

Groundwater Management Area # 7 Joint Planning Meeting

Notice is hereby given that on Thursday, **January 21, 2021 at 10:00 a.m.** that one or more members of the Board of Directors and/or the designated representative of said boards of Groundwater Conservation Districts within the Texas Water Development Board-designated **Groundwater Management Area # 7** of the State of Texas will meet at the **Sutton County Civic Center, 1700 North Crockett Street, Sonora, TX 76950**, for the purposes of conducting joint planning in compliance with the requirements of Section 36.108 of the Texas Water Code.

Agenda

1. Call to Order and Invocation.
2. Introduction of Member Districts and other persons in attendance.
3. Public Comment
4. Consider and Possible Action on Minutes of the September 16, 2020 meeting.
5. Update from Meredith Allen on GMA 7 Joint Planning
6. Update from the Texas Water Development Board.
7. Receive written comments on Edwards-Trinity (Plateau), Pecos Valley, and Trinity aquifers.
8. Presentation and Possible Action on approval of draft summary of draft explanatory report and associated tech memos for the Edwards-Trinity (Plateau), Pecos Valley, and Trinity aquifers, by Dr. Hutchison
9. Other Matters to become before the membership
10. Set date and preliminary agenda for next meeting
11. Adjourn.

Groundwater Conservation Districts located partially or wholly within
Groundwater Management Area # 7 are:

Coke County UWCD; Crockett County GCD; Glasscock GCD; Hickory UWCD No. 1; Hill Country UWCD; Irion County WCD; Kimble County GCD; Kinney County GCD; Lipan-Kickapoo WCD; Lone Wolf GCD; Menard County UWD; Middle Pecos GCD; Plateau UWC&SD; Real-Edwards C&RD; Santa Rita UWCD; Sterling County UWCD; Sutton County UWCD; Terrell County GCD; Uvalde County UWCD; Wes-Tex GCD

Requests for additional information and comments may be submitted to:

Meredith Allen
GMA # 7 Coordinator
Sutton County Underground Water Conservation District
301 S. Crockett Ave, Sonora, Texas 76950
Telephone: 325-226-9093 / Fax: 325-387-5737
e-mail: manager@suttoncountyuwcd.org

Groundwater Management Area # 7 Joint Planning Meeting

Minutes

Pursuant to notice posted in accordance with Section 36.108(e) of the Texas Water Code and Chapter 552 of the Government Code, the meeting of Groundwater Management Area 7 was called to order at 1:30 p.m. at the Caverns of Sonora, located at 1711 Private Road 4468, Sonora, TX 76950

1. The Meeting was called to Order at 1:37 pm and a quorum was established by Meredith Allen. Invocation was given by Scott Holland.
2. Following the invocation, introduction of member districts and other persons in attendance were made:

Districts present:

Crockett County GCD - Slate Williams
Glasscock GCD- Rhetta Yanez
Hill Country UWCD - Paul Tybor
Irion County WCD - Diana Thomas
Kimble County GCD - Jerry Kirby
Kinney County GCD – Genell Hobbs
Menard County UWD – Meredith Allen
Middle Pecos GCD - Ty Edwards
Plateau UWC & SD - Jon Cartwright
Real-Edwards C&RD – Tooter Trees
Sterling County UWCD - Diana Thomas
Sutton County UWCD - Meredith Allen
Terrell County UWCD – Debbie Deaton
Uvalde County UWCD – Vic Hilderbran
Wes-Tex GCD - Dale Adams

Public Attendees:

Lana Tolleson – Sutton County UWCD
Rocio De Luna – Glasscock GCD
Joel Pigg – Real-Edwards C&RD
Lynda Helmers – Terrell County UWCD
Bill Hutchison – GMA Consultant
Scott Holland – ICWCD and SCUWCD
Julie Lewey – Devils River Conservancy
Ed C. Mayfield – Devils River Conservancy
Jim Polonis - rancher

Districts Absent:

Coke County UWCD
Hickory UWCD#1
Lipan-Kickapoo WCD
Lone Wolf GCD
Santa Rita UWCD

3. There were no public comments made.
4. The minutes of the July 16, 2020 virtual meeting were reviewed. Diana Thomas made the motion to approve the July minutes, Ty Edwards seconded, and the motion passed.
5. Meredith Allen gave an update to the Joint Planning progress and reviewed the projected cost for the next fiscal year. She also reviewed possible legislative matters that would impact the joint planning process.
6. The Texas Water Development Board sent written updates that included new guidance documents for desired future conditions, review of pending projects, and the new website for water information, texaswaternewsroom.org.
7. Dr. Hutchison informed the GMA that the draft reports for the Capital Reef and Rustler aquifers would be sent out at a later date. He reported that the Cross Timbers aquifer is now listed as a minor aquifer in GMA 7, but will be deemed non relevant for the purposes of Joint Planning for GMA

7. He reported that the TWDB update of the Edwards-Trinity (Plateau) model will cover the entire model and therefore there will likely be changes in the next DFC planning round.
8. Pursuant the Texas Water Code, Chapter 36.108(c) Groundwater Conservation Districts located wholly or partially within GMA 7 must review their respective management plans annually. Due to the large number of GCDs located in GMA 7, a compilation of Districts was selected for review at the meeting:
- Crockett County GCD, Glasscock GCD, Kinney County GCD, Lipan-Kickapoo WCD (presented by Meredith Allen), Plateau UWC&SD, Real-Edwards C&RD, Santa Rita UWCD (presented by Meredith Allen), Terrell County GCD, Uvalde County UWCD, Wes-Tex GCD, Middle Pecos GCD
9. Meredith Allen presented the 'State of GMA 7' draft document. After discussion, a motion was made to make edits presented and resend the final draft to the group for final approval by Vic Hilderbran. The motion was seconded by Paul Tybor and passed unanimously.
10. The next meeting was set to be on January 21, 2020, location to be determined.
11. Rhett Yanetz made a motion that the meeting be adjourned, Ty Edwards seconded, motion carried, and the meeting was adjourned at 3:15 p.m.

Groundwater Conservation Districts located partially or wholly within
Groundwater Management Area # 7 are:

Coke County UWCD; Crockett County GCD; Glasscock GCD; Hickory UWCD No. 1; Hill Country UWCD; Irion County WCD; Kimble County GCD; Kinney County GCD; Lipan-Kickapoo WCD; Lone Wolf GCD; Menard County UWD; Middle Pecos GCD; Plateau UWC&SD; Real-Edwards C&RD;
Santa Rita UWCD; Sterling County UWCD; Sutton County UWCD; Terrell County GCD; Uvalde County UWCD; Wes-Tex GCD

Requests for additional information and comments may be submitted to:

Meredith Allen
GMA # 7 Coordinator
Sutton County Underground Water Conservation District
301 S. Crockett Ave, Sonora, Texas 76950
Telephone: 325-226-9093 / Fax: 325-387-5737
e-mail: manager@suttoncountyuwcd.org

RESOLUTION NO. XXXX
OF GROUNDWATER MANAGEMENT AREA 7
REGARDING THE REASSIGNMENT OF BOUNDARIES BETWEEN GMA7 AND GMA 8

WHEREAS, groundwater conservation districts are charged by the Texas Legislature with providing for the conservation, preservation, protection, and prevention of waste of groundwater, and of groundwater resources under Section 36.0015, Texas Water Code;

WHEREAS, groundwater conservation districts are required by 36.108 et seq., Texas Water Code, to meet with the other groundwater districts within their Groundwater Management Areas (GMAs), as designated by the Texas Water Development Board, for joint planning;

WHEREAS, as part of the joint planning process, the groundwater districts within each GMA are required to collectively establish desired future conditions for the relevant aquifers within the GMA using groundwater availability models and other data;

WHEREAS, Taylor County is currently in both GMA 7 and GMA 8;

WHEREAS, the current boundaries between GMA7 and GMA 8 do not exclusively follow the Texas Water Development Board's modeled boundaries of the Edwards-Trinity Aquifer and the Trinity Aquifer;

WHEREAS, GMA 7 is the GMA setting the desired future conditions for the Edwards-Trinity Aquifer;

WHEREAS, GMA 8 is the GMA setting the desired future conditions for the Trinity Aquifer;

WHEREAS, GMA 7 requests that the Texas Water Development Board amend the boundary between GMA 7 and GMA 8 to reassign: (1) the sliver in Southeastern Taylor County of the Edwards-Trinity Aquifer to GMA 7; and (2) the sliver in Eastern Taylor County of the Trinity Aquifer to GMA 8; and

WHEREAS, the district representatives of GMA 7 find that geographic and hydrogeologic conditions and factual data related thereto justify and require the proposed amendment to the boundary separating GMA 7 and GMA 8, and that the proposed amendment will result in the most suitable GMA boundaries for the management of the Trinity Aquifer and the Edwards-Trinity Aquifer.

NOW, THEREFORE, BE IT RESOLVED BY THE DISTRICT REPRESENTATIVES OF GROUNDWATER MANAGEMENT AREA 7 THAT:

(1) The above recitals are true and correct.

(2) Groundwater Management Area 7 hereby supports the reassignment by the Texas Water Development Board of the sliver in Southeastern Taylor County of the Edwards-Trinity Aquifer to Groundwater Management Area 7 and the sliver in Eastern Taylor County of the Trinity Aquifer to Groundwater Management Area 8.

(3) The proposed amendment to the boundary between Groundwater Management Area 7 and Groundwater Management Area 8 is justified and required by the geographic and hydrogeologic conditions and factual data related to the groundwater resources in the area of the proposed boundary change and will result in the most suitable GMA boundaries for the management of the Trinity Aquifer and Edwards-Trinity Aquifer, and the other groundwater resources in the area as set forth in Title 31, Texas Administrative Code, Section 356.22 and Section 35.004, Texas Water Code.

PASSED AND APPROVED this X day of MONTH YEAR.

GROUNDWATER MANAGEMENT AREA 7 DISTRICT REPRESENTATIVES:

Coke County Underground Water Conservation District

Crockett County Groundwater Conservation District

Glasscock Groundwater Conservation District

Hickory Underground Water Conservation District No. 1

Hill Country Underground Water Conservation District

Irion County Water Conservation District

Kimble County Groundwater Conservation District

Kinney County Groundwater Conservation District

Lipan-Kickapoo Water Conservation District

Lone Wolf Groundwater Conservation District

Menard County Underground Water District

Middle Pecos Groundwater Conservation District

Plateau Underground Water Conservation And Supply District

Real-Edwards Conservation And Reclamation District

Santa Rita Underground Water Conservation District

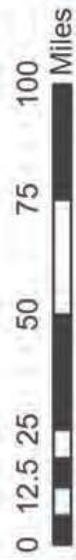
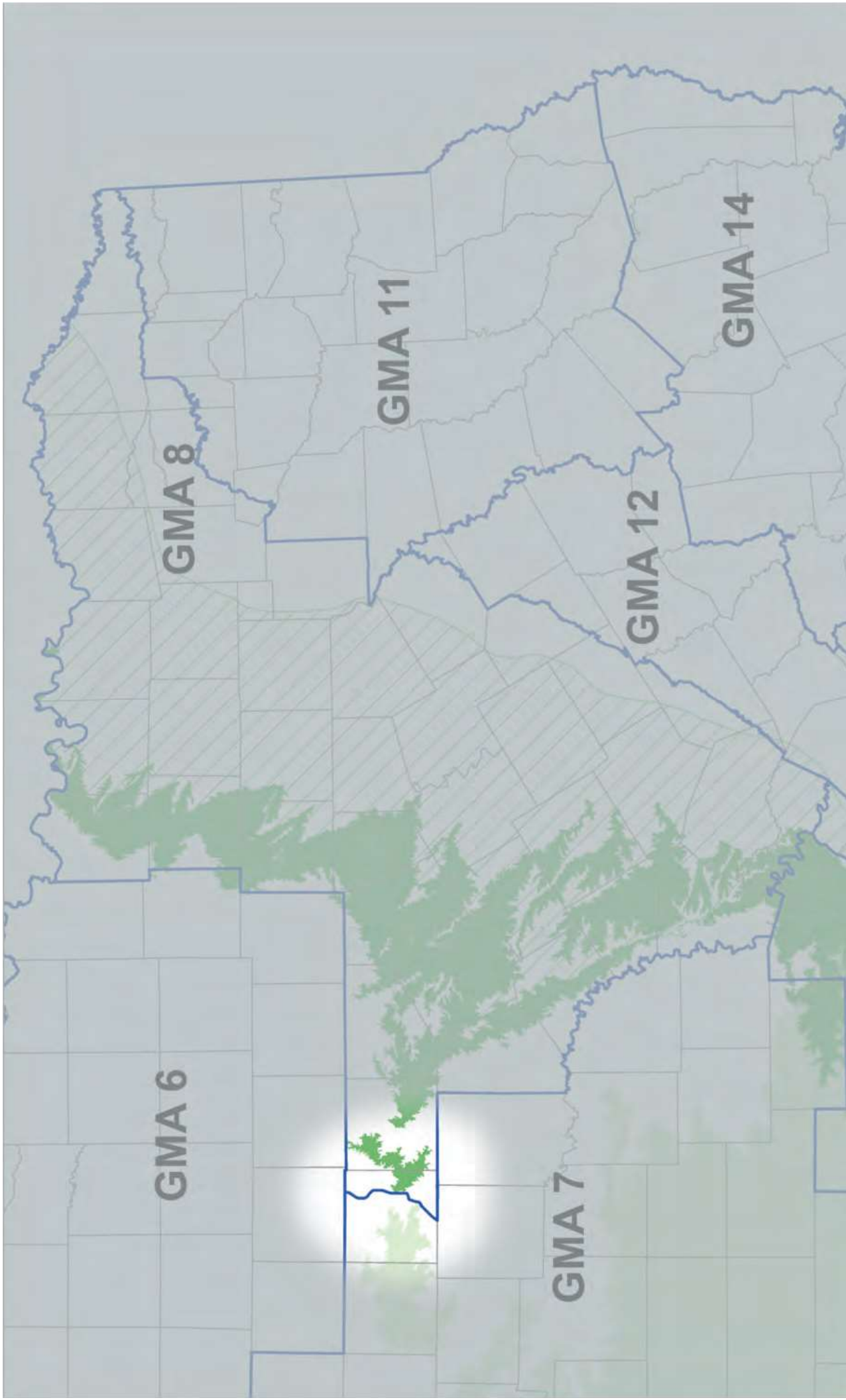
Sterling County Underground Water Conservation District

Sutton County Underground Water Conservation District

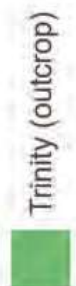
Terrell County Groundwater Conservation District

Uvalde County Underground Water Conservation District

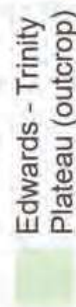
Wes-Tex Groundwater Conservation District



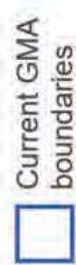
Trinity (subcrop)



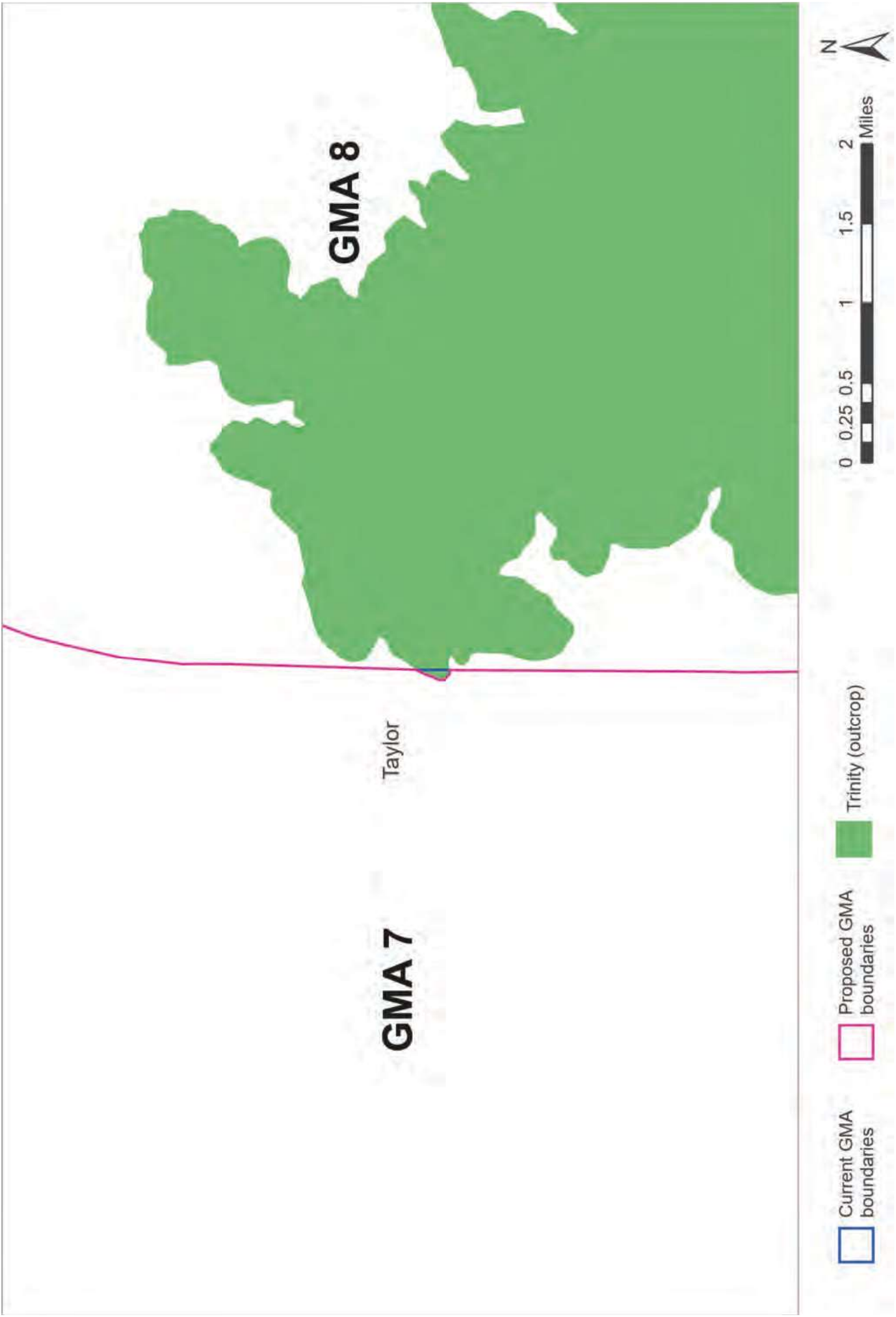
Trinity (outcrop)

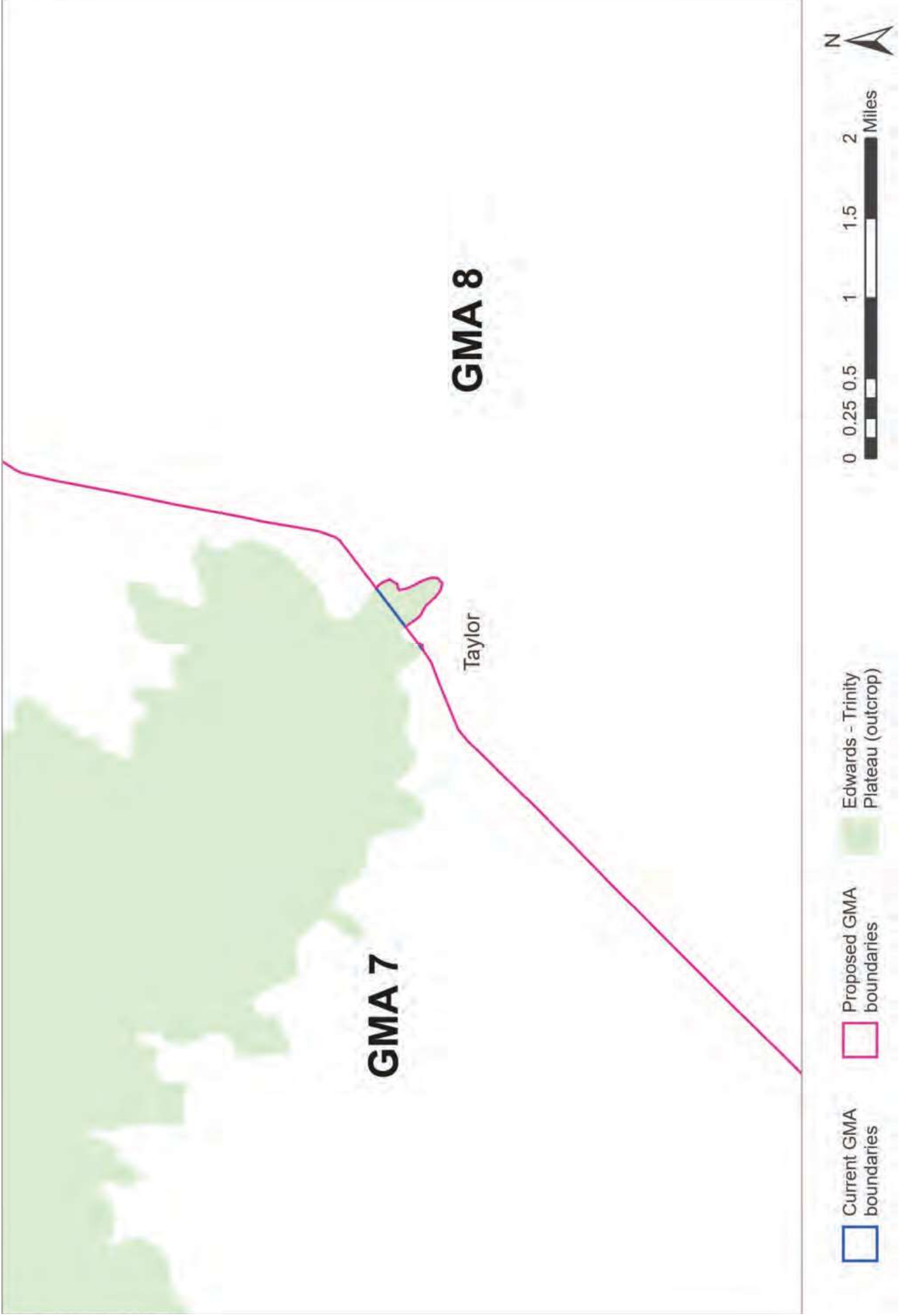


Edwards - Trinity Plateau (outcrop)



Current GMA boundaries





December 21, 2020

Ms. Meredith E. Allen
Groundwater Management Area 7 Coordinator
General Manager
Sutton County Underground Water Conservation District
301 South Crockett Avenue Sonora, Texas 76950

Re: The Devils River and Val Verde County Desired Future Conditions

Dear Ms. Allen,

We appreciate the opportunity to submit comments to Groundwater Management Area 7 (GMA7) regarding the groundwater resources of Val Verde County and the important values the Edwards-Trinity Plateau Aquifer (ETP) provides to its citizens and stakeholders. Together we are (or represent) the stewards of significant land holdings in the Devils River watershed. Below we recommend important considerations for future development of Desired Future Conditions (DFCs) aimed to protect the ETP in Val Verde County.

We commend GMA7 for consideration of springflow in DFCs for both Val Verde County (based on San Felipe Springs) and Kinney County (Las Moras Springs) and for making it a general goal for DFCs in portions of the GMA where groundwater-surface water interactions are of critical importance to water resources. We also commend GMA7 for inclusion of a DFC for Val Verde County, even though there is currently no Groundwater Conservation District (GCD) in the county.

Recent recognition of the importance and complexity of water resources in Val Verde County, the Devils River in particular, warrant consideration in the joint planning process. In addition, recent groundwater development proposals for Val Verde County highlight the urgency of considering the impacts of additional water development on all the ground and surface water resources of the county. While there is not currently a GCD to implement DFCs in Val Verde County, the joint planning results inform the groundwater component of regional water planning and will advise the scope of any future created GCD or other water management entity in Val Verde County.

Value of the Devils River

The Devils River is a valuable resource and provides critical freshwater flows to downstream areas of the Rio Grande Basin, including the lower Rio Grande Valley. In a year of normal rainfall, the Devils River contributes 20% of the inflow to Amistad Reservoir which provides water supply to millions of downstream users, as well as additional recreational opportunities on the lake.

The river's undeveloped, rural watershed is the most intact ecosystem in the state and protects the region's water quality as well as provides unparalleled wilderness recreation opportunities and historical

and cultural tourism attractions. Indeed, the Devils, and groundwater resources upon which it depends, has been the subject of a legislatively-requested study in 2018 and discussions of legislative interim committees in 2018 and 2020. The recognition of the importance of the Devils River has led to significant advances in understanding the river and its relationship to the aquifer, which we briefly outline below.

Recent Hydrogeological and Ecological Research in the Devils River

Much information has been developed over the last ten years on the Devils River. This work is the result of multi-partner collaborations and has brought more than \$2 million in federal and private funding to research in the Devils River watershed. Key contributions have been made by stakeholders and research institutions such as Texas Parks and Wildlife Department, U.S. Fish and Wildlife Service, The Nature Conservancy, The Devils River Conservancy, University of Texas, Texas A&M University as well as philanthropic foundations and private donors.

In response to a legislative request, TWDB completed a comprehensive report synthesizing available information on the groundwater resources of Val Verde County (TWDB 2018). This report recognizes that the Devils River and its springs may be useful benchmarks for groundwater management in Val Verde County. Other researchers have also advanced the understanding of groundwater flow paths and groundwater surface water interactions in Val Verde County (Green et al. 2014, Wolaver et al. 2018, and Caldwell et al. 2020). This work supported the development of numerical groundwater models to simulate the groundwater system (Ecokai and Hutchison 2014, Green et al. 2016, Toll et al. 2017) that have been used to evaluate future water management scenarios, including additional pumping in the lower portions of the watershed (Ecokai and Hutchison 2014, Toll et al. 2017) and the headwater regions (Fratesi et al. 2019).

There has also been ongoing research and monitoring to understand the flow needs of the Devils River ecosystem and how it would respond to groundwater alteration. Instream habitat modeling studies (URG BBEST 2012, Hardy 2014) have estimated how available habitat changes with reductions in river flow, and these studies are currently being expanded to other areas of the river and updated with additional information on temperature. TPWD has also established a biological monitoring program that has informed research efforts and established a baseline for monitoring changes to ecosystem health that may result from water management, climate change or other impacts. Recent work has also increased the understanding of the flow needs of the two aquatic species in Val Verde County listed under the Endangered Species Act, the Devils River minnow (threatened) and Texas hornshell (endangered) (Randklev et al. 2018).

Devils River Flow Targets

In aggregate, these studies have resulted in scientifically-defensible information to determine levels of river flows necessary to maintain the values provided by the Devils River and could form the basis for future DFCs to protect the flow of the Devils. Some examples of potential flow targets have been based on percentages of historical flows (Smith 2007) or groundwater levels (Green 2016), similar to the approach used in the Edwards Aquifer to maintain flows at Comal and San Marcos Springs. An important

advance in development of flow targets occurred during the process set forth by Senate Bill 3 (SB3) in 2007 to define environmental flow standards for Texas rivers and bays to maintain a sound ecological environment. In the Upper Rio Grande Basin, science-based recommendations were made for two locations on the Devils River which resulted in the eventual adoption of flow standards by the Texas Commission on Environmental Quality for the Devils River at Pafford's Crossing (TCEQ 2014)(Figure 1). The base flow portions of the flow standards represent seasonal flows necessary to maintain habitats and recreational opportunities, while the subsistence flow portion represents minimum flows needed to sustain the river, and rare species found there, during drought (URGB BBEST 2012).

International Boundary and Water Commission
Gage 08-4494.00, Devils River at Pafford Crossing near Comstock

Season	Hydrologic Condition	Subsistence	Base	Seasonal Pulse (1 per season)	Annual Pulse (1 per year)
Winter	Subsistence	84 cfs	175 cfs	N/A	Trigger: 3,673 cfs Volume: 34,752 af Duration: 13 days
Winter	Dry	N/A	175 cfs		
Winter	Average	N/A	200 cfs		
Winter	Wet	N/A	243 cfs		
Spring	Subsistence	91 cfs	160 cfs	Trigger: 558 cfs Volume: 17,374 af Duration: 7 days	
Spring	Dry	N/A	160 cfs		
Spring	Average	N/A	207 cfs		
Spring	Wet	N/A	253 cfs		
Fall	Subsistence	87 cfs	166 cfs	Trigger: 1,872 cfs Volume: 27,781 af Duration: 9 days	
Fall	Dry	N/A	166 cfs		
Fall	Average	N/A	206 cfs		
Fall	Wet	N/A	238 cfs		

cfs = cubic feet per second
 af = acre-feet
 N/A = not applicable

Figure 1. Adopted environmental flow standards for the Devils River at Pafford's Crossing.

Consideration of the Devils River in Groundwater Management and Planning

The Devils River should be specifically considered when creating and implementing DFCs for Val Verde County, and maintenance of historic surface flows should be a primary basis for groundwater management in the county should a GCD or other regulatory entity be formed. GMA 7 has set a MAG of 50,000 acre-feet for the ETP in Val Verde County, which was primarily developed with a DFC based on maintaining flows from San Felipe Springs. This degree of pumping in some areas of the county could result in unintended impacts to the groundwater resources and surface water flows of the Devils River. Recent work by SWRI (Fratesi et al. 2019) suggests that as little as 3,000 - 5,000 acre-feet of pumping beyond what is pumped now could create significant reductions in river flows during periods of drought, which in turn could have significant ecological impacts. Maintaining the previously described flow standards for the Devils River at or near the historical frequency should be considered as minimum thresholds when developing DFCs and MAGs for Val Verde County to maintain surface flows for a sound ecological environment and the downstream municipal and agricultural users historically dependent on those flows.

Consequently, groundwater models should be further refined before the next round of DFCs to allow explicit consideration of changes to Devils River (and Pecos River) flow and springflow resulting from pumping throughout the county. This would enable consideration of other approaches to more effectively manage the totality of water resources of Val Verde Co (e.g., management zones), depending on interest from stakeholders.

In closing, we commend GMA7 for consideration of the importance of Val Verde County, even though there is no GCD. The water resources of Val Verde County are uniquely important to the people of Texas. We appreciate GMA7's consideration of the Devils River and the future creation DFCs to better manage the groundwater which feeds it.

Thank you. Should you have any questions or wish to discuss this matter in more detail, please do not hesitate to contact Ryan Smith at ryan_smith@tnc.org.

Sincerely,



Ryan Smith
The Nature Conservancy of Texas



Julie Lewey
Executive Director
Devils River Conservancy

Cc: Sarah Robertson, Texas Parks and Wildlife Department

Attachment:

Fratesi, S.B., R.T. Green, and N. Martin. 2019. Evaluation of the Devils River Watershed Surface-Water/Groundwater Model for Determination of Pumping Impacts near Finnegan and Dolan Springs Image Courtesy of The Nature Conservancy. Prepared for The Nature Conservancy of Texas. Available on request and attached to these comments.

References

- Caldwell, T.G., B.D. Wolaver, T. Bongiovanni, J.P. Pierre, S. Robertson, C. Abolt, and B.R. Scanlon. 2020. Spring discharge and thermal regime of a groundwater dependent ecosystem in an arid karst environment. *Journal of Hydrology* 587 (2020): 124947.
- Eco-Kai Environmental Inc. and Hutchison, W. R., 2014, Hydrogeological study for Val Verde County and City of Del Rio, Texas, report prepared for Val Verde County and City of Del Rio, 152 pp, at www.edwardsaquifer.net/pdf/Val_Verde_May_2014.pdf
- Fratesi, S.B., R.T. Green, and N. Martin. 2019. Evaluation of the Devils River Watershed Surface-Water/Groundwater Model for Determination of Pumping Impacts near Finnegan and Dolan Springs. Image Courtesy of The Nature Conservancy. Prepared for The Nature Conservancy of Texas. Available on request and attached to these comments.
- Green, R.T., F.P. Bertetti, and M.S. Miller. 2014. Focused Groundwater Flow in a Carbonate Aquifer in a Semi-Arid Environment. *Journal of Hydrology*. 517:284–297. doi: 10.1016/j.jhydrol.2014.05.015
- Green, R. T., 2016, Val Verde County Drought/Pumping Triggers, presentation to Devils River stakeholder group, October 27, 2016.
- Green, R.T., N. Toll, and F.P. Bertetti. 2016. Develop a Groundwater Flow Model to Understand the Groundwater Resources of the Lower Pecos River Watershed. Contract Report for the City of Laredo. Final Report.
- Hardy, T.B. 2014. Relationship Between Stream Discharge and Habitat Availability for the Devils River Minnow (*Dionda diaboli*) and Other Native Fishes in Portions of the Devils River and Dolan Creek, Val Verde County, Texas. Final Report to Texas Parks and Wildlife Department under U.S. Fish and Wildlife Service award: TX E-115-R-1, Endangered Species Grant Program.
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- Texas Commission on Environmental Quality (TCEQ). 2014. Chapter 298 - Environmental Flow Standards for Surface Water. SUBCHAPTER H: RIO GRANDE, RIO GRANDE ESTUARY, AND LOWER LAGUNA MADRE. <https://www.tceq.texas.gov/assets/public/legal/rules/rules/pdflib/298h.pdf>
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- Toll, N., Fratesi, S.B., Green, R.T., Bertetti, F.P., and Nunu, R., 2017, Water resource management of the Devils River watershed, final report: Southwest Research Institute report under contract to the Devils River Conservancy, at <http://www.devilsriverconservancy.org/research/>

Upper Rio Grande Basin and Bay Expert Science Team (URGB BBEST). 2012. Environmental flows recommendations report. Final submission to the Environmental Flows Advisory Group, Rio Grande Basin and Bay Area Stakeholders Committee and Texas Commission on Environmental Quality. Texas Commission on Environmental Quality, Austin, Texas.

Wolaver, B., T. Caldwell, T. Bongiovanni, and J.P. Pierre. 2018. Monitoring the effects of groundwater level on spring and stream discharge, stream temperature, and habitat for *Dionda diaboli* in the Devils River. Final Report to Texas Parks and Wildlife Department under U.S. Fish and Wildlife Service award: TX E-173-R-1, F15AP00669.



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Carter P. Smith
Executive Director

December 17, 2020

Ms. Meredith E. Allen
GMA Coordinator
General Manager
Sutton County Underground Water Conservation District
301 South Crockett Avenue
Sonora, Texas 76950

Dear Ms. Allen,

As the state agency charged with the primary responsibility for protecting the state's fish and wildlife resources (Texas Parks and Wildlife Code § 12.001), and as the steward of the Devils River State Natural Area, Texas Parks and Wildlife Department appreciates this opportunity to provide comments regarding the determination of desired future conditions (DFCs) for Groundwater Management Area 7 (GMA 7).

We commend GMA7 for consideration of springflow in DFCs for both Val Verde County (based on San Felipe Springs) and Kinney County (based on Las Moras Springs) and for making it a general goal for DFCs in portions of the GMA where groundwater-surface water interactions are of critical importance to water resources. We also commend GMA7 for inclusion of a DFC for Val Verde County, even though there is currently no Groundwater Conservation District (GCD) in the county.

Recent recognition of the importance and complexity of water resources in Val Verde County, the Devils River in particular, warrant consideration in the joint planning process. In addition, recent groundwater development proposals for Val Verde County highlight the urgency of considering the impacts of additional water development on all the ground and surface water resources of the county. While there is not currently a GCD to implement DFCs in Val Verde County, the results of the joint planning process inform the groundwater component of regional water planning and will advise the scope of any future created GCD or other water management entity in Val Verde County.

Value of the Devils River

The Devils River is a valuable resource and provides critical freshwater flows to downstream areas of the Rio Grande Basin, including the lower Rio Grande Valley. In a year of normal rainfall, the Devils River contributes 20% of the inflow to Amistad Reservoir which provides water supply to millions of downstream users, as well as additional recreational opportunities on the lake. The river's

undeveloped, rural watershed is the most intact ecosystem in the state and protects the region's water quality as well as provides unparalleled wilderness recreation opportunities and historical and cultural tourism attractions. Indeed, the Devils River, and groundwater resources upon which it depends, has been the subject of a legislatively-requested study in 2018 and discussions of legislative interim committees in 2018 and 2020. The recognition of the importance of the Devils River has led to significant advances in understanding the river and its relationship to the aquifer, which we briefly outline below.

Recent Hydrogeological and Ecological Research in the Devils River

Much information has been developed over the last ten years on the Devils River. This work is the result of multi-partner collaborations and has brought more than \$2 million in federal and private funding to research in the Devils River watershed. Key contributions have been made by stakeholders and research institutions such as Texas Parks and Wildlife Department, U.S. Fish and Wildlife Service, The Nature Conservancy, The Devils River Conservancy, University of Texas, Texas A&M University as well as philanthropic foundations and private donors.

In response to a legislative request, TWDB completed a comprehensive report synthesizing available information on the groundwater resources of Val Verde County (TWDB 2018). This report, which recognizes that the Devils River and its springs may be useful benchmarks for groundwater management in Val Verde County. Other researchers have also advanced the understanding of groundwater flow paths and groundwater surface water interactions in Val Verde County (Green et al. 2014, Wolaver et al. 2018, and Caldwell et al. 2020). This work supported the development of numerical groundwater models to simulate the groundwater system (Ecokai and Hutchison 2014, Green et al. 2016, Toll et al. 2017) that have been used to evaluate future water management scenarios, including additional pumping in the lower portions of the watershed (Ecokai and Hutchison 2014, Toll et al. 2017) and the headwater regions (Fratesi et al. 2019).

There has also been ongoing research and monitoring to understand the flow needs of the Devils River ecosystem and how it would respond to groundwater alteration. Instream habitat modeling studies (URG BBEST 2012, Hardy 2014) have estimated how available habitat changes with reductions in river flow, and these studies are currently being expanded to other areas of the river and updated with additional information on temperature. TPWD has also established a biological monitoring program that has informed research efforts and established a baseline for monitoring changes to ecosystem health that may result from water management, climate change or other impacts. Recent work has also increased the understanding of the flow needs of the two aquatic species in Val Verde County

listed under the Endangered Species Act, the Devils River minnow and Texas hornshell (Randklev et al. 2018).

Devils River Flow Targets

In aggregate, these studies have resulted in scientifically-defensible information to define levels of river flows necessary to maintain the values provided by the Devils River and could form the basis for future DFCs to protect the flow of the Devils. Some examples of potential flow targets have been based on percentages of historical flows (Smith 2007) or groundwater levels (Green 2016), similar to the approach used in the Edwards Aquifer to maintain flows at Comal and San Marcos Springs. An important advance in development of flow targets occurred during the process set forth by Senate Bill 3 (SB3) in 2007 to define environmental flow standards for Texas rivers and bays to maintain a sound ecological environment. In the Upper Rio Grande Basin, science-based recommendations were made for two locations on the Devils River which resulted in the eventual adoption of flow standards by the Texas Commission on Environmental Quality for the Devils River at Pafford's Crossing (TCEQ 2014) (Figure 1). The base flow portions of the flow standards represent seasonal flows necessary to maintain habitats and recreational opportunities, while the subsistence flow portion represents minimum flows needed to sustain the river, and rare species found there, during drought (URGB BBEST 2012).

Season	Hydrologic Condition	Subsistence	Base	Seasonal Pulse (1 per season)	Annual Pulse (1 per year)
Winter	Subsistence	84 cfs	175 cfs	N/A	Trigger: 3,673 cfs Volume: 34,752 af Duration: 13 days
Winter	Dry	N/A	175 cfs		
Winter	Average	N/A	200 cfs		
Winter	Wet	N/A	243 cfs		
Spring	Subsistence	91 cfs	160 cfs	Trigger: 558 cfs Volume: 17,374 af Duration: 7 days	
Spring	Dry	N/A	160 cfs		
Spring	Average	N/A	207 cfs		
Spring	Wet	N/A	253 cfs		
Fall	Subsistence	87 cfs	166 cfs	Trigger: 1,872 cfs Volume: 27,781 af Duration: 9 days	
Fall	Dry	N/A	166 cfs		
Fall	Average	N/A	206 cfs		
Fall	Wet	N/A	238 cfs		

cfs = cubic feet per second
af = acre-feet
N/A = not applicable

Figure 1. Adopted environmental flow standards for the Devils River at Pafford's Crossing.

Consideration of the Devils River in Groundwater Management and Planning

The Devils River should be explicitly considered when creating and implementing DFCs for Val Verde County, and should be a primary basis for groundwater management in the county should a GCD or other regulatory entity be formed. GMA 7 has set the Modeled Available Groundwater (MAG) of 50,000 acre-feet for

the ETP in Val Verde County, which was primarily developed with a DFC based on maintaining flows from San Felipe Springs. This degree of pumping in some areas of the county could result in unintended impacts to the groundwater resources and surface water flows of the Devils River. Recent work by SWRI (Fratesi et al. 2019) suggests that as little as 3,000 - 5,000 acre-feet of pumping beyond what is pumped now could create significant reductions in river flows during periods of drought, which in turn could have significant ecological impacts. Maintaining the previously described flow standards for the Devils River at or near the historical frequency should be considered as minimum thresholds when developing DFCs and MAGs for Val Verde County to maintain surface flows and a sound ecological environment.

Groundwater models should be further refined before the next round of DFCs to allow explicit consideration of changes to Devils River (and Pecos River) flow and springflow resulting from pumping throughout the county. This would also enable consideration of other approaches for representing the various water resources of Val Verde County (e.g., management zones), depending on interest from stakeholders.

In closing, we commend GMA7 for consideration of the importance of Val Verde County, even though there is no GCD. The water resources of Val Verde County are unique and important to the people of Texas. We appreciate GMA7's consideration of the Devils River and the future creation DFCs to better manage the groundwater which feeds it.

Thank you. Should you have any questions or wish to discuss this matter in more detail, please do not hesitate to contact Sarah Robertson at Sarah.Robertson@tpwd.texas.gov.

Sincerely,

Cindy Loeffler

Cindy Loeffler, Chief
Water Resources Branch

Cc: Ryan Smith, Texas Nature Conservancy
Julie Lewey, Devils River Conservancy

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