Other	24051.8	Riverine, Coastal, Urban, Other,	00000290	13000001,00000005,000000 07,00000011,00000015,000 00021,00000022,00000073, 00000074,00000076,130000 77,13000078,13000079,130 00080,13000081,00000082, 00000083,00000084,130000 85,13000086,13000087,130 00089,00000090,00000091, 13000092,13000093,000000 95,00000096,000	No	$ 100,000	

Appendix A.10
Flood Management Strategies Recommended by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Assoc Goals	Counties	HUC8s	HUC12s	Watersheds	Study Type	FME Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need	Estimated Study Cost	Potential Funding Sources
131000179	13	Nueces	Scaling Up Nature Based Solutions (NBS) in the Nueces Flood Planning Region to support community resilience and enhance flood and hazard mitigation planning	Multi-jurisdictional feasibility analyses will be performed in targeted areas to identify a prioritized portfolio of NBS flood mitigation projects and strategies that consider both risk reduction and ecological benefits.	13000019	Atascosa,Wilson, Kinney,Uvalde, Medina,Bexar,B andera,Real,Edw ards,Kerr,Brooks ,Kenedy,Jim Hogg,Kleberg,Nu eces,Duval,Jim Wells,San Patricio,Webb,A ransas,Refugio,D immit,La Salle,McMullen, Bee,Live Oak,Goliad,Mav erick,Zavala,Frio, Karnes				Other	24051.8	Riverine, Coastal, Urban, Other,	00000290	13000001,00000005,000000 07,00000011,00000015,000 00021,00000022,00000073, 00000074,00000076,130000 77,13000078,13000079,130 00080,13000081,00000082, 00000083,00000084,130000 85,13000086,13000087,130 00089,00000090,00000091, 13000092,13000093,000000 95,00000096,000	No	$ 1,000,000	
131000180	13	Nueces	Petronilla Drainage Improvements Feasibility Study	Petronilla Drainage Improvements Feasibility Study	13000014	Nueces	12110205	121102050606	13000559	Project Planning	0.5	Urban,	13002390	13000078,00000260,000002 90,13000409,13000940,130 02390,13003452	Yes	$ 100,000	
131000181	13	Nueces	COASTAL BEND MITIGATION ACTION PLAN - NU - 64	To improve drainage throughout the City of Agua Dulce, it is necessary to properly assess the community drainage needs and establish a local prioritization plan to serve as a guide to successful flood mitigation.	13000013	Nueces	12110205	121102050506,1211020506 02	13000532,13000561	Project Planning	0.3	Riverine, Urban,	13002546	13000078,00000260,000002 90,13000409,13000779,130 02546,13003452	Yes	$ 250,000	State or Federal Grants
131000177	13	Nueces	Nueces Basin Floodplain Map Updates	Develop floodplain maps to NFHL level for HUC 12 watershed areas that have a high flood risk (risk score > 3.0 per the Regional Flood Plan) but do not currently have accurate mapping. Accurate mapping is defined as NFHL level accuracy.	13000011	Atascosa,Wilson, Kinney,Uvalde, Medina,Bexar,B andera,Real,Edw ards,Kerr,Brooks ,Kenedy,Jim Hogg,Kleberg,Nu eces,Duval,Jim Wells,San Patricio,Webb,A ransas,Refugio,D immit,La Salle,McMullen, Bee,Live Oak,Goliad,Mav erick,Zavala,Frio, Karnes				Watershed Planning	24051.8	Riverine, Coastal, Urban, Other,	00000290	13000001,00000005,000000 07,00000011,00000015,000 00021,00000022,00000073, 00000074,00000076,130000 77,13000078,13000079,130 00080,13000081,00000082, 00000083,00000084,130000 85,13000086,13000087,130 00089,00000090,00000091, 13000092,13000093,000000 95,00000096,000	No	$ 51,628,000	

Appendix A.10
Flood Management Strategies Recommended by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Est number of struct at flood risk	Habitable struct at flood risk	Est Popul at flood risk	Critical facilities at flood risk (#)	Number of low water crossings at flood risk (#)	Est number of road closures (#)	Est length of roads at flood risk (Miles)	Est active farm & ranch land at flood risk (acres)	Exist or Anticipated Models (year)	Exist or Anticipated Maps (year)	RFPG Recommend. (Y/N)	Reason for Recomm.
131000005	13	Nueces	Others (Flood Prevention/Planning Study, LOMR etc)	Atascosa Flood Prevention Project - Pleasanton	464	322	2226	1	5	107	15.6	7.7			Y	high need area
131000006	13	Nueces	Camp Wood City-wide Drainage Study	Camp Wood City-wide Drainage Study	36	31	25	0	0	10	0.8	0.0			Y	high need and no existing study
131000007	13	Nueces	City of Hondo Drainage Master Plan and Flood Mitigation plan	City of Hondo Drainage Master Plan and Flood Mitigation plan	592	425	2211	3	5	67	15.2	1095.9			Y	high need, In vulnerable area
131000008	13	Nueces	D'Hanis Flood Study	D'Hanis Flood Study needed from Leakey road show on 3/21/2022	253	154	591	16	5	39	15.7	404.7			Y	high need and benefit
131000009	13	Nueces	Comprehensive Plan Update	Creation of Future Land Use Plan, Thoroughfare Plan, Site Plans for Planned Development, Parks Planning, Implementation	592	425	2211	3	5	67	15.2	1095.9			Y	high need, In vulnerable area
131000010	13	Nueces	Flood mapping updates and hydrologic and hydraulic modeling	Scope would likely include updating the Hydrology and Hydraulic modeling for approximately 5 miles of study stream for the Hondo area. The goal would be to then use this data to apply to FEMA to update the flood mapping within the City and immediate area.	592	425	2211	3	5	67	15.2	1095.9			Y	high need, In vulnerable area
131000011	13	Nueces	Drainage and Stormwater Master Plan	Restudy of the City's floodplain and creation of a holistic plan for the City's drainage and stormwater system. This data would then be used as a foundation to update the City's Subdivision Ordinance and Building Codes to mitigate future flood risks.	592	425	2211	3	5	67	15.2	1095.9			Y	high need, In vulnerable area
131000012	13	Nueces	Emergency Management Plan and Flood Hazard Mitigation Plan	Creation of a plan for disaster preparedness to decrease repetitive losses, financial hardship and loss of life.	592	425	2211	3	5	67	15.2	1095.9			Y	high need, In vulnerable area
131000013	13	Nueces	Feasibility Study for Regional detention	Create a feasibility study for Regional Detention areas to be incorporated into comprehensive drainage planning projects.	592	425	2211	3	5	67	15.2	1095.9			Y	high need, In vulnerable area
131000014	13	Nueces	City of Natalia Floodplain Study	City wide flood study to evaluate floodplain.	56	31	68	0	0	16	1.4	1.3			Y	high need from the stakeholder interview
131000016	13	Nueces	Crystal City City-wide Drainage Study	Crystal City City-wide Drainage Study	772	655	2376	3	0	82	16.2	3.0			Y	high need in vulnerable area, stakeholder request
131000018	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - City of Pleasanton Action #10	reduce flooding and poor drainage by increasing maintenance of existing storm water system.	464	322	2226	1	5	107	15.6	7.7			Y	high need area
131000019	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #2	Conduct a countywide floodplain study and mapping to understand the limits of the 1% annual chance and 0.2% annual chance floodplain boundaries and their effects on the community, infrastructure and critical facilities.	339	90	103	0	6	70	39.5	2424.7			Y	high need area
131000020	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #3	Study and prioritize low water crossing improvements	339	90	103	0	6	70	39.5	2424.7			Y	high need area
131000021	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #5	Provide FEMA review of floodplain management criteria by ensuring that the community correct NRP program deficiencies and enforces existing ordinances that regular planning and development.	339	90	103	0	6	70	39.5	2424.7			Y	high need area
131000022	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #9	Upgrade existing floodplain maps. Add new Atlas 14 rainfall frequency data.	1947	1498	3669	1	28	570	141.2	3068.9			Y	high need area
131000023	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #10	Upgrade existing floodplain maps. Add new Atlas 14 rainfall frequency data.	1947	1498	3669	1	28	570	141.2	3068.9			Y	high need area

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131000024	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - City of Charlotte Action #3	Implement a stormwater plan needing to identify and prioritize projects that will improve drainage in the areas in the city.	3	3	4	0	0	10	0.2	0.0			Y	high need area
131000026	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - City of Christine Action #2	Improve drainage in certain areas of the city that are subject to flooding and conduct a study to identify deficiencies in current land development code for future developments.	15	8	13	0	0	18	0.8	0.0			Y	high need area
131000027	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #12	Identify problem flooding areas within an area drainage study and implement a program to reduce citywide and localized flooding.	18	11	113	0	0	25	1.0	1.3			Y	high need area
131000028	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - City of Lytle Action #11	Develop a stormwater management plan and implement the structural and non-structural solutions to mitigate flooding.	112	92	288	0	9	29	2.9	7.4			Y	high need area
131000029	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - City of Lytle Action #4	Enforcement of code and floodplain development is improving with meetings with new businesses.	112	92	288	0	9	29	2.9	7.4			Y	high need area
131000031	13	Nueces	Atascosa McMullen Hazard Mitigation Plan - City of Poteet Action #7	Study and implement findings of study to improve local drainage at Betty Louis and school drive	259	224	471	0	0	35	4.7	0.8			Y	high need area
131000032	13	Nueces	Gilliam Rd Drainage Improvements- FH#9	Install series of underground storm water lines and drop structures along Loma Vista Closed street and Gilliam road near Sewer Treatment Plant tying in to the existing Channel on FM1581.	0	0	0	0	0	1	0.1	0.0			Y	stakeholder provided, high need area
131000033	13	Nueces	CR4001 and I-35 Access Road Drainage- FH#10	Install trapezoidal concrete channel and proposed culvert crossings at the driveways along south of IH-35 access at CR4001 tying into the existing drainage channel 1700 LF south of the intersection of IH-35 access at CR4001.	0	0	0	0	0	0	0.0	0.0			Y	stakeholder provided, high need area
131000037	13	Nueces	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Construct Storm Drainage Infrastructure (City of Alice)	This action proposes constructing new storm drainage infrastructure to reduce the potential impacts of future flood events.	893	572	6681	8	4	296	19.3	131.8			Y	high need area
131000039	13	Nueces	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Conduct Dam / Levee Failure Studies (City of Alice)	The City of Alice will work with local dam / levee owners to conduct relevant studies to identify peak flow rates and expected inundations in the event of local dam failures	893	572	6681	8	4	296	19.3	131.8			Y	high need area
131000040	13	Nueces	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Construct New Levees and Improve Existing System	This action proposes constructing new levees and improving existing ones to reduce the potential impacts of future flood events by reducing the likelihood of levee failure.	893	572	6681	8	4	296	19.3	131.8			Y	high need area
131000041	13	Nueces	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Construct Storm Drainage Infrastructure (Jim Wells County)	This action proposes constructing new storm drainage infrastructure to reduce the potential impacts of future flood events.	2398	1145	8685	9	13	624	201.3	25815.6			Y	high need area
131000042	13	Nueces	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Purchase Portable Pumps	This action proposes purchasing portable pumps that can be deployed as needed to reduce the potential impacts of future flood events.	2398	1145	8685	9	13	624	201.3	25815.6			Y	high need area
131000043	13	Nueces	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Conduct Dam / Levee Failure Studies (Jim Wells County)	Jim Wells County will work with local dam / levee owners to conduct relevant studies to identify peak flow rates and expected inundations in the event of local dam failures.	2398	1145	8685	9	13	624	201.3	25815.6			Y	high need area
131000044	13	Nueces	Colorado Street Drainage Improvements- FH#1	Install series of underground storm water trunk lines and drop structures along Garcia Street and Colorado Street before outfalling in to trapezoidal channel on S. Puente Street.	0	0	0	0	0	9	0.0	0.0			Y	stakeholder provided, high need area
131000045	13	Nueces	Trinity Street & N Cherry Street Drainage Improvements- FH#2	Install series of underground storm water trunk lines and drop structures along N Cherry street tying in to the existing 2-8'x7' concrete boxes on W San Antonio Street.	1	0	3	0	0	4	0.0	0.0			Y	stakeholder provided, high need area

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131000046	13	Nueces	W Comal St & FM 1581 Drainage Channel- FH#3	Install trapezoidal concrete channel and upsize existing culverts at the crossing on W Comal Street and W San Antonio street at FM1581 intersections.	1	0	4	0	0	3	0.1	0.0			Y	stakeholder provided, high need area
131000047	13	Nueces	W Pena St and N Mulberry St Drainage Improvements- FH#4	Install series of underground storm water trunk lines and drop structures along Pena street and N Willow street tying into the existing 10'x4' concrete boxes on N Mulberry Street.	0	0	0	0	0	1	0.0	0.0			Y	stakeholder provided, high need area
131000048	13	Nueces	Pearsall RV Park on Guadalupe Street Drainage Improvements- FH#5	Install underground storm water trunk lines and drop structures at the intersection of Powerplant Road and Guadalupe Street carrying drainage to avoid flooding before outfalling in to earthen swale on Powerplant Road.	0	0	0	0	0	0	0.0	0.0			Y	stakeholder provided, high need area
131000049	13	Nueces	Westview Apartment Detention Pond Underground Drainage- FH#6	Install series of underground storm water trunk lines and drop structures in the alley running along Colorado Street before tying in to the proposed drainage on Garcia Street.	0	0	0	0	0	6	0.2	0.0			Y	stakeholder provided, high need area
131000050	13	Nueces	S Roosevelt Street and E Haynes Avenue Drainage- FH#7	Install series of underground storm water lines and drop structures along S Roosevelt Street and E Carter Street acquiring drainage easement of 27000 SF south west of S Roosevelt Street tying in to the existing earthen channel on S Oak Street.	2	2	1	0	0	2	0.0	1.3			Y	stakeholder provided, high need area
131000051	13	Nueces	N Roosevelt Street and Chapparal Road Drainage- FH#8	Install series of underground storm water lines and drop structures on N Roosevelt Street acquiring drainage easement of 12500 SF north of intersection of S Roosevelt Street and Chapparal Road outfalling to existing earthen swale on Nail Road(CR2015).	0	0	0	0	0	2	0.1	0.0			Y	stakeholder provided, high need area
131000052	13	Nueces	Jourdanton Drainage Improvements and Detention/Retention Ponds	Multiple detention ponds, drainage channel, box culverts improvements near Main St and Terrel Ave, Jourdanton	3	3	7	0	0	5	0.2	0.1			Y	high need area
131000053	13	Nueces	Las Animas Conveyance Infrastructure	Channel improvements to system near Las Animas Creek to improve conveyance - Upsize culverts on Palacios St and S Benavides St - Improve conveyance capacity under bridges on HWY 359 and HWY 339 - Procurement of easements and rights-of-ways	89	58	239	6	0	23	2.5	3.2			Y	high need area
131000054	13	Nueces	Benavides Main City Network	Improvements to the Drainage System in Central Benavides	89	58	239	6	0	23	2.5	3.2			Y	high need area
131000055	13	Nueces	Upsize Burch St Crossing	Increase the capacity on Burch Street by adding a second 36-inch culvert under the road. - Increase culvert capacity on Burch St and other undersized crossings - Channel improvements along the main earthen channel "	124	80	175	0	0	21	1.9	8.3			Y	high need area
131000056	13	Nueces	Northern San Diego Street Conveyance Improvement	Improvements to street overland drainage system - Curb and gutter replacement - Improve conveyance by road paving and regrading of prioritized streets "	210	176	489	0	0	57	5.5	0.8			Y	high need area
131000057	13	Nueces	Northern San Diego Drainage Improvement Project	Drainage improvements to subsurface drainage systems - installation of new underground drainage infrastructure along Luby street; expansion and improvements to Dix Street System	268	199	698	0	0	67	11.0	69.1			Y	high need area
131000058	13	Nueces	Realitos Drainage Improvements	Improvements to surface and subsurface infrastructure of Realitos Drainage System	66	27	93	0	0	13	2.3	2.3			Y	high need area
131000059	13	Nueces	Concepcion Drainage Improvements	Improvements to drainage infrastructure in Concepcion	16	1	5	0	0	9	3.0	17.1			Y	high need area
131000060	13	Nueces	Improvements to Drainage Connectivity along Railroad	Improvement to underground drainage system to increase capacity and improve conveyance on railroad under-crossings and on sections of Highway 44 to improve stormwater drainage from north to south	2	0	3	0	0	9	2.2	0.8			Y	high need area
131000061	13	Nueces	Improvements to San Diego Levee Outfall System	Improvements to outfall structures and appurtenances along San Diego Levee System	2	1	2	0	0	4	0.1	0.6			Y	high need area
131000062	13	Nueces	Southern San Diego Drainage Improvement Project	New underground stormwater collection system along Collins Street, including interconnections between existing and new infrastructure.	268	199	698	0	0	67	11.0	69.1			Y	high need area
131000063	13	Nueces	Lattas Creek Improvements	Concrete line Lattas Creek to improved drainage capacity.	72	33	172	0	3	47	2.9	63.0			Y	high need area
131000064	13	Nueces	Burnt Boot Creek Drainage Improvement Project	Two-phase project to improve drainage at Burnt Boot Creek in Devine, TX.	0	0	0	0	0	6	0.1	0.0			Y	abundant information, high need

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131000065	13	Nueces	Uvalde City-wide Drainage Study	Uvalde City-wide Drainage study to further define existing flood risk and to recommend flood risk reduction measures.	176	142	543	2	6	38	2.8	7.1			Y	high need, helps with Goal 5 (structures in floodplain)
131000066	13	Nueces	Martin Branch Drainage Study	Martin Branch Drainage Study to evaluate existing flood risk for multiple roadway crossings and potential structural flooding along Martin Branch, just north of Dilley	22	6	37	0	3	15	4.7	283.4			Y	high need, helps with Goal 5 (structures in floodplain)
131000067	13	Nueces	City of Falfurrias City-Wide Flood Study	City wide flood study to evaluate floodplain is required in the City of Falfurrias.	1675	1248	5071	33	2	115	41.3	12.4			Y	high need, helps with Goal 5 (structures in floodplain)
131000068	13	Nueces	William's Drive Drainage Improvements Phase 2 - Lexington to Ennis Joslin	Study to determine appropriate alternatives to increase capacity of existing William's Ditch from Lexington Road to Ennis Joslin Road.	0	0	0	0	0	1	0.0	0.0			Y	high need area
131000069	13	Nueces	William's Drive Drainage Improvements Phase 3 - Rodd Field to Lexington	Study to determine appropriate alternatives to increase capacity of existing William's Ditch from Rodd Field Road to Lexington Road, as well as to acquire Right of Way (ROW) at William's Drive to implement these drainage improvements.	0	0	0	0	0	1	0.0	0.0			Y	high need area
131000070	13	Nueces	Downtown Rockport Drainage Study	Design and conduct an engineering study to address flooding in downtown Rockport	57	9	195	0	0	21	2.9	0.0			Y	priority based on stakeholder interview
131000071	13	Nueces	Easement Outfall Loop 70 & Shell Ridge Rd	Purchase Drainage easement and construct outfall ditch south of Church St.	0	0	0	0	0	2	0.0	0.0			Y	priority based on stakeholder interview
131000072	13	Nueces	Rockport County Club Lakes	RCC Lakes - Upgrade drainage system and increase the capacity of the lakes within the Rockport County Club	2	2	7	0	0	1	0.0	0.0			Y	high need from the stakeholder interview
131000073	13	Nueces	Poesta Creek Drainage Improvements	Poesta creek drainage project. Complete concrete lining of drainage ditch from St. Marys to Hwy 181. A portion of the project has been completed from Adams street to South Jackson.	17	4	6	0	4	8	0.5	1.3			Y	priority based on stakeholder interview
131000074	13	Nueces	Ave A 4th Street Extension	Secure drainage ROWs along Ave. A near 4th to South of 6th St. Design underground and/or open channel system improve drainage. This section of Avenue A has is often inundated by heavy rains due to poor drainage, cutting off access to area residences.	4	3	4	0	0	3	0.1	0.2			Y	sponsor requested
131000075	13	Nueces	Avenue B Drainage Channel Extension and Outfall Improvements	Storm sewer replacement between Humble Ave. and Mustang Ave.as well as between Mustang Ave. and Ave. B channel. Improvements from 5th St., 6th St., 7th St., and 8th St. into the improved Ave. B channel, and downstream channel excavation.	11	10	45	0	0	20	0.3	0.0			Y	priority project for the sponsor
131000076	13	Nueces	Ave A & 8th St Drainage Improvements	Drainage improvements along Avenue A from south of 6th Street, south to 8th Street, and west along 8th Street to the existing drainage channel.	0	0	0	0	0	0	0.0	0.0			Y	priority project for the sponsor
131000077	13	Nueces	Wright Avenue Drainage Improvements	Easement Acquisition and construction of two channels between Wright Ave. and McCampbell Slough; channel widening from the north side of the existing hotel properties to the west and tie-in with McCampbell slough. Addresses Nystrom Property area flooding.	0	0	0	0	0	0	0.0	0.1			Y	priority project for the sponsor
131000078	13	Nueces	Airport Rd - Recurring Flooding & Project Location	Improved drainage to reduce disruptions due to flooding in the vicinity of the Live Oak County Airport. The area surrounding the airport is subject to flood inundation, thereby cutting off access to the airport and also on the future runway extension.	0	0	0	0	0	3	0.4	0.1			Y	flood benefit to critical infrastructure
131000079	13	Nueces	Drainage improvements at Mission River Park in Refugio	Reduce flooding at Mission River Park in Refugio.	0	0	0	0	0	0	0.2	0.2			Y	sponsor requested
131000080	13	Nueces	Humble Channel Drainage Improvements & Ditch Extension	Reduce flooding in the residential area of Ingleside located to the east of Emory Bellard Dr. via improvements to Humble Channel Outfall, installation of crossings at Emory Ballard Dr., acquisition of easements, and excavation of new drainage ditches.	0	0	0	0	0	1	0.2	3.3			Y	priority project for the sponsor
131000081	13	Nueces	Drainage Improvements to Outfall Channel - Lateral AN	Reduce flooding in NE part of Taft. The project will widen and deepen the Main Lateral AN; replace bridge crossings at FM 631, CR 102, CR 77, and CR 81; and armor the ditch section between FM 693 and CR 102 to improve runoff through this section of ditch.	0	0	0	0	0	3	0.1	22.5			Y	priority project for the sponsor

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131000082	13	Nueces	Drainage Improvements & Ditch Extension for Outfall Channel - Lateral AS	Reduce flooding in northern residential area of Gregory. Project includes drainage easement acquisition and excavation, culvert installation at FM 3284, CR 106, and FM 136, excavation of Main Lateral AS, armoring of ditch sections prone to erosion.	0	0	0	0	0	6	0.4	4.9			Y	priority project for the sponsor
131000083	13	Nueces	Fulton Drainage Master Plan	New stormwater master plan that includes a capital improvement plan	83	43	126	1	0	34	3.6	0.0			Y	high need and no existing plan
131000084	13	Nueces	Euclid Stormwater Pump Station Improvements	Pump house is at risk of notable damage due to hurricane winds and flooding during large rain events, and it's capacity is undersized for peak flood flows. Improvements needed to improve maintenance access, flood resiliency, and to facilitate more pumps.	0	0	0	0	0	0	0.0	0.0			Y	high priority to community
131000085	13	Nueces	Modify Pump Station Outfalls	Modify outfalls of pump station that pump into Aransas Bay at Murray, Morgan, Lamar, Corpus Christi and 1st St. Raise outfall so above sea level to reduce backwater effect on the system.	0	0	0	0	0	2	0.0	0.0			Y	high need from the stakeholder interview
131000086	13	Nueces	Oso Creek Channel Bottom Rectification and Green Infrastructure	Planning and Design for Oso Creek and it's contributing channels to remove channel bottom irregularities, study inclusion of green infrastructure BMPS, improve conveyance and capacity, implement soil stabilization near infrastructure, remove debris.	3	1	2	0	0	3	0.2	1.4			Y	high need, In vulnerable area
131000087	13	Nueces	Brawner Outfall Improvements	Inspect the Brawner Outfall system and assess needed repairs, design improvements, and construct necessary repairs and upgrades to accommodate future flows to prevent flooding and improve water quality.	7	7	21	0	0	8	1.1	0.0			Y	high need, includes water quality measures
131000088	13	Nueces	Greenwood WWTP Flood Mitigation and Emergency Generator	Greenwood Wastewater Treatment Plant improvements include site grading, piping, floodway improvements, plant structure flood walls, new effluent pump station, and two electrical generators. Scope includes design and construction.	7	0	12	0	0	0	0.0	0.0			Y	high need, In vulnerable area
131000089	13	Nueces	Wesley Seale Dam Inspection	This project is for the detailed inspection of the Wesley Seale Dam structure and system components.	0	0	0	0	0	0	0.0	10.0			Y	In vulnerable area
131000090	13	Nueces	Corpus Christi Police Headquarters Flood Proofing	COASTAL BEND MITIGATION ACTION PLAN - NU - 33 - The automatic generator transfer switch is located in a control room on the ground floor of the building, which is in an area vulnerable to street flooding. Project intends to elevate power transfer switch.	1	0	229	1	0	0	0.0	0.0			Y	sponsor requested; protects emergency services
131000091	13	Nueces	Upper Tule Storm Drain System	Install storm drainage system with capacity to reduce current flooding and capacity for future development.	5	3	9	0	0	5	0.3	0.7			Y	high need from the stakeholder interview
131000092	13	Nueces	601 Racine Street Easement & Outfall Project	Acquire drainage easements in natural wetlands and construct new outfalls.	1	1	0	0	0	2	0.0	0.0			Y	high need from the stakeholder interview
131000093	13	Nueces	Club Lake Drainage Channel	Construct drainage channel from Club Lake to FM 1069. Most easements have been acquired; still negotiating with one property owner and condemnation likely required for another property	0	0	0	0	0	1	0.0	0.1			Y	high need from the stakeholder interview
131000094	13	Nueces	Holiday Beach East Drainage System Improvement	Construct outfall east to Aransas Wildlife Refuge and construct outfall west to HWY 35 Bypass. Construct culvert under Hwy 35 Bypass. Improve drainage channel from Hwy 35 Bypass to Copano Bay.	0	0	0	0	0	2	0.1	0.0			Y	high need from the stakeholder interview
131000095	13	Nueces	Sparks Colony Drainage Improvements	Construct drainage channel from Rattlesnake Point Road to Bailey Ranch. Project partially constructed, but easements still needed from two property owners.	0	0	0	0	0	0	0.0	0.0			Y	high need from the stakeholder interview
131000096	13	Nueces	Lee Road Drainage Improvements	Secure drainage easements and construct drainage channel from Lee Road to Hwy 35-BUS.	0	0	0	0	0	0	0.0	0.0			Y	high need from the stakeholder interview
131000097	13	Nueces	Mohawk Ave Drainage Improvements	Construct drainage channel to connect existing ponds (supported by property owner)	0	0	0	0	0	1	0.0	0.2			Y	high need from the stakeholder interview
131000098	13	Nueces	Nell Road Drainage Improvements	Construct drainage channel from Nell Road to outfall (route undefined).	0	0	0	0	0	1	0.0	0.0			Y	high need from the stakeholder interview

Appendix A.10
Flood Management Strategies Recommended by RFPG

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131000099	13	Nueces	Mack Road Drainage Improvements	Construct drainage channel from Hwy 35 Bypass to Port Bay. Easements needed from three property owners.	0	0	0	0	0	1	0.0	0.2			Y	high need from the stakeholder interview
131000100	13	Nueces	Bee Road Drainage Improvements	Construct drainage channel from Hwy 35 Bypass to Port Bay. Easements needed from three property owners	0	0	0	0	0	2	0.0	0.3			Y	high need from the stakeholder interview
131000101	13	Nueces	Stormwater Master Plan #1 - North of Parkview between Starlight and Sunset Outfall Pipe	Positive drainage to Parkview Place to be improved by minor site regrading, grate inlet installation, and installation of RCP along Sunset Drive, as well as the alley that runs parallel to the West. Alley drainage improvement to connect to existing inlet.	0	0	0	0	0	0	0.0	0.0			Y	sponsor requested
131000102	13	Nueces	Stormwater Master Plan #2 - North of Parkview between Sunset and Woodhaven Outfall Pipe	Positive drainage to Parkview Place to be improved by minor site regrading, grate inlet installation, and installation of RCP along Woodhaven Drive. Improvement to be connected to existing storm pipe via junction box.	1	1	4	0	0	2	0.1	0.0			Y	sponsor requested
131000103	13	Nueces	Stormwater Master Plan #3 - North of Post Oak between Starlight and Sunset Outfall	Positive drainage to Post Oak Drive to be improved by minor site regrading along alley between Starlight Drive and Sunset Drive.	0	0	0	0	0	0	0.0	0.0			Y	sponsor requested
131000104	13	Nueces	Stormwater Master Plan #4 - North of Post Oak between Sunset and Woodhaven Outfall	Positive drainage to Post Oak Drive and Retama Drive to be improved by minor site regrading, grate inlet installation, and installation of RCP along alley between Woodhaven Drive and Sunset Drive. Improvements to connect to existing inlet.	0	0	0	0	0	0	0.0	0.0			Y	sponsor requested
131000105	13	Nueces	Stormwater Master Plan #5 - North of Ebony between Starlight and Sunset Outfall	Positive drainage to Ebony Street to be improved by minor site regrading, grate inlet installation, and installation of RCP along alley between Starlight Drive and Sunset Drive. Site regrade and installation of RCP will also take place on Ebony Street.	0	0	0	0	0	0	0.0	0.0			Y	sponsor requested
131000106	13	Nueces	Stormwater Master Plan #6 - Live Oak/Ebony and Woodhaven Improvements and Outfall	Ponding to be reduced by minor regrading, installation of new standpipes with low flow outlets, and implementation of sediment filters around existing inlets. Installation of RCB along Live Oak St. and RCP along Woodhaven Dr. and Ebony Dr. to be included.	5	5	15	0	0	3	0.1	0.0			Y	sponsor requested
131000107	13	Nueces	Stormwater Master Plan #7 - Bayshore East Channel and Culvert Improvements	Positive drainage from stormwater ditch to bay to be improved by site and channel regrading and installation of RCP to provide direct outfalls for low lying areas to the bay.	4	4	7	0	0	1	0.1	0.0			Y	sponsor requested
131000108	13	Nueces	Stormwater Master Plan #8 - Bayshore East Outfall	Positive drainage from stormwater ditch to bay to be improved by site and channel regrading and installation of RCP to provide direct outfalls for low lying areas to the bay.	9	9	20	0	0	1	0.1	0.0			Y	sponsor requested
131000109	13	Nueces	Stormwater Master Plan #9 - Bayshore Court Outfall	Positive drainage from stormwater ditch to bay to be improved by site and channel regrading and installation of RCP to provide direct outfalls for low lying areas to the bay.	13	13	22	0	0	2	0.1	0.0			Y	sponsor requested
131000111	13	Nueces	FM1356 Channel Improvements	Increase the capacity of the channel just north of Paulson Falls. This is one of the main entrances to the naval air station.	0	0	0	0	0	5	0.0	0.9			Y	sponsor requested
131000112	13	Nueces	Paulson Falls Subdivision Detention Pond Improvements	Paulson Falls Subdivision has detention ponds, but the berm has deteriorated.	0	0	0	0	0	0	0.0	0.0			Y	sponsor requested
131000113	13	Nueces	Lang Road Drainage Ditch and Outfall	This is the location of a future project a drainage ditch is needed to alleviate flooding created by increased development. The ditch would run south from Lang Road to the bay.	0	0	0	0	0	1	0.0	0.5			Y	sponsor requested
131000114	13	Nueces	Madison St Low Water Crossing Replacement Project	Madison St Low Water crossing replacement	0	0	0	0	1	1	0.0	0.0			Y	priority based on stakeholder interview
131000115	13	Nueces	County Road 6- North Carreta Creek Drainage Improvements	Restoration project to bring this section of North Carreta creek (located between CR6 and Meadowbrook Road) back to its original elevation as built by USDA Soil Conservation Service in 1960. Located in Bishop, TX.	0	0	0	0	0	0	0.0	8.8			Y	vulnerable area
131000116	13	Nueces	Tierra Grande Subdivision Drainage Improvements Feasibility Study	Hydrological and Hydraulic Study to provide drainage solutions to reduce flooding within the subdivision due to existing hydrological flow patterns from regional, upgradient, and local runoff drainage areas flowing toward the center of the subdivision.	30	29	31	0	0	5	0.6	12.4			Y	vulnerable area

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131000117	13	Nueces	Aransas National Wildlife Refuge Dagger Point Shoreline Preservation	Texas Coastal Resiliency Master Plan - R3-3 Project would install a living shoreline using breakwaters. This project would help protect the shoreline along Dagger Pointas well as nearby critical habitat and public infrastructure.	0	0	0	0	0	0	0.0	0.0			Y	Nature based solution
131000118	13	Nueces	Nueces River Delta Shoreline Stabilization	Texas Coastal Resiliency Master Plan - R3-15 The project would include the construction of breakwaters along approximately 3,900 linear feet of shoreline at the Nueces River Delta to dissipate wave energy that is causing estuarine wetland loss	0	0	0	0	0	0	0.0	0.0			Y	sponsor requested; shoreline protection
131000119	13	Nueces	Silver Creek Bridge	COASTAL BEND MITIGATION ACTION PLAN - BE - 03 Silver Creek Rd. Build a 26 ft. wide by 100 ft. long bridge 100. The low water crossing at Silver Creek Rd., across silver creek, floods during and after heavy rains, trapping approximately 30 residents.	0	0	0	0	0	1	0.0	0.0			Y	vulnerable area
131000120	13	Nueces	Redfish Bay Protection and Enhancement	Coastal Texas Protection and Restoration Feasibility Study - SP1 Restoration of the Dagger, Ransom, and Stedman Island complex via introduction of breakwater and supporting reefballs along the backside of Redfish Bay and on the bayside of the islands.	0	0	0	0	0	0	0.9	0.0			Y	Nature based solution
131000121	13	Nueces	Pelican Cove Sea Gate Replacement	Improve the Pelican Cove sea gates for easier installment & removal. To prevent rising water into the City, existing huge metal gates are lowered into concrete frames with a 10 ton crane. Post storm surge, high water levels make gate removal difficult.	0	0	0	0	0	0	0.0	0.0			Y	sponsor requested; storm surge protection
131000122	13	Nueces	Port Aransas Nature Preserve Stabilization and Restoration	Repair of ship channel revetment breaches on northern Mustang Island; Constructing living shoreline near the ship channel; Rebuilding marsh/wetland habitat; Repair of Charlie's Pasture bulkhead; and Permitting this site for elevation via dredged material.	1	0	0	0	0	0	1.7	1.7			Y	Nature based solution
131000123	13	Nueces	Conn Brown Harbor Bulkhead Improvements	Install bulkheads at Conn Brown Harbor to protect new and existing buildings and infrastructure.	6	0	52	0	0	0	0.0	0.0			Y	high need from the stakeholder interview
131000124	13	Nueces	City of Three Rivers City-Wide Drainage Study	City of Three Rivers City-Wide Drainage Study. Study to specifically focus on flood risk in the Hackberry Creek and Frio River watershed.	5	0	0	0	0	87	0.1	0.9			Y	high need area, helps with Goal 5 (structures in floodplain)
131000125	13	Nueces	County Wide Drainage Master Plan Study	Drainage Master Planning Study - Bee County	1617	792	6275	27	34	400	113.1	10462.9			Y	vulnerable area
131000126	13	Nueces	Beeville City-wide Drainage Study	Beeville City-wide Drainage Study	671	477	2931	18	13	136	13.4	13.7			Y	sponsor requested; vulnerable area
131000128	13	Nueces	Citywide Stormwater Drainage Improvements - Gregory	Improving TXDOT road drainage ditches & railroad undercrossings conveyance; armor ditch crossing US-181 and I-35 (South of city); city ditch restoration; expand stormwater network to unserved residential areas; maintenance of curbs, gutters, and inlets	5577	4182	10683	23	13	914	287.6	30917.0			Y	High risk area; includes emergency evacuation routes

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131000130	13	Nueces	Portland Stream Gauges	San Patricio County Hazard Mitigation Action Plan - City of Portland, Action #5 Identify and install stream and rain gauges at critical sites, upgrade gauges at established sites where necessary, coordinate installation requests.	285	251	600	3	0	87	19.1	267.5			Y	sponsor requested; vulnerable area
131000131	13	Nueces	Citywide Stormwater Drainage Improvements - Taft	Expanding the current stormwater network in residential areas. Reconstructing/regrading the roads to allow water to flow in the natural drainage direction instead of ponding.	89	81	180	0	0	34	1.7	99.3			Y	vulnerable area
131000132	13	Nueces	City of Taft Flood Study	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #6 Complete a comprehensive flood study for FEMA flood mapping. Adopt higher floodplain development standards, above th e minimum required based on the results of the flood stud y.	89	81	180	0	0	34	1.7	99.3			Y	vulnerable area
131000133	13	Nueces	Webb County Becerra Creek Headwater Flood Study	Flood study to define existing flood risk and potential flood risk reduction projects for subdivisions located in the vicinity of Highway 59.	97	82	35	0	0	15	8.5	0.5			Y	high need and vulnerable area, helps with Goal 5 (structures in floodplain)
131000134	13	Nueces	Aransas County Flood Response Plan	Aransas County Multi-Jurisdictional Floodplain Management Plan - Action 3.1.f: A flood response plan that will identify outreach projects that can be utilized to implement a flood information program.	3334	2828	4790	4	0	548	103.3	571.3			Y	sponsor requested; vulnerable area
131000135	13	Nueces	Purchase Land Behind Aransas Pass Levees	Purchase land behind levees to prevent people from building in a floodplain area. This will allow the City to use this land for preventing further flooding.	89	26	318	0	0	29	4.9	0.3			Y	high need from the stakeholder interview
131000136	13	Nueces	San Patricio County Repetitive Loss Property Reduction	San Patricio County Hazard Mitigation Action Plan - San Patricio County, County Wide, Action #1: Identify and implement actions such as flood proofing, elevation, acquisition, relocation, and retrofitting to reduce risk for repetitive loss properties.	5577	4182	10683	23	13	914	287.6	30917.0			Y	vulnerable area
131000137	13	Nueces	Aransas Pass Homeowner Buyout Program	Develop and implement a buyout program. The purpose is to buy out land owners in areas that have had repeated monetary lose due to storm flooding.	914	639	2022	0	0	138	32.1	4.8			Y	high need from the stakeholder interview
131000138	13	Nueces	Sinton Repetitive Loss Property Reduction	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #13: Identify and implement feasible actions to reduce risk for r epetitive loss properties.	762	612	2145	2	0	87	15.1	69.1			Y	vulnerable area
131000139	13	Nueces	Drainage Improvements - FM 1069 to McCampbell Slough	Easement Acquisition and the design and construction of 10,000 LF of drainage channels along FM 1069 and from Morgan Lane and Mooney Lane to McCampbell Slough. Addresses the flood prone Mooney-Vickery area.	0	0	0	0	0	3	0.3	0.3			Y	priority project for the sponsor
131000140	13	Nueces	Morgan Avenue & Mooney Avenue Drainage Improvements	2,500 LF of improved channels and below ground concrete boxes. The project would also include easement acquisition and the crossing of both SH 361 and the UP Railroad and concrete outfall. Addresses the flood prone Mooney-Morgan area.	0	0	0	0	0	5	0.1	0.0			Y	priority project for the sponsor
131000141	13	Nueces	Outfall No. 10	Hazard mitigation drainage improvements for the City of Port Aransas. Outfall 10 is 3 5'x2' RCBs and extends Southwest from the Northwest end of Howard Blvd to a nearby basin.	125	80	263	0	0	18	2.6	0.7			Y	helps maintain a hurricane evacuation route
131000142	13	Nueces	Outfall No. 9	Hazard mitigation drainage improvements for the City of Port Aransas. The outfall has a 8'x3' RCB extending West from HWY 361 to an existing basin, 441 ft. North of the HWY 361 and Access Road 1A intersection.	69	45	131	2	0	8	2.8	0.9			Y	helps maintain a hurricane evacuation route

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131000143	13	Nueces	Outfall No. 5	Hazard mitigation drainage improvements for the City of Port Aransas. The outfall is composed of two 48" RCPs and extend West from HWY 361 to a nearby basin. Outfall is	32	31	53	0	0	8	2.2	2.0			Y	helps maintain a hurricane evacuation route
				361 ft. South of Mustang Blvd and HWY 361 intersection.												
131000144	13	Nueces	Outfall No. 2	Hazard mitigation drainage improvements for the City of Port Aransas. Outfall 2 is a trapezoidal channel and goes northwest from SH 361 to an existing basin. Outfall is approximately 5.7 miles SSW of Aransas along SH 361.	0	0	0	0	0	1	0.4	0.9			Y	helps maintain a hurricane evacuation route
131000145	13	Nueces	Fulton West Drainage Improvements	Collection System Improvements include inlets, drain pipes, manholes or junction boxes, collection swales, and connection of the system to existing major drainage outfalls.	25	14	45	1	0	10	0.8	0.0			Y	priority based on stakeholder interview
131000146	13	Nueces	Fulton East Drainage Improvements	Collection system improvements include collection swales, inlets, drain pipes, manholes or junction boxes, and collection of the system to existing major drainage outfalls or the construction of new outfalls.	32	11	56	0	0	22	1.3	0.0			Y	priority based on stakeholder interview
131000147	13	Nueces	Town of Fulton Palmetto Outfall Improvements	New storm drain pipes, inlets, and channel improvements with new outfall structure to Aransas Bay. Reduce frequency of roadway flooding and risk of property flooding in Southern Fulton, Northern Rockport, and Rockport CC/Tulle Creek area	23	15	36	0	0	17	0.5	0.0			Y	priority based on stakeholder interview
131000148	13	Nueces	Kinney St. Pump Station Inlet Modifications	It is recommended that modifications be made to increase the size and capacity of the inlet to the Kinney Street Pump Station.	2	0	55	0	0	0	0.0	0.0			Y	sponsor requested
131000149	13	Nueces	Power St. Pump Station Improvements	Improvements to the inlet of Power Street Power Station will improve upstream drainage hydraulics throughout the basin. It is proposed to widen the inlet as much as possible to reduce headloss at the Power Station Inlet.	1	0	17	0	0	0	0.0	0.0			Y	sponsor requested
131000150	13	Nueces	12th Street Drainage Improvements	Construct drainage channel from 12th St to Bee Tree Circle and increase capacity of drainage structure under Bee Tree Circle.	0	0	0	0	0	0	0.0	0.0			Y	high need from the stakeholder interview
131000151	13	Nueces	Aransas County Drainage Improvements - Henderson Street Property - Project 4	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #28: Precinct 3 - Henderson Street Property - Project 4. Reduce flood risk to buildings and infrastructure by making improvements to the County drainage system	0	0	0	0	0	0	0.0	0.0			Y	sponsor requested; vulnerable area
131000152	13	Nueces	San Patricio County Hazard Mitigation Action Plan - City of Mathis, Action #9	Equip manholes with water tight covers/inflow guards; Raise sewage lift stations electrical systems above BFE; Floodproof sewage treatment plants in flood hazard areas	54	48	53	0	0	34	1.1	16.7			Y	sponsor requested
131000153	13	Nueces	Cove Harbor Bulkhead Construction	Cove Harbor Bulkhead Construction	1	0	3	0	0	0	0.0	0.0			Y	sponsor requested; vulnerable area
131000154	13	Nueces	Kleberg County Drainage Improvement Study	COASTAL BEND MITIGATION ACTION PLAN - KL - 13: Improve drainage to county roads, Pcts 1 & 3, heavy rains cause road flooding and standing water to ditches. The overflow of stormwater has produced some flooding to residential homes and properties.	17	17	42	0	1	9	0.8	2.6			Y	vulnerable area
131000155	13	Nueces	Citywide Stormwater Drainage Improvements - Odem	Drainage issues at railroad undercrossings caused by neighborhood development.	0	0	0	0	0	0	0.0	0.0			Y	vulnerable area
131000156	13	Nueces	Expanding Drainage System to Odem HS Area	Expanding and improving drainage network to Odem HS area and constructing a detention basin	0	0	0	0	0	0	0.0	0.1			Y	vulnerable area
131000157	13	Nueces	Improvements to Doyle Drainage Basin	Improvement to outfall into Nueces bay; increase conveyance capacity of ditches.	5	5	10	0	0	1	0.0	0.0			Y	sponsor requested; vulnerable area
131000158	13	Nueces	Channel Outfall Drainage Improvement Project	Improving outfall structures to Chiltipin Creek	0	0	0	0	0	4	0.1	0.0			Y	vulnerable area
131000159	13	Nueces	Citywide Stormwater Drainage Improvements - Sinton	Improving drainage on ditches along TXDOT roads and conveyance on railroad undercrossings.	0	0	0	0	0	0	0.0	0.0			Y	vulnerable area
131000160	13	Nueces	Expanding Drainage System to Newly Developed Areas	Expanding the citywide drainage system to include the newly developed residential areas	0	0	0	0	0	0	0.0	9.4			Y	vulnerable area

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131000161	13	Nueces	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #15	Clean and repair stormwater drains. Upgrade undersized stormwater drains.	762	612	2145	2	0	87	15.1	69.1			Y	vulnerable area
131000162	13	Nueces	Aransas County Griffith Street Drainage Improvements	Aransas County Griffith Street Drainage Improvements	0	0	0	0	0	0	0.0	1.9			Y	sponsor requested; vulnerable area
131000163	13	Nueces	Aransas County Drainage Improvements - Southeast 35 - Project 2	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #25: Precinct 1/1A - Southeast 35 - Project 2. Reduce flood risk to buildings and infrastructure by making improvements to the County drainage system	1	1	1	0	0	3	0.7	0.7			Y	sponsor requested; vulnerable area
131000164	13	Nueces	Aransas County Drainage Improvements - Southeast 35 - Project 1	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #26: Precinct 1/1A - Southeast 35 - Project 1. Reduce flood risk to buildings and infrastructure by making improvements to the County drainage system	68	57	54	0	0	26	2.8	1.8			Y	sponsor requested; vulnerable area
131000165	13	Nueces	Aransas County Drainage Improvements - Project 3	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #62: Master Plan - Drainage Improvements - Project 3 - Market St (FM1069) at SH 35 Bypass, Hickory & Steart	0	0	0	0	0	0	0.0	0.0			Y	sponsor requested; vulnerable area
131000166	13	Nueces	Nueces Delta Preserve Project - Land Acquisition	This master plan envisions that the delta land identified here will likely become part of the Nueces Delta Preserve via voluntary coordination with private landowners.	58	52	106	0	0	9	5.2	200.8			Y	Nature based solution
131000170	13	Nueces	Nueces Off-Channel Reservoir near Lake Corpus Christi	The Nueces OCR at the proposed location could be operated to capture water that would otherwise spill from LCC while still maintaining freshwater inflows to the Nueces Bay and Estuary (B&E) and could potentially reduce flood events downstream of LCC.	0	0	0	0	0	2	0.1	8.0			Y	high need for combined benefits of water supply/flood mitigation
131000171	13	Nueces	Sediment Removal in Lake Corpus Christi	The accumulation of sediment in Lake Corpus Christi is a long-term concern. The 2001 Costal Bend Regional Water Plan studied a water supply option that involved the dredging of Lake Corpus Christi.	702	537	675	0	0	35	7.2	227.7			Y	high need for combined benefits of water supply/flood mitigation
131000172	13	Nueces	Diversion from the Nueces River to Choke Canyon	Rent large, high capacity mobile diesel pumps to pump water from Nueces River to Choke Canyon during flood events.	0	0	0	0	0	1	0.0	0.3			Y	high need for combined benefits of water supply/flood mitigation
131000173	13	Nueces	Pipeline between Choke Canyon Reservoir and Lake Corpus Christi	A 2001 study showed that losses in the natural streams between CCR and LCC could possibly be prevented by a transmission pipeline. The pipeline can also provide flood mitigation benefits with a two-way operation via pumping.	2	0	24	0	0	3	0.4	1.4			Y	high need for combined benefits of water supply/flood mitigation
131000174	13	Nueces	Nueces Basin early flood warning system	Develop Flood Preparedness Toolsets Using Streamgaging and Flood Inundation Mapping to develop a basin wide early flood warning system.	60967	42976	136543	445	526	7401	3214.5	251437.0			Y	major issue in Leakey on Frio, Camp Wood on Nueces, Atascosa County, helps meet Goal 3 (flood warning system)

Appendix A.10
Flood Management Strategies Recommended by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Est number of struct at flood risk	Habitable struct at flood risk	Est Popul at flood risk	Critical facilities at flood risk (#)	Number of low water crossings at flood risk (#)	Est number of road closures (#)	Est length of roads at flood risk (Miles)	Est active farm & ranch land at flood risk (acres)	Exist or Anticipated Models (year)	Exist or Anticipated Maps (year)	RFPG Recommend. (Y/N)	Reason for Recomm.
131000175	13	Nueces	Nueces Basin low water crossing study and upgrade prioritization	Conduct an inventory of low water crossings (LWC), characterize risk, and rank low water crossings to prioritize those with high risk. Prepare a large scale public outreach campaign aimed at reducing loss of life. Address top 30% of high risk LWC.	60967	42976	136543	445	526	7401	3214.5	251437.0			Y	major life safety issue in upper basin due to flash flooding and numerous low water crossings, needed to meet Goal 1 (Low Water Crossings)
131000176	13	Nueces	Nueces Basin High Hazard Dam identification and risk assessment	The region currently has 116 TCEQ regulated dams. Of these, 7 are 'non-functional' and 9 are 'deficient'. This study would identify all deficient high hazard dams in the region and recommend the removal or rehabilitation of the most high hazard dams.	60967	42976	136543	445	526	7401	3214.5	251437.0			Y	needed to meet Goal 2 (high hazard dams)
131000178	13	Nueces	Nueces Basin Assessment of Flood Mitigation and Performance of Nature-based Solutions (NBS)	Basin-wide analysis on the flood mitigation value of select nature-based solutions (NBS) at a variety of scales and land use types, looking for consistent, accurate, and broadly applicable methods to quantify flood mitigation benefits of NBS.	60967	42976	136543	445	526	7401	3214.5	251437.0			Y	needed to meet Goal 7 (nature-based practices)

Appendix A.10

Flood Management Strategies Recommended by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Est number of struct at flood risk	Habitable struct at flood risk	Est Popul at flood risk	Critical facilities at flood risk (#)	Number of low water crossings at flood risk (#)	Est number of road closures (#)	Est length of roads at flood risk (Miles)	Est active farm & ranch land at flood risk (acres)	Exist or Anticipated Models (year)	Exist or Anticipated Maps (year)	RFPG Recommend. (Y/N)	Reason for Recomm.
131000179	13	Nueces	Scaling Up Nature Based Solutions (NBS) in the Nueces Flood Planning Region to support community resilience and enhance flood and hazard mitigation planning	Multi-jurisdictional feasibility analyses will be performed in targeted areas to identify a prioritized portfolio of NBS flood mitigation projects and strategies that consider both risk reduction and ecological benefits.	60967	42976	136543	445	526	7401	3214.5	251437.0			Y	needed to meet Goal 7 (nature-based practices)
131000180	13	Nueces	Petronilla Drainage Improvements Feasibility Study	Petronilla Drainage Improvements Feasibility Study	0	0	0	0	0	2	0.2	3.1			Y	helps maintain a hurricane evacuation route
131000181	13	Nueces	COASTAL BEND MITIGATION ACTION PLAN - NU - 64	To improve drainage throughout the City of Agua Dulce, it is necessary to properly assess the community drainage needs and establish a local prioritization plan to serve as a guide to successful flood mitigation.	213	177	407	15	0	26	7.3	1.1			Y	high need, In vulnerable area
131000177	13	Nueces	Nueces Basin Floodplain Map Updates	Develop floodplain maps to NFHL level for HUC 12 watershed areas that have a high flood risk (risk score > 3.0 per the Regional Flood Plan) but do not currently have accurate mapping. Accurate mapping is defined as NFHL level accuracy.	60967	42976	136543	445	526	4499	3214.5	251437.0			Y	needed to meet Goal 4 (floodplain maps)

Appendix A11 – TWDB Table 16 – Flood Mitigation Projects Recommended by RFPG

(Not provided at this time as no projects recommended)

Appendix A12 – TWDB Table 17 – Flood Management Strategies Recommended by RFPG

Appendix A.12
Flood Management Strategies Recommended by RFPG

FMS ID	FMS Name	Description	Associated Goals (ID)	Counties	HUC12s	Watersheds	Strategy Type	Strategy Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need (Y/N)	Esitimated Total Stategy Cost ($)	Potential Funding Sources and Amount
132000001	Education and Outreach	Create a public outreach program to educate the community on the benefits of building code enforcement and flood hazard mitigation strategies. Also, coordinate regionally regarding flood early warning systems currently implemented in our region.	13000024	Medina	121101070109,121101070201,121101070202,121101070203,121101070204	13000322,13000325,13000329,13000330,13000333	Education and Outreach	28.38	Riverine, Urban,	13002953	00000005,00000255,00000290,13002953	Y	$ 375,000.00	-
132000002	Review and Adoption of Updated Building Codes	Review and Adoption of Updated Building Codes	13000016	Medina	121101070109,121101070201,121101070202,121101070203,121101070204	13000322,13000325,13000329,13000330,13000333	Regulatory and Guidance	28.38	Riverine, Urban,	13002953	00000005,00000255,00000290,13002953	Y	$ 100,000.00	-
132000003	Subdivision Ordinance Revision	Create new Subdivision Ordinance and development standards to ensure the city is proactive in our regulatory practices and to ensure that the standards align with flood hazard mitigation strategies.	13000016	Medina	121101070109,121101070201,121101070202,121101070203,121101070204	13000322,13000325,13000329,13000330,13000333	Regulatory and Guidance	28.38	Riverine, Urban,	13002953	00000005,00000255,00000290,13002953	Y	$ 100,000.00	-
132000004	Update City's Flood Hazard Mitigation Ordinance	Update the City's Flood Hazard Mitigation Ordinance to ensure proper regulation of NFIP requirements and to implement higher standards of floodplain management.	13000016	Medina	121101070109,121101070201,121101070202,121101070203,121101070204	13000322,13000325,13000329,13000330,13000333	Regulatory and Guidance	28.38	Riverine, Urban,	13002953	00000005,00000255,00000290,13002953	Y	$ 100,000.00	-
132000006	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #1	Place flood gauges upstream of flood-prone areas to alert citizens to quickly rising waters.	13000007	Atascosa,Wilson,Medina,Bexar,La Salle,McMullen,Live Oak,Frio,Karnes			Flood Measurement and Warning	1214.85	Riverine, Coastal, Urban,	00000096	00000005,00000007,13000086,13000089,13000093,00000096,00000100,00000255,00000260,00000282,00000290,00000299,00000392,13002446,13003116,13003117,13003118,13003214,13003216	Y	$ 300,000.00	-
132000007	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #5	Inventory of all low water crossing in the county and develop a prioritize projects in a COP for upgrades or replacement.	13000001	Atascosa,Wilson,Medina,Bexar,La Salle,McMullen,Live Oak,Frio,Karnes			Infrastructure Projects	1214.85	Riverine, Coastal, Urban,	00000096	00000005,00000007,13000086,13000089,13000093,00000096,00000100,00000255,00000260,00000282,00000290,00000299,00000392,13002446,13003116,13003117,13003118,13003214,13003216	Y	$ 60,000.00	-
132000009	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #12	Eastablish and implement a voluntary "acquistion and demo program" to address repetitive loss to floodprone properties.	13000013, 13000020	Atascosa,Wilson,Medina,Bexar,La Salle,McMullen,Live Oak,Frio,Karnes			Property Acquisition and Structural Elevation	1214.85	Riverine, Coastal, Urban,	00000096	00000005,00000007,13000086,13000089,13000093,00000096,00000100,00000255,00000260,00000282,00000290,00000299,00000392,13002446,13003116,13003117,13003118,13003214,13003216	Y	$ 600,000.00	-
132000011	Atascosa McMullen Hazard Mitigation Plan - City of Charlotte Action #7	The enforcement of the flood damage prevention ordinance	13000016	Atascosa	121101090402,121101090404,121101100401	13000397,13000399,13000426	Regulatory and Guidance	1.97	Riverine, Urban,	13003214	00000096,00000255,00000290,13003214	Y	$ 75,000.00	-
132000014	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #3	Enforcement of flood damage prevention ordinance	13000016	Atascosa	121101100206,121101100402,121101100405	13000419,13000427,13000428	Regulatory and Guidance	3.48	Riverine, Urban,	13003116	00000096,00000255,00000290,13003116	Y	$ 75,000.00	-
132000015	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #6	Install educational signage such as "turn around don't drown" at high risk low water crossings	13000002	Atascosa	121101100206,121101100402,121101100405	13000419,13000427,13000428	Education and Outreach	3.48	Riverine, Urban,	13003116	00000096,00000255,00000290,13003116	Y	$ 25,000.00	-
132000016	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #4	Maintain Storm Drainage System	13000013	Atascosa	121101100206,121101100402,121101100405	13000419,13000427,13000428	Infrastructure Projects	3.48	Riverine, Urban,	13003116	00000096,00000255,00000290,13003116	Y	$ 40,000.00	-
132000024	Atascosa McMullen Hazard Mitigation Plan - City of Poteet Action #2	Increase local enforcement of the flood damage prevention ordinance by hiring a more full time staff	13000016	Atascosa	121101100203	13000416	Regulatory and Guidance	1.66	Riverine, Urban,	13003118	00000096,00000255,00000290,13003118	Y	$ 530,000.00	-
132000027	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Create a Buyout Program for Repetitive Loss P	This action will develop and implement a program to buyout repetitive loss properties to expand drainage systems.	13000013	Jim Wells	121102040404,121102040405	13000496,13000513	Property Acquisition and Structural Elevation	12.7	Riverine, Urban,	13003128	13000080,00000260,00000290,13001788,13003128	Y	$ 5,000,000.00	-
132000028	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Restrict development in high hazard areas (City of Ali	The City of Alice will re-evaluate all existing floodplain construction restrictions to identify strengths and weaknesses and update.	13000016	Jim Wells	121102040404,121102040405	13000496,13000513	Regulatory and Guidance	12.7	Riverine, Urban,	13003128	13000080,00000260,00000290,13001788,13003128	Y	$ 200,000.00	-
132000030	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Mandate Freeboard on Structures to Reduce Flooding Damage	Jim Wells County will re-evaluate all existing floodplain construction restrictions to identify strengths and weaknesses in order to produce a new ordinance, update its existing flood damage prevention ordinance, and / or update its zoning code.	13000016	Brooks,Kleberg,Nueces,Duval,Jim Wells,San Patricio,Live Oak			Regulatory and Guidance	867.95	Riverine, Urban,	13000080	13000079,13000080,13000081,13000089,00000260,00000290,13000409,13000585,13000779,13000842,13001666,13001741,13001788,13003127,13003128,13003130,13003131	Y	$ 200,000.00	-
132000036	Jim Wells County Flood Warning System	A county wide flood warning system	13000007	Brooks,Kleberg,Nueces,Duval,Jim Wells,San Patricio,Live Oak			Flood Measurement and Warning	867.95	Riverine, Urban,	13000080	13000079,13000080,13000081,13000089,00000260,00000290,13000409,13000585,13000779,13000842,13001666,13001741,13001788,13003127,13003128,13003130,13003131	Y	$ 250,000.00	-

Appendix A.12
Flood Management Strategies Recommended by RFPG

FMS ID	FMS Name	Description	Associated Goals (ID)	Counties	HUC12s	Watersheds	Strategy Type	Strategy Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need (Y/N)	Esitimated Total Stategy Cost ($)	Potential Funding Sources and Amount
132000037	Citywide Stormwater System Inspection	Inspect the City's storm water infrastructure to determine needed repairs.	13000013	Kleberg,Nueces,San Patricio	121101110706,121101110705,121101110707,121102010001,121102010003,121102010005,121102010004,121102020200,121102020106,121102020104,121102020101,121102020105,121102020102,121102020103,121102020107,121102020300,121102030100,121102030206	13000442,13000447,13000448,13000479,13000481,13000482,13000608,13000609,13000610,13000611,13000612,13000613,13000614,13000615,13000616,13000617,13000618,13000619,13000620,13000621,13000622,13000623,13000624	Other	158.01	Riverine, Coastal, Urban, Other,	13002900	13000077,13000078,13000081,00000260,00000290,13000409,13000585,13000876,13000981,13000982,13001739,13002900,13002930,13003368	Y	$ 250,000.00	-
132000038	Flood Mitigation Public Education	Design and implement a program for public education. The program will educate citizens on methods of hazard mitigation and risk reduction. To be incorporated into Aransas County's floodplain management program as part of CRS.	13000022	Nueces,San Patricio,Aransas,Refugio	121004040000,121004070404,121004070402,121004030200,121004050400,121004050203,121004050305,121004050204,121004050304,121004050306,121004050307,121004050308,121004050303,121004050205,121004050302,121004050102,121004050103,121004050505	13000026,13000028,13000592,13000594,13000595,13000596,13000597,13000598,13000599,13000600,13000602,13000603,13000606,13000607,13000627	Education and Outreach	281.79	Riverine, Coastal, Urban,	00000083	13000078,13000081,00000083,00000084,00000260,00000264,00000290,00000291,13000381,13000409,13000576,13000585,13000586,00000714,13000727,00000758,13000881,13000981,13001044,00001608,13002735,13002900,13003368,13003450,13003451	Y	$ 50,000.00	-
132000039	Aransas County Wetlands Preservation Plan	Aransas County Texas Multi-Jurisdisctinal Hazard Mitigation Action Plan - Action #4: Create a county-wide wetlands preservation plan	13000008, 13000020	Nueces,San Patricio,Aransas,Refugio	121004040000,121004070404,121004070402,121004030200,121004050400,121004050203,121004050305,121004050204,121004050304,121004050306,121004050307,121004050308,121004050303,121004050205,121004050302,121004050102,121004050103,121004050505	13000026,13000028,13000592,13000594,13000595,13000596,13000597,13000598,13000599,13000600,13000602,13000603,13000606,13000607,13000627	Regulatory and Guidance	281.79	Riverine, Coastal, Urban,	00000083	13000078,13000081,00000083,00000084,00000260,00000264,00000290,00000291,13000381,13000409,13000576,13000585,13000586,00000714,13000727,00000758,13000881,13000981,13001044,00001608,13002735,13002900,13003368,13003450,13003451	Y	$ 5,000,000.00	-
132000040	Aransas County Flood Warning System	The county needs flood warning systems throughout the region.	13000007	Nueces,San Patricio,Aransas,Refugio	121004040000,121004070404,121004070402,121004030200,121004050400,121004050203,121004050305,121004050204,121004050304,121004050306,121004050307,121004050308,121004050303,121004050205,121004050302,121004050102,121004050103,121004050505	13000026,13000028,13000592,13000594,13000595,13000596,13000597,13000598,13000599,13000600,13000602,13000603,13000606,13000607,13000627	Flood Measurement and Warning	281.79	Riverine, Coastal, Urban,	00000083	13000078,13000081,00000083,00000084,00000260,00000264,00000290,00000291,13000381,13000409,13000576,13000585,13000586,00000714,13000727,00000758,13000881,13000981,13001044,00001608,13002735,13002900,13003368,13003450,13003451	Y	$ 250,000.00	-
132000041	Bee County Emergency Warning System	COASTAL BEND MITIGATION ACTION PLAN - BE - 05: Emergency Warning and Public Information System, Bee County and the City of Beeville's capacity to communicate warnings and emergency information to residents is limited to a siren in Beeville's city limits.	13000007	San Patricio,Refugio,Bee,Live Oak,Goliad,Karnes			Flood Measurement and Warning	878.78	Riverine, Urban,	13000087, 13002711	13000087,13000089,00000090,00000095,00000255,00000260,00000264,00000282,00000290,13000409,13000585,00000714,00000758,13001487,13001488,13002711	Y	$ 250,000.00	-
132000042	San Patricio County Dam Failure Education Program	San Patricio County Hazard Mitigation Action Plan - San Patricio County, Action #5: Develop and implement a dam failure hazard education program to provide information on the potential for dam failure and th	13000022	Nueces,Jim Wells,San Patricio,Aransas,Refugio,Bee,Live Oak			Education and Outreach	704.79	Riverine, Coastal, Urban,	13000081	13000087,13000089,00000090,00000095,00000255,00000260,00000264,00000282,00000290,13000409,13000585,00000714,00000758,13001487,13001488,13002711	Y	$ 50,000.00	-
132000043	Ingleside on the Bay Flood Mitigation Policy	San Patricio County Hazard Mitigation Action Plan - City of Ingleside on the Bay, Action #11: Adopt ASFPM's "No Adverse Impact" policy to mitigate local flooding	13000007	Nueces,San Patricio	121102010003,121102010005	13000481,13000482	Regulatory and Guidance	0.31	Riverine, Coastal, Urban,	13003248	13000078,13000081,00000260,00000290,13000409,13000585,13000586,13002900,13002930,13003248	Y	$ 100,000.00	-
132000044	Odem Flood Mitigation Policy	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #5: Adopt higher floodplain standards above the minimum requirements to provide additional flood protection to new development	13000007	San Patricio	121004070302,121102010001	13000031,13000479	Regulatory and Guidance	1.27	Riverine, Urban,	13003412	13000081,00000260,00000290,13000409,13000585,13000586,13003412	Y	$ 100,000.00	-
132000045	Odem Flood Awareness Program	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #15: Implement a flood awareness program by providing FEMA/NFIP materials to mortgage lenders, real estate agents and insurance agents and place them in local libraries.	13000022	San Patricio	121004070302,121102010001	13000031,13000479	Education and Outreach	1.27	Riverine, Urban,	13003412	13000081,00000260,00000290,13000409,13000585,13000586,13003412	Y	$ 50,000.00	-
132000046	Portland Flood Mitigation Policy	San Patricio County Hazard Mitigation Action Plan - City of Portland, Action #4: Adopt higher floodplain standards above the minimum requirements to provide additional flood protection to new development	13000007	Nueces,San Patricio	121004070403,121102010002,121102010003,121102010005,121102010004	13000043,13000480,13000481,13000482,13000624	Regulatory and Guidance	15.13	Riverine, Coastal, Urban,	13003233	13000078,13000081,00000260,00000290,13000409,13000585,13000586,13002900,13003233	Y	$ 100,000.00	-
132000047	Sinton Flood Mitigation Policy	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #2: Adopt higher floodplain standards above the minimum requirements to provide additional flood protection to new development	13000007	San Patricio	121004070302,121004070303,121004070304	13000031,13000034,13000046	Regulatory and Guidance	2.97	Riverine, Urban,	13002864	13000081,00000260,00000290,13000409,13000585,13002864	Y	$ 100,000.00	-
132000048	Floodplain Management Training	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #14: Cross-train building inspectors in floodplain management requirements.	13000007	San Patricio	121004070302,121004070303,121004070304	13000031,13000034,13000046	Education and Outreach	2.97	Riverine, Urban,	13002864	13000081,00000260,00000290,13000409,13000585,13002864	Y	$ 75,000.00	-
132000049	Taft Flood Awareness Program	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #11: Educate community on the dangers of low water crossings through the installation of warning signs and promotion of "Turn Around, Don't Drown" program	13000007, 13000022	San Patricio	121004070403,121004070305	13000043,13000044	Education and Outreach	1.67	Riverine, Coastal, Urban,	13002882	13000081,00000260,00000290,13000409,13000585,13000586,13002882	Y	$ 25,000.00	-
132000050	Nueces Basin Minimum Flood Management Standards	Promote minimum flood management standards) and identify and promote best practices to maintain drainage structures. Minimum flood management standards to require 1 ft above 100-year BFE or based on local ordinances, whichever is more stringent.	13000016	Atascosa,Wilson,Kinney,Uvalde,Medina,Bexar,Bandera,Real,Edwards,Kerr,Brooks,Kenedy,Jim Hogg,Kleberg,Nueces,Duval,Jim Wells,San Patricio,Webb,Aransas,Refugio,Dimmit,La Salle,McMullen,Bee,Live Oak,Goliad,Maverick,Zavala,F			Regulatory and Guidance	24051.79	Riverine, Coastal, Urban, Other,	00000290	13000001,00000005,00000007,00000011,00000015,00000021,00000022,00000073,00000074,00000076,13000077,13000078,13000079,13000080,13000081,00000082,00000083,00000084,13000085,13000086,13000087,13000089,00000090,00000091,13000092,13000093,00000095,00000096,000	N	$ 100,000.00	-

Appendix A.12
Flood Management Strategies Recommended by RFPG

FMS ID	FMS Name	Description	Associated Goals (ID)	Counties	HUC12s	Watersheds	Strategy Type	Strategy Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need (Y/N)	Esitimated Total Stategy Cost ($)	Potential Funding Sources and Amount
132000051	Nueces Basin flood public information campaign	Identify local, subregional workgroups aligned with flooding issues. Develop public information campaign templates with relevant flood-related communications.	13000028	Atascosa,Wilson,Kinney,Uvalde,Medina,Bexar,Bandera,Real,Edwards,Kerr,Brooks,Kenedy,Jim Hogg,Kleberg,Nueces,Duval,Jim Wells,San Patricio,Webb,Aransas,Refugio,Dimmit,La Salle,McMullen,Bee,Live Oak,Goliad,Maverick,Zavala,F			Education and Outreach	24051.79	Riverine, Coastal, Urban, Other,	00000290	13000001,00000005,00000007,00000011,00000015,00000021,00000022,00000073,00000074,00000076,13000077,13000078,13000079,13000080,13000081,00000082,00000083,00000084,13000085,13000086,13000087,13000089,00000090,00000091,13000092,13000093,00000095,00000096,000	N	$ 100,000.00	-
132000052	Shell Point Ranch Wetlands Protection	Texas Coastal Resiliency Master Plan - R3-5: Acquisition of approx 400 acres of coastal habitats and the southernmost extents of mima mounds at Shell Point Ranch. The acquisition also would mitigate flooding and storm surge damage to the area.	13000020	Aransas	121004050103,121004050205	13000607,13000627	Property Acquisition and Structural Elevation	1.08	Riverine, Coastal,	00003593	00000083,00000260,13003452	Y	$ 5,100,000.00	-
132000053	Aransas County Coastal Erosion Response Plan	Aransas County Texas Multi-Jurisdisctinal Hazard Mitigation Action Plan - Action #9: Create an erosion response plan. New and existing buildings and infrastructure will benefit from coastal erosion protection	13000016	Aransas	121004070404,121004070402,121004050400,121004050203,121004050305,121004050204,121004050304,121004050306,121004050307,121004050308,121004050303,121004050302,121004050102,121004050103,121102020200,121004050205	13000026,13000028,13000592,13000594,13000595,13000596,13000597,13000598,13000599,13000600,13000602,13000603,13000606,13000607,13000608,13000627	Other	458.96	Riverine, Coastal, Urban,	00000083	00000083	Y	$ 2,650.00	County and Municipal Budgets, Coastal Management Program (CMP) Grant -
132000054	Aransas County Educational Signage Program	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.1.e: Develop and install educatinal signage regarding flood safety to located along low areas of roadways likey to flood.	13000001	Aransas	121004070404,121004070402,121004050400,121004050203,121004050305,121004050204,121004050304,121004050306,121004050307,121004050308,121004050303,121004050302,121004050102,121004050103,121102020200,121004050205	13000026,13000028,13000592,13000594,13000595,13000596,13000597,13000598,13000599,13000600,13000602,13000603,13000606,13000607,13000608,13000627	Education and Outreach	458.96	Riverine, Coastal, Urban,	00000083	00000083	Y	$ 7,000.00	Local Budget, GOMA Award -
132000055	Aransas Pass Flood Mitigation Policy	Incorporate higher floodplain management standards into City of Aransas Pass comprehensive plan update.	13000017	Aransas	121004050400,121004050204,121102020200	13000592,13000596,13000608	Regulatory and Guidance	52.4	Riverine, Coastal, Urban,	13002735	13002735	Y	$ 81,000.00	-
132000056	Duval County Master Plan- Refine City of Freer Earthen Channel Maintenance Program	Revamp maintenance program for clearing excess debris and vegetation from the earthen channel. Prioritize the cross drains on the upstream side of the earthen channel.	13000025	Duval	121101051001	13000224	Other	0.02	Urban,	13000079	13000079,00000260,13001665,13003411,13003452	Y	$ 40,000.00	-
132000057	Duval County Master Plan- Adopt and Enforce Design Standards and Ordinances in Freer	Adopt and enforce design standards and ordinances for new construction projects. Separate design standards exclusively about drainage should be considered.	13000016	Duval	121101051001	13000224	Regulatory and Guidance	4.11	Urban,	13000079	13000079,00000260,00000290,13001665,13001666,13003411,13003452	Y	$ 100,000.00	-
132000058	Duval County Master Plan- Procure Easements for Drainage Infrastructure in Freer	Significant structures in Freer's drainage system are on private property, and the city does not have an access or maintenance easement. Freer should procure easements to these locations so structures can be maintained without private party involvement.	13000025	Duval	121101051001	13000224	Other	4.11	Urban,	13000079	13000079,00000260,00000290,13001665,13001666,13003411,13003452	Y	$ 20,000.00	-
132000059	Duval County Master Plan- Clean and Maintain Drainage Infrastructure in San Diego	Clear, clean, and maintain current stormwater drainage infrastructure such as curbs and gutters on roads, culverts, ditches, inlets, and outfalls into San Diego Creek.	13000025	Duval,Jim Wells	121102040304,121102040309,121102040310	13000505,13000508,13000509	Other	1.9	Riverine, Urban,	13000079, 13000080	13000079,13000080,00000260,00000290,13001666,13001741,13003127,13003452	Y	$ 205,000.00	-
132000060	Duval County Master Plan- Adopt and Enforce Design Standards and Ordinances in San Diego	Adopt and enforce design standards and ordinances for new construction projects. Separate design standards exclusively about drainage should be considered.	13000016	Duval,Jim Wells	121102040304,121102040309,121102040310	13000505,13000508,13000509	Regulatory and Guidance	1.65	Riverine, Urban,	13000079, 13000080	13000079,13000080,00000260,00000290,13001666,13001741,13003127,13003452	Y	$ 100,000.00	-

Appendix A.12
Flood Management Strategies Recommended by RFPG

			Flood Risk										Reduction in Flood Risk																	
FMS ID	FMS Name	Description	Area in 100yr (1% annual chance) Floodplain	Area in 500yr (0.2% annual chance) Floodplain	Estimated number of structures at 100yr flood risk	Habitable structures at flood risk	Estimated Population at flood risk	Critical facilities at flood risk (#)	Low water crossings at flood risk (#)	Estimated road closures (#)	Estimated length of roads at flood risk (Miles)	Estimated active farm land at flood risk (acres)	Number of structures with reduced 1% Flood risk	Number of structures removed from 1% Flood risk	Number of structures removed from 0.2% Flood risk	Habitable structures removed from 1% Flood risk	Estimated Pop removed from 100yr (1% annual chance) Flood risk	Critical facilities removed from 1% Flood risk (#)	Number of low water crossings removed from 1% Flood risk (#)	Estimated reduction in road closure occurrences	Estimated length of roads removed from 1% flood risk (Miles)	Estimated active farm & ranch land removed from 1% flood risk (acres)	Estimated reduction in fatalities (if available)	Estimated reduction in injuries (if available)	Cost/ Structure removed	Consideration of Nature-based Solution (Y/N)	Negative Impact (Y/N)	Negative Impact Mitigation (Y/N)	Water Supply Benefit (Y/N)	RFPG Recommendation (Y/N)	Reason for Recommendation
132000001	Education and Outreach	Create a public outreach program to educate the community on the benefits of building code enforcement and flood hazard mitigation strategies. Also, coordinate regionally regarding flood early warning systems currently implemented in our region.	4.44	1.23	592.00	425.00	2211.00	3.00	5.00	67.00	15.00	1095.85													0	Yes	N		N	Y	high need, in vulnerable area
132000002	Review and Adoption of Updated Building Codes	Review and Adoption of Updated Building Codes	4.44	1.23	592.00	425.00	2211.00	3.00	5.00	67.00	15.00	1095.85													0	Yes	N		N	Y	high need, in vulnerable area
132000003	Subdivision Ordinance Revision	Create new Subdivision Ordinance and development standards to ensure the city is proactive in our regulatory practices and to ensure that the standards align with flood hazard mitigation strategies.	4.44	1.23	592.00	425.00	2211.00	3.00	5.00	67.00	15.00	1095.85													0	Yes	N		N	Y	high need, in vulnerable area
132000004	Update City's Flood Hazard Mitigation Ordinance	Update the City's Flood Hazard Mitigation Ordinance to ensure proper regulation of NFIP requirements and to implement higher standards of floodplain management.	4.44	1.23	592.00	425.00	2211.00	3.00	5.00	67.00	15.00	1095.85													0	Yes	N		N	Y	high need, in vulnerable area
132000006	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #1	Place flood gauges upstream of flood-prone areas to alert citizens to quickly rising waters.	189.68	63.27	1947.00	1498.00	3669.00	1.00	28.00	570.00	141.00	3068.91													0	Yes	N		N	Y	high need area
132000007	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #5	Inventory of all low water crossing in the county and develop a prioritize projects in a COP for upgrades or replacement.	189.68	63.27	1947.00	1498.00	3669.00	1.00	28.00	570.00	141.00	3068.91													0	Yes	N		N	Y	high need area
132000009	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #12	Eastablish and implement a voluntary "acquistion and demo program" to address repetitive loss to floodprone properties.	189.68	63.27	1947.00	1498.00	3669.00	1.00	28.00	570.00	141.00	3068.91													0	Yes	N		N	Y	high need area
132000011	Atascosa McMullen Hazard Mitigation Plan - City of Charlotte Action #7	The enforcement of the flood damage prevention ordinance	0.08	0.04	3.00	3.00	4.00	0.00	0.00	10.00	0.00	0.00													0	Yes	N		N	Y	high need area
132000014	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #3	Enforcement of flood damage prevention ordinance	0.19	0.15	18.00	11.00	113.00	0.00	0.00	25.00	1.00	1.34													0	Yes	N		N	Y	high need area
132000015	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #6	Install educational signage such as "turn around don't drown" at high risk low water crossings	0.19	0.15	18.00	11.00	113.00	0.00	0.00	25.00	1.00	1.34													0	Yes	N		N	Y	high need area
132000016	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #4	Maintain Storm Drainage System	0.19	0.15	18.00	11.00	113.00	0.00	0.00	25.00	1.00	1.34													0	Yes	N		N	Y	high need area
132000024	Atascosa McMullen Hazard Mitigation Plan - City of Poteet Action #2	Increase local enforcement of the flood damage prevention ordinance by hiring a more full time staff	0.30	0.06	259.00	224.00	471.00	0.00	0.00	35.00	5.00	0.76													0	Yes	N		N	Y	high need area
132000027	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Create a Buyout Program for Repetitive Loss	This action will develop and implement a program to buyout repetitive loss properties to expand drainage systems.	3.96	6.54	893.00	572.00	6681.00	8.00	4.00	296.00	19.00	131.84													0	Yes	N		N	Y	high need area
132000028	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Restrict development in high hazard areas (City of Alice)	The City of Alice will re-evaluate all existing floodplain construction restrictions to identify strengths and weaknesses and update.	3.96	6.54	893.00	572.00	6681.00	8.00	4.00	296.00	19.00	131.84													0	Yes	N		N	Y	high need area
132000030	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Mandate Freeboard on Structures to Reduce Flooding Damage	Jim Wells County will re-evaluate all existing floodplain construction restrictions to identify strengths and weaknesses in order to produce a new ordinance, update its existing flood damage prevention ordinance, and / or update its zoning code.	201.35	53.99	2398.00	1145.00	8685.00	9.00	13.00	624.00	201.00	25815.62													0	Yes	N		N	Y	high need area
132000036	Jim Wells County Flood Warning System	A county wide flood warning system	201.35	53.99	2398.00	1145.00	8685.00	9.00	13.00	624.00	201.00	25815.62													0	Yes	N		N	Y	high need area

Appendix A.12
Flood Management Strategies Recommended by RFPG

			Flood Risk										Reduction in Flood Risk																
FMS ID	FMS Name	Description	Area in 100yr (1% annual chance) Floodplain	Area in 500yr (0.2% annual chance) Floodplain	Estimated number of structures at 100yr flood risk	Habitable structures at flood risk	Estimated Population at flood risk	Critical facilities at flood risk (#)	Low water crossings at flood risk (#)	Estimated road closures (#)	Estimated length of roads at flood risk (Miles)	Estimated active farm land at flood risk (acres)	Number of structures with reduced 1% Flood risk	Number of structures removed from 1% Flood risk	Number of structures removed from 0.2% Flood risk	Habitable structures removed from 1% Flood risk	Estimated Pop removed from 100yr (1% annual chance) Flood risk	Critical facilities removed from 1% Flood risk (#)	Number of low water crossings removed from 1% Flood risk (#)	Estimated reduction in road closure occurrences	Estimated length of roads removed from 1% flood risk (Miles)	Estimated active farm & ranch land removed from 1% flood risk (acres)	Estimated reduction in fatalities (if available)	Estimated reduction in injuries (if available)	Cost/ Structure removed	Consideration of Nature-based Solution (Y/N)	Negative Impact (Y/N)	Negative Impact Mitigation (Y/N)	Water Supply Benefit (Y/N)	RFPG Recommendation (Y/N)	Reason for Recommendation
132000037	Citywide Stormwater System Inspection	Inspect the City's storm water infrastructure to determine needed repairs.	40.82	18.17	18577.00	16324.00	61330.00	114.00	0.00	2089.00	375.00	3908.27													0	Yes	N		N	Y	High risk area
132000038	Flood Mitigation Public Education	Design and implement a program for public education. The program will educate citizens on methods of hazard mitigation and risk reduction. To be incorporated into Aransas County's floodplain management program as part of CRS.	111.33	37.82	3334.00	2828.00	4790.00	4.00	0.00	548.00	103.00	571.30													0	Yes	N		N	Y	High risk area
132000039	Aransas County Wetlands Preservation Plan	Aransas County Texas Multi-Jurisdisctinal Hazard Mitigation Action Plan - Action #4: Create a county-wide wetlands preservation plan	111.33	37.82	3334.00	2828.00	4790.00	4.00	0.00	548.00	103.00	571.30													0	Yes	N		N	Y	Nature Based Solution
132000040	Aransas County Flood Warning System	The county needs flood warning systems throughout the region.	111.33	37.82	3334.00	2828.00	4790.00	4.00	0.00	548.00	103.00	571.30													0	Yes	N		N	Y	High risk area
132000041	Bee County Emergency Warning System	COASTAL BEND MITIGATION ACTION PLAN - BE - 05: Emergency Warning and Public Information System, Bee County and the City of Beeville's capacity to communicate warnings and emergency information to residents is limited to a siren in Beeville's city limits.	163.19	45.33	1617.00	792.00	6275.00	27.00	34.00	399.00	113.00	10462.88													0	Yes	N		N	Y	High risk area
132000042	San Patricio County Dam Failure Education Program	San Patricio County Hazard Mitigation Action Plan - San Patricio County, Action #5: Develop and implement a dam failure hazard education program to provide information on the potential for dam failure and its consequences	179.43	38.36	5577.00	4182.00	10683.00	23.00	13.00	913.00	288.00	30916.99													0	Yes	N		N	Y	High risk area
132000043	Ingleside on the Bay Flood Mitigation Policy	San Patricio County Hazard Mitigation Action Plan - City of Ingleside on the Bay, Action #11: Adopt ASFPM's "No Adverse Impact" policy to mitigate local flooding	0.09	0.02	157.00	153.00	232.00	0.00	0.00	20.00	2.00	0.00													0	Yes	N		N	Y	provide regional support of local policies
132000044	Odem Flood Mitigation Policy	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #5: Adopt higher floodplain standards above the minimum requirements to provide additional flood protection to new development	0.24	0.08	137.00	110.00	293.00	0.00	0.00	18.00	3.00	38.44													0	Yes	N		N	Y	provide regional support of local policies
132000045	Odem Flood Awareness Program	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #15: Implement a flood awareness program by providing FEMA/NFIP materials to mortgage lenders, real estate agents and insurance agents and place them in local libraries.	0.24	0.08	137.00	110.00	293.00	0.00	0.00	18.00	3.00	38.44													0	Yes	N		N	Y	provide regional support of local policies
132000046	Portland Flood Mitigation Policy	San Patricio County Hazard Mitigation Action Plan - City of Portland, Action #4: Adopt higher floodplain standards above the minimum requirements to provide additional flood protection to new development	1.89	0.71	285.00	251.00	600.00	3.00	0.00	87.00	19.00	267.55													0	Yes	N		N	Y	provide regional support of local policies
132000047	Sinton Flood Mitigation Policy	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #2: Adopt higher floodplain standards above the minimum requirements to provide additional flood protection to new development	1.23	0.54	762.00	612.00	2145.00	2.00	0.00	87.00	15.00	69.11													0	Yes	N		N	Y	provide regional support of local policies
132000048	Floodplain Management Training	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #14: Cross-train building inspectors in floodplain management requirements.	1.23	0.54	762.00	612.00	2145.00	2.00	0.00	87.00	15.00	69.11													0	Yes	N		N	Y	provide regional support of local policies
132000049	Taft Flood Awareness Program	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #11: Educate community on the dangers of low water crossings through the installation of warning signs and promotion of "Turn Around, Don't Drown" program	0.35	0.14	89.00	81.00	180.00	0.00	0.00	34.00	2.00	99.32													0	Yes	N		N	Y	High risk area
132000050	Nueces Basin Minimum Flood Management Standards	Promote minimum flood management standards) and identify and promote best practices to maintain drainage structures. Minimum flood management standards to require 1 ft above 100-year BFE or based on local ordinances, whichever is more stringent.	4540.08	1278.58	60967.00	42976.00	136543.00	445.00	526.00	7400.00	3215.00	251436.97													0	Yes	N		N	Y	needed to meet Goal 6 (min. flood standards)

Appendix A.12
Flood Management Strategies Recommended by RFPG

			Flood Risk										Reduction in Flood Risk																
FMS ID	FMS Name	Description	Area in 100yr (1% annual chance) Floodplain	Area in 500yr (0.2% annual chance) Floodplain	Estimated number of structures at 100yr flood risk	Habitable structures at flood risk	Estimated Population at flood risk	Critical facilities at flood risk (#)	Low water crossings at flood risk (#)	Estimated road closures (#)	Estimated length of roads at flood risk (Miles)	Estimated active farm land at flood risk (acres)	Number of structures with reduced 1% Flood risk	Number of structures removed from 1% Flood risk	Number of structures removed from 0.2% Flood risk	Habitable structures removed from 1% Flood risk	Estimated Pop removed from 100yr (1% annual chance) Flood risk	Critical facilities removed from 1% Flood risk (#)	Number of low water crossings removed from 1% Flood risk (#)	Estimated reduction in road closure occurrences	Estimated length of roads removed from 1% flood risk (Miles)	Estimated active farm & ranch land removed from 1% flood risk (acres)	Estimated reduction in fatalities (if available)	Estimated reduction in injuries (if available)	Cost/ Structure removed	Consideration of Nature-based Solution (Y/N)	Negative Impact (Y/N)	Negative Impact Mitigation (Y/N)	Water Supply Benefit (Y/N)	RFPG Recommendation (Y/N)	Reason for Recommendation
132000051	Nueces Basin flood public information campaign	Identify local, subregional workgroups aligned with flooding issues. Develop public information campaign templates with relevant flood-related communications.	4540.08	1278.58	60967.00	42976.00	136543.00	445.00	526.00	7400.00	3215.00	251436.97													0	Yes	N		N	Y	needed to meet Goal 8 (flood public information campaign)
132000052	Shell Point Ranch Wetlands Protection	Texas Coastal Resiliency Master Plan - R3-5: Acquisition of approx 400 acres of coastal habitats and the southernmost extents of mima mounds at Shell Point Ranch. The acquisition also would mitigate flooding and storm surge damage to the area.	1.02	0.06	1.00	1.00	1.00	0.00	0.00	0.00	1.00	4.55													0	Yes	N		N	Y	Nature based solution
132000053	Aransas County Coastal Erosion Response Plan	Aransas County Texas Multi-Jurisdisctinal Hazard Mitigation Action Plan - Action #9: Create an erosion response plan. New and existing buildings and infrastructure will benefit from coastal erosion protection	18.55	6.30	3334.00	2828.00	4790.00	4.00	0.00	548.00	103.00	571.25													0	Yes	N		N	Y	priority based on stakeholder interview
132000054	Aransas County Educational Signage Program	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.1.e: Develop and install educatinal signage regarding flood safety to located along low areas of roadways likey to flood.	18.55	6.30	3334.00	2828.00	4790.00	4.00	0.00	548.00	103.00	571.25													0	Yes	N		N	Y	sponsor requested; vulnerable area
132000055	Aransas Pass Flood Mitigation Policy	Incorporate higher floodplain management standards into City of Aransas Pass comprehensive plan update.	4.34	0.21	914.00	639.00	2022.00	0.00	0.00	138.00	32.00	4.77													0	Yes	N		N	Y	provide regional support of local policies
132000056	Duval County Master Plan- Refine City of Freer Earthen Channel Maintenance Program	Revamp maintenance program for clearing excess debris and vegetation from the earthen channel. Prioritize the cross drains on the upstream side of the earthen channel.	0.02	0.00	37.00	28.00	46.00	0.00	0.00	9.00	0.00	0.00													0	Yes	N		N	Y	Vulnerable area
132000057	Duval County Master Plan- Adopt and Enforce Design Standards and Ordinances in Freer	Adopt and enforce design standards and ordinances for new construction projects. Separate design standards exclusively about drainage should be considered.	0.80	0.20	259.00	173.00	343.00	0.00	0.00	38.00	5.00	10.36													0	Yes	N		N	Y	Vulnerable area
132000058	Duval County Master Plan- Procure Easements for Drainage Infrastructure in Freer	Significant structures in Freer's drainage system are on private property, and the city does not have an access or maintenance easement. Freer should procure easements to these locations so structures can be maintained without private party involvement.	0.80	0.20	259.00	173.00	343.00	0.00	0.00	38.00	5.00	10.36													0	Yes	N		N	Y	Vulnerable area
132000059	Duval County Master Plan- Clean and Maintain Drainage Infrastructure in San Diego	Clear, clean, and maintain current stormwater drainage infrastructure such as curbs and gutters on roads, culverts, ditches, inlets, and outfalls into San Diego Creek.	0.42	0.16	207.00	170.00	482.00	0.00	0.00	57.00	6.00	3.55													0	Yes	N		N	Y	High risk area
132000060	Duval County Master Plan- Adopt and Enforce Design Standards and Ordinances in San Diego	Adopt and enforce design standards and ordinances for new construction projects. Separate design standards exclusively about drainage should be considered.	0.30	0.13	210.00	176.00	489.00	0.00	0.00	57.00	6.00	0.81													0	Yes	N		N	Y	High risk area

Appendix A13 – TWDB Table 19 – Funding Survey

RFPG #	Sponsor Entity Name	FMS or FMP or FME	FMS FMP FME - Name	Regional plan's unique FMS/FMP/FME identification number	Target year of full implementation*	Estimated costs in plan			Estimated percent (share) of total FMS, FMP, or FME estimated cost			
									Sponsor Funding		Other Funding Needed (including state, federal and/ or other funding)	TOTAL (auto) sum must = 100%
						Non-construction costs	Construction-related costs	Total estimated cost	ANTICIPATED SOURCE of Sponsor funding (e.g., taxes; general revenue; dedicated revenue incl. fees)	FUNDING TO BE FINANCED BY SPONSOR (incl. those local, county, or regional mechanisms available but not yet fully utilized)		
13	Pleasanton	FME	Others (Flood Prevention/Planning Study, LOMR etc)	131000005	2030	$79,000	$0	$79,000	Unknown	**10%**	**90%**	**100%**
13	Camp Wood	FME	Camp Wood City-wide Drainage Study	131000006	2030	$250,000	$0	$250,000	Unknown	**0%**	**100%**	**100%**
13	Hondo	FME	City of Hondo Drainage Master Plan and Flood Mitigation plan	131000007	2030	$250,000	$0	$250,000	General Fund, Other	**10%**	**90%**	**100%**
13	Medina	FME	D'Hanis Flood Study	131000008	2030	$250,000	$0	$250,000	Permitting Fees	**10%**	**90%**	**100%**
13	Hondo	FME	Comprehensive Plan Update	131000009	2030	$200,000	$0	$200,000	General Fund, Other	**10%**	**90%**	**100%**
13	Hondo	FME	Flood mapping updates and hydrologic and hydraulic modeling	131000010	2030	$523,000	$0	$523,000	General Fund, Other	**10%**	**90%**	**100%**
13	Hondo	FME	Drainage and Stormwater Master Plan	131000011	2030	$250,000	$0	$250,000	General Fund, Other	**10%**	**90%**	**100%**
13	Hondo	FME	Emergency Management Plan and Flood Hazard Mitigation Plan	131000012	2030	$300,000	$0	$300,000	General Fund, Other	**10%**	**90%**	**100%**
13	Hondo	FME	Feasibility Study for Regional detention	131000013	2030	$250,000	$0	$250,000	General Fund, Other	**10%**	**90%**	**100%**
13	Natalia	FME	City of Natalia Floodplain Study	131000014	2030	$48,000	$0	$48,000	Unknown	**0%**	**100%**	**100%**

13	Crystal City	FME	Crystal City City-wide Drainage Study	131000016	2030	$250,000	$0	$250,000	Unknown	**10%**	**90%**	**100%**
13	Pleasanton	FME	Atascosa McMullen Hazard Mitigation Plan - City of Pleasanton Action #10	131000018	2040	$3,150,000	$0	$3,150,000	Unknown	**10%**	**90%**	**100%**
13	McMullen	FME	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #2	131000019	2030	$450,000	$0	$450,000	Unknown	**0%**	**100%**	**100%**
13	McMullen	FME	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #3	131000020	2030	$50,000	$0	$50,000	Unknown	**0%**	**100%**	**100%**
13	McMullen	FME	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #5	131000021	2030	$10,000	$0	$10,000	Unknown	**0%**	**100%**	**100%**
13	Atascosa	FME	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #9	131000022	2030	$250,000	$0	$250,000	Unknown	**10%**	**90%**	**100%**
13	Atascosa	FME	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #10	131000023	2030	$850,000	$0	$850,000	Unknown	**10%**	**90%**	**100%**
13	Charlotte	FME	Atascosa McMullen Hazard Mitigation Plan - City of Charlotte Action #3	131000024	2030	$350,000	$0	$350,000	Unknown	**0%**	**100%**	**100%**
13	Christine	FME	Atascosa McMullen Hazard Mitigation Plan - City of Christine Action #2	131000026	2040	$350,000	$0	$350,000	Unknown	**0%**	**100%**	**100%**
13	Jourdanton	FME	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #12	131000027	2030	$225,000	$0	$225,000	Unknown	**10%**	**90%**	**100%**
13	Lytle	FME	Atascosa McMullen Hazard Mitigation Plan - City of Lytle Action #11	131000028	2030	$750,000	$0	$750,000	Unknown	**10%**	**90%**	**100%**

13	Lytle	FME	Atascosa McMullen Hazard Mitigation Plan - City of Lytle Action #4	131000029	2030	$30,000	$0	$30,000	Unknown	**10%**	**90%**	**100%**
13	Poteet	FME	Atascosa McMullen Hazard Mitigation Plan - City of Poteet Action #7	131000031	2040	$38,000	$0	$38,000	Unknown	**10%**	**90%**	**100%**
13	Pearsall	FME	Gilliam Rd Drainage Improvements- FH#9	131000032	2040	$279,000	$0	$279,000	Unknown	**10%**	**90%**	**100%**
13	Pearsall	FME	CR4001 and I-35 Access Road Drainage- FH#10	131000033	2040	$530,000	$0	$530,000	Unknown	**10%**	**90%**	**100%**
13	Alice	FME	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Construct Storm Drainage Infrastructure (City of Alice)	131000037	2040	$159,000	$0	$159,000	Unknown	**10%**	**90%**	**100%**
13	Alice	FME	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Conduct Dam / Levee Failure Studies (City of Alice)	131000039	2040	$106,000	$0	$106,000	Unknown	**10%**	**90%**	**100%**
13	Alice	FME	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Construct New Levees and Improve Existing System	131000040	2040	$159,000	$0	$159,000	Unknown	**10%**	**90%**	**100%**
13	Jim Wells	FME	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Construct Storm Drainage Infrastructure (Jim Wells County)	131000041	2040	$159,000	$0	$159,000	Unknown	**10%**	**90%**	**100%**
13	Jim Wells	FME	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Purchase Portable Pumps	131000042	2030	$40,000	$0	$40,000	Unknown	**10%**	**90%**	**100%**
13	Jim Wells	FME	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Conduct Dam / Levee Failure Studies (Jim Wells County)	131000043	2030	$689,000	$0	$689,000	Unknown	**10%**	**90%**	**100%**
13	Pearsall	FME	Colorado Street Drainage Improvements- FH#1	131000044	2040	$571,000	$0	$571,000	Unknown	**10%**	**90%**	**100%**

13	Pearsall	FME	Trinity Street & N Cherry Street Drainage Improvements- FH#2	131000045	2040	$1,218,000	$0	$1,218,000	Unknown	**10%**	**90%**	**100%**
13	Pearsall	FME	W Comal St & FM 1581 Drainage Channel- FH#3	131000046	2040	$86,000	$0	$86,000	Unknown	**10%**	**90%**	**100%**
13	Pearsall	FME	W Pena St and N Mulberry St Drainage Improvements- FH#4	131000047	2040	$529,000	$0	$529,000	Unknown	**10%**	**90%**	**100%**
13	Pearsall	FME	Pearsall RV Park on Guadalupe Street Drainage Improvements- FH#5	131000048	2040	$367,000	$0	$367,000	Unknown	**10%**	**90%**	**100%**
13	Pearsall	FME	Westview Apartment Detention Pond Underground Drainage- FH#6	131000049	2040	$233,000	$0	$233,000	Unknown	**10%**	**90%**	**100%**
13	Pearsall	FME	S Roosevelt Street and E Haynes Avenue Drainage- FH#7	131000050	2040	$764,000	$0	$764,000	Unknown	**10%**	**90%**	**100%**
13	Pearsall	FME	N Roosevelt Street and Chapparal Road Drainage- FH#8	131000051	2040	$749,000	$0	$749,000	Unknown	**10%**	**90%**	**100%**
13	Jourdanton	FME	Jourdanton Drainage Improvements and Detention/Retention Ponds	131000052	2040	$226,000	$0	$226,000	Unknown	**10%**	**90%**	**100%**
13	Benavides, Duval	FME	Las Animas Conveyance Infrastructure	131000053	2040	$150,000	$0	$150,000	General Fund	**10%**	**90%**	**100%**
13	Benavides, Duval	FME	Benavides Main City Network	131000054	2040	$150,000	$0	$150,000	General Fund	**10%**	**90%**	**100%**
13	Freer, Duval	FME	Upsize Burch St Crossing	131000055	2040	$80,000	$0	$80,000	General Fund	**10%**	**90%**	**100%**

13	San Diego, Duval	FME	Northern San Diego Street Conveyance Improvement	131000056	2040	$250,000	$0	$250,000	General Fund	**10%**	**90%**	**100%**
13	San Diego, Duval	FME	Northern San Diego Drainage Improvement Project	131000057	2040	$250,000	$0	$250,000	General Fund	**10%**	**90%**	**100%**
13	Duval	FME	Realitos Drainage Improvements	131000058	2040	$150,000	$0	$150,000	General Fund	**10%**	**90%**	**100%**
13	Duval	FME	Concepcion Drainage Improvements	131000059	2040	$150,000	$0	$150,000	General Fund	**10%**	**90%**	**100%**
13	San Diego, Duval	FME	Improvements to Drainage Connectivity along Railroad	131000060	2040	$250,000	$0	$250,000	General Fund	**10%**	**90%**	**100%**
13	San Diego, Duval	FME	Improvements to San Diego Levee Outfall System	131000061	2040	$250,000	$0	$250,000	General Fund	**10%**	**90%**	**100%**
13	San Diego, Duval	FME	Southern San Diego Drainage Improvement Project	131000062	2040	$250,000	$0	$250,000	General Fund	**10%**	**90%**	**100%**
13	Alice	FME	Lattas Creek Improvements	131000063	2040	$150,000	$0	$150,000	Unknown	**10%**	**90%**	**100%**
13	Devine	FME	Burnt Boot Creek Drainage Improvement Project	131000064	2040	$506,000	$0	$506,000	Unknown	**10%**	**90%**	**100%**
13	Uvalde	FME	Uvalde City-wide Drainage Study	131000065	2030	$250,000	$0	$250,000	Unknown	**10%**	**90%**	**100%**
13	Frio	FME	Martin Branch Drainage Study	131000066	2030	$150,000	$0	$150,000	None	**0%**	**100%**	**100%**

13	Falfurrias	FME	City of Falfurrias City-Wide Flood Study	131000067	2030	$250,000	$0	$250,000	Unknown	**10%**	**90%**	**100%**
13	Corpus Christi	FME	William's Drive Drainage Improvements Phase 2 - Lexington to Ennis Joslin	131000068	2040	$138,000	$0	$138,000	Storm Water Fund	**10%**	**90%**	**100%**
13	Corpus Christi	FME	William's Drive Drainage Improvements Phase 3 - Rodd Field to Lexington	131000069	2040	$293,000	$0	$293,000	Storm Water Fund	**10%**	**90%**	**100%**
13	Rockport	FME	Downtown Rockport Drainage Study	131000070	2030	$1,090,000	$0	$1,090,000	Unknown	**10%**	**90%**	**100%**
13	Rockport	FME	Easement Outfall Loop 70 & Shell Ridge Rd	131000071	2040	$250,000	$0	$250,000	Unknown	**10%**	**90%**	**100%**
13	Rockport	FME	Rockport County Club Lakes	131000072	2040	$62,000	$0	$62,000	Unknown	**10%**	**90%**	**100%**
13	Beeville	FME	Poesta Creek Drainage Improvements	131000073	2040	$169,000	$0	$169,000	General Fund	**10%**	**90%**	**100%**
13	Ingleside	FME	Ave A 4th Street Extension	131000074	2040	$750,000	$0	$750,000	Bond Program, General Fund	**10%**	**90%**	**100%**
13	Ingleside	FME	Avenue B Drainage Channel Extension and Outfall Improvements	131000075	2040	$750,000	$0	$750,000	Bond Program, General Fund	**10%**	**90%**	**100%**
13	Ingleside	FME	Ave A & 8th St Drainage Improvements	131000076	2040	$231,000	$0	$231,000	Bond Program, General Fund	**10%**	**90%**	**100%**
13	Ingleside	FME	Wright Avenue Drainage Improvements	131000077	2040	$60,000	$0	$60,000	Bond Program, General Fund	**10%**	**90%**	**100%**

13	Live Oak	FME	Airport Rd - Recurring Flooding & Project Location	131000078	2040	$13,000	$0	$13,000	Unknown	**10%**	**90%**	**100%**
13	Refugio	FME	Drainage improvements at Mission River Park in Refugio	131000079	2040	$100,000	$0	$100,000	None	**0%**	**100%**	**100%**
13	San Patricio County Drainage District	FME	Humble Channel Drainage Improvements & Ditch Extension	131000080	2040	$281,000	$0	$281,000	Ad Valorem Tax	**0%**	**100%**	**100%**
13	San Patricio County Drainage District	FME	Drainage Improvements to Outfall Channel - Lateral AN	131000081	2040	$760,000	$0	$760,000	Ad Valorem Tax	**0%**	**100%**	**100%**
13	San Patricio County Drainage District	FME	Drainage Improvements & Ditch Extension for Outfall Channel - Lateral AS	131000082	2040	$871,000	$0	$871,000	Ad Valorem Tax	**0%**	**100%**	**100%**
13	Fulton	FME	Fulton Drainage Master Plan	131000083	2030	$188,000	$0	$188,000	Unknown	**0%**	**100%**	**100%**
13	Aransas Pass	FME	Euclid Stormwater Pump Station Improvements	131000084	2030	$900,000	$0	$900,000	Unknown	**10%**	**90%**	**100%**
13	Rockport	FME	Modify Pump Station Outfalls	131000085	2030	$327,000	$0	$327,000	Unknown	**10%**	**90%**	**100%**
13	Corpus Christi	FME	Oso Creek Channel Bottom Rectification and Green Infrastructure	131000086	2030	$4,751,000	$0	$4,751,000	Storm Water Fund	**10%**	**90%**	**100%**
13	Corpus Christi	FME	Brawner Outfall Improvements	131000087	2040	$459,000	$0	$459,000	Storm Water Fund	**10%**	**90%**	**100%**
13	Corpus Christi	FME	Greenwood WWTP Flood Mitigation and Emergency Generator	131000088	2040	$2,126,000	$0	$2,126,000	Storm Water Fund	**10%**	**90%**	**100%**

13	Corpus Christi	FME	Wesley Seale Dam Inspection	131000089	2030	$375,000	$0	$375,000	Storm Water Fund	**10%**	**90%**	**100%**
13	Corpus Christi	FME	Corpus Christi Police Headquarters Flood Proofing	131000090	2030	$7,000	$0	$7,000	Storm Water Fund	**10%**	**90%**	**100%**
13	Aransas	FME	Upper Tule Storm Drain System	131000091	2040	$2,000,000	$0	$2,000,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Aransas	FME	601 Racine Street Easement & Outfall Project	131000092	2040	$75,000	$0	$75,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Aransas	FME	Club Lake Drainage Channel	131000093	2040	$300,000	$0	$300,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Aransas	FME	Holiday Beach East Drainage System Improvement	131000094	2040	$300,000	$0	$300,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Aransas	FME	Sparks Colony Drainage Improvements	131000095	2040	$225,000	$0	$225,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Aransas	FME	Lee Road Drainage Improvements	131000096	2040	$150,000	$0	$150,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Aransas	FME	Mohawk Ave Drainage Improvements	131000097	2040	$300,000	$0	$300,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Aransas	FME	Nell Road Drainage Improvements	131000098	2040	$150,000	$0	$150,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Aransas	FME	Mack Road Drainage Improvements	131000099	2040	$300,000	$0	$300,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**

13	Aransas	FME	Bee Road Drainage Improvements	131000100	2040	$225,000	$0	$225,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Ingleside on the Bay	FME	Stormwater Master Plan #1 - North of Parkview between Starlight and Sunset Outfall Pipe	131000101	2040	$11,000	$0	$11,000	None	**0%**	**100%**	**100%**
13	Ingleside on the Bay	FME	Stormwater Master Plan #2 - North of Parkview between Sunset and Woodhaven Outfall Pipe	131000102	2040	$7,000	$0	$7,000	None	**0%**	**100%**	**100%**
13	Ingleside on the Bay	FME	Stormwater Master Plan #3 - North of Post Oak between Starlight and Sunset Outfall	131000103	2040	$4,000	$0	$4,000	None	**0%**	**100%**	**100%**
13	Ingleside on the Bay	FME	Stormwater Master Plan #4 - North of Post Oak between Sunset and Woodhaven Outfall	131000104	2040	$11,000	$0	$11,000	None	**0%**	**100%**	**100%**
13	Ingleside on the Bay	FME	Stormwater Master Plan #5 - North of Ebony between Starlight and Sunset Outfall	131000105	2040	$12,000	$0	$12,000	None	**0%**	**100%**	**100%**
13	Ingleside on the Bay	FME	Stormwater Master Plan #6 - Live Oak/Ebony and Woodhaven Improvements and Outfall	131000106	2040	$44,000	$0	$44,000	None	**0%**	**100%**	**100%**
13	Ingleside on the Bay	FME	Stormwater Master Plan #7 - Bayshore East Channel and Culvert Improvements	131000107	2040	$47,000	$0	$47,000	None	**0%**	**100%**	**100%**
13	Ingleside on the Bay	FME	Stormwater Master Plan #8 - Bayshore East Outfall	131000108	2040	$14,000	$0	$14,000	None	**0%**	**100%**	**100%**
13	Ingleside on the Bay	FME	Stormwater Master Plan #9 - Bayshore Court Outfall	131000109	2040	$14,000	$0	$14,000	None	**0%**	**100%**	**100%**
13	Kingsville	FME	FM1356 Channel Improvements	131000111	2040	$100,000	$0	$100,000	Unknown	**10%**	**90%**	**100%**

13	Kingsville	FME	Paulson Falls Subdivision Detention Pond Improvements	131000112	2040	$100,000	$0	$100,000	Unknown	**10%**	**90%**	**100%**
13	Portland	FME	Lang Road Drainage Ditch and Outfall	131000113	2040	$100,000	$0	$100,000	Unknown	**10%**	**90%**	**100%**
13	Beeville	FME	Madison St Low Water Crossing Replacement Project	131000114	2040	$192,000	$0	$192,000	General Fund	**10%**	**90%**	**100%**
13	Nueces	FME	County Road 6- North Carreta Creek Drainage Improvements	131000115	2040	$100,000	$0	$100,000	Unknown	**10%**	**90%**	**100%**
13	Nueces, Town of Tierra Grande	FME	Tierra Grande Subdivision Drainage Improvements Feasibility Study	131000116	2030	$250,000	$0	$250,000	Unknown	**10%**	**90%**	**100%**
13	Coastal Bend Bays and Estuaries Program, U.S. Fish and Wildlife Service, Aransas National Wildlife Refuge, U.S. Department of the Interior	FME	Aransas National Wildlife Refuge Dagger Point Shoreline Preservation	131000117	2040	$398,000	$0	$398,000	Unknown	**0%**	**100%**	**100%**
13	Coastal Bend Bays and Estuaries Program, Texas General Land Office	FME	Nueces River Delta Shoreline Stabilization	131000118	2040	$536,000	$0	$536,000	Unknown	**0%**	**100%**	**100%**
13	Bee	FME	Silver Creek Bridge	131000119	2040	$47,000	$0	$47,000	Unknown	**10%**	**90%**	**100%**
13	Texas General Land Office	FME	Redfish Bay Protection and Enhancement	131000120	2040	$51,613,000	$0	$51,613,000	Unknown	**0%**	**100%**	**100%**
13	Aransas Pass	FME	Pelican Cove Sea Gate Replacement	131000121	2040	$47,000	$0	$47,000	Unknown	**10%**	**90%**	**100%**
13	Port Aransas, Port of Corpus Christi Authority	FME	Port Aransas Nature Preserve Stabilization and Restoration	131000122	2040	$680,000	$0	$680,000	General Fund	**10%**	**90%**	**100%**

13	Aransas Pass	FME	Conn Brown Harbor Bulkhead Improvements	131000123	2040	$164,000	$0	$164,000	Unknown	**10%**	**90%**	**100%**
13	Three Rivers	FME	City of Three Rivers City-Wide Drainage Study	131000124	2030	$250,000	$0	$250,000	Unknown	**10%**	**90%**	**100%**
13	Bee	FME	County Wide Drainage Master Plan Study	131000125	2030	$500,000	$0	$500,000	Unknown	**10%**	**90%**	**100%**
13	Beeville	FME	Beeville City-wide Drainage Study	131000126	2030	$250,000	$0	$250,000	General Fund	**10%**	**90%**	**100%**
13	Gregory	FME	Citywide Stormwater Drainage Improvements - Gregory	131000128	2040	$250,000	$0	$250,000	Permitting Fees, General Fund	**10%**	**90%**	**100%**
13	Portland	FME	Portland Stream Gauges	131000130	2030	$2,000	$0	$2,000	Unknown	**10%**	**90%**	**100%**
13	Taft	FME	Citywide Stormwater Drainage Improvements - Taft	131000131	2040	$150,000	$0	$150,000	Taft	**10%**	**90%**	**100%**
13	Taft	FME	City of Taft Flood Study	131000132	2030	$82,000	$0	$82,000	Taft	**10%**	**90%**	**100%**
13	Webb	FME	Webb County Becerra Creek Headwater Flood Study	131000133	2030	$120,000	$0	$120,000	General Fund	**10%**	**90%**	**100%**
13	Aransas	FME	Aransas County Flood Response Plan	131000134	2030	$50,000	$0	$50,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Aransas Pass	FME	Purchase Land Behind Aransas Pass Levees	131000135	2030	$82,000	$0	$82,000	Unknown	**10%**	**90%**	**100%**

13	San Patricio	FME	San Patricio County Repetitive Loss Property Reduction	131000136	2030	$795,000	$0	$795,000	General Fund	**10%**	**90%**	**100%**
13	Aransas Pass	FME	Aransas Pass Homeowner Buyout Program	131000137	2030	$82,000	$0	$82,000	Unknown	**10%**	**90%**	**100%**
13	Sinton	FME	Sinton Repetitive Loss Property Reduction	131000138	2030	$159,000	$0	$159,000	General Fund	**10%**	**90%**	**100%**
13	Ingleside	FME	Drainage Improvements - FM 1069 to McCampbell Slough	131000139	2040	$113,000	$0	$113,000	Bond Program, General Fund	**10%**	**90%**	**100%**
13	Ingleside	FME	Morgan Avenue & Mooney Avenue Drainage Improvements	131000140	2040	$525,000	$0	$525,000	Bond Program, General Fund	**10%**	**90%**	**100%**
13	Port Aransas	FME	Outfall No. 10	131000141	2040	$130,000	$0	$130,000	General Fund	**10%**	**90%**	**100%**
13	Port Aransas	FME	Outfall No. 9	131000142	2040	$198,000	$0	$198,000	General Fund	**10%**	**90%**	**100%**
13	Port Aransas	FME	Outfall No. 5	131000143	2040	$12,000	$0	$12,000	General Fund	**10%**	**90%**	**100%**
13	Port Aransas	FME	Outfall No. 2	131000144	2040	$48,000	$0	$48,000	General Fund	**10%**	**90%**	**100%**
13	Fulton	FME	Fulton West Drainage Improvements	131000145	2040	$450,000	$0	$450,000	Unknown	**0%**	**100%**	**100%**
13	Fulton	FME	Fulton East Drainage Improvements	131000146	2040	$900,000	$0	$900,000	Unknown	**0%**	**100%**	**100%**

13	Fulton	FME	Town of Fulton Palmetto Outfall Improvements	131000147	2040	$1,500,000	$0	$1,500,000	Unknown	**0%**	**100%**	**100%**
13	Corpus Christi	FME	Kinney St. Pump Station Inlet Modifications	131000148	2040	$117,000	$0	$117,000	Storm Water Fund	**10%**	**90%**	**100%**
13	Corpus Christi	FME	Power St. Pump Station Improvements	131000149	2040	$201,000	$0	$201,000	Storm Water Fund	**10%**	**90%**	**100%**
13	Corpus Christi	FME	12th Street Drainage Improvements	131000150	2040	$150,000	$0	$150,000	Storm Water Fund	**10%**	**90%**	**100%**
13	Aransas	FME	Aransas County Drainage Improvements - Henderson Street Property - Project 4	131000151	2040	$176,000	$0	$176,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Mathis	FME	San Patricio County Hazard Mitigation Action Plan - City of Mathis, Action #9	131000152	2040	$477,000	$0	$477,000	Unknown	**10%**	**90%**	**100%**
13	Aransas County Navigation District	FME	Cove Harbor Bulkhead Construction	131000153	2040	$2,453,000	$0	$2,453,000	Unknown	**0%**	**100%**	**100%**
13	Kleberg	FME	Kleberg County Drainage Improvement Study	131000154	2030	$49,000	$0	$49,000	Unknown	**10%**	**90%**	**100%**
13	Odem	FME	Citywide Stormwater Drainage Improvements - Odem	131000155	2040	$100,000	$0	$100,000	Unknown	**10%**	**90%**	**100%**
13	Odem	FME	Expanding Drainage System to Odem HS Area	131000156	2040	$100,000	$0	$100,000	Unknown	**10%**	**90%**	**100%**
13	Portland	FME	Improvements to Doyle Drainage Basin	131000157	2040	$100,000	$0	$100,000	Unknown	**10%**	**90%**	**100%**

13	Sinton	FME	Channel Outfall Drainage Improvement Project	131000158	2040	$150,000	$0	$150,000	General Fund	**10%**	**90%**	**100%**
13	Sinton	FME	Citywide Stormwater Drainage Improvements - Sinton	131000159	2040	$200,000	$0	$200,000	General Fund	**10%**	**90%**	**100%**
13	Sinton	FME	Expanding Drainage System to Newly Developed Areas	131000160	2040	$150,000	$0	$150,000	General Fund	**10%**	**90%**	**100%**
13	Sinton	FME	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #15	131000161	2040	$477,000	$0	$477,000	General Fund	**10%**	**90%**	**100%**
13	Aransas	FME	Aransas County Griffith Street Drainage Improvements	131000162	2040	$97,000	$0	$97,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Aransas	FME	Aransas County Drainage Improvements - Southeast 35 - Project 2	131000163	2040	$27,000	$0	$27,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Aransas	FME	Aransas County Drainage Improvements - Southeast 35 - Project 1	131000164	2040	$40,000	$0	$40,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Aransas	FME	Aransas County Drainage Improvements - Project 3	131000165	2040	$231,000	$0	$231,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Coastal Bend Bays and Estuaries Program	FME	Nueces Delta Preserve Project - Land Acquisition	131000166	2030	$1,635,000	$0	$1,635,000	Unknown	**0%**	**100%**	**100%**
13	Live Oak	FME	Nueces Off-Channel Reservoir near Lake Corpus Christi	131000170	2040	$65,673,000	$0	$65,673,000	Unknown	**10%**	**90%**	**100%**
13	Live Oak	FME	Sediment Removal in Lake Corpus Christi	131000171	2030	$2,536,000	$0	$2,536,000	Unknown	**10%**	**90%**	**100%**

13	Live Oak	FME	Diversion from the Nueces River to Choke Canyon	131000172	2040	$11,702,000	$0	$11,702,000	Unknown	**10%**	**90%**	**100%**
13	Live Oak	FME	Pipeline between Choke Canyon Reservoir and Lake Corpus Christi	131000173	2040	$40,739,000	$0	$40,739,000	Unknown	**10%**	**90%**	**100%**
13	Nueces River Authority	FME	Nueces Basin early flood warning system	131000174	2050	$250,000	$0	$250,000	None	**0%**	**100%**	**100%**
13	Nueces River Authority	FME	Nueces Basin low water crossing study and upgrade prioritization	131000175	2050	$700,000	$0	$700,000	None	**0%**	**100%**	**100%**
13	Nueces River Authority	FME	Nueces Basin High Hazard Dam identification and risk assessment	131000176	2050	$1,355,000	$0	$1,355,000	None	**0%**	**100%**	**100%**
13	Nueces River Authority	FME	Nueces Basin Floodplain Map Updates	131000177	2050	$51,628,000	$0	$51,628,000	None	**0%**	**100%**	**100%**
13	Nueces River Authority	FME	Nueces Basin Assessment of Flood Mitigation and Performance of Nature-based Solutions (NBS)	131000178	2050	$100,000	$0	$100,000	None	**0%**	**100%**	**100%**
13	Nueces River Authority	FME	Scaling Up Nature Based Solutions (NBS) in the Nueces Flood Planning Region to support community resilience and enhance flood and hazard mitigation planning	131000179	2050	$1,000,000	$0	$1,000,000	None	**0%**	**100%**	**100%**
13	Petronila	FME	Petronilla Drainage Improvements Feasibility Study	131000180	2030	$100,000	$0	$100,000	Unknown	**0%**	**100%**	**100%**
13	Agua Dulce	FME	COASTAL BEND MITIGATION ACTION PLAN - NU - 64	131000181	2030	$250,000	$0	$250,000	Unknown	**10%**	**90%**	**100%**
13	Hondo	FMS	Education and Outreach	132000001	2030	$375,000	$0	$375,000	General Fund, Other	**10%**	**90%**	**100%**

13	Hondo	FMS	Review and Adoption of Updated Building Codes	132000002	2030	$100,000	$0	$100,000	General Fund, Other	**10%**	**90%**	**100%**
13	Hondo	FMS	Subdivision Ordinance Revision	132000003	2030	$100,000	$0	$100,000	General Fund, Other	**10%**	**90%**	**100%**
13	Hondo	FMS	Update City's Flood Hazard Mitigation Ordinance	132000004	2030	$100,000	$0	$100,000	General Fund, Other	**10%**	**90%**	**100%**
13	Atascosa	FMS	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #1	132000006	2030	$300,000	$0	$300,000	Unknown	**10%**	**90%**	**100%**
13	Atascosa	FMS	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #5	132000007	2030	$60,000	$0	$60,000	Unknown	**10%**	**90%**	**100%**
13	Atascosa	FMS	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #12	132000009	2030	$600,000	$0	$600,000	Unknown	**10%**	**90%**	**100%**
13	Charlotte	FMS	Atascosa McMullen Hazard Mitigation Plan - City of Charlotte Action #7	132000011	2030	$75,000	$0	$75,000	Unknown	**0%**	**100%**	**100%**
13	Jourdanton	FMS	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #3	132000014	2030	$75,000	$0	$75,000	Unknown	**10%**	**90%**	**100%**
13	Jourdanton	FMS	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #6	132000015	2030	$25,000	$0	$25,000	Unknown	**10%**	**90%**	**100%**
13	Jourdanton	FMS	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #4	132000016	2030	$40,000	$0	$40,000	Unknown	**10%**	**90%**	**100%**
13	Poteet	FMS	Atascosa McMullen Hazard Mitigation Plan - City of Poteet Action #2	132000024	2030	$530,000	$0	$530,000	Unknown	**10%**	**90%**	**100%**

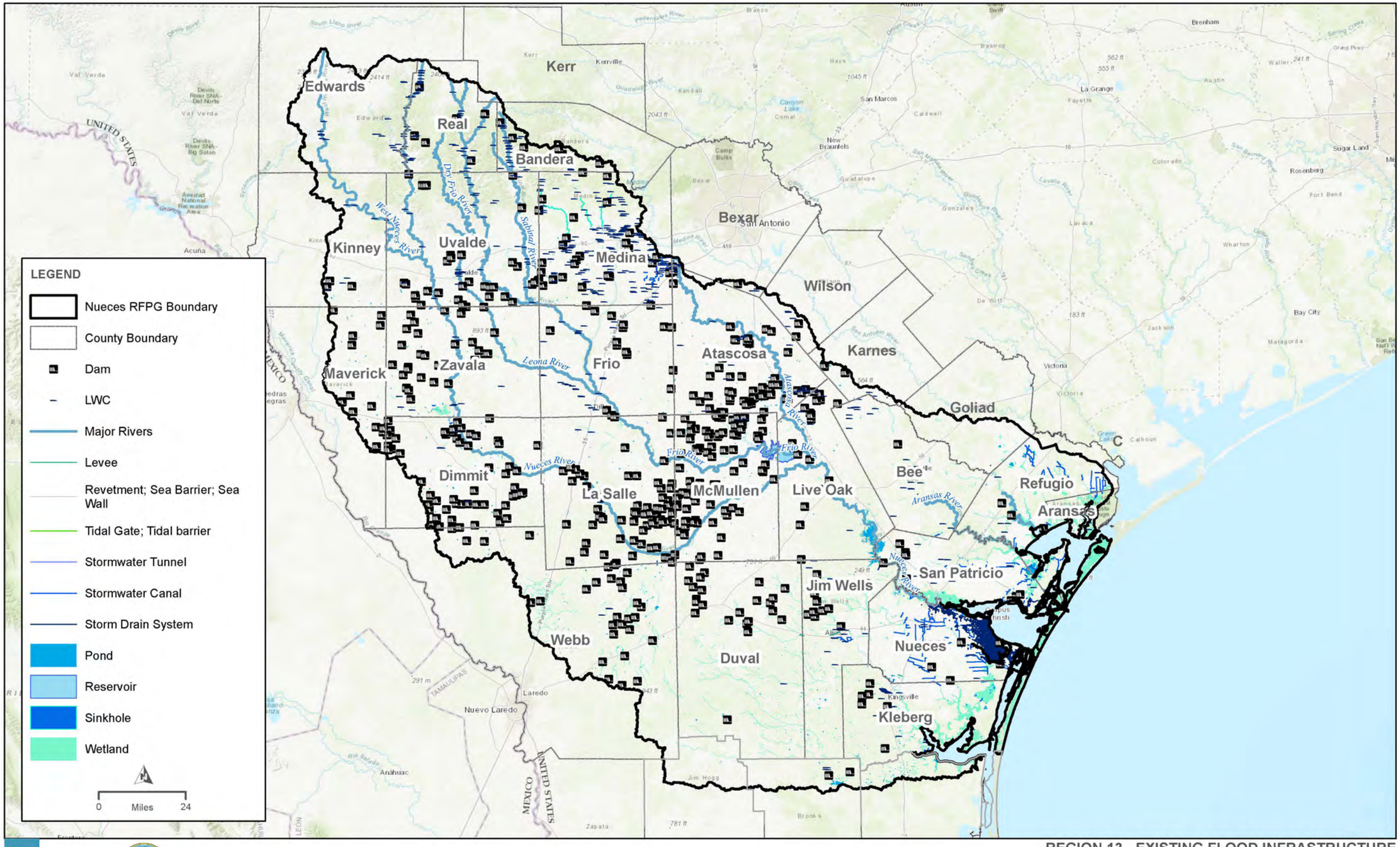
13	Alice	FMS	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Create a Buyout Program for Repetitive Loss Properties	132000027	2030	$5,000,000	$0	$5,000,000	Unknown	**10%**	**90%**	**100%**
13	Alice	FMS	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Restrict development in high hazard areas (City of Alice)	132000028	2030	$200,000	$0	$200,000	Unknown	**10%**	**90%**	**100%**
13	Jim Wells	FMS	City of Alice & Jim Wells County Multi-Hazard Mitigation Plan - Mandate Freeboard on Structures to Reduce Flooding Damage	132000030	2030	$200,000	$0	$200,000	Unknown	**10%**	**90%**	**100%**
13	Jim Wells	FMS	Jim Wells County Flood Warning System	132000036	2030	$250,000	$0	$250,000	Unknown	**10%**	**90%**	**100%**
13	Corpus Christi	FMS	Citywide Stormwater System Inspection	132000037	2030	$250,000	$0	$250,000	Storm Water Fund	**10%**	**90%**	**100%**
13	Aransas	FMS	Flood Mitigation Public Education	132000038	2030	$50,000	$0	$50,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Aransas	FMS	Aransas County Wetlands Preservation Plan	132000039	2030	$5,000,000	$0	$5,000,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Aransas	FMS	Aransas County Flood Warning System	132000040	2030	$250,000	$0	$250,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Bee, Beeville	FMS	Bee County Emergency Warning System	132000041	2030	$250,000	$0	$250,000	General Fund	**10%**	**90%**	**100%**
13	San Patricio	FMS	San Patricio County Dam Failure Education Program	132000042	2030	$50,000	$0	$50,000	General Fund	**10%**	**90%**	**100%**
13	Ingleside on the Bay	FMS	Ingleside on the Bay Flood Mitigation Policy	132000043	2030	$100,000	$0	$100,000	None	**0%**	**100%**	**100%**

13	Odem	FMS	Odem Flood Mitigation Policy	132000044	2030	$100,000	$0	$100,000	Unknown	**10%**	**90%**	**100%**
13	Odem	FMS	Odem Flood Awareness Program	132000045	2030	$50,000	$0	$50,000	Unknown	**10%**	**90%**	**100%**
13	Portland	FMS	Portland Flood Mitigation Policy	132000046	2030	$100,000	$0	$100,000	Unknown	**10%**	**90%**	**100%**
13	Sinton	FMS	Sinton Flood Mitigation Policy	132000047	2030	$100,000	$0	$100,000	General Fund	**10%**	**90%**	**100%**
13	Sinton	FMS	Floodplain Management Training	132000048	2030	$75,000	$0	$75,000	General Fund	**10%**	**90%**	**100%**
13	Taft	FMS	Taft Flood Awareness Program	132000049	2030	$25,000	$0	$25,000	Taft	**10%**	**90%**	**100%**
13	Nueces River Authority	FMS	Nueces Basin Minimum Flood Management Standards	132000050	2030	$100,000	$0	$100,000	None	**0%**	**100%**	**100%**
13	Nueces River Authority	FMS	Nueces Basin flood public information campaign	132000051	2030	$100,000	$0	$100,000	None	**0%**	**100%**	**100%**
13	Texas Parks and Wildlife Department	FMS	Shell Point Ranch Wetlands Protection	132000052	2030	$5,100,000	$0	$5,100,000	Unknown	**0%**	**100%**	**100%**
13	Aransas	FMS	Aransas County Coastal Erosion Response Plan	132000053	2030	$2,650	$0	$2,650	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**
13	Aransas	FMS	Aransas County Educational Signage Program	132000054	2030	$7,000	$0	$7,000	Bond Program, Special Tax Districts, Permitting Fees	**10%**	**90%**	**100%**

13	Aransas Pass	FMS	Aransas Pass Flood Mitigation Policy	132000055	2030	$81,000	$0	$81,000	Unknown	**10%**	**90%**	**100%**
13	Duval	FMS	Duval County Master Plan- Refine City of Freer Earthen Channel Maintenance Program	132000056	2030	$40,000	$0	$40,000	Unknown	**10%**	**90%**	**100%**
13	Duval	FMS	Duval County Master Plan- Adopt and Enforce Design Standards and Ordinances in Freer	132000057	2030	$100,000	$0	$100,000	Unknown	**10%**	**90%**	**100%**
13	Duval	FMS	Duval County Master Plan- Procure Easements for Drainage Infrastructure in Freer	132000058	2030	$20,000	$0	$20,000	Unknown	**10%**	**90%**	**100%**
13	Duval	FMS	Duval County Master Plan- Clean and Maintain Drainage Infrastructure in San Diego	132000059	2030	$205,000	$0	$205,000	Unknown	**10%**	**90%**	**100%**
13	Duval	FMS	Duval County Master Plan- Adopt and Enforce Design Standards and Ordinances in San Diego	132000060	2030	$100,000	$0	$100,000	Unknown	**10%**	**90%**	**100%**

* Expected completion time is 10 years for studies and non-structural FMXs, 20 years for structural FMXs, and 30 years for extensive and or region-wide FMXs.

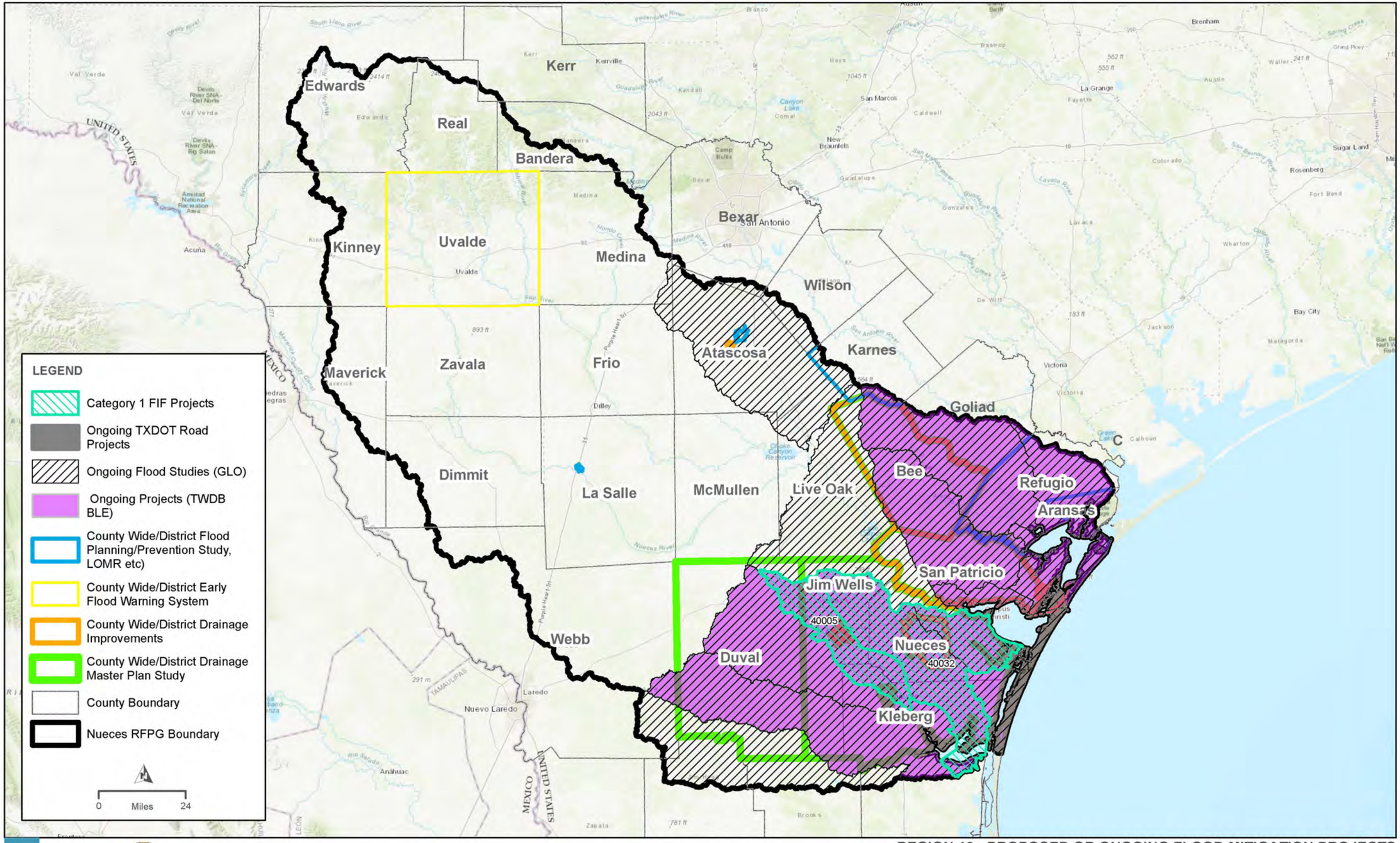
Appendix B1 – TWDB Map 1 - Existing Flood Infrastructure Regional Map



REGION 13 - EXISTING FLOOD INFRASTRUCTURE

MAP 1

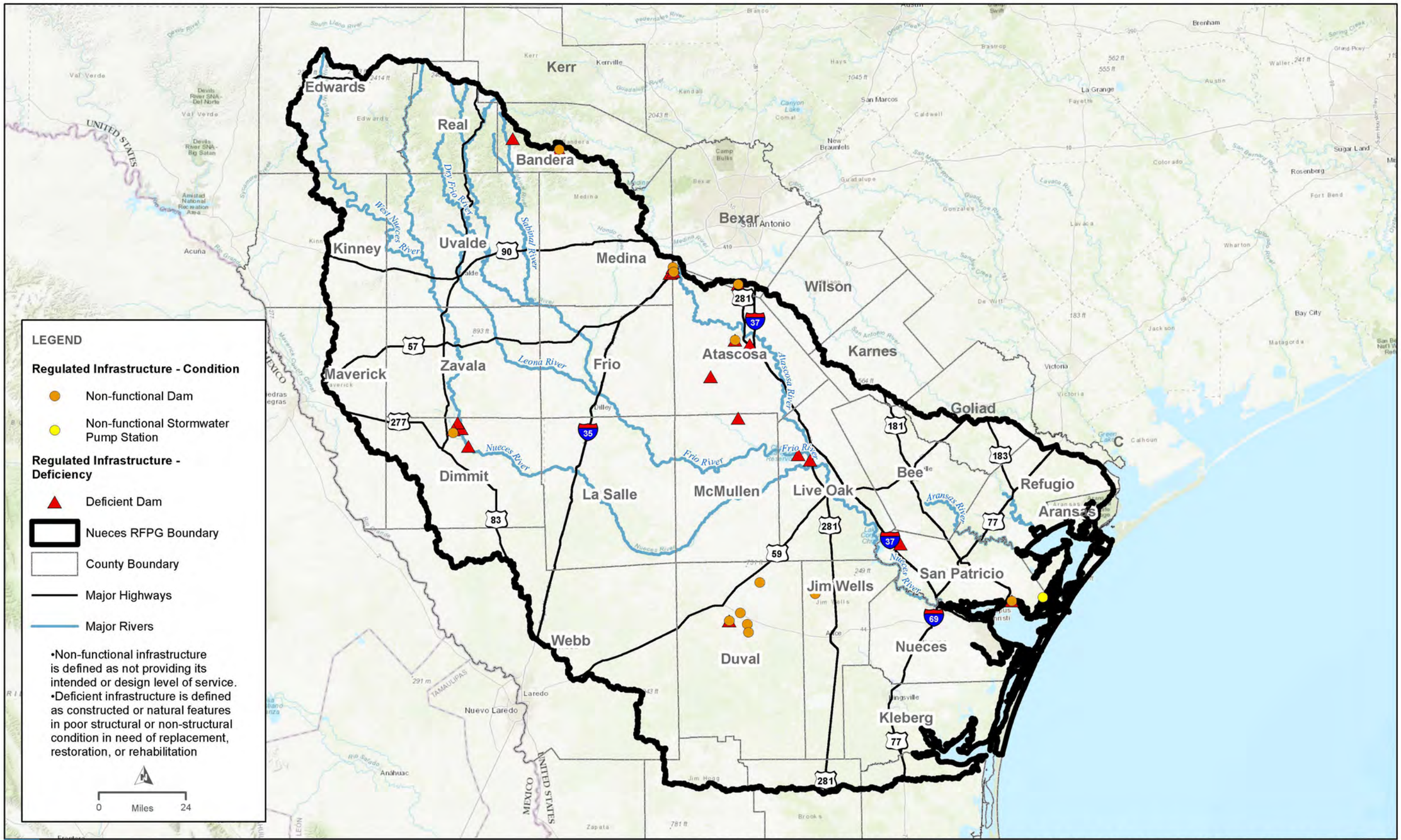
Appendix B2 – TWDB Map 2 - Proposed or Ongoing Flood Mitigation Projects Regional Map



REGION 13 - PROPOSED OR ONGOING FLOOD MITIGATION PROJECTS

MAP 2

Appendix B3 – TWDB Map 3 - Non-Functional or Deficient Flood Mitigation Features or Infrastructure Regional Map



REGION 13 - NON-FUNCTIONAL OR DEFICIENT FLOOD MITIGATION FEATURES OR INFRASTRUCTURE

MAP 3

DOCUMENT PATH: Z:\PROJECTS\TWDB\TWDB_RFPG\RFP2023_REGION13_ELECTRONICFILES_HDR_WORKING\MAP_DOCS\EXHIBITS\TM_FIGURES\MAP3_NONFUNCTIONALORDEFICIENT_INFRA_11X17.MXD

Appendix B4 – TWDB Map 4 - Existing Condition Flood Hazard Subregion Maps

Map 4A - Existing Condition Flood Hazard - Subregion A – Upper Basin

Map 4B - Existing Condition Flood Hazard – Subregion B – Upper Mid-Basin

Map 4C - Existing Condition Flood Hazard – Subregion C – Lower Mid-Basin

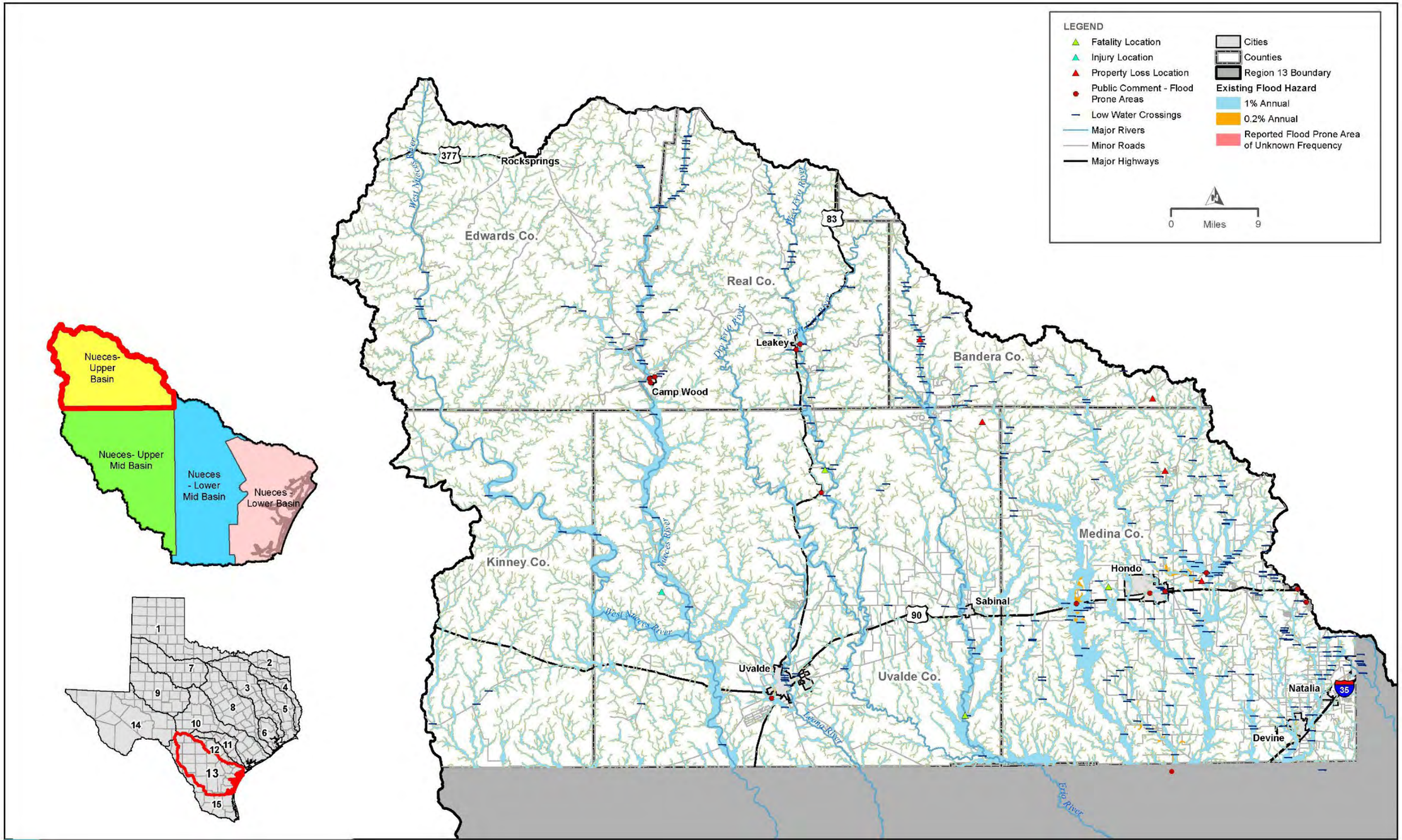
Map 4D - Existing Condition Flood Hazard – Subregion D – Lower Basin

Map 4E – Type of Existing Flood Hazard – Subregion A – Upper Basin

Map 4F – Type of Existing Flood Hazard – Subregion B – Upper Mid-Basin

Map 4G – Type of Existing Flood Hazard – Subregion C – Lower Mid-Basin

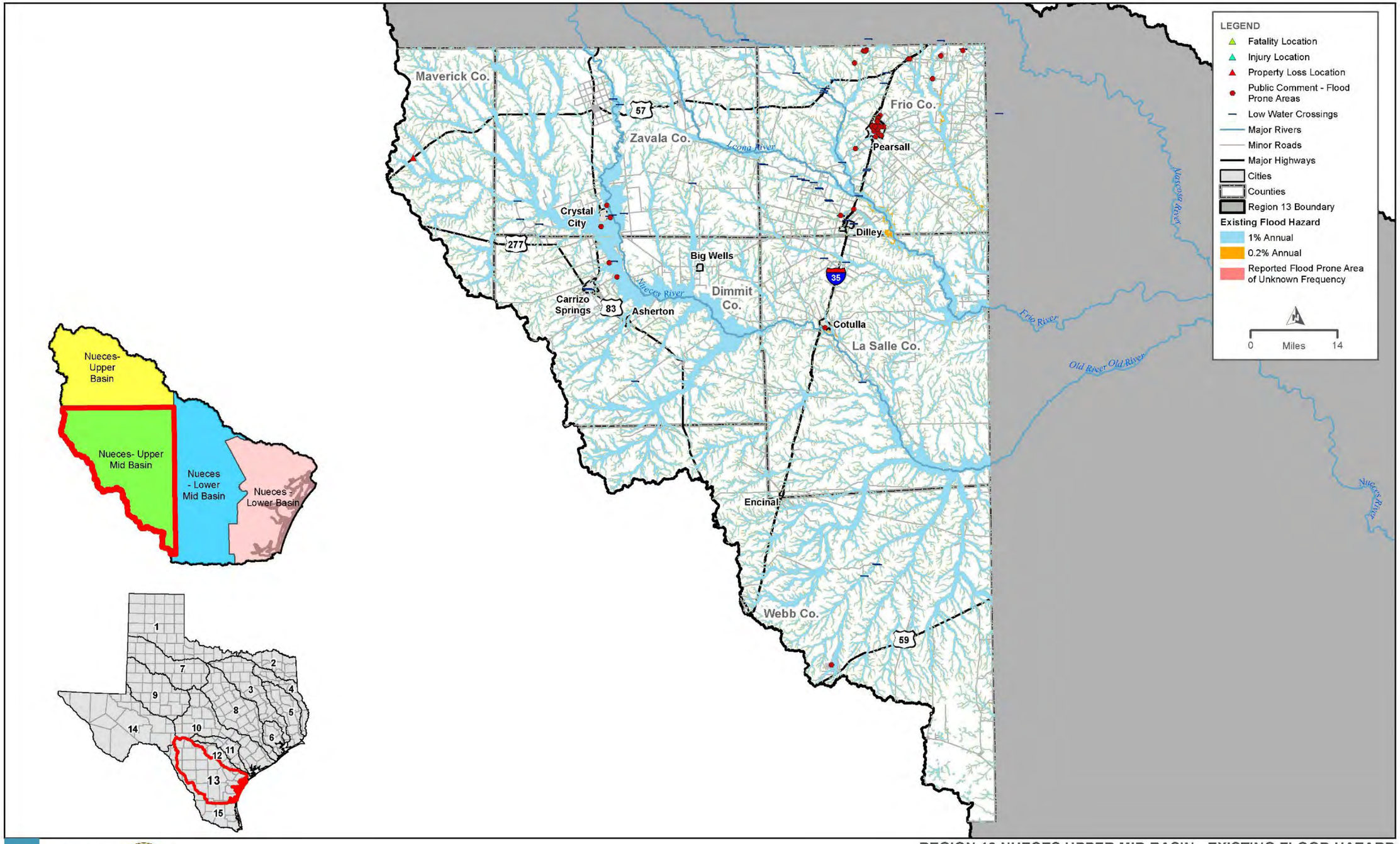
Map 4H - Type of Existing Flood Hazard – Subregion D – Lower Basin



REGION 13 NUECES UPPER BASIN - EXISTING FLOOD HAZARD

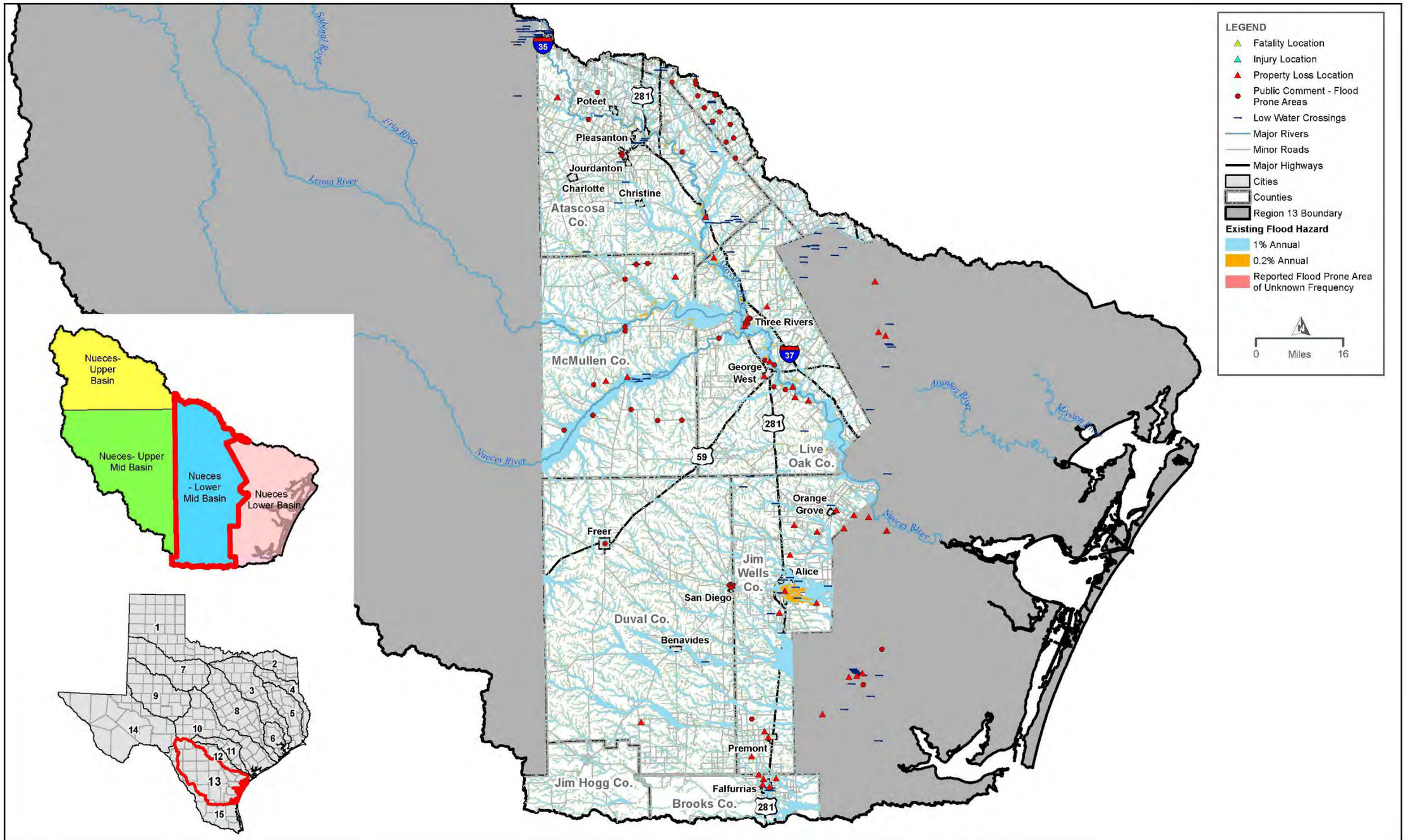
MAP 4A

PATH: Z:\PROJECTS\TWDB\TWDB_RFP\RFP2023_REGION13_ELECTRONICFILES_HDR_WORKING\MAP_DOCS\EXHIBITS\TM_FIGURES\MAP4\MAP4_EXISTINGFLDHAZARD_GROUPA_11X17_FIG1.MXD - USER: PDUNNING - DATE: 12/21/2022



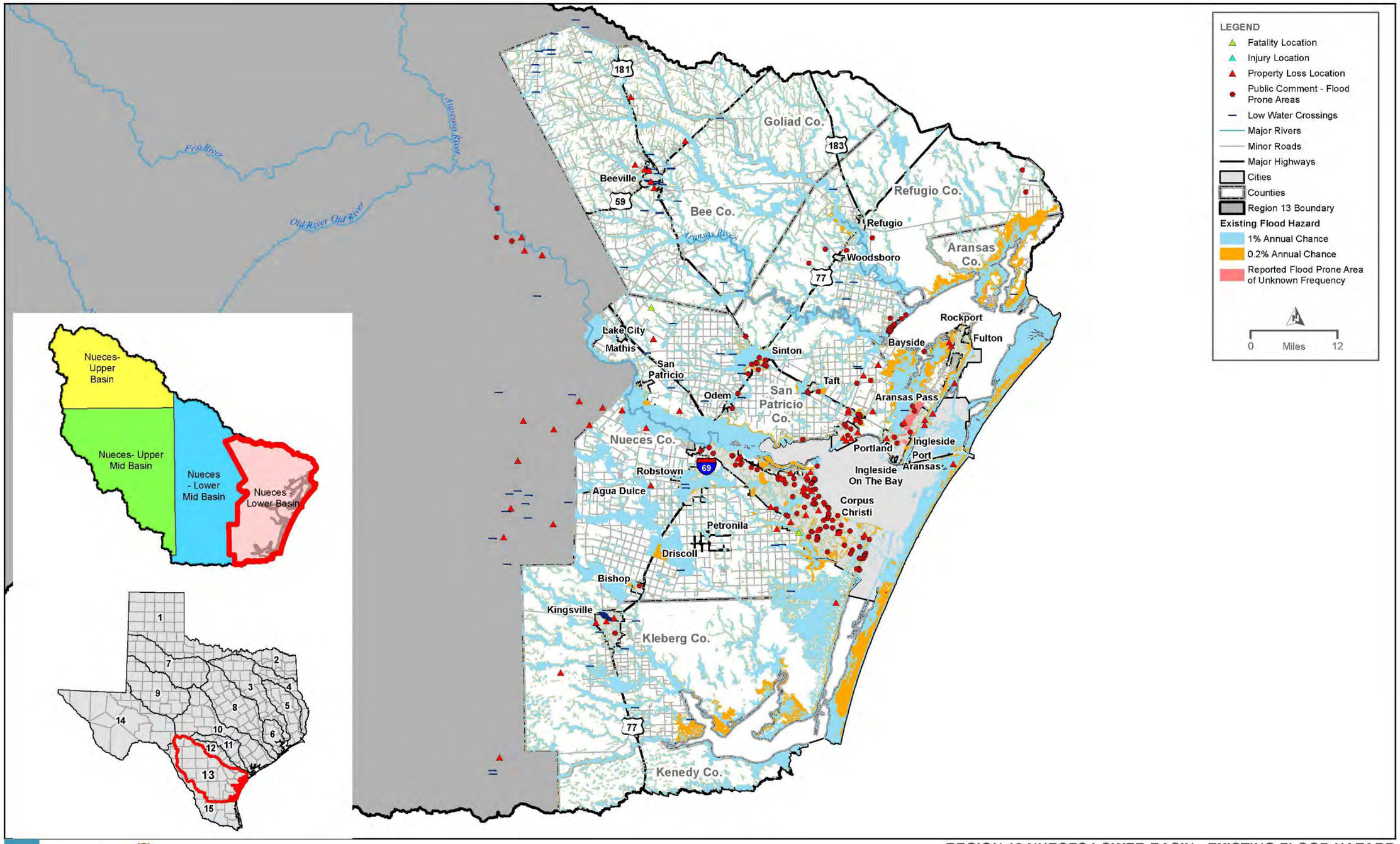
REGION 13 NUECES UPPER MID BASIN - EXISTING FLOOD HAZARD

MAP 4B



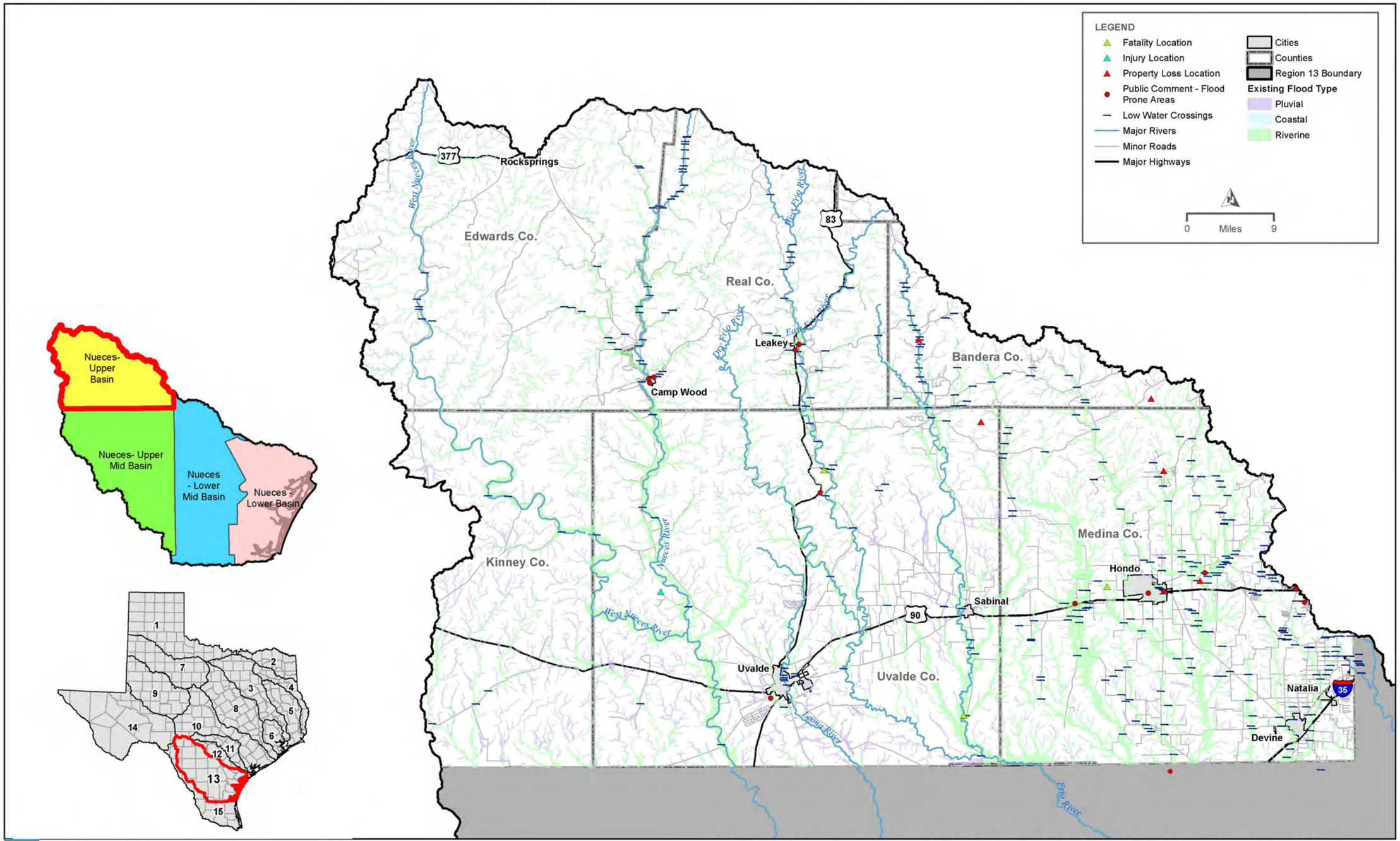
REGION 13 NUECES LOWER MID BASIN - EXISTING FLOOD HAZARD

MAP 4C



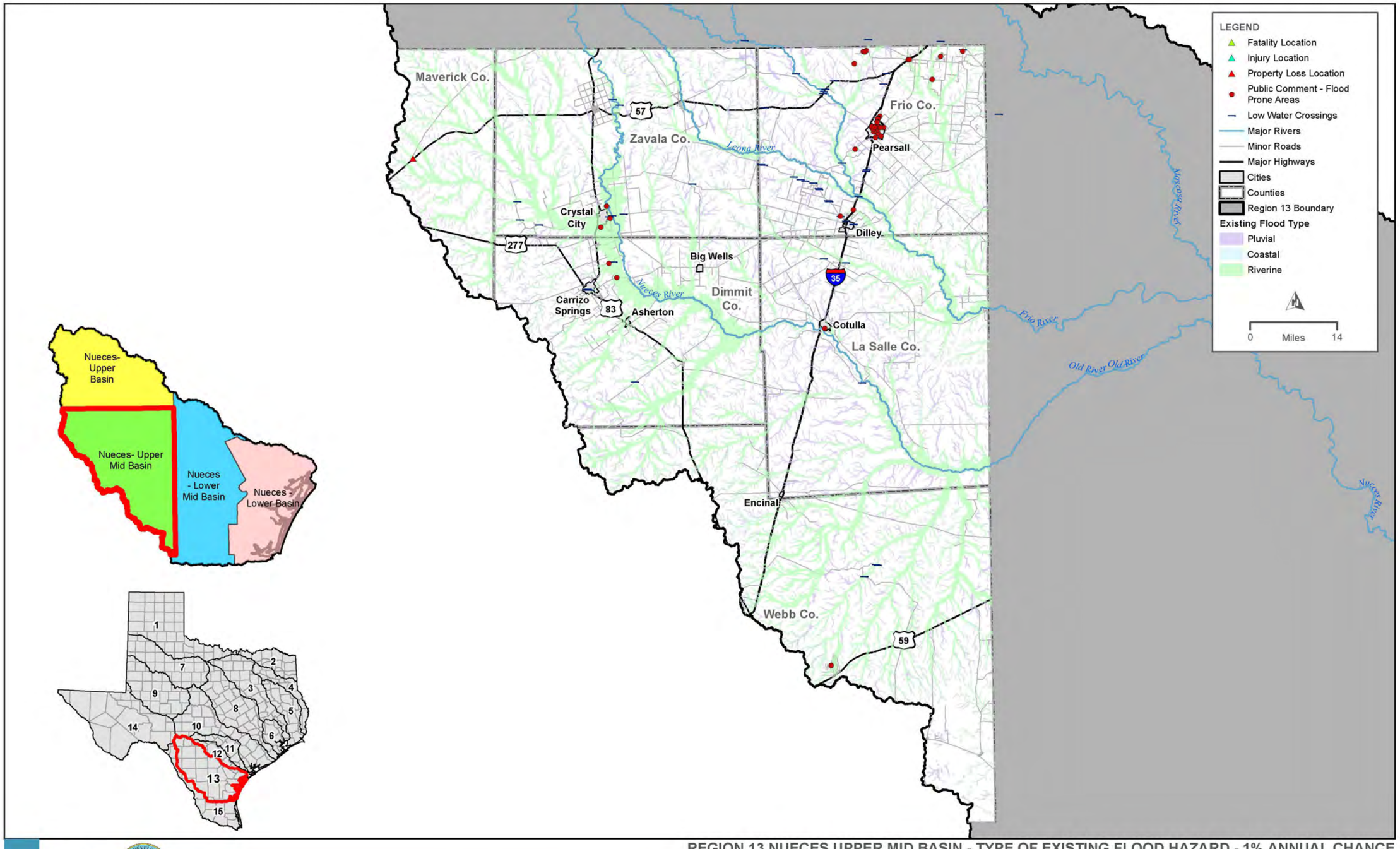
REGION 13 NUECES LOWER BASIN - EXISTING FLOOD HAZARD

MAP 4D



REGION 13 NUECES UPPER BASIN - TYPE OF EXISTING FLOOD HAZARD - 1% ANNUAL CHANCE

MAP 4E



REGION 13 NUECES UPPER MID BASIN - TYPE OF EXISTING FLOOD HAZARD - 1% ANNUAL CHANCE

MAP 4F

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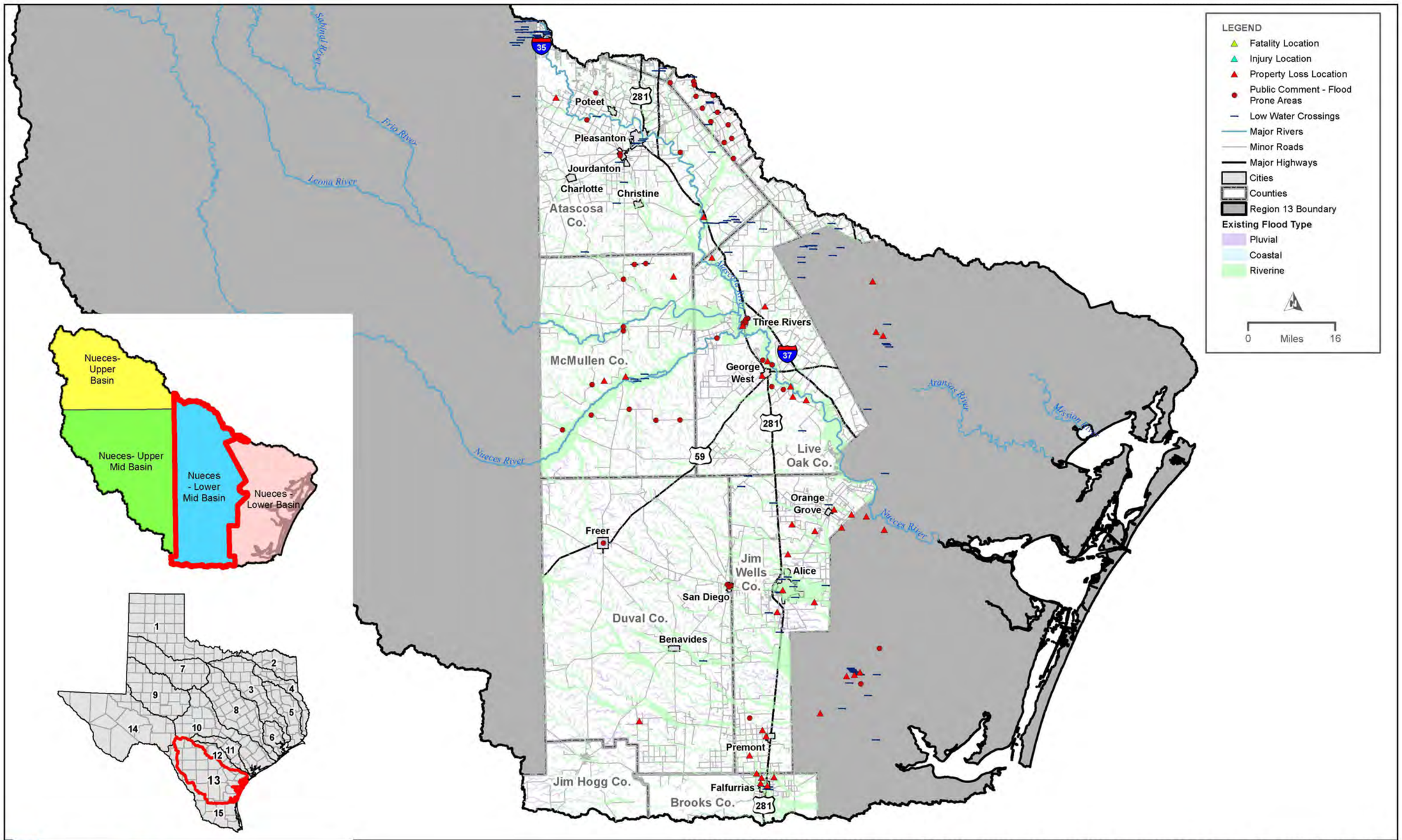
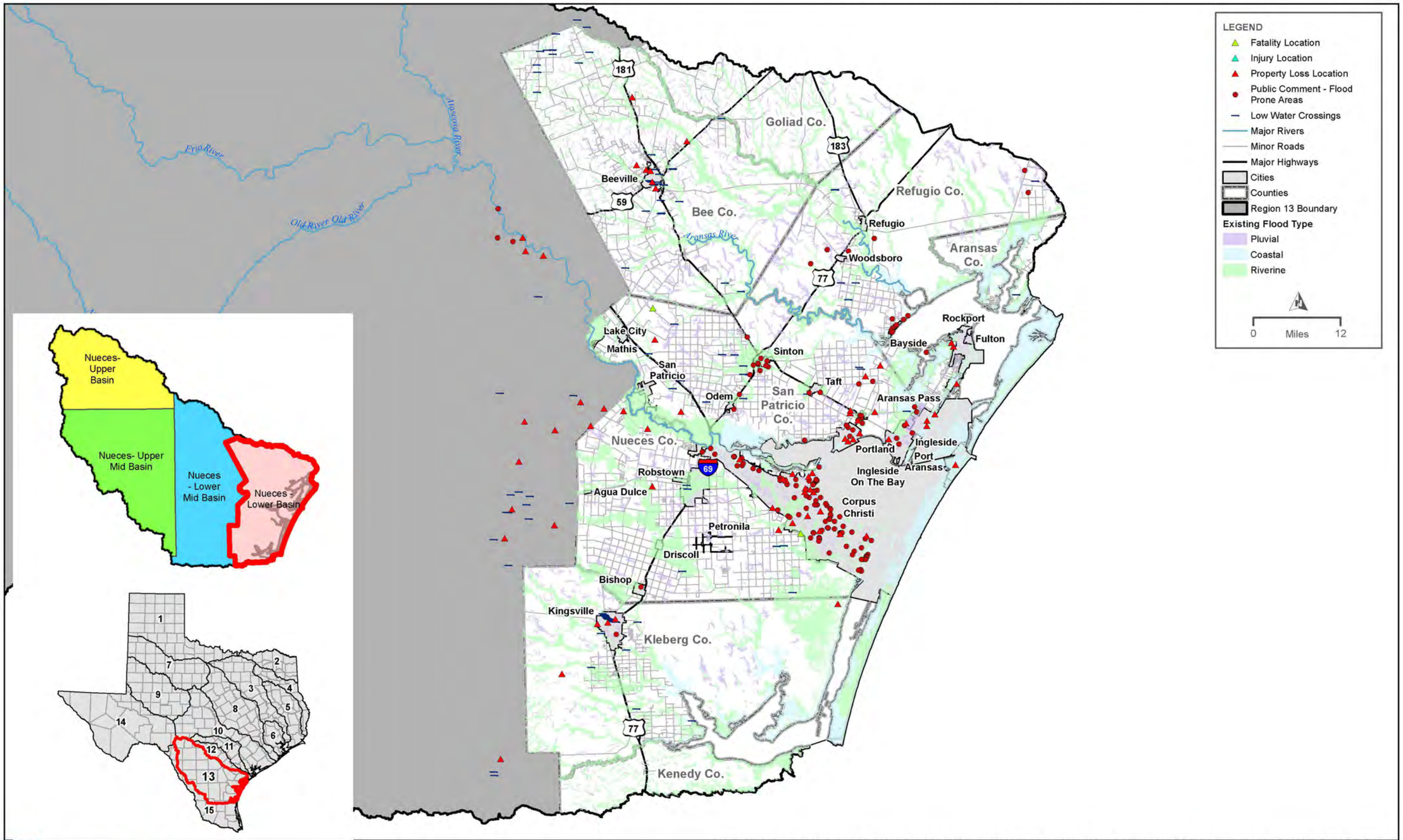


REGION 13 NUECES LOWER MID BASIN - TYPE OF EXISTING FLOOD HAZARD - 1% ANNUAL CHANCE

MAP 4G



REGION 13 NUECES LOWER BASIN - TYPE OF EXISTING FLOOD HAZARD - 1% ANNUAL CHANCE

MAP 4H

Appendix B5 – TWDB Map 5 - Existing Condition Flood Hazard Gaps Regional Maps

Map 5A – Source of Flood Modeling and Mapping Data

Map 5B – Modeling Map

Map 5C – Known Data Gaps

Nueces- Upper Basin

Nueces- Upper Mid Basin

Nueces - Lower Mid Basin

Nueces - Lower Basin

Corpus Christi Downtown Study

Nueces RFPG - Boundary

Sub Regions

Existing Condition Flood Hazard

Source (Accuracy decrease from top listed source to the bottom listed source)

- Corpus Christi Downtown Study
- NFHL Preliminary Data
- NFHL Effective Data

Detailed Data

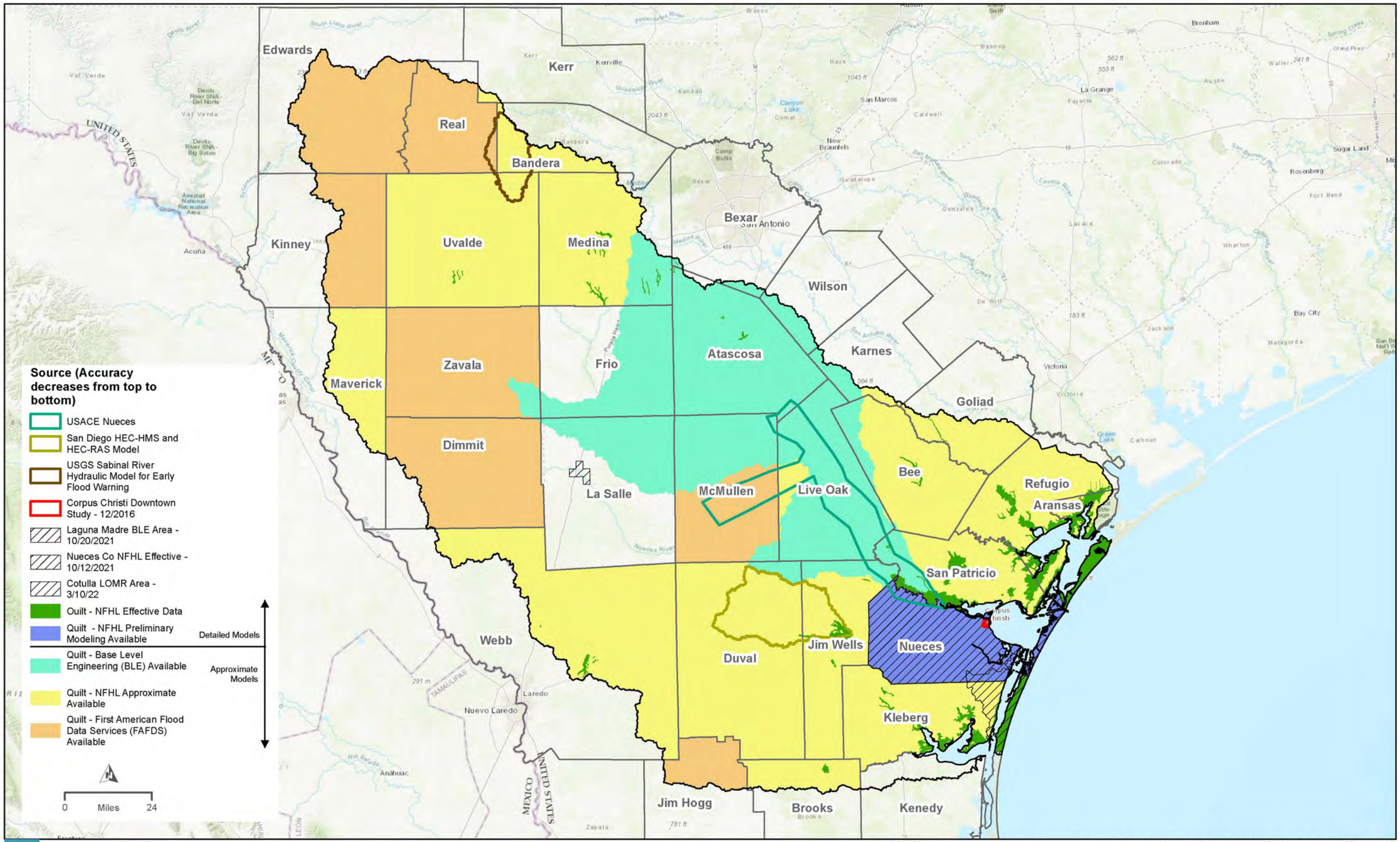
- Base Level Engineering (BLE)
- NFHL Approximate Study
- First American Flood Data Services (FAFDS)
- Draft Cursory Floodplain Data

Approximate Data

0 Miles 24

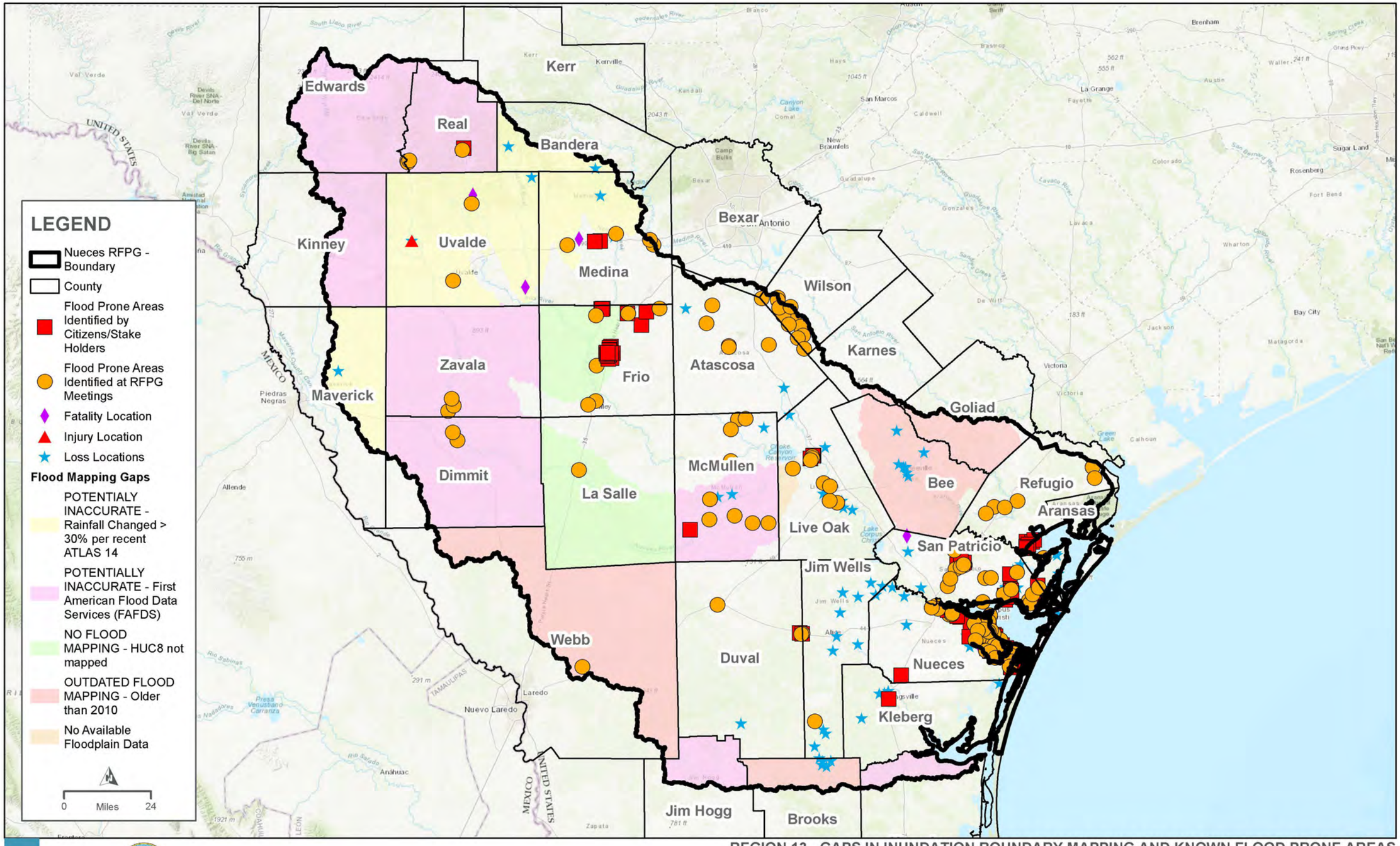
REGION 13 - SOURCE AND ACCURACY OF FLOOD RISK INUNDATION BOUNDARIES

MAP 5A



REGION 13 - MAP OF AVAILABLE DETAILED AND APPROXIMATE MODELS

MAP 5B



REGION 13 - GAPS IN INUNDATION BOUNDARY MAPPING AND KNOWN FLOOD PRONE AREAS

MAP 5C

Appendix B6 – TWDB Map 6 - Existing Condition Flood Exposure Regional Map

HAZARD
EXPOSURE
RISK
VULNERABILITY

LEGEND

- Nueces RFPG Boundary
- Sub Region Boundary
- County Boundary
- Cities

Existing Exposure*

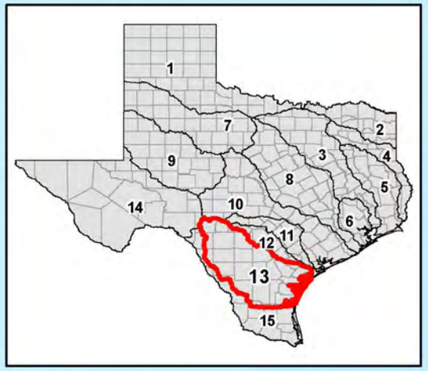
Density

- Less
- More

*Exposure = who and what might be harmed. The Exposure score factors in number of structures in the floodplain, population (day/night), roadway stream crossings, agricultural areas, and critical facilities
Source of Data: TWDB

0 Miles 25

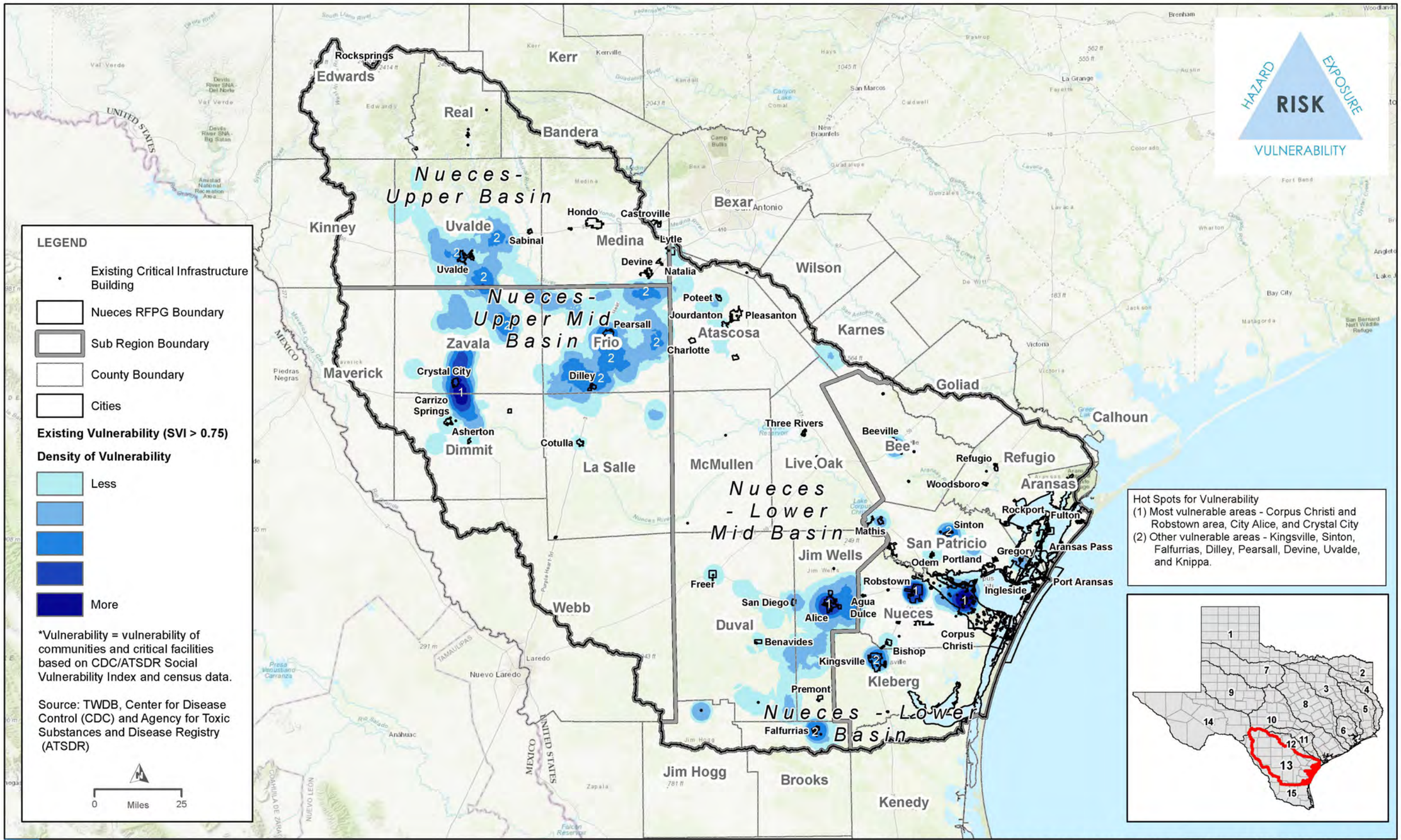
Hot Spots for Flood Exposure
(1) City of Corpus Christi area
(2) Rockport, Ingleside, and Port Aransas areas
(3) cities in the lower basin
(4) areas along the Nueces River from the City of Three Rivers to Corpus Christi
(5) cities in the upper basin



REGION 13 - EXISTING CONDITION EXPOSURE ANALYSIS

MAP 6

Appendix B7 – TWDB Map 7 - Existing Condition Vulnerability and Critical Infrastructure Regional Map



REGION 13 - EXISTING CONDITION VULNERABILITY ANALYSIS (SVI > 0.75)

MAP 7

Appendix B8 – TWDB Map 8 - Future Condition Flood Hazard Subregion Maps

Map 8A - Future Condition Flood Hazard – Subregion A – Upper Basin

Map 8B - Future Condition Flood Hazard – Subregion B – Upper Mid-Basin

Map 8C - Future Condition Flood Hazard – Subregion C – Lower Mid-Basin

Map 8D - Future Condition Flood Hazard – Subregion D – Lower Basin

Map 8E – Type of Future Condition Flood Hazard – Subregion A – Upper Basin

Map 8F – Type of Future Condition Flood Hazard – Subregion B – Upper Mid-Basin

Map 8G – Type of Future Condition Flood Hazard – Subregion C – Lower Mid-Basin

Map 8H - Type of Future Condition Flood Hazard – Subregion D – Lower Basin

This Appendix is available for viewing on the Region 13 Nueces website (https://www.nueces-rfpg.org)

Appendix B9 – TWDB Map 9 - Future Condition Flood Hazard - Gaps in Inundation Boundary Mapping and Identify Known Flood-Prone Areas Regional Map

(not provided, same as existing, see Map 5)

Appendix B10 – TWDB Map 10 - Extent of Increase of Flood Hazard Compared to Existing Condition Regional Map

Map 10 – Extent of Increase of Flood Hazard Compared to Existing Condition

Map 10A – Extent of Future Flood Hazard Compared to Existing Condition – 1% Annual Chance – Upper Basin

Map 10B – Extent of Future Flood Hazard Compared to Existing Condition – 1% Annual Chance – Upper Mid Basin

Map 10C – Extent of Future Flood Hazard Compared to Existing Condition – 1% Annual Chance – Lower Mid Basin

Map 10D – Extent of Future Flood Hazard Compared to Existing Condition – 1% Annual Chance – Lower Basin

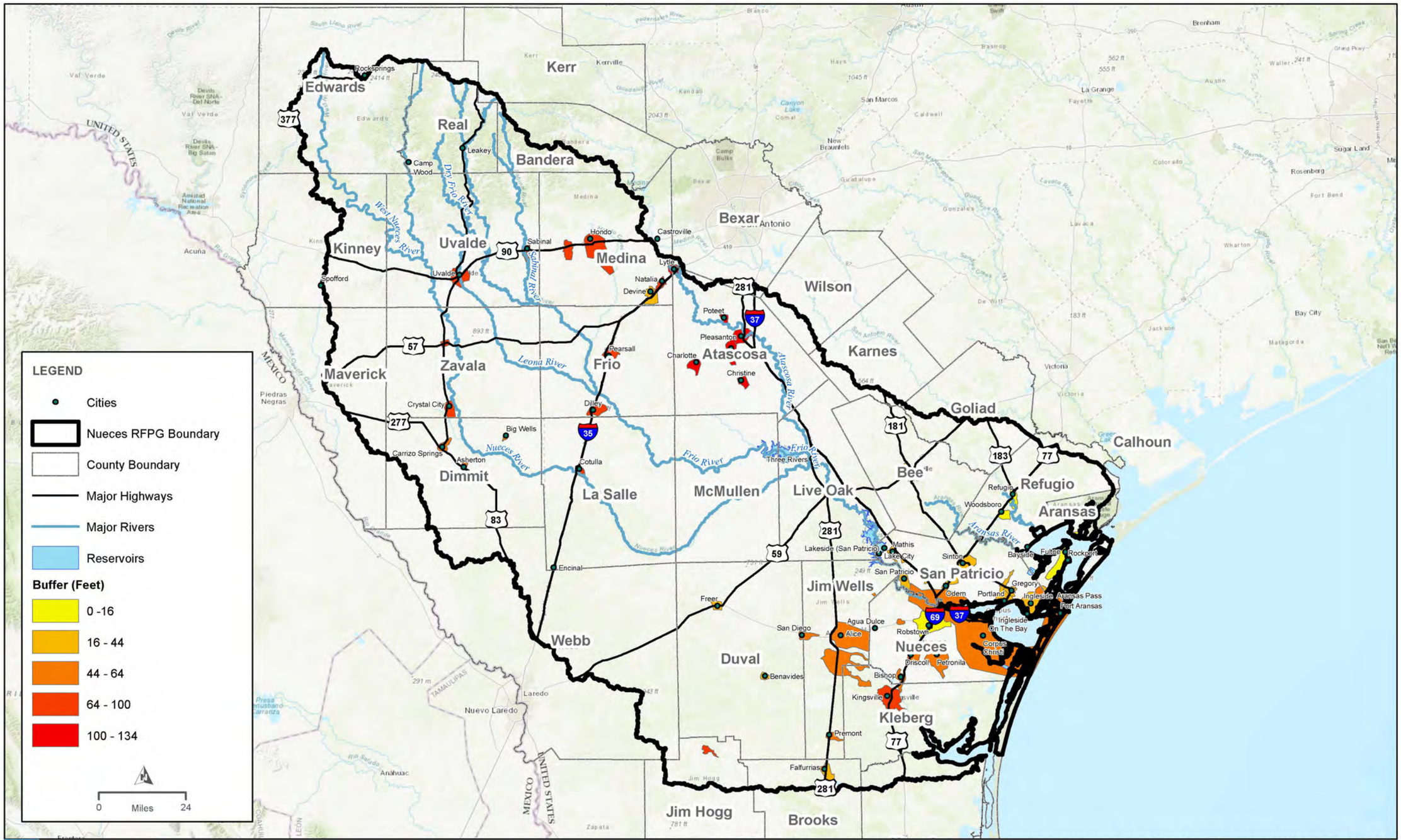
Map 10E – Extent of Future Flood Hazard Compared to Existing Condition – 0.2% Annual Chance – Upper Basin

Map 10F – Extent of Future Flood Hazard Compared to Existing Condition – 0.2% Annual Chance – Upper Mid Basin

Map 10G – Extent of Future Flood Hazard Compared to Existing Condition – 0.2% Annual Chance – Lower Mid Basin

Map 10H – Extent of Future Flood Hazard Compared to Existing Condition – 0.2% Annual Chance – Lower Basin

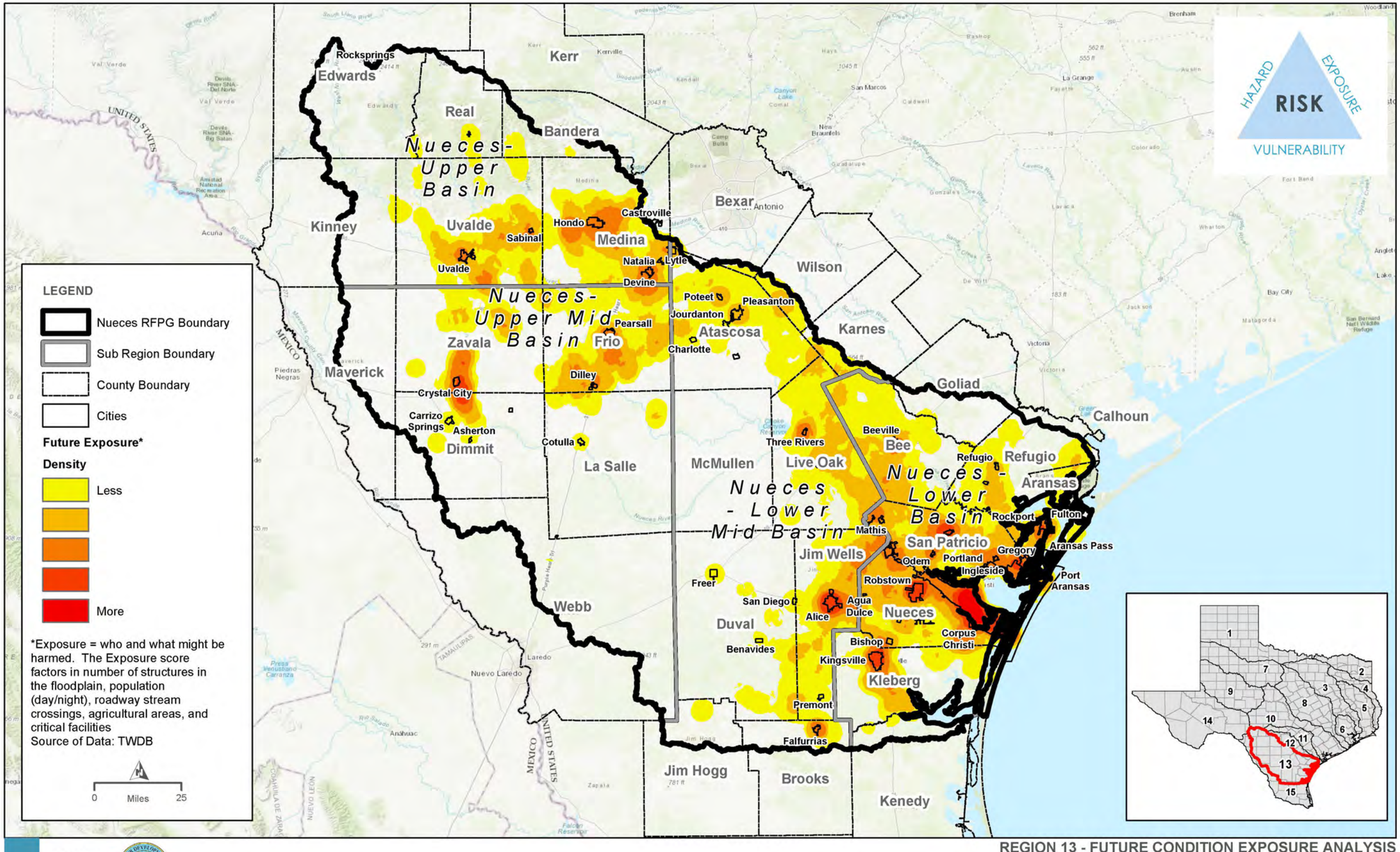
Maps 10A-10H are available for viewing on the Region 13 Nueces website (https://www.nueces-rfpg.org)



REGION 13 - EXTENT OF INCREASE OF FLOOD HAZARD COMPARED TO EXISTING CONDITION

MAP 10

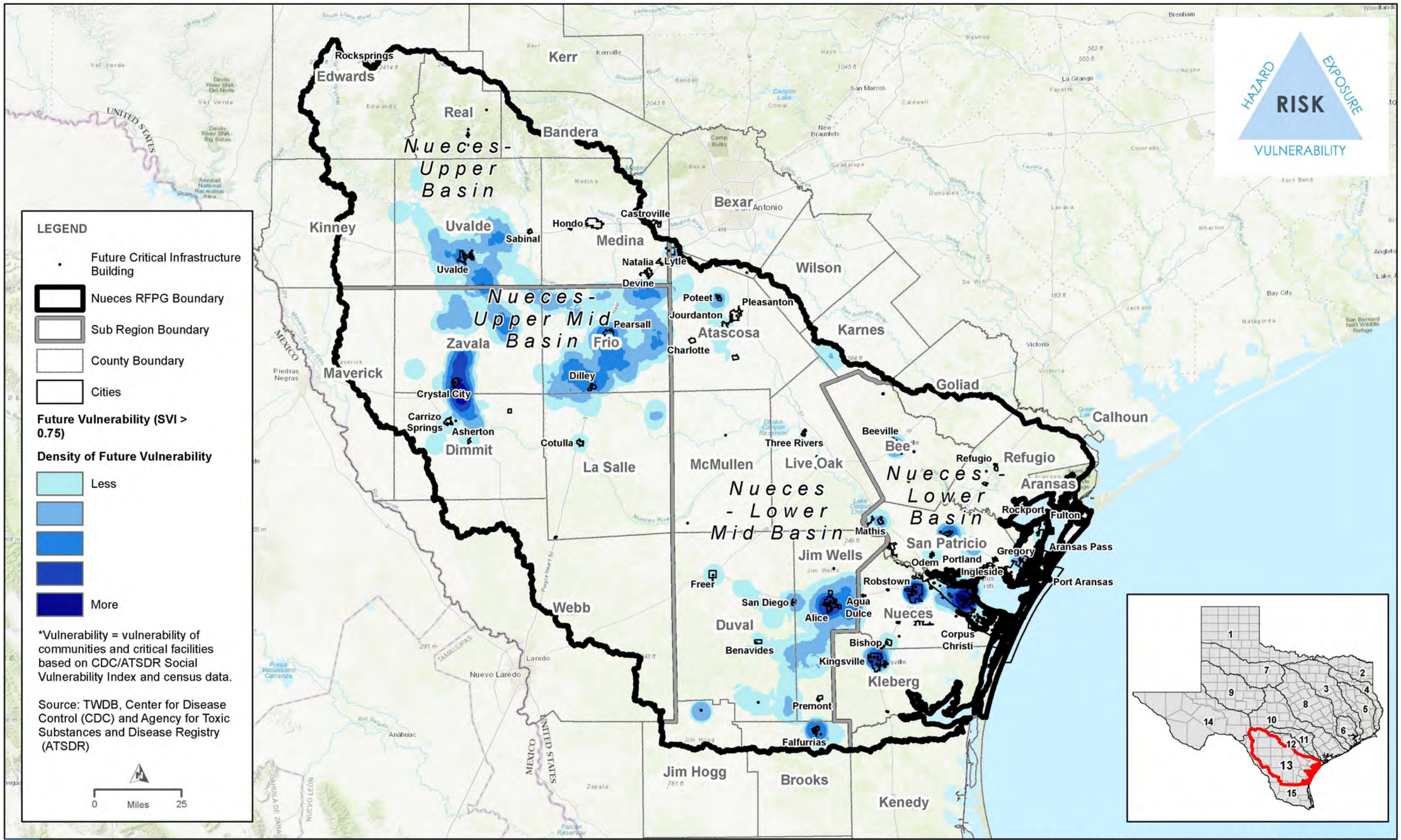
Appendix B11 – TWDB Map 11 - Future Condition Flood Exposure Regional Map



REGION 13 - FUTURE CONDITION EXPOSURE ANALYSIS

MAP 11

Appendix B12 – TWDB Map 12 - Future Condition Vulnerability and Critical Infrastructure Regional Map



REGION 13 - FUTURE CONDITION VULNERABILITY ANALYSIS (SVI > 0.75)

MAP 12

Appendix B13 – TWDB Map 13 - Floodplain Management Practices Regional Map

Cities w/ higher flood standards (TFMA 2019)

Counties w/ higher flood standards (TFMA 2019)

LEGEND

Nueces RFPG Boundary

Floodplain Management Practices

Unknown

None

Low

Moderate

Strong

0 Miles 24

Edwards
Real
Bandera
Kinney
Uvalde
Medina
Maverick
Zavala
Frio
Atascosa
Dimmit
La Salle
McMullen
Live Oak
Bee
Refugio
Aransas
San Patricio
Webb
Duval
Jim Wells
Nueces
Kleberg

UNITED STATES
MEXICO
Rio Grande
San Antonio
Laredo
Nuevo Laredo
Piedras Negras
Acuña

REGION 13 - FLOOD MANAGEMENT PRACTICES

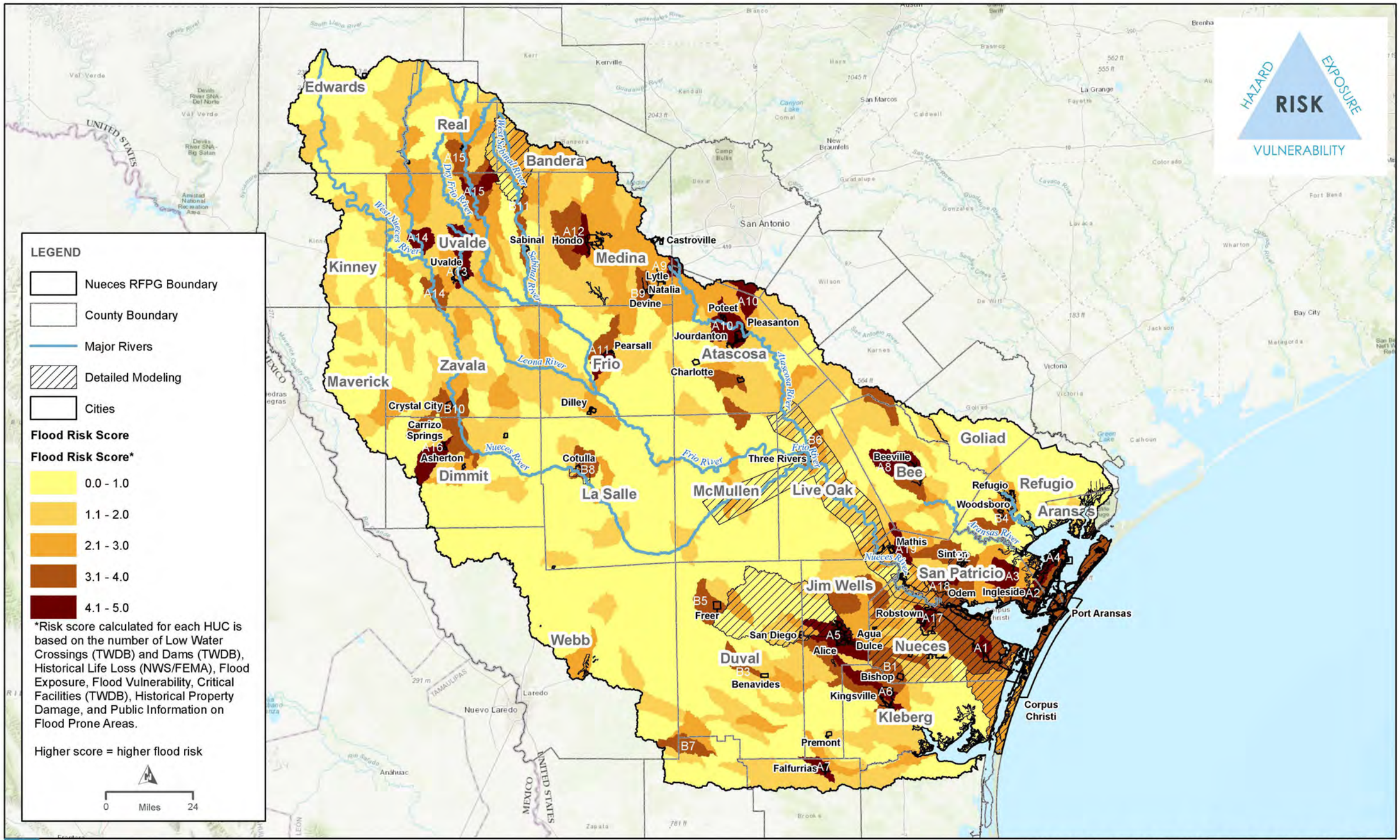
MAP 13

Appendix B14 – TWDB Map 14 - Greatest Gaps in Flood Risk Information Regional Maps

Map 14A – Detailed Modeling and Risk Score

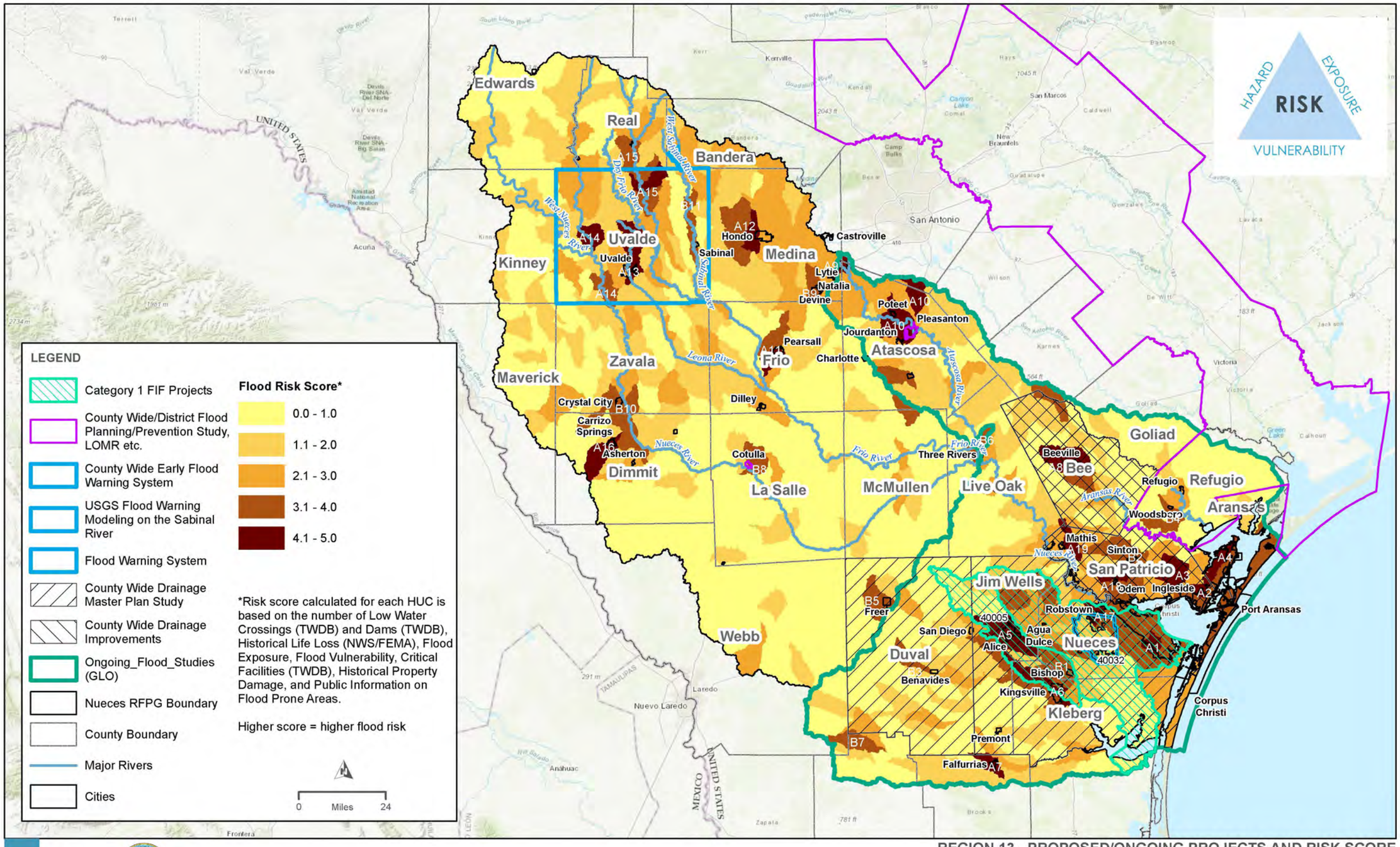
Map 14B – Proposed/Ongoing Projects and Risk Score

Map 14C – Level of Enforcement and Risk Score



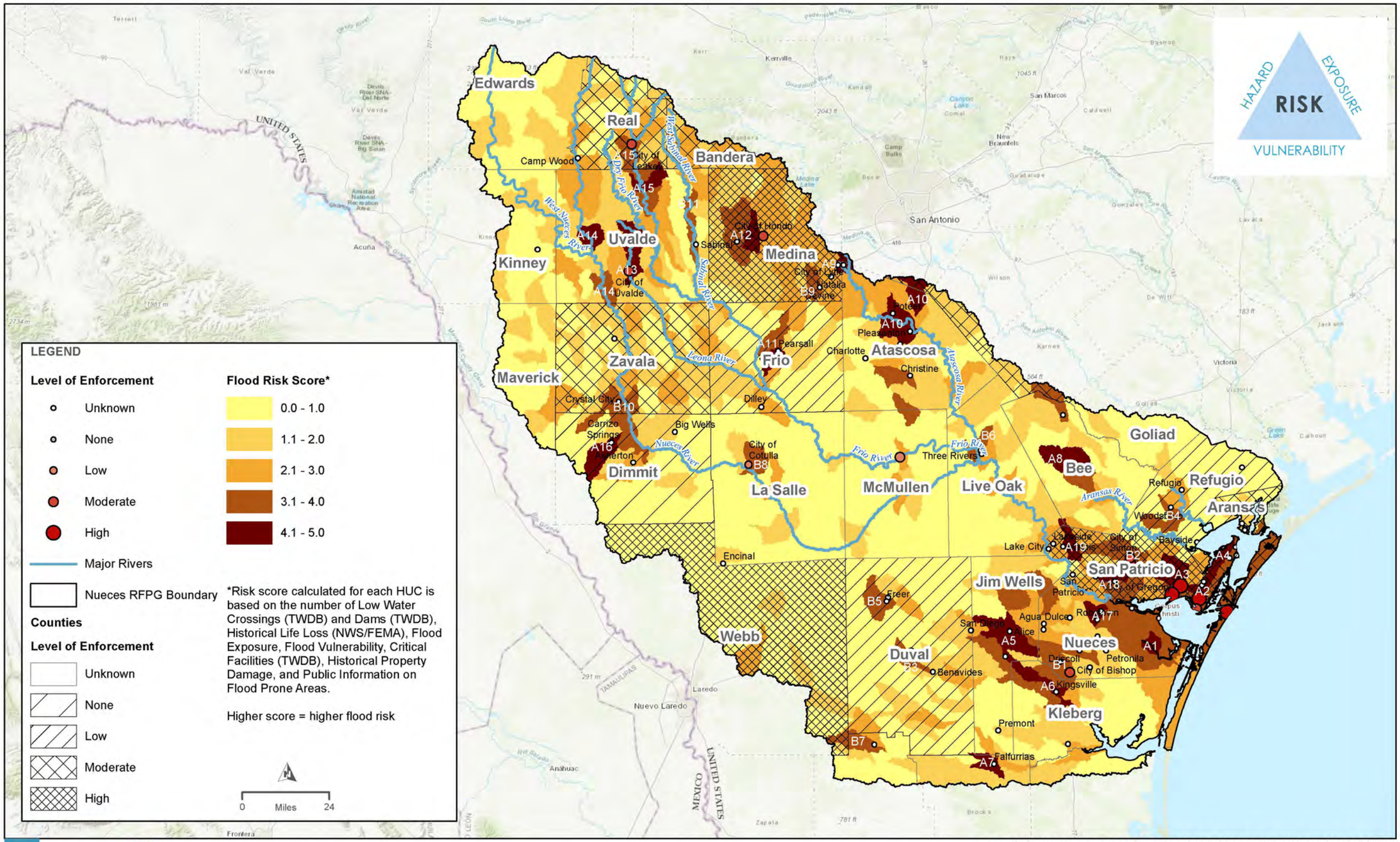
REGION 13 - DETAILED MODELING AND RISK SCORE

MAP 14A



REGION 13 - PROPOSED/ONGOING PROJECTS AND RISK SCORE

MAP 14B



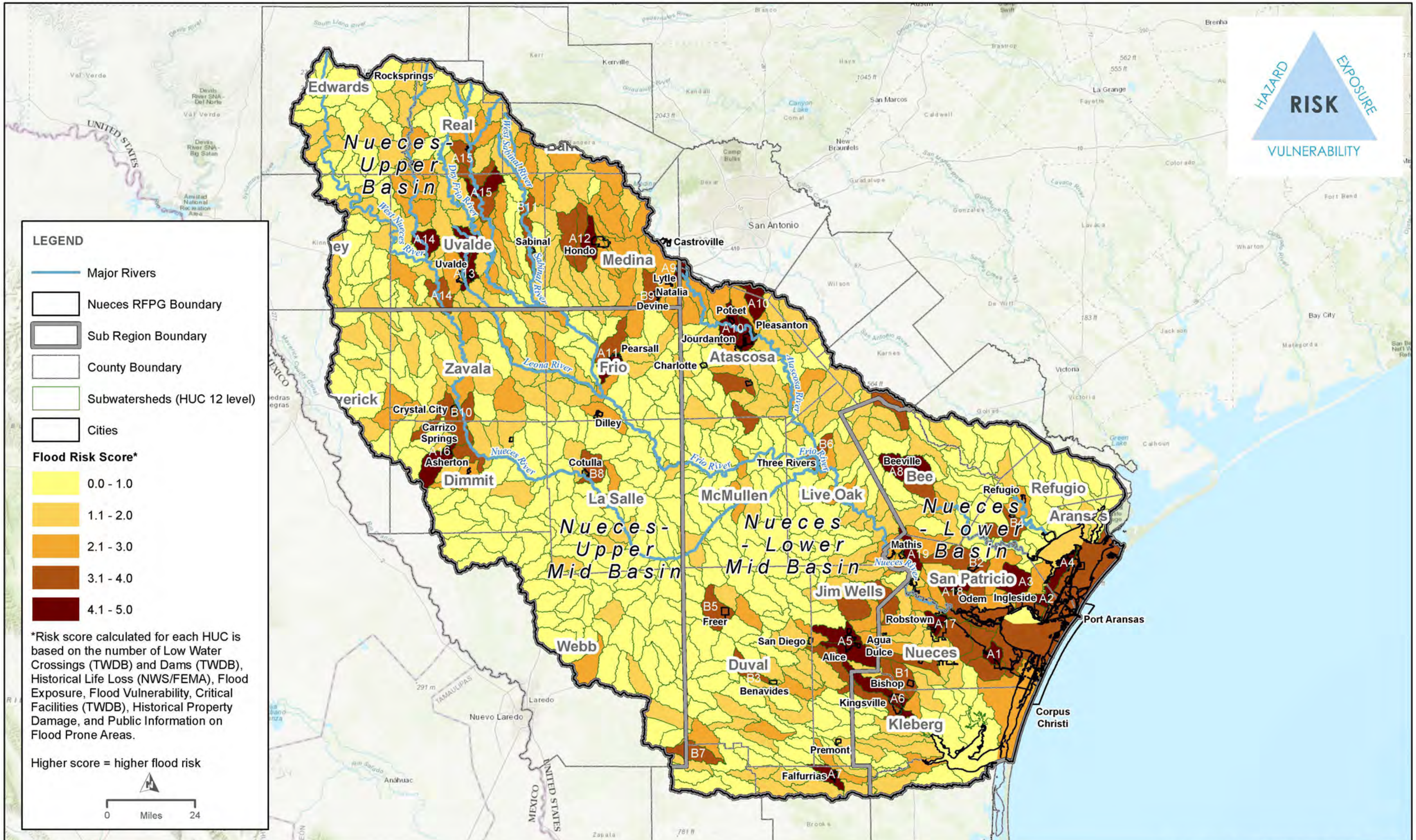
REGION 13 - LEVEL OF ENFORCEMENT AND RISK SCORE

MAP14C

DOCUMENT PATH: Z:\PROJECTS\TWDB\TWDB_RFPG\RFP2023_REGION13_ELECTRONICFILES_HDR_WORKINGMAP_DOCS\EXHIBITS\TM_FIGURES\MAP14\MAP14C_RISK_SCR_OVERLAY_LOE_11X17.MXD

Appendix B15 – TWDB Map 15 - Greatest Flood Risk Regional Map

(Reference Appendix B23 for county based greatest flood risk maps)



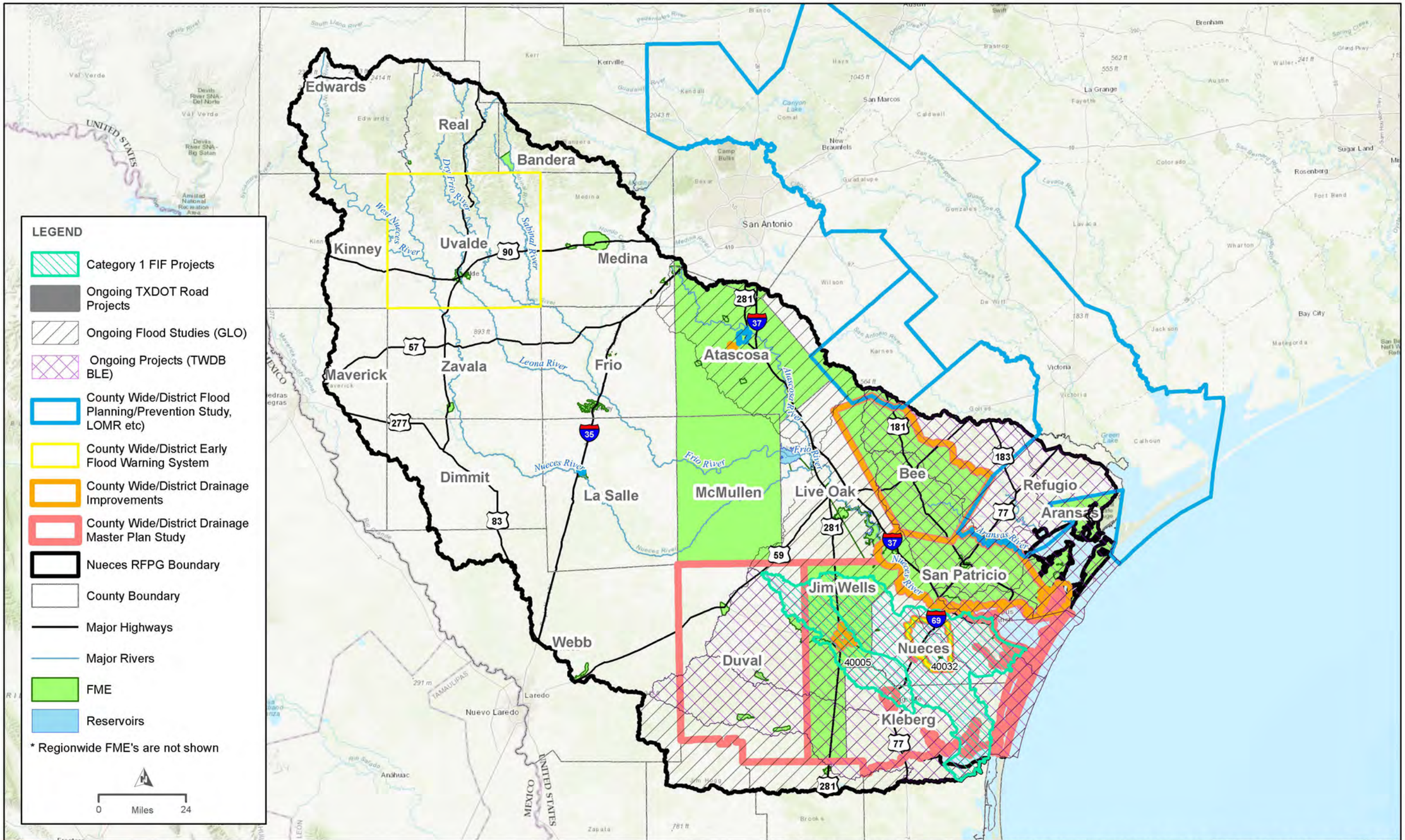
REGION 13 - HIGHEST FLOOD RISK

MAP 15

Appendix B16 – TWDB Map 16 - Potential Flood Management Evaluations in relation to other Studies/Mapping Regional Maps

Map 16A – Potential Flood Management Evaluations and Ongoing Projects

Map 16B – Potential Flood Management Evaluations and Detailed Modeling



REGION 13 - POTENTIAL FLOOD MANAGEMENT EVALUATIONS AND ONGOING PROJECTS

MAP 16A

Edwards
Real
Bandera
Kinney
Uvalde
Medina
Maverick
Zavala
Frio
Atascosa
Dimmit
La Salle
McMullen
Live Oak
Bee
Refugio
Aransas
San Patricio
Jim Wells
Webb
Duval
Nueces
Kleberg

LEGEND

- Nueces RFPG Boundary
- Detailed Modeling
- County Boundary
- Major Highways
- Major Rivers
- Potential FME
- Reservoirs

* Regionwide FME's are not shown

0 Miles 24

REGION 13 - POTENTIAL FLOOD MANAGEMENT EVALUATIONS AND DETAILED MODELING

MAP 16B

DOCUMENT PATH: Z:\PROJECTS\TWDB\TWDB_RFPG\RFP_2023_REGION13_ELECTRONICFILES_HDR_WORKING\MAP_DOCS\EXHIBITS\TM_FIGURES\MAP16\MAP16B_REGIONAL_FME_MODELING_OVERLAY_11X17.MXD

Appendix B17 – TWDB Map 17 - Potential Flood Mitigation Projects Regional Map

FMP 133000002: Bed-Material Entrainment in selected Streams of the Edwards Plateau ----Edwards, Kimble, and Real Counties, Texas, and Vicinity

FMP 133000001: County Wide Early Flood Warning System

FMP 133000003: Lamar Golf Course Drainage Easements

FMP 133000004: Southcentral Lamar Drainage Easement

Edwards
Real
Bandera
Kinney
Uvalde
Medina
Maverick
Zavala
Frio
Atascosa
Dimmit
La Salle
McMullen
Live Oak
Bee
Refugio
Aransas
San Patricio
Jim Wells
Webb
Duval
Nueces
Kleberg

West Nueces River
Dry Frio River
Sabinal River
Leona River
Nueces River
Frio River
Atascosa River
Aransas River

San Antonio
Laredo
Nuevo Laredo
Piedras Negras
Victoria
Corpus Christi

LEGEND

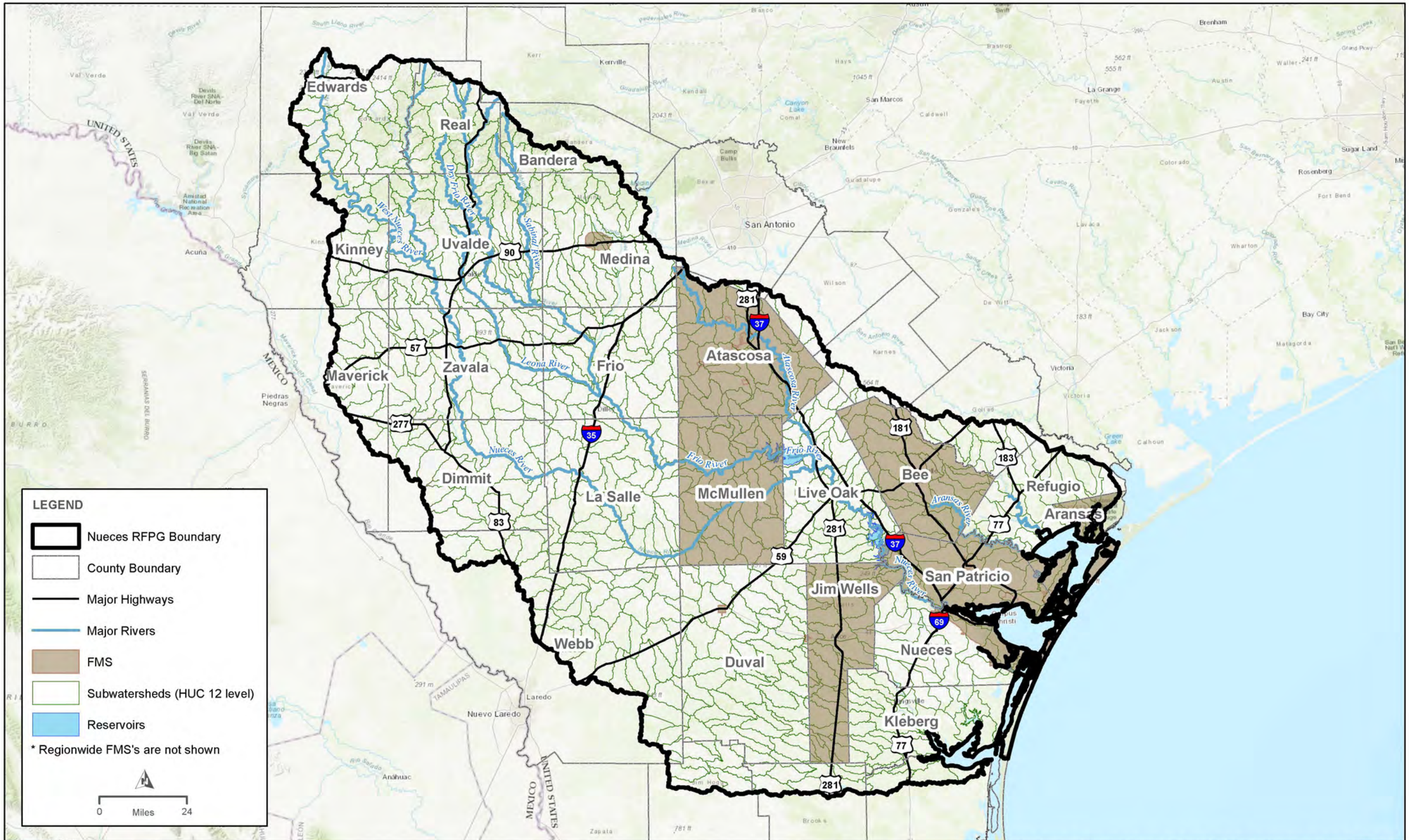
- Nueces RFPG Boundary
- County Boundary
- Major Highways
- Major Rivers
- FMP
- Subwatersheds (HUC 12 level)
- Reservoirs

0 Miles 24

REGION 13 - POTENTIAL FLOOD MITIGATION PROJECTS

MAP 17

Appendix B18 – TWDB Map 18 - Potential Flood Management Strategies Regional Map



REGION 13 - POTENTIAL FLOOD MANAGEMENT STRATEGIES

MAP 18

Appendix B19 – TWDB Map 19 - Recommended Flood Management Evaluations Regional Map

(Refer to Appendix B23 for county based recommended Flood Management Evaluations)

Edwards
Real
Bandera
Kinney
Uvalde
Medina
Maverick
Zavala
Frio
Atascosa
Dimmit
La Salle
McMullen
Live Oak
Bee
Refugio
Aransas
San Patricio
Jim Wells
Webb
Duval
Nueces
Kleberg

LEGEND

- Nueces RFPG Boundary
- County Boundary
- Major Highways
- Major Rivers
- FME
- Subwatersheds (HUC 12 level)
- Reservoirs

* Regionwide FME's are not shown

REFERENCE COUNTY MAPS FOR SPECIFIC DETAILS (MAPS 23A-W)

0 Miles 24

REGION 13 - RECOMMENDED FLOOD MANAGEMENT EVALUATIONS

MAP 19

Appendix B20 – TWDB Map 20 - Recommended Flood Mitigation Projects Regional Map

(Not provided at this time as no projects recommended)

Appendix B21 – TWDB Map 21 - Recommended Flood Management Strategies Regional Map

(Refer to Appendix B23 for county based recommended Flood Management Strategies)

Edwards
Real
Bandera
Kinney
Uvalde
Medina
Atascosa
Maverick
Zavala
Frio
Dimmit
La Salle
McMullen
Live Oak
Bee
Refugio
Aransas
San Patricio
Jim Wells
Webb
Duval
Nueces
Kleberg

LEGEND

- Nueces RFPG Boundary
- County Boundary
- Major Highways
- Major Rivers
- FMS
- Subwatersheds (HUC 12 level)
- Reservoirs

* Regionwide FMS's are not shown

REFERENCE COUNTY MAPS FOR SPECIFIC DETAILS (MAPS 23A-W)

0 Miles 24

REGION 13 - RECOMMENDED FLOOD MANAGEMENT STRATEGIES

MAP 21

Appendix B22 – TWDB Map 22 - Modeling Availability Regional Map

Source (Accuracy decreases from top to bottom)

- USACE Nueces HEC-HMS and HEC-RAS Model
- San Diego HEC-HMS and HEC-RAS Model
- USGS Sabinal River Hydraulic Model for Early Flood Warning
- Corpus Christi Downtown Study - 12/2016
- Nueces Co NFHL Effective - 10/12/2021
- Cotulla LOMR Area - 3/10/22
- Quilt - NFHL Effective Data
- Quilt - NFHL Preliminary Modeling Available

0 Miles 24

REGION 13 - MAP OF AVAILABLE DETAILED MODELS

MAP 22

Appendix B23 – Flood Hazard Risk, Flood Risk Score, and Recommended Flood Mitigation Actions County Maps

See specific county map sorted alphabetically.

Map 23A – Aransas County

Map 23B – Atascosa-Bexar-Karnes-Wilson Counties

Map 23C – Bandera County

Map 23D – Bee-Goliad Counties

Map 23E – Dimmit County

Map 23F – Duval County

Map 23G – Edwards County

Map 23H – Frio County

Map 23I – Jim Hogg-Brooks County

Map 23J – Jim Wells County

Map 23K – Kinney County

Map 23L – Kleberg-Kenedy County

Map 23M – LaSalle County

Map 23N – LiveOak County

Map 23O – Maverick-Zavala County

Map 23P – McMullen County

Map 23Q – Medina County

Map 23R – Nueces County

Map 23S –Real-Kerr County

Map 23T – Refugio County

Map 23U – San Patricio County

Map 23V – Uvalde County

Map 23W – Webb County

This Appendix is available for viewing on the Region 13 Nueces website (https://www.nueces-rfpg.org)

Appendix C1 – Historic Flood Event Data

Historical Flood Summary for Select USGS Gage Records

U.S. Geological Survey (USGS) gage information was used to identify historical flood stages located along the major rivers and tributaries within the basin. The date, peak flow, peak stage, and expected consequences during these historic flood events at several key locations throughout the basin are summarized in Table B-1. USGS gage locations are also viewable at Region 13 Nueces (arcgis.com).

Table 1. USGS Historical Flood Summary

River Gages	Flood Date	Peak Flow (cubic feet per second)	Peak Stage (feet)	Expected Consequence
Nueces River				
Calallen	9/15/2002	47,800	13	Widespread long-lived residential flooding of hundreds of homes above Calallen occurs. This requires residents to be evacuated. Roads into the flood-prone areas flood for miles, cutting off large residential areas for weeks. Massive flooding of roads near and around Calallen.
Three Rivers	9/12/2002	48,500	44.4	Boats needed in downtown area of Three Rivers. Water is over the County Road 151 bridge south of George West.
Tilden	10/16/2003	31,000	23.1	Moderate flooding occurs. The flow is to the slab elevation of the lowest businesses and homes in Tilden. Numerous roads and low bridges flood and become very dangerous to motorists. Hundreds of livestock are trapped and potentially drowned in the flood plain, below Derby to the Choke Canyon Reservoir.
Cotulla	7/15/2002	18,700	21.6	Major and massive lowland flooding occurs. Evacuations of livestock and a few residential properties along the river required. Many roads near the river will flood, including FM 3408 from I-35, Valley Wells Road, the frontage road near mile marker 67. Flooding also occurs on Dobie Road including in and around Highway 624. FM 624 also floods south of Highway 97 toward Fowlerton.
Uvalde	10/27/1996	201,000	24.9	Residents of many low lying homes in Crystal City flood in less than a day from a crest in Uvalde. Roads and bridges are damaged above Barksdale to below Carrizo Springs. Flow ranges from one half mile to four miles wide in the flood plain, trapping livestock and destroying equipment in the flood plain.
Mission River				
Refugio	8/31/2001	46,900	Missing	Missing
Frio River				
Concan	6/21/1997	56,200	24.4	Disastrous life-threatening flooding destroys anything in the flood plain from the headwaters to below Concan. Homes are flooded and a few washed downstream below Leakey to below Rio Frio. Up to and over 15 feet of turbulent flow is life threatening in campgrounds above Rio Frio to Concan.

River Gages	Flood Date	Peak Flow (cubic feet per second)	Peak Stage (feet)	Expected Consequence
Tilden	7/10/2002	33,000	30.1	Major flooding occurs. Disastrous flooding of commercial and residential buildings in Tilden. Restaurant on the right bank of the Frio River had 3 to 4 feet of water in it.

Historic Flood Events

Past flood events provide insight on where flood-prone areas are located within the basin. Table B-2 provides a list and brief description of historical events within the basin.

Table 2. Listing of Historical Flood Events

Flood Event	
2017 Hurricane Harvey	Hurricane Harvey is the most expensive storm on record, costing an estimated $4.28 billion dollars in damages to Region 13 counties. Aransas county experienced the most extensive damages with an estimated cost totaling $1.75 billion. Nueces, San Patricio, and Refugio counties saw losses of $1.32 billion, $520 million, and $520 million respectively. The National Weather Service (NWS) reports that 64 injuries and 2 fatalities were caused in Region 13 by Hurricane Harvey.
2003 Flash Floods	In late June and early July of 2003, flash floods hit the northwestern counties of Region 13 after a hurricane turned tropical storm blew across the coastal counties.
2002 Frio River Flood	In July and September of 2002, Frio River saw record stages near Tilden. The July storm represents the flood of record for parts of the middle basin. The tributaries of the complex northwestern portion of the basin see peak stages in different storm events.
1998 Flash Flood Real County	The deadliest floods in these records are the flood of August 1998, which took four lives in Real County.
1997 Flash Flood in Medina, Bandera, and Goliad Counties	The flood of June 1997 which took four lives across Medina, Bandera, and Goliad Counties.
1996 Nueces Flood	The Nueces near Uvalde saw its record peak stage in 1996.
1971 Hurricane Edith and Fern	The combination of Hurricanes Edith and Fern caused only a slightly higher stage on the Mission River in 1971. These two storms represent the largest storms in the lower counties of the Nueces Basin, at the time of occurrence.
1967 Hurricane Beulah	In 1967, Hurricane Beulah set the record for highest stage in the Nueces River at gages in Tilden, Three Rivers, and Calallen. Beulah also set the record for highest recorded stage in the Atascosa at Whitsett and caused the second highest stage recorded in the Mission River at Refugio. National Oceanic and Atmospheric Administration (NOAA) reports that 41 lives were lost in Hurricane Beulah and an estimated 1 billion dollars of damage was done to property. Beulah is reported to have left thousands of people homeless as well.
1935 Nueces and West Nueces Flood	The earliest major flood in the Nueces River Basin regularly referenced in literature is the flood of 1935. This historic flood affected the Nueces River and its tributaries in the early weeks of June. The Nueces River and many of its tributaries saw record stages with some like the West Nueces River breaking their prior stage records by over ten feet. This storm caused the largest peak stage in the Nueces River at Cotulla and in the West Nueces River.
1932 Frio and Nueces Flood	There was a 1932 storm that caused the highest peak stage in the Frio River at Concan and the second highest recorded peak stage in the Nueces River at near Uvalde.

National Weather Service Flood Data

The National Weather Service (NWS) has documented fatalities, injuries, and property damage as the result of past flood events since 1996 as shown in Figures B-1 through B-3.

A summary of flood damage data gathered from the NWS can be seen in Tables B-3 ad B-4. Table B-3 reports flood damage in dollars, injuries, and fatalities by year. Table B-4 uses the same base data as Table 3 but is divided based on counties. To generate Tables B-3 and B-4, raw yearly damage data in Texas was downloaded from NWS website. Then, a filter on counties is used so that only damage data of Region 13 counties remain in the dataset. Finally, types of damages that are non-essential to this study, such as wind and fire damage, were filtered out so that damages include only rain, storm and flood damages.

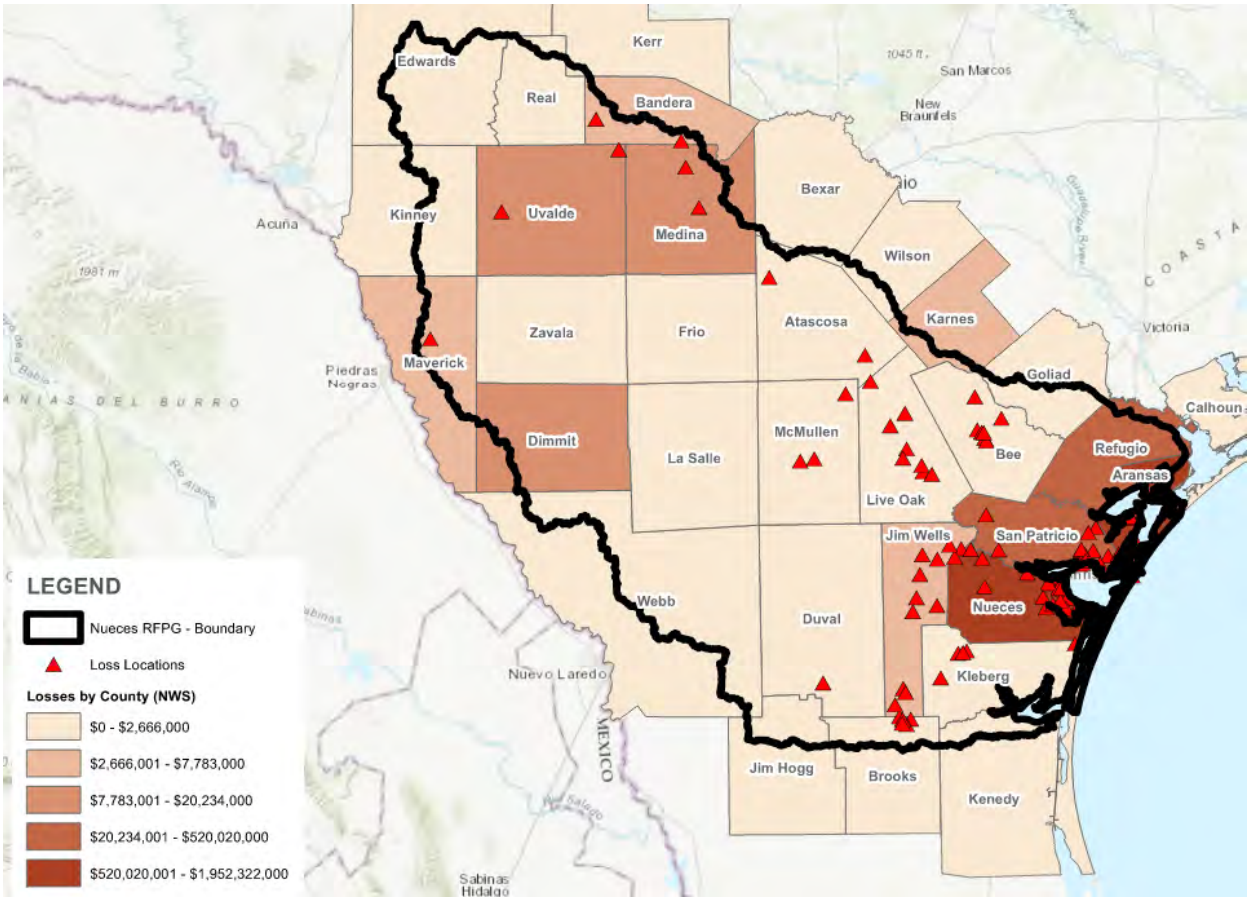


Figure 1. National Weather Service Property Damage from Flooding, since 1996

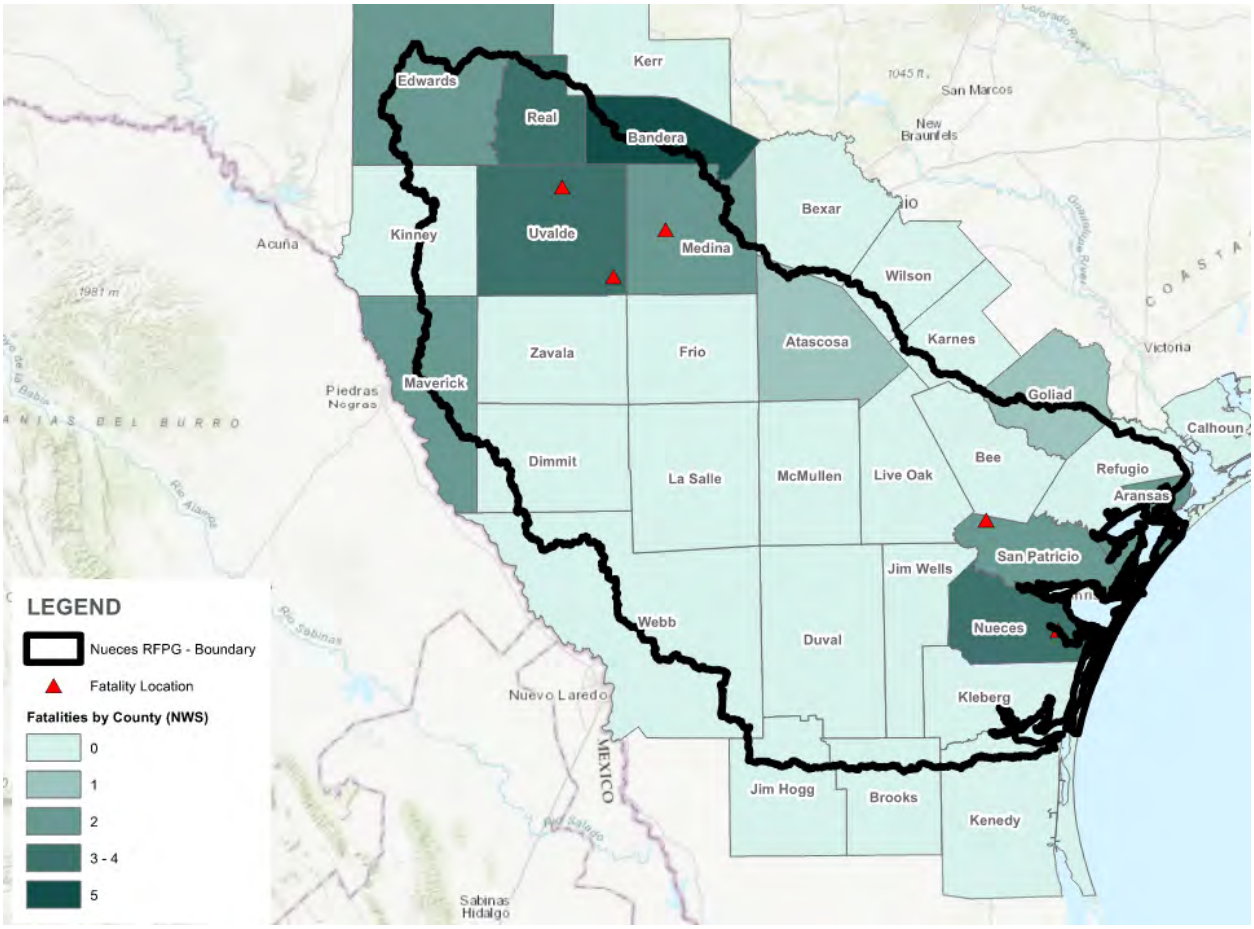


Figure 2. National Weather Service Fatalities from Flooding, since 1996

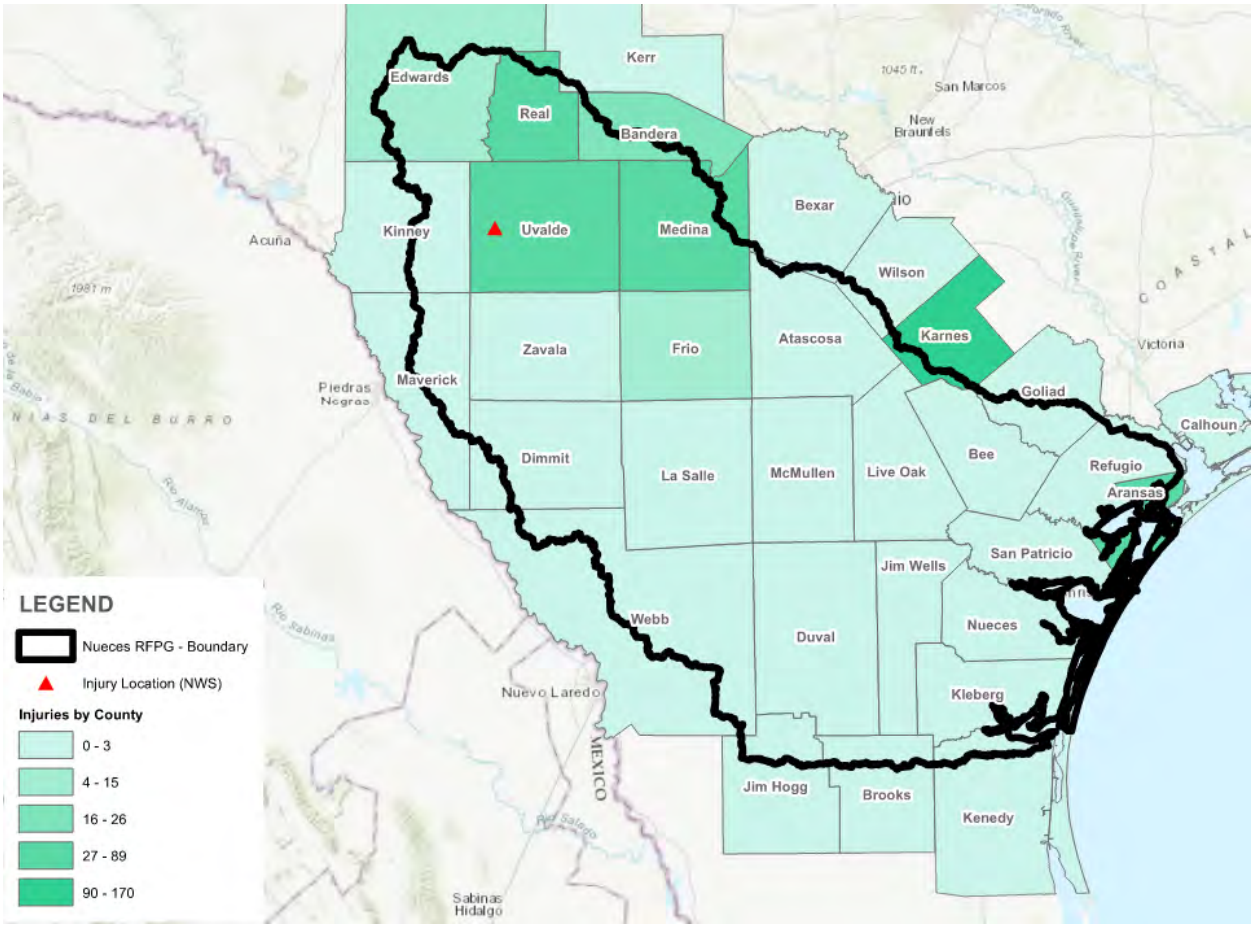


Figure 3. National Weather Service Injuries from Flooding, since 1996

Table 3. Losses associated with Flooding in Region 13 counties since 1996 as reported by the National Weather Service

Flood Year	Damages (in Dollars)	Injuries	Fatalities
1996	56,367,000	0	1
1997	21,807,000	170	8
1998	94,424,000	495	5
1999	492,000	4	0
2000	961,000	1	0
2001	3,540,000	21	1
2002	4,680,000	29	1
2003	5,642,000	0	1
2004	2,585,000	7	1
2005	-	0	0
2006	2,170,000	0	0
2007	4,910,000	0	0
2008	7,207,000	2	1
2009	-	0	0
2010	10,775,000	0	3
2011	-	0	0
2012	6,770,000	0	0
2013	810,000	0	0
2014	1,550,000	0	0
2015	5,365,000	0	4
2016	2,335,000	0	0
2017[1]	4,278,561,000	65	2
2018	1,350,000	3	1
2019	155,000	0	0
2020	1,005,000	0	0
Totals	4,513,461,000	797	29

[1] Hurricane Harvey is responsible for most of these damages

Table 4. Losses associated with Flooding from 1996 to 2020 as reported by the National Weather Service

Counties	Damages	Injuries	Fatalities
Aransas	$ 1,952,322,000	65	2
Atascosa[2]	$ 2,067,000	0	1
Bandera[2]	$ 7,783,000	26	5
Bee	$ 1,049,000	0	0
Bexar[2]	$ -	0	0
Brooks[2]	$ 1,625,000	0	0
Dimmit[2]	$ 20,234,000	0	0
Duval	$ 50,000	0	0
Edwards[2]	$ 721,000	15	2
Frio	$ 2,342,000	15	0
Goliad[2]	$ 1,025,000	0	1
Jim Hogg[2]	$ -	0	0
Jim Wells	$ 4,816,000	0	0
Karnes[2]	$ 7,084,000	170	0
Kenedy[2]	$ -	0	0
Kerr[2]	$ -	0	0
Kinney[2]	$ 1,390,000	0	0
Kleberg	$ 1,170,000	0	0
La Salle	$ -	0	0
Live Oak	$ 425,000	0	0
Maverick[2]	$ 7,266,000	3	2
McMullen	$ 200,000	0	0
Medina[2]	$ 17,148,000	59	2
Nueces	$ 1,315,015,000	3	4
Real[2]	$ 2,666,000	69	4
Refugio[2]	$ 520,020,000	0	0
San Patricio	$ 518,722,000	0	2
Uvalde	$ 18,009,000	89	4
Webb[2]	$ -	0	0
Wilson[2]	$ 89,786,000	257	0
Zavala	$ 20,526,000	26	0
Total	$ 4,513,461,000	797	29

[2] Total county damages shown. These counties are only partially located in Region 13, with the remaining amount in an adjoining flood planning basin.

Federal Emergency Management Agency Flood Damage Data

Federal Emergency Management Agency (FEMA) funding for flood damages was obtained from 2002 to June 2021 as shown in Figure B-4. Table B-5 includes flood related damages by county. Unlike the gross damage data in Table B-3 and Table B-4, data in Table B-5 is summarized from various federal programs. First, raw data of all program funds in the Region 13 counties was downloaded from the FEMA website. Then, programs that are non-related to flood damages are filtered out. Finally, FEMA funding of four federal programs is summarized by county: Public Assistance Funded Project Summaries, Individuals and Households Program – Valid Registrations, Individual Assistance Housing Registrants – Large Disasters, and Housing Assistance Program.

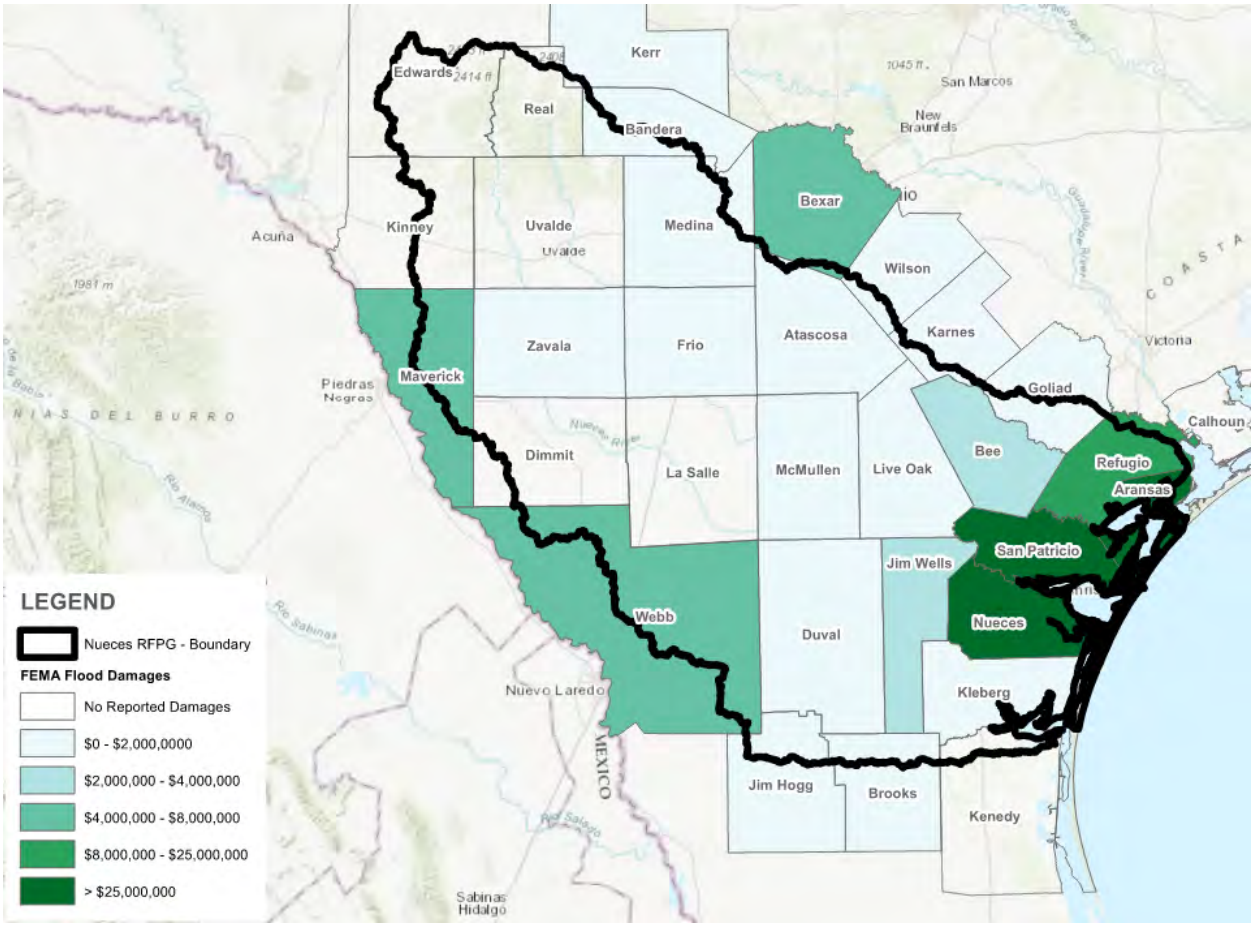


Figure 4. FEMA Flood Assistance to Owners and Renters for Flood Damages, since 2002

Table 5. FEMA Funding for Flood Related Damages by Program (2002 to June 2021)

	Public Assistance Funded Project Summaries	Individuals and Households Program Valid Registrations		Individual Assistance Housing Registrants Large Disasters	Housing Assistance Program
Counties	Federal Share Obligated	Flood Damage Amount	Repair Amount	Real Property Damage Amount Observed by FEMA	Owners and Renters Combined Amount
Aransas[2]	75,674,264	616,914	734,181	8,457,466	50,377,516
Atascosa[2]	1,534,103	0	0	0	668,809
Bandera[2]	2,077,275	0	0	0	72,991
Bee	1,198,186	9,016	7,686	62,702	2,908,309
Bexar[2]	0	0	0	0	6,886,899
Brooks[2]	152,608	0	0	0	218,103
Dimmit[2]	758,646	0	0	0	0
Duval	0	0	0	0	595,316
Edwards[2]	0	0	0	0	0
Frio	497,840	4,767	7,737	0	435,145
Goliad[2]	618,371	453	1,175	40,534	1,550,171
Jim Hogg[2]	265,938	0	0	0	404,417
Jim Wells	1,754,451	150,464	59,198	895	3,090,062
Karnes[2]	751,420	482	3,677	6,823	1,108,783
Kenedy[2]	29,192	0	0	0	0
Kerr[2]	1,110,759	0	0	0	5,902
Kinney[2]	663,038	0	0	0	0
Kleberg	1,185,217	63,131	30,086	32,654	999,455

Table 5. FEMA Funding for Flood Related Damages by Program (2002 to June 2021)

	Public Assistance Funded Project Summaries	Individuals and Households Program Valid Registrations		Individual Assistance Housing Registrants Large Disasters	Housing Assistance Program
Counties	**Federal Share Obligated**	**Flood Damage Amount**	**Repair Amount**	**Real Property Damage Amount Observed by FEMA**	**Owners and Renters Combined Amount**
La Salle	783,237	0	0	0	0
Live Oak	333,648	1,530	3,911	0	633,648
Maverick[2]	568,802	0	0	0	5,485,074
McMullen	125,315	0	0	0	30,906
Medina[2]	2,658,555	0	0	0	1,448,375
Nueces	107,325,093	2,543,856	2,049,947	7,302,464	43,018,855
Real[2]	1,427,573	0	0	0	0
Refugio[2]	27,531,715	2,028	0	323,289	8,183,992
San Patricio	38,006,297	0	0	2,481,751	25,725,502
Uvalde	2,934,567	0	0	0	0
Webb[2]	3,761,150	0	0	0	4,085,755
Wilson[2]	2,059,932	0	0	0	267,428
Zavala	3,827,640	27,034	14,984	0	1,408,517
Totals	***279,614,832***	***3,419,675***	***2,912,582***	***18,708,578***	***159,609,930***

Historical Flood Data Summary

National Weather Service (NWS) and Federal Emergency Management Agency (FEMA) data both report flood damages and correlate well throughout the basin. These two agencies report different figures, but the underlying data agrees on important points for regional flood planning including which counties see the largest financial losses due to flooding, what type of storms are the most damaging, and which years were the costliest. In summary of these two data sources the coastal counties of Aransas, Nueces, San Patricio, and Refugio see the most expensive damages and receive the most federal relief in relation to flooding. Hurricanes and tropical storms cause the higher rates of loss experienced in these counties. However, NWS reported injuries and fatalities indicate that the flash flooding of the northwest basin and riverine flooding of the middle basin are also dangerous and costly. It is important to mention that neither of these data providers are able to completely capture the total amount of damages caused by flooding. The NWS, for example, reports no damages in Webb County since 1996 while FEMA reports some $4 million provided to homeowners and renters for flood damage repairs since 2002. The NWS also reports damages that FEMA does not when no federal funds are distributed for repair or future mitigation.

Flash floods prove to be even more dangerous making up 72% of all fatalities and 59% of all injuries reported by the NWS since 1996 with most of these incidents in the northwestern counties. While dangerous, flash floods are responsible for less than 3% of total damages with a total across all Region 13 counties of $105 million. These figures may include losses that occurred in adjacent flood planning regions if a county is located in more than one region.

Appendix C2 – List of Previous Flood Studies

Appendix C2 – Previous Relevant Flood Studies

A list of previous flood studies considered by the Regional Flood Planning Group (RFPG) to be relevant to the development of the regional flood plan are provided in the following table:

Previous and Relevant Flood Study	Description	Jurisdictions	Counties	Year
Coastal Texas Protection and Restoration Feasibility Study	This effort, known as the Coastal Texas Protection and Restoration Feasibility Study (Coastal Texas Study), was initiated in 2014 to evaluate large-scale coastal storm risk management (CSRM) and ecosystem restoration (ER) actions aimed at providing the coastal communities of Texas with multiple lines of defense to reduce impacts from a wide array of coastal hazards. This study falls under the U.S. Army Corps of Engineers (USACE) Civil Works Mission, which includes but is not limited to inland and coastal flood risk management and the restoration, protection, and management of aquatic ecosystems. This planning effort was conducted in full compliance with the National Environmental Policy Act (NEPA) and this report includes a companion Final Environmental Impact Statement (EIS).	USACE, GLO	Nueces, San Patricio	2021
Lower Nueces River Watershed Protection Plan	The purpose of this report is to summarize data collected by Texas Stream Team citizen scientists. The data presented in this report should be considered in conjunction with other relevant water quality reports for a holistic view of water quality in the lower Nueces River watershed.	Jurisdictions within the Lower Nueces River Watershed	Counties within the Lower Nueces River Watershed	2020
Atascosa-McMullen Multi-Jurisdictional Hazard Mitigation Action Plan	The Atascosa and McMullen Counties Hazard Mitigation Plan is a multi-jurisdictional plan covering two counties, 8 cities, and 2 school districts. The purpose of the plan is to minimize or eliminate long-term risks to human life and property from known hazards and to break the cycle of high-cost disaster response and recovery within the planning area.	Atascosa County, McMullen County, the Cities of Charlotte, Christine, Jourdanton, Pleasanton, Poteet, Lytle, the school district of Lytle Independent School District (ISD) and Poteet ISD.	Atascosa-McMullen	2020
Coastal Resiliency Master Plan	Developed by the Texas General Land Office (GLO), the 2019 Texas Coastal Resiliency Master Plan is the second installment of a statewide plan to protect and promote a vibrant and resilient Texas coast that supports and sustains a strong economy and healthy environment for all who live, work, play or otherwise benefit from the natural resources and infrastructure along the Texas coast.	GLO	Aransas, Kleberg, Nueces, Refugio, San Patricio	2019

Appendix C2 – Previous Relevant Flood Studies

Previous and Relevant Flood Study	Description	Jurisdictions	Counties	Year
Bandera County River Authority and Groundwater District Flood Plan	The purpose of the flood plan is to outline a plan of operation to effectively coordinate and provide reliable information to the community during rainfall runoff events resulting in minor to significant flooding conditions of the Medina River and Sabinal River within Bandera County.	Bandera County River Authority and Groundwater District	Bandera	2019
The City of Alice & Jim Wells County Multi-Hazard Mitigation Plan	This plan addresses the following natural hazards: floods, hurricanes / tropical storms, wildfire, tornados, drought, riverine erosion, dam/levee failure, earthquakes, expansive soils, extreme heat, hailstorms, severe winter storms, windstorms, and lightning. The goals of the plan are to reduce loss of life and injury to persons; reduce disruptions to essential public services and infrastructure; reduce economic impacts to individuals, businesses, and area institutions; and to reduce losses to civic, cultural, and environmental resources.	Jim Wells County and City of Alice	Jim Wells County	2018
San Patricio County Hazard Mitigation Action Plan	The plan was prepared by San Patricio County, participating jurisdictions, and H2O Partners, Inc. The purpose of the plan is to protect people and structures and to minimize the costs of disaster response and recovery. The goal of the plan is to minimize or eliminate long-term risks to human life and property from known hazards by identifying and implementing cost-effective hazard mitigation actions.	San Patricio County	San Patricio	2018
Aransas County Multi-Jurisdictional Floodplain Management Plan	The focus of the mitigation action plan is to reduce future losses within Aransas County by identifying mitigation strategies based on a detailed hazard risk analysis, including both an assessment of regional hazards and vulnerability. The mitigation strategies seek to identify potential loss-reduction opportunities. The goal of this effort is to work towards more disaster-resistant and resilient communities throughout Aransas County.	Aransas County, the City of Aransas Pass, the Town of Fulton, and the City of Rockport.	Aransas	2017
Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan	This plan covers two counties, 8 cities, and 2 school districts. The purpose of the plan is to minimize or eliminate long-term risks to human life and property from known hazards and to break the cycle of high-cost disaster response and recovery within the planning area	Unincorporated Aransas County, City of Aransas Pass, Town of Fulton, City of Rockport	Aransas	2017
Nueces County Multi-Jurisdictional Hazard Mitigation Action Plan	The focus of the mitigation action plan is to reduce future losses within Nueces County by identifying mitigation strategies based on a detailed hazard risk analysis, including both an assessment of regional hazards and vulnerability. The mitigation strategies seek to identify potential loss-reduction opportunities. The goal of this effort is to work towards more disaster-resistant and resilient communities throughout Nueces County.	Nueces County, City of Aqua Dulce, City of Bishop, City of Corpus Christi, City of Driscoll, City of Petronila, City of Port Aransas, City of Robstown, Port of Corpus Christi Authority	Nueces	2017

Appendix C2 – Previous Relevant Flood Studies

Previous and Relevant Flood Study	Description	Jurisdictions	Counties	Year
Hazard Identification, Risk Assessment (HIRA) and Consequence Analysis	The HIRA is the first step in evaluating natural and technological hazards that exist. It serves as a basis for the development plans, public education programs, responder training and exercises. It also lays foundation to begin mitigation efforts to minimize these identified potential threats.	Bexar County, City of San Antonio	Bexar	2014
A Joint Erosion Response Plan for Nueces County and the City of Corpus Christi	The purpose of the erosion response plan is to reduce storm damage along the city and county gulf coastlines. The erosion response plan will be used by the GLO to qualify local governments for certain GLO grants.	City of Corpus Christi, Nueces County	Nueces	2012
Coastal Bend Mitigation Action Plan	The main purpose to the planning project is to reduce future losses in the Coastal Bend region of Texas by identifying mitigation strategies based on an analysis of risk, including both an assessment of regional hazards and vulnerability. The mitigation strategies seek to identify potential loss-reduction opportunities; however, implementation of the strategies will be constrained to some extent by the future availability of funding in the context of other community priorities.	Aransas County, Bee County, Jim Wells County, Kleberg County, Live Oak County, Nueces County, San Patricio County	Aransas, Bee, Jim Wells, Kleberg, Live Oak, Nueces, San Patricio	2012
Potential for Bed-Material Entrainment in selected Streams of the Edwards Plateau----Edwards, Kimble, and Real Counties, Texas, and Vicinity	An investigation of the problem at low-water crossings (LWCs) was made by the U.S. Geological Survey (USGS) in cooperation with the Texas Department of Transportation (TXDOT), and in collaboration with Texas Tech University, Lamar University, and the University of Houston. The bed-material entrainment problem for LWCs occurs at two spatial scales - watershed scale and channel-reach scale. First, the relative abundance and activity of cobble- and gravel-sized bed material along a given channel reach becomes greater with increasingly steeper watershed slopes. Second, the stresses required to mobilize bed material at a location can be attributed to reach-scale hydraulic factors, including channel geometry and particle size.	USGS, TXDOT	Edwards, Kimble and Real	2008

Appendix C3 – Floodplain Management Practices and Goal Survey Results

Entity Name:	Submission Date	Does your entity have floodplain management regulations?	Has your organization adopted minimum regulations pursuant to Texas Water Code Section 16.3145?	What standards or regulations does your community or jurisdiction use to protect the floodplain and/or encourage disaster resistant development/design? What are your minimum standards for: floodplain management, disaster resistant building codes, other ordinances? (Select all that apply)	Higher standards adopted	How would you gauge the level of enforcement of floodplain management practices?	Is there an existing stormwater or drainage fee?	Web link to entity regulations	Are these flood regulations in the process of being updated/changed?	Which of the following describes your local funding sources for flood management activities? (Select all that apply)	Over the next ten years, what specific challenges does your community or jurisdiction face regarding managing any potential increase in flood risk in your jurisdiction? Include challenges such as funding, project identification, training, resources, etc.	Does your jurisdiction have access to the necessary training and educational resources for floodplain management?	Please explain your jurisdiction access needs.	Has your city/county identified short term (10 year) floodplain management goals? If yes, please describe goal and extent of area that it applies to.	Has your city/county identified long term (30 year) floodplain management goals? If yes, please describe goal and extent of area that it applies to.
Aransas County	2021/07/30 17:41:58	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only Local Floodplain ordinance with higher standards (greater than NFIP)		Moderate	No	https://www.aransascountytx.gov/main/docs/ordinances/DAmended%20Aransas%20County%20Floodplain%20Management%20Watershed%20Protection%20Order%20O-23-2019.pdf	Yes	Bond Program Special Tax Districts Permitting Fees	Sea-level rise, project identification, resources (namely staff - more full-time employees are needed both for maintenance of drainage infrastructure and for code enforcement), inconsistent regulations and methods for drainage between County and municipalities within the County	No	More staffing for public outreach and code enforcement; assistance in coordinating regional drainage standards and projects	Protect existing resources through regulatory standards; utilize the CRS to incentivize higher floodplain management standards; create comprehensive Public Information Plan; protect property through mitigation measures	Create a coordinated infrastructure plan for all jurisdictions
Bandera County	2021/08/06 07:14:21	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only		Moderate	No	www.banderacounty.org	No	Permitting Fees		Yes			
Bexar County	2021/07/15 14:54:29	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP)		Moderate	No	Not Available on line	Yes	General Fund Permitting Fees	Funding related to projects to remove dangerous roadway crossings and floodplain impacts on private property; Funding related to having staffing to inspect and enforce the Floodplain Damage Prevention Court Order to including having attorneys with the District Attorney's Office dedicated to prosecuting floodplain violators; Lack of stiff penalties for individuals who violate the Court Order	Yes		Bexar County identifies projects on a continuing basis. Approximately $2 million/yr is delegated to projects that can be completed in a short time frame with a high cost/benefit ratio. Higher dollar/long term projects are slated for future multi-year bond projects.	
City of Beeville	2021/07/17 19:06:34	No	No	National Flood Insurance Program (NFIP) minimum requirements only		Low	No	NO	No	General Fund	Funding and community awareness and buy-in from the community	No	Routine training on floodplain management and best practices		
City of Bishop	2021/07/13 15:58:07	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only		Moderate	No	www.cityofbishoptx.com	Yes	We do not have a local funding source for flood management activities	Funding plays a huge part for the city the only improvements the city can make is with grant funds.	No	The city is in desperate need of dredging 2 creek beds located on either side of town. 1 creed bed is located by city park and the other on the Hackberry Ditch. Both of these areas carry runoff from the county and neighboring county.	We have a flood management plan that is included with Nueces County but for some reason the creek beds weren't included and this is our only drainage for the city.	Yes, we are included in Nueces County's floodplain management plan, but drainage issues were left out from the current plan.
City of Corpus Chris	2021/07/13 10:17:40	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP)		High	No	https://library.municode.com/tx/corpus_christi/codes/code_of_ordinances?nodeId=PTIIITHCOOR_CH14DESE_ARTVFLHAPRCO	No	Storm Water Fund	Funding, getting local builders & developers in tune with our vision, enough educational materials and trainings for public.	No	We have 1 person on our staff to handle floodplain issues/questions/concerns and would love to have as much training & educational resources as possible.	In the process of doing that.	In the process of doing that
City of Cotulla La Sa	2021/08/05 09:54:14	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only		Low	No	municode	Yes	General Fund	funding and training; Map revision of main floodways	No	lack of training and resources	Beginning initial studies to create new LOMOR for main drainage area of City.	no
City of Gregory	2021/08/02 12:49:35	Yes	No	National Flood Insurance Program (NFIP) minimum requirements only Local Floodplain ordinance with higher standards (greater than NFIP)		High	No	N/A	No	General Fund Permitting Fees Ad Valorem Tax		Yes	our current need will be opening drainage ditches and installation of culverts to carry the storm water to relief the low line areas	Yes will have allocated funding for the drainage culverts within the community through our Drainage District with anticipation of curb and gutters	goals will be to have all streets with curb and gutters
City of Hondo	2021/08/05 15:07:40	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only Disaster Resistant Building Codes Designated design storms (design for a specific storm event)		Moderate	No	https://z2.franklinlegal.net/franklin/z2Browser2.html?showset=hondoset&collection=hondo&doccode=z2Code_z20000462	No	General Fund We will research this and provide additional information if there are other funds available.	Funding, project identification, training, and staff time/resources are all challenges faced for floodplain management. The City has a large floodplain, some of which does not have a defined floodway. The area needs to be restudied and the City needs to develop a comprehensive stormwater management plan, but these actions require significant funding and staff time to manage.	Yes	We do have access to educational resources. We struggle with allocation of staff time for such training opportunities.	Not officially at this time. Generally speaking the City needs to create a stormwater management plan and drainage study which incorporates a restudy of the City's floodplain. There have been improvements to the bridges that run under the Union Pacific Railroad, so a subsequent restudy would improve the accuracy of our floodplain management.	
City of Ingleside	2021/07/09 11:47:29	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP) Disaster Resistant Building Codes Designated design storms (design for a specific storm event)		High	No	https://library.municode.com/TX/ingleside/codes/code_of_ordinances?nodeId=PTIICO_CH118BUBURE_ARTXFLMA&showChanges=true	No	General Fund Bond Program	New development not creating new issues and requiring new development to include surrounding area drainage in their engineered drainage plans; Funding can be challenging.	Yes		The City of Ingleside is currently working on a drainage master plan that will identify troublesome areas; An increase in the freeboard from 12" to 18" is being considered	
City of Leakey	2021/08/05 14:26:08	Yes	No	National Flood Insurance Program (NFIP) minimum requirements only		Moderate	No	none	No	General Fund	none	Yes			

Appendix C3 - Floodplain Management Practices and Goal Survey Results

Entity Name:	Submission Date	Does your entity have floodplain management regulations?	Has your organization adopted minimum regulations pursuant to Texas Water Code Section 16.3145?	What standards or regulations does your community or jurisdiction use to protect the floodplain and/or encourage disaster resistant development/design? What are your minimum standards for: floodplain management, disaster resistant building codes, other ordinances? (Select all that apply)	Higher standards adopted	How would you gauge the level of enforcement of floodplain management practices?	Is there an existing stormwater or drainage fee?	Web link to entity regulations	Are these flood regulations in the process of being updated/changed?	Which of the following describes your local funding sources for flood management activities? (Select all that apply)	Over the next ten years, what specific challenges does your community or jurisdiction face regarding managing any potential increase in flood risk in your jurisdiction? Include challenges such as funding, project identification, training, resources, etc.	Does your jurisdiction have access to the necessary training and educational resources for floodplain management?	Please explain your jurisdiction access needs.	Has your city/county identified short term (10 year) floodplain management goals? If yes, please describe goal and extent of area that it applies to.	Has your city/county identified long term (30 year) floodplain management goals? If yes, please describe goal and extent of area that it applies to.
City of Port Aransas	2021/06/18 09:21:22	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only Local Floodplain ordinance with higher standards (greater than NFIP)		High	No	https://library.municodeXXXom/tx/portXXXransas/codes/code_of_ordinances?nodeId=COOR_CH8FLDAPR	No	General Fund Other (please explain)	Funding, training, resources	Yes		The city has a master drainage plan, and works consistently on upgrading drainage areas in need.	
City of Sinton	2021/07/12 14:32:02	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only Disaster Resistant Building Codes No building in the floodplains		Moderate	No	sintontexas.org	No	General Fund		Yes			
City of Uvalde	2021/07/12 07:21:42	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP)		Moderate	No	https://library.municodeXXXom/tx/uvalde/codes/code_of_ordinances?nodeId=CH15BUCO_CH15.48FLDAPR	No	General Fund Other (please explain)	Finances, resources	Yes	With only one person doing floodplain, its kind of hard to hire a Floodplain manager to just do floodplain in our smaller communities.	I would for the city to hire another floodplain manager. I wear many hats besides floodplain manager and i know that floodplain is not a priority to us.	Not that I know of, maybe strategic planning has something that they are working on?
Dimmit County	2021/08/06 15:47:25	No	No	I don't know		None	No	none	No			No	Not very familiar with the floodplain management in our County. Substantial research will be needed with follow-ups.	No	No
Duval County	2021/08/04 16:48:40	No	No	No building in the floodplains		Low	No	www.co.duval.tx.us	No	General Fund		No			
Duval County Conservation & Reclamation District	2021/08/05 09:40:04	No	No			None	No	None	No	We do not have a local funding source for flood management activities		No			
Frio County	2021/07/13 11:36:52	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only		Low	No	N/A	No	We do not have a local funding source for flood management activities	Flood mapping, funding	Yes		No	No
Karnes County	2021/08/05 10:56:15	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP)		Moderate	No	none	No	Permitting Fees		Yes			
KERR COUNTY ENG	2021/08/03 08:38:05	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only		Moderate	No	https://www.co.kerr.tx.us/engineer/floodplain.html	No	General Fund	Funding	Yes			
McMullen County W	2021/08/10 10:00:55	No	No	I don't know		Low	No	None	No	We do not have a local funding source for flood management activities	We have no jurisdiction.	No	We have no jurisdiction on floodplain management.	No	No
Medina County	2021/08/04 09:33:23	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only Local Floodplain ordinance with higher standards (greater than NFIP)		High	No	medinacountytexas.org	No	General Fund Permitting Fees	development	Yes	?		
Portland, Texas	2021/07/16 13:04:38	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP) Designated design storms (design for a specific storm event)		High	Yes	https://library.municodeXXXom/tx/portXXXand/codes/code_of_ordinances?nodeId=COOR_CH4BUGEBURE_ARTIIIFLDAPR_S4-30STAVESFAPUME	No	General Fund Storm Water Utility Fee	Portland is growing, however much of the growth is occuring westerly away from the bays and established floodplains. However, in response to this growth, we'll need to review our current stormwater and floodplain regulations to access whether amendments are needed	Yes	We need to continue networking with adjacent cities, county and state regarding flood plain management best practices and regulatory measures.	The City recently hired a new Building Official and the flood plain regulations are to be administered by this position. I am currently a Certified Flood Plain Manager and City staff will explore review of our current regulations and identify future short term flood plain management goals.	In general, we don't typically receive many permit applications for proposed improvements that would be located within the floodplain. However, part of our exploration will involve greater community education about the importance of protecting our flood plains from encroachment and if construction is proposed that permit applications are submitted for review and that any project meet the City's flood plain development requirements.
Real County	2021/08/09 12:52:49	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only		Moderate	No	co.real.tx.us	No	General Fund					

Entity Name:	Submission Date	Does your entity have floodplain management regulations?	Has your organization adopted minimum regulations pursuant to Texas Water Code Section 16.3145?	What standards or regulations does your community or jurisdiction use to protect the floodplain and/or encourage disaster resistant development/design? What are your minimum standards for: floodplain management, disaster resistant building codes, other ordinances? (Select all that apply)	Higher standards adopted	How would you gauge the level of enforcement of floodplain management practices?	Is there an existing stormwater or drainage fee?	Web link to entity regulations	Are these flood regulations in the process of being updated/changed?	Which of the following describes your local funding sources for flood management activities? (Select all that apply)	Over the next ten years, what specific challenges does your community or jurisdiction face regarding managing any potential increase in flood risk in your jurisdiction? Include challenges such as funding, project identification, training, resources, etc.	Does your jurisdiction have access to the necessary training and educational resources for floodplain management?	Please explain your jurisdiction access needs.	Has your city/county identified short term (10 year) floodplain management goals? If yes, please describe goal and extent of area that it applies to.	Has your city/county identified long term (30 year) floodplain management goals? If yes, please describe goal and extent of area that it applies to.
Refugio County	2021/08/04 13:59:15	Yes	Yes	I don't know		Low	No	n/a	No	We do not have a local funding source for flood management activities	Training and updating FP regulations, as needed.	No	Do not have the funds for the labor to acquire certifications and manage the FP administration process. County Judge reviews each building permit for FP applicability per the established 9/2014 FIRM maps. If proposed building is in a Flood Zone, the applicant is asked to provide elevation certificates and warnings acknowledged. Approvals can be with elevation stipulations.		
San Patricio County	2021/07/14 09:35:18	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP)		High	No	https://www.twdb.texas.gov/financial/programs/EDAP/maps/San_Patricio_Co_MSRs.pdf	Yes	Other	More training and collaboration of our order and regulations with local appraisal district, relators, "building movers," etc. in order to spread necessary knowledge for the safety and well being of the community	Yes	unknown what the question is asking	Yes. There are many different goals we have that include but not limited to: -increasing community knowledge of rules and regulations -identifying key issues and mitigate their risks -expediting permitting process -collaborating more with other departments in our community -updating our policies and procedures that will increase the well being of the community -working more with surrounding communities -increase and store data of development in an fashion that is feasible to search back for	Drainage Study RFPG Study Hazard mitigation action plan long term recover plan
San Patricio County Drainage District	2021/06/23 10:34:30	No	No	National Flood Insurance Program (NFIP) minimum requirements only		High	No	co.san-patricio.tx.us	No	Ad Valorem Tax	n/a	Yes	n/a	n/a	n/a
San Patricio County, City of Ingleside on the Bay	2021/08/03 09:00:52	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only		Moderate	No	www.inglesideonthebay.org, ordinances	No	We do not have a local funding source for flood management activities	A city wide drainage study is in process at this time. The study should be finished in the next couple of months. The council will review existing measures taken and new suggestions, solutions included in the study. Funding will be an issue and the City will be looking for grant sources. We are not really in a position where bonds or loans are feasible as we have limited funding for our small community.	Yes	Ingleside on the Bay is under the direction of San Patricio County and I think they offer updates and training on a limited basis. Our building official has some basic training in floodplain issues but is not certified.	No, not really. As mentioned above, Ingleside on the Bay is conducting a drainage study to integrate existing measures in place with additional actions to alleviate some of the flooding problems we have experienced.	No
Uvalde County UWC	2021/06/18 09:03:43	No	Yes	I don't know		High	No	none	No	Ad Valorem Tax		Yes			
Webb County	2021/06/18 09:32:50	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP)		High	No	https://www.webbcountytx.gov/Planning/	Yes	General Fund		Yes			
Wilson County	2021/07/19 16:28:33	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP)		Moderate	No	http://www.co.wilson.tx.us/uploads/page/2300/Docs/Dawn/Ordinances/WC_Flood_Order_Final_10272010.pdf	No	Permitting Fees		Yes			
Zavala County	2021/08/05 13:34:10	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP)		Moderate	No	http://co.zavala.tx.us	No	I don't know	Funding and resources	No		No I am new to the department and I am learning and seeing all the different challenges that we are facing little by little.	No, not at the moment

Appendix C4 – TFMA Higher Standard Survey Results for the Nueces Basin

Appendix C4 - TFMA 2018 Higher Standard Survey Results for the Nueces Basin

No.	City or County Name	Feet above Fully Developed BFE	Feet above Existing BFE	Zone X(B) (Shaded) above street or curb	Zone X(C) (Unshaded) above street or curb	Special Notes	Is Local Floodplain Administer (LFA) a CFM?	CFM s on Staff	Community Rating System (CRS)
1	City of Alice	-	1	1.5	1.5	(1) The City requires a hydraulic analysis on all new development. (2) The City requires on-site detention. (3) In Zone X new construction must be elevated a minimum of 1.5' above natural grade or above the crown of the nearest street, whichever is higher.	-	-	
2	City of Aransas Pass	-	1	0	0	City building FPM program	LFA is a CFM	1	
3	City of Charlotte	0	0	-	-	(1) Developer is required to conduct a study to define BFE and floodway in Zone A. (2) Detention is required (3) EC is required prior to forming/pouring lowest floor; when structure is completed; and prior to CO.	-	-	-
4	City of Corpus Christi	-	-	1.5	1.5	(1) Developer is required to conduct a study to define BFE in Zone A. (2) Developer must mitigate downstream impacts (3) In Zone X new structures must be elevated a minimum of +1.5' above curb of nearest street (4) EC is required prior to forming/pouring lowest floor; when structure is completed; and prior to CO. (5) Biggest problem is community education	LFA is a CFM	9	7

No.	City or County Name	Feet above Fully Developed BFE	Feet above Existing BFE	Zone X(B) (Shaded) above street or curb	Zone X(C) (Unshaded) above street or curb	Special Notes	Is Local Floodplain Administer (LFA) a CFM?	CFM s on Staff	Community Rating System (CRS)
5	City of Ingleside	1	1	1	1	(1) City utilized the 1987 San Patricio Drainage District Study that established the 100-year flood elevation in the City (2) New development must be +1' above BFE or +1' above crown of nearest street whichever is higher. (3) Developer must conduct a study, based on fully developed watershed conditions, to define the BFE in Zone A (4) Onsite Detention required, setback from Floodway and mitigation of downstream impacts (5) Development in Zone X must be elevated a minimum of +1' above the crown of closest road (6) EC required prior to forming/pouring lowest floor; when construction is completed and prior to CO. (7) Biggest problem is coastal flooding and incomplete record keeping in the past	LFA is a CFM	1	-
6	City of Kingsville	-	1	-	-	City is proposing +2 ft above BFE along the floodplain with no new development allowed in the floodplain unless an engineered study is provided showing no rise in FP	-	-	-
7	City of Port Aransas	1	1	0	0	(1) City is a Zone V community (2) EC required before framing/pouring lowest floor and prior to CO (3) Biggest problem is hurricanes	LFA is a CFM	2	-

No.	City or County Name	Feet above Fully Developed BFE	Feet above Existing BFE	Zone X(B) (Shaded) above street or curb	Zone X(C) (Unshaded) above street or curb	Special Notes	Is Local Floodplain Administer (LFA) a CFM?	CFM s on Staff	Community Rating System (CRS)
8	City of Rockport	0	1.5	1	1	(1) Detention is required (2) EC required prior to CO (3) Biggest problems are: transitioning to higher floodplain management standards; resistance to freeboard requirements; and historic waterfront structures downtown	LFA is a CFM	1	-
9	City of Uvalde	-	2	2	2	(1) New construction must be elevated a minimum of 2' above BFE. (2) Developer must conduct a study to establish the BFE and floodway in Zone A based on existing watershed conditions (3) No fill in floodway without mitigation. (4) In Zone X new construction must be elevated 2' above natural grade or crown of nearest street (5) EC required prior to framing/pouring lowest floor.	-	-	-
10	Aransas County	-	1.5	-	-	Aransas County requires new construction to be elevated in the SFHA - 18" for new structures and 6" for accessory buildings.	LFA is a CFM	1	-
11	Bandera County	-	3	2	1	(1) Developer must submit a study defining the floodway boundary in Zone A prior to permit (2) EC required prior to forming or pouring the lowest floor and when construction is completed (3) County requires detention, mitigation of downstream impacts and setback from floodway	LFA is a CFM	1	-

No.	City or County Name	Feet above Fully Developed BFE	Feet above Existing BFE	Zone X(B) (Shaded) above street or curb	Zone X(C) (Unshaded) above street or curb	Special Notes	Is Local Floodplain Administer (LFA) a CFM?	CFM s on Staff	Community Rating System (CRS)
12	Bexar County	-	1	8”	8”	(1) Developer must conduct a study to determine the BFE and Floodway in Zone A prior to permit (2) NAI is required (no impact) outside of owners property (3) Platted property requirements include residences to be 8" above finish grade in all zones (4) Plat must show floodplain areas as drainage easements (5) County does not use floodway rules (6) EC is required prior to framing/pouring lowest floor and when structure is completed (7) Biggest problem is building and modifying structures without permits	-	10	-
13	Kerr County	-	1	-	-	(1) Developer must conduct a study to define the BFE in Zone A areas. (2) EC required when construction is completed	LFA is a CFM	1	-
14	Live Oak County	1	1	1	1	(1) Developer must conduct a study to define BFE in Zone A. (2) Onsite and regional Detention is required for new construction. (3) Developer must offset from Floodway boundary and mitigate downstream impacts (4) No fill is allowed in floodplain or floodway without mitigation. (5) In Zone X new construction must be elevated to street level (6) EC is required prior to forming/placement of lowest floor and prior to CO.	LFA is a CFM	1	-

No.	City or County Name	Feet above Fully Developed BFE	Feet above Existing BFE	Zone X(B) (Shaded) above street or curb	Zone X(C) (Unshaded) above street or curb	Special Notes	Is Local Floodplain Administer (LFA) a CFM?	CFM s on Staff	Community Rating System (CRS)
15	Medina County	1	1	1.5	0	(1) Developer must conduct a study to define BFE and floodway in Zone A prior to permit (2) On-site detention is required for new construction. (3) Developer must mitigate downstream impacts (4) 18" Freeboard required in all zones (4) EC is required prior to forming/pouring lowest floor and when construction is completed. (5) Biggest problem is County has numerous unstudied streams	LFA is a CFM	1	-
16	Nueces County	1	1	1	1	(1) Fill placed in floodplain/floodway must be mitigated. (2) On-site detention required (3) EC required prior to forming/pouring lowest floor and when structure is completed. (4) Biggest problem is staffing	-	-	-
17	Refugio County	0	0	2	2	-	-	-	-

No.	City or County Name	Feet above Fully Developed BFE	Feet above Existing BFE	Zone X(B) (Shaded) above street or curb	Zone X(C) (Unshaded) above street or curb	Special Notes	Is Local Floodplain Administer (LFA) a CFM?	CFM s on Staff	Community Rating System (CRS)
18	San Patricio County	1.5	1.5	1.5	1.5	San Patricio County requires all development, regardless of zone, to be elevated a minimum of 18" above NG. (1) Developer must conduct a study, based on fully developed watershed conditions, to define BFE and Floodway in Zone A . (2) Detention is required for new construction. (3) Developer must setback from Floodway and mitigate downstream impacts (NAI) upstream and downstream. (4) Development in Zone X must be elevated a minimum of 18" above NG or the crown of the nearest street (5) EC is required when construction is completed and prior to CO. (6) Biggest problem is citizen compliance with Court Orders	LFA is a CFM	3	-
19	Webb County	1	1	-	-	(1) Developer must conduct a study, based on fully developed watershed conditions, to identify BFE and Floodway boundary in Zone A. (2) Developer must mitigate all fill placed in floodplain and floodway. (3) Both onsite and regional detention required (4) Developer must setback from Floodway boundary and mitigate downstream impacts (5) EC is required before forming/pouring lowest floor; when construction is completed; and prior to CO. (6) County withholds public utility connections until structure is compliant with FP development requirements	LFA is a CFM	4	-

Appendix C5 – Mid-Point Technical Memorandum

This Appendix is available for viewing on the Region 13 Nueces website (https://www.nueces-rfpg.org)

Appendix C6 – HUC-12 Flood Risk Data Score Table

HUC12	Unique ID	Count								HUC 12 Percentile Rank								Unweighted Score (1-5)								Weighted Score									
																										7.5%	7.5%	15%	15%	15%	15%	15%	10%	100%	
		Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Total Score	Scaled Score (1-5)
121004050101	1	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004050102	2	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004050103	3	0	0	0	681	0	0	0	0	0%	0%	0%	96%	0%	0%	0%	0%	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0	0	0.75	1.07
121004050201	4	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004050202	5	0	0	0	15	0	0	0	0	0%	0%	0%	73%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121004050203	6	0	2	0	231	0	9	0	0	0%	97%	0%	92%	0%	96%	0%	0%	0	5	0	5	0	5	0	0	0	0.375	0	0.75	0	0.75	0	0	1.50	2.14
121004050204	7	0	3	0	2809	582	7	1	0	0%	98%	0%	99%	98%	95%	74%	0%	0	5	0	5	5	5	4	0	0	0.375	0	0.75	0.75	0.75	0.6	0	2.85	4.07
121004050205	8	0	0	0	41	0	0	0	0	0%	0%	0%	81%	0%	0%	0%	0%	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0	0	0.75	1.07
121004050301	9	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004050302	10	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004050303	11	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004050304	12	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004050305	13	0	0	0	2	0	0	0	0	0%	0%	0%	51%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121004050306	14	0	0	0	148	0	0	0	0	0%	0%	0%	89%	0%	0%	0%	0%	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0	0	0.75	1.07
121004050307	15	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004050308	16	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004050400	17	0	4	0	4833	963	19	0	0	0%	99%	0%	99%	98%	97%	0%	0%	0	5	0	5	5	5	0	0	0	0.375	0	0.75	0.75	0.75	0	0	2.25	3.21
121004060101	18	0	0	0	82	0	6	2	0	0%	0%	0%	85%	0%	95%	85%	0%	0	0	0	5	0	5	5	0	0	0	0	0.75	0	0.75	0.75	0	2.25	3.21
121004060102	19	0	0	0	1	0	0	2	0	0%	0%	0%	42%	0%	0%	85%	0%	0	0	0	3	0	0	5	0	0	0	0	0.45	0	0	0.75	0	1.20	1.71
121004060103	20	0	1	0	9	0	0	0	0	0%	91%	0%	69%	0%	0%	0%	0%	0	5	0	4	0	0	0	0	0	0.375	0	0.6	0	0	0	0	0.60	0.86
121004060104	21	0	0	0	9	0	0	0	0	0%	0%	0%	69%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121004060105	22	0	1	0	1	0	0	0	0	0%	91%	0%	42%	0%	0%	0%	0%	0	5	0	3	0	0	0	0	0	0.375	0	0.45	0	0	0	0	0.45	0.64
121004060106	23	0	0	0	5	0	0	0	0	0%	0%	0%	62%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121004060107	24	0	0	0	1	0	0	0	0	0%	0%	0%	42%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121004060108	25	0	0	0	3	0	0	0	0	0%	0%	0%	56%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121004060109	26	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004060201	27	0	0	0	1	0	0	0	0	0%	0%	0%	42%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121004060202	28	0	0	0	9	0	0	1	0	0%	0%	0%	69%	0%	0%	74%	0%	0	0	0	4	0	0	4	0	0	0	0	0.6	0	0	0.6	0	1.20	1.71
121004060203	29	0	0	0	2	0	0	0	0	0%	0%	0%	51%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121004060204	30	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004060205	31	0	0	0	1	0	0	0	0	0%	0%	0%	42%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121004060206	32	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004060207	33	0	0	0	1	0	0	0	0	0%	0%	0%	42%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121004060208	34	0	0	0	7	0	0	0	0	0%	0%	0%	66%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121004060209	35	0	0	0	4	0	0	2	0	0%	0%	0%	60%	0%	0%	85%	0%	0	0	0	3	0	0	5	0	0	0	0	0.45	0	0	0.75	0	1.20	1.71
121004060301	36	0	0	0	244	0	9	0	0	0%	0%	0%	92%	0%	96%	0%	0%	0	0	0	5	0	5	0	0	0	0	0	0.75	0	0.75	0	0	1.50	2.14
121004060302	37	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004060303	38	0	0	0	189	0	4	3	0	0%	0%	0%	91%	0%	93%	89%	0%	0	0	0	5	0	5	5	0	0	0	0	0.75	0	0.75	0.75	0	2.25	3.21
121004060304	39	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004060305	40	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004060306	41	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004060307	42	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004070101	43	0	4	0	655	608	17	13	0	0%	99%	0%	96%	98%	97%	99%	0%	0	5	0	5	5	5	5	0	0	0.375	0	0.75	0.75	0.75	0.75	0	3.00	4.29
121004070102	44	0	1	0	317	269	3	5	0	0%	91%	0%	94%	97%	92%	95%	0%	0	5	0	5	5	5	5	0	0	0.375	0	0.75	0.75	0.75	0.75	0	3.00	4.29
121004070103	45	0	0	0	52	0	1	5	0	0%	0%	0%	82%	0%	88%	95%	0%	0	0	0	5	0	5	5	0	0	0	0	0.75	0	0.75	0.75	0	2.25	3.21
121004070104	46	0	0	0	24	0	0	0	0	0%	0%	0%	76%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121004070105	47	0	0	0	16	0	0	1	0	0%	0%	0%	73%	0%	0%	74%	0%	0	0	0	4	0	0	4	0	0	0	0	0.6	0	0	0.6	0	1.20	1.71
121004070106	48	0	0	0	28	0	0	0	0	0%	0%	0%	77%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121004070201	49	0	0	1	12	0	0	1	0	0%	0%	99%	71%	0%	0%	74%	0%	0	0	5	4	0	0	4	0	0	0	0.75	0.6	0	0	0.6	0	1.20	1.71
121004070202	50	0	0	0	25	0	0	0	0	0%	0%	0%	76%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121004070203	51	0	0	0	33	0	0	2	0	0%	0%	0%	78%	0%	0%	85%	0%	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	1.35	1.93
121004070204	52	0	0	0	0	0	4	0	0	0%	0%	0%	0%	0%	93%	0%	0%	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0.75	1.07
121004070205	53	0	0	0	37	0	5	0	0	0%	0%	0%	80%	0%	94%	0%	0%	0	0	0	5	0	5	0	0	0	0	0	0.75	0	0.75	0	0	1.50	2.14
121004070206	54	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004070301	55	0	0	0	39	0	0	0	0	0%	0%	0%	81%	0%	0%	0%	0%	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0	0	0.75	1.07
121004070302	56	0	0	0	360	163	2	3	0	0%	0%	0%	94%	96%	91%	89%	0%	0	0	0	5	5	5	5	0	0	0	0	0.75	0.75	0.75	0.75	0	3.00	4.29
121004070303	57	0	0	0	308	0	5	3	0	0%	0%	0%	93%	0%	94%	89%	0%	0	0	0	5	0	5	5	0	0	0	0	0.75	0	0.75	0.75	0	2.25	3.21
121004070304	58	0	0	0	1538	1496	4	0	0	0%	0%	0%	98%	99%	93%	0%	0%	0	0	0	5	5	5	0	0	0	0	0	0.75	0.75	0.75	0	0	2.25	3.21
121004070305	59	0	0	0	120	85	0	1	0	0%	0%	0%	88%	94%	0%	74%	0%	0	0	0	5	5	0	4	0	0	0	0	0.75	0.75	0	0.6	0	2.10	3.00
121004070401	60	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004070402	61	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121004070403	62	0	3	0	536	419	5	2	0	0%	98%	0%	96%	97%	94%	85%	0%	0	5	0	5	5	5	5	0	0	0.375	0	0.75	0.75	0.75	0.75	0	3.00	4.29
121004070404	63	0	0	0	13	0	0	0	0	0%	0%	0%	72%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101010101	64	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101010102	65	0	0	0	0	0	0	3	0	0%	0%	0%	0%	0%	0%	89%	0%	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0.75	1.07
121101010103	66	0	0	0	0	0	0	9	0	0%	0%	0%	0%	0%	0%	98%	0%	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0.75	1.07
121101010104	67	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101010105	68	0	0	0	7	0	0	6	0	0%	0%	0%	66%	0%	0%	96%	0%	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	1.35	1.93
121101010201	69	0	0	0	2	0	0	1	0	0%	0%	0%	51%	0%	0%	74%	0%	0	0	0	3	0	0	4	0	0	0	0	0.45	0	0	0.6	0	1.05	1.50
121101010202	70	0	0	0	1	0	0	0	0	0%	0%	0%	42%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101010203	71	0	0	0	6	0	0	0	0	0%	0%	0%	65%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101010204	72	0	0	0	0	0	0	3	0	0%	0%	0%	0%	0%	0%	89%	0%	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0.75	1.07
121101010205	73	0	0	0	10	0	0	4	0	0%	0%	0%	70%	0%	0%	93%	0%	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	1.35	1.93
121101010301	74	0	0	0	0	0	0	2	0	0%	0%	0%	0%	0%	0%	85%	0%	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0.75	1.07
121101010302	75	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101010303	76	0	0	0	2	0	0	0	0	0%	0%	0%	51%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101010304	77	0	0	0	39	0	0	11	0	0%	0%	0%	81%	0%	0%	99%	0%	0	0	0	5	0	0	5	0	0	0	0	0.75	0	0	0.75	0	1.50	2.14
121101010305	78	0	0	0	8	0	0	0	0	0%	0%	0%	68%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101010401	79	0	0	0	61	0	0	3	0	0%	0%	0%	84%	0%	0%	89%	0%	0	0	0	5	0	0	5	0	0	0	0	0.75	0	0	0.75	0	1.50	2.14
121101010402	80	0	0	0	145	131	0	1	0	0%	0%	0%	89%	95%	0%	74%	0%	0	0	0	5	5	0	4	0	0	0	0	0.75	0.75	0	0.6	0	2.10	3.00

HUC12	Unique ID	Count								HUC 12 Percentile Rank								Unweighted Score (1-5)								Weighted Score									Scaled Score (1-5)
																										7.5%	7.5%	15%	15%	15%	15%	15%	10%	100%	
		Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Total Score	
121101010403	81	0	0	0	44	44	0	0	0	0%	0%	0%	82%	92%	0%	0%	0%	0	0	0	5	5	0	0	0	0	0	0	0.75	0.75	0	0	0	1.50	2.14
121101010404	82	0	0	0	34	34	0	2	0	0%	0%	0%	79%	90%	0%	85%	0%	0	0	0	4	5	0	5	0	0	0	0	0.6	0.75	0	0.75	0	2.10	3.00
121101010405	83	0	0	0	5	5	0	0	0	0%	0%	0%	62%	83%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101010406	84	0	1	1	108	108	0	1	0	0%	91%	99%	87%	95%	0%	74%	0%	0	5	5	5	5	0	4	0	0	0.375	0.75	0.75	0.75	0	0.6	0	2.10	3.00
121101020101	85	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101020102	86	0	0	0	1	0	0	0	0	0%	0%	0%	42%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101020103	87	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101020104	88	0	0	0	1	0	0	0	0	0%	0%	0%	42%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101020105	89	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101020201	90	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101020202	91	0	0	0	2	0	0	0	0	0%	0%	0%	51%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101020203	92	0	0	0	0	0	0	3	0	0%	0%	0%	0%	0%	0%	89%	0%	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0.75	1.07
121101020204	93	0	0	0	0	0	0	3	0	0%	0%	0%	0%	0%	0%	89%	0%	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0.75	1.07
121101020205	94	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101020206	95	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101020301	96	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101020302	97	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101020303	98	0	0	0	1	0	0	0	0	0%	0%	0%	42%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101020304	99	0	0	0	8	0	0	0	0	0%	0%	0%	68%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101020305	100	0	0	0	3	0	0	1	0	0%	0%	0%	56%	0%	0%	74%	0%	0	0	0	3	0	0	4	0	0	0	0	0.45	0	0	0.6	0	1.05	1.50
121101020401	101	0	0	0	1	0	0	2	0	0%	0%	0%	42%	0%	0%	85%	0%	0	0	0	3	0	0	5	0	0	0	0	0.45	0	0	0.75	0	1.20	1.71
121101020402	102	0	0	0	12	0	0	0	0	0%	0%	0%	71%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101020403	103	0	0	0	2	0	0	0	0	0%	0%	0%	51%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101020404	104	0	0	0	4	0	0	1	0	0%	0%	0%	60%	0%	0%	74%	0%	0	0	0	3	0	0	4	0	0	0	0	0.45	0	0	0.6	0	1.05	1.50
121101020405	105	0	0	0	4	4	0	0	0	0%	0%	0%	60%	83%	0%	0%	0%	0	0	0	3	5	0	0	0	0	0	0	0.45	0.75	0	0	0	1.20	1.71
121101020406	106	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030101	107	0	0	0	2	2	0	0	0	0%	0%	0%	51%	77%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101030102	108	0	0	0	13	13	0	0	0	0%	0%	0%	72%	87%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101030103	109	1	0	0	16	16	0	1	0	99%	0%	0%	73%	88%	0%	74%	0%	5	0	0	4	5	0	4	0	0.375	0	0	0.6	0.75	0	0.6	0	1.95	2.79
121101030104	110	0	0	0	5	5	0	0	0	0%	0%	0%	62%	83%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101030105	111	0	0	0	8	8	0	2	0	0%	0%	0%	68%	86%	0%	85%	0%	0	0	0	4	5	0	5	0	0	0	0	0.6	0.75	0	0.75	0	2.10	3.00
121101030201	112	0	0	0	5	5	0	0	0	0%	0%	0%	62%	83%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101030202	113	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030203	114	0	0	0	19	19	0	0	0	0%	0%	0%	74%	88%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101030204	115	0	0	0	25	25	0	1	0	0%	0%	0%	76%	89%	0%	74%	0%	0	0	0	4	5	0	4	0	0	0	0	0.6	0.75	0	0.6	0	1.95	2.79
121101030205	116	0	0	0	165	165	4	5	0	0%	0%	0%	90%	96%	93%	95%	0%	0	0	0	5	5	5	5	0	0	0	0	0.75	0.75	0.75	0.75	0	3.00	4.29
121101030206	117	0	0	0	3	3	0	0	0	0%	0%	0%	56%	80%	0%	0%	0%	0	0	0	3	5	0	0	0	0	0	0	0.45	0.75	0	0	0	1.20	1.71
121101030207	118	0	0	0	159	159	0	3	5	0%	0%	0%	90%	96%	0%	89%	100%	0	0	0	5	5	0	5	5	0	0	0	0.75	0.75	0	0.75	0.5	2.75	3.93
121101030301	119	0	0	0	2	2	0	0	0	0%	0%	0%	51%	77%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101030302	120	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030303	121	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030304	122	0	0	0	109	109	0	0	1	0%	0%	0%	87%	95%	0%	0%	97%	0	0	0	5	5	0	0	5	0	0	0	0.75	0.75	0	0	0.5	2.00	2.86
121101030305	123	0	0	0	1	1	1	0	1	0%	0%	0%	42%	72%	88%	0%	97%	0	0	0	3	4	5	0	5	0	0	0	0.45	0.6	0.75	0	0.5	2.30	3.29
121101030306	124	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101030401	125	0	0	0	2	2	0	0	0	0%	0%	0%	51%	77%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101030402	126	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030403	127	0	0	0	2	2	0	0	0	0%	0%	0%	51%	77%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101030404	128	0	0	0	1	1	0	1	0	0%	0%	0%	42%	72%	0%	74%	0%	0	0	0	3	4	0	4	0	0	0	0	0.45	0.6	0	0.6	0	1.65	2.36
121101030405	129	0	0	0	12	12	0	0	0	0%	0%	0%	71%	87%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101030501	130	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030502	131	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030503	132	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030504	133	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030505	134	0	0	0	0	0	0	1	0	0%	0%	0%	0%	0%	0%	74%	0%	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0.60	0.86
121101030506	135	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030507	136	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030601	137	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030602	138	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030603	139	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030604	140	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030605	141	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101030606	142	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030701	143	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030702	144	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030703	145	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030704	146	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101030705	147	0	0	0	25	25	0	0	0	0%	0%	0%	76%	89%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101040101	148	0	0	0	1	0	0	0	0	0%	0%	0%	42%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101040102	149	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040103	150	0	0	0	0	0	0	1	0	0%	0%	0%	0%	0%	0%	74%	0%	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0.60	0.86
121101040104	151	0	0	0	0	0	0	1	0	0%	0%	0%	0%	0%	0%	74%	0%	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0.60	0.86
121101040105	152	0	0	0	4	0	0	1	0	0%	0%	0%	60%	0%	0%	74%	0%	0	0	0	3	0	0	4	0	0	0	0	0.45	0	0	0.6	0	1.05	1.50
121101040106	153	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040107	154	0	0	0	2	2	0	0	0	0%	0%	0%	51%	77%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101040108	155	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040201	156	0	0	0	3	3	0	0	0	0%	0%	0%	56%	80%	0%	0%	0%	0	0	0	3	5	0	0	0	0	0	0	0.45	0.75	0	0	0	1.20	1.71
121101040202	157	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040203	158	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101040204	159	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040205	160	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00

HUC12	Unique ID	Count								HUC 12 Percentile Rank								Unweighted Score (1-5)								Weighted Score									Scaled Score (1-5)
																										7.5%	7.5%	15%	15%	15%	15%	15%	10%	100%	
		Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Total Score	
121101040301	161	0	1	0	0	0	0	0	0	0%	91%	0%	0%	0%	0%	0%	0%	0	5	0	0	0	0	0	0	0	0.375	0	0	0	0	0	0	0.00	0.00
121101040302	162	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040303	163	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040304	164	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040305	165	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040306	166	0	0	0	3	3	0	1	0	0%	0%	0%	56%	80%	0%	74%	0%	0	0	0	3	5	0	4	0	0	0	0	0.45	0.75	0	0.6	0	1.80	2.57
121101040307	167	0	0	0	6	6	0	0	0	0%	0%	0%	65%	84%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101040308	168	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040309	169	0	0	0	0	0	0	1	0	0%	0%	0%	0%	0%	0%	74%	0%	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0.60	0.86
121101040310	170	0	0	0	5	5	0	1	0	0%	0%	0%	62%	83%	0%	74%	0%	0	0	0	4	5	0	4	0	0	0	0	0.6	0.75	0	0.6	0	1.95	2.79
121101040401	171	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040402	172	0	0	0	3	3	0	1	0	0%	0%	0%	56%	80%	0%	74%	0%	0	0	0	3	5	0	4	0	0	0	0	0.45	0.75	0	0.6	0	1.80	2.57
121101040403	173	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040404	174	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101040405	175	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040501	176	0	0	0	2	2	0	0	0	0%	0%	0%	51%	77%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101040502	177	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040503	178	0	0	0	2	0	0	0	0	0%	0%	0%	51%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101040504	179	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040505	180	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101040601	181	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040602	182	0	0	0	2	2	0	0	0	0%	0%	0%	51%	77%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101040603	183	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040604	184	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101040605	185	0	0	0	822	822	3	0	0	0%	0%	0%	97%	98%	92%	0%	0%	0	0	0	5	5	5	0	0	0	0	0	0.75	0.75	0.75	0	0	2.25	3.21
121101050101	186	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050102	187	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050103	188	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050104	189	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050105	190	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050106	191	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050201	192	1	0	0	49	49	3	0	0	99%	0%	0%	82%	92%	92%	0%	0%	5	0	0	5	5	5	0	0	0.375	0	0	0.75	0.75	0.75	0	0	2.25	3.21
121101050202	193	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050203	194	0	0	0	3	3	0	1	0	0%	0%	0%	56%	80%	0%	74%	0%	0	0	0	3	5	0	4	0	0	0	0	0.45	0.75	0	0.6	0	1.80	2.57
121101050204	195	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050205	196	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050206	197	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050207	198	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101050301	199	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050302	200	0	0	0	21	21	0	0	0	0%	0%	0%	75%	89%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101050303	201	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050304	202	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050305	203	0	0	0	4	4	0	0	0	0%	0%	0%	60%	83%	0%	0%	0%	0	0	0	3	5	0	0	0	0	0	0	0.45	0.75	0	0	0	1.20	1.71
121101050401	204	0	0	0	14	0	0	0	0	0%	0%	0%	72%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101050402	205	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050403	206	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050404	207	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050405	208	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050406	209	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050501	210	0	0	0	1	0	0	0	0	0%	0%	0%	42%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101050502	211	0	0	0	4	0	0	0	0	0%	0%	0%	60%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101050503	212	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050504	213	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050505	214	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050506	215	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050507	216	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050601	217	0	0	0	182	56	0	0	0	0%	0%	0%	90%	92%	0%	0%	0%	0	0	0	5	5	0	0	0	0	0	0	0.75	0.75	0	0	0	1.50	2.14
121101050602	218	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050603	219	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050604	220	0	0	0	0	0	0	4	0	0%	0%	0%	0%	0%	0%	93%	0%	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0.75	1.07
121101050605	221	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050701	222	0	0	0	3	3	0	0	0	0%	0%	0%	56%	80%	0%	0%	0%	0	0	0	3	5	0	0	0	0	0	0	0.45	0.75	0	0	0	1.20	1.71
121101050702	223	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050703	224	0	0	0	3	0	0	0	0	0%	0%	0%	56%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101050704	225	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050705	226	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050706	227	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050707	228	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050708	229	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050709	230	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050801	231	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050802	232	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050803	233	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050804	234	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050805	235	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050806	236	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050807	237	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050808	238	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050809	239	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050901	240	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00

HUC12	Unique ID	Count								HUC 12 Percentile Rank								Unweighted Score (1-5)								Weighted Score									Scaled Score (1-5)
																										7.5%	7.5%	15%	15%	15%	15%	15%	10%	100%	
		Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Total Score	
121101050902	241	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050903	242	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050904	243	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050905	244	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050906	245	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101050907	246	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101051001	247	0	0	0	251	251	1	0	0	0%	0%	0%	92%	96%	88%	0%	0%	0	0	0	5	5	5	0	0	0	0	0	0.75	0.75	0.75	0	0	2.25	3.21
121101051002	248	0	0	0	2	2	0	0	0	0%	0%	0%	51%	77%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101051003	249	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101051004	250	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101051005	251	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101051006	252	0	0	0	2	0	1	0	0	0%	0%	0%	51%	0%	88%	0%	0%	0	0	0	3	0	5	0	0	0	0	0	0.45	0	0.75	0	0	1.20	1.71
121101051007	253	0	0	0	1	0	0	0	0	0%	0%	0%	42%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101051008	254	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101051009	255	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101051101	256	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101051102	257	0	1	0	0	0	0	0	0	0%	91%	0%	0%	0%	0%	0%	0%	0	5	0	0	0	0	0	0	0	0.375	0	0	0	0	0	0	0.00	0.00
121101051103	258	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101051104	259	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101051105	260	1	1	0	1	0	0	2	0	99%	91%	0%	42%	0%	0%	85%	0%	5	5	0	3	0	0	5	0	0.375	0.375	0	0.45	0	0	0.75	0	1.20	1.71
121101051106	261	0	0	0	1	0	0	2	0	0%	0%	0%	42%	0%	0%	85%	0%	0	0	0	3	0	0	5	0	0	0	0	0.45	0	0	0.75	0	1.20	1.71
121101051201	262	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101051202	263	0	0	0	3	0	0	0	0	0%	0%	0%	56%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101051203	264	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101051204	265	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101051205	266	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101051206	267	0	0	0	5	0	0	0	0	0%	0%	0%	62%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101060101	268	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101060102	269	0	0	0	3	0	0	1	0	0%	0%	0%	56%	0%	0%	74%	0%	0	0	0	3	0	0	4	0	0	0	0	0.45	0	0	0.6	0	1.05	1.50
121101060103	270	0	0	0	15	0	0	4	0	0%	0%	0%	73%	0%	0%	93%	0%	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	1.35	1.93
121101060104	271	0	0	0	0	0	0	1	0	0%	0%	0%	0%	0%	0%	74%	0%	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0.60	0.86
121101060105	272	0	0	0	21	0	3	1	0	0%	0%	0%	75%	0%	92%	74%	0%	0	0	0	4	0	5	4	0	0	0	0	0.6	0	0.75	0.6	0	1.95	2.79
121101060106	273	0	0	0	0	0	1	0	0	0%	0%	0%	0%	0%	88%	0%	0%	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0.75	1.07
121101060107	274	0	0	0	33	0	1	2	0	0%	0%	0%	78%	0%	88%	85%	0%	0	0	0	4	0	5	5	0	0	0	0	0.6	0	0.75	0.75	0	2.10	3.00
121101060201	275	0	0	0	256	0	1	7	0	0%	0%	0%	93%	0%	88%	97%	0%	0	0	0	5	0	5	5	0	0	0	0	0.75	0	0.75	0.75	0	2.25	3.21
121101060202	276	0	0	0	10	0	0	3	0	0%	0%	0%	70%	0%	0%	89%	0%	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	1.35	1.93
121101060203	277	0	0	0	109	3	0	4	0	0%	0%	0%	87%	80%	0%	93%	0%	0	0	0	5	5	0	5	0	0	0	0	0.75	0.75	0	0.75	0	2.25	3.21
121101060204	278	0	0	1	101	5	0	3	0	0%	0%	99%	87%	83%	0%	89%	0%	0	0	5	5	5	0	5	0	0	0	0.75	0.75	0.75	0	0.75	0	2.25	3.21
121101060205	279	1	0	0	231	17	0	1	0	99%	0%	0%	92%	88%	0%	74%	0%	5	0	0	5	5	0	4	0	0.375	0	0	0.75	0.75	0	0.6	0	2.10	3.00
121101060206	280	0	0	0	45	38	0	1	0	0%	0%	0%	82%	91%	0%	74%	0%	0	0	0	5	5	0	4	0	0	0	0	0.75	0.75	0	0.6	0	2.10	3.00
121101060301	281	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101060302	282	0	0	0	28	25	0	0	0	0%	0%	0%	77%	89%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101060303	283	0	0	0	36	36	0	0	0	0%	0%	0%	80%	91%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101060304	284	0	0	0	7	7	0	0	0	0%	0%	0%	66%	85%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101060305	285	0	0	0	11	11	0	1	0	0%	0%	0%	71%	86%	0%	74%	0%	0	0	0	4	5	0	4	0	0	0	0	0.6	0.75	0	0.6	0	1.95	2.79
121101060401	286	0	0	0	11	11	0	0	0	0%	0%	0%	71%	86%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101060402	287	0	0	0	4	4	0	1	0	0%	0%	0%	60%	83%	0%	74%	0%	0	0	0	3	5	0	4	0	0	0	0	0.45	0.75	0	0.6	0	1.80	2.57
121101060403	288	0	0	0	6	6	0	0	0	0%	0%	0%	65%	84%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101060404	289	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101060405	290	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101060501	291	0	0	0	7	2	0	2	0	0%	0%	0%	66%	77%	0%	85%	0%	0	0	0	4	4	0	5	0	0	0	0	0.6	0.6	0	0.75	0	1.95	2.79
121101060502	292	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101060503	293	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101060504	294	0	0	0	2	2	0	1	0	0%	0%	0%	51%	77%	0%	74%	0%	0	0	0	3	4	0	4	0	0	0	0	0.45	0.6	0	0.6	0	1.65	2.36
121101060505	295	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101060601	296	0	0	0	4	0	0	2	1	0%	0%	0%	60%	0%	0%	85%	97%	0	0	0	3	0	0	5	5	0	0	0	0.45	0	0	0.75	0.5	1.70	2.43
121101060602	297	0	0	0	16	0	0	7	0	0%	0%	0%	73%	0%	0%	97%	0%	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	1.35	1.93
121101060603	298	0	1	0	31	0	0	10	0	0%	91%	0%	78%	0%	0%	98%	0%	0	5	0	4	0	0	5	0	0	0.375	0	0.6	0	0	0.75	0	1.35	1.93
121101060604	299	0	0	0	3	0	0	2	0	0%	0%	0%	56%	0%	0%	85%	0%	0	0	0	3	0	0	5	0	0	0	0	0.45	0	0	0.75	0	1.20	1.71
121101060605	300	0	0	0	144	0	0	8	0	0%	0%	0%	89%	0%	0%	98%	0%	0	0	0	5	0	0	5	0	0	0	0	0.75	0	0	0.75	0	1.50	2.14
121101060606	301	0	0	0	22	0	0	0	0	0%	0%	0%	76%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101060701	302	0	0	0	15	0	0	0	0	0%	0%	0%	73%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101060702	303	0	0	0	2	0	0	3	0	0%	0%	0%	51%	0%	0%	89%	0%	0	0	0	3	0	0	5	0	0	0	0	0.45	0	0	0.75	0	1.20	1.71
121101060703	304	0	0	0	53	0	1	3	0	0%	0%	0%	83%	0%	88%	89%	0%	0	0	0	5	0	5	5	0	0	0	0	0.75	0	0.75	0.75	0	2.25	3.21
121101060704	305	0	0	0	0	0	0	1	0	0%	0%	0%	0%	0%	0%	74%	0%	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0.60	0.86
121101060705	306	0	0	0	1	0	0	1	0	0%	0%	0%	42%	0%	0%	74%	0%	0	0	0	3	0	0	4	0	0	0	0	0.45	0	0	0.6	0	1.05	1.50
121101060706	307	0	0	1	0	0	0	1	0	0%	0%	99%	0%	0%	0%	74%	0%	0	0	5	0	0	0	4	0	0	0	0.75	0	0	0	0.6	0	0.60	0.86
121101060801	308	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101060802	309	0	0	0	1	1	0	1	0	0%	0%	0%	42%	72%	0%	74%	0%	0	0	0	3	4	0	4	0	0	0	0	0.45	0.6	0	0.6	0	1.65	2.36
121101060803	310	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101060804	311	0	0	0	3	3	0	0	0	0%	0%	0%	56%	80%	0%	0%	0%	0	0	0	3	5	0	0	0	0	0	0	0.45	0.75	0	0	0	1.20	1.71
121101060805	312	0	0	0	0	0	0	1	0	0%	0%	0%	0%	0%	0%	74%	0%	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0.60	0.86
121101060901	313	0	0	0	174	84	4	6	0	0%	0%	0%	90%	93%	93%	96%	0%	0	0	0	5	5	5	5	0	0	0	0	0.75	0.75	0.75	0.75	0	3.00	4.29
121101060902	314	0	0	0	316	135	0	0	0	0%	0%	0%	94%	95%	0%	0%	0%	0	0	0	5	5	0	0	0	0	0	0	0.75	0.75	0	0	0	1.50	2.14
121101060903	315	0	0	0	140	125	2	3	0	0%	0%	0%	89%	95%	91%	89%	0%	0	0	0	5	5	5	5	0	0	0	0	0.75	0.75	0.75	0.75	0	3.00	4.29
121101060904	316	0	0	0	27	27	0	0	0	0%	0%	0%	77%	90%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101060905	317	0	0	0	7	7	0	0	0	0%	0%	0%	66%	85%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101060906	318	0	0	0	2	2	0	0	0	0%	0%	0%	51%	77%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101061001	319	0	0	0	43	43	0	0	0	0%	0%	0%	82%	91%	0%	0%	0%	0	0	0	5	5	0	0	0	0	0	0	0.75	0.75	0	0	0	1.50	2.14
121101061002	320	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00

HUC12	Unique ID	Count								HUC 12 Percentile Rank								Unweighted Score (1-5)								Weighted Score									
																										7.5%	7.5%	15%	15%	15%	15%	15%	10%	100%	
		Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Total Score	Scaled Score (1-5)
121101061003	321	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101061004	322	0	0	0	3	3	0	0	0	0%	0%	0%	56%	80%	0%	0%	0%	0	0	0	3	5	0	0	0	0	0	0	0.45	0.75	0	0	0	1.20	1.71
121101061005	323	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101061006	324	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101061101	325	0	0	0	0	0	0	2	0	0%	0%	0%	0%	0%	0%	85%	0%	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0.75	1.07
121101061102	326	0	0	0	1	1	0	1	0	0%	0%	0%	42%	72%	0%	74%	0%	0	0	0	3	4	0	4	0	0	0	0	0.45	0.6	0	0.6	0	1.65	2.36
121101061103	327	0	0	0	2	2	0	0	0	0%	0%	0%	51%	77%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101061104	328	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101061105	329	0	0	0	0	0	0	3	0	0%	0%	0%	0%	0%	0%	89%	0%	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0.75	1.07
121101061106	330	0	0	0	0	0	0	5	0	0%	0%	0%	0%	0%	0%	95%	0%	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0.75	1.07
121101061201	331	0	0	0	59	59	0	2	0	0%	0%	0%	84%	93%	0%	85%	0%	0	0	0	5	5	0	5	0	0	0	0	0.75	0.75	0	0.75	0	2.25	3.21
121101061202	332	0	0	0	0	0	0	1	0	0%	0%	0%	0%	0%	0%	74%	0%	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0.60	0.86
121101061203	333	0	0	0	0	0	0	1	0	0%	0%	0%	0%	0%	0%	74%	0%	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0.60	0.86
121101061204	334	0	0	0	615	615	2	2	0	0%	0%	0%	96%	98%	91%	85%	0%	0	0	0	5	5	5	5	0	0	0	0	0.75	0.75	0.75	0.75	0	3.00	4.29
121101061205	335	0	0	0	1	1	0	3	0	0%	0%	0%	42%	72%	0%	89%	0%	0	0	0	3	4	0	5	0	0	0	0	0.45	0.6	0	0.75	0	1.80	2.57
121101070101	336	0	0	0	28	0	0	5	1	0%	0%	0%	77%	0%	0%	95%	97%	0	0	0	4	0	0	5	5	0	0	0	0.6	0	0	0.75	0.5	1.85	2.64
121101070102	337	0	0	0	6	0	0	5	0	0%	0%	0%	65%	0%	0%	95%	0%	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	1.35	1.93
121101070103	338	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101070104	339	0	1	0	11	0	0	3	0	0%	91%	0%	71%	0%	0%	89%	0%	0	5	0	4	0	0	5	0	0	0.375	0	0.6	0	0	0.75	0	1.35	1.93
121101070105	340	0	1	0	34	0	0	5	0	0%	91%	0%	79%	0%	0%	95%	0%	0	5	0	4	0	0	5	0	0	0.375	0	0.6	0	0	0.75	0	1.35	1.93
121101070106	341	0	0	0	60	0	0	8	0	0%	0%	0%	84%	0%	0%	98%	0%	0	0	0	5	0	0	5	0	0	0	0	0.75	0	0	0.75	0	1.50	2.14
121101070107	342	0	0	0	17	0	0	13	0	0%	0%	0%	74%	0%	0%	99%	0%	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	1.35	1.93
121101070108	343	0	0	0	73	0	0	12	0	0%	0%	0%	85%	0%	0%	99%	0%	0	0	0	5	0	0	5	0	0	0	0	0.75	0	0	0.75	0	1.50	2.14
121101070109	344	0	1	0	34	0	0	11	0	0%	91%	0%	79%	0%	0%	99%	0%	0	5	0	4	0	0	5	0	0	0.375	0	0.6	0	0	0.75	0	1.35	1.93
121101070201	345	0	0	0	390	0	0	7	0	0%	0%	0%	95%	0%	0%	97%	0%	0	0	0	5	0	0	5	0	0	0	0	0.75	0	0	0.75	0	1.50	2.14
121101070202	346	0	0	0	42	0	0	9	0	0%	0%	0%	82%	0%	0%	98%	0%	0	0	0	5	0	0	5	0	0	0	0	0.75	0	0	0.75	0	1.50	2.14
121101070203	347	0	0	1	14	0	5	3	0	0%	0%	99%	72%	0%	94%	89%	0%	0	0	5	4	0	5	5	0	0	0	0.75	0.6	0	0.75	0.75	0	2.10	3.00
121101070204	348	0	0	0	213	0	0	4	0	0%	0%	0%	91%	0%	0%	93%	0%	0	0	0	5	0	0	5	0	0	0	0	0.75	0	0	0.75	0	1.50	2.14
121101070205	349	0	0	0	23	9	0	3	0	0%	0%	0%	76%	86%	0%	89%	0%	0	0	0	4	5	0	5	0	0	0	0	0.6	0.75	0	0.75	0	2.10	3.00
121101070206	350	0	0	0	34	0	0	11	0	0%	0%	0%	79%	0%	0%	99%	0%	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	1.35	1.93
121101070207	351	0	0	0	20	0	0	5	0	0%	0%	0%	75%	0%	0%	95%	0%	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	1.35	1.93
121101070301	352	0	0	0	5	0	0	1	0	0%	0%	0%	62%	0%	0%	74%	0%	0	0	0	4	0	0	4	0	0	0	0	0.6	0	0	0.6	0	1.20	1.71
121101070302	353	0	1	0	5	0	0	5	0	0%	91%	0%	62%	0%	0%	95%	0%	0	5	0	4	0	0	5	0	0	0.375	0	0.6	0	0	0.75	0	1.35	1.93
121101070303	354	0	0	0	1	0	0	1	0	0%	0%	0%	42%	0%	0%	74%	0%	0	0	0	3	0	0	4	0	0	0	0	0.45	0	0	0.6	0	1.05	1.50
121101070304	355	0	0	0	212	0	1	6	0	0%	0%	0%	91%	0%	88%	96%	0%	0	0	0	5	0	5	5	0	0	0	0	0.75	0	0.75	0.75	0	2.25	3.21
121101070305	356	0	0	0	84	0	15	9	0	0%	0%	0%	86%	0%	97%	98%	0%	0	0	0	5	0	5	5	0	0	0	0	0.75	0	0.75	0.75	0	2.25	3.21
121101070401	357	0	0	0	1	0	0	4	0	0%	0%	0%	42%	0%	0%	93%	0%	0	0	0	3	0	0	5	0	0	0	0	0.45	0	0	0.75	0	1.20	1.71
121101070402	358	0	0	0	1	0	0	2	0	0%	0%	0%	42%	0%	0%	85%	0%	0	0	0	3	0	0	5	0	0	0	0	0.45	0	0	0.75	0	1.20	1.71
121101070403	359	0	0	0	1	0	0	1	0	0%	0%	0%	42%	0%	0%	74%	0%	0	0	0	3	0	0	4	0	0	0	0	0.45	0	0	0.6	0	1.05	1.50
121101070404	360	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101070405	361	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101070406	362	0	0	0	0	0	0	1	0	0%	0%	0%	0%	0%	0%	74%	0%	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0.60	0.86
121101070407	363	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080101	364	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080102	365	0	0	0	27	27	0	3	0	0%	0%	0%	77%	90%	0%	89%	0%	0	0	0	4	5	0	5	0	0	0	0	0.6	0.75	0	0.75	0	2.10	3.00
121101080103	366	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080104	367	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080105	368	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080106	369	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080201	370	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101080202	371	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080203	372	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080204	373	0	0	0	0	0	0	1	0	0%	0%	0%	0%	0%	0%	74%	0%	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0.60	0.86
121101080205	374	0	0	0	0	0	0	1	0	0%	0%	0%	0%	0%	0%	74%	0%	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0.60	0.86
121101080301	375	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080302	376	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080303	377	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080304	378	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080305	379	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080401	380	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101080402	381	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080403	382	0	0	0	10	0	0	0	0	0%	0%	0%	70%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101080404	383	0	0	0	3	0	0	0	0	0%	0%	0%	56%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101080405	384	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080406	385	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080407	386	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080408	387	0	0	0	35	0	0	0	0	0%	0%	0%	79%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101080409	388	0	0	0	10	0	0	0	0	0%	0%	0%	70%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101080410	389	0	0	0	7	0	0	0	0	0%	0%	0%	66%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101080501	390	1	0	0	114	0	1	0	0	99%	0%	0%	87%	0%	88%	0%	0%	5	0	0	5	0	5	0	0	0.375	0	0	0.75	0	0.75	0	0	1.50	2.14
121101080502	391	0	0	0	2	0	0	0	0	0%	0%	0%	51%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101080503	392	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101080504	393	0	1	0	0	0	0	0	0	0%	91%	0%	0%	0%	0%	0%	0%	0	5	0	0	0	0	0	0	0	0.375	0	0	0	0	0	0	0.00	0.00
121101080505	394	0	0	0	10	0	0	0	0	0%	0%	0%	70%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101080506	395	0	1	0	257	0	1	0	2	0%	91%	0%	93%	0%	88%	0%	99%	0	5	0	5	0	5	0	5	0	0.375	0	0.75	0	0.75	0	0.5	2.00	2.86
121101090101	396	0	0	0	481	0	0	26	0	0%	0%	0%	95%	0%	0%	100%	0%	0	0	0	5	0	0	5	0	0	0	0	0.75	0	0	0.75	0	1.50	2.14
121101090102	397	0	0	0	63	0	0	6	0	0%	0%	0%	84%	0%	0%	96%	0%	0	0	0	5	0	0	5	0	0	0	0	0.75	0	0	0.75	0	1.50	2.14
121101090103	398	0	0	0	527	0	23	4	0	0%	0%	0%	96%	0%	98%	93%	0%	0	0	0	5	0	5	5	0	0	0	0	0.75	0	0.75	0.75	0	2.25	3.21
121101090104	399	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101090105	400	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50

Appendix C6 - HUC12 Flood Risk Data Score Table

HUC12	Unique ID	Count								HUC 12 Percentile Rank								Unweighted Score (1-5)								Weighted Score									
																										7.5%	7.5%	15%	15%	15%	15%	15%	10%	100%	
		Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Total Score	Scaled Score (1-5)
121101090201	401	0	0	0	30	0	0	4	0	0%	0%	0%	78%	0%	0%	93%	0%	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	1.35	1.93
121101090202	402	0	0	0	20	19	0	1	0	0%	0%	0%	75%	88%	0%	74%	0%	0	0	0	4	5	0	4	0	0	0	0	0.6	0.75	0	0.6	0	1.95	2.79
121101090203	403	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101090204	404	0	0	0	4	4	0	0	0	0%	0%	0%	60%	83%	0%	0%	0%	0	0	0	3	5	0	0	0	0	0	0	0.45	0.75	0	0	0	1.20	1.71
121101090205	405	0	0	0	2	2	0	0	0	0%	0%	0%	51%	77%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101090301	406	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101090302	407	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101090303	408	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101090304	409	0	0	0	6	0	0	0	0	0%	0%	0%	65%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101090305	410	0	0	0	7	0	0	1	0	0%	0%	0%	66%	0%	0%	74%	0%	0	0	0	4	0	0	4	0	0	0	0	0.6	0	0	0.6	0	1.20	1.71
121101090401	411	0	0	0	0	0	0	1	0	0%	0%	0%	0%	0%	0%	74%	0%	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0.60	0.86
121101090402	412	0	0	0	17	0	0	0	0	0%	0%	0%	74%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101090403	413	0	0	0	8	1	0	0	0	0%	0%	0%	68%	72%	0%	0%	0%	0	0	0	4	4	0	0	0	0	0	0	0.6	0.6	0	0	0	1.20	1.71
121101090404	414	0	0	0	4	0	0	0	0	0%	0%	0%	60%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101090405	415	0	0	0	4	0	0	0	0	0%	0%	0%	60%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101090406	416	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101090501	417	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101090502	418	0	0	0	1	0	0	0	0	0%	0%	0%	42%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101090503	419	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101090504	420	0	0	0	2	2	0	2	1	0%	0%	0%	51%	77%	0%	85%	97%	0	0	0	3	4	0	5	5	0	0	0	0.45	0.6	0	0.75	0.5	2.30	3.29
121101090505	421	0	0	0	5	0	0	0	0	0%	0%	0%	62%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101100101	422	0	0	0	190	107	1	14	4	0%	0%	0%	91%	94%	88%	100%	100%	0	0	0	5	5	5	5	5	0	0	0	0.75	0.75	0.75	0.75	0.5	3.50	5.00
121101100102	423	0	0	0	122	103	0	0	0	0%	0%	0%	88%	94%	0%	0%	0%	0	0	0	5	5	0	0	0	0	0	0	0.75	0.75	0	0	0	1.50	2.14
121101100103	424	0	0	0	84	3	0	0	0	0%	0%	0%	86%	80%	0%	0%	0%	0	0	0	5	5	0	0	0	0	0	0	0.75	0.75	0	0	0	1.50	2.14
121101100104	425	0	1	0	57	39	0	0	0	0%	91%	0%	83%	91%	0%	0%	0%	0	5	0	5	5	0	0	0	0	0.375	0	0.75	0.75	0	0	0	1.50	2.14
121101100105	426	0	0	0	17	0	0	0	0	0%	0%	0%	74%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101100201	427	0	0	0	21	8	0	0	0	0%	0%	0%	75%	86%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101100202	428	0	0	0	333	22	0	0	0	0%	0%	0%	94%	89%	0%	0%	0%	0	0	0	5	5	0	0	0	0	0	0	0.75	0.75	0	0	0	1.50	2.14
121101100203	429	0	0	0	369	343	1	1	0	0%	0%	0%	95%	97%	88%	74%	0%	0	0	0	5	5	5	4	0	0	0	0	0.75	0.75	0.75	0.6	0	2.85	4.07
121101100204	430	0	0	0	396	154	1	2	1	0%	0%	0%	95%	95%	88%	85%	97%	0	0	0	5	5	5	5	5	0	0	0	0.75	0.75	0.75	0.75	0.5	3.50	5.00
121101100205	431	0	0	0	182	16	0	0	0	0%	0%	0%	90%	88%	0%	0%	0%	0	0	0	5	5	0	0	0	0	0	0	0.75	0.75	0	0	0	1.50	2.14
121101100206	432	0	0	0	950	19	1	5	1	0%	0%	0%	97%	88%	88%	95%	97%	0	0	0	5	5	5	5	5	0	0	0	0.75	0.75	0.75	0.75	0.5	3.50	5.00
121101100301	433	0	0	0	62	0	0	0	1	0%	0%	0%	84%	0%	0%	0%	97%	0	0	0	5	0	0	0	5	0	0	0	0.75	0	0	0	0.5	1.25	1.79
121101100302	434	0	0	0	9	0	0	0	0	0%	0%	0%	69%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101100303	435	0	0	0	79	0	0	0	0	0%	0%	0%	85%	0%	0%	0%	0%	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0	0	0.75	1.07
121101100304	436	0	0	0	13	0	0	4	0	0%	0%	0%	72%	0%	0%	93%	0%	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	1.35	1.93
121101100305	437	0	0	0	5	0	0	1	0	0%	0%	0%	62%	0%	0%	74%	0%	0	0	0	4	0	0	4	0	0	0	0	0.6	0	0	0.6	0	1.20	1.71
121101100306	438	0	0	0	5	0	0	0	0	0%	0%	0%	62%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101100307	439	0	0	0	7	0	0	0	0	0%	0%	0%	66%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101100308	440	0	1	0	109	0	0	3	0	0%	91%	0%	87%	0%	0%	89%	0%	0	5	0	5	0	0	5	0	0	0.375	0	0.75	0	0	0.75	0	1.50	2.14
121101100401	441	0	0	0	3	0	0	0	0	0%	0%	0%	56%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101100402	442	0	0	0	52	52	0	1	0	0%	0%	0%	82%	92%	0%	74%	0%	0	0	0	5	5	0	4	0	0	0	0	0.75	0.75	0	0.6	0	2.10	3.00
121101100403	443	0	0	0	30	30	0	1	1	0%	0%	0%	78%	90%	0%	74%	97%	0	0	0	4	5	0	4	5	0	0	0	0.6	0.75	0	0.6	0.5	2.45	3.50
121101100404	444	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101100405	445	0	0	0	25	25	0	0	0	0%	0%	0%	76%	89%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101100406	446	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101100407	447	0	0	0	20	15	0	0	0	0%	0%	0%	75%	87%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121101100408	448	0	0	0	2	2	0	0	0	0%	0%	0%	51%	77%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101100409	449	0	0	0	3	3	0	0	0	0%	0%	0%	56%	80%	0%	0%	0%	0	0	0	3	5	0	0	0	0	0	0	0.45	0.75	0	0	0	1.20	1.71
121101100501	450	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101100502	451	0	1	0	0	0	0	5	0	0%	91%	0%	0%	0%	0%	95%	0%	0	5	0	0	0	0	5	0	0	0.375	0	0	0	0	0.75	0	0.75	1.07
121101100503	452	0	0	0	5	0	0	1	0	0%	0%	0%	62%	0%	0%	74%	0%	0	0	0	4	0	0	4	0	0	0	0	0.6	0	0	0.6	0	1.20	1.71
121101100504	453	0	0	0	2	1	0	0	0	0%	0%	0%	51%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121101100505	454	0	0	0	6	0	0	2	0	0%	0%	0%	65%	0%	0%	85%	0%	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	1.35	1.93
121101100506	455	0	0	0	4	0	0	1	0	0%	0%	0%	60%	0%	0%	74%	0%	0	0	0	3	0	0	4	0	0	0	0	0.45	0	0	0.6	0	1.05	1.50
121101100507	456	0	0	0	2	0	0	0	0	0%	0%	0%	51%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101110101	457	1	0	0	365	0	21	0	0	99%	0%	0%	95%	0%	98%	0%	0%	5	0	0	5	0	5	0	0	0.375	0	0	0.75	0	0.75	0	0	1.50	2.14
121101110102	458	0	0	0	1	0	0	2	0	0%	0%	0%	42%	0%	0%	85%	0%	0	0	0	3	0	0	5	0	0	0	0	0.45	0	0	0.75	0	1.20	1.71
121101110103	459	0	0	0	1	0	0	0	0	0%	0%	0%	42%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101110104	460	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101110105	461	0	0	0	0	0	0	3	0	0%	0%	0%	0%	0%	0%	89%	0%	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0.75	1.07
121101110106	462	0	1	0	7	0	0	0	0	0%	91%	0%	66%	0%	0%	0%	0%	0	5	0	4	0	0	0	0	0	0.375	0	0.6	0	0	0	0	0.60	0.86
121101110201	463	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101110202	464	0	0	0	10	0	0	0	0	0%	0%	0%	70%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101110203	465	0	0	0	5	0	0	0	0	0%	0%	0%	62%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101110204	466	0	2	0	99	0	12	0	0	0%	97%	0%	86%	0%	97%	0%	0%	0	5	0	5	0	5	0	0	0	0.375	0	0.75	0	0.75	0	0	1.50	2.14
121101110205	467	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101110206	468	0	0	0	3	0	0	0	0	0%	0%	0%	56%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101110301	469	0	0	0	23	0	0	0	0	0%	0%	0%	76%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101110302	470	0	2	0	40	0	0	0	0	0%	97%	0%	81%	0%	0%	0%	0%	0	5	0	5	0	0	0	0	0	0.375	0	0.75	0	0	0	0	0.75	1.07
121101110303	471	0	0	0	8	0	0	0	0	0%	0%	0%	68%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101110304	472	0	1	0	121	0	0	0	0	0%	91%	0%	88%	0%	0%	0%	0%	0	5	0	5	0	0	0	0	0	0.375	0	0.75	0	0	0	0	0.75	1.07
121101110305	473	0	0	0	53	0	0	0	0	0%	0%	0%	83%	0%	0%	0%	0%	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0	0	0.75	1.07
121101110401	474	0	0	0	6	0	0	0	0	0%	0%	0%	65%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101110402	475	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101110403	476	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101110404	477	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101110405	478	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101110501	479	0	0	0	2	0	0	0	0	0%	0%	0%	51%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101110502	480	0	0	0	0	0	0	1	0	0%	0%	0%	0%	0%	0%	74%	0%	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0.60	0.86

Appendix C6 - HUC12 Flood Risk Data Score Table

HUC12	Unique ID	Count								HUC 12 Percentile Rank								Unweighted Score (1-5)								Weighted Score									
																										7.5%	7.5%	15%	15%	15%	15%	15%	10%	100%	
		Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Total Score	Scaled Score (1-5)
121101110503	481	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121101110504	482	0	0	0	2	0	0	0	0	0%	0%	0%	51%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121101110505	483	0	0	0	73	0	0	0	0	0%	0%	0%	85%	0%	0%	0%	0%	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0	0	0.75	1.07
121101110601	484	0	0	0	0	0	0	1	0	0%	0%	0%	0%	0%	0%	74%	0%	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0.60	0.86
121101110602	485	0	0	0	271	0	0	0	0	0%	0%	0%	93%	0%	0%	0%	0%	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0	0	0.75	1.07
121101110603	486	0	0	0	1218	24	0	0	0	0%	0%	0%	97%	89%	0%	0%	0%	0	0	0	5	5	0	0	0	0	0	0	0.75	0.75	0	0	0	1.50	2.14
121101110604	487	0	0	0	41	0	0	0	0	0%	0%	0%	81%	0%	0%	0%	0%	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0	0	0.75	1.07
121101110605	488	0	0	0	161	0	0	0	0	0%	0%	0%	90%	0%	0%	0%	0%	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0	0	0.75	1.07
121101110701	489	0	0	0	154	102	0	0	0	0%	0%	0%	89%	94%	0%	0%	0%	0	0	0	5	5	0	0	0	0	0	0	0.75	0.75	0	0	0	1.50	2.14
121101110702	490	0	1	0	38	24	0	1	1	0%	91%	0%	80%	89%	0%	74%	97%	0	5	0	5	5	0	4	5	0	0.375	0	0.75	0.75	0	0.6	0.5	2.60	3.71
121101110703	491	0	0	0	16	0	0	0	0	0%	0%	0%	73%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121101110704	492	0	2	0	120	0	0	0	0	0%	97%	0%	88%	0%	0%	0%	0%	0	5	0	5	0	0	0	0	0	0.375	0	0.75	0	0	0	0	0.75	1.07
121101110705	493	1	1	0	448	0	0	0	0	99%	91%	0%	95%	0%	0%	0%	0%	5	5	0	5	0	0	0	0	0.375	0.375	0	0.75	0	0	0	0	0.75	1.07
121101110706	494	0	1	0	7	0	0	1	0	0%	91%	0%	66%	0%	0%	74%	0%	0	5	0	4	0	0	4	0	0	0.375	0	0.6	0	0	0.6	0	1.20	1.71
121101110707	495	0	1	0	806	53	5	0	0	0%	91%	0%	97%	92%	94%	0%	0%	0	5	0	5	5	5	0	0	0	0.375	0	0.75	0.75	0.75	0	0	2.25	3.21
121102010001	496	0	0	0	99	58	1	0	0	0%	0%	0%	86%	93%	88%	0%	0%	0	0	0	5	5	5	0	0	0	0	0	0.75	0.75	0.75	0	0	2.25	3.21
121102010002	497	0	1	0	210	0	2	0	0	0%	91%	0%	91%	0%	91%	0%	0%	0	5	0	5	0	5	0	0	0	0.375	0	0.75	0	0.75	0	0	1.50	2.14
121102010003	498	0	5	0	2089	0	41	0	1	0%	100%	0%	98%	0%	99%	0%	97%	0	5	0	5	0	5	0	5	0	0.375	0	0.75	0	0.75	0	0.5	2.00	2.86
121102010004	499	0	0	0	118	113	17	0	0	0%	0%	0%	88%	95%	97%	0%	0%	0	0	0	5	5	5	0	0	0	0	0	0.75	0.75	0.75	0	0	2.25	3.21
121102010005	500	0	0	0	19	0	0	0	0	0%	0%	0%	74%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121102020101	501	0	0	0	3544	3436	59	2	0	0%	0%	0%	99%	100%	100%	85%	0%	0	0	0	5	5	5	5	0	0	0	0	0.75	0.75	0.75	0.75	0	3.00	4.29
121102020102	502	0	0	0	1008	413	11	0	0	0%	0%	0%	97%	97%	96%	0%	0%	0	0	0	5	5	5	0	0	0	0	0	0.75	0.75	0.75	0	0	2.25	3.21
121102020103	503	0	3	0	5287	4516	33	0	0	0%	98%	0%	99%	100%	99%	0%	0%	0	5	0	5	5	5	0	0	0	0.375	0	0.75	0.75	0.75	0	0	2.25	3.21
121102020104	504	0	3	1	5883	347	44	0	0	0%	98%	99%	100%	97%	100%	0%	0%	0	5	5	5	5	5	0	0	0	0.375	0.75	0.75	0.75	0.75	0	0	2.25	3.21
121102020105	505	0	0	0	953	0	2	2	0	0%	0%	0%	97%	0%	91%	85%	0%	0	0	0	5	0	5	5	0	0	0	0	0.75	0	0.75	0.75	0	2.25	3.21
121102020106	506	0	5	0	9925	2176	209	0	0	0%	100%	0%	100%	99%	100%	0%	0%	0	5	0	5	5	5	0	0	0	0.375	0	0.75	0.75	0.75	0	0	2.25	3.21
121102020107	507	0	6	0	1758	994	27	0	0	0%	100%	0%	98%	99%	98%	0%	0%	0	5	0	5	5	5	0	0	0	0.375	0	0.75	0.75	0.75	0	0	2.25	3.21
121102020200	508	0	1	0	2560	83	31	0	0	0%	91%	0%	98%	93%	99%	0%	0%	0	5	0	5	5	5	0	0	0	0.375	0	0.75	0.75	0.75	0	0	2.25	3.21
121102030100	509	0	1	0	5466	0	23	0	0	0%	91%	0%	100%	0%	98%	0%	0%	0	5	0	5	0	5	0	0	0	0.375	0	0.75	0	0.75	0	0	1.50	2.14
121102040101	510	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102040102	511	0	0	0	75	75	7	0	0	0%	0%	0%	85%	93%	95%	0%	0%	0	0	0	5	5	5	0	0	0	0	0	0.75	0.75	0.75	0	0	2.25	3.21
121102040103	512	0	0	0	13	13	0	0	0	0%	0%	0%	72%	87%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121102040104	513	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102040105	514	0	0	0	3	3	0	0	0	0%	0%	0%	56%	80%	0%	0%	0%	0	0	0	3	5	0	0	0	0	0	0	0.45	0.75	0	0	0	1.20	1.71
121102040106	515	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102040107	516	0	0	0	12	12	0	0	0	0%	0%	0%	71%	87%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121102040108	517	0	0	0	3	3	0	0	0	0%	0%	0%	56%	80%	0%	0%	0%	0	0	0	3	5	0	0	0	0	0	0	0.45	0.75	0	0	0	1.20	1.71
121102040109	518	0	0	0	3	3	0	1	0	0%	0%	0%	56%	80%	0%	74%	0%	0	0	0	3	5	0	4	0	0	0	0	0.45	0.75	0	0.6	0	1.80	2.57
121102040201	519	0	0	0	2	2	0	0	0	0%	0%	0%	51%	77%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121102040202	520	0	0	0	41	41	0	2	0	0%	0%	0%	81%	91%	0%	85%	0%	0	0	0	5	5	0	5	0	0	0	0	0.75	0.75	0	0.75	0	2.25	3.21
121102040203	521	0	0	0	3	0	0	0	0	0%	0%	0%	56%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121102040204	522	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102040205	523	0	1	0	270	11	0	1	0	0%	91%	0%	93%	86%	0%	74%	0%	0	5	0	5	5	0	4	0	0	0.375	0	0.75	0.75	0	0.6	0	2.10	3.00
121102040206	524	0	0	0	306	104	5	1	0	0%	0%	0%	93%	94%	94%	74%	0%	0	0	0	5	5	5	4	0	0	0	0	0.75	0.75	0.75	0.6	0	2.85	4.07
121102040301	525	0	0	0	0	0	0	0	2	0%	0%	0%	0%	0%	0%	0%	99%	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.5	0.50	0.71
121102040302	526	0	0	0	1	1	0	0	1	0%	0%	0%	42%	72%	0%	0%	97%	0	0	0	3	4	0	0	5	0	0	0	0.45	0.6	0	0	0.5	1.55	2.21
121102040303	527	0	0	0	0	0	0	0	1	0%	0%	0%	0%	0%	0%	0%	97%	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.5	0.50	0.71
121102040304	528	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121102040305	529	0	0	0	0	0	0	0	1	0%	0%	0%	0%	0%	0%	0%	97%	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.5	0.50	0.71
121102040306	530	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102040307	531	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102040308	532	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102040309	533	0	0	0	12	12	0	0	0	0%	0%	0%	71%	87%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121102040310	534	0	0	0	335	335	0	0	0	0%	0%	0%	94%	97%	0%	0%	0%	0	0	0	5	5	0	0	0	0	0	0	0.75	0.75	0	0	0	1.50	2.14
121102040401	535	0	0	0	4	0	0	0	0	0%	0%	0%	60%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121102040402	536	0	0	0	3	0	0	0	1	0%	0%	0%	56%	0%	0%	0%	97%	0	0	0	3	0	0	0	5	0	0	0	0.45	0	0	0	0.5	0.95	1.36
121102040403	537	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102040404	538	0	1	0	3400	1089	34	4	0	0%	91%	0%	99%	99%	99%	93%	0%	0	5	0	5	5	5	5	0	0	0.375	0	0.75	0.75	0.75	0.75	0	3.00	4.29
121102040405	539	0	1	0	3075	2383	18	3	0	0%	91%	0%	99%	100%	97%	89%	0%	0	5	0	5	5	5	5	0	0	0.375	0	0.75	0.75	0.75	0.75	0	3.00	4.29
121102040406	540	0	0	0	2	2	0	0	0	0%	0%	0%	51%	77%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121102040407	541	0	1	0	119	100	3	0	0	0%	91%	0%	88%	94%	92%	0%	0%	0	5	0	5	5	5	0	0	0	0.375	0	0.75	0.75	0.75	0	0	2.25	3.21
121102040408	542	0	0	0	247	240	10	0	0	0%	0%	0%	92%	96%	96%	0%	0%	0	0	0	5	5	5	0	0	0	0	0	0.75	0.75	0.75	0	0	2.25	3.21
121102040409	543	0	2	0	1933	1861	19	29	0	0%	97%	0%	98%	99%	97%	100%	0%	0	5	0	5	5	5	5	0	0	0.375	0	0.75	0.75	0.75	0.75	0	3.00	4.29
121102040410	544	0	0	0	4	0	40	1	0	0%	0%	0%	60%	0%	99%	74%	0%	0	0	0	3	0	5	4	0	0	0	0	0.45	0	0.75	0.6	0	1.80	2.57
121102050101	545	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050102	546	0	0	0	3	3	0	0	0	0%	0%	0%	56%	80%	0%	0%	0%	0	0	0	3	5	0	0	0	0	0	0	0.45	0.75	0	0	0	1.20	1.71
121102050103	547	0	0	0	1	0	0	0	0	0%	0%	0%	42%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121102050104	548	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050105	549	0	2	0	0	0	0	0	0	0%	97%	0%	0%	0%	0%	0%	0%	0	5	0	0	0	0	0	0	0	0.375	0	0	0	0	0	0	0.00	0.00
121102050106	550	0	0	0	231	0	0	1	0	0%	0%	0%	92%	0%	0%	74%	0%	0	0	0	5	0	0	4	0	0	0	0	0.75	0	0	0.6	0	1.35	1.93
121102050201	551	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050202	552	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050203	553	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050204	554	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050301	555	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050302	556	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050303	557	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050304	558	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050305	559	0	0	0	36	36	0	0	0	0%	0%	0%	80%	91%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121102050306	560	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50

Appendix C6 - HUC12 Flood Risk Data Score Table

HUC12	Unique ID	Count								HUC 12 Percentile Rank								Unweighted Score (1-5)								Weighted Score									Scaled Score (1-5)
																										7.5%	7.5%	15%	15%	15%	15%	15%	10%	100%	
		Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Hist. Prop. Damage (Flood Prone Areas)	Hist. Prop. Damage (Agency Data)	Hist. Life Loss/ Injuries	Prop. Damage - Exposure (Bldgs)	Prop. Damage - Vulner. (Bldgs)	Prop. Damage - Vulner. (Critical Bldgs)	Low Water Crossings	Life Loss (Dams)	Total Score	
121102050307	561	0	1	0	2	2	0	0	0	0%	91%	0%	51%	77%	0%	0%	0%	0	5	0	3	4	0	0	0	0	0.375	0	0.45	0.6	0	0	0	1.05	1.50
121102050401	562	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050402	563	0	0	0	5	0	0	0	0	0%	0%	0%	62%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121102050403	564	0	0	0	5	4	0	0	0	0%	0%	0%	62%	83%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121102050404	565	0	2	0	66	62	0	0	0	0%	97%	0%	84%	93%	0%	0%	0%	0	5	0	5	5	0	0	0	0	0.375	0	0.75	0.75	0	0	0	1.50	2.14
121102050405	566	0	1	0	83	0	0	0	0	0%	91%	0%	86%	0%	0%	0%	0%	0	5	0	5	0	0	0	0	0	0.375	0	0.75	0	0	0	0	0.75	1.07
121102050406	567	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050407	568	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050501	569	0	0	0	1	0	0	1	0	0%	0%	0%	42%	0%	0%	74%	0%	0	0	0	3	0	0	4	0	0	0	0	0.45	0	0	0.6	0	1.05	1.50
121102050502	570	0	0	0	25	0	0	0	0	0%	0%	0%	76%	0%	0%	0%	0%	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	0.60	0.86
121102050503	571	0	2	0	37	18	3	0	0	0%	97%	0%	80%	88%	92%	0%	0%	0	5	0	5	5	5	0	0	0	0.375	0	0.75	0.75	0.75	0	0	2.25	3.21
121102050504	572	0	1	0	56	50	0	0	0	0%	91%	0%	83%	92%	0%	0%	0%	0	5	0	5	5	0	0	0	0	0.375	0	0.75	0.75	0	0	0	1.50	2.14
121102050505	573	0	2	0	39	0	1	1	0	0%	97%	0%	81%	0%	88%	74%	0%	0	5	0	5	0	5	4	0	0	0.375	0	0.75	0	0.75	0.6	0	2.10	3.00
121102050506	574	0	0	0	362	0	25	0	0	0%	0%	0%	94%	0%	98%	0%	0%	0	0	0	5	0	5	0	0	0	0	0	0.75	0	0.75	0	0	1.50	2.14
121102050601	575	0	1	0	52	0	0	0	0	0%	91%	0%	82%	0%	0%	0%	0%	0	5	0	5	0	0	0	0	0	0.375	0	0.75	0	0	0	0	0.75	1.07
121102050602	576	0	0	0	36	9	0	1	0	0%	0%	0%	80%	86%	0%	74%	0%	0	0	0	4	5	0	4	0	0	0	0	0.6	0.75	0	0.6	0	1.95	2.79
121102050603	577	0	0	0	185	0	0	0	0	0%	0%	0%	90%	0%	0%	0%	0%	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0	0	0.75	1.07
121102050604	578	0	0	0	368	6	7	0	0	0%	0%	0%	95%	84%	95%	0%	0%	0	0	0	5	5	5	0	0	0	0	0	0.75	0.75	0.75	0	0	2.25	3.21
121102050605	579	0	0	0	3	0	0	1	0	0%	0%	0%	56%	0%	0%	74%	0%	0	0	0	3	0	0	4	0	0	0	0	0.45	0	0	0.6	0	1.05	1.50
121102050606	580	0	0	0	84	0	0	0	0	0%	0%	0%	86%	0%	0%	0%	0%	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0	0	0.75	1.07
121102050607	581	0	0	0	82	0	0	0	0	0%	0%	0%	85%	0%	0%	0%	0%	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0	0	0.75	1.07
121102050608	582	0	0	0	1	0	0	0	0	0%	0%	0%	42%	0%	0%	0%	0%	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	0.45	0.64
121102050701	583	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050702	584	0	0	0	4	0	0	1	0	0%	0%	0%	60%	0%	0%	74%	0%	0	0	0	3	0	0	4	0	0	0	0	0.45	0	0	0.6	0	1.05	1.50
121102050703	585	0	0	0	142	0	0	1	0	0%	0%	0%	89%	0%	0%	74%	0%	0	0	0	5	0	0	4	0	0	0	0	0.75	0	0	0.6	0	1.35	1.93
121102050704	586	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050705	587	0	0	0	99	0	8	0	0	0%	0%	0%	86%	0%	96%	0%	0%	0	0	0	5	0	5	0	0	0	0	0	0.75	0	0.75	0	0	1.50	2.14
121102050706	588	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050707	589	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050801	590	0	0	0	6	0	1	0	0	0%	0%	0%	65%	0%	88%	0%	0%	0	0	0	4	0	5	0	0	0	0	0	0.6	0	0.75	0	0	1.35	1.93
121102050802	591	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050803	592	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050804	593	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050805	594	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050806	595	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050807	596	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102050808	597	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102060101	598	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102060102	599	0	0	0	6	6	0	0	0	0%	0%	0%	65%	84%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121102060103	600	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102060104	601	0	0	0	227	227	0	0	0	0%	0%	0%	91%	96%	0%	0%	0%	0	0	0	5	5	0	0	0	0	0	0	0.75	0.75	0	0	0	1.50	2.14
121102060105	602	0	0	0	509	509	2	0	0	0%	0%	0%	96%	98%	91%	0%	0%	0	0	0	5	5	5	0	0	0	0	0	0.75	0.75	0.75	0	0	2.25	3.21
121102060201	603	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102060202	604	0	0	0	5	5	0	0	0	0%	0%	0%	62%	83%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121102060203	605	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102060204	606	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102060205	607	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102060206	608	0	0	0	3	3	0	0	0	0%	0%	0%	56%	80%	0%	0%	0%	0	0	0	3	5	0	0	0	0	0	0	0.45	0.75	0	0	0	1.20	1.71
121102060301	609	0	0	0	0	0	2	0	0	0%	0%	0%	0%	0%	91%	0%	0%	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0.75	1.07
121102060302	610	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102060303	611	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102060304	612	0	4	0	1489	1489	37	4	0	0%	99%	0%	98%	99%	99%	93%	0%	0	5	0	5	5	5	5	0	0	0.375	0	0.75	0.75	0.75	0.75	0	3.00	4.29
121102060401	613	0	0	0	2	2	0	0	0	0%	0%	0%	51%	77%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121102060402	614	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102060403	615	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102060404	616	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00
121102060405	617	0	0	0	7	7	0	0	0	0%	0%	0%	66%	85%	0%	0%	0%	0	0	0	4	5	0	0	0	0	0	0	0.6	0.75	0	0	0	1.35	1.93
121102060406	618	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121102060501	619	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50
121102060502	620	0	0	0	1	1	0	0	0	0%	0%	0%	42%	72%	0%	0%	0%	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	1.05	1.50

REGION 13 HUC 12 UNIQUE IDS

Appendix C7 – List of Removed Flood Mitigation Actions

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
44	COASTAL BEND MITIGATION ACTION PLAN - AR-02	Proceed with acquisition of easements to permit implementation of Drainage Master Plan. Six priority drainage projects have been identified in the Drainage Master Plan to reduce repeated flooding in poorly drained areas of the county. Funding Needed.	The project lacks important information to pass the screening	Aransas				
45	COASTAL BEND MITIGATION ACTION PLAN - AR-03	The City of Rockport recently completed a Master Drainage Plan for the Live Oak Peninsula, which has also been adopted by the Town of Fulton. The City of Rockport has also recently completed a $2.7 million drainage improvement project in south Rockport. As new street projects arise in the future, they will be built in accordance with the requirements of the Master Plan, to ensure that flooding is minimized.	The project lacks important information to pass the screening	Aransas				
46	COASTAL BEND MITIGATION ACTION PLAN - AR-04	Coastal erosion along the shoreline of Aransas Bay is threatening to undermine local roadways and recreational areas. A strategic plan to address this issue has been developed and adopted by the participating jurisdictions. The success of this project is only limited by availability of funding. There isa need to raise the grade of the roads in some areas. There are miles of public bay access and the potential to develop this area in a very nice fashion is quite great. The affected shoreline has been divided into 6 critical areas and prioritized.Priority 1: Broadway along Little Bay (City of Rockport)Priority 2: Fulton Beach Road, south of Fulton Harbor (City of Rockport)Priority 3: Fulton Beach Road, north of Fulton Harbor (Town of Fulton, Aransas County)Priority 4: Water Street (City of Rockport)Priority 5: Bayshore Drive on Key Allegro Island (City of Rockport)Priority 6: Shell Ridge Road (Aransas County)	The project lacks important information to pass the screening	Aransas				5000000 - 25000000
197	Texas Coastal Resiliency Master Plan - R3-6	Under this project, approximately 1 mile of breakwaters would be installed along Lamar Beach Road, from Main Street to 12th Street in Aransas County. The project also would include regrading and flling along the shoreline, and marsh planting to establish a living shoreline system	This project is already in progress or completed.	Aransas			Aransas County, Aransas County Navigation District	$ 3,500,000.00
198	Texas Coastal Resiliency Master Plan - R3-8	Newcomb's Point is located northeast of Copano Bay. This project would place shoreline stabilization at Newcomb's Point to help protect the valuable habitat from threats of erosion. Potential solutions could include creating a living shoreline that would protect the shoreline from erosion, such as a semi-submerged breakwater with vegetation behind it to allow the shoreline to accrete and stabilize natural	This project is already in progress or completed.	Aransas			Texas Parks & Wildlife Department	$ 2,700,000.00
207	Tule Creek Watershed Project Report - 7.1.1 Area 1: Mesquite By-pass	The mesquite by-pass project is primarily a drainage and flood control plan that will divert 25 percent of the total Tule Creek Watershed area to a new Aransas Bay Outfall. This project will require approx. 3,200 feet of 5x5 box culvert to be installed within the Mesquite Street ROW.	The project is no longer wanted by the stakeholder per our last conversation	Aransas			TCEQ	$ 1,600,000.00
208	Tule Creek Watershed Project Report - 7.1.2 Area 2: Tule Creek West Sediment pond and habitat Enhancement	This project is located in a position that will enable capture of most flows and sediment from the watershed before discharge into Little Bay. The pond will emphasize sediment control should be placed more or less on-line but so as to avoid changes to flood and drainage control.	The project lacks important information to pass the screening	Aransas			TCEQ	$ 650,000.00

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
209	Tule Creek Watershed Project Report - 7.1.3 Area 3: Upper Tule Creek West Widening and slope Protection	This project will help significantly reduce one of the leading stormwater pollutants within the Tule Creek Watershed and discharge to little Bay. The vegetative slope protection will help control erosion and sedimentation downstream when combined with a maintenance projgram designed to also control erosion. It is expected that approx. 100 feet of additinal ROW is needed to be dedicated and cleared to accommodate the widening.	The project lacks important information to pass the screening	Aransas			TCEQ	$ 650,000.00
210	Tule Creek Watershed Project Report - 7.1.4 Area 4: Tule Creek north Retention Pond and Habitat Enhancement	An on-line pond, up to 5 acres, capturing frequent flows from the Railroad ROW tributary as well as the lands to the west should be designed at this location. It is also recommended that an additional 42" pipe be placed adjacent to the existing 42" outfall from the golf course.	The project lacks important information to pass the screening	Aransas			TCEQ	$ 1,325,000.00
211	Tule Creek Watershed Project Report - 7.1.5 Area 5: Tule Creek East Detention Pond and Marsh Enhancement	This area is located near the downstream part of the watershed, which makes it ideally located from the perspective of providing capture of contaminants before discharge into the Bay. Due to the requiement of constructing a weir and overflow device, this project is hydraulically sensitive and will neeed carefull planing to develop an effective project design and avoid obvious potential risk.	The project lacks important information to pass the screening	Aransas			TCEQ	$ 925,000.00
112	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #13	St. Charles Bay Shoreline/Lamar Beach Road - the creation of a new habitat will provide erosion protection improvements	This project is already in progress or completed.	Aransas				$ 3,426,000
113	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #14	Precinct 1/1A- Pinciana/Weeping Willow- Projects 1,2: Surface stormwater conveyance imrpovements from Weeping Willow Rd to FM1069	This project is already in progress or completed.	Aransas				$ 605,880
114	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #15	Precinct 4 - Tule Creek- Mesquite Bypass - Project 1: Subsurface drainage system from 12th St (Fulton) to Aransas Bay Reduces the threat of flooding to new and existing buildings and infrastructure by making improvments to the County drainage system	The project is no longer wanted by the stakeholder per our last conversation	Aransas				$ 1,769,900
115	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #16	Precinct 4 - South Central Lamar Project 1: Surface stormwater conveyance system from Bee tree Circle to Copano Bay with 6-ac stormwater management pond west of SH35. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvments to the County drainage system	This project is already in progress or completed.	Aransas				$ 160,380
116	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #17	Precinct 1/2 - Griffith St. projects 1,2,3: Surface storwater conveyance system improvements. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvments to the County drainage system	This project is a duplicate of another project.	Aransas				$ 591,030
117	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #18	Precinct 1/1A - Palm Harbor - Project 1: Create outfall to Aransas Bay, improvements to surface to subsurface conveyance system, draiange structures under SH35 business. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvments to the County drainage system	This project is already in progress or completed.	Aransas				$ 400,895
118	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #19	Precinct 4 - Southeast Lamar - Projects 1,2,3: Subsurface conveyance system. Reduces the threat of flooding to new and existing buildings and infrastructure by	This project is already in progress or completed.	Aransas				$ 239,030
119	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #20	Precinct 2 - Copano Heights - Projects 1,2,3: Surface SW conveyance system imrpovements from Copano Heights through Bailey Ranch with drainage structures	This project is already in progress or completed.	Aransas				$ 2,090,550
120	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #21	Precinct 4 - Spanish woods - Projects 1, 2, 3: Surface conveyance system and drainage structures under Sanctuary Drive and Spanish Woods Drive. Reduces the	This project is already in progress or completed.	Aransas				$ 692,120
121	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #22	Precinct 1/1A - Southwest 1069 - Projects 2, 3: Improve upon inadequate right-of-way width on County roads in this watershed, improve upon undersized structures	This project is already in progress or completed.	Aransas				$ 1,323,476
122	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #23	Precinct 1/1A - Northeast AP - Project 1. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvments to the County	This project is already in progress or completed.	Aransas				$ 2,125,200

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
123	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #24	Precinct 4 - Lowering of Picton/Sorenson - Project 5. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvments to the County drainage system	The project is no longer wanted by the stakeholder per our last conversation	Aransas				$ 114,400
126	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #27	Precinct 3 - West Tule - Pond/Channel Widening - Projects 2, 3. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvments	This project is already in progress or completed.	Aransas				$ 979,000
128	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #31	Shell Ridge Road - the construction of new habitat will provide erosion protection improvements. Reduces the threat of flooding to new and existing buildings and	This project is already in progress or completed.	Aransas				$ 2,375,700
129	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #32	Newcomb's Point - the construction of new habitat will provide erosion protection improvements. Reduces the threat of flooding to new and existing	This project is already in progress or completed.	Aransas				$ 3,028,500
131	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #40	Develop and adopt a stormwater master plan	This project is already in progress or completed.	Aransas				$ 2,500
134	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #50	Update and improve sea gates that protect the city and harbor	This project is a duplicate of another project.	Aransas				$ 1,000,000
135	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #53	Design and implement a coastal erosion study to identify projects	The project lacks important information to pass the	Aransas				$ 2,500
136	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #55	Update stormwater master plan	This project is a duplicate of another project.	Aransas				$ 2,500
138	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #59	Stormwater Crossing at FM 1781 - Upgrade/replacement of box culverts to accommodate growth	This project is already funded.	Aransas				$ 171,248
139	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #60	Master Plan - Drainage Improvements - Project 1 - SH 35 BUS - Traylor Ave & Tule Park Dr.	This project is already funded.	Aransas				$ 996,175
140	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #61	Master Plan - Drainage Improvements - Project 2 - SH 35 BUS - Enterprise & Maple	This project is already funded.	Aransas				$ 540,798
142	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #63	Master Plan - Drainage Improvements - Project 4 - Market St (FM1069) at SH 35 BUS	This project is already funded.	Aransas				$ 791,725
143	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #64	Master Plan - Drainage Improvements - Project 5 - Market St (FM1069) at Burton & Kossuth	This project is already funded.	Aransas				$ 3,135,881
144	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #65	Master Plan - Drainage Improvements - Project 7 - Market St (FM1069) at Church St (Loop 70)	This project is already in progress or completed.	Aransas				$ 349,414
145	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #66	Master Plan - Drainage Improvements - Project 8 - Pearl St (FM2165) at Orleans & Laure	This project is already in progress or completed.	Aransas				$ 2,813,827
146	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #68	RCC Lakes - removal of sediment for drainage improvements	This project is a duplicate of another project.	Aransas				$ 376,800
147	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #73	Repair outfalls of pump station that pump into Aransas Bay	This project is a duplicate of another project.	Aransas				$ 2,000,000
148	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.1.d	Incorporate higher floodplain management standards into City of aransas Pass comprehensive plan update.	The project is no longer wanted by the stakeholder per our last conversation	Aransas				$ 76,754
149	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.1.e	Incorporate higher floodplain management standards into City of Rockport comprehensive plan update.	This project is already in progress or completed.	Aransas				
150	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.1.f	Incorporate higher floodplain management standards into Aransas County hazard Mitigation Action plan update	This project is already in progress or completed.	Aransas				
151	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.1.b	Develop a joint floodplain management and awareness website with all jurisdictions.	This project is a duplicate of another project.	Aransas				

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
152	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.1.c	Publish informational flood articles in city and county newsletters	The project lacks important information to pass the screening	Aransas				
154	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.1.h	Send informational mailers to repetitive loss property owners about buyouts and other mitigation options.	This project is already in progress or completed.	Aransas				
155	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 4.1.b	Each jurisdiction will continue ongoing maintenance of drainage pipes, culverts, and swales until the county-wide master plan is approved and implementation can begin.	The project is no longer wanted by the stakeholder per our last conversation	Aransas				
5	Others (Flood Prevention/Planning Study, LOMR etc)	GBRA Hazard Mitigation Plan Jurisdiction	This project is already funded.	Aransas, Bandera, Bexar, Calhoun, Goliad, Karnes, Kerr, Refugio, San	731.72		TWDB FIF	$ 78,500
10	Drainage Improvements	Stormwater Pump Station #3 (Euclid) - Aransas Pass	This project is already funded.	Aransas, Nueces, San Patricio	4.88		TWDB FIF	$ 6,000,000
201	Texas Coastal Resiliency Master Plan - R3-18	This project would acquire additional land within the Guadalupe River and Delta Wildlife Management Area corridor to connect tidal marsh from the upper reaches of Hynes Bay to the Wildlife Management Area in Refugio County.	The project lacks important information to pass the screening	Aransas, Refugio, Nueces			Texas Parks & Wildlife Department	$ 3,000,000.00
12	Drainage Improvements	Jourdanton Main Street Drainage Project	This project is already in progress or completed.	Atascosa	0.32		TWDB FIF	$ 1,504,770
32	TXDOT Road Projects	TXDOT Road Project - 007313012	This project is already funded.	Atascosa	0.00018		TXDOT	$ 5,195,540
34	TXDOT Road Projects	TXDOT Road Project - 085504032	The project is already funded.	Bandera	0.00033		TXDOT	$ 1,456,894
2	County Wide Drainage Improvements	Medio Creek Flood Control Improvements	This project is already in progress or completed.	Bee	81.64		TWDB FIF	$ 3,473,313
4	County Wide Early Flood Warning System	Flood Early Warning System – Phase I	This project is already in progress or completed.	Bee	81.64		TWDB FIF	$ 437,500
15	City of Beeville Low Water Crossings Replacement Project	GLO Disaster Mitigation Project	This project is already funded.	Bee	0.00		TX GLO	$ 3,844,490
48	COASTAL BEND MITIGATION ACTION PLAN - BE - 04	Build a box culvert with parallel wings on C.R. 628, Low water crossing washes out during heavy rains, causing erosion to road surface.	The project lacks important information to pass the screening	Bee				$ 70,200
50	COASTAL BEND MITIGATION ACTION PLAN - BE - 06	Poesta and Medio creek drainage project. Complete concrete drainage ditch from east city limits to west city limits. A portion of the project has been completed from Adams street to South Jackson.	This project is a duplicate of another project.	Bee				$ 900,000
11	Drainage Improvements	Pintas Creek at Sunset Dr. & Virginia St. Drainage Improvements - Alice	This project is already funded.	Jim Wells	1.18		TWDB FIF	$ 372,500
13	City of Alice: Virginia St. Area Drainage Project	GLO Disaster Mitigation Project	This project is already funded.	Jim Wells	0.00		TX GLO	$ 6,942,193

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
51	COASTAL BEND MITIGATION ACTION PLAN - JW - 03	Annual maintenance of flood prevention system, including dams, associated levees and stream channels.The dams, levees, and stream channels maintained by Jim Wells county are part of a larger flood prevention system spanning four counties, including Duval to the west, and Nueces and Kleberg to the east. Federally constructed beginning in the early Sixties, responsibility for annual maintenance has been assumed by local authorities. This system is designed to mitigate flooding across large portions of central Jim Wells County, as well as other downstream communities in neighboring counties.	The project is no longer wanted by the stakeholder per our last conversation	Jim Wells				33000 / annually
52	COASTAL BEND MITIGATION ACTION PLAN - JW - 12	Lake Findley is the primary source of water for the city of Alice. The dam requires routine maintenance to ensure it stays in compliance with TCEQ standards for such structures to prevent dam failure and resulting downstream flooding. This project also includes an Operations and Maintenance Manual that is in development.	The project is no longer wanted by the stakeholder per our last conversation	Jim Wells				25000 Annually
53	COASTAL BEND MITIGATION ACTION PLAN - JW - 16	Acquire and install outdoor warning system for the Tecolote Subdivision, residents in this subdivision do not have a means of being warned of imminent hazards.	The project lacks important information to pass the screening	Jim Wells				$ 85,000
54	COASTAL BEND MITIGATION ACTION PLAN - JW - 17	Acquire and install outdoor warning system for the City of Orange Grove, residents of this city do not have a means of being warned of imminent hazards.	The project lacks important information to pass the screening	Jim Wells				$ 85,000
55	COASTAL BEND MITIGATION ACTION PLAN - JW - 18	Purchase or lease emergency warning call down system (reverse 911), a call down warning system can alert residents directly by calling their homes or places of business. This capability is especially useful during daylight business hours when individuals may not have access to warning broadcast via television or radio. Although telephonic messages must be concise, they can provide additional instructions as to recommended response actions for all hazardous situations.	The project lacks important information to pass the screening	Jim Wells				30000 annually
17	Drainage Improvements Project	Drainage Improvements Project - Location 1 - Corral Street, Kingsville	This project is already funded.	Kleberg	0.00		TX GLO	$ 3,333,333
18	Drainage Improvements Project	Drainage Improvements Project - Location 2 - Kenedy Street, Kingsville	This project is already funded.	Kleberg	0.00		TX GLO	$ 3,333,333
19	Drainage Improvements Project	Drainage Improvements Project - Location 3 - Johnston Street, Kingsville	This project is already funded.	Kleberg	0.00		TX GLO	$ 3,333,333
56	COASTAL BEND MITIGATION ACTION PLAN - KL - 07	Purchase and install two outdoor warning sirens. There is currently no outdoor warning siren to alert the public to rapid onset hazards, such as tornadoes or hazardous materials.	The project lacks important information to pass the screening	Kleberg				$ 40,000
57	COASTAL BEND MITIGATION ACTION PLAN - KL - 11	Coastal erosion at Riviera Park on Baffin Bay is threatening to undermine recreational facilities. This is a fairly well-used winter Texan recreation area. The scope would include an offshore breakwater to protect the beach and a fishing pier extension.	The project lacks important information to pass the screening	Kleberg				500000 - 1000000
58	COASTAL BEND MITIGATION ACTION PLAN - KL - 12	This project will allow public works employees to provide more sandbags to the community faster and with less employees.	The project lacks important information to pass the screening	Kleberg				$ 13,000

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
199	Texas Coastal Resiliency Master Plan - R3-12	This project would protect two rookery islands, Tern Island and Triangle Tree Island, in the Upper Laguna Madre from erosion by constructing protective structures, such as shoreline armoring for each island. This project would be considered Phase 1 and would include feasibility, preliminary engineering, alternatives analysis, fnal design and permitting. Phase 2 would cover the construction phase. Opportunities to include benefcial use of dredged material during the construction would be pursued	The project lacks important information to pass the screening	Kleberg			Coastal Bend Bays and Estuaries Program, The Nature Conservancy, Audubon Texas, U.S. Fish and Wildlife	$ 3,600,000.00
202	Texas Coastal Resiliency Master Plan - R3-19	In 2015, Nueces County acquired property on North Padre Island approximately 4 miles southwest of the causeway. There are several ongoing restoration eforts at the site, including eradicating approximately 12 acres of invasive Brazilian Pepper Trees, implementing a prescribed burn management plan, and re-purposing an old impacted well pad site to establish burrowing owl habitat. Nueces County completed a Habitat Land Use Management Plan for the property to guide future conservation eforts that included input received during public meetings from regulatory agencies, non-governmental organizations and the general public. The acquired property has three immediate needs: 1. Repairing a large blow out in the dune system. During and after the dune restoration process, data will be collected to inform future repairs. 2. Restoring damaged wetlands from human use activities, such as driving through jurisdictional wetlands. 3. Invasive species control and post-control monitoring and removal. This include Brazilian Pepper Trees and Chinese Tallow Trees	The project lacks important information to pass the screening	Kleberg			Coastal Bend Bays and Estuaries Program, The Nature Conservancy, Texas Parks & Wildlife Department, U.S. Fish and Wildlife Service, U.S. National Park Service, Texas General Land Ofce, Private Landowners	$ 500,000.00
36	TXDOT Road Projects	TXDOT Road Project - 001708113	The project is already funded.	La Salle	0.00019		TXDOT	$ 5,500,000
37	TXDOT Road Projects	TXDOT Road Project - 001708112	The project is already funded.	La Salle	0.00019		TXDOT	$ 5,500,000
25	TXDOT Road Projects	TXDOT Road Project - 120601020	The project is already funded.	Live Oak	0.00008		TXDOT	$ 519,596
26	TXDOT Road Projects	TXDOT Road Project - 099103013	The project is already funded.	Live Oak	0.00012		TXDOT	$ 260,900
30	TXDOT Road Projects	TXDOT Road Project - 120601019	The project is already funded.	Live Oak	0.00052		TXDOT	$ 905,442
60	COASTAL BEND MITIGATION ACTION PLAN - LO - 10	Augment the outdoor warning system for the City of George West with the purchase and installation of two additional sirens. The City of George West has one 10 hp siren located at the fire station, which is not adequate. The city needs at least two more sirens to warn most of the city. A study by Texas A&M during the late 1970's indicated that at least three-sirens were needed within the City to warn at least 95% of the public.	The project lacks important information to pass the screening	Live Oak				$ 16,000
61	COASTAL BEND MITIGATION ACTION PLAN - LO - 12	Enhance the City of Three Rivers outdoor warning system to include voice capability. A large refinery, currently owned and operated by Valero, is situated within the City of Three Rivers, where a multi-purpose, outdoor warning siren system is currently implemented. Enhancing the system to include voice capability would permit broadcasting of specific messages, such as public protective actions.	The project lacks important information to pass the screening	Live Oak				$ 10,000
31	TXDOT Road Projects	TXDOT Road Project - 059502024	The project is already funded.	Medina	0.00015		TXDOT	$ 2,176,000
33	TXDOT Road Projects	TXDOT Road Project - 084804049	The project is already funded.	Medina	0.00046		TXDOT	$ 3,332,101
35	TXDOT Road Projects	TXDOT Road Project - 252001015	The project is already funded.	Medina	0.00040		TXDOT	$ 861,900
38	TXDOT Road Projects	TXDOT Road Project - 264901035	The project is already funded.	Medina	0.00033		TXDOT	$ 3,784,200
6	Flood Warning System	Nueces County Drainage & Conservation District 2	The project is already funded.	Nueces	11.79		TWDB FIF	$ 465,500

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
7	County Wide Drainage Improvements	Nueces County Drainage & Conservation District 2 - Casa Blanca Drainage Improvements	This project is already in progress or completed.	Nueces	11.79		TWDB FIF	$ 809,600
8	County Wide Drainage Improvements	Nueces County Drainage & Conservation District 2 - Bosquez Rd. / Avenue J Drainage Improvements	This project is already in progress or completed.	Nueces	11.79		TWDB FIF	$ 2,453,716
9	County Wide Drainage Improvements	Nueces County Drainage & Conservation District 2 - Ditch “A” and Bluebonnet Drainage Improvements	This project is already in progress or completed.	Nueces	11.79		TWDB FIF	$ 1,311,320
24	Downtown Drainage Improvements Phase III - Project A	CoCC Downtown Study	This project is already funded.	Nueces	0.00019			
27	TXDOT Road Projects	TXDOT Road Project - 037310009	The project is already funded.	Nueces	0.00161		TXDOT	$ 1,500,000
28	TXDOT Road Projects	TXDOT Road Project - 010106095	The project is already funded.	Nueces	0.00099		TXDOT	$ 800,000,000
29	TXDOT Road Projects	TXDOT Road Project - 037310008	The project is already funded.	Nueces	0.00047		TXDOT	$ 60,000
43	A Joint Erosion Response Plan for Nueces County and the City of Corpus Christi	The study "A Joint Erosion Response Plan for Nueces County and for the City of Corpus Christi 2012" lays out goals and approaches for erosion control, beach maintenance, improvement of safety, access and enjoyment of beaches, and increased education of residents and visitors about the beaches, it's dangers, and the importance of its maintenance. It would be beneficial to work towards determining a holistic solution to satisfy the goals of erosion control, beach maintenance, and improved beach access, while also providing funding solutions to enable the community to pursue as many of these goals as possible.	The project lacks important information to pass the screening	Nueces				
62	COASTAL BEND MITIGATION ACTION PLAN - NU - 07	Formalize procedures to gain authorized access to an existing regional Call Down system through City of Kingsville/Kleberg.The City of Bishop is located close to the border of Nueces and Kleberg Counties, near the City of Kingsville. Natural and other hazards impacting Bishop are likely to impact Kingsville, and vice versa. Kleberg County has recently entered into an Inter-local Cooperation Agreement with the City of Corpus Christi and Nueces County, operators of the METROCOM center, to obtain authorized access to various warning tools, including a Call Down system. Some expense is involved with maintenance and activation of the system, including long distance telephone charges. The parties have agreed in principle to provide access to the City of Bishop through the Kingsville/Kleberg County agreement. Formal agreement as to who is authorized to activate the system on behalf of Bishop, the specific procedures to be used, and what costs will be incurred remains to be finalized.	The project lacks important information to pass the screening	Nueces				
63	COASTAL BEND MITIGATION ACTION PLAN - NU - 08	Evaluate cost/benefit of implementing an outdoor warning siren system and present recommendations to local officials.No outdoor warningsiren system is currently available within the City of Bishop to alert residents to rapid onset natural hazards such as tornadoes, or other hazardous situation.	The project lacks important information to pass the screening	Nueces				$ 51,113

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
64	COASTAL BEND MITIGATION ACTION PLAN - NU - 18	A periodic inspection of over 71,400 linear feet (13.5 miles) of storm water runoff conveyance lines during mid-2003 indicated that some sections of the lines needed repairs. The structural integrity and functionality of these outfall lines are critical in preventing flooding and in improving water quality.There are eight major storm water outfalls that convey storm water runoff into Corpus Christi Bay. The purpose of this project is to perform needed repairs along sections of the major outfalls. Typical repairs will include: headwalls, wing walls, isolated structural repairs, damaged lateral lines that penetrate outfall, holes, joints, and spalls.	This project is a duplicate of another project.	Nueces				$ 2,000,000
65	COASTAL BEND MITIGATION ACTION PLAN - NU - 19	A periodic inspection of over 71,400 linear feet (13.5 miles) of storm waterrunoff conveyance lines during mid-2003 indicated that that two of the eight major outfalls needed replacement. The structural integrity and functionality of these outfall lines are critical in preventing flooding and in improving water quality. The purpose of this project is to replace the two outfalls: Brawner Proctor, and Gollihar.	This project is a duplicate of another project.	Nueces				$ 5,000,000
66	COASTAL BEND MITIGATION ACTION PLAN - NU - 20	The purpose of this project is to repair erosion and other damages to major drainage channels as a result of a heavy rain or other severe weather. A number of earthen ditches throughout the City have steep side slope (2:1) which makes them more prone to erosion of stream beds and slopes during a prolong and intense rain event. In order to make improvements which will stabilize the slopes and stream beds of major channels, an allocation of funds is earmarked for this project to be utilized on a priority basis on those ditches where erosion and slope failures becomes a serious and critical problem. The project will generally includes shaping, grading, flattening side slopes, seeding, adding concrete flumes or lined channels, adding storm water appurtenances such as inlets, pipes, and some minor right-of-way acquisitions as necessary.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				$ 3,000,000
67	COASTAL BEND MITIGATION ACTION PLAN - NU - 21	Having adequate and available drainage ROW is critical to developing drainage infrastructure to meet the demand for orderly growth and development within the City. Adequate ROW helps to prevent/minimize flooding, helps to facilitate maintenance, and allows potential for improving quality of storm water runoff.The purpose of this project is to provide funding for acquiring right-of-way (ROW) where needed in order to implement drainage problem solutions, such as ditch widening, erosion control, extending storm sewers, providing easements, etc. During design, it is often required that additional ROW be provided for implementation of the project.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				$ 2,000,000
68	COASTAL BEND MITIGATION ACTION PLAN - NU - 22	Flooding in the downtown area is a frequently recurring event, and a major concern for both citizens and businesses. In addition to a variety of private businesses, several local and federal public facilities are located within this area. The existing pumps date from 1948 and are potentially subject to failure. Replacing the pumps will minimize the probability of a future catastrophic failure.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				$ 800,000
69	COASTAL BEND MITIGATION ACTION PLAN - NU - 27	The Oso Treatment Plant is situated in a location subject to flooding from coastal inundation. The wastewater lift stations are also vulnerable to flooding. The proposed improvements could include structural elevation and/or the installation of dikes, berms or other flood control devices.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				$ 160,000

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
70	COASTAL BEND MITIGATION ACTION PLAN - NU - 28	Portions of the Greenwood wastewater treatment plant are located immediately adjacent to the La Volla Creek floodplain. Recent flood events have inundated various process units at the plant. Flood waters have come very close to damaging equipment in the electrical building which is critical to plant operations. This project would provide flood protection for the electrical building and would help to ensure that the plant remains in operation during flood events, and protect public health and welfare.	This project is a duplicate of another project.	Nueces				$ 90,000
71	COASTAL BEND MITIGATION ACTION PLAN - NU - 29	Lake Corpus Christi, which stores 242,241 acre-feet of water, was dedicated April 26, 1958 with the construction of Wesley Seale Dam. The Lower Nueces River Water Supply District built and owned the reservoir until the bonds were paid off in 1986 and the City of Corpus Christi assumed ownership. Wesley Seale Dam is located approximately 35 miles from Corpus Christi, Texas. This facility is used to store raw water that flows down the Nueces River from the northern part of the watershed. DuringMarch 2001, the Wesley Seale Dam north and south spillway stabilization project was completed. This $22 million project included the installation of special equipment to monitor the stability of the dam structure. This equipment is presently being utilized as part of the City's overall dam monitoring plan. Information included in the program is obtained from equipment and flow measurements from piezometers, extensometers, relief wells, and sand drains. Inspections are conducted on a daily and monthly basis by Water Department staff, with extra inspections occurring during crest gate operation. In addition, formal inspections are conducted annually by an independent engineering firm, and a highly detailed inspection is scheduled for every three years.	This project is a duplicate of another project.	Nueces				200000-300000 annually
73	COASTAL BEND MITIGATION ACTION PLAN - NU - 41	This project pertains to coastal erosion of the bulkheading along the Corpus Christi Ship Channel, and the Municipal Marina. Ship traffic in the channel has consistently eroded the west side of the island. Existing bulk-heading in the Municipal Harbor has been undermined by the tides.	This project is already in progress or completed.	Nueces				$ 785,000
74	COASTAL BEND MITIGATION ACTION PLAN - NU - 49	Project is permitted and ready to go –just needs funding. Coastal erosion in Corpus Christi Bay is very high and if the project is not done soon, the entire island may erode away and would have to be rebuilt (or abandoned). Sunfish Island is an important bird sanctuary in the Corpus Christi area. An alternatives analysis and engineering design were conducted for Sunfish Island during CEPRA Cycle 2. Construction could not be done due to restrictions during bird nesting season.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				500000 - 1000000
75	COASTAL BEND MITIGATION ACTION PLAN - NU - 50	Prevention of further erosion of shoreline at Cole Park on Corpus Christi Bay through installation of groins and/or breakwaters. Cole Park is a high use park in Corpus Christi. The area behind the bulkhead is eroding and needs to be retrofitted.	This project is already in progress or completed.	Nueces				500000 - 1000000

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
76	COASTAL BEND MITIGATION ACTION PLAN - NU - 53	Nueces County finished a countywide Master Drainage Plan Study and developed the Master Drainage Implementation Plan as a guide for prioritizing and implementing the improvements identified as part of the study.The priorities outlined in the implementation plan are items which will have an immediate impact on storm water management for areas experiencing flooding problems.Nueces County is susceptible to flooding because some of its defined drainage ways and creeks are constricted by inadequate channel capacities, man-made barriers such as road and railroad embankments, irrigation canals, and because its flat topography and low soil permeability create poor drainage and pounding. Implementation Plan for Master Drainage Plan Nueces County, Texas December 2009 identifies major improvements which will be required throughout the county once future development occurs. The recommendations in the study provide a guide for the county in implementing a plan which will reduce flood damages through both structural and non-structural measures. Structural measures include enlarging existing channels, constructing new channels, enlarging bridge openings and constructing flood protection levees. Non structural measures include floodplain regulation, flood proofing, flood forecasting, on-site detention of storm water, clearing existing streams, and buyout and/or relocate structures in existing floodplains.	The project lacks important information to pass the screening	Nueces				$ 258,587,835
77	COASTAL BEND MITIGATION ACTION PLAN - NU - 55	Residential flood buyout along Nueces River to reduce repetitive losses and potential loss of life attributed to a major flood event or dam failure. Residential development along the river in the unincorporated areas is a patchwork of substandard homes and development well below recommended base elevation for the 100 year floodplain. Most of the property owners are not insured and have had numerous repetitive loses. Additionally, this project will leverage existing partnerships with an interest in maintaining a clean, safe and reliable water supply for the City of Corpus Christi as part of the Nueces River Watershed Protection Plan. The Nueces River Authority, City of Corpus Christi, Texas Commission on Environmental Quality and Coastal Bend Bays and Estuaries Foundation support continued buyouts along the river to maintain open green space and to aid in removing environmentally undesirable structures responsible for runoff pollutants and raw sewage discharges. This program will be multi year and will leverage multiple funding sources and partners. There are currently 66 eligible properties in Nueces County for the Repetitive Flood Claims Grant. Approximately 15 residential properties are located within the unincorporated areas of the county and would be thefirst targeted for participation. Additional properties will be targeted as part of the less restrictive Hazard Mitigation Grant Program. The City of Corpus Christi failed to meet state water quality standards in November 2009 attributed to high levels ofpollutants caused by runoff from heavy rain. As part of the necessary corrective actions, the City partnered to develop the Nueces River Watershed Protection Plan. This project will support the established mission and goals set forth in the plan to createenvironmentally friendly open space.	The project lacks important information to pass the screening	Nueces				$ 1,000,000

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
78	COASTAL BEND MITIGATION ACTION PLAN - NU - 65	Elevate and re-grade dilapidated roads. Many of the City's roads have sunk significantly and are a contributing factor to many of flood issues throughout the community. Repetitive flood damages have caused maintenance costs to be burdensome on the City. Upgrades from caliche to a more standard road surface would greatly enhance the ability of the road system to tolerate nuisance and reoccurring flooding. The City of Driscoll was first formed as a community in 1904 and was later incorporated as a Class C City in 1951. The City's infrastructure and buildings are very old and is located in an area that is very flat, causing it to be prone to flash floods. Aggressive debris control and flood-proofing is essential to mitigate against flooding and hurricane winds. All citizens and business owners remain concerned about their health and public safety due to continuous flooding. Over the past several years, there have been numerous flood events that have directly affected the City. The Coastal Bend will continue to be susceptible to very heavy rainfall and tropical weather events putting the City in a continuous battle to stay accessible and safe for its citizens. In addition to the alreadymentioned issues, travel near and through the community is limited on a regular basis including a very heavily highway that is also a critical hurricane evacuation route.	The project lacks important information to pass the screening	Nueces				$ 8,750,000
156	Nueces County Hazard Mitigation - Corpus Christi Action #1	Seawall capital Imrpovement Project for routine maintenance and restoration.	This project is already in progress or completed.	Nueces				$ 5,500,000
157	Nueces County Hazard Mitigation - Corpus Christi Action #2	Construction of a new bulkhead in Corpus Christi Bay along the south side shoreline of Corpus Christi.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				$ 10,500,000
158	Nueces County Hazard Mitigation - Corpus Christi Action #3	Make improvements to the Salt Flat Levee System	This project is already in progress or completed.	Nueces				$ 3,000,000
159	Nueces County Hazard Mitigation - Corpus Christi Action #4	Make improvements to Power Street Pump Station	This project is a duplicate of another project.	Nueces				$ 5,500,000
160	Nueces County Hazard Mitigation - Corpus Christi Action #6	Excavate silt and debris in Drainage Master Channel 31 caused by the erosion on sides and bottom of the Drainage Master Channel 31. Master Channel 31 was constructed in various phases in conjunction with the development in the area. The side slopes and bottom are severely eroded resulting in poor drainage and encroachment of ditch outside of the City right-of-way. This project will provide critical improvements to restore and improve the drainage profile and include erosion control measures such as side slope stabilization, soil treatment, vegetative cover and other best management practices. This project is planned in multiple phases as funding allows.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				$ 2,819,800

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
161	Nueces County Hazard Mitigation - Corpus Christi Action #7	Improvements to side slopes on Schanen Ditch to eliminate erosion problems. The existing profile of Schanen Ditch exceeds the recommended slope of 4:1 and maximum of 3:1. This is resulting in major slope stabilization failure in multiple areas near the Yorktown Bridge. Work to improve this ditch will include excavation/backfill to widen and create 3:1 side slopes with stabilization matting, new culvert and outfalls, riprap and ditch bottom improvements, seeding, irrigation adjustments, traffic controls, dewatering and other miscellaneous items. Construction of Phase 1 of this project has been recently completed and future phases will be completed to the extent that funding allows.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				$ 2,756,100
162	Nueces County Hazard Mitigation - Corpus Christi Action #8	This project will involve the improvement of La Volla Creek that crosses SH 357 (Saratoga Blvd). The project will provide 100-year capacity for conveyance to the Oso Creek. Phase 1 Channel improvements include the removal of vegetation from the channel North of Saratoga Boulevard and channel widening South of Saratoga Boulevard.	This project is already in progress or completed.	Nueces				$ 4,152,800
163	Nueces County Hazard Mitigation - Corpus Christi Action #13	Make improvements to the instrumentation system at Wesley Seale Dam. This project provides for improvements to the original instrumentation system including annual safety inspection, integration with O.N. Stevens WTP process controls, The Howell-Bunger Valve, the downstream sluice gates, and the dewatering system, in response to previous inspections and priority investment recommendations into the system. This project will protect the integrity of the Wesley Seale Dam system (1957), to provide for proper inspection and updated regulatory reports per TCEQ.	This project is already in progress or completed.	Nueces				$ 5,850,600
164	Nueces County Hazard Mitigation - Corpus Christi Action #15	Make improvements to the side seals on the Wesley Seale Dam Spillway to maintain the spillway's integrity. The Wesley Seals Dam has 60 crest gates located in two separate spillways: the south spillway includes 27 gates and the north spillway includes 33 gates. Over the years, leakage from the side seals has increased and it has become significant at several of the gates. The water flow from the excessive leakage damages the concrete and encourages algae and other vegetative growth and leads to corrosion issues on the gates, metal appurtenances and reinforcing steel. This project provides for the necessary improvements including seal replacement, miscellaneous structural repairs and application of a protective coating system for the Dam.	This project is already in progress or completed.	Nueces				$ 22,800,000
165	Nueces County Hazard Mitigation - Corpus Christi Action #16	Build a floodwall along Corpus Christi Bay at the Science and Natural History Museum. Recommendation to construct a new floodwall (or a coastal structure) that would follow a "hypotenuse"alignment between the existing Promenade and the USACE Bulkhead. The project would also backfill the triangle to make it function more like a coastal structure. This would also provide additional land area for future use.	This project is already in progress or completed.	Nueces				$ 350,000,000

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
166	Nueces County Hazard Mitigation - Corpus Christi Action #17	Make improvements to the erosion on sides and bottom of Drainage Master Channel 31. Master Channel 31 was constructed in various phases in conjunction with the development in the area. The side slopes and bottom are severely eroded resulting in poor drainage and encroachment of ditch outside of the City right-of-way. This project will provide critical improvements to restore and improve the drainage profile and include erosion control measures such as side slope stabilization, soil treatment, vegetative cover and other best management practices. This project is planned in multiple phases as funding allows.	This project is already in progress or completed.	Nueces				$ 3,000,000
167	Nueces County Hazard Mitigation - Corpus Christi Action #24	Coastal Erosion Cole Park: Installation of groins and/or breakwaters to the areas behind the bulkhead to retrofit the areas that are eroding.	This project is already in progress or completed.	Nueces				500000-1000000
203	Texas Coastal Resiliency Master Plan - R3-23	The recommended improvements under this project include: • Repairing breaches in the ship channel revetment on northern Mustang Island; • Constructing living shorelines coming of the ship channel near existing rock revetments to protect mangrove habitat; • Rebuilding marsh and wetland habitat; • Repairing the Charlie's Pasture bulkhead that was damaged during Hurricane Harvey; • Repairing public access; and • Permitting this site for benefcial use of dredged material to elevate the land. There is a potential to leverage Federal Emergency Management Agency-Public Assistance funding for this project. The engineering work has been initiated	This project is already in progress or completed.	Nueces			City of Port Aransas Port of Corpus Christi Texas General Land Ofce	$ 4,400,000.00
204	Lower Nueces River Watershed Protection Plan - Riparian habitat Conservation Management Measures No. 1	Purchase of Properties	The project lacks important information to pass the screening	Nueces			City of Corpus Christi and Counties	$ 15,000.00
205	Lower Nueces River Watershed Protection Plan - Riparian habitat Conservation Management Measures No. 2	Acquisitions of Conservation Easements (approximately 970 acres)	The project lacks important information to pass the screening	Nueces			City of Corpus Christi/NRA/TSALT	$ 970,000.00
212	Nueces Delta Preserve Project - Building an educational Estuary Learing Center and Visitor Center	While the first priority of the Nueces Delta Preserve is habitat conservation, this unique location provides South Texas an important opportunity for pubic education and better understanding of the delta's role as the transition zone at the water's edge.This vision includes an Estuary Learning Center and Visitor Center to be built on the Rincon Unit's highest ground near the Union Pacific Railroad and overlooking the delta. An observation tower and hillside amphitheater will be next to the existing classroom. A bunkhouse for visiting researchers will be nearby along with maintenance and support facilities. Hiking trails with improved rest areas and interpretive signage will allow visitors to venture deep into the varied delta habitats.	The project is no longer wanted by the stakeholder per our last conversation	Nueces			CBBEP	

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
215	Nueces County Living Breakwater project	The proposed project will improve the resiliency of the County and surrounding communities that sustained damage Hurricane Harvey. Select, key mitigation interventions are needed around the Bay to augment and leverage the range of shoreline stabilization and erosion control projects that have been constructed throughout the Corpus Christi Bay area to protect the communities from storm-related hazards. (This includes budget justification for North Beach, Port Aransas and Ingleside on the Bay).	The project lacks important information to pass the screening	Nueces			City of Corpus Christi, Nueces County, CDBG	$99,856,213.50
227	Upper Oso Creek/Channel A Robstown-Calallen area	Acquire right of way to widen & deepen existing drainage ditches.	The project lacks important information to pass the screening	Nueces				
228	Upper Oso Creek	Acquire right of way to improve the flow of flood waters from the Robstown/ Calallen Area.	The project lacks important information to pass the screening	Nueces				
229	Tributary No. 5	Acquire right of way to improve the flow of flood waters in the London Area.	The project lacks important information to pass the screening	Nueces				
231	Belk Lane Street and Drainage Improvements	Road reconstruction and drainage improvements consisting of driveway culvert replacement and road side ditch regrading.	The project lacks important information to pass the screening	Nueces				
232	Rehabilitation of Ditch at County Road 14F	Topographic and hydrological study for improvement and regrading of Drainage ditch.	The project lacks important information to pass the screening	Nueces				
20	Town of Refugio Wastewater Treatment and Drainage Project	Citywide Wastewater Treatment Plant and Drainage Project	This project is already in progress or completed.	Refugio	0.14		TX GLO	$ 12,112,636
21	Refugio County Hazard Mitigation Improvements Project	Hazard Mitigation Improvements Project	This project is already in progress or completed.	Refugio	72.27		TX GLO	$ 6,910,131
1	County Wide Drainage Improvements	Green Lake Outfall System and Gregory Diversion Ditch	This project is already in progress or completed.	San Patricio	65.48		TWDB FIF	$ 11,841,990
22	San Patricio County Channel Outfall Drainage Improvement Project	Channel Outfall Drainage Improvement Project - Location 1 - Taft Site	This project is already funded.	San Patricio	0.14		TX GLO	$ 7,717,591
23	San Patricio County Channel Outfall Drainage Improvement Project	Channel Outfall Drainage Improvement Project - Location 2 - Sinton Site	This project is already funded.	San Patricio	0.25		TX GLO	$ 7,717,591
80	COASTAL BEND MITIGATION ACTION PLAN - SP-02	Re-Furbish, Flood proof Repetitive Loss Homes damaged by Declared Disasters. San Patricio County obtained monies to complete 40 home rebuilds and has approximately 60 homes which are qualified but has no funding at this time.Many residential structures were damaged by storms in 2002. Insurance was non-existent, or coverage was not provided for by the homeowner, who were either elderly, low-income, or unaware that coverage on normal homeowner's insurance does not provide for flood or wind storm damage.	The project lacks important information to pass the screening	San Patricio				$ 4,500,000

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
81	COASTAL BEND MITIGATION ACTION PLAN - SP-03	The Nueces River has had three major flood events, two Presidential declarations in 2002, and a non-declared event in 2003. The property is located in the 100 year floodplain, with portions in the floodway. San Patricio County has procured nine properties in the area, 6 in River Estates and 3 in Peaceful Valley through FEMA & ORCA Grants. We are in the process of purchasing one 600 acre parcel through the Coastal Bays and Estuary Program, and 13 tracts through a Texas General Land Office Grant (GLO) in the La Fruita Subdivision on the Nueces River.	The project lacks important information to pass the screening	San Patricio				$ 20,000,000
82	COASTAL BEND MITIGATION ACTION PLAN - SP-04	The City of Ingleside currently has a warning siren that is out of service. This project is to replace that equipment for the purpose of alerting residents to impending natural and manmade hazards.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				$ 75,000
83	COASTAL BEND MITIGATION ACTION PLAN - SP-05	Secure drainage right of ways along Avenue A in the area near 4th to 8th Street. This section of Avenue A has historically been inundated by heavy rain events due to poor drainage, cutting off access to area residences.	This project is a duplicate of another project.	San Patricio				
84	COASTAL BEND MITIGATION ACTION PLAN - SP-06	Conduct Engineering drainage study along California Street from West Main to the Kenney Bayou. Secure drainage right of ways to include possible property acquisition and utility relocation. This section of town has historically been inundated by heavy rain events due to poor drainage, cutting offaccess to area residences.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				
85	COASTAL BEND MITIGATION ACTION PLAN - SP-26	Elevate roadway/construct bridge in city of San Patricio on Nopal street and county road 60A. City has had multiple floods from the Nueces river due to releases from choke canyon and Lake Corpus Christi dams due to tropical storms and heavy rain events.	The project lacks important information to pass the screening	San Patricio				$ 1,000,000
86	COASTAL BEND MITIGATION ACTION PLAN - SP-29	elevate roadway/construct bridge in city of San Patricio on Nopal street and county road 60B. City has had multiple floods from the Nueces river due to releases from choke canyon and Lake Corpus Christi dams due to tropical storms and heavy rain events.	This project is a duplicate of another project.	San Patricio				$ 1,000,000
87	COASTAL BEND MITIGATION ACTION PLAN - SP-30	To prevent flood surge (sea gates) at pelican cove by lowering huge metal gates into concrete frames with a 10 ton crane. To prevent rising water into city, sea gates will be placed into these frames at two railroad track openings.	This project is a duplicate of another project.	San Patricio				$ 250,000
88	San Patricio County Hazard Mitigation Action Plan - San Patricio County, Action #3	Clean and clear out drainage ditches, culverts and easements; Upgrade drainage system to increase capacity and reduce flooding; Utilize Next Door app to encourage area residents to maintain culverts and ditches on private property.	The project lacks important information to pass the screening	San Patricio				$ 250,000
89	San Patricio County Hazard Mitigation Action Plan - City of Gregory, Action #3	Survey and remove hazardous trees and brush from drainage system.	The project lacks important information to pass the screening	San Patricio				$ 10,000
90	San Patricio County Hazard Mitigation Action Plan - City of Gregory, Action #5	Clean and clear out drainage ditches, culverts and easements; Upgrade drainage system to increase capacity and reduce flooding; Utilize Next Door app to encourage area residents to maintain culverts and ditches on private property	The project lacks important information to pass the screening	San Patricio				$ 450,000

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
91	San Patricio County Hazard Mitigation Action Plan - City of Gregory, Action #6	"Adopt/update disaster resistant building codes, ordinances and / or subdivision regulations (see comments). (Heat resistant roofing, elevate utilities and equipment/appliances, hail resistant roofing, shatter proof windows, lightning rods, roof strapping, drought tolerant landscaping ,low flow toilets , sprinkler system, fire resistant building materials, insulated pipes, etc.)"	The project lacks important information to pass the screening	San Patricio				$ 2,000
92	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #1	Obtain and implement an AM Emergency Advisory Radio System for emergency notifications to citizens during extreme events; Purchase and distribute NOAA all hazard radios to critical facilities for early warning.	The project lacks important information to pass the screening	San Patricio				$ 20,000
93	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #2	Improve drainage, implement drainage right-of-way on California Street.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				$ 250,000
94	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #6	Adopt and implement a program to regularly clean and repair storm water drains; Upgrade undersized storm water drains to improve drainage and reduce flooding	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				$ 1,000,000
95	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #8	Develop a hazard resistant municipal complex that will facilitate City Hall functions, Police Department, Municipal Court and an Emergency Operations Center	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				$ 8,000,000
96	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #12	Implement Avenue B drainage project improvements	This project is already in progress or completed.	San Patricio				$ 3,700,000
97	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #13	Purchase emergency heavy equipment to facilitate recovery after a significant event.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				$ 650,000
98	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #14	Upgrade and harden critical communication infrastructure and equipment.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				$ 500,000
99	San Patricio County Hazard Mitigation Action Plan - City of Ingleside on the Bay, Action #9	Survey and remove hazardous trees and brush from drainage system.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				$ 10,000
100	San Patricio County Hazard Mitigation Action Plan - City of Ingleside on the Bay, Action #9	Purchase NOAA “All Hazards” radios for early warning and post-event information and place in area schools/businesses/critical facilities.	The project lacks important information to pass the screening	San Patricio				$ 10,000
101	San Patricio County Hazard Mitigation Action Plan - City of Mathis, Action #1	Install generators with hard-wired quick connections at critical facilities, including lift and pump stations, as deemed necessary; Harden/retrofit critical facilities to protect against hazards (see comments).	The project lacks important information to pass the screening	San Patricio				$ 500,000
103	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #3	Harden/retrofit critical facilities, including fire, police, and EMS facilities, to protect against hazards (see comments).	The project lacks important information to pass the screening	San Patricio				$ 1,000,000
104	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #19	Install city-wide warning system as well as phone notification system for all critical facilities including schools.	The project lacks important information to pass the screening	San Patricio				$ 20,000

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
105	San Patricio County Hazard Mitigation Action Plan - City of Portland, Action #1	Install generators with hard-wired quick connections at critical facilities, including lift and pump stations, as deemed necessary.	The project lacks important information to pass the screening	San Patricio				$ 275,000
106	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #4	Retrofit police, fire, EMS facilities to hazard-resistant levels (see comments); Install generators with hard-wired quick connections.	The project lacks important information to pass the screening	San Patricio				$ 1,000,000
107	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #12	Flood-proof sewage treatment plants in flood hazard/low-lying areas; Raise electrical components of sewage lift stations above BFE; Equip sewer manholes with watertight covers and inflow guards.	The project lacks important information to pass the screening	San Patricio				$ 500,000
109	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #5	Harden/retrofit critical facilities to protect against hazards (see comments). Install generators with hard-wired quick connections.	The project lacks important information to pass the screening	San Patricio				$ 1,000,000
110	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #7	Adopt and implement a program for clearing debris from bridges, drains and culverts. Clean and repair stormwater drains. Upgrade undersized stormwater drains.	The project lacks important information to pass the screening	San Patricio				$ 1,000,000
111	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #9	Equip sewer manholes with watertight covers and inflow guards; Raise electrical components of sewage lift stations above BFE.	The project lacks important information to pass the screening	San Patricio				$ 100,000
206	Nueces Delta Shoreline Erosion Protection	This project will construct 3,900 linear feet of breakwater to protect 650 acres of marsh habitat along the face of the Nueces Delta shoreline. The Nueces Delta is currently undergoing rapid erosion that is causing the loss of significant marsh habitat for a variety of estuarine species that were injured by the Deepwater Horizon Oil Spill, including juvenile fishes, shrimp, and crabs that support important commercial and recreational fisheries. The Nueces Delta is also important habitat for many bird species impacted by the spill, such as white pelicans, brown pelicans, reddish egrets, black skimmers, least terns, snowy plovers, and piping plovers. Construction of a living shoreline will enhance the bay and estuarine habitat and contribute to the protection and restoration of a large contiguous area of salt marsh which will benefit these estuarine species. The proposed breakwater system will improve the area's resilience against sea level rise, storm surge, and flooding, and also protect nearby conservation properties. Outcomes from this project contribute to goals in several regional conservation management plans, including the Texas General Land Office's Texas Coastal Resiliency Master Plan and Texas Parks and Wildlife's Texas Wetlands Conservation Plan.	This project is a duplicate of another project.	San Patricio			Nation Fish and Wildlife Foundation	$ 3,328,000.00
216	Dagger island restoration Project	This project will construct a half-mile, nearshore breakwater and beneficially use dredged material to restore an island in order to protect approximately 5,236 acres of coastal habitat, including 2,630 acres of seagrass in Redfish Bay, an area adjacent to Corpus Christi Bay. Additionally, this project will restore approximately 28 acres of coastal wetland habitat and create oyster, invertebrate and fisheries habitat.	The project lacks important information to pass the screening	San Patricio			Texas Parks and Wildlife Department	$3,824,000.00

List of Flood Management Projects (FMPs) Removed

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost ($)
200	Texas Coastal Resiliency Master Plan - R3-15	The project would include the construction of breakwaters along approximately 3,900 linear feet of shoreline at the Nueces River Delta to dissipate wave energy that is causing estuarine wetland loss. This project was permitted by the U.S. Army Corps of Engineers in October 2016 and the project is considered shovel-ready. Coordination is ongoing with the Port of Corpus Christi regarding the possibility of benefcially using dredged material in this area.	This project is a duplicate of another project.	San Patricio, Nueces			Coastal Bend Bays and Estuaries Program, Texas General Land Ofce	$ 3,500,000.00
39	TXDOT Road Projects	TXDOT Road Project - 003702060	The project is already funded.	Zavala	0.00126		TXDOT	$ 15,000,000
40	TXDOT Road Projects	TXDOT Road Project - 193702032	The project is already funded.	Zavala	0.00115		TXDOT	$ 6,886,071
194	Margie, Commissioner Precinct 1- to San Diego	Drainage in Colonias: K-Bar, Alice Acres, and Rancho Allegre (GLO)	The project does not have enough information to be considered as feasible.					$ 9,800,000.00

List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
36	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.1.a	Evaluate current floodplain management regulations in other coastal towns, cities, and counties in order to identify potential areas of improvment for Aransas County jurisdictions.	The project is no longer wanted by the stakeholder per our last conversation	Aransas					
37	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.1.b	Using the information collected in Action 1.1.a, create a plan for how, and when, to integrate potential improvements into existing county and municipality regulations.	The project is no longer wanted by the stakeholder per our last conversation	Aransas					
38	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.1.c	Create a coordinated development flow-chart for Arasas County, the Tow of Fulton, and the City of Rockport floodplain managers.	The project is no longer wanted by the stakeholder per our last conversation	Aransas					
39	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 2.1.a	Evaluate list of repetivitive loss propoerties for opportunities to parnter with property owners regarding potential mitigation actions.	The project is already in progress or completed	Aransas					
40	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 2.1.b	Evaluate areas in the floodplain viaable for open space preservation.	The project is already in progress or completed	Aransas					
41	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 2.1.c	Investigate grant opportunities for property buyouts, open space preservations or other flood mitigation measures.	The project is no longer wanted by the stakeholder per our last conversation	Aransas					
42	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 2.1.d	Investigate potential partnerships with local non-profits to purchase high priority areas for public parkland/open space preservation.	The project is already in progress or completed	Aransas					
22	COASTAL BEND MITIGATION ACTION PLAN - JW - 05	Study options for preventing inundation of County Road 303 and the Barbon Estates Subdivision.In heavy rainfall events,County Road 303 becomes inundated, preventing egress from the Barbon Estates subdivision and access to emergency response vehicles. In the past, residents have been stranded for a period of two to three days.	The project is no longer wanted by the stakeholder per our last conversation	Jim Wells				$20,000	

List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
23	COASTAL BEND MITIGATION ACTION PLAN - JW - 11	The City of Alice and Jim Wells County were notified in July 2008 that the San Diego Creek Levee was an unacceptable flood control structure. Since that time the City and County have been moving forward to bring the levee back into compliance by conducting the San Diego Creek Levee Certification study, survey work and clearing. A total of $93,500.00 has been spent to date from local funds. This project will involve raising the height of the levee to meet the required freeboard for a 100 year flood.	The project is no longer wanted by the stakeholder per our last conversation	Jim Wells				$850,000	
61	Texas Coastal Resiliency Master Plan - R4-13	This project would create a program to monitor long-term subsidence and sea level rise in the Laguna Madre. While the causes of subsidence are understood in general, they have not been identifed for individual coastal communities. This project would include assessing combinations of repeated benchmark measurements, installing Continuously Operating Reference Stations (CORS), studying tide gauge data, andanalyzing Interferometric Synthetic Aperture Radar (InSAR) data. The project would make data publicly accessible to all coastal communities	The project lacks important information to pass the screening	Kenedy, Kleberg, Willacy, cameron			Texas General Land Office	$500,000	
8	Drainage Master Plan Study	Drainage Master Plan - Location 1 - Kingsville	This project is already in progress or completed.	Kleberg	1.291288	Riverine	TWDB FIF	$1,360,258	TWDB FIF
9	Drainage Master Plan Study	Drainage Master Plan - Location 2 - Kingsville	This project is already funded.	Kleberg	1.291288	Riverine	TWDB FIF	$3,600,000	TWDB FIF
10	Drainage Master Plan Study	Drainage Master Plan - Location 3 - Kingsville	This project is already in progress or completed.	Kleberg	1.291288	Riverine	TWDB FIF	$1,457,419	TWDB FIF
11	Drainage Master Plan Study	Drainage Master Plan - Location 4 - Kingsville	This project is already in progress or completed.	Kleberg	1.291288	Riverine	TWDB FIF	$1,846,064	TWDB FIF
12	Drainage Master Plan Study	Drainage Master Plan - Location 5 - Kingsville	This project is already funded.	Kleberg	1.291288	Riverine	TWDB FIF	$7,800,000	TWDB FIF
13	Drainage Master Plan Study	Drainage Master Plan - Location 6 - Kingsville	This project is already funded.	Kleberg	1.291288	Riverine	TWDB FIF	$230,000	TWDB FIF
14	Drainage Master Plan Study	Drainage Master Plan - Location 7 - Kingsville	This project is already in progress or completed.	Kleberg	1.291288	Riverine	TWDB FIF	$1,360,258	TWDB FIF

List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
15	Drainage Master Plan Study	Drainage Master Plan - Location 8 - Kingsville	This project is already funded.	Kleberg	1.291288	Riverine	TWDB FIF	$700,000	TWDB FIF
16	Drainage Master Plan Study	Drainage Master Plan - Location 9 - Kingsville	This project is already funded.	Kleberg	1.291288	Riverine	TWDB FIF	$5,600,000	TWDB FIF
60	Texas Coastal Resiliency Master Plan - R3-25	The Baffin Bay Watershed Monitoring and Management Plan would guide restoration eforts aimed at reducing pollutants to the watershed streams and bay. This project would support all phases of plan development, including additional bay and watershed data collection, land use and load modeling, outreach to engage landowners and businesses in the stakeholder process, and improvement of stewardship practices. And fnally, assembly of the watershed plan itself. The same stakeholder group also is working to secure funding for “early phase” targeted restoration activities.	The project lacks important information to pass the screening	Kleberg			Coastal Bend Bays and Estuaries Program Texas A&M University-Corpus Christi Texas Water Resources Institute Bafn Bay Stakeholder Group	$2,500,000	
6	County Wide Drainage Master Plan Study	Nueces County Drainage & Conservation District 2	This project is already funded.	Nueces	11.79478	Riverine	TWDB FIF	$2,137,500	TWDB FIF
19	Drainage Master Plan Study	Drainage Master Plan Study - Driscoll	This project is already funded.	Nueces	0.106516	Riverine	TWDB FIF	$150,000	TWDB FIF

List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
25	COASTAL BEND MITIGATION ACTION PLAN - NU - 12	The Corps of Engineers studied the Cotulla Reservoir site, located in the upper Nueces Basin, in the 1960's. Therecent Nueces River Basin Reconnaissance Study identified a potentially down-sized version of this project, including a pipeline to divert water directly into Choke Canyon Reservoir. In addition to the flood damage reduction potential for Lake Corpus Christi and the lower river basin, this project would enhance the regional water supply by increasing water storage capacity, and reducing losses associated with downstream evaporation across an 81 mile braided reach.During Phase 1 of the Feasibility Study, existing data will be reviewed to estimate the flood damage reduction potential of the project::a.A preliminary hydrologic analysis to determine the portion of the volume of historical lower-basin floods that originate upstream of Cotulla will be performed.b.A review of existing map information of the Nueces River for a 25-mile reach downstream of the proposed reservoir to identify areas that could benefit from the potential flood damage reduction potential of the reservoir will be performed.c.Data from FEMA and other agencies on historical flood damages will be summarized.(Phase 2) Depending on the findings of the flood damage analyses, a daily flow flood model may need to be developed to evaluate the downstream flood damage reduction potential in terms of magnitude and frequency for the Cotulla Diversion Project.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				$269,000	

List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
26	COASTAL BEND MITIGATION ACTION PLAN - NU - 13	The Nueces River Basin Reconnaissance Study identified a two-way pipeline project between Choke Canyon and Lake Corpus Christi, coupled with the off-channel storage and a high capacity pump station, for the dual purpose of flood control and increased water supply, through reduced channel losses.During the Feasibility Study, analyses will be performed to determine the potential flood damage reduction benefits of this project:a.A review of existing map information of the area along the Lower Nueces River below LCC will be performed to identify areas that could benefit from the potential flood damage reduction potential of the diversion facilities. Records of flood damages associated with historical events will be obtained.b.(Phase 2) A daily flood model to evaluate the downstream flood damage reduction potential in terms of magnitude and frequency for this project will be developed.c.(Phase 2) Analysis will be performed to determine the potential effects of coupling the pipeline with the off-channel storage and a high capacity pump station in order to manage Lake Corpus Christi storage to better control incoming flood flows.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				$279,000	

List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
		The Corpus Christi City Council approved the Storm Water Capital Improvement Program (CIP) for FY99-00 on July 20, 1999 (Ordinance No. 023703). Included were separate projects for drainage studies in specific areas of the City. The need to integrate these individual drainage studies into a consistent, uniform analysis became evident and was approved in Storm Water CIP for FY00-01, (Ordinance No. 024130). The City's use of master plans that date back to 1946, 1961, 1970, 1982, and 1988 resulted in the use of inconsistent criteria without an adopted level of protection policy. The separate projects are integrated into the FY00-01 Storm Water CIP as a Storm Water Master Plan Project. The Development of a comprehensive, updated, consistent Storm Water Master Plan based on an adopted Storm Water Criteria and Design Manual is necessary to respond to development, environmental issues and tobetter define and prioritize on going and future drainage capital improvement projects. The purposes of this project are as follows:a.Establish drainage criteria that reflects input from the different segments of the community (elected officials, developers, engineers, citizens, planning and zoning) and in the consensus process identify a "level of protection" for the City to be adopted as a standard for the Cityb.Adopt a drainage criteria and design procedure for designers to use in capital improvement projects and in the subdivision platting process of residential and commercial developmentc.Establish policy statements or guidelines that are responsive to storm water quality, storm water pollution prevention requirements, development issues for usein future street and drainage	This project is a duplicate of another project.						
27	COASTAL BEND MITIGATION ACTION PLAN - NU - 17			Nueces				$2,000,000	

List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
28	COASTAL BEND MITIGATION ACTION PLAN - NU - 23	The Federal Emergency Management Agency's Multi-Hazard Flood Map Modernization Program will update and digitize flood hazard maps across the nation. The majority of theCity of Corpus Christi's FIRMs are nearly 20 years old. It is in the interest of the City and its residents for the maps, which determine flood insurance premiums, to be accurate and up-to-date. Other planning and hazard mitigation benefits are expectedto accrue as well. FEMA has notified the City by letter dated July 15, 2004, that its contractor will be contacting the City within the next few months regarding the flood mapping effort. A key FEMA strategy is to form local partnerships for this purpose under the Cooperating Technical Partners program to leverage local resources. In addition to preparation for the contractor visit, the City will evaluate the feasibility of becoming a CTP partner.	This project is already in progress or completed.	Nueces					
43	Nueces County Hazard Mitigation - Corpus Christi Action #9	The Federal Emergency Management Agency's Multi-Hazard Flood Map Modernization Program will update and digitize flood hazard maps across the nation. Most the City of Corpus Christi's FIRMsare nearly 20 years old. It is in the interest of the City and its residents for the maps, which determine flood insurance premiums, to be accurate and up-to-date. Other planning and hazard mitigation benefits are expected to accrue as well. The City of Corpus Christi is currently working through the appeals process of the map modernization	This project is already in progress or completed.	Nueces					

List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
44	Nueces County Hazard Mitigation - Corpus Christi Action #11	Corpus Christi Action #11 Proposed ActionBuild the Catulla Reservoir in the upper reaches ofthe Nueces River which would include a pipeline to divert water directly into Choke Canyon Reservoir. The Corps of Engineers studied the Cotulla Reservoir site, located in the upper Nueces Basin, in the 1960's. The recent Nueces River Basin Reconnaissance Study identified a potentially down-sized version of this project, including a pipeline to divert water directly into Choke CanyonReservoir. In addition to the flood damage reduction potential for Lake Corpus Christi and thelower river basin, this project would enhance the regional water supply by increasing water storage capacity, and reducing losses associated with downstream evaporation across an 81 mile braided reach. During Phase 1 of the Feasibility Study, existing data will be reviewed to estimate the flood damage reduction potential of the project: a. A preliminary hydrologic analysis to determine the portion of the volume of historical lower- basin floods that originate upstream of Cotulla will be performed. b. A review of existing map information of the Nueces River for a 25-mile reach downstream of the proposed reservoir to identify areas that couldbenefit from the potential flood damage reduction potential of the reservoir will be performed. c. Data from FEMA and other agencies on historical flood damages will be summarized. (Phase 2) Depending on the findings of the flood damage analyses, a daily flow flood model may need to be developed to evaluate the downstream flood damage reduction potential in terms of magnitude and frequency for	The project is no longer wanted by the stakeholder per our last conversation	Nueces				$445,000	
45	Nueces County Hazard Mitigation - Corpus Christi Action #19	Complete an assessment of the needed repairs and improvements on all 8 major and 100 minor stormwater outfalls that drain into Corpus Christi Bay. There are eight major storm water outfalls and more than 100 other outfalls that allow runoff to drain into Corpus Christi Bay. In 2003, 13.5 miles of these outfall structures were inspected and improvements and repairs were made to four outfalls. The purpose of this current project is toprovide an updated assessment, which may include the Brawner/proctor and Gollihar outfalls and other outfalls, pending results of the initial assessment, and providing recommendations for repairs, improvements, and rehabilitation as necessary.	This project is a duplicate of another project.	Nueces				$2,447,200	

List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
46	Nueces County Hazard Mitigation - Corpus Christi Action #20	Complete a feasibility study of Oso Creek at the confluence of La Volla Creek to determine if any construction projects will help the creek conveyance capacity during high flow events. The drainage profiles of Oso Creek east of the La Volla Creek confluence show several constrictions that impact the base flood elevations upstream. This project will investigate the feasibility of the construction of additional creek conveyance capacity for high flow events. If the investigationshows a significant potential to impact the base flood elevation, then construction will be completed in those areas.	This project is already in progress or completed.	Nueces				$4,715,400	
47	Nueces County Hazard Mitigation - Corpus Christi Action #23	Map and assess the vulnerabilities the city may face for Coastal Erosion, Expansive Soils, Land Subsidence, and Wildfires. Improve data and mapping on specific risks for coastal erosion, expansive soils, land subsidence and wildfires. Use GIS to identify and map erosion areas, riparianlandslides, expansive soils and wildfires. Develop and maintain a database to track vulnerability and indicate where critical structures and any development is located in relation to the hazardousareas.	The project is no longer wanted by the stakeholder per our last conversation	Nueces					
48	Nueces County Hazard Mitigation - Corpus Christi Action #27	Design and implement a dam breach study for dams in Corpus Christi.	This project is already in progress or completed.	Nueces				$200,000	
62	Indian Point Shoreline Erosion Project	A feasibility study was performed to assess methods to help protect wetlands, seagrass, and otherrelated aquatic and coastal habitat at Indian Point from erosion associated with shoreline retreat. Inaddition to the benefits of protecting valuable habitat, the project would also provide an increased level of protection to public infrastructure at Indian Point Park including a roadway, parking lot, and pier entrance. This feasibility study is intended as a precursor to development of a U.S. Army Corps of Engineers (USACE) permit application.	The project lacks important information to pass the screening	Nueces				3558000	
1	County Wide Drainage Master Plan Study	Nueces County Regional Drainage Master Plan Study	This project is already in progress or completed.	Nueces, Jim Wells, Kleberg	244.4051	Riverine	TWDB FIF	$2,137,500	TWDB FIF

List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
59	Texas Coastal Resiliency Master Plan - R2-20	An adaptive management hydrologic restoration study would look at the interactions of the physical systems that afect the hydrology in Nueces County, as well as the stakeholder interactions in the region. Work has been conducted on Nueces Bay freshwater infows via adaptive management plans of the Senate Bill 3 (80th Texas Legislature, 2007) Environmental Flows Process. Two current studies include: Using Comparative Long-Term Benthic Data for Adaptive Management of Freshwater Infow to Three Estuaries (Colorado-Lavaca, Guadalupe, and Nueces) and Infuence of Freshwater Infow Gradients on Estuarine Nutrient-Phytoplankton Dynamics in the Three Estuaries (Guadalupe, Nueces, and Upper Laguna Madre).	The project lacks important information to pass the screening	Nueces, San Patricio, Aransas			Coastal Bend Bays and Estuaries Program, Texas Commission on Environmental Quality, Texas A&M University-Corpus Christi, Nueces River Authority, City of Corpus Christi, Port of Corpus Christi Authority	$200,000	
3	County Wide Drainage Master Plan Study	Drainage Master Planning Study - San Patricio County	This project is already in progress or completed.	San Patricio	65.47693	Riverine	TDEM	$900,000	TDEM
30	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #7	Undertake a comprehensive study of flood risk and flood reduction alternatives with the assistance of the USACE; Implement feasible alternatives for flood reduction.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				$1,000,000	
33	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #13	Assess and map City of Taft hazard vulnerability.	The project lacks important information to pass the screening	San Patricio				$50,000	

List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost ($)
6	COASTAL BEND MITIGATION ACTION PLAN - AR-05	Aransas County is in the process of developing the Intergrated Stormwater Management Plan (ISWMP). Aransas County has historically experienced flooding problems due to its coastal location and topography. The ISWMP will identify problem areas and recommend improvement projects.	The project is already in progress or completed	Aransas				$ 900,000
48	Aransas County Texas Multi-Jurisdisctinal Hazard Mitigation Action Plan - Action #7	design and implement a debris removal program in local drainage systems	The project is already in progress or completed	Aransas				$ 2,500
49	Aransas County Texas Multi-Jurisdisctinal Hazard Mitigation Action Plan - Action #6	Buyouts of RL Properties	The project lacks important information to pass the screening	Aransas				$ 500,000
51	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.3.a	Complete process of entry into the Community Rating System (CRS) to incentivize higher floodplain management standards for the City of Rockport.	The project is already in progress or completed	Aransas				$ 60,000
52	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.3.b	Complete process of entry into the Community Rating System (CRS) to incentivize higher floodplain management standards for Aransas County.	The project is already in progress or completed	Aransas				$ 45,000
53	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.3.c	Investigate whether CRS is viable for the City of Aransas Pass and the Town of Fulton.	The project lacks important information to pass the screening	Aransas				
55	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.2.a	Determine whether any lift stations and pump stations will need generators.	The project lacks important information to pass the screening	Aransas				
56	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 4.1.a	Work across jurisdictions to coordinate drainage/stormwater projects that impact the same watersheed or sub-watersheds while working to create a county-wide prioritized, master plan of all flood related projects.	The project is already in progress or completed	Aransas				
57	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 4.1.c	Continue to use county resiliency group to investigate potential funding options for erosion protection and habitat restoration.	The project is already in progress or completed	Aransas				

List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost ($)
4	COASTAL BEND MITIGATION ACTION PLAN - RG-02	Implement 'All Hazards' NOAA Weather Radio (NWR) procedures for dissemination of emergency messages originating with local jurisdictions. The National Weather Service (NWS) will implement a new, centralized point of collection for non-weather related emergency messages broadcast over NWS systems. NWS expects to deploy the All-Hazards Emergency Message Collection System, HazCollect, in the summer and fall of 2005. HazCollect will provide an information technology interface between state and local systems, and the NWS Advanced Weather Interactive Processing System (AWIPS). HazCollect will provide a fast, reliable way to inject messagesinto the Emergency Alert System (EAS) and NOAA Weather Radio.	The project lacks important information to pass the screening	Aransas, Bee, Jim Wells, Kleberg, Live Oak, Nueces, San Patricio				Low cost activity
5	COASTAL BEND MITIGATION ACTION PLAN - RG-04	Promote public awareness and use of NOAA Weather Radio (NWR) to receive 'All Hazards' warnings by distributing NWR literature, posting information on jurisdiction Web sites, hosting special events, and taking advantage of other opportunities as they arise. The National Weather Service provides weather-related hazards warnings to citizens, both through feeds to commercial media via the Emergency Alert System (EAS), and directly into homes, businesses, schools and other locationsthrough NOAA Weather Radio (NWR). Through the efforts of the Emergency Management programs in both Kleberg and Live Oak counties, broadcast coverage has recently been completed for the Coastal Bend region through installation of transmitters near the communities of Riviera and Three Rivers. These transmitters will also enhance reception of the NWR signals in Jim Wells and Bee counties.	The project lacks important information to pass the screening	Aransas, Bee, Jim Wells, Kleberg, Live Oak, Nueces, San Patricio				Low cost activity

List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost ($)
7	COASTAL BEND MITIGATION ACTION PLAN - JW - 01	Areas of Jim Wells County and the City of Alice are subject to persistent flooding including: the south quadrant of the City of Alice (Lattas Creek/South Relief Creek watershed), the northwest quadrant of the Ben Bolt areas, and the southwest quadrant of the city of Alice (Lattas Creek/Rancho Alegre area). There is currently no officially recognized district or advisory group addressing drainage issues in a comprehensive manner. A Joint Advisory group may provide an organizational framework for establishing priorities, determining what studies are needed, and developing a Drainage Master Plan to guide future efforts to reduce flooding.	The project is no longer wanted by the stakeholder per our last conversation	Jim Wells				$ 8,000,000
8	COASTAL BEND MITIGATION ACTION PLAN - JW - 08	Purchase or lease emergency warning call down system (Reverse 911). A call down warning system can alert residents directly by calling their homes or places of business. This capability is especially useful during daylight business hours when individuals may not have access to warnings broadcast via television or radio. Although telephonic messages must be concise, they can provide additional instructions as to recommended response actions for all hazardous situations.	The project is no longer wanted by the stakeholder per our last conversation	Jim Wells				
9	COASTAL BEND MITIGATION ACTION PLAN - KL - 04	There are no independent drainage districts currently existing within the county addressing drainage issues in a comprehensive manner. A county-wide approach can facilitate coordination for the development of a Drainage Master Plan. A specially appointed Task Force could be charged with examining alternative frameworks and reporting their recommendations to the participating governing bodies for evaluation and action to reduce losses from flooding.	This project is a duplicate of another project.	Kleberg				$ 20,000

List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost ($)
10	COASTAL BEND MITIGATION ACTION PLAN - KL - 05	Coordinate with Texas A&M University -Kingsville to promote campus mitigation activities, and to enhance awareness of the Disaster Resistant University Program. This activity may potentially include hosting a workshop based on the FEMA report, Building a Disaster-Resistant University.The Texas A&M University-Kingsville campus is located within a predominately residential area on the northwest edge of Kingsville. The university has approximately 6000 students with nearly 1,000 faculty and staff. The main campus encompasses 257 acres and has 82 primary buildings including five occupied residence halls and 13 occupied student family apartments. FEMA's Disaster Resistant University Program is specifically designed to provide assistance for mitigation in the university setting and in the past, has set aside monies from the Pre Disaster Mitigation Competitive grant program for this purpose.	The project lacks important information to pass the screening	Kleberg				
11	COASTAL BEND MITIGATION ACTION PLAN - NU - 11	The City of Bishop is subject to frequent episodes of inland flooding during heavy rainfall events. Nueces County Drainage District #3 is responsible for addressing drainage issues which may have impacts for the City of Bishop; however, there has been a lack of coordinated effort in the past. Additional flood control projects of interest to the City of Bishop include clearing of stream blockage on King Ranch property and the Carreto Creek project, including removal of silt and connection with the flood control project on King Ranch.	The project lacks important information to pass the screening	Nueces				

List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost ($)
12	COASTAL BEND MITIGATION ACTION PLAN - NU - 24	The Federal Emergency Management Agency (FEMA) Mitigation Division administers the National Flood Insurance Program (NFIP). To encourage participating communities to go beyond the minimum requirements for flood plain management, the Community Rating System (CRS) program classifies communities by awarding points for related activities. Corpus Christi has participated in the CRS program since 1991 and is currently rated as a Class 9 community, entitling its residents to a 5% discount on flood insurance premiums. This project is intended to improve its rating to a Class 8, thereby increasing the premium discount to 10% for Special Flood Hazard Areas (SFHAs).The CRS classes for local communities are based on 18 creditable activities, organized under four categories: (i) Public Information, (ii) Mapping and Regulations, (iii) Flood Damage Reduction, and (iv) Flood Preparedness. Other actions identified in this Mitigation Plan will have a direct bearing on fulfilling CRS requirements to qualify for the higher classification. This activity includes a comprehensive review of eligible activity requirements, identification of additional potential actions, monitoring completion of previously identified actions, and completing the application process.	This project is already in progress or completed.	Nueces				
13	COASTAL BEND MITIGATION ACTION PLAN - NU - 35	Evaluate eligibility for participation in National Flood Insurance Program (NFIP) Community Rating System (CRS) for the purpose of improving CRS rating to qualify policyholders for premium discounts.The City of Port Aransas currently has a rating of 10, which is automatically assigned to all communities participating in the NFIP. In order to qualify for a rating of 9, and entry into the CRS program, sufficient points must be scored in a variety of program areas. This activity is to investigate whether Port Aransas currently can achieve the required score, or can do so with improvement in its program areas.	This project is already funded or complete.	Nueces				

List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost ($)
14	COASTAL BEND MITIGATION ACTION PLAN - NU - 40	Identify opportunities to increase home and business owner awareness of hazards and use of mitigation for private property such as the City Web site and distribution of printed literature.The City of Port Aransas has a City Web site that can be updated to promote mitigation activities by residents and businesses; mitigation literature can be added to other emergency preparedness literature currently distributed annually.	This project is already funded or complete.	Nueces				$ 1,000
58	Nueces County Hazard Mitigation - Corpus Christi Action #5	The Corpus Christi City Council approved the Storm Water Capital Improvement Program (CIP) for FY99-00 on July 20, 1999 (Ordinance No. 023703). Included were separate projects for drainage studies in specific areas of the City. Theneed to integrate these individual drainage studiesinto a consistent, uniform analysis became evident and was approved in Storm Water CIP for FY00-01, (Ordinance No. 024130). The City's use of master plans that date back to 1946, 1961, 1970, 1982, and 1988 resulted in the use of inconsistent criteria without an adopted level of protection policy. The separate projects are integrated into the FY00-01 Storm Water CIP as a Storm Water Master Plan Project. The Development of a comprehensive, updated, consistent Storm Water Master Plan based on an adopted Storm Water Criteria and Design Manual is necessary to respond to development, environmental issues and to better define and prioritize on going and futuredrainage capital improvement projects. The purposes of this project is as follows: a. Establish drainage criteria that reflects input from the different segments of the community (elected officials, developers, engineers, citizens, planning and zoning) and in the consensus process identify a "level of protection" for the City to be adopted as a standard for the City b. Adopt a drainage criteria and design procedure for designers to use in capital improvement projects and in the subdivision platting process ofresidential and commercial development c. Establish policy statements or guidelines that are responsive to storm water quality, storm water pollution prevention requirements,	This project is already in progress or completed.	Nueces				$ 4,084,900

List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost ($)
59	Nueces County Hazard Mitigation - Corpus Christi Action #10	Corpus Christi has participated in the CRS program since 1991 and is currently rated as a Class 7 community, entitling its residents to a 15% discount on flood insurance premiums. This project is intended to improve its rating to a Class 5, thereby increasing the premium discount by an additional 10% for Special Flood Hazard Areas (SFHAs). Other actions identified in this Mitigation Plan will have a direct bearing on fulfilling CRS requirements to qualify for the higher classification. This activity includes a comprehensive review of eligible activity requirements, identification of additional potential actions, monitoring completionof previously identified actions, and completing the application process.	This project is a duplicate of another project.	Nueces				
60	Nueces County Hazard Mitigation - Corpus Christi Action #18	Utilize the city adopted “Developer Agreement” thatthe can use with developers to help cover the cost of installing over-sized stormwater drainage. Under the platting ordinance, the City of Corpus Christi participates with developers on utility construction for over-sized main stormwater lines. These funds may also be used to address development drainage concerns. This project will provide for the City’s share of such projects, as necessary, up to the approved amount.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				$ 3,100,000
61	Nueces County Hazard Mitigation - Corpus Christi Action #21	Insurance Services Office, Inc. (ISO) is an independent organization that administers the Building Code Effectiveness Grading Schedule (BECGS) to assess "the building codes in effect in a particular community and how the community enforces its building codes, with special emphasis on mitigation of losses from natural hazards." The grading can influence the cost of insurance coverage in the community. Since its last assessment, the City of Corpus Christi has adopted the 2015 International Building Code and the 2016 International Residential Code for One and Two Family Dwellings, among others, and should be eligible for an improved grade. This activity includes scheduling a re-assessment and compiling the necessary documentation.	This project is already in progress or completed.	Nueces				

List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost ($)
62	Nueces County Hazard Mitigation - Corpus Christi Action #22	The City of Corpus Christi has seen multiple hazards occur within the years past. Most residents are heavily informed of what to do during heavy rains, tropical storms and hurricanes. However, there are multiple hazards that are not as frequent. The City will be working towards creating and disseminating a pamphlet(s) that will cover what todo before, during and after the following hazards: Extreme Heat, Lighting, Hailstorm, Hurricane and Tropical Storms, Windstorms, Tornados, Drought, Flood, Dam/Levee Failure, Coastal Erosion, Expansive Soils, Land Subsidence and Wildfires	This project is already in progress or completed.	Nueces				
69	County Road 18 Drainage Improvements	Inspection and Assessment of CR18 Drainage Ditch to evaluate the physical and operational conditions of the drainage system by conducting on-site visual and drone scanning inspections. Generate a report based on these inspections to provide Nueces County with a preliminary assessment report and recommendations that can be utilized to make an informed decision regarding plans and advancements for the improvement of the drainage ditch system.	The project lacks important information to pass the screening	Nueces				
65	Texas Coastal Resiliency Master Plan - R3-26	Under this project, locations in the Coastal Bend area that have been identifed through existing habitat suitability index models would be selected to restore degraded oyster reefs. The project would include data collection and monitoring activities to assess the viability of future oyster reefrestoration efforts in the Coastal Bend bays.	The project lacks important information to pass the screening	Nueces, San Patricio			Texas Parks & Wildlife Department Coastal Bend Bays and Estuaries Program	$ 700,000
15	COASTAL BEND MITIGATION ACTION PLAN - SP-13	The City of Portland has no Master Drainage Plan that would guide future development, and prevent new developments from compounding existing drainage problems. This project would develop a Master Drainage Plan for the City of Portland.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				$ 40,000
16	COASTAL BEND MITIGATION ACTION PLAN - SP-32	Public needs to know what to expect during a disaster. The city of Aransas Pass will need to promote public awareness by distributing literature, posting information on jurisdiction websites, hosting events and taking advantage of other opportunities as they arise to keep the community informed to save lives.	The project lacks important information to pass the screening	San Patricio				$ 2,000
18	San Patricio County Hazard Mitigation Action Plan - San Patricio County, County Wide, Action #2	Developandimplementanallhazardseducationprogram.UtilizeFacebook,city/countywebpagesanddistributionofbrochurestoprovideinformationonallhazardsthatcouldimpactthecommunity.Providemitigationmeasurestoreduceriskofdamages,injuryorillness.	The project lacks important information to pass the screening	San Patricio				$ 2,000

List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost ($)
19	San Patricio County Hazard Mitigation Action Plan - San Patricio County, County Wide, Action #3	Adopt/update disaster resistant building codes, ordinances and / or subdivision regulations (see comments). (Heat resistant roofing, elevate utilities and equipment/appliances, hail resistant roofing, shatter proof windows, lightning rods, roof strapping, drought tolerant landscaping ,low flow toilets , sprinkler system, fire resistant building materials, insulated pipes, etc.)	The project lacks important information to pass the screening	San Patricio				$ 2,000
20	San Patricio County Hazard Mitigation Action Plan - San Patricio County, County Wide, Action #4	Participate in the Community Rating System.	The project lacks important information to pass the screening	San Patricio				$ 5,000
22	San Patricio County Hazard Mitigation Action Plan - City of Gregory, Action #1	Develop and implement an all hazards education program. Utilize Facebook, city webpage and distribution of brochures to provide information on all hazards that could impact the community. Provide mitigation measures to reduce risk of damage, injury or illness.	The project lacks important information to pass the screening	San Patricio				$ 2,000
23	San Patricio County Hazard Mitigation Action Plan - City of Ingleside on the Bay, Action #1	Develop and implement an all hazards education program. Utilize Facebook, city webpage and distribution of brochures to provide information on all hazards that could impact the community. Provide mitigation measures to reduce risk of damages, injury or illness.	The project lacks important information to pass the screening	San Patricio				$ 2,000
city	San Patricio County Hazard Mitigation Action Plan - City of Mathis, Action #6	Develop and implement an all hazards education program. Utilize Facebook and city webpage to provide information on all hazards that could impact the community. Provide mitigation measures to reduce risk of damages, injury or illness.	The project lacks important information to pass the screening	San Patricio				$ 2,000
26	San Patricio County Hazard Mitigation Action Plan - City of Mathis, Action #7	Obtain certification by the National Weather Service as “Storm Ready” community; improve emergency management radio coverage and reception; Implement and enhance an area-wide telephone Emergency Notification System (“Reverse 911”).	The project lacks important information to pass the screening	San Patricio				$ 50,000
27	San Patricio County Hazard Mitigation Action Plan - City of Mathis, Action #10	Install signs prohibiting dumping in streams, ditches, waterways and floodplain areas.	The project lacks important information to pass the screening	San Patricio				$ 2,000

List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost ($)
28	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #1	Develop and implement an all hazards education program. Utilize Facebook and city webpage to provide information on all hazards that could impact the community. Provide mitigation measures to reduce risk of damages, injury or illness and post information on evacuation routes and procedures.	The project lacks important information to pass the screening	San Patricio				$ 2,000
29	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #4	Improve emergency management radio coverage and reception; Implement and enhance an area-wide telephone Emergency Notification System ("Reverse 911"); Develop alternative evacuation routes/plans and designate emergency thoroughfares, particularly in areas with limited capacity; Educate citizens on evacuation routes and procedures.	The project lacks important information to pass the screening	San Patricio				$ 10,000
31	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #12	Update public community facilities to include severe weather action plans and designated tornado shelter areas. Educate public on plans and shelter locations.	The project lacks important information to pass the screening	San Patricio				$ 2,500
32	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #15	Relocate books, manuals, permits, and other critical government records to the upper floors and/or on shelves above the base flood elevation of the library and records building.	The project lacks important information to pass the screening	San Patricio				$ 2,500
34	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #18	Educate city employees on risks associated with natural hazards and measures to prevent injury or loss of life.	The project lacks important information to pass the screening	San Patricio				$ 2,000
37	San Patricio County Hazard Mitigation Action Plan - City of Portland, Action #7	Develop and implement an all hazards education program. Utilize Facebook and city webpage to provide information on all hazards that could impact the community. Provide mitigation measures to reduce risk of damages, injury or illness and post information on evacuation routes and procedures.	The project lacks important information to pass the screening	San Patricio				$ 2,000
39	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #3	Develop and implement an all hazards education program; Utilize Facebook, city webpage and distribution of brochures to provide information on all hazards that could impact the community; Provide mitigation measures to reduce risk of damages, injury or illness; Establish a user-friendly database for local residents to access resources for mitigation purposes.	The project lacks important information to pass the screening	San Patricio				$ 2,000

List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost ($)
40	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #6	Limit development and increase density requirements within hazard areas; Incorporate higher standards for hazard resistance in local application of the building code.	The project lacks important information to pass the screening	San Patricio				$ 3,000
41	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #7	Obtain certification by the National Weather Service as a “Storm Ready” community.	The project lacks important information to pass the screening	San Patricio				$ 2,000
43	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #1	Develop and implement an all hazards education program. Utilize Facebook and city webpage to provide information on all hazards that could impact the community. Provide mitigation measures to reduce risk of damages, injury or illness.	The project lacks important information to pass the screening	San Patricio				$ 2,000
44	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #8	Install signs prohibiting dumping in streams, ditches, waterways and floodplain areas.	The project lacks important information to pass the screening	San Patricio				$ 2,000
45	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #10	Advertise and promote the availability of flood insurance and availability of the Preferred Risk Policy (PRP); Distribute flood insurance handouts with all permit applications.	The project lacks important information to pass the screening	San Patricio				$ 2,000
67	Flood Proof Repetitive Loss Homes in San Patricio County	Re-Furbish, Flood proof Repetitive Loss Homes damaged by Declared Disasters. San Patricio County obtained monies to complete 40 home rebuilds and has approximately 60 homes which are qualified but has no funding at this time. Many residential structures were damaged by storms in 2002. Insurance was non-existent, or coverage was not provided for by the homeowner, who were either elderly, low-income, or unaware that coverage on normal homeowner’s insurance does not provide for flood or wind storm damage.	The project lacks important information to pass the screening	San Patricio			Office of Community and Rural Areas	$ 4,500,000
68	Buyout Program in Peaceful Valley	The Nueces River has had three major flood events, two Presidential declarations in 2002, and a non-declared event in 2003. The property is located in the 100 year floodplain,with portions in the floodway. San Patricio County has procured nine properties in the area, 6 in River Estates and 3 in Peaceful Valley through FEMA & ORCA Grants. We are in the process of purchasing one 600 acre parcel through the Coastal Bays and Estuary Program, and 13 tracts through a Texas General Land Office Grant (GLO) in the La Fruita Subdivision on the Nueces River.	The project lacks important information to pass the screening	San Patricio			Potential funding sources include FEMA, ORCA, and GLO	$ 20,000,000

Appendix C8 – Supporting Costing Material for Flood Mitigation Actions

Nueces (Region 13) FMEs			
	FME Type	**General Description**	**Scope & Assumptions**
1	Watershed Planning – Drainage Master Plans	Supports the development and analysis of hydrologic and hydraulic models to evaluate flood risk within a given jurisdiction, evaluate potential alternatives to mitigate flood risk, and develop capital improvement plans.	Assuming Open Channel DMPs **County DMP:** Chose to assign a uniform cost of $500,000 for each county to cover the following **Basic Services**: 1. Project Management 2. Coordination and Collaboration Work Sessions 3. Data Collection 4. Screening Assessment 5. Targeted H&H Modeling and Alternatives Analysis 6. Technical Report 7. Public Outreach **City DMP:** Assign fee based on population (2020 Census) 1. Small (< 25,000) - $250,000 2. Medium (25,000 to 100,000) - $500,000 3. Large (100,000+) - $1,000,000
2	Watershed Planning – Flood Mapping Updates	Promotes the development and/or refinement of detailed flood risk maps to address data gaps and inadequate mapping. Create FEMA mapping in previously unmapped areas and update existing FEMA maps as needed.	Key GIS Factors: • HUC 8 Intersections with County ▪ Stream Miles* (Zone A & Zone X) o 25% of total streams (unmapped and mapped) • FEMA FIRM Panels Basic Services Include: 1. Project Management 2. Topo Data Capture 3. Survey Data 4. Alluvial Fan Data Capture 5. Hydrologic Data Capture 6. Hydraulics Data Capture 7. Coastal Data Capture 8. Floodplain Mapping 9. Technical Report ***Important to Note:* *1) Revisions might be made for counties that are in more than one region.* *2) These costs reflect "develop FEMA mapping" from scratch; therefore, an adjustment will need to be made to for FEMA mapping products that need to be updated.*
3	Watershed Planning – Flood Mapping for Dam Failure	Conduct studies to develop dam failure inundation maps and models. Hydrologic studies to determine threat, risk, and potential impacts of flooding from dam failure.	Dam Failure Scope: [$$/Dam] 1. Project Management 2. Discovery Data Capture 3. Screening Assessment 4. Detailed Dam Breach Analysis
4	Engineering Project Planning	Evaluation of a proposed project to determine whether implementation would be feasible OR Initial engineering assessment including conceptual design, alternative analysis, and up to 30 percent engineering design.	Where the (assumed) construction cost is available: • Assume FME cost is equivalent to 15% of construction costs. • Where no cost is available, assume study cost range from $100,000 to $250,000 based on scope of project as follows: • Localized - $100,000 • Community - $150,000 • Citywide - $200,000 • In excess of Citywide - $250,000 • When cost estimates were available, project costs were fragmented into "FMP Cost" (Construction) and "FME Cost" (Study) based on the project description and available information. • Where available costing information fragmented the project cost between Construction and Study, "FMP Cost" and "FME Cost" were assigned accordingly. • Where available costing information was not fragmented between Construction and Study costs, project description and supporting documentation was used to determine an appropriate split, explained below: • Where the description/documentation leaned towards Construction (no mention of Study), Study Cost was assumed as 15% of the project cost, and the existing project cost was assumed to be the Construction Cost. • Where the description/documentation leaned towards Study (no mention of Construction), the existing project cost was assumed to be the Study Cost, and the Construction Cost was assumed to be $0. • Where the description/documentation mentioned both a study and Construction Portion, the existing project cost was split such that 15% was assumed to be for Study, and 85% was assumed to be for Construction.
Notes:			
• Use project cost estimates when available.			
• Where cost estimates are not available, use the above table.			
• In all instances where a cost predating September 2020 is used, costs must be escalated to September 2020. Costs that fall within or after September 2020 may be used without being escalated.			
• Where cost estimates are available, but the year/month of their development is not available, compare the available cost with the assumed cost outlined in the above table, and use the highest of the two.			
• Reference the "Factors" sheet for additional information on accelerating project costs.			
• Reference Appendix 5-2 for for calculators associated and additional information associated with cost determination for "Watershed Planning – Flood Mapping Updates" "Watershed Planning – Flood Mapping for Dam Failure".			

FME Costing Table

Nueces (Region 13) FMSs			
	FMS Type	FMS Description/FMS Scope	Assumptions
1	Education and Outreach	1. 'Turn Around Don't Drown" campaign and LWC 2. NFIP program and flood insurance public awareness 3. Public education on flooding	1. Assume a $50,000 minimum for this group based on similar educational programs. 2. Assume a $50,000 minimum for this group based on similar educational programs. 3. Assume as follows based on extents of education program: Region Wide - $100,000 County Wide - $50,000 City Wide - $25,000
2	Flood Measurement and Warning	1. Early flood warning system/local warning system 2. Install stream and rain gauges and weather stations 3. LWC flood warning devices, signs, and gates	Assume a minimum of $250,000 for this group based on https://texaswaternewsroom.org/pressreleases/2016-08-25_flood.html
3	Infrastructure Projects	1. HROM Program 2. Lift station flood-proofing	1. Assume $35,000,000. 2. Assume $100,000.
4	Other	1. Debris clearing maintenance program 2. Channel maintenance and erosion control 3. Dam inspection program 4. Levee inspection 5. Establish city parks in low lying areas 6. Implement green infrastructure	1. Assume $100,000. 2. Assume $250,000. 3. Assume $100,000 per dam. (High Level Estimate) 4. Assume $50,000 a year. (High Level Estimate) 5. Assume $1,000,000. 6. Assume $500,000.
5	Property Acquisition and Structural Elevation	1. Acquire high risk and repetitive loss properties 2. Acquire and preserve open space adjacent to floodplain areas	Assume $5,000,000 minimum to acquire several structures based on http://nrcsolutions.org/rush-creek-property-acquisition-project-arlington-tx/
6	Regulatory and Guidance	1. City floodplain ordinance creation/updates 2. Zoning regulations and Land Use Programs 3. Create a Storm water Management Plan 4. Levy a stormwater fee for developers 5. Floodplain Manager Position / Enforcement of Code and Flood Damage Prevention Ordinances 6. NFIP/CRS participation 7. Region-wide stormwater management manual	1. Assume a $100,000 minimum for policy/regulations to cover engineering consultant fees. 2. Assume $100,000 to cover engineering consultant fees. 3. Assume $300,000 for engineering consultant fees. 4. Assume $200,000. 5. Assume $75,000 for a first-year salary based on the top 25% annual salary for a floodplain manager; https://www.floods.org/career-center/careers-in-floodplain-management/salary-information/ 6. Assume $100,000 to cover engineering consultant fees and implement projects to increase rating. 7. Assume $500,000 to cover engineering consultant fees and support communities in their implementation process.

Notes:

- Use project cost estimates when available.
- Where cost estimates are not available, use the above table.
- In all instances where a cost predating September 2020 is used, costs must be accelerated to September 2020. Costs that fall within or after September 2020 may be used without being accelerated.
- Where cost estimates are available, but the year/month of their development is not available, compare the available cost with the assumed cost outlined in the above table, and use the highest of the two.
- Reference the "Factors" sheet for additional information on accelerating project costs.

FMS Costing Table

Year	January	February	March	April	May	June	July	August	September	October	November	December	Avg
2022	0.92	0.91	0.90	0.89									
2021	0.99	0.98	0.98	0.97	0.96	0.95	0.94	0.92	0.92	0.92	0.92	0.92	0.95
2020	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.00	1.00	1.00	0.99	0.99	1.00
2019	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.01	1.01	1.02
2018	1.06	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.03	1.03	1.03	1.04
2017	1.09	1.09	1.08	1.08	1.08	1.07	1.07	1.06	1.06	1.06	1.06	1.06	1.07
2016	1.13	1.13	1.12	1.12	1.11	1.11	1.11	1.11	1.11	1.10	1.10	1.09	1.11
2015	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.14	1.14	1.14	1.13	1.15
2014	1.19	1.19	1.19	1.18	1.17	1.17	1.17	1.17	1.17	1.16	1.16	1.16	1.17
2013	1.22	1.22	1.22	1.21	1.21	1.21	1.20	1.20	1.20	1.19	1.19	1.19	1.20
2012	1.25	1.25	1.24	1.24	1.24	1.24	1.23	1.23	1.23	1.23	1.22	1.22	1.24
2011	1.29	1.28	1.28	1.27	1.27	1.27	1.27	1.27	1.26	1.26	1.25	1.25	1.27
2010	1.33	1.33	1.33	1.33	1.31	1.31	1.30	1.30	1.30	1.29	1.28	1.28	1.31
2009	1.35	1.35	1.35	1.35	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.33	1.34
2008	1.42	1.42	1.42	1.42	1.41	1.40	1.39	1.38	1.34	1.33	1.34	1.34	1.38
2007	1.46	1.46	1.46	1.46	1.45	1.45	1.44	1.44	1.43	1.43	1.42	1.42	1.44
2006	1.50	1.50	1.49	1.49	1.50	1.49	1.49	1.49	1.48	1.46	1.45	1.46	1.48
2005	1.58	1.58	1.57	1.56	1.55	1.55	1.55	1.54	1.53	1.52	1.51	1.50	1.54
2004	1.68	1.68	1.65	1.64	1.63	1.62	1.61	1.60	1.58	1.57	1.57	1.57	1.62
2003	1.75	1.73	1.74	1.73	1.73	1.72	1.72	1.71	1.71	1.70	1.69	1.70	1.72
2002	1.78	1.78	1.77	1.77	1.77	1.76	1.74	1.74	1.75	1.75	1.75	1.75	1.76
2001	1.83	1.83	1.83	1.83	1.83	1.82	1.80	1.80	1.80	1.80	1.79	1.80	1.81
2000	1.88	1.87	1.85	1.85	1.84	1.84	1.85	1.84	1.85	1.84	1.84	1.83	1.85
1999	1.92	1.92	1.92	1.91	1.91	1.90	1.89	1.89	1.88	1.87	1.88	1.88	1.90
1998	1.96	1.96	1.96	1.95	1.96	1.95	1.94	1.94	1.93	1.92	1.92	1.92	1.94
1997	1.99	1.99	2.00	1.98	1.97	1.96	1.96	1.96	1.97	1.97	1.97	1.96	1.97
1996	2.08	2.08	2.08	2.07	2.06	2.05	2.05	2.03	2.02	2.01	2.00	2.00	2.05
1995	2.11	2.11	2.12	2.12	2.12	2.12	2.10	2.09	2.09	2.09	2.08	2.08	2.10
1994	2.15	2.14	2.14	2.13	2.13	2.13	2.13	2.12	2.11	2.11	2.11	2.11	2.13
1993	2.27	2.27	2.25	2.23	2.19	2.19	2.19	2.20	2.19	2.18	2.18	2.17	2.21
1992	2.35	2.35	2.33	2.32	2.32	2.31	2.30	2.29	2.28	2.28	2.27	2.27	2.31
1991	2.41	2.41	2.41	2.41	2.40	2.39	2.37	2.35	2.35	2.35	2.35	2.35	2.38
1990	2.46	2.45	2.45	2.45	2.44	2.43	2.43	2.42	2.41	2.41	2.40	2.41	2.43

1. Multipy project cost by factor that represents the month and year the cost estimate was developed to convert to September 2020 dollars.

Project Cost Escalation Factors

OPINION OF PROBABLE CONSTRUCTION COST - DEVELOP FEMA FIS

PROJECT NAME	Regional Flood Plans	DATE	
CLIENT	Regional Flood Planning Group (RFPG)	GROUP	
FML ID		PM	

ESTIMATED BY	QC CHECKED BY	FNI PROJECT NUMBER
Jane Doe	XXXX	ABC12345

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT MANAGEMENT					
1	Project Management and Meetings	1	LS	$ 7,029.86	$ 7,030
DISCOVERY DATA CAPTURE					
2	Data Collection	1	HUC 8	$ 15,000.00	$ 15,000.00
3	Data Collection QA/QC	1	LS	$ 1,500.00	$ 1,500.00
4	Event Data Capture	1	LS	$ 750.00	$ 750.00
ALLUVIAL FAN DATA CAPTURE					
9	High Alluvial Fan Analysis (low)	1	SQ MI	$ 3,000.00	$ 3,000.00
10	High Alluvial Fan Analysis (medium)	1	SQ MI	$ 6,250.00	$ 6,250.00
11	High Alluvial Fan Analysis (high)	1	SQ MI	$ 9,500.00	$ 9,500.00
12	High Alluvial Fan Analysis QA/QC	1	LS	$ 1,875.00	$ 1,875.00
HYDROLOGIC DATA CAPTURE					
13	Regression Analyses (low)	1	SQ MI	$ 450.00	$ 450.00
14	Regression Analyses (med)	1	SQ MI	$ 700.00	$ 700.00
15	Regression Analyses (high)	1	SQ MI	$ 950.00	$ 950.00
16	Rainfall-Runoff Analyses (low)	1	SQ MI	$ 550.00	$ 550.00
17	Rainfall-Runoff Analyses (medium)	1	SQ MI	$ 2,300.00	$ 2,300.00
18	Rainfall-Runoff Analyses (high)	1	SQ MI	$ 6,600.00	$ 6,600.00
19	Rainfall-Runoff Analyses QA/QC	1	LS	$ 189.00	$ 189.00
HYDRAULICS DATA CAPTURE					
20	Approximate Study (low)	1	RV MI	$ 50.00	$ 50.00
21	Approximate Study (medium)	1	RV MI	$ 125.00	$ 125.00
22	Approximate Study (high)	1	RV MI	$ 175.00	$ 175.00
23	Detailed Study (low)	1	RV MI	$ 2,500.00	$ 2,500.00
24	Detailed Study (medium)	1	RV MI	$ 3,500.00	$ 3,500.00
25	Detailed Study (high)	1	RV MI	$ 4,750.00	$ 4,750.00
26	Floodplain Mapping	6	RV MI	$ 105.00	$ 630.00
27	Riverine Workmaps	20	PANEL	$ 200.00	$ 4,000.00
28	QA/QC	1	LS	$ 314.60	$ 314.60
COASTAL DATA CAPTURE					
29	Floodplain Mapping of Coastal	1	CO MI	$ 3,000.00	$ 3,000.00
30	QA/QC	1	LS	$ 300.00	$ 300.00
FLOODPLAIN MAPPING DATA CAPTURE					
31	Redelineation (low)	1	RV MI	$ 200.00	$ 200.00
32	Redelineation (medium)	1	RV MI	$ 350.00	$ 350.00
33	Redelineation (high)	1	RV MI	$ 550.00	$ 550.00
34	Redelineation QA/QC	3	RV MI	$ 80.00	$ 240.00
FINAL DELIVERABLES					
35	Technical Report	1	LS	$ 7,029.86	$ 7,029.86
36	Technical Report QC	1	LS	$ 3,514.93	$ 3,514.93

SUBTOTAL			$ 87,873
CONTINGENCY	30%	$	27,000
SUBTOTAL			$ 115,000
SURVEY DATA CAPTURE	5%	$	6,000

PROJECT TOTAL (2021 COSTS)	**$ 121,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

NOTES:

1. FNI OPCC classified as an AACE Class 4 Estimate with accuracy range of -20 to + 30.

IMPORTANT NOTES / ASSUMPTIONS:

The highlighted units (ie: HUC 8, SQ MI, RIV MI) are all values pulled from the GIS effort.

FORM SETUP / QC REVIEW COMMENTS

INSTRUCTIONS

Enter **Pricing** and **Quantities** using the sections to the right. **Expand/collapse** each section by clicking on the **+** or **-** button at the top.

ENTER COMMENTS / QC REVIEW COMMENTS

Note base year of costs in OPCC

Determine and Input Cost Esclation Factor Used
Note year costs escalated to in parenthesis

FORM SETUP / QC REVIEW

PRICING

PRICING SECTION

INSTRUCTIONS

1. **Unit Prices** - enter the Detailed Unit Price Breakdown for each line item OR overwrite formula to enter specific Unit Price to use.
2. **Contingency** - if desired apply a contingency factor to increase the Unit Prices either at an Individual line item level or for all unit prices.
3. **Location Factor** - select state to adjust unit prices based on location.

1.00	LOCATION MULTIPLIER	Texas	SELECT STATE
1.00	HIDDEN CONTINGENCY (applied to all unit prices)		

UNIT PRICES	OR	DETAILED UNIT PRICE BREAKDOWN LABOR	MATERIALS	EQUIPMENT	OTHER	INDIVIDUAL CONTINGENCY	REFERENCE/ASSUMPTION
							Assuming 10% of total/overall project cost
$ 15,000.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 1,500.00							Assumming 10% of Discovery Data Capture cost
$ 750.00							Assumming 5% of Discovery Data Capture cost
$ 3,000.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 6,250.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 9,500.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 1,875.00							Assuming 10% of total Alluvial Cost
$ 450.00							
$ 700.00							
$ 950.00							
$ 550.00							RFP Fee Spreadsheet
$ 2,300.00							RFP Fee Spreadsheet
$ 6,600.00							RFP Fee Spreadsheet
$ 189.00							Assumming 2% of total Hydrology Cost
$ 50.00							
$ 125.00							
$ 175.00							
$ 2,500.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 3,500.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 4,750.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 105.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 200.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 314.60							Assumming 2% of total Hydraulics Cost
$ 3,000.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 300.00							Assumming 10% of total Coastal Data Cost
$ 200.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 350.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 550.00							FEMA Bluebook/LWI Region 2 Spreadsheet
$ 80.00							FEMA Bluebook/LWI Region 2 Spreadsheet
							Assumming 10% of Total Project Cost?
							Assumming 5% of Technical Report Line

QUANTITY TAKEOFF

QUANTITY TAKEOFF SECTION

INSTRUCTIONS

1. **Sheet Reference** - input the primary sheet where this line item is details within the plans.
2. **Total Quantity** - the quantity can be calculated by sheet using the "Quantity by Sheet" section and it is automatically summed or the quantity can be manually inputted below to overwrite the formula.
3. **Units of Measure** - determine the appropriate unit of measure based on how item is priced to calculate quantity
4. **Quantity Details Described** - input description of what is being quantified for this line item, especially for Lump Sum quantities provide details on what is included within that lump sum.
5. **Assumptions/Comments** - input any specific assumptions made when quantifying this line item.

SHEET REFERENCE	TOTAL QUANTITY	UNITS OF MEASURE	QUANTITY DETAILS DESCRIBED	ASSUMPTIONS/COMMENTS
	1	LS		Assuming 10% of total project cost
	1	HUC 8		
	1	LS		
	1	LS		
				Use when applicable to county
	1	SQ MI		
	1	SQ MI		
	1	SQ MI		
	1	LS		
				Total Drainage Area (Sq. Mi.)
	1	SQ MI	0.8	Assumming 80% of hydrology
	1	SQ MI		
	1	SQ MI		
	1	SQ MI	0.2	Assumming will need to do a model to cover larger lakes/ponds
	1	SQ MI	0	
	1	SQ MI	0	
	1	LS		
				Total River Miles
	1	RV MI	0.7	Assuming 70% of total stream miles with this LOD
	1	RV MI	0.2	Assuming 20% of total stream miles with this LOD
	1	RV MI		
	1	RV MI		
	1	RV MI		
	1	RV MI	0.1	Assuming 10% of total stream miles with this LOD
	6	RV MI		Assumming 100% of total stream miles (ie: the sum)
	20	PANEL		The total number of FIRM panels (see GIS)
	1	LS		
				Use when applicable to county
	1	CO MI		
	1	LS		
	1	RV MI		
	1	RV MI		
	1	RV MI		
	3	RV MI		
	1	LS		
	1	LS		

DETAILED QUANTITY TAKEOFF - TOTALS BY SHEET

QUANTITY BY SHEET

SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT

OPINION OF PROBABLE CONSTRUCTION COST - DAM FAILURE

PROJECT NAME	Regional Flood Plans	DATE	7/5/2022
CLIENT	Regional Flood Planning Group (RFPG)	GROUP	
FME ID		PM	

ESTIMATED BY	QC CHECKED BY	FNI PROJECT NUMBER
Jane Doe	XXXX	ABC12345

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT MANAGEMENT					
1	Project Management	1	LS	$ 49,600.00	$ 49,600
DISCOVERY DATA CAPTURE					
2	Dam Data Collection + QC	1	LS	$ 10,000.00	$ 10,000.00
SCREENING ASSESSMENT					
3	Dam Prioritization & Need	116	EA	$ 2,000.00	$ 232,000.00
DETAILED DAM BREACH ANALYSIS					
4	Full Hydrologic Analysis + PMF Regulations + Technical Report	25	EA	$ 30,000.00	$ 750,000.00
		SUBTOTAL			$ 1,041,600
		CONTINGENCY		30%	$ 313,000
PROJECT TOTAL (2021 COSTS)					$ 1,355,000

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

NOTES:

1. FNI OPCC classified as an AACE Class 4 Estimate with accuracy range of -20 to + 30.

IMPORTANT NOTES / ASSUMPTIONS / SCOPE ITEMS:

Task 1 - Project Management

- Perform internal project setup and coordination, including project kickoff meetings and maintaining project schedule. Provide monthly status reports and invoices with backup documentation for the duration of the project.
- Participate in up to ## project coordination meetings with CLIENT staff, via teleconference, as specified in the following tasks. One (1) site visit will be performed to kick-off the project, review project requirements, and tour the downstream breach inundation zone

Task 2 - Hydrologic Assessment

Hydrologic models are used to analyze dam performance during a rainfall event. Per TCEQ regulations, dams are required to be evaluated for hydrologic capacity for minimum design flood based on the Probable Maximum Flood (PMF) event. The design flood for a given dam is based on both the size and hazard classification of the dam and is expressed as a percentage of the PMF. In addition to evaluating the design flood capacity, the hydrologic models are used to establish peak water surface elevations and reservoir inflow hydrographs, which are in turn utilized for performing the breach analysis and generating breach inundation mapping

- Research and gather historical information about the dams
- Generate PMP depths based on recently updated TCEQ PMP guidelines
- Develop hydrologic models for routing the PMF utilizing HEC-HMS
- Compute spillway discharge rating curves based on dimensions of the structure provided in available construction drawings
- Evaluate the dams' existing capacity, expressed as a percentage of the PMF, to determine whether the dam complies with TCEQ criteria for hydrologic adequacy
- Results of the hydrologic analysis for each dam will be presented in a technical report combined with the dam breach analysis. This report is described under the Dam Breach Analysis task.

Task 3 - Dam Breach Analysis

Hydraulic models are used to analyze downstream conditions from flows through a dam; either designed flows through a spillway or hypothetical flows resulting from an uncontrolled breach, or failure, of the dam. Specific to this project, hydraulic models are used to map inundation extents from a hypothetical breach of the dam

- Gather necessary data for hydraulic model inputs, including any relevant previous studies and topography data from available LiDAR or other sources.
- Develop dam breach models in HEC-RAS to evaluate the required breach scenarios – normal pool breach, barely overtopping breach (if necessary), and design flood (PMF) breach (TAC)
- Evaluate the downstream hazard classification according to TCEQ criteria
- Prepare breach inundation maps of the final breach scenarios for inclusion in an Emergency Action Plan (EAP)
- Prepare a combined draft technical report documenting the processes, assumptions, and findings of both the Hydrologic Assessment (Task 2) and the Dam Breach Analysis (Task 3).
- Meet with CLIENT to discuss findings of the Hydrologic Assessment and Breach Analysis for each dam.

FORM SETUP / QC REVIEW COMMENTS

INSTRUCTIONS

Enter **Pricing** and **Quantities** using the sections to the right. **Expand/collapse** each section by clicking on the + or - button at the top.

ENTER COMMENTS / QC REVIEW COMMENTS

To add row, copy entire row and paste

Note base year of costs in OPCC

FORM SETUP / QC REVIE

Flood Mapping for Dam Failure Costing Calculator (1 of 4)

PRICING

PRICING SECTION

INSTRUCTIONS

1. **Unit Prices** - enter the Detailed Unit Price Breakdown for each line item OR overwrite formula to enter specific Unit Price to use.
2. **Contingency** - if desired apply a contingency factor to increase the Unit Prices either at an Individual line item level or for all unit prices.
3. **Location Factor** - select state to adjust unit prices based on location.

1.00	LOCATION MULTIPLIER	Texas	SELECT STATE
1.00	HIDDEN CONTINGENCY (applied to all unit prices)		

UNIT PRICES	OR	DETAILED UNIT PRICE BREAKDOWN LABOR	MATERIALS	EQUIPMENT	OTHER	INDIVIDUAL CONTINGENCY	REFERENCE/ASSUMPTION
							Assumming 5% of total project cost
$ 10,000.00							Ranges between $10,000 - $20,000
$ 2,000.00							
$ 30,000.00							Ranges between $10,000-$50,000

Flood Mapping for Dam Failure Costing Calculator (2 of 4)

QUANTITY TAKEOFF

QUANTITY TAKEOFF SECTION

INSTRUCTIONS

1. **Sheet Reference** - input the primary sheet where this line item is details within the plans.
2. **Total Quantity** - the quantity can be calculated by sheet using the "Quantity by Sheet" section and it is automatically summed or the quantity can be manually inputted below to overwrite the formula.
3. **Units of Measure** - determine the appropriate unit of measure based on how item is priced to calculate quantity
4. **Quantity Details Described** - input description of what is being quantified for this line item, especially for Lump Sum quantities provide details on what is included within that lump sum.
5. **Assumptions/Comments** - input any specific assumptions made when quantifying this line item.

SHEET REFERENCE	TOTAL QUANTITY	UNITS OF MEASURE	QUANTITY DETAILS DESCRIBED	ASSUMPTIONS/COMMENTS
	1	LS		Lump sum, assumming 5% of total project cost
	1	LS		Identifying what's available
	116	EA		Use all dams accounted for in County
	25	EA		Assumming 10 is the maximum number of dams that will be analyzed at this LOD. If there aren't

QUANTITY BY SHEET

DETAILED QUANTITY TAKEOFF - TOTALS BY SHEET

SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT

Appendix D – Comments Received on the Draft Plan and Responses

Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

October 13, 2022

Mr. Travis Pruski
Senior Planner
Nueces River Authority
200 E Nopal St # 206
Uvalde, TX 78801

RE: Texas Water Development Board Comments on Region 13 Nueces RFPG's Draft Regional Flood Plan Contract No. 2101792498

Dear Mr. Pruski,

Texas Water Development Board (TWDB) staff has performed a review of the draft regional flood plan submitted by August 1, 2022, on behalf of the Region 13 Nueces Regional Flood Planning Group (RFPG). The attached comments will follow this format:

- **LEVEL 1**: Comments and questions that must be satisfactorily addressed to meet specific statute, rule, or contract requirements; and,
- **LEVEL 2**: Comments and suggestions for consideration that may improve the readability and/or overall understanding of the regional flood plan

Please note that while Level 2 comments are provided for the planning group's consideration, Level 1 comments must be addressed prior to the submission of final Regional Flood Plans by the January 10, 2023, deadline.

It is expected that the data contained in all written report sections, tables, excel spreadsheets, and the geodatabase will be consistent throughout. In cases where there are any discrepancies in data, the geodatabase dataset will supersede other data and the TWDB will utilize the geodatabase dataset when developing the state flood plan.

TWDB review of the draft regional flood plans is comprised of many spot checks of data across several deliverables and is not an all-encompassing data review. Please note that TWDB's review does not imply accuracy of the draft regional flood plan. Each RFPG is responsible for ensuring the completeness and accuracy of the plan and all associated data.

To facilitate efficient and timely completion, and Board approval, of your final regional flood plan, please provide your TWDB Regional Flood Planner with a draft of your response to these comments (e.g., informally via email) on the draft RFP as soon as possible. This will allow TWDB staff to provide preliminary feedback on proposed RFPG responses to assist you in meeting your RFPG's timeline for approval and submission to TWDB of the final plan by the deadline. This will also help to minimize the need for subsequent follow-up following final regional flood plan submission to TWDB.

Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

Title 31 TAC §361.50(c) requires the regional flood planning group to consider any written or oral Comment received from the public on the draft regional flood plan (RFP); and the EA's written comment on the draft RFP prior to adopting a final RFP. Section 361.50(d) requires the final adopted plan include summaries of all timely written and oral comments received, along with a response, for each, explaining any resulting revisions or why changes are not warranted. Copies of TWDB's Level 1 and 2 written comments and the RFPG's responses must be included in the final, adopted RFP. While the comments included in this letter represent TWDB's review to date, please anticipate the need to respond to additional comments or questions, as necessary, regarding data integrity related to the Board's State Flood Plan Database (that is built from the 15 regional databases), even after submission of the final plan to TWDB.

Standard to all RFPGs is the need to include certain content in the final RFPs that was not yet available at the time that drafts were prepared and submitted. In your final RFP, please be sure to incorporate in the final submitted plan, documentation, for example, that a public meeting to receive comments was held as required and that comments received on the draft RFP were considered in the development of the final plan [31 TAC §361.50(d)].

If you have any questions regarding these comments or would like to discuss your approach to addressing any of these comments, please do not hesitate to contact Tressa Olsen of our Flood Planning staff at (512) 475-1908 or via email at tressa.olsen@twdb.texas.gov. TWDB staff are available to assist you in any way possible to ensure successful completion of your final regional flood plan.

Lastly, on behalf of TWDB, I would like to thank you, the sponsor, the RFPG members and the technical consultants for accomplishing this major milestone of a herculean effort and advancing the flood risk reduction mission in our state.

Sincerely,

Reem J. Zoun, PE, CFM, ENV SP
Director
Flood Planning

Attachment: TWDB Comments

Cc: LJ Francis, RFPG Chair
Kristi Shaw, HDR Inc.
Bryan Martin, HDR Inc.
Matt Nelson, TWDB
James Bronikowski, TWDB
Tressa Olsen, TWDB

TWDB Comments on Region 13 Nueces Regional Flood Planning Group's Draft Regional Flood Plan (10/13/2022) and Responses

Level 1: Comments and questions must be satisfactorily addressed to meet statutory, agency rule, and/or contract requirements.

General Comments

1. Please ensure that all "Submittal requirements" identified in each of the Exhibit C Guidance document sections are submitted in the final flood plan.
   Response: *Reviewed list of submittal requirements in each of the Exhibit C Guidance document sections and confirmed items have been submitted in the final flood plan.*

SOW Task 1

2. Existing Infrastructure GIS Feature Class, *ExFldInfraPol*: Several required fields appear to contain invalid entries, including 'DEF_TYPE' and 'NATBUILT'. Please ensure all required fields are populated with valid entries per Exhibit D Table 5 [31 TAC §361.31].
   Response: *HDR revisited the geodatabase submitted in August and it appears that the fields were filled in properly with no "NULL" values used. Upon further discussion with TWDB, TWDB staff verified that both fields contain valid entries and no change is needed.*
3. Existing Infrastructure GIS Feature Classes, *ExFldInfraPt* and *ExFldInfraAll*: Please describe in the Regional Flood Plan how low water crossings were identified in the region per Exhibit D Table 7 [31 TAC §361.31].
   Response: *By definition, low-water crossings are defined where a creek crosses a road that is low enough to be subject to frequent flooding during storm events or during a 50 percent annual chance (2-year) storm event.*
   Low Water Crossings were identified in the region as follows:
   (1) 548 low-water crossings were identified from TWDB HUB low water crossing data dated May 2021.
   (2) 22 low-water crossings were identified from available TxDOT data to be subject to frequent flooding
   (3) 6 low water crossings were identified by the City of Beeville to be subject to frequent flooding.
   The above description has been added to Chapter 1.11.
4. Existing Projects GIS Feature Class, *ExFldProjs*: Several required fields appear to contain invalid entries, including 'COST', 'COMP_YR', and 'EXHAZ_ID'. Please confirm that all NULL values utilized for numeric fields represent either "not applicable" or "unknown". Please ensure all required fields are populated with valid entries per Exhibit D Table 8 [31 TAC §361.32].
   Response: *For the "COST" field, zero was used to indicate that a cost was unknown. This will be changed to "NULL" for fields where the numerical value is unknown. For the "COMP_YR" field, info on the expected date of completion was not available for these projects. These will be marked as "NULL". For the "EXHZA_ID" field, NULL values are for any project that overlapped too many floodplain polygons and exceeded the number of characters allowed by the schema (255 character limit).*
5. Existing Projects Table (Exhibit C Table 2): Please include the expected year of completion for all ongoing projects. [31 TAC §361.32(3)].

Response: *There are 93 ongoing projects identified in the region and for most the expected year of completion is unknown. We have reviewed our records and reached back out to project sponsors to further complete this information. As a result, we are now able to report the expected year of completion for 16 of the 93 ongoing projects and the geodatabase has been updated accordingly.*

SOW Task 2A

6. Existing Condition Flood Risk Analysis: Please include an in-text summary of total land areas (square miles) of each flood risk by flood risk type, county, region, and frequency in Chapter 2 of the regional flood plan, per Submittal requirement #2 of Exhibit C Section 2.2.A.1 [31 TAC §361.33].
   Response: *HDR added an in-text summary of total land area at flood risk with a summary of square miles of 1% annual chance flood inundation provided by county and flood type (riverine, coastal, urban). See Chapter 2.1.1.6.*
7. Existing Condition Flood Exposure (Exhibit C Table 3): Please ensure that the value for 'Population' is the max of day or night.
   a. Please ensure that values for Day and Night Populations are consistent with the *ExFldExpAll* GIS Feature Class.
   b. Please ensure that the feature counts for both Residential Structures and total Structures are consistent with the *ExFldExpAll* GIS feature class [31 TAC §361.33].

   Response: *The value in the table has been revised to summarize the day and night population at the county level and then uses the maximum.*
8. Existing Condition Flood Exposure GIS Feature Class, *ExFldExpAll*: Please describe how low water crossings were identified in the region per Exhibit D Table 14 [31 TAC §361.33(c-e)].
   ***Response*:** *A description of how low-water crossings were defined and identified was added to Chapter 1.11. A reference was added in Chapter 2.1 to direct the reader to Chapter 1.11 for more information on how LWCs were identified).*
9. Model Coverage: There appear to be inconsistencies between related text, GIS Feature Class (*ModelCoverage*), and map deliverable (Map 22). For example, the in-text map shows stream coverage while *ModelCoverage* shows six detailed model boundaries, and Map 22 in the Appendix shows BLE and detailed model boundaries along county boundaries. Please ensure consistency between all related deliverables.
   Response: *Per discussions with TWDB, model coverage should at a minimum include: (1) models associated with FMPs (at this time R13 does not have any FMPs and thus there are no models associated with FMPs); (2) models generated or modified by the RFPG for use in the plan (at this time there were no models modified for use in the plan). TWDB did state that any model information beyond the two categories above would be appreciated but are not required. HDR believes it would be of value to show where 'detailed' and 'approximate' models are available. HDR has updated the report text, GIS Feature Class, and modeling map deliverables.*

SOW Task 2B

10. Future Condition Flood Risk Analysis: Please include an in-text summary of total land areas (square miles) of each flood risk by flood risk type, county, region, and frequency in Chapter 2 of the regional flood plan, per Submittal requirement #2 of Exhibit C Section 2.2.B.1 [31 TAC §361.34].
    Response: *HDR added an in-text summary of total land area at flood risk with a summary of square miles of 1% annual chance flood inundation provided by county and flood type (riverine, coastal, urban). See Chapter 2.2.1.11.*
11. Future Condition Flood Hazard Map (Exhibit C Map 8): Please include coastal and local types of flooding as applicable or create an additional set of maps to display this required information [31 TAC §361.34(b)(5), Exhibit C Section 2.2.B.1].
    Response: *An additional set of maps as part of the Map 4 sets (existing) and Map 8 sets (future) have been created to display the types of flooding, which are considered riverine, coastal, and pluvial. Note, the original Fathom data had 'pluvial' and 'fluvial' floodplain polygons. The majority of pluvial flood type came from the Fathom datum.*
12. Existing vs. Future Hazards Map (Exhibit C Map 10): Please update the map to depict floodplain extent increases versus broad buffer polygons [31 TAC §361.34].
    Response: *Maps were created for each subregion to depict existing vs. future flood hazard boundaries, for both 1% and 0.2% annual chance storm events.*
13. Future Condition Flood Exposure text: The number of structures at risk under existing conditions is ~60,000 (page 2-22) while the number of structures at risk under future conditions is 73,000, a difference of ~13,000 however the text on page 2-33 lists a difference of 4,000 structures. Please review and revise, as necessary. It is expected that the numbers in the draft plan report and all related, tables, excel spreadsheet, and the geodatabase will be consistent. In cases where there are discrepancies between report text, tables, and the geodatabase dataset, the TWDB will utilize the geodatabase dataset for the state flood plan [31 TAC §361.34].
    Response: *The reported numbers have been reviewed and revised so that text, tables, and the geodatabase are consistent.*

SOW Task 3A

14. Existing Floodplain Management Practices GIS Feature Class, *ExFpMp*: There appear to be invalid entries populated for required fields. For example, "I do not know" was populated for the required field, 'LEV_ENFC'. Please ensure only valid entries are used per Exhibit D Table 20 [31 TAC §361.35, Exhibit D Section 3.7].
    Response: *The valid entries for 'LEV_ENFC' are "High, Moderate, Low, None, or Unknown." The plan feature class designated floodplain management practices as "Low Activity, Moderate Activity, and I Do Not Know". The feature class fields have been updated to reflect valid designations. "Unknown" was be used for blank fields.*

SOW Task 3B

15. Goals GIS Feature Class, *Goals*: It appears that the required field 'RESIDUAL' contains only NULL values. Please ensure all required fields are populated with valid entries per Exhibit D Table 21 [31 TAC §361.36].
    Response: *The 'RESIDUAL' field in the feature class was updated to "Unknown" rather than NULL.*

SOW Task 4B

16. Flood Management Evaluations GIS Feature Class, *FME*: Several required fields contain NULL values. For example, 'REDSTRUCT100' and 'REMSTRUC100'. Please confirm that all NULL values are utilized for numeric fields represents either 'not applicable' or 'unknown'. Please ensure all required fields are populated with valid entries per Exhibit D Table 23 [31 TAC §361. 38].
    Response: *Required fields have been reviewed and filled in with valid entries.*
17. Flood Mitigation Projects GIS Feature Class, *FMP*: Several required fields contain NULL values. For example, 'REDSTRUCT100' and 'REMSTRUC100'. Please confirm that all NULL values are utilized for numeric fields represents either 'not applicable' or 'unknown'. Please ensure all required fields are populated with valid entries per Exhibit D Table 24 [31 TAC §361. 38(c-e)].
    Response: *The fields listed are N/A or unknown at this time. All other fields have been filled in per guidance. Per TWDB input on 11/10/2022, No change is needed to the data. For the fields REDSTRUCT100 and REMSTRC100, Null is acceptable when used for "not applicable" or "unknown".*
18. Flood Management Strategies GIS Feature Class, *FMS*: Several required fields contain NULL values. For example, 'REDSTRUCT100', 'REMPOP', and 'NRNC_COST'. Please confirm that all NULL values are utilized for numeric fields represent either 'not applicable' or 'unknown'. Please ensure all required fields are populated with valid entries per Exhibit D Table 25 [31 TAC §361. 38(d)].
    Response: *The fields listed are N/A or unknown at this time. All other fields have been filled in per guidance. For "NRNC_COST" there was no "Estimated nonrecurring, noncapital cost in dollars" at this time and zero was used. Per TWDB input on 11/10/2022, Zero is appropriate for NRNC_COST when there is no non-recurring, non-capital cost. No change is needed to the data.*

    An additional comment was provided by TWDB on 11/10/2022- The entry in 'SPONSOR' for FMS_ID 13000052 should be an Entity_ID instead of text "Texas Parks and Wildlife Department". HDR added a Texas Parks and Wildlife Entity to the "Entities" layer with ID 00003593. It is a merge of all the TPWD parks within the region.

SOW Task 5

19. Flood Management Evaluation (FME) Recommendations (Exhibit C Table 10): All recommended FMEs shall have a "Quantitative reporting of the estimated study cost" in the table and the geodatabase. For example, FME ID 131000177 appears to be missing this value in the Exhibit C table [31 TAC §361.38 (i)(6)(E)].
    Response: *Noted. A cost has been provided for FME ID 131000177.*

SOW Task 6B

20. Contributions and Impacts to Water Supply: In Table 6-5, please include the estimated quantified annual volume of water associated with the "Nueces River Diversion to CCR" FMS [31 TAC §361.41].
    Response: *This strategy has not been evaluated in the Regional Water Plan or State Water Plan and does not have an annual volume of water associated with it at this time. Based on*

additional guidance from the TWDB on 12/2/22, in order for the Nueces River Diversion to CCR project to be included in the Plan, it must include an estimated annual water supply volume. Therefore, this strategy has been removed from the recommended FMS list for the Final Plan. Should additional information be made available by other studies by May 2023 to quantify the water supply volume provided by this strategy, this proposed FMS will be considered by the Nueces Regional Flood Planning Group for inclusion in the Revised Plan (due to TWDB in July 2023).

SOW Task 9

21. Flood Infrastructure Financing Analysis: Please include a discussion about whether an acceptable minimum percent survey completion was achieved [31 TAC §361.44, Exhibit C Section 2.9].
    Response: *The information included in the project financing discussion was collected during an initial survey sent out to city/county representatives and additional requests during phone interviews/roadshow discussions. Limited responses were received on the survey due most likely to changes in staff and capacity of city/county personnel who often fill multiple organizational roles for the rural communities in the region. HDR added in-line text to Chapter 9 including effectiveness of the survey methodology, percentage of survey completion, and acceptability of the response rate within the context described above.*

Level 2: Comments and suggestions for consideration that may improve the readability and overall understanding of the regional flood plan.

General Comments

22. To better align with our agency's preferred nomenclature, please consider using the name, "Cursory Floodplain Data" instead of "Fathom" or Cursory Fathom Data" throughout the regional flood plan.
    Response: *The report and associated maps have been updated to reflect TWDB's preferred nomenclature. No changes will be made to the GIS feature classes, specifically the ExFldHazard and FutFldHazard layers.*
23. Some in-text maps included throughout the regional flood plan appear blurry on the printed page. For example, Figures ES-1-3 and 1-4. Please consider steps to improve legibility when printed.
    Response: *In-text maps have been reviewed for legibility and the resolution improved where possible.*
24. When hyperlinks are included within the text, please consider including the full URL in a footnote or in-text parentheses so that those reading physical copies of the plan can easily access the source material. For example, funding sources listed throughout Chapter 9.
    Response: *The full URL information has been provided for hyperlinks.*
25. To aid in reader comprehension, please consider reviewing the text for tense agreement throughout.
    Response: *The document has been reviewed for tense agreement throughout and updated where necessary.*

Executive Summary:

26. Please consider including Chapter 2 summary data regarding existing and future flood risk.
Response: *A summary of the total land at risk of 1% annual chance flooding was added for both existing and future conditions to the executive summary.*

SOW Task 1

27. Existing Flood Projects GIS Feature Class, *ExFldProjs:* For the field 'EXHAZ_ID', please confirm that all "NULL" or "999999" values used represent either "not applicable" or "unknown".
Response: *The 47 ExFldProjs boundaries that have NULL's are too large and cross too many ExFldHazard polygons to list all of the ID's with the 255 character limit. Per TWDB input on 11/10/2022, it is appropriate to use NULL when there are too many to fit the field. No change needed.*
28. Watersheds GIS Feature Class, *Watersheds*: Please consider populating the applicable ID fields to associate the watershed feature class with identified FME/FMS/FMP.
Response: *Completed.*
29. Deficient Infrastructure Map (Exhibit C Map 3): Please consider including other deficient features, which may include levees, wetlands, etc.
Response: *HDR investigated other deficient features. In the data collection process, 8 levees were identified within Region 13. USACE did not flag any of the 8 levees as deficient. An additional location of deficient infrastructure (The Euclid Pump Station in Aransas Pass) was identified and added to the Deficient Infrastructure Map.*
30. Existing Projects Table (Exhibit C Table 2): Please note that Bee County has notified TWDB that they do not intend to proceed with Project 13000009 "Flood Early Warning System, Phase 1" using TWDB Flood Infrastructure Fund financing. Please consider updating, as necessary.
Response: *Removed as suggested. GIS tables and maps have been updated accordingly.*
31. Planning Area Description text: Please provide a description of how Low Water Crossings were identified within the text of Chapter 1.
Response: *A description of low water crossings and how they were identified has been added to Table 1.8.*

SOW Task 2A

32. Existing Condition Flood Hazard Map (Exhibit C Map 4): Please consider including a description or footnote of what "Other" Existing Flood Hazards include in the region.
Response**:** *'Other' has been replaced with 'Reported Flood Prone Area of Unknown Frequency'. These flood prone areas were identified during stakeholder outreach efforts and included in the plan when located outside 1% and 0.2% annual chance flood extents.*
33. Existing Condition Flood Exposure GIS Feature Classes, *ExFldExPol* and *ExFldExpAll*: Multiple cells have "0" entries for required fields 'POP_DAY', 'POP_NIGHT', and 'SVI', which may be acceptable for vacant or unknown buildings. Please consider reviewing data for accuracy.
Response**:** *HDR only considered associating population to building footprints. Ag Land (in ExFldExpPol) did not have an associated population. After confirming with TWDB, "SVI" had been calculated from the Census tracts data and has no NULL values. Some of the census tracts had an SVI of -999 which is also reflected in the Vulnerability layer. These -999 values were*

removed when averaging the SVI for the county tables. Per TWDB input on 11/10/2022, these approaches are reasonable, and no change is needed to the data.

SOW Task 2B

34. Future Condition Flood Hazard Map (Exhibit C Map 8):
    a. Please consider including a footnote with a description on "Other" Existing Flood Hazards.
    b. There appears to be a missing "%" sign next to "0.2" Annual Chance in the legend.

    ***Response*:**

    a. *Other' has been replaced with 'Reported Flood Prone Area of Unknown Frequency'. These flood prone areas were identified during stakeholder outreach efforts and included in the plan when located outside 1% and 0.2% annual chance flood extents.*

    b. Corrected.
35. Future Condition Flood Exposure GIS Feature Classes, *FutFldExpPol* and *FutFldExpAll*: Multiple cells have "0" entries for required fields 'POP_DAY', 'POP_NIGHT', and 'SVI', which may be acceptable for vacant or unknown buildings. Please consider reviewing data for accuracy.

    Response: *HDR only considered associating population to building footprints. Ag Land (in ExFldExpPol) did not have an associated population. After confirming with TWDB, "SVI" had been calculated from the Census tracts data and has no NULL values. Some of the census tracts had an SVI of -999 which is also reflected in the Vulnerability layer. These -999 values were removed when averaging the SVI for the county tables. Per TWDB input on 11/10/2022, these approaches are reasonable, and no change is needed to the data.*

SOW Task 4A

36. Greatest Gaps Map (Exhibit C Map 14). It appears that each of the three maps provided prioritized risk thus making it difficult to visually identify gaps. Please consider reviewing and revising as appropriate for legibility.

    Response: *The intent of the maps is to show where flood risks are high and where studies/projects, detailed mapping, and floodplain management is lacking. It is challenging to depict where the flood risk is great in relation to the gaps for these 3 areas. Thus, the report provides a summary table which lists areas of greatest flood risk in relation to vulnerability, exposure, and modeling/study/management gaps. High risk areas with multiple 'Y' values represent the greatest gap.*
37. Greatest Gaps Map (Exhibit C Map 14). Please provide a single map that only depicts the greatest gaps [31 TAC §361.37, Exhibit C Section 2.4.A].

    Response: *See response to Comment No.35 above. A summary table was used to convey the greatest gap areas.*
38. Streams GIS Feature Class, *Streams:* Please replace "Unnamed Stream" entries with "Tributary of XX" when the main channel name is known.

    Response: *There are 38,000 unnamed streams in the basin, which means the effort to perform this request would be very costly. Thus, no changes are proposed to address this comment.*

SOW Task 4B

39. Flood Management Evaluation (FME) text:

a. Please consider verifying that identified FMEs would not duplicate effort of FIF Category 1 studies and/or indicating how the FME will expand on and/or utilize the existing study. For example, FIF ID 40032 (Nueces County Regional Master Plan Study) and 40005 (City of Alice Master Drainage Study) appear to overlap with listed FMEs.
Response: *The following revisions were made:*
FIF 40005 Alice - Master Drainage Study - Removed FME 131000038 - City of Alice Drainage Master Plan.
FIF 40032 - Nueces County Regional Master Plan Study - No exact duplicate of any study was found in the FME list. However, this study is currently in progress and further coordination and updates to the FME list is anticipated as part of the 2024 plan revision to avoid duplication.

The following statement was added to Chapter 5, "All recommended FMEs were screened to ensure that they would not exactly duplicate the work of an ongoing FIF category 1 study. Although some recommended FMEs overlap with ongoing FIF category 1 studies, all recommended FMEs studies have different aims from the ongoing FIF category 1 studies. While some duplication of effort is inevitable between funded FMEs and the FIF category 1 studies, care should be taken to communicate with the sponsoring entity to minimize any duplication of work."

b. If possible, please provide more detailed descriptions of the identified FMEs in the region as was done for identified FMPs in Chapter 5.
Response: *There are 181 recommended FMEs in the draft report. This would make more detailed descriptions as was done for FMPs in Chapter 5 very cumbersome for this first flood plan and in many cases the FMEs are loosely formed at this point. Suggest improving the detail of FMEs as available in future flood planning cycles. Thus, no changes are proposed to address this comment.*

40. Flood Management Evaluation GIS Feature Class, *FME*:
    a. FME IDs 1310000017 and 131000001 appear to lie outside the region boundaries. For county-wide FMEs where most of the county falls outside of the RFPG boundary, please consider providing justification on how the FME would benefit the RFPG if implemented. Please consider coordinating with adjacent RPFGs to ensure efforts are not duplicated.
    Response: *FME IDs 1310000017 and 131000001 both contain area within the Region 13 boundary. HDR will coordinate with adjacent regions to ensure efforts are not duplicated. Region 13 FME ID 131000174 "Nueces Basin Early Flood Warning System" overlaps slightly with Region 12 FME ID 121000119. If they are both funded, coordination will be necessary between the two entities conducting the studies. Thus, no changes are proposed to address this comment.*
    b. Where applicable, please consider including FIF studies in the 'MODEL_DESC' field.
    Response: *FIF studies will be included in 'MODEL_DESC'.*
41. Flood Management Evaluation Map (Exhibit C Map 16): Please include FIF Category 1 studies in the map to indicate previously studied areas.
Response: *The boundary of FIF Category 1 studies were added to the FME Map.*

42. Flood Mitigation Projects (FMP) Map (Exhibit C Map 17): The map only appears to portray the extent of one identified FMP. Please consider including additional maps or map insets to clearly show the locations and extents of all identified FMPs in the region.
Response: *The map was updated to show the 4 FMPs that were identified.*

SOW Task 5

43. Flood Management Evaluation (FME) Recommendations (Exhibit C Table 15): Recommended FMEs should not have redundant of duplicative project costs. For example, the recommended FMEs with FME ID 131000170 -131000173 appears to have identical 'Estimated Study Cost'. Please confirm that these are accurate, and they are not redundant or duplicate cost estimate.
Response: *The estimated studies (FME ID 131000170 -131000173) are similar, and the provided cost serves as our best estimate.*
44. Flood Mitigation Project (FMP) Recommendations: There are not currently any recommended FMPs in the draft regional flood plan. When incorporated recommendations in the final and/or amended regional flood plan, please ensure compliance with guidance documents and rule requirements.
Response: *Recommended FMPs that are added for the amended regional flood plan will comply with guidance documents and rules to the best of our knowledge.*

SOW Task 9

45. Flood Infrastructure Financing Analysis text: Please consider providing clarification on what is included with "other means of collecting the required information" for the financing survey.
Response: *Additional in-line text was added to Chapter 9.2 that describes outreach to gather input on financing. See response to TWDB Comment No. 20 above.*

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October 26, 2022

TEXAS PARKS & WILDLIFE

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Region 13 Nueces Flood Planning Group
Travis Pruski - Nueces River Authority
539 South Highway 83
Uvalde, TX 78801

Re: 2023 Nueces Regional Flood Plan

Dear LJ Francis,

In 2019 Senate Bills 7 and 8 established a regional and state flood planning process for Texas, aimed at better managing flood risk to reduce loss of life and property. As part of the process, Texas Parks and Wildlife Department (TPWD) was identified as a non-voting member of the regional flood planning groups (Texas Water Code Sec. 16.062). The mission of TPWD is to manage and conserve the natural and cultural resources of Texas and its ability to provide opportunities of hunting, fishing, and outdoor recreation for the use and enjoyment of present and future generations. TPWD values this opportunity to contribute to the flood planning process with the goal of enhancing flood risk management and achieving beneficial flood mitigation outcomes. Toward this effort TPWD members serve a dual role of supporting the voting membership in development of the plans and representing the natural resource interests of the state.

TPWD applauds the Nueces Regional Flood Planning Group for their efforts in completing the inaugural regional flood plan (RFP) especially considering the abbreviated timeline. Through the exceptional efforts of the RFPG, this plan will be a meaningful tool for reducing flood impacts to society, especially in those disastrous events that cause loss of life and injury. Because this represents the initial region-wide plan, it has the potential to be precedent setting for subsequent iterations. As such, it is important this plan recognizes the role nature and nature-based solutions can play in flood risk management and promotes opportunities to protect, enhance and restore the flood mitigation benefits provided by natural landforms.

TPWD is supportive of the planning process outlined by the Texas Water Development Board (TWDB) because it aims to achieve an integrative flood risk management (FRM) approach that prioritizes risk reduction through implementation of floodplain management, land use regulations, policy, and a balanced use of grey and natural and nature-based (NNBS) flood mitigation measures that are formed by an inclusive participation within all levels of society. TPWD believes this integrative approach, when implemented holistically, will achieve the maximum benefits for society and natural ecosystems while minimizing environmental impacts. Recent published works on FRM and NNBS (Bridges et al 2021, Glick et al 2020, World Wildlife Fund 2016, Sayers et al 2013) support TWDB integrative flood management approach and provide extensive resources for flood planners.

In the interest of achieving the state's flood risk management goals while protecting the state's fish and wildlife resources, TPWD reviewed regional flood plans based on the TWDB guidance principals as described in 31 Texas Administrative Code Chapters 361 and

362. Special focus was provided on the following subset of guidance principals due to its relevance to fish and wildlife management.

- Does the draft flood plan use the best available science, data, models, and flood risk mapping?
- Does the draft flood plan consider the potential upstream and downstream effects, including environmental, of potential flood management strategies (and associated projects) of neighboring areas?
- Does the draft flood plan include strategies and projects that provide for a balance of structural and non-structural flood mitigation measures, including projects that use nature-based features that lead to long-term mitigation of flood risk?
- Does the draft flood plan consider natural systems and beneficial functions of floodplains, including flood peak attenuation and ecosystem services?
- Does the draft flood plan encourage flood mitigation design approaches that work with, rather than against, natural patterns and conditions of floodplains?
- Does the draft flood plan seek to not cause long-term impairment to the designated water quality as shown in the state water quality management plan as a result of a recommended flood management strategy or project?
- Does the draft flood plan consider benefits of flood management strategies to water quality, fish and wildlife, ecosystem function, and recreation, as appropriate?
- Does the draft flood plan minimize adverse environmental impacts and conform with adopted environmental flow standards?
- Does the draft flood plan consider multi-use opportunities such as green space, parks, water quality, or recreation, portions of which could be funded, constructed, and or maintained by additional, third-party project participants?

Additionally, TPWD emphasizes that the following FRM concepts identified in the forementioned literature be incorporated into the RFP.

- Flood is a natural process that has many benefits to human and natural systems.
- Promoting some flooding as desirable and making room for water promotes native species, maintains vital ecosystem services, and reduces the chance of flooding elsewhere.
- Natural landscapes and watersheds provide flood mitigation functions that should be promoted, protected, enhanced, and restored.
- Prioritize risk reduction over flood control by focusing first on reducing loss of life and injury.
- Utilize limited resources fairly.
- Address flood risk using a portfolio approach to first implement non-structural (policy, land management, emergency management) followed by structural (grey and natural and nature-based) strategies.
- Criteria for assessing projects strategies should include a comprehensive suite of measures spanning economical, operational, societal, and environmental

- advantages and disadvantages. Assessments focusing on economics alone (number of buildings, acres) should be avoided.

Nueces Regional Flood Plan Comments

Texas Conservation Action Plan (TCAP) is a guiding document for conservation in the state of Texas, with the goals of realizing conservation benefits, preventing species listings, and preserving our natural heritage for future generations. Species of Greatest Conservation Need (SGCN) include numerous aquatic species such as fish, freshwater mussels, and salamanders. The TCAP handbook (Texas Parks and Wildlife Department, 2012) includes six types of priority habitats, three of which are aquatic: water resources; riparian and floodplains; and caves and karst. Issues affecting these environments include environmental flows, impoundments and dam operations, and water quality issues (including stormwater runoff).

The Draft Nueces Regional Flood Plan (NRFP) encompasses the entirety of the Nueces River basin and borders the San Antonio River basin (Region 12) to the north and the Lower Rio Grande basin (Region 15) to the south. The planning area spans 24,094 square miles and is diverse in nature. This planning area includes 31 counties, 57 municipalities, and 50 other government entities. The basin is largely rural in nature, with a population of 1,140,000 in 2020. The city of Corpus Christi is the major population center within the basin, with a population of 325,000 in 2020. Other nearby population centers include Laredo and San Antonio. The NRFP calculated and mapped flood risk analysis for both 1% and 0.2% annual chance storm events for current and future conditions. A model of the current conditions for risks for flooding was created by compiling local knowledge, low-water crossing information obtained from the Texas Natural Resources Information System, United States Geological Survey (USGS) gage information, Nueces River Authority data, National Flood Hazard Layer (NFHL) data, FEMA Base Level Engineering data, and National Oceanic and Atmospheric Administration (NOAA) Atlas-14 rainfall data. While a number of areas within the Region lacked current detailed flood hazard information and were approximated using Base Level Engineering (BLE) and First American Flood Data Services (FAFDS), TPWD appreciates and supports the use of the best available science and most relevant data.

Some of the goals of the Draft NRFP included improving flood warning and readiness, increasing the number of flood studies, increasing the prevention of flooding, and supporting flood infrastructure projects with respect to water supplies and the State Water Plan. Taken together, these actions provide for forward-looking floodplain management, land use, and economic practices in the Region. While these practices play a key role in preventing the creation of additional flood risk in the future, TPWD encourages the inclusion of ecological and societal benefits of flooding in any future iterations of the Plan, and strongly encourages any nature-based solutions as one of the goals of the NRFP.

The NRFP identified a total of four (4) Flood Management Projects (FMPs), of which none were deemed potentially feasible. Of these four projects, one project was determined to be an ongoing project with current dedicated funding, so was removed from

consideration. The three remaining projects continued through the screening process, although due to the high level of detail required for consideration as an FMP, none of the three potentially feasible projects were determined to have enough detail available for evaluation and recommendation as an FMP. Each was moved to the FME level.

The Plan also evaluated 164 potentially feasible Flood Management Evaluations (FMEs), and 35 recommended Flood Management Strategies (FMSs). While most of the recommended FMPs are infrastructure based, TPWD appreciates that the Draft NRFP acknowledges the gap in flood risk and mitigation in relation to nature-based infrastructure in the region. TPWD understands that the goal of the RFP is to mitigate floods to reduce risk to life and property but would like to encourage the use of nature-based solutions where possible. Importantly, the Draft NRFP states that none of the projects are anticipated to negatively impact regional water supplies, water availability, or projects currently within the State Water Plan.

TPWD would like to encourage all the FMXs (an FMP, FME, or FMS, taken together) to consider stream crossing designs that allow for sediment transport and passage of aquatic organisms and do not impound water. This is especially important in the Upper Nueces Basin, where large movements of gravel and rubble are notable even in the lowest of flooding events. These designs should include bridges that span the creek where possible or culverted crossings designed with the culvert(s) in the active channel area lower than those in the floodplain benches so that the flow in the channel is not overly spread out. The central/low-flow culvert(s) should be large enough to handle a 1.5-year flow without backing up water. The bottoms of these lower culverts should be set at least a foot below grade (i.e., recessed) to allow natural substrate to cover the culvert bottom and to allow for aquatic organism passage. These lower, recessed culverts should be installed in the thalweg or deepest part of the channel and be aligned with the low flow channel (Clarkin et al., 2006).

The proposed Flood Management Evaluations, Plans, and Strategies include numerous infrastructure projects that may affect the aquatic habitats that are prioritized in the TCAP. For example, the removal of low-water crossings can benefit rare species such as mussels and fish if the crossing is replaced with a bridge or culvert that does not form a barrier to species movement. Conversely, building dams and channelizing streams can adversely affect aquatic habitats and species.

The Draft NRFP includes numerous channel improvement projects which may include widening, deepening, and straightening streams. Channelization and over-widening of streams slows flow, which increases deposition of sediment, decreases fish habitat, increases water temperatures, and can result in channel erosion. Streams in good condition naturally reach bankfull and begin spilling onto the floodplain during a 1.5 to 2-year flood event. Widening and deepening a stream channel to force it to contain the 100-year flow negatively impacts the adjacent water table and riparian area and has geomorphic effects upstream and downstream of the modification. If channelization is necessary, constructing a two-stage channel with a low-flow channel and a floodplain allows for the continued transport of sediment, habitat for aquatic wildlife, and can reduce maintenance (Rosgen 1996). TPWD encourages the RFPG to protect existing streams, riparian areas, and floodplains.

Thank you for your consideration of these comments. TPWD looks forward to continuing to work with the planning group to develop flood plans that protect life and property but are also beneficial to the environment. Please contact me at (512) 389 – 8214 or at Marty.Kelly@TPWD.Texas.gov or Jim Tolan at (361) 431– 6003 ext. 814, or at James.Tolan@TPWD.Texas.gov if you have any questions or comments.

Sincerely,

Marty Kelly
Water Resources Program Coordinator

MK:jt

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World Wildlife Fund. 2016. Natural and Nature-based Flood Management: A Green Guide. Washington, DC: World Wildlife Fund. Http://envirodm.org/flood-managment 2016 WWF.

Texas Parks & Wildlife Department (TPWD)					
Project Title:			Nueces Regional Flood Plan		
Project Development Engineer (PDE):			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
1	See letter dated Oct 26, 2022 Page 1	Marty Kelly and James Tolan, TPWD	Plan should recognize the role nature and nature-based solutions can play in flood risk management and promotes opportunities to protect, enhance and restore the flood mitigation benefits provided by natural landforms.	E. Acknowledge comment, no change made. Nature-based solutions are recognized in the plan for their role in flood risk reduction. The plan includes nature-based solution goals and FMXs.	Complete
2	See letter dated Oct 26, 2022 Page 2	Marty Kelly and James Tolan, TPWD	Guidance Principal Comment Does the draft flood plan use the best available science, data, models, and flood risk mapping?	E. Acknowledge comment, no change made. Yes, the intent of the plan was to use the best available practices and information available at the time of the plan. Being the first plan, acquiring and managing all the available data for the basin was challenging and will be improved upon with each subsequent flood plan. Best available models were identified and utilized, and best available flood mapping data, science, and project population data was used to define 100- and 500-year storm event inundation extents for the entire basin.	Complete

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Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
3	See letter dated Oct 26, 2022 Page 2	Marty Kelly and James Tolan, TPWD	Guidance Principal Comment Does the draft flood plan consider the potential upstream and downstream effects, including environmental, of potential flood management strategies (and associated projects) of neighboring areas?	E. Acknowledge comment, no change made. Verification of no adverse impacts to downstream or upstream properties is a requirement of projects to be included in the flood plan. TWDB provides a definition of no adverse impact in its technical guidance for the flood plan and states 'No negative impact means that a project will not increase flood risk of surrounding properties'. TWDB definition is based solely on hydrology and hydraulic calculations and does not include environmental impacts. The impacts of specific projects on the environment are often difficult to quantify at a planning level. Typically environmental impacts are evaluated if certain permitting regulations are triggered such as when fill occurs in jurisdiction waters of the U.S. and a Section 404 Individual Permit is required. The plan does consider the overall impacts of the plan on the environment in Chapter 6 where it states no long-term impairment to designated water quality in the State Water Quality Management Plan is anticipated as a result of the recommended FMXs.	Complete
4	See letter dated Oct 26, 2022 Page 2	Marty Kelly and James Tolan, TPWD	Guidance Principal Comment Does the draft flood plan include strategies and projects that provide for a balance of structural and non-structural flood mitigation measures, including projects that use nature-based features that lead to long-term mitigation of flood risks?	E. Acknowledge comment, no change made. Yes, a Nature-Based Solution goal is included in the plan and 2 FMEs (i.e. studies) were developed and defined to help achieve these goals in the basin.	Complete

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Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
5	See letter dated Oct 26, 2022 Page 2	Marty Kelly and James Tolan, TPWD	Guidance Principal Comment Does the draft flood plan consider natural systems and beneficial functions of floodplains, including flood peak attenuation and ecosystem services?	A - Comment incorporated The following text was added to Chapter 3.1.3: Floodplain mitigation studies in the Nueces Basin are encouraged to consider natural systems and beneficial functions of floodplains, including flood peak attenuation and ecosystem services when identifying projects to reduce flood risk. Flood mitigation design approaches that work together with natural floodplain patterns is advised.	Complete
6	See letter dated Oct 26, 2022 Page 2	Marty Kelly and James Tolan, TPWD	Guidance Principal Comment Does the draft plan encourage flood mitigation design approaches that work with, rather than against, natural patterns and conditions of floodplains?	A. Comment incorporated Yes, the floodplain includes Nature Based Solution goals and two regional Natural Based Solution FMEs to help achieve these goals. See comment response No. 5 above and additional text added to Chapter 3.1.3.	Complete
7	See letter dated Oct 26, 2022 Page 2	Marty Kelly and James Tolan, TPWD	Guidance Principal Comment Does the draft flood plan seek to not cause long-term impairment to the designated water quality as shown in the state water quality management plan as a result of a recommended flood management strategy or project?	E. Acknowledge comment, no change made. Yes, an evaluation and statement to the overall affect of the flood plan on the State Water Quality Management Plan is a part of the Chapter 6 discussion.	Complete

Texas Parks & Wildlife Department (TPWD)					
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Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
8	See letter dated Oct 26, 2022 Page 2	Marty Kelly and James Tolan, TPWD	Guidance Principal Comment Does the draft flood plan consider benefits of flood management strategies to water quality, fish and wildlife, ecosystem function, and recreation, as appropriate?	E. Acknowledge comment, no change made. Yes, the flood plan describes benefits of FMS and FMPs on environment, water quality, navigation, and recreation in Chapter 6.1.5 and 6.1.6.	Complete
9	See letter dated Oct 26, 2022 Page 2	Marty Kelly and James Tolan, TPWD	Guidance Principal Comment Does the draft flood plan minimize adverse environmental impacts and conform with adopted environmental flow standards?	E. Acknowledge comment, no change made. Yes, the flood plan considers the following when identifying potential FMXs: 'assess potential for including nature-based solutions and applicability' and 'unlikely to negatively affect a neighboring areas'. Yes, the flood plan conforms with adopted environmental flow standards.	Complete
10	See letter dated Oct 26, 2022 Page 2	Marty Kelly and James Tolan, TPWD	Guidance Principal Comment Does the draft flood plan consider multi-use opportunities such as green space, parks, water quality, or recreation, portions of which could be funded, constructed, and or maintained by additional, third-party project participants?	E. Acknowledge comment, no change made. Yes, plan is open to these potential opportunities.	Complete

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Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
11	See letter dated Oct 26, 2022 Page 2	Marty Kelly and James Tolan, TPWD	TPWD emphasizes the following Flood Risk Management (FRM) concepts be incorporated into the Regional Flood Plan - Flood is a natural process that has many benefits to human and natural systems - Promoting some flooding as desirable and making room for water promotes native species, maintains vital ecosystem services, and reduces the chance of flooding elsewhere - Natural landscapes and watersheds provide flood mitigation functions that should be promoted, protected, enhanced, and restored. - Prioritize risk reduction over flood control by focusing first on reducing loss of life and injury. - Utilize limited resources fairly. - Address flood risk using a portfolio approach to first implement non-structural (policy, land management, emergency management) followed by structural (grey and natural and nature-based) strategies. - Criteria for assessing projects strategies should include a comprehensive suite of measures spanning economical, operational, societal, and environmental advantages and disadvantages. Assessments focusing on economics alone (number of buildings, acres) should be avoided.	A- Comment incorporated. Added to Chapter 6.1.6.	Complete

Texas Parks & Wildlife Department (TPWD)					
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Project Development Engineer (PDE):		HDR			
Project Manager:		Bryan Martin			
Deliverable Milestone:		Final Plan 01/10/2022			
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
12	See letter dated Oct 26, 2022 Page 3	Marty Kelly and James Tolan, TPWD	TPWD encourages the inclusion of ecological and societal benefits of flooding in any future iterations of the Plan, and strongly encourages any nature-based solutions as one of the goals of the NRFP	E. Acknowledge comment, no change made. Noted. Ecological and societal benefits can be further considered for inclusion in future iterations of the plan. The flood plan includes a nature-based solution goal.	Complete
13	See letter dated Oct 26, 2022 Page 3	Marty Kelly and James Tolan, TPWD	TPWD understands that the goal of the RFP is to mitigate floods to reduce risk to life and property but would like to encourage the use of nature-based solutions where possible.	E. Acknowledge comment, no change made. The flood plan includes a nature-based solution goal and includes several region-wide nature-based studies to help achieve this goal.	Complete

Texas Parks & Wildlife Department (TPWD)					
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Project Manager:		Bryan Martin			
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Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
14	See letter dated Oct 26, 2022 Page 4	Marty Kelly and James Tolan, TPWD	TPWD would like to encourage all the FMXs (an FMP, FME, or FMS, taken together) to consider stream crossing designs that allow for sediment transport and passage of aquatic organisms and do not impound water. This is especially important in the Upper Nueces Basin, where large movements of gravel and rubble are notable even in the lowest of flooding events. These designs should include bridges that span the creek where possible or culverted crossings designed with the culvert(s) in the active channel area lower than those in the floodplain benches so that the flow in the channel is not overly spread out. The central/low-flow culvert(s) should be large enough to handle 1.5-year flow without backing up water. The bottoms of these lower culverts should be set at least a foot below grade (i.e., recessed) to allow natural substrate to cover the culvert bottom and to allow for aquatic organism passage. These lower, recessed culverts should be installed in the thalweg or deepest part of the channel and aligned with the flow channel (Clarkin et at., 2006)	A- Comment incorporated. This criteria is particularly important to improve the overall function of creek crossings in the upper basin. Goal No. 6 includes identifying operations and maintenance best practices to maintain drainage structures including remove gravel and sediment deposition to mitigate future flooding impacts. Additional evaluations of FMXs to be included in the Revised Plan (associated with Task 12) will consider sediment transport in the design, particularly in the upper basin, where applicable. Added the following text to Chapter 6.1.6 (grey text is from the draft plan): Several recommended FMSs are specifically identified to reduce erosion and sedimentation impacts. Flood projects should consider stream crossing designs that allow for sediment transport and passage of aquatic organisms and do not impound water.	Complete

Texas Parks & Wildlife Department (TPWD)					
Project Title:			Nueces Regional Flood Plan		
Project Development Engineer (PDE):			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
15	See letter dated Oct 26, 2022 Page 4	Marty Kelly and James Tolan, TPWD	TPWD encourages the RFPG to protect existing streams, riparian areas, and floodplains. States channelizing streams can adversely affect aquatic habitats and species. And suggests, if channelization is necessary, constructing a two-stage channel with a low-flow channel and a floodplain allows for the continued transport of sediment, habitat for aquatic wildlife, and can reduce maintenance (Rosgen 1996). States the removal of low-water crossings can benefit rare species such as mussels and fish if the crossing is replaced with a bridge or culvert that does not form a barrier to species movement.	A- Comment incorporated. Text was added in Chapter 3.1.3- Flood management agencies should carefully consider protecting existing streams, riparian areas, and floodplains when considering channelization projects. If channelization is necessary, a two-stage channel with a low-flow channel and a floodplain allows for the continued transport of sediment, habitat for aquatic wildlife, and can reduce maintenance (Rosgen 1996).	Complete

Gettig, Ben

From: tpruski <tpruski@nueces-ra.org>
Sent: Wednesday, October 26, 2022 9:36 AM
To: Shaw, Kristi; Tressa Olsen; Martin, Bryan
Subject: FW: Comment on Nueces Regional Flood Plan

Please see the comments for the Nueces Regional Flood plan from Amanda Torres

---

From: Amanda Torres <AmandaT@cctexas.com>
Sent: Wednesday, October 26, 2022 9:08 AM
To: tpruski <tpruski@nueces-ra.org>
Subject: Comment on Nueces Regional Flood Plan

Hi Travis,

This is Amanda Torres with the City of Corpus Christi. I had a comment regarding the listing of Flood Preparedness Measures for the City of Rockport on p. 7-11.

They do have or do the following:

- Protect buildings against flood damage at initial construction
- Master plan of all flood-related projects
- Consider higher standards list
- Local Floodplain ordinance with higher standards (they have a 1.5-foot freeboard requirement): https://z2codes.franklinlegal.net/franklin/Z2Browser2.html?showset=rockportset&collection=rockport&doccode=z2Code_z20001357

On P. 7-16, Rockport :

- Closes flooded roads
- Assess road and property damage
- List and schedule repairs and replacements
- Fire or police department responds
- Pump out flooded areas

I used to be their floodplain admin, so I wanted to make sure that was right! Thanks!

Amanda Torres, MPA, CFM
Senior City Planner

City of Corpus Christi – Planning Division
1201 Leopard St., 78401 | City Hall, 4th Floor
P.O. Box 9277 | Corpus Christi, TX 78469-9277
Phone: (361) 826-3246 | Fax: (361) 826-3609
AmandaT@cctexas.com | www.cctexas.com/planning

Corpus Christi R13 Draft Plan Comments and Responses
1/3/2023

Corpus Christi				
Project Title:			Nueces Regional Flood Plan	
Project Development Engineer (PDE):			HDR	
Project Manager:			Bryan Martin	
Deliverable Milestone:			Final Plan 01/10/2022	
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made				
Comment #	Comment Location	Reviewer	Comment	Final Disposition
1	7-11	Amanda Torres	Update the flood preparedness measures for the City of Rockport on page 7-11. Flood Preparedness measures include: - - Protect buildings against flood damage at initial construction - Master plan of all flood-related projects - Consider higher standards list - Local Floodplain ordinance with higher standards (they have a 1.5-foot freeboard requirement): https://z2codes.franklinlegal.net/franklin/Z2Browser2.html?showset=rockportset&collection=rockport&doccode=z2Code_z20001357	A - Comment Incorporated Table has been updated
2	7-16	Amanda Torres	Update flood response and recovery measures on page 7-16. - Closes flooded roads - Assess road and property damage - List and schedule repairs and replacements - Fire or police department responds - Pump out flooded areas	A - Comment Incorporated Table has been updated

Duval County R13 Draft Plan Comments

Potential Flood Mitigation Projects List for Duval County

Project Name	Description	County(ies)	City	HUC12s	Watershed Name	Project Type	Project Area (sq-miles)	Flood Risk Type	Coordinates (x,y)*
Las Animas Conveyance Infrastructure	Channel improvements to system near Las Animas Creek to improve conveyance: - Upsize culverts on Palacios St and S Benavides St - Improve conveyance capacity under bridges on HWY 359 and HWY 339 - Procurement of easements and rights-of-ways	Duval County	Benavides	121102040102	Upper Santa Gertrudis Creek	FMP-Structural: Infrastructure	4	Urban / Riverine	-98.41511, 27.59229
Benavides Main City Network	Improvements to the Drainage System in Central Benavides: - Increase capacity to inlets and pipes on Depot St, E Railroad Ave, Clark St, E Mesquite St, & Peters St. - Upsize pipes downstream of the inlet on Highway 339 - Expand network to Santa Rosa de Lima Street - Improvements to concrete channel on Peters Street. - Improvements to outfall structures - Procurement of outfall easements	Duval County	Benavides	121102040103	Upper Santa Gertrudis Creek	FMP-Structural: Infrastructure	3.8	Urban	-98.40567, 27.5979
Upsize Burch St Crossing	Improvements to Earthen Channel System: - Increase culvert capacity on Burch St and other undersized crossings - Channel improvements along the main earthen channel	Duval County	Freer	121101051001	Upper Ygnacio Creek	FMP-Structural: Infrastructure	5.6	Urban	-98.60829, 27.87407
Northern San Diego Street Conveyance Improvement	Improvements to street overland drainage system: - Curb and gutter replacement - Improve conveyance by road paving and regrading of prioritized streets	Duval County / Jim Wells County	San Diego	121102040310	San Diego Creek	Storm Drainage Improvements	26	Urban	-98.2376, 27.76437
Northern San Diego Drainage Improvement Project	Drainage improvements to subsurface drainage systems - Installation of new underground drainage infrastructure along Luby street - Expansion and improvements to Dix Street System	Duval County / Jim Wells County	San Diego	121102040310	San Diego Creek	Storm Drainage Improvements	26	Urban	-98.23702, 27.76748
Improvements to Drainage Connectivity along Railroad	Improvement to underground drainage system to increase capacity and improve conveyance on railroad under-crossings and on sections of Highway 44 to improve stormwater drainage from north to south	Duval County / Jim Wells County	San Diego	121102040310	San Diego Creek	Storm Drainage Improvements	26	Urban	-98.23689, 27.76398
Southern San Diego Drainage Improvement Project	New underground stormwater collection system along Collins Street, including interconnections between existing and new infrastructure.	Duval County / Jim Wells County	San Diego	121102040310	San Diego Creek	Storm Drainage Improvements	26	Urban	-98.2372, 27.76291
Improvements to San Diego Levee Outfall System	Improvements to outfall structures and appurtenances along San Diego Levee System	Duval County / Jim Wells County	San Diego	121102040310	San Diego Creek	Storm Drainage Improvements	26	Urban / Riverine	-98.23877, 27.75701
Realitos Drainage Improvements	Improvements to surface and subsurface infrastructure of Realitos Drainage System	Duval County	Realitos	121102050305	Middle Macho Creek	Storm Drainage Improvements	4.7	Urban / Riverine	-98.5289, 27.44378
Concepcion Drainage Improvements	Improvements to drainage infrastructure in Concepcion	Duval County	Concepcion	121102050307, 121102050204	Lower Macho Creek, Cuerva Tank-Los Olmos Creek	Storm Drainage Improvements	4.1	Riverine	-98.35543, 27.39472

* Approximate location of the project's center, using coordinate system NAD83 UTM Zone14N in decimal degrees (DD)

Duval R13 Draft Plan Comments and Response
1/3/2023

Duval County				
Project Title:			Nueces Regional Flood Plan	
Project Development Engineer (PDE):			HDR	
Project Manager:			Bryan Martin	
Deliverable Milestone:			Final Plan 01/10/2022	
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made				
Comment #	Comment Location	Reviewer	Comment	Final Disposition
1	Sept 26, 2022 Regional Planning Group Meeting and Public Hearing	Duval County represented by Stacy Barna and Jenny Bywater of CDM	The Duval County Masterplan was completed in April 2022 and includes recommended FMX (Chapter 4) and costs for projects (Chapter 8). FMX list should match this information. The FMX count is: 4 for Freer, 9 for San Diego, and 2 for Benavides.	A - Comment Incorporated We revised the FMX list for Duval County to include the projects provided in the April 2022 Master Plan

Greater Edwards Aquifer Alliance

Member Organizations

Alamo, Austin, and Lone Star chapters of the Sierra Club
Bexar Audubon Society
Austin, Bexar and Travis Green Parties
Bexar Grotto
Boerne Together
Bulverde Neighborhood Alliance
Bulverde Neighbors for Clean Water
Cibolo Center for Conservation
Citizens for the Protection of Cibolo Creek
Comal County Conservation Alliance
Environment Texas
First Universalist Unitarian Church of SA
Friends of Canyon Lake
Friends of Dry Comal Creek
Friends of Government Canyon
Fuerza Unida
Green Society of UTSA
Guadalupe River Road Alliance
Guardians of Lick Creek
Headwaters at Incarnate Word
Helotes Heritage Association
Hill Country Alliance
Kendall County Well Owners Association
Kinney County Ground Zero
Leon Springs Business Association
Native Plant Society of Texas – SA
Northwest Interstate Coalition of Neighborhoods
Pedernales River Alliance – Gillespie Co.
Preserve Castroville
Preserve Lake Dunlop Association
Preserve Our Hill Country Environment
RiverAid San Antonio
San Antonio Audubon Society
San Antonio Conservation Society
San Geronimo Valley Alliance
San Marcos Greenbelt Alliance
San Marcos River Foundation
Save Barton Creek Association
Save Our Springs Alliance
Scenic Loop/Boerne Stage Alliance
Securing a Future Environment
SEED Coalition
Signal Hill Area Alliance
Sisters of the Divine Providence
Solar San Antonio
Texas Cave Management Association
Trinity Edwards Spring Protection Assoc.
Water Aid – Texas State University
Wildlife Rescue & Rehabilitation
Wimberley Valley Watershed Association

PO Box 15618
San Antonio, Texas 78212
(210) 320-6294

October 5, 2022

Chairman LJ Francis and Stakeholders
Regional Flood Planning Group 13

Re: Recommendations to the TWDB Promoting the Protection of Natural Flood Mitigation Features and Use of Nature Based Flood Mitigation Solutions

Dear Chairman Francis and Appointed Stakeholders of RFPG 13,

These comments are submitted on behalf of the fifty-five member groups of the Greater Edwards Aquifer Alliance and the undersigned.

Background

State legislation enabling the Regional Flood Plan process provided guidelines and deliverables to be accomplished by each flood planning group with a goal of regional plans becoming the basis of a state flood plan and also to create and identify projects to be considered for future funding. Within this enabling legislation the Texas Water Development Board (TWDB) was directed to identify and evaluate natural flood mitigation features and include Nature Based Solutions (NBS) within proposed flood mitigation projects.

While the TWDB has been very responsive to the questions and concerns expressed by the various Regional Flood Planning Groups (RFPG), the process highlighted several areas of concern regarding the evaluation of natural flood mitigation features for their level of function and incorporating NBS into flood control projects. This process highlighted the lack of data needed to evaluate natural flood mitigation features and, therefore, the need for methods beyond a Hydrologic Engineering Center's - River Analysis System (HEC-RAS) model. In addition, Technical Consultant outreach to communities demonstrated the need to increase knowledge on when and how to incorporate Nature Based Solutions into flood control projects.

Nature-based solutions will need to be weaved into every facet of this program and incorporated into future policies in order to empower community collaboration that leverages the state's vast network of natural ecosystems to build resilient communities.

Recommendations

Broad and specific recommendations have been collected across the state from RFPG committee members and collaborators, including:

1. Increase use and funding for Nature Based Solutions that appropriately weights projects that offer
    i. social and environmental benefits,
    ii. reduced environmental impact,

iii. cost avoidance for infrastructure replacement, for example https://mediaspace.du.edu/media/David+Skuodas+-+Seeing+the+Forest+and+the+Trees/1_g90zp1xz
iv. future flood prevention while also creating resiliency to recover after a natural disaster.

b. Increased number of trainings and workshops on the use and cost benefit analysis of Nature Based Solutions.
c. Improve the modeling software to include soil absorption, geologic porosity, plant interception, and other variables that slow flows or convey surface water below ground; as well as water quality improvements and ground water recharge that can be realized with NBS.
d. Work with FEMA to expand the concept of "adverse impact" to include loss of functioning floodplains and the resiliency that they provide.
e. Promote collaboration within major watersheds towards a regional approach to floodplain management using NBS

2. Recognize the role that land development codes and location of infrastructure have on flood impacts:
   a. Emphasize the need for counties to be enabled by the state to exert authority to influence development that negatively impacts natural features that mitigate flooding and to levy stormwater/drainage utility fees to retrofit and maintain flood infrastructure.
   b. Promote and fund the use of NBS throughout watersheds with the understanding that most natural flood mitigation features, including our floodplains, are in some state of degradation and can be improved with appropriate land use regulation
   c. Encourage legislators to provide counties or Groundwater Conservation Districts with authority to protect natural Aquifer Storage and Recovery features, like karst recharge and fracture zones, and sink holes that help mitigate flood intensity while transferring potential flood water into aquifers.
   d. Ensure that TXDOT builds to 100 year standards as utilizing the best available and most current flood maps and that such infrastructure does not increase downstream flooding nor damage riparian streamsides.
3. Specific project recommendations:
   a. Fund a Texas Watershed Initiative similar to Louisiana's[1] with a robust program on use and adoption of NBS
   b. Provide training and technical resources to flood districts/floodplain managers to advance understanding and adoption of NBS and best management practices for maintaining floodplains and other natural flood mitigation features to fully realize potential benefits
   c. Use all available federal and state programs to prioritize the preservation and restoration of natural flood mitigation features throughout watersheds
   d. Develop a compendium of Nature-Based Resources for all Communities across Texas.
   e. Recommend policy changes that enable Counties or Groundwater Conservation Districts to protect Natural Aquifer Storage and Recovery features
   f. Review submitted FMPs, FMEs and FMSs submitted for this first 5-year cycle to determine the feasibility to include or increase NBS aspects

[1] https://watershed.la.gov/nature-based-solutions

Conclusions

If preventative flood mitigation strategies are not prioritized for funding, then flood events will be more frequent and cause greater harm. If natural infrastructure that mitigates flooding is harmed, undoing the damage to many of these features may be cost-prohibitive or otherwise impossible. Retrofitting with flood control projects is also short sighted, given pathways for prevention. Conversely, strategically protecting natural infrastructure and placing Nature Based Solution throughout a watershed can significantly reduce flood risks within major riverine systems.

Thank you for the opportunity to submit these comments.

Respectfully,

Annalisa Peace
Executive Director
Greater Edwards Aquifer Alliance

Luke Metzger
Executive Director
Environment Texas

Greater Edwards Aquifer Alliance (GEAA)					
Project Title:		Nueces Regional Flood Plan			
Project Development Engineer (PDE):		HDR			
Project Manager:		Bryan Martin			
Deliverable Milestone:		Final Plan 01/10/2022			
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
1	See Oct 5, 2022 Letter Page 1	Annalisa Peace	1a. Increase use and funding for Nature Based Solutions that appropriately weights projects that offer i. social and environmental benefits, ii. reduced environmental impact, iii. cost avoidance for infrastructure replacement, for example https://mediaspace.du.edu/media/David+Skuodas+-+Seeing+the+Forest+and+the+Trees/1_g90zp1xz iv. future flood prevention while also creating resiliency to recover after a natural disaster.	E. Acknowledge comment, no change made. The Nueces Flood Plan acknowledges the benefits of and encourages the use and funding of Nature Based Solutions (NBS). The plan includes a goal to increase nature-based practices through land conservation and restoration programs and includes NBS based FMEs.	Complete
2	See Oct 5, 2022 Letter Page 2	Annalisa Peace	1b. Increased number of trainings and workshops on the use and cost benefit analysis of Nature Based Solutions.	E. Acknowledge comment, no change made. Goal No. 10 includes training. RFPG prefered to leave training process open, rather than prescriptively focuses on structural or NBS.	Complete
3	See Oct 5, 2022 Letter Page 2	Annalisa Peace	1c. Improve the modeling software to include soil absorption, geologic porosity, plant interception, and other variables that slow flows or convey surface water below ground; as well as water quality improvements and ground water recharge that can be realized with NBS.	A- Comment incorporated. Added text to Chapter 3.1.3: As basic flood delineation models becomes available, building more sophisticated hydrologic and hydraulic models that include soil absorption, geologic porosity, plant interception, and other variables that slow flows or convey surface water below ground can help to provide a deeper understanding of water quality improvements and ground water recharge potential to assess benefits of nature-based solutions.	Complete

Greater Edwards Aquifer Alliance (GEAA)					
Project Title:		Nueces Regional Flood Plan			
Project Development Engineer (PDE):		HDR			
Project Manager:		Bryan Martin			
Deliverable Milestone:		Final Plan 01/10/2022			
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
4	See Oct 5, 2022 Letter Page 2	Annalisa Peace	1d. Work with FEMA to expand the concept of "adverse impact" to include loss of functioning floodplains and the resiliency that they provide.	E - Acknowledge comment, no change made. This is the first flood plan and most of the basin does not enforce 'no adverse impact' regulations that are solely based on hydrology and hydraulic calculations. Suggest this concept be reconsidered in future flood plans.	Complete
5	See Oct 5, 2022 Letter Page 2	Annalisa Peace	1e. Promote collaboration within major watersheds towards a regional approach to floodplain management using NBS	E. Acknowledge comment, no change made. The plan recommends the following NBS FMEs that promote collaboration within the basin: - Nueces Basin Assessment of Flood Mitigation and Performance of Nature-based Solutions (NBS) - Basin-wide analysis on the flood mitigation value of select nature-based solutions (NBS) at a variety of scales and land use types, looking for consistent, accurate, and broadly applicable methods to quantify flood mitigation benefits of NBS. - Scaling Up Nature Based Solutions (NBS) in the region to support community resilience and enhance flood and hazard mitigation planning - Multi-jurisdictional feasibility analyses will be performed in targeted areas to identify a prioritized portfolio of NBS flood mitigation projects and strategies that consider both risk reduction and ecological benefits.	Complete

Greater Edwards Aquifer Alliance (GEAA)					
Project Title:			Nueces Regional Flood Plan		
Project Development Engineer (PDE):			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
6	See Oct 5, 2022 Letter Page 2	Annalisa Peace	Recognize the role that land development codes and location of infrastructure have on flood impacts: 2a. Emphasize the need for counties to be enabled by the state to exert authority to influence development that negatively impacts natural features that mitigate flooding and to levy stormwater/drainage utility fees to retrofit and maintain flood infrastructure.	A- Comment incorporated. Revised text in Chapter 8.2 to read: III.The NRFPG (Region 13) urges the legislature to provide implementation guidance to empower county governments to have greater regulatory control over land development activities, including land use plans, adoption of waterway set-backs to protect natural features that mitigate flooding, and/or levying stormwater drainage impact fees to maintain flood infrastructure if desired. Additionally, to provide funding support to local floodplain administrators to develop accurate inundation mapping, which is current absent in over 70% of the 31-county area in Region 13.	Complete
7	See Oct 5, 2022 Letter Page 2	Annalisa Peace	2b. Promote and fund the use of NBS throughout watersheds with the understanding that most natural flood mitigation features, including our floodplains, are in some state of degradation and can be improved with appropriate land use regulation.	A- Comment incorporated. Added text to Chapter 3.1.3- Most natural flood mitigation features, including floodplains, are in need of maintenance and can be improved with land use management.	Complete

Greater Edwards Aquifer Alliance (GEAA)					
Project Title:			Nueces Regional Flood Plan		
Project Development Engineer (PDE):			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
8	See Oct 5, 2022 Letter Page 2	Annalisa Peace	2c. Encourage legislators to provide counties or Groundwater Conservation Districts with authority to protect natural Aquifer Storage and Recovery features, like karst recharge and fracture zones, and sink holes that help mitigate flood intensity while transferring potential flood water into aquifers.	A- Comment Incorporated. Revised text in Chapter 8.3 to read: IV. The NRFPG (Region 13) urges the legislature to support legislation to empower counties or Groundwater Conservation Districts with authority to protect natural Aquifer Storage and Recovery features, like karst recharge and fracture zones, and sink holes that help mitigate flood intensity while transferring potential flood water into aquifers.	Complete
9	See Oct 5, 2022 Letter Page 2	Annalisa Peace	2d. Ensure that TXDOT builds to 100 year standards as utilizing the best available and most current flood maps and that such infrastructure does not increase downstream flooding nor damage riparian streamsides.	A- Comment incorporated. Added text in Chapter 8.3: IX. The Texas Legislature is urged to support forward-thinking measures for our transportation system by requiring TxDOT to build to 100-year standards using the best available and most current flood maps and that such infrastructure will does not increase downstream flooding nor damage riparian streamsides.	Complete

Greater Edwards Aquifer Alliance (GEAA)					
Project Title:		Nueces Regional Flood Plan			
Project Development Engineer (PDE):		HDR			
Project Manager:		Bryan Martin			
Deliverable Milestone:		Final Plan 01/10/2022			
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
10	See Oct 5, 2022 Letter Page 2	Annalisa Peace	3. Specific project recommendations: 3a. Fund a Texas Watershed Initiative similar to Louisiana's with a robust program on use and adoption of NBS	E. Acknowledge comment, no change made. In 2016 historic flooding exposed deficiencies in Louisiana's approach to floodplain management. The governor issued an executive order to create Louisiana's Watershed Initiative (LWI) to reform the state's approach to flood mitigation. LWI received a $1.2B federal grant to support statewide planning, watershed modeling, and data collection and projects that reduce flood risk. The R13 flood plan includes legislative recommendations to fund projects, maintenance, and NBS.	Complete
11	See Oct 5, 2022 Letter Page 2	Annalisa Peace	3b. Provide training and technical resources to flood districts/floodplain managers to advance understanding and adoption of NBS and best management practices for maintaining floodplains and other natural flood mitigation features to fully realize potential benefits	A- Comment incorporated. Goal #10 in Table 3-3 was revised to add technical capacity/support: Identify funding, resources, and technical training for floodplain districts, managers, administrators or designees to enhance technical capacity for identifying floodplain projects, community outreach, and permitting support to verify new projects meet floodplain development requirements.	Complete

Greater Edwards Aquifer Alliance (GEAA)					
Project Title:		Nueces Regional Flood Plan			
Project Development Engineer (PDE):		HDR			
Project Manager:		Bryan Martin			
Deliverable Milestone:		Final Plan 01/10/2022			
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
12	See Oct 5, 2022 Letter Page 2	Annalisa Peace	3c. Use all available federal and state programs to prioritize the preservation and restoration of natural flood mitigation features throughout watersheds	E. Acknowledge comment, no change made. The legislative recommendations encourages support of funding programs for NBS and land restoration programs in Chapter 8.3: XII. The Texas Legislature is urged to make funds available to support nature-based practices through land conservation, restoration programs, and participation in landowner incentive programs to encourage voluntary land stewardship practices to manage floodwaters by slowing runoff and dissipating flood energy to include riparian, wetland, forest, upland, and other habitat protection programs. Promote land coverage studies to effectively identify riparian corridors to protect for floodplain mitigation and erosion reduction. Additional low interest programs to support voluntary city and county buy-back of lands for county parks and flood mitigation should also be included.	Complete
13	See Oct 5, 2022 Letter Page 2	Annalisa Peace	3d. Develop a compendium of Nature-Based Resources for all Communities across Texas.	A- Comment incorporated. Added text in Chapter 8.1: VIII. The TWDB is encouraged to develop a compendium of resources identifying nature-based solutions for communities to use for flood mitigation purposes.	Complete

Greater Edwards Aquifer Alliance (GEAA)					
Project Title:		Nueces Regional Flood Plan			
Project Development Engineer (PDE):		HDR			
Project Manager:		Bryan Martin			
Deliverable Milestone:		Final Plan 01/10/2022			
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
14	See Oct 5, 2022 Letter Page 2	Annalisa Peace	3e. Recommend policy changes that enable Counties or Groundwater Conservation Districts to protect Natural Aquifer Storage and Recovery features	A- Comment incorporated. Revised text in Chapter 8.3 to read: IV. The NRFPG (Region 13) urges the legislature to support legislation to empower counties or Groundwater Conservation Districts with authority to protect natural Aquifer Storage and Recovery features, like karst recharge and fracture zones, and sink holes that help mitigate flood intensity while transferring potential flood water into aquifers.	Complete
15	See Oct 5, 2022 Letter Page 2	Annalisa Peace	3f. Review submitted FMPs, FMEs and FMSs submitted for this first 5-year cycle to determine the feasibility to include or increase NBS aspects	E. Acknowledge comment, no change made. Agree that this effort may be fruitful in R13 promoting implementation of NBS features. This should be considered in the next planning cycle.	Complete

education
conservation
cooperation

hill country alliance

October 7, 2022

Chairman LJ Francis and Stakeholders
Region 13 Regional Flood Planning

Re: Region 13 Regional Flood Plan

Dear Chairman Francis and Appointed Stakeholders of RFPG 13:

Thank you for your dedicated work and leadership addressing the flood planning needs of Nueces River basin.

I am writing to submit comments regarding Region 13's Draft Regional Flood Plan on behalf of the Hill Country Alliance (HCA). HCA is a regional nonprofit working to preserve land, waters, and night skies across 17 counties of the Hill Country. Our water program is focused on advancing water resource resilience in Hill Country communities and protecting natural infrastructure like aquifers and floodplains. In this capacity, we work with local officials and invested community members across the region and regularly engage our readership of over 7000 Texans living, working, and recreating in the Texas Hill Country.

Nature-based strategies for flood mitigation tend to be highly effective and less costly than construction-based solutions, while providing additional benefits to local communities and natural systems. For instance, smart floodplain protection policies are not only cost-effective and impactful strategies for flood mitigation, but they also tend to provide the additional benefits of improving aquifer recharge and expanding healthy recreational opportunities for nearby communities and visitors. As such, we strongly recommend the implementation of nature-based solutions to flood mitigation whenever possible.

Our partners at the Greater Edwards Aquifer Alliance have written comprehensive recommendations for how we might advance nature-based solutions and protect natural infrastructure through the flood planning process. Their recommendations fully capture our own views on Region 13's Draft Regional Flood Plan, and we endorse them completely. Those recommendations are attached.

We thank you for your consideration. If you have any questions about our position or our comments, or if we can be a resource to your work in any way, please don't hesitate to reach out.

Sincerely,

Marisa Bruno
Water Program Manager
Hill Country Alliance

Cliff Kaplan
Program Director
Hill Country Alliance

Hill Country Alliance				
Project Title:			Nueces Regional Flood Plan	
Project Development Engineer (PDE):			HDR	
Project Manager:			Bryan Martin	
Deliverable Milestone:			Final Plan 01/10/2022	
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made				
Comment #	Comment Location	Reviewer	Comment	Final Disposition
1	See Letter dated Oct 7, 2022	Marisa Bruno, Water Program Manager and Cliff Kaplan, Program Director, of Hill Country Alliance	Nature-based strategies for flood mitigation tend to be highly effective and less costly than construction-based solutions, while providing additional benefits to local communities and natural systems. For instance, smart floodplain protection policies are not only cost-effective and impactful strategies for flood mitigation, but they also tend to provide the additional benefits of improving aquifer recharge and expanding healthy recreational opportunities for nearby communities and visitors. As such, we strongly recommend the implementation of nature-based solutions to flood mitigation whenever possible. Our partners at the Greater Edwards Aquifer Alliance have written comprehensive recommendations for how we might advance nature-based solutions and protect natural infrastructure through the flood planning process. Their recommendations fully capture our own views on Region 13's Draft Regional Flood Plan, and we endorse them completely.	E. Acknowledge comment, no change made. See responses to Greater Edwards Aquifer Alliance comments.

Meeting Notes

Region 13. Nueces Flood Planning Group Meeting Public Hearing

September 26th, 2022

11:00 am

McMullen County EOC, 306 Live Oak Street, Tilden, Texas

Attendees:

Voting

LJ Francis, Chair	Municipalities	City of Corpus Christi
Larry Dovalina, Vice-Chair	Water Utilities	City of Cotulla
Shanna Owens, Secretary	Counties	San Patricio County DEMS
Julie Lewey	River Authorities	Nueces River Authority
Debra Barrett	Agricultural	Barrett Ag
JR Ramirez	Water Utilities	Wintergarden GCD
Robert Williams	Public	Mayor of Jourdanton

Non-Voting

Patrick McGinn – San Patricio County
Reem Zoun – TWDB
Manuel Razo – TWDB
Tressa Olsen - TWDB
Shannan Smith – Mayor Lake City (online)
Judy Lucio – TDEM (online)
Rene Saenz – City of Hondo (online)
Lisa McCracken Mairs – USACE (online)
Kendria Ray – TSSWCB (online)
Jim Tolan – TPWD (online)
Kim Chanslor – CDM Smith (online)
Jenny Bywater – CDM Smith
Jessica Watts – CDM Smith
David Wright – City of Cotulla

Agenda:

1. Call to Order
2. Prayer

3. Presentation: Overview of Nueces Regional Flood Plan by HDR Team
4. Public Input: The NFPG is soliciting public input regarding the Draft Region 13 Nueces Regional Flood Plan (as required per Texas Water Code §16.062(f) and 31 Texas Administrative Code §361.21(h)(3) (A, F)). Public General Comments – limit 3 minutes per person

Draft Plan Chapter Section	Person Submitting Comment	Stakeholder Comments/Questions	NRA/HDR/Other Responses
	Shanna Owens, Region 13 member	My question is about recommending 12" above base flood elevation as the freeboard vs a higher level in the plan. Do we need to say we're recommending 12" now, but changes may be coming later? FEMA will be recommending 2' in 2025. Do we want to recommend 18" for BRIC and special flood hazard areas? Also, San Patricio County is not listed as having higher standards in the Floodplain Management Practices section, but it is on the map. We need to update that.	HDR - This was a discussion item from floodplain goals meeting. The intention was to enable communities without anything in place to put something in place. I agree with what you're saying. Being able to add context would be helpful. We'll double check the text on page 2.
	Larry Dovalina, Region 13 member	A lot of growth is expected in the next 10 years in the southern end of the basin, which is where we had little or no participation. Congestion in Laredo will increase with more traffic on I-35. Growth will increase more when more lanes are added to I-35. Investors want to know where the flood maps are. There will be issues of flooding once investors start investing. TxDOT only plans for a 10 year flood event. When more lanes added, it will get worse.	
Ch 2 – Existing and	Lj Francis, Region 13 member	I didn't get a clear definition of resilience. We used the social vulnerability index for resilience.	TDEM - SVI was used for the

Draft Plan Chapter Section	Person Submitting Comment	Stakeholder Comments/Questions	NRA/HDR/Other Responses
Future Condition Flood Risk Analysis			vulnerability assessment in this first round. We'll look at the definition and expand it in the next round.
	Lj Francis, Region 13 member	I feel that social vulnerability and resilience are different.	TWDB – there was no guidance on how to define resilience. Historically SVI has been used, including in the flood quilt.
	Lj Francis, Region 13 member	My issue is that the SVI inserts a lot of squishiness. It's very subjective and there are more quantitative approaches that would be more appropriate. Vulnerability and resilience are 2 different things. In the Future Condition Analysis, it's not clear what built-in resilience exists. We did a good job on vulnerability but it appears interchangeable with resilience. I would like us to look at that for the next time. Look at published data, mathematical models that describe risk resilience, in addition to the SVI. We should have a more concrete method. It has to be more quantitative. We would still have to define what is satisfactory or unsatisfactory.	HDR - has TWDB identified tools for measuring resilience other than SVI? TWDB - at this time, we can look at what exists. We kept it open for regions if they want to go above and beyond. But we don't require it. We can look at what other regions are doing and get back to you. We are engaging in research to look at that. SVI looks at the ability to bounce back from all

Draft Plan Chapter Section	Person Submitting Comment	Stakeholder Comments/Questions	NRA/HDR/Other Responses
			disasters, not just flood. We're working with a Texas university to look at vulnerability that is flood specific. That will be available for the next cycle.
	Lj Francis, Region 13 member	Both quantitative and qualitative?	TWDB – yes.
	Lj Francis, Region 13 member	In flood planning, I had problem with using minority status as an indication of preparedness. I don't think that is a true indication. There are better methods.	

Adjourned.

Nueces Flood Planning Group Public Hearing on Sept 26, 2022					
Project Title:			Nueces Regional Flood Plan		
Project Development Engineer:			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
1	Ch 2 - Existing ...	LJ Francis	"I didn't get a clear definition of resilience. We used the social vulnerability index for resilience"	E. Acknowledge comment, no change made. The U.S. Centers for Disease Control and Prevention calculates a Social Vulnerability Index (SVI) using 15 U.S. census variables to help local officials identify communities that may need support before, during, or after disasters. The higher the SVI value the higher the vulnerability and the lower the SVI the higher the resilience. The SVI is intended as the proxy for resilience for this first planning cycle. We'll look at the definition and expand it in the next round.	Complete
2	Future Condition Flood Risk Analysis	LJ Francis	I feel that social vulnerability and resilience are different	E. Acknowledge comment, no change made. Agree vulnerability and resilience are different. Vulnerability considers a community's susceptibilities to harm while resilience considers the capacity of a community to recovery after a disaster. As stated above the SVI is intended as the proxy for resilience for this first planning cycle.	Complete

Nueces Flood Planning Group Public Hearing on Sept 26, 2022					
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Project Development Engineer:		HDR			
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Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
3	Future Condition Flood Risk Analysis	LJ Francis	"My issue is that the SVI inserts a lot of squishiness. It's very subjective and there are more quantitative approaches that would be more appropriate. Vulnerability and resilience are 2 different things. In the Future Condition Analysis, it's not clear what built-in resilience exists. We did a good job on vulnerability but it appears interchangeable with resilience. I would like us to look at that for the next time. Look at published data, mathematical models that describe risk resilience, in addition to the SVI. We should have a more concrete method. It has to be more quantitative. We would still have to define what is satisfactory or unsatisfactory"	E. Acknowledge comment, no change made. Acknowledge that the SVI may not be the best measure for resilience. The measure for resilience and what qualifies as satisfactory or unsatisfactory for this metric will be further investigated and considered during the next planning cycle. We have received the following publications for future consideration: 'Reliability, Resiliency, and Vulnerability Criteria for Water Resource System Performance Evaluation' Tsuyoshi Hashimoto, 1982 'Performance evaluation of a water resource system under varying climatic conditions: Reliability, Resilience, Vulnerability and beyond' Tirusew Asefa, 2013	Complete
4	Future Condition Flood Risk Analysis	LJ Francis	"In flood planning, I had problem with using minority status as an indication of preparedness. I don't think that is a true indication. There are better methods"	E. Acknowledge comment, no change made. Assumption that this comment is in regards to the use of SVI, which considers racial and ethnic minority status. The measures for vulnerability and resilience can be further investigated and considered for the next flood plan.	Complete

Nueces Flood Planning Group Public Hearing on Sept 26, 2022					
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Project Development Engineer:		HDR			
Project Manager:		Bryan Martin			
Deliverable Milestone:		Final Plan 01/10/2022			
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
5	Chapter 3 Recommended Strategy for Floodplain Management and Floodplain Management Practices	Shanna Owens	"My question is about recommending 12” above base flood elevation as the freeboard vs a higher level in the plan. Do we need to say we’re recommending 12” now, but changes may be coming later? FEMA will be recommending 2’ in 2025. Do we want to recommend 18” for BRIC and special flood hazard areas? Also, San Patricio County is not listed as having higher standards in the Floodplain Management Practices section, but it is on the map. We need to update that"	A- Comment incorporated. (1) Additional text was placed in Chapter 3.1.3 that strongly encourages adoption of 2' above BFE consistent with upcoming FEMA guidance (grey text is from the draft plan): Finished floor of structures should be a minimum of 1 foot above base flood elevations (BFE) 100 year or based on local ordinances, whichever is higher. The NRFPG strongly encourages cities and counties in the Nueces Basin to actively consider a minimum 2 feet above base flood elevations, consistent with upcoming 2025 FEMA ordinances. Such higher standards build more resilience and reduces future flood risk for homeowners. (2) San Patricio County is included in the Higher Standards list in Chapter 3.1.1.4. Added text in that section, stating San Patricio Counties freeboard standard of 2.0 ft above the existing BFE.	Complete

Nueces Flood Planning Group Public Hearing on Sept 26, 2022					
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Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
6	General	Larry Dovalina	"A lot of growth is expected in the next 10 years in the southern end of the basin, which is where we had little or no participation. Congestion in Laredo will increase with more traffic on I-35. Growth will increase more when more lanes are added to I-35. Investors want to know where the flood maps are. There will be issues of flooding once investors start investing. TxDOT only plans for a 10 year flood event. When more lanes added, it will get worse"	A. Comment incorporated. TWDB is currently developing updated base level engineering (BLE) mapping for the entire Nueces Basin, which is scheduled for release in 2023 as described in Chapter 3.1.3. Related to TxDOT planning, a new legislative recommendation was added to Chapter 8.3: IX. The Texas Legislature is urged to support forward-thinking measures for our transportation system by requiring TxDOT to build to 100-year standards using the best available and most current flood maps and that such infrastructure does not increase downstream flooding nor damage riparian streamsides.	Complete

Comments on Region 13 Regional Flood Planning Group

Background

State legislation enabling the Regional Flood Plan process provided guidelines and deliverables to be accomplished by each flood planning group, with regional plans becoming the basis of a state flood plan. These plans are developed through the creation and identification of projects to be considered for future funding. Enabling legislation also directed the Texas Water Development Board (TWDB) to identify and evaluate natural flood mitigation features and include Nature Based Solutions (NBS) among proposed flood mitigation projects.

Region 13, along with all the other Regional Flood Planning Groups (RFPGs) have had to work under a tight timeline during the initial planning round – and we appreciate the work the Region has put into making a holistic flood plan. In particular, the National Wildlife Federation's Texas Coast and Water Program and Sierra Club, Lone Star Chapter are encouraged by the following recommendations and goals included in Region 6's draft Regional Flood Plan:

- *Administrative Recommendations:*
    - The NRFPG should play a role in facilitating public information/public education activities in the Nueces Basin and providing support to local public agencies to promote a wider understanding of state and regional flood issues and the importance of flood preparedness and long-range regional flood planning and mitigation;
    - The TWDB should provide a funding mechanism for smaller communities to receive dedicated funding for studies / planning efforts to identify flood management strategies (FMSs), flood management evaluations (FMEs), and flood mitigation plans (FMPs), including both traditional, engineered flood mitigation projects and nature-based solutions. Most smaller communities do not have the resources to hire an engineer to complete these studies.
    - The TWDB should use the project list in the adopted RFP and state flood plan (SFP) to help connect local communities to grant programs administered by federal or other state agencies; and
    - The TWDB is encouraged to consider use of hybrid approaches that blend structural engineered projects and nature-based solutions for flood mitigation: a) Incentivize voluntary buy out programs, turning previously flooded properties/neighborhoods into stormwater parks as an alternative to large scale construction projects; and b) Provide training to state

agencies, local governments, engineers, planners in the use of natural floodplain preservation/conservation.

- *Regulatory Recommendations:*
    - *The Texas Legislature is urged to support adoption of 2015 or 2018 versions of International Building Code and International Residential Code as State Building Standards;*
    - *The Texas Legislature is urged to develop a program through the TWDB to provide support services to rural and socioeconomic disadvantaged communities to develop and maintain flood management activities; and*
    - *The NRFPG (Region 13) urges the legislature to support legislation to empower county governments to have greater regulatory control over land development activities.*

- *Legislative Recommendations*:
    - The Texas Legislature should continue to provide funding to state agencies for flood planning initiatives, including providing technical support and assistance to county and city floodplain administrators or designees to support development of building standards, permitting support to verify new projects meet floodplain development requirements, and training; and
    - The Texas Legislature is urged to make funds available to support nature based practices through land conservation, restoration programs, and participation in landowner incentive programs to encourage voluntary land stewardship practices to manage floodwaters by slowing runoff and dissipating flood energy to include riparian, wetland, forest, upland, and other habitat protection programs. Promote land coverage studies to effectively identify riparian corridors to protect for floodplain mitigation and erosion reduction. Additional low interest programs to support voluntary city and county buy-back of lands for county parks and flood mitigation should also be included.

- *Adopted Flood Protection Goals*:
    - Reduce the number of structures within NFHL-Detailed Study Area and Existing Floodplain with 1% annual chance flood risk;
    - Prepare minimum flood management standards, including identifying operations and maintenance best practices to maintain drainage structures including remove gravel and sediment deposition to mitigate future flooding impacts;

- Increase nature-based practices through land conservation and restoration programs and participation in landowner incentive programs to encourage voluntary land stewardship practices to manage floodwaters, slow runoff and dissipate flood energy to include riparian, wetland, forest, upland, and other habitat protection programs; and
- Develop public information campaigns to increase community knowledge of rules and regulations, flood-prone areas, and importance of protecting floodplains from encroachment.

The process and initial regional planning round has highlighted several areas of concern regarding the evaluation of natural flood mitigation features for their level of function and the incorporation of nature based solutions into flood control strategies.

Equity and nature-based solutions will need to be woven into every facet of this program and incorporated into future policies and strategies in order to empower community collaboration and leverage the state's vast network of natural ecosystems in building resilient communities. The following **comments and recommendations specific to Region 13** seek to better ensure an equitable flood plan, and one that centers natural infrastructure and nature-based projects. We recognize that the region will not be able to address some comments provided in the current planning cycle, however it is our hope that during subsequent rounds these comments will be taken into consideration.

I. Apply alternative methodologies to assess future conditions analysis for inland riverine areas

According to *Information included in rules and scope of work* subsection (pg. 29), RFPGs shall perform a future condition flood hazard analysis to determine the location of both 1% annual chance and 0.2% annual chance flood events. In Method 1, the TWDB provided a methodology that looked at future population increases to determine future conditions. The TWDB, however, noted that "an increase in flood water surface elevations based solely on population increase will lead to underestimation of flood risks. The increase in population will vary within a floodplain which means a general regionwide relationship, as indicated in the document, cannot be established within an RFPG. To refine these methods, we suggest including high resolution data based on remote sensing and satellite altimetry to improve water surface elevations and more accurate flood extent."

Region 13 utilized Method 1 to analyze future conditions throughout the region. Population growth and a corresponding horizontal floodplain buffer was applied to the existing 1 percent and 0.2 percent annual chance floodplains. This inland approach was established due to the lack of available detailed floodplain data and hydrologic/hydraulic

models. Notably, when applying this methodology, it was estimated that "no floodplain increase [were] attributed to population growth…outside the city areas."[1] We are therefore concerned that this methodology will greatly underestimate future flood conditions. We suggest comparing this methodology to other methodologies provided by the TWDB to better estimate future flood conditions in inland areas.

II. *Apply higher-end sea level rise projections to assess future conditions analysis for Coastal Zones*

Currently, the future conditions for Region 13 are based on a low scenario of 1.2 ft sea level rise. This is an extremely conservative estimate, and most projections show confidence in an intermediate to intermediate high increase in sea levels. We recommend using the intermediate to intermediate high projections for planning.

III. *Expand the types of structures included when assessing vulnerability of Critical Facilities and weigh these structures higher during the Flood Mitigation Needs assessment*

Region 13 included schools, hospitcals, police stations, and fire stations as critical facilities when determining vulnerability to flood hazards. Unlike many other regions, Region 13 did not include chemical plants, refineries, chemical storage facilities, oil and gas infrastructure, and Superfund sites as critical facilities. We believe that these other facilities need to be included in order to have a proper understanding of the Region 13's flood risk. Additionally, during the Flood Mitigation Needs Assessment in Chapter 4, Region 13 should weigh these additional facilities higher than hospitals, schools, fire stations, and police stations, as they can pose additional risks to the health and safety of communities when flooded.

IV. *We support Region 13's Minimum Floodplain Management Regulations*

Region 13 required two minimum floodplain management regulations:compliance with Texas Water Code Section 16.3145 and FEMA's National Flood Insurance Program (NFIP) participation. As these regulations are widespread across the region, and create a strong foundation for the region, we support the inclusion of these as minimum floodplain management regulations.

V. *Include a Goal to increase enforcement of Floodplain Ordinances*

[1] Region 13, Draft Regional Flood Plan, at 2-26 to 2-27.

The level of enforcement of floodplain management practices varied across Region 13, with the highest enforcement located near high growth urban areas of Corpus Christi, San Antonio, and Laredo. However, for the vast majority of counties and municipalities, the Region was not able to determine level of enforcement. We believe that Region 13 should include a goal for the region to increase knowledge of enforcement across the region, and to increase levels of enforcement, region-wide.

VI. Include impact to natural infrastructure in No Negative Impacts analysis

Natural features and nature-based infrastructure provide significant flood mitigation benefits to neighboring communities. The analysis of "No Negative Impacts" should include impacts to natural infrastructure.

VII. We support The Nature Conservancy's recommended flood studies to address goals

The Nature Conservancy proposed two flood studies to address nature based practices goals: Nueces Basin Assessment of Flood Mitigation and Performance of Nature-based Solutions (NBS) and Scaling Up Nature Based Solutions (NBS) in the Nueces Flood Planning Region to support community resilience and enhance flood and hazard mitigation planning. Nature-based solutions can provide effective and resilient flood mitigation infrastructure to communities, and we are in support of the inclusion of these flood studies into the Regional Flood Plan for Region 13.

VIII. Include annual appropriations to FIF as a legislative recommendation

We recommend that Region 13 include a legislative recommendation that the state should allocate funding for recurring biennial appropriations to the Flood Infrastructure Fund. Annual appropriations to FIF will ensure that the state can continue to invest in FMPs included in the regional flood plans. 7 out of 14 regions analyzed have included this as a recommendation in their draft plans.

We appreciate the work the Region is doing to help better plan for and protect our communities from flooding. Further, we appreciate the opportunity to submit these comments.

Sincerely,

Arsum Pathak
Senior Adaptation and Coastal Resilience Specialist, South Central Region

National Wildlife Federation
PathakA@NWF.org

Danielle Goshen
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National Wildlife Federation					
Project Title:			Nueces Regional Flood Plan		
Project Development Engineer:			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
1	Chapter 2.3 - Future Condition Flood Hazard Analysis		"Apply alternative methodologies to assess future conditions analysis for inland riverine areas" According to Information included in rules and scope of work subsection (pg. 29), RFPGs shall perform a future condition flood hazard analysis to determine the location of both 1% annual chance and 0.2% annual chance flood events. In Method 1, the TWDB provided a methodology that looked at future population increases to determine future conditions. The TWDB, however, noted that "an increase in flood water surface elevations based solely on population increase will lead to underestimation of flood risks. The increase in population will vary within a floodplain which means a general regionwide relationship, as indicated in the document, cannot be established within an RFPG. To refine these methods, we suggest including high resolution data based on remote sensing and satellite altimetry to improve water surface elevations and more accurate flood extent." Region 13 utilized Method 1 to analyze future conditions throughout the region. Population growth and a corresponding horizontal floodplain buffer was applied to the existing 1 percent and 0.2 percent annual chance floodplains. This inland approach was established due to the lack of available detailed floodplain data and hydrologic/hydraulic models. Notably, when applying this methodology, it was estimated that "no floodplain increase [were] attributed to population growth…outside the city areas."1 We are therefore concerned that this methodology will greatly underestimate future flood conditions. We suggest comparing this methodology to other methodologies provided by the TWDB to better estimate future flood conditions in inland areas.	E. Acknowledge comment, no change made. We understand the concern that the use of only population data and corresponding floodplain buffers to represent future flood conditions may underestimate future flood conditions. This approach was used in consideration of the compressed schedule, budget, and available data for this first flood plan. We agree further investigations and considerations of other data be considered for future flood plans.	Complete

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Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
2	Chapter 2.3 - Future Condition Flood Hazard Analysis		"Apply higher-end sea level rise projections to assess future conditions analysis for Coastal Zones" "Currently, the future conditions for Region 13 are based on a low scenario of 1.2 ft sea level rise. This is an extremely conservative estimate, and most projections show confidence in an intermediate to intermediate high increase in sea levels. We recommend using the intermediate to intermediate high projections for planning"	E. Acknowledge comment, no change made. At the March 28, 2022 planning group meeting a 1.2-foot sea level rise for the year 2050 was selected and approved, which is similar to the NOAA 2022 intermediate sea level rise of 1.1-foot. Thus, an 'intermediate' scenario was selected and not a 'low' scenario. Note, an 'intermediate high' scenario correlates to a 1.3-foot sea level rise by 2050.	Complete

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Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
3	Chapter 2.1.3.1 - Vulnerability of Critical Facilities		"Expand the types of structures included when assessing vulnerability of Critical Facilities and weigh these structure higher during the Flood Mitigation Needs assessment" Region 13 included schools, hospitals, police stations, and fire stations as critical facilities when determining vulnerability to flood hazards. Unlike many other regions, Region 13 did not include chemical plants, refineries, chemical storage facilities, oil and gas infrastructure, and Superfund sites as critical facilities. We believe that these other facilities need to be included in order to have a proper understanding of the Region 13's flood risk. Additionally, during the Flood Mitigation Needs Assessment in Chapter 4, Region 13 should weigh these additional facilities higher than hospitals, schools, fire stations, and police stations, as they can pose additional risks to the health and safety of communities when flooded.	E. Acknowledge comment, no change made. TWDB guidance on types of critical facilities included as critical facilities the following: medical servicer provider, police/fire/EMS, schools, public infrastructure (i.e. w/ww treatment plants). Implementation of this guidance resulted in the Region 13 critical infrastructure layer including the following: shelters, schools, power generation, hospitals, airports, DOD military facilities, natural gas pipelines, transmission lines, and fire station facilities. We did not include chemical plants, refineries, chemical storage facilities, and Superfund sites. Agree, that facilities could be considered critical infrastructure as they pose a risk to health and safety if flooded. Additional consideration should be given to include these facilities as critical during the next planning cycle and to factor them into the Flood Mitigation Needs assessment.	Complete

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Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
4			"We support Region 13's Minimum Floodplain Management Regulations" Region 13 required two minimum floodplain management regulations: compliance with Texas Water Code Section 16.3145 and FEMA's National Flood Insurance Program (NFIP) participation. As these regulations are widespread across the region, and create a strong foundation for the region, we support the inclusion of these as	E. Acknowledge comment, no change made. Noted.	Complete
5			"Include a Goal to increase enforcement of Floodplain Ordinances" The level of enforcement of floodplain management practices varied across Region 13, with the highest enforcement located near high growth urban areas of Corpus Christi, San Antonio, and Laredo. However, for the vast majority of counties and municipalities, the Region was not able to determine level of enforcement. We believe that Region 13 should include a goal for the region to increase knowledge of enforcement across the region, and to increase levels of enforcement, region-wide.	A. Comment incorporated. Although the NRFPG does not have enforcement authority, the plan provides recommendations to support local authorities in developing floodplain management practices and summarizes enforcement level across the region based on survey responses. The NRFPG recognizes that enforcement of standards is required for communities participating in the National Flood Insurance Program. An additional administrative recommendation has been added in Chapter 8: The TWDB is encouraged to prepare a brief report that summarizes enforcement levels of floodplain ordinances for all cities and counties (where applicable) and includes guidance on tools and resources that are available to help communities improve the enforcement of floodplain standards.	Complete

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Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
6			"Include impact to natural infrastructure in No Negative Impacts analysis" Natural features and nature-based infrastructure provide significant flood mitigation benefits to neighboring communities. The analysis of "No Negative Impacts" should include impacts to natural infrastructure.	D - Disagree. The use of hydrologic and hydraulic calculations/models is the primary method to evaluate negative impacts of a flood project to neighboring lands. The TWDB provides guidance on determining 'no negative impact' relative to hydrologic and hydraulic parameters in this first state flood plan. It is not clear how no negative impacts to natural infrastructure would be quantified. Suggest Region 13 continue to follow TWDB guidance on 'no negative impact'.	Complete
7			"We support The Nature Conservancy's recommended flood studies to address goals" The Nature Conservancy proposed two flood studies to address nature based practices goals: Nueces Basin Assessment of Flood Mitigation and Performance of Nature-based Solutions (NBS) and Scaling Up Nature Based Solutions (NBS) in the Nueces Flood Planning Region to support community resilience and enhance flood and hazard mitigation planning. Nature-based solutions can provide effective and resilient flood mitigation infrastructure to communities, and we are in support of the inclusion of these flood studies into the Regional Flood Plan for Region 13.	E. Acknowledge comment, no change made. Noted.	Complete

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8			"Include annual appropriations to FIF as a legislative recommendation" We recommend that Region 13 include a legislative recommendation that the state should allocate funding for recurring biennial appropriations to the Flood Infrastructure Fund. Annual appropriations to FIF will ensure that the state can continue to invest in FMPs included in the regional flood plans. 7 out of 14 regions analyzed have included this as a recommendation in their draft plans.	A- Comment incorporated. Added text in Chapter 8.3: X.The Texas Legislature is urged to provide biennial appropriations to maintain the Flood Infrastructure Fund. Biennial appropriations to FIF will ensure that the state can continue to invest in FMPs included in the regional flood plans.	Complete

U.S. Corp of Engineers R13 Draft Plan Comments

RFPG Comments Regarding Legislative Recommendations, Regulatory and Administrative Recommendations and State Flood Planning Recommendations		
Name	**Flood Plan Recommendations**	**Comments**
Jerry Cotter	**Table 8.1 Legislative**	
	Non regulatory regional flood control or drainage districts should be established and funded for rapidly growing urban areas such as DFW, Houston, San Antonio, etc. Responsibility would be to provide consistency, technical resources, funding and reviews in support of FME's, FMS's. These organizations would also implement or support implementation of FMP's. These organizations would augment communities and counties that just don't have the resources and expertise to manage flooding.	Rapidly developing areas surrounding larger urban centers are at greater risk of having runoff patterns increasing because of development. These urban areas are comprised of many communities and unincorporated county areas. Many of the smaller communities are not funded or resourced to deal with the complexities of floodplain management and therefore there is a lack of or inconsistencies in floodplain management practices.
	Clarify the early 2000's state legislation that provide counties the authority to regulate floodplains to explicidly allow and encorage activiites associated with floodplain management such as development of land use plans, regulatory authorites, e.g. permitting.	Although state legislation was passed in the early 2000's which gave counties the ability to regulate floodplains, interpretation of these regulations varies widely from county to county. The legislate bill lacks implementation guidance in the form of administrative rules. If development is occuring in unincorporated areas, this development can dynamically impact flood risk.
Jerry Cotter	**Table 8.2 Regulatory**	
	Require the use of n-values and channel conditions which would likely result if the channel or project were not maintained. Exceptions would be golf courses or other areas where an organization exists which would maintain the channel in perpetuity. Disallow maintence by marginal organizations such as home owners associations to justify acceptance of lower n-values as this is an unrealistic expectation.	When channels are constructed, most often channel bed, banks and overbanks are cleared; however; with many miles of these channels, it is often difficult for communities to maintain those beds, banks and overbanks at their design conditions. Generally, there is a lack of channel maintenance to ensure flood conveyance areas, established as part of a development or improvement projects, to retain their design level n-values. This results in unexpected changes in channel conveyance and increased flooding. Channel maintenance is very expensive activity that can trigger environmenatl permitting requirements.
	No loss of valley storage to the 500-year level. Communities could allow redistribution of valley storage to allow interactions with natural areas but no loss of storage.	Land development in upstream areas increases runoff in downstream areas. This happens because of increased impervious cover and decreased tree cover, and therefore less ability to absorb rainfall. Additionally, development, in most communities, encroaches into riparian areas and decreases the amount of storage available to accommodate flood waters. Just the main thread of the Trinity River though DFW stors more flood waters during of flood than any three of the USACE reservoirs that provide flood protection for DFW. The many other stream provide even more storage than the main stem. There is limited capacity in rivers and streams to convey floodwaters. This means that all areas above any given conveyance point have to stor flood water until sufficient time has laps to pass the water away from the impacted area. The streams are where this water is stored and depleting these storage areas will impact DS areas.
	Establish future land use plans for unincorporated areas associated with rapidly growing urban areas.	"
	Use of ultimate development land use conditions in the development of future flows. Require use of future flows for regulation of floodplains and development of FMP's.	"
Jerry Cotter	**Table 8.3 State Flood Planning Recommendations**	
	None	
	Potential FMS	
	Encorage storm shifting to validate 100-yr estimates and to provide a broader understanding of communities actual flood risk Storms identified and cataloged as part of the GLO funded USACE led Texas Storm Study could be the primary source of storms to be shifted.	Notes: Great deal of uncertainty in 100-yr estimates. Use of observed storms that approximately match depth duration data from NOAA Atlas 14 or other precipitation frequency sources validates 100-yr estimates. Additionally wet, dry and average conditions as well as conditions at the time the storm occured can be presented. Additionally, communities have and can experience storms that exceed the 100-yr. While not regulatory, this information will provide additional hazard mitigation data so communities can address critical infrastructure impacts and be better prepared.
	Add detail to Watersshed Hydrology Assessments (WHA) for communities within basins with completed WHA's. The WHA for the Trinity has been completed.	The WHA's, funded by FEMA, are considered the best available flood flow frequency estimates, e.g. 100-yr. These estimates consider the latest precipitation frequencies, the variations in watershed response and determine critical flood drivers by employing a wide range of sensitivity analysis for each computation point.
	Update WHA's when future precipitation frequency estimates become available. Efforts to develop future precipitation frequency estimates for Texas are starting.	
	Establish regional efforts, for large urban centers to develop future land use data for all developing areas, not just encorporated areas, for use in developing future flood flow frequency estimates and future 100-yr (and other recurrence interval) hazard boundaries.	

U.S. Corp of Engineers					
Project Title:			Nueces Regional Flood Plan		
Project Development Engineer:			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
1	Chapter 8 .1 Legislative Recommend .	Jerry Cotter	Comment Rapidly developing areas surrounding larger urban centers are at greater risk of having runoff patterns increasing because of development. These urban areas are comprised of many communities and unincorporated county areas. Many of the smaller communities are not funded or resourced to deal with the complexities of floodplain management and therefore there is a lack of or inconsistencies in floodplain management practices. Recommendation Non regulatory regional flood control or drainage districts should be established and funded for rapidly growing urban areas such as DFW, Houston, San Antonio, etc. Responsibility would be to provide consistency, technical resources, funding and reviews in support of FME's, FMS's. These organizations would also implement or support implementation of FMP's. These organizations would augment communities and counties that just don't have the resources and expertise to manage flooding.	A- Comment incorporated. Added text to Administrative Recommendations in Chapter 8.1: IV. The NRFPG encourages counties and cities to consider drainage districts as a mechanism to manage flooding.	Complete

U.S. Corp of Engineers					
Project Title:			Nueces Regional Flood Plan		
Project Development Engineer:			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
2	Chapter 8 .1 Legislative Recommend .		Comment Although state legislation was passed in the early 2000's which gave counties the ability to regulate floodplains, interpretation of these regulations varies widely from county to county. The legislate bill lacks implementation guidance in the form of administrative rules. If development is occurring in unincorporated areas, this development can dynamically impact flood risk. Recommendation Clarify the early 2000's state legislation that provide counties the authority to regulate floodplains to explicitly allow and encourage activities associated with floodplain management such as development of land use plans, regulatory authorities, e.g. permitting.	A- Comment incorporated. Added text to Regulatory/Policy Recommendations in Chapter 8.2: III.The NRFPG (Region 13) urges the legislature to provide implementation guidance to empower county governments to have greater regulatory control over land development activities, including land use plans, adoption of waterway set-backs to protect natural features that mitigate flooding, and/or levying stormwater drainage impact fees to maintain flood infrastructure if desired. Additionally, to provide funding support to local floodplain administrators to develop accurate inundation mapping, which is current absent in over 70% of the 31-county area in Region 13.	Complete

U.S. Corp of Engineers					
Project Title:			Nueces Regional Flood Plan		
Project Development Engineer:			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
3	Chapter 8.2 Regulatory		Comment When channels are constructed, most often channel bed, banks and overbanks are cleared; however; with many miles of these channels, it is often difficult for communities to maintain those beds, banks and overbanks at their design conditions. Generally, there is a lack of channel maintenance to ensure flood conveyance areas, established as part of a development or improvement projects, to retain their design level n-values. This results in unexpected changes in channel conveyance and increased flooding. Channel maintenance is very expensive activity that can trigger environmental permitting requirements. Recommendation Require the use of n-values and channel conditions which would likely result if the channel or project were not maintained. Exceptions would be golf courses or other areas where an organization exists which would maintain the channel in perpetuity. Disallow maintenance by marginal organizations such as home owners associations to justify acceptance of lower n-values as this is an unrealistic expectation.	A- Comment incorporated. Agree that channel maintenance often should not be relied upon for flood benefits unless well funded in perpetuity. Added text to Chapter 8.3 legislative recommendations (text from the draft plan shown in grey). V. The Texas Legislature should continue to provide funding to state agencies for flood planning initiatives, including providing technical support and assistance to county and city floodplain administrators or designees to support development of building standards, permitting support to verify new projects meet floodplain development requirements, and training. These initiatives should prioritize solutions that do not rely on channel maintenance programs to reduce flood risk.	Complete

U.S. Corp of Engineers					
Project Title:			Nueces Regional Flood Plan		
Project Development Engineer:			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
4			Comment Land development in upstream areas increases runoff in downstream areas. This happens because of increased impervious cover and decreased tree cover, and therefore less ability to absorb rainfall. Additionally, development, in most communities, encroaches into riparian areas and decreases the amount of storage available to accommodate flood waters. Just the main thread of the Trinity River though DFW stores more flood waters during of flood than any three of the USACE reservoirs that provide flood protection for DFW. The many other streams provide even more storage than the main stem. There is limited capacity in rivers and streams to convey floodwaters. This means that all areas above any given conveyance point have to store flood water until sufficient time has laps to pass the water away from the impacted area. The streams are where this water is stored and depleting these storage areas will impact downstream areas. Recommendation No loss of valley storage to the 500-year level. Communities could allow redistribution of valley storage to allow interactions with natural areas but no loss of storage.	A- Comment incorporated. This is a good practice and will help protect against the loss of floodplain storage and protect downstream areas from flooding from upstream development. Added text to Chapter 3.1.2 - Land development in upstream areas is apt to increase runoff in downstream areas by encroaching on riparian areas that diminishes the capacity of streams to store flood waters during storm events. The NRFPG recommends that cities and counties consider ordinances for land developers to consider flood mitigation measures to reduce future flood risk.	Complete

U.S. Corp of Engineers					
Project Title:			Nueces Regional Flood Plan		
Project Development Engineer:			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
5			Comment Establish future land use plans for unincorporated areas associated with rapidly growing urban areas.	E. Acknowledge comment, no change made. Land use plans are a helpful tool in managing growth and associated flood issues created by that growth. This strategy will be further considered in future plan updates. For the first plan the focus is to highly encourage 2' of freeboard for finished floor elevations and to obtain accurate flood maps for high flood risk areas.	Complete
6			Comment Use of ultimate development land use conditions in the development of future flows. Require use of future flows for regulation of floodplains and development of FMP's.	E. Acknowledge comment, no change made. Use of ultimate development land use condition is one of the higher standards listed in the TFMA Guide for Higher Standards in Floodplain Management. One of the goals in the region is the adoption of higher standards by communities.	Complete

U.S. Corp of Engineers					
Project Title:			Nueces Regional Flood Plan		
Project Development Engineer:			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
7			Potential FMS Encorage storm shifting to validate 100-yr estimates and to provide a broader understanding of communities actual flood risk. Storms identified and cataloged as part of the GLO funded USACE led Texas Storm Study could be the primary source of storms to be shifted. Notes: Great deal of uncertainty in 100-yr estimates. Use of observed storms that approximately match depth duration data from NOAA Atlas 14 or other precipitation frequency sources validates 100-yr estimates. Additionally wet, dry and average conditions as well as conditions at the time the storm occured can be presented. Additionally, communities have and can experience storms that exceed the 100-yr. While not regulatory, this information will provide additional hazard mitigation data so communities can address critical infrastructure impacts and be better prepared.	E. Acknowledge comment, no change made. Our understanding of 'storm shifting' is the application of simulating the rainfall of an historic storm event to a new location to understand the flood risk if a similar storm were to occur again. Storm shifting would provide beneficial information and help communities be better prepared. This strategy should be considered in future flood plans once the basic flood mapping needs are met. At this time most of the region lacks detailed flood models.	Complete

U.S. Corp of Engineers					
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Project Development Engineer:			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
8			Potential FMS Add detail to Watershed Hydrology Assessments (WHA) for communities within basins with completed WHA's. The WHA for the Trinity has been completed. The WHA's, funded by FEMA, are considered the best available flood flow frequency estimates, e.g. 100-yr. These estimates consider the latest precipitation frequencies, the variations in watershed response and determine critical flood drivers by employing a wide range of sensitivity analysis for each computation point.	E. Acknowledge comment, no change made. No WHA is known to be completed in the Nueces Basin.	Complete
9			Potential FMS Update WHA's when future precipitation frequency estimates become available. Efforts to develop future precipitation frequency estimates for Texas are starting.	E. Acknowledge comment, no change made. Noted.	Complete
10			Potential FMS Establish regional efforts, for large urban centers to develop future land use data for all developing areas, not just incorporated areas, for use in developing future flood flow frequency estimates and future 100-yr (and other recurrence interval) hazard boundaries.	E. Acknowledge comment, no change made. This strategy would be helpful in high growth areas within the basin to better plan for future development and to limited associated flood risks. This strategy should be considered in future flood plans.	Complete

Nueces Regional Flood Plan Draft Comments

Executive Summary

Numbered page 4 under Flood Hazard

Recheck how the % values are written, just pick a format and stick to it as it is confusing.

- Recommendation:
    - Special Flood Hazard Area is the 100-year or 1% annual chance of flooding, up to or beyond the BFE.
    - The 500 year is the 0.20% annual chance of flooding, up to or beyond the BFE.

Maps are a bit fuzzy, is there a way to sharpen them up?

Page 11 under Higher Floodplain Management Standards

San Patricio County has a 24" freeboard requirement for any development within the unincorporated areas of the County. This is a higher standard, but they are not listed in this section. In the map San Patricio County is highlighted to be at a higher standard, these two should match.

Question, maybe I was not available for the conversation, but why did we go with the 12" freeboard instead of a higher level?

- The standard for NFIP is at BFE, but they recommend the 12", should we not at least go to 18" to split the difference from minimum to high standard?
- There are structures in a 100 year floodplain that could not get assistance from FEMA unless they elevated the structure. If we recommend a higher standard then we build more resilience for the homeowner in the future.

Numbered page 12 under Greatest Flood Risk and Flood Mitigation Needs paragraph 1 line 3 where it has the percent again.

- I just recommend that we stick to one way of describing the 100 and 500-year floodplains.

Chapter 1

What happened to the table of contents?

Page 1-17, 5th bullet point down be the same throughout the plan with how we describe the 100 and 500-year floodplains.

San Patricio County					
Project Title:			Nueces Regional Flood Plan		
Project Development Engineer:			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
1	Executive Summary page 4		Recheck how the % values are written, just pick a format and stick to it as it is confusing. Recommendation: Special Flood Hazard Area is the 100-year or 1% annual chance of flooding, up to or beyond the BFE. The 500 year is the 0.20% annual chance of flooding, up to or beyond the BFE.	A - Comment incorporated Revised to use 1% and 0.2% annual chance consistently throughout the document when describing the probability of occurrence of the 'Flood Hazard'. Note this is how TWDB describes it in their guidance documents.	Complete
2	Executive Summary		Maps are a bit fuzzy, is there a way to sharpen them up?	A - Comment incorporated Higher resolution figures were used where possible.	Complete
3	Page 11 under Higher Floodplain Management Standards		San Patricio County has a 24” freeboard requirement for any development within the unincorporated areas of the County. This is a higher standard, but they are not listed in this section. In the map San Patricio County is highlighted to be at a higher standard, these two should match.	A - Comment incorporated Revised the text under this section to state San Patricio County has a 24" freeboard requirement.	Complete

San Patricio County					
Project Title:			Nueces Regional Flood Plan		
Project Development Engineer:			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment incorporated; D = Disagree; E = Acknowledge comment, no change made					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
4	3.1.1.4 Higher Floodplain Management Standards		Why did we go with the 12" freeboard instead of a higher level? The standard for NFIP is at BFE, but they recommend the 12", should we not at least go to 18" to split the difference from minimum to high standard? There are structures in a 100 year floodplain that could not get assistance from FEMA unless they elevated the structure. If we recommend a higher standard then we build more resilience for the homeowner in the future.	A - Comment incorporated. Additional text was placed in Chapter 3.1.3 that strongly encourages adoption of 2' above BFE consistent with upcoming FEMA guidance (grey text is from the draft plan): Finished floor of structures should be a minimum of 1 foot above base flood elevations (BFE) 100 year or based on local ordinances, whichever is higher. The NRFPG strongly encourages cities and counties in the Nueces Basin to actively consider a minimum 2 foot above base flood elevations, consistent with upcoming 2025 FEMA ordinances. Such higher standards build more resilience and reduces future flood risk for homeowners.	Complete
5	Numbered page 12 under Greatest Flood Risk and Flood Mitigation Needs paragraph 1 line 3 where it has the percent again.		I just recommend that we stick to one way of describing the 100 and 500-year floodplains.	A - Comment incorporated Revised to use 1% and 0.2% annual chance consistently.	Complete
6	Chapter 1		What happened to the table of contents?	E. Acknowledge comment, no change made. Table of contents are not provided for each chapter but rather at the beginning of the report	Complete
7	Page 1-17, 5th bullet point down		Be the same throughout the plan with how we describe the 100 and 500-year floodplains.	A - Comment incorporated Revised to use 1% and 0.2% annual chance consistently.	Complete

BARBARA CANALES
COUNTY JUDGE

Maggie Turner
Chief Executive to County Judge
maggie.turner@nuecesco.com
(361) 888-0264

Monica Perez
Executive Secretary
monica.perez1@nuecesco.com
(361) 888-0444

Louie M. Ray, Jr.
Emergency Management Coordinator
louie.ray@nuecesco.com
(361) 888-0513

October 25, 2022

Sent Via Email

Travis Pruski
Director of Planning
Nueces River Authority
539 South Highway 83
Uvalde, Texas 78801

RE: TWDB Region 13 Draft Regional Flood Plan – Nueces County Public Comment

Dear Travis:

On behalf of Nueces County, we request having thirty-one (31) additional Flood Management Evaluations (FMEs) identified by the TWDB Tri-County Drainage Master Plan Study included in the draft regional flood plan for the Nueces Basin. The attached list of 31 FMEs along with an exhibit of the study area was recently approved by Nueces County Commissioners Court on October 19, 2022, for submittal to the TWDB Region 13 – Regional Flood Planning Group (RFPG) for consideration. As discussed, our Program Manager, Susan Roth, will coordinate with you to provide the RFPG with the required technical information for projects developed in the next stage of the TWDB Tri-County Drainage Master Plan Study by no later than March 1, 2023, in order to have them classified as Flood Mitigation Projects (FMPs) in the TWDB Region 13 – Regional Flood Plan.

We appreciate your favorable consideration of our request. If you have any questions or need additional information, please do not hesitate to contact me at (361) 888-0264.

Sincerely,

Barbara Canales

Barbara Canales
County Judge

Cc: Susan Roth, P.E., Susan Roth Consulting, LLC
Kristi Shaw, P.E., HDR Engineering, Inc.

TWDB Nueces County Regional Drainage Master Plan Study

Additional FMXs to incorporate into TWDB Region 13 - Draft Flood Plan for Nueces Basin

Official Response to Public Comment Period (October 26, 2022)

Additional FMXs	Label/Circle Number	Precinct Location
The Ranch & Cyndie Park Area	1	1
Westwood Estates Area	2	1
Indian Trails	3	1
Rancho Banquete Area	4	1
Banquete	5	1
Agua Dulce	6	1
La Paloma Ranch Area	7	2
North Robstown Area*	8	1
IH 69E Crossing*	9	1
Robstown Drains	10	3
Callicoatte Farm Area	11	1
FM 1694 & TX 44 North	12	3
FM 1694 & TX 44 South	13	3
County Road 61 & TX 44	14	3
Spring Gardens & Primavera Estates Area	15	3
Tierra Verde Area	16	3
Lost Creek & Nye & Peterson Farm Area	17	1
FM 892	18	2,3
Driscoll	19	1
Fiesta Ranch Area	20	1
FM 665 & CR 69 Area	21	2
Petronila Acres Area	22	2
Tierra Grande & Crossroads Estates Area	23	2
San Petronila Estates Area	24	2
Corpus Christi International Airport	25	3
Balchuck Lane & Digger Lane	26	4
Nottingham Acres Area	27	4
South Prairie Estates Area	28	4
US Naval Base	29	2
Petronila Creek Environmental Study	30	NA
Santa Maria Area	31	4

Project Area Name	Label Number	Precinct
The Ranch & Cyndie Park Area	1	1
Westwood Estates Area	2	1
Indian Trails	3	1
Rancho Banquete Area	4	1
Banquete	5	1
Agua Dulce	6	1
La Paloma Ranch Area	7	2
North Robstown Area	8	1
IH 69E Crossing	9	1
Robstown Drains	10	3
Callicoatte Farm Area	11	1
FM 1694 & TX 44 North	12	3
FM 1694 & TX 44 South	13	3
County Road 61 & TX 44	14	3
Spring Gardens & Primavera Estates Area	15	3
Tierra Verde Area	16	3
Lost Creek & Nye & Peterson Farm Area	17	1
FM 892	18	2,3
Driscoll	19	1
Fiesta Ranch Area	20	1
FM 665 & CR 69 Area	21	2
Petronila Acres Area	22	2
Tierra Grande & Crossroads Estates Area	23	2
San Petronila Estates Area	24	2
Corpus Christi International Airport	25	3
Balchuck Ln & Digger Ln	26	4
Nottingham Acres Area	27	4
South Prairie Estates Area	28	4
Cabaniss NOLF	29	2
Petronila Creek Environmental Study	30	NA
Santa Maria Area	31	4

STATE OF TEXAS
COUNTY OF NUECES

Nueces County Drainage Master Plan Study
Risk Area Identification

Legend

- Prelim. Identified Areas of Risk
- Upcoming Funded Projects

Nueces Co. Precincts

- Precinct 1
- Precinct 2
- Precinct 3
- Precinct 4
- Nueces Co. Drainage District 2

13-in in 24 hrs (100YR) DRAFT Depth

- 0.33 - 0.5ft
- 0.5 - 1ft
- 1 - 3ft
- 3+ ft

N

0 0.5 1 2 Miles

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Gmail

Susan Roth <susan@srothconsulting.com>

Agenda Item 3A4 from 10/19/22 Court

Monica Perez <monica.perez1@nuecesco.com> Wed, Oct 26, 2022 at 11:11 AM
To: "Susan @ Roth Consulting" <susan@srothconsulting.com>

Good morning Susan,

Maggie asked me to help you out in getting a copy of the approval of AI: 3A4. I've put, below, a copy of the item that is on the Minutes to be approved in Commissioners Court next week.

I hope this helps if not let me know exactly what you're looking for and I'll be happy to see about getting it for you.

3.A.4. The Court approved the official response of the public notice period for the Texas Water Development Board (TWDB) Region 13 Regional Flood Planning Group; approved the request to include thirty-one (31) additional Flood Management Evaluations/Flood Mitigation Projects identified by the Tri-County Drainage Master Plan Study into the draft regional flood plan for the Nueces Basin.

Motion by: County Judge Canales, Second by: Commissioner Gonzalez

Vote: 5 - 0 Approved

Motion by: County Judge Canales, Second by: Commissioner Chesney

Motion: Include all 31 projects identified.

Vote: 5 - 0 Approved

Attachments:

Rec. of Flood Risk Areas for Further Analysis

Overall Map for Drainage Study - Flood Risk Areas

Thanks,

Monica Perez

Executive Secretary to County Judge Barbara Canales

Nueces County Courthouse

901 Leopard Street, Ste. 303

Corpus Christi, Texas 78401

Ph:361.888.0444

Fax: 361.888.0445

Monica.Perez1@nuecesco.com

Nueces County					
Project Title:			Nueces Regional Flood Plan		
Project Development Engineer:			HDR		
Project Manager:			Bryan Martin		
Deliverable Milestone:			Final Plan 01/10/2022		
Final Disposition: A = Comment to be incorporated; D = Disagree; E = No change required					
Comment #	Comment Location	Reviewer	Comment	Final Disposition	Final Verification
1	Draft Plan		On behalf of Nueces County, we request having thirty-one (31) additional Flood Management Evaluations (FMEs) identified by the TWDB Tri-County Drainage Master Plan Study included in the draft regional flood plan for the Nueces Basin. The attached list of 31 FMEs along with an exhibit of the study area was recently approved by Nueces County Commissioners Court on October 19, 2022, for submittal to the TWDB Region 13 — Regional Flood Planning Group (RFPG) for consideration. As discussed, our Program Manager, Susan Roth, will coordinate with you to provide the RFPG with the required technical information for projects developed in the next stage of the TWDB Tri-County Drainage Master Plan Study by no later than March 1, 2023, in order to have them classified as Flood Mitigation Projects (FMPs) in the TWDB Region 13 — Regional Flood Plan.	E. Acknowledge comment, no change made. The additional FMEs and FMPs will be added to the plan as part of the plan amendment process in 2023, as additional information becomes available on projects that are in the process of being identified in the TWDB Tri-County Drainage Master Plan Study. HDR has participated in four calls with the Tri-County Drainage consultant team to date and continues to coordinate through ongoing Task 12 activities.	Complete