Trinity Aquifer: Not Relevant for Purposes of Joint Planning

GMA 13 Technical Memorandum 16-05, Draft 1

William R. Hutchison, Ph.D., P.E., P.G.
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Introduction

The Texas Water Development Board, in its July 2013 document, Explanatory Report for Submittal of Desired Future Conditions to the Texas Water Development Board, offers the following guidance regarding documentation for aquifers that are to be classified not relevant for purposes of joint planning:

> *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 (31 Texas Administrative Code 356.31 (b)). This proposed classification of an aquifer may be made if the districts determine that aquifer characteristics, groundwater demands, and current groundwater uses do not warrant adoption of a desired future condition.*
>
> *The districts must submit to the TWDB the following documentation for the portion of the 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 TWDB, 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.*

This technical memorandum provides the required documentation to classify the Trinity Aquifer as not relevant for purposes of joint planning.

Aquifer Description and Location

As described in George and others (2011):

> ***The Trinity Aquifer,*** *a major aquifer, extends across much of the central and northeastern part of the state. It is composed of several smaller aquifers contained within the Trinity Group. Although referred to differently in different parts of the state, they include the Antlers, Glen Rose, Paluxy, Twin Mountains, Travis Peak, Hensell, and Hosston aquifers. These aquifers consist of limestones, sands, clays, gravels, and conglomerates. Their combined freshwater saturated thickness averages about 600 feet in North Texas and about 1,900 feet in Central Texas. In*

> *general, groundwater is fresh but very hard in the outcrop of the aquifer. Total dissolved solids increase from less than 1,000 milligrams per liter in the east and southeast to between 1,000 and 5,000 milligrams per liter, or slightly to moderately saline, as the depth to the aquifer increases. Sulfate and chloride concentrations also tend to increase with depth. The Trinity Aquifer discharges to a large number of springs, with most discharging less than 10 cubic feet per second. The aquifer is one of the most extensive and highly used groundwater resources in Texas. Although its primary use is for municipalities, it is also used for irrigation, livestock, and other domestic purposes. Some of the state's largest water level declines, ranging from 350 to more than 1,000 feet, have occurred in counties along the IH-35 corridor from McLennan County to Grayson County. These declines are primarily attributed to municipal pumping, but they have slowed over the past decade as a result of increasing reliance on surface water. The regional water planning groups, in their 2006 Regional Water Plans, recommended numerous water management strategies for the Trinity Aquifer, including developing new wells and well fields, pumping more water from existing wells, overdrafting, reallocating supplies, and using surface water and groundwater conjunctively.*

Figure 1 (taken from Wade and Bradley, 2013) shows the limited extent of the Trinity Aquifer in GMA 13. Note that it occurs only in a small portion of Uvalde, Medina, Atascosa, and Bexar counties.

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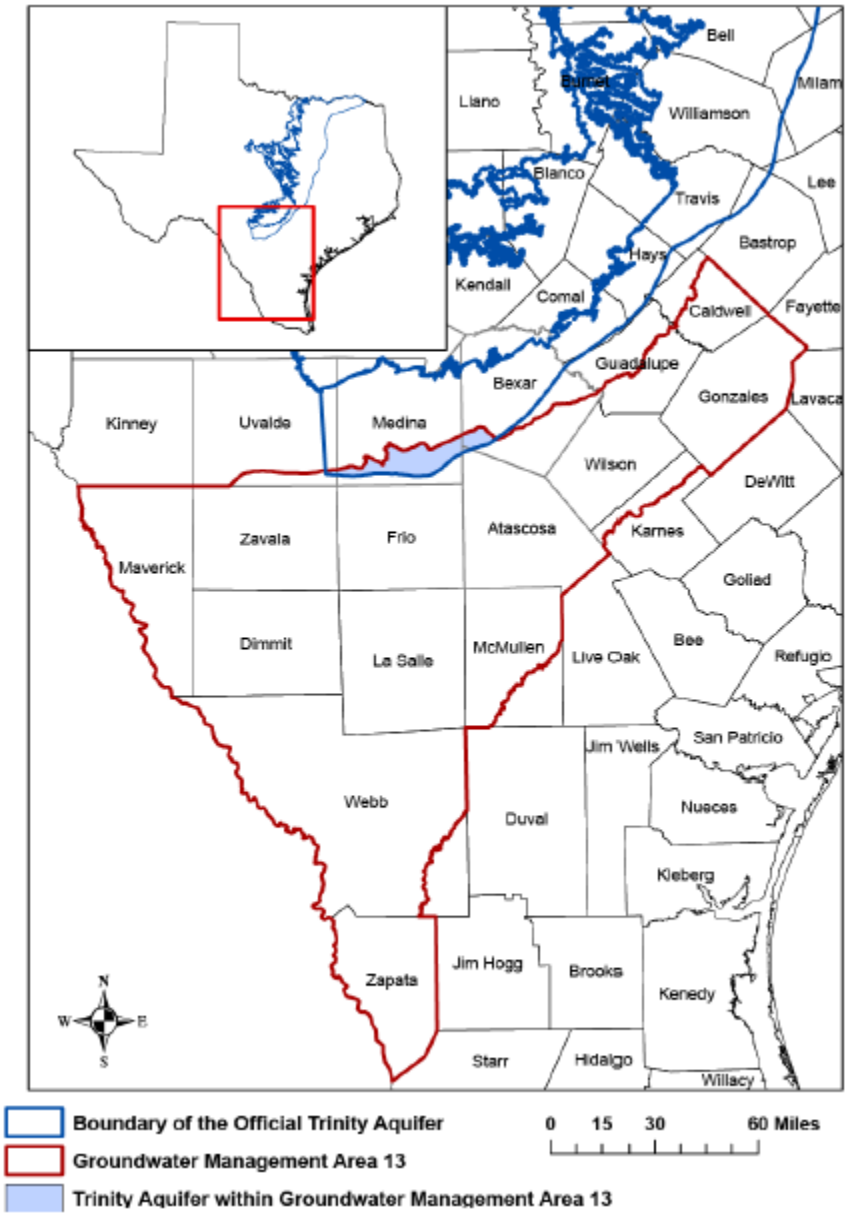

Figure 1. Location of Trinity Aquifer in GMA 13

Aquifer Characteristics

Mace and others (2000, pp 54-55) provided maps of the distribution of hydraulic conductivity of the area. Within GMA 13, the hydraulic conductivity appears to be less than 1 ft/day.

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Groundwater Demands and Current Groundwater Uses

The Texas Water Development Board pumping database shows 2012 groundwater pumping for the Trinity Aquifer as follows:

- Atascosa: 0 AF/yr
- Bexar: 17,854 AF/yr
- Medina: 338 AF/yr
- Uvalde: 195 AF/yr

Please note that these are totals for the entire county, not necessarily in the GMA 13 portion of the Trinity Aquifer.

Total Estimated Recoverable Storage

Wade and others (2013) documented the total estimated recoverable storage for the Trinity Aquifer in GMA 13 as follows:

County	*Total Storage (acre-feet)*	*25% of Total Storage (acre-feet)*	*75% of Total Storage (acre-feet)*
Atascosa	35,000	8,750	26,250
Bexar	660,000	165,000	495,000
Medina	3,890,000	972,500	2,917,500
Uvalde	110,000	27,500	82,500
Total	4,695,000	1,173,750	3,521,250

Total storage is given in the first column. The recoverable storage is assumed to be between 25 and 75 percent of the total storage.

Explanation of Non-Relevance

Due to its limited areal extent and generally low use, the Trinity Aquifer is classified as not relevant for purposes of joint planning in Groundwater Management Area 13.

References

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

Mace, R.E., Chowdhury, A.H., Anaya, R., and Way, S-C., 2000. Groundwater Availability of the Trinity Aquifer, Hill Country Area, Texas: Numerical Simulations through 2050. Texas Water Development Board Report 353, September 2000, 122p.

Wade, S., and Bradley, R., 2013. GAM Task 13-036: Total Estimated Recoverable Storage for Aquifers in Groundwater Management Area 13. Texas Water Development Board, Groundwater Resources Division, July 8, 2013, 30p.