NOTICE OF OPEN MEETING OF THE SAN ANTONIO REGIONAL FLOOD PLANNING GROUP TECHNICAL SUBCOMMITTEE

Region 12 San Antonio RFPG

12/07/2022

2:00 PM

TAKE NOTICE that a meeting of the Technical Subcommittee of the San Antonio Regional Flood Planning Group as established by the Texas Water Development Board will be held on Wednesday, December 7, 2022, at 2:00 PM, in-person at the San Antonio River Authority, located at 201 W. Sheridan St and virtually at https://meet.goto.com/450031317.

Agenda:

1. (2:00 PM) Roll-Call
2. Public Comments – limit 3 minutes per person
3. Review Public Comments on the Region 12 Draft Flood Plan
4. Discussion and Appropriate Action Regarding Recommendation to Planning Group
5. Public Comments – limit 3 minutes per person
6. Date and Potential Agenda Items for Next Meeting
7. Adjourn

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

Additional information may be obtained from: Kendall Hayes, (210) 302-3641, khayes@sariverauthority.org, San Antonio River Authority, 201 W. Sheridan, San Antonio, TX 78204.

education
conservation
cooperation

hill country alliance

San Antonio Regional Flood Planning Group c/o San Antonio River Authority
100 East Guenther St.
San Antonio, Texas 78283-9980

October 11, 2022

Dear Regional Flood Planning Group 12,

Thank you for your ongoing work to create a comprehensive flood plan for the San Antonio River Basin planning area. I am writing to encourage the Planning Group (i) to consider use of nature-based solutions as a primary tool for mitigating flooding and extreme weather events, as well as (ii) to engage the Camp Bullis Sentinel Landscape Partnership as we implement and learn from nature-based solutions in a multi-county focal area around Joint Base San Antonio's Camp Bullis, in the Upper San Antonio River Basin.

JBSA-Camp Bullis provides training for 266 partners, including the institutional and field training component for all Department of Defense enlisted and officer medical training. The continuation and protection of the Camp Bullis training mission directly and significantly affect strategic national defense initiatives as articulated in the National Defense Strategy. Several stressors to the military installation, including encroachment, drought, and flooding, threaten the training mission.

In 2020, the Camp Bullis Sentinel Landscape Partnership—a collaborative now of over 50 organizations—was created to address these and other stressors by enhancing natural resources conservation, agricultural productivity, military readiness, and resilience to extreme weather events such as drought and flooding. Camp Bullis is drained by several creeks, including Cibolo and Salado Creeks, subject to flooding during high rainfall periods. Several personnel have been killed on base from flash floods. The CBSL Partnership is advancing nature-based solutions to enhance groundwater replenishment and mitigate inland flooding to benefit Camp Bullis and surrounding communities.

For example, Texas A&M Natural Resources Institute recently secured an $8.57 million grant from the USDA on behalf of the CBSL Partnership to work with volunteering private landowners to advance nature-based solutions (e.g. enhancing soil health and infiltration). The City of Boerne is protecting and quantifying impacts of riparian stewardship for flood mitigation and groundwater recharge; the University of Texas-San Antonio is assessing how four different permeable pavement designs can mitigate the water quality and quantity of stormwater runoff compared to impermeable pavement surfaces over the Edwards Aquifer Recharge Zone; and the Edwards Aquifer Authority, along with the University of Texas at San Antonio, is studying the impacts of land stewardship practices (e.g. on-contour berms and swales, as well as log and rock structures) on soil infiltration, surface water runoff, and aquifer recharge at the Authority's new Field Research Park.

We invite the RFPG to learn with and support us on how we can most effectively implement nature-based solutions to mitigate flooding, while achieving other co-benefits such as groundwater

replenishment, habitat, agricultural productivity, and public recreation in the Upper San Antonio River Basin.

We appreciate your efforts to protect the people and places that define this region. Please let me know if you have any questions or would like to discuss the CBSL Partnership at your convenience. I can be reached by cell phone at 210-287-0478 or by e-mail at Daniel@HillCountryAlliance.Org.

Respectfully,

Daniel Oppenheimer
HCA Land Program Director &
Camp Bullis Sentinel Landscape Partnership Coordinator

CC:

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Hollie Bierbauer, Texas Division of Emergency Management, Hollie.Bierbauer@tdem.texas.gov
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Organization	Camp Bullis Sentinial Landscape
Submitted by	Daniel Oppenheimer
Submitted on	10/12/2022

Type	Comment	Response
General	(i) to consider use of nature-based solutions as a primary tool for mitigating flooding and extreme weather events	The Plan does consider Nature-Based solutions when searching for eligible FMXs.
General	(ii) to engage the Camp Bullis Sentinel Landscape Partnership as we implement and learn from nature-based solutions in a multi-county focal area around Joint Base San Antonio's Camp Bullis, in the Upper San Antonio River Basin	We will continue to engage CBSL as the flood planning process continues and thereon future flood plans

Greater Edwards Aquifer Alliance

Letter of Recommendations to the TWDB Promoting the Protection of Natural Flood Mitigation Features and Use of Nature Based Flood Mitigation Solutions

Background

State legislation enabling the Regional Flood Plan process provided guidelines and deliverables to be accomplished by each flood planning group, with regional plans becoming the basis of a state flood plan. Included in deliverable was the request for proposed flood mitigation projects to be considered for future funding. Enabling legislation also directed the Texas Water Development Board (TWDB) to identify and evaluate natural flood mitigation features and include Nature Based Solutions (NBS) within proposed flood mitigation projects.

While TWDB has been very responsive to the questions and concerns expressed by the various Regional Flood Planning Groups (RFPG), the process highlighted several areas of concern regarding the evaluation of natural flood mitigation features for their level of function and use in flood mitigation. This process highlighted the current lack of data specific to Texas regions needed to accurately evaluate natural flood mitigation features and, therefore, the need for methods beyond a traditional Hydrologic Engineering Center's - River Analysis System (HEC-RAS) approach. In addition, Technical Consultant outreach to communities demonstrated the need to increase knowledge on incorporating not only the protection and restoration of natural flood mitigation features but also in general, NBS into flood control strategies.

Nature Based Solutions will need to be woven into every facet of this program and incorporated into future policies and strategies in order to empower community collaboration and leveraging the state's vast network of natural ecosystems in building resilient communities.

Recommendations

Broad and specific recommendations have been collected across the state from RFPG committee members and collaborators, including:

1. Increase funding for and use of Nature Based Solutions, and reduce hurdles to their incorporation into the Regional Flood Plans as Flood Mitigation Strategies, Evaluations and Projects by:
    a. Increasing number of trainings and workshops on accurate cost benefit analysis and use of NBS;
    b. Improving modeling methods to provide greater sensitivity beyond traditional hydrological models to include soil porosity and moisture holding capacity, plant interception, evaporation, and transpiration; and other processes that affect flows and interactions with groundwater; as well as water quality improvements and groundwater recharge that can be realized with NBS;
    c. Expanding the TWDB's concept of "adverse impact" to include loss of functioning floodplains and the resiliency that they provide;
    d. Incentivizing collaboration across watersheds and jurisdictions towards a regional approach to floodplain management using NBS by prioritizing such projects.

2. Ensure that the TWDB's cost benefit analysis appropriately weights projects offering:
    a. Increased social and environmental benefits,
    b. Reduced negative environmental impact,

   c. Reduced cost avoidance for infrastructure replacement (for data on gray infrastructure replacement costs: https://mediaspace.du.edu/media/David+Skuodas+-+Seeing+the+Forest+and+the+Trees/1_g90zp1xz), and
   d. Increased flood prevention for future conditions while also creating resiliency to recover after natural disasters.

3. Recognize the role that land development codes and location of infrastructure have on flood impacts:
   a. Educate on the need for counties to use their ability provided by the State to exert authority to influence development and reduce negative impacts to natural features that mitigate flooding and enable counties to levy stormwater/drainage utility fees to retrofit and maintain natural flood infrastructure,
   b. Promote and fund the use of NBS throughout watersheds with the understanding that most natural flood mitigation features, including floodplains, are in some state of degradation and can be improved with appropriate land use policies,
   c. Recommend policy changes that enable Counties or Groundwater Conservation Districts to protect Natural Aquifer Storage and Recovery features (e.g., karst, fracture zones, and sinkholes) that help mitigate flood severity while transferring potential flood water into aquifers, and
   d. Partner with other agencies to incorporate flood considerations into applicable agency activities (e.g., ensure TxDOT builds to 1% annual probability ("100-year") standards and uses updated flood maps defined by the National Oceanic and Atmospheric Administration (currently the Atlas 14 data) and that such infrastructure does not increase downstream flooding nor damage floodplains and riparian corridors.

4. Specific project recommendations:
   a. Fund a Texas Watershed Initiative similar to Louisiana's[1] with a robust program on use and adoption of NBS,
   b. Provide training and technical resources to flood districts, river authorities, municipal utility districts, water control and improvement districts, and municipal and county floodplain managers to advance understanding and adoption of NBS and best practices for maintaining floodplains and other natural flood mitigation features to fully realize potential benefits,
   c. Use all available federal and state programs to prioritize the preservation and restoration of natural flood mitigation features throughout watersheds,
   d. Develop a compendium of Nature-Based resources for non-coastal communities, and
   e. Review submitted FMPs, FMEs and FMSs submitted for this first 5-year cycle to determine the feasibility to augment with NBS aspects.

Conclusions

If preventative flood mitigation strategies are not prioritized for funding, then flood events will be more frequent and cause greater harm, leading to much higher costs for Texas taxpayers. Similarly, if natural infrastructure that mitigates flooding is degraded, undoing the damage to some of these features may be cost-prohibitive. Retrofitting with flood control projects is also not cost-effective, given pathways for prevention already in use in many other states. Conversely, strategically protecting natural infrastructure and placing Nature Based Solutions throughout a watershed can significantly reduce flood risks along tributaries and major riverine systems alike.

[1] https://watershed.la.gov/nature-based-solutions

Organization	Greater Edwards Aquifer Alliance
Submitted by	
Submitted on	

Type	Comment	Response
1. *Increase funding for and use of Nature Based Solutions, and reduce hurdles to their incorporation into the Regional Flood Plans as Flood Mitigation Strategies, Evaluations and Projects by:*		
1	a. Increasing number of trainings and workshops on accurate cost benefit analysis and use of NBS;	This is captured in the Goals of the RFPG
1	b. Improving modeling methods to provide greater sensitivity beyond traditional hydrological models to include soil porosity and moisture holding capacity, plant interception, evaporation, and transpiration; and other processes that affect flows and interactions with groundwater; as well as water quality improvements and groundwater recharge that can be realized with NBS;	The new FEMA models use different hydrology which has more soil and evapotranspiration parameters
1	c. Expanding the TWDB's concept of "adverse impact" to include loss of functioning floodplains and the resiliency that they provide;	Will include as recommendation to the TWDB
1	d. Incentivizing collaboration across watersheds and jurisdictions towards a regional approach to floodplain management using NBS by prioritizing such projects.	Will include as recommendation to the TWDB
2. *Ensure that the TWDB's cost benefit analysis appropriately weights projects offering:*		
2	a. Increased social and environmental benefits,	Will include as recommendation to the TWDB
2	b. Reduced negative environmental impact,	Enviornmental impacts and permitting are adressed and mitigated during the design process. If a project was assumed to have an insupmountable envionrmental contstraint it was not conisdered for the plan.
2	c. Reduced cost avoidance for infrastructure replacement (for data on gray infrastructure replacement costs: https://mediaspace.du.edu/media/David+Skuodas+-+Seeing+the+Forest+and+the+Trees/1_g90zp1xz), and	Will include as recommendation to the TWDB
2	d. Increased flood prevention for future conditions while also creating resiliency to recover after natural disasters.	Will include as recommendation to the TWDB
3. *Recognize the role that land development codes and location of infrastructure have on flood impacts:*		
3	a. Educate on the need for counties to use their ability provided by the State to exert authority to influence development and reduce negative impacts to natural features that mitigate flooding and enable counties to levy stormwater/drainage utility fees to retrofit and maintain natural flood infrastructure,	This was included in chapter 8 Legislative Reccomendations
3	b. Promote and fund the use of NBS throughout watersheds with the understanding that most natural flood mitigation features, including floodplains, are in some state of degradation and can be improved with appropriate land use policies,	This was included in chapter 8 Legislative Reccomendations
3	c. Recommend policy changes that enable Counties or Groundwater Conservation Districts to protect Natural Aquifer Storage and Recovery features (e.g., karst, fracture zones, and sinkholes) that help mitigate flood severity while transferring potential flood water into aquifers, and	This was included in chapter 8 Legislative Reccomendations

3	d. Partner with other agencies to incorporate flood considerations into applicable agency activities (e.g., ensure TxDOT builds to 1% annual probability ("100-year") standards and uses updated flood maps defined by the National Oceanic and Atmospheric Administration (currently the Atlas 14 data) and that such infrastructure does not increase downstream flooding nor damage floodplains and riparian corridors.	This was included in chapter 8 Legislative Reccomendations
4. *Specific project recommendations:*		
4	a. Fund a Texas Watershed Initiative similar to Louisiana's with a robust program on use and adoption of NBS,	Will include as recommendation to the TWDB
4	b. Provide training and technical resources to flood districts, river authorities, municipal utility districts, water control and improvement districts, and municipal and county floodplain managers to advance understanding and adoption of NBS and best practices for maintaining floodplains and other natural flood mitigation features to fully realize potential benefits,	This is part of the Region 12 flood planning goals
4	c. Use all available federal and state programs to prioritize the preservation and restoration of natural flood mitigation features throughout watersheds,	Will include as recommendation to the TWDB
4	d. Develop a compendium of Nature-Based resources for non-coastal communities, and	This is part of the Region 12 flood planning goals
4	e. Review submitted FMPs, FMEs and FMSs submitted for this first 5-year cycle to determine the feasibility to augment with NBS aspects.	All project can be evalusted during design for the inclusion of NBS

September 30, 2022

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Carter P. Smith
Executive Director

Nefi Garza, Chair
San Antonio Flood Planning Region c/o
San Antonio River Authority
100 E. Gunter Street
San Antonio, Texas 78283

Re: 2023 San Antonio Regional Flood Plan

Dear Mr. Garza,

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 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 San Antonio Regional Flood Planning Group (SARFPG) 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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www.tpwd.texas.gov

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.

San Antonio Regional Flood Plan Comments

Texas Conservation Action Plan (TCAP) is a guiding document 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. Species of Greatest Conservation Need (SGCN) include numerous aquatic species such as fish, freshwater mussels, and salamanders. The TCAP handbook (Texas Parks and Wildlife Department, 2012) 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 Draft San Antonio Regional Flood Plan (SARFP) calculated and mapped flood risk analysis for both 1% and 0.2% annual chance storm events for current and future conditions. A model of the current conditions risk of flooding was created by compiling local knowledge, United States Geological Survey (USGS) gage information, San Antonio River Authority (SARA) data, National Flood Hazard Layer (NFHL) data, FEMA Base Level Engineering data, Fathom data, and National Oceanic and Atmospheric Administration (NOAA) Atlas-14 rainfall data. TPWD appreciates and supports the use of the best available science and most relevant data and encourages the consideration of environmental flow standards for the San Antonio River, Medina River, Mission River, Cibolo Creek, and San Antonio Bay. These environmental flow standards were established by the Texas Commission on Environmental Quality to ensure that natural flow regimes are maintained which include large seasonal pulse flows.

The goals of the Draft SARFP include education and outreach, improving flood warning and readiness, increasing the number of flood studies, increasing the prevention of flooding, and supporting flood infrastructure projects. TPWD encourages the inclusion of the ecological and societal benefits of flooding in any education program and appreciates the repeated mention of nature-based solutions in the education and outreach goals of the SARFP.

The SARFP identified 29 potentially feasible Flood Management Projects (FMPs), 165 potentially feasible Flood Management Evaluations (FMEs), and 20 potentially feasible Flood Management Strategies (FMSs). It appears that most of the recommended FMPs are infrastructure based with only one nature-based solution being put forward. TPWD appreciates that the Draft SARFP acknowledges the gap in flood risk and mitigation in relation to nature-based infrastructure in the region. TPWD understands that the goal of

the RFP is to mitigate floods to reduce risk to life and property but would like to encourage the use of nature-based solutions where possible. The Draft SARFP states that none of the projects or strategies are anticipated to have negative downstream effects.

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 SARFP 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 if you have any questions or comments.

Sincerely,

Marty Kelly
Water Resources Program Coordinator

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.

Clarkin, K. Keller, G., Warhol, T., Hixson, S. 2006. Low-Water Crossings: Geomorphic, Biological, and Engineering Design Considerations. 0625 1808P. San Dimas, CA: U.S. Department of Agriculture, Forest Service, San Dimas Technology and Development Center. 366 p. http://www.fs.fed.us/eng/pubs/pdf/LowWaterCrossings/index.shtml

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Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs.

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.

Organization	Texas Parks and Wildlife Department
Submitted by	
Submitted on	

Type	Comment	Response
San Antonio Regional Flood Plan Comments	The goals of the Draft SARFP include education and outreach, improving flood warning and readiness, increasing the number of flood studies, increasing the prevention of flooding, and supporting flood infrastructure projects. **TPWD encourages the inclusion of the ecological and societal benefits of flooding in any education program and appreciates the repeated mention of nature-based solutions in the education and outreach goals of the SARFP.**	Will try and add the inclusion of ecological and societal benefits of flooding in eduacation programs to the text.
San Antonio Regional Flood Plan Comments	The SARFP identified 29 potentially feasible Flood Management Projects (FMPs), 165 potentially feasible Flood Management Evaluations (FMEs), and 20 potentially feasible Flood Management Strategies (FMSs). It appears that most of the recommended FMPs are infrastructure based with only one nature-based solution being put forward. TPWD appreciates that the Draft SARFP acknowledges the gap in flood risk and mitigation in relation to nature-based infrastructure in the region. TPWD understands that the goal of the RFP is to mitigate floods to reduce risk to life and property **but would like to encourage the use of nature-based solutions where possible.** The Draft SARFP states that none of the projects or strategies are anticipated to have negative downstream effects.	The Region 12 FPG encourages the use of natural design features during the design phase of the project. At this level of project planning, it is not feasible in many cases to evaluate the ability of these projects to incorpartate NBS during the design pha
San Antonio Regional Flood Plan Comments	**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 (Clark in et at., 2006).	These types of design considerations are supported byt the Region 12 FPG, however this level of detail was not evalauted during this stage of the project.
San Antonio Regional Flood Plan Comments	The Draft SARFP 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.**	The Region 12 FPG encourages the use of natural design features during the design phase of the project. At this level of project planning, it is not feasible in many cases to evaluate the ability of these projects to incorpartate NBS during the design phase.

National Wildlife Federation's Letter of Recommendations to Region 12 Regional Flood Planning Group Promoting an Equitable Regional Flood Plan, the Protection of Natural Flood Mitigation Features, and Use of Nature Based Flood Mitigation Solutions

Background

State legislation enabling the Regional Flood Plan process provided guidelines and deliverables to be accomplished by each flood planning group, with regional plans becoming the basis of a state flood plan. These plans would be developed through the creation and identification of projects to be considered for future funding. Enabling legislation also directed the Texas Water Development Board (TWDB) to identify and evaluate natural flood mitigation features and include Nature Based Solutions (NBS) among proposed flood mitigation projects.

Region 12, along with all the other Regional Flood Planning Groups (RFPGs) have had to work under a tight timeline during the initial planning round – and we appreciate the work the Region has put into making a holistic flood plan. In particular, in addition to the various flood mitigation evaluations, strategies, and projects that incorporate nature-based solutions, we are encouraged by the following items included in Region 12's draft Regional Flood Plan:

- Regulatory and Administrative Recommendations:
    - 8.1.3. (TxDOT should employ roadway design criteria to require all new and reconstructed state roadways to be designed and constructed, to the extent practicable, at elevations at or above the 1.0% annual chance event water surface elevation. TxDOT should also consider future conditions, such as urbanization and changing rainfall, in its roadway design criteria for drainage and flood risk reduction);
    - 8.1.4 (Establish programs and funding to evaluate and update development code and educate local and regional officials to the floodplain management tools they have available along with nature-based solutions);
    - 8.1.7 (Revise the scoring criteria for funding associated with stormwater and flood-related projects that benefit nature based solutions and agricultural activities);
    - 8.1.8 (Provide financial or technical assistance and training to smaller/rural jurisdictions to help educate them on implementing flood mitigation policy, practices, and funding opportunities);
- *Legislative Recommendations*:
    - 8.2.1 (Direct state funding to counties to maintain drainage and stormwater infrastructure in unincorporated areas);

    - 8.2.2. (Provide funding and/or technical assistance to develop regulatory floodplain maps)
    - 8.2.3. (Provide funding and/or technical assistance to update drainage criteria and development standards that prevents development in or impacts to the Effective FEMA floodplain); and
    - 8.2.9 (Establish perpetual and dedicated funding to implement projects identified in the state flood plan).
- *Regional Flood Planning Process Recommendations:*
    - *8.3.2 (Develop a fact sheet and/or other publicity measures to encourage entities to participate in the SAFPR effort);*
    - *8.3.4 (Develop a process to efficiently amend approved regional flood plans to incorporate additional recommended FMEs, FMSs, and FMPs, and to allow the San Antonio RFPG to advance the recommended FMEs to FMPs);*
    - *8.3.6 Revise the criteria for the "No Adverse Impact" certification required for FMPs.*
    - *8.3.14 Develop guidance and a standardized evaluation criteria for the benefits of nature-based solutions.*
- *Adopted Flood Protection Goals*:
    - *Increase the number of participating Community Rating System (CRS) entities in the FPR by 5 (short term) and 100% (long term);*
    - *Increase the number of entities which regulate to the 1% annual chance future conditions floodplains as part of new development and redevelopment by 10% (short term) and 50% (long term);*
    - *Increase the number of entities above the established baseline that have adopted a holistic watershed approach using existing Natural Flood Mitigation Features (NFMF) such as headwaters, buffers, and conservation easements for flood risk reduction as a basis for comprehensive subdivision regulations;*
    - *Establish a baseline and increase the number of acres of publicly protected open space by 10 % as part of land conservation and acquisitions to reduce future impacts of flooding;*
    - *Reduce the number of NFIP repetitive-loss properties in the FPR by 25% (short term) and 75% (long term);*
    - *Reduce the number of vulnerable critical facilities located within the existing and future 1% annual chance (100-year) floodplain by 50%;*
    - *Increase the number of structural projects by 10% (short term) and 50% (long term) that include a NBS or Green Infrastructure (GI) component.*

While Region 12 and the TWDB has been very responsive to the questions and concerns expressed by the public and various RFPGs, the process and initial regional planning round has highlighted several areas of concern regarding the evaluation of natural flood mitigation features for their level of function and the incorporation of NBS into flood control strategies.

This process highlighted the current lack of data specific to Texas regions needed to accurately evaluate natural flood mitigation features and, therefore, the need for methods beyond a traditional Hydrologic Engineering Center's - River Analysis System (HEC-RAS) approach. In addition, Technical Consultant outreach to communities demonstrated the need to increase knowledge on incorporating Nature Based Solutions into flood control strategies.

Equity and nature-based solutions will need to be woven into every facet of this program and incorporated into future policies and strategies in order to empower community collaboration and leverage the state's vast network of natural ecosystems in building resilient communities.

The following **comments and recommendations specific to Region 12** seek to better ensure an equitable flood plan, and one that centers natural infrastructure and nature-based projects. We recognize that the region will not be able to address some comments provided, however it is our hope that during subsequent rounds, these comments will be taken into consideration.

I. *Adopt NFIP participation as a minimum floodplain management standard*

Region 12 did not adopt any minimum floodplain management standards into its draft plan. Minimum floodplain management standards can be adopted by the region, which local entities must adopt before a FME, FMS, or FMP is included under the Regional Flood Plan, and therefore eligible for funding under FIF.

We encourage Region 12 to consider NFIP participation as a minimum floodplain management standard. Participation in the NFIP requires participants to adopt a floodplain management ordinance and to designate a floodplain administrator who is responsible for understanding and interpreting local floodplain management regulations and reviewing them for compliance with NFIP standards.

Since floodplain management ordinances and designation of a floodplain administrator are essential to proper flood planning at the local level, requiring the remaining communities to participate in the NFIP seems like an appropriate baseline, before entities can potentially receive funding for flood mitigation projects. We recommend that the Region uses its power to adopt minimum floodplain standards, by requiring NFIP participation as a minimum standard.

II. *Refine Assessment and Identification of Flood Mitigation Needs*

Critical facilities in particular need additional attention when assessing and identifying flood mitigation needs. Certain critical facilities pose higher risk to surrounding communities during flooding, such as superfund sites and refineries. We recommend that the Region include in its weighted approach risks based on the number of industrial facilities that pose environmental

justice risks to neighboring and fenceline communities. If facilities are identified that are within floodplains and are not adequately protected, the region should propose legislative, administrative, and regulatory recommendations to better ensure facilities do not pose a risk to neighboring communities during flooding.

III. *Revise description of Nature-Based Features under section 5.1*

Section 5.1 defines multiple structural and nonstructural strategies to mitigate flooding. Nature-based features is defined in the structural section as the following:

> "FMPs can include nature-based features as part of flood mitigation solutions where applicable including, but not limited to, stream and coastal restorations, wetlands, natural channel design, other green infrastructure elements, and land preservation. Although nature-based solutions generally do not provide significant flood risk reduction to 1% annual chance flood hazards (100-year floods), they can improve stormwater quality, provide ecological function uplift, and reduce riverine and coastal erosion risk."[1]

We disagree with the statement that "nature-based solutions generally do not provide significant flood risk reduction to 1% annual chance flood hazards." Nature-based solutions can provide significant benefits to communities, and can provide risk reduction to the 1% annual chance flood. Numerous reports and studies continue to show the benefits of nature-based solutions for flood mitigation – including the U.S. Army Corps of Engineer's International Guidelines on NNBF for Flood Risk Management report released earlier this year. In addition to their ability to provide significant flood mitigation benefits, nature-based solutions are also not associated with negative downstream impacts, commonly associated with traditional gray infrastructure approaches, such as channelization. The description of nature-based features should be revised to acknowledge the considerable mitigation these techniques can have.

IV. *Consider discretion when analyzing nature-based FMPs and provide an administrative recommendations to the TWDB on how to apply potential FMP requirements to nature-based projects*

Only projects with significant amounts of detail are incorporated as Flood Management Projects in the Draft Regional Flood Plans. We are concerned that since no nature-based projects were recommended by the RFPG, natural infrastructure projects may have been downgraded to FMSs due to lack of data provided to the Region. It is important to note that analyses like the BCR are not always tailored for natural infrastructure projects. For example, while preserving open space within the floodplain helps protect land from development which could negatively impact

[1] Region 12, Draft Regional Flood Plan at 5-10.

flooding, a traditional BCR may not adequately account for protection of development that hasn't occurred yet. Since we are unsure where to view which projects were submitted to the Region, but subsequently removed because it didn't align with a goal or other reason, or downgraded to a strategy, we recommend the RFPG to provide discretion to potential FMPs that are largely nature-based. We also encourage the Region to provide an administrative recommendation to the TWDB to provide guidance to the Regions on how to apply potential FMP requirements to nature-based projects.

V. *Recommend that the Flood Planning Process be revised to remove the TWDB minimum screening requirement of "the evaluation /strategy/project addresses a flood problem with drainage area of 1 square mile or greater. "*

Many small, distributed projects can provide significant benefits to the floodplain. For example, multiple green stormwater infrastructure projects across a city can reduce runoff. It can also act as a demonstration so that other applicants can implement their own projects. We do not, therefore, believe that the 1 square mile requirement should be included in this criteria. We appreciate that Region 12 did not exclude good flood reduction projects that had a drainage area less than 1 mile.[2]

VI. *Include impact to natural infrastructure when analyzing "No Negative Impacts"*

There seemed to be considerable discretion from the Region on which projects to incorporate, using engineering judgment. Open spaces, such as parks, provide significant flood mitigation benefits to neighboring communities. The analysis of "No Negative Impacts"should therefore include impacts to natural infrastructure, which should be mitigated to the greatest extent possible.

VII. *Add a Flood Protection Goal to decrease number of FMPs that have negative impacts associated with the project and add an administrative recommendation to provide best management practices to local entities on how to avoid negative impacts*

In the draft Flood Plan, the majority of recommended FMPs showed "#N/A" under the negative impacts analysis. TThe region, therefore, should strive to better analyze negative impacts, and decrease the amount of projects with negative impacts over time – which could be reflected in a Flood Protection Goal. Further, Region 12 can provide an administrative recommendation to the TWDB to provide best management practices to local entities on how to reduce negative impacts associated with projects.

VIII. *Add a Flood Protection Goal to have increased enforcement of floodplain ordinances*

[2] Region 12, Draft Regional Flood Plan at 5-22.

Region 12 noted that approximately 10 out of 14 entities within the region have moderate, low, or no enforcement of floodplain regulations. These entities have a significant opportunity to improve the effectiveness of their ordinance or court order by increasing the enforcement of their existing floodplain ordinances. In order to address this shortfall, we recommend that Region 12 adopt a Goal to increase enforcement of floodplain ordinances.

IX. We applaud Region 12's use of local studies to determine "future conditions analysis"

For Region 12, the existing 0.2% flood risk areas were used as a proxy for the future 1% flood risk areas in areas where future 1% flood risk areas did not exist, per Method 2 in TWDB's guidance. Method 3, a San Antonio RFPG method, was used to calculate the 0.2% future storm event risk area given as a buffer value utilizing the 2018 San Antonio River Basin Future Precipitation Study, developed by SARA. This analysis showed the average increase in the 0.2% annual chance storm event peak flows throughout the basin were between 30% and 40% for the 20- and 40-year future projections, respectively. From this data, HDR estimated a 35% increase in 0.2% annual chance storm event peak flows for a 30-year future event. While we applaud Region 12 for utilizing local studies to determine future 500 year floodplain, we believe there should be some discussion of whether this methodology comports with the State Climatologist's recommendations to determine the extent of the future 500 year floodplain.[3]

We appreciate the work the Region is doing to help better plan for and protect our communities from flooding. Further, we appreciate the opportunity to submit these comments. In addition to the comments, above, we've attached a letter providing additional comments for consideration by the region during future planning cycles.

Sincerely,

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Danielle Goshen
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National Wildlife Federation

[3] John Nielsen-Gammon and Savannah Jorgensen, Climate Change Recommendations for Regional Flood Planning Group (April 16, 2021), available at: https://climatexas.tamu.edu/files/CliChFlood.pdf.

Organization	National Wildlife Federation
Submitted by	
Submitted on	

Type	Comment	Response
	Regulatory and Administrative Recommendations	
Regulatory and Administrative Recommendations	8.1.3. **(TxDOT should employ roadway design criteria** to require all new and reconstructed state roadways to be designed and constructed, to the extent practicable, at elevations at or above the **1.0% annual chance event** water surface elevation. TxDOT should also consider future conditions, such as urbanization and changing rainfall, in its roadway design criteria for drainage and flood risk reduction)	Already have this, Chapter 8
Regulatory and Administrative Recommendations	8.1.4 (Establish programs and funding to **evaluate and update development code** and **educate local and regional officials** to the floodplain management tools they have available along with nature-based solutions);	Already have this, Chapter 8
Regulatory and Administrative Recommendations	8.1.7 (**Revise the scoring criteria** for funding associated with stormwater and flood-related **projects that benefit nature based solutions and agricultural** activities);	The scoring criteria is determined by the TWDB
Regulatory and Administrative Recommendations	8.1.8 (Provide financial or technical assistance and training to smaller/rural jurisdictions to help **educate them on implementing flood mitigation policy**, **practices, and funding opportunities);**	This is part of the Region 12 goals
	Legislative Recommendations	
Legislative Recommendations	8.2.1 (Direct state funding to counties to maintain drainage and stormwater infrastructure in unincorporated areas);	
Legislative Recommendations	8.2.2. (Provide funding and/or technical assistance to develop regulatory floodplain maps)	Will make this recommendation to the TWDB
Legislative Recommendations	8.2.3. (Provide funding and/or technical assistance to update drainage criteria and development standards that prevents development in or impacts to the Effective FEMA floodplain); and	
Legislative Recommendations	8.2.9 (Establish perpetual and dedicated funding to implement projects identified in the state flood plan).	THis is currenlty in Chapter 8 and 9
	Regional Flood Planning Process Recommendations:	
Regional Flood Planning Process Recommendations:	8.3.2 (Develop a fact sheet and/or other publicity measures to encourage entities to participate in the SAFPR effort);	Agree, this is anticipated.
Regional Flood Planning Process Recommendations:	8.3.4 (Develop a process to efficiently amend approved regional flood plans to incorporate additional recommended FMEs, FMSs, and FMPs, and to allow the San Antonio RFPG to advance the recommended FMEs to FMPs);	This process has been identified by the TWDB
Regional Flood Planning Process Recommendations:	8.3.6 Revise the criteria for the "No Adverse Impact" certification required for FMPs.	
Regional Flood Planning Process Recommendations:	8.3.14 Develop guidance and a standardized evaluation criteria for the benefits of nature-based solutions.	Will make this recommendation to the TWDB
	Adopted Flood Protection Goals:	
Adopted Flood Protection Goals:	Increase the number of participating Community Rating System (CRS) entities in the FPR by 5 (short term) and 100% (long term);	Goals have been adopted for this regional flood plan and updated can be considered in future rounds
Adopted Flood Protection Goals:	Increase the number of entities which regulate to the 1% annual chance future conditions floodplains as part of new development and redevelopment by 10% (short term) and 50% (long term);	Goals have been adopted for this regional flood plan and updated can be considered in future rounds
Adopted Flood Protection Goals:	Increase the number of entities above the established baseline that have adopted a holistic watershed approach using existing Natural Flood Mitigation Features (NFMF) such as headwaters, buffers, and conservation easements for flood risk reduction as a basis for comprehensive subdivision regulations;	Goals have been adopted for this regional flood plan and updated can be considered in future rounds
Adopted Flood Protection Goals:	Establish a baseline and increase the number of acres of publicly protected open space by 10 % as part of land conservation and acquisitions to reduce future impacts of flooding;	Goals have been adopted for this regional flood plan and updated can be considered in future rounds
Adopted Flood Protection Goals:	Reduce the number of NFIP repetitive-loss properties in the FPR by 25% (short term) and 75% (long term);	Goals have been adopted for this regional flood plan and updated can be considered in future rounds
Adopted Flood Protection Goals:	Reduce the number of vulnerable critical facilities located within the existing and future 1% annual chance (100-year) floodplain by 50%;	Goals have been adopted for this regional flood plan and updated can be considered in future rounds
Adopted Flood Protection Goals:	Increase the number of structural projects by 10% (short term) and 50% (long term) that include a NBS or Green Infrastructure (GI) component.	Goals have been adopted for this regional flood plan and updated can be considered in future rounds
	The following comments and recommendations specific to Region 12	
I. Adopt NFIP participation as a minimum floodplain management standard		We do; "The San Antonio RFPG recommends that entities that are not currently NFIP participants should adopt at least the minimum standards and take the necessary steps in order to become active NFIP participants."
II. Refine Assessment and Identification of Flood Mitigation Needs	Critical facilities in particular need additional attention when assessing and identifying flood mitigation needs. Certain critical facilities pose higher risk to surrounding communities during flooding, such as superfund sites and refineries. **We recommend that the Region include in its weighted approach risks based on the number of industrial facilities that pose environmental justice risks to neighboring and fenceline communities.** If facilities are identified that are within floodplains and are not adequately protected, the region should propose legislative, administrative, and regulatory recommendations to better ensure facilities do not pose a risk to neighboring communities during flooding.	

III. Revise description of Nature-Based Features under section 5.1	Section 5.1 defines multiple structural and nonstructural strategies to mitigate flooding. Nature-based features is defined in the structural section as the following: "FMPs can include nature-based features as part of flood mitigation solutions where applicable including, but not limited to, stream and coastal restorations, wetlands, natural channel design, other green infrastructure elements, and land preservation. Although nature-based solutions generally do not provide significant flood risk reduction to 1% annual chance flood hazards (100-year floods), they can improve stormwater quality, provide ecological function uplift, and reduce riverine and coastal erosion risk." **We disagree with the statement that "nature-based solutions generally do not provide significant flood risk reduction to 1% annual chance flood hazards.**" Nature-based solutions can provide significant benefits to communities, and can provide risk reduction to the 1% annual chance flood. Numerous reports and studies continue to show the benefits of nature-based solutions for flood mitigation – including the U.S. Army Corps of Engineer's International Guidelines on NNBF for Flood Risk Management report released earlier this year. In addition to their ability to provide significant flood mitigation benefits, nature-based solutions are also not associated with negative downstream impacts, commonly associated with traditional gray infrastructure approaches, such as channelization. The description of nature-based features should be revised to acknowledge the considerable mitigation these techniques can have.	This wording was misinterpreted and we will update to clarify.
IV. Consider discretion when analyzing nature-based FMPs and provide an administrative recommendations to the TWDB on how to apply potential FMP requirements to nature-based projects	Only projects with significant amounts of detail are incorporated as Flood Management Projects in the Draft Regional Flood Plans. We are concerned that since no nature-based projects were recommended by the RFPG, natural infrastructure projects may have been downgraded to FMSs due to lack of data provided to the Region. It is important to note that analyses like the BCR are not always tailored for natural infrastructure projects. For example, while preserving open space within the floodplain helps protect land from development which could negatively impact flooding, a traditional BCR may not adequately account for protection of development that hasn't occurred yet. Since we are unsure where to view which projects were submitted to the Region, but subsequently removed because it didn't align with a goal or other reason, or downgraded to a strategy, we recommend the RFPG to provide discretion to potential FMPs that are largely nature-based. **We also encourage the Region to provide an administrative recommendation to the TWDB to provide guidance to the Regions on how to apply potential FMP requirements to nature-based projects.**	In order for FMX's to qaulify as an FMP engineering data was required to determine: hydorolgic and hydrulics impacts, constuction cost, down stream impacts, Cost-Benefit Analysis. All projects evaluated by the Region 12 FPG that met these requirements were included as FMP's. If any part of this data was lacking, it was included as an FME.
V. Recommend that the Flood Planning Process be revised to remove the TWDB minimum screening requirement of "the evaluation /strategy/project addresses a flood problem with drainage area of 1 square mile or greater. "	Many small, distributed projects can provide significant benefits to the floodplain. For example, multiple green stormwater infrastructure projects across a city can reduce runoff. It can also act as a demonstration so that other applicants can implement their own projects. **We do not, therefore, believe that the 1 square mile requirement should be included in this criteria.** We appreciate that Region 12 did not exclude good flood reduction projects that had a drainage area less than 1 mile.	This was a bsic requirement developed by the TWDB to help identify regional flooding issues. Region 12 had the ability to still evaluate projects on a smaller scale if deemed a critical project.
VI. Include impact to natural infrastructure when analyzing "No Negative Impacts"	There seemed to be considerable discretion from the Region on which projects to incorporate, using engineering judgment. Open spaces, such as parks, provide significant flood mitigation benefits to neighboring communities. **The analysis of "No Negative Impacts"should therefore include impacts to natural infrastructure, which should be mitigated to the greatest extent possible.**	"No negative impact" was defined by TWDB
VII. Add a Flood Protection Goal to decrease number of FMPs that have negative impacts associated with the project and add an administrative recommendation to provide best management practices to local entities on how to avoid negative impacts	In the draft Flood Plan, the majority of recommended FMPs showed "#N/A" under the negative impacts analysis. **The region, therefore, should strive to better analyze negative impacts**, and decrease the amount of projects with negative impacts over time – which could be reflected in a Flood Protection Goal. Further, Region 12 can provide an administrative recommendation to the TWDB to provide best management practices to local entities on how to reduce negative impacts associated with projects.	For many of these projects, no-negative imapact could not be determined and this is a reason they are an FME and not an FMP. In order to determine no-negative impacts a detailed hydrologic and hydruilc maodel must be availabe.
VIII. Add a Flood Protection Goal to have increased enforcement of floodplain ordinances	Region 12 noted that approximately 10 out of 14 entities within the region have moderate, low, or no enforcement of floodplain regulations. These entities have a significant opportunity to improve the effectiveness of their ordinance or court order by increasing the enforcement of their existing floodplain ordinances. In order to address this shortfall, **we recommend that Region 12 adopt a Goal to increase enforcement of floodplain ordinances.**	Several of the Region 12 goals promote increased floodplain regulations and ordinances.
IX. We applaud Region 12's use of local studies to determine "future conditions analysis"	For Region 12, the existing 0.2% flood risk areas were used as a proxy for the future 1% flood risk areas in areas where future 1% flood risk areas did not exist, per Method 2 in TWDB's guidance. Method 3, a San Antonio RFPG method, was used to calculate the 0.2% future storm event risk area given as a buffer value utilizing the 2018 San Antonio River Basin Future Precipitation Study, developed by SARA. This analysis showed the average increase in the 0.2% annual chance storm event peak flows throughout the basin were between 30% and 40% for the 20- and 40-year future projections, respectively. From this data, HDR estimated a 35% increase in 0.2% annual chance storm event peak flows for a 30-year future event. While we applaud Region 12 for utilizing local studies to determine future 500 year floodplain, **we believe there should be some discussion of whether this methodology comports with the State Climatologist's recommendations to determine the extent of the future 500 year floodplain.**	This methodology conformed to the TWDB guidlines and was believed to be the best available data for the region at the time. Future floodplain analysis will be updated in each of the planning cylces as more data becomes available.