September 30, 2022

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Mr. Reeves Hayter, Chair
Lower Red-Sulphur-Cypress Flood Planning Group c/o
Ark-Tex Council of Governments
4808 Elizabeth St
Texarkana, TX, 75503

Re: 2023 Lower Red-Sulphur-Cypress Flood Plan

Dear Mr. Hayter,

In 2019 Senate Bills 7 and 8 established a regional and state flood planning process for Texas, aimed at better managing flood risk to reduce loss of life and property. As part of the process, Texas Parks and Wildlife Department (TPWD) was identified as a member of the regional flood planning groups (Texas Water Code (PWC) Sec. 16.062). The mission of TPWD is to manage and conserve the natural and cultural resources of Texas and its ability to provide opportunities of hunting, fishing, and outdoor recreation for the use and enjoyment of present and future generations. TPWD values this opportunity to contribute to the flood planning process with the goal of enhancing flood risk management and achieving beneficial flood mitigation outcomes. Toward this effort TPWD members serve a dual role of supporting the voting membership in development of the plans and representing the natural resource interests of the state.

TPWD applauds the Lower Red-Sulphur-Cypress Regional Flood Planning Group for their efforts in completing the inaugural regional flood plan (RFP) especially considering the abbreviated timeline. Through the exceptional efforts of the RFPG, this plan will be a meaningful tool for reducing flood impacts to society, especially in those disastrous events that cause loss of life and injury. Because this represents the initial region-wide plan, it has the potential to be precedent setting for subsequent iterations. As such, it is important this plan recognizes the role nature and nature-based solutions can play in flood risk management and promotes opportunities to protect, enhance and restore the flood mitigation benefits provided by natural landforms.

TPWD is supportive of the planning process outlined by the Texas Water Development Board (TWDB) because it aims to achieve an integrative flood risk management (FRM) approach that prioritizes risk reduction through implementation of floodplain management, land use regulations, policy, and a balanced use of grey and natural and nature-based (NNBS) flood mitigation measures that are formed by inclusive participation at all levels of society. TPWD believes this integrative approach when implemented holistically will achieve the maximum benefits for society and natural ecosystems while minimizing environmental impacts. Recent published works on FRM and NNBS (Bridges et al 2021, Glick et al 2020, World Wildlife Fund 2016, Sayers et al 2013) support TWDB integrative flood management approach and provide extensive resources for flood planners.

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In the interest of achieving the state's flood risk management goals while protecting the state's fish and wildlife resources, TPWD reviewed regional flood plans based on the TWDB guidance principals as described in 31 Texas Administrative Code Chapters 361 and 362. Special focus was provided on the following subset of guidance principals due to its relevance to fish and wildlife management.

- Does the draft flood plan use the best available science, data, models, and flood risk mapping?
- Does the draft flood plan consider the potential upstream and downstream effects, including environmental, of potential flood management strategies (and associated projects) of neighboring areas?
- Does the draft flood plan include strategies and projects that provide for a balance of structural and non-structural flood mitigation measures, including projects that use nature-based features that lead to long-term mitigation of flood risk?
- Does the draft flood plan consider natural systems and beneficial functions of floodplains, including flood peak attenuation and ecosystem services?
- Does the draft flood plan encourage flood mitigation design approaches that work with, rather than against, natural patterns and conditions of floodplains?
- Does the draft flood plan seek to not cause long-term impairment to the designated water quality as shown in the state water quality management plan as a result of a recommended flood management strategy or project?
- Does the draft flood plan consider benefits of flood management strategies to water quality, fish and wildlife, ecosystem function, and recreation, as appropriate?
- Does the draft flood plan minimize adverse environmental impacts and conform with adopted environmental flow standards?
- Does the draft flood plan consider multi-use opportunities such as green space, parks, water quality, or recreation, portions of which could be funded, constructed, and or maintained by additional, third-party project participants?

Additionally, TPWD emphasizes that the following FRM concepts identified in the forementioned literature be incorporated into the RFP.

- Flood is a natural process that has many benefits to human and natural systems.
- Promoting some flooding as desirable and making room for water promotes native species, maintains vital ecosystem services, and reduces the chance of flooding elsewhere.
- Natural landscapes and watersheds provide flood mitigation functions that should be promoted, protected, enhanced, and restored.
- Prioritize risk reduction over flood control by focusing first on reducing loss of life and injury.
- Utilize limited resources fairly.
- Address flood risk using a portfolio approach to first implement non-structural (policy, land management, emergency management) followed by structural (grey and natural and nature-based) strategies.

- Criteria for assessing projects strategies should include a comprehensive suite of measures spanning economical, operational, societal, and environmental advantages and disadvantages. Assessments focusing on economics alone (number of buildings, acres) should be avoided.

Lower Red-Sulphur-Cypress Flood Plan Comments

The Texas Conservation Action Plan (TCAP; Texas Parks and Wildlife Department, 2012) provides guidance for conservation in the state of Texas, with the goals of realizing conservation benefits, preventing species listings, and preserving our natural heritage for future generations. The TCAP focuses on Species of Greatest Conservation Need (SGCN), including numerous aquatic species such as fish, freshwater mussels, and salamanders. The TCAP handbook includes six types of priority habitats, three of which are aquatic: water resources; riparian and floodplains; and caves and karst. Issues affecting these environments include environmental flows, impoundments and dam operations, and water quality issues (including stormwater runoff). The proposed Flood Management Evaluations, Plans, and Strategies (FMXs, all together) include numerous infrastructure projects that may affect the aquatic habitats that are prioritized in the TCAP. For example, the removal of low-water crossings can benefit rare species such as mussels and fish if the crossing is replaced with a bridge or culvert that does not form a barrier to species movement. Conversely, building dams and channelizing streams can adversely affect aquatic habitats and species.

TPWD is the state agency with the primary responsibility for protection of the state's fish and wildlife resources and providing information and recommendations to local, state, and federal agencies and other organizations (PWC §12.0011). Per the PWC, TPWD would like to provide information about SGCNs located within the planning area and recommends the use of the Rare, Threatened, and Endangered Species of Texas database as an SGCN resource (https://tpwd.texas.gov/gis/rtest/). Examples of SGCN within the planning area include the Paddlefish (*Polydon spathula),* Lousiana Pigtoe (*Pleurobema riddellii)* (freshwater mussel), and the Alligator Snapping Turtle (*Macrochyelys temminckii).* Fish, freshwater mussels, and aquatic reptiles are just a few species that are impacted from stream bed modifications. TPWD works with agencies and consultants across the state on construction projects impacting bed and banks to reduce impacts to Texas' unique freshwater mussel species. TPWD looks forward to working with project sponsors from project concept to finish. Working together from the start of a project allows for discussions and shorter timeline for project completion.

Chapter 1 discusses the benefits of natural wetland features within the region for flood mitigation and ecosystem health and highlights the importance of protection of these critical features. The plan suggests the region stringently protect these features from development to continue to receive the benefits of these areas. The plan includes state parks and wildlife management areas (WMAs) as natural areas that can provide flood mitigation and ecosystem function. These state properties are managed in such a way that supports LRSCFPG flood mitigation goals. As the region refines its natural infrastructure areas and needs, we encourage LRSCFPG to continue to work with TPWD

and other landowners in the region to meet the flood mitigation goals while also considering existing recreational, land and historical management objectives, to ensure those resources are protected as well.

The Lower Red-Sulphur-Cypress Flood Plan recommended 3 potentially feasible Flood Management Projects (FMPs), 42 potentially feasible Flood Management Evaluations (FMEs), and 38 potentially feasible Flood Management Strategies (FMSs). TPWD would like to encourage all the FMX (an FMP, FME, or FMS) proponents to consider stream crossing designs that allow for sediment transport and passage of aquatic organisms and do not impound water. Basically, designs that are invisible to the creek. This includes bridges that span the creek where possible or culverted crossings designed with the culvert(s) in the active channel area lower than those in the floodplain benches so that the flow in the channel is not overly spread out. The central/low-flow culvert(s) should be large enough to handle a 1.5-year flow without backing up water. The bottoms of these lower culverts should be set at least a foot below grade (i.e., recessed) to allow natural substrate to cover the culvert bottom and to allow for aquatic organism passage. These lower, recessed culverts should be installed in the thalweg or deepest part of the channel and be aligned with the low flow channel (Clarkin et al., 2006).

The Draft Lower Red-Sulphur-Cypress Flood Plan includes a number of channel improvement projects which may include widening, deepening, and straightening streams. Channelization and over-widening of streams slows flow, which increases deposition of sediment, decreases fish habitat, increases water temperatures, and can result in channel erosion. Streams in good condition naturally reach bankfull and start spilling onto the floodplain during a 1.5 to 2-year flood event. Widening and deepening a stream channel to force it to contain the 100-year flow negatively impacts the adjacent water table and riparian area and has geomorphic effects upstream and downstream of the modification. If channelization is necessary, constructing a two-stage channel with a low-flow channel and a floodplain allows for the continued transport of sediment, habitat for aquatic wildlife, and can reduce maintenance (Rosgen 1996). TPWD encourages the RFPG to protect existing streams, riparian areas, and floodplains.

Thank you for your consideration of these comments. TPWD looks forward to continuing to work with the planning group to develop flood plans that protect life and property that are also beneficial to the environment. Please contact me at (512) 389 – 8214 or at Marty.Kelly@TPWD.Texas.gov or James Shipes at (409) 736 – 2551 or James.Shipes@TPWD.Texas.gov if you have any questions or comments.

Sincerely,

Marty Kelly

Marty Kelly
Water Resources Program Coordinator

MK:js

References

Bridges, T. S., J. K. King, J. D. Simm, M. W. Beck, G. Collins, Q. Lodder, and R. K. Mohan, eds. 2021. International Guidelines on Natural and Nature-Based Features for Flood Risk Management. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

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Sayers, P., Y. L.i, G. Galloway, E. Penning-Rowsell, F. Shen, K. Wen, Y. Chen, and T. Le Quesne. 2013. Flood Risk Management: A Strategic Approach. Paris, UNESCO.

Texas Parks and Wildlife Department. 2012. Texas Conservation Action Plan 2012 - 2016: Overview. Editor, Wendy Connally, Texas Conservation Action Plan Coordinator. Austin, Texas.

World Wildlife Fund. 2016. Natural and Nature-based Flood Management: A Green Guide. Washington, DC: World Wildlife Fund. Http://envirodm.org/flood-managment 2016 WWF.

Response to TWDB Comments
Region 2 Lower Red-Sulphur-Cypress Basins Draft Regional Flood Plan

Level	Num.	Task	TWDB Comment	Region 2 FPG Response
1	1	General	1. Please ensure that all "Submittal requirements" identified in each of the Exhibit C Guidance document sections are submitted in the final flood plan. Appendix 2 appears to be missing from the submittal. Please submit Appendix 2.	Appendix 2 is included in the digital submittal, but not the hard copy, per TWDB direction.
1	2	Task 1	2. Proposed or Ongoing Flood Mitigation Projects, Text: Table 1.20 Proposed	Table 1.20 shows the types of projects that
1	3	Task 1	3. Proposed or Ongoing Flood Mitigation Projects, (Exhibit C Table 2): a. Please review and revise information in Chapter 1.3, Table 2, and the ExFldProjs feature class. There appear to be inconsistencies on whether there are existing or proposed projects identified by the data collection survey. Table 1.20 Proposed Projects by Type and the accompanying Chapter 1.3 text appears to describe about 31 flood mitigation projects of differing type compiled from survey results, however, Exhibit C Table 2 and the ExFldProjs feature class appear to be blank. Please reconcile.	Table 1.20 shows the types of projects that survey respondents said that they engage in, but were not specific projects. No specific projects were provided. Language clarified in the text and captions.
1	3	Task 1	b. Appendix 2 does not appear to be included with the draft plan submission. Please ensure that all referenced maps, tables, and appendices are included with the final plan. [31 TAC §361.32].	Appendix 2 is included in the digital submittal, but not the hard copy, per TWDB direction.
1	4	Task 1	4. Proposed or Ongoing Flood Mitigation Projects GIS Feature Class, ExFldProjs: Please review and revise information in Chapter 1.3, Exhibit C Table 2, and the ExFldProjs feature class. There appear to be inconsistencies on whether there are existing or proposed projects identified by the data collection survey. Table 1.20 Proposed Projects by Type and the accompanying Chapter 1.3 text appears to describe about 31 flood mitigation projects of differing type compiled from survey results, however, Exhibit C Table 2 and the ExFldProjs feature class appear to be blank. Please populate all required fields with valid entries per Exhibit D Table 8. Please leave NULL to represent either "not applicable" or "unknown".	Table 1.20 shows the types of projects that survey respondents said that they engage in, but were not specific projects. No specific projects were provided. Language clarified in the text and captions.

Level	Num.	Task	TWDB Comment	Region 2 FPG Response
1	5	Task 1	5. Existing Flood Infrastructure GIS Feature Class, ExFldInfraPt: Please include all low water crossings (LWCs) identified during the flood planning process in this feature layer. The ExFldExpAll feature class contains 253 LWCs, and the ExFldInfraPt feature class contains only 133 LWCs. Note: This is required in contrast to the optional LWC feature class. See Exhibit D Table 7 for a list of valid entries [31 TAC §361.31].	Exposed polygons (such as ag land) and lines (such as roads) within 15' of actual LWC points were also marked as LWC. These have been removed.
1	6	Task 2A	6. Existing Condition Flood Hazard GIS Feature Class, ExFldHazard: Streams with multiple data sources should be combined in such a way that the 0.2% is not within a 1% floodplain. Using both the BLE and Cursory floodplain data has created a floodplain that has 1% of Cursory floodplain extending beyond the .02% of the BLE. This potential overlap affects structure count and other analysis. Please review and revise as appropriate. [31 TAC §361.33(b)].	Per our prioritization matrix, we prioritized Zone AE and BLE over Fathom data; therefore, any 0.2% BLE/AE overrode 0.1% Fathom. The Fathom data was added as supplemental information on upland flooding risks beyond the BLE data. We have verified that no overlap of the 0.2% BLE and 1% Cursory data exists.
1	7	Task 2A	7. Existing Condition Flood Hazard (Exhibit C, Map 4): Please review and revise all Existing Hazard maps to reflect the corrected ExFldHazard feature class (see previous comment). [31 TAC §361.33(b)(4)].	See comment 6 response.
1	8	Task 2A	8. Existing Condition Flood Exposure Analysis, Text: a. Please check that the population count in Table 3 is the maximum of day and night population. The population count in Table 3 appears to match the total night population from the ExFldExpAll feature class, however, the total day population from the feature class appears to be higher. "Population (daytime)" and "Population (nighttime)" columns are not included in the table but can be added to the left of "Population" in Table 3 to facilitate this check.	Daytime populations added.
1	8	Task 2A	b. The Structure and Residential Structure counts in Table 3 do not appear to match the ExFldExpAll feature class counts. Please review and reconcile.	Our review shows that they match. No changes made.
1	8	Task 2A	c. The Hazard area in Table 3 does not appear to match the ExFldExpAll feature class. Please review and reconcile. [31 TAC §361.33 & Exhibit C 2.2.A.3].	The hazard area was not captured in ExFldExpAll but ExFldHazard areas match Table 3.

Level	Num.	Task	TWDB Comment	Region 2 FPG Response
1	9	Task 2A	9. Existing Condition Flood Vulnerability GIS Feature Class, ExFldExpAll: If the 'CRITICAL' field contains a "No" entry, then please leave 'CRIT_TYPE' as NULL.	This is the way data is populated. No changes made.
1	10	Task 2A	10. Existing Condition Flood Hazard Analysis, Text: Please include total land areas (square miles) of each flood risk by flood risk type, county, region, and frequency as per guidance document (page 24): Submittal requirement number 2.	Add reference to appendix. Added column for flood risk type.
1	11	Task 2A	11. Existing Condition Flood Risk Analyses, Text: Please include a reference to Exhibit C Table 3 in the text. As per guidance document (page 27): Once Task 2A Existing Condition Flood Risk Analyses is complete, RFPGs must include a summary table with findings summarizing flood risk by county (Exhibit C Table 3).	Added a reference to Table 3 and add a column for flood risk type.
1	12	Task 2B	12. Future Condition Flood Vulnerability, GIS Feature Class, FutFldExpAll: If the 'CRITICAL' field contains a "No" entry, then please leave 'CRIT_TYPE' as NULL [31 TAC §361.33(c) & Exhibit D 3.6.2].	This is currently the way data is populated.
1	13	Task 2B	13. Future Condition Flood Vulnerability (Exhibit C Map 12): There is no legend on the index maps and upon review it appears to reference the wrong data set. Please review and revise as appropriate per [31 TAC §361.34(d) & Exhibit C 2.2.B.2].	We do not believe this comment references Maps 12A & 12B. Legend added.
1	14	Task 2B	14. Future Condition Flood Hazard Analysis, Text: Please include total land areas (square miles) of each flood risk by flood risk type, county, region, and frequency as per guidance document (page 33), Submittal requirement number 3.	Added text and table reference within text.
1	15	Task 2B	15. Future Condition Flood Risk Analyses, Text: Please include a reference to Exhibit C Table 5 in the text. As per guidance document (page 35): Once Task 2B Future Condition Flood Risk Analyses is complete, RFPGs must include a summary table with findings summarizing flood risk by county (Exhibit C Table 5).	Added a reference to Table 5 and add a column for flood risk type.
1	16	Task 4B	16. Flood Management Evaluations (FME) GIS Feature Class, FME: Please review FME_ID 021000002 as the description states "Update remainder of the County to Zone AE", however, the spatial extent appears to cover the entire county. Please revise to more specifically depict what geographic area needs to be updated.	FME description was edited as follows: "Update or improve County to Zone AE"

Level	Num.	Task	TWDB Comment	Region 2 FPG Response
1	17	Task 4B	17. Flood Mitigation Projects (FMP) (Exhibit C Table 13): Please provide a Benefit Cost Ratio (BCR) for FMP_ID: 023000001 as required per [31 TAC §361.38(c-e) & Exhibit C 2.4.B].	Reconciled.
1	18	Task 5	18. Flood Management Evaluation (FME) Recommendations, Text: Please review the table included within the map. Based on Table 16 there appear to be 9 FMPs recommended in the flood plan, however, the table included in this map appears to indicate only 5 FMPs are recommended [31 TAC §361.39(c) & (f)].	This comment appears to be an error. We only have 3 FMPs recommended in Chapter 5.
1	19	Task 6	19. Flood Mitigation Project (FMP) Recommendations, GIS Feature Class, FMP: Please provide a Benefit Cost Ratio for FMP_ID: 023000001 as required per [31 TAC §361.39 & Exhibit C 2.5.B].	Reconciled.
1	20	Task 7	20. Flood Mitigation Project (FMP) Recommendations, Text: Each recommended FMP must be accompanied with an associated model or supporting documentation to show no negative impact. Please confirm that this was done and provide reference to supporting materials. As per the draft report (page 5-9), "A preliminary comparison of pre-and post-project conditions for the 1 percent ACE event (100-year flood) was performed for each potentially feasible FMP to determine if the FMP conforms to the no negative impacts requirements. This preliminary comparison was based on planning level information found in supporting studies and associated H&H model results when available. Based on this planning level review, it was determined that all potentially feasible FMPs would require mitigation measures to offset potential impacts downstream and conform to the no negative impact requirements. It is anticipated that mitigation measures will be incorporated in the design phases of the FMPs. However, the local sponsor will ultimately be responsible for proving the final project design has no negative flood impact before initiating construction." For each recommended FMP, please identify in the plan how no negative impact was determined as required by Exhibit C Section 3.6.A (page 108), either via a model, a study or engineering judgement, and submit the associated model, include the model name, study name, or engineering judgement in tabular format. [31 TAC §361.39 & Exhibit C 2.5.B]	In some cases the models have been lost over time or rougher approximations were used, so most will be references to a report or engineering judgement. Table added to show source.

Level	Num.	Task	TWDB Comment	Region 2 FPG Response
2	21	General	21. To better align with our agency's preferred nomenclature, please consider using the name, "Cursory Floodplain Data" instead of "Fathom" or Cursory Fathom Data" throughout the regional flood plan.	Changed
2	22	Task 1	22. Planning Area Description, Text: a. It appears that a reference to Figure 1.12 on page 1-28 should instead reference Figure 1.13. Please consider revising as appropriate.	Corrected
2	22	Task 1	b. It appears that a reference to Figure 1.13 on page 1-38 should instead reference Figure 1.14. Please consider revising as appropriate.	Corrected
2	22	Task 1	c. It appears that a reference to Figure 1.14 on page 1-39 should instead reference Figure 1.15. Please consider revising as appropriate.	Corrected
2	23	Task 1	23. Watersheds GIS Feature Class, Watersheds: Please ensure that watersheds referenced in FMEs are included in the Watersheds feature class. For example, the stream referenced in FME_ID 021000021 does not appear to be included.	All referenced watersheds in the FME feature class have a polygon in the watersheds feature class.
2	24	Task 1	24. Existing Flood Infrastructure, Text: Please provide a description of how Low Water Crossings were identified within the text of Chapter 1.	Added
2	25	Task 2A	25. Existing Condition Flood Exposure, GIS Feature Class, ExFldExpPt: Please ensure that critical facilities are not duplicated in the point and polygon feature classes. It is preferred for critical features to be shown in the polygon feature class (ExFldExpPol).	Verify, did not find duplicates, but one power plant was identified only as a point and not a polygon.
2	26	Task 2A	26. Existing Condition Flood Exposure GIS Feature Class, ExFldExpPol: The agricultural coverage layers appear to have irregular triangle and rectangular features that may be a result of the conversion of a raster to polygon. Please review and revise, as appropriate.	Upon review, these polygons are representative of the source. Polygons were intersected with the quilt and the counties for easy summarizing which could attribute to irregular shapes. No changes made.
2	27	Task 2A	27. Existing Condition Flood Exposure, (Exhibit C Map 6): Please consider reviewing and revising Map 6B with regard to legibility including differentiations between Roadway Segments and Gas Pipelines.	Upon review, the symbology already separates road segments from gas lines. No changes were made

Level	Num.	Task	TWDB Comment	Region 2 FPG Response
2	28	Task 2A	28. Existing Condition Flood Vulnerability, Text: Chapter 2 does not appear to discuss identifying the vulnerabilities of critical facilities by looking at factors such as proximity to a floodplain, proximity to other bodies of water, past flooding issues, emergency management plans, and location of critical systems like primary and back-up power. Please summarize the resilience of critical facilities identified in the existing condition hazard area [31 TAC §361.33].	This was not addressed. Little is know about most of these facilities and collecting the needed data on every critical facility would be extremely time consuming.
2	29	Task 2A	29. Model Coverage, Text: Please consider including a table of the relevant models that are currently available for the region.	No models were obtained for developing the flood quilt. FEMA and TWDB have models available for the Effective Zone AE floodplain and BLE data, but only the BLE data is readily accessible.
2	30	Task 2B	30. Future Condition Flood Vulnerability Analysis, Text: Chapter 2 does not appear to discuss identifying the vulnerabilities of critical facilities by looking at factors such as proximity to a floodplain, proximity to other bodies of water, past flooding issues, emergency management plans, and location of critical systems like primary and back-up power. Please summarize the resilience of critical facilities identified in the future condition hazard area.	This was not addressed. Little is know about most of these facilities and collecting the needed data on every critical facility would be extremely time consuming.
2	31	Task 2B	31. Future Condition Flood Vulnerability, GIS Feature Class, FutFldExpAll: a. It appears that some critical facilities may not be included in the dataset (e.g., LH Rather Jr. High School). Please review and confirm that the inclusion of critical facilities such as hospitals, schools, and fire stations.	"L H Rather" was in ExFldExpAll. Will change name to include "Jr. High School". No other data found to be missing.
2	31	Task 2B	b. Some points along the Louisiana border do not appear to have SVI values. Please consider reviewing and verify SVI availability for points with NULL values.	Upon review, there are no null values.
2	32	Task 2B	32. Future Condition Flood Exposure GIS Feature Class, FutFldExpPol: The agricultural coverage layers appear to have irregular triangle and rectangular features that may be a result of the conversion of a raster to polygon. Please review and revise, as appropriate.	Upon review, these polygons are representative of the source. Polygons were intersected with the quilt and the counties for easy summarizing which could attribute to irregular shapes. No changes made.

Level	Num.	Task	TWDB Comment	Region 2 FPG Response
2	33	Task 3A	33. Existing Floodplain Management Practices, Text: Please consider revising Table 3.1 to use 1% and 0.2% instead of the occurrence interval year.	Table 3.1 was updated as recommended.
2	34	Task 4A	34. Greatest Gaps Map (Exhibit C Map 14): Please consider including score values or numerical values for the colors related to Flood Risk.	Color codes reflect Flood Risk Knowledge Gaps primarily based on the "Areas Without Adequate Inundation Maps" criteria (See Table 4.4 in Chapter 4). Added score shown in Table 4.4 to the levels in the legend to add clarity.
2	35	Task 4A	35. Greatest Risks Map (Exhibit C Map 15): Please consider including score values or numerical values for the colors related to Flood Risk.	Added subjective number ratings to colors.
2	36	Task 4B	36. Flood Management Evaluations (FME), Text: For county-wide watershed FMEs where a majority of the county falls outside of the Flood Planning Region boundary, please consider including justification for how the FME benefits the region and please coordinate with other RFPGs to make sure the efforts are not duplicated. For example, FME_ID 021000004.	Countywide FMEs were only recommended if more than 50% of the County area is within Region 2. Any recommended countywide evaluation will benefit the portion of the county within the Lower-Red-Sulphur-Cypress Region's jurisdiction. Coordination with adjacent regions has occured.
2	37	Task 4B	37. Flood Management Evaluations (FME) GIS Feature Class, FME: a. Please consider revising descriptions to describe the flood study or proposed study of flood prone area needed in order to assess flood risk and/or determine if there are potentially feasible FMSs or FMPs.	FME descriptions were reviewed and updated as necessary to provide better description of scope of work.

Level	Num.	Task	TWDB Comment	Region 2 FPG Response
2	37	Task 4B	b. Please consider providing more description on the FME_IDs: 021000045-021000053. Based on current information, it is difficult to determine if these are projects or studies, and if so, what they entail.	FME_ID 021000045 is a comprehensive stormwater plan update and it is the only recommended FME from this list. FME_IDs 46 to 53 where specific projects within the current plan, but the RFPG decided not to recommend them as individual studies and lumped them into FME_ID 45. Descriptions were improved in Table 5.2 (TWDB Table 15) to clarify.
2	38	Task 4B	38. Flood Management Evaluations (FME) (Exhibit C Map 15): Please consider including TWDB-funded FIF Category 1 studies in indication of a previously studied area.	TWDB-funded FIF Category 1 study areas were used to indicate previously studied areas.
2	39	Task 4B	39. Flood Mitigation Projects (FMP) GIS Feature Class, FMP: Please consider developing a FMP_HazPost feature class showing an updated hazard area that accounts for the impact of recommended FMPs.	None of the FMPs have detailed modeling and inundation areas for proposed conditions; therefore, none will be added.
2	40	Task 4B	40. Flood Management Evaluations (FME) (Exhibit C Map 17): a. Please consider increasing legibility for example, by outlining rather than shading HUC12s.	Addressed
2	40	Task 4B	b. Please consider including an inset map of the FMP locations.	Addressed
2	40	Task 4B	c. Please consider reviewing the FMP titles to improve the legibility of the map.	Addressed
2	41	Task 4B	41. Flood Management Strategies (FMS) GIS Feature, FMS: Please consider reviewing FMSs to ensure correct categorization. For example, FMS_IDs 022000052, 022000070 include emergency response systems which could potentially be categorized as an FMP- Nonstructural.	The listed FMSs were reconsidered as non-structural FMPs, but only limited data is available from the Sponsor. Were left as FMS as they are both intended to fund the programmatic aspects of the Flood Measurement and Warning System.
2	42	Task 4B	42. Flood Mitigation Strategies (FMS) (Exhibit C Map 18): Please consider increasing legibility of the Flood Planning Region boundary and text.	Addressed

Level	Num.	Task	TWDB Comment	Region 2 FPG Response
2	43	Task 5	43. Flood Management Evaluation (FME) Recommendations, Text: Please verify that FMEs do not duplicate the efforts of any TWDB-funded, FIF Category 1 studies, and state how any such FMEs will expand on the existing study. For example, FME_ID 02100013 appears that it may be able to use data from FIF ID 40058 (Sabine River Authority Flood Protection Planning for Watersheds - Upper Sabine River Basin) and/or FME_ID 02100003 from FIF ID 40027 (Hunt County Countywide Drainage Study).	The following general statement was added in Chapter 4 under the "Comparison and Assessment of Flood Mitigation Evaluations" section. "Every recommended FME will leverage any existing or on-going studies and expand the H&H modeling analysis as necessary to achieve the FME goals. For example, some FMEs may be able to use data and analysis results from on-going FIF Category 1 studies such as the Sabine River Authority Flood Protection Planning for Watersheds - Upper Sabine River Basin (FIF ID 40058) and the Hunt County Countywide Drainage Study (FIF ID 40027)."
2	44	Task 5	44. Flood Management Evaluation (FME) Recommendations, (Exhibit C Table 15): Please verify that FMEs do not duplicate the efforts of any TWDB-funded, FIF Category 1 studies, and state how any such FMEs will expand on the existing study. For example, FME_ID 02100013 appears that it may be able to use data from FIF ID 40058 (Sabine River Authority Flood Protection Planning for Watersheds - Upper Sabine River Basin) and/or FME_ID 02100003 from FIF ID 40027 (Hunt County Countywide Drainage Study).	The following general statement was added in Chapter 4 under the "Comparison and Assessment of Flood Mitigation Evaluations" section. "Every recommended FME will leverage any existing or on-going studies and expand the H&H modeling analysis as necessary to achieve the FME goals. For example, some FMEs may be able to use data and analysis results from on-going FIF Category 1 studies such as the Sabine River Authority Flood Protection Planning for Watersheds - Upper Sabine River Basin (FIF ID 40058) and the Hunt County Countywide Drainage Study (FIF ID 40027)."

Level	Num.	Task	TWDB Comment	Region 2 FPG Response
2	45	Task 5	45. Flood Management Evaluation (FME) Recommendations (Exhibit C Map 19): Please consider improving the legibility of the Flood Planning Region boundary and text.	Addressed
2	46	Task 5	46. Flood Mitigation Project (FMP) Recommendations (Exhibit C Map 20): a. Please consider increasing legibility for example, by outlining rather than shading HUC12s.	Addressed
2	46	Task 5	b. Please consider including an inset map of the FMP locations.	Addressed
2	46	Task 5	c. Please consider reviewing the FMP titles to improve legibility of the map.	Addressed
2	47	Task 5	47. Flood Management Strategy (FMS) Recommendations (Exhibit C Map 21): Please consider improving the legibility of the Flood Planning Region boundary and text.	Addressed

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Table 8.1 Legislative		
Non regulatory regional flood control or drainage districts should be established and funded for rapidly growing urban areas such as DFW, Houston, San Antonio, etc. Responsibility would be to provide consistency, technical resources, funding and reviews in support of FME's, FMS's. These organizations would also implement or support implementation of FMP's. These organizations would augment communities and counties that just don't have the resources and expertise to manage flooding.	Rapidly developing areas surrounding larger urban centers are at greater risk of having runoff patterns increasing because of development. These urban areas are comprised of many communities and unincorporated county areas. Many of the smaller communities are not funded or resourced to deal with the complexities of floodplain management and therefore there is a lack of or inconsistencies in floodplain management practices.	The FPG is not opposed to this concept, but it would only have minor impacts to the westernmost limits of Region 2, since almost all of the Region is not rapidly developing.
Clarify the early 2000's state legislation that provide counties the authority to regulate floodplains to explicitly allow and encourage activities associated with floodplain management such as development of land use plans, regulatory authorities, e.g. permitting.	Although state legislation was passed in the early 2000's which gave counties the ability to regulate floodplains, interpretation of these regulations varies widely from county to county. The legislate bill lacks implementation guidance in the form of administrative rules. If development is occurring in unincorporated areas, this development can dynamically impact flood risk.	We generally concur. This Regional Flood Plan includes FMSs and FMEs that would provide counties with the tools to more actively manage their floodplains.

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Table 8.2 Regulatory		
Require the use of n-values and channel conditions which would likely result if the channel or project were not maintained. Exceptions would be golf courses or other areas where an organization exists which would maintain the channel in perpetuity. Disallow miniatous by marginal organizations such as home owners associations to justify acceptance of lower n-values as this is an unrealistic expectation.	When channels are constructed, most often channel bed, banks and overbanks are cleared; however; with many miles of these channels, it is often difficult for communities to maintain those beds, banks and overbanks at their design conditions. Generally, there is a lack of channel maintenance to ensure flood conveyance areas, established as part of a development or improvement projects, to retain their design level n-values. This results in unexpected changes in channel conveyance and increased flooding. Channel maintenance is very expensive activity that can trigger environmental permitting requirements.	This can be considered in a Regional Stormwater Management Manual that is recommended as an FMS
No loss of valley storage to the 500-year level. Communities could allow redistribution of valley storage to allow interactions with natural areas but no loss of storage.	Land development in upstream areas increases runoff in downstream areas. This happens because of increased impervious cover and decreased tree cover, and therefore less ability to absorb rainfall. Additionally, development, in most communities, encroaches into riparian areas and decreases the amount of storage available to accommodate flood waters. Just the main thread of the Trinity River though DFW stores more flood waters during of flood than any three of the USACE reservoirs that provide flood protection for DFW. The many other stream provide even more storage than the main stem. There is limited capacity in rivers and streams to convey floodwaters. This means that all areas above any given conveyance point have to store flood water until sufficient time has laps to pass the water away from the impacted area. The streams are where this water is stored and depleting these storage areas will impact DS areas.	This can be considered in a Regional Stormwater Management Manual that is recommended as an FMS. It can also be considered as a goal in future cycles.
Establish future land use plans for unincorporated areas associated with rapidly growing urban areas.	"	Due to the relatively low urbanization of this region, coordination of regional land use plans is not considered a critical issue.
Use of ultimate development land use conditions in the development of future flows. Require use of future flows for regulation of floodplains and development of FMP's.	"	This can be an important issue in some of the more rapidly developing parts of the region and should be considered as flood studies are developed. Considering the lack of detailed studies in the region, the focus of this plan is on establishing existing conditions baselines.

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Table 8.3 State Flood Planning Recommendations		
None		
Potential FMS		
Encourage storm shifting to validate 100-yr estimates and to provide a broader understanding of communities actual flood risk Storms identified and cataloged as part of the GLO funded USACE led Texas Storm Study could be the primary source of storms to be shifted.	Notes: Great deal of uncertainty in 100-yr estimates. Use of observed storms that approximately match depth duration data from NOAA Atlas 14 or other precipitation frequency sources validates 100-yr estimates. Additionally wet, dry and average conditions as well as conditions at the time the storm occurred can be presented. Additionally, communities have and can experience storms that exceed the 100-yr. While not regulatory, this information will provide additional hazard mitigation data so communities can address critical infrastructure impacts and be better prepared.	These studies can be a useful tool in understanding flood risks; however, the focus of this plan is on establishing baseline 1% and 0.2% ACE floodplain studies and boundaries throughout Region 2.
Add detail to Watershed Hydrology Assessments (WHA) for communities within basins with completed WHA's. The WHA for the Trinity has been completed.	The WHA's, funded by FEMA, are considered the best available flood flow frequency estimates, e.g. 100-yr. These estimates consider the latest precipitation frequencies, the variations in watershed response and determine critical flood drivers by employing a wide range of sensitivity analysis for each computation point.	The Region 2 FPG encourages these types of studies and hopes to see them incorporated into the recommended FMEs to establish detailed models and maps for the region.
Update WHA's when future precipitation frequency estimates become available. Efforts to develop future precipitation frequency estimates for Texas are starting.		The Region 2 FPG encourages these types of studies and hopes to see them incorporated into the recommended FMEs to establish detailed models and maps for the region.
Establish regional efforts, for large urban centers to develop future land use data for all developing areas, not just incorporated areas, for use in developing future flood flow frequency estimates and future 100-yr (and other recurrence interval) hazard boundaries.		The Region 2 FPG encourages these efforts, especially in the western portion of the region impacted by rapid urbanization in DFW.