

**NOTICE OF OPEN MEETING OF THE SAN ANTONIO REGIONAL FLOOD PLANNING  
GROUP**

*Region 12 San Antonio RFPG*

*01/04/2022*

*10:00 AM*

*TAKE NOTICE that a meeting of the San Antonio Regional Flood Planning Group as established by the Texas Water Development Board, will be held on Tuesday, January 4, 2022, at 10:00 AM, in-person at the San Antonio River Authority Board room, located at 201 W. Sheridan St. and virtually on GotoMeeting at <https://global.gotomeeting.com/join/201218829>. You may also dial into the meeting on your phone at +1 (872) 240-3212, access code: 201-218-829*

- Agenda:**
1. (10:00 AM) Roll-Call
  2. Public Comments – limit 3 minutes per person
  3. Approval of the Minutes from the Previous San Antonio Regional Flood Planning Group Meeting (Region 12)
  4. Communications from the Texas Water Development Board (TWDB)
  5. Chair Report
  6. Updates from Region 12 Subcommittees
  7. Discussion and Appropriate Action Regarding the Consultant's Work and Schedule
    - a. Technical Memo
      - i. RFPG Action on Proposed Memo
  8. Regional Liaison Update
  9. Public Comments - limit 3 minutes per person
  10. Date and Potential Agenda Items for Next Meeting
  11. Adjourn

If you wish to provide written comments prior to or after the meeting, please email your comments to [khayes@sariverauthority.org](mailto:khayes@sariverauthority.org) or physically mail them to the attention of Kendall Hayes at San Antonio River Authority, 201 W. Sheridan, San Antonio, TX, 78204 and include “Region 12 San Antonio Flood Planning Group Meeting” in the subject line of the email.

Additional information may be obtained from: Kendall Hayes (210) 302-3641, [khayes@sariverauthority.org](mailto:khayes@sariverauthority.org), San Antonio River Authority, 201 W. Sheridan, San Antonio, TX.

**Meeting Minutes**  
**Region 12 San Antonio Regional Flood Planning Group Meeting**  
**Thursday, December 16, 2021**  
**2:00 PM**  
**San Antonio River Authority**

**Roll Call:**

<b><u>Voting Member</u></b>	<b><u>Interest Category</u></b>	<b><u>Present (x) /Absent ( ) / Alternate Present (*)</u></b>
Brian Yanta	<i>Agricultural interests</i>	X
David Wegmann	<i>Counties</i>	
Derek Boese	<i>River authorities</i>	X
Doris Cooksey	<i>Electric generating utilities</i>	X
Deborah (Debbie) Reid	<i>Environmental interests</i>	X
Nefi M. Garza	<i>Flood districts</i>	X
Cara C. Tackett	<i>Industries</i>	
Jeffrey Carroll	<i>Municipalities</i>	X
John Paul Beasley	<i>Public</i>	
Suzanne B. Scott	<i>Nonprofit</i>	
Steve Gonzales	<i>Small business</i>	X
David Mauk	<i>Water districts</i>	X
Steve Clouse	<i>Water utilities</i>	X

<b><u>Non-voting Member</u></b>	<b><u>Agency</u></b>	<b><u>Present(x)/Absent( )/ Alternate Present (*)</u></b>
Marty Kelly	Texas Parks and Wildlife Department	X
James Guin	Texas Division of Emergency Management	
Jami McCool	Texas Department of Agriculture	
Jarod Bowen	Texas State Soil and Water Conservation Board	
Kris Robles	General Land Office	X
Anita Machiavello	Texas Water Development Board (TWDB)	X
Susan Roberts	Texas Commission on Environmental Quality	X

**Quorum:**

Quorum: **Yes**

Number of voting members or alternates representing voting members present: **9**

Number required for quorum per current voting positions of 12: **7**

*All meeting materials are available for the public at: <http://www.region12texas.org>.*

### **AGENDA ITEM NO.1: ROLL CALL**

Ms. Kendall Hayes, San Antonio River Authority, called the role and confirmed a quorum.

### **AGENDA ITEM NO.2: PUBLIC COMMENT – LIMIT 3 MINUTES PER PERSON**

No public comments.

### **AGENDA ITEM NO.3: APPROVAL OF THE MINUTES FROM THE PREVIOUS SAN ANTONIO REGIONAL FLOOD PLANNING GROUP MEETING (REGION 12)**

Ms. Reid motioned to approve the minutes. Mr. Boese seconded the motion, motion passed.

### **AGENDA ITEM NO.4: COMMUNICATIONS FROM THE TEXAS WATER DEVELOPMENT BOARD (TWDB)**

Ms. Machiavello provided an update. This month, TWDB held conference calls for technical consultants and chairs. She also reminded the RWPG that elections should be held in the beginning of 2022.

### **AGENDA ITEM NO.5: CHAIR REPORT**

Chair Garza reminded the group of the January 7<sup>th</sup> deadline for the tech memo. He provided an update on the City's ongoing Bond discussions.

### **AGENDA ITEM NO.6: UPDATES FROM REGION 12 SUBCOMMITTEES**

Mr. Boese commented on the technical committee's latest meeting. They reviewed Task 4B and provided comments to the technical consultants that were added into the document included today.

### **AGENDA ITEM NO.7: DISCUSSION REGARDING THE CONSULTANT'S WORK AND SCHEDULE**

Mr. Ron Branyon, HDR, provided an update on the current efforts of the consulting team, with a focus on Tasks 4A and 4B. The Tech Memo deliverable is due to the TWDB on January 7<sup>th</sup>. It will be distributed to the planning group and comments are due back on December 28<sup>th</sup>. December 9<sup>th</sup>'s public and stakeholder meetings were well attended. There is an upcoming public meeting in St. Hedwig on January 11<sup>th</sup>. HDR's presentation and the recording for this meeting can be found on the Region 12 website at <http://www.region12texas.org>.

Mr. Boese motioned to accept the identification and evaluation of potential FME's, FMS's, and FMP's as amended by the planning group today. Mr. Mauk seconded the motion, motion passed.

#### **AGENDA ITEM NO.8: REGIONAL LIAISON UPDATES**

Mr. Mauk provided an update on Region 13. He will provide their tech memo to the RFPG.

#### **AGENDA ITEM NO.9: PUBLIC COMMENTS:**

No public comments.

#### **AGENDA ITEM NO.10: DATE AND POTENTIAL AGENDA ITEMS FOR NEXT MEETING**

Next planning group meeting date is January 4, 2021, at 10:00 AM. The technical consultants will present the Technical Memo. The February meeting will be held February 24, 2022, at 2:00 PM.

#### **AGENDA ITEM NO.11: ADJOURN**

Mr. Boese motioned to adjourn the meeting. Ms. Reid seconded the motion, the motion passed. Meeting adjourned at 3:56 PM.



## Draft Technical Memorandum

2023 Regional Flood Plan – Flood Planning  
Region 12 – San Antonio

*Texas Water Development Board*  
January 7, 2022

### **DRAFT**

THIS DOCUMENT IS RELEASED TO THE SAN ANTONIO REGION FLOOD PLANNING GROUP FOR APPROVAL AND SUBMITTAL TO THE TEXAS WATER DEVELOPMENT BOARD. THIS DOCUMENT WAS PREPARED UNDER THE ENGINEERING SUPERVISION OF:

HDR ENGINEERING, INC.  
Texas PE Firm Registration No. F-754  
ENGINEER: [Ron J Branyon, P.E.](#)  
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DATE: [April 29, 2021](#)

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A-4	Exhibit C, Table 13 – Potentially Feasible Flood Mitigation Projects Identified by the Regional Flood Planning Group
A-5	Exhibit C, Table 14 – Potentially Feasible Flood Management Strategies Identified by the Regional Flood Planning Group
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A-7	Full Reference Links to Hyperlinks Cited in Technical Memorandum

## List of Abbreviations

BLE	Base Level Engineering
CoSA	City of San Antonio
DFirm	Digital Flood Insurance Rate Map
FEMA	Federal Emergency Management Agency
FME	Flood Management Evaluations
FMP	Flood Management Projects
FMS	Flood Management Strategies
FPR	Flood Planning Region
GIS	Geographic Information Systems
HUC	Hydrologic Unit Code
LOMC	Letters of Map Change
LOS	Level-of-Service
LWC	Low Water Crossing
NFHL	National Flood Hazard Layer
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
RFP	Regional Flood Plan
RFPG	Regional Flood Planning Group
SARA	San Antonio River Authority
SARB	San Antonio River Basin
TFMA	Texas Floodplain Management Association
TNRIS	Texas Natural Resources Information System
TWDB	Texas Water Development Board
USGS	United States Geological Survey

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# 1 Political Subdivisions with Flood-Related Authority

## ***1.a - A list of existing political subdivisions within the FPR that have flood-related authorities or responsibilities.***

A list of existing political subdivisions within the San Antonio FPR that have regulatory authority is provided in **Appendix A-1, Exhibit C, Table 6**.

Cities and counties are the primary regulatory entities in the San Antonio FPR. The TWDB provided a list of the FEMA NFIP participants in the region; a total of 69 entities were identified in the FPR.

All entities reported have floodplain management regulations and have adopted minimum regulations pursuant to Texas Water Code Section 16.3145. All entities reported are participants of the NFIP.

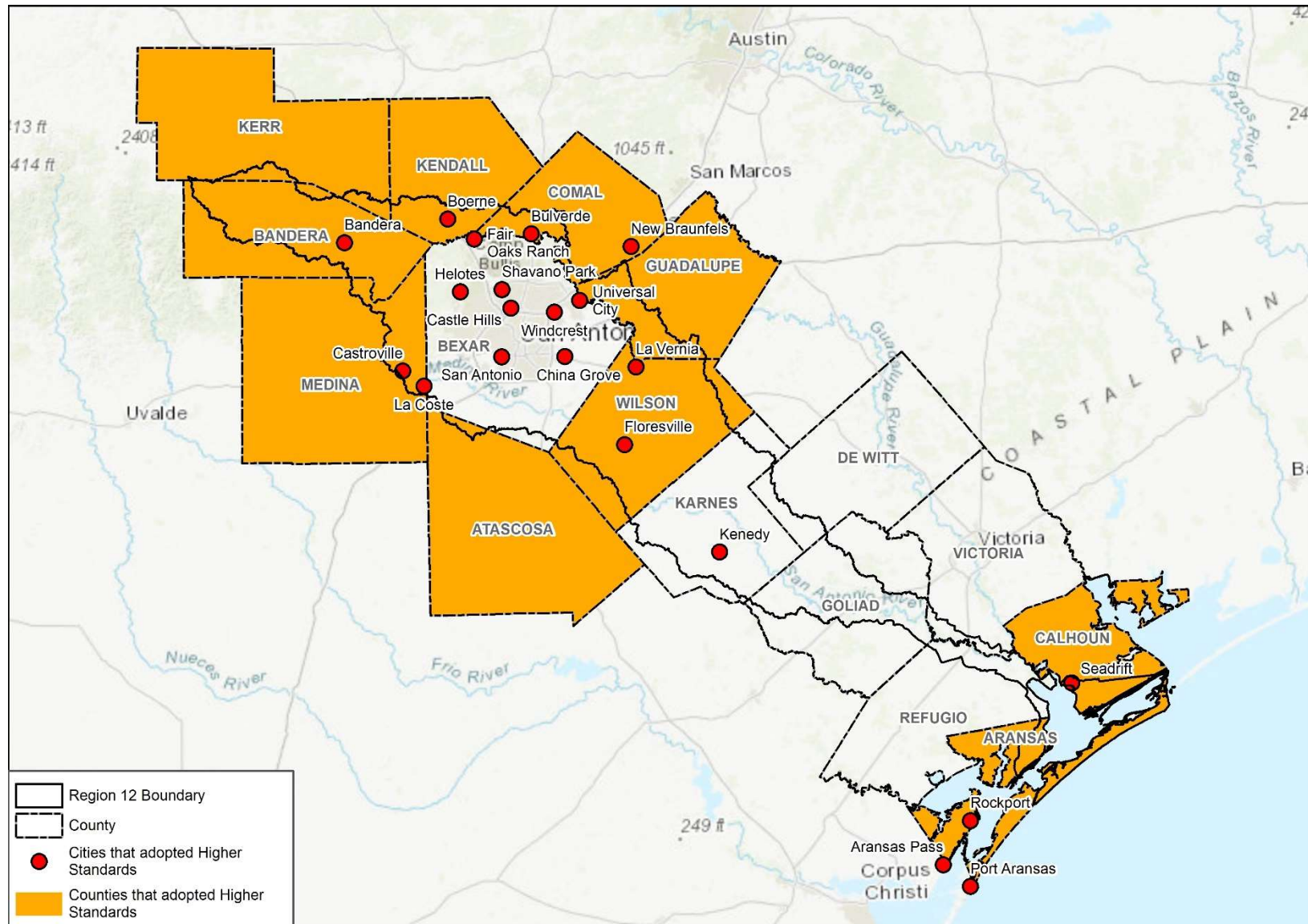
Out of the 69 entities identified, a total of 29 entities have adopted higher standards according to the TFMA 2016 higher standards survey, those entities are shown below in **Figure 1-1**.

The level of floodplain management practices was identified as 'strong', 'moderate', 'low', or 'none' based on the following criteria provided by the TWDB.

- 'Strong' Level – Significant regulations that exceed NFIP standard with enforcement, or community belongs to the Community Rating System.
- 'Moderate' Level – Some higher standards adopted.
- 'Low' Level – Regulations meet the minimum NFIP standards.
- 'None' Level – No floodplain management practices in place.

Based on the above criteria, out of the 69 entities identified, 29 entities are classified as having 'moderate' level and 40 entities are classified as having a 'low' level of floodplain management practices. However, also based on the above criteria, some of the 'moderate' level entities could be 'strong' level, further examination is needed as more data is collected. **Figure 1-1** below shows the locations of the entities that have adopted higher standards which based on the above criteria would be considered at least 'moderate' level of floodplain management practices.

Figure 1-1. Entities with Higher Standards



## 2 Previous Relevant Flood Studies

### ***1.b - A list of previous flood studies considered by the RFPG to be relevant to development of the RFP.***

A list of previous watershed flood studies considered by RFPG to be relevant to the development of the RFP is being developed. The studies that have been identified to this point are provided in **Table 2-1** below and more studies are anticipated to be included as stakeholder outreach continues.

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

Previous and Relevant Flood Study	Description	Jurisdictions Covered	Region 12 Locations (Counties)	Year
Base Level Engineering	BLE is an efficient modeling and mapping approach that aims to provide technically credible flood hazard data at various geographic scales such as community, county, watershed, and/or state level. This data is meant to complement the current effective FIRM data, but not replace it.	All jurisdictions within the SARB	Bandera, Bexar, Karnes, Kendall, Kerr, Goliad, Refugio, Wilson	Ongoing
City of Boerne Drainage Master Plan	The City of Boerne updated their drainage masterplan and updated development Code Changes.	City of Boerne	Kendall	2021
Upper Cibolo Risk MAP Study	Floodplain physical map revisions based on updated hydrologic and hydraulic analysis within the San Antonio River Basin in the Upper Cibolo watershed. The results are being incorporated into the draft National Flood Hazard Layer (NHFL).	City of Bulverde, City of Boerne, City of Fair Oaks Ranch, City of San Antonio, Bandera County, Bexar County, Comal County, Kendall County	Bandera, Bexar, Comal, Kendall	2021

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

Previous and Relevant Flood Study	Description	Jurisdictions Covered	Region 12 Locations (Counties)	Year
Lower San Antonio Risk MAP Study	Floodplain physical map revisions based on updated hydrologic and hydraulic analysis within the San Antonio River Basin in the Upper Cibolo watershed. The results are being incorporated into the draft National Flood Hazard Layer (NHFL).	City of Floresville, City of Kenedy, City of Runge, City of Norheim, City of Goliad, City of Falls City, City of Karnes, City of Poth, City of San Antonio, Bexar County, Dewitt County, Wilson County, Karnes County, Goliad County	Bexar, Guadalupe, DeWitt, Wilson, Karnes, Goliad	2021
San Geronimo Risk MAP Study	Floodplain physical map revisions based on updated hydrologic and hydraulic analysis within the San Antonio River Basin in the San Geronimo watershed. The results are being incorporated into the draft National Flood Hazard Layer (NHFL).	City of San Antonio, Bandera County, Bexar County, Medina County	Bandera, Bexar, Medina	2021
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.	All jurisdictions within the Texas Coastal Counties	Aransas, Refugio,	2020
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	2020

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

Previous and Relevant Flood Study	Description	Jurisdictions Covered	Region 12 Locations (Counties)	Year
Calaveras Risk MAP Study	<p>Floodplain physical map revisions based on updated hydrologic and hydraulic analysis within the San Antonio River Basin in the Calaveras watershed. The results have been incorporated into the preliminary National Flood Hazard Layer (NHFL).</p> <p>FEMA's Flood Datasets are available through the <a href="#">Map Service Center</a> (full link in Appendix A-7).</p> <p>Flood risk data can be viewed on the <a href="#">SARA Risk MAP Viewer</a> (full link in Appendix A-7).</p>	City of China Grove, City of Elmendorf, City of San Antonio, Bexar County, Wilson County	Bexar, Wilson	2019
Bandera County River Authority and Groundwater District Flood Plan	The Bandera County River Authority and Groundwater District (BCRAGD) Flood Plan defines lines of communication, personnel assignments, safety, special flood conditions and post-flood operations for Bandera County.	All jurisdictions within the BCRAGD	Bandera	2019
Development of Flood Warning Tool Set for Medina River, Bandera County (TWDB Final Report: Contract No. 1600012035)	<p>The study area encompassed a 23-mile reach of the Medina River from the confluence of Winans Creek to English Crossing Road above Medina Lake. The USGS developed a Hydrologic Engineering Center-River Analysis System (HEC-RAS) model, which applied data from existing streamflow-gaging stations and installed two additional 'stage only' streamflow-gaging stations along the headwaters of the North and West Prongs of the Medina River. A flood atlas, consisting of a library of flood-inundation maps for a range of streamflow conditions, was developed and included on the <a href="#">USGS Flood Inundation Mapping Program (FIMP) Website</a> (full link in Appendix A-7). The Flood Inundation Maps (FIMS) depict estimates of the areal extent and depth of flooding corresponding to selected water levels (stages) at the USGS streamflow-gaging station 08178880 Medina River at Bandera, Texas.</p>	All jurisdictions within BCRAGD	Bandera	2019
Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan	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.	Unincorporated Aransas County, City of Aransas Pass, Town of Fulton, City of Rockport	Aransas	2019

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

Previous and Relevant Flood Study	Description	Jurisdictions Covered	Region 12 Locations (Counties)	Year
Medina Risk MAP Study	<p>Floodplain physical map revisions based on updated hydrologic and hydraulic analysis within the San Antonio River Basin in the Medina River watershed. The results have been incorporated into the effective National Flood Hazard Layer (NHFL).</p> <p>FEMA's Flood Datasets are available through the <a href="#">Map Service Center</a> (full link in Appendix A-7).</p> <p>Flood risk data can be viewed on the <a href="#">SARA Risk MAP Viewer</a> (full link in Appendix A-7).</p>	City of Bandera, City of Castroville, Kerr County, Bandera County, Medina County	Bandera, Kendall, Kerr, Medina	2018
Hazard Identification, Risk Assessment and Consequence Analysis	The Hazard Identification Risk Assessment (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	2017
City of San Antonio Local Drainage Master Plan	In 2016, SARA teamed with the CoSA to develop a Drainage Master Plan of previously documented potential projects within the city limits, in order to identify candidates for the 2017 bond program.	CoSA	Bexar	2016
Bexar Risk MAP Study – Ft Sam Trib, Airport Trib, and UNT 1 to Martinez A	<p>Floodplain physical map revisions based on updated hydrologic and hydraulic analysis within the San Antonio River Basin in the Medina River watershed. The results have been incorporated into the effective National Flood Hazard Layer (NHFL).</p> <p>FEMA's Flood Datasets are available through the <a href="#">Map Service Center</a> (full link in Appendix A-7).</p> <p>Flood risk data can be viewed on the <a href="#">SARA Risk MAP Viewer</a> (full link in Appendix A-7).</p>	City of San Antonio, City of Terrell Hills, Bexar County	Bexar	2015

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

Previous and Relevant Flood Study	Description	Jurisdictions Covered	Region 12 Locations (Counties)	Year
Holistic Watershed Masterplans	<p>The San Antonio River Authority (SARA) has worked with partner agencies since 2009 to complete Watershed Master Plans for the Upper San Antonio River, Leon Creek, Salado Creek, Medina River, Lower San Antonio River, and Cibolo Creek watersheds.</p> <p>The Master Plans have two primary objectives:</p> <ul style="list-style-type: none"> <li>Identify needs and opportunities related to flood risk, water quality issues, low impact development, stream restoration, nature based park planning, mitigation banking, and conservation easements.</li> <li>Develop and assess proposed projects to address the identified needs and preserve identified opportunities.</li> </ul> <p>The <a href="#">Watershed Master Plan Viewer</a> (full link in Appendix A-7) displays data produced in the various Master Plan reports, as well as other useful reference data. It is intended to be used as a visualization tool to assist the public, stakeholders, and decision-makers in understanding both watershed issues and potential solutions.</p>	All jurisdictions within Bexar, Karnes, Wilson, and Goliad Counties	Bexar, Goliad, Karnes, Wilson	2009-2015
Bexar, Wilson, Karnes, and Goliad County-Wide 2010 FIS Studies	<p>The FEMA NFHL data was digitized and updated with new terrain, survey, hydrologic, and hydraulic data.</p> <p>FEMA's Flood Datasets are available through the <a href="#">Map Service Center</a> (full link in Appendix A-7).</p>	All jurisdictions within Bexar, Wilson, Karnes, and Goliad Counties	Bexar, Wilson, Karnes, Goliad	2010
Alamo Area Council of Governments Regional Multi-Hazard Mitigation Plan	In 2005, CoSA and Bexar County participated in the development of the Alamo Area Council of Government's (AACOG) Regional Multi-Hazard Mitigation Plan. This plan looked at a range of hazards and provided some basic risk and vulnerability information for those identified.	All jurisdictions within AACOG Area	Bexar, Kerr, Kendall, Comal, Bandera, Guadalupe, Medina, Atascosa, Wilson, Karnes	2005

## 3 Inundation Boundaries

***1.c - A geodatabase and associated maps in accordance with TWDB Flood Planning guidance documents that the RFPG considers to be best representation of the region-wide 1.0% annual chance flood event and 0.2% 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.***

### 3.1 Existing Flood Hazard

The 1.0% and 0.2% annual chance flood inundation boundaries were defined for all waterways with contributing drainage areas larger than one-tenth of a 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. The 'floodplain quilt' 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, new preliminary inundation boundaries were obtained from SARA, which is currently the only detailed flood data that uses the latest NOAA Atlas 14 rainfall. In addition, flood prone areas identified through public comments will be evaluated as the data becomes available.

The following list summarizes the various flood inundation data sets used in their order of accuracy from most accurate to least accurate, with data sets including the BLE data and above considered accurate.

1. SARA Preliminary Data (Submitted to FEMA for review)
2. NFHL Preliminary Data
3. NFHL Detailed Effective Data
4. Base Level Engineering Studies
5. NFHL Approximate Effective Data
6. Fathom Draft Data – October 29th, 2021
7. Public Comments

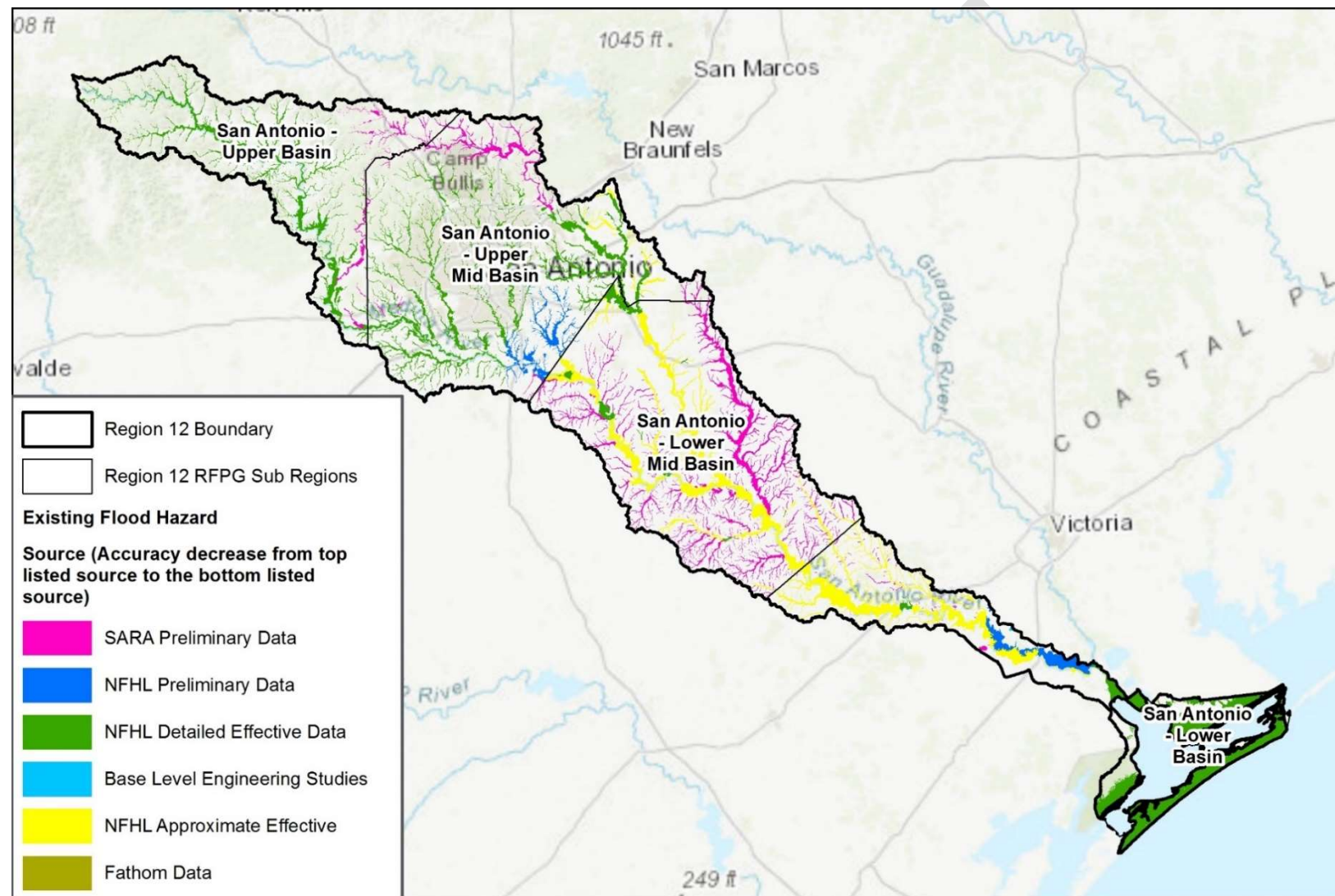
A portion of the Regional Flood Planning Area contains 'approximate' 1.0% annual chance flood inundation boundaries but no 0.2% annual chance flood inundation boundaries (i.e. NFHL Approximate Study Areas). Thus, for these approximate areas, the Fathom 1.0% and 0.2% annual chance data was used to define flood hazard extents. In early 2022, additional preliminary data will be provided by SARA and the entire San Antonio River basin will have complete BLE coverage. Therefore, existing flood hazard mapping will be updated in its entirety to include Preliminary, Detailed Effective or BLE quality data.

The existing condition 1.0% and 0.2% annual chance flood inundation boundaries are provided in the geodatabase (i.e. 'ExFldHazard') and are available for viewing in the [Regional Flood Planning ArcGIS Online Interactive Map](#) (full link in Appendix A-7).

**Figure 3-1** below provides a region-wide depiction of the 1.0% annual chance flood event and 0.2% annual chance flood event inundation boundaries, and the source of flooding for each area, for use in the risk analysis.

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**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 assumes no change to current floodplain ordinances and development regulations. Future conditions can be influenced by several factors, such as:

- 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 – 2023 planning cycle, the development of future floodplains for riverine systems (inland areas) will be established for the:

- 1.0% annual chance future conditions floodplain – Set to the 0.2% annual chance existing conditions floodplain
- 0.2% annual chance future conditions floodplain – Floodplain buffer based on previous studies

For the 0.2% annual chance future conditions floodplain, HDR will utilize the 2018 San Antonio River Basin **Future Precipitation Study**, done by SARA, which estimates the 0.2% annual chance rainfall total will increase 3.8 inches in 20 years and 5.1 inches in 40 years. HDR recently used this previous precipitation study to update the effective hydrology models for the major watersheds within the SARB to estimate peak discharges. This analysis showed that the average increase in the 0.2% annual chance rainfall throughout the basin was between 30% and 40% for the 20- and 40-year future projections respectively. From this data HDR can estimate a 35% increase in 0.2% annual chance rainfall for a 30-year future event. With this estimated increase HDR will evaluate a horizontal increase in 0.2% annual chance floodplain top-widths using selected HEC-RAS models in various locations throughout the watershed. HDR will then categorize the changes in floodplain top-widths based on tributary size, general land slope, and urbanization levels to obtain averages. The average increases in top-width will then be applied to the existing 0.2% annual chance floodplain as a horizontal buffer to establish a future 0.2% annual chance floodplain to be used in this study.

Once available, the future condition 1.0% and 0.2% annual chance flood inundation boundaries will be provided in the geodatabase (i.e. 'FutFldHazard') and will be accessible for interactive viewing on the San Antonio Regional Flood Planning ArcGIS Online story map.

## 4 Additional Flood-Prone Areas

***1.d - A geodatabase and associated maps in accordance with TWDB Flood Planning guidance documents that identifies additional flood-prone areas not described in (c) based on location of hydrologic features, historic flooding, and/or local knowledge.***

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

- Local Knowledge (Stakeholders / Citizens)
- Low Water Crossings (TNRIS)
- USGS Gages
- Historical Flood Data (National Weather Service, FEMA, TxDOT, CoSA 311 complaints)

Local Knowledge, TxDOT, and CoSA 311 complaints data is still being collected, additional flood-prone areas will be evaluated and added as data become available.

The San Antonio Flood Planning Area was sub-divided into four subregions to facilitate stakeholder engagement amongst the varying geographic areas of the basin. The additional flood prone areas are shown for each of these subregions in **Figure 4-1** through **Figure 4-4** below. These flood prone points are also available for viewing in the [Regional Flood Planning ArcGIS Online Interactive Map](#) (full link in Appendix A-7).

Figure 4-1. Additional Flood-Prone Areas San Antonio – Upper Basin

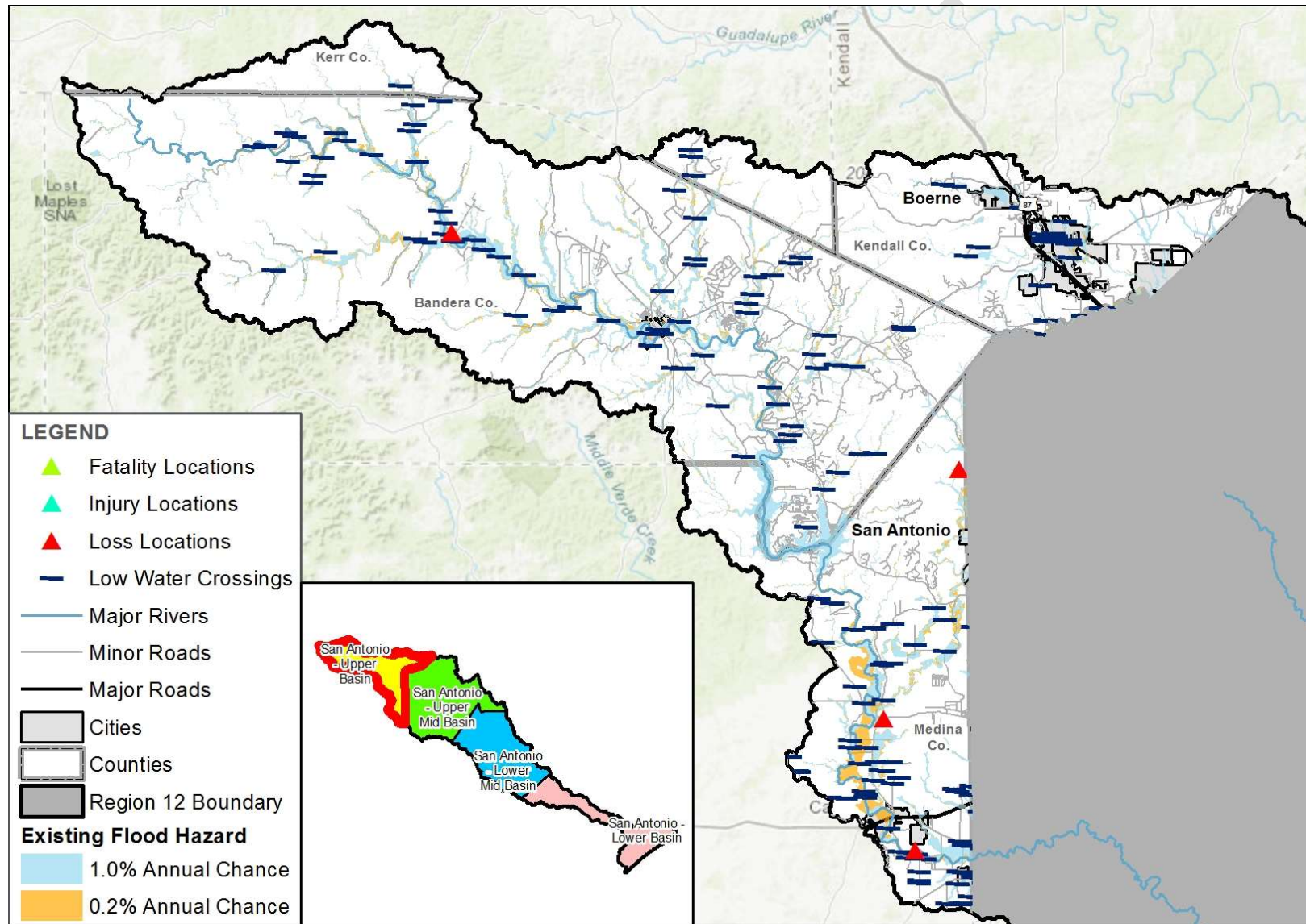


Figure 4-2. Additional Flood-Prone Areas San Antonio – Upper Mid Basin

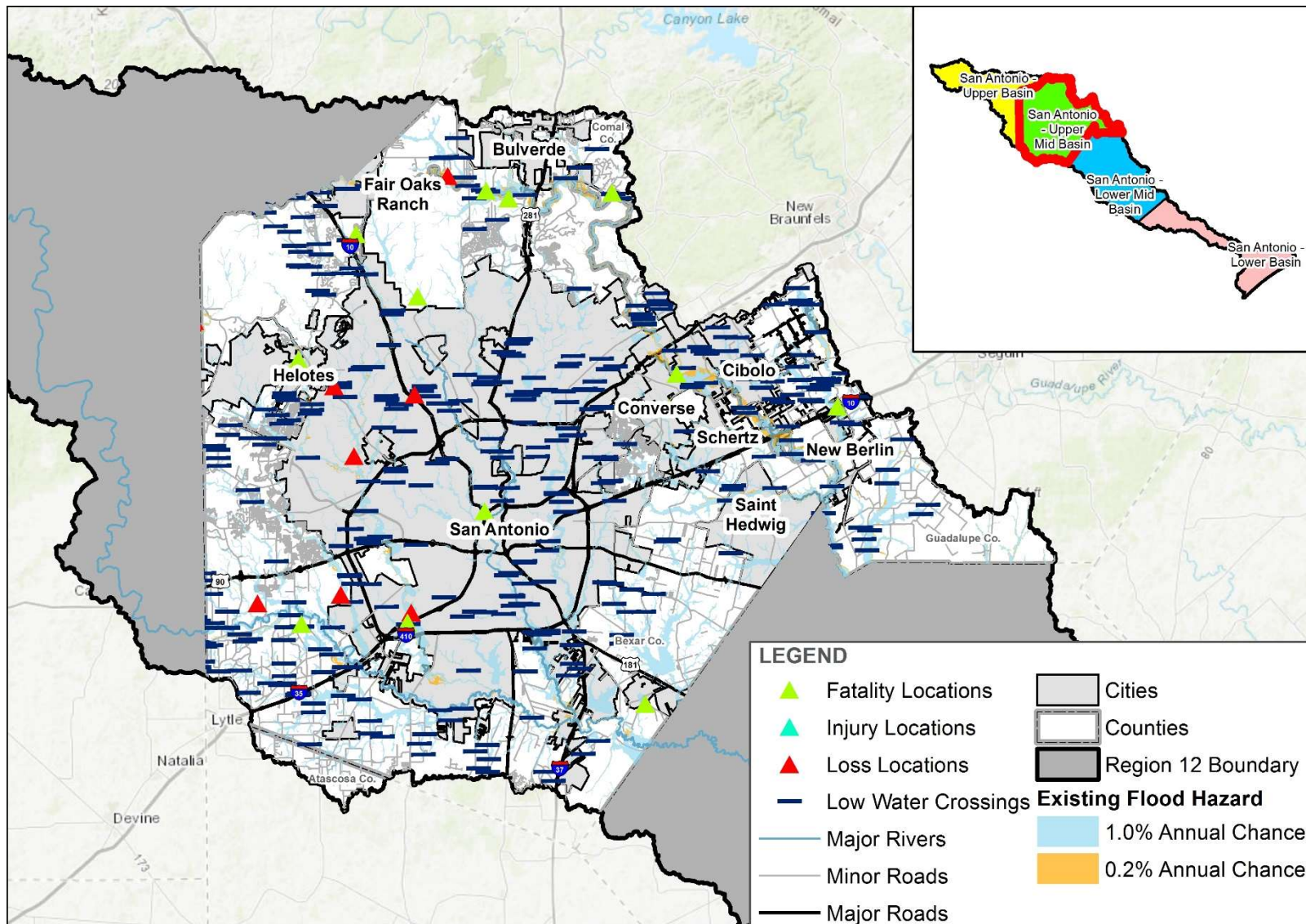


Figure 4-3. Additional Flood-Prone Areas San Antonio – Lower Mid Basin

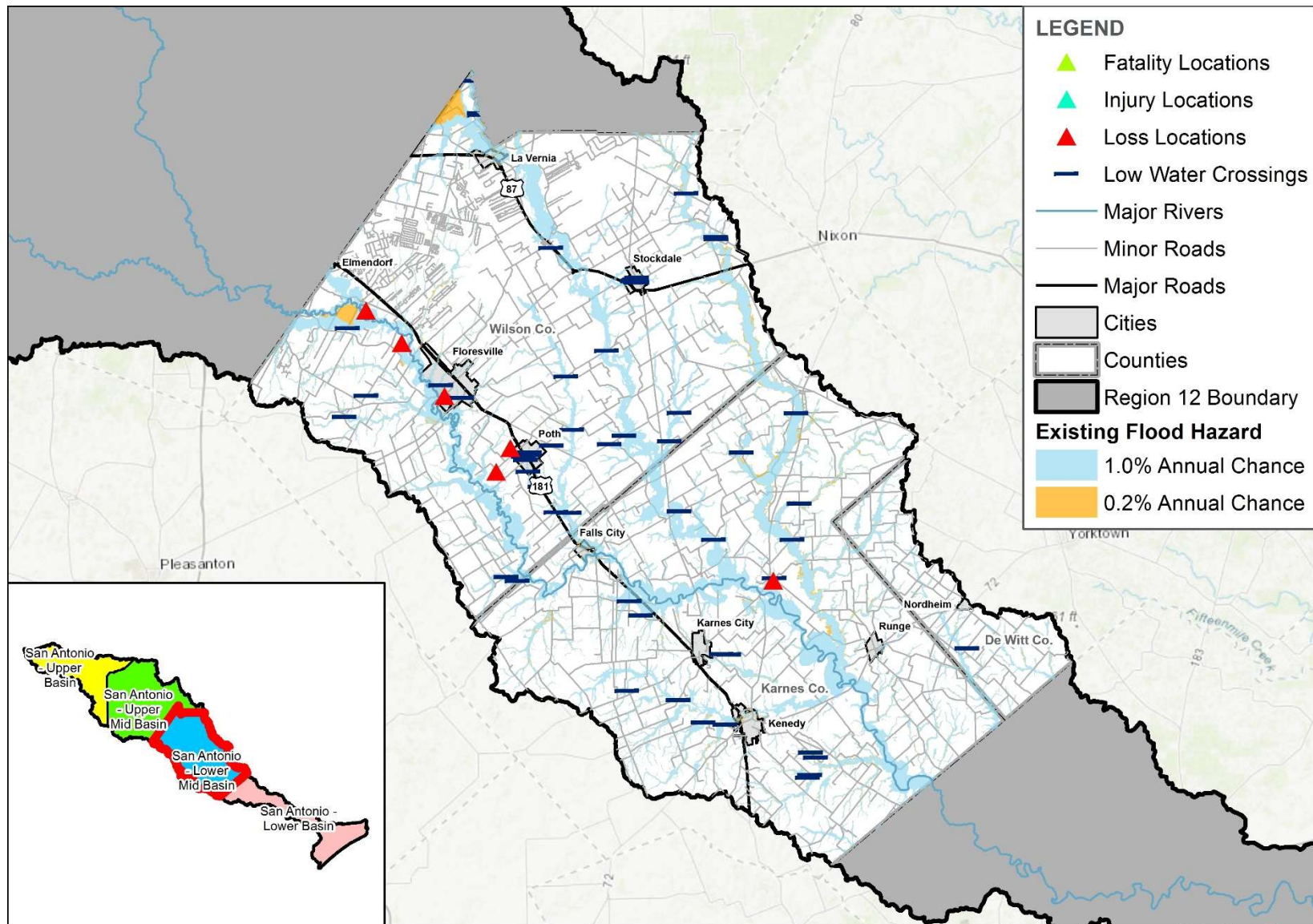
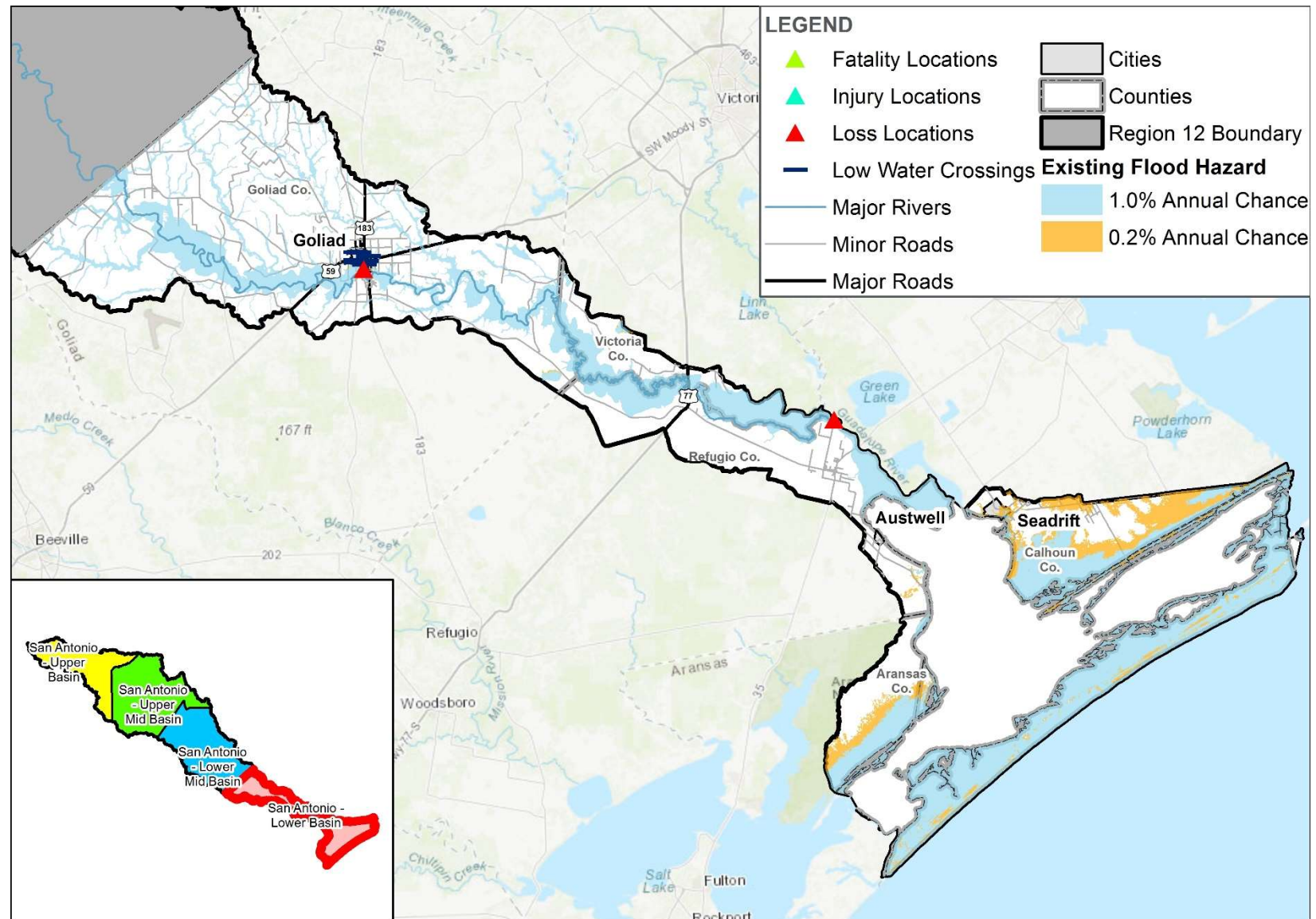


Figure 4-4. Additional Flood-Prone Areas San Antonio – Lower Basin



## 4.1 Local Knowledge

The Regional Flood Planning Area is subdivided into four subregions as shown in the **Figure 4-1** through **Figure 4-4** above to facilitate stakeholder and citizen engagement in the varying geographic areas of the basin. The first round of in-person meetings are to introduce the regional flood planning process and to gather local knowledge of flood-prone areas, historical flooding, flood mitigation projects and needs. Additionally, an interactive on-line comment map is used to allow stakeholders and citizens the opportunity to identify flood-prone areas for consideration in the Regional Flood Plan. These flood-prone points are also viewable in the [Regional Flood Planning ArcGIS Online Interactive Map](#) (full link in Appendix A-7). The first public meeting was held on December 8, 2021 in the City of Bandera within the Upper Basin subregion. The remaining public meetings are expected to be conducted at the beginning of 2022.

## 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% annual chance (2-year) storm event.

A total of 589 low water crossings have been identified as part of the Regional Flood Plan. These low water crossings are from TNRIS and were last updated in March 2021. The TNRIS data includes locations monitored by the [Bexar County Highwater Alert Lifesaving Technology \(HALT\)](#) and [San Antonio Flood Emergency \(SAFE\) Route System](#) (full links in Appendix A-7). During the first planning cycle for the Regional Flood Planning, the Advisory Groups can utilize the community feedback to identify additional problematic low water crossings not already included in the plan. Low water crossing locations are shown in **Figure 4-1** through **Figure 4-4** above and are also viewable at [Regional Flood Planning ArcGIS Online Interactive Map](#) (full link in Appendix A-7).

## 4.3 USGS Gage Data

USGS gage information was used to identify flood prone areas and evaluate historical flood events. A few key locations were identified along the major rivers and tributaries within the basin. The gages in these locations were evaluated for crucial historic flood events, these events are summarized in **Table 4-1** below. USGS gage locations are viewable at [Regional Flood Planning ArcGIS Online Interactive Map](#) (full link in Appendix A-7).

## 4.4 Historical Flooding

Past flood events provide insight on the location of flood-prone areas within the basin. **Table 4-1** below provides a list and brief description of historical events within the basin.

**Table 4-1. List of Historic Floods**

Flood Event	Description
2021 Coastal Flash Floods	Early summer 2021, a series of storms hit the Texas Mid Coastal Counties and caused flash flooding. Victoria and Karnes County USGS gages along the San Antonio River saw record discharge amounts. As a result of this flash flooding, the NWS reports one injury and one death in Victoria.
2017 Hurricane Harvey	Hurricane Harvey is one of the most expensive storms on record, costing an estimated \$24 million dollars in damages to Region 12 counties.
2016 Floods	Texas was hit by a series of large storms in 2016. Historic USGS gage discharge rates were recorded in Karnes and Victoria counties along the San Antonio River. NWS reports two flash flood related casualties recorded this year within the region.
2015 Memorial Day Flood	May 2015, a slow-moving storm swept Oklahoma and Texas causing flash flooding throughout the region. Bandera and Victoria County USGS gages along the Medina and San Antonio River recorded historic discharge rates. As a result of this flash flooding, the NWS reports one death in Bexar County and one in Medina County.
2015 October Flood	In October of 2015, a tornado and a large storm ravaged Central Texas. Wilson County USGS gage on the Cibolo Creek saw record discharge amounts. As a result of this flash flooding, the NWS reports one death in Bexar and one in Comal counties.
2013 May Floods	May 2013 brought flash floods that affected the whole region. Historic discharge rates were recorded along the San Antonio River in Bexar and Karnes County. These flash floods resulted in 3 reported casualties by the NWS in Bexar and Guadalupe counties.
2010 June Floods	Flash floods hit Central Texas in June 2010, making it one of the more costly events the region has endured. An estimated \$20 million dollars in damages were reported for Bexar, Comal, and Guadalupe counties. As a result, the NWS reports one death in Comal County.
Water Year 2007	A 6-month period where there was nearly continuous flooding in Texas from March to September. In August, Tropical Storm Erin hit the regions coastal counties. 2007 was one of the costliest years ever recorded for flood damage. Just in Region 12, there was \$20 million reported in damages by the NWS. June through August NWS reports historic USGS gage discharge rates for the San Antonio River and Cibolo Creeks in Bexar and Wilson County. NWS reports that Region 12 had 10 fatalities within this 6-month span.
2004 November Flash Flood	November 2004, the region was hit by a costly flash flood that resulted in 2 deaths in Bexar County and set historic peak discharge rates at the USGS gage on Salado Creek in Bexar County.
2002 Flash Floods	July 2002 Flash Floods hit the region. Historic USGS discharge rates were recorded all across the region; Medina River in Bandera County, Salado Creek in Bexar County, and San Antonio River in Karnes and Goliad counties. As a result of these floods the NWS reports 5 deaths from Bexar and Kendall counties. Later that year extreme flash flooding in November resulted in 18 injuries in Bexar County.
1998 October Flood	South central Texas experienced record-breaking rainfall in October 1998, making it the costliest flood event for the region. NWS reports \$446 million in damages across the region. NWS reports 11 casualties in Bexar County and 4,040 injuries total for the region, most of them being in Bexar, Comal, Guadalupe, and De Witt counties. Historic USGS gage discharge rates were recorded throughout the region, from Medina River in Bandera County all the way down to the coast on the San Antonio River in Goliad. Per the San Antonio River Authority, the completion of the San Antonio River Flood Tunnels in January 1998 significantly reduced the impacts of these flash floods in San Antonio.

**Table 4-1. List of Historic Floods**

Flood Event	Description
1997 June Flash Flood	Heavy rainfall in June 1997 caused flash flooding in South Central Texas. As a result, the NWS reports 4 casualties and 115 injuries across Bexar, Medina, Bandera, Guadalupe, Comal, and Kendall counties. Historic USGS gage discharge rates were recorded along the Medina River in Bandera and Bexar County. This is one of the more costly events for the region, the NWS reports \$29 million in damages resulting this event.
1990 July Flood	July 1990 was known as the "wettest" July in San Antonio. One of the largest USGS gage discharge rates was recorded for San Antonio River in Bexar County.
1987 June Flood	The upper counties were hit by a storm in June 1987, setting historic USGS gage discharge rates for the Medina River in Bandera and Bexar County.
1978 Hurricane Amelia	Hurricane Amelia hit Texas and stalled over the region's upper counties. This storm devastated Bandera County and surrounding areas. Due to this event, the USGS gage on the Media River in Bandera County recorded the highest discharge rate and water level ever recorded for the region, at 281,000 cfs and 50 ft.
1946 San Antonio Flood	A September flood hit Bexar and Karnes counties. This event set a historic USGS discharge rate along the San Antonio River in Karnes county. As a result, the San Antonio River Authority reports 4 casualties in San Antonio.
1921 San Antonio Flood	On September 9, 1921, a tropical depression stalled just north of San Antonio and within hours flooded the creek networks in San Antonio. Due to this event, the San Antonio River Authority reports a total of 3.7 million in damages and more than 51 casualties in San Antonio. This flood sparked the construction of Olmos Dam.
1913 October Flood	A record rainfall of over 7 inches in 24-hours caused major flooding along the San Antonio River. The City of San Antonio reports flooding along San Pedro and Alazan creeks. Historic USGS gage levels were recorded in Goliad and Karnes County.

#### 4.4.1 National Weather Service Flood Data

The NWS has documented fatalities, injuries, and property damage as the result of past flood events since 1996.

Data is shown in the following figures below; **Figure 4-5** property damage, **Figure 4-6** fatalities, and **Figure 4-7** injuries.

A summary of flood damage data gathered from the NWS can be seen in **Table 4-2** and **Table 4-3**. **Table 4-2** reports flood damage in dollars, injuries, and fatalities by year. **Table 4-3** uses the same base data as **Table 4-2** but is summarized based on counties. To generate **Table 4-2** and **Table 4-3**, raw yearly damage data in Texas was downloaded from the NWS website. Then, a filter on counties is used so that only damage data of Region 12 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, leaving only damages such as rain, storm and flood related.

**Figure 4-5. National Weather Service Property Damage from Flooding, since 1996**  
**Figure 4-6. National Weather Service Fatalities from Flooding, since 1996**

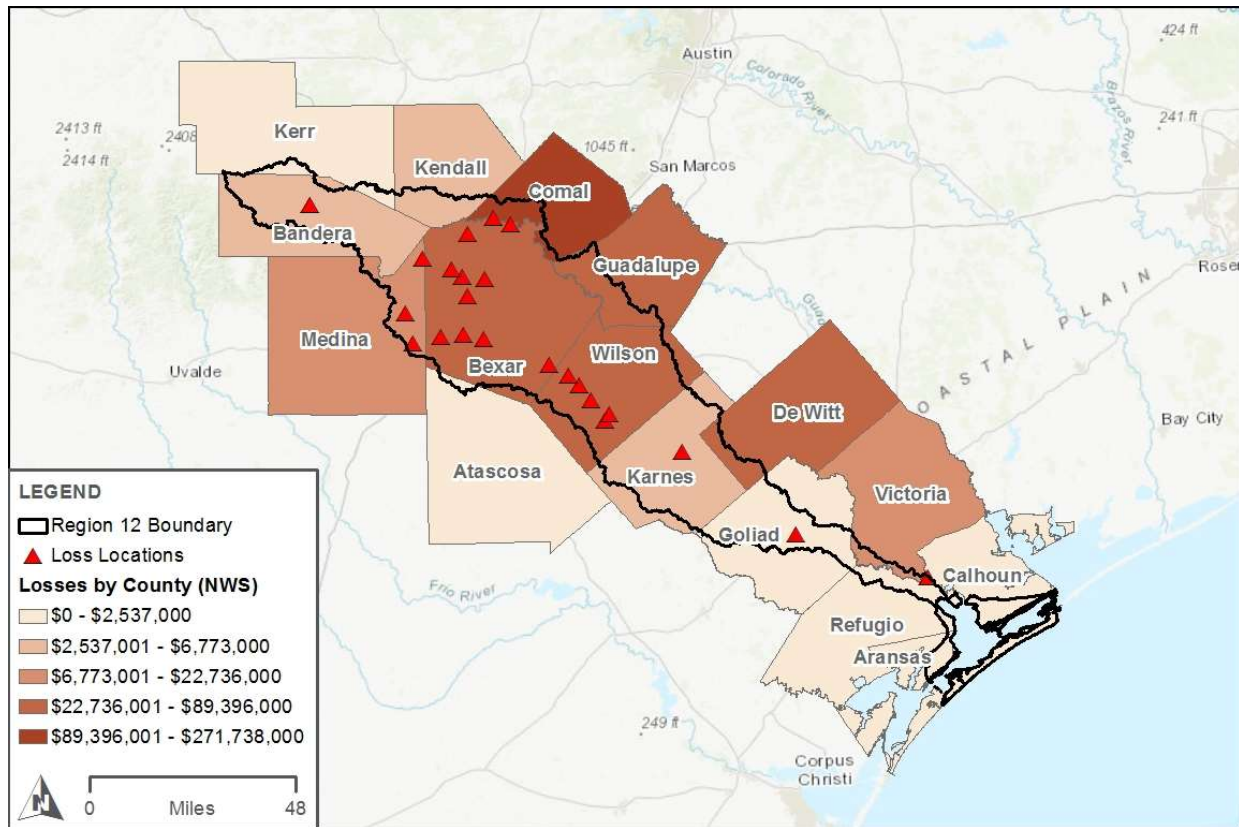
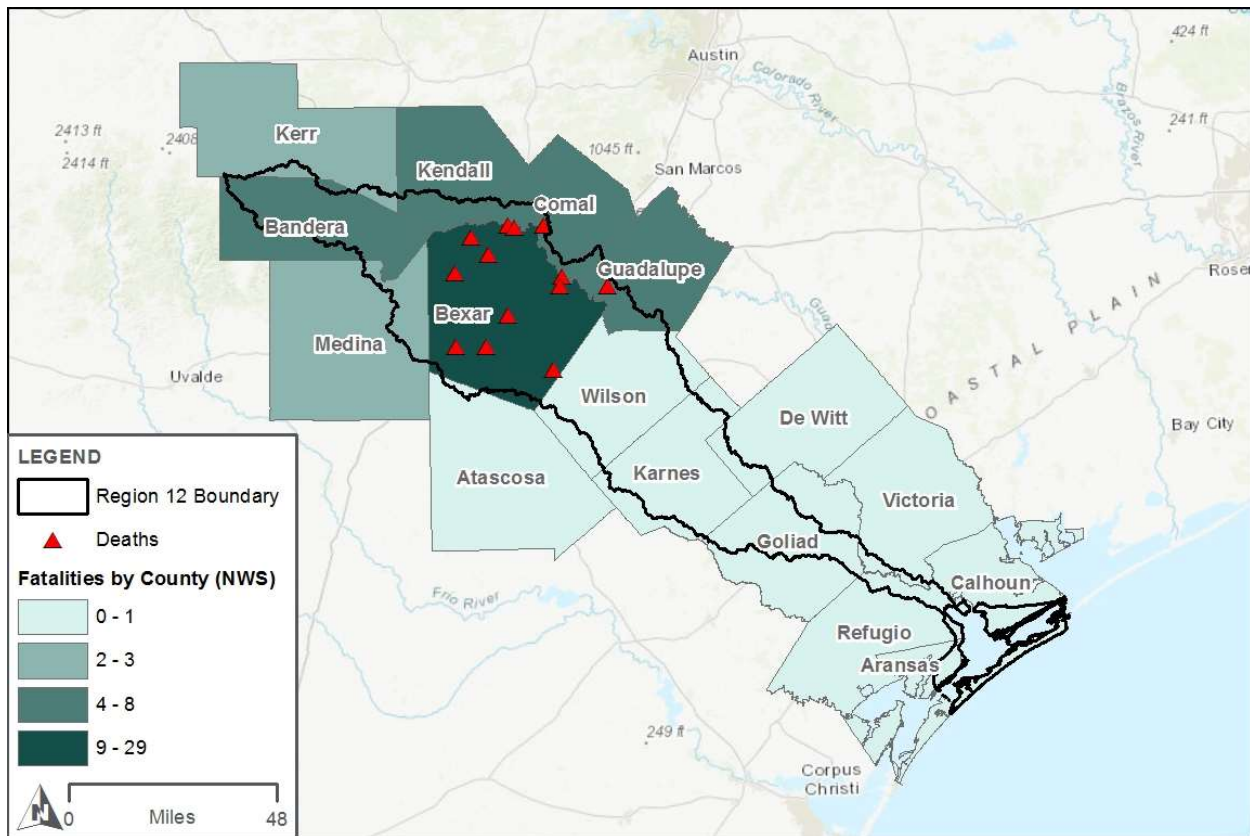
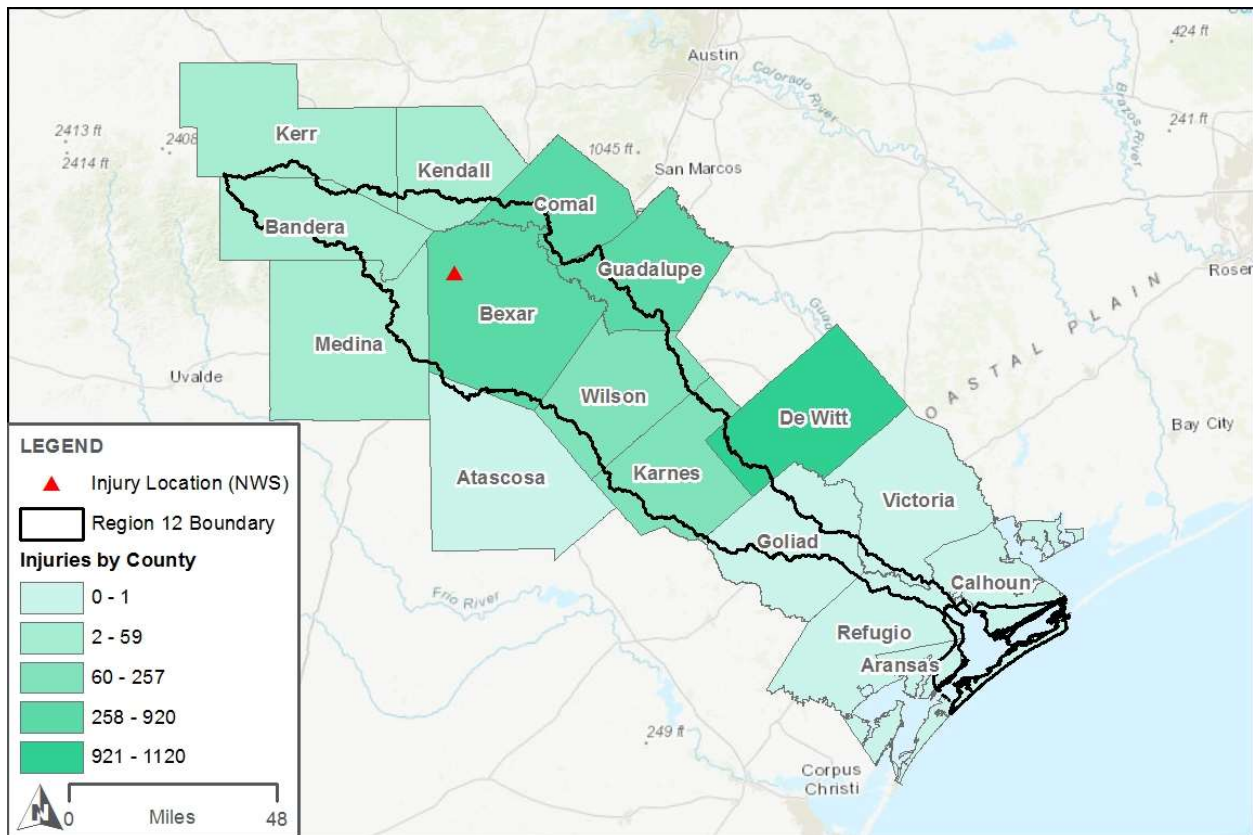


Figure 4-6. National Weather Service Fatalities from Flooding, since 1996



**Figure 4-7. National Weather Service Injuries from Flooding, since 1996**



**Table 4-2. Losses associated with Flooding in Region 12 counties since 1996 as reported by the National Weather Service**

Flood Year	Damages (in Dollars)	Injuries	Fatalities
1996	76,000	2	1
1997	32,173,000	115	6
1998	452,054,000	4063	17
1999	446,000	0	0
2000	1,208,000	8	1
2001	4,969,000	63	1
2002	2,300,000	22	5
2003	528,000	0	0
2004	1,572,000	1	4
2005	0	0	0
2006	2,000,000	0	0
2007	21,920,000	1	10
2008	20,000	0	0
2009	0	0	0
2010	20,900,000	0	4
2011	0	0	0
2012	110,000	0	0
2013	100,000	0	4
2014	200,000	0	0
2015	155,000	0	4
2016	250,000	0	2
2017	24,000,000	0	1
2018	50,000	0	0
2019	5,000	0	0
2020	1,455,000	0	0
2021	690,000	1	1
<b>Total</b>	<b>567,181,000</b>	<b>4276</b>	<b>61</b>

<sup>1</sup> Data as of December 2021.

**Table 4-3. Losses associated with Flooding from 1996-2021 as reported by the National Weather Service**

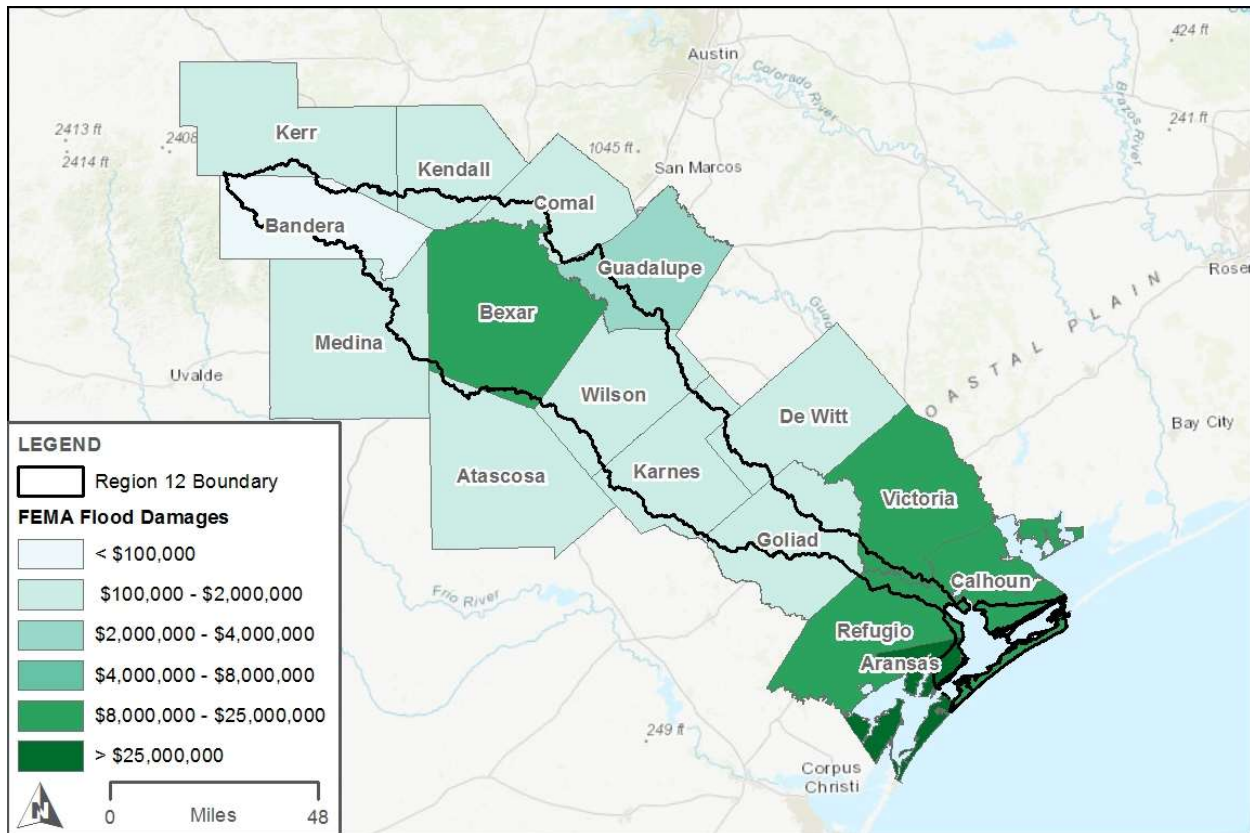
Counties	Percentage of County Area in Region 12	Damages (in Dollars)	Injuries	Fatalities
Aransas	13%	2,537,000	0	0
Atascosa	1%	1,267,000	0	0
Bandera	66%	7,783,000	26	5
Bexar	97%	44,390,000	852	29
Calhoun	27%	1,110,000	0	0
Comal	17%	272,468,000	920	6
De Witt	9%	43,265,000	1120	0
Goliad	39%	25,000	0	1
Guadalupe	24%	52,083,000	829	8
Karnes	80%	4,584,000	170	0
Kendall	19%	6,846,000	20	6
Kerr	5%	1,253,000	22	3
Medina	15%	17,148,000	59	2
Refugio	13%	0	0	0
Victoria	5%	22,736,000	1	1
Wilson	82%	89,686,000	257	0
<b>Total</b>	<b>-</b>	<b>567,181,000</b>	<b>4276</b>	<b>61</b>

#### 4.4.2 FEMA Flood Damage Data

FEMA data on disaster funding for flood damages was obtained from 1996 to June 2021. Data is shown in the following **Figure 4-8** below.

**Table 4-4** includes flood related damages by county. Unlike the gross damage data in **Table 4-2** and **Table 4-3**, data in **Table 4-4** is summarized from various federal programs. First, raw data of all program funds in the Region 12 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 4-8. FEMA Flood Assistance to Owners and Renters for Flood Damages, since 1996**



**Table 4-4. FEMA Funding for Flood Related Damages by Program (1996 – June 2021)**

Counties	Percentage of County Area in Region 12	Public Assistance Funded Project Summaries	Individuals and Households Program - Valid Registrations		Individual Assistance Housing Registrants - Large Disasters	Housing Assistance Program
		Federal Share Obligated	Flood Damage Amount	Repair Amount	Real Property Damage Amount Observed by FEMA	Owners and Renters Combined Amount
Aransas	13%	75,463,478	7,328,541	12,488,979	55,009,113	50,412,810
Atascosa	1%	1,663,563	94,935	280,715	226,154	875,027
Bandera	66%	2,080,777	0	0	79,676	97,212
Bexar	97%	50,005,333	2,045,533	1,317,967	4,605,858	19,501,737
Calhoun	27%	23,004,779	588,398	3,278,010	3,723,571	9,217,394
Comal	17%	6,525,770	585,521	172,868	549,725	1,539,102
De Witt	9%	4,320,705	484,243	435,925	1,137,800	1,499,327
Goliad	39%	625,031	22,554	636,172	577,051	1,554,971
Guadalupe	24%	5,118,692	741,266	402,861	325,694	2,089,239
Karnes	80%	754,616	4,580	530,048	372,964	1,128,253
Kendall	19%	712,625	118,970	29,522	160,589	264,451
Kerr	5%	1,224,307	0	0	140,710	228,894
Medina	15%	2,679,089	1,421,149	843,199	208,545	1,484,783
Refugio	13%	28,969,743	195,479	2,816,461	6,029,616	8,192,161
Victoria	5%	34,618,575	2,070,202	6,387,900	9,538,865	22,614,208
Wilson	82%	2,081,921	0	18,564	218,166	360,002
<b>Totals</b>	<b>-</b>	<b>239,849,004</b>	<b>15,701,370</b>	<b>29,639,191</b>	<b>82,904,099</b>	<b>121,059,571</b>

## 5 Availability of Existing Hydrologic and Hydraulic Models

### ***1.e - A geodatabase and associated maps in accordance with TWDB Flood Planning guidance***

documents that identifies areas where existing hydrologic and hydraulic models needed to evaluate FMSs and FMPs are available

Hydraulic models are available for areas where the following flood inundation boundary source data is provided:

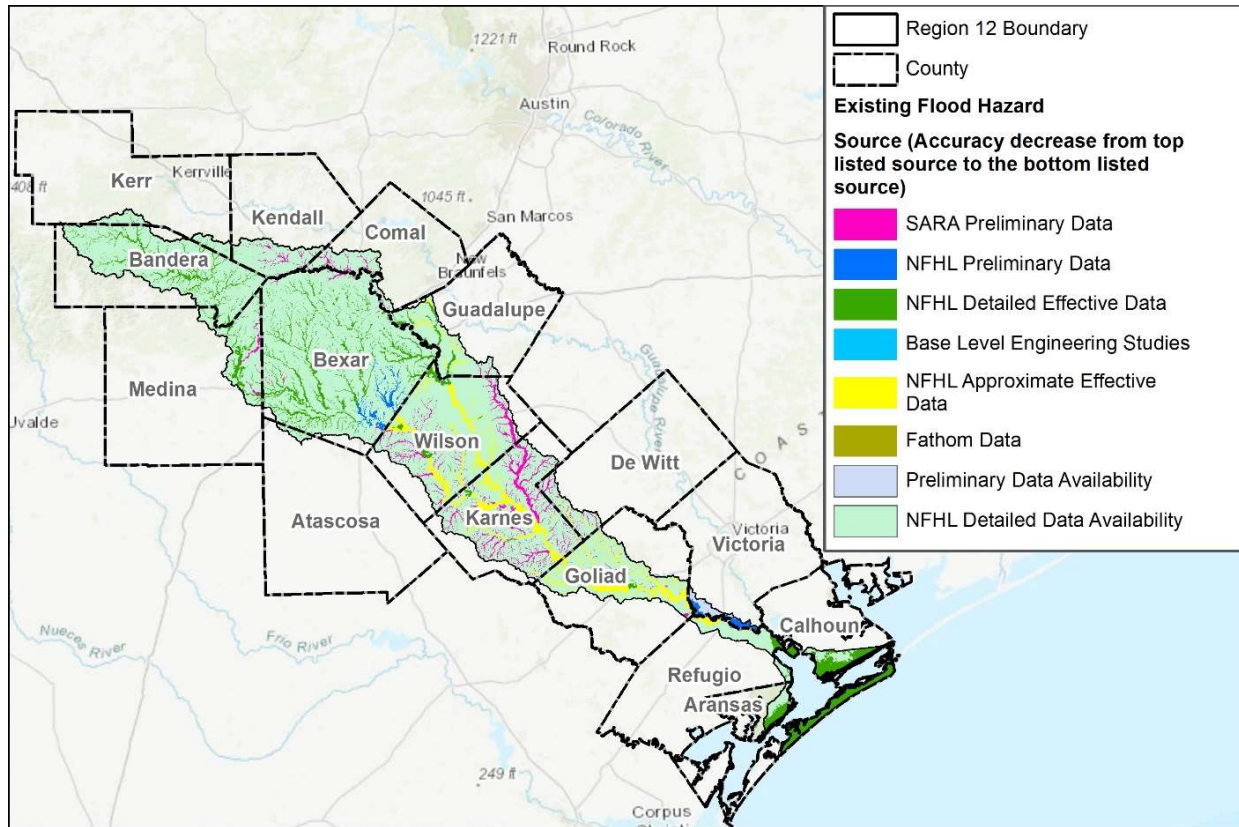
- San Antonio River Authority
- National Flood Hazard Layer
- Base Level Engineering Studies

The SARA Preliminary data was provided by the San Antonio River Authority, a FEMA Cooperating Technical Partner. Under SARA's Risk MAP Mapping Activity Statements, revised mapping and modeling has been completed for various areas within the San Antonio River basin which incorporates NOAA Atlas 14 rainfall data and the latest modeling standards. The SARA Preliminary data was provided for the RFP efforts but has not been made public for use at the time of this memorandum.

The NFHL detailed study reaches' hydrologic and hydraulic (H&H) models for Bexar, Wilson, Karnes, and Goliad counties are made available through the [SARA Digital Data and Model Repository \(D2MR\) Website](#) (full link in Appendix A-7), where H&H models and data related to FEMA DFIRM is stored and managed. The SARA D2MR serves as a centralized location for the storage, management, and dissemination of H&H models and data related to the FEMA DFIRM and subsequent updates. The D2MR website provides the public with standard web tools to navigate and access information related to the effective FEMA DFIRMs and supporting models. The D2MR also serves as a document management system to control and track the information being provided to and edited by consulting engineers as part of the FEMA LOMR Review Partnership. The mapping component of the D2MR application provides users the ability to search by address, cross streets, stream name, watershed name, FEMA panel, or LOMC. The D2MR application empowers the public to get involved with the regional flood control strategies and interact with SARA to better prepare for and respond to flooding.

Additional studies with available H&H models identified through public comments will be evaluated as the data becomes available.

**Figure 5-1. Hydrologic and Hydraulic Model Availability**



## 6 List of Available Flood-Related Models of Most Value

### ***1.f - A list of available flood-related models that the RFPG considers of most value in developing its plan***

The following provides a list of available flood-related models, in order of most valuable to least valuable, that are available to define the extents of the 1.0% and 0.2% annual chance flood event boundaries.

1. SARA Preliminary Data
2. NFHL Preliminary Data
3. NFHL Detailed Effective Data
4. Base Level Engineering Studies (BLE)

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

1. NFHL Approximate Effective Data
2. Fathom Draft Data
3. Public Comments

Fathom Draft Data was pulled from the [TWDB Cursory Floodplain Page](#) (full link in Appendix A-7), the page was last updated on October 29, 2021.

BCRAGD was awarded grant funds from the TWDB for the installation of a Flood Early Warning System (FEWS) on the Medina River. The USGS developed a flood warning tool set for use by Bandera County Emergency Services and the public during rainfall events. The hydraulic model was calibrated to historical floods and the model was used to create a flood atlas and an interactive flood inundation map that has predictive properties.

## 7 Adopted Flood Mitigation and Floodplain Management Goals

### ***1.g - The flood mitigation and floodplain management goals adopted by the RFPG per §361.36***

The RFPG is to define overarching flood mitigation and floodplain management goals for the Flood Planning Area. These goals will serve as a guide to the overall approach and recommendations in the plan.

The overarching goal is “to protect against the loss of life and property” as set forth in the Guidance Principles in 31 TAC §362.3. Other overarching goals defined are “enhancing floodplain management and “funding” within the Flood Planning Area.

The goals must be specific and achievable flood mitigation and floodplain management goals that when implemented will demonstrate progress towards the overarching goal. Both short-term goals (10 years) and long-term goals (30 years) were identified.

The following were considered in the development of the goals:

- Guidance Principles as listed in 31 TAC §362.3
- The existing condition flood risk analyses
- The future condition flood risk analyses
- The consideration of current floodplain management and land use approaches
- Input from the public
- Understanding of the residual risk of each goal (i.e. the remaining risk)

Refer to **Appendix A-2, Exhibit C, Table 11** for the list of flood mitigation and floodplain management goals developed by the Region 12 Technical Subcommittee and adopted by the San Antonio RFPG at the Planning Group Meeting on November 16, 2021.

## 8 Documented Process to Identify Feasible Flood Projects and Strategies

### ***1.h - The documented process used by the RFPG to identify potentially feasible FMSs and FMPs***

The process for identifying potential Flood Management Evaluations, Strategies, and Projects for the 2023 San Antonio Regional Flood Plan was prepared by a Region 12 subcommittee and presented at the December 17, 2021 Regional Flood Planning Meeting. Refer to **Appendix A-6** for the documented process.

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## 9 Potential Flood Evaluations and Potential Feasible Flood Projects and Strategies

### ***1.i - A list of potential FMEs and potentially feasible FMSs and FMPs identified by the RFPG, if any***

A list of potential Flood Management Evaluations (FMEs) and potentially feasible Flood Mitigation Strategies (FMSs) and Flood Mitigation Projects (FMPs) has been prepared by the Regional Flood Planning Group and will continue to be updated in 2022. The associated tables are provided in **Appendix A-3, A-4, and A-5**.

The list was obtained by reviewing a list of projects funding through the Texas Water Development Board Flood Infrastructure Fund (FIF), stakeholder engagement, and through the review of relevant studies.

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 in order 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

A Flood Mitigation Project (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:

- Structural Flood Mitigation Projects
  - 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 Flood Mitigation Projects
  - 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

A Flood Management Strategy (FMS) is a proposed plan to reduce flood risk or mitigate flood hazards to life or property. A 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 Flood Management Evaluations, Strategies, and Projects for the 2023 San Antonio Regional Flood Plan can be found under **Section 8 Documented Process to Identify Feasible Flood Projects and Strategies**.

## 10 Identified Flood Projects and Strategies determined Infeasible

***1.j - 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.***

At this time no FMSs or FMPs have been determined infeasible by the Regional Flood Planning Group.

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# Appendix A-1

Exhibit C, Table 6

Existing Floodplain  
Management Practices

Exhibit C, Table 6  
Existing Floodplain Management Practices

Existing Floodplain Management Practices

Entity <sup>A, E</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
Alamo Heights	Yes	Yes	Yes		Low	-	-	-
Aransas County	Yes	Yes	Yes	Yes	Moderate	-	-	-
Aransas Pass	Yes	Yes	Yes	Yes	Moderate	-	-	-
Atascosa County	Yes	Yes	Yes	Yes	Moderate	-	-	-
Austwell	Yes	Yes	Yes		Low	-	-	-
Balcones Heights	Yes	Yes	Yes		Low	-	-	-
Bandera County	Yes	Yes	Yes	Yes	Moderate	-	-	-
Bexar County	Yes	Yes	Yes		Low	-	-	-
Boerne	Yes	Yes	Yes	Yes	Moderate	-	-	-
Bulverde	Yes	Yes	Yes	Yes	Moderate	-	-	-
Calhoun County	Yes	Yes	Yes	Yes	Moderate	-	-	-
Castle Hills	Yes	Yes	Yes	Yes	Moderate	-	-	-
Castroville	Yes	Yes	Yes	Yes	Moderate	-	-	-
China Grove	Yes	Yes	Yes	Yes	Moderate	-	-	-
Cibola	Yes	Yes	Yes		Low	-	-	-
City of Bandera	Yes	Yes	Yes		Low	-	-	-
City of Goliad	Yes	Yes	Yes		Low	-	-	-
Comal County	Yes	Yes	Yes	Yes	Moderate	-	-	-
Converse	Yes	Yes	Yes		Low	-	-	-
DeWitt County	Yes	Yes	Yes		Low	-	-	-
Elmendorf	Yes	Yes	Yes		Low	-	-	-
Fair Oaks Ranch	Yes	Yes	Yes	Yes	Moderate	-	-	-
Falls City	Yes	Yes	Yes		Low	-	-	-
Floresville	Yes	Yes	Yes	Yes	Moderate	-	-	-
Fulton	Yes	Yes	Yes		Low	-	-	-
Garden Ridge	Yes	Yes	Yes		Low	-	-	-
Goliad County	Yes	Yes	Yes		Low	-	-	-
Grey Forest	Yes	Yes	Yes		Low	-	-	-
Guadalupe County	Yes	Yes	Yes	Yes	Moderate	-	-	-
Helotes	Yes	Yes	Yes	Yes	Moderate	-	-	-
Hill Country Village	Yes	Yes	Yes		Low	-	-	-
Hollywood Park	Yes	Yes	Yes		Low	-	-	-
Karnes City	Yes	Yes	Yes		Low	-	-	-
Karnes County	Yes	Yes	Yes		Low	-	-	-
Kendall County	Yes	Yes	Yes	Yes	Moderate	-	-	-
Kenedy	Yes	Yes	Yes	Yes	Moderate	-	-	-
Kerr County	Yes	Yes	Yes	Yes	Moderate	-	-	-
Kirby	Yes	Yes	Yes		Low	-	-	-
La Coste	Yes	Yes	Yes	Yes	Moderate	-	-	-
LaVernia	Yes	Yes	Yes	Yes	Moderate	-	-	-
Leon Valley	Yes	Yes	Yes		Low	-	-	-
Live Oak	Yes	Yes	Yes		Low	-	-	-
Marion	Yes	Yes	Yes		Low	-	-	-
Medina County	Yes	Yes	Yes	Yes	Moderate	-	-	-
New Berlin	Yes	Yes	Yes		Low	-	-	-
New Braunfels	Yes	Yes	Yes	Yes	Moderate	-	-	-
Olmos Park	Yes	Yes	Yes		Low	-	-	-
Port Aransas	Yes	Yes	Yes	Yes	Moderate	-	-	-
Poth	Yes	Yes	Yes		Low	-	-	-
Refugio County	Yes	Yes	Yes		Low	-	-	-
Rockport	Yes	Yes	Yes	Yes	Moderate	-	-	-
Runge	Yes	Yes	Yes		Low	-	-	-
San Antonio	Yes	Yes	Yes	Yes	Moderate	-	-	-
Santa Clara	Yes	Yes	Yes		Low	-	-	-
Schertz	Yes	Yes	Yes		Low	-	-	-
Sea Drift	Yes	Yes	Yes	Yes	Moderate	-	-	-
Selma	Yes	Yes	Yes		Low	-	-	-
Selma	Yes	Yes	Yes		Low	-	-	-
Shavano Park	Yes	Yes	Yes	Yes	Moderate	-	-	-
Somerset	Yes	Yes	Yes		Low	-	-	-
Spring Branch	Yes	Yes	Yes		Low	-	-	-
Staples	Yes	Yes	Yes		Low	-	-	-
Stockdale	Yes	Yes	Yes		Low	-	-	-
Terrell Hills	Yes	Yes	Yes		Low	-	-	-
Universal City	Yes	Yes	Yes	Yes	Moderate	-	-	-
Victoria County	Yes	Yes	Yes		Low	-	-	-
Von Ormy	Yes	Yes	Yes		Low	-	-	-
Wilson County	Yes	Yes	Yes	Yes	Moderate	-	-	-
Windcrest	Yes	Yes	Yes	Yes	Moderate	-	-	-

<sup>A</sup> At a minimum, the RFPs 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, RFPs are strongly encouraged to provide this information when applicable and available.

<sup>C</sup> The following may serve as a guide for evaluating enforcement:

high – actively enforces the entire ordinance, performs many inspections throughout construction process, issues fines, violations, and Section 1316s where appropriate, and enforces substantial damage and substantial improvement;

moderate – enforces much of the ordinance, performs limited inspections and is limited in issuance of fines and violations;

low – provides permitting of development in the floodplain, may not perform inspections, may not issue fines or violations;

none – does not enforce floodplain management regulations.

<sup>D</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*

<sup>E</sup> Entity will be a city unless otherwise stated.

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# Appendix A-2

Exhibit C, Table 11

Flood Mitigation and  
Floodplain Management  
Goals

**Exhibit C, Table 11**  
**Regional Flood Plan, Flood Mitigation, and Floodplain Management Goals**

Regional Flood Plan, Flood Mitigation, and Floodplain Management Goals (draft as of December 17, 2021)

Goal ID	RFPG No.	RFPG Name	Goal	Term of Goal	Target Year	Applicable To	Residual Risk	How will the Goal be Measured	Overarching Goal(s)	Associated Goal IDs
1	12	San Antonio	Increase the number of public outreach and education activities to improve awareness of flood hazards and benefits of flood planning in the FPR by X occurrences, and nature base solution training and receive certificate enabling greater participation in flood risk/mitigation decisions.	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Education and Outreach	
2	12	San Antonio	Increase the proficiency of floodplain managers across the region through training from TFMA, ASFPM and FEMA. Improve FPM knowledge of nature based solutions, floodplain preservation, and cost/benefit of traditional structural solutions.	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Education and Outreach	
3	12	San Antonio	Support the development of a regionally coordinated warning and emergency response program that can detect the flood threat and provide timely warning of impending flood danger to reduce flood deaths and high water rescues across the region	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Flood Warning and Readiness	5
4	12	San Antonio	Increase the number of flood gauges (rainfall, stream, reservoir, etc.) in the region by X gauges to provide localized information to emergency responders, and storage and accessibility of data to agencies.	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Flood Warning and Readiness	5
5	12	San Antonio	Increase the number of entities that communicate real time flood warnings to the public. Leverage mobile phone navigation apps to provide real time rerouting for the public.	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Flood Warning and Readiness	4
6	12	San Antonio	Increase the number of entities which utilize/adopt Atlas 14 (Volume 11) or best available data from NOAA revised rainfall data as part of revisions to design criteria and flood prevention regulations by X percent. (region specific)	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Flood Studies and Analysis	
7	12	San Antonio	Increase the number of entities that conduct detailed studies to update their local flood risk by X.	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Flood Studies and Analysis	
8	12	San Antonio	Decrease the average age of FEMA Flood Insurance Rate Maps (NFHL/FIRMS/FIS) by X years.	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Flood Studies and Analysis	
9	12	San Antonio	Increase the number of entities which have completed an analysis for using existing Natural Flood Mitigation Features (NFMF) such as headwaters, buffers, and conservation easements.	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Flood Studies and Analysis	
10	12	San Antonio	Increase the number of participating Community Rating System (CRS) entities in the FPR by X.	Short Term (10 year)	2033	Entire RFPG			Flood Prevention	11
11	12	San Antonio	Increase the rating of participating entities within Community Rating System (CRS) in the FPR by X.	Long Term (30 year)	2053	Entire RFPG			Flood Prevention	10

**Exhibit C, Table 11**  
**Regional Flood Plan, Flood Mitigation, and Floodplain Management Goals**

12	12	San Antonio	Increase the number of entities which regulate to the 1% annual chance future conditions floodplains as part of new development and redevelopment by <b>X</b> .	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Flood Prevention	
13	12	San Antonio	Increase the number of entities that have adopted a holistic watershed approach using existing Natural Flood Mitigation Features (NFMF) such as headwaters, buffers, and conservation easements for flood risk reduction as a basis for comprehensive subdivision regulations.	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Flood Prevention	
14	12	San Antonio	Increase the number of acres of publicly protected open space by <b>X</b> as part of land conservation and acquisitions to reduce future impacts of flooding.	Short Term (10 year)	2033	Entire RFPG			Non-Structural Flood Infrastructure Projects	15
15	12	San Antonio	Increase the number of restored acres of publicly protected open space land in the region.	Long Term (30 year)	2053	Entire RFPG			Non-Structural Flood Infrastructure Projects	14
16	12	San Antonio	Reduce the number of NFIP repetitive-loss properties in the FPR by <b>X</b> .	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Non-Structural Flood Infrastructure Projects	
17	12	San Antonio	Reduce the number of residential properties in the future 1% annual chance floodplain by <b>X</b> .	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Non-Structural Flood Infrastructure Projects	
18	12	San Antonio	Reduce the number of vulnerable critical facilities located within the existing and future 1% annual chance (100-year) floodplain by <b>X</b> .	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Structural Flood Infrastructure Projects	
19	12	San Antonio	Reduce the number of vulnerable roadway segments and low water crossings located within the existing and future 1% annual chance (100-year) floodplain by <b>X</b> .	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Structural Flood Infrastructure Projects	
20	12	San Antonio	Increase the number of structural projects that include a NBS or Green Infrastructure (GI) component	Short Term (10 year) /Long Term (30 year)	2033 / 2053	Entire RFPG			Structural Flood Infrastructure Projects	

\*This table contains examples of regional flood mitigation and floodplain management goals and does not reflect any TWDB recommended goals based on real data. The goals are included to reflect reporting requirements.



# Appendix A-3

Exhibit C, Table 12

Potential Flood  
Management Evaluations  
Identified by the Regional  
Flood Planning Group

#### Potential Flood Management Evaluations Identified by RFPC

[illegible]

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# Appendix A-4

Exhibit C, Table 13

Potentially Feasible Flood  
Mitigation Projects  
Identified by the Regional  
Flood Planning Group

### Potentially Feasible Flood Mitigation Projects Identified by RFPC

[illegible]



# Appendix A-5

Exhibit C, Table 14

Potentially Feasible Flood  
Management Strategies  
Identified by the Regional  
Flood Planning Group

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

[illegible]

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## Appendix A-6

Proposed Process for  
Identifying Potential Flood  
Management Evaluations,  
Strategies, and Projects  
for the 2023 San Antonio  
Regional Flood Plan

## **Task 4B – Identification and Evaluation of Potential Flood Management Evaluations and Potentially Feasible Flood Management Strategies and Flood Mitigation Projects**

TWDB requirements for Task 4B state that each RFPG is to develop and receive public comment on a “...proposed process to be used by the RFPG to identify and select flood management evaluations, flood mitigation strategies, and flood mitigation projects”. This process, once adopted by the RFPG, is to be documented and such documentation is to be included in the Technical Memorandum, the Initial Draft Regional Flood Plan, and the adopted Regional Flood Plan.

The following describes the proposed process being considered by the RFPG and on which public comment will be taken, both during the December RFPG meeting and via written comments submitted through the RFPG’s website. The process, as described below, was designed to conform with TWDB requirements as expressed in the rules, the scope-of-work for the regional flood planning process, and technical guidelines.

### **Step 1: Conduct an initial screening of Projects, Evaluations, and Strategies that were received by or developed in conjunction with floodplain management communities/project sponsors:**

In this first step, screening is conducted based on minimum TWDB requirements. The screening criteria applied in this step are:

- The evaluation/strategy/project is related to a flood mitigation or floodplain management goal.
- The evaluation /strategy/project meets an emergency need.
- The evaluation /strategy/project addresses a flood problem with drainage area of 1 square mile or greater.
- The evaluation /strategy/project reduces flood risk for the 100-year (1% annual chance) flood.
- Exceptions for level of flood risk reduction or problem area size include instances of flooding of critical facilities, transportation routes, or other factors as determined by the RFPG.

### **Step 2-1: Screening of Projects (FMPs):**

In the second step, potential Flood Mitigation Projects

(FMPs) are subjected to a screening-level evaluation based on the TWDB Technical Guidelines for Regional Flood Planning (April 2021) and specifically Figure 5 FMP flowchart (Attachment A). If a potential FMP does not satisfy the screening criteria in this step, it will then become a potential Flood Management Evaluation. There are three criteria that are applied in this step are: “sufficient data”, “no negative effect”, and “project details”.

- Sufficient data - The data upon which an assessment of no negative effect has been made must be reliable and have minimal uncertainty. H&H modeling, mapping, and basis for mitigation analysis must generally meet Section 3.5 of TWDB technical guidelines.
- No negative effect - The potential Project must not have negative impact on the 100-year (1% annual chance) flood event. It must not raise the flood elevation or increase discharge of the

100-year flood event. Any of the following will disqualify the potential project in this screening step:

- Potential project increases inundation on homes or commercial buildings.
  - Potential project increases inundation beyond existing or proposed ROW or easements.
  - Potential project increases inundation beyond existing drainage infrastructure capacity.
- Project details – Data used to define the potential project must include sufficient project details as described in Section 3.9 of TWDB technical guidelines, including but not limited to the following:
  - Flood severity level metrics
  - Flood risk/damage reduction metrics
  - Estimated capital and O&M costs
  - Benefit/Cost ratios
  - Environmental benefits/impacts
  - Implementation constraints
  - Water supply benefits

Step 2-2: Screening of Evaluations (FMEs):

Flood Management evaluations may fall into one of three general categories:

1. Potential projects (FMPs) that did not meet screening criteria Step 2-1.
2. Planned flood studies or flood risk reduction alternatives analyses provided by or developed in conjunction with floodplain management communities/project sponsors.
3. Potential flood studies or flood risk reduction alternatives analysis needs identified by the technical consultant in Task 4A.

In this step potential studies are screened based on the following criteria from TWDB technical guidelines and illustrated in the flowchart in Attachment B:

- Potential evaluation must identify structures, population, and critical facilities at risk within the flood problem area being studied.
- Potential evaluation must identify roadways impacted by flooding within the flood problem area being studied, if applicable.
- Potential evaluation must quantify area of agricultural land at risk within the flood problem area being studied, if applicable.
- Potential evaluation must have willing sponsor(s) identified that are willing to commit resources and some level of potential cost sharing.
- Potential evaluation must have reasonable planning-level cost estimate.

If there is sufficiently detailed H&H analysis and flood mitigation alternatives analysis, then the Evaluation may be considered as Project (FMP) or Strategy (FMS)

Step 2-3: Screening of Strategies (FMSs):

Strategies are proposed plans or actions that reduce flood risk or mitigate flood hazards to life or property. Any proposed action that doesn't meet the criteria to qualify as an evaluation or as a project can potentially be considered as a strategy. Strategies can also be flood studies or flood risk reduction

alternatives analysis needs that are identified in Task 4A. In general, RFPG has flexibility with what qualifies as Strategies.

In this step, Strategies are screened based on the following criteria from the TWDB technical guidelines:

- Potential strategies must include a planning-level cost estimate.
- Potential strategies must have an identified sponsor(s) that are willing to commit resources and some level of potential cost sharing.
- Potential strategies must quantify the estimated flood risk being addressed and potential level of flood risk reduction.

*Step 3: Sorting of Projects, Evaluations and Strategies by Flood Mitigation and Floodplain Management Goals:*

In the third step, the projects, evaluations, and strategies identified will be assigned to one of more of the goals defined in Task 3B.

*Step 4: Detailed assessment of selected Projects, Evaluations, and Strategies:*

In the fourth step, potential evaluations, strategies, and projects that meet the criteria in the initial screening processes described in Steps 1 and 2 are to be evaluated further for potential feasibility and must meet the following:

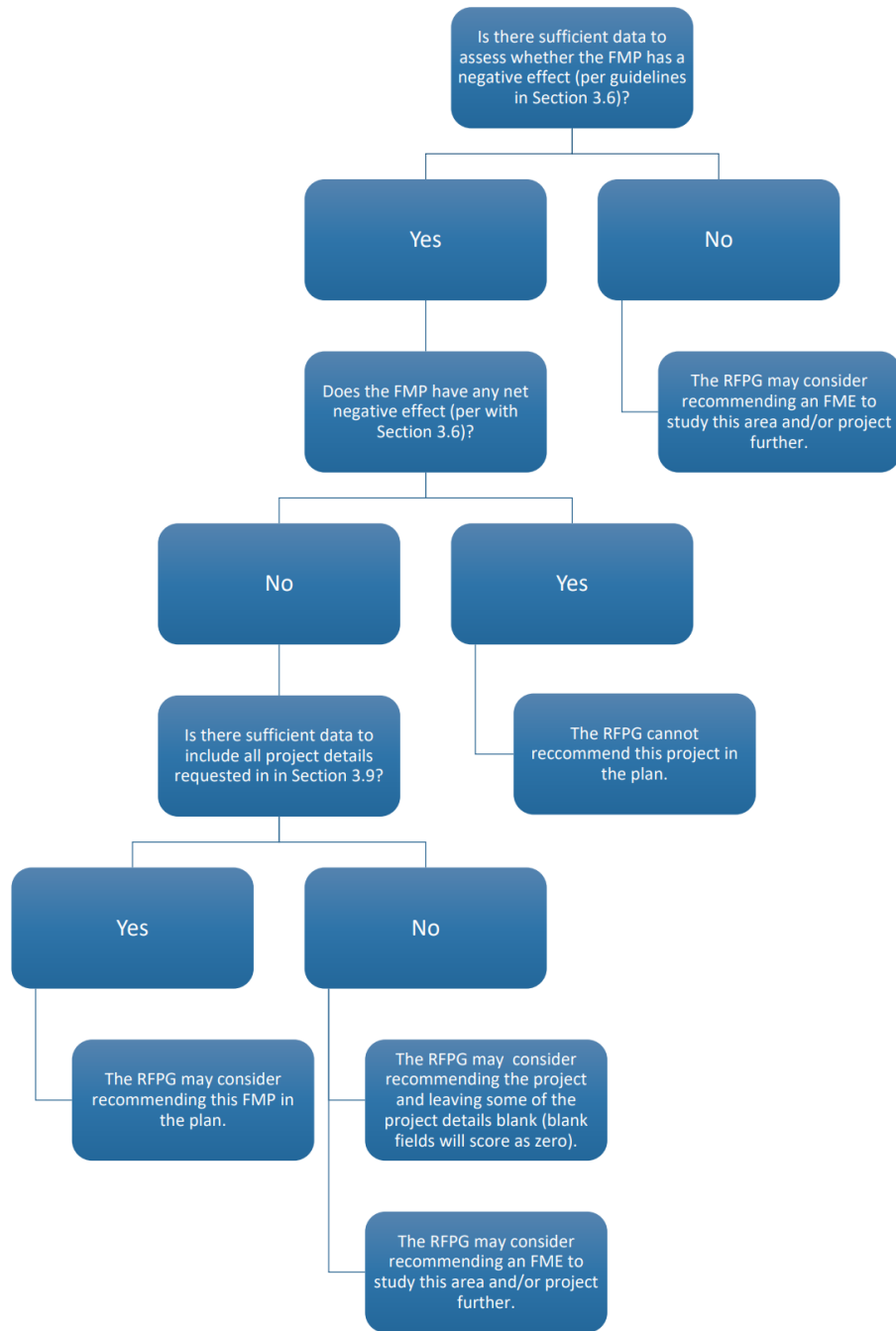
- Potential projects must have an estimated benefit-cost ratio greater than 1.0.
- Potential evaluations, strategies, and projects must have a willing sponsor(s) that has been verified.
- There must be no known insurmountable implementation constraints or hurdles, such as ROW acquisitions, utility conflicts, and/or permitting issues.

*Step 5: Final recommendation of Projects, Evaluations, and Strategies:*

In this final step recommended studies, strategies, and projects are to be incorporated in the initial draft and final regional flood plan. The regional flood plan must also include:

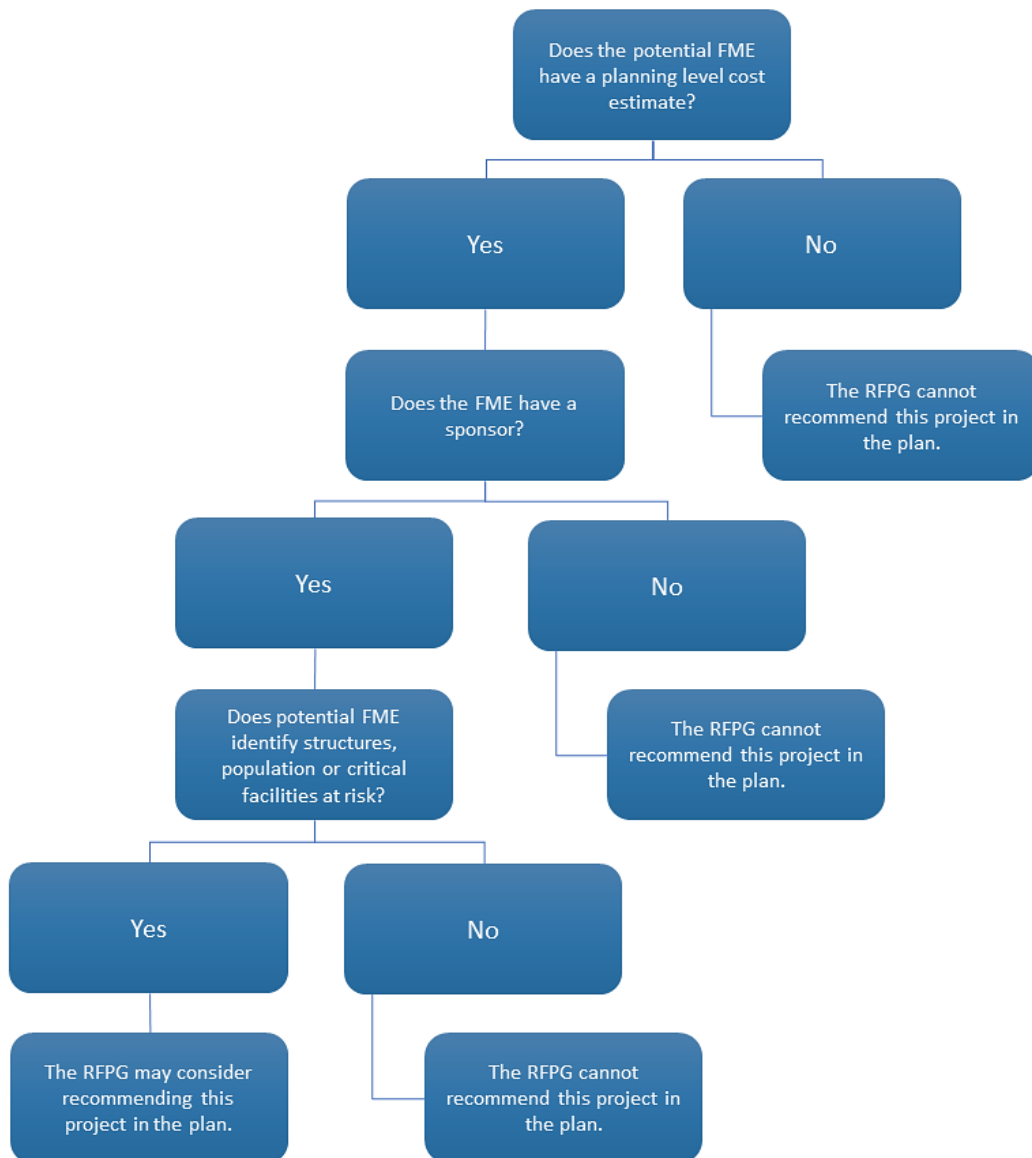
- Public comments and RFPG response on the recommended FMPs, FMEs and FMSs
- Initial and final adoption

Attachment A



RFP Technical Guidelines Figure 5: FMP Flowchart

Attachment B



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# Appendix A-7

Full Reference Links

# Appendix A-7 – Full Reference Links

*Full web addresses listed for the hyperlinks cited in the Technical Memorandum.*

## Section 2

- Watershed Master Plan Viewer:  
<https://sara-tx.maps.arcgis.com/apps/webappviewer/index.html?id=1cc5aae56ef145b69aab7dc1b6e52597>
- FEMA's Map Service Center:  
<https://msc.fema.gov/portal/advanceSearch>
- San Antonio River Authority's Risk MAP Viewer:  
<https://www.arcgis.com/apps/webappviewer/index.html?id=0b13614f13124257bfe589a459ba84fe>
- USGS Flood Inundation Mapping Program (FIMP) Website:  
<https://www.usgs.gov/mission-areas/water-resources/science/flood-inundation-mapping-fim-program>

## Section 3.4

- Regional Flood Planning ArcGIS Online Interactive Map:  
<https://hdr.maps.arcgis.com/apps/CrowdsourceReporter/index.html?appid=3b5355d3c32a4f9a9e3118532b633ebb&>

## Section 4

- Bexar County Highwater Alert Lifesaving Technology (HALT)  
<https://www.bexar flood.org/#/main/map>
- San Antonio Flood Emergency (SAFE) Route System  
<https://gis.sanantonio.gov/OEM/SAFE/index.html>

## Section 5

- SARA Digital Data and Model Repository (D2MR) Website:  
<https://d2mr.sara-tx.org/Login?ReturnUrl=%2F#/>

## Section 6

- TWDB Cursory Floodplain Page:  
<https://twdb-flood-planning-resources-twdb.hub.arcgis.com/pages/cursory-flood>

Project Title:			San Antonio Regional Flood Plan		RFPG Reviewers:		Response By:		
Project Development Engineer (PDE):			HDR		SS - Susanne Scott		LV- Ludivine Varga		
Project Manager:			Ron Branyon		EC - Erin Cavazos		RB - Ron Branyon		
Deliverable Milestone:			Technical Memorandum		DB - Derek Boese				
Initial Disposition: A = Agree, will incorporate; C = Requires Clarification; D = Disagree, do not incorporate; E = Acknowledge comment, no change to deliverable required									
Final Disposition: A = Comment to be incorporated; D = Disagree; E = No change required									
Comment #	Comment Location		Reviewer	Comment	Response	Response By	Initial Disposition	Final Disposition	Final Verification
	Document	Page / Section							
SARFP TM Package									
1	TM	1	RFPG - SS	<p>Trying to make sense of the number of entities is hard to follow—There is a total of 69 entities; a total of 29 entities have adopted higher standards....is that the same 29 entities that have moderate level standards? You may want to clarify the entities numbers—it was a little confusing in the reading.</p> <p>There are reference errors (which I am assuming will be fixed once the report is finalized).</p> <p>The map was confusing—does City San Antonio not have higher standards? I did not see a red dot for San Antonio. Bexar County?</p>	<p>- Updated text to clarify.</p> <p>- Updated cross references within text.</p> <p>-City of San Antonio should have higher standards. Updated figure.</p>	LV/RB	A A A		
2	TM	1	RFPG - EC	<p>Since this list seems to only include entities with regulatory authority, I recommended adding this clarifier. This list does not contain all entities with flood-related authorities or responsibilities such as dam ownership or maintenance of other flood mitigation infrastructure.</p>	<p>-Text added as suggested.</p>	LV/RB	A		
3	TM	2, Table General	RFPG - EC	<p>Is this the jurisdiction covered by the study or the entity performing the study? For the River Authority-sponsored studies, the jurisdictions listed are the ones covered by the study.</p>	<p>-These are the jurisdictions covered by the study. Updated column title.</p>	LV/RB	A		
4	TM	2	RFPG - SS	<p>Is the date on SARA’s Holistic Watershed Plans correct (2008?) I thought some had been updated since then.</p> <p>Should we include SARA’s predictive flood model?</p> <p>Bexar Flood Website (HALT system/COSA Safe Route system)of low water crossings?</p> <p>Does City of San Antonio have a drainage master plan/stormwater code?</p> <p>I thought there is a Hazard Mitigation Plan (either through AACOG/COSA/Bexar County);</p> <p>Does the Atlas 14 Analysis that COSA and SARA conducted count as a study?</p>	<p>-The study started in 2009 and the last revision was made in 2015. Table updated.</p> <p>- Will be considered when the data becomes available.</p> <p>- Added to Section 4.2 Low Water Crossings.</p> <p>- Yes, drainage master plan added to Table.</p> <p>- Yes, AACOG Regional Muti-Hazard Mitigation Plan added to Table.</p> <p>- The Atlas 14 analysis that was done localaly is considered in other modeling and mapping studies and development codes so it was not added to the table.</p>	LV/RB	A D A A D		
5	TM	2	RFPG - DB	<p>Table 2-1. We have links to some but not others. Should there either 1) be links in each box if available, or 2) an Appendix that lists locations of all studies/info with their links? Will have similar comment for later on.</p>	<p>-Since we dont have links or access to all the studies, individual study links were removed. However, hyperlinks to the web viewers will remain, full links will be added to Appendix 7.</p>	LV/RB	A		

Project Title:			San Antonio Regional Flood Plan		RFPG Reviewers:		Response By:		
Project Development Engineer (PDE):			HDR		SS - Susanne Scott		LV- Ludivine Varga		
Project Manager:			Ron Branyon		EC - Erin Cavazos		RB - Ron Branyon		
Deliverable Milestone:			Technical Memorandum		DB - Derek Boese				
Initial Disposition: A = Agree, will incorporate; C = Requires Clarification; D = Disagree, do not incorporate; E = Acknowledge comment, no change to deliverable required									
Final Disposition: A = Comment to be incorporated; D = Disagree; E = No change required									
Comment #	Comment Location		Reviewer	Comment	Response	Response By	Initial Disposition	Final Disposition	Final Verification
	Document	Page / Section							
6	TM	2	RFPG - EC	Flood Risk Mapping - These are included in the Risk MAP studies along with the floodplain map updates. I've added each study completed by the River Authority since DFIRM and included the flood risk products in the description.  Bexar/Wilson/Karnes/Goliad Counties 2010 FIS Studies - Note – one of our PMRs triggered an update to the format of the FIS which resulted in a new effective date, but the older date more accurately reflects the age of the study.	- Text added as suggested.  - Accepted changes.	LV/RB	A  A		
7	TM	3.2	RFPG - SS	Is this section only those factors that add to flooding hazard or also those actions that can mitigate the future hazards? an influence on future flooding—not only is the increased development a factor—but also the preservation of open space (to the positive, ie: EAPP and other preservation of large open spaces);  what about regulations development (ie: restrictions to development in flood plains/restrictions to impervious cover, preservation of trees, incentives for LID/GSI?	-Future flood conditions assume no change to current floodplain ordinances and development regulations per TWDB guidelines. Reworded texted.  -See comment above.	LV/RB	D  D		
8	TM	4	RFPG - SS	Should we add emergency response data, 311 calls in San Antonio, Local governmental tracking through Emergency Managers/EOC of flooded areas, etc.	- CoSA is currently compiling a list of FMPs/FME/FMS to be included in the final plan - the 311 data will be considered for this. 311 data can also be used for historical flooding evaluation, text added.	LV/RB	A		
9	TM	4.2	RFPG - SS	should we add Bexar Flood website of low water crossings (HALT system/COSA Safe Route System)	- Yes. Updated text to include sources and links.	LV/RB	A		
10	TM	4.4	RFPG - DB	Table 4-1. Still learning a lot but unless Water Years are calculated in a funky way, not sure how Water Year 2007 would be the same year Katrina hit Louisiana (this is info I do know!). Plus that was also Rita which hit both LA and TX.	- Correct, this was the year that Tropical Storm Erin hit Texas. Rita and Katerina were in 2005, the region does not have any flood related damages/casulties associated with these events. Text updated.	LV/RB	A		
11	TM	6.2	RFPG - DB	Similar to first comment - should be there a place for links to references? As public doc and for traceability of info seems should be somewhere.	- Agree. Any hyperlinks that are included in the document will have their full links listed in an Appendix.	LV/RB	A		

SARFPG Technical Memo Comment Log									
Project Title:			San Antonio Regional Flood Plan		RFPG Reviewers: SS - Susanne Scott EC - Erin Cavazos DB - Derek Boese		Response By: LV- Ludivine Varga RB - Ron Branyon		
Project Development Engineer (PDE):			HDR						
Project Manager:			Ron Branyon						
Deliverable Milestone:			Technical Memorandum						
Initial Disposition: A = Agree, will incorporate; C = Requires Clarification; D = Disagree, do not incorporate; E = Acknowledge comment, no change to deliverable required									
Final Disposition: A = Comment to be incorporated; D = Disagree; E = No change required									
Comment #	Comment Location		Reviewer	Comment	Response	Response By	Initial Disposition	Final Disposition	Final Verification
	Document	Page / Section							
12	TM	9	RFPG - SS	Under non-structural; —would you see <i>updated development codes; polices; incentives (stormwater fees based on impervious cover, LID/GSI incentives/rebates</i> —all falling under Regulatory Requirements (or should we list then more specifically?)  What about CRS participation?  Is preservation of open space covered under property easement/acquisition?  How about public education and awareness programs—this could be under flood readiness?	- This list was taken from the TWDB guidelines. FMPs are projects with non-zero capital costs or other non-recurring cost; development codes, policy changes, and incentives would not be considered under this criteria. However, a study to determine fesibility, benefits, or cost could be considered an FME.  -See comment above.  - Yes.  - Yes.	LV/RB	D  D  E  E		