

## Appendix C1 – Historic Flood Event Data

## Historical Flood Summary for Select USGS Gage Records

U.S. Geological Survey (USGS) gage information was used to identify historical flood stages located along the major rivers and tributaries within the basin. The date, peak flow, peak stage, and expected consequences during these historic flood events at several key locations throughout the basin are summarized in Table B-1. USGS gage locations are also viewable at [Region 13 Nueces \(arcgis.com\)](https://arcgis.com).

**Table 1. USGS Historical Flood Summary**

River Gages	Flood Date	Peak Flow (cubic feet per second)	Peak Stage (feet)	Expected Consequence
Tilden	7/10/2002	33,000	30.1	Major flooding occurs. Disastrous flooding of commercial and residential buildings in Tilden. Restaurant on the right bank of the Frio River had 3 to 4 feet of water in it.

## Historic Flood Events

Past flood events provide insight on where flood-prone areas are located within the basin. Table B-2 provides a list and brief description of historical events within the basin.

**Table 2. Listing of Historical Flood Events**

Flood Event	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.

## 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 and B-4. Table B-3 reports flood damage in dollars, injuries, and fatalities by year. Table B-4 uses the same base data as [Table 3](#) but is divided based on counties. To generate Tables B-3 and B-4, raw yearly damage data in Texas was downloaded from NWS website. Then, a filter on counties is used so that only damage data of Region 13 counties remain in the dataset. Finally, types of damages that are non-essential to this study, such as wind and fire damage, were filtered out so that damages include only rain, storm and flood damages.

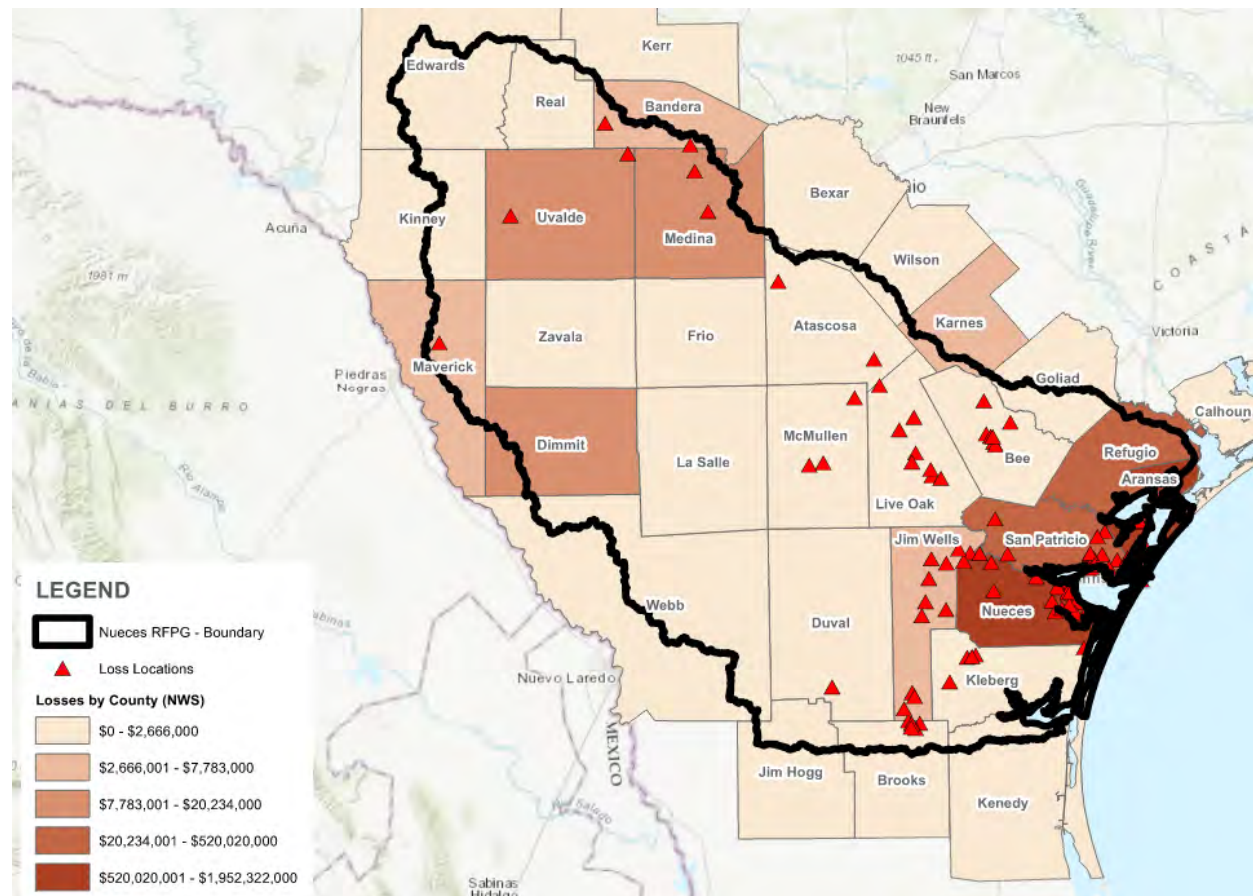


Figure 1. National Weather Service Property Damage from Flooding, since 1996



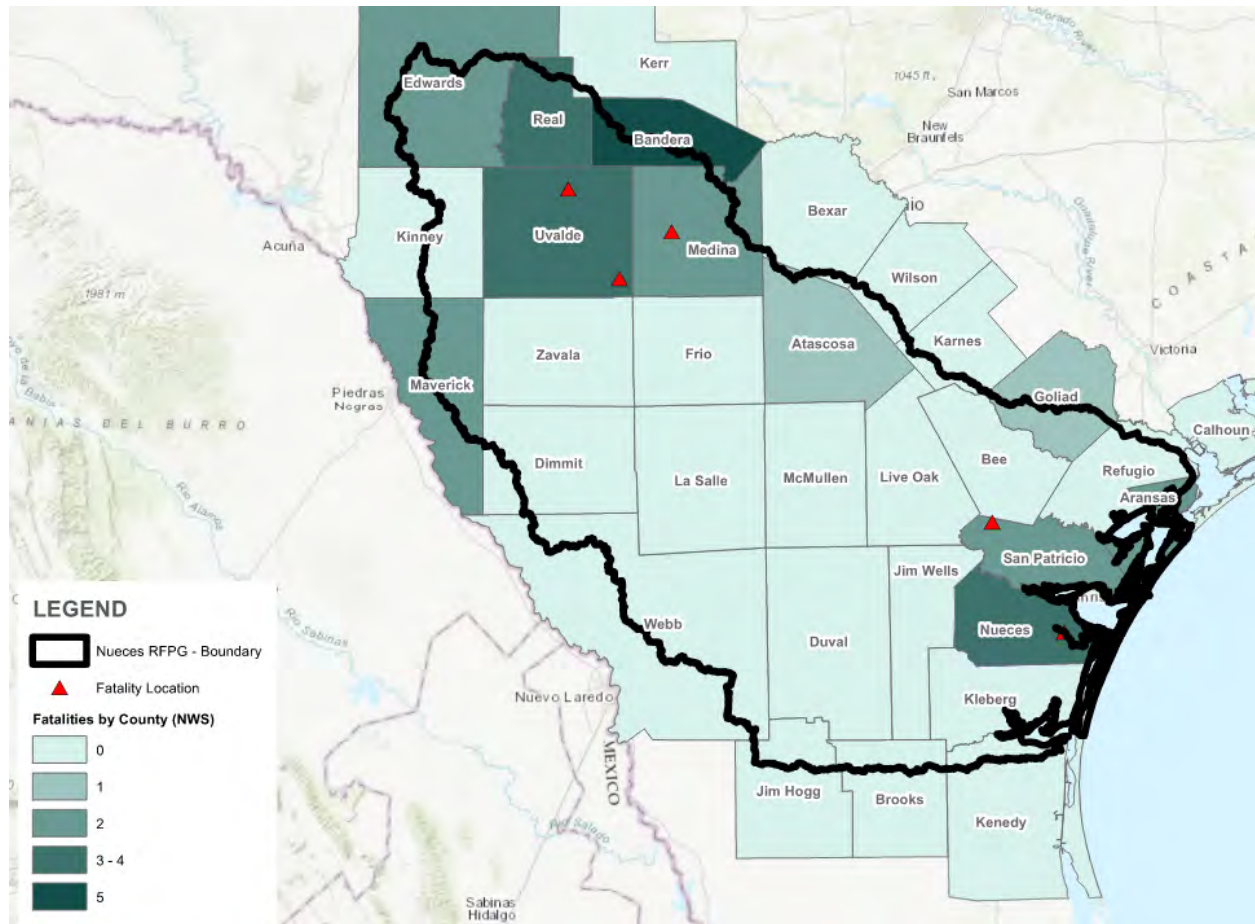


Figure 2. National Weather Service Fatalities from Flooding, since 1996

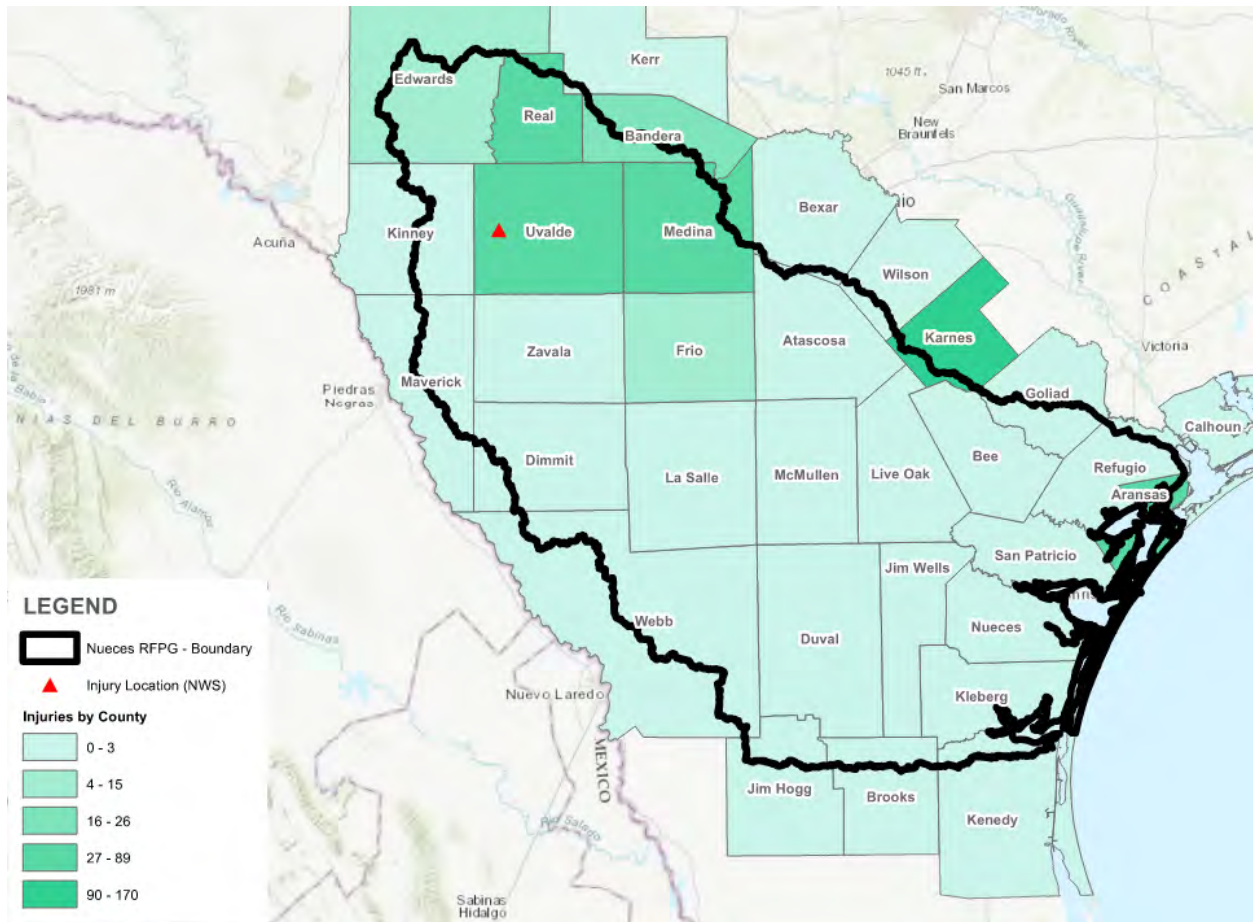


Figure 3. National Weather Service Injuries from Flooding, since 1996

**Table 3. Losses associated with Flooding in Region 13 counties since 1996 as reported by the National Weather Service**

Flood Year	Damages (in Dollars)	Injuries	Fatalities
1996	56,367,000	0	1
1997	21,807,000	170	8
1998	94,424,000	495	5
1999	492,000	4	0
2000	961,000	1	0
2001	3,540,000	21	1
2002	4,680,000	29	1
2003	5,642,000	0	1
2004	2,585,000	7	1
2005	-	0	0
2006	2,170,000	0	0
2007	4,910,000	0	0
2008	7,207,000	2	1
2009	-	0	0
2010	10,775,000	0	3
2011	-	0	0
2012	6,770,000	0	0
2013	810,000	0	0
2014	1,550,000	0	0
2015	5,365,000	0	4
2016	2,335,000	0	0
2017 <sup>1</sup>	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

<sup>1</sup> Hurricane Harvey is responsible for most of these damages

**Table 4. Losses associated with Flooding from 1996 to 2020 as reported by the National Weather Service**

Counties	Damages	Injuries	Fatalities
Aransas	\$ 1,952,322,000	65	2
Atascosa <sup>2</sup>	\$ 2,067,000	0	1
Bandera <sup>2</sup>	\$ 7,783,000	26	5
Bee	\$ 1,049,000	0	0
Bexar <sup>2</sup>	\$ -	0	0
Brooks <sup>2</sup>	\$ 1,625,000	0	0
Dimmit <sup>2</sup>	\$ 20,234,000	0	0
Duval	\$ 50,000	0	0
Edwards <sup>2</sup>	\$ 721,000	15	2
Frio	\$ 2,342,000	15	0
Goliad <sup>2</sup>	\$ 1,025,000	0	1
Jim Hogg <sup>2</sup>	\$ -	0	0
Jim Wells	\$ 4,816,000	0	0
Karnes <sup>2</sup>	\$ 7,084,000	170	0
Kenedy <sup>2</sup>	\$ -	0	0
Kerr <sup>2</sup>	\$ -	0	0
Kinney <sup>2</sup>	\$ 1,390,000	0	0
Kleberg	\$ 1,170,000	0	0
La Salle	\$ -	0	0
Live Oak	\$ 425,000	0	0
Maverick <sup>2</sup>	\$ 7,266,000	3	2
McMullen	\$ 200,000	0	0
Medina <sup>2</sup>	\$ 17,148,000	59	2
Nueces	\$ 1,315,015,000	3	4
Real <sup>2</sup>	\$ 2,666,000	69	4
Refugio <sup>2</sup>	\$ 520,020,000	0	0
San Patricio	\$ 518,722,000	0	2
Uvalde	\$ 18,009,000	89	4
Webb <sup>2</sup>	\$ -	0	0
Wilson <sup>2</sup>	\$ 89,786,000	257	0
Zavala	\$ 20,526,000	26	0
Total	\$ 4,513,461,000	797	29

<sup>2</sup> Total county damages shown. These counties are only partially located in Region 13, with the remaining amount in an adjoining flood planning basin.

## Federal Emergency Management Agency Flood Damage Data

Federal Emergency Management Agency (FEMA) funding for flood damages was obtained from 2002 to June 2021 as shown in Figure B-4. Table B-5 includes flood related damages by county. Unlike the gross damage data in Table B-3 and Table B-4, data in Table B-5 is summarized from various federal programs. First, raw data of all program funds in the Region 13 counties was downloaded from the FEMA website. Then, programs that are non-related to flood damages are filtered out. Finally, FEMA funding of four federal programs is summarized by county: Public Assistance Funded Project Summaries, Individuals and Households Program – Valid Registrations, Individual Assistance Housing Registrants – Large Disasters, and Housing Assistance Program.

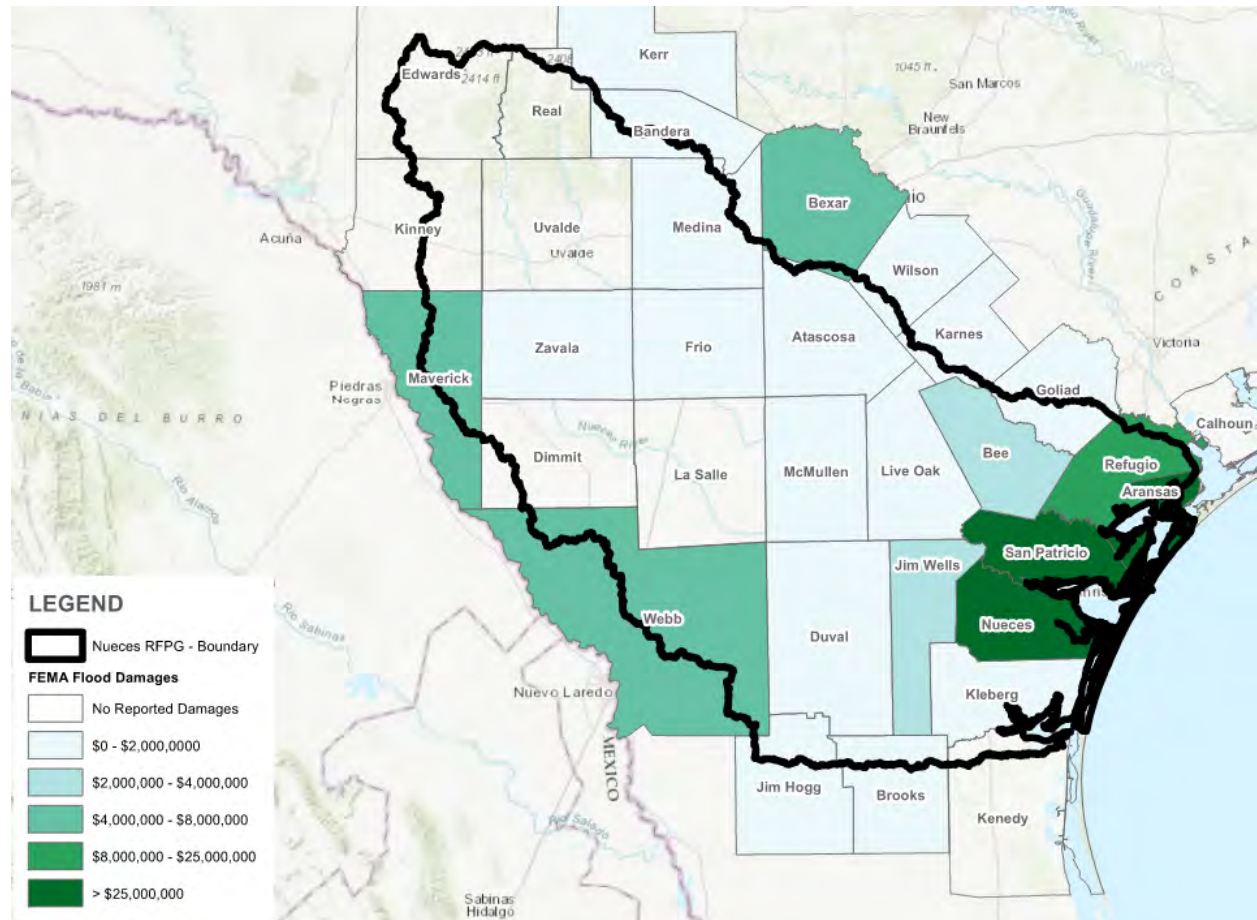


Figure 4. FEMA Flood Assistance to Owners and Renters for Flood Damages, since 2002

**Table 5. FEMA Funding for Flood Related Damages by Program (2002 to June 2021)**

	Public Assistance Funded Project Summaries	Individuals and Households Program Valid Registrations		Individual Assistance Housing Registrants Large Disasters	Housing Assistance Program
Counties	Federal Share Obligated	Flood Damage Amount	Repair Amount	Real Property Damage Amount Observed by FEMA	Owners and Renters Combined Amount
Aransas <sup>2</sup>	75,674,264	616,914	734,181	8,457,466	50,377,516
Atascosa <sup>2</sup>	1,534,103	0	0	0	668,809
Bandera <sup>2</sup>	2,077,275	0	0	0	72,991
Bee	1,198,186	9,016	7,686	62,702	2,908,309
Bexar <sup>2</sup>	0	0	0	0	6,886,899
Brooks <sup>2</sup>	152,608	0	0	0	218,103
Dimmit <sup>2</sup>	758,646	0	0	0	0
Duval	0	0	0	0	595,316
Edwards <sup>2</sup>	0	0	0	0	0
Frio	497,840	4,767	7,737	0	435,145
Goliad <sup>2</sup>	618,371	453	1,175	40,534	1,550,171
Jim Hogg <sup>2</sup>	265,938	0	0	0	404,417
Jim Wells	1,754,451	150,464	59,198	895	3,090,062
Karnes <sup>2</sup>	751,420	482	3,677	6,823	1,108,783
Kenedy <sup>2</sup>	29,192	0	0	0	0
Kerr <sup>2</sup>	1,110,759	0	0	0	5,902
Kinney <sup>2</sup>	663,038	0	0	0	0
Kleberg	1,185,217	63,131	30,086	32,654	999,455



Table 5. FEMA Funding for Flood Related Damages by Program (2002 to June 2021)

	Public Assistance Funded Project Summaries	Individuals and Households Program Valid Registrations		Individual Assistance Housing Registrants Large Disasters	Housing Assistance Program
Counties	Federal Share Obligated	Flood Damage Amount	Repair Amount	Real Property Damage Amount Observed by FEMA	Owners and Renters Combined Amount
La Salle	783,237	0	0	0	0
Live Oak	333,648	1,530	3,911	0	633,648
Maverick <sup>2</sup>	568,802	0	0	0	5,485,074
McMullen	125,315	0	0	0	30,906
Medina <sup>2</sup>	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 <sup>2</sup>	1,427,573	0	0	0	0
Refugio <sup>2</sup>	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 <sup>2</sup>	3,761,150	0	0	0	4,085,755
Wilson <sup>2</sup>	2,059,932	0	0	0	267,428
Zavala	3,827,640	27,034	14,984	0	1,408,517
<b>Totals</b>	<b>279,614,832</b>	<b>3,419,675</b>	<b>2,912,582</b>	<b>18,708,578</b>	<b>159,609,930</b>

## Historical Flood Data Summary

National Weather Service (NWS) and Federal Emergency Management Agency (FEMA) data both report flood damages and correlate well throughout the basin. These two agencies report different figures, but the underlying data agrees on important points for regional flood planning including which counties see the largest financial losses due to flooding, what type of storms are the most damaging, and which years were the costliest. In summary of these two data sources the coastal counties of Aransas, Nueces, San Patricio, and Refugio see the most expensive damages and receive the most federal relief in relation to flooding. Hurricanes and tropical storms cause the higher rates of loss experienced in these counties. However, NWS reported injuries and fatalities indicate that the flash flooding of the northwest basin and riverine flooding of the middle basin are also dangerous and costly. It is important to mention that neither of these data providers are able to completely capture the total amount of damages caused by flooding. The NWS, for example, reports no damages in Webb County since 1996 while FEMA reports some \$4 million provided to homeowners and renters for flood damage repairs since 2002. The NWS also reports damages that FEMA does not when no federal funds are distributed for repair or future mitigation.

Flash floods prove to be even more dangerous making up 72% of all fatalities and 59% of all injuries reported by the NWS since 1996 with most of these incidents in the northwestern counties. While dangerous, flash floods are responsible for less than 3% of total damages with a total across all Region 13 counties of \$105 million. These figures may include losses that occurred in adjacent flood planning regions if a county is located in more than one region.



## Appendix C2 – List of Previous Flood Studies

## Appendix C2 – Previous Relevant Flood Studies

A list of previous flood studies considered by the Regional Flood Planning Group (RFPG) to be relevant to the development of the regional flood plan are provided in the following table:

Previous and Relevant Flood Study	Description	Jurisdictions	Counties	Year
Coastal Texas Protection and Restoration Feasibility Study	This effort, known as the Coastal Texas Protection and Restoration Feasibility Study (Coastal Texas Study), was initiated in 2014 to evaluate large-scale coastal storm risk management (CSRM) and ecosystem restoration (ER) actions aimed at providing the coastal communities of Texas with multiple lines of defense to reduce impacts from a wide array of coastal hazards. This study falls under the U.S. Army Corps of Engineers (USACE) Civil Works Mission, which includes but is not limited to inland and coastal flood risk management and the restoration, protection, and management of aquatic ecosystems. This planning effort was conducted in full compliance with the National Environmental Policy Act (NEPA) and this report includes a companion Final Environmental Impact Statement (EIS).	USACE, GLO	Nueces, San Patricio	2021
Lower Nueces River Watershed Protection Plan	The purpose of this report is to summarize data collected by Texas Stream Team citizen scientists. The data presented in this report should be considered in conjunction with other relevant water quality reports for a holistic view of water quality in the lower Nueces River watershed.	Jurisdictions within the Lower Nueces River Watershed	Counties within the Lower Nueces River Watershed	2020
Atascosa-McMullen Multi-Jurisdictional Hazard Mitigation Action Plan	The Atascosa and McMullen Counties Hazard Mitigation Plan is a multi-jurisdictional plan covering two counties, 8 cities, and 2 school districts. The purpose of the plan is to minimize or eliminate long-term risks to human life and property from known hazards and to break the cycle of high-cost disaster response and recovery within the planning area.	Atascosa County, McMullen County, the Cities of Charlotte, Christine, Jouranton, Pleasanton, Poteet, Lytle, the school district of Lytle Independent School District (ISD) and Poteet ISD.	Atascosa-McMullen	2020
Coastal Resiliency Master Plan	Developed by the Texas General Land Office (GLO), the 2019 Texas Coastal Resiliency Master Plan is the second installment of a statewide plan to protect and promote a vibrant and resilient Texas coast that supports and sustains a strong economy and healthy environment for all who live, work, play or otherwise benefit from the natural resources and infrastructure along the Texas coast.	GLO	Aransas, Kleberg, Nueces, Refugio, San Patricio	2019

## Appendix C2 – Previous Relevant Flood Studies

Previous and Relevant Flood Study	Description	Jurisdictions	Counties	Year
Bandera County River Authority and Groundwater District Flood Plan	The purpose of the flood plan is to outline a plan of operation to effectively coordinate and provide reliable information to the community during rainfall runoff events resulting in minor to significant flooding conditions of the Medina River and Sabinal River within Bandera County.	Bandera County River Authority and Groundwater District	Bandera	2019
The City of Alice & Jim Wells County Multi-Hazard Mitigation Plan	This plan addresses the following natural hazards: floods, hurricanes / tropical storms, wildfire, tornados, drought, riverine erosion, dam/levee failure, earthquakes, expansive soils, extreme heat, hailstorms, severe winter storms, windstorms, and lightning. The goals of the plan are to reduce loss of life and injury to persons; reduce disruptions to essential public services and infrastructure; reduce economic impacts to individuals, businesses, and area institutions; and to reduce losses to civic, cultural, and environmental resources.	Jim Wells County and City of Alice	Jim Wells County	2018
San Patricio County Hazard Mitigation Action Plan	The plan was prepared by San Patricio County, participating jurisdictions, and H2O Partners, Inc. The purpose of the plan is to protect people and structures and to minimize the costs of disaster response and recovery. The goal of the plan is to minimize or eliminate long-term risks to human life and property from known hazards by identifying and implementing cost-effective hazard mitigation actions.	San Patricio County	San Patricio	2018
Aransas County Multi-Jurisdictional Floodplain Management Plan	The focus of the mitigation action plan is to reduce future losses within Aransas County by identifying mitigation strategies based on a detailed hazard risk analysis, including both an assessment of regional hazards and vulnerability. The mitigation strategies seek to identify potential loss-reduction opportunities. The goal of this effort is to work towards more disaster-resistant and resilient communities throughout Aransas County.	Aransas County, the City of Aransas Pass, the Town of Fulton, and the City of Rockport.	Aransas	2017
Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan	This plan covers two counties, 8 cities, and 2 school districts. The purpose of the plan is to minimize or eliminate long-term risks to human life and property from known hazards and to break the cycle of high-cost disaster response and recovery within the planning area	Unincorporated Aransas County, City of Aransas Pass, Town of Fulton, City of Rockport	Aransas	2017
Nueces County Multi-Jurisdictional Hazard Mitigation Action Plan	The focus of the mitigation action plan is to reduce future losses within Nueces County by identifying mitigation strategies based on a detailed hazard risk analysis, including both an assessment of regional hazards and vulnerability. The mitigation strategies seek to identify potential loss-reduction opportunities. The goal of this effort is to work towards more disaster-resistant and resilient communities throughout Nueces County.	Nueces County, City of Aqua Dulce, City of Bishop, City of Corpus Christi, City of Driscoll, City of Petronila, City of Port Aransas, City of Robstown, Port of Corpus Christi Authority	Nueces	2017

## Appendix C2 – Previous Relevant Flood Studies

Previous and Relevant Flood Study	Description	Jurisdictions	Counties	Year
Hazard Identification, Risk Assessment (HIRA) and Consequence Analysis	The HIRA is the first step in evaluating natural and technological hazards that exist. It serves as a basis for the development plans, public education programs, responder training and exercises. It also lays foundation to begin mitigation efforts to minimize these identified potential threats.	Bexar County, City of San Antonio	Bexar	2014
A Joint Erosion Response Plan for Nueces County and the City of Corpus Christi	The purpose of the erosion response plan is to reduce storm damage along the city and county gulf coastlines. The erosion response plan will be used by the GLO to qualify local governments for certain GLO grants.	City of Corpus Christi, Nueces County	Nueces	2012
Coastal Bend Mitigation Action Plan	The main purpose to the planning project is to reduce future losses in the Coastal Bend region of Texas by identifying mitigation strategies based on an analysis of risk, including both an assessment of regional hazards and vulnerability. The mitigation strategies seek to identify potential loss-reduction opportunities; however, implementation of the strategies will be constrained to some extent by the future availability of funding in the context of other community priorities.	Aransas County, Bee County, Jim Wells County, Kleberg County, Live Oak County, Nueces County, San Patricio County	Aransas, Bee, Jim Wells, Kleberg, Live Oak, Nueces, San Patricio	2012
Potential for Bed-Material Entrainment in selected Streams of the Edwards Plateau---Edwards, Kimble, and Real Counties, Texas, and Vicinity	An investigation of the problem at low-water crossings (LWCs) was made by the U.S. Geological Survey (USGS) in cooperation with the Texas Department of Transportation (TXDOT), and in collaboration with Texas Tech University, Lamar University, and the University of Houston. The bed-material entrainment problem for LWCs occurs at two spatial scales - watershed scale and channel-reach scale. First, the relative abundance and activity of cobble- and gravel-sized bed material along a given channel reach becomes greater with increasingly steeper watershed slopes. Second, the stresses required to mobilize bed material at a location can be attributed to reach-scale hydraulic factors, including channel geometry and particle size.	USGS, TXDOT	Edwards, Kimble and Real	2008



## Appendix C3 – Floodplain Management Practices and Goal Survey Results

Appendix C3 - Floodplain Management Practices and Goal Survey Results

Entity Name:	Submission Date	Does your entity have floodplain management regulations?	Has your organization adopted minimum regulations pursuant to Texas Water Code Section 16.3145?	What standards or regulations does your community or jurisdiction use to protect the floodplain and/or encourage disaster resistant development/design? What are your minimum standards for: floodplain management, disaster resistant building codes, other ordinances? (Select all that apply)	Higher standards adopted	How would you gauge the level of enforcement of floodplain management practices?	Is there an existing stormwater or drainage fee?	Web link to entity regulations	Are these flood regulations in the process of being updated/change d?	Which of the following describes your local funding sources for flood management activities? (Select all that apply)	Over the next ten years, what specific challenges does your community or jurisdiction face regarding managing any potential increase in flood risk in your jurisdiction? Include challenges such as funding, project identification, training, resources, etc.	Does your jurisdiction have access to the necessary training and educational resources for floodplain management?	Please explain your jurisdiction access needs.	Has your city/county identified short term (10 year) floodplain management goals? If yes, please describe goal and extent of area that it applies to.	Has your city/county identified long term (30 year) floodplain management goals? If yes, please describe goal and extent of area that it applies to.
Aransas County	2021/07/30 17:41:58	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only Local Floodplain ordinance with higher standards (greater than NFIP)		Moderate	No	<a href="https://www.aransascountytx.gov/DocumentCenter/View/1111/Floodplain-Management-Ordinance">https://www.ar</a>	Yes	Bond Program Special Tax Districts Permitting Fees	Sea-level rise, project identification, resources (namely staff - more full-time employees are needed both for maintenance of drainage infrastructure and for code enforcement), inconsistent regulations and methods for drainage between County and municipalities within the county	No	More staffing for public outreach and code enforcement; assistance in coordinating regional drainage standards and projects	Protect existing resources through regulatory standards; utilize the CRS to incentivize higher floodplain management standards; create comprehensive Public Information Plan; protect property through mitigation measures	Create a coordinated infrastructure plan for all jurisdictions
Bandera County	2021/08/06 07:14:21	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only		Moderate	No	<a href="http://www.bandera-county.com/">www.bandera.co</a>	No	Permitting Fees		Yes			
Bexar County	2021/07/15 14:54:29	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP)		Moderate	No	Not Available on	Yes	General Fund Permitting Fees	Funding related to projects to remove dangerous roadway crossings and floodplain impacts on private property; Funding related to having staffing to inspect and enforce the Floodplain Damage Prevention Court Order to including having attorneys with the District Attorney's Office dedicated to prosecuting floodplain violators; Lack of stiff penalties for individuals who violate the Court Order	Yes		Bexar County identifies projects on a continuing basis. Approximately \$2 million/yr is delegated to projects that can be completed in a short time frame with a high cost/benefit ratio. Higher dollar/long term projects are slated for future multi-year bond projects.	
City of Beeville	2021/07/17 19:06:34	No	No	National Flood Insurance Program (NFIP) minimum requirements only		Low	No	NO	No	General Fund	Funding and community awareness and buy-in from the community	No	Routine training on floodplain management and best practices		
City of Bishop	2021/07/13 15:58:07	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only		Moderate	No	<a href="http://www.cityofbishoptx.com/">www.cityofbisho</a>	Yes	We do not have a local funding source for flood management activities	Funding plays a huge part for the city the only improvements the city can make is with grant funds.	No	The city is in desperate need of dredging 2 creek beds located on either side of town. 1 creed bed is located by city park and the other on the Hackberry Ditch. Both of these areas carry runoff from the county and neighboring county.	We have a flood management plan that is included with Nueces County but for some reason the creek beds weren't included and this is our only drainage for the city.	Yes, we are included in Nueces County's floodplain management plan, but drainage issues were left out from the current plan.
City of Corpus Chris	2021/07/13 10:17:40	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP)		High	No	<a href="https://library.municode.com/texas/corpus-christ/codes/ordinances">https://library.m</a>	No	Storm Water Fund	Funding, getting local builders & developers in tune with our vision, enough educational materials and trainings for public.	No	We have 1 person on our staff to handle floodplain issues/questions/concerns and would love to have as much training & educational resources as possible.	In the process of doing that.	In the process of doing that
City of Cotulla La Sa	2021/08/05 09:54:14	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only		Low	No	<a href="http://municode.com/texas/cotulla/codes/ordinances">municode</a>	Yes	General Fund	funding and training; Map revision of main floodways	No	lack of training and resources	Beginning initial studies to create new LOMOR for main drainage area of City.	no
City of Gregory	2021/08/02 12:49:35	Yes	No	National Flood Insurance Program (NFIP) minimum requirements only Local Floodplain ordinance with higher standards (greater than NFIP)		High	No	N/A	No	General Fund Permitting Fees Ad Valorem Tax		Yes	our current need will be opening drainage ditches and installation of culverts to carry the storm water to relief the low line areas	Yes will have allocated funding for the drainage culverts within the community through our Drainage District with anticipation of curb and gutters	goals will be to have all streets with curb and gutters
City of Hondo	2021/08/05 15:07:40	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only Disaster Resistant Building Codes Designated design storms (design for a specific storm event)		Moderate	No	<a href="https://z2.franklincountytexas.gov/">https://z2.frankli</a>	No	General Fund We will research this and provide additional information if there are other funds available.	Funding, project identification, training, and staff time/resources are all challenges faced for floodplain management. The City has a large floodplain, some of which does not have a defined floodway. The area needs to be restudied and the City needs to develop a comprehensive stormwater management plan, but these actions require significant funding and staff time to manage.	Yes	We do have access to educational resources. We struggle with allocation of staff time for such training opportunities.	Not officially at this time. Generally speaking the City needs to create a stormwater management plan and drainage study which incorporates a restudy of the City's floodplain. There have been improvements to the bridges that run under the Union Pacific Railroad, so a subsequent restudy would improve the accuracy of our floodplain management.	
City of Ingleside	2021/07/09 11:47:29	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP) Disaster Resistant Building Codes Designated design storms (design for a specific storm event)		High	No	<a href="https://library.municode.com/texas/ingleside/codes/ordinances">https://library.m</a>	No	General Fund Bond Program	New development not creating new issues and requiring new development to include surrounding area drainage in their engineered drainage plans; Funding can be challenging in any situation.	Yes		The City of Ingleside is currently working on a drainage master plan that will identify troublesome areas; An increase in the freeboard from 12" to 18" is being considered	
City of Leahey	2021/08/05 14:26:08	Yes	No	National Flood Insurance Program (NFIP) minimum requirements only		Moderate	No	none	No	General Fund	none	Yes			

Appendix C3 - Floodplain Management Practices and Goal Survey Results

Entity Name:	Submission Date	Does your entity have floodplain management regulations?	Has your organization adopted minimum regulations pursuant to Texas Water Code Section 16.3145?	What standards or regulations does your community or jurisdiction use to protect the floodplain and/or encourage disaster resistant development/design? What are your minimum standards for: floodplain management, disaster resistant building codes, other ordinances? (Select all that apply)	Higher standards adopted	How would you gauge the level of enforcement of floodplain management practices?	Is there an existing stormwater or drainage fee?	Web link to entity regulations	Are these flood regulations in the process of being updated/change d?	Which of the following describes your local funding sources for flood management activities? (Select all that apply)	Over the next ten years, what specific challenges does your community or jurisdiction face regarding managing any potential increase in flood risk in your jurisdiction? Include challenges such as funding, project identification, training, resources, etc.	Does your jurisdiction have access to the necessary training and educational resources for floodplain management?	Please explain your jurisdiction access needs.	Has your city/county identified short term (10 year) floodplain management goals? If yes, please describe goal and extent of area that it applies to.	Has your city/county identified long term (30 year) floodplain management goals? If yes, please describe goal and extent of area that it applies to.
City of Port Aransas	2021/06/18 09:21:22	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only Local Floodplain ordinance with higher standards (greater than NFIP)		High	No	<a href="https://library.m">https://library.m</a>	No	General Fund	funding, training, resources	Yes		The city has a master drainage plan, and works consistently on upgrading drainage areas in need.	
City of Sinton	2021/07/12 14:32:02	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only Disaster Resistant Building Codes No building in the floodplains		Moderate	No	<a href="http://sintontexas.org">sintontexas.org</a>	No	General Fund		Yes			
City of Uvalde	2021/07/12 07:21:42	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP)		Moderate	No	<a href="https://library.m">https://library.m</a>	No	General Fund I don't know	The lack of resources.	Yes	With only one person doing floodplain, its kind of hard to hire a Floodplain manager to just do floodplain in our smaller communities.	I would for the city to hire another floodplain manager. I wear many hats besides floodplain manager and i know that floodplain is not a priority to us.	Not that I know of, maybe strategic planning has something that they are working on?
Dimmit County	2021/08/06 15:47:25	No	No	I don't know		None	No	none	No			No	Not very familiar with the floodplain management in our County. Substantial research will be needed with follow-ups.	No	No
Duval County	2021/08/04 16:48:40	No	No	No building in the floodplains		Low	No	<a href="http://www.co.duval.tx">www.co.duval.tx</a>	No	General Fund		No			
Duval County Conservation & Reclamation District	2021/08/05 09:40:04	No	No			None	No	None	No	We do not have a local funding source for flood management activities		No			
Frio County	2021/07/13 11:36:52	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only Local Floodplain ordinance with higher standards (greater than NFIP)		Low	No	N/A	No	We do not have a local funding source for flood management activities	Flood mapping, funding	Yes		No	No
Karnes County	2021/08/05 10:56:15	Yes	Yes			Moderate	No	none	No	Permitting Fees		Yes			
KERR COUNTY ENG	2021/08/03 08:38:05	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only		Moderate	No	<a href="https://www.co.k">https://www.co.k</a>	No	General Fund	Funding	Yes			
McMullen County V	2021/08/10 10:00:55	No	No	I don't know		Low	No	None	No	We do not have a local funding source for flood management activities	We have no jurisdiction.	No	We have no jurisdiction on floodplain management.	No	No
Medina County	2021/08/04 09:33:23	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only Local Floodplain ordinance with higher standards (greater than NFIP)		High	No	<a href="http://medinacountytex">medinacountytex</a>	No	General Fund Permitting Fees	development	Yes	?		
Portland, Texas	2021/07/16 13:04:38	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP) Designated design storms (design for a specific storm event)		High	Yes	<a href="https://library.m">https://library.m</a>	No	General Fund Storm Water Utility Fee	Portland is growing, however much of the growth is occurring westerly away from the bays and established floodplains. However, in response to this growth, we'll need to review our current stormwater and floodplain regulations to access whether amendments are needed.	Yes	We need to continue networking with adjacent cities, county and state regarding flood plain management best practices and regulatory measures.	The City recently hired a new Building Official and the flood plain regulations are to be administered by this position. I am currently a Certified Flood Plain Manager and City staff will explore review of our current regulations and identify future short term flood plain management goals.	In general, we don't typically receive many permit applications for proposed improvements that would be located within the floodplain. However, part of our exploration will involve greater community education about the importance of protecting our flood plains from encroachment and if construction is proposed that permit applications are submitted for review and that any project meet the City's flood plain development requirements.
Real County	2021/08/09 12:52:49	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only		Moderate	No	<a href="http://co.real.tx.us">co.real.tx.us</a>	No	General Fund					

Appendix C3 - Floodplain Management Practices and Goal Survey Results

Entity Name:	Submission Date	Does your entity have floodplain management regulations?	Has your organization adopted minimum regulations pursuant to Texas Water Code Section 16.3145?	What standards or regulations does your community or jurisdiction use to protect the floodplain and/or encourage disaster resistant development/design? What are your minimum standards for: floodplain management, disaster resistant building codes, other ordinances? (Select all that apply)	Higher standards adopted	How would you gauge the level of enforcement of floodplain management practices?	Is there an existing stormwater or drainage fee?	Web link to entity regulations	Are these flood regulations in the process of being updated/change d?	Which of the following describes your local funding sources for flood management activities? (Select all that apply)	Over the next ten years, what specific challenges does your community or jurisdiction face regarding managing any potential increase in flood risk in your jurisdiction? Include challenges such as funding, project identification, training, resources, etc.	Does your jurisdiction have access to the necessary training and educational resources for floodplain management?	Please explain your jurisdiction access needs.	Has your city/county identified short term (10 year) floodplain management goals? If yes, please describe goal and extent of area that it applies to.	Has your city/county identified long term (30 year) floodplain management goals? If yes, please describe goal and extent of area that it applies to.
Refugio County	2021/08/04 13:59:15	Yes	Yes	I don't know		Low	No	n/a	No	We do not have a local funding source for flood management activities	Training and updating FP regulations, as needed.	No	Do not have the funds for the labor to acquire certifications and manage the FP administration process. County Judge reviews each building permit for FP applicability per the established 9/2014 FIRM maps. If proposed building is in a Flood Zone, the applicant is asked to provide elevation certificates and warnings acknowledged. Approvals can be with elevation stipulations.		
San Patricio County	2021/07/14 09:35:18	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP)		High	No	https://www.twc	Yes	General Fund	More training and collaboration of our order and regulations with local appraisal district, relators, "building movers," etc. in order to spread necessary knowledge for the safety and well being of the community.	Yes	unknown what the question is asking	Yes. There are many different goals we have that include but not limited to: -increasing community knowledge of rules and regulations -identifying key issues and mitigate their risks -expediting permitting process -collaborating more with other departments in our community -updating our policies and procedures that will increase the well being of the community -working more with surrounding communities -increase and store data of development in an fashion that is feasible to search back for	Drainage Study RFPG Study Hazard mitigation action plan long term recover plan
San Patricio County Drainage District	2021/06/23 10:34:30	No	No	National Flood Insurance Program (NFIP) minimum requirements only		High	No	co.san-patricio.tx	No	Ad Valorem Tax	n/a	Yes	n/a	n/a	n/a
San Patricio County, City of Ingleside on the Bay	2021/08/03 09:00:52	Yes	Yes	National Flood Insurance Program (NFIP) minimum requirements only		Moderate	No	www.inglesideon	No	We do not have a local funding source for flood management activities	A city wide drainage study is in process at this time. The study should be finished in the next couple of months. The council will review existing measures taken and new suggestions, solutions included in the study. Funding will be an issue and the City will be looking for grant sources. We are not really in a position where bonds or loans are feasible as we have limited funding for our small community.	Yes	Ingleside on the Bay is under the direction of San Patricio County and I think they offer updates and training on a limited basis. Our building official has some basic training in floodplain issues but is not certified.	No, not really. As mentioned above, Ingleside on the Bay is conducting a drainage study to integrate existing measures in place with additional actions to alleviate some of the flooding problems we have experienced.	No
Uvalde County UWCD	2021/06/18 09:03:43	No	Yes	I don't know		High	No	none	No	Ad Valorem Tax		Yes			
Webb County	2021/06/18 09:32:50	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP)		High	No	https://www.webb	No	General Fund		Yes			
Wilson County	2021/07/19 16:28:33	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP)		Moderate	No	http://www.co.wilson	No	Permitting Fees Ad Valorem Tax		Yes			
Zavala County	2021/08/05 13:34:10	Yes	Yes	Local Floodplain ordinance with higher standards (greater than NFIP)		Moderate	No	http://co.zavala.tx	No	I don't know	Funding and resources	No		No I am new to the department and I am learning and seeing all the different challenges that we are facing little by little.	No, not at the moment



## Appendix C4 – TFMA Higher Standard Survey Results for the Nueces Basin

Appendix C4 - TFMA 2018 Higher Standard Survey Results for the Nueces Basin

No.	City or County Name	Feet above Fully Developed BFE	Feet above Existing BFE	Zone X(B) (Shaded) above street or curb	Zone X(C) (Unshaded) above street or curb	Special Notes	Is Local Floodplain Administer (LFA) a CFM?	CFM s on Staff	Community Rating System (CRS)
1	City of Alice	-	1	1.5	1.5	(1) The City requires a hydraulic analysis on all new development. (2) The City requires on-site detention. (3) In Zone X new construction must be elevated a minimum of 1.5' above natural grade or above the crown of the nearest street, whichever is higher.	-	-	
2	City of Aransas Pass	-	1	0	0	City building FPM program	LFA is a CFM	1	
3	City of Charlotte	0	0	-	-	(1) Developer is required to conduct a study to define BFE and floodway in Zone A. (2) Detention is required (3) EC is required prior to forming/pouring lowest floor; when structure is completed; and prior to CO.	-	-	-
4	City of Corpus Christi	-	-	1.5	1.5	(1) Developer is required to conduct a study to define BFE in Zone A. (2) Developer must mitigate downstream impacts (3) In Zone X new structures must be elevated a minimum of +1.5' above curb of nearest street (4) EC is required prior to forming/pouring lowest floor; when structure is completed; and prior to CO. (5) Biggest problem is community education	LFA is a CFM	9	7

Appendix C4 - TFMA 2018 Higher Standard Survey Results for the Nueces Basin

No.	City or County Name	Feet above Fully Developed BFE	Feet above Existing BFE	Zone X(B) (Shaded) above street or curb	Zone X(C) (Unshaded) above street or curb	Special Notes	Is Local Floodplain Administer (LFA) a CFM?	CFM s on Staff	Community Rating System (CRS)
5	City of Ingleside	1	1	1	1	(1) City utilized the 1987 San Patricio Drainage District Study that established the 100-year flood elevation in the City (2) New development must be +1' above BFE or +1' above crown of nearest street whichever is higher. (3) Developer must conduct a study, based on fully developed watershed conditions, to define the BFE in Zone A (4) Onsite Detention required, setback from Floodway and mitigation of downstream impacts (5) Development in Zone X must be elevated a minimum of +1' above the crown of closest road (6) EC required prior to forming/pouring lowest floor; when construction is completed and prior to CO. (7) Biggest problem is coastal flooding and incomplete record keeping in the past	LFA is a CFM	1	-
6	City of Kingsville	-	1	-	-	City is proposing +2 ft above BFE along the floodplain with no new development allowed in the floodplain unless an engineered study is provided showing no rise in FP	-	-	-
7	City of Port Aransas	1	1	0	0	(1) City is a Zone V community (2) EC required before framing/pouring lowest floor and prior to CO (3) Biggest problem is hurricanes	LFA is a CFM	2	-

Appendix C4 - TFMA 2018 Higher Standard Survey Results for the Nueces Basin

No.	City or County Name	Feet above Fully Developed BFE	Feet above Existing BFE	Zone X(B) (Shaded) above street or curb	Zone X(C) (Unshaded) above street or curb	Special Notes	Is Local Floodplain Administer (LFA) a CFM?	CFM s on Staff	Community Rating System (CRS)
8	City of Rockport	0	1.5	1	1	(1) Detention is required (2) EC required prior to CO (3) Biggest problems are: transitioning to higher floodplain management standards; resistance to freeboard requirements; and historic waterfront structures downtown	LFA is a CFM	1	-
9	City of Uvalde	-	2	2	2	(1) New construction must be elevated a minimum of 2' above BFE. (2) Developer must conduct a study to establish the BFE and floodway in Zone A based on existing watershed conditions (3) No fill in floodway without mitigation. (4) In Zone X new construction must be elevated 2' above natural grade or crown of nearest street (5) EC required prior to framing/pouring lowest floor.	-	-	-
10	Aransas County	-	1.5	-	-	Aransas County requires new construction to be elevated in the SFHA - 18" for new structures and 6" for accessory buildings.	LFA is a CFM	1	-
11	Bandera County	-	3	2	1	(1) Developer must submit a study defining the floodway boundary in Zone A prior to permit (2) EC required prior to forming or pouring the lowest floor and when construction is completed (3) County requires detention, mitigation of downstream impacts and setback from floodway	LFA is a CFM	1	-

Appendix C4 - TFMA 2018 Higher Standard Survey Results for the Nueces Basin

No.	City or County Name	Feet above Fully Developed BFE	Feet above Existing BFE	Zone X(B) (Shaded) above street or curb	Zone X(C) (Unshaded) above street or curb	Special Notes	Is Local Floodplain Administer (LFA) a CFM?	CFM s on Staff	Community Rating System (CRS)
12	Bexar County	-	1	8"	8"	(1) Developer must conduct a study to determine the BFE and Floodway in Zone A prior to permit (2) NAI is required (no impact) outside of owners property (3) Platted property requirements include residences to be 8" above finish grade in all zones (4) Plat must show floodplain areas as drainage easements (5) County does not use floodway rules (6) EC is required prior to framing/pouring lowest floor and when structure is completed (7) Biggest problem is building and modifying structures without permits	-	10	-
13	Kerr County	-	1	-	-	(1) Developer must conduct a study to define the BFE in Zone A areas. (2) EC required when construction is completed	LFA is a CFM	1	-
14	Live Oak County	1	1	1	1	(1) Developer must conduct a study to define BFE in Zone A. (2) Onsite and regional Detention is required for new construction. (3) Developer must offset from Floodway boundary and mitigate downstream impacts (4) No fill is allowed in floodplain or floodway without mitigation. (5) In Zone X new construction must be elevated to street level (6) EC is required prior to forming/placement of lowest floor and prior to CO.	LFA is a CFM	1	-

Appendix C4 - TFMA 2018 Higher Standard Survey Results for the Nueces Basin

No.	City or County Name	Feet above Fully Developed BFE	Feet above Existing BFE	Zone X(B) (Shaded) above street or curb	Zone X(C) (Unshaded) above street or curb	Special Notes	Is Local Floodplain Administer (LFA) a CFM?	CFM s on Staff	Community Rating System (CRS)
15	Medina County	1	1	1.5	0	(1) Developer must conduct a study to define BFE and floodway in Zone A prior to permit (2) On-site detention is required for new construction. (3) Developer must mitigate downstream impacts (4) 18" Freeboard required in all zones (4) EC is required prior to forming/pouring lowest floor and when construction is completed. (5) Biggest problem is County has numerous unstudied streams	LFA is a CFM	1	-
16	Nueces County	1	1	1	1	(1) Fill placed in floodplain/floodway must be mitigated. (2) On-site detention required (3) EC required prior to forming/pouring lowest floor and when structure is completed. (4) Biggest problem is staffing	-	-	-
17	Refugio County	0	0	2	2	-	-	-	-

Appendix C4 - TFMA 2018 Higher Standard Survey Results for the Nueces Basin

No.	City or County Name	Feet above Fully Developed BFE	Feet above Existing BFE	Zone X(B) (Shaded) above street or curb	Zone X(C) (Unshaded) above street or curb	Special Notes	Is Local Floodplain Administer (LFA) a CFM?	CFM s on Staff	Community Rating System (CRS)
18	San Patricio County	1.5	1.5	1.5	1.5	San Patricio County requires all development, regardless of zone, to be elevated a minimum of 18" above NG. (1) Developer must conduct a study, based on fully developed watershed conditions, to define BFE and Floodway in Zone A . (2) Detention is required for new construction. (3) Developer must setback from Floodway and mitigate downstream impacts (NAI) upstream and downstream. (4) Development in Zone X must be elevated a minimum of 18" above NG or the crown of the nearest street (5) EC is required when construction is completed and prior to CO. (6) Biggest problem is citizen compliance with Court Orders	LFA is a CFM	3	-
19	Webb County	1	1	-	-	(1) Developer must conduct a study, based on fully developed watershed conditions, to identify BFE and Floodway boundary in Zone A. (2) Developer must mitigate all fill placed in floodplain and floodway. (3) Both onsite and regional detention required (4) Developer must setback from Floodway boundary and mitigate downstream impacts (5) EC is required before forming/pouring lowest floor; when construction is completed; and prior to CO. (6) County withholds public utility connections until structure is compliant with FP development requirements	LFA is a CFM	4	-

## Appendix C5 – Mid-Point Technical Memorandum





# Technical Memorandum

2023 Regional Flood Plan  
Nueces Basin –Region 13

*Texas Water Development Board*  
January 7, 2022

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## 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 <sup>A</sup>	Entity ID	Currently Engaged in Flood Planning Activities (Yes/ No/ Unknown)	Floodplain Management Regulations (Yes/ No/ Unknown) <sup>A</sup>	NFIP Participant (Yes/ No) <sup>A,C</sup>	Higher Standards Adopted (Yes/ No) <sup>B</sup>
<b>Counties</b>					
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 <sup>A</sup>	Entity ID	Currently Engaged in Flood Planning Activities (Yes/ No/ Unknown)	Floodplain Management Regulations (Yes/ No/ Unknown) <sup>A</sup>	NFIP Participant (Yes/ No) <sup>A,C</sup>	Higher Standards Adopted (Yes/ No) <sup>B</sup>
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
<b>Cities</b>					
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 <sup>A</sup>	Entity ID	Currently Engaged in Flood Planning Activities (Yes/ No/ Unknown)	Floodplain Management Regulations (Yes/ No/ Unknown) <sup>A</sup>	NFIP Participant (Yes/ No) <sup>A,C</sup>	Higher Standards Adopted (Yes/ No) <sup>B</sup>
Benavides	13003410	Unknown	Unknown	Yes	
Big Wells	13002553	Unknown	Unknown	No <sup>D</sup>	
Camp Wood	13002625	Unknown	Unknown	Yes	
Carrizo Springs	13002556	Unknown	Unknown	Yes	
Charlotte	13003214	Unknown	Unknown	Yes	Yes
Christine	13003215	Unknown	Unknown	Yes <sup>D</sup>	
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 <sup>A</sup>	Entity ID	Currently Engaged in Flood Planning Activities (Yes/ No/ Unknown)	Floodplain Management Regulations (Yes/ No/ Unknown) <sup>A</sup>	NFIP Participant (Yes/ No) <sup>A,C</sup>	Higher Standards Adopted (Yes/ No) <sup>B</sup>
<b>Cities</b>					
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 <sup>A</sup>	Entity ID	Currently Engaged in Flood Planning Activities (Yes/ No/ Unknown)	Floodplain Management Regulations (Yes/ No/ Unknown) <sup>A</sup>	NFIP Participant (Yes/ No) <sup>A,C</sup>	Higher Standards Adopted (Yes/ No) <sup>B</sup>
Woodsboro	13003124	Unknown	Unknown	Yes	
<b>River Authorities</b>					
Nueces River Authority	00000290	Yes	No	No	
<b>Other</b> ( <a href="#">Council of Governments [COGs]</a> , Drainage/Conservation Districts, <a href="#">Fresh Water Supply District (FWSD)</a> , Water Authorities, Districts, <a href="#">Water Control and Improvement Districts [WCIDs]</a> , <a href="#">Municipal Utility Districts (MUDs)</a> , <a href="#">Municipal Water Districts (MWDs)</a> , <a href="#">Underground Water Conservation Districts (UWCDs)</a> , 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 <sup>A</sup>	Entity ID	Currently Engaged in Flood Planning Activities (Yes/ No/ Unknown)	Floodplain Management Regulations (Yes/ No/ Unknown) <sup>A</sup>	NFIP Participant (Yes/ No) <sup>A,C</sup>	Higher Standards Adopted (Yes/ No) <sup>B</sup>
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 <sup>A</sup>	Entity ID	Currently Engaged in Flood Planning Activities (Yes/ No/ Unknown)	Floodplain Management Regulations (Yes/ No/ Unknown) <sup>A</sup>	NFIP Participant (Yes/ No) <sup>A,C</sup>	Higher Standards Adopted (Yes/ No) <sup>B</sup>

<sup>A</sup> 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.

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

<sup>C</sup> 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.**

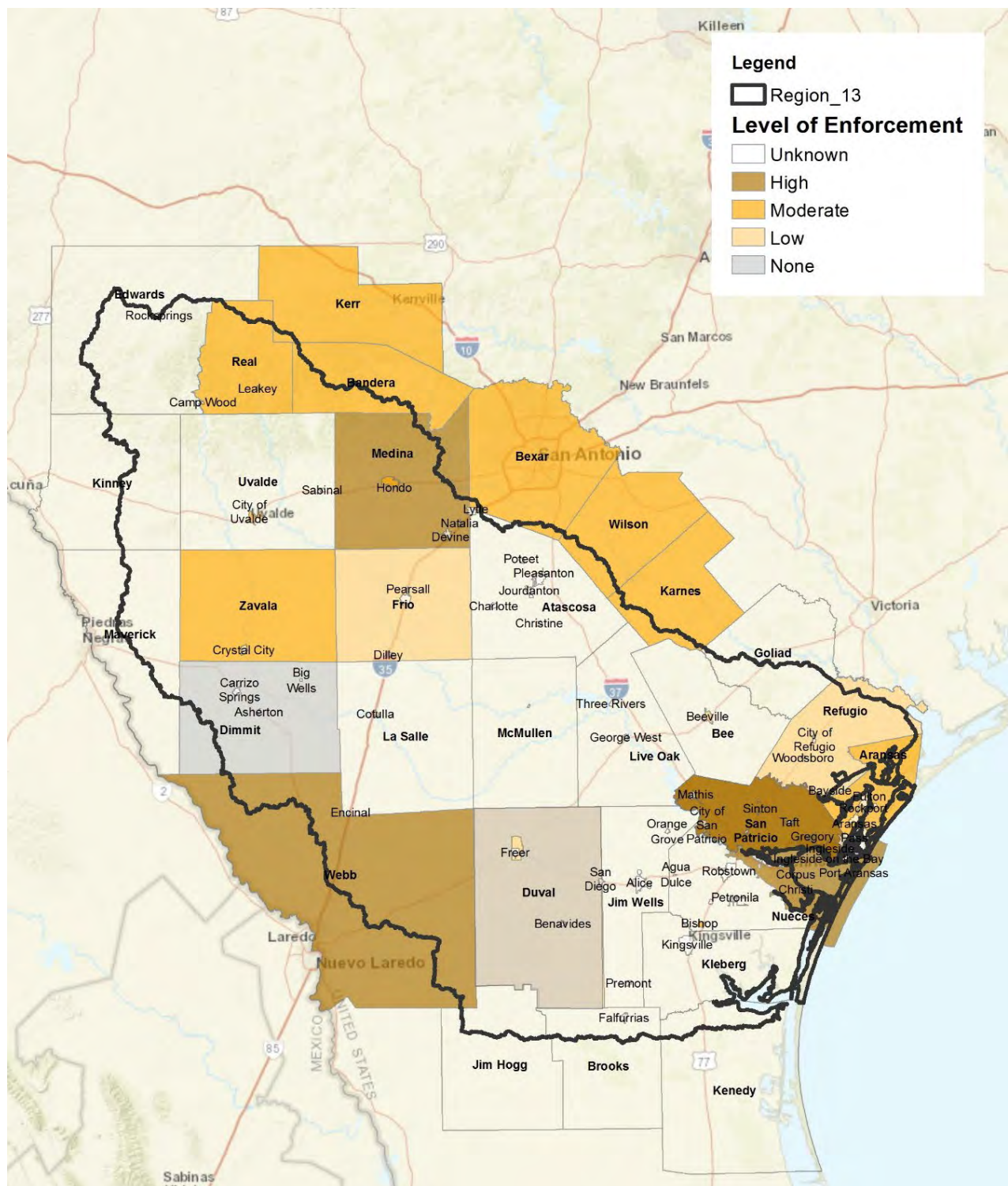


Figure 1-1. Degree of Floodplain Management Practices



## 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<sup>1</sup>
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.

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<sup>1</sup> 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.

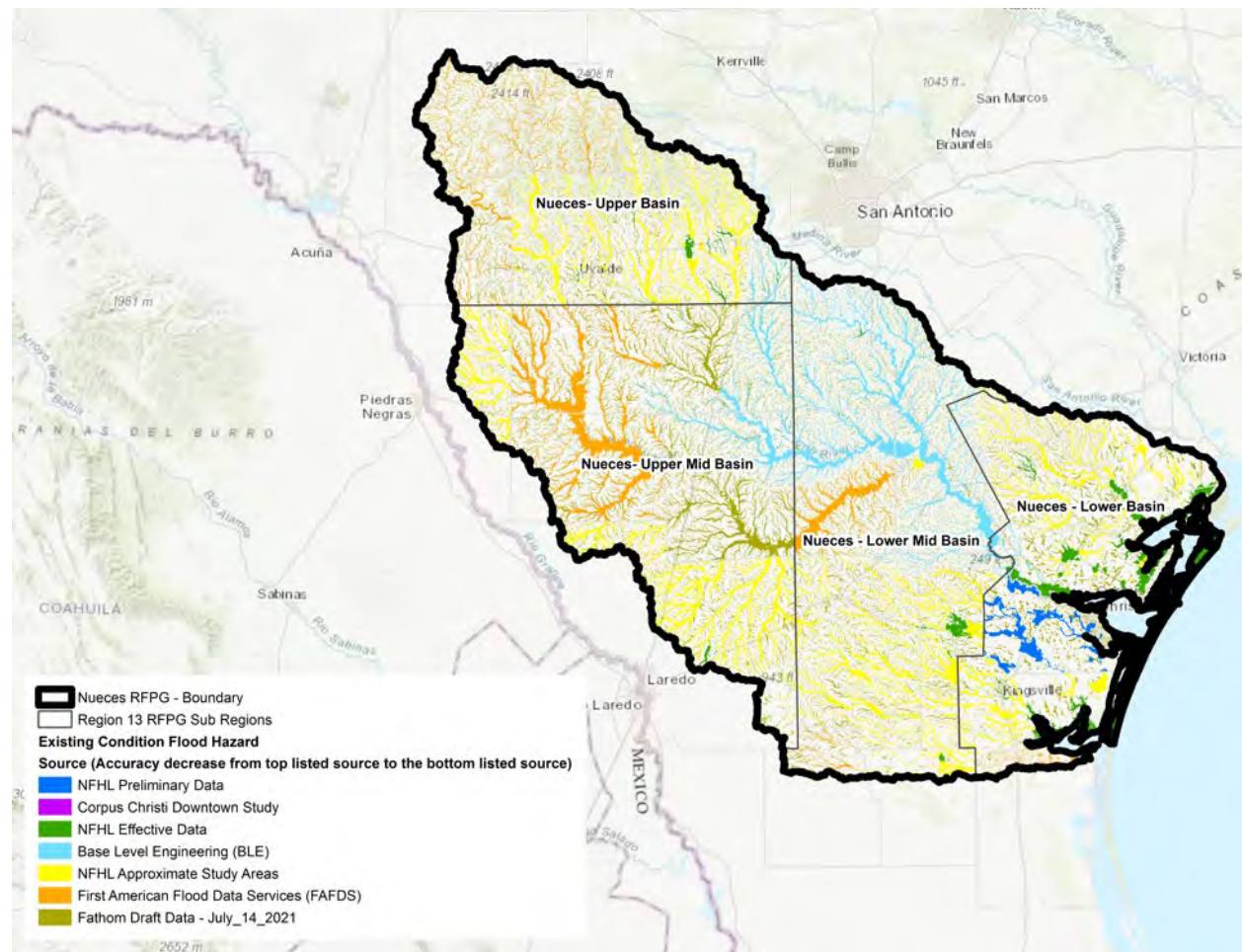


Figure 3-1. Inundation Boundary Sources

## 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 horizontal 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.



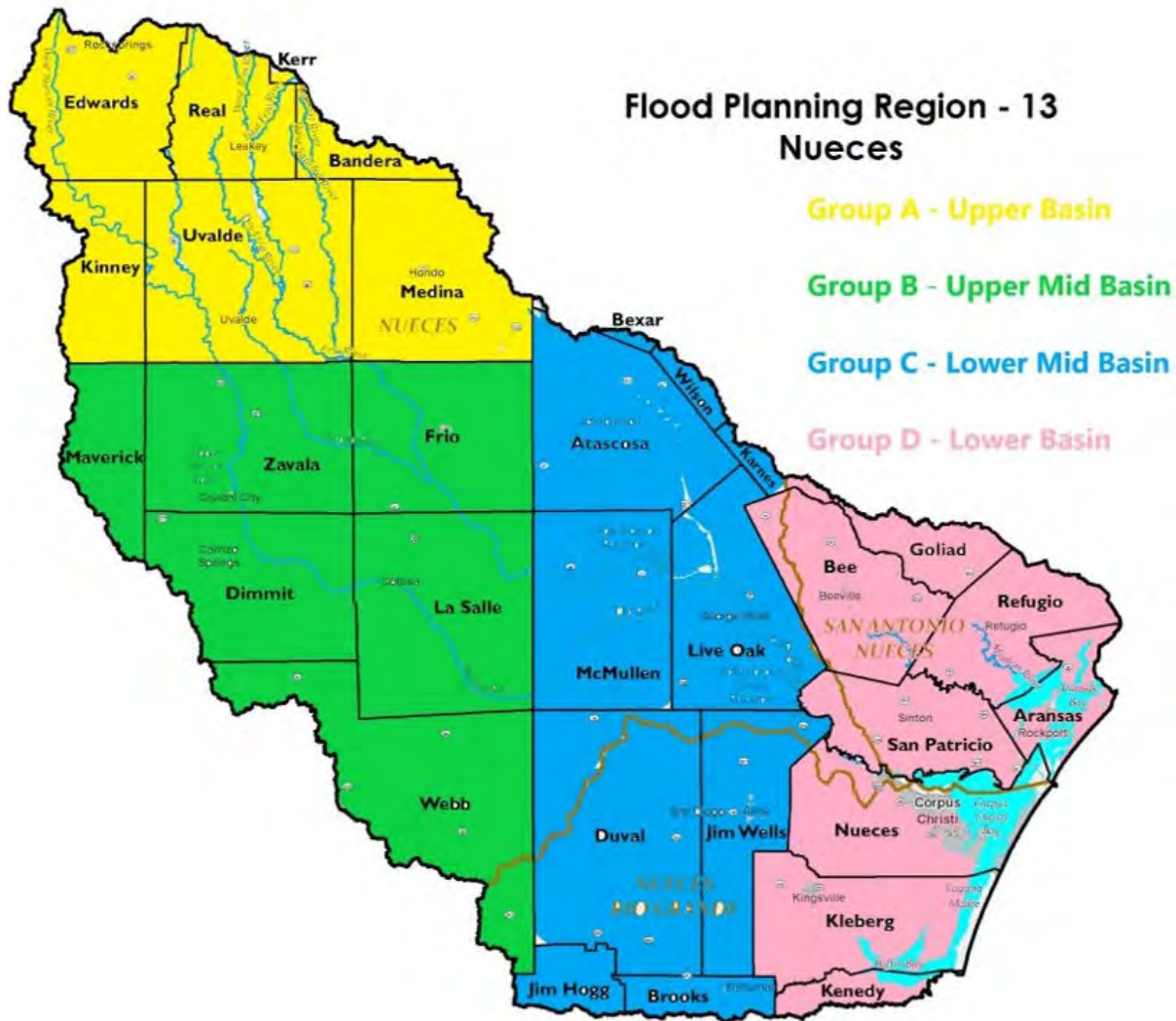


Figure 4-1. Nueces Flood Planning Sub-Regions

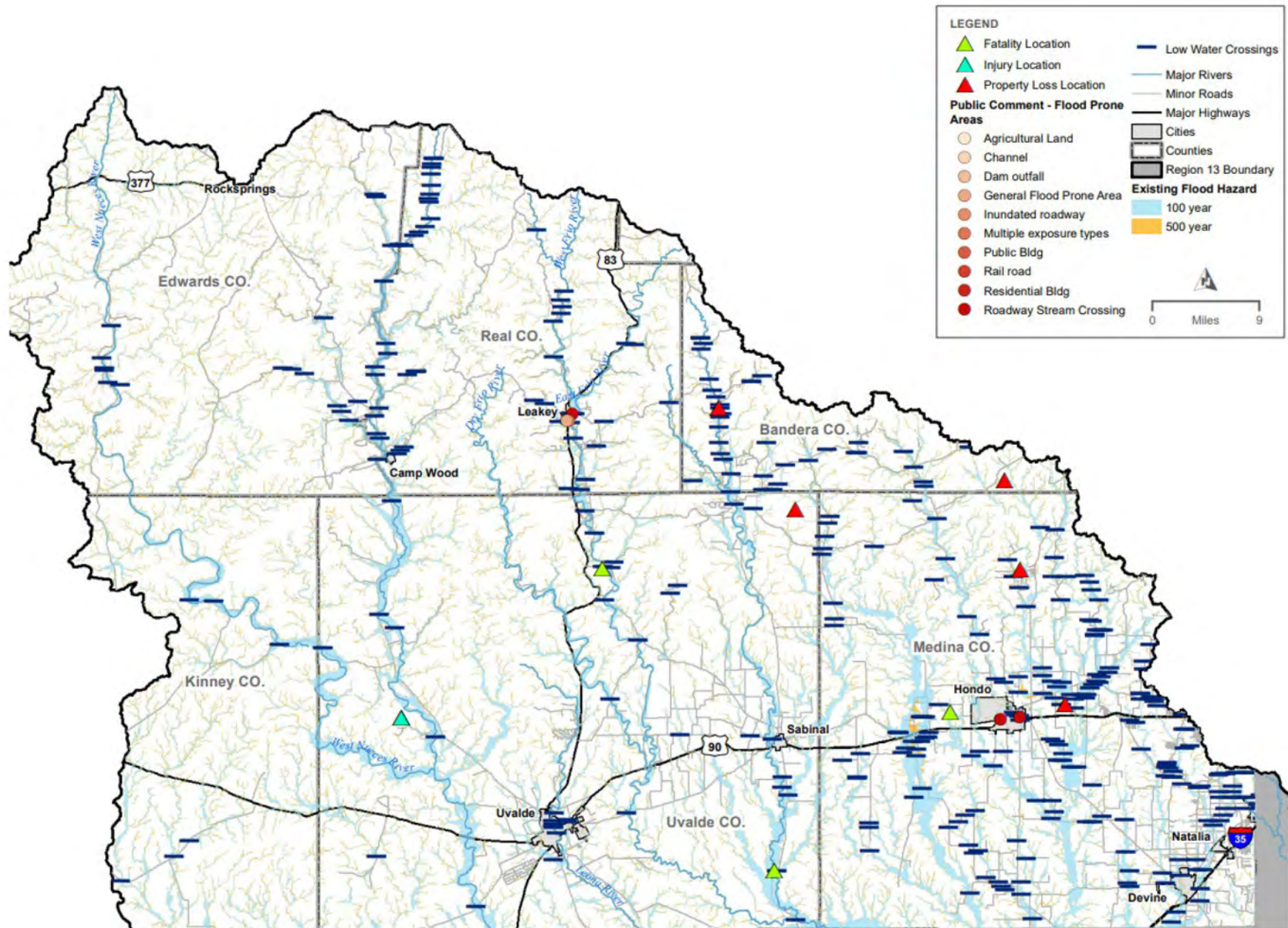


Figure 4-2. Additional Flood-Prone Areas in the Upper Nueces Basin



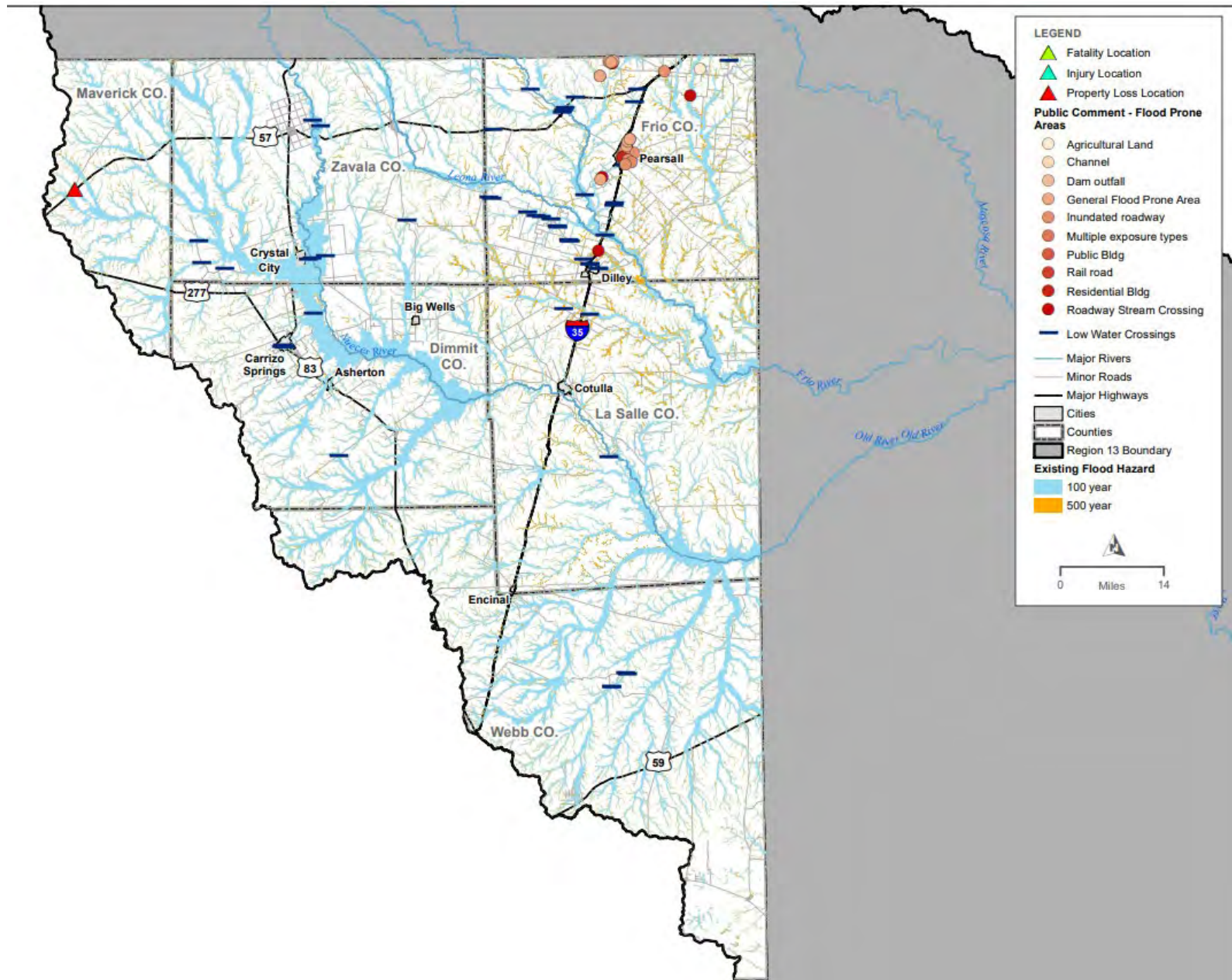


Figure 4-3. Additional Flood-Prone Areas in the Upper Mid-Nueces Basin

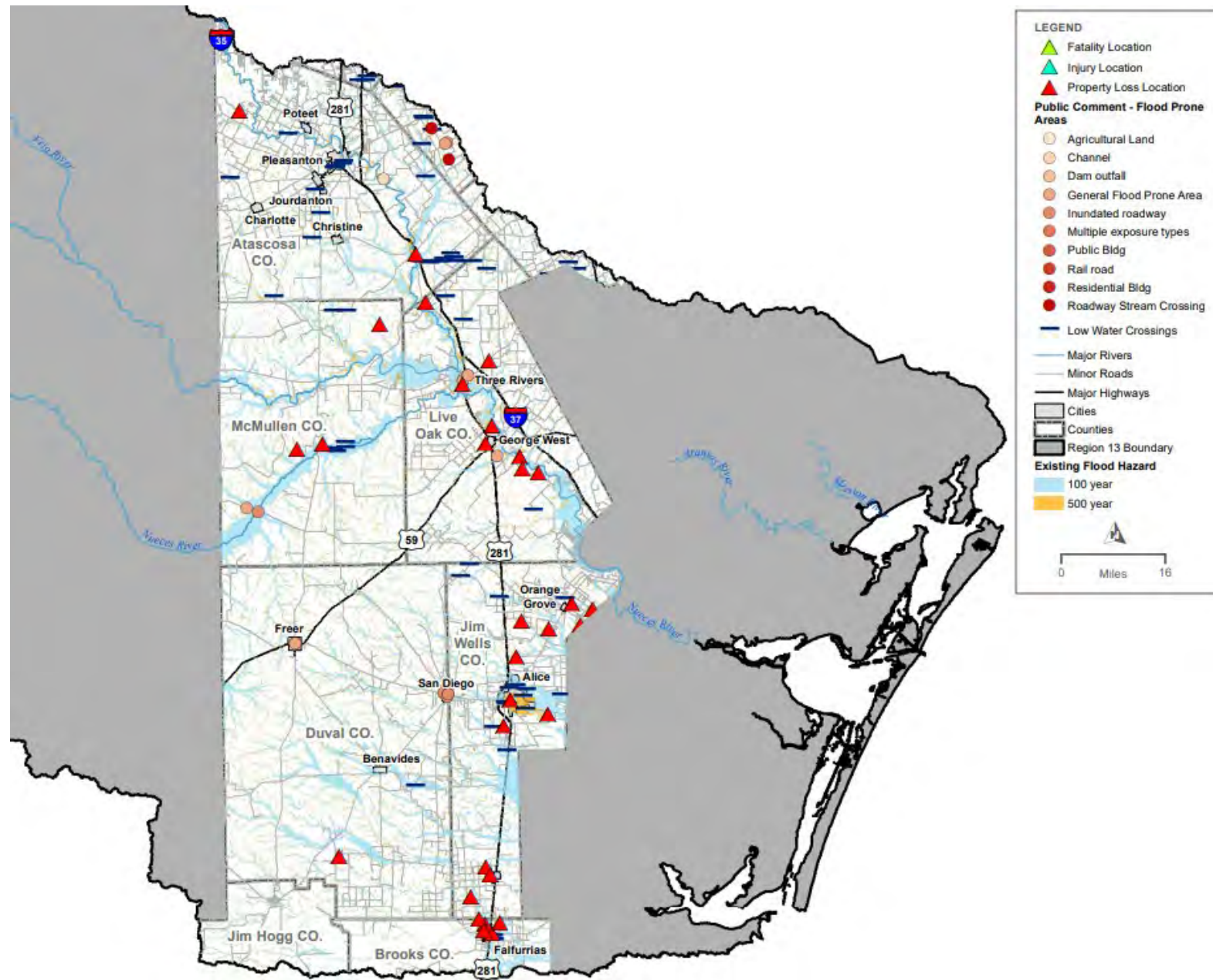


Figure 4-4. Additional Flood-Prone Areas in the Lower Mid-Nueces Basin



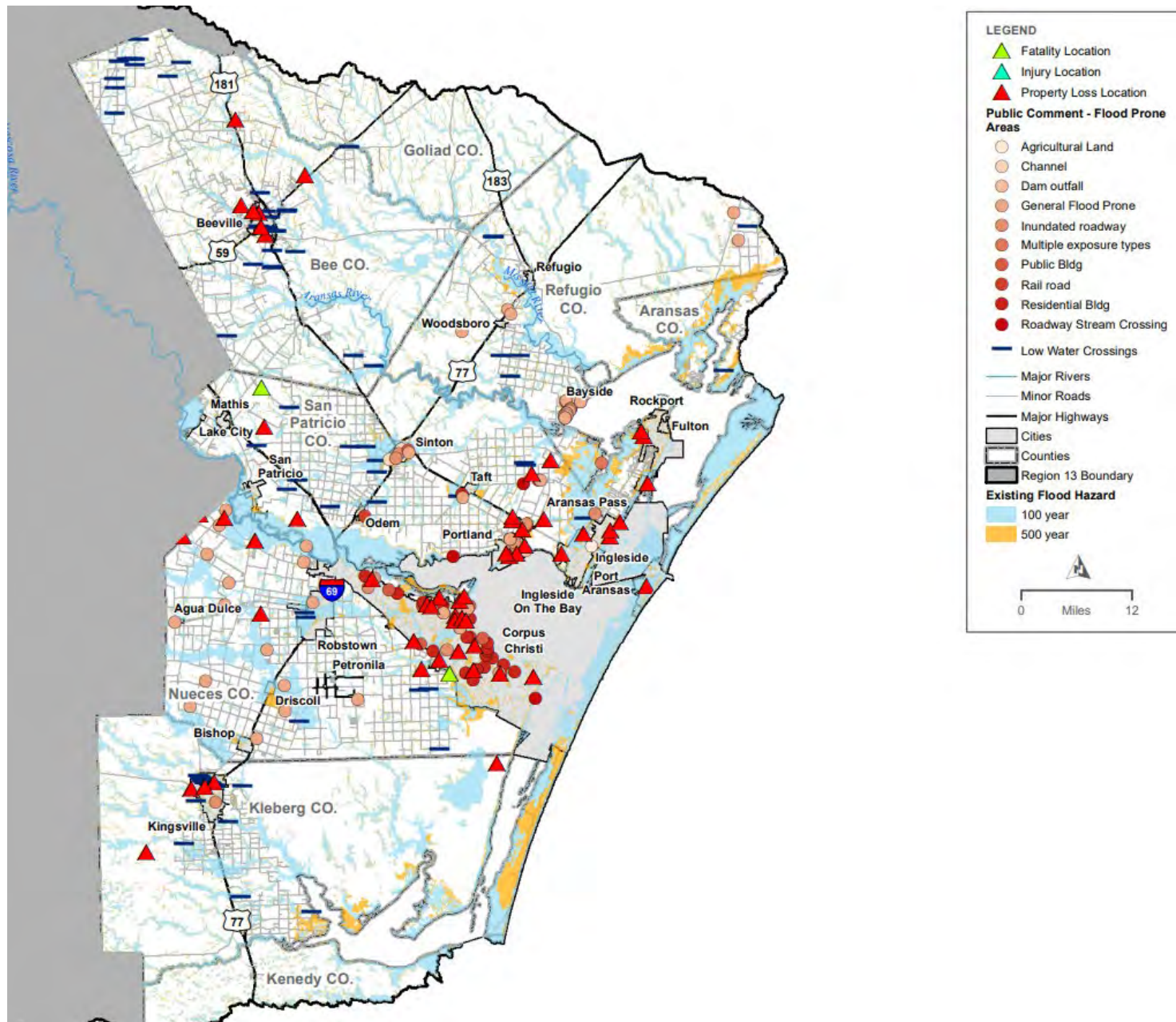


Figure 4-5. Additional Flood-Prone Areas in the Lower Nueces Basin

## 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 \(Region 13\) \(nueces-rfpg.org\)](https://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 identified 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 \(arcgis.com\)](https://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 \(arctgis.com\)](#) 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.

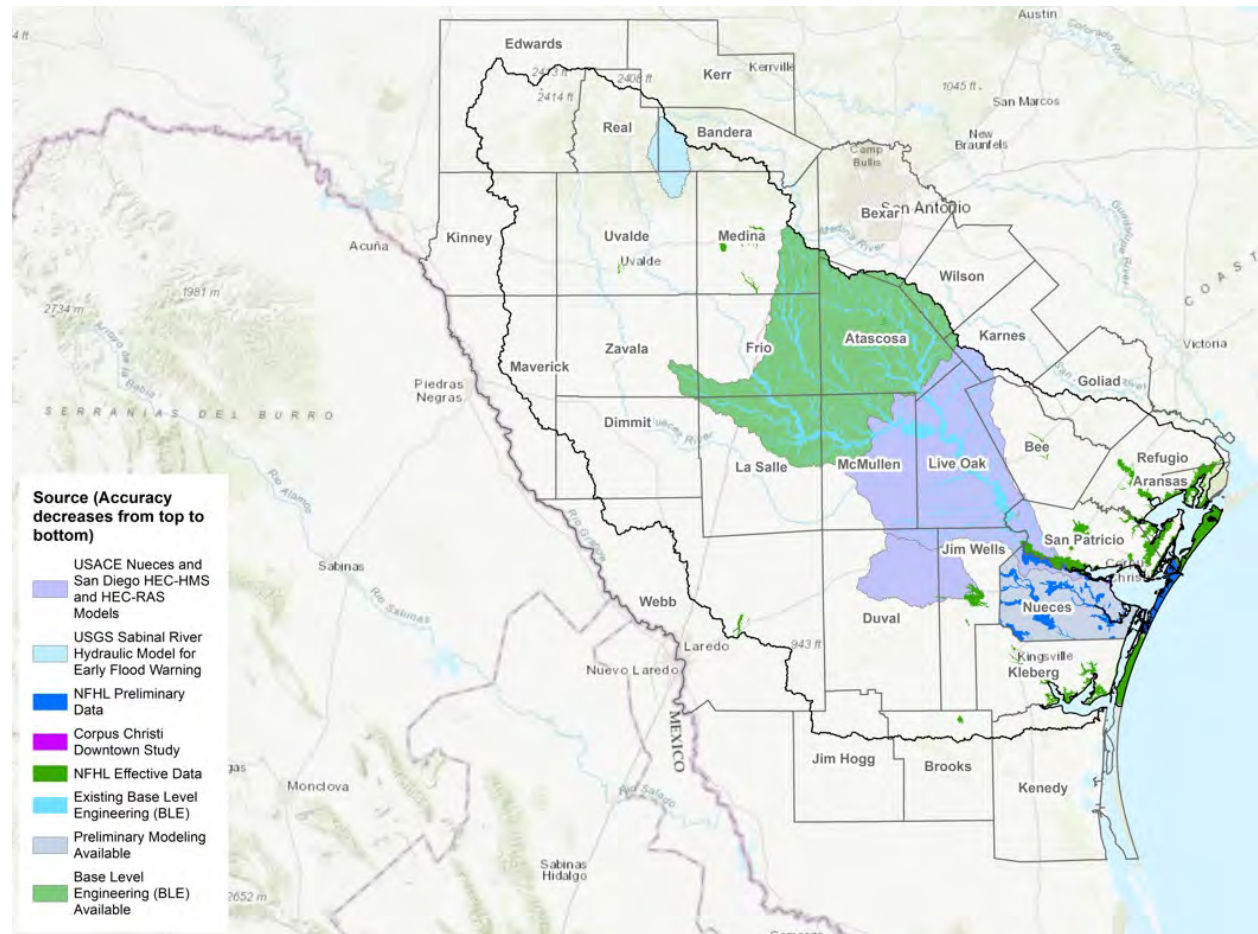


Figure 5-1. Hydrologic and Hydraulic Model Availability



## 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 <b>low-water crossings</b> 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 <b>High Hazard Dams</b> 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 <b>regional coordination</b> , 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 <b>flood mapping evaluations and update floodplain maps</b> 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	<b>Reduce the number of structures within NFHL-detailed study area</b> 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 <b>minimum flood management standards</b> , 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 <b>funding sources to provide maintenance</b> 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 <b>funding</b> , resources, and technical training for floodplain administrators or designees to <b>support community outreach</b> 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

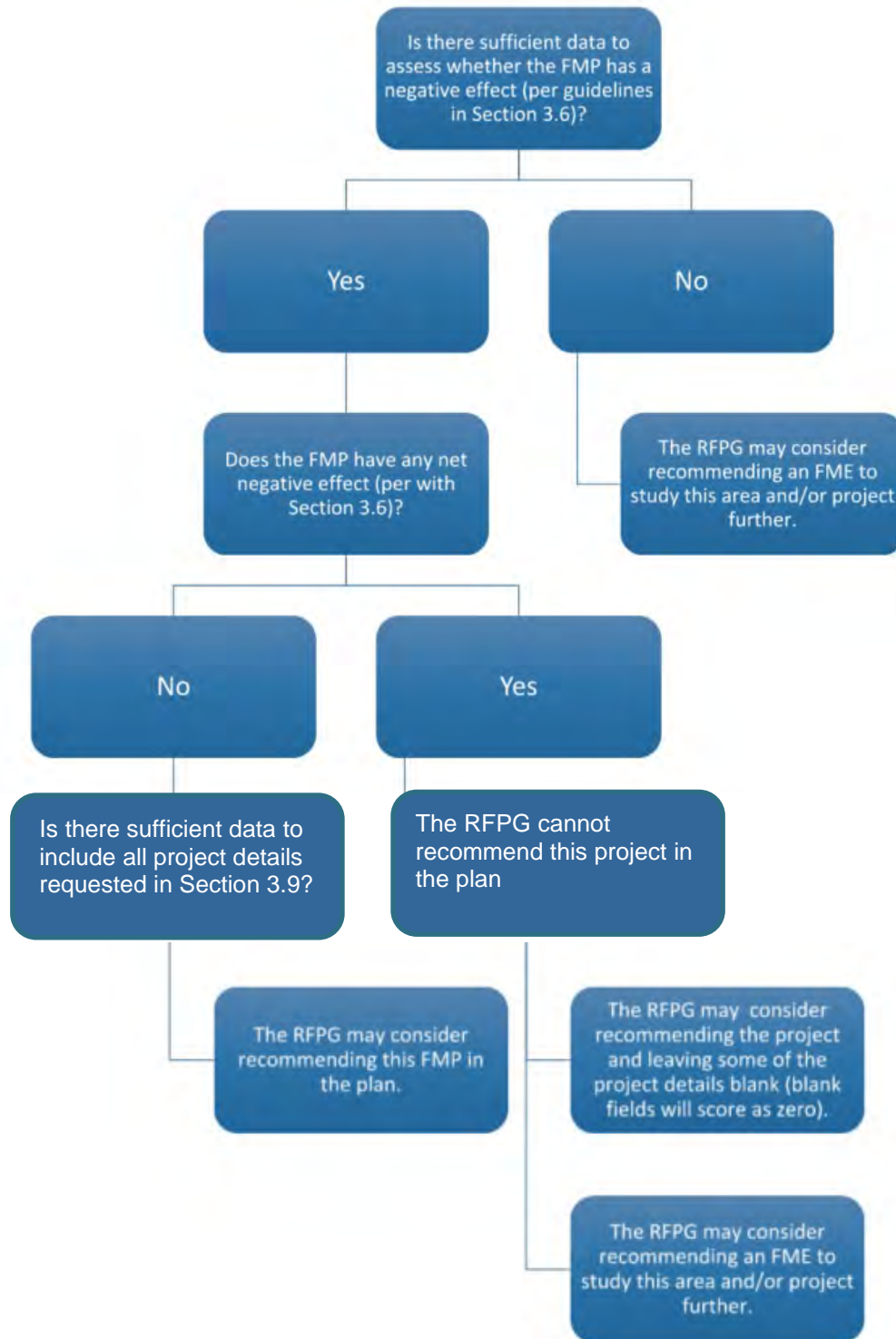
**The documented process used by the RFPG to identify potentially feasible FMSs and FMPs for the Nueces RFP** was prepared by a Region 13 subcommittee and approved at the September 27, 2021, Regional Flood Planning Meeting. At the Nueces RFPG meeting on July 26, 2021, a Region 13 subcommittee was formed 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 \(Region 13\) \(nueces-rfpg.org\)](https://www.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 <sup>A</sup>	Floodplain Management Regulations (Yes/ No/ Unknown) <sup>A</sup>	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No) <sup>A</sup>	NFIP Participant (Yes/ No) <sup>A,D</sup>	Higher Standards Adopted (Yes/ No) <sup>B</sup>	Floodplain Management Practices (Strong/Moderate/ Low/None) <sup>B</sup>	Level of Enforcement of Practices (High/ Moderate/ Low/ None) <sup>B,C</sup>	Existing Stormwater or Drainage Fee (Yes/ No) <sup>B</sup>	Web Link to Entity Regulations <sup>B</sup>
Atascosa County	Unknown		Yes	Yes				
Bandera County	Yes	Yes	Yes	No	Moderate	Moderate	No	<a href="http://www.banderacounty.org">www.banderacounty.org</a>
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	<a href="http://www.co.duval.tx.us">www.co.duval.tx.us</a>
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	<a href="https://www.co.kerr.tx.us/engineer/floodplain.html">https://www.co.kerr.tx.us/engineer/floodplain.html</a>
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	<a href="https://www.twdb.texas.gov/financial/programs/EDAP/mr/doc/San_Patricio_Co_MSRS.pdf">https://www.twdb.texas.gov/financial/programs/EDAP/mr/doc/San_Patricio_Co_MSRS.pdf</a>
Uvalde County	Unknown		Yes					
Webb County	Yes	Yes	Yes	No	Strong	High	No	<a href="https://www.webbcountytx.gov/Planning/">https://www.webbcountytx.gov/Planning/</a>
Wilson County	Yes	Yes	Yes	No	Moderate	Moderate	No	<a href="http://www.co.wilson.tx.us/upload/page/2300/docs/Dawn/Ordinances/WC_Flood_Order_Final_10272010.pdf">http://www.co.wilson.tx.us/upload/page/2300/docs/Dawn/Ordinances/WC_Flood_Order_Final_10272010.pdf</a>
Zavala County	Yes	Yes	Yes	No	Moderate	Moderate	No	<a href="http://co.zavala.tx.us">http://co.zavala.tx.us</a>
Agua Dulce	Unknown		Yes					
Alamo Area Council of Governments	Unknown		No					
Alice	Unknown		Yes	Yes				

Exhibit C: Table 6. Existing Floodplain Management Practices

Entity <sup>A</sup>	Floodplain Management Regulations (Yes/ No/ Unknown) <sup>A</sup>	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No) <sup>A</sup>	NFIP Participant (Yes/ No) <sup>A,D</sup>	Higher Standards Adopted (Yes/ No) <sup>B</sup>	Floodplain Management Practices (Strong/Moderate/ Low/None) <sup>B</sup>	Level of Enforcement of Practices (High/ Moderate/ Low/ None) <sup>B,C</sup>	Existing Stormwater or Drainage Fee (Yes/ No) <sup>B</sup>	Web Link to Entity Regulations <sup>B</sup>
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 <sup>D</sup>					
Camp Wood	Unknown		Yes					
Canyon Regional Water Authority	Unknown		No					
Carrizo Springs	Unknown		Yes					
Charlotte	Unknown		Yes	Yes				
Christine	Unknown		Yes <sup>D</sup>					
City of Beeville	No	No	Yes	No	Low	Low	No	NO
City of Bishop	Yes	Yes	Yes	No	Moderate	Moderate	No	<a href="http://www.cityofbishoptx.com">www.cityofbishoptx.com</a>
City of Corpus Christi	Yes	Yes	Yes	Yes	Strong	High	No	<a href="https://library.municode.com/tx/corpus_christi/codes/code_of_ordinances?nodeId=PTIIITHCOOR_CH14DESE_ARTV_FlhAPRCO">https://library.municode.com/tx/corpus_christi/codes/code_of_ordinances?nodeId=PTIIITHCOOR_CH14DESE_ARTV_FlhAPRCO</a>
City of Gregory	Yes	No	Yes	No	Strong	High	No	N/A
City of Hondo	Yes	Yes	Yes	No	Moderate	Moderate	No	<a href="https://z2.franklinlegal.net/franklin/Z2Browser2.html?showset=hondoset&amp;collection=hondo&amp;doccode=z2Code_z20000462">https://z2.franklinlegal.net/franklin/Z2Browser2.html?showset=hondoset&amp;collection=hondo&amp;doccode=z2Code_z20000462</a>
City of Ingleside	Yes	Yes	Yes	Yes	Strong	High	No	<a href="https://library.municode.com/TX/ingleside/codes/code_of_ordinances?nodeId=PTIICICO_CH18BUBURE_ARTXFLMA&amp;showChanges=true">https://library.municode.com/TX/ingleside/codes/code_of_ordinances?nodeId=PTIICICO_CH18BUBURE_ARTXFLMA&amp;showChanges=true</a>
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 <sup>A</sup>	Floodplain Management Regulations (Yes/ No/ Unknown) <sup>A</sup>	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No) <sup>A</sup>	NFIP Participant (Yes/ No) <sup>A,D</sup>	Higher Standards Adopted (Yes/ No) <sup>B</sup>	Floodplain Management Practices (Strong/Moderate/ Low/None) <sup>B</sup>	Level of Enforcement of Practices (High/ Moderate/ Low/ None) <sup>B,C</sup>	Existing Stormwater or Drainage Fee (Yes/ No) <sup>B</sup>	Web Link to Entity Regulations <sup>B</sup>
City of Port Aransas	Yes	Yes	Yes	No	Strong	High	No	<a href="https://library.municode.com/tx/port_aransas/codes/code_of_ordinances?nodeId=PTIIPPOARCO_CH8FLDAPR">https://library.municode.com/tx/port_aransas/codes/code_of_ordinances?nodeId=PTIIPPOARCO_CH8FLDAPR</a>
City of Portland	Yes	Yes	Yes	No	Strong	High	Yes	<a href="https://library.municode.com/tx/portland/codes/code_of_ordinances?nodeId=COOR_CH4BUGEBURE_ARTIIIFLDAPR_S4-30STAUFIFAPUME">https://library.municode.com/tx/portland/codes/code_of_ordinances?nodeId=COOR_CH4BUGEBURE_ARTIIIFLDAPR_S4-30STAUFIFAPUME</a>
City of Sinton	Yes	Yes	Yes	No	Moderate	Moderate	No	sintontexas.org
City of Uvalde	Yes	Yes	Yes	No	Moderate	Moderate	No	<a href="https://library.municode.com/tx/uvalde/codes/code_of_ordinances?nodeId=TIT15BUCO_CH15.48FLDAPR">https://library.municode.com/tx/uvalde/codes/code_of_ordinances?nodeId=TIT15BUCO_CH15.48FLDAPR</a>
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 <sup>A</sup>	Floodplain Management Regulations (Yes/ No/ Unknown) <sup>A</sup>	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No) <sup>A</sup>	NFIP Participant (Yes/ No) <sup>A,D</sup>	Higher Standards Adopted (Yes/ No) <sup>B</sup>	Floodplain Management Practices (Strong/Moderate/ Low/None) <sup>B</sup>	Level of Enforcement of Practices (High/ Moderate/ Low/ None) <sup>B,C</sup>	Existing Stormwater or Drainage Fee (Yes/ No) <sup>B</sup>	Web Link to Entity Regulations <sup>B</sup>
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 <sup>A</sup>	Floodplain Management Regulations (Yes/ No/ Unknown) <sup>A</sup>	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No) <sup>A</sup>	NFIP Participant (Yes/ No) <sup>A,D</sup>	Higher Standards Adopted (Yes/ No) <sup>B</sup>	Floodplain Management Practices (Strong/Moderate/ Low/None) <sup>B</sup>	Level of Enforcement of Practices (High/ Moderate/ Low/ None) <sup>B,C</sup>	Existing Stormwater or Drainage Fee (Yes/ No) <sup>B</sup>	Web Link to Entity Regulations <sup>B</sup>
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 <sup>A</sup>	Floodplain Management Regulations (Yes/ No/ Unknown) <sup>A</sup>	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No) <sup>A</sup>	NFIP Participant (Yes/ No) <sup>A,D</sup>	Higher Standards Adopted (Yes/ No) <sup>B</sup>	Floodplain Management Practices (Strong/Moderate/ Low/None) <sup>B</sup>	Level of Enforcement of Practices (High/ Moderate/ Low/ None) <sup>B,C</sup>	Existing Stormwater or Drainage Fee (Yes/ No) <sup>B</sup>	Web Link to Entity Regulations <sup>B</sup>
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	<a href="https://www.aransascountytexas.gov/main/docs/ordinances/OAmended%20Aransas%20County%20Floodplain%20Management%20Watershed%20Protection%20Order%20O-23-2019.pdf">https://www.aransascountytexas.gov/main/docs/ordinances/OAmended%20Aransas%20County%20Floodplain%20Management%20Watershed%20Protection%20Order%20O-23-2019.pdf</a>
City of Cotulla	Yes	Yes	Yes	No	Low	Low	No	municode
City of Ingleside on the Bay	Yes	Yes	Yes	No	Moderate	Moderate	No	<a href="http://www.inglesideonthebay.org">www.inglesideonthebay.org</a>

## **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 \(arcgis.com\)](https://arcgis.com).

**Table B-1. USGS Historical Flood Summary**

River Gages	Flood Date	Peak Flow (cubic feet per second)	Peak Stage (feet)	Expected Consequence
<b>Nueces River</b>				
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.
<b>Mission River</b>				
Refugio	8/31/2001	46,900	Missing	Missing
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 Whittett 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 and 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 B-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.

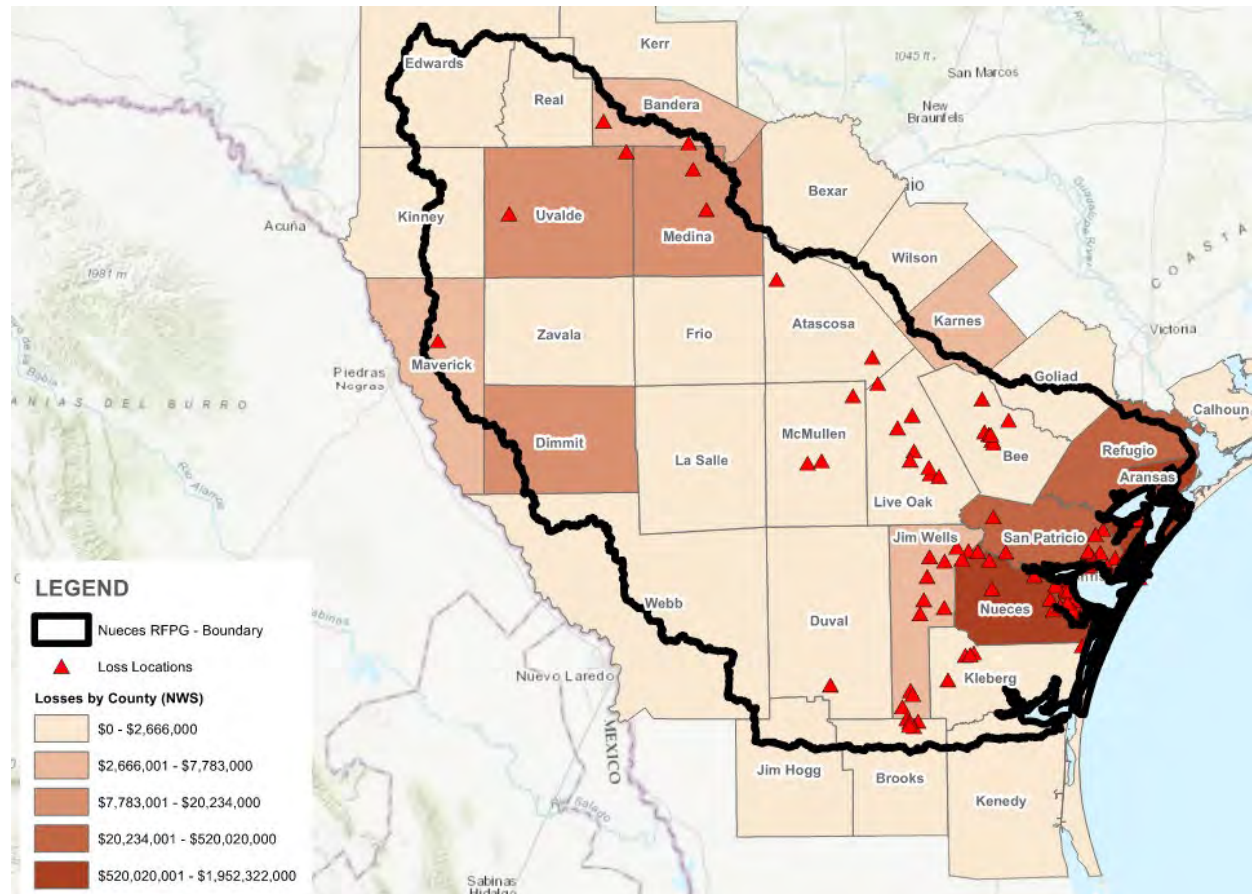
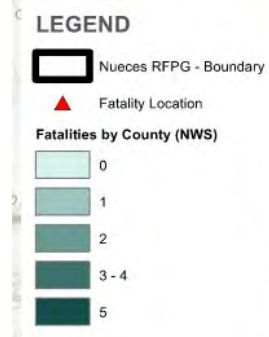


Figure B-1. National Weather Service Property Damage from Flooding, since 1996



4



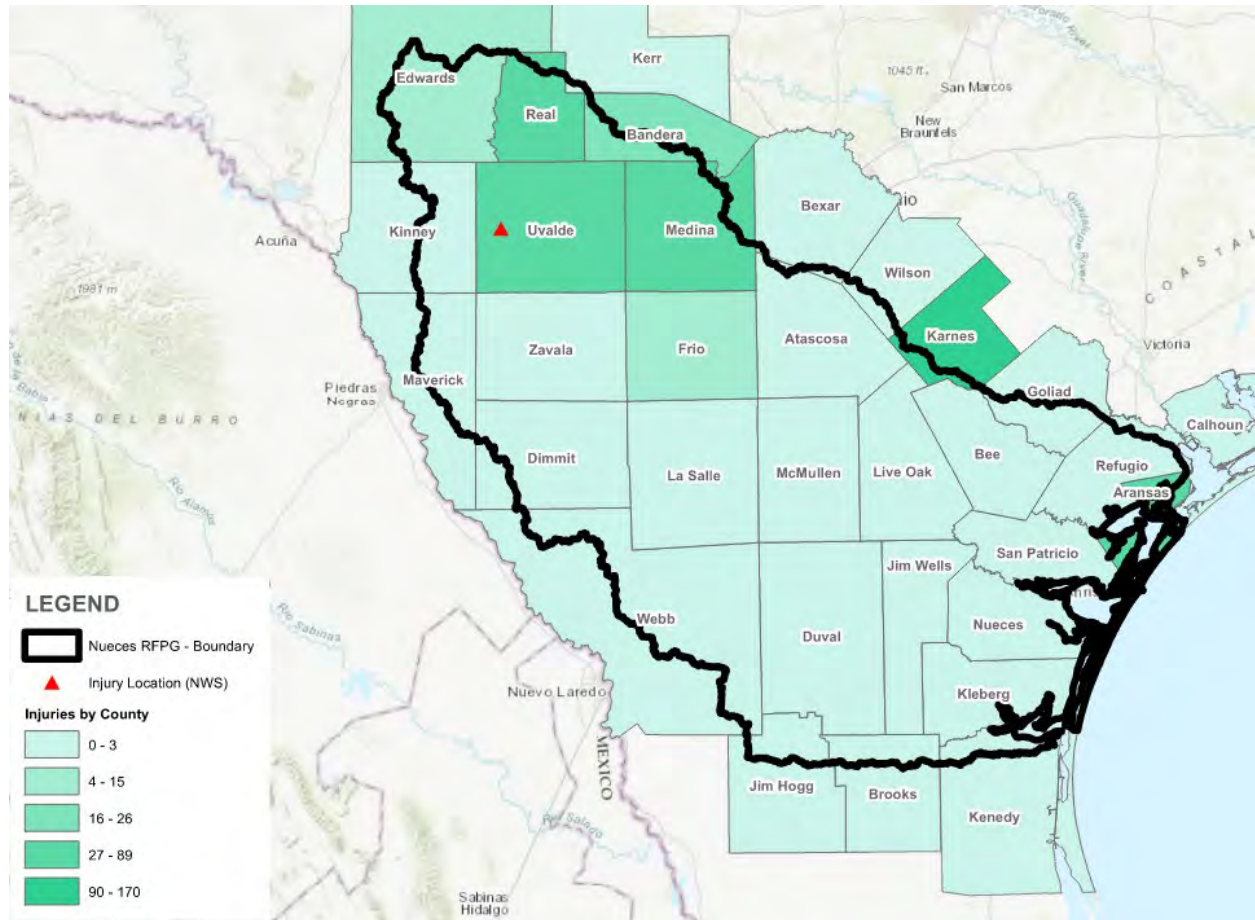


Figure B-3. National Weather Service Injuries from Flooding, since 1996

**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 <sup>1</sup>	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

<sup>1</sup> 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 <sup>2</sup>	\$ 2,067,000	0	1
Bandera <sup>2</sup>	\$ 7,783,000	26	5
Bee	\$ 1,049,000	0	0
Bexar <sup>2</sup>	\$ -	0	0
Brooks <sup>2</sup>	\$ 1,625,000	0	0
Dimmit <sup>2</sup>	\$ 20,234,000	0	0
Duval	\$ 50,000	0	0
Edwards <sup>2</sup>	\$ 721,000	15	2
Frio	\$ 2,342,000	15	0
Goliad <sup>2</sup>	\$ 1,025,000	0	1
Jim Hogg <sup>2</sup>	\$ -	0	0
Jim Wells	\$ 4,816,000	0	0
Karnes <sup>2</sup>	\$ 7,084,000	170	0
Kenedy <sup>2</sup>	\$ -	0	0
Kerr <sup>2</sup>	\$ -	0	0
Kinney <sup>2</sup>	\$ 1,390,000	0	0
Kleberg	\$ 1,170,000	0	0
La Salle	\$ -	0	0
Live Oak	\$ 425,000	0	0
Maverick <sup>2</sup>	\$ 7,266,000	3	2
McMullen	\$ 200,000	0	0
Medina <sup>2</sup>	\$ 17,148,000	59	2
Nueces	\$ 1,315,015,000	3	4
Real <sup>2</sup>	\$ 2,666,000	69	4
Refugio <sup>2</sup>	\$ 520,020,000	0	0
San Patricio	\$ 518,722,000	0	2
Uvalde	\$ 18,009,000	89	4
Webb <sup>2</sup>	\$ -	0	0
Wilson <sup>2</sup>	\$ 89,786,000	257	0
Zavala	\$ 20,526,000	26	0
Total	\$ 4,513,461,000	797	29

<sup>2</sup> 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.

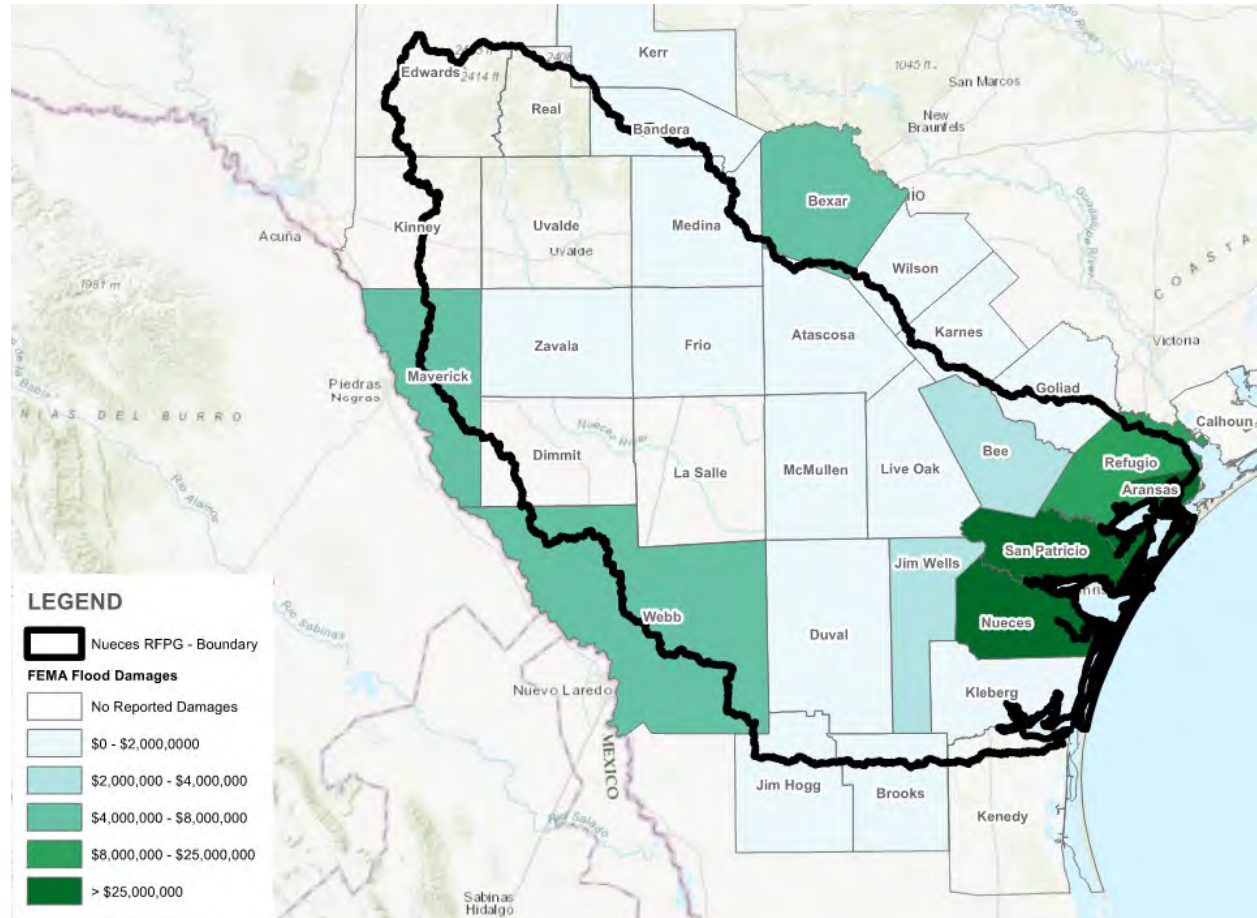


Figure B-4. FEMA Flood Assistance to Owners and Renters for Flood Damages, since 2002

**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 <sup>2</sup>	75,674,264	616,914	734,181	8,457,466	50,377,516
Atascosa <sup>2</sup>	1,534,103	0	0	0	668,809
Bandera <sup>2</sup>	2,077,275	0	0	0	72,991
Bee	1,198,186	9,016	7,686	62,702	2,908,309
Bexar <sup>2</sup>	0	0	0	0	6,886,899
Brooks <sup>2</sup>	152,608	0	0	0	218,103
Dimmit <sup>2</sup>	758,646	0	0	0	0
Duval	0	0	0	0	595,316
Edwards <sup>2</sup>	0	0	0	0	0
Frio	497,840	4,767	7,737	0	435,145
Goliad <sup>2</sup>	618,371	453	1,175	40,534	1,550,171
Jim Hogg <sup>2</sup>	265,938	0	0	0	404,417
Jim Wells	1,754,451	150,464	59,198	895	3,090,062
Karnes <sup>2</sup>	751,420	482	3,677	6,823	1,108,783
Kenedy <sup>2</sup>	29,192	0	0	0	0
Kerr <sup>2</sup>	1,110,759	0	0	0	5,902
Kinney <sup>2</sup>	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 <sup>2</sup>	568,802	0	0	0	5,485,074
McMullen	125,315	0	0	0	30,906
Medina <sup>2</sup>	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 <sup>2</sup>	1,427,573	0	0	0	0
Refugio <sup>2</sup>	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 <sup>2</sup>	3,761,150	0	0	0	4,085,755
Wilson <sup>2</sup>	2,059,932	0	0	0	267,428
Zavala	3,827,640	27,034	14,984	0	1,408,517
<b>Totals</b>	<b>279,614,832</b>	<b>3,419,675</b>	<b>2,912,582</b>	<b>18,708,578</b>	<b>159,609,930</b>

**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	HUCs	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, 12104060101, 121004060201, 121101100306, 121101100435, 130000441, 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				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	121101102026, 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, 12102040206, 121102040407, 12102040409, 121102040410	13000483, 13000497, 13000502, 13000515, 1300517	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, 12102040409, 121102040410	13000483, 13000497, 13000502, 13000515, 1300517	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, 12102040409, 121102040410	13000483, 13000497, 13000502, 13000515, 1300517	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, 12102040409, 121102040410	13000483, 13000497, 13000502, 13000515, 1300517	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, 12102040409, 121102040410	13000483, 13000497, 13000502, 13000515, 1300517	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, 12102040409, 121102040410	13000483, 13000497, 13000502, 13000515, 1300517	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, 12102040409, 121102040410	13000483, 13000497, 13000502, 13000515, 1300517	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, 12102040409, 121102040410	13000483, 13000497, 13000502, 13000515, 1300517	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, 12102040409, 121102040410	13000483, 13000497, 13000502, 13000515, 1300517	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 assessment 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 develop funding sources based on the nature of projects they expect to pursue, or work with them to help narrow down a broad list of projects to those that might offer the most benefit. 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.	13000004, 13000025	Bexar																								
131000022	COASTAL BEND MITIGATION ACTION PLAN - JW - 05	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.	13000013	Jim Wells																								
131000023	COASTAL BEND MITIGATION ACTION PLAN - JW - 11		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 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) Analyses 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 to better 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 City. b. 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 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. 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 the City 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 expected to 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. One of the City's most critical facilities, the waste-water																										

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

FME ID	FME Name	Description	Associated Goals	Counties	HUCs	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
		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 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 expected to accrue as well. The City of Corpus Christi is currently working through the appeals process of the map modernization																									
131000043	Nueces County Hazard Mitigation - Corpus Christi Action #9		13000010	Nueces																							
		Corpus Christi Action #11 Proposed Action Build the Cotulla Reservoir in the upper reaches of the 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 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																							
131000044	Nueces County Hazard Mitigation - Corpus Christi Action #11		13000013	Nueces																							
		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 to provide 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																							
131000045	Nueces County Hazard Mitigation - Corpus Christi Action #19		13000013	Nueces																							
		Complete a feasibility study of Osio Creek at the confluence of La Villa Creek to determine if any construction projects will help the creek conveyance capacity during high flow events. The drainage profiles of Osio Creek east of the La Villa 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 investigation shows a significant potential to impact the base flood elevation, then construction will be completed in those areas.	13000013	Nueces																							
131000046	Nueces County Hazard Mitigation - Corpus Christi Action #20		13000013	Nueces																							
		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, riparian landslides, 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 hazardous areas.	13000013, 13000019	Nueces																							
131000047	Nueces County Hazard Mitigation - Corpus Christi Action #23		13000013	Nueces																							
131000048	Nueces County Hazard Mitigation - Corpus Christi Action #27		13000004	Nueces																							
131000049	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #9		13000010	Atascosa																							
131000050	Atascosa McMullen Hazard Mitigation Plan - Atascosa County Action #10		13000010	Atascosa																							
131000051	Atascosa McMullen Hazard Mitigation Plan - City of Charlotte Action #4		13000007	Atascosa																							
131000052	Atascosa McMullen Hazard Mitigation Plan - City of Christine Action #2		13000014, 13000015	Atascosa																							
131000053	Atascosa McMullen Hazard Mitigation Plan - City of Jourdanton Action #12		13000008, 13000009	Atascosa																							
131000054	Atascosa McMullen Hazard Mitigation Plan - City of Lytle Action #6		13000016	Atascosa																							
131000055	Atascosa McMullen Hazard Mitigation Plan - Lytle ISD Action #3		13000025, 13000026	Atascosa																							
131000056	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #2		13000008, 13000009	McMullen																							
			13000001, 13000002, 13000003	McMullen																							
131000057	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #3		13000003	McMullen																							
131000058	Atascosa McMullen Hazard Mitigation Plan - McMullen County Action #5		13000010	McMullen																							
		An adaptive management hydrologic restoration study would look at the interactions of the physical systems that affect 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 (SB3) Texas Legislature, 2007 Environmental Flow 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). The Baffin Bay Watershed Monitoring and Management Plan would guide restoration efforts 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.	13000007, 13000010, 13000009, 13000010, 13000020	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												
131000059	Texas Coastal Resiliency Master Plan - R2-20																										
131000060	Texas Coastal Resiliency Master Plan - R3-25																										
		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, and analyzing Interferometric Synthetic Aperture Radar (InSAR) data. The project would make data publicly accessible to all coastal communities	13000022	Kleberg																							
131000061	Texas Coastal Resiliency Master Plan - R4-13		13000022																								
		A feasibility study was performed to assess methods to help protect wetlands, seagrass, and other related aquatic and coastal habitat at Indian Point from erosion associated with shoreline retreat. In addition 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																							
131000062	Indian Point Shoreline Erosion Project		13000019, 13000020	Nueces																							
131000063	City of Hondo Drainage Master Plan and Flood Mitigation plan		13000014	Medina																							
131000064	Petronila Drainage Improvements Feasibility Study		13000014	Nueces																							
		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		13000014	Nueces																							
		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																							



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



#### Potentially Feasible Flood Mitigation Projects Identified by RFPG

[illegible]

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

[illegible]

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

[illegible]

#### Potentially Feasible Flood Mitigation Projects Identified by RFPG

FAP ID	FMP Name	Description	Ancient Goods (G)	Counsite	NCLLA	Waterworks	Project Type	Project Area (sqm)	Flood Risk Type (Firmness, Coastal, Urban, Playa, Other)	Sponsor	Timeline with Drought	Emergency Need (Y/N)	Estimated Project Cost (\$)	Potential Funding Source(s) and Amount	Risk Reduction Potential	Area in 100yr Flood Hazard (acres)	Area in 100yr Flood Hazard (chained flood risk)	Estimated reduction in structural damage from 100-year flood risk	Estimated reduction in residential loss from 100-year flood risk	Estimated reduction in commercial loss from 100-year flood risk	Estimated reduction in agricultural loss from 100-year flood risk	Estimated reduction in industrial loss from 100-year flood risk	Estimated reduction in public infrastructure loss from 100-year flood risk	Estimated reduction in cultural heritage loss from 100-year flood risk	Estimated reduction in environmental loss from 100-year flood risk	Estimated reduction in total losses from 100-year flood risk	Estimated reduction in fatalities from 100-year flood risk	Estimated reduction in injuries from 100-year flood risk	Estimated reduction in displacement from 100-year flood risk	Estimated reduction in economic activity from 100-year flood risk	Estimated reduction in social well-being from 100-year flood risk	Remarks for Recommendation			
13100019	Texas Coastal Resiliency Master Plan - R3-12	This project would protect two historic 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, final design and permitting. Phase 2 would cover the construction phase. Opportunities to include beneficial use of dredged material during the construction would be pursued.	13100019	Kalberg					Coastal Bend Bay and Estuarine Program, The Nature Conservancy, Audubon Texas U.S. Fish and Wildlife Service, Texas General Land Office				\$ 8,600,000.00																						
13100020	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 2018 and the project is considered shovel ready. Coordination is ongoing with the Port of Corpus Christi regarding the possibility of beneficially using dredged material in this area.	13100020	San Patricio, Nueces, Aransas, Refugio,				Coastal Bend Bay and Estuarine Program, Texas General Land Office					\$ 3,500,000.00																						
13100021	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 New Bay to the Wildlife Management Area in Hidalgo County.	13100021					Texas Parks & Wildlife Department					\$ 8,000,000.00																						
13100022	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 efforts at the site, including erecting approximately 22 acres of live-stake Brazilian Pepper Trees, implementing a prescribed burn management plan, and re-spraying grass and mulched weed pat sites to establish burrowing owl habitat. Nueces County completed a Habitat Land Use Management Plan for the property to guide future conservation efforts that included repeat inspections during public meetings from regulatory agencies, non-governmental organizations and the general public. The acquired property has three immediate needs: 1. Requiring a large flow levee to be done system. During and after the done restoration projects, data will be collected to inform future water fays. 2. Restoring damaged wetlands from human use activities, such as driving through jurisdictional wetlands. 3. Wetland species control and pest control monitoring and removal. This includes Brazilian Pepper Trees and Chinese Tallow Trees The recommended improvements under this project include: • Repairing breaches in the ship channel revetment on northern Mustang Island • Constructing longshoreline coving of the ship channel near existing rock investments to protect mangrove habitat; • Rehabilitating marsh and wetland habitat • Repairing the Charter's Pasture bulldozer that was damaged during Hurricane Harvey • Repairing public access, and • Permitting this site for beneficial 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	13100022	Kalberg				Coastal Bend Bay and Estuarine 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																							
13100023	Texas Coastal Resiliency Master Plan - R3-23		13100023	Nueces				City of Port Aransas Texas General Land Office					\$ 4,400,000.00																						
13100024	Lower Nueces River Watershed Protection Plan - Riparian habitat Conservation Management Measures No. 1	Purchase of Properties	13100024	Nueces				City of Corpus Christi					\$ 15,000.00																						
13100025	Lower Nueces River Watershed Protection Plan - Riparian habitat Conservation Management Measures No. 2	Acquisitions of Conservation Easements (approximately 970 acres)	13100025	Nueces				City of Corpus Christi(NACLT)					\$ 970,000.00																						
13100026	Nueces Delta Shoreline Erosion Protection	This project will construct 1,800 linear feet of breakwater to protect 600 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 are ignored by the Department for US Fish, including juvenile fishes, shrimp, and crabs that support important commercial and recreational fisheries. The Nueces Delta is also important habitat for many other species impacted by the spill, such as white pelicans, roseate spoonbills, red-tailed hawks, black skimmers, least terns, snowy plovers, and piping plover. Construction of a living breakwater will enhance the bay and adjacent habitat and contribute to the protection and restoration of a large contiguous area of salt marsh which will benefit those 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.	13100026	San Patricio				Nation Fish and Wildlife Foundation					\$ 3,328,000.00																						
13100027	Tule Creek Watershed Project Report 7.1.1 Area 2: 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 Outlet. This project will require approx. 3,200 feet of full box culvert to be installed within the Mesquite Branch ROW.	13100027	Aransas				TCEQ					\$ 1,600,000.00																						
13100028	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 up to avoid changes to flood and drainage control	13100028	Aransas				TCEQ					\$ 650,000.00																						
13100029	Tule Creek Watershed Project Report 7.1.3 Area 3: Upper Tule Creek West Wetland 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 program designed to also control erosion. It is expected that approx. 100 feet of additional ROW is needed to be dedicated and cleared to accommodate the widening.	13100029	Aransas				TCEQ					\$ 600,000.00																						
13100030	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 Road tributary as well as the lands to the west should be designed at this location. It is also recommended that an additional 40' pipe be placed adjacent to the existing 42" outlet from the golf course.	13100030	Aransas				TCEQ					\$ 1,325,000.00																						
13100031	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 water lock, which makes it likely resistant from perspective of providing capture of contaminants before discharge into the Bay. Due to the requirement of constructing a weir and overflow device, this project is hydrologically sensitive and will need careful planning to develop an effective project design and avoid adverse potential risks.	13100031	Aransas				TCEQ					\$ 825,000.00																						
13100032	Nueces Delta PresERVE Project - Building an educational Outreach Learning 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 public education and better understanding of the delta's role as the transition zone of the water's edge. This vision includes an Estuary Learning Center and Visitor Center to be built on the Nueces 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 boutique 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 coastal delta habitat.	13100032	Nueces				CBEP																											
13100033	Oso Creek Channel Bottom Rehabilitation and Bank Stabilization Project	The Oso Creek Channel Bottom Rehabilitation and Green Infrastructure Project would address a 12-mile section of Oso Creek channel from Greenwood Drive to Cays Bay (Oso including channel modifications to remove potholes and culverts, and implement bank stabilization, vegetation, and other green infrastructure techniques. It will advance long-term resilience by enhancing capacity of stormwater system and improving water quality.	13100033	Nueces				TWDB					\$44,000,000.00																						
13100034	Greenwood Plant Community Restoration Project	Greenwood Plant Community Restoration and is in need of repair. The proposed project would improve the infrastructure in and around the plant to prevent future floods from impacting the plant.	13100034	Nueces				City of Corpus Christi					\$5,000,000.00																						
13100035	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 segment and lower the range of shoreline modification and erosion control projects that have been conducted 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).	13100035	Nueces				City of Corpus Christi, Nueces County, CBEP					\$99,856,213.50																						
13100036	Chigger Island restoration Project	This project will construct a half-mile, marsh-edge breakwater and beneficially use dredged material to restore an island in order to protect approximately 1,236 acres of wetland habitat, including 1,658 acres of seagrass in Redfish Bay, an area adjacent to Corpus Christi Bay. Additionally, this project will restore approximately 32 acres of coastal wetland habitat and create oyster, invertebrate and fisheries habitat.	13100036	San Patricio				Texas Parks and Wildlife Department					\$3,834,000.00																						
13100037	Los Arroyos Conveyance Infrastructure Improvements	Channel improvements to improve near sea Aransas Creek to improve conveyance - Update culverts on Polanco St. and 5 Benavides St. - Improve conveyance capacity under bridges on HWY 339 and HWY 339 - Procurement of easements and rights-of-way	13100037	Duval				4	Urban / Rurine																										
13100038	Bermudez Main City Network	Improvements to the Drainage System in Central Bermudez: Increase capacity to inlet and pipe on Depot St., Railroad Ave, Clark St., E. Railroad Ave, Clark St., E. Mesquite St., & Peters St. Install pipe 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 structure	13100038	Duval				3.8	Urban																										
13100039	Uptown Burch St Crossing	Improvements to Uptown Channel System: Increase culvert capacity on Burch St. and other underized crossings Channel improvements along the main urban channel Improvements to street overland drainage system	13100039	Duval				5.6	Urban																										
13100040	Northern San Diego Street Conveyance Improvements	Curb and gutter replacement Improve conveyance by street paving and regrading of parietized streets	13100040	Duval, Jim Wells				2.7	Urban																										
13100041	Northern San Diego Drainage Improvement Project	Drainage improvements to subsurface drainage systems Installation of new underground drainage infrastructure along Living Alley street	13100041	Duval, Jim Wells				2.7	Urban																										
13100042	Improvements to Drainage Conveyance along Railroad	Expansion and improvements to Dixie Street System 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	13100042	Duval, Jim Wells				2.7	Urban																										
13100043	Southern San Diego Drainage Improvement Project	New underground stormwater collection system along Collins Street, including interconnections between existing and new infrastructure	13100043	Duval, Jim Wells				2.7	Urban																										
13100044	Improvements to San Diego Levee Outlet System	Improvements to outfall structure and opportunities along San Diego Levee System	13100044	Duval, Jim Wells				2.7	Urban / Rurine																										
13100045	Resilient Drainage Improvements	Improvements to surface and subsurface infrastructure of Resilient Drainage System	13100045	Duval				4.7	Rurine																										
13100046	Conveyance Drainage Improvements	Improvements to drainage infrastructure in Conveyance	13100046	Duval				4.1	Rurine																										
13100047	Upper Oso Creek Channel A Rehabilitation	Acquire right of way to widen & deepen existing drainage ditches.	13100047	Nueces																															
13100048	Upper Oso Creek	Acquire right of way to improve the flow of flood waters from the Redfish/Carriker Area	13100048	Nueces																															
13100049	Trinity City St.	Acquire right of way to improve the flow of flood waters to the Trinity Area	13100049	Nueces																															
13100050	County Road 6 North Carriker Creek	Restoration project to bring this section of North Carriker Creek (located between CHS and Meadowbrook Road) back to its original elevation as built by USDA Soil Bank program	13100050	Nueces																															
13100051	Bulk Low-level and Drainage Rehabilitation at County Road 14F	Drainage improvements to improve near sea Aransas Creek to improve conveyance - Update culverts on Polanco St. and 5 Benavides St. - Improve conveyance capacity under bridges on HWY 339 and HWY 339 - Procurement of easements and rights-of-way	13100051	Nueces																															
13100052	Topographic and hydrological study for improvement and regrading of Drainage ditch.		13100052	Nueces																															

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





### Potentially Feasible Flood Management Strategies Identified by RFPG

<p>The Corpus Christi City Council approved the Storm Water Capital Improvement Program (CIP) for FY1999-2000 on July 20, 1999 (Ordinance No. 023703). Included were separate projects for drainage studies in specific areas of the City. Threatened to negate these individual drainage studies a consistent, unified analysis became evident and was approved in Storm Water CIP for FY02-03 (Ordinance No. 024212). 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 FY02-03 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 future drainage capital improvement projects. The purpose 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 to use. B. Adopt a drainage criteria and design procedure for designers to use in capital improvement projects and in the subdivision planning process. 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 of the existing areas and projects and the subdivision planning process. 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.</p>						
12200008	Neuces County Hazard Mitigation - Corpus Christi Action #5	Corpus Christi has participated in the CCRs program since 1991 and is currently rated as a Class C community, entitling its residents to a 10% discount on flood insurance premiums. This project is intended to improve the rating to a Class S, thereby increasing the premium discount by an additional 10% for Special Flood Hazard Areas (SFHA). Other actions identified in this Mitigation Plan will have a direct bearing on fulfilling CCR requirements to qualify for the higher classification. This activity includes a comprehensive review of eligible activity requirements, identification of additional potential actions, monitoring completed previously identified actions, and completing the application process.	13000013	Neuces	\$	4,084,900
12200009	Neuces County Hazard Mitigation - Corpus Christi Action #10	Corpus Christi has participated in the CCRs program since 1991 and is currently rated as a Class C community, entitling its residents to a 10% discount on flood insurance premiums. This project is intended to improve the rating to a Class S, thereby increasing the premium discount by an additional 10% for Special Flood Hazard Areas (SFHA). Other actions identified in this Mitigation Plan will have a direct bearing on fulfilling CCR requirements to qualify for the higher classification. This activity includes a comprehensive review of eligible activity requirements, identification of additional potential actions, monitoring completed previously identified actions, and completing the application process.	13000007	Neuces		

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

[illegible]

## Appendix C6 – HUC-12 Flood Risk Data Score Table



Appendix C6 - HUC-12 Flood Risk Data Score Table

HUC12	Unique ID	Score									Weighted Score									Scaled Score (1-5)
		Historical Property Damage (Flood-Prone Areas)	Historical Property Damage (Agency Data)	Historical Life Loss	Property Damage – Exposure (Buildings)	Property Damage – Vulnerability (Buildings)	Property Damage – Vulnerability (Critical Buildings)	Low Water Crossings	Life Loss (Dams)	Historical Property Damage (Flood-Prone Areas)	Historical Property Damage (Agency Data)	15% Historical Life Loss	Property Damage – Exposure (Buildings)	Property Damage – Vulnerability (Buildings)	Property Damage – Vulnerability (Critical Buildings)	Low Water Crossings	Life Loss (Dams)	Total Score		
121004050101	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42	
121004050102	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42	
121004050103	3	0	0	0	5	0	2	0	0	0	0	0	0.75	0	0.3	0	0	7	1.46	
121004050201	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121004050202	5	5	0	0	4	0	1	0	0	0.375	0	0	0.6	0	0.15	0	0	10	1.56	
121004050203	6	1	5	0	5	0	5	0	0	0.075	0.375	0	0.75	0	0.75	0	0	16	2.71	
121004050204	7	3	4	0	5	5	5	1	0	0.225	0.3	0	0.75	0.75	0.75	0.15	0	23	4.06	
121004050205	8	1	0	0	4	0	1	0	0	0.075	0	0	0.6	0	0.15	0	0	6	1.15	
121004050301	9	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	4	0.83	
121004050302	10	1	0	0	0	0	1	0	0	0.075	0	0	0	0	0.15	0	0	2	0.31	
121004050303	11	1	0	0	0	0	0	0	0	0.075	0	0	0	0	0	0	0	1	0.10	
121004050304	12	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	4	0.83	
121004050305	13	0	0	0	1	0	5	0	0	0	0	0	0.15	0	0.75	0	0	6	1.25	
121004050306	14	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0	0	5	1.04	
121004050307	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121004050308	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121004050400	17	0	4	0	5	5	4	0	0	0	0.3	0	0.75	0.75	0.6	0	0	18	3.33	
121004060101	18	0	0	0	4	0	3	3	0	0	0	0	0.6	0	0.45	0.45	0	10	2.08	
121004060102	19	0	0	0	1	0	0	3	0	0	0	0	0.15	0	0	0.45	0	4	0.83	
121004060103	20	0	4	0	3	0	0	0	0	0	0.3	0	0.45	0	0	0	0	7	1.04	
121004060104	21	0	0	0	3	0	4	0	0	0	0	0	0.45	0	0.6	0	0	7	1.46	
121004060105	22	0	1	0	1	0	2	0	0	0	0.075	0	0.15	0	0.3	0	0	4	0.73	
121004060106	23	0	0	0	2	0	2	0	0	0	0	0	0.3	0	0.3	0	0	4	0.83	
121004060107	24	0	0	0	1	0	3	0	0	0	0	0	0.15	0	0.45	0	0	4	0.83	
121004060108	25	0	0	0	2	0	2	0	0	0	0	0	0.3	0	0.3	0	0	4	0.83	
121004060109	26	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	1	0.21	
121004060201	27	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	0	0	1	0.21	
121004060202	28	0	0	0	3	0	2	1	0	0	0	0	0.45	0	0.3	0.15	0	6	1.25	
121004060203	29	0	0	0	1	0	3	0	0	0	0	0	0.15	0	0.45	0	0	4	0.83	
121004060204	30	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42	
121004060205	31	0	0	0	1	0	1	0	0	0	0	0	0.15	0	0.15	0	0	2	0.42	
121004060206	32	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	1	0.21	
121004060207	33	0	0	0	1	0	4	0	0	0	0	0	0.15	0	0.6	0	0	5	1.04	
121004060208	34	0	0	0	3	0	2	0	0	0	0.375	0	0.45	0	0.3	0	0	5	1.04	
121004060209	35	0	0	0	2	0	1	3	0	0	0	0	0.3	0	0.15	0.45	0	6	1.25	
121004060301	36	3	0	0	5	0	5	0	0	0.225	0	0	0.75	0	0.75	0	0	13	2.40	
121004060302	37	1	0	0	0	0	1	0	0	0.075	0	0	0	0	0.15	0	0	2	0.31	
121004060303	38	1	0	0	5	0	5	3	0	0.075	0	0	0.75	0	0.75	0.45	0	14	2.81	
121004060304	39	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42	
121004060305	40	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	1	0.21	
121004060306	41	0	0	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	3	0.63	
121004060307	42	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42	
121004070101	43	0	4	0	5	5	5	5	0	0	0.3	0	0.75	0.75	0.75	0.75	0	24	4.58	
121004070102	44	0	1	0	5	5	3	4	0	0	0.075	0	0.75	0.75	0.45	0.6	0	18	3.65	
121004070103	45	0	0	0	4	0	5	4	0	0	0	0	0.6	0	0.75	0.6	0	13	2.71	
121004070104	46	0	0	0	3	0	5	0	0	0	0	0	0.45	0	0.75	0	0	8	1.67	
121004070105	47	0	0	0	3	0	3	1	0	0	0	0	0.45	0	0.45	0.15	0	7	1.46	
121004070106	48	0	0	0	4	0	3	0	0	0	0	0	0.6	0	0.45	0	0	7	1.46	
121004070201	49	0	0	5	3	0	2	1	0	0	0	0.75	0.45	0	0.3	0.15	0	11	2.29	
121004070202	50	0	0	0	3	0	3	0	0	0	0	0	0.45	0	0.45	0	0	6	1.25	
121004070203	51	0	0	0	4	0	4	3	0	0	0	0	0.6	0	0.6	0.45	0	11	2.29	
121004070204	52	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	1	0.21	
121004070205	53	0	0	0	4	0	2	0	0	0	0	0	0.6	0	0.3	0	0	6	1.25	
121004070206	54	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42	
121004070301	55	0	0	0	4	0	4	0	0	0	0	0	0.6	0	0.6	0	0	8	1.67	
121004070302	56	0	0	0	5	5	4	3	0	0	0	0	0.75	0.75	0.6	0.45	0	17	3.54	
121004070303	57	0	0	0	5	0	5	3	0	0	0	0	0.75	0	0.75	0.45	0	13	2.71	
121004070304	58	4	0	0	5	5	5	0	0	0.3	0	0	0.75	0.75	0.75	0	0	19	3.54	
121004070305	59	0	0	0	4	4	4	1	0	0	0	0	0.6	0.6	0.6	0.15	0	13	2.71	
121004070401	60	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42	
121004070402	61	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	4	0.83	
121004070403	62	4	5	0	5	5	5	3	0	0.3	0.375	0	0.75	0.75	0.75	0.45	0	27	4.69	
121004070404	63	0	0	0	3	0	2	0	0	0	0	0	0.45	0	0.3	0	0	5	1.04	
121101010101	64	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	4	0.83	
121101010102	65	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0.45	0	3	0.63	
121101010103	66	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	5	1.04	
121101010104	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101010105	68	0	0	0	3	0	0	5	0	0	0	0	0.45	0	0	0.75	0	8	1.67	
121101010201	69	0	0	0	1	0	2	1	0	0	0	0	0.15	0	0.3	0.15	0	4	0.83	
121101010202	70	0	0	0	1	0	1	0	0	0	0	0	0.15	0	0.15	0	0	2	0.42	
121101010203	71	0	0	0	2	0	3	0	0	0	0	0	0.3	0	0.45	0	0	5	1.04	
121101010204	72	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0.45	0	3	0.63	
121101010205	73	0	0	0	3	0	4	4	0	0	0	0	0.45	0	0.6	0.6	0	11	2.29	
121101010301	74	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0.45	0	3	0.63	
121101010302	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101010303	76	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	0	0	1	0.21	
121101010304	77	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	9	1.88	
121101010305	78	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	3	0.63	
121101010401	79	0	0	0	4	0	4	3	0	0	0	0	0.6	0	0.6	0.45	0	11	2.29	
121101010402	80	0	0	0	5	5	2	1	0	0	0	0	0.75	0.75	0.3	0.15	0	13	2.71	
121101010403	81	0	0	0	4	4	1	0	0	0	0	0	0.6	0.6	0.15	0	0	9	1.88	
121101010404	82	0	0</																	



Appendix C6 - HUC-12 Flood Risk Data Score Table

HUC12	Unique ID	Score								Weighted Score										Scaled Score (1-5)
		Historical Property Damage (Flood-Prone Areas)	Historical Property Damage (Agency Data)	Historical Life Loss	Property Damage – Exposure (Buildings)	Property Damage – Vulnerability (Buildings)	Property Damage – Vulnerability (Critical Buildings)	Low Water Crossings	Life Loss (Dams)	7.5% Historical Property Damage (Flood-Prone Areas)	7.5% Historical Property Damage (Agency Data)	15% Historical Life Loss	15% Property Damage – Exposure (Buildings)	15% Property Damage – Vulnerability (Critical Buildings)	15% Property Damage – Vulnerability (Critical Buildings)	15% Low Water Crossings	10% Life Loss (Dams)	100% Total Score		
121101020104	88	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	0	0	1	0.21	
121101020105	89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101020201	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101020202	91	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	0	0	1	0.21	
121101020203	92	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0.45	0	3	0.63	
121101020204	93	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0.45	0	3	0.63	
121101020205	94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101020206	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101020301	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101020302	97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101020303	98	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	0	0	1	0.21	
121101020304	99	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	3	0.63	
121101020305	100	0	0	0	2	0	0	1	0	0	0	0	0.3	0	0	0.15	0	3	0.63	
121101020401	101	0	0	0	1	0	0	3	0	0	0	0	0.15	0	0	0.45	0	4	0.83	
121101020402	102	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	3	0.63	
121101020403	103	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	0	0	1	0.21	
121101020404	104	0	0	0	2	0	0	1	0	0	0	0	0.3	0	0	0.15	0	3	0.63	
121101020405	105	0	0	0	2	2	0	0	0	0	0	0	0.3	0.3	0	0	0	4	0.83	
121101020406	106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101030101	107	0	0	0	1	1	2	0	0	0	0	0	0.15	0.15	0.3	0	0	4	0.83	
121101030102	108	0	0	0	3	3	1	0	0	0	0	0	0.45	0.45	0.15	0	0	7	1.46	
121101030103	109	0	0	0	3	3	3	1	0	0	0	0	0.45	0.45	0.45	0.15	0	10	2.08	
121101030104	110	0	0	0	2	3	3	0	0	0	0	0	0.3	0.45	0.45	0	0	8	1.67	
121101030105	111	0	0	0	3	3	4	3	0	0	0	0	0.45	0.45	0.6	0.45	0	13	2.71	
121101030201	112	0	0	0	2	3	3	0	0	0	0	0	0.3	0.45	0.45	0	0	8	1.67	
121101030202	113	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42	
121101030203	114	0	0	0	3	3	2	0	0	0	0	0	0.45	0.45	0.3	0	0	8	1.67	
121101030204	115	0	0	0	3	4	5	1	0	0	0	0	0.45	0.6	0.75	0.15	0	13	2.71	
121101030205	116	0	0	0	5	5	3	4	0	0	0	0	0.75	0.75	0.45	0.6	0	17	3.54	
121101030206	117	0	0	0	2	2	0	0	0	0	0	0	0.3	0.3	0	0	0	4	0.83	
121101030207	118	0	0	0	5	5	1	3	5	0	0	0	0.75	0.75	0.15	0.45	0.5	19	3.61	
121101030301	119	0	0	0	1	1	2	0	0	0	0	0	0.15	0.15	0.3	0	0	4	0.83	
121101030302	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101030303	121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101030304	122	0	0	0	4	4	4	0	1	0	0	0	0.6	0.6	0.6	0	0.1	13	2.64	
121101030305	123	0	0	0	1	1	1	0	1	0	0	0	0.15	0.15	0.15	0	0.1	4	0.76	
121101030306	124	0	0	0	1	1	2	0	0	0	0	0	0.15	0.15	0.3	0	0	4	0.83	
121101030401	125	0	0	0	1	1	4	0	0	0	0	0	0.15	0.15	0.6	0	0	6	1.25	
121101030402	126	0	0	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	3	0.63	
121101030403	127	0	0	0	1	1	1	0	0	0	0	0	0.15	0.15	0.15	0	0	3	0.63	
121101030404	128	0	0	0	1	1	0	1	0	0	0	0	0.15	0.15	0	0.15	0	3	0.63	
121101030405	129	0	0	0	3	3	1	0	0	0	0	0	0.45	0.45	0.15	0	0	7	1.46	
121101030501	130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101030502	131	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101030503	132	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42	
121101030504	133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101030505	134	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	1	0.21	
121101030506	135	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42	
121101030507	136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101030601	137	0	0	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	3	0.63	
121101030602	138	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	1	0.21	
121101030603	139	0	0	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	3	0.63	
121101030604	140	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42	
121101030605	141	0	0	0	1	1	0	0	0	0	0	0	0.15	0.15	0	0	0	2	0.42	
121101030606	142	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101030701	143	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101030702	144	0	0	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	3	0.63	
121101030703	145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101030704	146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101030705	147	1	0	0	3	4	4	0	0	0.075	0	0	0.45	0.6	0.6	0	0	12	2.40	
121101040101	148	0	0	0	1	0	3	0	0	0	0	0	0.15	0	0.45	0	0	4	0.83	
121101040102	149	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	1	0.21	
121101040103	150	0	0	0	0	0	3	1	0	0	0	0	0	0	0.45	0.15	0	4	0.83	
121101040104	151	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	1	0.21	
121101040105	152	0	0	0	2	0	2	1	0	0	0	0	0.3	0	0.3	0.15	0	5	1.04	
121101040106	153	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101040107	154	0	0	0	1	1	0	0	0	0	0	0	0.15	0.15	0	0	0	2	0.42	
121101040108	155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101040201	156	0	0	0	2	2	0	0	0	0	0	0	0.3	0.3	0	0	0	4	0.83	
121101040202	157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101040203	158	0	0	0	1	1	0	0	0	0	0	0	0.15	0.15	0	0	0	2	0.42	
121101040204	159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101040205	160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101040301	161	0	1	0	0	0	0	0	0	0	0.075	0	0	0	0	0	0	1	0.10	
121101040302	162	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101040303	163	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101040304	164	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101040305	165	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	4	0.83	
121101040306	166	0	0	0	2	2	0	1	0	0	0	0	0.3	0.3	0	0.15	0	5	1.04	
121101040307	167	0	0	0	2	3	4	0	0	0	0	0	0.3	0.45	0.6	0	0	9	1.88	
121101040308	168	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	1	0.21	
121101040309	169	0	0	0	0	0	2	1	0	0	0	0								







Appendix C6 - HUC-12 Flood Risk Data Score Table

HUC12	Unique ID	Score									Weighted Score										Scaled Score (1-5)
		Historical Property Damage (Flood-Prone Areas)	Historical Property Damage (Agency Data)	Historical Life Loss	Property Damage – Exposure (Buildings)	Property Damage – Vulnerability (Buildings)	Property Damage – Vulnerability (Critical Buildings)	Low Water Crossings	Life Loss (Dams)	Historical Property Damage (Flood-Prone Areas)	Historical Property Damage (Agency Data)	15% Historical Life Loss	15% Property Damage – Exposure (Buildings)	15% Property Damage – Vulnerability (Buildings)	15% Property Damage – Vulnerability (Critical Buildings)	15% Low Water Crossings	10% Life Loss (Dams)	100% Total Score			
121101051201	262	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101051202	263	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	0	0	2	0.42		
121101051203	264	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101051204	265	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101051205	266	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101051206	267	1	0	0	2	0	3	0	0	0.075	0	0	0.3	0	0.45	0	0	6	1.15		
121101060101	268	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101060102	269	0	0	0	2	0	0	1	0	0	0	0	0.3	0	0	0.15	0	3	0.63		
121101060103	270	0	0	0	3	0	0	4	0	0	0	0	0.45	0	0	0.6	0	7	1.46		
121101060104	271	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	1	0.21		
121101060105	272	0	0	0	3	0	1	1	0	0	0	0	0.45	0	0.15	0.15	0	5	1.04		
121101060106	273	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	1	0.21		
121101060107	274	0	0	0	4	0	1	3	0	0	0	0	0.6	0	0.15	0.45	0	8	1.67		
121101060201	275	3	0	0	5	0	3	5	0	0.225	0	0	0.75	0	0.45	0.75	0	16	3.02		
121101060202	276	0	0	0	3	0	4	3	0	0	0	0	0.45	0	0.6	0.45	0	10	2.08		
121101060203	277	0	0	0	4	2	0	4	0	0	0	0	0.6	0.3	0	0.6	0	10	2.08		
121101060204	278	0	0	5	4	3	0	3	0	0	0	0.75	0.6	0.45	0	0.45	0	15	3.13		
121101060205	279	1	0	0	5	3	0	1	0	0.075	0	0	0.75	0.45	0	0.15	0	10	1.98		
121101060206	280	0	0	0	4	4	0	1	0	0	0	0	0.6	0.6	0	0.15	0	9	1.88		
121101060301	281	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	1	0.21		
121101060302	282	0	0	0	4	4	2	0	0	0	0	0	0.6	0.6	0.3	0	0	10	2.08		
121101060303	283	0	0	0	4	4	0	0	0	0	0	0	0.6	0.6	0	0	0	8	1.67		
121101060304	284	0	0	0	3	3	0	0	0	0	0	0	0.45	0.45	0	0	0	6	1.25		
121101060305	285	0	0	0	3	3	1	1	0	0	0	0	0.45	0.45	0.15	0.15	0	8	1.67		
121101060401	286	0	0	0	3	3	5	0	0	0	0	0	0.45	0.45	0.75	0	0	11	2.29		
121101060402	287	0	0	0	2	2	4	1	0	0	0	0	0.3	0.3	0.6	0.15	0	9	1.88		
121101060403	288	0	0	0	2	3	3	0	0	0	0	0	0.3	0.45	0.45	0	0	8	1.67		
121101060404	289	0	0	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	3	0.63		
121101060405	290	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101060501	291	0	0	0	3	1	0	3	0	0	0	0	0.45	0.15	0	0.45	0	7	1.46		
121101060502	292	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101060503	293	0	0	0	1	1	3	0	0	0	0	0	0.15	0.15	0.45	0	0	5	1.04		
121101060504	294	0	0	0	1	1	3	1	0	0	0	0	0.15	0.15	0.45	0.15	0	6	1.25		
121101060505	295	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42		
121101060601	296	0	0	0	2	0	0	3	1	0	0	0	0.3	0	0	0.45	0.1	6	1.18		
121101060602	297	0	0	0	3	0	0	5	0	0	0	0	0.45	0	0	0.75	0	8	1.67		
121101060603	298	0	1	0	4	0	1	5	0	0	0.075	0	0.6	0	0.15	0.75	0	11	2.19		
121101060604	299	0	0	0	2	0	3	3	0	0	0	0	0.3	0	0.45	0.45	0	8	1.67		
121101060605	300	0	0	0	5	0	3	5	0	0	0	0	0.75	0	0.45	0.75	0	13	2.71		
121101060606	301	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	3	0.63		
121101060701	302	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	3	0.63		
121101060702	303	0	0	0	1	0	1	3	0	0	0	0	0.15	0	0.15	0.45	0	5	1.04		
121101060703	304	0	0	0	4	0	2	3	0	0	0	0	0.6	0	0.3	0.45	0	9	1.88		
121101060704	305	0	0	0	0	0	4	1	0	0	0	0	0	0	0.6	0.15	0	5	1.04		
121101060705	306	0	0	0	1	0	4	1	0	0	0	0	0.15	0	0.6	0.15	0	6	1.25		
121101060706	307	0	0	5	0	0	1	1	0	0	0	0.75	0	0	0.15	0.15	0	7	1.46		
121101060801	308	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	4	0.83		
121101060802	309	0	0	0	1	1	1	1	0	0	0	0	0.15	0.15	0.15	0.15	0	4	0.83		
121101060803	310	0	0	0	1	1	1	1	0	0	0	0	0.15	0.15	0.15	0	0	3	0.63		
121101060804	311	0	0	0	2	2	2	0	0	0	0	0	0.3	0.3	0.3	0	0	6	1.25		
121101060805	312	0	0	0	0	0	2	1	0	0	0	0	0	0	0.3	0.15	0	3	0.63		
121101060901	313	0	0	0	5	4	3	5	0	0	0	0	0.75	0.6	0.45	0.75	0	17	3.54		
121101060902	314	1	0	0	5	5	5	0	0	0.075	0	0	0.75	0.75	0.75	0	0	16	3.23		
121101060903	315	0	0	0	5	5	4	3	0	0	0	0	0.75	0.75	0.6	0.45	0	17	3.54		
121101060904	316	0	0	0	4	4	4	0	0	0	0	0	0.6	0.6	0.6	0	0	12	2.50		
121101060905	317	0	0	0	3	3	0	0	0	0	0	0	0.45	0.45	0	0	0	6	1.25		
121101060906	318	0	0	0	1	1	5	0	0	0	0	0	0.15	0.15	0.75	0	0	7	1.46		
121101061001	319	0	0	0	4	4	1	0	0	0	0	0	0.6	0.6	0.15	0	0	9	1.88		
121101061002	320	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42		
121101061003	321	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	5	1.04		
121101061004	322	0	0	0	2	2	4	0	0	0	0	0	0.3	0.3	0.6	0	0	8	1.67		
121101061005	323	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	1	0.21		
121101061006	324	0	0	0	1	1	1	0	0	0	0	0	0.15	0.15	0.15	0	0	3	0.63		
121101061101	325	0	0	0	0	0	1	3	0	0	0	0	0	0	0.15	0.45	0	4	0.83		
121101061102	326	0	0	0	1	1	2	1	0	0	0	0	0.15	0.15	0.3	0.15	0	5	1.04		
121101061103	327	0	0	0	1	1	4	0	0	0	0	0	0.15	0.15	0.6	0	0	6	1.25		
121101061104	328	0	0	0	1	1	1	0	0	0	0	0	0.15	0.15	0.15	0	0	3	0.63		
121101061105	329	0	0	0	0	0	0	3	5	0	0	0	0	0	0	0.45	0.5	8	1.32		
121101061106	330	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0.6	0.1	5	0.97		
121101061201	331	5	0	0	4	4	5	3	0	0.375	0	0	0.6	0.6	0.75	0.45	0	21	3.85		
121101061202	332	0	0	0	0	0	3	1	0	0	0	0	0	0	0.45	0.15	0	4	0.83		
121101061203	333	0	0	0	0	0	3	1	0	0	0	0	0	0	0.45	0.15	0	4	0.83		
121101061204	334	5	0	0	5	5	2	3	0	0.375	0	0	0.75	0.75	0.3	0.45	0	20	3.65		
121101061205	335	0	0	0	1	1	4	3	0	0	0	0	0.15	0.15	0.6	0.45	0	9	1.88		
121101070101	336	0	0	0	4	0	4	4	1	0	0	0	0.6	0	0.6	0.6	0.1	13	2.64		
121101070102	337	0	0	0	2	0	3	4	0	0	0	0	0.3	0	0.45	0.6	0	9	1.88		
121101070103	338	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101070104	339	0	5	0	3	0	0	3	0	0	0.375	0	0.45	0	0	0.45	0	11	1.77		
121101070105	340	0	1	0	4	0	0	4	0	0	0.075	0	0.6	0	0	0.6	0	9	1.77		
121101070106	341	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	9	1.88		



Appendix C6 - HUC-12 Flood Risk Data Score Table

		Score									Weighted Score									Scaled Score (1-5)
HUC12	Unique ID	Historical Property Damage (Flood-Prone Areas)	Historical Property Damage (Agency Data)	Historical Life Loss	Property Damage – Exposure (Buildings)	Property Damage – Vulnerability (Buildings)	Property Damage – Vulnerability (Critical Buildings)	Low Water Crossings	Life Loss (Dams)	Historical Property Damage (Flood-Prone Areas)	Historical Property Damage (Agency Data)	15% Historical Life Loss	15% Property Damage – Exposure (Buildings)	15% Property Damage – Vulnerability (Buildings)	15% Property Damage – Vulnerability (Critical Buildings)	15% Low Water Crossings	10% Life Loss (Dams)	100% Total Score		
121101070205	349	0	0	0	3	3	5	3	1	0	0	0	0.45	0.45	0.75	0.45	0.1	15	3.06	
121101070206	350	0	0	0	4	0	0	5	0	0	0	0	0.6	0	0	0.75	0	9	1.88	
121101070207	351	4	0	0	3	0	3	4	0	0.3	0	0	0.45	0	0.45	0.6	0	14	2.50	
121101070301	352	0	0	0	2	0	1	1	0	0	0	0	0.3	0	0.15	0.15	0	4	0.83	
121101070302	353	0	3	0	2	0	0	4	0	0	0.225	0	0.3	0	0	0.6	0	9	1.56	
121101070303	354	0	0	0	1	0	0	1	0	0	0	0	0.15	0	0	0.15	0	2	0.42	
121101070304	355	0	0	0	5	0	2	5	0	0	0	0	0.75	0	0.3	0.75	0	12	2.50	
121101070305	356	0	0	0	4	0	4	5	0	0	0	0	0.6	0	0.6	0.75	0	13	2.71	
121101070401	357	0	0	0	1	0	2	4	0	0	0	0	0.15	0	0.3	0.6	0	7	1.46	
121101070402	358	0	0	0	1	0	2	3	0	0	0	0	0.15	0	0.3	0.45	0	6	1.25	
121101070403	359	1	0	0	1	0	1	1	0	0.075	0	0	0.15	0	0.15	0.15	0	4	0.73	
121101070404	360	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	1	0.21	
121101070405	361	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101070406	362	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	1	0.21	
121101070407	363	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	1	0.21	
121101080101	364	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	4	0.83	
121101080102	365	1	0	0	4	4	5	3	0	0.075	0	0	0.6	0.6	0.75	0.45	0	17	3.44	
121101080103	366	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	4	0.83	
121101080104	367	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	4	0.83	
121101080105	368	0	0	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	3	0.63	
121101080106	369	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101080201	370	0	0	0	1	1	1	0	0	0	0	0	0.15	0.15	0.15	0	0	3	0.63	
121101080202	371	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42	
121101080203	372	0	0	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	3	0.63	
121101080204	373	0	0	0	0	0	5	1	0	0	0	0	0	0	0.75	0.15	0	6	1.25	
121101080205	374	0	0	0	0	0	4	1	0	0	0	0	0	0	0.6	0.15	0	5	1.04	
121101080301	375	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101080302	376	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101080303	377	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.75	0	0	0.00	
121101080304	378	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101080305	379	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
121101080401	380	0	0	0	1	1	0	0	0	0	0	0	0.15	0.15	0	0	0	2	0.42	
121101080402	381	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	4	0.83	
121101080403	382	0	0	0	3	0	1	0	0	0	0	0	0.45	0	0.15	0	0	4	0.83	
121101080404	383	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	0	0	2	0.42	
121101080405	384	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	5	1.04	
121101080406	385	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	1	0.21	
121101080407	386	0	0	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	3	0.63	
121101080408	387	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	4	0.83	
121101080409	388	0	0	0	3	0	3	0	0	0	0	0	0.45	0	0.45	0	0	6	1.25	
121101080410	389	0	0	0	3	0	4	0	0	0	0	0	0.45	0	0.6	0	0	7	1.46	
121101080501	390	3	0	0	4	0	1	0	0	0.225	0	0	0.6	0	0.15	0	0	8	1.35	
121101080502	391	0	0	0	1	0	4	0	0	0	0	0	0.15	0	0.6	0	0	5	1.04	
121101080503	392	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	4	0.83	
121101080504	393	0	3	0	0	0	4	0	0	0	0.225	0	0	0	0.6	0	0	7	1.15	
121101080505	394	0	0	0	3	0	5	0	0	0	0	0	0.45	0	0.75	0	0	8	1.67	
121101080506	395	4	3	0	4	0	5	0	4	0.3	0.225	0	0.6	0	0.75	0	0.4	20	3.16	
121101090101	396	0	0	0	5	0	5	5	0	0	0	0	0.75	0	0.75	0.75	0	15	3.13	
121101090102	397	0	0	0	4	0	4	5	0	0	0	0	0.6	0	0.6	0.75	0	13	2.71	
121101090103	398	0	0	0	5	0	5	4	0	0	0	0	0.75	0	0.75	0.6	0	14	2.92	
121101090104	399	3	0	0	0	0	5	0	0	0.225	0	0	0	0	0.75	0	0	8	1.35	
121101090105	400	0	0	0	1	1	3	0	0	0	0	0	0.15	0.15	0.45	0	0	5	1.04	
121101090201	401	0	0	0	4	0	4	4	0	0	0	0	0.6	0	0.6	0.6	0	12	2.50	
121101090202	402	1	0	0	3	3	5	1	0	0.075	0	0	0.45	0.45	0.75	0.15	0	13	2.60	
121101090203	403	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	5	1.04	
121101090204	404	1	0	0	2	2	5	0	0	0.075	0	0	0.3	0.3	0.75	0	0	10	1.98	
121101090205	405	0	0	0	1	1	2	0	0	0	0	0	0.15	0.15	0.3	0	0	4	0.83	
121101090301	406	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	5	1.04	
121101090302	407	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42	
121101090303	408	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	4	0.83	
121101090304	409	0	0	0	2	0	3	0	0	0	0	0	0.3	0	0.45	0	0	5	1.04	
121101090305	410	0	0	0	3	0	4	1	0	0	0	0	0.45	0	0.6	0.15	0	8	1.67	
121101090401	411	0	0	0	0	0	4	1	0	0	0	0	0	0	0.6	0.15	0	5	1.04	
121101090402	412	0	0	0	3	0	4	0	0	0	0	0	0.45	0	0.6	0	0	7	1.46	
121101090403	413	0	0	0	3	1	4	0	0	0	0	0	0.45	0.15	0.6	0	0	8	1.67	
121101090404	414	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	0	0	2	0.42	
121101090405	415	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	0	0	2	0.42	
121101090406	416	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	5	1.04	
121101090501	417	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	2	0.42	
121101090502	418	0	0	0	1	0	1	0	0	0	0	0	0.15	0	0.15	0	0	2	0.42	
121101090503	419	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	4	0.83	
121101090504	420	0	0	0	1	1	5	3	1	0	0	0	0.15	0.15	0.75	0.45	0.1	11	2.22	
121101090505	421	0	0	0	2	0	2	0	0	0	0	0	0.3	0	0.3	0	0	4	0.83	
121101100101	422	0	0	0	5	5	4	5	5	0	0	0	0.75	0.75	0.6	0.75	0.5	24	4.65	
121101100102	423	0	0	0	5	4	1	0	0	0	0	0	0.75	0.6	0.15	0	0	10	2.08	
121101100103	424	0	0	0	4	2	0	0	0	0	0	0	0.6	0.3	0	0	0	6	1.25	
121101100104	425	0	1	0	4	4	2	0	0	0	0.075	0	0.6	0.6	0.3	0	0	11	2.19	
121101100105	426	0	0	0	3	0	5	0	0	0	0	0	0.45	0	0.75	0	0	8	1.67	
121101100201	427	0	0	0	3	3	4	0	0	0	0	0	0.45	0.45	0.6	0	0	10	2.08	
121101100202	428	0	0	0	5	4	5	0	0	0	0	0	0.75	0.6	0.75	0	0	14	2.92	
121101100203	429	0	0	0	5	5	5	1	0	0	0	0	0.75	0.75						



Appendix C6 - HUC-12 Flood Risk Data Score Table

		Score									Weighted Score										Scaled Score (1-5)
		Historical Property Damage (Flood-Prone Areas)	Historical Property Damage (Agency Data)	Historical Life Loss	Property Damage – Exposure (Buildings)	Property Damage – Vulnerability (Buildings)	Property Damage – Vulnerability (Critical Buildings)	Low Water Crossings	Life Loss (Dams)	7.5% Historical Property Damage (Flood-Prone Areas)	7.5% Historical Property Damage (Agency Data)	15% Historical Life Loss	15% Property Damage – Exposure (Buildings)	15% Property Damage – Vulnerability (Buildings)	15% Property Damage – Vulnerability (Critical Buildings)	15% Low Water Crossings	10% Life Loss (Dams)	100% Total Score			
HUC12	Unique ID																				
121101100304	436	1	0	0	3	0	3	4	0	0.075	0	0	0.45	0	0.45	0.6	0	11	2.19		
121101100305	437	3	0	0	2	0	5	1	0	0.225	0	0	0.3	0	0.75	0.15	0	11	1.98		
121101100306	438	0	0	0	2	0	5	0	0	0	0	0	0.3	0	0.75	0	0	7	1.46		
121101100307	439	0	0	0	3	0	5	0	0	0	0	0	0.45	0	0.75	0	0	8	1.67		
121101100308	440	0	2	0	4	0	5	3	0	0	0.15	0	0.6	0	0.75	0.45	0	14	2.71		
121101100401	441	0	0	0	2	0	5	0	0	0	0	0	0.3	0	0.75	0	0	7	1.46		
121101100402	442	0	0	0	4	4	5	1	0	0	0	0	0.6	0.6	0.75	0.15	0	14	2.92		
121101100403	443	0	0	0	4	4	3	1	1	0	0	0	0.6	0.6	0.45	0.15	0.1	13	2.64		
121101100404	444	0	0	0	1	1	1	0	0	0	0	0	0.15	0.15	0.15	0	0	3	0.63		
121101100405	445	0	0	0	3	4	0	0	0	0	0	0	0.45	0.6	0	0	0	7	1.46		
121101100406	446	0	0	0	1	1	5	0	0	0	0	0	0.15	0.15	0.75	0	0	7	1.46		
121101100407	447	0	0	0	3	3	0	0	0	0	0	0	0.45	0.45	0	0	0	6	1.25		
121101100408	448	0	0	0	1	1	5	0	0	0	0	0	0.15	0.15	0.75	0	0	7	1.46		
121101100409	449	0	0	0	2	2	0	0	0	0	0	0	0.3	0.3	0	0	0	4	0.83		
121101100501	450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101100502	451	0	1	0	0	0	4	4	0	0	0.075	0	0	0	0.6	0.6	0	9	1.77		
121101100503	452	0	0	0	2	0	3	1	0	0	0	0	0.3	0	0.45	0.15	0	6	1.25		
121101100504	453	0	0	0	1	1	5	0	0	0	0	0	0.15	0.15	0.75	0	0	7	1.46		
121101100505	454	0	0	0	2	0	5	3	0	0	0	0	0.3	0	0.75	0.45	0	10	2.08		
121101100506	455	0	0	0	2	0	2	1	0	0	0	0	0.3	0	0.3	0.15	0	5	1.04		
121101100507	456	0	0	0	1	0	2	0	0	0	0	0	0.15	0	0.3	0	0	3	0.63		
121101110101	457	1	0	0	3	0	2	0	0	0.075	0	0	0.45	0	0.3	0	0	6	1.15		
121101110102	458	0	0	0	1	0	3	3	0	0	0	0	0.15	0	0.45	0.45	0	7	1.46		
121101110103	459	0	0	0	1	0	4	0	0	0	0	0	0.15	0	0.6	0	0	5	1.04		
121101110104	460	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101110105	461	0	0	0	0	0	2	3	0	0	0	0	0	0	0.3	0.45	0	5	1.04		
121101110106	462	0	1	0	3	0	2	0	0	0	0.075	0	0.45	0	0.3	0	0	6	1.15		
121101110201	463	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101110202	464	0	0	0	3	0	3	0	0	0	0	0	0.45	0	0.45	0	0	6	1.25		
121101110203	465	0	0	0	2	0	2	0	0	0	0	0	0.3	0	0.3	0	0	4	0.83		
121101110204	466	1	2	0	4	0	4	0	0	0.075	0.15	0	0.6	0	0.6	0	0	11	1.98		
121101110205	467	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101110206	468	1	0	0	2	0	2	0	0	0.075	0	0	0.3	0	0.3	0	0	5	0.94		
121101110301	469	1	0	0	3	0	2	0	0	0.075	0	0	0.45	0	0.3	0	0	6	1.15		
121101110302	470	0	2	0	4	0	2	0	0	0	0.15	0	0.6	0	0.3	0	0	8	1.46		
121101110303	471	0	0	0	3	0	3	0	0	0	0	0	0.45	0	0.45	0	0	6	1.25		
121101110304	472	0	1	0	5	0	0	0	0	0	0.075	0	0.75	0	0	0	0	6	1.15		
121101110305	473	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	0	0	4	0.83		
121101110401	474	0	0	0	2	0	0	0	0	0	0	0	0.3	0	0	0	0	2	0.42		
121101110402	475	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101110403	476	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101110404	477	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101110405	478	0	0	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	3	0.63		
121101110501	479	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	0	0	1	0.21		
121101110502	480	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	1	0.21		
121101110503	481	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		
121101110504	482	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	0	0	1	0.21		
121101110505	483	0	0	0	4	0	2	0	0	0	0	0	0.6	0	0.3	0	0	6	1.25		
121101110601	484	0	0	0	0	0	1	1	0	0	0	0	0	0	0.15	0.15	0	2	0.42		
121101110602	485	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	0	0	5	1.04		
121101110603	486	0	0	0	5	4	4	0	0	0	0	0	0.75	0.6	0.6	0	0	13	2.71		
121101110604	487	0	0	0	4	0	2	0	0	0	0	0	0.6	0	0.3	0	0	6	1.25		
121101110605	488	0	0	0	5	0	1	0	0	0	0	0	0.75	0	0.15	0	0	6	1.25		
121101110701	489	0	0	0	5	4	0	0	0	0	0	0	0.75	0.6	0	0	0	9	1.88		
121101110702	490	0	5	0	4	4	5	1	1	0	0.375	0	0.6	0.6	0.75	0.15	0.1	20	3.58		
121101110703	491	0	0	0	3	0	1	0	0	0	0	0	0.45	0	0.15	0	0	4	0.83		
121101110704	492	0	5	0	4	0	0	0	0	0	0.375	0	0.6	0	0	0	0	9	1.35		
121101110705	493	1	4	0	5	0	2	0	0	0.075	0.3	0	0.75	0	0.3	0	0	12	1.98		
121101110706	494	0	5	0	3	0	5	1	0	0	0.375	0	0.45	0	0.75	0.15	0	14	2.40		
121101110707	495	4	1	0	5	4	5	0	0	0.3	0.075	0	0.75	0.6	0.75	0	0	19	3.44		
121102010001	496	1	0	0	4	4	4	0	0	0.075	0	0	0.6	0.6	0.6	0	0	13	2.60		
121102010002	497	1	4	0	5	0	5	0	0	0.075	0.3	0	0.75	0	0.75	0	0	15	2.60		
121102010003	498	5	4	0	5	0	5	0	1	0.375	0.3	0	0.75	0	0.75	0	0.1	20	3.16		
121102010004	499	0	0	0	4	5	5	0	0	0	0	0	0.6	0.75	0.75	0	0	14	2.92		
121102010005	500	0	0	0	3	0	0	0	0	0	0	0	0.45	0	0	0	0	3	0.63		
121102020101	501	0	0	0	5	5	5	3	0	0	0	0	0.75	0.75	0.75	0.45	0	18	3.75		





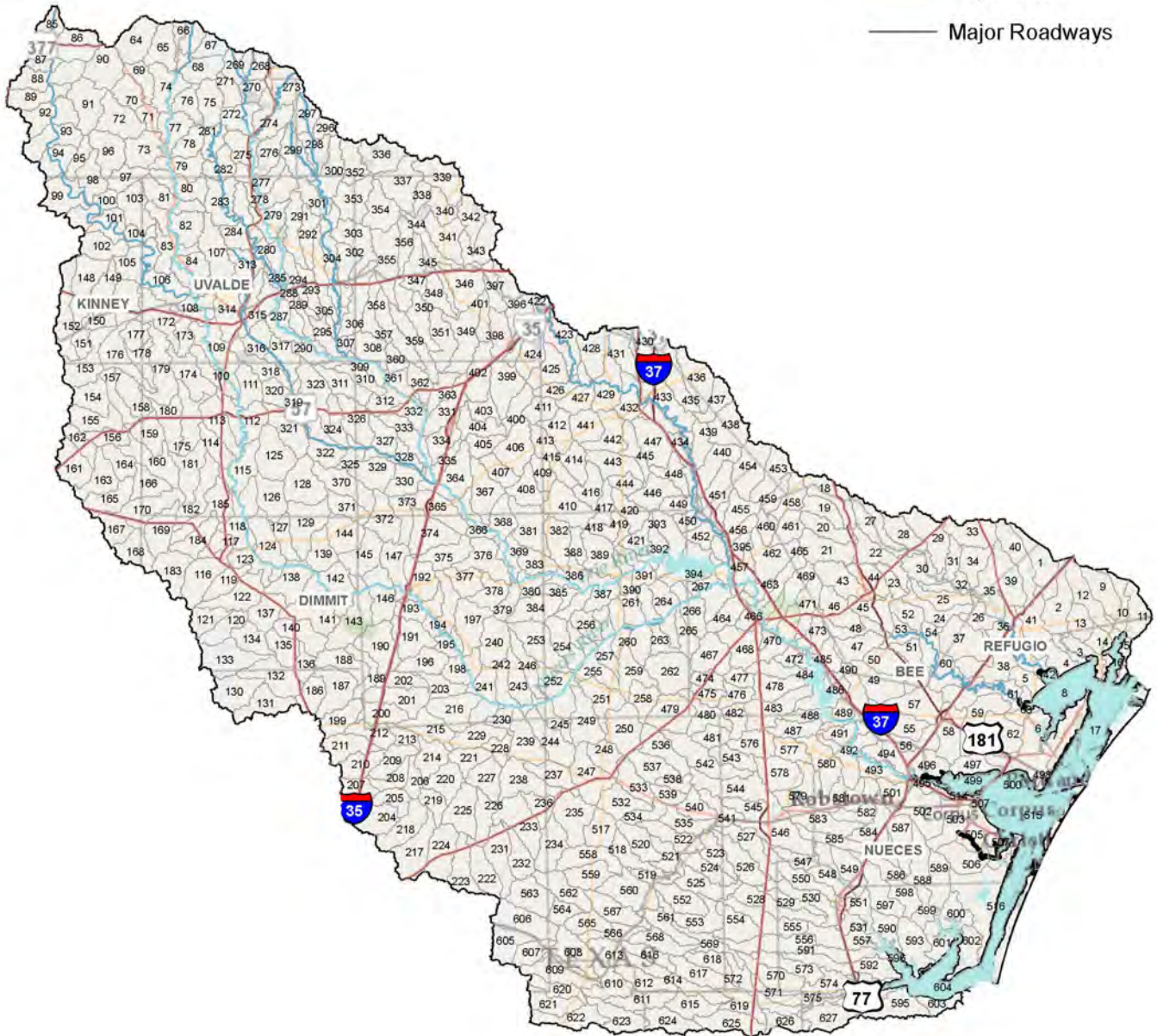


Appendix C6 - HUC-12 Flood Risk Data Score Table

HUC12	Unique ID	Score								Weighted Score									Scaled Score (1-5)
		Historical Property Damage (Flood-Prone Areas)	Historical Property Damage (Agency Data)	Historical Life Loss	Property Damage – Exposure (Buildings)	Property Damage – Vulnerability (Buildings)	Property Damage – Vulnerability (Critical Buildings)	Low Water Crossings	Life Loss (Dams)	7.5% Historical Property Damage (Flood-Prone Areas)	7.5% Historical Property Damage (Agency Data)	15% Historical Life Loss	15% Property Damage – Exposure (Buildings)	15% Property Damage – Vulnerability (Buildings)	15% Property Damage – Vulnerability (Critical Buildings)	15% Low Water Crossings	10% Life Loss (Dams)	100% Total Score	
121102060205	610	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
121102060206	611	0	0	0	2	3	0	0	0	0	0	0	0.3	0.45	0	0	0	5	1.04
121102060301	612	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
121102060302	613	0	0	0	0	0	5	0	0	0	0	0	0	0	0.75	0	0	5	1.04
121102060303	614	0	0	0	0	0	4	0	0	0	0	0	0	0	0.6	0	0	4	0.83
121102060304	615	0	0	0	2	2	0	0	0	0	0	0	0.3	0.3	0	0	0	4	0.83
121102060401	616	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	1	0.21
121102060402	617	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15	0	0	1	0.21
121102060403	618	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
121102060404	619	0	3	0	5	5	5	4	0	0	0.225	0	0.75	0.75	0.75	0.6	0	22	4.27
121102060405	620	0	0	0	1	1	0	0	0	0	0	0	0.15	0.15	0	0	0	2	0.42
121102060406	621	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
121102060501	622	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
121102060502	623	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
121102060405	624	0	0	0	3	3	0	0	0	0	0	0	0.45	0.45	0	0	0	6	1.25
121102060406	625	0	0	0	1	1	2	0	0	0	0	0	0.15	0.15	0.3	0	0	4	0.83
121102060501	626	0	0	0	1	1	1	0	0	0	0	0	0.15	0.15	0.15	0	0	3	0.63
121102060502	627	0	0	0	1	1	1	0	0	0	0	0	0.15	0.15	0.15	0	0	3	0.63

LEGEND

-  Watersheds\_Unique\_ID
-  Region 13 Boundary
-  Counties
-  Major Rivers
-  Major Roadways



0 Miles 30

## Appendix C7 – List of Removed Flood Mitigation Actions

List of Flood Management Projects (FMPs) Removed								
FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost (\$)
44	COASTAL BEND MITIGATION ACTION PLAN - AR-02	Proceed with acquisition of easements to permit implementation of Drainage Master Plan. Six priority drainage projects have been identified in the Drainage Master Plan to reduce repeated flooding in poorly drained areas of the county. Funding Needed.	The project lacks important information to pass the screening	Aransas				
45	COASTAL BEND MITIGATION ACTION PLAN - AR-03	The City of Rockport recently completed a Master Drainage Plan for the Live Oak Peninsula, which has also been adopted by the Town of Fulton. The City of Rockport has also recently completed a \$2.7 million drainage improvement project in south Rockport. As new street projects arise in the future, they will be built in accordance with the requirements of the Master Plan, to ensure that flooding is minimized.	The project lacks important information to pass the screening	Aransas				
46	COASTAL BEND MITIGATION ACTION PLAN - AR-04	Coastal erosion along the shoreline of Aransas Bay is threatening to undermine local roadways and recreational areas. A strategic plan to address this issue has been developed and adopted by the participating jurisdictions. The success of this project is only limited by availability of funding. There isa need to raise the grade of the roads in some areas. There are miles of public bay access and the potential to develop this area in a very nice fashion is quite great. The affected shoreline has been divided into 6 critical areas and prioritized.Priority 1: Broadway along Little Bay (City of Rockport)Priority 2: Fulton Beach Road, south of Fulton Harbor (City of Rockport)Priority 3: Fulton Beach Road, north of Fulton Harbor (Town of Fulton, Aransas County)Priority 4: Water Street (City of Rockport)Priority 5: Bayshore Drive on Key Allegro Island (City of Rockport)Priority 6: Shell Ridge Road (Aransas County)	The project lacks important information to pass the screening	Aransas				5000000 - 25000000
197	Texas Coastal Resiliency Master Plan - R3-6	Under this project, approximately 1 mile of breakwaters would be installed along Lamar Beach Road, from Main Street to 12th Street in Aransas County. The project also would include regrading and flling along the shoreline, and marsh planting to establish a living shoreline system	This project is already in progress or completed.	Aransas			Aransas County, Aransas County Navigation District	\$ 3,500,000.00
198	Texas Coastal Resiliency Master Plan - R3-8	Newcomb’s Point is located northeast of Copano Bay. This project would place shoreline stabilization at Newcomb’s Point to help protect the valuable habitat from threats of erosion. Potential solutions could include creating a living shoreline that would protect the shoreline from erosion, such as a semi-submerged breakwater with vegetation behind it to allow the shoreline to accrete and stabilize natural	This project is already in progress or completed.	Aransas			Texas Parks & Wildlife Department	\$ 2,700,000.00
207	Tule Creek Watershed Project Report - 7.1.1 Area 1: Mesquite By-pass	The mesquite by-pass project is primarily a drainage and flood control plan that will divert 25 percent of the total Tule Creek Watershed area to a new Aransas Bay Outfall. This project will require approx. 3,200 feet of 5x5 box culvert to be installed within the Mesquite Street ROW.	The project is no longer wanted by the stakeholder per our last conversation	Aransas			TCEQ	\$ 1,600,000.00
208	Tule Creek Watershed Project Report - 7.1.2 Area 2: Tule Creek West Sediment pond and habitat Enhancement	This project is located in a position that will enable capture of most flows and sediment from the watershed before discharge into Little Bay. The pond will emphasize sediment control should be placed more or less on-line but so as to avoid changes to flood and drainage control.	The project lacks important information to pass the screening	Aransas			TCEQ	\$ 650,000.00

**List of Flood Management Projects (FMPs) Removed**

<b>FMP ID</b>	<b>FMP Name</b>	<b>Description</b>	<b>Reason to Consider as Infeasible</b>	<b>Counties</b>	<b>Project Area (sqmi)</b>	<b>Flood Risk Type</b>	<b>Sponsor</b>	<b>Estimated Project Cost (\$)</b>
209	Tule Creek Watershed Project Report - 7.1.3 Area 3: Upper Tule Creek West Widening and slope Protection	This project will help significantly reduce one of the leading stormwater pollutants within the Tule Creek Watershed and discharge to little Bay. The vegetative slope protection will help control erosion and sedimentation downstream when combined with a maintenance program designed to also control erosion. It is expected that approx. 100 feet of additional ROW is needed to be dedicated and cleared to accommodate the widening.	The project lacks important information to pass the screening	Aransas			TCEQ	\$ 650,000.00
210	Tule Creek Watershed Project Report - 7.1.4 Area 4: Tule Creek north Retention Pond and Habitat Enhancement	An on-line pond, up to 5 acres, capturing frequent flows from the Railroad ROW tributary as well as the lands to the west should be designed at this location. It is also recommended that an additional 42" pipe be placed adjacent to the existing 42" outfall from the golf course.	The project lacks important information to pass the screening	Aransas			TCEQ	\$ 1,325,000.00
211	Tule Creek Watershed Project Report - 7.1.5 Area 5: Tule Creek East Detention Pond and Marsh Enhancement	This area is located near the downstream part of the watershed, which makes it ideally located from the perspective of providing capture of contaminants before discharge into the Bay. Due to the requirement of constructing a weir and overflow device, this project is hydraulically sensitive and will need careful planning to develop an effective project design and avoid obvious potential risk.	The project lacks important information to pass the screening	Aransas			TCEQ	\$ 925,000.00
112	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #13	St. Charles Bay Shoreline/Lamar Beach Road - the creation of a new habitat will provide erosion protection improvements	This project is already in progress or completed.	Aransas				\$ 3,426,000
113	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #14	Precinct 1/1A- Pinciana/Weeping Willow- Projects 1,2: Surface stormwater conveyance improvements from Weeping Willow Rd to FM1069	This project is already in progress or completed.	Aransas				\$ 605,880
114	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #15	Precinct 4 - Tule Creek- Mesquite Bypass - Project 1: Subsurface drainage system from 12th St (Fulton) to Aransas Bay Reduces the threat of flooding to new and existing buildings and infrastructure by making improvements to the County drainage system	The project is no longer wanted by the stakeholder per our last conversation	Aransas				\$ 1,769,900
115	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #16	Precinct 4 - South Central Lamar Project 1: Surface stormwater conveyance system from Bee tree Circle to Copano Bay with 6-ac stormwater management pond west of SH35. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvements to the County drainage system	This project is already in progress or completed.	Aransas				\$ 160,380
116	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #17	Precinct 1/2 - Griffith St. projects 1,2,3: Surface stormwater conveyance system improvements. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvements to the County drainage system	This project is a duplicate of another project.	Aransas				\$ 591,030
117	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #18	Precinct 1/1A - Palm Harbor - Project 1: Create outfall to Aransas Bay, improvements to surface to subsurface conveyance system, drainage structures under SH35 business. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvements to the County drainage system	This project is already in progress or completed.	Aransas				\$ 400,895
118	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #19	Precinct 4 - Southeast Lamar - Projects 1,2,3: Subsurface conveyance system. Reduces the threat of flooding to new and existing buildings and infrastructure by	This project is already in progress or completed.	Aransas				\$ 239,030
119	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #20	Precinct 2 - Copano Heights - Projects 1,2,3: Surface SW conveyance system improvements from Copano Heights through Bailey Ranch with drainage structures	This project is already in progress or completed.	Aransas				\$ 2,090,550
120	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #21	Precinct 4 - Spanish woods - Projects 1, 2, 3: Surface conveyance system and drainage structures under Sanctuary Drive and Spanish Woods Drive. Reduces the	This project is already in progress or completed.	Aransas				\$ 692,120
121	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #22	Precinct 1/1A - Southwest 1069 - Projects 2, 3: Improve upon inadequate right-of-way width on County roads in this watershed, improve upon undersized structures	This project is already in progress or completed.	Aransas				\$ 1,323,476
122	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #23	Precinct 1/1A - Northeast AP - Project 1. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvements to the County	This project is already in progress or completed.	Aransas				\$ 2,125,200



**List of Flood Management Projects (FMPs) Removed**

<b>FMP ID</b>	<b>FMP Name</b>	<b>Description</b>	<b>Reason to Consider as Infeasible</b>	<b>Counties</b>	<b>Project Area (sqmi)</b>	<b>Flood Risk Type</b>	<b>Sponsor</b>	<b>Estimated Project Cost (\$)</b>
123	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #24	Precinct 4 - Lowering of Picton/Sorenson - Project 5. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvments to the County drainage system	The project is no longer wanted by the stakeholder per our last conversation	Aransas				\$ 114,400
126	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #27	Precinct 3 - West Tule - Pond/Channel Widening - Projects 2, 3. Reduces the threat of flooding to new and existing buildings and infrastructure by making improvments	This project is already in progress or completed.	Aransas				\$ 979,000
128	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #31	Shell Ridge Road - the construction of new habitat will provide erosion protection improvements. Reduces the threat of flooding to new and existing buildings and	This project is already in progress or completed.	Aransas				\$ 2,375,700
129	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #32	Newcomb's Point - the construction of new habitat will provide erosion protection improvements. Reduces the threat of flooding to new and existing	This project is already in progress or completed.	Aransas				\$ 3,028,500
131	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #40	Develop and adopt a stormwater master plan	This project is already in progress or completed.	Aransas				\$ 2,500
134	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #50	Update and improve sea gates that protect the city and harbor	This project is a duplicate of another project.	Aransas				\$ 1,000,000
135	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #53	Design and implement a coastal erosion study to identify projects	The project lacks important information to pass the	Aransas				\$ 2,500
136	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #55	Update stormwater master plan	This project is a duplicate of another project.	Aransas				\$ 2,500
138	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #59	Stormwater Crossing at FM 1781 - Upgrade/replacement of box culverts to accommodate growth	This project is already funded.	Aransas				\$ 171,248
139	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #60	Master Plan - Drainage Improvements - Project 1 - SH 35 BUS - Traylor Ave & Tule Park Dr.	This project is already funded.	Aransas				\$ 996,175
140	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #61	Master Plan - Drainage Improvements - Project 2 - SH 35 BUS - Enterprise & Maple	This project is already funded.	Aransas				\$ 540,798
142	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #63	Master Plan - Drainage Improvements - Project 4 - Market St (FM1069) at SH 35 BUS	This project is already funded.	Aransas				\$ 791,725
143	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #64	Master Plan - Drainage Improvements - Project 5 - Market St (FM1069) at Burton & Kossuth	This project is already funded.	Aransas				\$ 3,135,881
144	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #65	Master Plan - Drainage Improvements - Project 7 - Market St (FM1069) at Church St (Loop 70)	This project is already in progress or completed.	Aransas				\$ 349,414
145	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #66	Master Plan - Drainage Improvements - Project 8 - Pearl St (FM2165) at Orleans & Laure	This project is already in progress or completed.	Aransas				\$ 2,813,827
146	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #68	RCC Lakes - removal of sediment for drainage improvements	This project is a duplicate of another project.	Aransas				\$ 376,800
147	Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan - Action #73	Repair outfalls of pump station that pump into Aransas Bay	This project is a duplicate of another project.	Aransas				\$ 2,000,000
148	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.1.d	Incorporate higher floodplain management standards into City of aransas Pass comprehensive plan update.	The project is no longer wanted by the stakeholder per our last conversation	Aransas				\$ 76,754
149	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.1.e	Incorporate higher floodplain management standards into City of Rockport comprehensive plan update.	This project is already in progress or completed.	Aransas				
150	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.1.f	Incorporate higher floodplain management standards into Aransas County hazard Mitigation Action plan update	This project is already in progress or completed.	Aransas				
151	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.1.b	Develop a joint floodplain management and awareness website with all jurisdictions.	This project is a duplicate of another project.	Aransas				



**List of Flood Management Projects (FMPs) Removed**

<b>FMP ID</b>	<b>FMP Name</b>	<b>Description</b>	<b>Reason to Consider as Infeasible</b>	<b>Counties</b>	<b>Project Area (sqmi)</b>	<b>Flood Risk Type</b>	<b>Sponsor</b>	<b>Estimated Project Cost (\$)</b>
152	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.1.c	Publish informational flood articles in city and county newsletters	The project lacks important information to pass the screening	Aransas				
154	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.1.h	Send informational mailers to repetitive loss property owners about buyouts and other mitigation options.	This project is already in progress or completed.	Aransas				
155	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 4.1.b	Each jurisdiction will continue ongoing maintenance of drainage pipes, culverts, and swales until the county-wide master plan is approved and implementation can begin.	The project is no longer wanted by the stakeholder per our last conversation	Aransas				
5	Others (Flood Prevention/Planning Study, LOMR etc)	GBRA Hazard Mitigation Plan Jurisdiction	This project is already funded.	Aransas, Bandera, Bexar, Calhoun, Goliad, Karnes, Kerr, Refugio, San	731.72		TWDB FIF	\$ 78,500
10	Drainage Improvements	Stormwater Pump Station #3 (Euclid) - Aransas Pass	This project is already funded.	Aransas, Nueces, San Patricio	4.88		TWDB FIF	\$ 6,000,000
201	Texas Coastal Resiliency Master Plan - R3-18	This project would acquire additional land within the Guadalupe River and Delta Wildlife Management Area corridor to connect tidal marsh from the upper reaches of Hynes Bay to the Wildlife Management Area in Refugio County.	The project lacks important information to pass the screening	Aransas, Refugio, Nueces			Texas Parks & Wildlife Department	\$ 3,000,000.00
12	Drainage Improvements	Jourdanton Main Street Drainage Project	This project is already in progress or completed.	Atascosa	0.32		TWDB FIF	\$ 1,504,770
32	TXDOT Road Projects	TXDOT Road Project - 007313012	This project is already funded.	Atascosa	0.00018		TXDOT	\$ 5,195,540
34	TXDOT Road Projects	TXDOT Road Project - 085504032	The project is already funded.	Bandera	0.00033		TXDOT	\$ 1,456,894
2	County Wide Drainage Improvements	Medio Creek Flood Control Improvements	This project is already in progress or completed.	Bee	81.64		TWDB FIF	\$ 3,473,313
4	County Wide Early Flood Warning System	Flood Early Warning System – Phase I	This project is already in progress or completed.	Bee	81.64		TWDB FIF	\$ 437,500
15	City of Beeville Low Water Crossings Replacement Project	GLO Disaster Mitigation Project	This project is already funded.	Bee	0.00		TX GLO	\$ 3,844,490
48	COASTAL BEND MITIGATION ACTION PLAN - BE - 04	Build a box culvert with parallel wings on C.R. 628, Low water crossing washes out during heavy rains, causing erosion to road surface.	The project lacks important information to pass the screening	Bee				\$ 70,200
50	COASTAL BEND MITIGATION ACTION PLAN - BE - 06	Poesta and Medio creek drainage project. Complete concrete drainage ditch from east city limits to west city limits. A portion of the project has been completed from Adams street to South Jackson.	This project is a duplicate of another project.	Bee				\$ 900,000
11	Drainage Improvements	Pintas Creek at Sunset Dr. & Virginia St. Drainage Improvements - Alice	This project is already funded.	Jim Wells	1.18		TWDB FIF	\$ 372,500
13	City of Alice: Virginia St. Area Drainage Project	GLO Disaster Mitigation Project	This project is already funded.	Jim Wells	0.00		TX GLO	\$ 6,942,193

**List of Flood Management Projects (FMPs) Removed**

<b>FMP ID</b>	<b>FMP Name</b>	<b>Description</b>	<b>Reason to Consider as Infeasible</b>	<b>Counties</b>	<b>Project Area (sqmi)</b>	<b>Flood Risk Type</b>	<b>Sponsor</b>	<b>Estimated Project Cost (\$)</b>
51	COASTAL BEND MITIGATION ACTION PLAN - JW - 03	Annual maintenance of flood prevention system, including dams, associated levees and stream channels. The dams, levees, and stream channels maintained by Jim Wells county are part of a larger flood prevention system spanning four counties, including Duval to the west, and Nueces and Kleberg to the east. Federally constructed beginning in the early Sixties, responsibility for annual maintenance has been assumed by local authorities. This system is designed to mitigate flooding across large portions of central Jim Wells County, as well as other downstream communities in neighboring counties.	The project is no longer wanted by the stakeholder per our last conversation	Jim Wells				33000 / annually
52	COASTAL BEND MITIGATION ACTION PLAN - JW - 12	Lake Findley is the primary source of water for the city of Alice. The dam requires routine maintenance to ensure it stays in compliance with TCEQ standards for such structures to prevent dam failure and resulting downstream flooding. This project also includes an Operations and Maintenance Manual that is in development.	The project is no longer wanted by the stakeholder per our last conversation	Jim Wells				25000 Annually
53	COASTAL BEND MITIGATION ACTION PLAN - JW - 16	Acquire and install outdoor warning system for the Tecolote Subdivision, residents in this subdivision do not have a means of being warned of imminent hazards.	The project lacks important information to pass the screening	Jim Wells				\$ 85,000
54	COASTAL BEND MITIGATION ACTION PLAN - JW - 17	Acquire and install outdoor warning system for the City of Orange Grove, residents of this city do not have a means of being warned of imminent hazards.	The project lacks important information to pass the screening	Jim Wells				\$ 85,000
55	COASTAL BEND MITIGATION ACTION PLAN - JW - 18	Purchase or lease emergency warning call down system (reverse 911), a call down warning system can alert residents directly by calling their homes or places of business. This capability is especially useful during daylight business hours when individuals may not have access to warning broadcast via television or radio. Although telephonic messages must be concise, they can provide additional instructions as to recommended response actions for all hazardous situations.	The project lacks important information to pass the screening	Jim Wells				30000 annually
17	Drainage Improvements Project	Drainage Improvements Project - Location 1 - Corral Street, Kingsville	This project is already funded.	Kleberg	0.00		TX GLO	\$ 3,333,333
18	Drainage Improvements Project	Drainage Improvements Project - Location 2 - Kenedy Street, Kingsville	This project is already funded.	Kleberg	0.00		TX GLO	\$ 3,333,333
19	Drainage Improvements Project	Drainage Improvements Project - Location 3 - Johnston Street, Kingsville	This project is already funded.	Kleberg	0.00		TX GLO	\$ 3,333,333
56	COASTAL BEND MITIGATION ACTION PLAN - KL - 07	Purchase and install two outdoor warning sirens. There is currently no outdoor warning siren to alert the public to rapid onset hazards, such as tornadoes or hazardous materials.	The project lacks important information to pass the screening	Kleberg				\$ 40,000
57	COASTAL BEND MITIGATION ACTION PLAN - KL - 11	Coastal erosion at Riviera Park on Baffin Bay is threatening to undermine recreational facilities. This is a fairly well-used winter Texan recreation area. The scope would include an offshore breakwater to protect the beach and a fishing pier extension.	The project lacks important information to pass the screening	Kleberg				500000 - 1000000
58	COASTAL BEND MITIGATION ACTION PLAN - KL - 12	This project will allow public works employees to provide more sandbags to the community faster and with less employees.	The project lacks important information to pass the screening	Kleberg				\$ 13,000

List of Flood Management Projects (FMPs) Removed								
FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost (\$)
199	Texas Coastal Resiliency Master Plan - R3-12	This project would protect two rookery islands, Tern Island and Triangle Tree Island, in the Upper Laguna Madre from erosion by constructing protective structures, such as shoreline armoring for each island. This project would be considered Phase 1 and would include feasibility, preliminary engineering, alternatives analysis, final design and permitting. Phase 2 would cover the construction phase. Opportunities to include beneficial use of dredged material during the construction would be pursued	The project lacks important information to pass the screening	Kleberg			Coastal Bend Bays and Estuaries Program, The Nature Conservancy, Audubon Texas, U.S. Fish and Wildlife	\$ 3,600,000.00
202	Texas Coastal Resiliency Master Plan - R3-19	In 2015, Nueces County acquired property on North Padre Island approximately 4 miles southwest of the causeway. There are several ongoing restoration efforts 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 efforts that included input received during public meetings from regulatory agencies, non-governmental organizations and the general public.  The acquired property has three immediate needs: 1. Repairing a large blow out in the dune system. During and after the dune restoration process, data will be collected to inform future repairs. 2. Restoring damaged wetlands from human use activities, such as driving through jurisdictional wetlands. 3. Invasive species control and post-control monitoring and removal. This include Brazilian Pepper Trees and Chinese Tallow Trees	The project lacks important information to pass the screening	Kleberg			Coastal Bend Bays and Estuaries Program, The Nature Conservancy, Texas Parks & Wildlife Department, U.S. Fish and Wildlife Service, U.S. National Park Service, Texas General Land Office, Private Landowners	\$ 500,000.00
36	TXDOT Road Projects	TXDOT Road Project - 001708113	The project is already funded.	La Salle	0.00019		TXDOT	\$ 5,500,000
37	TXDOT Road Projects	TXDOT Road Project - 001708112	The project is already funded.	La Salle	0.00019		TXDOT	\$ 5,500,000
25	TXDOT Road Projects	TXDOT Road Project - 120601020	The project is already funded.	Live Oak	0.00008		TXDOT	\$ 519,596
26	TXDOT Road Projects	TXDOT Road Project - 099103013	The project is already funded.	Live Oak	0.00012		TXDOT	\$ 260,900
30	TXDOT Road Projects	TXDOT Road Project - 120601019	The project is already funded.	Live Oak	0.00052		TXDOT	\$ 905,442
60	COASTAL BEND MITIGATION ACTION PLAN - LO - 10	Augment the outdoor warning system for the City of George West with the purchase and installation of two additional sirens. The City of George West has one 10 hp siren located at the fire station, which is not adequate. The city needs at least two more sirens to warn most of the city. A study by Texas A&M during the late 1970's indicated that at least three-sirens were needed within the City to warn at least 95% of the public.	The project lacks important information to pass the screening	Live Oak				\$ 16,000
61	COASTAL BEND MITIGATION ACTION PLAN - LO - 12	Enhance the City of Three Rivers outdoor warning system to include voice capability. A large refinery, currently owned and operated by Valero, is situated within the City of Three Rivers, where a multi-purpose, outdoor warning siren system is currently implemented. Enhancing the system to include voice capability would permit broadcasting of specific messages, such as public protective actions.	The project lacks important information to pass the screening	Live Oak				\$ 10,000
31	TXDOT Road Projects	TXDOT Road Project - 059502024	The project is already funded.	Medina	0.00015		TXDOT	\$ 2,176,000
33	TXDOT Road Projects	TXDOT Road Project - 084804049	The project is already funded.	Medina	0.00046		TXDOT	\$ 3,332,101
35	TXDOT Road Projects	TXDOT Road Project - 252001015	The project is already funded.	Medina	0.00040		TXDOT	\$ 861,900
38	TXDOT Road Projects	TXDOT Road Project - 264901035	The project is already funded.	Medina	0.00033		TXDOT	\$ 3,784,200
6	Flood Warning System	Nueces County Drainage & Conservation District 2	The project is already funded.	Nueces	11.79		TWDB FIF	\$ 465,500

**List of Flood Management Projects (FMPs) Removed**

<b>FMP ID</b>	<b>FMP Name</b>	<b>Description</b>	<b>Reason to Consider as Infeasible</b>	<b>Counties</b>	<b>Project Area (sqmi)</b>	<b>Flood Risk Type</b>	<b>Sponsor</b>	<b>Estimated Project Cost (\$)</b>
7	County Wide Drainage Improvements	Nueces County Drainage & Conservation District 2 - Casa Blanca Drainage Improvements	This project is already in progress or completed.	Nueces	11.79		TWDB FIF	\$ 809,600
8	County Wide Drainage Improvements	Nueces County Drainage & Conservation District 2 - Bosquez Rd. / Avenue J Drainage Improvements	This project is already in progress or completed.	Nueces	11.79		TWDB FIF	\$ 2,453,716
9	County Wide Drainage Improvements	Nueces County Drainage & Conservation District 2 - Ditch "A" and Bluebonnet Drainage Improvements	This project is already in progress or completed.	Nueces	11.79		TWDB FIF	\$ 1,311,320
24	Downtown Drainage Improvements Phase III - Project A	CoCC Downtown Study	This project is already funded.	Nueces	0.00019			
27	TXDOT Road Projects	TXDOT Road Project - 037310009	The project is already funded.	Nueces	0.00161		TXDOT	\$ 1,500,000
28	TXDOT Road Projects	TXDOT Road Project - 010106095	The project is already funded.	Nueces	0.00099		TXDOT	\$ 800,000,000
29	TXDOT Road Projects	TXDOT Road Project - 037310008	The project is already funded.	Nueces	0.00047		TXDOT	\$ 60,000
43	A Joint Erosion Response Plan for Nueces County and the City of Corpus Christi	The study "A Joint Erosion Response Plan for Nueces County and for the City of Corpus Christi 2012" lays out goals and approaches for erosion control, beach maintenance, improvement of safety, access and enjoyment of beaches, and increased education of residents and visitors about the beaches, it's dangers, and the importance of its maintenance. It would be beneficial to work towards determining a holistic solution to satisfy the goals of erosion control, beach maintenance, and improved beach access, while also providing funding solutions to enable the community to pursue as many of these goals as possible.	The project lacks important information to pass the screening	Nueces				
62	COASTAL BEND MITIGATION ACTION PLAN - NU - 07	Formalize procedures to gain authorized access to an existing regional Call Down system through City of Kingsville/Kleberg.The City of Bishop is located close to the border of Nueces and Kleberg Counties, near the City of Kingsville. Natural and other hazards impacting Bishop are likely to impact Kingsville, and vice versa. Kleberg County has recently entered into an Inter-local Cooperation Agreement with the City of Corpus Christi and Nueces County, operators of the METROCOM center, to obtain authorized access to various warning tools, including a Call Down system. Some expense is involved with maintenance and activation of the system, including long distance telephone charges. The parties have agreed in principle to provide access to the City of Bishop through the Kingsville/Kleberg County agreement. Formal agreement as to who is authorized to activate the system on behalf of Bishop, the specific procedures to be used, and what costs will be incurred remains to be finalized.	The project lacks important information to pass the screening	Nueces				
63	COASTAL BEND MITIGATION ACTION PLAN - NU - 08	Evaluate cost/benefit of implementing an outdoor warning siren system and present recommendations to local officials.No outdoor warningsiren system is currently available within the City of Bishop to alert residents to rapid onset natural hazards such as tornadoes, or other hazardous situation.	The project lacks important information to pass the screening	Nueces				\$ 51,113

**List of Flood Management Projects (FMPs) Removed**

<b>FMP ID</b>	<b>FMP Name</b>	<b>Description</b>	<b>Reason to Consider as Infeasible</b>	<b>Counties</b>	<b>Project Area (sqmi)</b>	<b>Flood Risk Type</b>	<b>Sponsor</b>	<b>Estimated Project Cost (\$)</b>
64	COASTAL BEND MITIGATION ACTION PLAN - NU - 18	A periodic inspection of over 71,400 linear feet (13.5 miles) of storm water runoff conveyance lines during mid-2003 indicated that some sections of the lines needed repairs. The structural integrity and functionality of these outfall lines are critical in preventing flooding and in improving water quality. There are eight major storm water outfalls that convey storm water runoff into Corpus Christi Bay. The purpose of this project is to perform needed repairs along sections of the major outfalls. Typical repairs will include: headwalls, wing walls, isolated structural repairs, damaged lateral lines that penetrate outfall, holes, joints, and spalls.	This project is a duplicate of another project.	Nueces				\$ 2,000,000
65	COASTAL BEND MITIGATION ACTION PLAN - NU - 19	A periodic inspection of over 71,400 linear feet (13.5 miles) of storm water runoff conveyance lines during mid-2003 indicated that that two of the eight major outfalls needed replacement. The structural integrity and functionality of these outfall lines are critical in preventing flooding and in improving water quality. The purpose of this project is to replace the two outfalls: Brawner Proctor, and Gollihar.	This project is a duplicate of another project.	Nueces				\$ 5,000,000
66	COASTAL BEND MITIGATION ACTION PLAN - NU - 20	The purpose of this project is to repair erosion and other damages to major drainage channels as a result of a heavy rain or other severe weather. A number of earthen ditches throughout the City have steep side slope (2:1) which makes them more prone to erosion of stream beds and slopes during a prolong and intense rain event. In order to make improvements which will stabilize the slopes and stream beds of major channels, an allocation of funds is earmarked for this project to be utilized on a priority basis on those ditches where erosion and slope failures becomes a serious and critical problem. The project will generally includes shaping, grading, flattening side slopes, seeding, adding concrete flumes or lined channels, adding storm water appurtenances such as inlets, pipes, and some minor right-of-way acquisitions as necessary.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				\$ 3,000,000
67	COASTAL BEND MITIGATION ACTION PLAN - NU - 21	Having adequate and available drainage ROW is critical to developing drainage infrastructure to meet the demand for orderly growth and development within the City. Adequate ROW helps to prevent/minimize flooding, helps to facilitate maintenance, and allows potential for improving quality of storm water runoff. The purpose of this project is to provide funding for acquiring right-of-way (ROW) where needed in order to implement drainage problem solutions, such as ditch widening, erosion control, extending storm sewers, providing easements, etc. During design, it is often required that additional ROW be provided for implementation of the project.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				\$ 2,000,000
68	COASTAL BEND MITIGATION ACTION PLAN - NU - 22	Flooding in the downtown area is a frequently recurring event, and a major concern for both citizens and businesses. In addition to a variety of private businesses, several local and federal public facilities are located within this area. The existing pumps date from 1948 and are potentially subject to failure. Replacing the pumps will minimize the probability of a future catastrophic failure.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				\$ 800,000
69	COASTAL BEND MITIGATION ACTION PLAN - NU - 27	The Oso Treatment Plant is situated in a location subject to flooding from coastal inundation. The wastewater lift stations are also vulnerable to flooding. The proposed improvements could include structural elevation and/or the installation of dikes, berms or other flood control devices.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				\$ 160,000

**List of Flood Management Projects (FMPs) Removed**

FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost (\$)
70	COASTAL BEND MITIGATION ACTION PLAN - NU - 28	Portions of the Greenwood wastewater treatment plant are located immediately adjacent to the La Volla Creek floodplain. Recent flood events have inundated various process units at the plant. Flood waters have come very close to damaging equipment in the electrical building which is critical to plant operations. This project would provide flood protection for the electrical building and would help to ensure that the plant remains in operation during flood events, and protect public health and welfare.	This project is a duplicate of another project.	Nueces				\$ 90,000
71	COASTAL BEND MITIGATION ACTION PLAN - NU - 29	Lake Corpus Christi, which stores 242,241 acre-feet of water, was dedicated April 26, 1958 with the construction of Wesley Seale Dam. The Lower Nueces River Water Supply District built and owned the reservoir until the bonds were paid off in 1986 and the City of Corpus Christi assumed ownership. Wesley Seale Dam is located approximately 35 miles from Corpus Christi, Texas. This facility is used to store raw water that flows down the Nueces River from the northern part of the watershed. During March 2001, the Wesley Seale Dam north and south spillway stabilization project was completed. This \$22 million project included the installation of special equipment to monitor the stability of the dam structure. This equipment is presently being utilized as part of the City's overall dam monitoring plan. Information included in the program is obtained from equipment and flow measurements from piezometers, extensometers, relief wells, and sand drains. Inspections are conducted on a daily and monthly basis by Water Department staff, with extra inspections occurring during crest gate operation. In addition, formal inspections are conducted annually by an independent engineering firm, and a highly detailed inspection is scheduled for every three years.	This project is a duplicate of another project.	Nueces				200000-300000 annually
73	COASTAL BEND MITIGATION ACTION PLAN - NU - 41	This project pertains to coastal erosion of the bulkheading along the Corpus Christi Ship Channel, and the Municipal Marina. Ship traffic in the channel has consistently eroded the west side of the island. Existing bulk-heading in the Municipal Harbor has been undermined by the tides.	This project is already in progress or completed.	Nueces				\$ 785,000
74	COASTAL BEND MITIGATION ACTION PLAN - NU - 49	Project is permitted and ready to go –just needs funding. Coastal erosion in Corpus Christi Bay is very high and if the project is not done soon, the entire island may erode away and would have to be rebuilt (or abandoned). Sunfish Island is an important bird sanctuary in the Corpus Christi area. An alternatives analysis and engineering design were conducted for Sunfish Island during CEPRA Cycle 2. Construction could not be done due to restrictions during bird nesting season.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				500000 - 1000000
75	COASTAL BEND MITIGATION ACTION PLAN - NU - 50	Prevention of further erosion of shoreline at Cole Park on Corpus Christi Bay through installation of groins and/or breakwaters. Cole Park is a high use park in Corpus Christi. The area behind the bulkhead is eroding and needs to be retrofitted.	This project is already in progress or completed.	Nueces				500000 - 1000000

List of Flood Management Projects (FMPs) Removed								
FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost (\$)
76	COASTAL BEND MITIGATION ACTION PLAN - NU - 53	Nueces County finished a countywide Master Drainage Plan Study and developed the Master Drainage Implementation Plan as a guide for prioritizing and implementing the improvements identified as part of the study.The priorities outlined in the implementation plan are items which will have an immediate impact on storm water management for areas experiencing flooding problems.Nueces County is susceptible to flooding because some of its defined drainage ways and creeks are constricted by inadequate channel capacities, man-made barriers such as road and railroad embankments, irrigation canals, and because its flat topography and low soil permeability create poor drainage and pounding. Implementation Plan for Master Drainage Plan Nueces County, Texas December 2009 identifies major improvements which will be required throughout the county once future development occurs. The recommendations in the study provide a guide for the county in implementing a plan which will reduce flood damages through both structural and non-structural measures. Structural measures include enlarging existing channels, constructing new channels, enlarging bridge openings and constructing flood protection levees. Non structural measures include floodplain regulation, flood proofing, flood forecasting, on-site detention of storm water, clearing existing streams, and buyout and/or relocate structures in existing floodplains.	The project lacks important information to pass the screening	Nueces				\$ 258,587,835
77	COASTAL BEND MITIGATION ACTION PLAN - NU - 55	Residential flood buyout along Nueces River to reduce repetitive losses and potential loss of life attributed to a major flood event or dam failure. Residential development along the river in the unincorporated areas is a patchwork of substandard homes and development well below recommended base elevation for the 100 year floodplain. Most of the property owners are not insured and have had numerous repetitive loses. Additionally, this project will leverage existing partnerships with an interest in maintaining a clean, safe and reliable water supply for the City of Corpus Christi as part of the Nueces River Watershed Protection Plan. The Nueces River Authority, City of Corpus Christi, Texas Commission on Environmental Quality and Coastal Bend Bays and Estuaries Foundation support continued buyouts along the river to maintain open green space and to aid in removing environmentally undesirable structures responsible for runoff pollutants and raw sewage discharges. This program will be multi year and will leverage multiple funding sources and partners. There are currently 66 eligible properties in Nueces County for the Repetitive Flood Claims Grant. Approximately 15 residential properties are located within the unincorporated areas of the county and would be thefirst targeted for participation. Additional properties will be targeted as part of the less restrictive Hazard Mitigation Grant Program. The City of Corpus Christi failed to meet state water quality standards in November 2009 attributed to high levels ofpollutants caused by runoff from heavy rain. As part of the necessary corrective actions, the City partnered to develop the Nueces River Watershed Protection Plan. This project will support the established mission and goals set forth in the plan to createenvironmentally friendly open space.	The project lacks important information to pass the screening	Nueces				\$ 1,000,000

**List of Flood Management Projects (FMPs) Removed**

<b>FMP ID</b>	<b>FMP Name</b>	<b>Description</b>	<b>Reason to Consider as Infeasible</b>	<b>Counties</b>	<b>Project Area (sqmi)</b>	<b>Flood Risk Type</b>	<b>Sponsor</b>	<b>Estimated Project Cost (\$)</b>
78	COASTAL BEND MITIGATION ACTION PLAN - NU - 65	Elevate and re-grade dilapidated roads. Many of the City's roads have sunk significantly and are a contributing factor to many of flood issues throughout the community. Repetitive flood damages have caused maintenance costs to be burdensome on the City. Upgrades from caliche to a more standard road surface would greatly enhance the ability of the road system to tolerate nuisance and reoccurring flooding. The City of Driscoll was first formed as a community in 1904 and was later incorporated as a Class C City in 1951. The City's infrastructure and buildings are very old and is located in an area that is very flat, causing it to be prone to flash floods. Aggressive debris control and flood-proofing is essential to mitigate against flooding and hurricane winds. All citizens and business owners remain concerned about their health and public safety due to continuous flooding. Over the past several years, there have been numerous flood events that have directly affected the City. The Coastal Bend will continue to be susceptible to very heavy rainfall and tropical weather events putting the City in a continuous battle to stay accessible and safe for its citizens. In addition to the 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.	The project lacks important information to pass the screening	Nueces				\$ 8,750,000
156	Nueces County Hazard Mitigation - Corpus Christi Action #1	Seawall capital Improvement Project for routine maintenance and restoration.	This project is already in progress or completed.	Nueces				\$ 5,500,000
157	Nueces County Hazard Mitigation - Corpus Christi Action #2	Construction of a new bulkhead in Corpus Christi Bay along the south side shoreline of Corpus Christi.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				\$ 10,500,000
158	Nueces County Hazard Mitigation - Corpus Christi Action #3	Make improvements to the Salt Flat Levee System	This project is already in progress or completed.	Nueces				\$ 3,000,000
159	Nueces County Hazard Mitigation - Corpus Christi Action #4	Make improvements to Power Street Pump Station	This project is a duplicate of another project.	Nueces				\$ 5,500,000
160	Nueces County Hazard Mitigation - Corpus Christi Action #6	Excavate silt and debris in Drainage Master Channel 31 caused by the erosion on sides and bottom of the Drainage Master Channel 31.  Master Channel 31 was constructed in various phases in conjunction with the development in the area. The side slopes and bottom are severely eroded resulting in poor drainage and encroachment of ditch outside of the City right-of-way. This project will provide critical improvements to restore and improve the drainage profile and include erosion control measures such as side slope stabilization, soil treatment, vegetative cover and other best management practices. This project is planned in multiple phases as funding allows.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				\$ 2,819,800



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161	Nueces County Hazard Mitigation - Corpus Christi Action #7	<p>Improvements to side slopes on Schanen Ditch to eliminate erosion problems.</p> <p>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.</p>	The project is no longer wanted by the stakeholder per our last conversation	Nueces				\$ 2,756,100
162	Nueces County Hazard Mitigation - Corpus Christi Action #8	This project will involve the improvement of La Volla Creek that crosses SH 357 (Saratoga Blvd). The project will provide 100-year capacity for conveyance to the Oso Creek. Phase 1 Channel improvements include the removal of vegetation from the channel North of Saratoga Boulevard and channel widening South of Saratoga Boulevard.	This project is already in progress or completed.	Nueces				\$ 4,152,800
163	Nueces County Hazard Mitigation - Corpus Christi Action #13	<p>Make improvements to the instrumentation system at Wesley Seale Dam.</p> <p>This project provides for improvements to the original instrumentation system including annual safety inspection, integration with O.N. Stevens WTP process controls, The Howell-Bunger Valve, the downstream sluice gates, and the dewatering system, in response to previous inspections and priority investment recommendations into the system. This project will protect the integrity of the Wesley Seale Dam system (1957), to provide for proper inspection and updated regulatory reports per TCEQ.</p>	This project is already in progress or completed.	Nueces				\$ 5,850,600
164	Nueces County Hazard Mitigation - Corpus Christi Action #15	<p>Make improvements to the side seals on the Wesley Seale Dam Spillway to maintain the spillway's integrity.</p> <p>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.</p>	This project is already in progress or completed.	Nueces				\$ 22,800,000
165	Nueces County Hazard Mitigation - Corpus Christi Action #16	<p>Build a floodwall along Corpus Christi Bay at the Science and Natural History Museum.</p> <p>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.</p>	This project is already in progress or completed.	Nueces				\$ 350,000,000

List of Flood Management Projects (FMPs) Removed								
FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost (\$)
166	Nueces County Hazard Mitigation - Corpus Christi Action #17	<p>Make improvements to the erosion on sides and bottom of Drainage Master Channel 31.</p> <p>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.</p>	This project is already in progress or completed.	Nueces				\$ 3,000,000
167	Nueces County Hazard Mitigation - Corpus Christi Action #24	Coastal Erosion Cole Park: Installation of groins and/or breakwaters to the areas behind the bulkhead to retrofit the areas that are eroding.	This project is already in progress or completed.	Nueces				500000-1000000
203	Texas Coastal Resiliency Master Plan - R3-23	<p>The recommended improvements under this project include:</p> <ul style="list-style-type: none"> <li>• Repairing breaches in the ship channel revetment on northern Mustang Island;</li> <li>• Constructing living shorelines coming of the ship channel near existing rock revetments to protect mangrove habitat;</li> <li>• Rebuilding marsh and wetland habitat;</li> <li>• Repairing the Charlie's Pasture bulkhead that was damaged during Hurricane Harvey;</li> <li>• Repairing public access; and</li> <li>• Permitting this site for beneficial use of dredged material to elevate the land.</li> </ul> <p>There is a potential to leverage Federal Emergency Management Agency-Public Assistance funding for this project. The engineering work has been initiated</p>	This project is already in progress or completed.	Nueces			City of Port Aransas Port of Corpus Christi Texas General Land Ofce	\$ 4,400,000.00
204	Lower Nueces River Watershed Protection Plan - Riparian habitat Conservation Management Measures No. 1	Purchase of Properties	The project lacks important information to pass the screening	Nueces			City of Corpus Christi and Counties	\$ 15,000.00
205	Lower Nueces River Watershed Protection Plan - Riparian habitat Conservation Management Measures No. 2	Acquisitions of Conservation Easements (approximately 970 acres)	The project lacks important information to pass the screening	Nueces		City of Corpus Christi/NRA/		\$ 970,000.00
212	Nueces Delta Preserve Project - Building an educational Estuary Learning Center and Visitor Center	While the first priority of the Nueces Delta Preserve is habitat conservation, this unique location provides South Texas an important opportunity for pubic education and better understanding of the delta's role as the transition zone at the water's edge.This vision includes an Estuary Learning Center and Visitor Center to be built on the Rincon Unit's highest ground near the Union Pacific Railroad and overlooking the delta. An observation tower and hillside amphitheater will be next to the existing classroom. A bunkhouse for visiting researchers will be nearby along with maintenance and support facilities. Hiking trails with improved rest areas and interpretive signage will allow visitors to venture deep into the varied delta habitats.	The project is no longer wanted by the stakeholder per our last conversation	Nueces			CBBEP	

List of Flood Management Projects (FMPs) Removed								
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215	Nueces County Living Breakwater project	The proposed project will improve the resiliency of the County and surrounding communities that sustained damage Hurricane Harvey. Select, key mitigation interventions are needed around the Bay to augment and leverage the range of shoreline stabilization and erosion control projects that have been constructed throughout the Corpus Christi Bay area to protect the communities from storm-related hazards. (This includes budget justification for North Beach, Port Aransas and Ingleside on the Bay).	The project lacks important information to pass the screening	Nueces			City of Corpus Christi, Nueces County, CDBG	\$99,856,213.50
227	Upper Oso Creek/Channel A Robstown-Calallen area	Acquire right of way to widen & deepen existing drainage ditches.	The project lacks important information to pass the screening	Nueces				
228	Upper Oso Creek	Acquire right of way to improve the flow of flood waters from the Robstown/Calallen Area.	The project lacks important information to pass the screening	Nueces				
229	Tributary No. 5	Acquire right of way to improve the flow of flood waters in the London Area.	The project lacks important information to pass the screening	Nueces				
231	Belk Lane Street and Drainage Improvements	Road reconstruction and drainage improvements consisting of driveway culvert replacement and road side ditch regrading.	The project lacks important information to pass the screening	Nueces				
232	Rehabilitation of Ditch at County Road 14F	Topographic and hydrological study for improvement and regrading of Drainage ditch.	The project lacks important information to pass the screening	Nueces				
20	Town of Refugio Wastewater Treatment and Drainage Project	Citywide Wastewater Treatment Plant and Drainage Project	This project is already in progress or completed.	Refugio	0.14		TX GLO	\$ 12,112,636
21	Refugio County Hazard Mitigation Improvements Project	Hazard Mitigation Improvements Project	This project is already in progress or completed.	Refugio	72.27		TX GLO	\$ 6,910,131
1	County Wide Drainage Improvements	Green Lake Outfall System and Gregory Diversion Ditch	This project is already in progress or completed.	San Patricio	65.48		TWDB FIF	\$ 11,841,990
22	San Patricio County Channel Outfall Drainage Improvement Project	Channel Outfall Drainage Improvement Project - Location 1 - Taft Site	This project is already funded.	San Patricio	0.14		TX GLO	\$ 7,717,591
23	San Patricio County Channel Outfall Drainage Improvement Project	Channel Outfall Drainage Improvement Project - Location 2 - Sinton Site	This project is already funded.	San Patricio	0.25		TX GLO	\$ 7,717,591
80	COASTAL BEND MITIGATION ACTION PLAN - SP-02	Re-Furbish, Flood proof Repetitive Loss Homes damaged by Declared Disasters. San Patricio County obtained monies to complete 40 home rebuilds and has approximately 60 homes which are qualified but has no funding at this time.Many residential structures were damaged by storms in 2002. Insurance was non-existent, or coverage was not provided for by the homeowner, who were either elderly, low-income, or unaware that coverage on normal homeowner's insurance does not provide for flood or wind storm damage.	The project lacks important information to pass the screening	San Patricio				\$ 4,500,000

**List of Flood Management Projects (FMPs) Removed**

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81	COASTAL BEND MITIGATION ACTION PLAN - SP-03	The Nueces River has had three major flood events, two Presidential declarations in 2002, and a non-declared event in 2003. The property is located in the 100 year floodplain, with portions in the floodway. San Patricio County has procured nine properties in the area, 6 in River Estates and 3 in Peaceful Valley through FEMA & ORCA Grants. We are in the process of purchasing one 600 acre parcel through the Coastal Bays and Estuary Program, and 13 tracts through a Texas General Land Office Grant (GLO) in the La Fruita Subdivision on the Nueces River.	The project lacks important information to pass the screening	San Patricio				\$ 20,000,000
82	COASTAL BEND MITIGATION ACTION PLAN - SP-04	The City of Ingleside currently has a warning siren that is out of service. This project is to replace that equipment for the purpose of alerting residents to impending natural and manmade hazards.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				\$ 75,000
83	COASTAL BEND MITIGATION ACTION PLAN - SP-05	Secure drainage right of ways along Avenue A in the area near 4th to 8th Street. This section of Avenue A has historically been inundated by heavy rain events due to poor drainage, cutting off access to area residences.	This project is a duplicate of another project.	San Patricio				
84	COASTAL BEND MITIGATION ACTION PLAN - SP-06	Conduct Engineering drainage study along California Street from West Main to the Kenney Bayou. Secure drainage right of ways to include possible property acquisition and utility relocation. This section of town has historically been inundated by heavy rain events due to poor drainage, cutting off access to area residences.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				
85	COASTAL BEND MITIGATION ACTION PLAN - SP-26	Elevate roadway/construct bridge in city of San Patricio on Nopal street and county road 60A. City has had multiple floods from the Nueces river due to releases from choke canyon and Lake Corpus Christi dams due to tropical storms and heavy rain events.	The project lacks important information to pass the screening	San Patricio				\$ 1,000,000
86	COASTAL BEND MITIGATION ACTION PLAN - SP-29	elevate roadway/construct bridge in city of San Patricio on Nopal street and county road 60B. City has had multiple floods from the Nueces river due to releases from choke canyon and Lake Corpus Christi dams due to tropical storms and heavy rain events.	This project is a duplicate of another project.	San Patricio				\$ 1,000,000
87	COASTAL BEND MITIGATION ACTION PLAN - SP-30	To prevent flood surge (sea gates) at pelican cove by lowering huge metal gates into concrete frames with a 10 ton crane. To prevent rising water into city, sea gates will be placed into these frames at two railroad track openings.	This project is a duplicate of another project.	San Patricio				\$ 250,000
88	San Patricio County Hazard Mitigation Action Plan - San Patricio County, Action #3	Clean and clear out drainage ditches, culverts and easements; Upgrade drainage system to increase capacity and reduce flooding; Utilize Next Door app to encourage area residents to maintain culverts and ditches on private property.	The project lacks important information to pass the screening	San Patricio				\$ 250,000
89	San Patricio County Hazard Mitigation Action Plan - City of Gregory, Action #3	Survey and remove hazardous trees and brush from drainage system.	The project lacks important information to pass the screening	San Patricio				\$ 10,000
90	San Patricio County Hazard Mitigation Action Plan - City of Gregory, Action #5	Clean and clear out drainage ditches, culverts and easements; Upgrade drainage system to increase capacity and reduce flooding; Utilize Next Door app to encourage area residents to maintain culverts and ditches on private property	The project lacks important information to pass the screening	San Patricio				\$ 450,000

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91	San Patricio County Hazard Mitigation Action Plan - City of Gregory, Action #6	"Adopt/update disaster resistant building codes, ordinances and / or subdivision regulations (see comments). (Heat resistant roofing, elevate utilities and equipment/appliances, hail resistant roofing, shatter proof windows, lightning rods, roof strapping, drought tolerant landscaping ,low flow toilets , sprinkler system, fire resistant building materials, insulated pipes, etc.)"	The project lacks important information to pass the screening	San Patricio				\$ 2,000
92	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #1	Obtain and implement an AM Emergency Advisory Radio System for emergency notifications to citizens during extreme events; Purchase and distribute NOAA all hazard radios to critical facilities for early warning.	The project lacks important information to pass the screening	San Patricio				\$ 20,000
93	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #2	Improve drainage, implement drainage right-of-way on California Street.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				\$ 250,000
94	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #6	Adopt and implement a program to regularly clean and repair storm water drains; Upgrade undersized storm water drains to improve drainage and reduce flooding	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				\$ 1,000,000
95	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #8	Develop a hazard resistant municipal complex that will facilitate City Hall functions, Police Department, Municipal Court and an Emergency Operations Center	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				\$ 8,000,000
96	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #12	Implement Avenue B drainage project improvements	This project is already in progress or completed.	San Patricio				\$ 3,700,000
97	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #13	Purchase emergency heavy equipment to facilitate recovery after a significant event.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				\$ 650,000
98	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #14	Upgrade and harden critical communication infrastructure and equipment.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				\$ 500,000
99	San Patricio County Hazard Mitigation Action Plan - City of Ingleside on the Bay, Action #9	Survey and remove hazardous trees and brush from drainage system.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				\$ 10,000
100	San Patricio County Hazard Mitigation Action Plan - City of Ingleside on the Bay, Action #9	Purchase NOAA "All Hazards" radios for early warning and post-event information and place in area schools/businesses/critical facilities.	The project lacks important information to pass the screening	San Patricio				\$ 10,000
101	San Patricio County Hazard Mitigation Action Plan - City of Mathis, Action #1	Install generators with hard-wired quick connections at critical facilities, including lift and pump stations, as deemed necessary; Harden/retrofit critical facilities to protect against hazards (see comments).	The project lacks important information to pass the screening	San Patricio				\$ 500,000
103	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #3	Harden/retrofit critical facilities, including fire, police, and EMS facilities, to protect against hazards (see comments).	The project lacks important information to pass the screening	San Patricio				\$ 1,000,000
104	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #19	Install city-wide warning system as well as phone notification system for all critical facilities including schools.	The project lacks important information to pass the screening	San Patricio				\$ 20,000

**List of Flood Management Projects (FMPs) Removed**

<b>FMP ID</b>	<b>FMP Name</b>	<b>Description</b>	<b>Reason to Consider as Infeasible</b>	<b>Counties</b>	<b>Project Area (sqmi)</b>	<b>Flood Risk Type</b>	<b>Sponsor</b>	<b>Estimated Project Cost (\$)</b>
105	San Patricio County Hazard Mitigation Action Plan - City of Portland, Action #1	Install generators with hard-wired quick connections at critical facilities, including lift and pump stations, as deemed necessary.	The project lacks important information to pass the screening	San Patricio				\$ 275,000
106	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #4	Retrofit police, fire, EMS facilities to hazard-resistant levels (see comments); Install generators with hard-wired quick connections.	The project lacks important information to pass the screening	San Patricio				\$ 1,000,000
107	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #12	Flood-proof sewage treatment plants in flood hazard/low-lying areas; Raise electrical components of sewage lift stations above BFE; Equip sewer manholes with watertight covers and inflow guards.	The project lacks important information to pass the screening	San Patricio				\$ 500,000
109	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #5	Harden/retrofit critical facilities to protect against hazards (see comments). Install generators with hard-wired quick connections.	The project lacks important information to pass the screening	San Patricio				\$ 1,000,000
110	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #7	Adopt and implement a program for clearing debris from bridges, drains and culverts. Clean and repair stormwater drains. Upgrade undersized stormwater drains.	The project lacks important information to pass the screening	San Patricio				\$ 1,000,000
111	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #9	Equip sewer manholes with watertight covers and inflow guards; Raise electrical components of sewage lift stations above BFE.	The project lacks important information to pass the screening	San Patricio				\$ 100,000
206	Nueces Delta Shoreline Erosion Protection	<p>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.</p> <p>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.</p>	This project is a duplicate of another project.	San Patricio			Nation Fish and Wildlife Foundation	\$ 3,328,000.00
216	Dagger island restoration Project	This project will construct a half-mile, nearshore breakwater and beneficially use dredged material to restore an island in order to protect approximately 5,236 acres of coastal habitat, including 2,630 acres of seagrass in Redfish Bay, an area adjacent to Corpus Christi Bay. Additionally, this project will restore approximately 28 acres of coastal wetland habitat and create oyster, invertebrate and fisheries habitat.	The project lacks important information to pass the screening	San Patricio			Texas Parks and Wildlife Department	\$3,824,000.00



List of Flood Management Projects (FMPs) Removed								
FMP ID	FMP Name	Description	Reason to Consider as Infeasible	Counties	Project Area (sqmi)	Flood Risk Type	Sponsor	Estimated Project Cost (\$)
200	Texas Coastal Resiliency Master Plan - R3-15	The project would include the construction of breakwaters along approximately 3,900 linear feet of shoreline at the Nueces River Delta to dissipate wave energy that is causing estuarine wetland loss. This project was permitted by the U.S. Army Corps of Engineers in October 2016 and the project is considered shovel-ready. Coordination is ongoing with the Port of Corpus Christi regarding the possibility of benefcially using dredged material in this area.	This project is a duplicate of another project.	San Patricio, Nueces			Coastal Bend Bays and Estuaries Program, Texas General Land Ofce	\$ 3,500,000.00
39	TXDOT Road Projects	TXDOT Road Project - 003702060	The project is already funded.	Zavala	0.00126		TXDOT	\$ 15,000,000
40	TXDOT Road Projects	TXDOT Road Project - 193702032	The project is already funded.	Zavala	0.00115		TXDOT	\$ 6,886,071
194	Margie, Commissioner Precinct 1- to San Diego	Drainage in Colonias: K-Bar, Alice Acres, and Rancho Allegre (GLO)	The project does not have enough information to be considered as feasible.					\$ 9,800,000.00

**List of Potential Flood Management Evaluations (FMEs) Removed**

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
36	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.1.a	Evaluate current floodplain management regulations in other coastal towns, cities, and counties in order to identify potential areas of improvment for Aransas County jurisdictions.	The project is no longer wanted by the stakeholder per our last conversation	Aransas					
37	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.1.b	Using the information collected in Action 1.1.a, create a plan for how, and when, to integrate potential improvements into existing county and municipality regulations.	The project is no longer wanted by the stakeholder per our last conversation	Aransas					
38	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.1.c	Create a coordinated development flow-chart for Arasas County, the Tow of Fulton, and the City of Rockport floodplain managers.	The project is no longer wanted by the stakeholder per our last conversation	Aransas					
39	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 2.1.a	Evaluate list of repetitive loss propoerties for opportunities to parnter with property owners regarding potential mitigation actions.	The project is already in progress or completed	Aransas					
40	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 2.1.b	Evaluate areas in the floodplain viaable for open space preservation.	The project is already in progress or completed	Aransas					
41	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 2.1.c	Investigate grant opportunities for property buyouts, open space preservations or other flood mitigation measures.	The project is no longer wanted by the stakeholder per our last conversation	Aransas					
42	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 2.1.d	Investigate potential partnerships with local non-profits to purchase high priority areas for public parkland/open space preservation.	The project is already in progress or completed	Aransas					
22	COASTAL BEND MITIGATION ACTION PLAN - JW - 05	Study options for preventing inundation of County Road 303 and the Barbon Estates Subdivision.In heavy rainfall events,County Road 303 becomes inundated, preventing egress from the Barbon Estates subdivision and access to emergency response vehicles. In the past, residents have been stranded for a period of two to three days.	The project is no longer wanted by the stakeholder per our last conversation	Jim Wells				\$20,000	

**List of Potential Flood Management Evaluations (FMEs) Removed**

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
23	COASTAL BEND MITIGATION ACTION PLAN - JW - 11	The City of Alice and Jim Wells County were notified in July 2008 that the San Diego Creek Levee was an unacceptable flood control structure. Since that time the City and County have been moving forward to bring the levee back into compliance by conducting the San Diego Creek Levee Certification study, survey work and clearing. A total of \$93,500.00 has been spent to date from local funds. This project will involve raising the height of the levee to meet the required freeboard for a 100 year flood.	The project is no longer wanted by the stakeholder per our last conversation	Jim Wells				\$850,000	
61	Texas Coastal Resiliency Master Plan - R4-13	This project would create a program to monitor long-term subsidence and sea level rise in the Laguna Madre. While the causes of subsidence are understood in general, they have not been 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, and analyzing Interferometric Synthetic Aperture Radar (InSAR) data. The project would make data publicly accessible to all coastal communities	The project lacks important information to pass the screening	Kenedy, Kleberg, Willacy, cameron			Texas General Land Office	\$500,000	
8	Drainage Master Plan Study	Drainage Master Plan - Location 1 - Kingsville	This project is already in progress or completed.	Kleberg	1.291288	Riverine	TWDB FIF	\$1,360,258	TWDB FIF
9	Drainage Master Plan Study	Drainage Master Plan - Location 2 - Kingsville	This project is already funded.	Kleberg	1.291288	Riverine	TWDB FIF	\$3,600,000	TWDB FIF
10	Drainage Master Plan Study	Drainage Master Plan - Location 3 - Kingsville	This project is already in progress or completed.	Kleberg	1.291288	Riverine	TWDB FIF	\$1,457,419	TWDB FIF
11	Drainage Master Plan Study	Drainage Master Plan - Location 4 - Kingsville	This project is already in progress or completed.	Kleberg	1.291288	Riverine	TWDB FIF	\$1,846,064	TWDB FIF
12	Drainage Master Plan Study	Drainage Master Plan - Location 5 - Kingsville	This project is already funded.	Kleberg	1.291288	Riverine	TWDB FIF	\$7,800,000	TWDB FIF
13	Drainage Master Plan Study	Drainage Master Plan - Location 6 - Kingsville	This project is already funded.	Kleberg	1.291288	Riverine	TWDB FIF	\$230,000	TWDB FIF
14	Drainage Master Plan Study	Drainage Master Plan - Location 7 - Kingsville	This project is already in progress or completed.	Kleberg	1.291288	Riverine	TWDB FIF	\$1,360,258	TWDB FIF

List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
15	Drainage Master Plan Study	Drainage Master Plan - Location 8 - Kingsville	This project is already funded.	Kleberg	1.291288	Riverine	TWDB FIF	\$700,000	TWDB FIF
16	Drainage Master Plan Study	Drainage Master Plan - Location 9 - Kingsville	This project is already funded.	Kleberg	1.291288	Riverine	TWDB FIF	\$5,600,000	TWDB FIF
60	Texas Coastal Resiliency Master Plan - R3-25	The Baffin Bay Watershed Monitoring and Management Plan would guide restoration efforts 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.	The project lacks important information to pass the screening	Kleberg			Coastal Bend Bays and Estuaries Program Texas A&M University-Corpus Christi Texas Water Resources Institute Baffin Bay Stakeholder Group	\$2,500,000	
6	County Wide Drainage Master Plan Study	Nueces County Drainage & Conservation District 2	This project is already funded.	Nueces	11.79478	Riverine	TWDB FIF	\$2,137,500	TWDB FIF
19	Drainage Master Plan Study	Drainage Master Plan Study - Driscoll	This project is already funded.	Nueces	0.106516	Riverine	TWDB FIF	\$150,000	TWDB FIF

List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
25	COASTAL BEND MITIGATION ACTION PLAN - NU - 12	<p>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.</p>	<p>The project is no longer wanted by the stakeholder per our last conversation</p>	Nueces				\$269,000	

List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
26	COASTAL BEND MITIGATION ACTION PLAN - NU - 13	The Nueces River Basin Reconnaissance Study identified a two-way pipeline project between Choke Canyon and Lake Corpus Christi, coupled with the off-channel storage and a high capacity pump station, for the dual purpose of flood control and increased water supply, through reduced channel losses.During the Feasibility Study, analyses will be performed to determine the potential flood damage reduction benefits of this project:a.A review of existing map information of the area along the Lower Nueces River below LCC will be performed to identify areas that could benefit from the potential flood damage reduction potential of the diversion facilities. Records of flood damages associated with historical events will be obtained.b.(Phase 2) A daily flood model to evaluate the downstream flood damage reduction potential in terms of magnitude and frequency for this project will be developed.c.(Phase 2) Analysis will be performed to determine the potential effects of coupling the pipeline with the off-channel storage and a high capacity pump station in order to manage Lake Corpus Christi storage to better control incoming flood flows.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				\$279,000	



List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
27	COASTAL BEND MITIGATION ACTION PLAN - NU - 17	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 to better 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 City b.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 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	This project is a duplicate of another project.	Nueces				\$2,000,000	

List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
28	COASTAL BEND MITIGATION ACTION PLAN - Nueces	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 the City 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 expected to accrue as well. FEMA has notified the City by letter dated July 15, 2004, that its contractor will be contacting the City within the next few months regarding the flood mapping effort. A key FEMA strategy is to form local partnerships for this purpose under the Cooperating Technical Partners program to leverage local resources. In addition to preparation for the contractor visit, the City will evaluate the feasibility of becoming a CTP partner.	This project is already in progress or completed.	Nueces					
43	Nueces County Hazard Mitigation - Corpus Christi Action #9	The Federal Emergency Management Agency's Multi-Hazard Flood Map Modernization Program will update and digitize flood hazard maps across the nation. Most the City of Corpus Christi's 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 expected to accrue as well. The City of Corpus Christi is currently working through the appeals process of the map modernization	This project is already in progress or completed.	Nueces					

**List of Potential Flood Management Evaluations (FMEs) Removed**

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
44	Nueces County Hazard Mitigation - Corpus Christi Action #11	<p>Reservoir in the upper reaches of the Nueces River which would include a pipeline to divert water directly into Choke Canyon Reservoir.</p> <p>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 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</p>	The project is no longer wanted by the stakeholder per our last conversation	Nueces				\$445,000	
45	Nueces County Hazard Mitigation - Corpus Christi Action #19	<p>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 to provide 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.</p>	This project is a duplicate of another project.	Nueces				\$2,447,200	

**List of Potential Flood Management Evaluations (FMEs) Removed**

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
46	Nueces County Hazard Mitigation - Corpus Christi Action #20	Complete a feasibility study of Oso Creek at the confluence of La Volla Creek to determine if any construction projects will help the creek conveyance capacity during high flow events. The drainage profiles of Oso Creek east of the La Volla Creek confluence show several constrictions that impact the base flood elevations upstream. This project will investigate the feasibility of the construction of additional creek conveyance capacity for high flow events. If the investigation shows a significant potential to impact the base flood elevation, then construction will be completed in those areas.	This project is already in progress or completed.	Nueces				\$4,715,400	
47	Nueces County Hazard Mitigation - Corpus Christi Action #23	Map and assess the vulnerabilities the city may face for Coastal Erosion, Expansive Soils, Land Subsidence, and Wildfires.  Improve data and mapping on specific risks for coastal erosion, expansive soils, land subsidence and wildfires. Use GIS to identify and map erosion areas, riparian landslides, 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 hazardous areas.	The project is no longer wanted by the stakeholder per our last conversation	Nueces					
48	Nueces County Hazard Mitigation - Corpus Christi Action #27	Design and implement a dam breach study for dams in Corpus Christi.	This project is already in progress or completed.	Nueces				\$200,000	
62	Indian Point Shoreline Erosion Project	A feasibility study was performed to assess methods to help protect wetlands, seagrass, and other related aquatic and coastal habitat at Indian Point from erosion associated with shoreline retreat. In addition to the benefits of protecting valuable habitat, the project would also provide an increased level of protection to public infrastructure at Indian Point Park including a roadway, parking lot, and pier entrance. This feasibility study is intended as a precursor to development of a U.S. Army Corps of Engineers (USACE) permit application.	The project lacks important information to pass the screening	Nueces				3558000	
1	County Wide Drainage Master Plan Study	Nueces County Regional Drainage Master Plan Study	This project is already in progress or completed.	Nueces, Jim Wells, Kleberg	244.4051	Riverine	TWDB FIF	\$2,137,500	TWDB FIF

List of Potential Flood Management Evaluations (FMEs) Removed

FME ID	FME Name	Description	Reason to consider as Infeasible	Counties	FME Area (sqmi)	Flood Risk Type	Sponsor	Estimated Study Cost	Funding Source
59	Texas Coastal Resiliency Master Plan - R2-20	An adaptive management hydrologic restoration study would look at the interactions of the physical systems that afect the hydrology in Nueces County, as well as the stakeholder interactions in the region. Work has been conducted on Nueces Bay freshwater infows via adaptive management plans of the Senate Bill 3 (80th Texas Legislature, 2007) Environmental Flows Process. Two current studies include: Using Comparative Long-Term Benthic Data for Adaptive Management of Freshwater Infow to Three Estuaries (Colorado-Lavaca, Guadalupe, and Nueces) and Infuence of Freshwater Infow Gradients on Estuarine Nutrient-Phytoplankton Dynamics in the Three Estuaries (Guadalupe, Nueces, and Upper Laguna Madre).	The project lacks important information to pass the screening	Nueces, San Patricio, Aransas			Coastal Bend Bays and Estuaries Program, Texas Commission on Environmental Quality, Texas A&M University-Corpus Christi, Nueces River Authority, City of Corpus Christi, Port of Corpus Christi Authority	\$200,000	
3	County Wide Drainage Master Plan Study	Drainage Master Planning Study - San Patricio County	This project is already in progress or completed.	San Patricio	65.47693	Riverine	TDEM	\$900,000	TDEM
30	San Patricio County Hazard Mitigation Action Plan - City of Ingleside, Action #7	Undertake a comprehensive study of flood risk and flood reduction alternatives with the assistance of the USACE; Implement feasible alternatives for flood reduction.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				\$1,000,000	
33	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #13	Assess and map City of Taft hazard vulnerability.	The project lacks important information to pass the screening	San Patricio				\$50,000	

**List of Flood Management Strategies (FMSs) Removed**

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost (\$)
6	COASTAL BEND MITIGATION ACTION PLAN - AR-05	Aransas County is in the process of developing the Intergrated Stormwater Management Plan (ISWMP). Aransas County has historically experienced flooding problems due to its coastal location and topography. The ISWMP will identify problem areas and recommend improvement projects.	The project is already in progress or completed	Aransas				\$ 900,000
48	Aransas County Texas Multi-Jurisdiscitinal Hazard Mitigation Action Plan - Action #7	design and implement a debris removal program in local drainage systems	The project is already in progress or completed	Aransas				\$ 2,500
49	Aransas County Texas Multi-Jurisdiscitinal Hazard Mitigation Action Plan - Action #6	Buyouts of RL Properties	The project lacks important information to pass the screening	Aransas				\$ 500,000
51	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.3.a	Complete process of entry into the Community Rating System (CRS) to incentivize higher floodplain management standards for the City of Rockport.	The project is already in progress or completed	Aransas				\$ 60,000
52	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.3.b	Complete process of entry into the Community Rating System (CRS) to incentivize higher floodplain management standards for Aransas County.	The project is already in progress or completed	Aransas				\$ 45,000
53	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 1.3.c	Investigate whether CRS is viable for the City of Aransas Pass and the Town of Fulton.	The project lacks important information to pass the screening	Aransas				
55	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 3.2.a	Determine whether any lift stations and pump stations will need generators.	The project lacks important information to pass the screening	Aransas				
56	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 4.1.a	Work across jurisdictions to coordinate drainage/stormwater projects that impact the same watershed or sub-watersheds while working to create a county-wide prioritized, master plan of all flood related projects.	The project is already in progress or completed	Aransas				
57	Aransas County Multi-Jurisdictional Floodplain Managment Plan - Action 4.1.c	Continue to use county resiliency group to investigate potential funding options for erosion protection and habitat restoration.	The project is already in progress or completed	Aransas				



List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost (\$)
4	COASTAL BEND MITIGATION ACTION PLAN - RG-02	Implement 'All Hazards' NOAA Weather Radio (NWR) procedures for dissemination of emergency messages originating with local jurisdictions. The National Weather Service (NWS) will implement a new, centralized point of collection for non-weather related emergency messages broadcast over NWS systems. NWS expects to deploy the All-Hazards Emergency Message Collection System, HazCollect, in the summer and fall of 2005. HazCollect will provide an information technology interface between state and local systems, and the NWS Advanced Weather Interactive Processing System (AWIPS). HazCollect will provide a fast, reliable way to inject messages into the Emergency Alert System (EAS) and NOAA Weather Radio.	The project lacks important information to pass the screening	Aransas, Bee, Jim Wells, Kleberg, Live Oak, Nueces, San Patricio				Low cost activity
5	COASTAL BEND MITIGATION ACTION PLAN - RG-04	Promote public awareness and use of NOAA Weather Radio (NWR) to receive 'All Hazards' warnings by distributing NWR literature, posting information on jurisdiction Web sites, hosting special events, and taking advantage of other opportunities as they arise. The National Weather Service provides weather-related hazards warnings to citizens, both through feeds to commercial media via the Emergency Alert System (EAS), and directly into homes, businesses, schools and other locations through NOAA Weather Radio (NWR). Through the efforts of the Emergency Management programs in both Kleberg and Live Oak counties, broadcast coverage has recently been completed for the Coastal Bend region through installation of transmitters near the communities of Riviera and Three Rivers. These transmitters will also enhance reception of the NWR signals in Jim Wells and Bee counties.	The project lacks important information to pass the screening	Aransas, Bee, Jim Wells, Kleberg, Live Oak, Nueces, San Patricio				Low cost activity

List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost (\$)
7	COASTAL BEND MITIGATION ACTION PLAN - JW - 01	<p>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.</p>	The project is no longer wanted by the stakeholder per our last conversation	Jim Wells				\$ 8,000,000
8	COASTAL BEND MITIGATION ACTION PLAN - JW - 08	<p>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.</p>	The project is no longer wanted by the stakeholder per our last conversation	Jim Wells				
9	COASTAL BEND MITIGATION ACTION PLAN - KL - 04	<p>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.</p>	This project is a duplicate of another project.	Kleberg				\$ 20,000

List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost (\$)
10	COASTAL BEND MITIGATION ACTION PLAN - KL - 05	Coordinate with Texas A&M University -Kingsville to promote campus mitigation activities, and to enhance awareness of the Disaster Resistant University Program. This activity may potentially include hosting a workshop based on the FEMA report, Building a Disaster-Resistant University.The Texas A&M University-Kingsville campus is located within a predominately residential area on the northwest edge of Kingsville. The university has approximately 6000 students with nearly 1,000 faculty and staff. The main campus encompasses 257 acres and has 82 primary buildings including five occupied residence halls and 13 occupied student family apartments. FEMA’s Disaster Resistant University Program is specifically designed to provide assistance for mitigation in the university setting and in the past, has set aside monies from the Pre Disaster Mitigation Competitive grant program for this purpose.	The project lacks important information to pass the screening	Kleberg				
11	COASTAL BEND MITIGATION ACTION PLAN - NU - 11	The City of Bishop is subject to frequent episodes of inland flooding during heavy rainfall events. Nueces County Drainage District #3 is responsible for addressing drainage issues which may have impacts for the City of Bishop; however, there has been a lack of coordinated effort in the past. Additional flood control projects of interest to the City of Bishop include clearing of stream blockage on King Ranch property and the Carreto Creek project, including removal of silt and connection with the flood control project on King Ranch.	The project lacks important information to pass the screening	Nueces				

List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost (\$)
12	COASTAL BEND MITIGATION ACTION PLAN - NU - 24	The Federal Emergency Management Agency (FEMA) Mitigation Division administers the National Flood Insurance Program (NFIP). To encourage participating communities to go beyond the minimum requirements for flood plain management, the Community Rating System (CRS) program classifies communities by awarding points for related activities. Corpus Christi has participated in the CRS program since 1991 and is currently rated as a Class 9 community, entitling its residents to a 5% discount on flood insurance premiums. This project is intended to improve its rating to a Class 8, thereby increasing the premium discount to 10% for Special Flood Hazard Areas (SFHAs).The CRS classes for local communities are based on 18 creditable activities, organized under four categories: (i) Public Information, (ii) Mapping and Regulations, (iii) Flood Damage Reduction, and (iv) Flood Preparedness. Other actions identified in this Mitigation Plan will have a direct bearing on fulfilling CRS requirements to qualify for the higher classification. This activity includes a comprehensive review of eligible activity requirements, identification of additional potential actions, monitoring completion of previously identified actions, and completing the application process.	This project is already in progress or completed.	Nueces				
13	COASTAL BEND MITIGATION ACTION PLAN - NU - 35	Evaluate eligibility for participation in National Flood Insurance Program (NFIP) Community Rating System (CRS) for the purpose of improving CRS rating to qualify policyholders for premium discounts.The City of Port Aransas currently has a rating of 10, which is automatically assigned to all communities participating in the NFIP. In order to qualify for a rating of 9, and entry into the CRS program, sufficient points must be scored in a variety of program areas. This activity is to investigate whether Port Aransas currently can achieve the required score, or can do so with improvement in its program areas.	This project is already funded or complete.	Nueces				

List of Flood Management Strategies (FMSs) Removed

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost (\$)
14	COASTAL BEND MITIGATION ACTION PLAN - NU - 40	Identify opportunities to increase home and business owner awareness of hazards and use of mitigation for private property such as the City Web site and distribution of printed literature.The City of Port Aransas has a City Web site that can be updated to promote mitigation activities by residents and businesses; mitigation literature can be added to other emergency preparedness literature currently distributed annually.	This project is already funded or complete.	Nueces				\$ 1,000
58	Nueces County Hazard Mitigation - Corpus Christi Action #5	The Corpus Christi City Council approved the Storm Water Capital Improvement Program (CIP) for FY99-00 on July 20, 1999 (Ordinance No. 023703). Included were separate projects for drainage studies in specific areas of the City. Theneed to integrate these individual drainage studiesinto a consistent, uniform analysis became evident and was approved in Storm Water CIP for FY00-01, (Ordinance No. 024130). The City's use of master plans that date back to 1946, 1961, 1970, 1982, and 1988 resulted in the use of inconsistent criteria without an adopted level of protection policy. The separate projects are integrated into the FY00-01 Storm Water CIP as a Storm Water Master Plan Project. The Development of a comprehensive, updated, consistent Storm Water Master Plan based on an adopted Storm Water Criteria and Design Manual is necessary to respond to development, environmental issues and to better define and prioritize on going and futuredrainage capital improvement projects. The purposes of this project is as follows: a. Establish drainage criteria that reflects input from the different segments of the community (elected officials, developers, engineers, citizens, planning and zoning) and in the consensus process identify a "level of protection" for the City to be adopted as a standard for the City b. Adopt a drainage criteria and design procedure for designers to use in capital improvement projects and in the subdivision platting process ofresidential and commercial development c. Establish policy statements or guidelines that are responsive to storm water quality, storm water pollution prevention requirements,	This project is already in progress or completed.	Nueces				\$ 4,084,900

**List of Flood Management Strategies (FMSs) Removed**

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost (\$)
59	Nueces County Hazard Mitigation - Corpus Christi Action #10	Corpus Christi has participated in the CRS program since 1991 and is currently rated as a Class 7 community, entitling its residents to a 15% discount on flood insurance premiums. This project is intended to improve its rating to a Class 5, thereby increasing the premium discount by an additional 10% for Special Flood Hazard Areas (SFHAs). Other actions identified in this Mitigation Plan will have a direct bearing on fulfilling CRS requirements to qualify for the higher classification. This activity includes a comprehensive review of eligible activity requirements, identification of additional potential actions, monitoring completion of previously identified actions, and completing the application process.	This project is a duplicate of another project.	Nueces				
60	Nueces County Hazard Mitigation - Corpus Christi Action #18	Utilize the city adopted "Developer Agreement" that the can use with developers to help cover the cost of installing over-sized stormwater drainage.  Under the platting ordinance, the City of Corpus Christi participates with developers on utility construction for over-sized main stormwater lines. These funds may also be used to address development drainage concerns. This project will provide for the City's share of such projects, as necessary, up to the approved amount.	The project is no longer wanted by the stakeholder per our last conversation	Nueces				\$ 3,100,000
61	Nueces County Hazard Mitigation - Corpus Christi Action #21	Insurance Services Office, Inc. (ISO) is an independent organization that administers the Building Code Effectiveness Grading Schedule (BECGS) to assess "the building codes in effect in a particular community and how the community enforces its building codes, with special emphasis on mitigation of losses from natural hazards." The grading can influence the cost of insurance coverage in the community. Since its last assessment, the City of Corpus Christi has adopted the 2015 International Building Code and the 2016 International Residential Code for One and Two Family Dwellings, among others, and should be eligible for an improved grade. This activity includes scheduling a re-assessment and compiling the necessary documentation.	This project is already in progress or completed.	Nueces				



FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost (\$)
62	Nueces County Hazard Mitigation - Corpus Christi Action #22	The City of Corpus Christi has seen multiple hazards occur within the years past. Most residents are heavily informed of what to do during heavy rains, tropical storms and hurricanes. However, there are multiple hazards that are not as frequent. The City will be working towards creating and disseminating a pamphlet(s) that will cover what todo before, during and after the following hazards: Extreme Heat, Lighting, Hailstorm, Hurricane and Tropical Storms, Windstorms, Tornados, Drought, Flood, Dam/Levee Failure, Coastal Erosion, Expansive Soils, Land Subsidence and Wildfires	This project is already in progress or completed.	Nueces				
69	County Road 18 Drainage Improvements	Inspection and Assessment of CR18 Drainage Ditch to evaluate the physical and operational conditions of the drainage system by conducting on-site visual and drone scanning inspections. Generate a report based on these inspections to provide Nueces County with a preliminary assessment report and recommendations that can be utilized to make an informed decision regarding plans and advancements for the improvement of the drainage ditch system.	The project lacks important information to pass the screening	Nueces				
65	Texas Coastal Resiliency Master Plan - R3-26	Under this project, locations in the Coastal Bend area that have been 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.	The project lacks important information to pass the screening	Nueces, San Patricio			Texas Parks & Wildlife Department Coastal Bend Bays and Estuaries Program	\$ 700,000
15	COASTAL BEND MITIGATION ACTION PLAN - SP-13	The City of Portland has no Master Drainage Plan that would guide future development, and prevent new developments from compounding existing drainage problems. This project would develop a Master Drainage Plan for the City of Portland.	The project is no longer wanted by the stakeholder per our last conversation	San Patricio				\$ 40,000
16	COASTAL BEND MITIGATION ACTION PLAN - SP-32	Public needs to know what to expect during a disaster. The city of Aransas Pass will need to promote public awareness by distributing literature, posting information on jurisdiction websites, hosting events and taking advantage of other opportunities as they arise to keep the community informed to save lives.	The project lacks important information to pass the screening	San Patricio				\$ 2,000
18	San Patricio County Hazard Mitigation Action Plan - San Patricio County, County Wide, Action #2	Developandimplementanallhazardseducationprogram.UtilizeFacebook,city/countywebpagesanddistributionofbrochurestoprovideinformationonallhazardsthatcouldimpactthecommunity.Providemitigationmeasurestoreducerriskofdammages,injuryorillness.	The project lacks important information to pass the screening	San Patricio				\$ 2,000

**List of Flood Management Strategies (FMSs) Removed**

<b>FMS ID</b>	<b>FMS Name</b>	<b>Description</b>	<b>Reason to Consider as Infeasible</b>	<b>Counties</b>	<b>Project Area</b>	<b>Flood Risk</b>	<b>Sponsor</b>	<b>Estimated Project Cost (\$)</b>
19	San Patricio County Hazard Mitigation Action Plan - San Patricio County, County Wide, Action #3	Adopt/update disaster resistant building codes, ordinances and / or subdivision regulations (see comments). (Heat resistant roofing, elevate utilities and equipment/appliances, hail resistant roofing, shatter proof windows, lightning rods, roof strapping, drought tolerant landscaping ,low flow toilets , sprinkler system, fire resistant building materials, insulated pipes, etc.)	The project lacks important information to pass the screening	San Patricio				\$ 2,000
20	San Patricio County Hazard Mitigation Action Plan - San Patricio County, County Wide, Action #4	Participate in the Community Rating System.	The project lacks important information to pass the screening	San Patricio				\$ 5,000
22	San Patricio County Hazard Mitigation Action Plan - City of Gregory, Action #1	Develop and implement an all hazards education program. Utilize Facebook, city webpage and distribution of brochures to provide information on all hazards that could impact the community. Provide mitigation measures to reduce risk of damage, injury or illness.	The project lacks important information to pass the screening	San Patricio				\$ 2,000
23	San Patricio County Hazard Mitigation Action Plan - City of Ingleside on the Bay, Action #1	Develop and implement an all hazards education program. Utilize Facebook, city webpage and distribution of brochures to provide information on all hazards that could impact the community. Provide mitigation measures to reduce risk of damages, injury or illness.	The project lacks important information to pass the screening	San Patricio				\$ 2,000
city	San Patricio County Hazard Mitigation Action Plan - City of Mathis, Action #6	Develop and implement an all hazards education program. Utilize Facebook and city webpage to provide information on all hazards that could impact the community. Provide mitigation measures to reduce risk of damages, injury or illness.	The project lacks important information to pass the screening	San Patricio				\$ 2,000
26	San Patricio County Hazard Mitigation Action Plan - City of Mathis, Action #7	Obtain certification by the National Weather Service as “Storm Ready” community; improve emergency management radio coverage and reception; Implement and enhance an area-wide telephone Emergency Notification System (“Reverse 911”).	The project lacks important information to pass the screening	San Patricio				\$ 50,000
27	San Patricio County Hazard Mitigation Action Plan - City of Mathis, Action #10	Install signs prohibiting dumping in streams, ditches, waterways and floodplain areas.	The project lacks important information to pass the screening	San Patricio				\$ 2,000

**List of Flood Management Strategies (FMSs) Removed**

<b>FMS ID</b>	<b>FMS Name</b>	<b>Description</b>	<b>Reason to Consider as Infeasible</b>	<b>Counties</b>	<b>Project Area</b>	<b>Flood Risk</b>	<b>Sponsor</b>	<b>Estimated Project Cost (\$)</b>
28	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #1	Develop and implement an all hazards education program. Utilize Facebook and city webpage to provide information on all hazards that could impact the community. Provide mitigation measures to reduce risk of damages, injury or illness and post information on evacuation routes and procedures.	The project lacks important information to pass the screening	San Patricio				\$ 2,000
29	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #4	Improve emergency management radio coverage and reception; Implement and enhance an area-wide telephone Emergency Notification System ("Reverse 911"); Develop alternative evacuation routes/plans and designate emergency thoroughfares, particularly in areas with limited capacity; Educate citizens on evacuation routes and procedures.	The project lacks important information to pass the screening	San Patricio				\$ 10,000
31	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #12	Update public community facilities to include severe weather action plans and designated tornado shelter areas. Educate public on plans and shelter locations.	The project lacks important information to pass the screening	San Patricio				\$ 2,500
32	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #15	Relocate books, manuals, permits, and other critical government records to the upper floors and/or on shelves above the base flood elevation of the library and records building.	The project lacks important information to pass the screening	San Patricio				\$ 2,500
34	San Patricio County Hazard Mitigation Action Plan - City of Odem, Action #18	Educate city employees on risks associated with natural hazards and measures to prevent injury or loss of life.	The project lacks important information to pass the screening	San Patricio				\$ 2,000
37	San Patricio County Hazard Mitigation Action Plan - City of Portland, Action #7	Develop and implement an all hazards education program. Utilize Facebook and city webpage to provide information on all hazards that could impact the community. Provide mitigation measures to reduce risk of damages, injury or illness and post information on evacuation routes and procedures.	The project lacks important information to pass the screening	San Patricio				\$ 2,000
39	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #3	Develop and implement an all hazards education program; Utilize Facebook, city webpage and distribution of brochures to provide information on all hazards that could impact the community; Provide mitigation measures to reduce risk of damages, injury or illness; Establish a user-friendly database for local residents to access resources for mitigation purposes.	The project lacks important information to pass the screening	San Patricio				\$ 2,000

**List of Flood Management Strategies (FMSs) Removed**

FMS ID	FMS Name	Description	Reason to Consider as Infeasible	Counties	Project Area	Flood Risk	Sponsor	Estimated Project Cost (\$)
40	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #6	Limit development and increase density requirements within hazard areas; Incorporate higher standards for hazard resistance in local application of the building code.	The project lacks important information to pass the screening	San Patricio				\$ 3,000
41	San Patricio County Hazard Mitigation Action Plan - City of Sinton, Action #7	Obtain certification by the National Weather Service as a "Storm Ready" community.	The project lacks important information to pass the screening	San Patricio				\$ 2,000
43	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #1	Develop and implement an all hazards education program. Utilize Facebook and city webpage to provide information on all hazards that could impact the community. Provide mitigation measures to reduce risk of damages, injury or illness.	The project lacks important information to pass the screening	San Patricio				\$ 2,000
44	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #8	Install signs prohibiting dumping in streams, ditches, waterways and floodplain areas.	The project lacks important information to pass the screening	San Patricio				\$ 2,000
45	San Patricio County Hazard Mitigation Action Plan - City of Taft, Action #10	Advertise and promote the availability of flood insurance and availability of the Preferred Risk Policy (PRP); Distribute flood insurance handouts with all permit applications.	The project lacks important information to pass the screening	San Patricio				\$ 2,000
67	Flood Proof Repetitive Loss Homes in San Patricio County	Re-Furbish, Flood proof Repetitive Loss Homes damaged by Declared Disasters. San Patricio County obtained monies to complete 40 home rebuilds and has approximately 60 homes which are qualified but has no funding at this time. Many residential structures were damaged by storms in 2002. Insurance was non-existent, or coverage was not provided for by the homeowner, who were either elderly, low-income, or unaware that coverage on normal homeowner's insurance does not provide for flood or wind storm damage.	The project lacks important information to pass the screening	San Patricio			Office of Community and Rural Areas	\$ 4,500,000
68	Buyout Program in Peaceful Valley	The Nueces River has had three major flood events, two Presidential declarations in 2002, and a non-declared event in 2003. The property is located in the 100 year floodplain, with portions in the floodway. San Patricio County has procured nine properties in the area, 6 in River Estates and 3 in Peaceful Valley through FEMA & ORCA Grants. We are in the process of purchasing one 600 acre parcel through the Coastal Bays and Estuary Program, and 13 tracts through a Texas General Land Office Grant (GLO) in the La Fruita Subdivision on the Nueces River.	The project lacks important information to pass the screening	San Patricio			Potential funding sources include FEMA, ORCA, and GLO	\$ 20,000,000

## Appendix C8 – Supporting Costing Material for Flood Mitigation Actions

Nueces (Region 13) FMEs			
	FME Type	General Description	Scope & Assumptions
1	Watershed Planning – Drainage Master Plans	Supports the development and analysis of hydrologic and hydraulic models to evaluate flood risk within a given jurisdiction, evaluate potential alternatives to mitigate flood risk, and develop capital improvement plans.	Assuming Open Channel DMPs <b>County DMP:</b> Chose to assign a uniform cost of \$500,000 for each county to cover the following <b>Basic Services</b> : 1. Project Management 2. Coordination and Collaboration Work Sessions 3. Data Collection 4. Screening Assessment 5. Targeted H&H Modeling and Alternatives Analysis 6. Technical Report 7. Public Outreach  <b>City DMP:</b> Assign fee based on population (2020 Census) 1. Small (< 25,000) - \$250,000 2. Medium (25,000 to 100,000) - \$500,000 3. Large (100,000+) - \$1,000,000
2	Watershed Planning – Flood Mapping Updates	Promotes the development and/or refinement of detailed flood risk maps to address data gaps and inadequate mapping. Create FEMA mapping in previously unmapped areas and update existing FEMA maps as needed.	Key GIS Factors: • HUC 8 Intersections with County • Stream Miles* (Zone A & Zone X) o 25% of total streams (unmapped and mapped) • FEMA FIRM Panels Basic Services Include: 1. Project Management 2. Topo Data Capture 3. Survey Data 4. Alluvial Fan Data Capture 5. Hydrologic Data Capture 6. Hydraulics Data Capture 7. Coastal Data Capture 8. Floodplain Mapping 9. Technical Report <b>**Important to Note:</b> 1) <i>Revisions might be made for counties that are in more than one region.</i> 2) <i>These costs reflect "develop FEMA mapping" from scratch; therefore, an adjustment will need to be made to for FEMA mapping products that need to be updated.</i>
3	Watershed Planning – Flood Mapping for Dam Failure	Conduct studies to develop dam failure inundation maps and models. Hydrologic studies to determine threat, risk, and potential impacts of flooding from dam failure.	Dam Failure Scope: [\$\$/Dam] 1. Project Management 2. Discovery Data Capture 3. Screening Assessment 4. Detailed Dam Breach Analysis
4	Engineering Project Planning	Evaluation of a proposed project to determine whether implementation would be feasible OR Initial engineering assessment including conceptual design, alternative analysis, and up to 30 percent engineering design.	Where the (assumed) construction cost is available: • Assume FME cost is equivalent to 15% of construction costs. • Where no cost is available, assume study cost range from \$100,000 to \$250,000 based on scope of project as follows: • Localized - \$100,000 • Community - \$150,000 • Citywide - \$200,000 • In excess of Citywide - \$250,000 • When cost estimates were available, project costs were fragmented into "FMP Cost" (Construction) and "FME Cost" (Study) based on the project description and available information. • Where available costing information fragmented the project cost between Construction and Study, "FMP Cost" and "FME Cost" were assigned accordingly. • Where available costing information was not fragmented between Construction and Study costs, project description and supporting documentation was used to determine an appropriate split, explained below: • Where the description/documentation leaned towards Construction (no mention of Study), Study Cost was assumed as 15% of the project cost, and the existing project cost was assumed to be the Construction Cost. • Where the description/documentation leaned towards Study (no mention of Construction), the existing project cost was assumed to be the Study Cost, and the Construction Cost was assumed to be \$0. • Where the description/documentation mentioned both a study and Construction Portion, the existing project cost was split such that 15% was assumed to be for Study, and 85% was assumed to be for Construction.
Notes:			
• Use project cost estimates when available.			
• Where cost estimates are not available, use the above table.			
• In all instances where a cost predating September 2020 is used, costs must be escalated to September 2020. Costs that fall within or after September 2020 may be used without being escalated.			
• Where cost estimates are available, but the year/month of their development is not available, compare the available cost with the assumed cost outlined in the above table, and use the highest of the two.			
• Reference the "Factors" sheet for additional information on accelerating project costs.			
• Reference Appendix 5-2 for calculators associated and additional information associated with cost determination for "Watershed Planning – Flood Mapping Updates" "Watershed Planning – Flood Mapping for Dam Failure".			

FME Costing Table



Nueces (Region 13) FMSs			
	FMS Type	FMS Description/FMS Scope	Assumptions
1	Education and Outreach	1. 'Turn Around Don't Drown' campaign and LWC 2. NFIP program and flood insurance public awareness 3. Public education on flooding	1. Assume a \$50,000 minimum for this group based on similar educational programs. 2. Assume a \$50,000 minimum for this group based on similar educational programs. 3. Assume as follows based on extents of education program: Region Wide - \$100,000 County Wide - \$50,000 City Wide - \$25,000
2	Flood Measurement and Warning	1. Early flood warning system/local warning system 2. Install stream and rain gauges and weather stations 3. LWC flood warning devices, signs, and gates	Assume a minimum of \$250,000 for this group based on <a href="https://texaswaternewsroom.org/pressreleases/2016-08-25_flood.html">https://texaswaternewsroom.org/pressreleases/2016-08-25_flood.html</a>
3	Infrastructure Projects	1. HROM Program 2. Lift station flood-proofing	1. Assume \$35,000,000. 2. Assume \$100,000.
4	Other	1. Debris clearing maintenance program 2. Channel maintenance and erosion control 3. Dam inspection program 4. Levee inspection 5. Establish city parks in low lying areas 6. Implement green infrastructure	1. Assume \$100,000. 2. Assume \$250,000. 3. Assume \$100,000 per dam. (High Level Estimate) 4. Assume \$50,000 a year. (High Level Estimate) 5. Assume \$1,000,000. 6. Assume \$500,000.
5	Property Acquisition and Structural Elevation	1. Acquire high risk and repetitive loss properties 2. Acquire and preserve open space adjacent to floodplain areas	Assume \$5,000,000 minimum to acquire several structures based on <a href="http://nrcsolutions.org/rush-creek-property-acquisition-project-arlington-tx/">http://nrcsolutions.org/rush-creek-property-acquisition-project-arlington-tx/</a>
6	Regulatory and Guidance	1. City floodplain ordinance creation/updates 2. Zoning regulations and Land Use Programs 3. Create a Storm water Management Plan 4. Levy a stormwater fee for developers 5. Floodplain Manager Position / Enforcement of Code and Flood Damage Prevention Ordinances 6. NFIP/CRS participation 7. Region-wide stormwater management manual	1. Assume a \$100,000 minimum for policy/regulations to cover engineering consultant fees. 2. Assume \$100,000 to cover engineering consultant fees. 3. Assume \$300,000 for engineering consultant fees. 4. Assume \$200,000. 5. Assume \$75,000 for a first-year salary based on the top 25% annual salary for a floodplain manager; <a href="https://www.floods.org/career-center/careers-in-floodplain-management/salary-information/">https://www.floods.org/career-center/careers-in-floodplain-management/salary-information/</a> 6. Assume \$100,000 to cover engineering consultant fees and implement projects to increase rating. 7. Assume \$500,000 to cover engineering consultant fees and support communities in their implementation process.
Notes:			
• Use project cost estimates when available.			
• Where cost estimates are not available, use the above table.			
• In all instances where a cost predating September 2020 is used, costs must be accelerated to September 2020. Costs that fall within or after September 2020 may be used without being accelerated.			
• Where cost estimates are available, but the year/month of their development is not available, compare the available cost with the assumed cost outlined in the above table, and use the highest of the two.			
• Reference the "Factors" sheet for additional information on accelerating project costs.			

FMS Costing Table



Year	January	February	March	April	May	June	July	August	September	October	November	December	Avg
2022	0.92	0.91	0.90	0.89									
2021	0.99	0.98	0.98	0.97	0.96	0.95	0.94	0.92	0.92	0.92	0.92	0.92	0.95
2020	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.00	1.00	1.00	0.99	0.99	1.00
2019	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.01	1.01	1.02
2018	1.06	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.03	1.03	1.03	1.04
2017	1.09	1.09	1.08	1.08	1.08	1.07	1.07	1.06	1.06	1.06	1.06	1.06	1.07
2016	1.13	1.13	1.12	1.12	1.11	1.11	1.11	1.11	1.11	1.10	1.10	1.09	1.11
2015	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.14	1.14	1.14	1.13	1.15
2014	1.19	1.19	1.19	1.18	1.17	1.17	1.17	1.17	1.17	1.16	1.16	1.16	1.17
2013	1.22	1.22	1.22	1.21	1.21	1.21	1.20	1.20	1.20	1.19	1.19	1.19	1.20
2012	1.25	1.25	1.24	1.24	1.24	1.24	1.23	1.23	1.23	1.23	1.22	1.22	1.24
2011	1.29	1.28	1.28	1.27	1.27	1.27	1.27	1.27	1.26	1.26	1.25	1.25	1.27
2010	1.33	1.33	1.33	1.33	1.31	1.31	1.30	1.30	1.30	1.29	1.28	1.28	1.31
2009	1.35	1.35	1.35	1.35	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.33	1.34
2008	1.42	1.42	1.42	1.42	1.41	1.40	1.39	1.38	1.34	1.33	1.34	1.34	1.38
2007	1.46	1.46	1.46	1.46	1.45	1.45	1.44	1.44	1.43	1.43	1.42	1.42	1.44
2006	1.50	1.50	1.49	1.49	1.50	1.49	1.49	1.49	1.48	1.46	1.45	1.46	1.48
2005	1.58	1.58	1.57	1.56	1.55	1.55	1.55	1.54	1.53	1.52	1.51	1.50	1.54
2004	1.68	1.68	1.65	1.64	1.63	1.62	1.61	1.60	1.58	1.57	1.57	1.57	1.62
2003	1.75	1.73	1.74	1.73	1.73	1.72	1.72	1.71	1.71	1.70	1.69	1.70	1.72
2002	1.78	1.78	1.77	1.77	1.77	1.76	1.74	1.74	1.75	1.75	1.75	1.75	1.76
2001	1.83	1.83	1.83	1.83	1.83	1.82	1.80	1.80	1.80	1.80	1.79	1.80	1.81
2000	1.88	1.87	1.85	1.85	1.84	1.84	1.85	1.84	1.85	1.84	1.84	1.83	1.85
1999	1.92	1.92	1.92	1.91	1.91	1.90	1.89	1.89	1.88	1.87	1.88	1.88	1.90
1998	1.96	1.96	1.96	1.95	1.96	1.95	1.94	1.94	1.93	1.92	1.92	1.92	1.94
1997	1.99	1.99	2.00	1.98	1.97	1.96	1.96	1.96	1.97	1.97	1.97	1.96	1.97
1996	2.08	2.08	2.08	2.07	2.06	2.05	2.05	2.03	2.02	2.01	2.00	2.00	2.05
1995	2.11	2.11	2.12	2.12	2.12	2.12	2.10	2.09	2.09	2.09	2.08	2.08	2.10
1994	2.15	2.14	2.14	2.13	2.13	2.13	2.13	2.12	2.11	2.11	2.11	2.11	2.13
1993	2.27	2.27	2.25	2.23	2.19	2.19	2.19	2.20	2.19	2.18	2.18	2.17	2.21
1992	2.35	2.35	2.33	2.32	2.32	2.31	2.30	2.29	2.28	2.28	2.27	2.27	2.31
1991	2.41	2.41	2.41	2.41	2.40	2.39	2.37	2.35	2.35	2.35	2.35	2.35	2.38
1990	2.46	2.45	2.45	2.45	2.44	2.43	2.43	2.42	2.41	2.41	2.40	2.41	2.43

1. Multiply project cost by factor that represents the month and year the cost estimate was developed to convert to September 2020 dollars.

Project Cost Escalation Factors

OPINION OF PROBABLE CONSTRUCTION COST - DEVELOP FEMA FIS

PROJECT NAME	Regional Flood Plans	DATE			
CLIENT	Regional Flood Planning Group (RFPG)	GROUP			
FME ID		PM			
ESTIMATED BY		QC CHECKED BY	FNI PROJECT NUMBER		
Jane Doe		XXXX	ABC12345		
ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT MANAGEMENT					
1	Project Management and Meetings	1	LS	\$ 7,029.86	\$ 7,030
DISCOVERY DATA CAPTURE					
2	Data Collection	1	HUC 8	\$ 15,000.00	\$ 15,000.00
3	Data Collection QA/QC	1	LS	\$ 1,500.00	\$ 1,500.00
4	Event Data Capture	1	LS	\$ 750.00	\$ 750.00
ALLUVIAL FAN DATA CAPTURE					
9	High Alluvial Fan Analysis (low)	1	SQ MI	\$ 3,000.00	\$ 3,000.00
10	High Alluvial Fan Analysis (medium)	1	SQ MI	\$ 6,250.00	\$ 6,250.00
11	High Alluvial Fan Analysis (high)	1	SQ MI	\$ 9,500.00	\$ 9,500.00
12	High Alluvial Fan Analysis QA/QC	1	LS	\$ 1,875.00	\$ 1,875.00
HYDROLOGIC DATA CAPTURE					
13	Regression Analyses (low)	1	SQ MI	\$ 450.00	\$ 450.00
14	Regression Analyses (med)	1	SQ MI	\$ 700.00	\$ 700.00
15	Regression Analyses (high)	1	SQ MI	\$ 950.00	\$ 950.00
16	Rainfall-Runoff Analyses (low)	1	SQ MI	\$ 550.00	\$ 550.00
17	Rainfall-Runoff Analyses (medium)	1	SQ MI	\$ 2,300.00	\$ 2,300.00
18	Rainfall-Runoff Analyses (high)	1	SQ MI	\$ 6,600.00	\$ 6,600.00
19	Rainfall-Runoff Analyses QA/QC	1	LS	\$ 189.00	\$ 189.00
HYDRAULICS DATA CAPTURE					
20	Approximate Study (low)	1	RV MI	\$ 50.00	\$ 50.00
21	Approximate Study (medium)	1	RV MI	\$ 125.00	\$ 125.00
22	Approximate Study (high)	1	RV MI	\$ 175.00	\$ 175.00
23	Detailed Study (low)	1	RV MI	\$ 2,500.00	\$ 2,500.00
24	Detailed Study (medium)	1	RV MI	\$ 3,500.00	\$ 3,500.00
25	Detailed Study (high)	1	RV MI	\$ 4,750.00	\$ 4,750.00
26	Floodplain Mapping	6	RV MI	\$ 105.00	\$ 630.00
27	Riverine Workmaps	20	PANEL	\$ 200.00	\$ 4,000.00
28	QA/QC	1	LS	\$ 314.60	\$ 314.60
COASTAL DATA CAPTURE					
29	Floodplain Mapping of Coastal	1	CO MI	\$ 3,000.00	\$ 3,000.00
30	QA/QC	1	LS	\$ 300.00	\$ 300.00
FLOODPLAIN MAPPING DATA CAPTURE					
31	Redelineation (low)	1	RV MI	\$ 200.00	\$ 200.00
32	Redelineation (medium)	1	RV MI	\$ 350.00	\$ 350.00
33	Redelineation (high)	1	RV MI	\$ 550.00	\$ 550.00
34	Redelineation QA/QC	3	RV MI	\$ 80.00	\$ 240.00
FINAL DELIVERABLES					
35	Technical Report	1	LS	\$ 7,029.86	\$ 7,029.86
36	Technical Report QC	1	LS	\$ 3,514.93	\$ 3,514.93
SUBTOTAL				\$	87,873
CONTINGENCY				30%	\$ 27,000
SUBTOTAL				\$	115,000
SURVEY DATA CAPTURE				5%	\$ 6,000
PROJECT TOTAL (2021 COSTS)				\$	121,000
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.					
NOTES:					
1. FNI OPCC classified as an AACE Class 4 Estimate with accuracy range of -20 to +30.					
IMPORTANT NOTES / ASSUMPTIONS:					
The highlighted units (ie: HUC 8, SQ MI, RIV MI) are all values pulled from the GIS effort.					

FORM SETUP / QC REVIEW COMMENTS

INSTRUCTIONS

Enter Pricing and Quantities using the sections to the right. Expand/collapse each section by clicking on the + or - button at the top.

ENTER COMMENTS / QC REVIEW COMMENTS

Note base year of costs in OPCC

Determine and Input Cost Escalation Factor Used

Note year costs escalated to in parenthesis

FORM SETUP / QC REVIEW COMMENTS



PRICING SECTION

INSTRUCTIONS

1. Unit Prices - enter the Detailed Unit Price Breakdown for each line item OR overwrite formula to enter specific Unit Price to use.

2. Contingency - if desired apply a contingency factor to increase the Unit Prices either at an Individual line item level or for all unit prices.

3. Location Factor - select state to adjust unit prices based on location.

1.00

LOCATION MULTIPLIER

1.00

HIDDEN CONTINGENCY (applied to all unit prices)

Texas

SELECT STATE

UNIT PRICES

OR

DETAILED UNIT PRICE BREAKDOWN

LABOR

MATERIALS

EQUIPMENT

OTHER

INDIVIDUAL CONTINGENCY

REFERENCE/ASSUMPTION

\$

15,000.00

\$

1,500.00

\$

750.00

\$

3,000.00

\$

6,250.00

\$

9,500.00

\$

1,875.00

\$

450.00

\$

700.00

\$

950.00

\$

550.00

\$

2,300.00

\$

6,600.00

\$

189.00

\$

50.00

\$

125.00

\$

175.00

\$

2,500.00

\$

3,500.00

\$

4,750.00

\$

105.00

\$

200.00

\$

314.60

\$

3,000.00

\$

300.00

\$

200.00

\$

350.00

\$

550.00

\$

80.00

Assuming 10% of total/overall project cost

FEMA Bluebook/LWI Region 2 Spreadsheet

Assuming 10% of Discovery Data Capture cost

Assuming 5% of Discovery Data Capture cost

FEMA Bluebook/LWI Region 2 Spreadsheet

FEMA Bluebook/LWI Region 2 Spreadsheet

FEMA Bluebook/LWI Region 2 Spreadsheet

Assuming 10% of total Alluvial Cost

RFP Fee Spreadsheet

RFP Fee Spreadsheet

RFP Fee Spreadsheet

Assuming 2% of total Hydrology Cost

FEMA Bluebook/LWI Region 2 Spreadsheet

FEMA Bluebook/LWI Region 2 Spreadsheet

FEMA Bluebook/LWI Region 2 Spreadsheet

FEMA Bluebook/LWI Region 2 Spreadsheet

FEMA Bluebook/LWI Region 2 Spreadsheet

Assuming 2% of total Hydraulics Cost

FEMA Bluebook/LWI Region 2 Spreadsheet

Assuming 10% of total Coastal Data Cost

FEMA Bluebook/LWI Region 2 Spreadsheet

FEMA Bluebook/LWI Region 2 Spreadsheet

FEMA Bluebook/LWI Region 2 Spreadsheet

FEMA Bluebook/LWI Region 2 Spreadsheet

Assuming 10% of Total Project Cost?

Assuming 5% of Technical Report Line

Flood Mapping Updates Costing Calculator (2 of 4)

QUANTITY TAKEOFF SECTION

- INSTRUCTIONS
- 1. **Sheet Reference** - input the primary sheet where this line item is details within the plans.
  - 2. **Total Quantity** - the quantity can be calculated by sheet using the "Quantity by Sheet" section and it is automatically summed or the quantity can be manually inputted below to overwrite the formula.
  - 3. **Units of Measure** - determine the appropriate unit of measure based on how item is priced to calculate quantity
  - 4. **Quantity Details Described** - input description of what is being quantified for this line item, especially for Lump Sum quantities provide details on what is included within that lump sum.
  - 5. **Assumptions/Comments** - input any specific assumptions made when quantifying this line item.

SHEET REFERENCE	TOTAL QUANTITY	UNITS OF MEASURE	QUANTITY DETAILS DESCRIBED	ASSUMPTIONS/COMMENTS
	1	LS		Assuming 10% of total project cost
	1	HUC 8		
	1	LS		
	1	LS		
				Use when applicable to county
	1	SQ MI		
	1	SQ MI		
	1	SQ MI		
	1	LS		
				Total Drainage Area (Sq. Mi.)
	1	SQ MI	0.8	Assuming 80% of hydrology
	1	SQ MI		
	1	SQ MI		
	1	SQ MI	0.2	Assuming will need to do a model to cover larger lakes/ponds
	1	SQ MI	0	
	1	SQ MI	0	
	1	LS		
				Total River Miles
	1	RV MI	0.7	Assuming 70% of total stream miles with this LOD
	1	RV MI	0.2	Assuming 20% of total stream miles with this LOD
	1	RV MI		
	1	RV MI		
	1	RV MI		
	1	RV MI	0.1	Assuming 10% of total stream miles with this LOD
	6	RV MI		Assuming 100% of total stream miles (ie: the sum)
	20	PANEL		The total number of FIRM panels (see GIS)
	1	LS		
				Use when applicable to county
	1	CO MI		
	1	LS		
	1	RV MI		
	1	RV MI		
	1	RV MI		
	3	RV MI		
	1	LS		
	1	LS		

QUANTITY TAKEOFF

DETAILED QUANTITY TAKEOFF - TOTALS BY SHEET

**QUANTITY BY SHEET:**

[illegible]This image shows a full page of blank graph paper. The grid consists of small, equal-sized squares formed by thin black lines. There are no margins, text, or other markings on the page.



OPINION OF PROBABLE CONSTRUCTION COST - DAM FAILURE

PROJECT NAME

Regional Flood Plans

DATE

7/5/2022

CLIENT

Regional Flood Planning Group (RFPG)

GROUP

FME ID

PM

ESTIMATED BY

Jane Doe

QC CHECKED BY

XXXX

FNI PROJECT NUMBER

ABC12345

ITEM

DESCRIPTION

QUANTITY

UNIT

UNIT PRICE

TOTAL

PROJECT MANAGEMENT

1

Project Management

1

LS

\$ 49,600.00

\$ 49,600

DISCOVERY DATA CAPTURE

2

Dam Data Collection + QC

1

LS

\$ 10,000.00

\$ 10,000.00

SCREENING ASSESSMENT

3

Dam Prioritization & Need

116

EA

\$ 2,000.00

\$ 232,000.00

DETAILED DAM BREACH ANALYSIS

4

Full Hydrologic Analysis + PMF Regulations + Technical Report

25

EA

\$ 30,000.00

\$ 750,000.00

SUBTOTAL

\$ 1,041,600

CONTINGENCY

30%

\$ 313,000

PROJECT TOTAL (2021 COSTS)

\$ 1,355,000

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

NOTES:

1. FNI OPCC classified as an AACE Class 4 Estimate with accuracy range of -20 to + 30.

IMPORTANT NOTES / ASSUMPTIONS / SCOPE ITEMS:

Task 1 - Project Management

- Perform internal project setup and coordination, including project kickoff meetings and maintaining project schedule; Provide monthly status reports and invoices with backup documentation for the duration of the project.

- Participate in up to ## project coordination meetings with CLIENT staff, via teleconference, as specified in the following tasks. One (1) site visit will be performed to kick-off the project, review project requirements, and tour the downstream breach inundation zone

Task 2 - Hydrologic Assessment

Hydrologic models are used to analyze dam performance during a rainfall event. Per TCEQ regulations, dams are required to be evaluated for hydrologic capacity for minimum design flood based on the Probable Maximum Flood (PMF) event. The design flood for a given dam is based on both the size and hazard classification of the dam and is expressed as a percentage of the PMF. In addition to evaluating the design flood capacity, the hydrologic models are used to establish peak water surface elevations and reservoir inflow hydrographs, which are in turn utilized for performing the breach analysis and generating breach inundation mapping

- Research and gather historical information about the dams

- Generate PMP depths based on recently updated TCEQ PMP guidelines

- Develop hydrologic models for routing the PMF utilizing HEC-HMS

- Compute spillway discharge rating curves based on dimensions of the structure provided in available construction drawings

- Evaluate the dams' existing capacity, expressed as a percentage of the PMF, to determine whether the dam complies with TCEQ criteria for hydrologic adequacy

- Results of the hydrologic analysis for each dam will be presented in a technical report combined with the dam breach analysis. This report is described under the Dam Breach Analysis task.

Task 3 - Dam Breach Analysis

Hydraulic models are used to analyze downstream conditions from flows through a dam; either designed flows through a spillway or hypothetical flows resulting from an uncontrolled breach, or failure, of the dam. Specific to this project, hydraulic models are used to map inundation extents from a hypothetical breach of the dam

- Gather necessary data for hydraulic model inputs, including any relevant previous studies and topography data from available LIDAR or other sources.

- Develop dam breach models in HEC-RAS to evaluate the required breach scenarios – normal pool breach, barely overtopping breach (if necessary), and design flood (PMF) breach (TAC)

- Evaluate the downstream hazard classification according to TCEQ criteria

- Prepare breach inundation maps of the final breach scenarios for inclusion in an Emergency Action Plan (EAP)

- Prepare a combined draft technical report documenting the processes, assumptions, and findings of both the Hydrologic Assessment (Task 2) and the Dam Breach Analysis (Task 3).

- Meet with CLIENT to discuss findings of the Hydrologic Assessment and Breach Analysis for each dam.

FORM SETUP / QC REVIEW COMMENTS

INSTRUCTIONS

Enter Pricing and Quantities using the sections to the right. Expand/collapse each section by clicking on the + or - button at the top.

ENTER COMMENTS / QC REVIEW COMMENTS

To add row, copy entire row and paste.

Note base year of costs in OPCC

FORM SETUP / QC REVIEW

Flood Mapping for Dam Failure Costing Calculator (1 of 4)



PRICING SECTION

PRICING

INSTRUCTIONS

1. **Unit Prices** - enter the Detailed Unit Price Breakdown for each line item OR overwrite formula to enter specific Unit Price to use.
2. **Contingency** - if desired apply a contingency factor to increase the Unit Prices either at an Individual line item level or for all unit prices.
3. **Location Factor** - select state to adjust unit prices based on location.

1.00

LOCATION MULTIPLIER

Texas

SELECT STATE

1.00

HIDDEN CONTINGENCY (applied to all unit prices)

UNIT PRICES	OR	DETAILED UNIT PRICE BREAKDOWN				INDIVIDUAL	REFERENCE/ASSUMPTION
		LABOR	MATERIALS	EQUIPMENT	OTHER	CONTINGENCY	
							Assuming 5% of total project cost
\$ 10,000.00							Ranges between \$10,000 - \$20,000
\$ 2,000.00							
\$ 30,000.00							Ranges between \$10,000-\$50,000

QUANTITY TAKEOFF SECTION

INSTRUCTIONS

1. **Sheet Reference** - input the primary sheet where this line item is details within the plans.

2. **Total Quantity** - the quantity can be calculated by sheet using the "Quantity by Sheet" section and it is automatically summed or the quantity can be manually inputted below to overwrite the formula.

3. **Units of Measure** - determine the appropriate unit of measure based on how item is priced to calculate quantity

4. **Quantity Details Described** - input description of what is being quantified for this line item, especially for Lump Sum quantities provide details on what is included within that lump sum.

5. **Assumptions/Comments** - input any specific assumptions made when quantifying this line item.

SHEET REFERENCE	TOTAL QUANTITY	UNITS OF MEASURE	QUANTITY DETAILS DESCRIBED	ASSUMPTIONS/COMMENTS
	1	LS		Lump sum, assuming 5% of total project cost
	1	LS		Identifying what's available
	116	EA		Use all dams accounted for in County
	25	EA		Assuming 10 is the maximum number of dams that will be analyzed at this LOD. If there aren't

Flood Mapping for Dam Failure Costing Calculator (3 of 4)

DETAILED QUANTITY TAKEOFF - TOTALS BY SHEET

QUANTITY BY SHEET

SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT	SHT