

**Edwards-Trinity (Plateau) Aquifer: Not Relevant for Purposes of Joint Planning
GMA 2 Technical Memorandum 16-02**

**Pecos Valley Aquifer: Not Relevant for Purposes of Joint Planning
GMA 2 Technical Memorandum 16-03**

Geoscientist and Engineering Seal

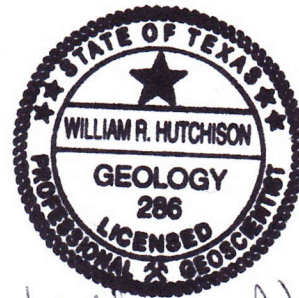
This report documents the work and supervision of work of the following licensed Texas Professional Geoscientist and licensed Texas Professional Engineers:

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Dr. Hutchison completed the analyses and model simulations described in this report, and was the principal author of the final report.



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11/1/2016



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GMA 2 Technical Memorandum 16-02, Final

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November 1, 2016

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 Edwards-Trinity (Plateau) Aquifer as not relevant for purposes of joint planning.

Aquifer Description and Location

As described in George and others (2011):

The Edwards-Trinity (Plateau) Aquifer is a major aquifer extending across much of the southwestern part of the state. The water-bearing units are composed predominantly of limestone and dolomite of the Edwards Group and sands of the Trinity Group. Although maximum saturated thickness of the aquifer is greater than 800 feet, freshwater saturated thickness averages 433 feet. Water quality ranges from fresh to slightly saline, with total dissolved solids ranging from 100 to 3,000

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milligrams per liter, and water is characterized as hard within the Edwards Group. Water typically increases in salinity to the west within the Trinity Group. Elevated levels of fluoride in excess of primary drinking water standards occur within Glasscock and Irion counties. Springs occur along the northern, eastern, and southern margins of the aquifer primarily near the bases of the Edwards and Trinity groups where exposed at the surface. San Felipe Springs is the largest exposed spring along the southern margin. Of groundwater pumped from this aquifer, more than two-thirds is used for irrigation, with the remainder used for municipal and livestock supplies. Water levels have remained relatively stable because recharge has generally kept pace with the relatively low amounts of pumping over the extent of the aquifer. The regional water planning groups, in their 2006 Regional Water Plans, recommended water management strategies that use the Edwards Trinity (Plateau) Aquifer, including the construction of a well field in Kerr County and public supply wells in Real County.

Figure 1 (taken from Kohlrenken and others, 2013) shows the limited extent of the Edwards-Trinity (Plateau) Aquifer in GMA 2. Note that it occurs only in a small portion of Andrews, Howard, and Martin counties.

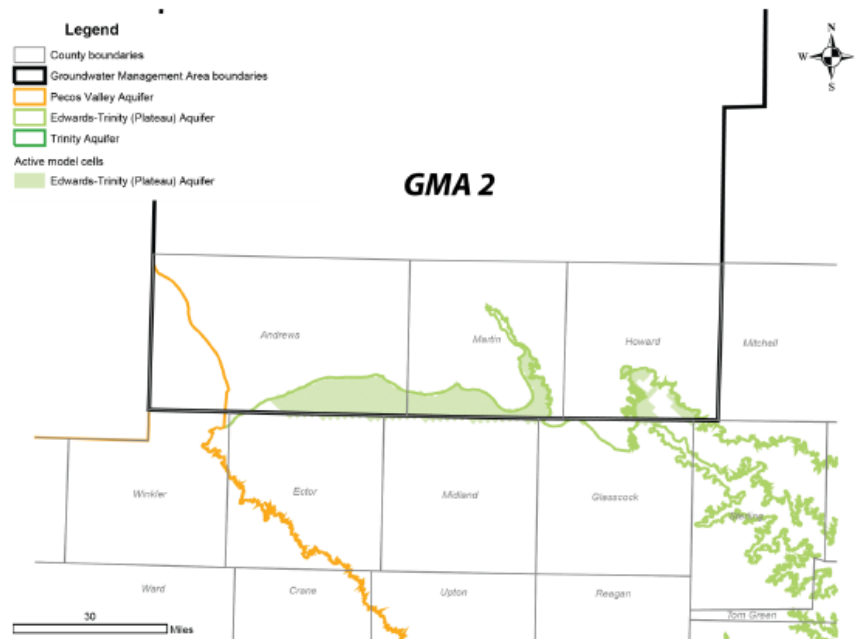


Figure 1. Location of Edwards-Trinity (Plateau) Aquifer in GMA 2

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Aquifer Characteristics

Hutchison and others (2010) developed an alternative groundwater availability model of the Edwards-Trinity (Plateau), Pecos Valley and Trinity aquifers for the Texas Water Development Board as part of the technical assistance to GMA 7. Based on the calibrated model, aquifer hydraulic conductivity in GMA 2 ranges from 5 to 29 ft/day.

Groundwater Demands and Current Groundwater Uses

The Texas Water Development Board pumping database shows 2012 groundwater pumping for the Edwards-Trinity (Plateau) in GMA 2 as follows:

- Andrews County: 3 AF/yr
- Howard County: 2,742 AF/yr
- Martin County: 17 AF/yr

Total Estimated Recoverable Storage

Kohlrenken and others (2013) documented the total estimated recoverable storage for the Edwards-Trinity (Plateau) Aquifer in GMA 2 as follows:

<i>County</i>	<i>Total Storage (acre-feet)</i>	<i>25 percent of Total Storage (acre-feet)</i>	<i>75 percent of Total Storage (acre-feet)</i>
Andrews	32,000	8,000	24,000
Howard	61,000	15,250	45,750
Martin	49,000	12,250	36,750
Total	142,000	35,500	106,500

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 lack of generally low use, Edwards-Trinity (Plateau) Aquifer is classified as not relevant for purposes of joint planning in Groundwater Management Area 2.

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References

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

Hutchison, W.R., Jones, I.C., and Anaya, R., 2011. Update of the Groundwater Availability Model of the Edwards-Trinity (Plateau) and Pecos Valley Aquifers of Texas. Texas Water Development Board Report, January 21, 2011, 61p.

Kohlrenken, W., Boghici, R., and Jones, I., 2013, GAM Task 13-026: Total Estimated Recoverable Storage for Aquifers in Groundwater Management Area 2. Texas Water Development Board, Groundwater Resources Division, Groundwater Availability Modeling Section, September 19, 2013, 26p.

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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 Pecos Valley Aquifer as not relevant for purposes of joint planning.

Aquifer Description and Location

As described in George and others (2011):

The Pecos Valley Aquifer is a major aquifer in West Texas. Water-bearing sediments include alluvial and windblown deposits in the Pecos River Valley. These sediments fill several structural basins, the largest of which are the Pecos Trough in the west and Monument Draw Trough in the east. Thickness of the alluvial fill reaches 1,500 feet, and freshwater saturated thickness averages about 250 feet. The water quality is highly variable, the water being typically hard, and generally better in the Monument Draw Trough than in the Pecos Trough. Total dissolved solids in

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groundwater from Monument Draw Trough are usually less than 1,000 milligrams per liter. The aquifer is characterized by high levels of chloride and sulfate in excess of secondary drinking water standards, resulting from previous oil field activities. In addition, naturally occurring arsenic and radionuclides occur in excess of primary drinking water standards. More than 80 percent of groundwater pumped from the aquifer is used for irrigation, and the rest is withdrawn for municipal supplies, industrial use, and power generation. Localized water level declines in south-central Reeves and northwest Pecos counties have moderated since the late 1970s as irrigation pumping has decreased; however, water levels continue to decline in central Ward County because of increased municipal and industrial pumping. The Region F Regional Water Planning Group recommended several water management strategies in their 2006 Regional Water Plan that would use the Pecos Valley Aquifer, including drilling new wells, developing two well fields in Winkler and Loving counties, and reallocating supplies.

Figure 1 (taken from Kohlrenken and others, 2013) shows the limited extent of the Pecos Valley Aquifer in GMA 2. Note that it occurs only in a small portion of Andrews County.

Aquifer Characteristics

Hutchison and others (2010) developed an alternative groundwater availability model of the Edwards-Trinity (Plateau) for the Texas Water Development Board. The model did not extend into the Andrews County portion of the Pecos Valley Aquifer. Aquifer hydraulic conductivity in Winkler County, just to the south of Andrews County was between 15 and 29 ft/day.

Groundwater Demands and Current Groundwater Uses

The Texas Water Development Board pumping database shows 2012 groundwater pumping for the Pecos Valley Aquifer in Andrews County was 141 AF/yr.

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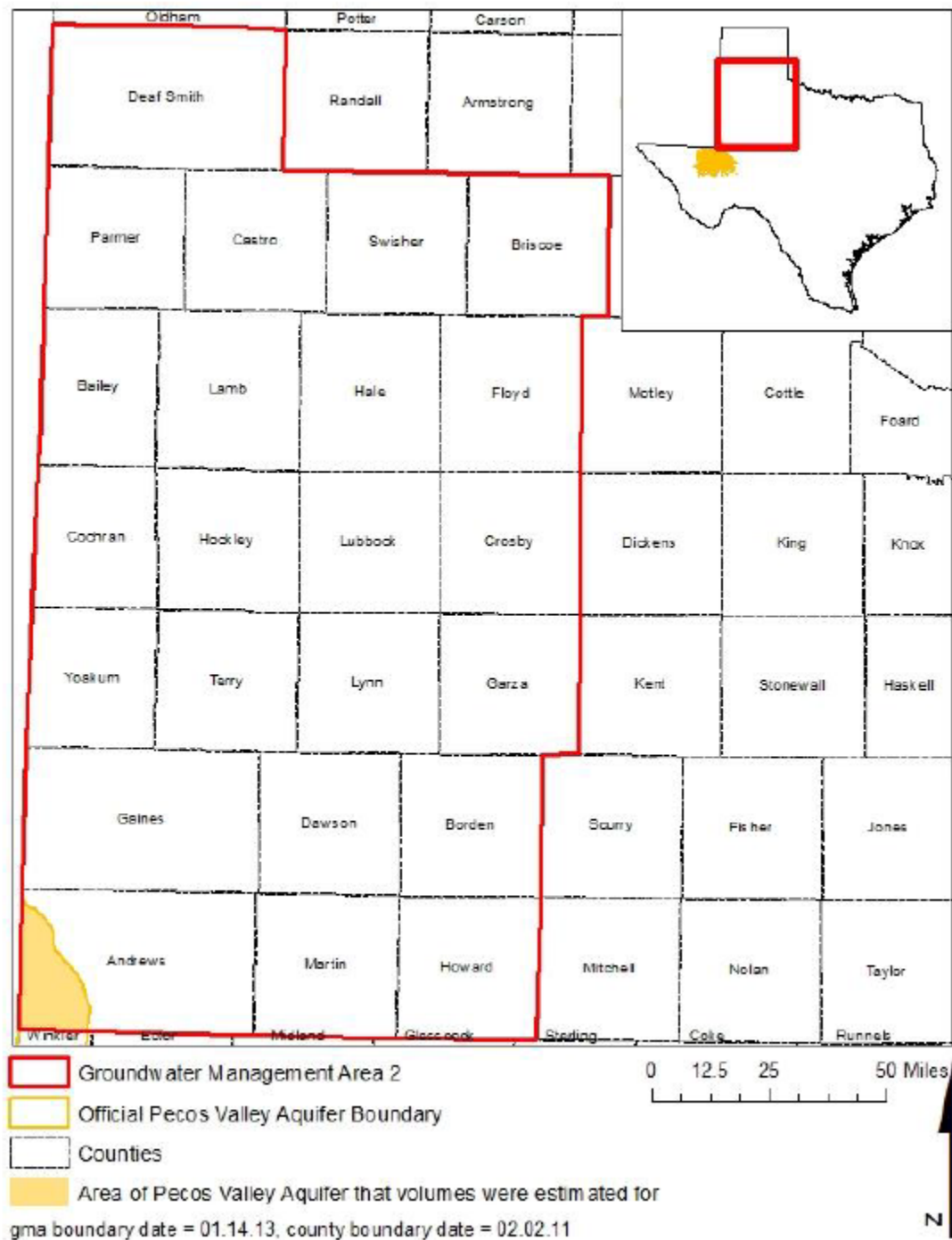


Figure 1. Location of Pecos Valley Aquifer in GMA 2

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Total Estimated Recoverable Storage

Kohlrenken and others (2013) documented the total estimated recoverable storage for the Pecos Valley Aquifer in GMA 2 as follows:

<i>County</i>	<i>Total Storage (acre-feet)</i>	<i>25% of Total Storage (acre-feet)</i>	<i>75% of Total Storage (acre-feet)</i>
<i>Andrews</i>	2,000,000	500,000	1,500,000
<i>Total</i>	2,000,000	500,000	1,500,000

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 lack of generally low use, Edwards-Trinity (Plateau) Aquifer is not relevant for purposes of joint planning in Groundwater Management Area 2.

References

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

Hutchison, W.R., Jones, I.C., and Anaya, R., 2011. Update of the Groundwater Availability Model of the Edwards-Trinity (Plateau) and Pecos Valley Aquifers of Texas. Texas Water Development Board Report, January 21, 2011, 61p.

Kohlrenken, W., Boghici, R., and Jones, I., 2013, GAM Task 13-026: Total Estimated Recoverable Storage for Aquifers in Groundwater Management Area 2. Texas Water Development Board, Groundwater Resources Division, Groundwater Availability Modeling Section, September 19, 2013, 26p.