



*Frio River at Kenneth Arthur Crossing
(Upper Nueces Basin)*

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

31 TAC § 361.38 and § 361.39

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5 Identification, Evaluation, and Recommendation of Flood Mitigation Actions

The objective of Chapter 5 is for regional flood planning groups (RFPGs) to evaluate and recommend identified flood mitigation actions, including flood management evaluations (FME), flood management strategies (FMS), and flood mitigation projects (FMP) for inclusion in the regional flood plan (RFP). This section builds on previous chapters with the ultimate objective of recommending flood mitigation actions that

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

This chapter summarizes and documents:

1. Categorization of the various flood mitigation actions,
2. Describes the process used to identify, evaluate, and recommend flood mitigation actions,
3. Summarizes the recommendation of flood mitigation actions in 2023 RFP,
4. Describes additional evaluations performed to identify potential additional FMEs and FMPs, and
5. Summarizes the recommendation of flood mitigation actions in the 2023 amended RFP.

5.1 Categorization of Flood Mitigation Actions

5.1.1 Flood Management Evaluation

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

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

5.1.2 Flood Mitigation Project

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

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

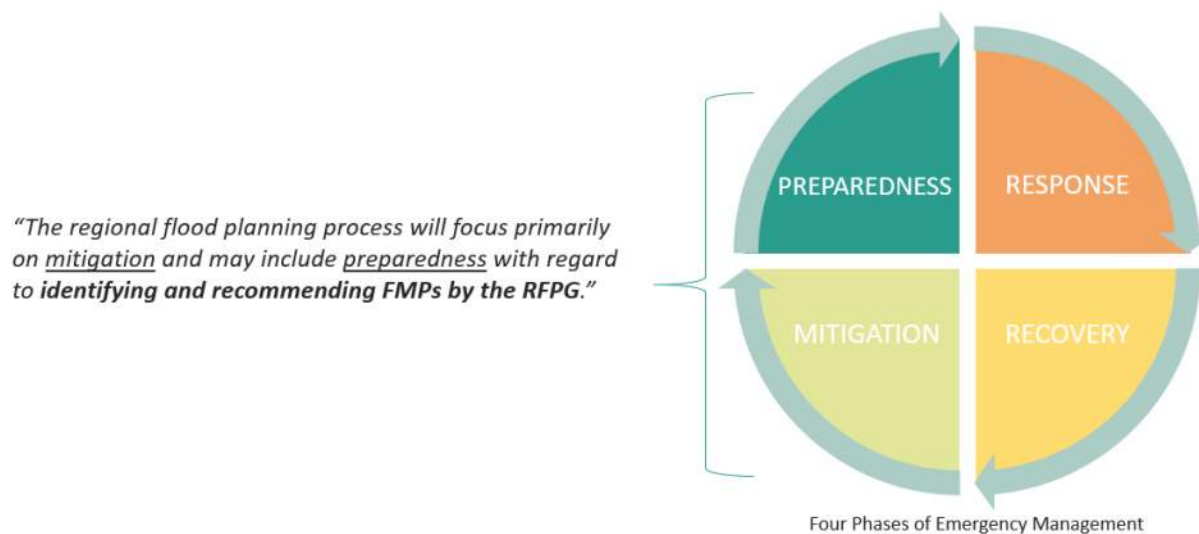


Figure 5-1. Four Phases of Emergency Management

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

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

- Low water Crossings (LWCs) or Culvert/Bridge Improvements
- Channel Improvements
- Flood Detention
- Flood Walls/Levees
- Flood Diversion – Examples include diversion channels or diversion tunnels

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

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

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

5.1.3 Flood Mitigation Strategy

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

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

5.2 Description of Process to Identify, Evaluate, and Recommend Flood Mitigation Actions

The following steps were used to identify, evaluate, and recommend flood mitigation actions:

1. Define draft process for identifying and evaluating flood mitigation actions.
2. Extract potential flood mitigation actions from review of relevant flood studies.
3. Conducted initial stakeholder outreach to obtain information on flood mitigation actions.
4. Identify additional flood mitigation actions to address unmet greatest known flood needs and goals.
5. Perform initial screening and evaluation of flood mitigation actions to determine if actions meet minimum TWDB requirements.
6. Recommend flood mitigation actions.
7. Perform, within the RFPG's resources and the time available, a portion of identified FMEs to identify additional recommended FMEs and FMPs for inclusion in the Amended 2023 Regional Flood Plan.

Steps 1-6 above were performed as part of the 2023 NRFP. Step 7 is a new step that forms the basis of the Amended 2023 RFP, based on additional resources provided by TWDB to RFPGs (Tasks 11-13). The above steps are further described in the following sections.

5.2.1 Draft Process

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

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

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

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

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

Flood Management Evaluation (FME)- flood study of a specific flood prone area needed to assess risk

Flood Mitigation Project (FMP)- structural or non-structural project that when implemented will reduce flood risk, mitigate hazards to life or property. Includes nature-based solutions. 'No negative impact'

Flood Management Strategy (FMS)- proposed plan to reduce flood risk or mitigate flood hazards. Any action that a RFPG would like to evaluate and recommend that does not qualify as FME or FMP.

Figure 5-2. Process for Identifying Potential Flood Mitigation Actions for the 2023 Nueces RFP

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

TWDB guidance for designating FMEs/FMPs (from TWDB)

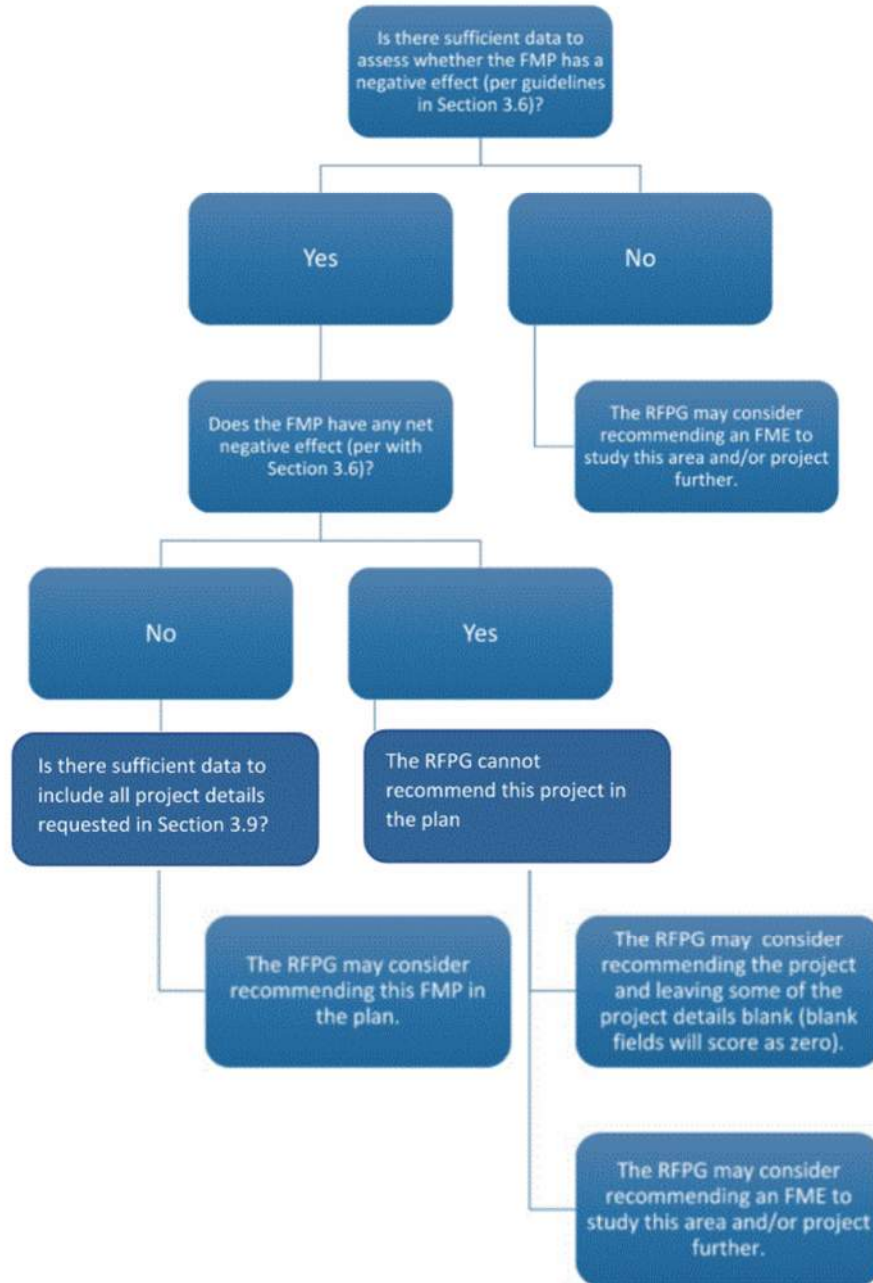


Figure 5-3: Process for Identifying Potential Flood Mitigation Actions for the 2023 Nueces RFP (Continued)

5.2.2 Review of Relevant Flood Studies

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

5.2.3 Stakeholder Outreach

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

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

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

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

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

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

From September 2022 to May 2023, the NRFPG reached out to potential project sponsors by email, phone call, and in-person meetings to gather information for further evaluation of additional recommended FMEs and FMPs for the Amended 2023 NRFP.

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

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

- City of Falfurrias in Brooks County
- City Lytle in Medina County
- City of Three Rivers in Live Oak County
- Pleasanton, Jourdanton, and Poteet area in Atascosa County
- City of Pearsall in Frio County
- Devine area in Medina County
- Hondo area in Medina County
- City of Uvalde in Uvalde County
- Crystal City in Zavala County
- City of Carrizo Springs in Dimmit County
- Cities of Vanderpool and Utopia area along Frio River in Real and Uvalde County
- Area along Nueces River in western Uvalde County
- City of Cotulla in LaSalle County
- City of Woodsboro in Refugio County



- City of Hebbronville in Jim Hogg County
- Sabinas River are in northeast Uvalde County and southwest Bandera County

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

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

Table 5-1. Recommended Flood Studies to address Goals

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

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

5.2.5 NRFPG Evaluation Process

The NRFPG considered recommendations on flood mitigation actions through a multi-step process. As documented in 5.2.3, the NRFPG created a Technical Subcommittee tasked with establishing a selection methodology, implementing the evaluation and selection process, and reporting their findings and recommendations back to the NRFPG for formal approval. The methodology included a screening of all potential flood mitigation actions considering TWDB requirements for inclusion in the RFP and any other additional considerations established by the Technical Subcommittee. The reasons for not recommending a particular flood mitigation action were reviewed by the NRFPG as part of the evaluation and recommendation process with reasons documented in the potential flood mitigation action tables attached to this plan (see Appendix A7 through A9).

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

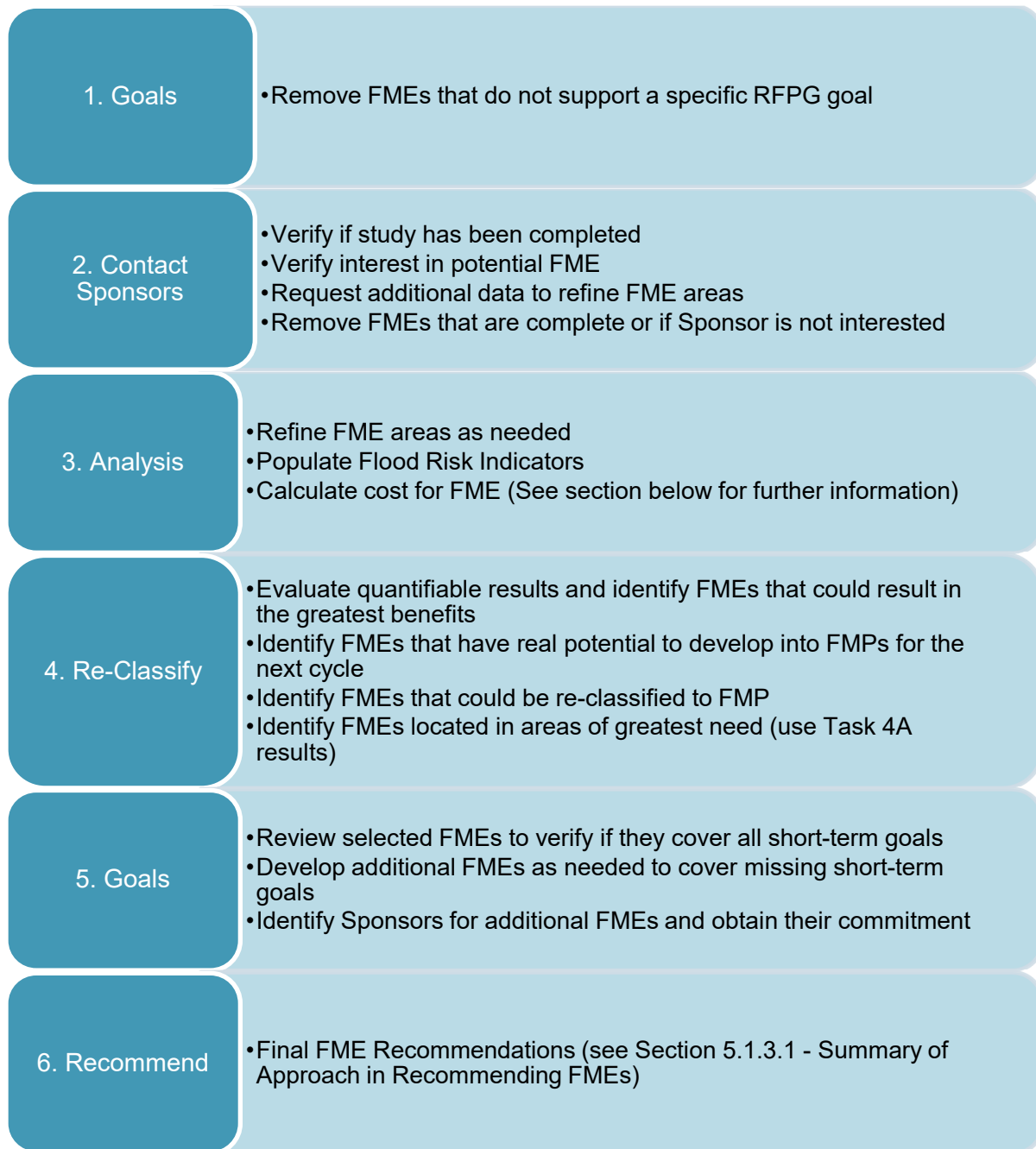


Figure 5-4: FME Screening, Evaluation, and Recommendation Process

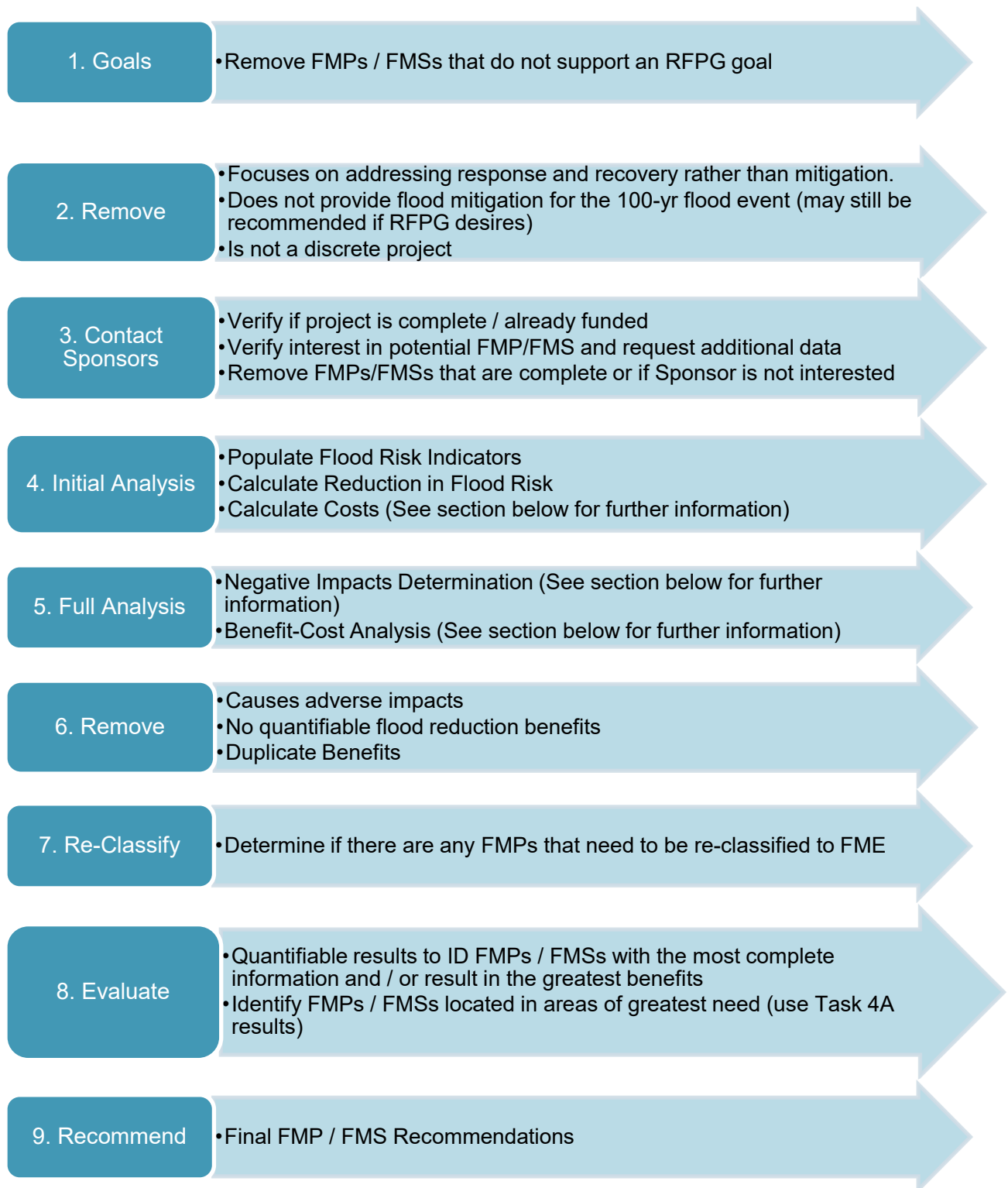


Figure 5-5: FMP and FMS Screening, Evaluation, and Recommendation Process

5.2.5.1 Flood Mitigation Action Costing Assumptions

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

5.2.5.2 No Negative Impacts Determination

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

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

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

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

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

The typical process for this determination is to perform a comparative assessment of pre- and post-project conditions for the 1% annual chance event (100-year flood) for each potentially feasible FMP based on their associated hydrologic and hydraulic models. The floodplain boundary extents, resulting water surface elevations, and peak discharge values would be compared at pertinent locations to determine if the FMP conforms to the no negative impacts requirements. This comparative assessment would be performed for the entire zone of influence of the FMP.

5.2.5.3 Benefit-Cost Analysis

Benefit-cost analysis (BCA) is the method by which the future benefits of a hazard mitigation project are determined and compared to its costs. The end result is a benefit-cost ratio (BCR), which is calculated by dividing the project’s total benefits, quantified as a dollar amount, by its total costs. Updated construction cost estimates and estimates of project benefits must also be available to define a BCR for each recommended FMP. The BCR is a numerical expression of the relative “cost-effectiveness” of a project. A project is generally considered to be cost effective when the BCR is 1.0 or greater, indicating the benefits of a prospective hazard mitigation project are sufficient to justify the costs (FEMA, 2009). However, a BCR greater than 1.0 is not a requirement for inclusion in the RFP. The RFPG can decide to recommend a project with a lower BCR with appropriate justification.

The NRFPG considered all potentially feasible FMPs within the context of necessary data and detailed hydrologic and hydraulic modeling results available in accordance with TWDB technical requirements.

5.2.6 Summary of Approach of Recommending Flood Mitigation Actions

While there is an abundant need across the Nueces Region and the State of Texas for data collection, strategy implementation, and project construction to reduce or remove risk of flooding, not every flood mitigation action can be recommended in the RFP or included in the state flood plan (SFP) due to insufficient available information. The NRFPG evaluated the identified flood mitigation actions, and based on the significant

needs in the region, recommended all those that met the TWDB requirements and offered the greatest potential of reducing flood risks within the region, understanding that as additional information is developed through ongoing or future studies that they can be recategorized as needed in future planning cycles. All recommended projects considered alignment with NRFBG-adopted flood mitigation and floodplain management goals (Chapter 4).

5.2.6.1 Summary of Approach of Recommending FMEs

In considering potential FMEs for recommendation, the NRFBG sought to determine which FMEs would be most likely to result in identification of potentially feasible FMSs and FMPs in future planning cycles. Recommended FMEs were also required to demonstrate alignment with at least one regional floodplain management and flood mitigation goal developed under Task 3. Finally, each recommended FME should identify and investigate at least one solution to mitigate the 1% annual chance flood. It is the intent that all FMEs with a hydrologic and hydraulic modeling component will evaluate multiple storm events, including the 1% annual chance flood. The exact solutions identified through performing these FMEs cannot be defined at this time. However, it is anticipated that an impact analysis will be performed for all alternatives and project benefits will be tabulated for the 1% annual chance flood to help inform any recommended alternatives and to define potentially feasible FMPs under this planning framework. Based on these TWDB requirements, the NRFBG identified two main reasons for recommending FMEs.

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

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

The second subset of recommended FMEs are project planning type FMEs. These FMEs are generally studies or preliminary designs to address a specific, known flood need. However, these flood mitigation actions currently lack some or all the detailed technical data necessary for evaluation and recommendation as an FMP such as demonstrating no adverse impacts, having a BCR greater than 1.0, or confirmation that the project provides mitigation for the 1% annual chance flood event. An example would be an existing study that identifies a potential drainage construction project but does not

provide a no adverse impact analysis or statement. Completing these components as part of an FME will result in a potentially feasible FMP for consideration during future flood planning efforts. Sponsor input was a major driver for choosing not to recommend FMEs. FMEs that were indicated by the sponsor as being in progress, completed, or lacking interest to pursue were not recommended. Additionally, FMEs in close proximity to one another were combined into a single FME for recommendation due to overlapping goals or benefits.

5.2.6.2 Summary of Approach of Recommending FMPs

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

1. The primary purpose is mitigation (response and recovery projects are not eligible for inclusion in the regional flood plan).
2. Supports at least one regional floodplain management and flood mitigation goal. The goals associated with each FMP are included in Appendix A6 – TWDB Table 11 – Flood Mitigation and Floodplain Management Goals.
3. The FMP is a discrete project (not an entire capital program or drainage master plan).
4. Implementation of the FMP results in:
 - a. Quantifiable flood risk reduction benefits (for further information see Benefit-Cost Analysis section below)
 - b. No negative impacts to adjacent or downstream properties (for further information see No Negative Impacts Determination section below)
 - c. No negative impacts to an entity's water supply
 - d. No overallocation of a water source based on the water availability allocations in the most recently adopted State Water Plan (TWDB, 2022 State Water Plan, Appendix B).

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

The TWDB recommends that proposed projects have a BCR greater than one, but the RFPG may recommend FMPs with a BCR lower than one with proper justification.

5.2.6.3 Summary of Approach in Recommending FMSs

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

1. The primary purpose is mitigation (response and recovery projects are not eligible for inclusion in the regional flood plan).
2. Supports at least one regional floodplain management and flood mitigation goal.
3. Implementation of the FMS results in:
 - a. Quantifiable flood risk reduction benefits
 - b. No negative impacts to adjacent or downstream properties (a No Negative Impact certification is required)
 - c. No negative impacts to an entities water supply
 - d. No overallocation of a water source based on the water availability allocations in the most recently adopted State Water Plan.

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

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

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

5.2.7 Recommendation of Flood Mitigation Actions

On May 6, 2022, the NRFPG voted to recommend FMEs, FMPs, and FMSs for inclusion into the 2023 RFP. This meeting was held in accordance with the requirements of the RFPG bylaws, the Texas Open Meetings Act, and the general requirements of the Texas Water Code and the flood planning process.

5.2.7.1 Identified and Recommended FMEs in the 2023 NRFP

The NRFPG identified and evaluated a total of 179 potential FMEs in the 2023 Final Plan. Of these projects, 163 were recommended, representing a combined total of \$282,331,000 of flood management evaluation need across the region. Note, the 2023 Final Plan FME recommendations have been amended as described in Sections 5.3.

5.2.7.2 Identified and Recommended FMPs in the 2023 NRFP

The NRFPG identified and evaluated a total of four potential FMPs in the 2023 Final Plan. Of these projects, zero were recommended due to insufficient levels of detail to meet the technical requirements for an FMP. After the 2023 Final Plan was delivered in January 2023, additional work was completed that resulted in recommendations of 31 FMPs in the Amended 2023 NRFP as described in Sections 5.3.

5.2.7.3 Identified and Recommended FMSs in the 2023 NRFP

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

The NRFPG identified and evaluated a total of 60 potential FMSs. Of these projects, 40 were recommended, representing a combined total cost of \$20,286,000.

Note, the 2023 Final Plan FMS recommendations did not change in the Amended 2023 NRFP.

5.3 Additional Evaluations Performed for the Amended 2023 NRFP

Multiple FMEs from the 2023 NRFP were selected by the NRFPG to be further evaluated to identify additional FMPs and advance FMEs for inclusion in the Amended 2023 NRFP. The selection of the FMEs for further evaluation was to achieve the following objectives:

- Evaluate flood risks in areas with currently limited flood risk data
- Evaluate flood risk reduction solutions, including feasibility studies
- Perform preliminary engineering needed to identify, evaluate, and recommend potential feasible FMPs for future planning cycles.

5.3.1 Identification of FMEs for Further Evaluation

The RFPG was required to approve the list of FMEs for additional evaluation. The process used to identify which FMEs to perform additional evaluation was as follows:

- Identify FMEs in the highest flood risk areas as identified in Map 15 – Region 13 Highest Flood Risk. The NRFPG must consider the needs in the region, flood risk to life and property, potential flood risk reduction, critical infrastructure, and other relevant factors.
- Identify FMEs in areas where there are no on-going flood studies as identified in Map 14B – Region 13 Proposed/On-going projects and Risk Score.
- Identify FMEs in areas where FMEs are close to being FMPs.

Thus, to identify FMEs to perform, the highest flood risk areas as defined in the flood mitigation needs analysis performed in Chapter 4, were listed along with associated on-going flood studies, potential new FMPs and FMEs, and a budget allocation assigned for the additional evaluation efforts. On September 26, 2022, the NRFPG voted to approve the list of additional evaluations and their respective allocation of the overall additional evaluation effort, as shown in Table 5-2. These additional evaluations are to be performed to identify additional potential FMEs and FMPs for inclusion in the Amended 2023 NRFP. Additionally, the NRFPG identified the Nueces County Regional Drainage Master Plan Study (Tri-County Study), Duval County Master Plan, San Patricio County Flood and Drainage Study, and the City of Corpus Christi Drainage Study as local projects to track which were anticipated to increase the total amount of additional FMEs and FMPs in the Amended 2023 NRFP.

Table 5-2. Additional Evaluations for the Amended 2023 RFP

Flood Area ID (Map 15)	Flood Area General Description	Prop/ On-going Flood Study	Potential New FMPs	Potential New FMEs	Additional Study Allocation of Overall Effort
Highest Risk Flood Areas (Score 4-5)					
A1	City of Corpus Christi, Nueces County	Yes	3	-	3%
A2	Cities of Ingleside and Aransas Pass, San Patricio County	Yes	1	-	1%
A3	City of Gregory, San Patricio County	Yes	1	-	1%
A4	Cities of Rockport and Fulton, Aransas County	Yes	3	-	3%
A5	City of Alice, Jim Wells County	Yes	1	-	1%
A6	City of Kingsville, Kleberg County	Yes	1	-	1%
A7	City of Falfurrias, Brooks County	Yes	-	-	0%
A8	City of Beeville, Bee County	Yes	-	-	0%
A9	City of Lytle, Medina County	-	-	1	1%
A10	Pleasanton, Jourdanton, and Poteet, area in Atascosa County	-	2	-	18%
A11	City of Pearsall, Frio County	-	4	-	18%
A12	Hondo Area, Medina County	-	1	-	9%

Flood Area ID (Map 15)	Flood Area General Description	Prop/ On-going Flood Study	Potential New FMPs	Potential New FMEs	Additional Study Allocation of Overall Effort
A13	City of Uvalde, Uvalde County	-	-	-	0%
A14	Area along Nueces River in western Uvalde County	-	2	-	9%
A15	Cities of Vanderpool and Utopia area along Frio River in Real and Uvalde Counties	-	3	-	9%
A16	City of Carrizo Springs, Dimmit County	-	-	1	2%
A17	City of Robstown, Nueces County	Yes	-	-	0%
A18	City of Odem, San Patricio County	Yes	-	-	0%
A19	City of Mathis, San Patricio County	Yes	-	1	0.5%
High Risk Flood Areas (Score 4-5)					
B1	Cities of Bishop and Driscoll, Nueces County	Yes	-	-	0%
B2	City of Sinton, San Patricio County	Yes	1	-	0.5%
B3	City of Benavides, Duval County	Yes	2	-	1%
B4	City of Woodsboro in Refugio County	Yes	-	-	0%
B5	City of Freer, Duval County	Yes	1	-	0.5%
B6	City of Three Rivers, Live Oak County	Yes	-	-	0%

Flood Area ID (Map 15)	Flood Area General Description	Prop/ On-going Flood Study	Potential New FMPs	Potential New FMEs	Additional Study Allocation of Overall Effort
B7	City of Hebbronville, Jim Hogg County	Yes	-	-	0%
B8	City of Cotulla, LaSalle County	-	-	-	0%
B9	City of Devine, Medina County	-	1	-	9%
B10	Crystal City, Zavala County	-	1	-	7%
B11	Sabinal River area in northeast Uvalde County and southwest Bandera County	-	-	-	0%
High Risk Flood Areas (Score 3-4)					
	City of San Diego, Duval County	Yes	4	-	1%
	Development of Overall Task 12 Strategy				2%
	Misc. for undesignated FMXs or additional costs				2%
		TOTALS	32	3	100%

5.3.2 Summary of Additional Evaluations

The additional evaluations listed in Table 5-4 were performed over a time span of eight months from October of 2022 through May of 2023. As part of this process, additional outreach to identified potential sponsors occurred, which resulted in additional refinement and advancement of new potential flood mitigation actions. In total, additional evaluations were performed for 36 sponsor flood authority entities located across the basin. These additional evaluations resulted in the identification of 54 new FMEs, 31 new FMPs, and the removal of 19 FMEs, which are described below on a

county-by-county basis. See the county maps (Map23A through Map23W in Appendix B) for depictions of the amended flood mitigation actions followed by a county specific listing of recommended flood mitigation actions. The sections below provide a high-level summary of amendment actions taken as a result of the additional evaluations performed.

All recommended FMPs required documentation of ‘no negative impact’ prior to inclusion in the Amended 2023 NRFP. Refer to

Appendix C13 – FMP No Negative Impact Determination Documentation. For further detail on the additional evaluations performed, see associated Appendix C9 – Additional Evaluation 1-Page FME Summaries, Appendix C10 – Additional Evaluation 1-Page FMP Summaries, and Appendix C11 – Additional Evaluation Technical Memorandums.

5.3.2.1 Aransas County (See Map 23-A)

City of Fulton (Flood Area ID A4)

Additional coordination with the City of Fulton occurred but the following FMEs were determined not to be developed enough to elevate to FMPs, as no detailed hydrologic and hydraulic models or reports were available.

- Existing FME to Remain – FME 131000145 – Fulton West Drainage Improvements
- Existing FME to Remain – FME 131000146 – Fulton East Drainage Improvements
- Existing FME to Remain – FME 131000147 – Palmetto Outfall Improvements

Aransas County (Flood Area ID A4)

Additional coordination with Aransas County resulted in the following:

- Added New FME - FME 131000182 – Aransas County Drainage Study - The need for a new county-wide flood study was identified by Aransas County to develop detailed solutions for their flooding problems, including some of their coast issues.

5.3.2.2 Atascosa-Bexar-Karnes-Wilson Counties (See Map 23-B)

City of Jourdanton (Flood Area ID A10)

Additional coordination with the City of Jourdanton resulted in the following:

- Added New FMP - FMP 133000005 – Jourdanton Drainage and Regional Detention Improvements, from SH-16 to Marion Road

- Removed Existing FME - FME 131000052 – Jourdanton Drainage Improvements and Detention/Retention Ponds – This FME was advanced through additional evaluations, including BCA and ‘no adverse impact’ analysis, to create FMP 133000005 and thus is no longer necessary.

City of Poteet (Flood Area ID A10)

Additional coordination with the City of Poteet resulted in the following:

- Added New FMP - FMP 133000006 – Rutledge Hollow Creek Tributary Regional Detention Pond Improvements
- Removed Existing FME - FME 131000031 – Atascosa McMullen Hazard Mitigation Plan – City of Poteet Action #7, was advanced through additional evaluations, including pre- and post-project hydrologic and hydraulic modeling, BCA, and ‘no adverse impact’ analysis, to create FMP 133000006 and thus is no longer necessary.

Bexar County

Additional coordination with Region 12 – San Antonio, resulted in identifying an FMP for Bexar County that is located within Region 13.

- Added New FMP – FMP 133000038 – Old Frio City Road at North Prong Creek Bridge

5.3.2.3 Bandera County (See Map23-C)

Additional evaluations did not result in changes to the recommended flood mitigation actions in Bandera County.

5.3.2.4 Bee-Goliad Counties (See Map23-D)

Additional evaluations did not result in changes to the recommended flood mitigation actions in Bee and Goliad counties.

5.3.2.5 Dimmit County (See Map 23-E)

Carrizo Springs (Flood Area ID A16)

Additional outreach to the City of Carrizo Springs was performed but identification and advancement of an FME did not result.

5.3.2.6 Duval County (See Map 23-F)

Additional coordination with the Duval County Master Plan resulted in the advancement of several FMEs and the development of two new FMPs. Several FMEs for the Cities of

Freer and San Diego were further evaluated under the Duval County Master Plan but remain as FMEs as the ‘no adverse impact’ requirement was not resolved.

City of Benavides (Flood Area ID B3)

- Added New FMP - FMP 133000007 – City of Benavides Las Animas Conveyance Infrastructure
- Removed Existing FME - FME 131000053 – Las Animas Conveyance Infrastructure, was advanced to create FMP 133000007 and thus is no longer necessary.
- Added New FMP - FMP 133000008 - City of Benavides Main City Network Storm Drain Improvements
- Removed Existing FME - FME 131000054 – Benavides Main City Network, was advanced to create FMP 133000008 and thus is no longer necessary.

City of Freer (Flood Area ID B5)

- Existing FME Advanced but to Remain as FME - FME 131000055 – Upsize Burch Street Crossing – This FME was further evaluated but remains as an FME as the ‘no adverse impact’ requirement was not resolved.

City of San Diego

- Existing FME Advanced but to Remain as FME - FME 131000056 – Northern San Diego Street Conveyance Improvements
- Existing FME Advanced but to Remain as FME - FME 131000057 – Northern San Diego Street Conveyance Improvements
- Existing FME Advanced but to Remain as FME - FME 131000060 – Improvements to Drainage Connectivity along Railroad
- Existing FME Advanced but to Remain as FME - FME 131000061 – Improvements to San Diego Levee Outfall System
- Existing FME Advanced but to Remain as FME - FME 131000062 – Southern Dan Diego Levee Outfall System

5.3.2.7 Edwards County (See Map 23-G)

Additional investigation determined that the following project should have been listed as a recommended FME in the 2023 NRFP.

- Added FME – FME 131000167 – Bed-Material Entrainment in selected Streams of the Edwards Plateau – Edwards, Kimble, and Real Counties

5.3.2.8 Frio County (See Map 23-H)

City of Pearsall (Flood Area ID A11)

Multiple FMEs within the City of Pearsall were further advanced through additional pre- and post-project hydrologic and hydraulic modeling, BCA, and ‘no adverse impact’ analysis, resulting in the following:

- Added New FMP - FMP 133000010 – Davila Street Tributary Regional Detention Pond
- Removed Existing FMEs – FME 131000044 – Colorado Street Drainage Improvements (FH#1) and FME 131000049 – West Apartment Detention Pond Underground Drainage (FH#6) - These two FMEs were combined and advanced to create FMP 133000010 and thus are no longer necessary.
- Added New FMP - 133000011 – Trinity Street Tributary Storm Sewer Bypass Improvements, from Trinity Street to Radio Road
- Removed Existing FME - FME 131000045 – Trinity Street & North Cherry Street Drainage Improvements (FH#2) - This FME was advanced to create FMP 133000011 and thus is no longer necessary.
- Added New FMP - FMP 133000012 – Pearsall High School Regional Detention Pond
- Added New FMP - FMP 133000013 – FM 1581 Channel Lining and Conveyance Improvements
- Removed Existing FMEs – FME 131000032 – Gilliam Road Drainage Improvements (FH#9) and FME 131000046 – West Comal Street & FM 1581 Drainage Channel (FH#3) - These two FMEs were combined and advanced to create FMP 133000013 and thus are no longer necessary.

Frio County (Flood Area ID A11)

Additional coordination with Frio County resulted in the county identifying multiple drainage improvement projects, which resulted in the addition of one FMP and several FMEs as follows:

- Added New FMP - FMP 133000009 – CR 1520 / Tehuacana Road Drainage Improvements (Frio County Project #8)
- Added New FME – FME 131000183 – North Pearsall Drainage Improvements (Frio County Project #5)
- Added New FME - FME 131000184 – CR 3000 / Keystone Road Drainage Improvements (Frio County Project #10)

- Added New FME - FME 131000185 – CR 4757 / Leona River Road Bridge Replacement (Frio County Project #11)
- Added New FME - FME 131000186 – Countywide Bridge Repairs (Frio County Project #12)
- Added New FME - FME 131000187 – CR 3300 / South Goldfinch Road Roadway Reconstruction and Drainage Improvements (Frio County Project #13)
- Added New FME - FME 131000230 – CR 4656 / Vine Loop Drainage Improvements (Frio County Project #9)

5.3.2.9 Jim Hogg – Brooks County (See Map23-I)

5.3.2.10 Jim Wells County (See Map 23-J)

City of Alice (Flood Area ID A5)

Additional coordination with City of Alice staff confirmed the FME below is not developed enough to elevate to an FMP as no detailed pre- and post- project hydrologic and hydraulic models nor reports are available.

- Existing FME to Remain – FME 131000063 – Lattas Creek Improvements

5.3.2.11 Kinney County (See Map 23-K)

Additional evaluations did not result in changes to the recommended flood mitigation actions in Kinney County.

5.3.2.12 Kleberg County (See Map 23-L)

City of Kingsville (Flood Area ID A6)

Additional coordination with the City of Kingsville resulted in the following:

- Added New FME 131000188 – 19th Street from East Lott Avenue to Maple Street Drainage Improvements (Kingsville Project Location 2)
- Added New FME 131000189 – Caesar Place Subdivision Drainage Improvements (Kingsville Project Location 5)
- Added New FME 131000190 – North 17th Street and Corral Avenue Intersection Drainage Improvements (Kingsville Project Location 9)
- Added New FME 131000191 – Carriage Park 2 Subdivision Drainage Improvements
- Existing FME to Remain – FME 131000111 – FM1356 Channel Improvements - City staff confirmed this project is not developed enough to elevate to an FMP as

no detailed pre- and post-project hydrologic and hydraulic models nor reports are available.

5.3.2.13 LaSalle County (See Map 23-M)

Additional evaluations did not result in changes to the recommended flood mitigation actions in LaSalle County.

5.3.2.14 Live Oak County (See Map 23-N)

Additional evaluations did not result in changes to the recommended flood mitigation actions in Live Oak County.

5.3.2.15 Maverick-Zavala Counties (See Map 23-O)

Crystal City (Flood Area ID B10)

Additional coordination with the Crystal City resulted in the following:

- Added New FMP 133000014 – Downtown Crystal City Regional Detention Pond Improvements
- Existing FME to Remain - FME 131000016 – Crystal City City-wide Drainage Study, was advanced with the city further identifying their greatest flood problem areas and additional hydrologic and hydraulic analysis performed to identify potential flood risk areas and solutions. These additional evaluations resulted in the development of FMP 133000014. However, FME 131000016 to remain as further evaluation across the city is still required.

5.3.2.16 McMullen County (See Map 23-P)

Additional evaluations did not result in changes to the recommended flood mitigation actions in McMullen County.

5.3.2.17 Medina County (See Map 23-Q)

City of Devine, Medina County (Flood Area ID B9)

Additional coordination with the City of Devine resulted in the following:

- Added New FMP – FMP 133000015 – Burnt Boot Creek Drainage Improvements from Route 132 to Colonial Parkway
- Removed Existing FME – FME 131000064 – Burnt Boot Creek Drainage Improvement Project – this FME was further evaluated resulting in the development of the following FMP and thus is no longer necessary.

City of Lytle (Flood Area ID A9)

Additional coordination with the City of Lytle resulted in the following:

- Added New FME - FME 131000192 – Lake Shore Estates Master Drainage Plan

City of Hondo, Medina County (Flood Area ID A12)

Additional coordination with the City of Hondo did not result in the advancement of an existing FME nor the development of a new FMP. Before undertaking new structural type projects, the city desires to perform additional study of the land with new and future conditions, to improve local codes and standards, and to perform outreach to the community on the topic of flooding.

5.3.2.18 Nueces County (See Map 23-R)

City of Corpus Christi (Flood Area ID A1)

Additional coordination with the City of Corpus Christi and the Nueces County Regional Drainage Master Plan (i.e. Tri-County study) resulted in the following:

- Removed Existing FME – FME 131000088 – Greenwood WWTP Flood Mitigation – City of Corpus Christi conveyed they have already found funding for this project. Thus, this FME is removed from the amended RFP and has been added to the ‘proposed and ongoing flood mitigation project’ list.
- Added New FMP – FMP 133000016 – Kinney Street Pump Station Inlet Modification
- Removed Existing FME – FME 131000148 – Kinney Street Pump Station Inlet Modification – this FME was advanced to create FMP 133000016 and thus is no longer necessary.
- Added New FMP – FMP 133000017 – Power Street Pump Station Improvements
- Removed Existing FME – FME 131000149 – Power Street Pump Station Improvements – this FME was advanced to create a new FMP and thus no longer necessary.
- Added New FMP – FMP 133000021 – Balchuck Lane & Digger Lane Improvements (Tri-County Study Risk Area 26)
- Added New FMP - FMP 133000022 – Nottingham Acres (Tri-County Study Risk Area 27)
- Added New FMP - FMP 133000023 – South Prairie Estates (Tri-County Risk Area 28)

- Added New FME - FME 131000193 – Santa Maria (Tri-County Study Risk Area 31)
- Added New FME – FME 131000194 – Corpus Christi International Airport
- Added New FME - FME 131000195 – Tierra Grande & Crossroads Estates (Tri-County Risk Area 23)
- Added New FME - FME 131000196 – US Naval Base (Tri-County Risk Area 29)

City of Aqua Dulce, Nueces County

Additional coordination with the Nueces County Regional Drainage Master Plan resulted in the following:

- Added New FMP - FMP 133000018 – Aqua Dulce (Tri-County Risk Area 06)

City of Banquete, Nueces County

Additional coordination with the Nueces County Regional Drainage Master Plan resulted in the following:

- Added New FMP - FMP 133000019 – Banquete (Tri-County Study Risk Area 05)

Nueces County

Additional coordination with the Nueces County Regional Drainage Master Plan resulted in the following:

- Added New FME – FME 131000211 – Petronila Creek Environmental Study (Tri-County Risk Area 30)

City of Robstown, Nueces County (Flood Area ID A17)

Additional coordination with the Nueces County Regional Drainage Master Plan resulted in the following:

- Added New FMP - FMP 133000025 – Callicoate Farms (Tri-County Risk Area 11)
- Added New FMP – FMP 133000026 – Fiesta Ranch (Tri-County Risk Area 20)
- Added New FME – FME 131000197 – FM 1694 & TX 44 North (Tri-County Risk Area 12)
- Added New FME – FME 131000198 – FM 665 & CR 69 Area (Tri-County Risk Area 21)
- Added New FME – FMP 131000199 – IH 69E Crossing (Tri-County Risk Area 09)



- Added New FMP – FMP 133000027 – Indian Trails (Tri-County Risk Area 03)
- Added New FME – FME 131000200 – North Robstown (Tri-County Risk Area 08)
- Added New FMP - FMP 133000028 – Ranch and Cyndie Park (Tri-County Risk Area 01)
- Added New FMP – FMP 133000029 – Rancho Banquete (Tri-County Risk Area 04)
- Added New FME – FME 131000201 – Robstown Drains (Tri-County Risk Area 10)
- Added New FME – FME 131000202 – County Road 61 & TX 44 (Tri-County Risk Area 14)
- Added New FME – FME 131000203 – FM 1694 & TX 44 South (Tri-County Risk Area 13)
- Added New FME – FME 131000204 – FM 892 (Tri-County Risk Area 18)
- Added New FME – FME 131000205 – Lost Creek & Nye & Peterson Farm (Tri-County Risk Area 17)
- Added New FME – FME 131000206 – Petronila Acres (Tri-County Risk Area 22)
- Added New FME – FME 131000207 – San Petronila Estates (Tri-County Risk Area 24)
- Added New FME – FME 131000208 – Spring Gardens & Primavera Estates (Tri-County Risk Area 15)
- Added New FME – FME 131000209 – Tierra Verde (Tri-County Risk Area 16)
- Added New FME – FME 131000210 – Westwood Estates (Tri-County Risk Area 02)

Nueces County Drainage District No.2 (Flood Area ID A17)

Additional coordination with the Nueces County Drainage District No.2 resulted in the development of the following:

- Added New FMP – FMP 133000030 – Robstown Various Drainage Improvements (FH#8,10, 12)

City of Bishop, Nueces County (Flood Area ID B1)

Additional coordination with the Nueces County Regional Drainage Master Plan resulted in the following:

- Added New FMP - FMP 133000020 – City of Bishop La Paloma Ranch (Tri-County Study Risk Area 07)

City of Driscoll, Nueces County (Flood Area ID B1)

- Added New FMP - FMP 133000024 – Driscoll (Tri-County Risk Area 19)

5.3.2.19 Real-Kerr Counties (See Map 23-S)

Real County (Flood Area ID A15)

Additional coordination with Real County resulted in the county identifying several new FMEs and recommending further evaluation of flood risks within the City of Camp Wood.

- Added New FME – FME 131000212 – McDonald Crossing of Plumin Creek and Crossing of Nueces River
- Added New FME – FME 131000213 – Bajo Camino Low Water Crossing

City of Camp Wood

- Existing FME Advanced but to Remain as FME - FME 131000006 – City of Camp Wood Downtown Drainage Improvements – this FME was further advanced through the development of pre- and post-project hydrologic and hydraulic models, but further coordination and analysis is needed to define potential FMPs.

5.3.2.20 Refugio County (See Map 23-T)

Additional evaluations did not result in changes to the recommended flood mitigation actions in Refugio County.

5.3.2.21 San Patricio County (See Map 23-U)

City of Ingleside, San Patricio County (Flood Area ID A2)

Additional coordination with the City of Ingleside was performed resulting in additional information on the FMEs below being obtained, but the information was determined insufficient to advance the FMEs to FMPs.

- Existing FME to Remain - FME 131000140 – Morgan Avenue & Mooney Avenue Drainage Improvements
- Existing FME to Remain - FME 131000139 – Drainage Improvements – FM 1069 to McCampbell Slough

City of Gregory, San Patricio County (Flood Area ID A3)

Additional coordination with the San Patricio County Drainage Master Plan resulted in the following:

- Added New FMP – FMP 133000031 – City of Gregory Citywide Stormwater Drainage Improvements
- Removed Existing FME – FME 131000128 – Citywide Stormwater Drainage Improvements – this FME was advanced to create FMP 133000031 and thus is no longer necessary.

City of Taft, San Patricio County (Flood Area ID A3)

Additional coordination with the San Patricio County Drainage Master Plan resulted in the following:

- Added New FMP – FMP 133000037 – City of Taft Citywide Stormwater Drainage Improvements
- Removed Existing FME – FME 131000131 – Citywide Stormwater Drainage Improvements. This FME was advanced to create FMP 133000037.

Lake City, San Patricio County

Additional coordination with the San Patricio County Drainage Master Plan resulted in the following:

- Added New FME – FME 131000216 – Park Road 25 Improvements (San Patricio County Drainage Master Plan Area Lc-A)

City of Odem, San Patricio County (Flood Area ID A18)

Additional coordination with the San Patricio County Drainage Master Plan resulted in the development of the following:

- Added New FMP – FMP 133000033 – City of Odem Citywide Stormwater Drainage Improvements
- Removed Existing FMEs – FME 131000155 – Cityside Stormwater Drainage Improvements and FME 131000156 – Expanding Drainage System to Odem High School Area – These FMEs were combined and advanced to create FMP 133000033.

City of Mathis, San Patricio County (Flood Area ID A19)

Additional coordination with the San Patricio County Drainage Master Plan resulted in the following:

- Added New FME – FME 131000231 – East Jackson Street South Ditch Development (San Patricio County Drainage Master Plan Area Ma-A)
- Added New FME – FME 131000232 – Replace Existign Culvert at Six Mile Creek Crossing of CR 359 (San Patricio County Drainage Master Plan Area Ma-B)

- Added New FME – FME 131000233 – New Culvert Near Front Street and CR 359 (San Patricio County Drainage Master Plan Area Ma-C)
- Added New FME – FME 131000234 – New Pipe at Huerta Street (San Patricio County Drainage Master Plan Area Ma-D)

City of Sinton, San Patricio County (Flood Area ID B2)

Additional coordination with the San Patricio County Drainage Master Plan resulted in the following:

- Added New FMP – FMP 133000035 – City of Sinton Citywide Stormwater Drainage Improvements
- Removed Existing FMEs – FME 131000159 – Citywide Stormwater Drainage Improvements and FME 131000161 – San Patricio County Hazard Mitigation Action Plan (City of Sinton, Action #15). These two FMEs were combined and advanced to create FMP 133000035.
- Existing FME to Remain – FME 131000158 – Channel Outfall Drainage Improvements

San Patricio County

Additional coordination with the San Patricio County Drainage Master Plan resulted in the following:

- Added New FME – FME 131000221 – Gregory Outfall Development (San Patricio County Drainage Master Plan Area Co-F)
- Added New FME – FME 131000222 – West Ingleside Outfall (San Patricio County Drainage Master Plan Area Co-G)
- Added New FME – FME 131000223 – Taft Southwest Outfall (San Patricio County Drainage Master Plan Area Co-H)
- Added New FME – FME 131000219 – South Sinton Levee (San Patricio County Drainage Master Plan Area Co-C)
- Added New FME – FME 131000220 – South Sinton Drainage Improvements (San Patricio County Drainage Master Plan Area Co-E)
- Added New FME – FME 131000214 – Glen Erin Estates Improvements (San Patricio County Drainage Master Plan Area Sp-A)
- Added New FME – FME 131000215 – Nopal Street Improvements (San Patricio County Drainage Master Plan Area Sp-B)
- Added New FME – FME 131000217 – The Colony Subdivision (San Patricio County Drainage Master Plan Area Co-A)

- Added New FME – FME 131000218 – County Road 1136 Improvements (San Patricio County Drainage Master Plan Area Co-B)

5.3.2.22 Uvalde County (See Map 23-V)

Uvalde County (Flood Area ID A14)

Additional coordination with Uvalde County resulted in the following:

- Added New FME - FME 131000224 – Various Flood Warning Gages
- Added New FME – FME 131000225 – Seven Bluff Low Water Crossing on Frio River
- Added New FME - FME 131000226 - County Road 348 on Bear Creek
- Added New FME - FME 131000227 - Kenneth Arthur Low Water Crossing on Frio River
- Added New FME - FME 131000228 - Avant Low Water Crossing - Tributary to Frio River
- Added New FME – FME 131000229 - Indian Creek Low Water Crossing

Webb County (See Map 23-W)

Additional evaluations did not result in changes to the recommended flood mitigation actions in Webb County.

5.3.3 Identified and Recommended Flood Mitigation Actions in the Amended 2023 NRFP

On May 15, 2023, the NRFPG voted to amend the 2023 NRFP recommended FMEs, FMPs, and FMSs to represent additional refinement and recommended flood mitigation actions, as described above in 5.3. This meeting was held in accordance with the requirements of the RFPG bylaws, the Texas Open Meeting Act, and the general requirements of the Texas Water Code and the flood planning process.

Additional stakeholder outreach and advancements of flood mitigation actions as part of the Amended 2023 RFP efforts resulted in the identification of a total of 269 recommended flood mitigation actions that were determined to meet TWDB requirements, of which 31 are FMPs, 198 are FMEs, and 40 are FMSs. This is an increase of 31 FMPs and 35 FMEs when compared to the 2023 RFP. The list of recommended 2023 RFP FMSs was not changed with the Amended 2023 RFP.

County-based tables and maps of flood mitigation actions are presented in Appendix B23 – Flood Hazard Risk, Flood Risk Score, and Recommended Flood Mitigation Actions.

A complete list of identified possible flood mitigation actions can be found in Appendix A7 – TWDB Table 12 – Potential Flood Management Evaluations Identified by RFPG, Appendix A8 – TWDB Table 13 – Potential Feasible Flood Mitigation Projects Identified By RFPG, and Appendix A9 – TWDB Table 14 – Potentially Feasible Flood Management Strategies Identified by RFPG.

A complete list of recommended flood mitigation actions can be found in Appendix A10 – TWDB Table 15 – Flood Management Evaluations Recommended by RFPG, Appendix A11 – TWDB Table 16 – Flood Mitigation Projects Recommended by RFPG, and Appendix A12 – TWDB Table 17 – Flood Management Strategies Recommended by RFPG.

5.3.3.1 Identified and Recommended FMEs in the Amended 2023 NRFP

The NRFPG identified and evaluated a total of 213 potential FMEs in the Amended 2023 NRFP. Of these projects, 198 were recommended, representing a combined total of \$284,500,000 needed across the region. This is an increase of 35 recommended FMEs, and \$2,170,000 in additional evaluations, when compared to the 2023 NRFP. The number, types, and costs of FME projects recommended by the NRFPG are summarized in Table 5-3.

Table 5-3: Summary of Recommended FMEs in the Amended 2023 NRFP

FME Types	FME Descriptions	# of FMEs Identified	# of FMEs Recommended	Cost of Recommended FMEs
Preparedness	Gauges, Barriers, Debris/ Vegetation Removal, and Channelization	5	3	\$800,000
Project Planning	Previously Identified Drainage Projects and Flood Studies	172	165	\$222,530,000
Watershed Planning	FIS Studies, Watershed Studies	25	21	\$58,570,000
Other	Property Acquisition and Buyout Programs	11	9	\$3,930,000
Total		213	198	\$284,500,000

5.3.3.2 Identified and Recommended FMPs in the Amended 2023 NRFP

The NRFPG identified and evaluated 31 potential FMPs in the Amended 2023 NRFP and all 31 are recommended, representing a combined total of \$1,205,100,000 of Flood



Mitigation Project needs across the region. The number, types, and costs of identified and recommended FMPs by the NRFPG are summarized in Table 5-4.

Table 5-4: Summary of Recommended FMPs in the Amended 2023 NRFP

FMP Types	# of FMPs Identified	# of FMPs Recommended	Total Cost of Recommended FMPs
Channel	3	3	\$17,100,000
Detention	4	4	\$7,400,000
Infrastructure	19	19	\$1,154,100,000
Low Water Crossing	3	3	\$9,200,000
Storm Drain	2	2	\$17,300,000
Total	31	31	\$1,205,100,000

5.3.3.3 Identified and Recommended FMSs in the Amended 2023 NRFP

No changes were made to the list of identified and recommended FMSs in the 2023 NRFP. The NRFPG identified and evaluated a total of 60 potential FMSs. Of these projects, 40 were recommended, representing a combined cost of \$20,286,000. The number and types of FMSs recommended by the NRFPG are summarized in Table 5-5.

Table 5-5: Summary of Recommended FMPs in the Amended 2023 NRFP

FMS Project Types	# of FMPs Identified	# of FMPs Recommended	Total Cost of Recommended FMPs
Education and Outreach	17	9	\$757,000
Flood Measurement and Warning	10	4	\$1,050,000
Infrastructure Projects	8	2	\$100,000
Property Acquisition and Structural Evaluation	3	3	\$10,700,000
Regulatory and Guidance	17	17	\$7,161,000
Other	5	5	\$518,000
Total	60	40	\$20,286,000