Technical Memorandum

2023 Regional Flood Plan
Nueces Basin −Region 13

Texas Water Development Board
January 7, 2022

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Contents

Tables

Figures

Appendices

Appendix A: Exhibit C, Table 6, Existing Floodplain Management Practices

Appendix B: Historical Flood Information Compiled for the Nueces FPR to Assess Flood Prone Areas

Appendix C: Exhibit C, Table 12, Potential Flood Management Evaluations, Identified by the Regional Flood Planning Group

Appendix D: Exhibit C, Table 13, Potentially Feasible Flood Mitigation Projects, Identified by the Regional Flood Planning Group

Appendix E: Exhibit C, Table 14, Potentially Feasible Flood Management Strategies, Identified by the Regional Flood Planning Group

List of Abbreviations

BLE	base level elevation
FAFDS	First American Flood Data Services
FEMA	Federal Emergency Management Agency
FIF	TWDB Flood Infrastructure Funding
FME	flood management evaluations
FMS	flood management strategies
FMP	flood mitigation projects
FPR	flood planning region
HDR	HDR Engineering, Inc.
LWC	low-water crossing
NFHL	National Flood Hazard Layer
NFIP	National Flood Insurance Program
Nueces FPR	Nueces flood planning region
RFPG	Regional Flood Planning Group
TNRIS	Texas Natural Resources Information System
TWDB	Texas Water Development Board
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey

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Background

This Technical Memorandum is an interim submittal to support development of the 2023 Nueces Basin Regional Flood Plan. On December 6, 2021, the Nueces Regional Flood Planning Group (RFPG) approved and authorized the Nueces River Authority to submit this technical memorandum and associated data to the TWDB.

1 Political Subdivisions with Flood-Related Authority

A list of existing political subdivisions within the Nueces FPR that have flood-related authorities or responsibilities is provided in Table 1-1. After the list of political subdivisions was identified for the Nueces Flood Planning Region (Nueces FPR), a point of contact was assigned for each entity based on the Federal Emergency Management Agency (FEMA) Community Contact Report (dated 2/12/2021), and additional information provided by the Nueces River Authority. HDR Engineering, Inc. (HDR) developed a Floodplain Management Survey on existing practices and sent it to the identified contact.

Table 1-1. List of Flood-Related Authorities Within the Nueces FPR

Entity[A]	Entity ID	Currently Engaged in Flood Planning Activities (Yes/ No/ Unknown)	Floodplain Management Regulations (Yes/ No/ Unknown)[A]	NFIP Participant (Yes/ No)[A,C]	Higher Standards Adopted (Yes/ No)[B]
Counties					
Aransas County	00000083	Yes	Yes	Yes	Yes
Atascosa County	00000096	Unknown	Unknown	Yes	Yes
Bandera County	00000011	Yes	Yes	Yes	No
Bee County	13000087	Unknown	Unknown	Yes	
Bexar County	00000007	Yes	Yes	Yes	Yes
Brooks County	00000073	Unknown	Unknown	Yes	
Dimmit County	00000254	No	No	Yes	No
Duval County	13000079	Yes	No	Yes	No
Edwards County	00000021	Yes	Unknown	Yes	
Frio County	13000093	Yes	Yes	Yes	No
Goliad County	00000090	Unknown	Unknown	Yes	

Entity[A]	Entity ID	Currently Engaged in Flood Planning Activities (Yes/ No/ Unknown)	Floodplain Management Regulations (Yes/ No/ Unknown)[A]	NFIP Participant (Yes/ No)[A,C]	Higher Standards Adopted (Yes/ No)[B]
Jim Hogg County	00000076	Unknown	Unknown	Yes	
Jim Wells County	13000080	Unknown	Unknown	Yes	
Karnes County	00000095	Yes	Yes	Yes	No
Kenedy County	00000074	Unknown	Unknown	Yes	
Kerr County	00000022	Yes	Yes	Yes	Yes
Kinney County	00000101	Unknown	Unknown	Yes	
Kleberg County	13000077	Unknown	Unknown	Yes	
La Salle County	13000085	Unknown	Unknown	Yes	
Live Oak County	13000089	Unknown	Unknown	Yes	Yes
Maverick County	00000091	Unknown	Unknown	Yes	
McMullen County	13000086	Unknown	Unknown	Yes	
Medina County	00000005	Yes	Yes	Yes	Yes
Nueces County	13000078	Unknown	Unknown	Yes	
Real County	00000015	Yes	Yes	Yes	No
Refugio County	00000084	Yes	Yes	Yes	No
San Patricio County	13000081	Yes	Yes	Yes	No
Uvalde County	13000001	Unknown	Unknown	Yes	
Webb County	00000082	Yes	Yes	Yes	No
Wilson County	00000100	Yes	Yes	Yes	No
Zavala County	13000092	Yes	Yes	Yes	No
Cities					
Agua Dulce	13002546	Unknown	Unknown	Yes	
Alice	13003128	Unknown	Unknown	Yes	Yes
Aransas Pass	13002735	Unknown	Unknown	Yes	
Asherton	13002555	Unknown	Unknown	Yes	
Bayside	13003122	Unknown	Unknown	Yes	

Entity[A]	Entity ID	Currently Engaged in Flood Planning Activities (Yes/ No/ Unknown)	Floodplain Management Regulations (Yes/ No/ Unknown)[A]	NFIP Participant (Yes/ No)[A,C]	Higher Standards Adopted (Yes/ No)[B]
Benavides	13003410	Unknown	Unknown	Yes	
Big Wells	13002553	Unknown	Unknown	No[D]	
Camp Wood	13002625	Unknown	Unknown	Yes	
Carrizo Springs	13002556	Unknown	Unknown	Yes	
Charlotte	13003214	Unknown	Unknown	Yes	Yes
Christine	13003215	Unknown	Unknown	Yes[D]	
City of Beeville	13002711	No	No	Yes	No
City of Bishop	13002388	Yes	Yes	Yes	No
City of Corpus Christi	13002625	Yes	Yes	Yes	Yes
City of Cotulla	13003005	Yes	Yes	Yes	No
City of Gregory	13002558	Yes	Yes	Yes	No
City of Hondo	13002953	Yes	Yes	Yes	No
City of Ingleside	13002930	Yes	Yes	Yes	Yes
City of Ingleside on the Bay	13003248	Yes	Yes	Yes	No
City of Leakey	13002626	Yes	Yes	Yes	No
City of Lytle	13002446	Unknown	Unknown	Yes	
City of Port Aransas	13003368	Yes	Yes	Yes	No
City of Portland	13003233	Yes	Yes	Yes	No
City of Sinton	13002864	Yes	Yes	Yes	No
City of Uvalde	13002952	Yes	Yes	Yes	No
Crystal City	13003432	Unknown	Unknown	Yes	
Devine	13003378	Unknown	Unknown	Yes	
Dilley	13003073	Unknown	Unknown	Yes	
Driscoll	13002389	Unknown	Unknown	Yes	
Encinal	13003006	Unknown	Unknown	Yes	
Falfurrias	13003038	Unknown	Unknown	Yes	

Entity[A]	Entity ID	Currently Engaged in Flood Planning Activities (Yes/ No/ Unknown)	Floodplain Management Regulations (Yes/ No/ Unknown)[A]	NFIP Participant (Yes/ No)[A,C]	Higher Standards Adopted (Yes/ No)[B]
Cities					
Freer	13003411	Unknown	Unknown	Yes	
Fulton	13003450	Unknown	Unknown	Yes	
George West	13003096	Unknown	Unknown	Yes	
Jourdanton	13003116	Unknown	Unknown	Yes	
Kingsville	13002378	Unknown	Unknown	Yes	Yes
Lake City	13003249	Unknown	Unknown	Yes	
Lakeside	13003250	Unknown	Unknown	Yes	
Mathis	13003251	Unknown	Unknown	Yes	
Natalia	13002955	Unknown	Unknown	Yes	
Odem	13003412	Unknown	Unknown	Yes	
Orange Grove	13003130	Unknown	Unknown	Yes	
Pearsall	13003230	Unknown	Unknown	Yes	
Petronila	13002390	Unknown	Unknown	No	
Pleasanton	13003117	Unknown	Unknown	Yes	
Poteet	13003118	Unknown	Unknown	Yes	
Premont	13003131	Unknown	Unknown	Yes	
Refugio	13003123	Unknown	Unknown	Yes	
Robstown	13002392	Unknown	Unknown	Yes	
Rockport	13003451	Unknown	Unknown	Yes	
Rocksprings	00003592	Unknown	Unknown	Yes	
Sabinal	13003329	Unknown	Unknown	Yes	
San Diego	13003127	Unknown	Unknown	Yes	
San Patricio	13003234	Unknown	Unknown	Yes	
Taft	13002882	Unknown	Unknown	Yes	
Three Rivers	13002540	Unknown	Unknown	Yes	

Entity[A]	Entity ID	Currently Engaged in Flood Planning Activities (Yes/ No/ Unknown)	Floodplain Management Regulations (Yes/ No/ Unknown)[A]	NFIP Participant (Yes/ No)[A,C]	Higher Standards Adopted (Yes/ No)[B]
Woodsboro	13003124	Unknown	Unknown	Yes	
River Authorities					
Nueces River Authority	00000290	Yes	No	No	
Other (Council of Governments [COGs], Drainage/Conservation Districts, Fresh Water Supply District (FWSD), Water Authorities, Districts, Water Control and Improvement Districts [WCIDs], Municipal Utility Districts (MUDs), Municipal Water Districts (MWDs), Underground Water Conservation Districts (UWCDs), and Others)					
Alamo Area Council of Governments	00000255	Unknown	Unknown	No	
Alice Water Authority	13001788	Unknown	Unknown	No	
Aransas County MUD 1	13000881	Unknown	Unknown	No	
Aransas County Navigation District	13000381	Unknown	Unknown	No	
Aransas County WCID 1	13000727	Unknown	Unknown	No	
Beeville Water Supply District	00000339	Unknown	Unknown	No	
Bexar-Medina-Atascosa Counties WCID 1	13001488	Unknown	Unknown	No	
Canyon Regional Water Authority	00000392	Unknown	Unknown	No	
Coastal Bend Council of Governments	00000260	Unknown	Unknown	No	
Corpus Christi Downtown Management District	13001739	Unknown	Unknown	No	
Duval County Conservation & Reclamation District	13001666	No	No	No	No
Escondido Watershed District	00000519	Unknown	Unknown	No	
Freer WCID	13001665	Unknown	Unknown	No	
Golden Crescent Regional Planning Commission	00000264	Unknown	Unknown	No	
Hondo Creek Watershed Improvement District	00000526	Unknown	Unknown	No	
Jim Hogg County WCID 2	13000843	Unknown	Unknown	No	
Jim Wells County FWSD 1	13000842	Unknown	Unknown	No	
Lamar Improvement District	13001044	Unknown	Unknown	No	

Entity[A]	Entity ID	Currently Engaged in Flood Planning Activities (Yes/ No/ Unknown)	Floodplain Management Regulations (Yes/ No/ Unknown)[A]	NFIP Participant (Yes/ No)[A,C]	Higher Standards Adopted (Yes/ No)[B]
Maverick County WCID 1	00000951	Unknown	Unknown	No	
McMullen County WCID #1	13000949	No	No	No	No
Medina County WCID 2	13000948	Unknown	Unknown	No	
Middle Rio Grande Dev Council	00000268	Unknown	Unknown	No	
Nueces County Bishop Driscoll Drainage District 3	13000384	Unknown	Unknown	No	
Nueces County Drainage & Conservation District 2	13000940	Unknown	Unknown	No	
Nueces County WCID 3	13000982	Unknown	Unknown	No	
Nueces County WCID 4	13000981	Unknown	Unknown	No	
Nueces County WCID 5	13000980	Unknown	Unknown	No	
Padre Island Gateway Municipal Management District	13000876	Unknown	Unknown	No	
Pettus MUD	13001487	Unknown	Unknown	No	
Port of Corpus Christi Authority	13000409	Unknown	Unknown	No	
Refugio County Drainage District 1	00001608	Unknown	Unknown	No	
Refugio County Navigation District	00000758	Unknown	Unknown	No	
Refugio County WCID 2	00000714	Unknown	Unknown	No	
Rio Grande Regional Water Authority	00001609	Unknown	Unknown	No	
Riviera WCID	13000674	Unknown	Unknown	No	
San Diego MUD 1	13001741	Unknown	Unknown	No	
San Patricio County Drainage District	13000585	No	No	No	No
San Patricio County MUD 1	13000972	Unknown	Unknown	No	
San Patricio County Navigation District 1	13000576	Unknown	Unknown	No	
San Patricio MWD	13000586	Unknown	Unknown	No	
South Texas Development Council	00000276	Unknown	Unknown	No	

Entity[A]	Entity ID	Currently Engaged in Flood Planning Activities (Yes/ No/ Unknown)	Floodplain Management Regulations (Yes/ No/ Unknown)[A]	NFIP Participant (Yes/ No)[A,C]	Higher Standards Adopted (Yes/ No)[B]
South Texas Water Authority	13000779	Unknown	Unknown	No	
Three Rivers Water District	13000851	Unknown	Unknown	No	
Zavala County WCID 1	13000902	Unknown	Unknown	No	
Uvalde County UWCD		No	No	No	No

[A] At a minimum, the RFPGs must list all counties, cities and districts in the region with flood related authority in the region and identify whether entity they have any established floodplain management practices.

[B] This field may be left blank during the 1st planning cycle. However, RFPGs are strongly encouraged to provide this information when applicable and available.

[C] Communities Participating in the National Flood Program- Texas, FEMA Community Status Book Report, May 15, 2021. *FEMA NFIP Participation Book – TX 5-15-21.pdf*

Thirty-two entities of the 134 identified in the Nueces FPR responded to the survey. Sixteen of the 31 counties located at least partly within the Nueces FPR responded to the survey. Twelve of the 57 cities located within the Nueces FPR responded to the survey. Four of the 45 water control districts located within the Nueces FPR responded to the survey.

A total of 25 entities reported that they had floodplain management regulations. The level of enforcement of floodplain management regulations within the basin are shown in Figure 1-1. The level of floodplain management practices and enforcement was identified as high, moderate, low, or none, as defined below, within the Nueces FPR.

- High Level – Actively enforces the entire ordinance, performs many inspections throughout the construction process, issues fines, violations, and Section 1316s where appropriate, and enforces substantial damage and substantial improvement.
- Moderate Level – Enforces much of the ordinance, performs limited inspections and is limited in issuance of fines and violations.
- Low Level – Provides permitting of development in the floodplain, may not perform inspections, may not issue fines or violations.
- None – Does not enforce floodplain management regulations.

Of the responses received, 10 entities reported having a high level, 14 entities reported having a ‘moderate level, 6 entities reported having a low level, and 2 entities reported having no level of floodplain management practices and enforcement.

Of the responses received, 28 entities reported that they are participants of the National Flood Insurance Program (NFIP) and 11 entities have adopted higher standards according to the Texas Floodplain Management Association (TFMA) 2016 higher standards survey. One entity reported having an existing stormwater or drainage fee.

A list of existing floodplain management practices based on survey responses is included in **Appendix A**.

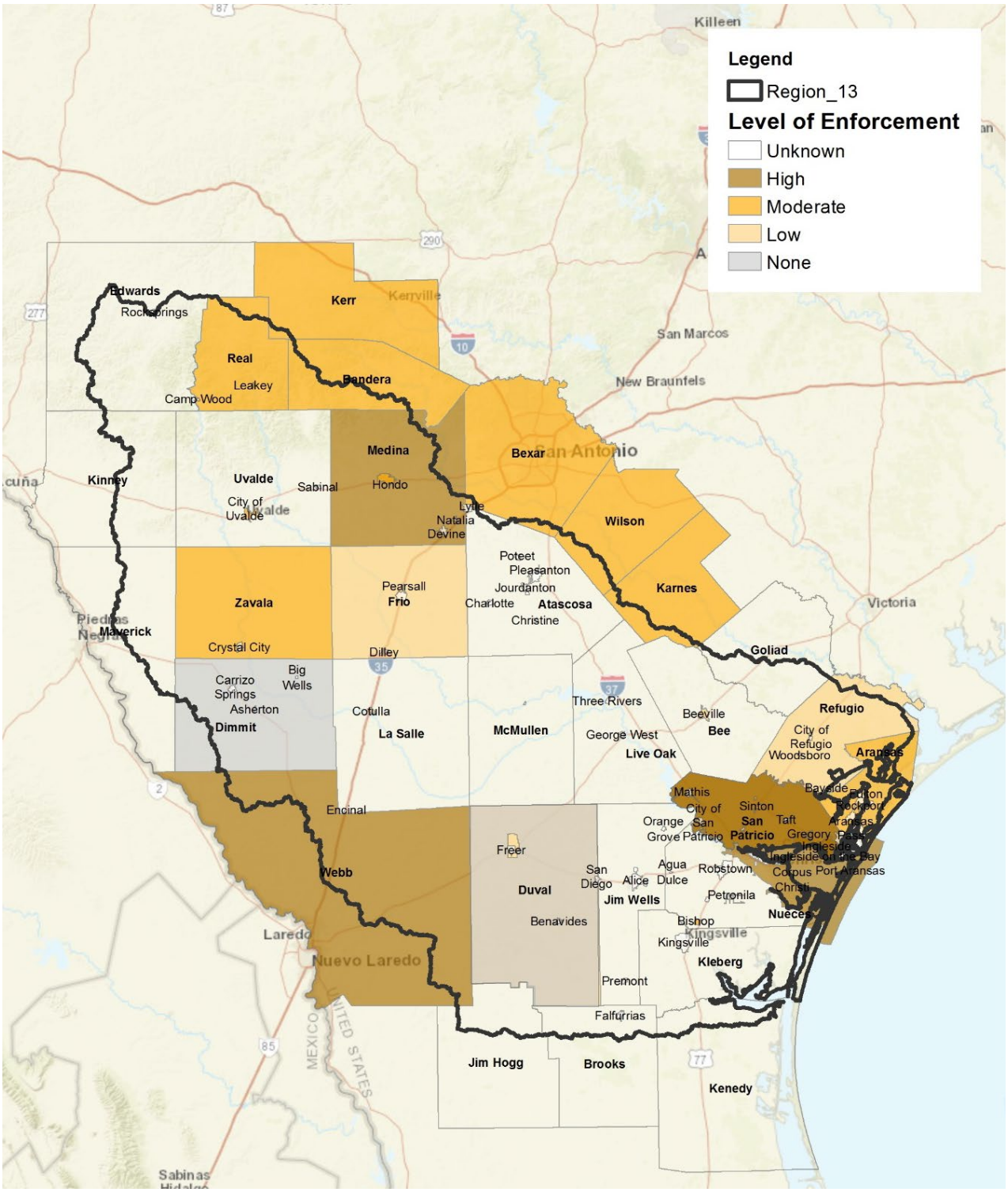


Figure 1-1. Degree of Floodplain Management Practices

2 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 Table 2-1.

Table 2-1. Previous Local and Regional Relevant Flood Plans and Studies

Previous and Relevant Flood Study	Description	Jurisdictions	Counties	Year
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
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
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

Previous and Relevant Flood Study	Description	Jurisdictions	Counties	Year
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
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
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
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
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

Previous and Relevant Flood Study	Description	Jurisdictions	Counties	Year
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
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 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
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

3 Inundation Boundaries

A geodatabase and associated maps in accordance with Texas Water Development Board (TWDB) flood planning guidance documents that the RFPG considers to be best representation of the region-wide 1.0 percent annual chance flood event and 0.2 percent annual chance flood event inundation boundaries, and the source of flooding for each area, for use in its risk analysis, including indications of locations where such boundaries remain undefined was prepared and is included in the electronic submittal to accompany this technical memorandum**.**

3.1 Existing Flood Hazard

The 1.0 percent and 0.2 percent annual chance flood inundation boundaries were defined for all waterways with contributing drainage areas larger than one square mile for the entire basin. This complete coverage was due in part to the availability of Fathom flood inundation boundaries for the entire basin. The most accurate inundation boundaries were applied when multiple inundation data sets were available.

The floodplain quilt was obtained from TWDB and 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, inundation boundaries were obtained from the City of Corpus Christi and some flood-prone areas were identified from public comments. The following list the various flood inundation data sets used, in order of accuracy from most accurate to least accurate, including the base level elevation (BLE) data and above considered accurate.

1. National Flood Hazard Layer (NFHL) Pending Data
2. NFHL Preliminary Data
3. Corpus Christi Downtown Study
4. NFHL Effective Data
5. BLE
6. NFHL Approximate Study Areas
7. First American Flood Data Services (FAFDS)
8. Fathom Draft Data[1]
9. Public Comments

A large portion of the regional flood planning area contains approximately 1.0 percent annual chance flood inundation boundaries but no 0.2 percent annual chance flood inundation boundaries (i.e., NFHL approximate study areas or lower accuracy data). Thus, for these areas, the 0.2 percent annual chance flood inundation boundary had to be estimated for approximate areas by buffering the 100-year 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 1.0 percent and 0.2 percent annual chance flood inundation boundary using a similar offset between the 1.0 percent and 0.2 percent annual chance flood inundation boundary.

[1] July 14, 2021 version.

The existing condition 1.0 percent and 0.2 percent annual chance flood inundation boundaries are provided in the geodatabase (i.e., ExFldHazard) and are available for interactive viewing at Region 13 Nueces (arcgis.com) in the Task 2 tab. Figure 3-1 below provides a region-wide depiction of the 1.0 percent annual chance flood event and 0.2 percent annual chance flood event inundation boundaries, and the source of flooding for each area, for use in the risk analysis.

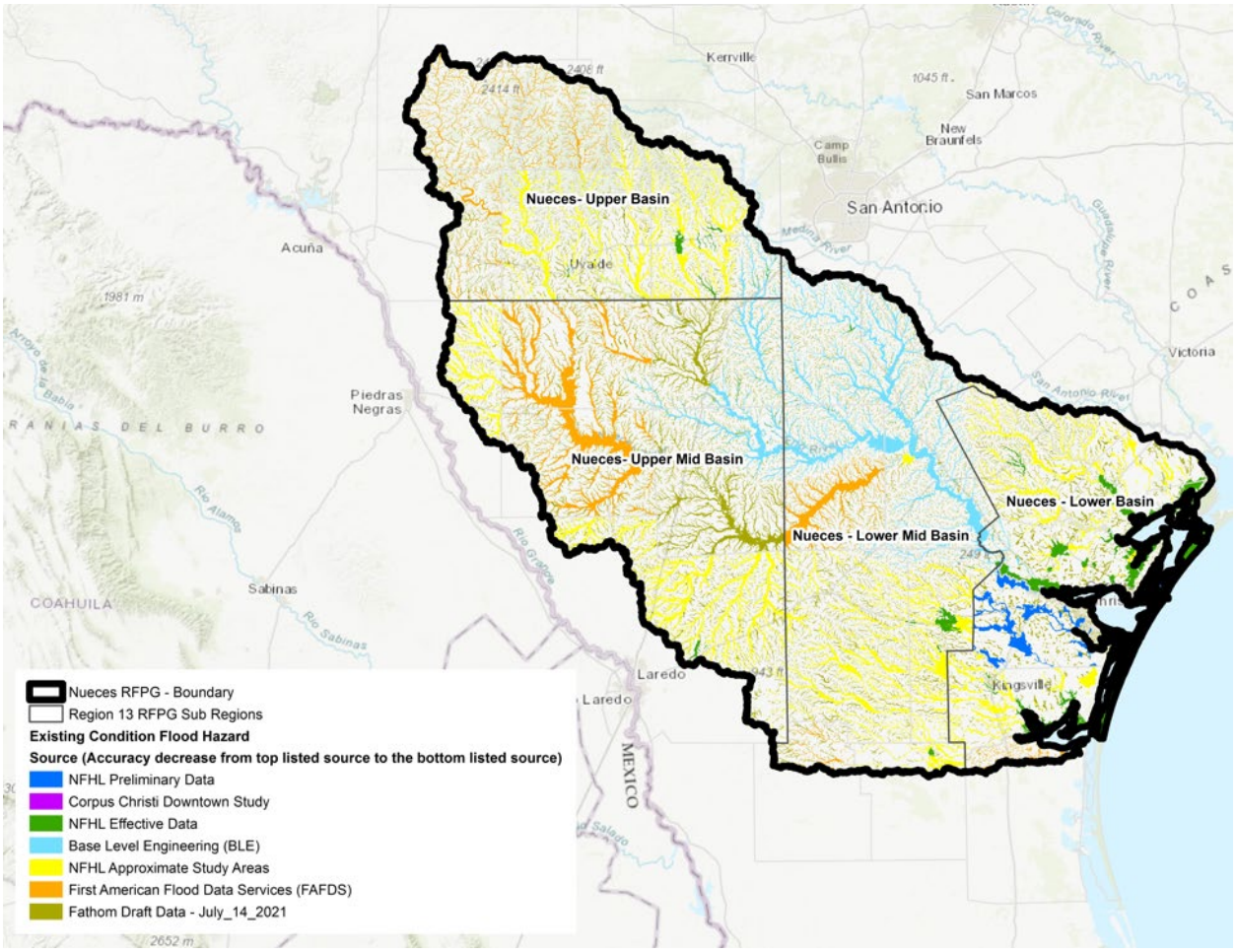


Figure 3-1. Inundation Boundary Sources

3.2 Future Flood Hazard

Future flood conditions represent projected conditions 30 years into the future, or year 2050, and can be influenced by several factors, such as the following:

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

For the 2020 to 2023 planning cycle, the development of future floodplains for riverine systems (inland areas) was considered to be dependent on population growth and coastal systems was considered to be dependent on population growth and sea level rise. This approach was established due to the lack of available detailed floodplain data and hydrologic/hydraulic models.

For riverine systems, the following approach was used to create future floodplains based on population growth.

Population growth projections for 2050 were determined for all cities or populated areas as well as county-wide regions within the entire watershed based on information from the 2021 State Water Plan. There is a direct correlation between population growth and an increase in development or impervious cover, which is a driving factor for adverse floodplain impacts.

The horizontal floodplain buffers summarized in Table 3-1 were developed to approximate the increase in the 1.0 percent and 0.2 percent annual chance flood inundation boundaries based on projected population increases, which are applied as appropriate to the existing 1.0 percent and 0.2 percent annual chance boundaries to obtain the future condition boundaries surrounding cities and concentrated populated areas.

Table 3-1. Future Condition Buffers based on Estimated Population Increase

Estimated Population Increase	Estimated, corresponding buffer in floodplain width	
	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. However, based on projected population density increases within the county regions, it was determined maximum increases were less than 20 people per square mile. Based on these assessments, it was estimated that no floodplain increases attributed to population growth would occur outside the city areas; therefore, they were shown as no change. Future 100-year and 500-year floodplain areas within the county regions, outside of cities or populated areas, were assumed to match the existing floodplain limits.

For coastal systems, an approach is currently under development to assess future flood hazards.

The future condition 1.0 percent and 0.2 percent annual chance flood inundation boundaries are provided in the geodatabase (i.e., FutFldHazard) and are available for interactive viewing at Region 13 Nueces (arcgis.com) in the Task 2 tab.

4 Additional Flood-Prone Areas

A geodatabase and associated maps in accordance with TWDB flood planning guidance documents that identify additional flood-prone areas not described in (c) based on location of hydrologic features, historic flooding, and/or local knowledge was prepared and is included in the electronic submittal to accompany this technical memorandum and for interactive viewing at Region 13 Nueces (arcgis.com).

Additional flood-prone areas were identified based on the location of hydrologic features, historic flooding, and/or local knowledge. Additional flood-prone areas were added for the following:

- Local Knowledge (Stakeholders / Citizens)
- Low-Water Crossings (TNRIS)
- Historical Flood Data (U.S. Geological Survey [USGS] gage data, National Weather Service flood data, FEMA flood damage data)

The Nueces flood planning area was sub-divided into four subregions as shown in Figure 4-1 to facilitate stakeholder engagement amongst the varying geographic areas of the basin. The flood-prone areas are shown for each of these subregions in Figure 4-2 through Figure 4-5. These flood-prone points are also viewable at Region 13 Nueces (arcgis.com) in the Task 1 tab.

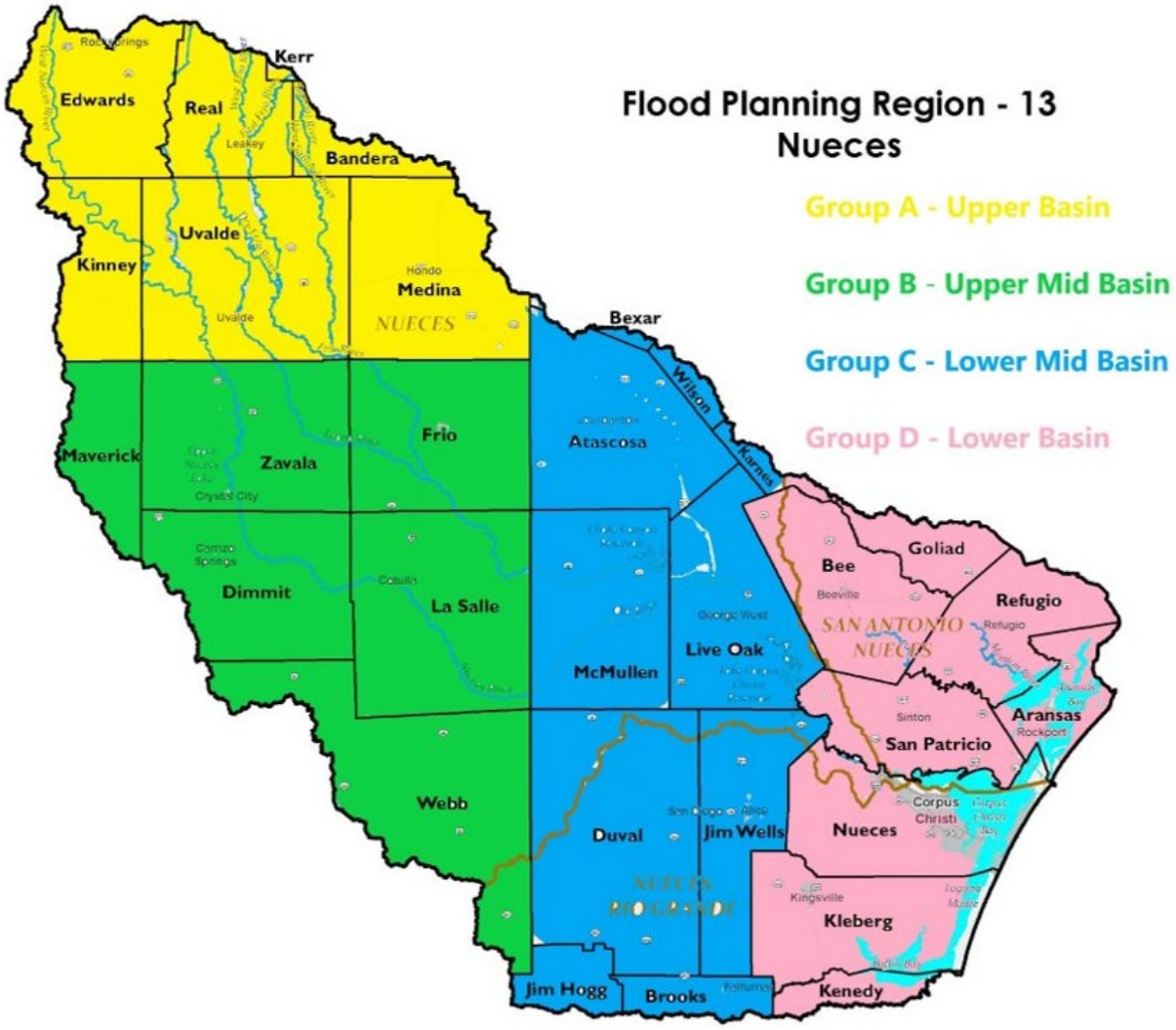


Figure 4-1. Nueces Flood Planning Sub-Regions

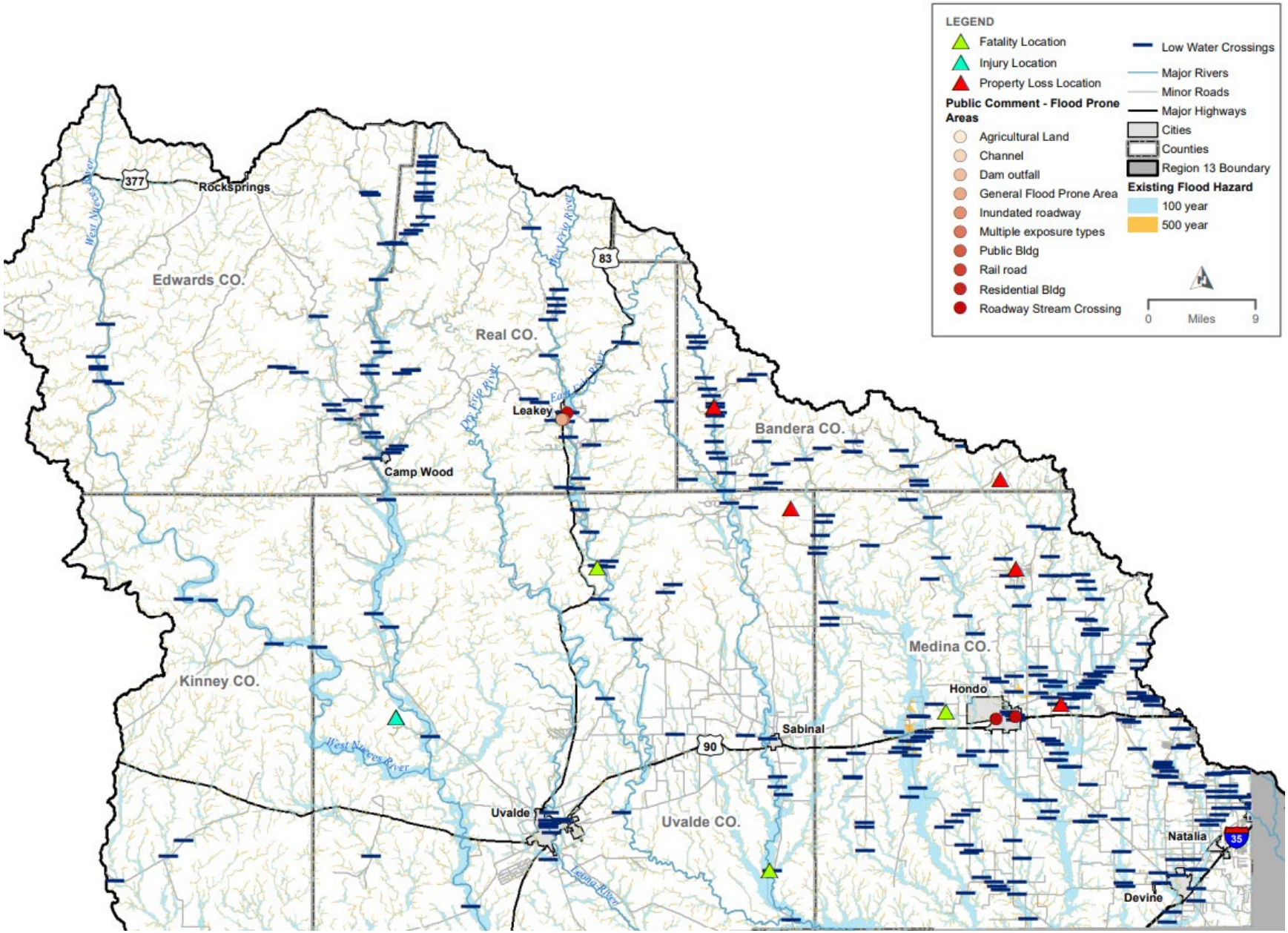


Figure 4-2. Additional Flood-Prone Areas in the Upper Nueces Basin

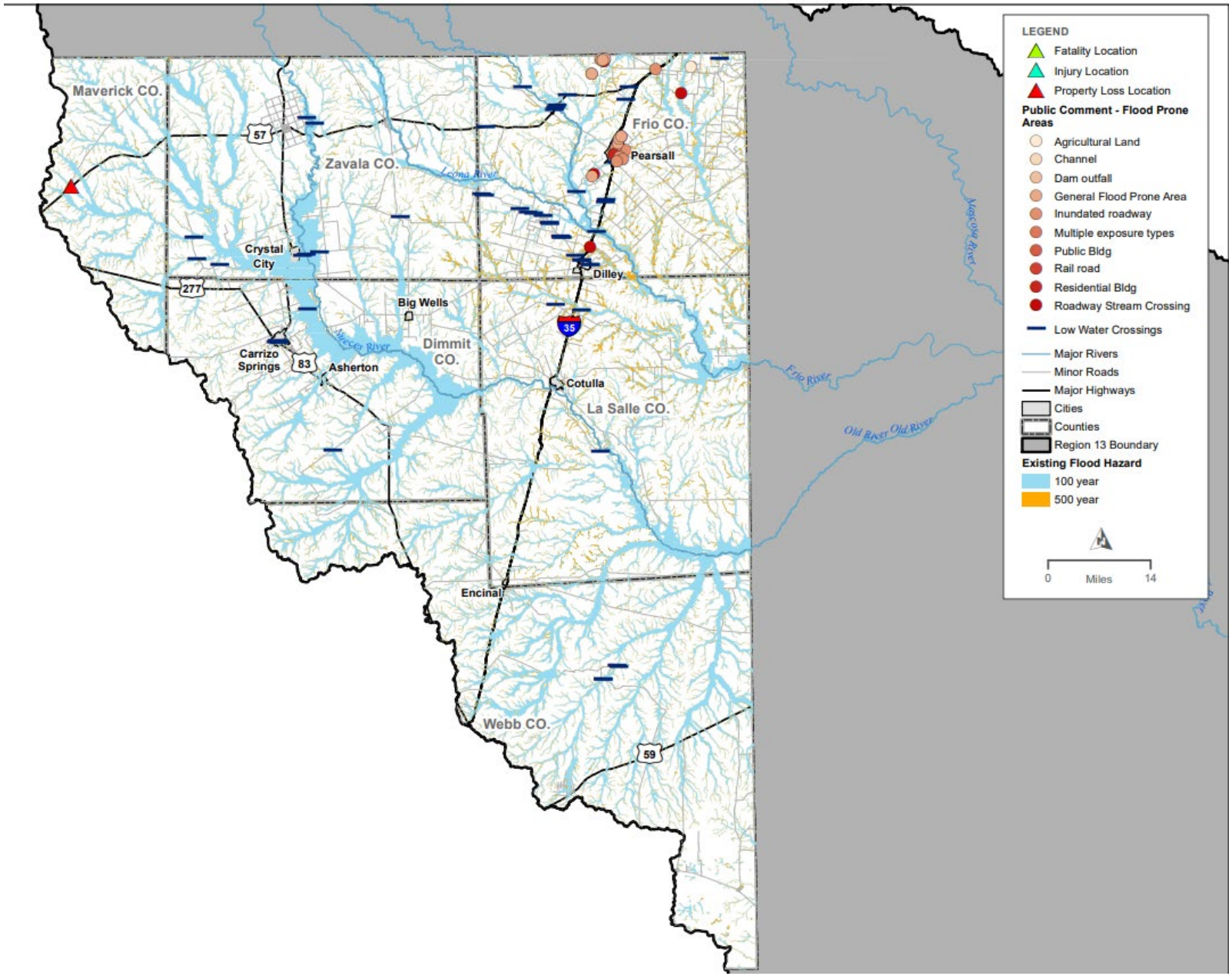


Figure 4-3. Additional Flood-Prone Areas in the Upper Mid−Nueces Basin

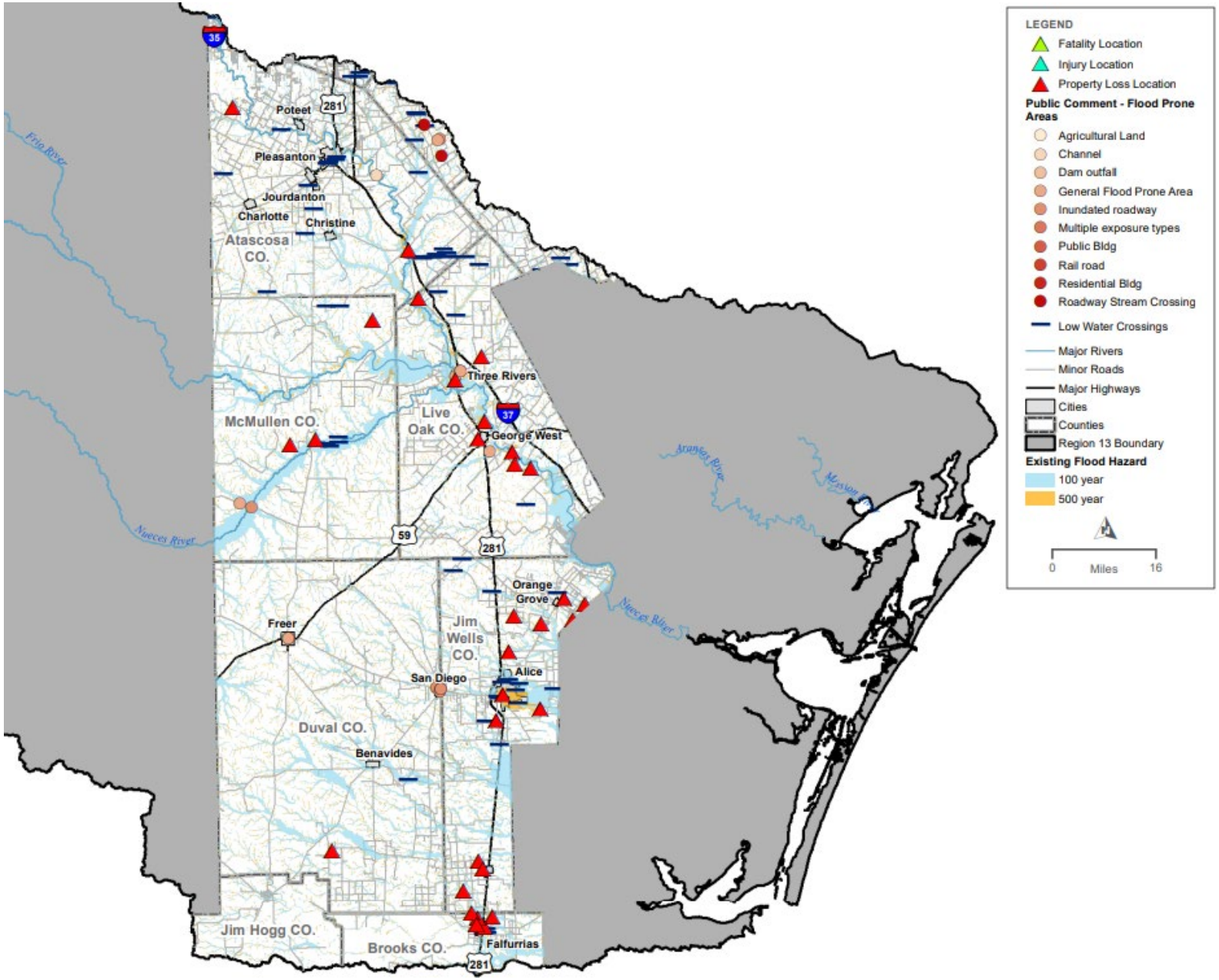


Figure 4-4. Additional Flood-Prone Areas in the Lower Mid−Nueces Basin

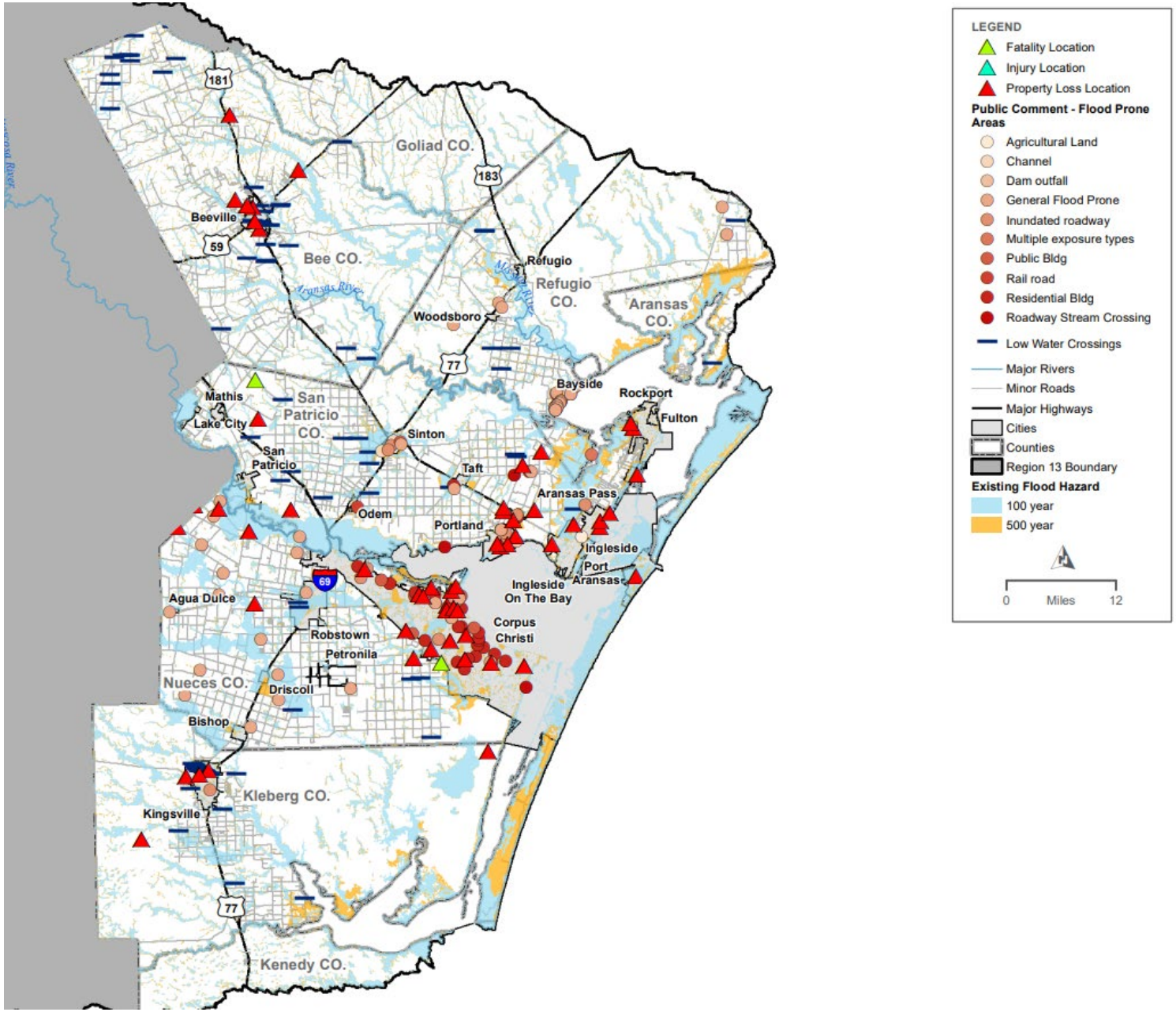


Figure 4-5. Additional Flood-Prone Areas in the Lower Nueces Basin

4.1 Local Knowledge

Four subregional meetings (one for each region shown in Figure 4-1) 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. 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) (nueces-rfpg.org)) to allow stakeholders and citizens the opportunity to identify flood-prone areas for consideration in the regional flood plan. The interactive map comment period was open from April through September 2021 and gathered additional comments on 143 flood-prone areas. Additional outreach was conducted to beneficiaries of TWDB Flood Infrastructure Funding (FIF) projects, and flood-prone areas provided during the comment period were also included on the map.

4.2 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 percent annual chance (2-year) storm event.

A total of 570 low-water crossings (LWCs) have been identify as part of the regional flood plan based on data from the Texas Natural Resources Information System (TNRIS), updated March 2021. During the first planning cycle for regional flood plan, the advisory groups can use the community feedback to identify additional, problematic LWCs not already included in the plan. Low-water crossing locations are shown in Figure 4-2 through Figure 4-5 and are also viewable at Region 13 Nueces (arcgis.com) in the Task 1 tab.

4.3 Historical Flood Data

Historical flood data was compiled from USGS gage records, National Weather Service flood data and identified historical flood events, and FEMA flood damages, including loss of life and property damage. This information is included in **Appendix B**.

5 Availability of Existing Hydrologic and Hydraulic Models

A geodatabase and associated maps in accordance with TWDB flood planning guidance documents that identify areas where existing hydrologic and hydraulic models needed to evaluate flood management strategies (FMSs) and flood mitigation projects (FMPs) are available was compiled based on the following publicly available flood inundation boundary source data:

- NFHL
- BLE
- Corpus Christi Downtown Study

Hydrologic and hydraulic models used for the purposes of defining inundation boundaries are currently only available for roughly 25 percent of the basin, as shown in Figure 5-1. For interactive viewing, see Region 13 Nueces (arcgis.com) in the Task 2 tab map of "Known Data Gaps."

Additionally, the following hydrologic and hydraulic models were developed for the purposes of flood warning:

- U.S. Army Corps of Engineers (USACE) Hydrologic Engineer Center-Hydrologic Modeling System (HEC-HMS) 4.2 model, which encompasses the entire Nueces basin.
- USACE, Hydrologic Engineer Center-River Analysis Model (HEC-RAS) 5.0.6 model, which includes portions of Atascosa River, Frio River downstream of Choke Canyon, and Nueces River from Tilden to Odem (between Lake Corpus Christi and Corpus Christi Bay).
- USACE San Diego Creek Corps Water Management System (CWMS) Model: HEC-HMS and HEC-RAS – Models include the main stem of San Diego Creek, in Duval and Jim Wells counties near the cities of 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; and
- USGS Sabinal River Hydraulic Model for Early Flood Warning

The existing hydrologic and hydraulic models are shown on Figure 5-1.

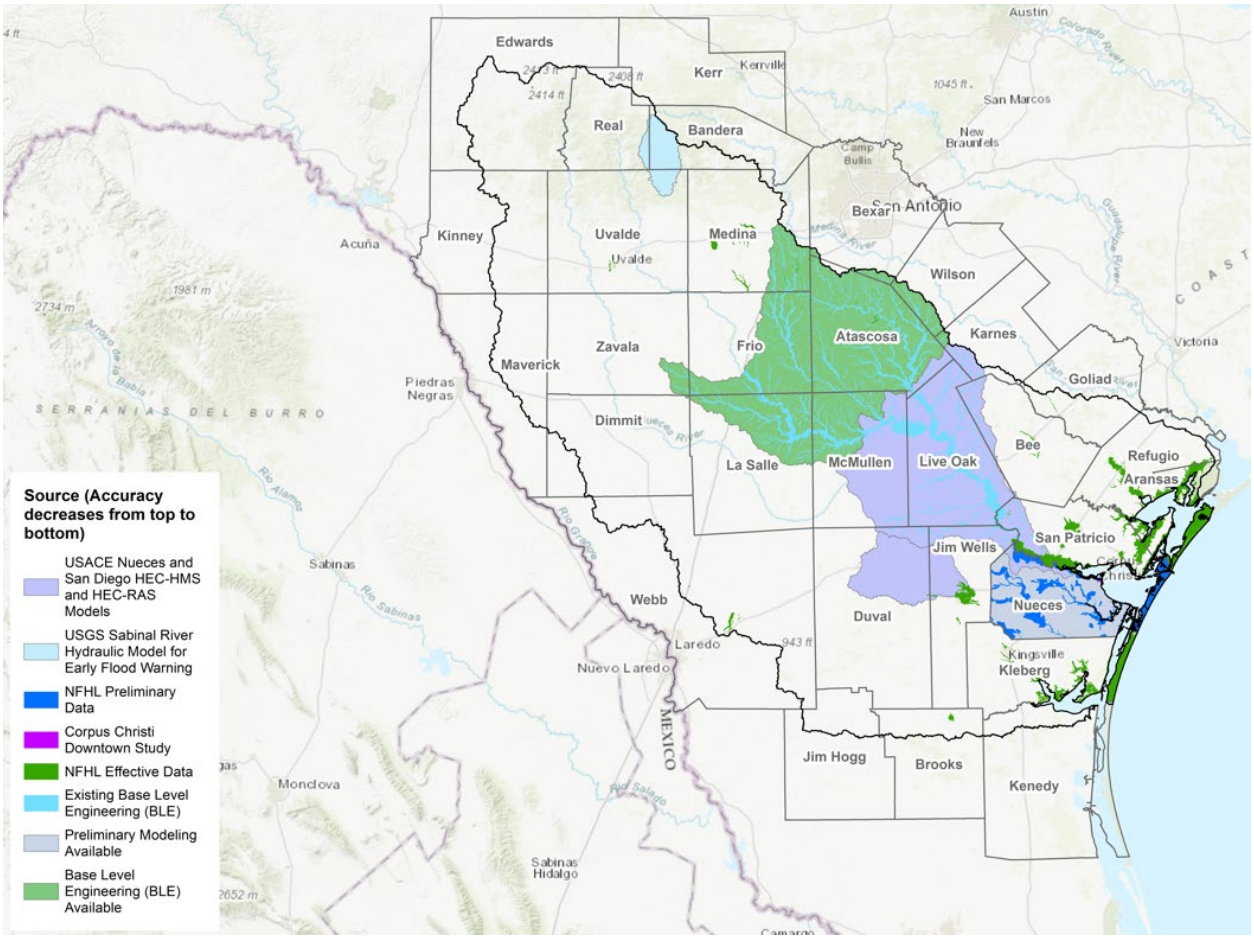


Figure 5-1. Hydrologic and Hydraulic Model Availability

6 List of Available Flood-Related Models of Most Value

A list of available flood-related models that the RFPG considers of most value in developing its plan, in order of most valuable to least valuable, based on their ability to define the extents of the 1.0 percent and 0.2 percent annual chance flood event boundaries.

1. USACE Nueces and San Diego HEC-HMS and HEC-RAS Models
2. USGS Sabinal HEC-RAS Model
3. NFHL
4. NFHL Preliminary Data
5. Corpus Christi Downtown Study
6. NFHL Effective Data
7. BLE

The following lists other inundation boundary data sources, which were not based on detailed hydrologic and hydraulic models.

1. NFHL Approximate Study Areas
2. FAFDS
3. Fathom Draft Data – July 14, 2021
4. Public Comments

7 Adopted Flood Mitigation and Floodplain Management Goals

The flood mitigation and floodplain management goals adopted by the RFPG per §361.36 were developed with the following objectives in mind:

- To evaluate and make recommendations on floodplain management practices.
- Define overarching flood mitigation and floodplain management goals to protect against the loss of life and property, including short-term (10-year) and long-term (30-year) goals that when implemented will demonstrate progress.

At the Nueces RFPG meeting on July 26, 2021, a Region 13 subcommittee was formed to develop draft goals. The subcommittee consisting of Nueces RFPG members (Larry Dovalina, Larry Thomas, Andy Rooke, and James Tolan) 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 Nueces RFPG consideration. The following were considered in the development of the goals:

- Guidance Principles as listed in 31 TAC §362.3
- Existing condition flood risk analyses
- Future condition flood risk analyses
- Consideration of current floodplain management and land use approaches
- Public input
- Understanding of the residual risk of each goal (i.e., the remaining risk)

During the September 27, 2021, RFPG meeting, comments were received on floodplain management standards and goals, which were approved with comment period remaining open for 30 days after the meeting. On November 3, 2021, RFPG members participated in a call with HDR to provide refinement of nature-based goals.

The Nueces RFPG recommends the following floodplain management standard for the region:

> *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 standards are based on available data, to be updated based on Atlas 14 data when available.*

The Nueces RFPG defined 10 overarching flood mitigation and floodplain management goals, including short-term and long-term goals, to guide the overall approach and recommendations of feasible flood projects and strategies in the plan. Table 7-1 lists the flood mitigation and floodplain management goals adopted by the Nueces RFPG.

Table 7-1. Nueces Regional Flood Planning Group (RFPG) Flood Mitigation and Floodplain Management Goals

Goal ID	RFPG No.	RFPG Name	Goal	Term of Goal	Target Year	Applicable To	Overarching Goal	Associated Goal IDs
13000001	13	Nueces	Improve safety at l**ow-water crossings** through structural improvements or warning systems			Entire RFPG	Protect against the loss of life	13000002, 13000003
13000002	13	Nueces	Conduct an inventory of low water crossings (LWCs), characterize risk, and rank low water crossings 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 low water crossings through mitigation or warning systems.	Short-Term (10-year)	2033	Entire RFPG	Protect against the loss of life	13000001, 13000003
13000003	13	Nueces	Address 80% of high risk LWC identified in the study.	Long-Term (30-year)	2053	Entire RFPG	Protect against the loss of life	13000001, 13000002
13000004	13	Nueces	Rehabilitation, Removal or Replacement of Deficient **High Hazard Dams** as Identified by Texas Commission on Environmental Quality (TCEQ) Dam Safety Regulation Program			Entire RFPG	Protect against the loss of life	13000005, 13000006
13000005	13	Nueces	Conduct a comprehensive study to identify all deficient high hazard dams in the 31-county region. Removal or rehabilitation of the top 30% high hazard dams.	Short-Term (10-year)	2033	Entire RFPG	Protect against the loss of life	13000004, 13000006
13000006	13	Nueces	Removal or rehabilitation of 100% deficient high hazard dams.	Long-Term (30-year)	2053	Entire RFPG	Protect against the loss of life	13000004, 13000005
13000007	13	Nueces	Improve **regional coordination**, data collection/sharing of flood events and impacts, and implementation of flood warning systems			Entire RFPG	Protect against the loss of life	13000008, 13000009
13000008	13	Nueces	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	Protect against the loss of life	13000007, 13000009

Goal ID	RFPG No.	RFPG Name	Goal	Term of Goal	Target Year	Applicable To	Overarching Goal	Associated Goal IDs
13000009	13	Nueces	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	Protect against the loss of life	13000007, 13000008
13000010	13	Nueces	Perform **flood mapping evaluations and update floodplain maps** and flood hazard data.			Entire RFPG	Property Damage	13000011, 13000012
13000011	13	Nueces	Develop maps to base level elevation (BLE) or NFHL level accuracy for 60% of the basin that does not currently have accurate mapping. Identify structures and buildings in the National Flood Hazard Layer (NFHL)-detailed study areas with elevations less than 1 foot above base flood elevations (BFE).	Short-Term (10-year)	2033	Entire RFPG	Property Damage	13000010, 13000012
13000012	13	Nueces	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	Property Damage	13000010, 13000011
13000013	13	Nueces	**Reduce the number of structures within NFHL-detailed study area** and existing floodplain with 1% annual chance flood risk.			Entire RFPG	Property Damage	13000014, 13000015
13000014	13	Nueces	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	Property Damage	13000013, 13000015

Goal ID	RFPG No.	RFPG Name	Goal	Term of Goal	Target Year	Applicable To	Overarching Goal	Associated Goal IDs
13000015	13	Nueces	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	Property Damage	13000013, 13000014
13000016	13	Nueces	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.			Entire RFPG	Floodplain Management	13000017, 13000018
13000017	13	Nueces	Provide minimum flood standard recommendation(s) adopted by the RFPG for the Nueces Basin 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 standards are based on available data, to be updated with Atlas 14 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 National Flood Insurance Program (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	Floodplain Management	13000016, 13000018

Goal ID	RFPG No.	RFPG Name	Goal	Term of Goal	Target Year	Applicable To	Overarching Goal	Associated Goal IDs
13000018	13	Nueces	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	Floodplain Management	13000016, 13000017
13000019	13	Nueces	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.			Entire RFPG	Floodplain Management	13000020, 13000021
13000020	13	Nueces	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	Floodplain Management	13000019, 13000021
13000021	13	Nueces	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	Floodplain Management	13000019, 13000020

Goal ID	RFPG No.	RFPG Name	Goal	Term of Goal	Target Year	Applicable To	Overarching Goal	Associated Goal IDs
13000022	13	Nueces	Develop public information campaign to increase community knowledge of rules and regulations, flood-prone areas, and importance of protecting floodplains from encroachment			Entire RFPG	Floodplain Management	13000023, 13000024
13000023	13	Nueces	Identify local, subregional workgroups aligned with flooding issues. Develop public information campaign templates with relevant flood-related communications for 20% of Nueces flood planning region (FPR).	Short-Term (10-year)	2033	Entire RFPG	Floodplain Management	13000022, 13000024
13000024	13	Nueces	Develop public information plan campaigns with relevant flood-related communications for 80% of the Region 13 area.	Long-Term (30-year)	2053	Entire RFPG	Floodplain Management	13000022, 13000023
13000025	13	Nueces	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.			Entire RFPG	Funding	13000026, 13000027
13000026	13	Nueces	Dedicated funding sources including state-funding opportunities to support operations and maintenance (O&M) for 20% of the communities and 30% counties in Region 13.	Short-Term (10-year)	2033	Entire RFPG	Funding	13000025, 13000027
13000027	13	Nueces	Dedicated funding sources, including state-funding opportunities to support O&M for 80% of the communities and 90% counties in Region 13.	Long-Term (30-year)	2053	Entire RFPG	Funding	13000025, 13000026
13000028	13	Nueces	Identify **funding**, resources, and technical training for floodplain administrators or designees to **support community outreach** including permitting support to verify new projects meet floodplain development requirements.			Entire RFPG	Funding	13000029, 13000030

Goal ID	RFPG No.	RFPG Name	Goal	Term of Goal	Target Year	Applicable To	Overarching Goal	Associated Goal IDs
13000029	13	Nueces	Dedicated funding sources including state-funding opportunities for 20% of the communities and 30% counties in Region 13. 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 FEMA Community Rating System) to serve as a template for rural and underserved communities by 2030.	Short-Term (10-year)	2033	Entire RFPG	Funding	13000028, 13000030
13000030	13	Nueces	Dedicated funding sources including state-funding opportunities for 80% of the communities and 90% counties.	Long-Term (30-year)	2053	Entire RFPG	Funding	13000028, 13000029

8 Documented Process to Identify Feasible Flood Projects and Strategies

The documented process used by the RFPG to identify potentially feasible FMSs and FMPs for the Nueces RFP was prepared by a Region 13 subcommittee and approved at the September 27, 2021, Regional Flood Planning Meeting. At the Nueces RFPG 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 and met on August 23 to prepare recommendations for the Nueces RFPG. The Nueces RFPG's documented process to identified feasible flood projects and strategies is presented below.

1) The Nueces RFPG solicited public and stakeholder comments related to identifying potential flood management evaluations (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 23, 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 17-20, 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 17, 32 entities had completed a survey on existing floodplain practices.

2) A subcommittee formed during the July 26 Nueces RFPG meeting consisted of voting and non-voting NRFPG members met on August 23 to develop a draft process for identifying projects.

3) The Nueces RFPG will receive public comment at the September 27 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
    - Addresses flood-prone areas and outcome of needs analysis, with special emphasis on highly vulnerable areas identified from current and future condition flood risk analysis (Task 2)
    - Consider prevention projects to mitigate future flooding or repetitive loss

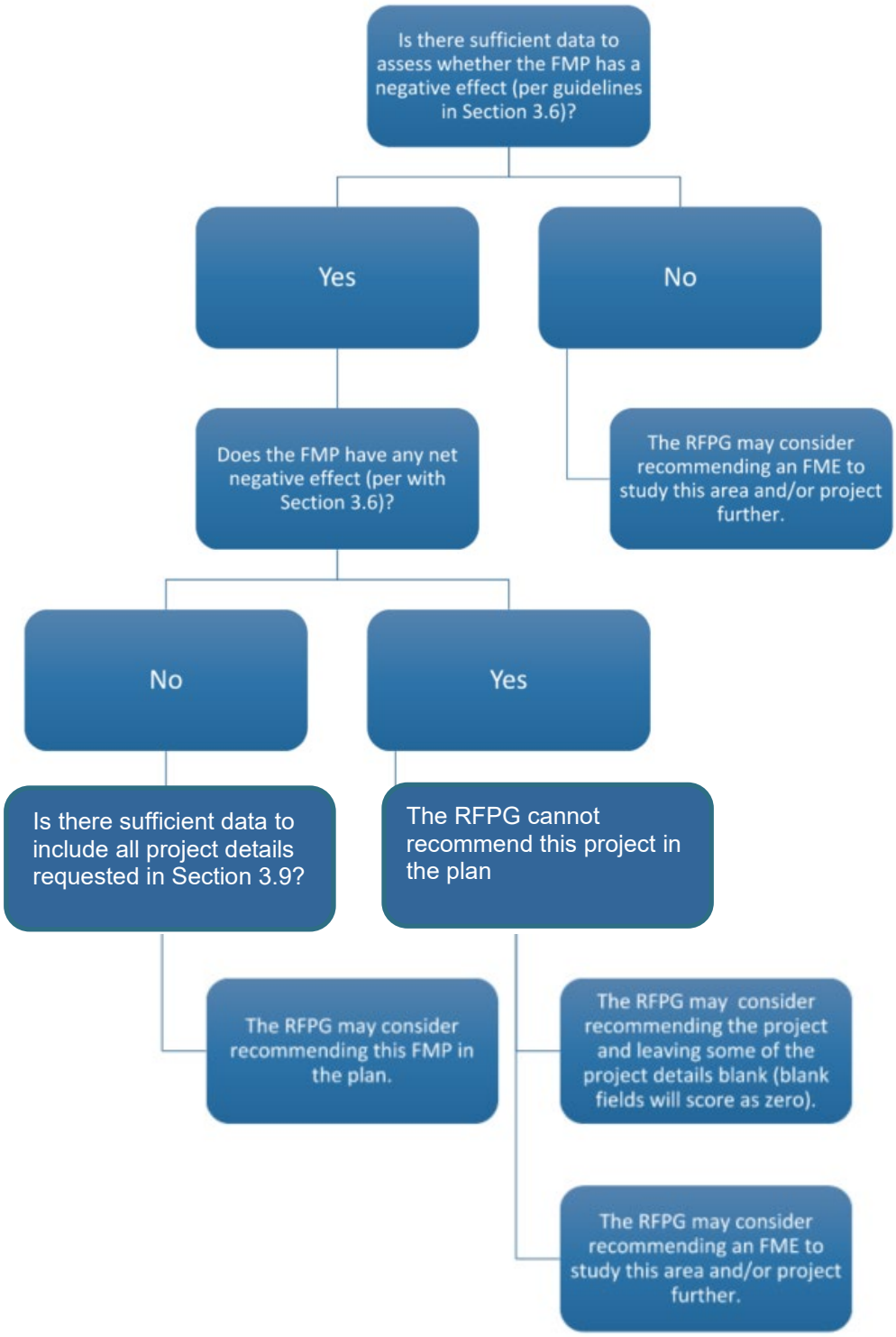
- Consider identified projects within a lens of potential impact to Agreed Order provisions
- Indication regarding potential use of federal funds, TWDB, or other sources of funding and include a table of potential funding sources in the draft and final plan
- Reduces flooding risk (benefits life and 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 Nueces RFPG and infeasible FMSs and FMPs will be included in the technical memorandum due to TWDB in January 2022.

8) 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)



9 Potential Flood Evaluations and Potential Feasible Flood Projects and Strategies

A list of potential FMEs and potentially feasible FMSs and FMPs identified by the RFPG, and associated tables are provided in **Appendices C through E.**

The list was obtained by reviewing a list of projects funded through the TWDB FIF, stakeholder engagement, and review of relevant studies. The Nueces RFPG considered and provided input on preliminary FME, FMS, and FMPs list during the October 25 and December 6, 2021, meetings.

The definitions for FMEs, FMPs, and FMSs are as follows:

A Flood Management Evaluation (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. Types of FMEs include:

- Watershed Planning
    - Hydrologic and hydraulic modeling
    - Flood mapping updates
    - Regional watershed studies
- Engineering Project Planning
    - Feasibility assessments
    - Preliminary engineering
    - Studies on flood preparedness

An FMP is a proposed project, either structural or non-structural, that has non-zero capital costs or other non-recurring cost and when implemented will reduce flood risk, mitigate flood hazards to life or property. The RFPGs are strongly encouraged to consider nature-based flood risk reduction solutions in their overall approach. Types of FMPs include the following:

- Structural FMPs
    - Low water crossings or bridge improvements
    - Stormwater infrastructure (channels, ditches, ponds, storm drains)
    - Regional detention
    - Reservoirs
    - Dam improvements, maintenance and repair
    - Flood walls / levees
    - Coastal protections
    - Natural based projects (i.e., living levees, increasing storage, increasing channel roughness, increasing losses, de-synchronizing peak flows, dune management, river restoration, riparian restoration, run-off pathway management, wetland restoration, low-impact development, green Infrastructure)
    - Comprehensive regional project – includes a combination of projects intended to work together

- Non-Structural FMPs
    - Property or easement acquisition
    - Elevation of individual structures
    - Flood readiness and resilience
    - Flood early warning systems
    - Flood proofing
    - Regulatory requirements for reduction of flood risk

An FMS is a proposed plan to reduce flood risk or mitigate flood hazards to life or property. An FMS may or may not require associated FMPs to be implemented. FMS at a minimum to include any proposed action that the group would like to identify, evaluate, and recommend that does not qualify as either a FME or FMP.

The proposed process for identifying potential FMEs, FMSs, and FMPs for the 2023 Nueces regional flood plan can be found under **Section 8 - Documented Process to Identify Feasible Flood Projects and Strategies**.

The following provides a summary of the listed FMEs, FMPs, and FMSs, as of December 17, 2021:

- 65 FMEs have been identified
- 232 FMPs have been identified
- 69 FMSs have been identified

A summary of FMP, FME, FMPs by county and goals is presented in Table 9-1 and 9-2, respectively.

Table 9-1. FMPs, FMEs, FMPs by County (as of 12/17/2021)

List of Counties	FMPs	FMEs	FMSs
Aransas	56	9	12
Atascosa	23	8	4
Bandera	2		
Bee	7	1	
Bexar			
Brooks			
Calhoun	1		
Dimmit			
Duval		1	
Edwards	1		
Frio			
Goliad	1		

List of Counties	FMPs	FMEs	FMSs
Jim Hogg			
Jim Wells	9	4	2
Karnes	1	1	
Kenedy			
Kerr	1		
Kinney			
Kleberg	8	10	2
La Salle	2	1	
Live Oak	5	1	
Maverick	3	4	
Nueces	49	15	15
Real	1		34
Refugio	3		
San Patricio	40	6	
Uvalde	2		
Webb			
Wilson			
Zavala	3		
Total	216	62	68

Table 9-2. FMPs, FMEs, FMSs by Goals (as of 12/17/2021)

List of Goals	Goal Short Description	FMPs	FMEs	FMSs
13000001 − 13000003	Improve Safety at Low Water Crossing	10		1
13000004 − 13000006	Improve Dam Safety	4	3	
13000007 − 13000009	Improve Regional Coordination	29	10	25
13000010 − 13000012	Perform Flood Mapping	1	16	
13000013 − 13000015	Reduce Structural Flooding	132	22	11
13000016 − 13000018	Define Minimum Flood Management Standards	12	2	10
13000019 − 13000021	Increase Nature-Based Practices	12	5	6

List of Goals	Goal Short Description	FMPs	FMEs	FMSs
13000022 − 13000024	Develop Public Information Campaign	8	2	23
13000025 − 13000027	Increase Dedicated Maintenance Funding	20	2	1
13000028 − 13000030	Increase Funding for Floodplain Administrators	2		1
Total		216	62	68

10 Identified Flood Projects and Strategies determined Infeasible

Preparation of **a list of FMSs and FMPs that were identified but determined by the RFPG to be infeasible, including the primary reason for it being infeasible,** was considered*.* At this time, the Nueces RFPG has not determined any FMSs or FMPs to be infeasible.

The potential flood evaluations and potential feasible flood projects and strategies will be reviewed with stakeholders in the first quarter of 2022 to determine the feasibility of projects and to identify other relevant flood projects. It is anticipated that subgroup meetings will be used to provide the findings of stakeholder outreach on a regional level to identify broader application for regional coordination to address flood risk areas.

Appendix A

Exhibit C, Table 6

Existing Floodplain Management Practices

Exhibit C: Table 6. Existing Floodplain Management Practices

Entity[A]	Floodplain Management Regulations (Yes/ No/ Unknown)[A]	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No)[A]	NFIP Participant (Yes/ No)[A,D]	Higher Standards Adopted (Yes/ No)[B]	Floodplain Management Practices (Strong/Moderate/ Low/None)[B]	Level of Enforcement of Practices (High/ Moderate/ Low/ None)[B,C]	Existing Stormwater or Drainage Fee (Yes/ No)[B]	Web Link to Entity Regulations[B]
Atascosa County	Unknown		Yes	Yes				
Bandera County	Yes	Yes	Yes	No	Moderate	Moderate	No	www.banderacounty.org
Bee County	Unknown		Yes					
Bexar County	Yes	Yes	Yes	Yes	Moderate	Moderate	No	Not Available on line
Brooks County	Unknown		Yes					
Dimmit County	No	No	Yes	No	None	None	No	none
Duval County	No	No	Yes	No	Low	Low	No	www.co.duval.tx.us
Edwards County	Unknown		Yes					
Frio County	Yes	Yes	Yes	No	Low	Low	No	N/A
Goliad County	Unknown		Yes					
Jim Hogg County	Unknown		Yes					
Jim Wells County	Unknown		Yes					
Karnes County	Yes	Yes	Yes	No	Moderate	Moderate	No	none
Kenedy County	Unknown		Yes					
Kerr County	Yes	Yes	Yes	Yes	Moderate	Moderate	No	https://www.co.kerr.tx.us/engineer/floodplain.html
Kinney County	Unknown		Yes					
Kleberg County	Unknown		Yes					
La Salle County	Unknown		Yes					
Live Oak County	Unknown		Yes	Yes				
Maverick County	Unknown		Yes					
McMullen County	Unknown		Yes					
Medina County	Yes	Yes	Yes	Yes	Strong	High	No	medinacountytexas.org
Nueces County	Unknown		Yes					
Real County	Yes	Yes	Yes	No	Moderate	Moderate	No	co.real.tx.us
Refugio County	Yes	Yes	Yes	No	Low	Low	No	n/a
San Patricio County	Yes	Yes	Yes	No	Strong	High	No	https://www.twdb.texas.gov/financial/programs/EDAP/msr/doc/San_Patricio_Co_MSRs.pdf
Uvalde County	Unknown		Yes					
Webb County	Yes	Yes	Yes	No	Strong	High	No	https://www.webbcountytx.gov/Planning/
Wilson County	Yes	Yes	Yes	No	Moderate	Moderate	No	http://www.co.wilson.tx.us/upload/page/2300/docs/Dawn/Ordinances/WC_Flood_Order_Final_10272010.pdf
Zavala County	Yes	Yes	Yes	No	Moderate	Moderate	No	http://co.zavala.tx.us
Agua Dulce	Unknown		Yes					
Alamo Area Council of Governments	Unknown		No					
Alice	Unknown		Yes	Yes				

Exhibit C: Table 6. Existing Floodplain Management Practices

Entity[A]	Floodplain Management Regulations (Yes/ No/ Unknown)[A]	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No)[A]	NFIP Participant (Yes/ No)[A,D]	Higher Standards Adopted (Yes/ No)[B]	Floodplain Management Practices (Strong/Moderate/ Low/None)[B]	Level of Enforcement of Practices (High/ Moderate/ Low/ None)[B,C]	Existing Stormwater or Drainage Fee (Yes/ No)[B]	Web Link to Entity Regulations[B]
Alice Water Authority	Unknown		No					
Aransas County MUD 1	Unknown		No					
Aransas County Navigation District	Unknown		No					
Aransas County WCID 1	Unknown		No					
Aransas Pass	Unknown		Yes					
Asherton	Unknown		Yes					
Bayside	Unknown		Yes					
Beeville Water Supply District	Unknown		No					
Benavides	Unknown		Yes					
Bexar-Medina-Atascosa Counties WCID 1	Unknown		No					
Big Wells	Unknown		No[D]					
Camp Wood	Unknown		Yes					
Canyon Regional Water Authority	Unknown		No					
Carrizo Springs	Unknown		Yes					
Charlotte	Unknown		Yes	Yes				
Christine	Unknown		Yes[D]					
City of Beeville	No	No	Yes	No	Low	Low	No	NO
City of Bishop	Yes	Yes	Yes	No	Moderate	Moderate	No	www.cityofbishoptx.com
City of Corpus Christi	Yes	Yes	Yes	Yes	Strong	High	No	https://library.municode.com/tx/corpus_christi/codes/code_of_ordinances?nodeId=PTIIITHCOOR_CH14DESE_ARTVFLHAPRCO
City of Gregory	Yes	No	Yes	No	Strong	High	No	N/A
City of Hondo	Yes	Yes	Yes	No	Moderate	Moderate	No	https://z2.franklinlegal.net/franklin/Z2Browser2.html?showset=hondoset&collection=hondo&doccode=z2Code_z20000462
City of Ingleside	Yes	Yes	Yes	Yes	Strong	High	No	https://library.municode.com/TX/ingleside/codes/code_of_ordinances?nodeId=PTIICICO_CH18BUBURE_ARTXFLMA&showChanges=true
City of Leakey	Yes	No	Yes	No	Moderate	Moderate	No	none
City of Lytle	Unknown		Yes					

Exhibit C: Table 6. Existing Floodplain Management Practices

Entity[A]	Floodplain Management Regulations (Yes/ No/ Unknown)[A]	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No)[A]	NFIP Participant (Yes/ No)[A,D]	Higher Standards Adopted (Yes/ No)[B]	Floodplain Management Practices (Strong/Moderate/ Low/None)[B]	Level of Enforcement of Practices (High/ Moderate/ Low/ None)[B,C]	Existing Stormwater or Drainage Fee (Yes/ No)[B]	Web Link to Entity Regulations[B]
City of Port Aransas	Yes	Yes	Yes	No	Strong	High	No	https://library.municode.com/tx/port_aransas/codes/code_of_ordinances?nodeId=PTIIPOARCO_CH8FLDAPR
City of Portland	Yes	Yes	Yes	No	Strong	High	Yes	https://library.municode.com/tx/portland/codes/code_of_ordinances?nodeId=COOR_CH4BUGEBURE_ARTIIIFLDAPR_S4-30STAUFIFAPUME
City of Sinton	Yes	Yes	Yes	No	Moderate	Moderate	No	sintontexas.org
City of Uvalde	Yes	Yes	Yes	No	Moderate	Moderate	No	https://library.municode.com/tx/uvalde/codes/code_of_ordinances?nodeId=TIT15BUCO_CH15.48FLDAPR
Coastal Bend Council of Governments	Unknown		No					
Corpus Christi Downtown Management District	Unknown		No					
Crystal City	Unknown		Yes					
Devine	Unknown		Yes					
Dilley	Unknown		Yes					
Driscoll	Unknown		Yes					
Duval County Conservation & Reclamation District	No	No	No	No	None	None	No	None
Encinal	Unknown		Yes					
Escondido Watershed District	Unknown		No					
Falfurrias	Unknown		Yes					
Freer	Unknown		Yes					
Freer WCID	Unknown		No					
Fulton	Unknown		Yes					
George West	Unknown		Yes					
Golden Crescent Regional Planning Commission	Unknown		No					

Exhibit C: Table 6. Existing Floodplain Management Practices

Entity[A]	Floodplain Management Regulations (Yes/ No/ Unknown)[A]	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No)[A]	NFIP Participant (Yes/ No)[A,D]	Higher Standards Adopted (Yes/ No)[B]	Floodplain Management Practices (Strong/Moderate/ Low/None)[B]	Level of Enforcement of Practices (High/ Moderate/ Low/ None)[B,C]	Existing Stormwater or Drainage Fee (Yes/ No)[B]	Web Link to Entity Regulations[B]
Hondo Creek Watershed Improvement District	Unknown		No					
Jim Hogg County WCID 2	Unknown		No					
Jim Wells County FWSD 1	Unknown		No					
Jourdanton	Unknown		Yes					
Kingsville	Unknown		Yes	Yes				
Lake City	Unknown		Yes					
Lakeside	Unknown		Yes					
Lamar Improvement District	Unknown		No					
Mathis	Unknown		Yes					
Maverick County WCID 1	Unknown		No					
McMullen County WCID #1	No	No	No	No	Low	Low	No	None
Medina County WCID 2	Unknown		No					
Middle Rio Grande Development Council	Unknown		No					
Natalia	Unknown		Yes					
Nueces County Bishop Driscoll Drainage District 3	Unknown		No					
Nueces County Drainage & Conservation District 2	Unknown		No					
Nueces County WCID 3	Unknown		No					
Nueces County WCID 4	Unknown		No					

Exhibit C: Table 6. Existing Floodplain Management Practices

Entity[A]	Floodplain Management Regulations (Yes/ No/ Unknown)[A]	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No)[A]	NFIP Participant (Yes/ No)[A,D]	Higher Standards Adopted (Yes/ No)[B]	Floodplain Management Practices (Strong/Moderate/ Low/None)[B]	Level of Enforcement of Practices (High/ Moderate/ Low/ None)[B,C]	Existing Stormwater or Drainage Fee (Yes/ No)[B]	Web Link to Entity Regulations[B]
Nueces County WCID 5	Unknown		No					
Nueces River Authority	Unknown		No					
Odem	Unknown		Yes					
Orange Grove	Unknown		Yes					
Padre Island Gateway Municipal Management District	Unknown		No					
Pearsall	Unknown		Yes					
Petronila	Unknown		No					
Pettus MUD	Unknown		No					
Pleasanton	Unknown		Yes					
Port of Corpus Christi Authority	Unknown		No					
Poteet	Unknown		Yes					
Premont	Unknown		Yes					
Refugio	Unknown		Yes					
Refugio County Drainage District 1	Unknown		No					
Refugio County Navigation District	Unknown		No					
Refugio County WCID 2	Unknown		No					
Rio Grande Regional Water Authority	Unknown		No					
Riviera WCID	Unknown		No					
Robstown	Unknown		Yes					
Rockport	Unknown		Yes					
Rocksprings	Unknown		Yes					
Sabinal	Unknown		Yes					
San Diego	Unknown		Yes					
San Diego MUD 1	Unknown		No					

Exhibit C: Table 6. Existing Floodplain Management Practices

Entity[A]	Floodplain Management Regulations (Yes/ No/ Unknown)[A]	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No)[A]	NFIP Participant (Yes/ No)[A,D]	Higher Standards Adopted (Yes/ No)[B]	Floodplain Management Practices (Strong/Moderate/ Low/None)[B]	Level of Enforcement of Practices (High/ Moderate/ Low/ None)[B,C]	Existing Stormwater or Drainage Fee (Yes/ No)[B]	Web Link to Entity Regulations[B]
San Patricio	Unknown		Yes					
San Patricio County Drainage District	No	No	No	No	Strong	High	No	co.san-patricio.tx.us
San Patricio County MUD 1	Unknown		No					
San Patricio County Navigation District 1	Unknown		No					
San Patricio MWD	Unknown		No					
South Texas Development Council	Unknown		No					
South Texas Water Authority	Unknown		No					
Taft	Unknown		Yes					
Three Rivers	Unknown		Yes					
Three Rivers Water District	Unknown		No					
Uvalde County UWCD	No	Yes	No	No	Strong	High	No	none
Woodsboro	Unknown		Yes					
Zavala County WCID 1	Unknown		No					
Aransas County	Yes	Yes	Yes	Yes	Moderate	Moderate	No	https://www.aransascountytx.gov/main/docs/ordinances/OAmended%20Aransas%20County%20Floodplain%20Management%20Watershed%20Protection%20Order%20O-23-2019.pdf
City of Cotulla	Yes	Yes	Yes	No	Low	Low	No	municode
City of Ingleside on the Bay	Yes	Yes	Yes	No	Moderate	Moderate	No	www.inglesideonthebay.org

Appendix B

Historical Flood Information Compiled for the Nueces FPR to Assess Flood Prone Areas

B.1 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 B-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.

B.2 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 B-2. Listing of Historical Flood Events

Flood Event	Description
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.

B.3 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 4-3 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.

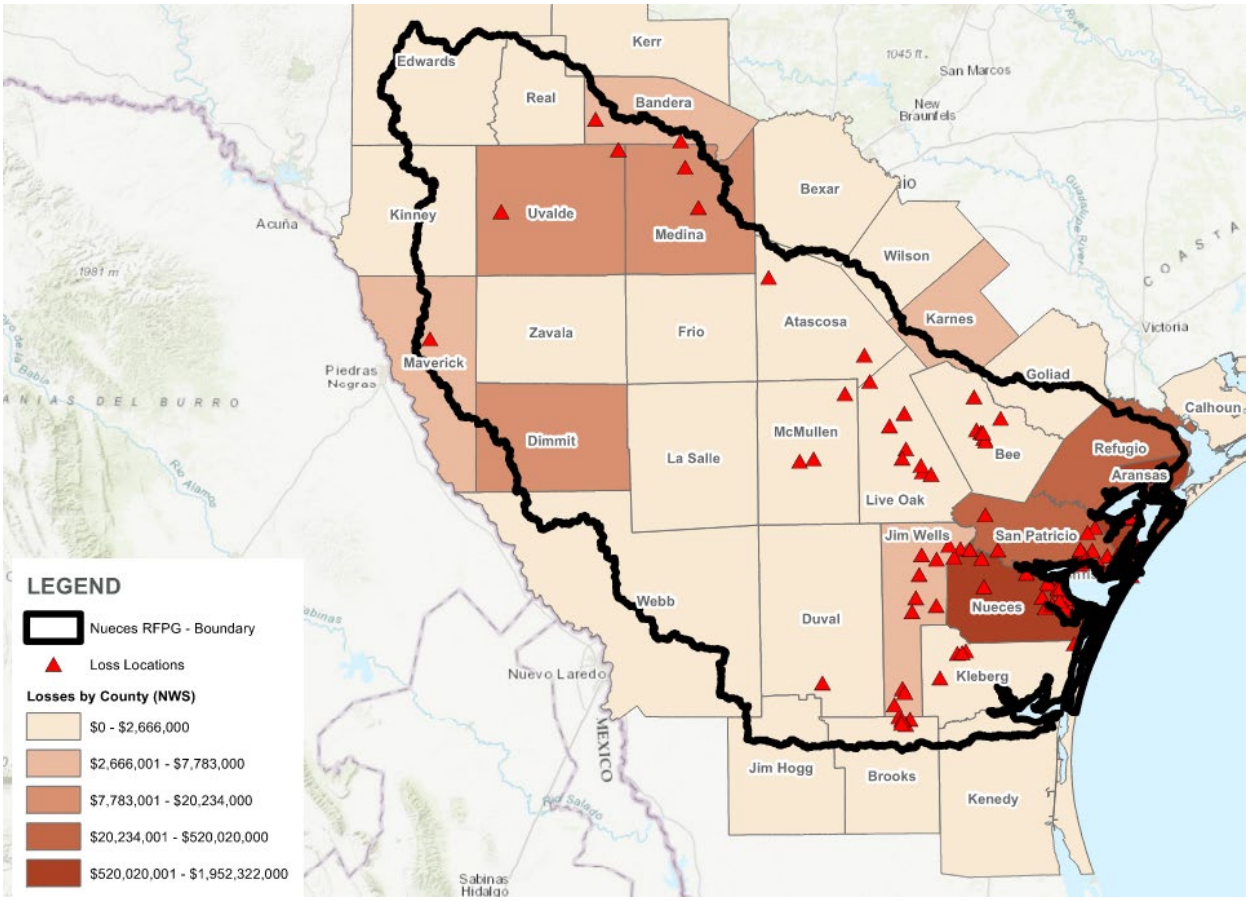


Figure B-1. National Weather Service Property Damage from Flooding, since 1996

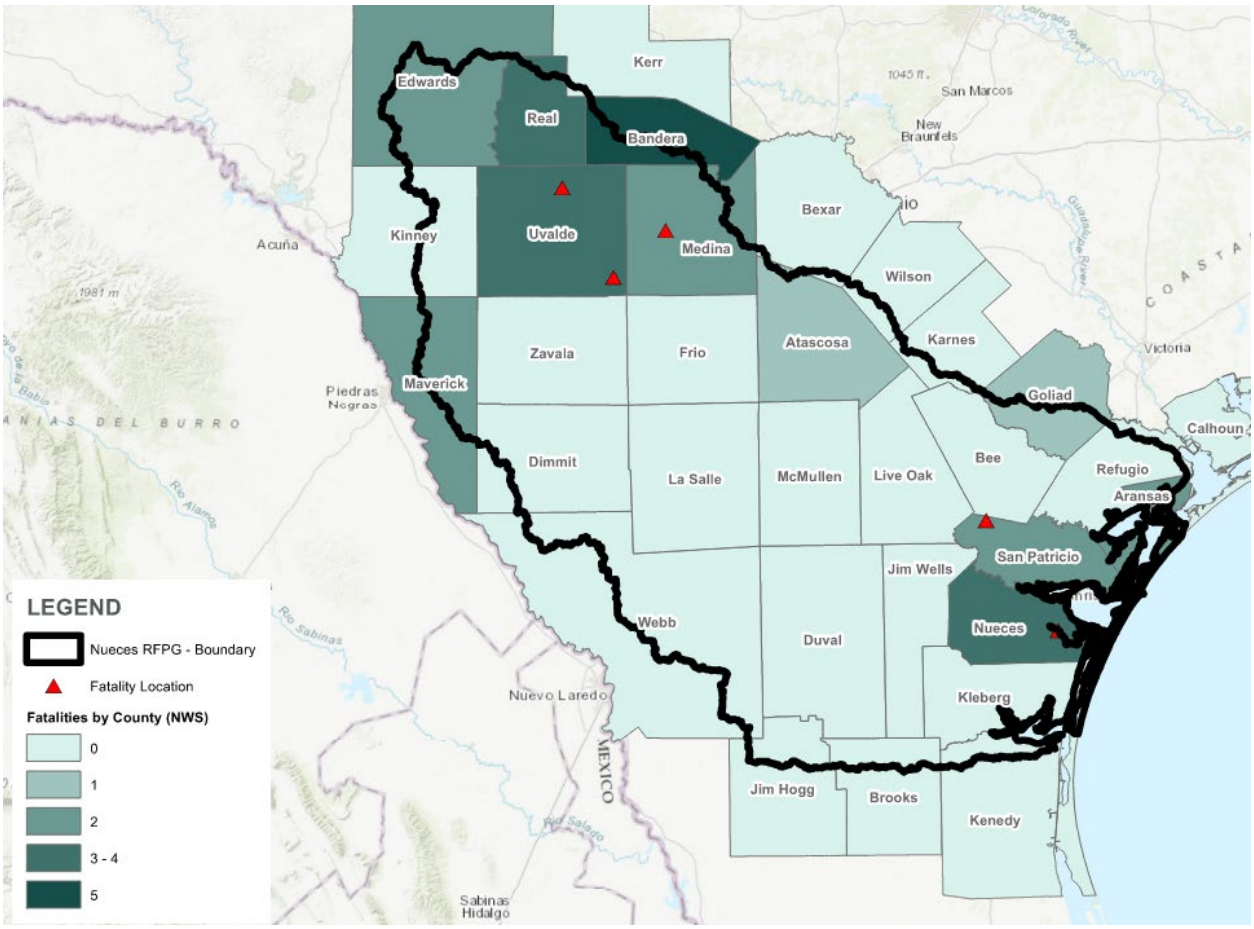


Figure B-2. National Weather Service Fatalities from Flooding, since 1996

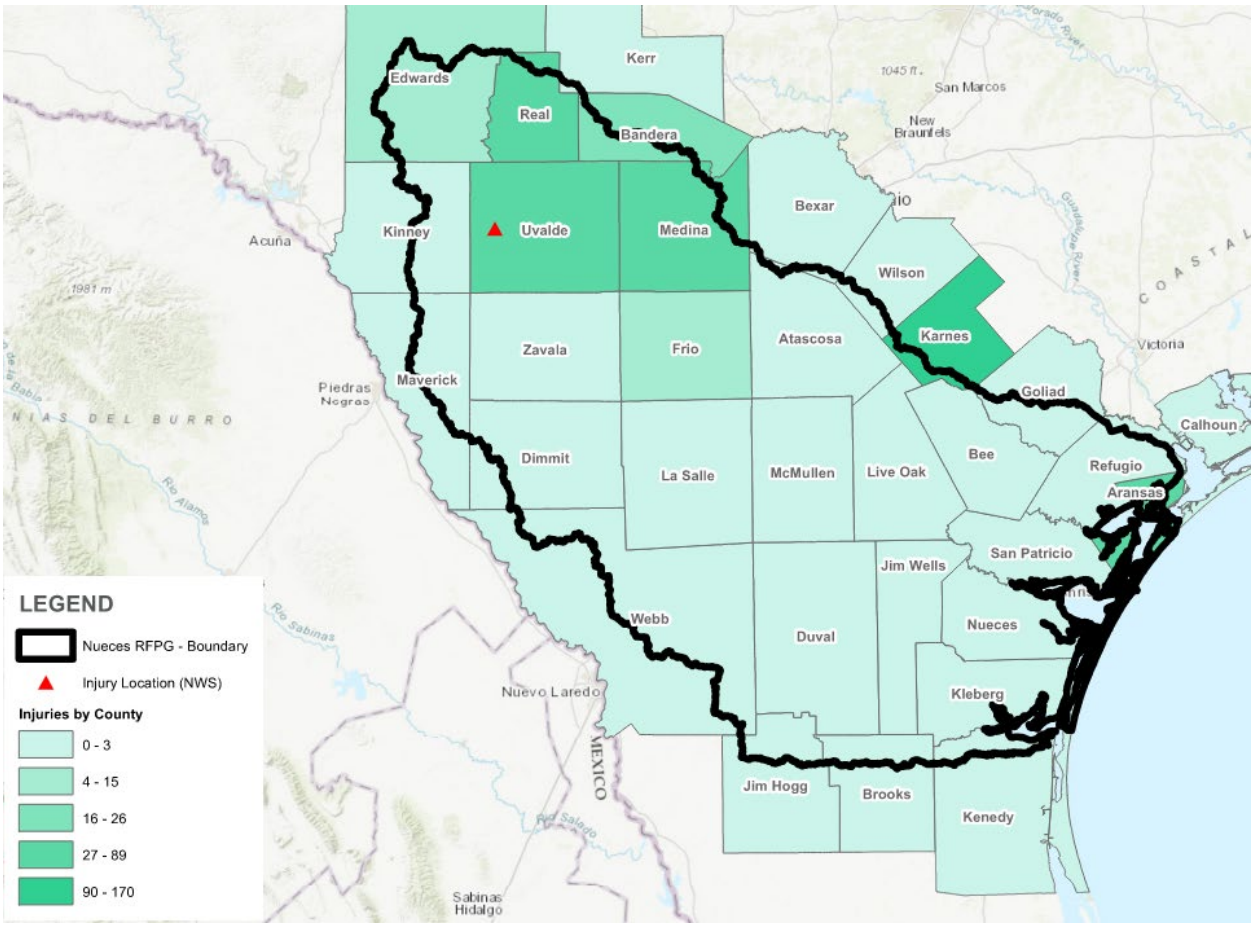


Figure B-3. National Weather Service Injuries from Flooding, since 1996

Table B-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 B-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.

B.4 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.

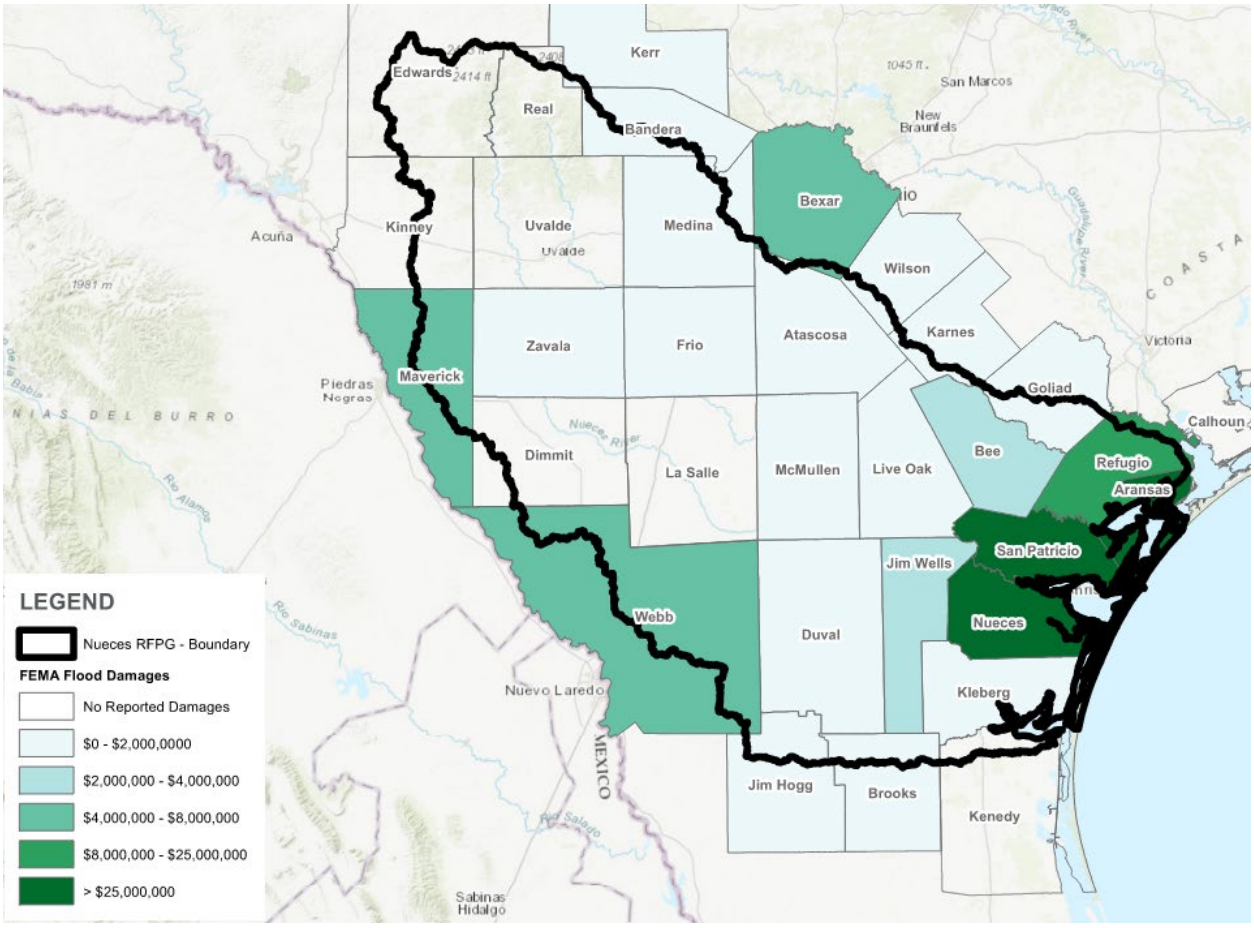


Figure B-4. FEMA Flood Assistance to Owners and Renters for Flood Damages, since 2002

Table B-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 B-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***

Appendix C
Exhibit C, Table 12
Potential Flood Management Evaluations
Identified by the Regional Flood Planning Group

Exhibit C, Table 12

Potential Flood Management Evaluations Identified by RFPG

FME ID	FME Name	Description	Associated 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 and Amount	Estimated number of structures at flood risk	Habitable structures at flood risk	Estimated Population at flood risk	Critical facilities at flood risk (#)	Number of low water crossings at flood risk (#)	Estimated number of road closures (#)	Estimated length of roads at flood risk (Miles)	Estimated active farm & ranch land at flood risk (acres)	Existing or Anticipated Models (year)	Existing or Anticipated Maps (year)	RFPG Recommendation (Y/N)	Reason for Recommendation
131000001	County Wide Drainage Master Plan Study	Nueces County Regional Drainage Master Plan Study	13000008	Nueces, Jim Wells, Kleberg	12100405,12110111,12110201,12110202,12110203,12110204,12110205,12110206				244.4050983	Riverine	TWDB FIF			$2,137,500	TWDB FIF												
131000002	County Wide Drainage Master Plan Study	Drainage Master Planning Study - Duval County	13000011	Duval	2110205,12110206				166.7713815	Riverine																	
131000003	County Wide Drainage Master Plan Study	Drainage Master Planning Study - San Patricio County	13000011	San Patricio	2110201		00034,13000035,13000037,13000043,130000		65.47693177	Riverine	TWDB FIF			$13,941,120	TWDB FIF												
131000004	County Wide Drainage Master Plan Study	Drainage Master Planning Study - Bee County	13000011	Bee	12100406,12100407,12110111				81.64120969	Riverine	TWDB FIF			$2,000,000	TWDB FIF												
131000005	County Wide Flood Planning/Prevention Study	Flood Planning/Prevention Study	13000011	Karnes	12100303,12100406,12110110,12110111	1003030402,121003030405,121003030504,121004060101,121004060201,121101100306,121101	13000003,13000010,13000410,13000432,13000435,13000441,13000446		69.60447877	Riverine	TWDB FIF			$618,750	TWDB FIF												
131000006	County Wide Drainage Master Plan Study	Nueces County Drainage & Conservation District 2	13000011	Nueces	12110202,12110205	121102020101,121102020102,121102050506,121102050601,121102050602,121102050603,121102050604,121102050606,121102050607	13000532,13000553,13000558,13000559,13000560,13000561,13000563,13000611,13000613		11.79478028	Riverine	TWDB FIF			$2,137,500	TWDB FIF												
131000007	Others (Flood Prevention/Planning Study, LOMR etc)	Atascosa Flood Prevention Project - Pleasanton	13000011	Atascosa	12110110	121101100205,121101100206	13000418,13000419		0.706252085	Riverine	TWDB FIF			$78,500	TWDB FIF												
131000008	Drainage Master Plan Study	Drainage Master Plan - Location 1 - Kingsville	13000014	Kleberg	12110204	121102040205,121102040206,121102040407,121102040409,121102040410	13000483,13000497,13000502,13000515,13000517		1.291287727	Riverine	TWDB FIF			$1,360,258	TWDB FIF												
131000009	Drainage Master Plan Study	Drainage Master Plan - Location 2 - Kingsville	13000014	Kleberg	12110204	121102040205,121102040206,121102040407,121102040409,121102040410	13000483,13000497,13000502,13000515,13000517		1.291287727	Riverine	TWDB FIF			$3,600,000	TWDB FIF												
131000010	Drainage Master Plan Study	Drainage Master Plan - Location 3 - Kingsville	13000014	Kleberg	12110204	121102040205,121102040206,121102040407,121102040409,121102040410	13000483,13000497,13000502,13000515,13000517		1.291287727	Riverine	TWDB FIF			$1,457,419	TWDB FIF												
131000011	Drainage Master Plan Study	Drainage Master Plan - Location 4 - Kingsville	13000014	Kleberg	12110204	121102040205,121102040206,121102040407,121102040409,121102040410	13000483,13000497,13000502,13000515,13000517		1.291287727	Riverine	TWDB FIF			$1,846,064	TWDB FIF												
131000012	Drainage Master Plan Study	Drainage Master Plan - Location 5 - Kingsville	13000014	Kleberg	12110204	121102040205,121102040206,121102040407,121102040409,121102040410	13000483,13000497,13000502,13000515,13000517		1.291287727	Riverine	TWDB FIF			$7,800,000	TWDB FIF												
131000013	Drainage Master Plan Study	Drainage Master Plan - Location 6 - Kingsville	13000014	Kleberg	12110204	121102040205,121102040206,121102040407,121102040409,121102040410	13000483,13000497,13000502,13000515,13000517		1.291287727	Riverine	TWDB FIF			$230,000	TWDB FIF												
131000014	Drainage Master Plan Study	Drainage Master Plan - Location 7 - Kingsville	13000014	Kleberg	12110204	121102040205,121102040206,121102040407,121102040409,121102040410	13000483,13000497,13000502,13000515,13000517		1.291287727	Riverine	TWDB FIF			$1,360,258	TWDB FIF												
131000015	Drainage Master Plan Study	Drainage Master Plan - Location 8 - Kingsville	13000014	Kleberg	12110204	121102040205,121102040206,121102040407,121102040409,121102040410	13000483,13000497,13000502,13000515,13000517		1.291287727	Riverine	TWDB FIF			$700,000	TWDB FIF												
131000016	Drainage Master Plan Study	Drainage Master Plan - Location 9 - Kingsville	13000014	Kleberg	12110204	121102040205,121102040206,121102040407,121102040409,121102040410	13000483,13000497,13000502,13000515,13000517		1.291287727	Riverine	TWDB FIF			$5,600,000	TWDB FIF												
131000017	Others (Flood Prevention/Planning Study, LOMR etc)	Flood Planning Study for LOMR - Cotulla	13000011	La Salle	12110103,12110105	121101030705,121101050201	13000117,13000239		0.183974647	Riverine	TWDB FIF			$149,500	TWDB FIF												
131000018	Drainage Master Plan Study	Drainage Master Plan Study - Alice	13000011	Jim Wells	12110204	121102040404,121102040405	13000496,13000513		1.179815544	Riverine	TWDB FIF			$241,500	TWDB FIF												
131000019	Drainage Master Plan Study	Drainage Master Plan Study - Driscoll	13000011	Nueces	12110205	121102050603,121102050604	13000558,13000560		0.106515502	Riverine	TWDB FIF			$150,000	TWDB FIF												
131000020	USGS Flood Warning Modeling on the Sabinal River	Developing Flood Preparedness Toolsets Using Streamgaging and Flood Inundation Mapping	13000008	Bandera, Uvalde	12110106	121101060603,121101060604	13000308,13000298		0.900368893	Riverine																	
131000021	Hazard Identification, Risk Assessment and Consequence Analysis	The premise of the Hazard Identification, Risk Assessment and Consequence Analysis is to determine what risks are most relevant to Bexar County and the City of San Antonio. Moving forward, this risk assesment could be used to determine what risks are most relevant, and accordingly pursue projects that work to reduce or eliminate these risks. There could be potential in working with Bexar COunty and the City of San Antonio to develope funding sources based on the nature of projects they expect to pursue, or work with them to help narrow down a broad list of porjects to those that might offer the most benefit.	13000004, 13000025	Bexar																							
131000022	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.	13000013	Jim Wells																							
131000023	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.	13000004	Jim Wells																							
131000024	COASTAL BEND MITIGATION ACTION PLAN - LO - 06	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.	13000013	Live Oak																							
131000025	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.	13000013	Nueces																							
131000026	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.	13000013	Nueces																							
131000027	COASTAL BEND MITIGATION ACTION PLAN - NU - 17	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 project designd.Develop a master plan to implement the drainage criteria established to include updates of the existing areas and production of new master plan for other areas. The master plan will include the inventory of all outfalls and data necessary for the design process and will utilize criteria and reflects the characteristics of each master plan	13000013	Nueces																							
131000028	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.	13000010	Nueces																							
131000029	COASTAL BEND MITIGATION ACTION PLAN - NU - 64	The City does not currently have a clearly defined drainage plan and is only marginally affected by the county master plan. 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. 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. Agua Dulce is geographically situated in a manner that makes it highly susceptible to flooding. Runoff to the west directly flows into the City and has almost no ability to continue to drain out, backing up into the streets and private property throughout the community. Oneof the City's most critical facilities, the waste-water lift stations on both the east and west side has continually been affected and the City has a great amount of trouble keeping these facilities operable during flooding. In addition to the already mentioned 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.	13000013	Nueces																							
131000030	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 fe asible alternatives for flood reduction.	13000007	San Patricio																							
131000031	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #13	Identify and implement feasible actions to reduce risk for repetitive loss properties.	13000013	San Patricio																							
131000032	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #6	Complete a comprehensive flood study. Submit data to FEMA for flood mapping. Adopt higher floodplain development standards, above the minimum required based on the results of the flood study.	13000007, 13000010	San Patricio																							
131000033	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #13	Assess and map City of Taft hazard vulnerability.	13000022	San Patricio																							
131000034	Aransas County Texas Multi-Jurisdisctinal Hazard Mitigation Action Plan - Action #1	Design and implement a program for public education. The program will educate citizens on methods of hazard mitigation and risk reduction.	13000022	Aransas																							
131000035	Aransas County Texas Multi-Jurisdisctinal Hazard Mitigation Action Plan - Action #70	Design and conduct an engineering study to address flooding in downtown Rockport	13000010	Aransas																							
131000036	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.	13000007, 13000016	Aransas																							
131000037	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.	13000007	Aransas																							
131000038	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.	13000007	Aransas																							
131000039	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.	13000014	Aransas																							
131000040	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 2.1.b	Evaluate areas in the floodplain viaable for open space preservation.	13000019	Aransas																							
131000041	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.	13000019	Aransas																							
131000042	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.	13000019	Aransas																							

Exhibit C, Table 12
Potential Flood Management Evaluations Identified by RFPG

FME ID	FME Name	Description	Associated 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 and Amount	Estimated number of structures at flood risk	Habitable structures at flood risk	Estimated Population at flood risk	Critical facilities at flood risk (#)	Number of low water crossings at flood risk (#)	Estimated number of road closures (#)	Estimated length of roads at flood risk (Miles)	Estimated active farm & ranch land at flood risk (acres)	Existing or Anticipated Models (year)	Existing or Anticipated Maps (year)	RFPG Recommendation (Y/N)	Reason for Recommendation
131000043	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	13000010	Nueces																							
131000044	Nueces County Hazard Mitigation - Corpus Christi Action #11	Corpus Christi Action #11 Proposed Action Build the Cotulla 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 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 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 Cotulla Diversion Project.	13000013	Nueces																							
131000045	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.	13000013	Nueces																							
131000046	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.	13000013	Nueces																							
131000047	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.	13000013, 13000019	Nueces																							
131000048	Nueces County Hazard Mitigation - Corpus Christi Action #27	Design and implement a dam breach study for dams in Corpus Christi.	13000004	Nueces																							
131000049	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #9	Upgrade existing floodplain maps. Add new Atlas 14 rainfall frequency data.	13000010	Atascosa																							
131000050	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #10	Develop and implement a new Stormwater Management Plan	13000010	Atascosa																							
131000051	Atascosa McMullen Hazard Mitigation Plan - City of Charlotte Action #4	Create and implement a hazard educational enchancement program which faculty/students can collaborate and understand the hazards.	13000007	Atascosa																							
131000052	Atascosa McMullen Hazard Mitigation Plan - City of Christine Action #2	Improve drainage in certain areas of the the city that are subject to flooding. conduct a study to identify deficiencies in current land development code for future developments.	13000014, 13000015	Atascosa																							
131000053	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.	13000008, 13000009	Atascosa																							
131000054	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																							
131000055	Atascosa McMullen Hazard Mitigation Plan - Lytle ISD Action #3	Preform a detailed study of cost effective measures to protect and harden schools against all hazards	13000025, 13000026	Atascosa																							
131000056	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #2	Conduct a countywide floodplain study and mapping to undertand the limits of the 1% annual chance and 0.2% annunal chance floodplain boundaries and their effects on the community, infrastructure and critical facilities.	13000008, 13000009	McMullen																							
131000057	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #3	Study and prioritize low water crossing improvements	13000001, 13000002, 13000003	McMullen																							
131000058	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #5	Provide FEMA review of floodplain management criteria by ensuring that the community correct NRP program deficiences and enforces existing ordinanaces that regular planning and development.	13000010	McMullen																							
131000059	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 inflows 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 Inflow to Three Estuaries (Colorado-Lavaca, Guadalupe, and Nueces) and Influence of Freshwater Inflow Gradients on Estuarine Nutrient-Phytoplankton Dynamics in the Three Estuaries (Guadalupe, Nueces, and Upper Laguna Madre).	13000007, 13000010	Nueces, San Patricio, Aransas												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													
131000060	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 finally, assembly of the watershed plan itself. The same stakeholder group also is working to secure funding for "early phase" targeted restoration activities.	13000009, 13000010, 13000020	Kleberg												Coastal Bend Bays and Estuaries Program Texas A&M University-Corpus Christi Texas Water Resources Institute													
131000061	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 identified 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	13000022	Kenedy, Kleberg, Willacy, cameron												Texas General Land Office											
131000062	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.	13000019, 13000020	Nueces																							
131000063	City of Hondo Drainage Master Plan and Flood Mitigation plan		13000014	Medina																							
131000064	Petronila Drainage Improvements Feasibility Study	Hydrological and Topographic Study to provide drainage solutions to alleviate flooding within the residential subdivision, as well as the low areas north and south of the intersection of FM 665 with CR 67.	13000014	Nueces																							
131000065	Tierra Grande Subdivision Drainage Improvements Feasibility Study	Hydrological and Hydraulic Study to provide drainage solutions to alleviate flooding within the residential subdivision due to existing hydrological flow patterns from regional (off-site), upgradient (off-site), and local (on-site) runoff drainage areas flowing toward the center of the subdivision.	13000014	Nueces																							

Appendix D

Exhibit C, Table 13

Potentially Feasible Flood Mitigation Projects

Identified by the Regional Flood Planning Group

Exhibit C, Table 13

Potentially Feasible Flood Mitigation Projects Identified by RFPG

FMP ID	FMP Name	Description	Associated Goals (ID)	Counties	HUC12s	Watersheds	Project Type	Project Area (sqmi)	Flood Risk Type (Riverine, Coastal, Urban, Playa, Other)	Sponsor	Entities with Oversight	Emergency Need (Y/N)	Estimated Project Cost ($)	Potential Funding Sources and Amount
133000001	County Wide Drainage Improvements	Green Lake Outfall System and Gregory Diversion Ditch	13000005, 13000014	San Patricio		13000026,13000028,13000030,13000031,13000034,13000035,13000037, 13000043,13000044,13000045,13000046,13000442,13000445,13000447, 13000448,13000462,13000463,13000466,13000467,13000469,13000479, 13000480,13000481,13000482,13000592,13000594,13000596		65.48		TWDB FIF			$ 11,841,990	TWDB FIF
133000002	County Wide Drainage Improvements	Medio Creek Flood Control Improvements	13000014	Bee				81.64		TWDB FIF			$ 3,473,313	TWDB FIF
133000003	County Wide Early Flood Warning System	Self-Supporting Tower for Early Warning System	13000008	Uvalde				144.78		TWDB FIF			$ 219,000	TWDB FIF
133000004	County Wide Early Flood Warning System	Flood Early Warning System – Phase I	13000008	Bee				81.64		TWDB FIF			$ 437,500	TWDB FIF
133000005	Others (Flood Prevention/Planning Study, LOMR etc)	GBRA Hazard Mitigation Plan Jurisdiction	13000011	Aransas, Bandera, Bexar, Calhoun, Goliad, Karnes, Kerr, Refugio, San Patricio, Wilson		13000002,13000005,13000006,13000007,13000021,13000022,13000023, 13000024,13000025,13000026,13000028,13000042,13000045,13000592, 13000593,13000595,13000597,13000598,13000601,13000602,13000603, 13000604,13000605,13000606,13000607		731.72		TWDB FIF			$ 78,500	TWDB FIF
133000006	Flood Warning System	Nueces County Drainage & Conservation District 2	13000008	Nueces	121102020101,121102020102,121102050506,12110205 0601,121102050602,121102050603,121102050604,1211 02050606,121102050607	13000532,13000553,13000558,13000559,13000560,13000561,13000563, 13000611,13000613		11.79		TWDB FIF			$ 465,500	TWDB FIF
133000007	County Wide Drainage Improvements	Nueces County Drainage & Conservation District 2 - Casa Blanca Drainage Improvements	13000014	Nueces	121102020101,121102020102,121102050506,12110205 0601,121102050602,121102050603,121102050604,1211 02050606,121102050607	13000532,13000553,13000558,13000559,13000560,13000561,13000563, 13000611,13000613		11.79		TWDB FIF			$ 809,600	TWDB FIF
133000008	County Wide Drainage Improvements	Nueces County Drainage & Conservation District 2 - Bosquez Rd. / Avenue J Drainage Improvements	13000014	Nueces	121102020101,121102020102,121102050506,12110205 0601,121102050602,121102050603,121102050604,1211 02050606,121102050607	13000532,13000553,13000558,13000559,13000560,13000561,13000563, 13000611,13000613		11.79		TWDB FIF			$ 2,453,716	TWDB FIF
133000009	County Wide Drainage Improvements	Nueces County Drainage & Conservation District 2 - Ditch "A" and Bluebonnet Drainage Improvements	13000014	Nueces	121102020101,121102020102,121102050506,12110205 0601,121102050602,121102050603,121102050604,1211 02050606,121102050607	13000532,13000553,13000558,13000559,13000560,13000561,13000563, 13000611,13000613		11.79		TWDB FIF			$ 1,311,320	TWDB FIF
133000010	Drainage Improvements	Stormwater Pump Station #3 (Euclid) - Aransas Pass	13000014	Aransas, Nueces, San Patricio	121004050204,121004050400,121102020200	13000592,13000596,13000608		4.88		TWDB FIF			$ 6,000,000	TWDB FIF
133000011	Drainage Improvements	Pintas Creek at Sunset Dr. & Virginia St. Drainage Improvements - Alice	13000014	Jim Wells	121102040404,121102040405	13000496,13000513		1.18		TWDB FIF			$ 372,500	TWDB FIF
133000012	Drainage Improvements	Jourdanton Main Street Drainage Project	13000014	Atascosa	121101100206,121101100402,121101100405	13000419,13000427,13000428		0.32		TWDB FIF			$ 1,504,770	TWDB FIF
133000013	City of Alice: Virginia St. Area Drainage Project	GLO Disaster Mitigation Project	13000014	Jim Wells	121102040405	13000513		0.00		TX GLO			$ 6,942,193	TX GLO
133000014	Jim Wells County: Rancho Alegre and Alice Acres Drainage and Detention Project	GLO Disaster Mitigation Project	13000014	Jim Wells	121102040202,121102040405,121102040409	13000497,13000498,13000513		0.67		TX GLO			$ 9,650,296	TX GLO
133000015	City of Beeville Low Water Crossings Replacement Project	GLO Disaster Mitigation Project	13000003	Bee	121004070101	13000032		0.00		TX GLO			$ 3,844,490	TX GLO
133000016	City of Premont Drainage Improvements and Flood Mitigation Project	GLO Disaster Mitigation Project	13000014	Jim Wells	121102050402, 121102050405	13000534,13000548		0.16		TX GLO			$ 13,116,000	TX GLO
133000017	Drainage Improvements Project	Drainage Improvements Project - Location 1 - Corral Street, Kingsville	13000014	Kleberg	121102040407, 121102040409	13000497,13000517		0.00		TX GLO			$ 3,333,333	TX GLO
133000018	Drainage Improvements Project	Drainage Improvements Project - Location 2 - Kenedy Street, Kingsville	13000014	Kleberg	121102040205, 121102040206, 121102040409	13000483,13000497,13000502		0.00		TX GLO			$ 3,333,333	TX GLO
133000019	Drainage Improvements Project	Drainage Improvements Project - Location 3 - Johnston Street, Kingsville	13000014	Kleberg	121102040205, 121102040206, 121102040409	13000483,13000497,13000502		0.00		TX GLO			$ 3,333,333	TX GLO
133000020	Town of Refugio Wastewater Treatment and Drainage Project	Citywide Wastewater Treatment Plant and Drainage Project	13000014	Refugio	121004060301	13000022		0.14		TX GLO			$ 12,112,636	TX GLO
133000021	Refugio County Hazard Mitigation Improvements Project	Hazard Mitigation Improvements Project	13000014	Refugio		13000002,13000005,13000006,13000007,13000021,13000022,13000023, 13000024,13000025,13000026,13000028,13000042,13000045,13000593, 13000595,13000597,13000598,13000601,13000602,13000603,13000604, 13000605,13000606,13000607		72.27		TX GLO			$ 6,910,131	TX GLO
133000022	San Patricio County Channel Outfall Drainage Improvement Project	Channel Outfall Drainage Improvement Project - Location 1 - Taft Site	13000014	San Patricio	121004070305, 121004070403	13000043,13000044		0.14		TX GLO			$ 7,717,591	TX GLO
133000023	San Patricio County Channel Outfall Drainage Improvement Project	Channel Outfall Drainage Improvement Project - Location 2 - Sinton Site	13000014	San Patricio	121004070303, 121004070304	13000034,13000046		0.25		TX GLO			$ 7,717,591	TX GLO
133000024	Downtown Drainage Improvements Phase III - Project A	CoCC Downtown Study	13000014	Nueces	121102020107	13000615,13000618		0.00019						
133000025	TXDOT Road Projects	TXDOT Road Project - 120601020	13000014	Live Oak	121101110106	13000454		0.00008		TXDOT			$ 519,596	TXDOT
133000026	TXDOT Road Projects	TXDOT Road Project - 099103013	13000014	Live Oak	121101100504	13000435		0.00012		TXDOT			$ 260,900	TXDOT
133000027	TXDOT Road Projects	TXDOT Road Project - 037310009	13000014	Nueces	121102020102	13000613		0.00161		TXDOT			$ 1,500,000	TXDOT
133000028	TXDOT Road Projects	TXDOT Road Project - 010106095	13000014	Nueces	121102020107, 121102020200	13000608,13000615,13000617,13000618,13000623		0.00099		TXDOT			$ 800,000,000	TXDOT
133000029	TXDOT Road Projects	TXDOT Road Project - 037310008	13000014	Nueces	121102020102	13000613		0.00047		TXDOT			$ 60,000	TXDOT
133000030	TXDOT Road Projects	TXDOT Road Project - 120601019	13000014	Live Oak	121101110106	13000454		0.00052		TXDOT			$ 905,442	TXDOT
133000031	TXDOT Road Projects	TXDOT Road Project - 059502024	13000014	Medina	121101070304	13000340		0.00015		TXDOT			$ 2,176,000	TXDOT
133000032	TXDOT Road Projects	TXDOT Road Project - 007313012	13000014	Atascosa	121101100308	13000413		0.00018		TXDOT			$ 5,195,540	TXDOT
133000033	TXDOT Road Projects	TXDOT Road Project - 084804049	13000014	Medina	121101070102	13000319		0.00046		TXDOT			$ 3,332,101	TXDOT
133000034	TXDOT Road Projects	TXDOT Road Project - 085504032	13000014	Bandera	121101060601	13000275		0.00033		TXDOT			$ 1,456,894	TXDOT
133000035	TXDOT Road Projects	TXDOT Road Project - 252001015	13000014	Medina	121101090103	13000380		0.00040		TXDOT			$ 861,900	TXDOT
133000036	TXDOT Road Projects	TXDOT Road Project - 001708113	13000014	La Salle	121101080205	13000370		0.00019		TXDOT			$ 5,500,000	TXDOT
133000037	TXDOT Road Projects	TXDOT Road Project - 001708112	13000014	La Salle	121101080205	13000370		0.00019		TXDOT			$ 5,500,000	TXDOT
133000038	TXDOT Road Projects	TXDOT Road Project - 264901035	13000014	Medina	121101070109	13000322		0.00033		TXDOT			$ 3,784,200	TXDOT
133000039	TXDOT Road Projects	TXDOT Road Project - 003702060	13000014	Zavala	121101030104	13000108		0.00126		TXDOT			$ 15,000,000	TXDOT
133000040	TXDOT Road Projects	TXDOT Road Project - 193702032	13000014	Zavala	121101040602	13000159		0.00115		TXDOT			$ 6,886,071	TXDOT
133000041	Coastal Texas Protection and Restoration Feasibility Study - SP1 – Redfish Bay Protection and Enhancement	This ER measure involves shoreline protection and restoration consisting of 7.4 miles of rock breakwater, at a crest height of 7 ft (NAVD88) with 2H:1V side slopes and a base width of 46 ft, 391.4 acres of island restoration, and 1.4 miles of oyster reef creation. A total of 3,500.5 AAHU would be created. The measure provides for the restoration of the Dagger, Ransom, and Stedman Island complex in Redfish Bay through the construction of breakwater along the unprotected GIWW shoreline along the backside of Redfish Bay and on the bayside of the restored islands. Additional protection is provided to the island complex through the placement of reef balls between the breakwater and island complex to create 1.4 miles of oyster reef. The breakwater and islands would protect submerged aquatic vegetation (e.g., seagrass) within Redfish Bay, and it is assumed that additional submerged aquatic vegetation will form between the breakwater and the islands and support coastal water birds.	13000021	Nueces, San Patricio										
133000042	Potential for Bed-Material Entrainment in selected Streams of the Edwards Plateau----Edwards, Kimble, and Real Counties, Texas, and Vicinity	Based on the findings of "Potential for Bed-Material Entrainment in Selected Streams of the Edwards Plateau—Edwards, Kimble, and Real Counties, Texas, and Vicinity", it is found that every 12 to 18 months, a flow occurs within the Edwards Plateua in Central Texas that entrains bed material with the capacity to damage Low Water Crossings. Based on the regularity pf this damaging event, it would appear beneficial to find a way to reduce or eliminate the damage that occurs at the locations of the Low Water Crossings. Could also be of benefit to assist in securement of funding for this prohject if applicable.	13000013	Edwards, Kimble and Real										
133000043	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.	13000019, 13000022, 13000025	Nueces										
133000044	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.	13000013, 13000025	Aransas										
133000045	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.	13000013, 13000025	Aransas										
133000046	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)	13000013, 13000025	Aransas									$ 25,000,000.00	
133000047	COASTAL BEND MITIGATION ACTION PLAN - BE - 03	Silver Creek road. Build a 100 foot bridge, 26 feet wide with a 45 degree skew. The low water crossing at Silver Creek road, across silver creek, floods during and after heavy rains, trapping approximately 30 people in the residences.	13000001	Bee									$ 250,000	
133000048	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.	13000013	Bee									$ 70,200	
133000049	COASTAL BEND MITIGATION ACTION PLAN - BE - 05	Emergency Warning and Public Information System, Bee County and the City of Beeville have no capability, other than a siren in the city limits of Beeville, to communicate warnings and emergency information to residents.	13000007	Bee									$ 20,000	
133000050	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.	13000013	Bee									$ 900,000	
133000051	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.	13000016	Jim Wells									$ 33,000	
133000052	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.	13000016	Jim Wells									$ 25,000	
133000053	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.	13000007	Jim Wells									$ 85,000	
133000054	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.	13000007	Jim Wells									$ 85,000	
133000055	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.	13000007	Jim Wells									$ 30,000	
133000056	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.	13000007	Kleberg									$ 40,000	
133000057	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.	13000013, 13000019	Kleberg									$ 1,000,000	
133000058	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.	13000013	Kleberg									$ 13,000	
133000059	COASTAL BEND MITIGATION ACTION PLAN - KL - 13	Improve water drainage to county roads, Pcts 1 and 3,historically heavy rains will produce county road flooding and standing water to ditches. The overflow of storm and rain water has also produced some flooding to residential homes and properties.	13000013	Kleberg									$ 260,000	
133000060	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.	13000007	Live Oak									$ 16,000	
133000061	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.	13000007	Live Oak									$ 10,000	
133000062	COASTAL BEND MITIGATION ACTION PLAN - NU - 07	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.	13000007	Nueces										
133000063	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.	13000007	Nueces									$ 51,113	
133000064	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.	13000013	Nueces									$ 2,000,000	
133000065	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.	13000013	Nueces									$ 5,000,000	
133000066	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.	13000013	Nueces									$ 3,000,000	
133000067	COASTAL BEND MITIGATION ACTION PLAN - NU - 21	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.	13000013	Nueces									$ 2,000,000	
133000068	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.	13000013	Nueces									$ 800,000	
133000069	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.	13000013	Nueces									$ 160,000	
133000070	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.	13000013	Nueces									$ 90,000	
133000071	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.	13000016	Nueces									$ 300,000	
133000072	COASTAL BEND MITIGATION ACTION PLAN - NU - 33	The Police Headquarters building is located in an area of downtown Corpus Christi that is vulnerable to street flooding. The automatic generator transfer switch is presently located in a control room on the ground floor of the building. If the switch isdamaged due to flooding, the Police Headquarters building, the 9-1-1 call taking/dispatch function, and the Metro-Com emergency alert and notification systems would be without electrical power, even if the auxiliary generator was undamaged.	13000013	Nueces									$ 36,000	

FMP ID	Flood Risk										Reduction in Flood Risk												Pre-Project Level-of-Service	Post-Project Level-of-Service	Cost/ Structure removed	Percent Nature-based Solution (by cost)	Negative Impact (Y/N)	Negative Impact Mitigation (Y/N)	Social Vulnerability Index (SVI)	Water Supply Benefit (Y/N)	Traffic Count for Low Water Crossings	Benefit-Cost Ratio	RFPG Recommendation (Y/N)	Reason for Recommendation
	Area in 100yr (1% annual chance) Floodplain	Area in 500yr (0.2% annual chance) Floodplain	Estimated number of structures at 100yr flood risk	Residential structures at 100-year flood risk	Estimated Population at 100-year flood risk	Critical facilities at 100-year flood risk (#)	Number of low water crossings at flood risk (#)	Estimated number of road closures (#)	Estimated length of roads at 100-year flood risk (Miles)	Estimated farm & ranch land at 100-year flood risk (acres)	Number of structures with reduced 100yr (1% annual chance) Flood risk	Number of structures removed from 100yr (1% annual chance) Flood risk	Number of structures removed from 500yr (0.2% annual chance) Flood risk	Residential structures removed from 100yr (1% annual chance) Flood risk	Estimated Population removed from 100yr (1% annual chance) Flood risk	Critical facilities removed from 100yr (1% annual chance) Flood risk (#)	Number of low water crossings removed from 100yr (1% annual chance) Flood risk (#)	Estimated reduction in road closure occurrences	Estimated length of roads removed from 100yr flood risk (Miles)	Estimated farm & ranch land removed from 100yr flood risk (acres)	Estimated reduction in fatalities (if available)	Estimated reduction in injuries (if available)												
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Exhibit C, Table 13

Potentially Feasible Flood Mitigation Projects Identified by RFPG

FMP ID	FMP Name	Description	Associated Goals (ID)	Counties	HUC12s	Watersheds	Project Type	Project Area (sqmi)	Flood Risk Type (Riverine, Coastal, Urban, Playa, Other)	Sponsor	Entities with Oversight	Emergency Need (Y/N)	Estimated Project Cost ($)	Potential Funding Sources and Amount	Flood Risk										Reduction in Flood Risk												Pre-Project Level-of-Service	Post-Project Level-of-Service	Cost/ Structure removed	Percent Nature-based Solution (by cost)	Negative Impact (Y/N)	Negative Impact Mitigation (Y/N)	Social Vulnerability Index (SVI)	Water Supply Benefit (Y/N)	Traffic Count for Low Water Crossings	Benefit-Cost Ratio	RFPG Recommendation (Y/N)	Reason for Recommendation
															Area in 100yr (1% annual chance) Floodplain	Area in 500yr (0.2% annual chance) Floodplain	Estimated number of structures at 100yr flood risk	Residential structures at 100-year flood risk	Estimated Population at 100-year flood risk	Critical facilities at 100-year flood risk (#)	Number of low water crossings at flood risk (#)	Estimated number of road closures (#)	Estimated length of roads at 100-year flood risk (Miles)	Estimated farm & ranch land at 100-year flood risk (acres)	Number of structures with reduced 100yr (1% annual chance) Flood risk	Number of structures removed from 100yr (1% annual chance) Flood risk	Number of structures removed from 500yr (0.2% annual chance) Flood risk	Residential structures removed from 100yr (1% annual chance) Flood risk	Estimated Population removed from 100yr (1% annual chance) Flood risk	Critical facilities removed from 100yr (1% annual chance) Flood risk (#)	Number of low water crossings removed from 100yr (1% annual chance) Flood risk (#)	Estimated reduction in road closure occurrences	Estimated length of roads removed from 100yr flood risk (Miles)	Estimated farm & ranch land removed from 100yr flood risk (acres)	Estimated reduction in fatalities (if available)	Estimated reduction in injuries (if available)												
133000073	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.	13000013, 13000019	Nueces									$ 785,000																																			
133000074	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.	13000013, 13000019	Nueces									$ 1,000,000																																			
133000075	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.	13000013, 13000019	Nueces									$ 1,000,000																																			
133000076	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.	13000013	Nueces									$ 258,587,835																																			
133000077	COASTAL BEND MITIGATION ACTION PLAN - NU - 55	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.	13000013	Nueces									$ 1,000,000																																			
133000078	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.	13000013	Nueces									$ 8,750,000																																			
133000079	COASTAL BEND MITIGATION ACTION PLAN - NU - 66	Conduct debris removal operations and incorporate drainage enhancements that will reduce the incidence of flooding. This will include upgrades to culverts and leveraging City and private maintenance of construction projects. This project will further be enhanced by the road elevation and re-grade project. 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 already mentioned 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.	13000013	Nueces									$ 325,000																																			
133000080	COASTAL BEND MITIGATION ACTION PLAN - SP-02	Refurbish, 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.	13000013	San Patricio									$ 4,500,000																																			
133000081	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.	13000013	San Patricio									$ 20,000,000																																			
133000082	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.	13000007	San Patricio									$ 75,000																																			
133000083	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.	13000013	San Patricio																																														
133000084	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.	13000013	San Patricio																																														
133000085	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.	13000013	San Patricio									$ 1,000,000																																			
133000086	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.	13000013	San Patricio									$ 1,000,000																																			
133000087	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.	13000013	San Patricio									$ 250,000																																			
133000088	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.	13000013	San Patricio									$ 250,000																																			
133000089	San Patricio County Hazard Mitigation Action Plan - City of Gregory, Action #3	Survey and remove hazardous trees and brush from drainage system.	13000013	San Patricio									$ 10,000																																			
133000090	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	13000013	San Patricio									$ 450,000																																			
133000091	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.)"	13000013	San Patricio									$ 2,000																																			
133000092	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.	13000007	San Patricio									$ 20,000																																			
133000093	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #2	Improve drainage, implement drainage right-of-way on California Street.	13000013	San Patricio									$ 250,000																																			
133000094	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	13000013	San Patricio									$ 1,000,000																																			
133000095	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	13000013	San Patricio									$ 8,000,000																																			
133000096	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #12	Implement Avenue B drainage project improvements	13000013	San Patricio									$ 3,700,000																																			
133000097	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #13	Purchase emergency heavy equipment to facilitate recovery after a significant event.	13000016	San Patricio									$ 650,000																																			
133000098	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #14	Upgrade and harden critical communication infrastructure and equipment.	13000013	San Patricio									$ 500,000																																			
133000099	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.	13000013	San Patricio									$ 10,000																																			
133000100	San Patricio County Hazard Mitigation	Purchase NOAA "All Hazards" radios for early warning	13000007	San Patricio									$ 10,000																																			
133000101	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).	13000013	San Patricio									$ 500,000																																			
133000102	San Patricio County Hazard Mitigation Action Plan - City of Mathis, Action #9	Equip sewer manholes with water tight covers and inflow guards; Raise electrical components of sewage lift stations above BFE; Floodproof sewage treatment plants in flood hazard/lowlying areas; Increase capacity/add stormwater detention /retention basins; Increase dimensions of drainage culverts in areas prone to flooding and/or with drainage problems (specify locations).	13000013	San Patricio									$ 3,000,000																																			
133000103	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).	13000013	San Patricio									$ 1,000,000																																			
133000104	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.	13000007	San Patricio									$ 20,000																																			
133000105	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.	13000013	San Patricio									$ 275,000																																			
133000106	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 hardwired quick connections.	13000013	San Patricio									$ 1,000,000																																			
133000107	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #12	Floodproof sewage treatment plants in flood hazard/lowlying areas; Raise electrical components of sewage lift stations above BFE; Equip sewer manholes with watertight covers and inflow guards.	13000013	San Patricio									$ 500,000																																			
133000108	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #15	Clean and repair stormwater drains. Upgrade undersized stormwater drains.	13000013	San Patricio									$ 3,000,000																																			
133000109	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.	13000013	San Patricio									$ 1,000,000																																			
133000110	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.	13000013, 13000016	San Patricio									$ 1,000,000																																			
133000111	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.	13000013	San Patricio									$ 100,000																																			
133000112	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	13000023	Aransas									$ 3,426,000																																			
133000113	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	13000001	Aransas									$ 605,880																																			
133000114	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	13000014	Aransas									$ 1,769,900																																			
133000115	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	13000014	Aransas									$ 160,380																																			
133000116	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	13000014	Aransas									$ 591,030																																			
133000117	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	13000014	Aransas									$ 400,895																																			
133000118	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 making improvments to the County drainage system	13000014	Aransas									$ 239,030																																			
133000119	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 under FM1781 at two locations. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvments to the County drainage system	13000014	Aransas									$ 2,090,550																																			
133000120	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 threat of flooding to new and existing buildings and infrastructure by making improvments to the County drainage system	13000014	Aransas									$ 692,120																																			
133000121	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 under FM1069, create an outfall channel from FM1069 to Port Bay. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvments to the County drainage system	13000014	Aransas									$ 1,323,476																																			
133000122	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 drainage system	13000014	Aransas									$ 2,125,200																																			
133000123	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	13000014	Aransas									$ 114,400																																			
133000124	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #25	Precinct 1/1A - Southeast 35 - Project 2. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvments to the County drainage system	13000014	Aransas									$ 167,200																																			
133000125	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #26	Precinct 1/1A - Southeast 35 - Project 1. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvments to the County drainage system	13000014	Aransas									$ 246,510																																			
133000126	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 to the County drainage system	13000014	Aransas									$ 979,000																																			
133000127	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #28	Precinct 3 - Henderson Street Property - Project 4. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvments to the County drainage system	13000014	Aransas									$ 1,074,150																																			
133000128	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 infrastructure by making improvments to the County drainage system	13000014	Aransas									$ 2,375,700																																			
133000129	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 buildings and infrastructure by making improvments to the County drainage system	13000014	Aransas									$ 3,028,500																																			
133000130	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #38	Install bulkheads at Conn Brown Harbor.	13000016	Aransas									$ 1,000,000																																			
133000131	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #40	Develop and adopt a stormwater master plan	13000014, 13000015, 13000016	Aransas									$ 2,500																																			
133000132	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #41	Purchase land behind leeves	13000020	Aransas									$ 500,000																																			

Exhibit C, Table 13
Potentially Feasible Flood Mitigation Projects Identified by RFPG

FMP ID	FMP Name	Description	Associated Goals (ID)	Counties	HUC12s	Watersheds	Project Type	Project Area (sqmi)	Flood Risk Type (Riverine, Coastal, Urban, Playa, Other)	Sponsor	Entities with Oversight	Emergency Need (Y/N)	Estimated Project Cost ($)	Potential Funding Sources and Amount	Flood Risk										Reduction in Flood Risk												Pre-Project Level-of-Service	Post-Project Level-of-Service	Cost/ Structure removed	Percent Nature-based Solution (by cost)	Negative Impact (Y/N)	Negative Impact Mitigation (Y/N)	Social Vulnerability Index (SVI)	Water Supply Benefit (Y/N)	Traffic Count for Low Water Crossings	Benefit-Cost Ratio	RFPG Recommendation (Y/N)	Reason for Recommendation
															Area in 100yr (1% annual chance) Floodplain	Area in 500yr (0.2% annual chance) Floodplain	Estimated number of structures at 100yr flood risk	Residential structures at 100-year flood risk	Estimated Population at 100-year flood risk	Critical facilities at 100-year flood risk (#)	Number of low water crossings at flood risk (#)	Estimated number of road closures (#)	Estimated length of roads at 100-year flood risk (Miles)	Estimated farm & ranch land at 100-year flood risk (acres)	Number of structures with reduced 100yr (1% annual chance) Flood risk	Number of structures removed from 100yr (1% annual chance) Flood risk	Number of structures removed from 500yr (0.2% annual chance) Flood risk	Residential structures removed from 100yr (1% annual chance) Flood risk	Estimated Population removed from 100yr (1% annual chance) Flood risk	Critical facilities removed from 100yr (1% annual chance) Flood risk (#)	Number of low water crossings removed from 100yr (1% annual chance) Flood risk (#)	Estimated reduction in road closure occurrences	Estimated length of roads removed from 100yr flood risk (Miles)	Estimated farm & ranch land removed from 100yr flood risk (acres)	Estimated reduction in fatalities (if available)	Estimated reduction in injuries (if available)												
133000133	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #42	Develop and implement a buyout program	13000015	Aransas									$ 500,000																																			
133000134	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #50	Update and improve sea gates that protect the city and harbor	13000013	Aransas									$ 1,000,000																																			
133000135	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #53	Design and implement a coastal erosion study to identify projects	13000014	Aransas									$ 2,500																																			
133000136	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #55	Update stormwater master plan	13000014, 13000016	Aransas									$ 2,500																																			
133000137	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #58	Cove Harbor Bulkheads - bulkhead construction will provide erosion protection improvements	13000016	Aransas									$ 1,000,000																																			
133000138	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #59	Stormwater Crossing at FM 1781 - Upgrade/replacement of box culverts to accommodate growth	13000014	Aransas									$ 171,248																																			
133000139	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.	13000014	Aransas									$ 996,175																																			
133000140	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #61	Master Plan - Drainage Improvements - Project 2 - SH 35 BUS - Enterprise & Maple	13000014	Aransas									$ 540,798																																			
133000141	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									$ 1,411,411																																			
133000142	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #63	Master Plan - Drainage Improvements - Project 4 - Market St (FM1069) at SH 35 BUS	13000014	Aransas									$ 791,725																																			
133000143	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #64	Master Plan - Drainage Improvements - Project 5 - Market St (FM1069) at Burton & Kossuth	13000014	Aransas									$ 3,135,881																																			
133000144	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)	13000014	Aransas									$ 349,414																																			
133000145	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #66	Master Plan - Drainage Improvements - Project 8 - Pearl St (FM2165) at Orleans & Laure	13000014	Aransas									$ 2,813,827																																			
133000146	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #68	RCC Lakes - removal of sediment for drainage improvements	13000014	Aransas									$ 376,800																																			
133000147	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #73	Repair outfalls of pump station that pump into Aransas Bay	13000014	Aransas									$ 2,000,000																																			
133000148	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.1.d	Incorporate higher floodplain management standards into City of aransas Pass comprehensive plan update.	13000016	Aransas									$ 76,754																																			
133000149	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.1.e	Incorporate higher floodplain management standards into City of Rockport comprehensive plan update.	13000016	Aransas																																													
133000150	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.1.f	Incorporate higher floodplain management standards into Aransas County hazard Mitigation Action plan update	13000016	Aransas																																													
133000151	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.1.b	Develop a joint floodplain management and awareness website with all jurisdictions.	13000007	Aransas																																													
133000152	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.1.c	Publish informational flood articles in city and county newsletters	13000007	Aransas																																													
133000153	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 give the public infomration on flood protection, rebuilding after a flood event, grant information, etc.	13000024	Aransas																																													
133000154	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.	13000024	Aransas																																													
133000155	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.	13000025	Aransas																																													
133000156	Nueces County Hazard Mitigation - Corpus Christi Action #1	Seawall capital Imrpovement Project for routine maintenance and restoration.	13000026, 13000027	Nueces									$ 5,500,000																																			
133000157	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.	13000026, 13000027	Nueces									$ 10,500,000																																			
133000158	Nueces County Hazard Mitigation - Corpus Christi Action #3	Make improvements to the Salt Flat Levee System	13000026, 13000027	Nueces									$ 3,000,000																																			
133000159	Nueces County Hazard Mitigation - Corpus Christi Action #4	Make improvements to Power Street Pump Station	13000026, 13000027	Nueces									$ 5,500,000																																			
133000160	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.	13000013	Nueces									$ 2,819,800																																			
133000161	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.	13000013	Nueces									$ 2,756,100																																			
133000162	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.	13000013	Nueces									$ 4,152,800																																			
133000163	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	13000004	Nueces									$ 5,850,600																																			
133000164	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.	13000004	Nueces									$ 22,800,000																																			
133000165	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.	13000013	Nueces									$ 350,000,000																																			
133000166	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.	13000013	Nueces									$ 3,000,000																																			
133000167	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.	13000013, 13000019	Nueces									500000-1000000																																			
133000168	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									$ 300,000																																			
133000169	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.	13000002	Atascosa									$ 60,000																																			
133000170	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #8	Develop and implement a revier/creek clean out plan.	13000025	Atascosa									$ 80,000																																			
133000171	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	Atascosa									$ 600,000																																			
133000172	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #13	Implement alert system to warn community of hazards.	13000007	Atascosa									$ 300,000																																			
133000173	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									$ 350,000																																			
133000174	Atascosa McMullen Hazard Mitigation Plan - City of Charlotte Action #7	The enforcement of the flood damage prevention ordinance	13000013	Atascosa									$ 30,000																																			
133000175	Atascosa McMullen Hazard Mitigation Plan - City of Charlotte Action #8	Conduct a feasibilty study to evaulate size options for a community safe room	13000028	Atascosa									$ 250,000																																			
133000176	Atascosa McMullen Hazard Mitigation Plan - City of Christine Action #4	Install early warning system for hazards	13000026, 13000027	Atascosa									$ 150,000																																			
133000177	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #3	Enforcement of flood damage prevention ordinance	13000013	Atascosa									$ 30,000																																			
133000178	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #4	Maintain Storm Drainage System	13000013	Atascosa									$ 40,000																																			
133000179	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	13000001, 13000002	Atascosa									$ 5,000																																			
133000180	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #9	Install early warning systems for hazards	13000026, 13000027	Atascosa									$ 100,000																																			
133000181	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #10	Conduct a feaibility study to evaulate site options for a community safe room for hazards	13000028	Atascosa									$ 250,000																																			
133000182	Atascosa McMullen Hazard Mitigation Plan - City of Lytle Action #1	Public education and outreach programs to education citizens about mitigation against hazards	13000024	Atascosa									$ 5,000																																			
133000183	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.	13000025	Atascosa									$ 750,000																																			
133000184	Atascosa McMullen Hazard Mitigation Plan - Lytle ISD Action #6	Create and implement a hazard educational enhancement program in which faculty/students can collaborate in inderstanding and communicating hazards of concern.	13000024	Atascosa									$ 5,000																																			
133000185	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #4	Public awareness and education on all hazards	13000024	McMullen									$ 300,000																																			
133000186	Atascosa McMullen Hazard Mitigation Plan - City of Pleasanton Action #5	Education homeowners on all types of hazards	13000022	McMullen									$ 10,000																																			
133000187	Atascosa McMullen Hazard Mitigation Plan - City of Pleasanton Action #6	New emergency communication infrastructure.	13000007	McMullen									$ 300,000																																			
133000188	Atascosa McMullen Hazard Mitigation Plan - City of Poteet Action #3	Install early warning systems	13000007	Atascosa									$ 50,000																																			
133000189	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	13000008, 13000009, 13000025	Atascosa									$ 250,000																																			
133000190	Atascosa McMullen Hazard Mitigation Plan - Poteet ISD Action #1	Upgrade Schools against all hazards. A detailed study on the cost effectiveness measures to protect schools agains all hazards	13000014, 13000015	Atascosa									$ 300,000																																			
133000191	Atascosa McMullen Hazard Mitigation Plan - Poteet ISD Action #6	Replace or improve inoperable communication equipment for better county wide coordination between municipalicies, police, EMTs, and other emergency personnels for hazards.	13000007	Atascosa									$ 50,000																																			
133000192	Atascosa McMullen Hazard Mitigation Plan - City of Poteet Action #1	Improve or replace inoperable communications in city departements and outside agencies	13000007	Atascosa									$ 50,000																																			
133000193	Atascosa McMullen Hazard Mitigation Plan - City of Pleasanton Action #10	reduce flooding and poor drainage by increasing maintenance of existing storm water system.	13000025	McMullen									$ 21,000,000																																			
133000194	Margie, Commissioner Precinct 1- to San Diego	Drainage in Colonias: K-Bar, Alice Acres, and Rancho Allegre (GLO)	13000025	Jim Wells									$ 9,800,000.00																																			
133000195	Texas Coastal Resiliency Master Plan - R3-3	The project is located along the San Antonio Bay shoreline side of the Aransas National Wildlife Refuge (ANWR) in an area known as Dagger Point. This project would install a living shoreline using rock breakwaters to preserve this area. The Coastal Bend Bays and Estuary Program is working with U.S. Fish and Wildlife Service to conduct an alternatives analysis and complete the preliminary engineering, alternatives analysis, final design and permitting for protection of 1.5 miles of shoreline at Dagger Point. Stakeholders are seeking funding for construction of the shoreline restoration and protection	13000020	Aransas						Estuaries Program, U.S. Fish and Wildlife Service, Aransas National Wildlife Refuge, U.S. Department			$ 2,600,000.00	Estuaries Program, U.S. Fish and Wildlife Service, Aransas National Wildlife																																		
133000196	Texas Coastal Resiliency Master Plan - R3-5	This project would acquire approximately 400 acres of coastal habitats that support coastal prairie, freshwater and estuarine wetlands, and the southernmost extents of mima mounds at Shell Point Ranch. After successful completion of this project, it would be optimal to protect additional areas north and east of Shell Point through acquisitions or conservation easements to provide a contiguous wildlife corridor to beneft whooping cranes and increase coastal land preservation.	13000020	Aransas						TPWD			$ 5,000,000.00	TPWD																																		
133000197	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	13000020	Aransas						County Navigation District			$ 3,500,000.00	Aransas County Navigation District																																		
133000198	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	13000020	Aransas						Texas Parks & Wildlife Department			$ 2,700,000.00	Texas Parks & Wildlife Department																																		

Exhibit C, Table 13

Potentially Feasible Flood Mitigation Projects Identified by RFPG

FMP ID	FMP Name	Description	Associated Goals (ID)	Counties	HUC12s	Watersheds	Project Type	Project Area (sqmi)	Flood Risk Type (Riverine, Coastal, Urban, Playa, Other)	Sponsor	Entities with Oversight	Emergency Need (Y/N)	Estimated Project Cost ($)	Potential Funding Sources and Amount	Flood Risk										Reduction in Flood Risk												Pre-Project Level-of-Service	Post-Project Level-of-Service	Cost/ Structure removed	Percent Nature-based Solution (by cost)	Negative Impact (Y/N)	Negative Impact Mitigation (Y/N)	Social Vulnerability Index (SVI)	Water Supply Benefit (Y/N)	Traffic Count for Low Water Crossings	Benefit-Cost Ratio	RFPG Recommendation (Y/N)	Reason for Recommendation
															Area in 100yr (1% annual chance) Floodplain	Area in 500yr (0.2% annual chance) Floodplain	Estimated number of structures at 100yr flood risk	Residential structures at 100-year flood risk	Estimated Population at 100-year flood risk	Critical facilities at 100-year flood risk (#)	Number of low water crossings at flood risk (#)	Estimated number of road closures (#)	Estimated length of roads at 100-year flood risk (Miles)	Estimated farm & ranch land at 100-year flood risk (acres)	Number of structures with reduced 100yr (1% annual chance) Flood risk	Number of structures removed from 100yr (1% annual chance) Flood risk	Number of structures removed from 500yr (0.2% annual chance) Flood risk	Residential structures removed from 100yr (1% annual chance) Flood risk	Estimated Population removed from 100yr (1% annual chance) Flood risk	Critical facilities removed from 100yr (1% annual chance) Flood risk (#)	Number of low water crossings removed from 100yr (1% annual chance) Flood risk (#)	Estimated reduction in road closure occurrences	Estimated length of roads removed from 100yr flood risk (Miles)	Estimated farm & ranch land removed from 100yr flood risk (acres)	Estimated reduction in fatalities (if available)	Estimated reduction in injuries (if available)												
133000199	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	13000019	Kleberg						Coastal Bend Bays and Estuaries Program, The Nature Conservancy, Audubon Texas, U.S. Fish and Wildlife Service, Texas General Land Office			$ 3,600,000.00	Coastal Bend Bays and Estuaries Program, The Nature Conservancy, Audubon Texas, U.S. Fish and Wildlife Service, Texas General Land Office																																		
133000200	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.	13000019	San Patricio, Nueces						Coastal Bend Bays and Estuaries Program, Texas General Land Office			$ 3,500,000.00	Coastal Bend Bays and Estuaries Program, Texas General Land Office																																		
133000201	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.	13000020	Aransas, Refugio, Nueces						Texas Parks & Wildlife Department			$ 3,000,000.00	Texas Parks & Wildlife Department																																		
133000202	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	13000020	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 Office, Private Landowners			$ 500,000.00	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 Office, Private Landowners																																		
133000203	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	13000020	Nueces						City of Port Aransas Port of Corpus Christi Texas General Land Office			$ 4,400,000.00	City of Port Aransas Port of Corpus Christi Texas General Land Office																																		
133000204	Lower Nueces River Watershed Protection Plan - Riparian habitat Conservation Management Measures No. 1	Purchase of Properties	13000019	Nueces						City of Corpus Christi and Counties			$ 15,000.00	City of Corpus Christi and Counties																																		
133000205	Lower Nueces River Watershed Protection Plan - Riparian habitat Conservation Management Measures No. 2	Acquisitions of Conservation Easements (approximately 970 acres)	13000019	Nueces						City of Corpus Christi/NRA/TALT			$ 970,000.00	City of Corpus Christi/NRA/TALT																																		
133000206	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.	13000006	San Patricio						Nation Fish and Wildlife Foundation			$ 3,328,000.00	Nation Fish and Wildlife Foundation																																		
133000207	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.	13000025	Aransas						TCEQ			$ 1,600,000.00	TCEQ																																		
133000208	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.	13000025	Aransas						TCEQ			$ 650,000.00	TCEQ																																		
133000209	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.	13000025	Aransas						TCEQ			$ 650,000.00	TCEQ																																		
133000210	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.	13000025	Aransas						TCEQ			$ 1,325,000.00	TCEQ																																		
133000211	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.	13000025	Aransas						TCEQ			$ 925,000.00	TCEQ																																		
133000212	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.	13000022	Nueces						CBBEP				CBBEP																																		
133000213	Oso Creek Channel Bottom Rectification and Bank Stabilization Project	The Oso Creek Channel Bottom Rectification and Green Infrastructure Project would address a 12-mile section of Oso Creek channel from Greenwood Drive to Cayo del Oso including channel modifications to remove peaks and valleys, and implement bank stabilization, revegetation, and other green infrastructure techniques. It will advance long term resilience by enhancing capacity of stormwater system and improving water quality.	13000025	Nueces						TWDB			$44,000,000.00	TWDB																																		
133000214	Greenwood Plant Flood Mitigation Project	Greenwood Plant consistently floods and is in need of repairs. The proposed project would improve the infrastructure in and around the plant to prevent furture floods from impacting the plant.	13000014	Nueces						City of Corpus Christi			$5,000,000.00	City of Corpus Christi																																		
133000215	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).	13000019, 13000020	Nueces						City of Corpus Christi, Nueces County, CDBG			$99,856,213.50	City of Corpus Christi, Nueces County, CDBG																																		
133000216	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.	13000019, 13000020	San Patricio						Texas Parks and Wildlife Department			$3,824,000.00	Texas Parks and Wildlife Department																																		
133000217	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	13000014	Duval				4	Urban / Riverine																																							
133000218	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	13000014	Duval				3.8	Urban																																							
133000219	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	13000014	Duval				5.6	Urban																																							
133000220	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	13000014	Duval, Jim Wells				2.7	Urban																																							
133000221	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	13000014	Duval, Jim Wells				2.7	Urban																																							
133000222	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	13000014	Duval, Jim Wells				2.7	Urban																																							
133000223	Southern San Diego Drainage Improvement Project	New underground stormwater collection system along Collins Street, including interconnections between existing and new infrastruture.	13000014	Duval, Jim Wells				2.7	Urban																																							
133000224	Improvements to San Diego Levee Outfall System	Improvements to outfall structures and appurtenances along San Diego Levee System	13000014	Duval, Jim Wells				2.7	Urban / Riverine																																							
133000225	Realitos Drainage Improvements	Improvements to surface and subsurface infrastructure of Realitos Drainage System	13000014	Duval				4.7	Urban / Riverine																																							
133000226	Concepcion Drainage Improvements	Improvements to drainage infrastructure in Concepcion	13000014	Duval				4.1	Riverine																																							
133000227	Upper Oso Creek/Channel A Robstown-Calallen area	Acquire right of way to widen & deepen existing drainage ditches.	13000014	Nueces																																												
133000228	Upper Oso Creek	Acquire right of way to improve the flow of flood waters from the Robstown/ Calallen Area.	13000014	Nueces																																												
133000229	Tributary No. 5	Acquire right of way to improve the flow of flood waters in the London Area.	13000014	Nueces																																												
133000230	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.	13000019	Nueces																																												
133000231	Belk Lane Street and Drainage	Road reconstruction and drainage improvements consisting of driveway culvert replacement and road side ditch regrading.	13000014	Nueces																																												
133000232	Rehabilitation of Ditch at County Road 14F	Topographic and hydrological study for improvement and regrading of Drainage ditch.	13000014	Nueces																																												

Appendix E
Exhibit C, Table 14
Potentially Feasible Flood Management Strategies Identified by the Regional Flood Planning Group

Exhibit C, Table 14

Potentially Feasible Flood Management Strategies Identified by RFPG

FMS ID	FMS Name	Description	Associated Goals (ID)	Counties	HUC8s	HUC12s	Watershed Name	Strategy Type	Strategy Project Area (sqmi)	Flood Risk Type (Riverine, Coastal, Urban, Playa Other)	Sponsor	Entities with Oversight	Emergency Need (Y/N)	Estimated Strategy Cost ($)	Potential Funding Sources and Amount	Flood Risk										Reduction in Flood Risk												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
																Area in 100yr (1% annual chance) Floodplain	Area in 500yr (0.2% annual chance) Floodplain	Estimated number of structures at 100yr flood risk	Residential structures at flood risk	Estimated Population at flood risk	Critical facilities at flood risk (#)	Number of low water crossings at flood risk (#)	Estimated number of road closures (#)	Estimated length of roads at flood risk (Miles)	Estimated active farm & ranch land at flood risk (acres)	Number of structures with reduced 100yr (1% annual chance) Flood risk	Number of structures removed from 100yr (1% annual chance) Flood risk	Number of structures removed from 500yr (0.2% annual chance) Flood risk	Residential structures removed from 100yr (1% annual chance) Flood risk	Estimated Population removed from 100yr (1% annual chance) Flood risk	Critical facilities removed from 100yr (1% annual chance) Flood risk (#)	Number of low water crossings removed from 100yr (1% annual chance) Flood risk (#)	Estimated reduction in road closure occurrences	Estimated length of roads removed from 100yr flood risk (Miles)	Estimated active farm & ranch land removed from 100yr flood risk (acres)	Estimated reduction in fatalities (if available)	Estimated reduction in injuries (if available)							
132000001	Improving Stormwater Management in Port Aransas	Improving Stormwater Management	13000008	Nueces	12110202	121102020200	13000608		0.95		GLO CMP / City of Port Aransas			$ 168,080	GLO CMP / City of Port Aransas																													
132000002	Riparian Buffers	Voluntary vegetation management on private riparian lands. Riparian area vegetation is a key factor in reducing downstream flooding.	13000020	Various	12100405,12110111,12110201,12110202,12110203,12110204,12110205		-		79.71		NRCS				NRCS																													
132000003	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										$ 530,000																														
132000004	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.	13000007	Aransas, Bee, Jim Wells, Kleberg, Live Oak, Nueces,										Low cost activity																														
132000005	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.	13000007	Aransas, Bee, Jim Wells, Kleberg, Live Oak, Nueces, San Patricio										Low cost activity																														
132000006	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.	13000007	Aransas										$ 900,000																														
132000007	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.	13000016	Jim Wells										$ 8,000,000																														
132000008	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.	13000007	Jim Wells																																								
132000009	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.	13000016	Kleberg										$ 20,000																														
132000010	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.	13000022	Kleberg																																								
132000011	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.	13000016	Nueces																																								
132000012	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.	13000007	Nueces																																								
132000013	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.	13000007	Nueces																																								
132000014	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.	13000022	Nueces										$ 1,000																														
132000015	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.	13000013	San Patricio										$ 40,000																														
132000016	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.	13000022	San Patricio										$ 2,000																														
132000017	San Patricio County Hazard Mitigation Action Plan - San Patricio County, County Wide, Action #1	Identify and implement feasible actions to reduce risk for repetitive loss properties including actions such as flood proofing, elevation, acquisition, relocation, and retrofitting.	13000013	San Patricio										$ 5,000,000																														
132000018	San Patricio County Hazard Mitigation Action Plan - San Patricio County, County Wide, Action #2	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.	13000022	San Patricio										$ 2,000																														
132000019	San Patricio County Hazard Mitigation Action	Adopt/update disaster resistant building codes, ordinances and / or subdivision regulations (see comments).	13000013	San Patricio										$ 2,000																														
132000020	San Patricio County Hazard Mitigation Action Plan - San Patricio County, County Wide, Action #4	Participate in the Community Rating System.	13000007	San Patricio										$ 5,000																														
132000021	San Patricio County Hazard Mitigation Action Plan - San Patricio County, Action #5	Develop and implement a dam failure hazard education program. Utilize Facebook, city/county webpages and distribution of brochures to provide information on the potential for dam failure and the areas at greatest risk. Provide mitigation measuresto reduce risk of damages, injury or illness.	13000022	San Patricio										$ 2,000																														
132000022	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.	13000022	San Patricio										$ 2,000																														
132000023	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 damage, injury or illness.	13000022	San Patricio										$ 2,000																														
132000024	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	San Patricio										$ 2,000																														
132000025	San Patricio County Hazard Mitigation Action Plan - City of Mathis, Action #6	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.	13000022	San Patricio										$ 2,000																														
132000026	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").	13000007, 13000022	San Patricio										$ 50,000																														
132000027	San Patricio County Hazard Mitigation Action Plan - City of Mathis, Action #10	Install signs prohibiting dumping in streams, ditches, waterways and floodplain areas.	13000007, 13000013	San Patricio										$ 2,000																														
132000028	San Patricio County Hazard Mitigation Action Plan - City of Odem, 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.	13000022	San Patricio										$ 2,000																														
132000029	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 ro utes and procedures.	13000007	San Patricio										$ 10,000																														
132000030	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										$ 1,000																														
132000031	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.	13000022	San Patricio										$ 2,500																														
132000032	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.	13000013	San Patricio										$ 2,500																														
132000033	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										$ 2,500																														
132000034	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.	13000022	San Patricio										$ 2,000																														
132000035	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	San Patricio										$ 1,000																														
132000036	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.	13000007	San Patricio										$ 10,000																														
132000037	San Patricio County Hazard Mitigation Action Plan - City of Portland, Action #7	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.	13000022	San Patricio										$ 2,000																														
132000038	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										$ 2,000																														
132000039	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 damage, injury or illness.	13000022	San Patricio										$ 2,000																														
132000040	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.	13000007, 13000016	San Patricio										$ 3,000																														
132000041	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #7	Obtain certification by the National Weather Service as a "Storm Ready" community.	13000007, 13000022	San Patricio										$ 2,000																														
132000042	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #14	Cross-train building inspectors in floodplain management requirements.	13000007	San Patricio										$ 2,000																														
132000043	San Patricio County Hazard Mitigation Action Plan - City of Taft, 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.	13000022	San Patricio										$ 2,000																														
132000044	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #8	Install signs prohibiting dumping in streams, ditches, waterways and floodplain areas.	13000007, 13000013	San Patricio										$ 2,000																														
132000045	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.	13000007, 13000022	San Patricio										$ 2,000																														
132000046	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										$ 1,000																														
132000047	Aransas County Texas Multi-Jurisdisctinal Hazard Mitigation Action Plan - Action #4	Create a county-wide wetlands preservation plan	13000008	Aransas										$ 2,500																														
132000048	Aransas County Texas Multi-Jurisdisctinal Hazard Mitigation Action Plan - Action #7	Design and implement a debris removal program in local drainage systems	13000013, 13000014	Aransas										$ 2,500																														
132000049	Aransas County Texas Multi-Jurisdisctinal Hazard Mitigation Action Plan - Action #6	Buyouts of RL Properties	13000013, 13000014	Aransas										$ 500,000																														
132000050	Aransas County Texas Multi-Jurisdisctinal Hazard Mitigation Action Plan - Action #9	Create an erosion response plan	13000016	Aransas										$ 2,500																														
132000051	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.	13000016	Aransas										$ 60,000																														
132000052	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.	13000016	Aransas										$ 45,000																														
132000053	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.	13000016	Aransas																																								
132000054	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																																								
132000055	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.2.a	Determine whether any life stations and pump stations will need generators.	13000025	Aransas																																								
132000056	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.	13000022	Aransas																																								
132000057	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.	13000028	Aransas																																								
132000058	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, development issues for use in future street and drainage project design d. Develop a master plan to implement the drainage criteria established to include updates ofthe existing areas and production of new master plan for other areas. The master plan will include the inventory of all outfalls and data necessary for the design process and will utilize criteria and reflects the characteristics of each master plan	13000013	Nueces										$ 4,084,900																														
132000059	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.	13000007	Nueces																																								

Exhibit C, Table 14
Potentially Feasible Flood Management Strategies Identified by RFPG

FMS ID	FMS Name	Description	Associated Goals (ID)	Counties	HUCBs	HUC12s	Watershed Name	Strategy Type	Strategy Project Area (sqmi)	Flood Risk Type (Riverine, Coastal, Urban, Playa Other)	Sponsor	Entities with Oversight	Emergency Need (Y/N)	Estimated Strategy Cost ($)	Potential Funding Sources and Amount	Flood Risk										Reduction in Flood Risk												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
																Area in 100yr (1% annual chance) Floodplain	Area in 500yr (0.2% annual chance) Floodplain	Estimated number of structures at 100yr flood risk	Residential structures at flood risk	Estimated Population at flood risk	Critical facilities at flood risk (#)	Number of low water crossings at flood risk (#)	Estimated number of road closures (#)	Estimated length of roads at flood risk (Miles)	Estimated active farm & ranch land at flood risk (acres)	Number of structures with reduced 100yr (1% annual chance) Flood risk	Number of structures removed from 100yr (1% annual chance) Flood risk	Number of structures removed from 500yr (0.2% annual chance) Flood risk	Residential structures removed from 100yr (1% annual chance) Flood risk	Estimated Population removed from 100yr (1% annual chance) Flood risk	Critical facilities removed from 100yr (1% annual chance) Flood risk (#)	Number of low water crossings removed from 100yr (1% annual chance) Flood risk (#)	Estimated reduction in road closure occurrences	Estimated length of roads removed from 100yr flood risk (Miles)	Estimated active farm & ranch land removed from 100yr flood risk (acres)	Estimated reduction in fatalities (if available)	Estimated reduction in injuries (if available)							
132000060	Nueces County Hazard Mitigation - Corpus	Utilize the city adopted "Developer Agreement" thatthe can use with developers to help cover the cost of installing over-sized stormwater drainage.	13000013	Nueces										$ 3,100,000																											
132000061	Nueces County Hazard Mitigation - Corpus	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	13000016	Nueces																																					
132000062	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	13000022	Nueces																																					
132000063	Atascosa McMullen Hazard Mitigation Plan - City of Christine Action #5	Public education and outreach programs to education citizens about mitigation against hazards	13000024	Atascosa										$ 5,000																											
132000064	Atascosa McMullen Hazard Mitigation Plan – Poteet ISD Action #4	Create and implement a hazard educational enhancement program in which faculty/students can collaborate in understanding and communicating hazards of concern.	13000022	Atascosa										$ 5,000																											
132000065	Texas Coastal Resiliency Master Plan - R3-26	Under this project, locations in the Coastal Bend area that have been identified 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.	13000020	Nueces, San Patricio										$ 700,000																											
132000066	Nueces Delta Preserve Project - Land Acquisition	This master plan envisions that eventually most or all of the delta land identified here will be part of the Nueces Delta Preserve. This effort will follow the Texas tradition of working voluntarily with private landowners and other organizations to achieve a common conservation goal. This will be done over time through a combination of strategies to meet the individual needs of specific landowners.	13000019, 13000020	Nueces										$ 1,500,000																											
132000067	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.	13000014	San Patricio										$ 4,500,000																											
132000068	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.	13000019	San Patricio										$ 20,000,000																											
132000069	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.	13000014	Nueces																																					