Proposed Desired Future Condition(s) for Aquifer(s) in GMA 12

Environmental Stewardship (ES) and
Simsboro Aquifer Water Defense Fund (SAWDF)
Considerations 4
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Dear District Representatives,

For nearly 15 years Environmental Stewardship has participated in the joint planning process as a stakeholder with primary interest in protecting the surface water resources of our region from the impacts of over-pumping of the aquifers. During the first round of developing desired future conditions (DFCs) we observed the "reverse engineering" of the DFCs as the demands developed by the Regional Water Planning Groups were simply plugged into the groundwater availability model (old GAM) to represent the supply side of the balancing equation without first using the GAM and other scientific information available to determine what amount of groundwater could be *sustainably produced* from the aquifers over the next several hundred years — in perpetuity. Without such knowledge, it is impossible to know whether the predicted supply of available groundwater will be available to meet the demands of the region.

In a *resilient* sustainability model that takes into consideration the ecology of the region, the amount of groundwater that can be pumped must be greater than or equal to the amount required to meet both human and environmental needs for the foreseeable future. As such, a major consideration is to determine the amount of groundwater and surface water needed to sustain both human demands and environmental health[1]. Based on this total demand, the amount of groundwater that can be *sustainably pumped* must be such that the surface waters are also conserved and protected while also protecting the property rights of exempt domestic wells.

Based on this premise, Environmental Stewardship developed the following description of the DFC process that has been shared with District representatives over the past several years. **It is time for this approach to the development of DFCs to be given serious consideration by using the GAM and other scientific information to develop a base scenario starting point.**

[1] A sound ecological environment as defined in Senate Bill 3.

Proposed Desired Future Condition(s):

In conformance with the Conservation Amendment of the Texas Constitution, it is the duty of Groundwater Conservation Districts to conserve and preserve the natural resources of the state -- our groundwater, our rivers, our springs, and our bays ... our ecosystems — by passing laws, rules, and for the purposes of this effort, adopting desired future conditions, that achieve a balance between conservation and development of those resources *in perpetuity*. To protect our aquifers as we found them while respecting the ownership rights of landowners.

Though the ability to preserve an aquifer for future generations is not totally in our control — its rate of replenishment, and its hydrologic characteristics, are largely a function of Mother Nature and must be accepted and respected — development of an aquifer, and ultimate depletion of an aquifer and/or the surface water and ecosystems which depend on groundwater, *is the voluntary human action in which we are currently engaged.*

The essence of conservation and preservation of an aquifer resource is that the rate at which we deplete our aquifers must be in balance with the protection of the aquifer and its associated surface waters. That the depletion is not driven only by the desire for development, against which we simply wait for damage to the ecosystem's sustainability before attempting to bring it back "in balance". Only when a definite "conservation standard" describing a sustainable ecosystem is established — an ecosystem that is preserved in perpetuity — can we then determine how much of that aquifer we can develop in balance with the conservation standard.

Since the inception of the DFC joint planning process, GMA-12 has always started by exploring the production-side of the balance bar. ES and SAWDF request that GMA-12 begin the next joint planning process by exploring conservation and protection of the existing ecosystem *for the common good of future generations*.

As a practical matter, GMA-12 should use the best science available, along with the GAM, to predict the amount of groundwater that can be continuously pumped over many centuries[2] without damaging the surface waters from which much of the water pumped is ultimately sourced[3]. In modeling these conditions, GMA-12 is required to fully consider the nine (9) items prescribed by the legislature while seeking to satisfy the mandate to maximize groundwater pumping to the extent possible while *balancing* the development of the groundwater resources against the requirement to conserve and protect.

So, where do we go from here?

ES & SAWDF Request:

When we next review and adopt DFCs, Environmental Stewardship and SAWDF will be requesting that the DFCs be revised in such a way to be based on the following three criteria:

1. Sustainable management of the aquifers (as described above, not just sustainable pumping),
2. Maintain the resilience of the Colorado River to drought conditions by maintaining its gaining relationship with the aquifers, and
3. Protection of exempt landowner domestic and livestock wells.

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[2] TWDB used a 500-year time to estimate the maximum sustainable pumping level for the first adopted 2011 DFCs. June 13, 2012. Memorandum to TWD Board of Directors. SUBJECT: Briefing, discussion, and possible action on appeals of the reasonableness of the Desired Future Conditions adopted by the groundwater conservation districts in Groundwater Management Area 12 for the Sparta, Queen City, Carrizo-Wilcox, Calvert Bluff, Simsboro, Hooper, Yegua-Jackson, and Brazos River Alluvium aquifers, page 17.

[3] GMA-11 Explanatory Report cited herein predicts that 72% of the groundwater pumped will ultimately come from surface water sources (alluvium).

As a starting point, ES & SAWDF are requesting that the GMA representatives do a GAM Run using S-3 and the methodology recently used by neighboring GMA-11 to establish a baseline for additional modeling. In the GMA-11 process, the results of a base simulation (Technical Memorandum 20-05[4]) was developed for this purpose. Based on the baseline and a recommendation, GMA 11 ran an additional set of simulations that would result in a constant pumping scenario for each county-river basin-aquifer unit in GMA 11. Technical Memorandum 21-01[5] Draft 2 reports on the development and results of the 33 iterations used to reach a constant pumping scenario[6] that would be expected to be sustained[7] if the model were run for a longer period of time. The process is discussed in GMA-11's Explanatory Report (Draft 2)[8]. All these GMA-11 documents are available on its public information[9] Google Drive.

To accomplish the objective in criteria 2 above -- which was not include in the GMA-11 process -- an additional limitation would need to be placed on GAM Run 3 to maintain the outflow to the alluvium (as surface water is defined in the tables within these reports) at an outflow volume adequate to maintain the gaining relationship of the Colorado River through a repeat of the recent drought of record (personal communications with author of the reports). This initial run could then be used as the base simulation to develop a proposed DFC using a methodology like that used by GMA-11.

To accomplish the objective in criteria 3 above -- which was not included in the GMA-11 process -- and additional limitation would need to be placed on GAM Run 3. At this time we do not have a method of limiting the run to offer but will work on this to see if there is a method of doing this in the GAM or if it needs to be done another way.

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[4] Hutchison, William R, Ph.D., P.E., P.G. December 30, 2020. GMA 11 Technical Memorandum 20-05. Base Simulation for Joint Planning with Updated Groundwater Availability Model for the Sparta, Queen City, and Carrizo-Wilcox Aquifers

[5] Hutchison, William R, Ph.D., P.E., P.G. February 28, 2021. GMA 11 Technical Memorandum 21-01Draft 2. March 4, 2021. Adjusted Pumping Simulations for Joint Planning with Updated Groundwater Availability Model for the Sparta, Queen City, and Carrizo-Wilcox Aquifers.

[6] Note: This scenario did not include the protection of surface waters and resulted in a pumping quantity that sources 54% of the water from surface waters (Induced inflow from the alluvium). The final proposed DFCs sources 72% of the pumped water from surface waters.

[7] Per Hutchison: The result of the simulations is constant pumping from 2014 to 2080. Tables 2, 3, and 4 of the Tech Memo 21-01 show it tabular form (the last two columns show the results of Scenario 33) for each county-aquifer unit. This is in contrast to the Base Scenario that has several instances of pumping reductions from 2014 to 2070. Maybe your definition of "sustainable" pumping and my use of "constant" pumping are not the same thing. My definition of constant pumping is simply 2014 to 2080 as simulated for the joint planning process. Based on the model results, I believe that this level of pumping would remain unchanged if I kept running the model, although I have not actually run the model beyond 2080. There is no specific reason I can think of that would suddenly cause the pumping rate to drop if the model was run for any number of years.

[8] Hutchison, William R, Ph.D., P.E., P.G. February 28, 2021. Desired Future Condition Explanatory Report (Draft 2) Carrizo-Wilcox/Queen City/Sparta Aquifers for Groundwater Management Area 11.

[9] GMA-11 public information google drive
https://drive.google.com/drive/folders/1ronw7ke38_lU4BHGEHbQQ0j9D7fYmFr?usp=sharing

Proposed AQUIFER DFCs and Measuring/Calculating Method

Please be as detailed as possible in describing your proposed DFC. Include the quantifiable value and a description of the method for measuring or calculating the value. Attach additional pages as needed.

Aquifer	Proposed DFC and Measuring/Calculating Method
Carrizo Aquifer	ES requests that the Districts develop DFCs based on DFC Run 3 (New GAM) that are sustainable with respect to long-term management of the aquifer where the amount of pumping, whether or not permitted, is determined by a process that protects surface waters and exempt domestic wells.
Calvert Bluff Aquifer	ES requests that the Districts develop DFCs based on DFC Run 3 (New GAM) that are sustainable with respect to long-term management of the aquifer where the amount of pumping, whether or not permitted, is determined by a process that protects surface waters and exempt domestic wells.
Simsboro Aquifer	ES requests that the Districts develop DFCs based on DFC Run 3 (New GAM) that are sustainable with respect to long-term management of the aquifer where the amount of pumping, whether or not permitted, is determined by a process that protects surface waters and exempt domestic wells.
Hooper Aquifer	ES requests that the Districts develop DFCs based on DFC Run 3 (New GAM) that are sustainable with respect to long-term management of the aquifer where the amount of pumping, whether or not permitted, is determined by a process that protects surface waters and exempt domestic wells.
Queen City Aquifer	
Sparta Aquifer	
Yegua-Jackson Aquifer	
Brazos Alluvium Aquifer	
Colorado Alluvium Aquifer	ES requests that the Districts initiate the development of DFCs for this aquifer in anticipation of adopting such DFCs during the next planning cycle.

Consideration of Proposed Desired Future Condition(s)

The Texas Water Code requires that the GMA develop DFCs that "provide a balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in the management area." In the space below, or on additional attached pages, please provide your considerations with regard to the nine items that must be considered, per the Texas Water Code, for the proposed DFC(s).

CONSIDERATION 4 – "Other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water:"

Please see introductory letter to GMA-12 Representatives.

CONSIDERATION 7 – "The impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater:"

Please see introductory letter to GMA-12 Representatives.