

Panhandle Groundwater

Conservation District

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Date: August 20, 2014

To: Panhandle GCD Board of Directors

From: C.E. Williams

Steve Shumate

Bill Mullican, P.G.,

Subject: Justification for and request to designate the Blaine Aquifer in Wheeler County as “non-relevant” for the purposes of joint-planning as detailed in Texas Administrative Code (TAC) §356.31. Specifically, TAC §326.31 states:

(a) The districts in a groundwater management area may, as part of the process for adopting and submitting desired future conditions, propose classification of a portion or portions of a relevant aquifer as non-relevant if the districts determine that aquifer characteristics, groundwater demands, and current groundwater uses do not warrant adoption of a desired future condition. In such a case no desired future condition is required. The districts must submit the following documentation to the agency related to the portion of the relevant aquifer proposed to be classified as non-relevant:

(1) A description, location, and/or map of the aquifer or portion of the aquifer;

(2) A summary of aquifer characteristics, groundwater demands, and current groundwater uses, including the total estimated recoverable storage as provided by the executive administrator, that support the

conclusion that desired future conditions in adjacent or hydraulically connected relevant aquifer(s) will not be affected; and

(3) An explanation of why the aquifer or portion of the aquifer is non-relevant for joint planning purposes.

The Panhandle GCD is currently participating in the joint-planning process as a member of Groundwater Management Area 1 (GMA 1). As part of this effort, we have reviewed the major and minor aquifers located within the Panhandle GCD boundaries for the purpose of assembling information on any aquifers that the Board may determine to be non-relevant during the joint-planning process as described above in TAC §356.31. In the Panhandle GCD, the Texas Water Development Board (TWDB) has formally designated one major aquifer (the Ogallala Aquifer) and two minor aquifers (the Dockum and Blaine aquifers). It is our recommendation that both the Ogallala and Dockum aquifers are relevant for joint-planning and that desired future condition statements will need to be adopted for both aquifers. However, due to the very localized nature, limited yield, and poor water quality, it is our recommendation that the Blaine Aquifer in Wheeler County be designated as non-relevant for the purposes of joint planning in GMA 1, as allowed by TAC §356.31. This technical memorandum provides the required supporting data for making that designation.

The Blaine Aquifer, both within Panhandle GCD and also in GMA 1, is isolated to the south-southeastern portion of Wheeler County (see Figure 1). A more detailed map of the Blaine Aquifer (subcrop only), along with the locations of registered/permitted Blaine Aquifer wells is illustrated in Figure 2.

Figure 1. Map of minor aquifers designated by the TWDB in GMA 1

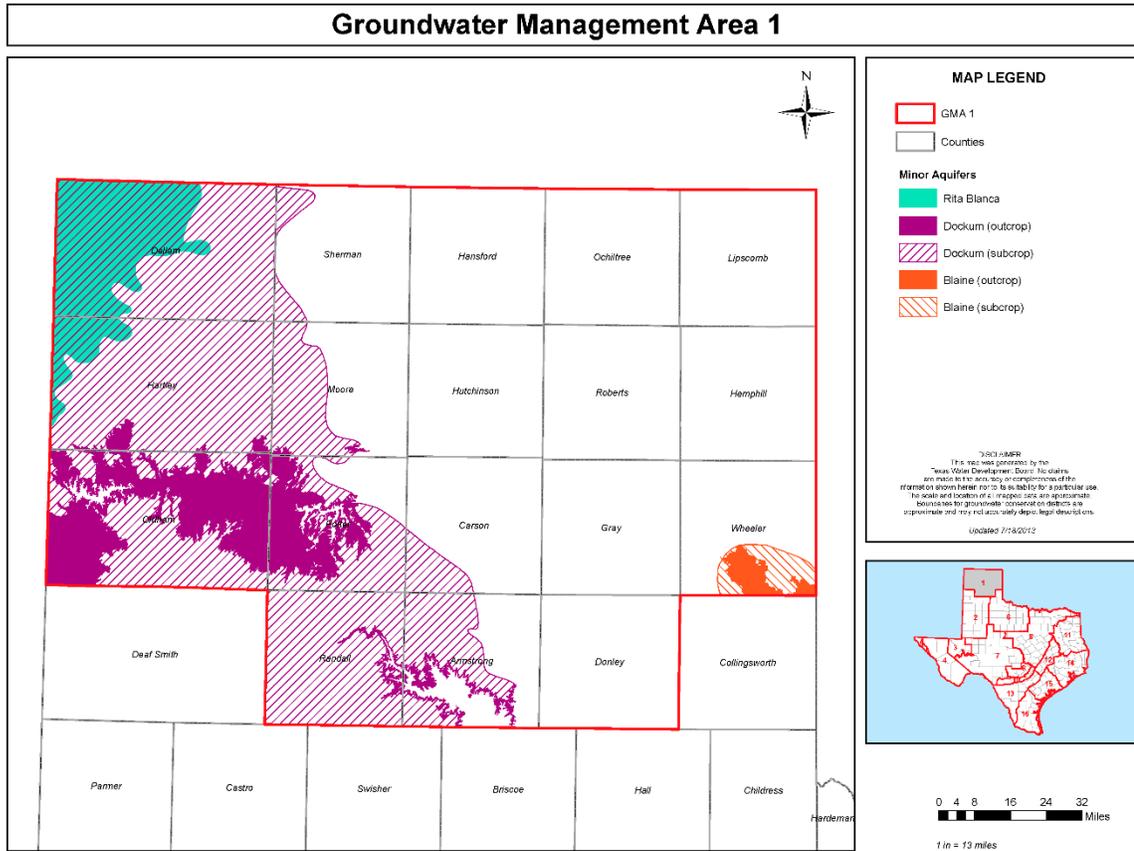
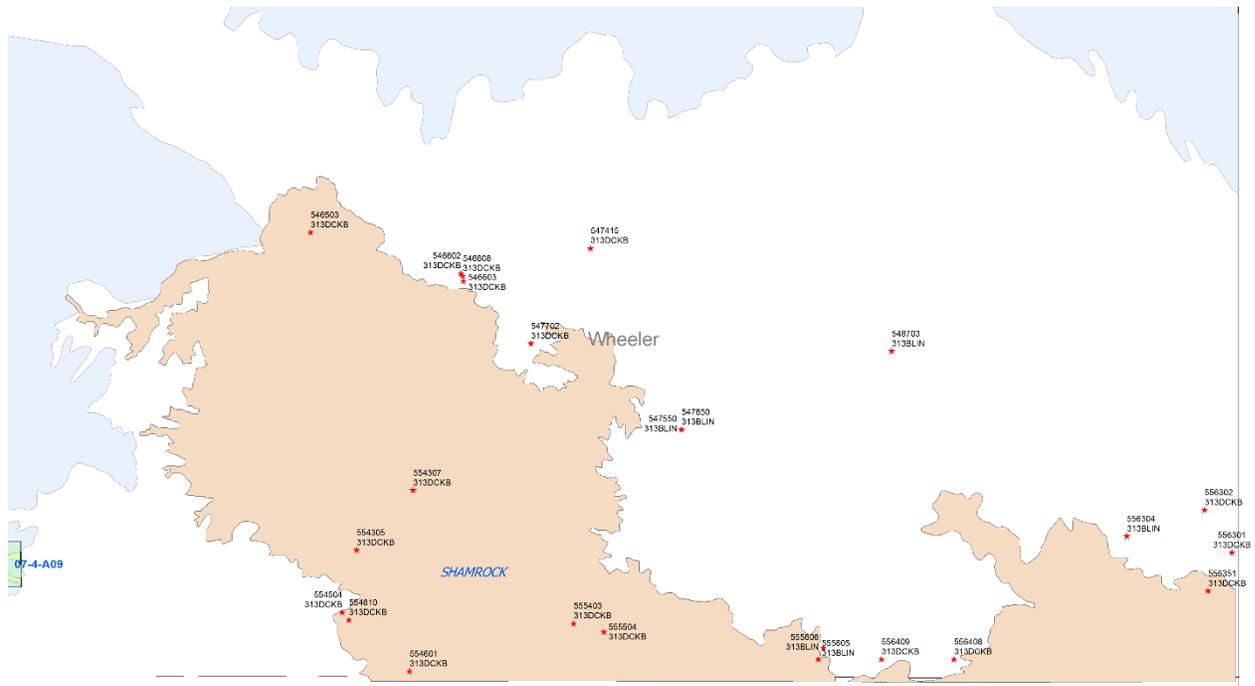


Figure 2. Map of the Blaine Aquifer in Wheeler County including locations of registered/permited Blaine Aquifer wells



Due primarily to poor water quality, there has been only limited scientific research published on the Blaine Aquifer. A few of the more notable publications on the Blaine Aquifer are George and others, (2011)¹, Hopkins and Muller (2011)² and Maderak (1973)³. Another good reference is the 2007 Texas Water Plan⁴. The Blaine Aquifer, one of 21 minor aquifers designated in Texas, is part of the Permian Blaine Formation, which is made up of cycles of marine and non-marine sediments deposited in a broad,

¹ George, P. G., Mace, R. E., and Petrossian, R., 2011, Aquifers of Texas: Texas Water Development Board, Report 380, 182 pg.

² Hopkins, J., and Muller, C., 2011, Water quality in the Blaine Aquifer: Texas Water Development Board, Report 376, 40 p.

³ Maderak, M. L., 1973, Ground-water resources of Wheeler and eastern Gray counties, Texas: Texas Water Development Board Report 170, 67 p.

⁴ Texas Water Development Board, 2007, Water for Texas—2007: The State Water Plan, Volumes I and II, variously paginated.

shallow sea (George and others, 2011). Groundwater in this aquifer is generally present in solution channels and caverns within strata composed of anhydrite and gypsum. The interaction of groundwater flowing through these calcium-sodium-magnesium-sulfate dominated sediments provides an explanation for the poor water quality of the Blaine Aquifer. According to TWDB (2007), the average saturated thickness for the Blaine Aquifer regionally is 137 feet. The Blaine Aquifer is approximately 20 – 35 mile wide and located along the eastern edge of the Texas Panhandle from Wheeler County in the north to Nolan County in the south.. The aquifer occurs in portions of 16 counties. According to Hopkins and Muller (2011) water quality for the Blaine Aquifer in Wheeler County ranges from 1,000 – 3,000 total dissolved solids.

While the Blaine Aquifer is an important water resource to the south of the District, in Wheeler County it has limited use. In the Panhandle GCD well database, there are currently 25 wells in the District with an aquifer code of either Blaine Aquifer or Dog Creek/Blaine Aquifer, and only 15 have been measured during the last five years. Of that 15, 12 are considered to be publishable due to data quality issues. Two of the longer-term hydrographs are illustrated in Figures 3 and 4 below. These hydrographs illustrate that no consistent trend in water level declines is evident, albeit on the basis of very limited data.

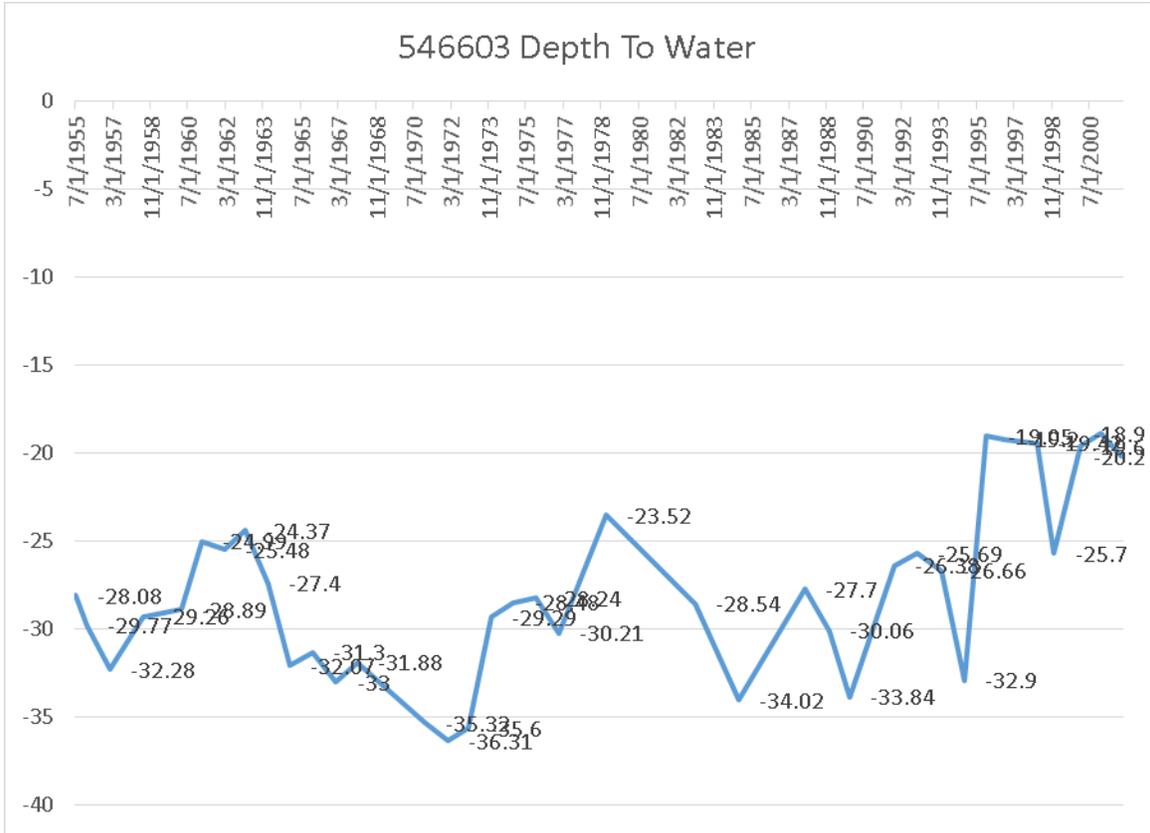


Figure 3 – Hydrograph for PGCD Well 546603 in Wheeler County. The period of record for this well is from July 1955 – December 2001. The total water level change is a rise of 7.88 feet over the period of record.

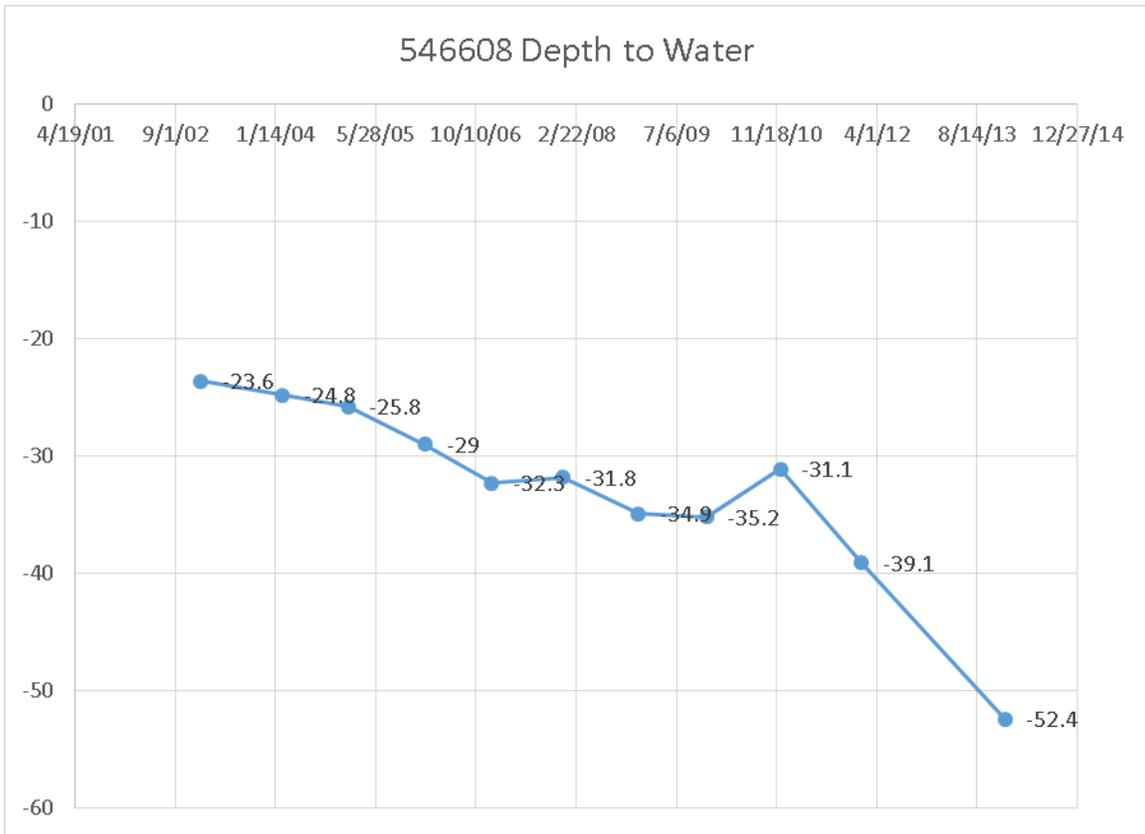


Figure 4 – Hydrograph for PGCD Well 546608 in Wheeler County. The period of record for this well is from September 2002 – January 2014. The total water level change is a decline of 28.8 feet over the period of record.

An important consideration in the designation of an aquifer as non-relevant is aquifer use. The Blaine Aquifer in Wheeler County is used primarily for domestic and livestock purposes. The Blaine Aquifer is also used for some limited irrigation. Groundwater pumping in Wheeler County from 2007 – 2012 for the Blaine Aquifer is reported below by water use sector in Table 1.

Table 1. Groundwater pumping estimates for the Blaine Aquifer in Wheeler County. Data obtained from the Texas Water Development Board Water Use Survey for 2007 – 2012). Reported values in acre-feet per year.

Year	Municipal	Manufacturing	Mining	Power	Irrigation	Livestock	Total
2007	9	0	0	0	1,537	121	1,667
2008	11	0	0	0	1,514	116	1,641
2009	13	0	0	0	1,428	118	1,559
2010	16	0	0	0	1,391	98	1,505

Year	Municipal	Manufacturing	Mining	Power	Irrigation	Livestock	Total
2011	18	0	0	0	1,660	108	1,786
2012	17	0	0	0	2,407	0	2,424

Another consideration in the designation of an aquifer as non-relevant is projections for water demands in the future from the aquifer. Water demand projections for regional water planning are developed irrespective of source. Water demand projections for Wheeler County for the next 50-years are presented in Table 2.

Table 2. Total water demand projections for Wheeler County as adopted for the upcoming 2016 Panhandle Regional Water Plan (TWDB Website <http://www.twdb.texas.gov/waterplanning/data/projections/2017/demandproj.asp>)

Wheeler	2020	2030	2040	2050	2060	2070
Irrigation	8,203	7,983	7,433	6,607	5,781	4,955
Livestock	1,577	1,680	1,682	1,684	1,687	1,689
Manufacturing	0	0	0	0	0	0
Mining	3,268	2,329	1,413	503	139	119
Municipal	1,147	1,164	1,183	1,220	1,265	1,315
Steam-electric	0	0	0	0	0	0
Total	14,195	13,156	11,711	10,014	8,872	8,078

A new parameter of the joint-planning process in establishing desired future conditions in Total Estimated Recoverable Storage, or TERS, for each of the relevant aquifers. As required by TAC §356.31, TERS must also be considered for an aquifer to be designated as non-relevant for the purposes of joint-planning. By statute, TERS is provided by the Executive Administrator of the TWDB. Table 3 includes estimates of TERS for the Blaine Aquifer in Wheeler County (from Kohlrenken, 2013)⁵

⁵ Kohlrenken, W., 2013, GAM Task 13-025: Total Estimated Recoverable Storage for aquifers in Groundwater Management Area 1; Texas Water Development Board, GAM Technical Memorandum, 20 p.

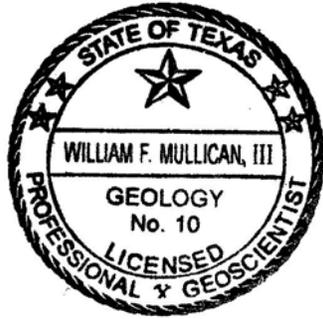
Table 3 – Total estimated recoverable storage for the Blaine Aquifer in Wheeler County.

County	Total Storage (acre feet)	25 percent of Total Storage (acre feet)	75 percent of Total Storage (acre feet)
Wheeler	6,700,000	1,675,000	5,025,000

Recommendations

In the initial round of joint planning in GMA 1 from 2005 – 2010, a desired future condition of 50/50 was adopted for the Blaine Aquifer in Wheeler County. Since that time, the process has been changed significantly, primarily through provisions included in Senate Bill 660 that was passed by the Texas Legislature in 2011. Under these new provisions, it is now necessary for any aquifer designated as a major or minor aquifer (as is the case with the Blaine Aquifer) to have statements of desired future conditions unless the aquifer has been declared through the joint-planning process as non-relevant for the purposes of joint-planning. Under the new procedures included in Texas Water Code §36.108, if an aquifer has an adopted desired future condition, then the responsible GCD must also include management goals, objectives, and performance standards for that aquifer. Then, the responsible GCD is required to develop and adopt rules as necessary in order to achieve the desired future conditions, management goals, objectives and standards for the aquifer.

Due to the very limited use of the Blaine Aquifer in Wheeler County, as described above, at this time we do not feel that sufficient justification exists to develop statements of desired future conditions, management goals, objectives, performance standards, and rules for the Blaine Aquifer in Wheeler County, therefore, we recommend that the Panhandle GCD Board of Directors request that the GMA 1 GCDs designate the Blaine Aquifer as non-relevant for the purposes of joint planning for the current cycle from 20111 – 2016.



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