NORTH TEXAS GROUNDWATER CONSERVATION DISTRICT

COLLIN COUNTY COOKE COUNTY DENTON COUNTY

VIA FEDERAL EXPRESS

August 31, 2011

Melanie Callahan, Interim Executive Administrator
Texas Water Development Board
1700 N. Congress Avenue
Austin, TX 78701

RE: Desired Future Conditions Submittal for Groundwater Management Area 8

Dear Ms. Callahan:

The North Texas Groundwater Conservation District is the administrator for the Groundwater Management Area 8 (GMA 8). On behalf of GMA 8, we are submitting readopted desired future conditions (DFC) for the major and minor aquifers within our boundary. The aquifers for which readopted DFCs have recently been adopted are as follows: Edwards BFZ, Blossom, Brazos River Alluvium, Nacatoch, Woodbine, Ellenburger-San Saba, Hickory, Marble Falls, and Trinity.

Our submittal includes the following information:

1) A signed resolution readopting the desired future conditions and recording the member votes.
2) Copies of agendas announcing the meeting at which the DFCs were readopted from each of the groundwater conservation districts in GMA 8.
3) Approved minutes from the meeting at which the DFCs were readopted.

Please feel free to contact me if you have any questions or need additional information.

Sincerely,

Eddy Daniel
President, North Texas Groundwater Conservation District
GMA 8 Chairman

Attachments

ATTACHMENT 1

SIGNED RESOLUTION ADOPTED THE DESIRED FUTURE CONDITIONS

RESOLUTION TO READOPT DESIRED FUTURE CONDITIONS
FOR AQUIFERS IN GROUNDWATER MANAGEMENT AREA 8

THE STATE OF TEXAS	§
	§
GROUNDWATER MANAGEMENT AREA 8	§
	§
GROUNDWATER CONSERVATION DISTRICTS	§

WHEREAS, Section 36.108 of the Texas Water Code requires groundwater conservation districts located entirely or partially within a groundwater management area designated by the Texas Water Development Board ("TWDB") to establish desired future conditions ("DFCs") for the relevant aquifers within each groundwater management area by no later than September 1, 2010, and every five years thereafter; and

WHEREAS, the groundwater conservation districts located entirely or partially within Groundwater Management Area 8 ("GMA 8") as of the date of this resolution are as follows: Central Texas Groundwater Conservation District, Clearwater Underground Water Conservation District, Fox Crossing Water District, Middle Trinity Groundwater Conservation District, North Texas Groundwater Conservation District, Northern Trinity Groundwater Conservation District; Post Oak Savannah Groundwater Conservation District, Prairielands Groundwater Conservation District, Red River Groundwater Conservation District, Saratoga Underground Water Conservation District, Southern Trinity Groundwater Conservation District (formerly McLennan County Groundwater Conservation District), and Upper Trinity Groundwater Conservation District (collectively referenced hereinafter as "GMA 8 Districts"); and

WHEREAS, the GMA 8 Districts are each governmental agencies and bodies politic and corporate operating pursuant to Chapter 36 of the Texas Water Code; and

WHEREAS, the GMA 8 Districts each desire to fulfill the requirements of Section 36.108 of the Texas Water Code through mutual cooperation and joint planning efforts; and

WHEREAS, in response to the statutory mandate embodied in Section 36.108, the GMA 8 Districts became the first in the state to adopt DFCs for the aquifers within the boundaries of a groundwater management area; and

WHEREAS, specifically, the groundwater conservation districts of GMA 8 adopted DFCs for the Edwards BFZ, Blossom, Brazos River Alluvium, Nacatoch, and Woodbine aquifers on December 17, 2007; and

WHEREAS, on May 19, 2008, the groundwater conservation districts of GMA 8 adopted DFCs for the Ellenburger-San Saba, Hickory, and Marble Falls aquifers; and

WHEREAS, on September 17, 2008, the groundwater conservation districts of GMA 8 adopted DFCs for the Trinity aquifer; and

WHEREAS, on March 16, 2009, the groundwater conservation districts of GMA 8 adopted revisions to the DFCs for the Nacatoch and the Blossom aquifers; and

WHEREAS, a true and correct copy of the December 17, 2007, Resolution to Adopt the Desired Future Conditions for Aquifer(s) in Groundwater Management Area 8, along with a true and correct copy of the approved minutes of the GMA 8 public meeting on December 17, 2007 wherein the DFCs for the Edwards BFZ, Blossom, Brazos River Alluvium, Nacatoch, and Woodbine aquifers were considered and adopted, are each attached hereto as Attachment A and are incorporated herein for all purposes; and

WHEREAS, a true and correct copy of the May 19, 2008, Resolution to Adopt the Desired Future Conditions for Aquifer(s) in Groundwater Management Area 8, along with a true and correct copy of the approved minutes of the GMA 8 public meeting on May 19, 2008, wherein the DFCs for the Ellenburger-San Saba, Hickory, and Marble Falls aquifers were considered and adopted, are each attached hereto as Attachment B and are incorporated herein for all purposes; and

WHEREAS, a true and correct copy of the September 17, 2008, Resolution to Adopt the Desired Future Conditions for Aquifer(s) in Groundwater Management Area 8, along with a true and correct copy of the approved minutes of the GMA 8 public meeting on September 17, 2008, wherein the DFCs for the Trinity aquifer were considered and adopted, are each attached hereto as Attachment C and are incorporated herein for all purposes; and

WHEREAS, a true and correct copy of the March 16, 2009, Resolutions to Adopt the Desired Future Conditions for Aquifer(s) in Groundwater Management Area 8, along with a true and correct copy of the approved minutes of the GMA 8 public meeting on March 16, 2009, wherein the revised DFCs for the Nacatoch and the Blossom aquifers were considered and adopted, are each attached hereto as Attachment D and are incorporated herein for all purposes; and

WHEREAS, in each instance, the DFCs were developed using the most reliable data and reasonable assumptions available to the groundwater conservation districts of GMA 8 at the time of their adoption; and

WHEREAS, it appeared to the groundwater conservation districts of GMA 8 at the time each of the DFCs were adopted that reconsideration of DFCs would not be required until September 1, 2015, under the plain language of Section 36.108(d) of the Texas Water Code; and

WHEREAS, however, the TWDB has indicated that its interpretation of Section 36.108(d) requires reestablishment of DFCs every five years from the date that the DFCs were originally adopted by the groundwater management areas, with the result being that the GMA 8 Districts are faced with undertaking a reconsideration of the GMA 8 DFCs as early as 2012; and

WHEREAS, it further is anticipated that TWDB will complete substantial revisions to certain Groundwater Availability Models as early as 2012 or 2013 that could impact DFC development in GMA 8, creating a heightened potential that if GMA 8 Districts were to maintain

the current reconsideration schedule, they could reconsider DFCs as early as 2012 based on modeling data that are quickly thereafter rendered obsolete by TWDB; and

WHEREAS, in effort to avoid this potential scenario, and to place GMA 8 on a DFC reconsideration schedule that more closely parallels the schedules of the several other groundwater management areas that adopted DFCs in 2010, the GMA 8 Districts find it to be a more efficient and reasonable regulatory approach to take action now to readopt the current DFCs so that their reconsideration will not be required under Section 36.108(d) until 2016 at the latest and so that it may utilize the revised TWDB Groundwater Availability Models in the analysis and preparation of its DFCs; and

WHEREAS, representatives of the GMA 8 Districts convened for a meeting, which was open to the public, this day, the 27th day of April, 2011, at 10:00 a.m. at the City of Woodway City Hall in Woodway, Texas, to take up and consider the readoption of DFCs for all aquifers within GMA 8; and

WHEREAS, of the twelve GMA 8 Districts, the meeting this day was attended by duly appointed voting representatives from the following districts (as indicated):

- Central Texas Groundwater Conservation District,
- Clearwater Underground Water Conservation District,
- Fox Crossing Water District,
- Middle Trinity Groundwater Conservation District,
- North Texas Groundwater Conservation District,
- Northern Trinity Groundwater Conservation District,
- Post Oak Savannah Groundwater Conservation District,
- Prairielands Groundwater Conservation District,
- Red River Groundwater Conservation District,
- Saratoga Underground Water Conservation District,
- Southern Trinity Groundwater Conservation District,
- Upper Trinity Groundwater Conservation District; and

WHEREAS, with voting representatives in attendance from at least two-thirds of the GMA 8 Districts, notice and meeting requirements set forth by Sections 36.108(d-1)(1)-(2) and (e) of the Texas Water Code have been met regarding this April 27, 2011, meeting, specifically notice of the meeting held this day was given in accordance with the requirements for notice of the board of directors for each of the GMA 8 Districts under Chapter 551 of the Texas Government Code, and a true and correct copy of each of the notices are attached hereto as Attachment E and are each incorporated herein for all purposes; and

WHEREAS, the GMA 8 Districts find therefore that the notice and meeting requirements to take up this day and consider the readoption of DFCs for all aquifers within GMA 8 have been and are satisfied; and

WHEREAS, it is the intent and purpose of the GMA 8 Districts by adoption of this resolution to fulfill the requirements of Section 36.108 of the Texas Water Code, including

establishing the same desired future conditions for the relevant aquifers within GMA 8 that were originally adopted by the groundwater conservation districts of GMA 8 on December 17, 2007, May 19, 2008, September 17, 2008, and March 16, 2009; and

WHEREAS, by adoption of this resolution, it is not the intent of the GMA 8 Districts to make any changes whatsoever to the DFCs that were previously adopted to apply to aquifers within GMA 8 on December 17, 2007, May 19, 2008, September 17, 2008, and March 16, 2009; and

WHEREAS, it is instead the intent of the GMA 8 Districts through this resolution to readopt the precise same DFCs that were adopted by the groundwater conservation districts within GMA 8 on December 17, 2007, May 19, 2008, September 17, 2008, and March 16, 2009, respectively; and

WHEREAS, the GMA 8 Districts base their readoption of DFCs today on the same rationale and science, technical and other supporting data that the groundwater conservation districts of GMA 8 relied upon in their considerations of the uses and conditions of the relevant aquifers in different geographic areas within GMA 8, the effects and impacts that adoption of the DFCs would have on the condition of those aquifers, the uses and users of groundwater from those aquifers both now and in the future, and all other criteria that was and is required to be considered under Chapter 36 of the Texas Water Code; and

WHEREAS, all components of the administrative record created during all stages of the original DFC development process for GMA 8, whether expressly identified in this resolution or not, are hereby adopted by the GMA 8 Districts and are incorporated by this reference into the administrative record of this resolution; and

WHEREAS, the GMA 8 Districts find that the readoption of DFCs for GMA 8 are in each instance merited and necessary to support the management of groundwater resources within the boundaries of the GMA 8 Districts in a manner consistent with the requirements of Chapter 36, Water Code.

NOW, THEREFORE, BE IT RESOLVED BY THE REPRESENTATIVES OF THE GROUNDWATER CONSERVATION DISTRICTS WITHIN GROUNDWATER MANAGEMENT AREA 8:

1) Each of the affirmations and recitals set forth above are true and correct.

2) The authorized voting representatives of the GMA 8 Districts hereby reestablish the DFCs for the aquifers within GMA 8 as those DFCs were originally established by the actions memorialized in Attachment Nos. A – D.

3) The GMA 8 Districts and their agents and representatives, individually and collectively, are further authorized to take any and all actions necessary to implement this resolution.

4) Each desired future condition for each aquifer within GMA 8 that is adopted upon the approval of this resolution shall be effective immediately and shall continue in effect until amended, superseded, or repealed.

AND IT IS SO ORDERED.

PASSED AND ADOPTED on this 27th day of April, 2011.

ATTEST:

Central Texas Groundwater Conservation District

Clearwater Underground Water Conservation District

Fox Crossing Water District

Middle Trinity Groundwater Conservation District

North Texas Groundwater Conservation District

Northern Trinity Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

Prairielands Groundwater Conservation District

Red River Groundwater Conservation District

Saratoga Underground Water Conservation District

Southern Trinity Groundwater Conservation District

Upper Trinity Groundwater Conservation District

ATTACHMENTS
Attachment A
Attachment B
Attachment C
Attachment D
Attachment E

1258005.2

ATTACHMENT "A"

RESOLUTION TO ADOPT DESIRED FUTURE CONDITIONS

FOR AQUIFER(S) IN GROUNDWATER MANAGEMENT AREA 8

THE STATE OF TEXAS	§
	§
GROUNDWATER MANAGEMENT AREA 8	§
	§
GROUNDWATER CONSERVATION DISTRICTS	§

WHEREAS, Texas Water Code § 36.108 requires the groundwater conservation districts located in whole or in part in a groundwater management area ("GMA") designated by the Texas Water Development Board to adopt desired future conditions for the relevant aquifers located within the management area;

WHEREAS, the groundwater conservation districts located wholly or partially within Groundwater Management Area 8 ("GMA 8"), as designated by the Texas Water Development Board, as of the date of this resolution are as follows: Central Texas Groundwater Conservation District, Clearwater Underground Water Conservation District, Fox Crossing Water District, McLennan County Groundwater Conservation District, Middle Trinity Groundwater Conservation District, Northern Trinity Groundwater Conservation District, Post Oak Savannah Groundwater Conservation District, Saratoga Underground Water Conservation District, Tablerock Groundwater Conservation District, and Upper Trinity Groundwater Conservation District (collectively hereinafter "the GMA 8 Districts");

WHEREAS, the GMA 8 Districts are each governmental agencies and bodies politic and corporate operating under Chapter 36, Water Code;

WHEREAS, the GMA 8 Districts desire to fulfill the requirements of Texas Water Code § 36.108 through mutual cooperation and joint planning efforts;

WHEREAS, the GMA 8 Districts have had numerous public meetings at which they have engaged in joint planning efforts to promote more comprehensive management of the aquifers located in whole or in part in Groundwater Management Area 8;

WHEREAS, the GMA 8 Districts may establish different desired future conditions for: (1) each aquifer, subdivision of an aquifer, or geologic strata located in whole or in part within the boundaries of GMA 8; or (2) each geographic area overlying an aquifer in whole or in part or subdivision of an aquifer within the boundaries of GMA 8;

WHEREAS, the GMA 8 Districts recognize that GMA 8 includes a geographically and hydrologically diverse area with a variety of land uses and a diverse mix of water users;

WHEREAS, the GMA 8 Districts have considered the relevant aquifers, subdivisions thereof, and geologic strata located in whole or in part within the boundaries of GMA 8, and have further considered the hydrogeologic characteristics of the same, as well as the various uses and users of groundwater produced from such aquifers, subdivisions, and strata;

WHEREAS, GMA 8 Districts held a meeting, which was open to the public, at 10:00 a.m. on Monday, December 17, 2007, in the Bellmead City Hall located at 3015 Bellmead Drive, Bellmead, Texas;

WHEREAS, notice of said December 17, 2007, meeting was properly given by each and all of the GMA 8 Districts in accordance with Chapter 36, Water Code, and Chapter 551, Government Code, and a true and correct copy of each of the notices has been attached hereto in Appendix A and is incorporated herein for all purposes;

WHEREAS, at least two-thirds of the GMA 8 Districts had a voting representative in attendance at said December 17, 2007, meeting in accordance with Section 36.108(d-1), Texas Water Code; to wit, the following districts had a voting representative in attendance at said meeting: Central Texas Groundwater Conservation District, Clearwater Underground Water Conservation District, Fox Crossing Water District, McLennan County Groundwater Conservation District, Middle Trinity Groundwater Conservation District, Northern Trinity Groundwater Conservation District, Post Oak Savannah Groundwater Conservation District, Saratoga Underground Water Conservation District, Tablerock Groundwater Conservation District, and Upper Trinity Groundwater Conservation District;

WHEREAS, it is the intent and purpose of the GMA 8 Districts by adoption of this resolution to fulfill the requirements of Texas Water Code § 36.108, including establishing "desired future conditions for the relevant aquifers" within GMA 8 for the specific aquifer(s) and desired future conditions described under "Appendix B" attached hereto and incorporated herein for all purposes;

WHEREAS, at said December 17, 2007, meeting, after a motion was duly made and seconded that the GMA 8 Districts adopt this resolution establishing desired future conditions for the aquifer(s) described under "Appendix B", the motion prevailed by the following vote:

Edwards BFZ 10 Ayes and 0 Nays;

Blossom 8 Ayes, 1 Nays and 1 Abstention;
to wit, the voting representatives of the following districts voted "Aye": Central Texas Groundwater Conservation District, Clearwater Underground Water Conservation District, Fox Crossing Water District, Middle Trinity Groundwater Conservation District, Northern Trinity Groundwater Conservation District, Post Oak Savannah Groundwater Conservation District, Saratoga Underground Water Conservation District, Tablerock Groundwater Conservation District;
the voting representatives of the following districts voted "Nay": McLennan County Groundwater Conservation District;
and, the voting representatives of the following districts abstained: Upper Trinity Groundwater Conservation District;

Brazos River Alluvium 10 Ayes and 0 Nays;

Nacatoch 9 Ayes, 0 Nays and 1 Abstention;
to wit, the voting representatives of the following districts voted "Aye": Central Texas Groundwater Conservation District, Clearwater Underground Water Conservation District, Fox Crossing Water District, McLennan County Groundwater Conservation District, Middle Trinity Groundwater Conservation District, Northern Trinity Groundwater Conservation District, Post Oak Savannah Groundwater Conservation District, Saratoga Underground Water Conservation District, Tablerock Groundwater Conservation District;
and, the voting representatives of the following districts abstained: Upper Trinity Groundwater Conservation District;

Woodbine 10 Ayes and 0 Nays;

WHEREAS, in establishing these desired future conditions for the aquifer(s) set forth under Appendix B, the GMA 8 Districts have considered all of the criteria required by Chapter 36 of the Texas Water Code and other information, including without limitation groundwater availability models and runs of those models to determine the effects of various conditions and parameters, hydrogeologic reports available for the relevant aquifers, and other technical data and information;

WHEREAS, many of the groundwater availability models, runs, hydrogeologic reports, and other technical data and information considered and determined to be reliable sources of information by the GMA 8 Districts in establishing these desired future conditions for the aquifer(s) have been attached hereto or referenced in the documents attached hereto under Appendix B;

WHEREAS, in establishing these desired future conditions for the aquifer(s) set forth under Appendix B, the GMA 8 Districts have considered the uses and conditions of the aquifer(s) in different geographic areas within GMA 8 and what the effects and impacts of adopting such desired future conditions will have upon the condition of the aquifer(s) and the uses and users of groundwater from the aquifer(s) both now and in the future;

WHEREAS, after considering such anticipated effects and impacts these desired future conditions will have on the aquifer(s), uses, and users of groundwater, and considering all of the other criteria required by Chapter 36 of the Texas Water Code, including without limitation the groundwater resource management duties and responsibilities of the GMA Districts individually and collectively, the GMA 8 Districts have determined that the desired future conditions for the aquifer(s) set forth under Appendix B are reasonable;

NOW, THEREFORE, BE IT RESOLVED BY THE AUTHORIZED VOTING REPRESENTATIVES OF THE GMA 8 DISTRICTS AS FOLLOWS:

1. The above recitals are true and correct.

2. The authorized voting representatives of the GMA 8 Districts hereby establish the desired future conditions of the aquifer(s) as set forth in Appendix B by the vote reflected in the above recitals.

3. The GMA 8 Districts and their agents and representatives, individually and collectively, are further authorized to take any and all actions necessary to implement this resolution.

4. The desired future conditions of the aquifer adopted by the GMA 8 Districts and attached hereto shall be effective immediately and shall continue in effect until amended, superseded, or repealed.

AND IT IS SO ORDERED.

PASSED AND ADOPTED on this 17th day of December, 2007.

ATTEST:

Richard S Bowman

Central Texas Groundwater Conservation District

Clearwater Underground Water Conservation District

Fox Crossing Water District

McLennan County Groundwater Conservation District

Middle Trinity Groundwater Conservation District

Northern Trinity Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

3. The GMA 8 Districts and their agents and representatives, individually and collectively, are further authorized to take any and all actions necessary to implement this resolution.

4. The desired future conditions of the aquifer adopted by the GMA 8 Districts and attached hereto shall be effective immediately and shall continue in effect until amended, superseded, or repealed.

AND IT IS SO ORDERED.

PASSED AND ADOPTED on this 17th day of December, 2007.

ATTEST:

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Central Texas Groundwater Conservation District

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Clearwater Underground Water Conservation District

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Fox Crossing Water District

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McLennan County Groundwater Conservation District

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Middle Trinity Groundwater Conservation District

_____

Northern Trinity Groundwater Conservation District

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Post Oak Savannah Groundwater Conservation District

3. The GMA 8 Districts and their agents and representatives, individually and collectively, are further authorized to take any and all actions necessary to implement this resolution.

4. The desired future conditions of the aquifer adopted by the GMA 8 Districts and attached hereto shall be effective immediately and shall continue in effect until amended, superseded, or repealed.

AND IT IS SO ORDERED.

PASSED AND ADOPTED on this 17th day of December, 2007.

ATTEST:

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Central Texas Groundwater Conservation District

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Clearwater Underground Water Conservation District

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Fox Crossing Water District

_____
McLennan County Groundwater Conservation District

_____
Middle Trinity Groundwater Conservation District

_____
Northern Trinity Groundwater Conservation District

_____
Post Oak Savannah Groundwater Conservation District

3. The GMA 8 Districts and their agents and representatives, individually and collectively, are further authorized to take any and all actions necessary to implement this resolution.

4. The desired future conditions of the aquifer adopted by the GMA 8 Districts and attached hereto shall be effective immediately and shall continue in effect until amended, superseded, or repealed.

AND IT IS SO ORDERED.

PASSED AND ADOPTED on this 17th day of December, 2007.

ATTEST:

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Central Texas Groundwater Conservation District

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Clearwater Underground Water Conservation District

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Fox Crossing Water District

Rocky McNeill

_____

McLennan County Groundwater Conservation District

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Middle Trinity Groundwater Conservation District

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Northern Trinity Groundwater Conservation District

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Post Oak Savannah Groundwater Conservation District

3. The GMA 8 Districts and their agents and representatives, individually and collectively, are further authorized to take any and all actions necessary to implement this resolution.

4. The desired future conditions of the aquifer adopted by the GMA 8 Districts and attached hereto shall be effective immediately and shall continue in effect until amended, superseded, or repealed.

AND IT IS SO ORDERED.

PASSED AND ADOPTED on this 17th day of December, 2007.

ATTEST:

_____
Central Texas Groundwater Conservation District

_____
Clearwater Underground Water Conservation District

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Fox Crossing Water District

_____
McLennan County Groundwater Conservation District

_____
Middle Trinity Groundwater Conservation District

_____
Northern Trinity Groundwater Conservation District

_____
Post Oak Savannah Groundwater Conservation District

3. The GMA 8 Districts and their agents and representatives, individually and collectively, are further authorized to take any and all actions necessary to implement this resolution.

4. The desired future conditions of the aquifer adopted by the GMA 8 Districts and attached hereto shall be effective immediately and shall continue in effect until amended, superseded, or repealed.

AND IT IS SO ORDERED.

PASSED AND ADOPTED on this 17th day of December, 2007.

ATTEST:

_____
Central Texas Groundwater Conservation District

_____
Clearwater Underground Water Conservation District

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Fox Crossing Water District

_____
McLennan County Groundwater Conservation District

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Middle Trinity Groundwater Conservation District

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Northern Trinity Groundwater Conservation District

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Post Oak Savannah Groundwater Conservation District

Saratoga Underground Water Conservation District

W. H. Ament

Tablerock Groundwater Conservation District

Upper Trinity Groundwater Conservation District

ATTACHMENTS
Appendix A: Copies of notices of December 17, 2007, meeting
Appendix B: Adopted Desired Future Conditions and supporting information

Saratoga Underground Water Conservation District

Tablerock Groundwater Conservation District

Mike Massey
Upper Trinity Groundwater Conservation District

ATTACHMENTS
Appendix A: Copies of notices of December 17, 2007, meeting
Appendix B: Adopted Desired Future Conditions and supporting information

David B. Hamilton

Saratoga Underground Water Conservation District

Tablerock Groundwater Conservation District

Upper Trinity Groundwater Conservation District

ATTACHMENTS
Appendix A: Copies of notices of December 17, 2007, meeting
Appendix B: Adopted Desired Future Conditions and supporting information

Appendix B

TCB
400 West 15th Street, Suite 500, Austin, Texas 78701
T 512.472.4519 F 512.472.7519 www.tcb.aecom.com

Memorandum

To: Cheryl Maxwell, Administrative Manager
Clearwater Underground Water Conservation District
Administrative Agent for Groundwater Management Area 8

From: Charles R. Williams, P.G. No. 526

Date: December 14, 2007

Re: Desired Future Conditions of N. Edwards BFZ Aquifer

Introduction

Groundwater Management Area 8 (GMA-8) is a groundwater management area of the State of Texas as defined by Statute with responsibility for developing a desired future condition (DFC) for aquifers within an approximately 46-County area. Membership of the GMA is composed of the groundwater conservation districts (GCDs) that occur all or in part within the GMA boundary. (Fig. 1) At the request of GMA-8, TCB Inc. (TCB) developed statements describing DFCs for the portions of the northern segment of the Edwards Balcones Fault Zone (BFZ) aquifer occurring in the areas of Bell, Travis and Williamson Counties, Texas lying within GMA-8. (Fig. 2)

Methodology

Clearwater Underground Water Conservation District (CUWCD) previously assessed the availability of groundwater in the N. Edwards BFZ aquifer of Bell County, Texas through an application of the Texas Water Development Board (TWDB) groundwater availability model for the N. Edwards BFZ aquifer (N. Edwards GAM). (Jones, 2003) GMA-8 used information from the CUWCD assessment of N. Edwards BFZ aquifer availability in adopting the maintenance of the aquifer discharge to creek and springs (spring flow) as the preferred metric for the DFCs for the N. Edwards BFZ aquifer. (Williams and others, 2006) GMA-8 requested TWDB to perform two simulations of the N. Edwards GAM and provide a report of the results to GMA-8. GMA-8 subsequently used information given in the TWDB reports to develop DFCs for the N. Edwards BFZ aquifer. (Anaya, $2007_{1 \text{ and } 2}$)

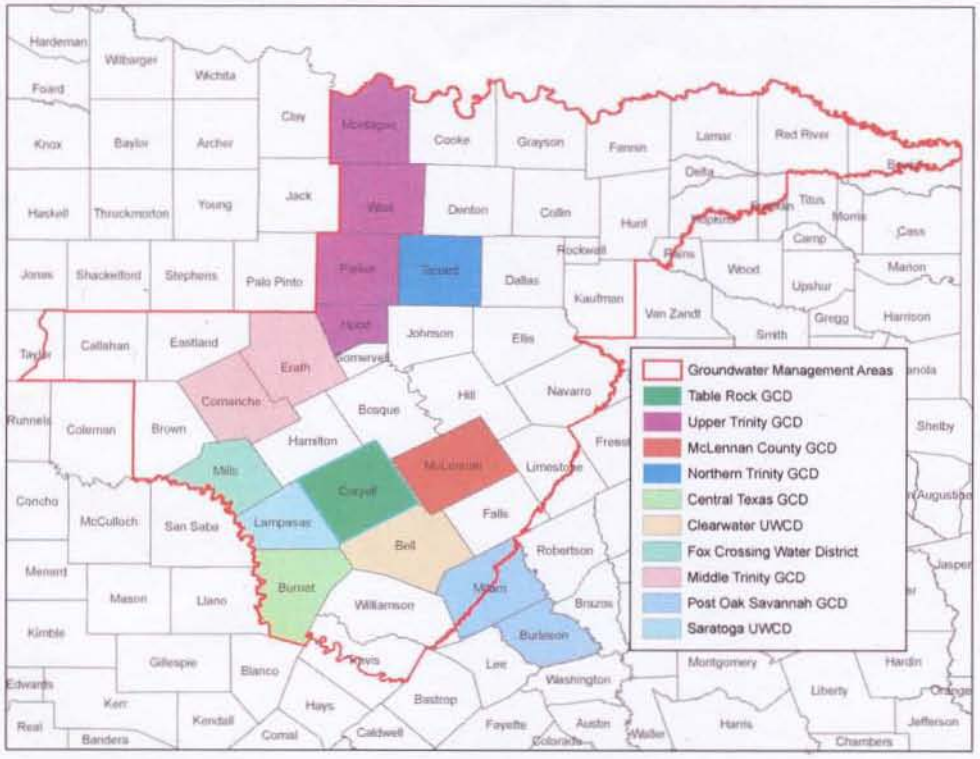

Figure 1, the Boundaries and Member GCDs of GMA-8

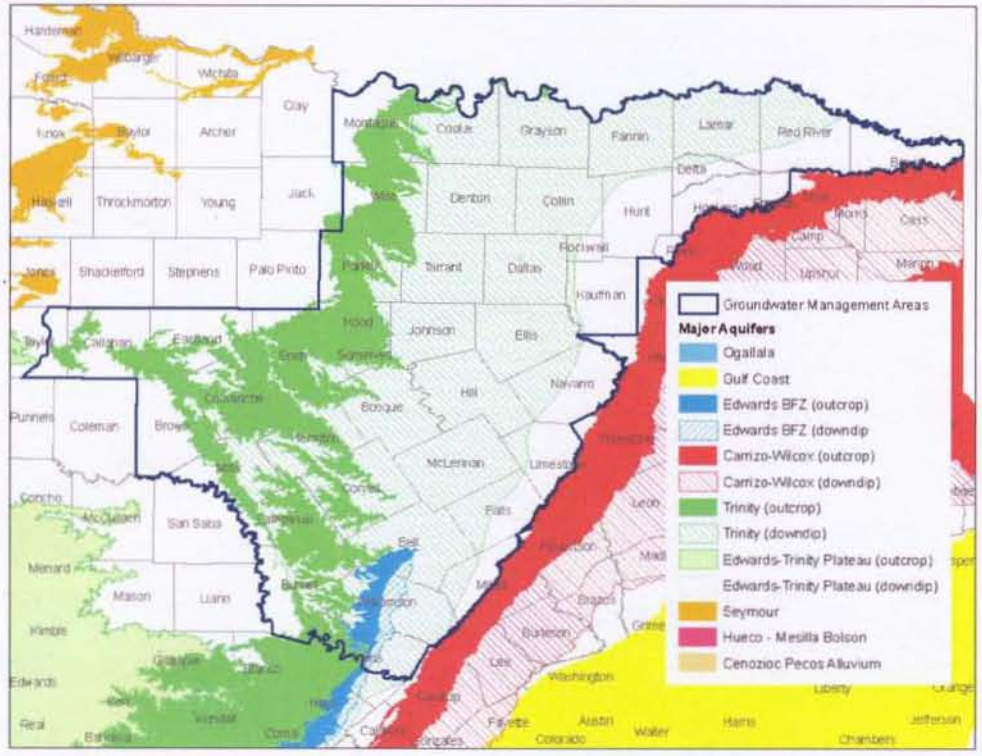

Figure 2, the Major Aquifers of GMA-8

Discussion

The N. Edwards GAM simulations performed by TWDB included the drought of record (DOR) by using recorded monthly historical rainfall totals for the Bell, Williamson and Travis County areas for the decade of the 1950s. (Fig. 3) Simulated pumping was applied to the areas of Bell, Williamson and Travis County included in the N. Edwards GAM. (Table 1) Pumping was held constant in Williamson and Travis Counties throughout the GAM simulations because no groundwater management entity exists in those areas. In Bell County, pumping was reduced by approximately 20 percent during periods of climatic stress to reflect the implementation of conservation measures by CUWCD. (Fig. 3)

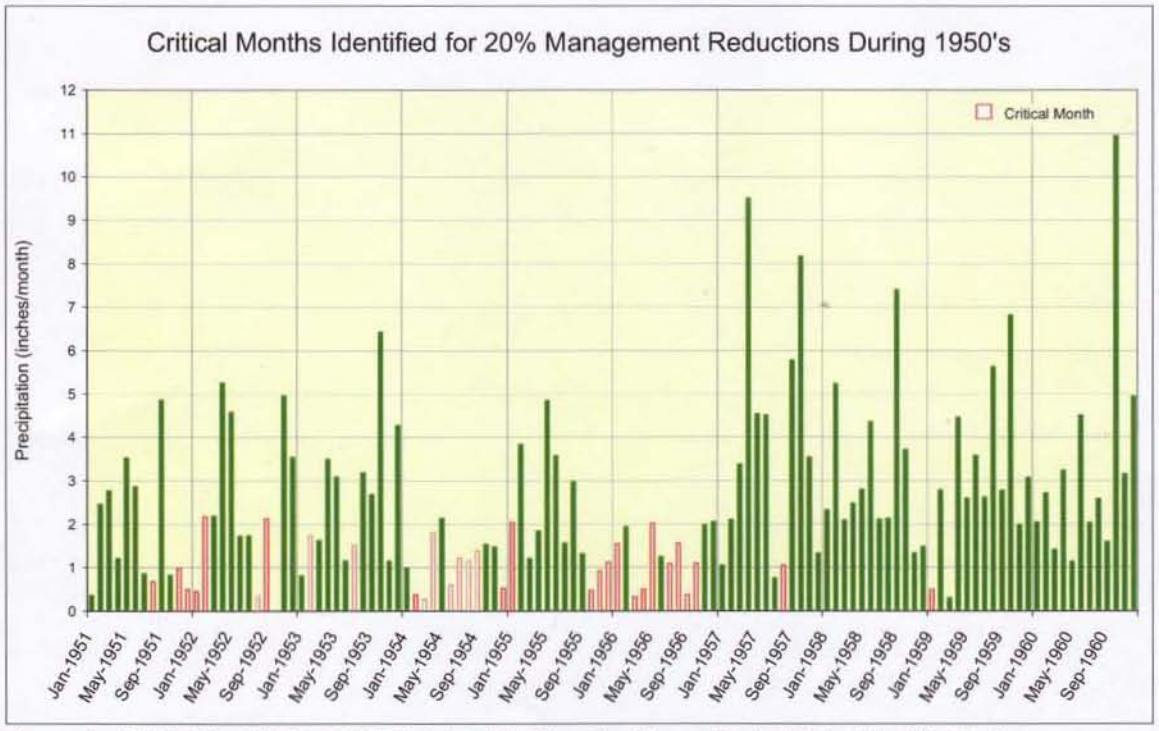

Figure 3, 1950s Monthly Rainfall Totals with Climatic Stress Periods Identified in Red

County	Pumping Specified for GAM-Run 07-15 in Acre-Feet per Year	Pumping Specified for GAM-Run 07-21 in Acre-Feet per Year
Bell	~ 7,509	~ 7,509
Williamson	~ 18,331	~ 21,372
Travis	~ 4,870	~ 4,870

Table 1, GAM-run Predictive Pumping Amounts for Bell, Williamson and Travis Counties

DFC Development Approach

The GMA reviewed the results of GAM-runs 07-15 and 07-21 and found that the levels of simulated pumping in Bell and Travis Counties allowed for the maintenance of spring flows during the simulated repeat of the DOR in both GAM-runs. The minimum predictive spring flow for Bell County occurs in Stress Period 332. Stress period 332 is equivalent to the climatic conditions in September 1956. The minimum predictive spring flow for Travis County occurs in Stress Period 334. Stress period 334 is equivalent to the climatic conditions in November 1956. (Table 2) The GMA compared the results of both GAM simulations. The comparison found that the predicted levels of spring flow in both Bell County and Travis County appeared to be negatively affected by the increased pumping simulated for Williamson County in GAM-run 07-21. (Table 3) GMA-8 determined that an acceptable DFC for the N. Edwards aquifer in each of those Counties could be developed by describing the amount of spring flow maintained during the simulated repeat of the DOR. A DFC was developed for each of Bell and Travis Counties describing the minimum predictive spring flow results as presented in GAM-run 07-21. The development of a DFC for Bell and Travis Counties based on GAM-run 07-21 reflects the belief that without management, pumping in Williamson County is likely to continue at rates simulated in GAM-run 07-21.

County	Predictive Spring Flow in Stress Period 332	Predictive Spring Flow in Stress Period 334
Bell	~ 109	~ 510
Williamson	~ 0	~ 164
Travis	~ 49	~ 46

Table 2, Predictive Monthly Spring Flow Values in Acre-feet per Month from Selected Stress Periods in GAM-run 07-15

County	Predictive Spring Flow in Stress Period 332	Predictive Spring Flow in Stress Period 334
Bell	~ 101	~ 501
Williamson	~ 0	~ 106
Travis	~ 45	~ 42

Table 3, Predictive Monthly Spring Flow Values in Acre-feet per Month from Selected Stress Periods in GAM-run 07-21

In Williamson County the GAM-runs indicated that spring flow was not maintained during the simulated repeat of the DOR. The results from GAM-run 07-15 show that in 7 (non-sequential) months the predicted spring flow was 0 acre-feet during the simulated repeat of the DOR at the levels of pumping simulated for Williamson County. The results from GAM-run 07-21 show that in the same 7 (non-sequential) months the predicted spring flow was 0 acre-feet during the simulated repeat of the DOR at the increased levels of pumping simulated for Williamson County as compared to GAM-run 07-15. In other wods, no additional months of 0 acre-feet spring flow are identified in the results of

GAM-run 07-21. (Table 4) The comparison of results of the two GAM-runs also indicated that in stress periods where the Williamson County predicted spring flow is greater than 0 acre-feet per month that spring flows are reduced in GAM-run 07-21 compared to GAM-run 07-15. (Table 5)

The hydrographs of predictive spring flow in GAM-run 07-15 and 07-21 illustrate large monthly or seasonal variations in predictive spring flows. The magnitude of the variations in predicted spring flows and the similarity to hydrographs of historic rainfall variations provide evidence that recent recharge is likely the dominant control over spring flow in the N. Edwards BFZ aquifer. However, the comparison of tabular results of GAM-runs 07-15 and 07-21 indicate that pumping has some influence over spring flow with respect to maintaining minimum spring flow rates.

GMA-8 agreed that that a DFC for the N. Edwards BFZ aquifer in Williamson County should be adopted describing an amount of spring flow to be maintained during the simulated repeat of the DOR. The level of spring flow selected by GMA-8 to be maintained during a simulated repeat of the DOR in Williamson County is 1 cubic foot per second (CFS) as expressed in acre-feet per month.

Stress Period	Climatic Conditions Equivalent Date	Predictive Spring Flow in GAM-run 07-15	Predictive Spring Flow in GAM-run 07-21
276	January 1952	~ 0	~ 0
285	October 1952	~ 0	~ 0
311	December 1954	~ 0	~ 0
326	March 1956	~ 0	~ 0
327	April 1956	~ 0	~ 0
332	September 1956	~ 0	~ 0
333	October 1956	~ 0	~ 0

Table 4, GAM-run Stress Periods and Climatic Conditions Equivalent Dates where the Predictive Spring Flow Values for Williamson County are 0 Acre-Feet per Month

Stress Period	Climatic Conditions Equivalent Date	Predictive Spring Flow in GAM-run 07-15 in Acre-feet per Month	Predictive Spring Flow in GAM-run 07-21 in Acre-feet per Month
264	January 1951	~ 93	~ 67
275	December 1951	~ 21	~ 4
283	August 1952	~ 105	~ 77
302	March 1954	~ 11	~ 0.7
322	November 1955	~ 74	~ 45
330	July 1956	~ 30	~ 5
362	March 1959	~ 146	~ 125

Table 5, Comparison of Williamson County Predictive Spring Flow Values in Selected GAM-run Stress Periods and Climatic Conditions Equivalent Dates

GMA-8 Desired Future Conditions for the N. Edwards BFZ Aquifer

- Maintain at least 100 acre-feet per month stream/spring flow in Salado Creek during a repeat of the Drought of Record in Bell County.
- Maintain at least 42 acre-feet per month of aggregated stream/spring flow during a repeat of the Drought of Record in Travis County.
- Maintain at least 60 acre-feet per month of aggregated stream/spring flow during a repeat of the Drought of Record in Williamson County.

Note: The observations and assessments made in this report were based on data supplied by CUWCD, TWDB or available from referenced published sources available at the time the report preparation. The conclusions drawn in the report are based on the available data and reasonable methods of assessment. The Desired Future Conditions presented in this report reflect policy decisions made by GMA-8. If new or different data is made available the conclusions of this report may change.

Bibliography

Anaya, Roberto, 2007;
(1) Texas Water Development Board: GAM run 07-15
(2) Texas Water Development Board: GAM run 07-21

Jones, Ian C., 2003; Groundwater Availability Model: Northern Segment of the Edwards Aquifer, Texas; Texas Water Development Board Report 358

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Desired Future Conditions

Edwards BFZ Aquifer
Bell, Travis and Williamson Counties

Desired Future Conditions

Woodbine Aquifer

Collin, Cooke, Dallas, Denton, Ellis, Fannin, Grayson, Hill, Hunt, Johnson, Kaufman, Lamar, McLennan, Navarro, Red River, Rockwall and Tarrant Counties

considered the TWDB report and requested 2 additional GAM simulations. (Donnelly, 2007) GMA-8 considered the results of the additional GAM simulations. (Wade, 2007) GMA-8 developed Woodbine aquifer DFCs from the GAM results.

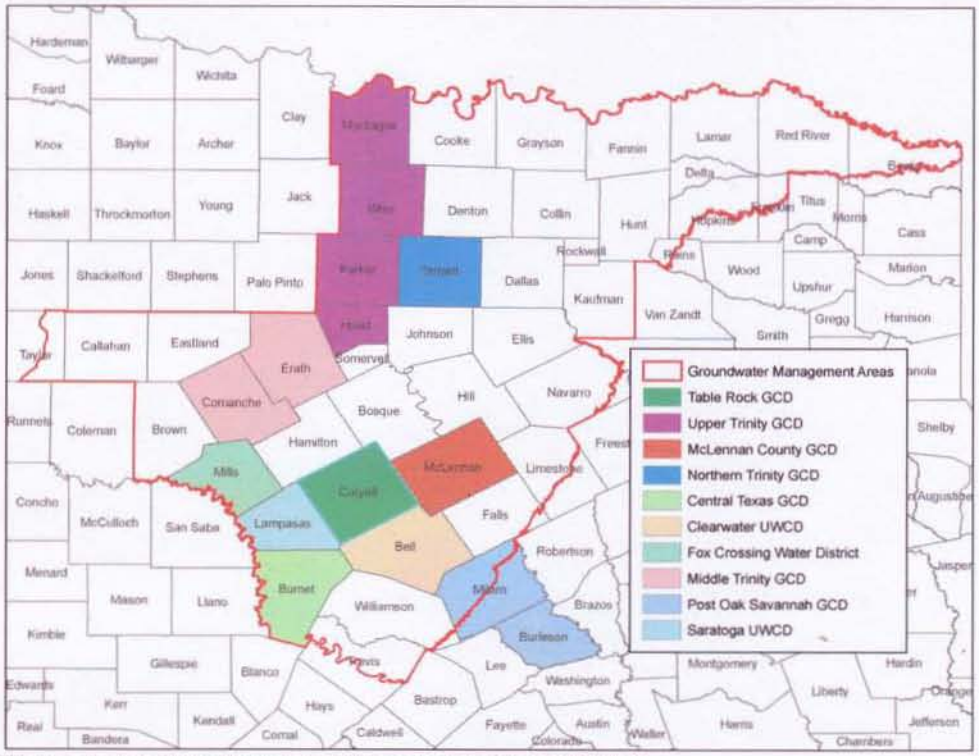

Figure 1, the Boundaries and Member GCDs of GMA-8

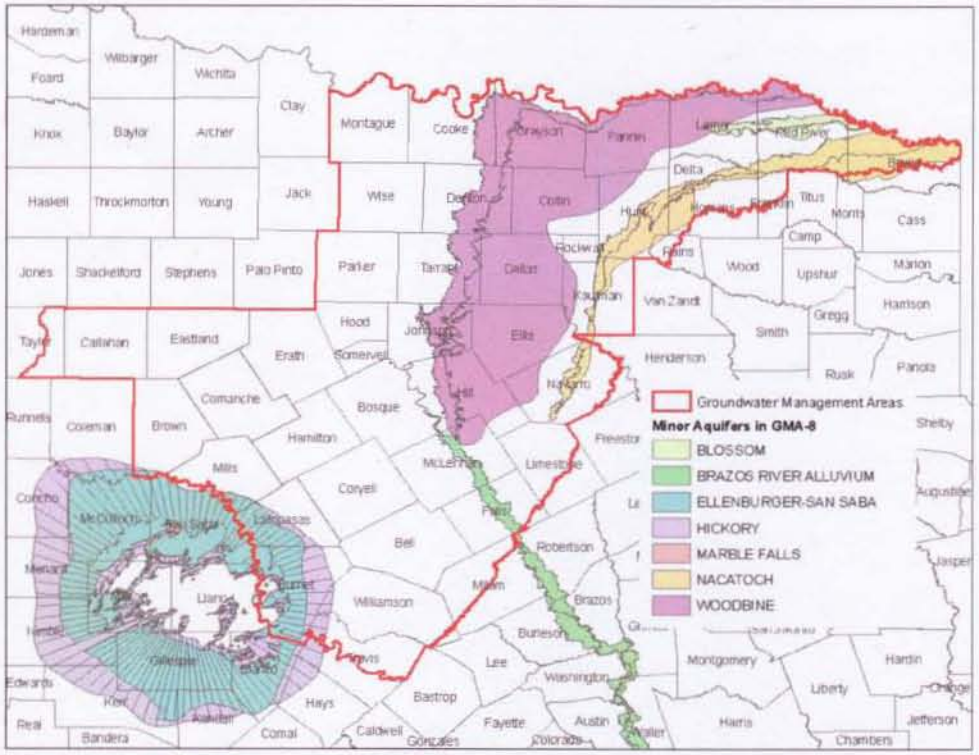

Figure 2, the Minor Aquifers of GMA-8

TCB
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Memorandum

To: Cheryl Maxwell, Administrative Manager
Clearwater Underground Water Conservation District
Administrative Agent for Groundwater Management Area 8

From: Charles R. Williams, P.G. No. 526

Date: December 21, 2007

Re: Desired Future Conditions of the Woodbine Aquifer

Introduction

Groundwater Management Area 8 (GMA-8) is a groundwater management area of the State of Texas as defined by Statute with responsibility for developing a desired future condition (DFC) for aquifers within an approximately 46-County area. Membership of the GMA is composed of the groundwater conservation districts (GCDs) that occur all or in part within the GMA boundary. (Fig. 1) At the request of GMA-8, TCB Inc. (TCB) developed statements describing DFCs for the portions of the Woodbine aquifer that occurs within the bounds of GMA-8. (Fig. 2) GMA-8 approached development of the Trinity and Woodbine aquifer DFCs conjunctively; however, as of the date of this report GMA-8 has not adopted a Trinity aquifer DFC. This report describes the general DFC development process for both aquifers, but presents only the adopted DFCs for the Woodbine aquifer.

Methodology

The Woodbine aquifer is included with the N. Trinity aquifer in the Texas Water Development Board (TWDB) groundwater availability model for the N. Trinity and Woodbine aquifers (GAM). (Bene, Hardin and others, 2004) Clearwater Underground Water Conservation District (Clearwater) in Bell County, Central Texas GCD (Central TX) in Burnet County and Saratoga Underground Water Conservation District (Saratoga) in Lampasas County previously assessed Trinity aquifer availability using the GAM. GMA-8 considered the Clearwater, Saratoga and CTGCD experience in adopting the preferred metric for the Woodbine aquifer DFC. Groundwater use data from TWDB and Regional Water Plan (RWP) data were collected. New projections of Trinity and Woodbine aquifer pumping were considered. (Bene, Hardin and others, 2007) GMA-8 requested TWDB to perform a GAM simulation and report the results to GMA-8. GMA-8

DFC Development Approach

Clearwater, Saratoga and Central TX previously assessed Trinity aquifer groundwater availability in their jurisdictions. GMA-8 considered the experience gained by those GCDs in adopting the maintenance of water-levels (or stated alternatively the management of drawdown) in the Woodbine aquifer (as represented in the GAM). The initial approach adopted by GMA-8 provided for each GCD to specify an amount of pumping to be applied to the Trinity aquifer its area and the RWP aquifer availability values for the Trinity and Woodbine aquifers to be specified for all unprotected Counties in a simulation request to TWDB. At the inception of the GMA process no GCDs existed in GMA-8 with jurisdiction over the Woodbine aquifer.

During the GMA consideration of the Trinity aquifer pumping to be specified by the GCDs TWDB released a report giving new pumping projections for the Trinity and Woodbine aquifers. The report also describes the use and sources of water for enhanced gas production in the Barnett Shale. (Bene, Hardin and others, 2007) GMA-8 considered the new information and decided to use the new projections for use of the Trinity and Woodbine aquifers for the GMA-8 Counties included in the Medium Barnett Shale Development scenario given in the TWDB report. (Fig. 3)

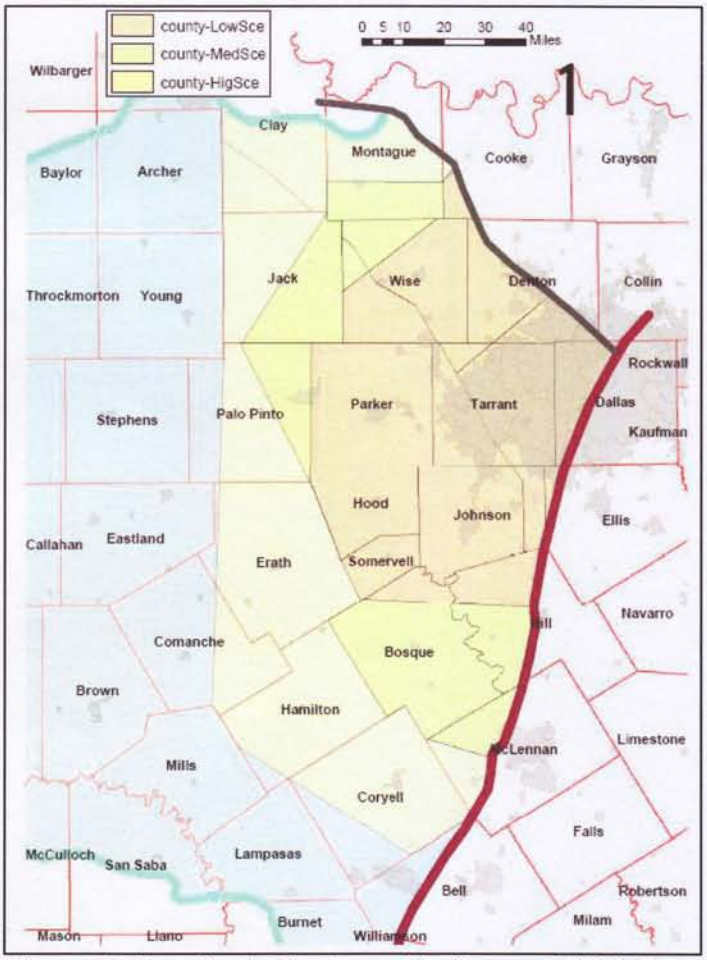

Figure 3, Counties in the Low, Medium and High Barnett Shale Development Scenarios, from Bene, Hardin and others, 2007

Discussion

The GAM consists of 7 layers representing the Woodbine and Trinity aquifers. Each layer in the GAM may represent an aquifer, an aquitard, or a subdivision of an aquifer. (Table 1) The pumping simulated in the GAM may be changed for each GAM run with respect to the amount of pumping applied to each layer and the spatial distribution of the pumping. Changes in the amount of pumping may be made to each layer individually, if desired, to all layers collectively or to one or more layers while the others remain unchanged.

The 50-year GAM simulations performed by TWDB included the drought of record (DOR) by using 47 of average climatic conditions (recharge) followed by 3 drought years (representing the 3 worst years of the 1950's drought). The GAM simulations maintained the spatial and vertical distribution (by model layer) of the original model predictive pumping data set. However, a revised simulated pumping amount was specified for each County in GMA-8 for each GAM run performed by TWDB. A total of three simulations were requested by GMA-8 and performed by TWDB. The results of the first simulation (GAM-run 07-09) suggested that the existing spatial distribution of Woodbine aquifer pumping in Lamar and Hunt Counties created an exaggerated cone of depression from the specified pumping. Additionally, the simulated Woodbine aquifer pumping specified for Delta County could not be applied because the spatial distribution of pumping in the original model did not include Delta County. The second and third runs had similar specifications and were combined by TWDB as GAM-run 07-30. GAM-run 07-30 revised the spatial pumping distribution in Hunt, Lamar and Delta Counties to address the previously identified issues in those Counties while maintaining pumping amounts specified for GMA-run 07-09. Simulation Request (Simulation) 2 of GAM-run 07-30 included revised Trinity aquifer pumping specifications for Comanche, Erath and McLennan Counties. Simulation 3 of GAM-run 07-30 differed from Simulation 2 only in revised Trinity aquifer pumping specifications for Comanche and Erath Counties.

<table>
<tr><th colspan="2">Geologic Unit</th><th>GAM Layer</th><th colspan="2">Hydrologic Unit</th></tr>
<tr><td colspan="2">Woodbine Fm.</td><td>Layer 1</td><td colspan="2">Woodbine Aquifer</td></tr>
<tr><td colspan="2">Fredericksburg Group</td><td>Layer 2</td><td colspan="2"></td></tr>
<tr><td colspan="2">Paluxy Sand</td><td>Layer 3</td><td>Upper Trinity</td><td rowspan="8">Trinity Aquifer</td></tr>
<tr><td colspan="2">Glen Rose Limestone</td><td>Layer 4</td><td>Upper / Middle Trinity</td></tr>
<tr><td rowspan="5">Travis Peak Fm.</td><td>Hensell Sand</td><td>Layer 5</td><td>Middle Trinity</td></tr>
<tr><td>Cow Creek Limestone</td><td rowspan="3">Layer 6
Treated as an Aquitard</td><td rowspan="3"></td></tr>
<tr><td>Hammett Shale</td></tr>
<tr><td>Sligo Limestone</td></tr>
<tr><td>Hosston Conglomerate</td><td>Layer 7</td><td>Lower Trinity</td></tr>
</table>

Table 1, Generalized Relationships of Geologic Units to GAM Layers and Hydrologic Units

To develop the initial GAM-run request to TWDB, the GCDs of GMA-8 each specified the amount of Trinity aquifer pumping to be simulated in the GAM run for their area. Clearwater and Central TX specified the pumping to be applied to GAM Layers 3, 4, 5 and 7 maintaining the existing model spatial pumping distribution in each layer. The other GCDs specified a total pumping to be applied to Trinity aquifer in their area maintaining the existing distribution of pumping as a percentage of the total pumping specified and maintaining the existing spatial pumping distribution. The specified pumping for the Trinity aquifer or Trinity and Woodbine aquifers for the Counties in the Medium Barnett Shale scenario was equal to the highest year of the projected pumping values given in the TWDB report. The specified pumping for the Trinity aquifer or Trinity and Woodbine aquifers for the remaining Counties in GMA-8 was equal to the highest year value (after year 2000) of the aquifer availability given in the RWP. Pumping was held constant in all areas of the model where a pumping specification was provided. (Appendix A)

While TWDB processed the initial GAM-run request, the Tablerock GCD (Tablerock), McLennan County GCD (McLennan Co.), Northern Trinity GCD (N. Trinity) and Upper Trinity GCD (U. Trinity) were created and became members of GMA-8. GMA-8 prepared orientation material for the new GCD members to acquaint them with the GMA process and the prior decisions made by the original members. At the next GMA meeting the new GCD members were provided with the orientation and materials.

On receipt of the report for GAM-run 07-09, GMA-8 considered the results and determined that 2 additional GAM-run requests would be necessary. The runs were considered necessary to address the issues identified in GAM-run 07-09 related to spatial pumping distribution. The additional runs allowed Middle Trinity GCD (M. Trinity) and McLennan Co. to give further pumping specifications for their areas. In the first of the two runs, M. Trinity and McLennan Co. specified a total pumping to for the Trinity aquifer in their area maintaining the existing distribution of pumping as a percentage of the total pumping specified and maintaining the existing spatial pumping distribution. All other previous GAM-run specifications remained unchanged. (Appendix B) In the second of the two runs, M. Trinity specified a total pumping to for the Trinity aquifer in its area maintaining the existing distribution of pumping as a percentage of the total pumping specified and maintaining the existing spatial pumping distribution. All other previous GAM-run specifications remained unchanged. (Appendix C)

On receipt of the report for GAM-run 07-30, GMA-8 considered the results and determined that no additional GAM-run requests were immediately necessary. GMA-8 gave careful consideration to two possible strategies for development of DFCs for the Trinity and Woodbine aquifers. The first strategy was continuing investigation of the Trinity and Woodbine aquifers until the statutory deadline for DFC submission in 2010. The second strategy was develop DFCs by the TWDB deadline (January 2008) to require inclusion of the resulting values for Managed Available Groundwater (MAG) in the next round of RWP development and continue Trinity and Woodbine aquifer investigations. After deliberation, GMA-8 decided to develop DFCs for the Trinity and Woodbine aquifers so that the MAG values could be used in the next round of RWPs while continuing Trinity and Woodbine aquifer investigations was preferred. GMA-8 decided that the DFCs for the M. Trinity Counties should be based on the results of GAM-run 07-09 and the DFCs for all other Counties in GMA-8 be based on the results of Simulation 2 of GAM-run 07-30. In further consideration of the DFCs; GMA-8 adopted

the Woodbine aquifer DFCs on December 17, 2007 and deferred action on the Trinity aquifer DFCs.

All average draw down values provided by TWDB are from GAM-runs 07-09 and 07-30 for use in developing DFCs are rounded to the nearest 1-foot for presentation in the DFC statements using the normal rounding convention.

GMA-8 Desired Future Conditions for the Woodbine Aquifer

Collin County

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 154 feet after 50 years.

Cooke County

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 0 feet after 50 years.

Dallas County

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 112 feet after 50 years.

Denton County

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 16 feet after 50 years.

Ellis County

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 102 feet after 50 years.

Fannin County

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 186 feet after 50 years.

Grayson County

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 28 feet after 50 years.

Hill County

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 87 feet after 50 years.

Hunt County

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 353 feet after 50 years.

Johnson County

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 4 feet after 50 years.

Kaufman County

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 211 feet after 50 years.

Lamar County

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 297 feet after 50 years.

McLennan County (McLennan County GCD)

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 61 feet after 50 years.

Navarro County

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 177 feet after 50 years.

Red River County

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 202 feet after 50 years.

Rockwall County

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 241 feet after 50 years.

Tarrant County (Northern Trinity GCD)

- From estimated year 2000 conditions, the average draw down of the Woodbine aquifer should not exceed approximately 2 feet after 50 years.

Note: The observations and assessments made in this report were based on data supplied by the members of GMA-8, TWDB or available from referenced published sources available at the time the report preparation. The conclusions drawn in the report are based on the available data and reasonable methods of assessment. The Desired Future Conditions presented in this report reflect policy decisions made by GMA-8. If new or different data is made available the conclusions of this report may change.

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Donnelley, Andrew, 2007; GAM-run 07-09; Texas Water Development Board

Wade, Shirley, 2007; GAM-run 07-30; Texas Water Development Board

APPENDIX A

GMA-8 Simulation Request Specifications
For Northern Trinity/Woodbine Aquifer GAM

April 25, 2007

Clearwater Underground Water Conservation District (UWCD) acting on behalf of GMA-8 requests Texas Water Development Board (TWDB) to perform a projected pumping simulation of the N. Trinity / Woodbine aquifer Groundwater Availability Model (GAM). The N. Trinity / Woodbine aquifer GAM consists of 7-layers representing both water-producing and non water-producing zones. In the GAM, layer 1 represents the Woodbine aquifer and layers 3, 4, 5, 6 and 7 represent both the water-bearing and non water-bearing portions of the Trinity aquifer. Clearwater UWCD requests the GAM simulation be performed with the following specifications:

1. The simulation period should be for 50 years.
2. The simulation should use annual time steps.
3. The simulated climatic conditions should include 4 decades of average climatic conditions with the last decade beginning with average climatic conditions and ending in a simulated repeat of the drought of record.
4. The simulation should maintain the existing model spatial pumping distribution.

5. The simulation should maintain the existing distribution of pumping by layer (as a percentage of the total Trinity aquifer pumping within a County area) for layers 3, 4, 5, 6, and 7; except where specified otherwise.
6. Pumping should be held constant for each area for which a pumping amount is specified (*i.e.* by County total for the Trinity aquifer or by a layer specified within a County).
7. The projected pumping to be applied to layer 1 (Woodbine) by County should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Woodbine aquifer; the balance of Counties using the Woodbine aquifer are addressed in request item 9 below):
    a. Collin – 2,500 ac-ft per year
    b. Delta – 16 ac-ft per year
    c. Fannin – 3,300 ac-ft per year
    d. Grayson – 12,100 ac-ft per year
    e. Hunt – 2,840 ac-ft per year
    f. Kaufman – 200 ac-ft per year
    g. Lamar – 3,658 ac-ft per year
    h. Limestone – 33 ac-ft per year
    i. Navarro – 300 ac-ft per year
    j. Red River – 170 ac-ft per year
    k. Rockwall – 144 ac-ft per year
8. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Trinity aquifer):
    a. Brown – 2,085 ac-ft per year
    b. Callahan – 3,787 ac-ft per year
    c. Collin – 2,100 ac-ft per year
    d. Coryell – 1,791 ac-ft per year
    e. Delta – 364 ac-ft per year
    f. Eastland – 4,853 ac-ft per year
    g. Falls – 161 ac-ft per year
    h. Fannin – 700 ac-ft per year
    i. Grayson – 9,400 ac-ft per year
    j. Hamilton – 2,146 ac-ft per year
    k. Hunt – 551 ac-ft per year
    l. Kaufman – 1,184 ac-ft per year
    m. Lamar – 1,320 ac-ft per year
    n. Limestone – 66 ac-ft per year
    o. Montague – 2,682 ac-ft per year
    p. Navarro – 1,873 ac-ft per year
    q. Red River – 528 ac-ft per year
    r. Rockwall – 958 ac-ft per year
    s. Taylor – 679 ac-ft per year
    t. Travis – 3,900 ac-ft per year
    u. Williamson – 1,810 ac-ft per year
9. The projected pumping to be applied to layers 1, 3, 4, 5 and 7 (as applicable with totals by County for Woodbine and Trinity aquifers) should be as follows (note these projected pumping values are based on the highest year for each requested County in the High Estimate of Predictive Groundwater Use given in

the TWDB report "Assessment of Groundwater Use in the Northern Trinity Aquifer Due to Urban Growth and Barnett Shale Development"):

a. Bosque – 7,509 ac-ft per year
b. Cooke – 7,018 ac-ft per year
c. Dallas – 7,807 ac-ft per year
d. Denton – 23,442 ac-ft per year
e. Ellis – 9,403 ac-ft per year
f. Hill – 5,412 ac-ft per year
g. Hood – 11,064 ac-ft per year
h. Johnson – 17,767 ac-ft per year
i. Mc Lennan - 15,234 ac-ft per year
j. Parker – 15,389 ac-ft per year
k. Somervell – 2,485 ac-ft per year
l. Tarrant – 19,615 ac-ft per year
m. Wise – 9,801 ac-ft per year

10. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Middle Trinity Groundwater Conservation District (GCD) should be as follows:
    a. Comanche – 25,000 ac-ft per year
    b. Erath – 30,000 ac-ft per year
11. The projected pumping to be applied to layers 3, 4, 5, and 7 (Trinity aquifer with total by County) in Lampasas County (Saratoga UWCD) should be – 3,164 ac-ft per year.
12. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Milam County (Post Oak Savannah GCD) should be – 321 ac-ft per year.
13. The projected pumping to be applied to layers 3, 4, 5 and 7 (total by County) in Mills County (Fox Crossing Water District) should be – 2,400 ac-ft per year.
14. The projected pumping to be applied to the Trinity aquifer in Bell County (Clearwater UWCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 112 ac-ft per year
    b. Layer 4 (Glen Rose) – 880 ac-ft per year
    c. Layer 5 (Hensell) – 1,100 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 5,000 ac-ft per year
15. The projected pumping to be applied to the Trinity aquifer in Burnet County (Central Texas GCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 200 ac-ft per year
    b. Layer 4 (Glen Rose) – 200 ac-ft per year
    c. Layer 5 (Hensell) – 700 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 2,500 ac-ft per year

APPENDIX B

GMA-8 2nd Simulation Request Specifications
For Northern Trinity/Woodbine Aquifer GAM

October 4, 2007

Clearwater Underground Water Conservation District (UWCD) acting on behalf of GMA-8 requests Texas Water Development Board (TWDB) to perform a projected pumping simulation of the N. Trinity / Woodbine aquifer Groundwater Availability Model (GAM). The N. Trinity / Woodbine aquifer GAM consists of 7-layers representing both water-producing and non water-producing zones. In the GAM, layer 1 represents the Woodbine aquifer and layers 3, 4, 5, 6 and 7 represent both the water-bearing and non water-bearing portions of the Trinity aquifer. Clearwater UWCD requests the GAM simulation be performed with the following specifications:

16. The simulation period should be for 50 years.
17. The simulation should use annual time steps.
18. The simulated climatic conditions should include 4 decades of average climatic conditions with the last decade beginning with average climatic conditions and ending in a simulated repeat of the drought of record.
19. The simulation should maintain the existing model spatial pumping distribution, where possible. It is understood from TWDB GAM Run 07-09 that the existing

model spatial distribution does not provide for pumping in the Woodbine aquifer in Delta County nor provide for pumping in the Trinity aquifer of Delta and Kaufman Counties. It is further understood from TWDB GAM Run 07-09 that the existing model spatial distribution of pumping in the Woodbine aquifer in Hunt and Lamar Counties may contribute to extreme draw down resulting in concentrated areas. TWDB is requested to suggest an appropriate methodology or methodologies by which the requested amounts of pumping may be reasonably distributed in the above mentioned Counties and aquifers.

20. The simulation should maintain the existing distribution of pumping by layer (as a percentage of the total Trinity aquifer pumping within a County area) for layers 3, 4, 5, 6, and 7; except where specified otherwise.
21. Pumping should be held constant for each area for which a pumping amount is specified (*i.e.* by County total for the Trinity aquifer or by a layer specified within a County).
22. The projected pumping to be applied to layer 1 (Woodbine) by County should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Woodbine aquifer; the balance of Counties using the Woodbine aquifer are addressed in request item 9 below):
    a. Collin – 2,500 ac-ft per year
    b. Delta – 16 ac-ft per year
    c. Fannin – 3,300 ac-ft per year
    d. Grayson – 12,100 ac-ft per year
    e. Hunt – 2,840 ac-ft per year
    f. Kaufman – 200 ac-ft per year
    g. Lamar – 3,658 ac-ft per year
    h. Limestone – 33 ac-ft per year
    i. Navarro – 300 ac-ft per year
    j. Red River – 170 ac-ft per year
    k. Rockwall – 144 ac-ft per year
23. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Trinity aquifer):
    a. Brown – 2,085 ac-ft per year
    b. Callahan – 3,787 ac-ft per year
    c. Collin – 2,100 ac-ft per year
    d. Coryell – 1,791 ac-ft per year
    e. Delta – 364 ac-ft per year
    f. Eastland – 4,853 ac-ft per year
    g. Falls – 161 ac-ft per year
    h. Fannin – 700 ac-ft per year
    i. Grayson – 9,400 ac-ft per year
    j. Hamilton – 2,146 ac-ft per year
    k. Hunt – 551 ac-ft per year
    l. Kaufman – 1,184 ac-ft per year
    m. Lamar – 1,320 ac-ft per year
    n. Limestone – 66 ac-ft per year
    o. Montague – 2,682 ac-ft per year
    p. Navarro – 1,873 ac-ft per year
    q. Red River – 528 ac-ft per year

d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
e. Layer 7 (Hosston) – 2,500 ac-ft per year

APPENDIX C

GMA-8 3rd Simulation Request Specifications
For Northern Trinity/Woodbine Aquifer GAM

October 4, 2007

Clearwater Underground Water Conservation District (UWCD) acting on behalf of GMA-8 requests Texas Water Development Board (TWDB) to perform a projected pumping simulation of the N. Trinity / Woodbine aquifer Groundwater Availability Model (GAM). The N. Trinity / Woodbine aquifer GAM consists of 7-layers representing both water-producing and non water-producing zones. In the GAM, layer 1 represents the Woodbine aquifer and layers 3, 4, 5, 6 and 7 represent both the water-bearing and non water-bearing portions of the Trinity aquifer. Clearwater UWCD requests the GAM simulation be performed with the following specifications:

32. The simulation period should be for 50 years.
33. The simulation should use annual time steps.
34. The simulated climatic conditions should include 4 decades of average climatic conditions with the last decade beginning with average climatic conditions and ending in a simulated repeat of the drought of record.

35. The simulation should maintain the existing model spatial pumping distribution, where possible. It is understood from TWDB GAM Run 07-09 that the existing model spatial distribution does not provide for pumping in the Woodbine aquifer in Delta County nor provide for pumping in the Trinity aquifer of Delta and Kaufman Counties. It is further understood from TWDB GAM Run 07-09 that the existing model spatial distribution of pumping in the Woodbine aquifer in Hunt and Lamar Counties may contribute to extreme draw down resulting in concentrated areas. TWDB is requested to suggest an appropriate methodology or methodologies by which the requested amounts of pumping may be reasonably distributed in the above mentioned Counties and aquifers.
36. The simulation should maintain the existing distribution of pumping by layer (as a percentage of the total Trinity aquifer pumping within a County area) for layers 3, 4, 5, 6, and 7; except where specified otherwise.
37. Pumping should be held constant for each area for which a pumping amount is specified (*i.e.* by County total for the Trinity aquifer or by a layer specified within a County).
38. The projected pumping to be applied to layer 1 (Woodbine) by County should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Woodbine aquifer; the balance of Counties using the Woodbine aquifer are addressed in request item 9 below):
    a. Collin – 2,500 ac-ft per year
    b. Delta – 16 ac-ft per year
    c. Fannin – 3,300 ac-ft per year
    d. Grayson – 12,100 ac-ft per year
    e. Hunt – 2,840 ac-ft per year
    f. Kaufman – 200 ac-ft per year
    g. Lamar – 3,658 ac-ft per year
    h. Limestone – 33 ac-ft per year
    i. Navarro – 300 ac-ft per year
    j. Red River – 170 ac-ft per year
    k. Rockwall – 144 ac-ft per year
39. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Trinity aquifer):
    a. Brown – 2,085 ac-ft per year
    b. Callahan – 3,787 ac-ft per year
    c. Collin – 2,100 ac-ft per year
    d. Coryell – 1,791 ac-ft per year
    e. Delta – 364 ac-ft per year
    f. Eastland – 4,853 ac-ft per year
    g. Falls – 161 ac-ft per year
    h. Fannin – 700 ac-ft per year
    i. Grayson – 9,400 ac-ft per year
    j. Hamilton – 2,146 ac-ft per year
    k. Hunt – 551 ac-ft per year
    l. Kaufman – 1,184 ac-ft per year
    m. Lamar – 1,320 ac-ft per year
    n. Limestone – 66 ac-ft per year
    o. Montague – 2,682 ac-ft per year

   p. Navarro – 1,873 ac-ft per year
   q. Red River – 528 ac-ft per year
   r. Rockwall – 958 ac-ft per year
   s. Taylor – 679 ac-ft per year
   t. Travis – 3,900 ac-ft per year
   u. Williamson – 1,810 ac-ft per year

40. The projected pumping to be applied to layers 1, 3, 4, 5 and 7 (as applicable with totals by County for Woodbine and Trinity aquifers) should be as follows (note these projected pumping values are based on the highest year for each requested County in the High Estimate of Predictive Groundwater Use given in the TWDB report "Assessment of Groundwater Use in the Northern Trinity Aquifer Due to Urban Growth and Barnett Shale Development"):
    a. Bosque – 7,509 ac-ft per year
    b. Cooke – 7,018 ac-ft per year
    c. Dallas – 7,807 ac-ft per year
    d. Denton – 23,442 ac-ft per year
    e. Ellis – 9,403 ac-ft per year
    f. Hill – 5,412 ac-ft per year
    g. Hood – 11,064 ac-ft per year
    h. Johnson – 17,767 ac-ft per year
    i. Parker – 15,389 ac-ft per year
    j. Somervell – 2,485 ac-ft per year
    k. Tarrant – 19,615 ac-ft per year
    l. Wise – 9,801 ac-ft per year
41. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in McLennan County (McLennan County Groundwater Conservation District (GCD)) should be – 20,694 ac-ft per year
42. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Middle Trinity GCD should be as follows:
    a. Comanche – 35,000 ac-ft per year
    b. Erath – 42,000 ac-ft per year
43. The projected pumping to be applied to layers 3, 4, 5, and 7 (Trinity aquifer with total by County) in Lampasas County (Saratoga UWCD) should be – 3,164 ac-ft per year.
44. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Milam County (Post Oak Savannah GCD) should be – 321 ac-ft per year.
45. The projected pumping to be applied to layers 3, 4, 5 and 7 (total by County) in Mills County (Fox Crossing Water District) should be – 2,400 ac-ft per year.
46. The projected pumping to be applied to the Trinity aquifer in Bell County (Clearwater UWCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 112 ac-ft per year
    b. Layer 4 (Glen Rose) – 880 ac-ft per year
    c. Layer 5 (Hensell) – 1,100 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 5,000 ac-ft per year
47. The projected pumping to be applied to the Trinity aquifer in Burnet County (Central Texas GCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 200 ac-ft per year
    b. Layer 4 (Glen Rose) – 200 ac-ft per year

c. Layer 5 (Hensell) – 700 ac-ft per year
d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
e. Layer 7 (Hosston) – 2,500 ac-ft per year

Desired Future Conditions

Blossom Aquifer
Bowie, Lamar and Red River Counties

Brazos River Alluvium Aquifer
Bosque, Falls, Hill, McLennan and Milam Counties

Nacatoch Aquifer
Bowie, Delta, Franklin, Hopkins, Hunt, Kaufman, Lamar, Navarro, Rains and Red River Counties

TCB
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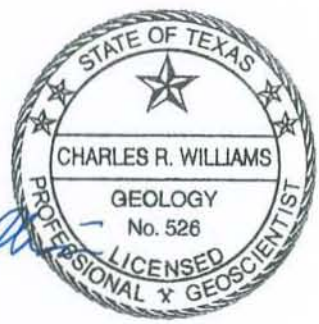
Memorandum

To: Cheryl Maxwell, Administrative Manager
Clearwater Underground Water Conservation District
Administrative Agent for Groundwater Management Area 8

From: Charles R. Williams, P.G. No. 526



Date: December 14, 2007

Re: Adopted Desired Future Conditions of Minor Aquifers

Introduction

Groundwater Management Area 8 (GMA-8) is a groundwater management area of the State of Texas as defined by Statute with responsibility for developing a desired future condition (DFC) for aquifers within an approximately 46-County area. Membership of the GMA is composed of the groundwater conservation districts (GCDs) that occur all or in part within the GMA boundary. (Fig. 1) At the request of GMA-8, TCB Inc. (TCB) developed statements describing DFCs for the portions of the Blossom, Nacatoch and Brazos Alluvium Aquifers recognized by the Texas Water Development Board (TWDB) to occur in whole or in part within GMA-8. (Fig. 2)

Methodology

To predict the effects of pumping in the Blossom, Nacotoch and Brazos Alluvium aquifers TCB developed two-dimensional (2-D) spreadsheet models. The models use estimates of recharge area, annual rainfall, recharge rate, aquifer saturated thickness and effective porosity (specific yield) to predict the percentage of saturated thickness maintained in the aquifer after a specified time period for a range of pumping amounts. Predictions are made for the Nacatoch aquifer as a whole and for specified areas of the Brazos River Alluvium and the Blossom aquifers. Aquifer recharge area estimates are from the TWDB geographic information system (GIS) coverages. Estimates of annual rainfall are from National Oceanic and Atmospheric Agency (NOAA) data. Estimates of the recharge rate, saturated thickness, and effective porosity of the Blossom and Nacatoch aquifers are from TWDB publications. (McLaurin, 1988; Ashworth, 1988) For the Brazos Alluvium aquifer, reasonable estimates are used of the recharge rate, saturated thickness, or effective porosity of similar materials from the aquifer in other areas. (Baker and others, 1974; Driscoll, 1986) The predictive time period is 50 years.

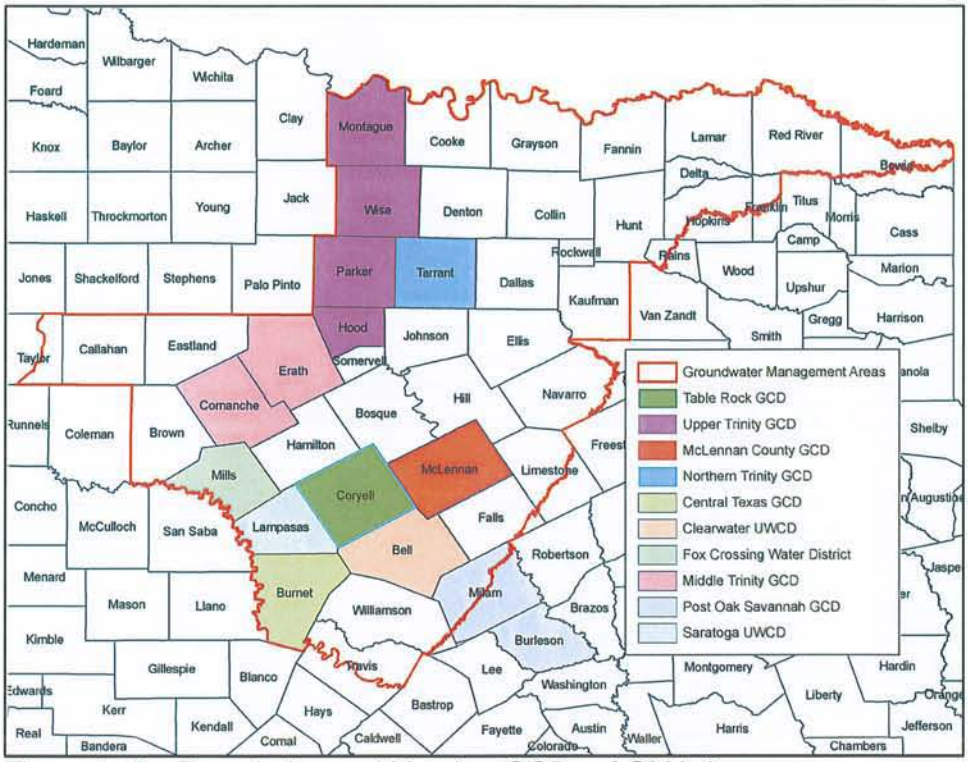


Figure 1, the Boundaries and Member GCDs of GMA-8

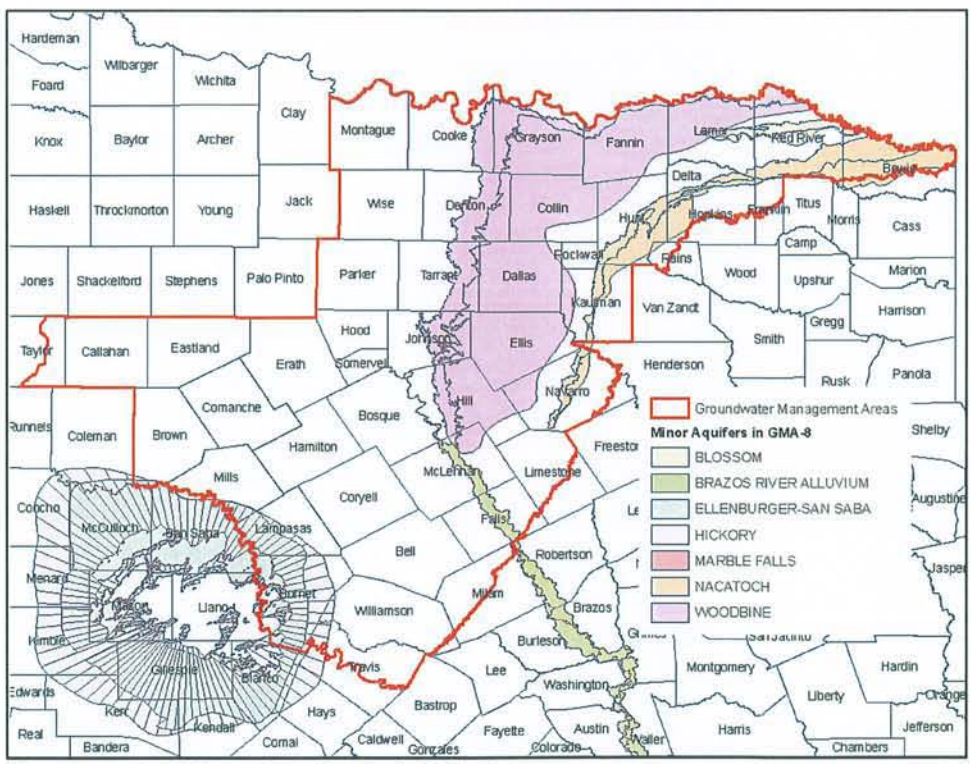


Figure 2, the Minor Aquifers of GMA-8

Discussion

The purpose of the 2-D models is to conveniently predict the potential results of a range of predictive pumping amounts over time. The models are used to aid in the DFC development process for aquifers where a TWDB GAM is not available. Results are presented in tabular and graphic formats, both of which allow indexing between pumping amounts and predicted changes in the saturated thickness of the aquifer.

An assumption of the 2-D models is that the aquifer is in an unconfined condition. However, the 2-D models may be reasonably applicable to aquifers that have both an unconfined and a confined component if, either the confined (artesian pressured) portion of the aquifer is relatively limited in area or if pumping in the aquifer is reasonably confined to near the aquifer recharge zone for the area of interest. The Brazos River Alluvium aquifer is an unconfined aquifer. The Blossom and Nacotoch aquifers both have limited confined zone areas. In areas where the models are applied to several Counties, the arithmetic mean of the average annual rainfall values of the several Counties is used. The 2-D models project the effects of pumping using the following relationships:

The term Groundwater Availability is used to express the annual amount of pumping in the area of interest and is composed of two components;
Groundwater Availability = Groundwater Availability $_{Storage}$ + Groundwater Availability$_{Recharge}$

GWA = GWAS + GWAR

Where:
GWA = Groundwater availability (ac-ft/yr)
GWAS = Groundwater availability from storage (ac-ft/yr)
GWAR = Groundwater availability from recharge (ac-ft/yr)

GWAS = (1-DD)*B*A*N/Y/43560
Where:
DD = average percentage of drawdown maintained (%)
B = average saturated thickness of aquifer (ft)
A = area of aquifer (ft^2)
N = effective porosity
Y = time duration (yrs)

GWAR = P*A*R/43560

Where:
P = average yearly precipitation (ft/yr)
R = % precipitation that infiltrates into groundwater system

Equation: GWA = GWAS + GWAR = (1-DD)*B*A*N/Y/43560 + P*A*R/43560

DFC Development Approach

Brazos Alluvium

In GMA-8, the Brazos River Alluvium occurs in five Counties. A GCD exists in two of the five Counties. The unprotected Counties bound one GCD and separate it from the other GCD. For the portions of the Brazos River Alluvium occurring within a GCD a County-specific model was applied for each GCD. After reviewing the model results the GCD selected the preferred percentage of aquifer saturated thickness to be maintained in the portion of the aquifer under its management authority. A DFC statement was developed describing the selected condition. (Figs 3-6) For Counties outside of a GCD, two models were applied. One model covers Falls County and the other combines Hill and Bosque Counties which are located on opposing banks of the same reach of the Brazos River.

Development of a DFC describing the percentage of saturated thickness maintained in the aquifer if pumping equivalent to the Regional Water Plan (RWP) aquifer availability occurred in each County or Counties was attempted. (Table 1) However, initial results suggested that some of the DFCs describing the predicted aquifer conditions may not be physically compatible with the DFC developed by an adjoining GCD. This is particularly true for the Bosque-Hill County and the McLennan County GCD models. Pumping equivalent to the combined Bosque-Hill County availability is predicted to reduce the saturated thickness to 0 percent. A DFC was subsequently developed describing the aquifer conditions in Bosque and Hill Counties predicted for pumping approximately 1,000 acre-feet per year less than the RWP availability for the two Counties. (Figs 7 and 8) A DFC was developed for Falls County describing aquifer conditions predicted from pumping an amount equivalent to approximately 1,000 acre-feet per year greater than the Falls County RWP availability. (Figs 9 and 10) The simulated pumping used for the Falls County DFC development is equal to approximately 97 percent of the estimated annual aquifer recharge in Falls County. Overall, the DFCs for the three-County area are based on an amount of pumping that is equal to the sum of the three-County RWP availability. (Table 2)

County	RWP Brazos Alluvium Aquifer Availability (acre-feet per year)
Falls	15,600
Bosque	2,500
Hill	0
Total	**18,100**

Table1, Regional Water Plan Availability Values for the Brazos River Alluvium in Falls, Bosque and Hill Counties

County	GMA-8 Brazos Alluvium Aquifer Simulated Pumping (acre-feet per year)
Falls	16,600
Bosque and Hill	1,500
Total	**18,100**

Table 2, GMA-8 Application of Simulated Pumping in the Brazos River Alluvium for DFC Development

% of saturated thickness maintained	GW availability from storage (ac-ft/yr)	GW availability from recharge (ac-ft/yr)	Total availability (ac-ft/yr)
100%	0	449	449
99%	2	449	451
98%	4	449	454
97%	6	449	456
96%	8	449	458
95%	10	449	460
94%	13	449	462
93%	15	449	464
92%	17	449	466
91%	19	449	468
90%	21	449	470

Sat. Thickness	35	(ft)	
Recharge Area	1997	(acres)	=
Effective porosity	0.15	(fraction)	
Time	50	(yr)	
Rainfall Rate	3	(ft/yr)	
Recharge Rate	0.075	(fraction)	

Figure 3, Model Input Values and Tabular Results for the Brazos River Alluvium in Milam County (Post Oak Savannah GCD)

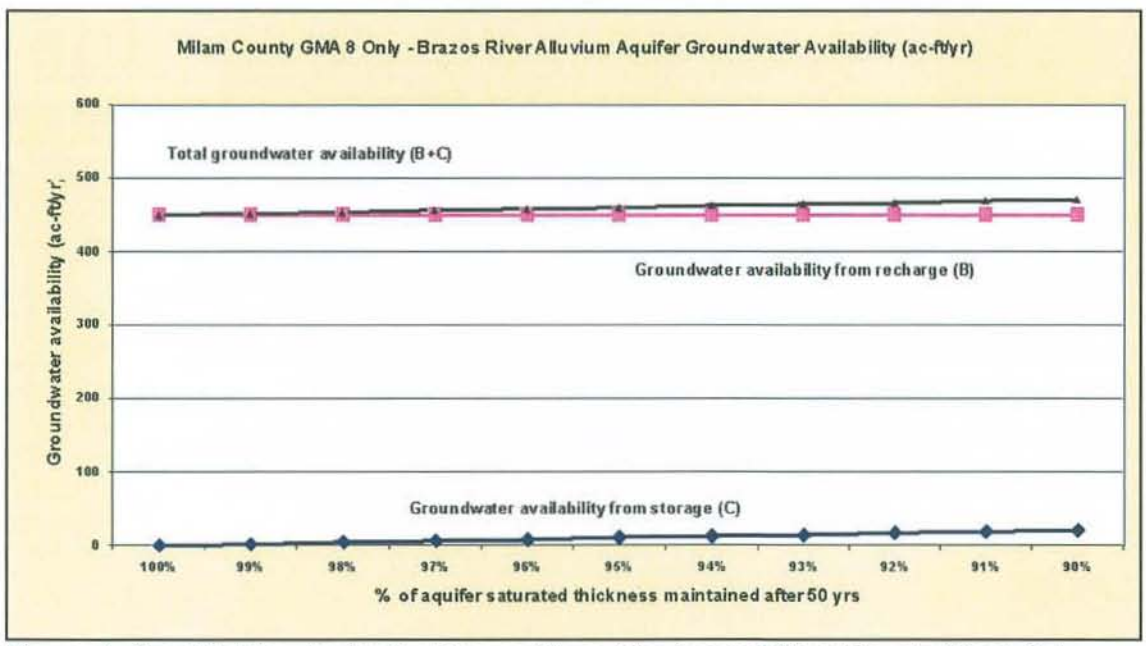


Figure 4, Graphic Results for the Brazos River Alluvium in Milam County (Post Oak Savannah GCD)

% of saturated thickness maintained	GW availability from storage (ac-ft/yr)	GW availability from recharge (ac-ft/yr)	Total availability (ac-ft/yr)
100%	0	14375	14375
98%	139	14375	14513
96%	278	14375	14652
94%	416	14375	14791
92%	555	14375	14930
90%	694	14375	15069
88%	833	14375	15207
86%	972	14375	15346
84%	1110	14375	15485
82%	1249	14375	15624
80%	1388	14375	15763

Sat. Thickness	35	(ft)	
Recharge Area	66090	(acres)	=
Effective porosity	0.15	(fraction)	
Time	50	(yr)	
Rainfall Rate	2.9	(ft/yr)	
Recharge Rate	0.075	(fraction)	

Figure 5, Model Input Values and Tabular Results for the Brazos River Alluvium in McLennan County (McLennan County GCD)

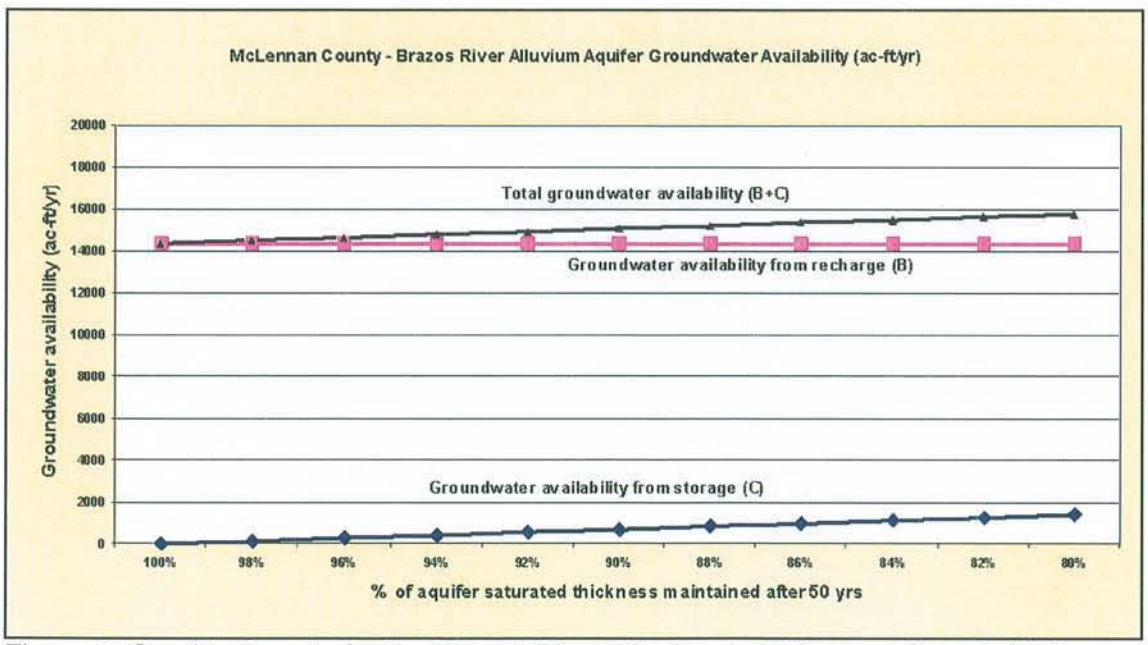


Figure 6, Graphic Results for the Brazos River Alluvium in McLennan County (McLennan County GCD)

% of saturated thickness maintained	GW availability from storage (ac-ft/yr)	GW availability from recharge (ac-ft/yr)	Total availability (ac-ft/yr)
100%	0	1442	1442
99%	7	1442	1449
98%	14	1442	1456
97%	21	1442	1463
96%	28	1442	1470
95%	35	1442	1477
94%	42	1442	1484
93%	49	1442	1491
92%	56	1442	1498
91%	63	1442	1505
90%	70	1442	1512

Sat. Thickness	35	(ft)
Recharge Area	6630	(acres) =
Effective porosity	0.15	(fraction)
Time	50	(yr)
Rainfall Rate	2.9	(ft/yr)
Recharge Rate	0.075	(fraction)

Figure 7, Model Input Values and Tabular Results for the Brazos River Alluvium in the Combined Area of Bosque and Hill Counties

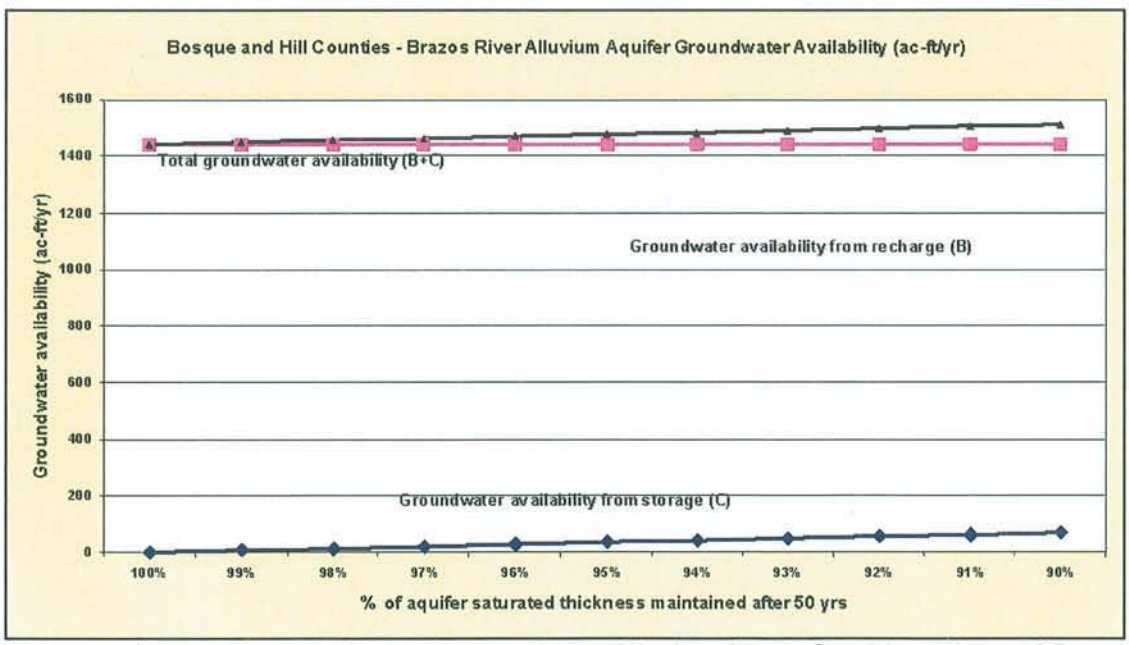


Figure 8, Graphic Results for the Brazos River Alluvium in the Combined Area of Bosque and Hill Counties

% of saturated thickness maintained	GW availability from storage (ac-ft/yr)	GW availability from recharge (ac-ft/yr)	Total availability (ac-ft/yr)
100%	0	17161	17161
99%	76	17161	17237
98%	152	17161	17313
97%	227	17161	17389
96%	303	17161	17464
95%	379	17161	17540
94%	455	17161	17616
93%	531	17161	17692
92%	606	17161	17768
91%	682	17161	17843
90%	758	17161	17919

Sat. Thickness	35	(ft)
Recharge Area	72182	(acres) =
Effective porosity	0.15	(fraction)
Time	50	(yr)
Rainfall Rate	3.17	(ft/yr)
Recharge Rate	0.075	(fraction)

Figure 11, Model Input Values and Tabular Results for the Brazos River Alluvium in Falls County

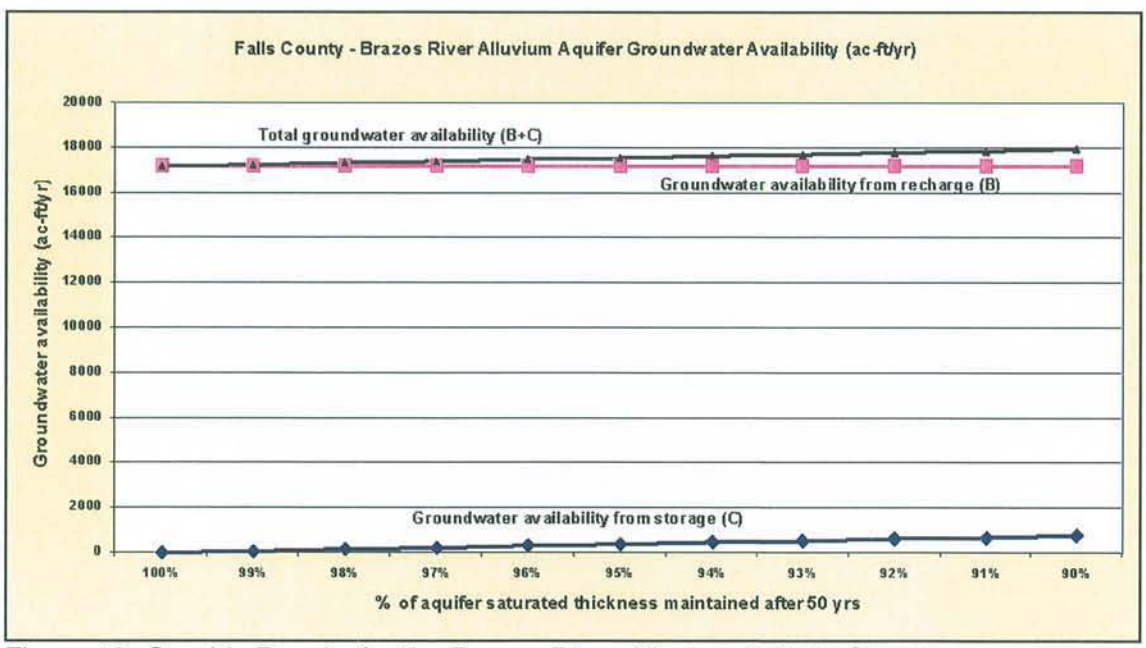


Figure 12, Graphic Results for the Brazos River Alluvium in Falls County

Nacatoch

For the Nacatoch aquifer; a DFC was developed for the entire aquifer in GMA-8. A model was developed for the aquifer and the results were reviewed by the GMA. (Figs 13 and14) The GMA selected the preferred percentage of saturated thickness to be maintained in the aquifer and a DFC statement was developed to describe the selected condition. The DFC describes the percentage of the aquifer saturated thickness maintained if pumping similar to the sum of the County values for the aquifer availability (highest value after year 2000) in the RWP were to occur. (Table 3) The exception is Rains County, the RWP aquifer availability is 10 acre-feet per year; however, the sum of RWP Nacatoch supplies and RWP recommended strategies is 77 acre-feet per year. The summed value of RWP Nacatoch supplies and strategies is used instead of the availability value. The total of the simulated pumping used in development of the DFC for the Nacatoch aquifer is approximately 88 percent of the estimated annual aquifer recharge.

County	GMA-8 Nacatoch Aquifer Simulated Pumping (acre-feet per year)
Navarro$_1$	229
Kaufman$_1$	318
Hunt$_1$	2,956
Hopkins$_1$	915
Franklin$_1$	10
Delta$_1$	282
Red River$_1$	700
Bowie$_1$	3,936
Rains$_2$	77
Lamar$_1$	45
Total	**9,468**

Table 3, GMA-8 Application of Simulated Pumping in the Nacatoch Aquifer for DFC Development 1, RWP Aquifer Availability Value; 2, RWP Supplies + Strategies Value for Aquifer

% of saturated thickness maintained	GW availability from storage (ac-ft/yr)	GW availability from recharge (ac-ft/yr)	Total GW availability (ac-ft/yr)
100%	0	10751	10751
99%	1820	10751	12571
98%	3640	10751	14391
97%	5461	10751	16211
96%	7281	10751	18031
95%	9101	10751	19852
94%	10921	10751	21672
93%	12741	10751	23492
92%	14562	10751	25312
91%	16382	10751	27132
90%	18202	10751	28953

Sat. Thickness	80	(ft)
Recharge Area	568812	(acres) =
Effective porosity	0.2	(fraction)
Time	50	(yr)
Rainfall Rate	3.78	(ft/yr)
Recharge Rate	0.005	(fraction)

Figure 13, Model Input Values and Tabular Results for the Nacatoch Aquifer

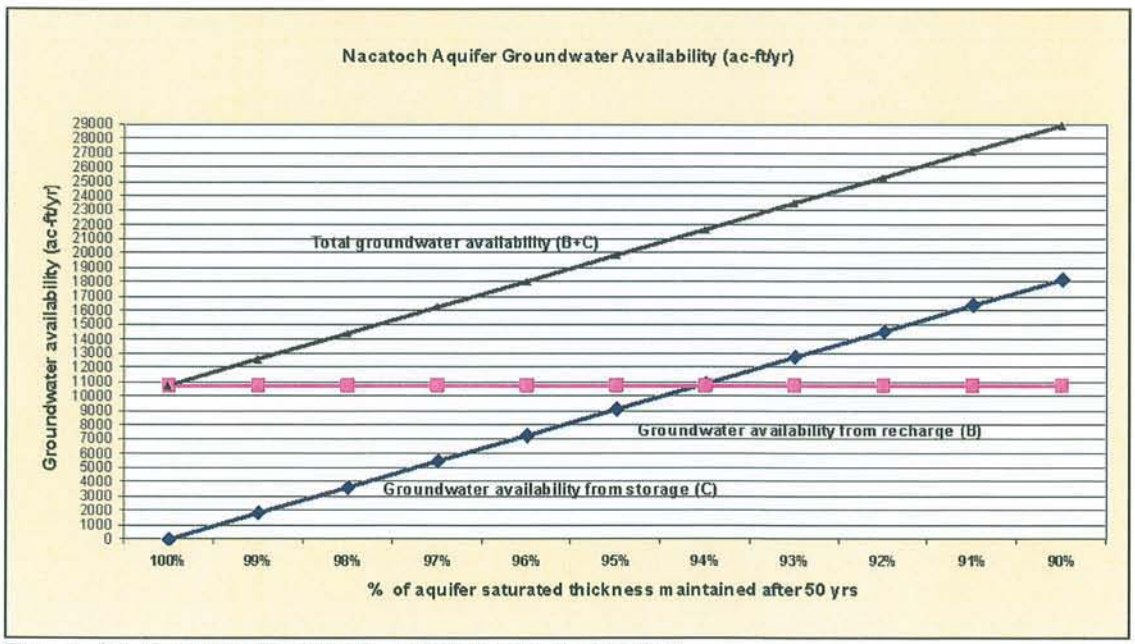


Figure 14, Graphic Results for the Nacatoch Aquifer

Blossom

DFCs were developed for two sections of the Blossom aquifer. The estimated average saturated thickness in Bowie County (approximately 60 feet) is significantly greater than in Lamar and Red River Counties (approximately 35 feet). Models were developed for each the two sections of the aquifer and GMA-8 reviewed the results. (Figs 15-18) GMA-8 selected the preferred percentage of saturated thickness to be maintained in each aquifer section and a DFC statement was developed to describe the selected condition. The DFC for the Lamar and Red River Counties aquifer section describes the percentage of the aquifer saturated thickness maintained if pumping equivalent to the sum of the County values for RWP aquifer availability (highest value after year 2000) were to occur. (Table 4) The Bowie County aquifer section DFC describes the percentage of aquifer saturated thickness maintained if pumping equivalent to the RWP aquifer availability value (highest value after year 2000) were to occur. (Table 5) The simulated pumping used for DFC development in each of the two Blossom aquifer sections is approximately equal to the estimated annual aquifer recharge of the same section.

County	GMA-8 Blossom Aquifer Simulated Pumping (acre-feet per year)
Lamar	391
Red River	1,679
Total	**2,070**

Table 4, GMA-8 Application of Simulated Pumping in the Blossom Aquifer for DFC Development in Lamar and Red River Counties

% of saturated thickness maintained	GW availability from storage (ac-ft/yr)	GW availability from recharge (ac-ft/yr)	Total GW availability (ac-ft/yr)
100%	0	2135	2135
99%	45	2135	2180
98%	90	2135	2225
97%	135	2135	2270
96%	180	2135	2315
95%	225	2135	2360
94%	270	2135	2405
93%	315	2135	2450
92%	360	2135	2495
91%	405	2135	2540
90%	450	2135	2585

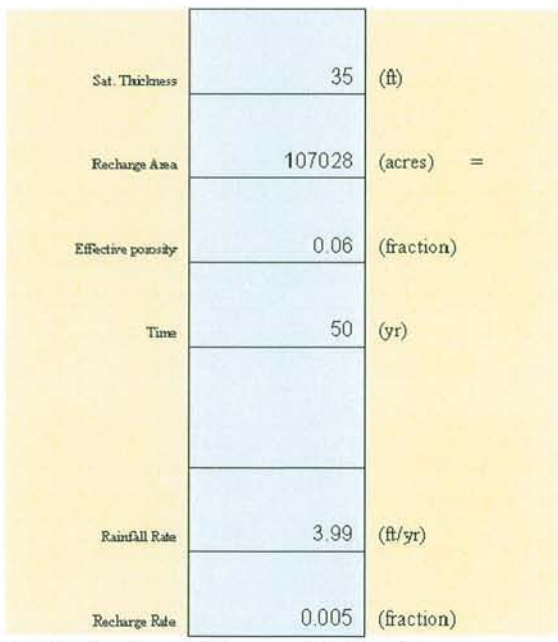


Figure 15, Model Input Values and Tabular Results for the Blossom Aquifer in Lamar and Red River Counties

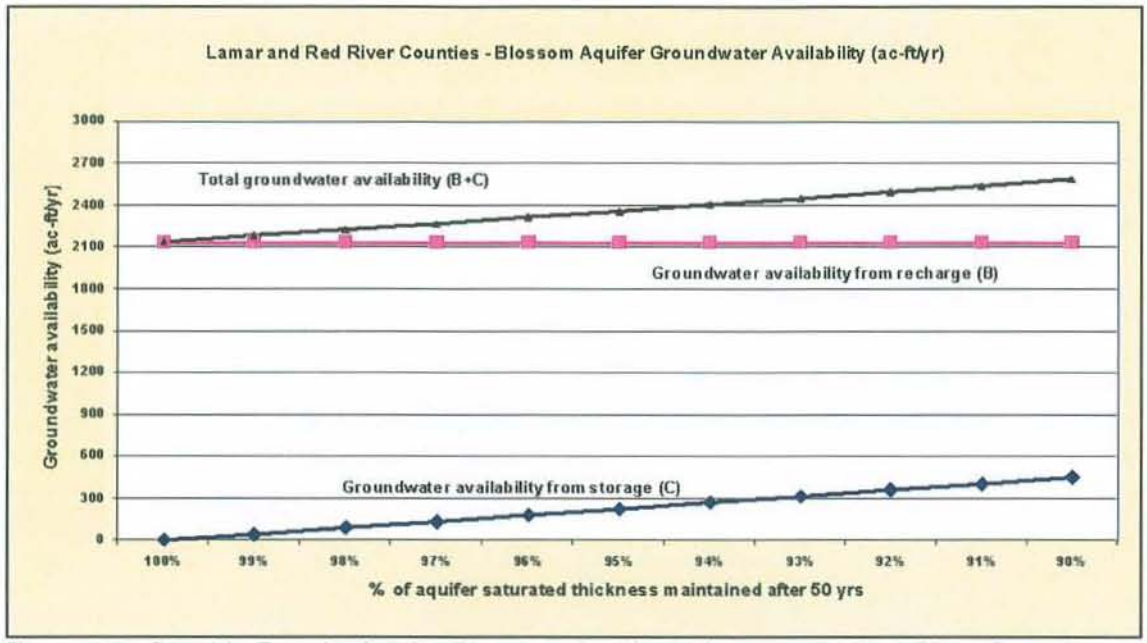


Figure 16, Graphic Results for the Blossom Aquifer in Lamar and Red River Counties

County	GMA-8 Blossom Aquifer Simulated Pumping (acre-feet per year)
Bowie	200
Total	**200**

Table 5, GMA-8 Application of Simulated Pumping in the Blossom Aquifer for DFC Development in Bowie County

% of saturated thickness maintained	GW availability from storage (ac-ft/yr)	GW availability from recharge (ac-ft/yr)	Total GW availability (ac-ft/yr)
100%	0	205	205
99%	7	205	212
98%	14	205	219
97%	21	205	226
96%	28	205	233
95%	35	205	240
94%	42	205	247
93%	48	205	254
92%	55	205	261
91%	62	205	268
90%	69	205	275

Sat. Thickness	60	(ft)
Recharge Area	9618	(acres) =
Effective porosity	0.06	(fraction)
Time	50	(yr)
Rainfall Rate	4.27	(ft/yr)
Recharge Rate	0.005	(fraction)

Figure 17, Model Input Values and Tabular Results for the Blossom Aquifer in Bowie County

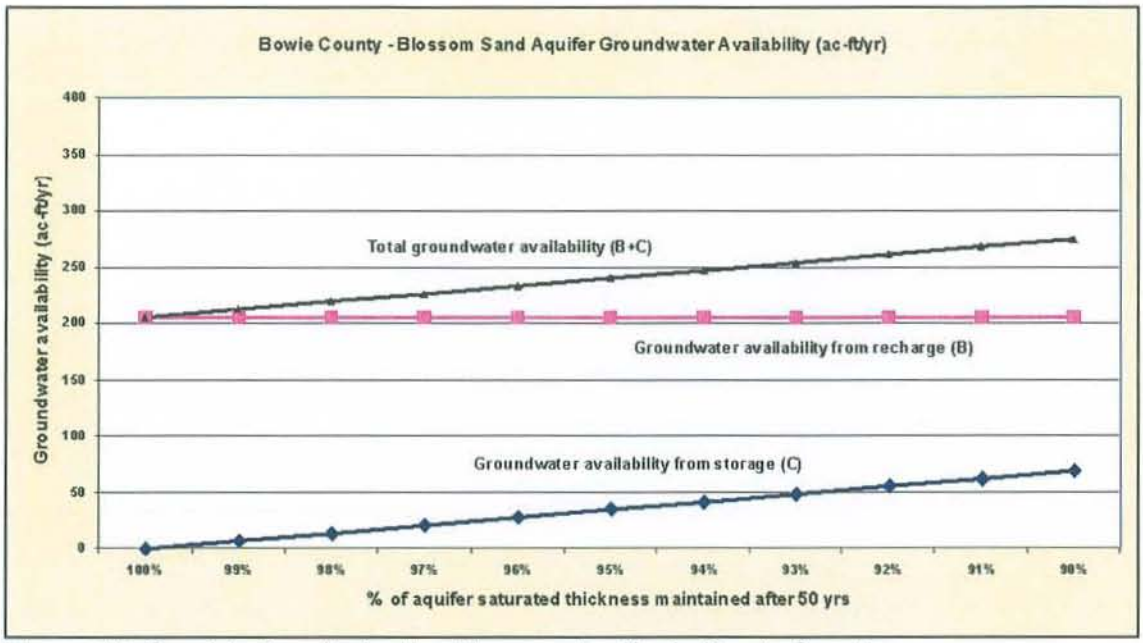


Figure 18, Graphic Results for the Blossom Aquifer in Bowie County

GMA-8 Desired Future Conditions for the Brazos Alluvium Aquifer

- Maintain approximately 90 percent of the estimated saturated thickness after 50 years in Milam County.
- Maintain approximately 100 percent of the saturated thickness after 50 years in Falls County.
- Maintain approximately 82 percent of the estimated saturated thickness after 50 years in McLennan County.
- Maintain approximately 90 percent of the estimated saturated thickness after 50 years in Hill and Bosque Counties.

GMA-8 Desired Future Condition for the Nacotoch Aquifer

- Maintain approximately 100 percent of the estimated saturated thickness after 50 years.

GMA-8 Desired Future Conditions for the Blossom Aquifer

- Maintain approximately 100 percent of the estimated saturated thickness after 50 years in Lamar and Red River Counties.
- Maintain approximately 100 percent of the estimated saturated thickness after 50 years in Bowie County.

Note: The observations and assessments made in this report were based on data supplied by GMA-8 members, TWDB, or available from referenced published sources available at the time of the report preparation. The conclusions drawn in the report are based on the available data and reasonable methods of assessment. The Desired Future Conditions presented in this report reflect policy decisions made by GMA-8. If new or different data is made available, the conclusions of this report may change.

Bibliography

Ashworth, John B., 1988; Ground-Water Resources of the Nacatoch Aquifer; Texas Water Development Board Report 305

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Meeting of the

Groundwater Management Area 8

December 17, 2007 in Bellmead, TX

Minutes

The Groundwater Management Area 8 consisting of the Central Texas Groundwater Conservation District (GCD), Clearwater Underground Water Conservation District (UWCD), Fox Crossing Water District (WD), McLennan County GCD, Middle Trinity GCD, Northern Trinity GCD, Post Oak Savannah GCD, Saratoga UWCD, Tablerock GCD, and Upper Trinity GCD held a meeting on Monday, December 17, 2007 in the City of Bellmead City Council Room, located at 3015 Bellmead Drive, Bellmead, Texas.

Groundwater District Representatives Present:

Central Texas GCD: Richard Bowers	Northern Trinity GCD: Jim Oliver
Clearwater UWCD: Horace Grace	Post Oak Savannah GCD: Gary Westbrook
Fox Crossing WD: Jerry Priddy	Saratoga UWCD: Dave Hamilton
McLennan Co. GWCD: Rodney Kroll	Tablerock GCD: Wyllis Ament
Middle Trinity GCD: Joe Cooper	Upper Trinity GCD: Mike Massey

1. Call meeting to order and establish quorum.

The Groundwater Management Area 8 meeting was called to order at 10:05 a.m. at the City of Bellmead City Council Chambers. Gary Westbrook gave the invocation. Horace Grace called roll and established that a quorum was present. All districts were represented.

2. Welcome and introductions.

Members of the audience were asked to introduce themselves.

3. Public Comments.

There was no public comment.

4. Approve minutes of November 27, 2007 GMA 8 meeting.

Mr. Cooper made a motion to approve the minutes of the November 27, 2007 GMA8 meeting, seconded by Mr. Hamilton. The motion passed unanimously.

5. Discuss action taken at the February 8, 2007 GMA 8 meeting regarding the adoption of Desired Future Conditions for the minor aquifers, except the Woodbine.

Mr. Bowers asked the committee to reconsider the February 8, 2007 action on the minor aquifers. He asked for a revote and to not accept the desired future conditions for the three minor aquifers at this time. This issue was discussed.

Mr. Hamilton stated his opinion was to move forward and when something better comes up, the committee could make amendments at that time.

Mr. Cooper said he would not feel comfortable going forward if some of the committee is not ready to move forward.

Mr. Grace summed up what happened in the February meeting and presented his thoughts on the issue.

6. Hold public hearing on proposed desired future conditions for the major and minor aquifers within GMA 8 to include the following: Edwards BFZ, Trinity, Blossom, Brazos River Alluvium, Ellenburger-San Saba, Hickory, Marble Falls, Nacatoch, and Woodbine.

Public Hearing was opened at 10:37 a.m. with Mr. Grace asking Randy Williams, TCB, Inc. to provide a summary regarding how the DFCs were developed. When he finished, Mr. Grace asked if there were any public or committee comments. There being none, he closed the public hearing at 11:07 p.m.

7. Discussion and possible action to ratify adoption of proposed desired future conditions for the major and minor aquifers within GMA 8 as described above.

Mr. Ament advised that he wishes to work with the committee, but at this time his district is not comfortable with their DFC's, so he will not be in support of the adoption.

Mr. Ament made a motion to table the adoption of the DFCs until all the Districts agreed on the DFC's, seconded by Mr. Bowers. Discussion ensued.

Mr. Priddy and Mr. Hamilton disagreed with the motion on the table.

Mr. Kroll questioned what timeframe Mr. Ament was considering? Mr. Ament stated they're willing to work at it but they want to investigate the whole concept.

Mr. Grace let it be known that he was against tabling the item.

Mr. Bowers suggested that he may want to amend the motion and leave the Edwards BFZ out.

The motion and second were withdrawn.

Mr. Ament made a motion to vote on the DFCs aquifer by aquifer, seconded by Mr. Massey. The motion passed with 9 votes in favor and 1 in opposition. Mr. Priddy cast the opposing vote.

It was asked that as they do each aquifer that Mr. Williams state what Counties or Districts were affected by the aquifer.

Mr. Grace stated the first aquifer under consideration is the Edwards BFZ.

Mr. Cooper made a motion to adopt the DFCs for the Edwards BFZ aquifer, seconded by Mr. Westbrook. The motion passed unanimously.

Mr. Grace stated the next aquifer under consideration is the Trinity.

Mr. Hamilton made a motion to adopt the DFCs for the Trinity aquifer, seconded by Mr. Kroll. The motion to adopt failed with 6 votes in favor, 3 votes in opposition, and 1 abstention. The opposing votes were cast by Mr. Bowers, Mr. Massey, and Mr. Ament. Mr. Westbrook abstained. (DFC adoption requires approval by two-thirds of the members present at a meeting where two-thirds of the voting representatives are in attendance.)

The next aquifer under consideration was the Blossom.

Mr. Priddy made a motion to adopt the DFCs for the Blossom aquifer, seconded by Mr. Cooper. The motion passed with 8 votes in favor, 1 vote in opposition cast by Mr. Kroll, and 1 abstention by Mr. Massey.

The Brazos River Alluvium was the next aquifer under consideration.

Mr. Westbrook made a motion to adopt the DFCs for the Brazos River Alluvium, seconded by Mr. Kroll. The motion passed unanimously.

The next aquifer under consideration was the Ellenburger-San Saba.

Mr. Bowers made a motion to deny adopting the DFCs for the Ellenburger-San Saba aquifer, seconded by Mr. Ament. The motion to deny adoption passed with 7 votes in favor, 1 vote in opposition cast by Mr. Hamilton, and 2 abstentions by Mr. Kroll and Mr. Grace.

The Hickory aquifer was the next aquifer under consideration.

Mr. Bowers made a motion to deny adopting the DFCs for the Hickory aquifer, seconded by Mr. Ament. The motion to deny adoption passed with 7 votes in favor, 1 vote in opposition cast by Mr. Hamilton, and 2 abstentions by Mr. Kroll and Mr. Grace.

The next aquifer under consideration was the Marble Falls.

Mr. Bowers made a motion to deny adopting the DFCs for the Marble Falls aquifer, seconded by Mr. Massey. The motion to deny adoption passed with 7 votes in favor, 1 vote in opposition cast by Mr. Hamilton, and 2 abstentions by Mr. Kroll and Mr. Grace.

The Nacatoch aquifer was the next aquifer under consideration.

Mr. Hamilton made a motion to adopt the DFCs for the Nacatoch aquifer, seconded by Mr. Cooper. The motion passed with 9 votes in favor; Mr. Massey abstained.

The next aquifer under consideration was the Woodbine.

Mr. Hamilton made a motion to adopt the DFCs for the Woodbine aquifer, seconded by Mr. Cooper. The motion passed unanimously.

8. Discussion and possible action to amend contract with TCB, Inc. to develop the desired future conditions for the aquifers in GMA 8.

Mr. Grace asked the committee members whether their district could provide money to amend the contract with TCB, Inc. He explained that extra work had been done that was not included in the contract price that he felt should be paid. He stated that TCB, Inc. has done fine work and he feels they should be compensated for it.

At the last meeting a poll was taken showing seven districts would be able to provide extra funds to pay the outstanding bill. Five of the seven were able to actually get the funds. It was decided that TCB, Inc would bill for the work provided and GMA 8 would pay what they could. In the meantime, the other districts will ask their board or commissioners for an additional amount to pay the remaining portion.

Mr. Grace and Mr. Cooper stated if necessary, they could come up with another $500 each to give the other districts time to get more money.

David Parkhill, Vice President of TCB, Inc., advised that there was much time and effort put in with the contract that was not billed. They submitted the bills at the risk of non-payment for being over the contract amount. He stated that at this time, TCB, Inc. will stay on as consultants but additional work would require compensation.

A question was brought up about two GAM runs that were done on the Trinity which resulted in extra billing. Mr. Cooper advised that he requested these runs to confirm his availability numbers.

Mr. Bowers said he requested additional funds from his board but was turned down. He stated that if the contract was amended to show the additional bills and he could take a copy of that back to his board, they would reconsider the request and may provide some extra money.

The committee discussed the limited funds available and the additional cost that would be involved with TCB, Inc. to finalize the DFCs for the remaining aquifers.

After discussion, the committee returned to Item No. 7.

7. ***Discussion and possible action to ratify adoption of proposed desired future conditions for the major and minor aquifers within GMA 8 as described above.***

Mr. Priddy made a motion to reconsider adopting the DFCs for the four aquifers—Trinity, Ellenburger-San Saba, Hickory, and Marble Falls, seconded by Mr. Cooper. The motion to reconsider passed with 7 votes in favor, 2 votes in opposition cast by Mr. Massey and Mr. Ament, and 1 vote in abstention by Mr. Westbrook.

The first aquifer up for reconsideration was the Trinity.

Mr. Priddy made a motion to adopt the DFCs for the Trinity aquifer, seconded by Mr. Kroll. The motion to adopt failed with 6 votes in favor, 3 votes in opposition, and 1 abstention. Opposing votes were cast by Mr. Bowers, Mr. Massey, and Mr. Ament. Mr. Westbrook abstained.

Mr. Bowers made a motion to table action on the DFCs for the four remaining aquifers (Trinity, Ellenburger-San Saba, Hickory, and Marble Falls) until the next meeting, seconded by Mr. Oliver. The motion to table failed with 5 votes in favor and 5 in

opposition. The opposing votes were cast by Mr. Kroll, Mr. Hamilton, Mr. Grace, Mr. Massey, and Mr. Westbrook.

The next aquifer up for reconsideration was the Ellenburger-San Saba.

Mr. Hamilton made a motion to adopt the DFCs for the Ellenburger-San Saba aquifer, seconded by Mr. Priddy. The motion to adopt failed with 4 votes in favor, 5 votes in opposition, and 1 abstention. The opposing votes were cast by Mr. Bowers, Mr. Massey, Mr. Ament, Mr. Cooper, and Mr. Oliver. Mr. Westbrook abstained.

The Hickory aquifer was the next aquifer up for reconsideration.

Mr. Bowers made a motion to deny adoption of the DFCs for the Hickory aquifer. There was no second to the motion so the motion died.

Mr. Hamilton made a motion to adopt the DFCs for the Hickory aquifer. There was no second to the motion so the motion died.

No motion was made to reconsider the DFCs for the Marble Falls aquifer.

The committee returned to Item No. 8.

8. Discussion and possible action to amend contract with TCB, Inc. to develop the desired future conditions for the aquifers in GMA 8.

Mr. Kroll made a motion to amend the contract to reflect the pledged amounts and then see if the other districts can contribute funds to compensate TCB, Inc. for the rest of their expenses, seconded by Mr. Priddy. The motion passed unanimously.

9. Discussion and possible action on renewal of interlocal agreement.

Mr. Hamilton advised the committee that his District will be voting against this. Mr. Kroll and Mr. Ament also advised that their Districts would not be supporting the interlocal agreement as well. (No other action was taken.)

10. Committee member comments.

There were no comments.

11. Discuss agenda items for next meeting

Discuss DFCs for the remaining aquifers.

12. Set date, time, and place of next meeting.

Next meeting to be determined.

Referring back to Agenda Item No. 7, Mr. Westbrook suggested the committee clarify that the administrator is to work with TCB, Inc. to submit the adopted DFCs to the Texas Water Development Board by the January 1, 2008.

Mr. Hamilton made a motion directing the GMA 8 administrator to submit the approved DFCs to the TWDB by January 1, 2008, seconded by Mr. Westbrook. The motion passed unanimously.

13. Closing comments.

No closing comments.

14. Adjourn.

Meeting was adjourned at 1:20pm.

(A digital recording of this meeting is available upon request.)

The GMA 8 Board unanimously approved the minutes on this 19th day of May, 2008.

ATTACHMENT "B"

RESOLUTION TO ADOPT DESIRED FUTURE CONDITIONS

FOR AQUIFER(S) IN GROUNDWATER MANAGEMENT AREA 8

THE STATE OF TEXAS	§
	§
GROUNDWATER MANAGEMENT AREA 8	§
	§
GROUNDWATER CONSERVATION DISTRICTS	§

WHEREAS, Texas Water Code § 36.108 requires the groundwater conservation districts located in whole or in part in a groundwater management area ("GMA") designated by the Texas Water Development Board to adopt desired future conditions for the relevant aquifers located within the management area;

WHEREAS, the groundwater conservation districts located wholly or partially within Groundwater Management Area 8 ("GMA 8"), as designated by the Texas Water Development Board, as of the date of this resolution are as follows: Central Texas Groundwater Conservation District, Clearwater Underground Water Conservation District, Fox Crossing Water District, McLennan County Groundwater Conservation District, Middle Trinity Groundwater Conservation District, Northern Trinity Groundwater Conservation District, Post Oak Savannah Groundwater Conservation District, Saratoga Underground Water Conservation District, Tablerock Groundwater Conservation District, and Upper Trinity Groundwater Conservation District (collectively hereinafter "the GMA 8 Districts");

WHEREAS, the GMA 8 Districts are each governmental agencies and bodies politic and corporate operating under Chapter 36, Water Code;

WHEREAS, the GMA 8 Districts desire to fulfill the requirements of Texas Water Code § 36.108 through mutual cooperation and joint planning efforts;

WHEREAS, the GMA 8 Districts have had numerous public meetings at which they have engaged in joint planning efforts to promote more comprehensive management of the aquifers located in whole or in part in Groundwater Management Area 8;

WHEREAS, the GMA 8 Districts may establish different desired future conditions for: (1) each aquifer, subdivision of an aquifer, or geologic strata located in whole or in part within the boundaries of GMA 8; or (2) each geographic area overlying an aquifer in whole or in part or subdivision of an aquifer within the boundaries of GMA 8;

WHEREAS, the GMA 8 Districts recognize that GMA 8 includes a geographically and hydrologically diverse area with a variety of land uses and a diverse mix of water users;

WHEREAS, the GMA 8 Districts have considered the relevant aquifers, subdivisions thereof, and geologic strata located in whole or in part within the boundaries of GMA 8, and have further considered the hydrogeologic characteristics of the same, as well as the various uses and users of groundwater produced from such aquifers, subdivisions, and strata;

WHEREAS, GMA 8 Districts held a meeting, which was open to the public, at 10:00 a.m. on Monday, May 19, 2008, in the Bellmead City Hall located at 3015 Bellmead Drive, Bellmead, Texas;

WHEREAS, notice of said May 19, 2008, meeting was properly given by each and all of the GMA 8 Districts in accordance with Chapter 36, Water Code, and Chapter 551, Government Code, and a true and correct copy of each of the notices has been attached hereto in Appendix A and is incorporated herein for all purposes;

WHEREAS, at least two-thirds of the GMA 8 Districts had a voting representative in attendance at said May 19, 2008, meeting in accordance with Section 36.108(d-1), Texas Water Code; to wit, the following districts had a voting representative in attendance at said meeting: Central Texas Groundwater Conservation District, Clearwater Underground Water Conservation District, Fox Crossing Water District, McLennan County Groundwater Conservation District, Middle Trinity Groundwater Conservation District, Northern Trinity Groundwater Conservation District, Post Oak Savannah Groundwater Conservation District, Saratoga Underground Water Conservation District, Tablerock Groundwater Conservation District, and Upper Trinity Groundwater Conservation District;

WHEREAS, it is the intent and purpose of the GMA 8 Districts by adoption of this resolution to fulfill the requirements of Texas Water Code § 36.108, including establishing "desired future conditions for the relevant aquifers" within GMA 8 for the specific aquifer(s) and desired future conditions described under "Appendix B" attached hereto and incorporated herein for all purposes;

WHEREAS, at said May 19, 2008, meeting, after motions were duly made and seconded that the GMA 8 Districts adopt this resolution establishing desired future conditions for the aquifer(s) described under "Appendix B", the motions prevailed by the following vote:

Ellenburger-San Saba, Hickory, Marble Falls: 10 Ayes and 0 Nays;

WHEREAS, in establishing these desired future conditions for the aquifer(s) set forth under Appendix B, the GMA 8 Districts have considered all of the criteria required by Chapter 36 of the Texas Water Code and other information, including without limitation groundwater availability models and runs of those models to determine the effects of various conditions and parameters, hydrogeologic reports available for the relevant aquifers, and other technical data and information;

WHEREAS, many of the groundwater availability models, runs, hydrogeologic reports, and other technical data and information considered and determined to be reliable sources of information by the GMA 8 Districts in establishing these desired future conditions for the aquifer(s) have been attached hereto or referenced in the documents attached hereto under Appendix B;

WHEREAS, in establishing these desired future conditions for the aquifer(s) set forth under Appendix B, the GMA 8 Districts have considered the uses and conditions of the aquifer(s) in different geographic areas within GMA 8 and what the effects and impacts of adopting such desired future conditions will have upon the condition of the aquifer(s) and the uses and users of groundwater from the aquifer(s) both now and in the future;

WHEREAS, after considering such anticipated effects and impacts these desired future conditions will have on the aquifer(s), uses, and users of groundwater, and considering all of the other criteria required by Chapter 36 of the Texas Water Code, including without limitation the groundwater resource management duties and responsibilities of the GMA Districts individually and collectively, the GMA 8 Districts have determined that the desired future conditions for the aquifer(s) set forth under Appendix B are reasonable;

NOW, THEREFORE, BE IT RESOLVED BY THE AUTHORIZED VOTING REPRESENTATIVES OF THE GMA 8 DISTRICTS AS FOLLOWS:

1. The above recitals are true and correct.

2. The authorized voting representatives of the GMA 8 Districts hereby establish the desired future conditions of the aquifer(s) as set forth in Appendix B by the vote reflected in the above recitals.

3. The GMA 8 Districts and their agents and representatives, individually and collectively, are further authorized to take any and all actions necessary to implement this resolution.

4. The desired future conditions of the aquifer adopted by the GMA 8 Districts and attached hereto shall be effective immediately and shall continue in effect until amended, superseded, or repealed.

AND IT IS SO ORDERED.

PASSED AND ADOPTED on this 19th day of May, 2008.

ATTEST:

Central Texas Groundwater Conservation District

Clearwater Underground Water Conservation District

Fox Crossing Water District

McLennan County Groundwater Conservation District

Middle Trinity Groundwater Conservation District

Northern Trinity Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

Saratoga Underground Water Conservation District

Tablerock Groundwater Conservation District

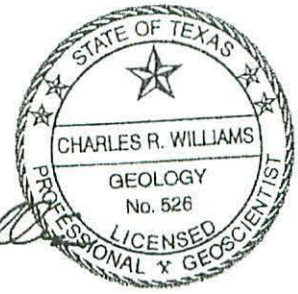
Upper Trinity Groundwater Conservation District

ATTACHMENTS
Appendix A: Copies of notices of May 19, 2008, meeting
Appendix B: Adopted Desired Future Conditions and supporting information

Appendix B

TCB
400 West 15th Street, Suite 500, Austin, Texas 78701
T 512.472.4519 F 512.472.7519 www.tcb.aecom.com

Memorandum



To: Cheryl Maxwell, Administrative Manager
Clearwater Underground Water Conservation District
Administrative Agent for Groundwater Management Area 8

From: Charles R. Williams, P.G. No. 526

Date: June 9, 2008

Re: Adopted Desired Future Conditions of the Ellenburger-San Saba, Hickory and Marble Falls Aquifers

Introduction

Groundwater Management Area 8 (GMA-8) is a groundwater management area of the State of Texas as defined by Statute with responsibility for developing a desired future condition (DFC) for aquifers within an approximately 46-County area. Membership of the GMA is composed of the groundwater conservation districts (GCDs) that occur all or in part within the GMA boundary. (Fig. 1) At the request of GMA-8, TCB Inc. (TCB) developed statements describing DFCs for the portions of the Ellenburger-San Saba, Hickory and Marble Falls Aquifers recognized by the Texas Water Development Board (TWDB) to occur in whole or in part within GMA-8. (Fig. 2)

Methodology

To predict the effects of pumping on the Ellenburger-San Saba and Marble Falls aquifers in Burnet and Lampasas Counties and the Hickory aquifer in Burnet County, TCB developed 2-D spreadsheet models. The models use estimates of the recharge area, annual rainfall, recharge rate, the saturated thickness of the aquifer and the effective porosity (specific yield) to predict the percentage of saturated thickness maintained after a specified time period for a range of simulated pumping amounts. Predictions may be made on a by-County basis or for the aquifer as a whole aquifer. The estimates of the recharge area for each aquifer are taken from the TWDB geographic information system (GIS) coverages. Estimates of the annual rainfall for each county were taken from National Oceanic and Atmospheric Agency (NOAA) data. Estimates of the recharge rates saturated thicknesses are from TWDB publications on the occurrence and availability of groundwater. (Muller and Price, 1979 and Bluntzer, 1992) Estimates of

effective porosities are based on representative value for aquifers of similar materials. (Driscoll, 1986) The time period for the predictions is 50 years.

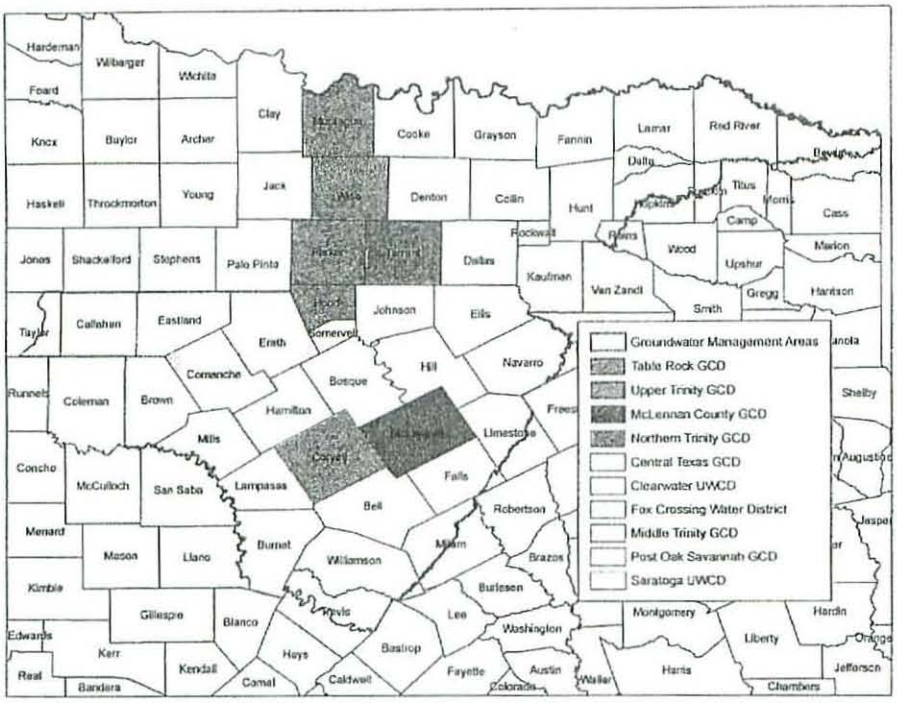


Figure 1, the Boundaries and Member GCDs of GMA-8

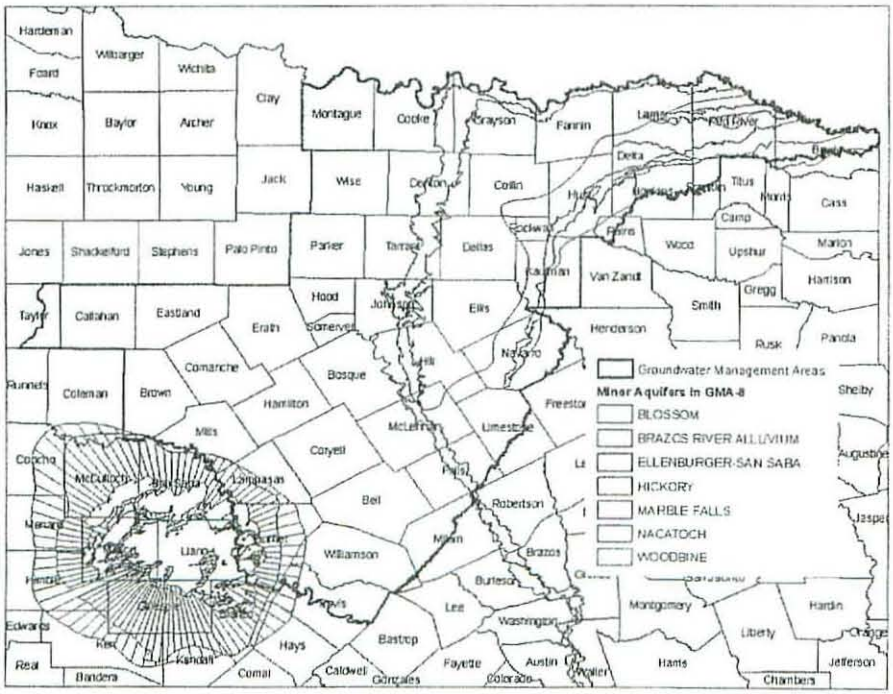


Figure 2, the Minor Aquifers of GMA-8

Where possible, for the portions of the Ellenburger-San Saba, Hickory and Marble Falls aquifers occurring within a GCD; the GCD selected the preferred percentage of aquifer saturated thickness to be maintained in the portion of the aquifer within its management. A DFC statement was developed describing the selected condition. For the portions of the Hickory aquifer outside of a GCD; no DFC was developed. The occurrence of the Hickory in those Counties is extremely deep and at the down-dip margin of the recognition of the aquifer; the Regional Water Plan (RWP) does not include an availability value for those areas.

Discussion

The purpose of the 2-D models is to conveniently predict the potential results of a range of predictive pumping amounts over time for aquifers where a TWDB GAM is not available. An assumption of the 2-D models is the aquifer is in unconfined condition. However, the 2-D models may be reasonably applicable to aquifers that have both an unconfined and a confined component if: either the confined (artesian pressured) portion of the aquifer is relatively limited in area or if pumping in the aquifer is reasonably confined to near the aquifer recharge zone for the area of interest. The Marble Falls aquifer is either in unconfined condition or pumping is believed to be limited to areas relatively near the recharge zone or outcrop area where it occurs in GMA-8. The Ellenburger-San Saba aquifer has recharge zone areas occurring in Burnet and Lampasas Counties of GMA-8; pumping is considered to be limited largely to the recharge zone and nearby vicinity due to the depth of the aquifer in down-dip areas. The 2-D model was applied to the Ellenburger-San Saba aquifer in Burnet and Lampasas Counties but was not applied to Mills County. The aquifer recharge zone does not occur in Mills County; only the extremely deep down-dip extent of the aquifer occurs in Mills County. The 2-D model was applied to the Hickory in Burnet County but was not applied to Mills and Lampasas Counties. The aquifer recharge zone does not occur in either Mills or Lampasas County; only the extremely deep down-dip extent of the aquifer occurs in these Counties.

The 2-D models project the effects of pumping using the following relationships:

The term Groundwater Availability is used to express the annual amount of pumping in the area of interest and is composed of two components;
Groundwater Availability = Groundwater Availability $_{Storage}$ + Groundwater Availability$_{Recharge}$

GWA = GWAS + GWAR

Where:
GWA = Groundwater availability (ac-ft/yr)
GWAS = Groundwater availability from storage (ac-ft/yr)
GWAR = Groundwater availability from recharge (ac-ft/yr)

GWAS = (1-DD)*B*A*N/Y/43560
Where:
DD = average percentage of drawdown maintained (%)
B = average saturated thickness of aquifer (ft)
A = area of aquifer (ft^2)

N = effective porosity
Y = time duration (yrs)

GWAR = P*A*R/43560

Where:
P = average yearly precipitation (ft/yr)
R = % precipitation that infiltrates into groundwater system

Equation: GWA = GWAS + GWAR = (1-DD)*B*A*N/Y/43560 + P*A*R/43560

DFC Development Approach

In GMA-8, the Marble Falls Aquifer occurs in 2 Counties. A GCD exists in both of the Counties. A County-specific model was applied for each GCD. After reviewing the model results the GCD selected the preferred percentage of aquifer saturated thickness to be maintained in the portion of the aquifer under its management. (Figs 3-6) A DFC statement was developed describing the selected condition for each County. Due to uncertainty regarding the inventory of springs producing water from the Marble Falls aquifer in Burnet County, the Central Texas GCD (CTGCD) preferred to maintain the saturated thickness of the aquifer by using only approximately 80 percent of the estimated annual recharge. (Table 1)

% of saturated thickness maintained	GW availability from storage (ac-ft/yr)	GW availability from recharge (ac-ft/yr)	Total GW availability (ac-ft/yr)
100%	0	1974	1974
99%	76	1974	2050
98%	152	1974	2125
97%	227	1974	2201
96%	303	1974	2277
95%	379	1974	2353
94%	455	1974	2429
93%	531	1974	2504
92%	606	1974	2580
91%	682	1974	2656
90%	758	1974	2732

Sat. Thickness	160	(ft)
Recharge Area	15790	(acres) =
Effective porosity	0.15	(fraction)
Time	50	(yr)
Rainfall Rate	2.5	(ft/yr)
Recharge Rate	0.05	(fraction)

Figure 3, Model Input Values and Tabular Results for the Marble Falls Aquifer in Burnet County (Central Texas GCD)

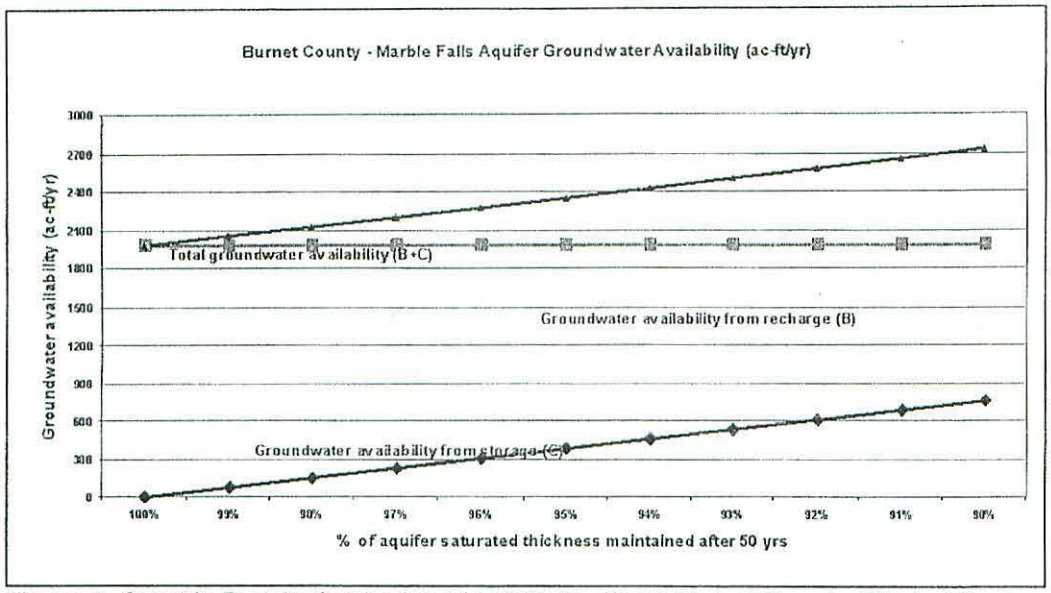


Figure 4, Graphic Results for the Marble Falls Aquifer in Burnet County (Central Texas GCD)

% of saturated thickness maintained	GW availability from storage (ac-ft/yr)	GW availability from recharge (ac-ft/yr)	Total GW availability (ac-ft/yr)
100%	0	2095	2095
99%	78	2095	2173
98%	155	2095	2251
97%	233	2095	2328
96%	311	2095	2406
95%	388	2095	2484
94%	466	2095	2561
93%	544	2095	2639
92%	621	2095	2717
91%	699	2095	2794
90%	777	2095	2872

Sat. Thickness	160	(ft)	
Recharge Area	16180	(acres)	=
Effective porosity	0.15	(fraction)	
Time	50	(yr)	
Rainfall Rate	2.59	(ft/yr)	
Recharge Rate	0.05	(fraction)	

Figure 5, Model Input Values and Tabular Results for the Marble Falls Aquifer in Lampasas County (Saratoga UWCD)

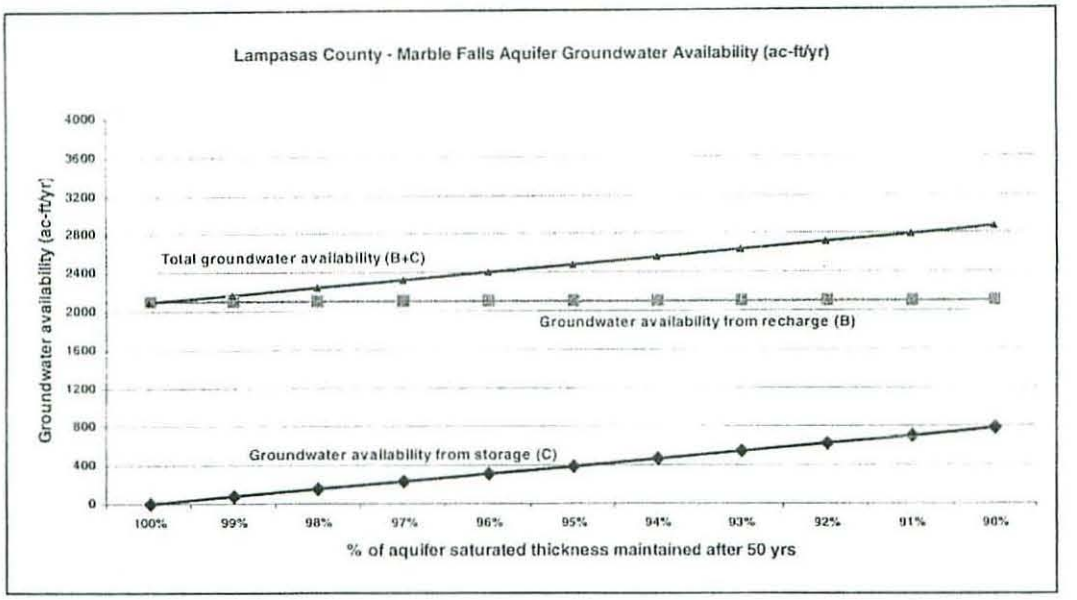


Figure 6, Graphic Results for the Marble Falls Aquifer in Lampasas County (Saratoga UWCD)

County	GMA-8 Marble Falls Aquifer Estimated Recharge (acre-feet per year)
Burnet	1,974
80%	**1,579**

Table 1, Estimated Recharge for the Marble Falls Aquifer in Burnet County

In GMA-8, the Ellenburger-San Saba Aquifer occurs in 4 Counties. A GCD exists in 3 of the 4 Counties. A County-specific model was applied for the CTGCD (Burnet County) and the Saratoga GCD (SUWCD) (Lampasas County). No model was developed for the aquifer in Mills County (Fox Crossing Water District) and Brown County because they are at the extreme down-dip edge of the aquifer. After reviewing the model results the CTGCD and SUWCD selected the preferred percentage of aquifer saturated thickness to be maintained in the portion of the aquifer under its management. (Figs 7-10) A DFC statement was developed describing the selected condition for each County. Due to uncertainty regarding the inventory of springs producing water from the Ellenburger-San Saba aquifer in Burnet County, CTGCD chose to maintain the saturated thickness of the aquifer by using approximately 80 percent of the estimated annual recharge. (Table 2)

% of saturated thickness maintained	GW availability from storage (ac-ft/yr)	GW availability from recharge (ac-ft/yr)	Total GW availability (ac-ft/yr)
100%	0	5521	5521
99%	1656	5521	7177
98%	3312	5521	8833
97%	4969	5521	10489
96%	6625	5521	12145
95%	8281	5521	13802
94%	9937	5521	15458
93%	11593	5521	17114
92%	13250	5521	18770
91%	14906	5521	20426
90%	16562	5521	22083

Sat. Thickness	500	(ft)
Recharge Area	110,413	(acres) =
Effective porosity	0.15	(fraction)
Time	50	(yr)
Rainfall Rate	2.5	(ft/yr)
Recharge Rate	0.02	(fraction)

Figure 7, Model Input Values and Tabular Results for the Ellenburger-San Saba Aquifer in Burnet County (Central Texas GCD)

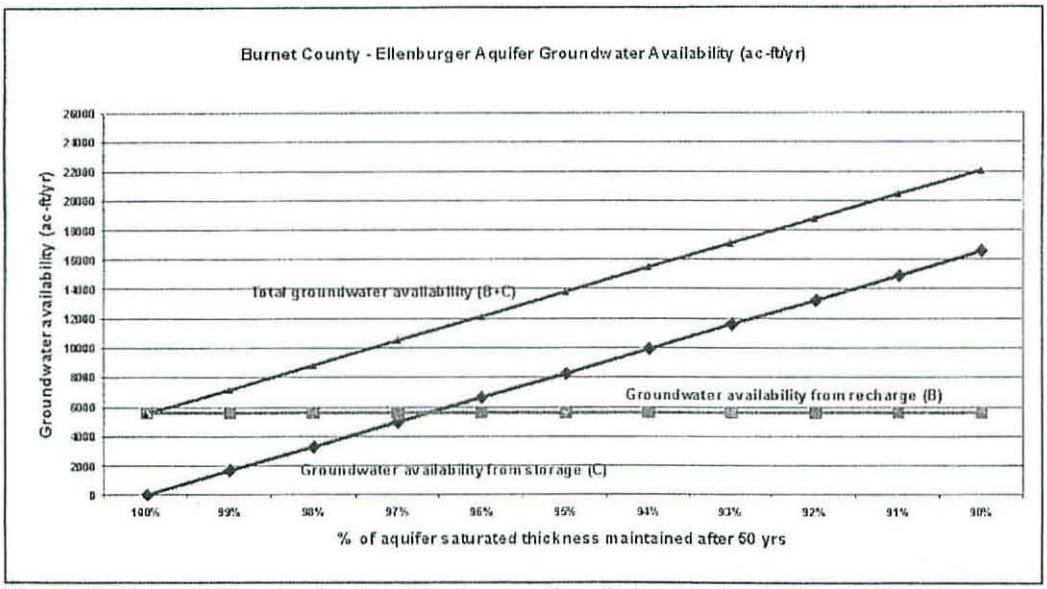


Figure 8, Graphic Results for the Ellenburger-San Saba Aquifer in Burnet County (Central Texas GCD)

County	GMA-8 Ellenburger-San Saba Aquifer Estimated Recharge (acre-feet per year)
Burnet	5,521
80%	**4,417**

Table 2, Estimated Recharge for the Ellenburger-San Saba Aquifer in Burnet County

% of saturated thickness maintained	GW availability from storage (ac-ft/yr)	GW availability from recharge (ac-ft/yr)	Total GW availability (ac-ft/yr)
100%	0	601	601
99%	174	601	775
98%	348	601	949
97%	522	601	1123
96%	696	601	1297
95%	870	601	1471
94%	1044	601	1645
93%	1218	601	1819
92%	1392	601	1993
91%	1566	601	2167
90%	1740	601	2341

Sat. Thickness	500	(ft)
Recharge Area	11599	(acres) =
Effective porosity	0.15	(fraction)
Term	50	(yr)
Rainfall Rate	2.59	(ft/yr)
Recharge Rate	0.02	(fraction)

Figure 9, Model Input Values and Tabular Results for the Ellenburger-San Saba Aquifer in Lampasas County (Saratoga UWCD)

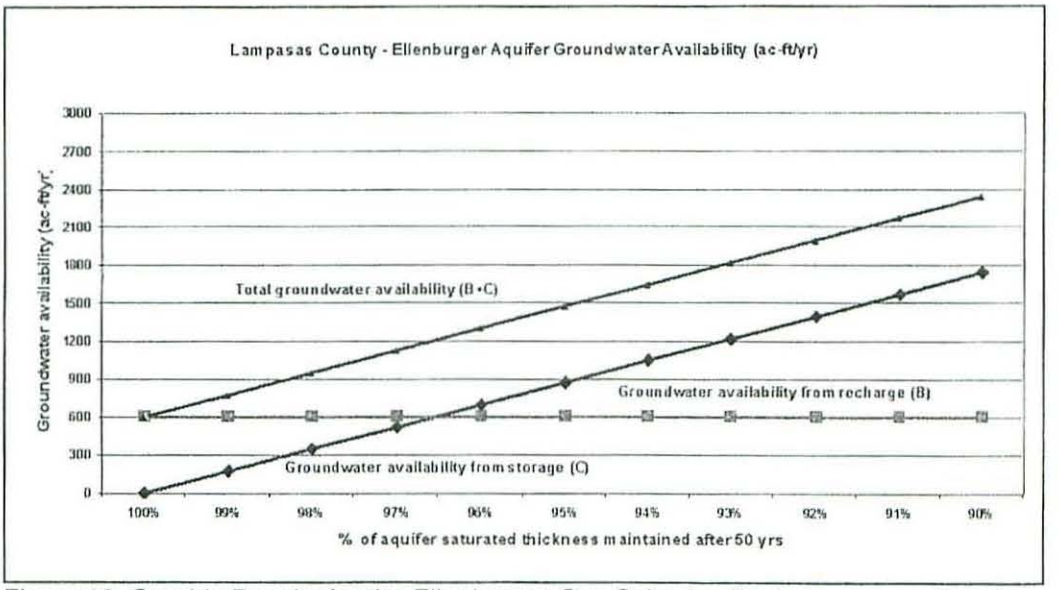


Figure 10, Graphic Results for the Ellenburger-San Saba Aquifer in Lampasas County (Saratoga UWCD)

In GMA-8, the Hickory Aquifer occurs in 6 Counties. A GCD exists in 3 of the 6 Counties. A County-specific model was applied for the CTGCD (Burnet County). No model was developed for the aquifer in Mills County (Fox Crossing Water District), Lampasas County (SUWCD), Brown, Travis and Williamson Counties because these areas are at the extreme down-dip edge of the aquifer. After reviewing the model results CTGCD

selected the preferred percentage of aquifer saturated thickness to be maintained in the portion of the aquifer under its management. (Figs. 11, 12) A DFC statement was developed describing the selected condition for each County. Due to uncertainty regarding the inventory of springs producing water from the Hickory aquifer in Burnet County, the CTGCD preferred to maintain the saturated thickness of the aquifer by using approximately 80 percent of the estimated annual recharge. (Table 3)

% of saturated thickness maintained	GW availability from storage (ac-ft/yr)	GW availability from recharge (ac-ft/yr)	Total GW availability (ac-ft/yr)
100%	0	4503	4503
99%	86	4503	4589
98%	173	4503	4676
97%	259	4503	4762
96%	346	4503	4849
95%	432	4503	4935
94%	519	4503	5021
93%	605	4503	5108
92%	692	4503	5194
91%	778	4503	5281
90%	865	4503	5367

Sat. Thickness	160	(ft)
Recharge Area	18011	(acres) =
Effective porosity	0.15	(fraction)
Time	50	(yr)
Rainfall Rate	2.5	(ft/yr)
Recharge Rate	0.1	(fraction)

Figure 11, Model Input Values and Tabular Results for the Hickory Aquifer in Burnet County (Central Texas GCD)

County	GMA-8 Hickory Aquifer Estimated Recharge (acre-feet per year)
Burnet	4,503
80%	**3,602**

Table 3, Estimated Recharge for the Ellenburger-Hickory Aquifer in Burnet County

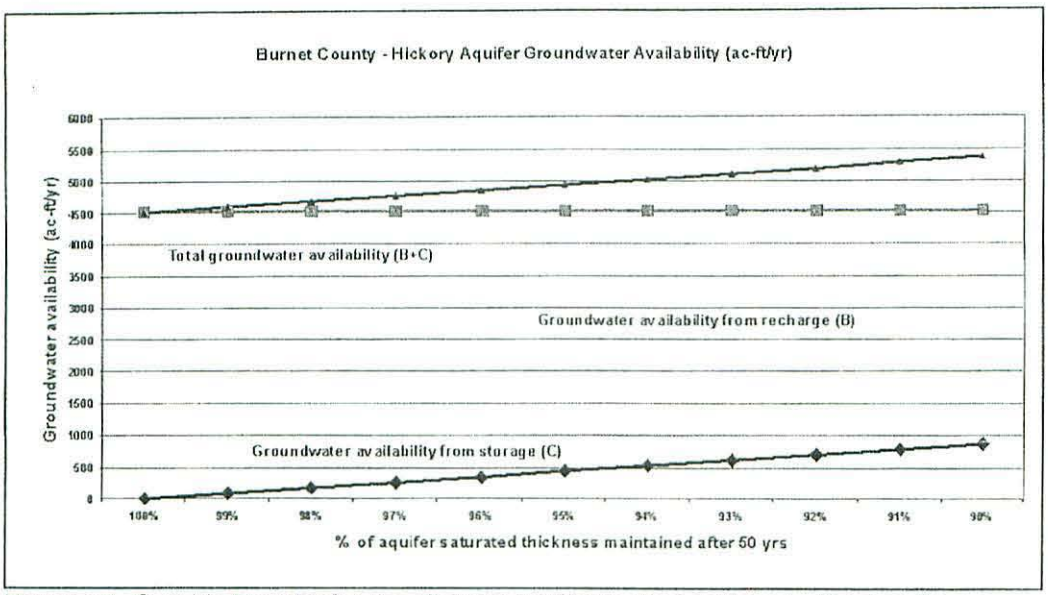


Figure 12, Graphic Results for the Hickory Aquifer in Burnet County (Central Texas GCD)

GMA-8 recognized of the limitations of the 2-D models in being applied to the extreme down-dip portion of the aquifer in confined condition under artesian pressure. As a result, GMA-8 considered several options for adoption of a DFC for the Hickory aquifer in Brown, Lampasas (Saratoga UWCD), Mills (Fox Crossing Water District), Travis and Williamson Counties. The same options for DFC adoption were considered for the Ellenburger-San Saba aquifer in Brown, Lampasas (Saratoga UWCD) and Mills (Fox Crossing Water District) Counties. The options for DFC adoption considered by GMA-8 were as follows:

1. The GMA could designate the areas that could not be addressed by the 2-D models as "down-dip slivers" of the aquifer and decline to specify a DFC for those areas of the Ellenburger-San Saba and Hickory aquifers.

2. The GMA could opt to follow (or extend) the DFC that may be adopted for the Ellenburger-San Saba and Hickory aquifers by GMA-7 at such time as a DFC for those aquifers may be adopted by GMA-7.

3. The GMA could opt to follow (or extend) the DFC that may be adopted for the Ellenburger-San Saba and Hickory aquifers by GMA-7 with exception of Burnet and Lampasas Counties in the Ellenburger-San Saba aquifer and Burnet County in the Hickory aquifer. In Burnet and Lampasas Counties; the 2-D model based DFCs previously developed by GMA-8 would be used.

4. The GMA could determine that the 2-D model-based DFCs previously developed by GMA-8 for the Ellenburger-San Saba aquifer in Burnet and Lampasas Counties and Burnet County in the Hickory aquifer would be used. The GMA could then specify a DFC (or DFCs) for the remaining areas in the Ellenburger-San Saba and Hickory aquifers to be submitted to TWDB. TWDB would then determine the Managed Available Groundwater (MAG) based on the DFC or DFCs specified for each aquifer using a methodology other than the 2-D models.

After holding a public hearing and consideration of the 4 identified options in a public meeting; GMA-8 selected option 4 for submittal of DFCs for the Paleozoic-age minor aquifers. After selecting the method of DFC submittal GMA-8 then deliberated on the aquifer measure to be used in describing a DFC for the Paleozoic-age minor aquifers. GMA-8 considered and selected maintenance of a specified percentage of the available draw down of the Hickory and Ellenburger-San Saba aquifers after 50-years in the applicable counties or GCDs. Having selected maintenance of a specified the aquifer available draw down after 50-years; GMA-8 then considered the percentage of the aquifer available draw down to be maintained. After deliberation, GMA-8 determined that 90 percent of the available draw down in the Hickory and Ellenburger-San Saba aquifers in the applicable counties or GCDs should be maintained after 50-years.

GMA-8 Desired Future Conditions for the Marble Falls Aquifer

- Burnet County should maintain approximately100 percent of the saturated thickness after 50 years by using approximately 80 percent of the estimated recharge.
- Lampasas County should maintain approximately 90 percent of the saturated thickness after 50 years.

GMA-8 Desired Future Conditions for the Ellenburger-San Saba Aquifer

- Burnet County should maintain approximately100 percent of the saturated thickness after 50 years by using approximately 80 percent of the estimated recharge.
- Lampasas County should maintain approximately 90 percent of the saturated thickness after 50 years.,
- Brown and Mills Counties should maintain approximately 90 percent of the available draw down after 50 years.

GMA-8 Desired Future Conditions for the Hickory Aquifer

- Burnet County pumping should maintain approximately100 percent of the saturated thickness after 50 years by using approximately 80 percent of the estimated recharge.
- Brown, Lampasas, Mills, Travis and Williamson Counties should maintain approximately 90 percent of the available draw down after 50 years.

Note: The observations and assessments made in this report were based on data supplied by CUWCD, TWDB or available from referenced published sources available at the time the report preparation. The conclusions drawn in the report are based on the available data and reasonable methods of assessment. The Desired Future Conditions presented in this report reflect policy decisions made by GMA-8. If new or different data is made available the conclusions of this report may change.

Bibliography

Bluntzer, Robert, 1992; evaluation of the Ground-Water Resources of the Paleozoic and Cretaceous Aquifers in the Hill County of Central Texas, Texas Water Development Board Report 339

Driscoll, Fletcher, 1986; Groundwater and Wells, Second Edition; Johnson Division; ISBN 0-9616456-0-1

Muller, Daniel and Price, Robert, 1979; Ground-Water Availability in Texas; Texas Water Development Board Report 238

Meeting of the

Groundwater Management Area 8

May 19, 2008 in Bellmead, TX

Minutes

The Groundwater Management Area 8 consisting of the Central Texas Groundwater Conservation District (GCD), Clearwater Underground Water Conservation District (UWCD), Fox Crossing Water District (WD), McLennan County GCD, Middle Trinity GCD, Northern Trinity GCD, Post Oak Savannah GCD, Saratoga UWCD, Tablerock GCD, and Upper Trinity GCD held a meeting on Monday, May 19, 2008 in the City of Bellmead City Council Room, located at 3015 Bellmead Drive, Bellmead, Texas.

Groundwater District Representatives Present:

Central Texas GCD: Richard Bowers	Northern Trinity GCD: Jim Oliver
Clearwater UWCD: Horace Grace	Post Oak Savannah GCD: Dwayne Jekel
Fox Crossing WD: Jerry Priddy	Saratoga UWCD: Dave Hamilton
McLennan Co. GWCD: Rodney Kroll	Tablerock GCD: Wyllis Ament
Middle Trinity GCD: Joe Cooper	Upper Trinity GCD: Mike Massey

1. Invocation

Mike Massey gave the invocation

2. Call meeting to order and establish quorum.

The Groundwater Management Area 8 meeting was called to order at 10:08 a.m. at the City of Bellmead City Council Chambers. Horace Grace called roll and established that a quorum was present. All districts were represented.

3. Welcome and introductions.

Horace Grace gave an overview of the GMA process to the members of the audience. Members of the audience were then asked to introduce themselves.

4. Public Comments.

There was no public comment.

Joe Cooper announced that he was proud of the progress GMA 8 has made toward moving ahead with reporting desired future conditions (DFC) to the Texas Water Development Board.

Mike Massey expressed gratitude to the GMA 8 board for the time that they have given for he and his board, along with the other newly established districts, to become educated on their respective district's water issues and needs.

5. Approve minutes of December 17, 2007 GMA 8 meeting.

Richard Bowers moved to approve the minutes of the December 17, 2007 GMA 8 meeting, seconded by Joe Cooper. The motion carried unanimously, 10-0.

6. Update from the Texas Water Development Board on the GMA joint planning process.

Robert Bradley with the Texas Water Development Board (TWDB) addressed the GMA 8 board and announced that GMA 10 was moving forward with establishing DFCs for their region including setting the public hearing date in June to adopt DFCs. He also noted that there were several GMAs waiting for GAM runs from TWDB. GMA 7 was reviewing runs; GMA 9 was establishing stakeholder groups at UT at Austin; GMA 12 has had to postpone meetings due to health issues; and GMA 11 districts were getting together to start work on developing DFCs.

Overall the TWDB reported that they currently had 50 groundwater availability models (GAM) to review.

7. Presentation on proposed desired future conditions for the following minor aquifers within GMA 8: Ellenburger-San Saba, Hickory, and Marble Falls.

Randy Williams addressed the committee and reported that in the past the committee has used the 2 dimensional (2-D) model to determine DFCs and this method has worked well in the GMA 8 area. However, it does not seem to be the case for the Paleozoic aquifers. He noted that in order for the 2-D model to be effective in determining the DFC it needs to be near or in the recharge zone.

In regards to the Mills and Brown Counties aquifers, there are tips or "slivers" that are not addressed in these 2-D models. Therefore, Mr. Williams developed four (4) options for the board to consider.

These options as presented were:

1. Declare those areas as downdip slivers.
2. Follow the DFCs set by another GMA that the aquifer is in. (Mr. Williams asked the board to consider that there was uncertainty about GMA 7 making the state deadline and at this point they do not know what the DFC would be.)
3. Follow or extend the DFC adopted for GMA 7 except for Burnet and Lampasas Counties (use the 2-D model based DFC previously developed by GMA 8).
4. Determine that the 2-D model-based DFCs previously developed by GMA 8 for the Ellenburger-San Saba aquifer in Burnet and Lampasas Counties and Burnet County in the Hickory aquifer would be used. The GMA could then specify a DFC for the remaining areas in the Ellenburger-San Saba and Hickory aquifers to be submitted to TWDB. TWDB would then determine the MAG using other methodology than the 2-D models.

Randy Williams recommended that the committee approve option 4.

The committee discussed options and moved forward to the public hearing item.

8. <u>Public hearing</u> on proposed desired future conditions for the minor aquifers described above.

Horace Grace clarified that the committee had entered a public hearing at 10:39 a.m. and explained the purpose of the public hearing.

No comments or questions were made by the public on this item.

Horace Grace closed the public hearing at 10:40 a.m.

9. Discussion and possible action to adopt proposed desired future conditions for the minor aquifers described above.

Dave Hamilton moved to adopt the DFCs for the Marble Falls, Ellenburger-San Saba and Hickory aquifers as previously stated, seconded by Richard Bowers. The motion carried, 10-0.

Dave Hamilton then moved to use option #4 to develop DFCs for those areas where the 2-D models could not be applied, with a goal of maintaining 90% of the available drawdown in these aquifers, seconded by Richard Bowers. The motion carried, 10-0.

10. Discussion regarding status of desired future conditions for the Trinity aquifer.

Joe Cooper commented that he would like to revise his numbers and redistribute pumping before making a decision on the Trinity DFC for his area.

(Joe Cooper left meeting at approximately 10:57 a.m.)

Mike Massey noted that Northern Trinity and Upper Trinity GCDs need to work on their numbers and have planned to meet on June 12th for that purpose.

Horace Grace pointed out that the numbers are not permanent and that the GAM runs are models, just tools, not actual data to aid in the DFC determination process.

Wyllis Ament said that he appreciated the workshop that was held with the surrounding counties to help out in his determination of DFCs for his area.

Mike Massey gave a brief explanation of the origin of their numbers.

Cindy Ridgeway, TWDB, commented that the GMA 8 committee's decision on the Trinity may affect the Woodbine due to intermingling.

Sam Beaumont, Fox Crossing WD, noted that all of the district that are involved with the GMA 8 process are developing the DFCs for the whole GMA 8 area and if there is a water shortfall then there are two options. Option one is that the districts will stop permitting within that aquifer and the second option is that the Regional Water Planning Group (RWPG) will have to find a solution and develop a strategy to resolve the shortfall.

Horace Grace reiterated that setting the DFC is the first stage of the planning process. Not getting everything exactly right on the first trial is okay. The GMA 8 committee will be required to review these figures in five years and can opt to review it sooner than that at any time if they so desire. He stated that it is the job of the committee to protect the recharge area of these aquifers.

11. Update on managed available groundwater figures for the Edwards BFZ aquifer.

Randy Williams, TCB Inc., reported that he would get these figures to Clearwater to review and then make available to GMA 8.

12. Discussion and possible action to amend contract to approve additional work previously conducted by TCB, Inc. to develop the desired future conditions for the aquifers in GMA 8.

Richard Bowers moved to amend the contract to approve additional work previously conducted by TCB, Inc. to develop the desired future conditions for the aquifers in GMA 8, seconded by Jim Oliver. The motion carried, 9-0.

13. Committee member comments.

Rodney Kroll reported that the Texas Commission on Environmental Quality (TCEQ) has been holding meetings with counties in the proposed Central Texas Priority Groundwater Management Area (PGMA) and informing them that the plan is to form one or two multi-county districts within the PGMA and that they plan to create more PGMAs in the Metroplex area. Wyllis Ament commented that he certainly foresees having to join a multi-county district sooner rather than later.

Rodney Kroll noted that McLennan County GCD would not be holding a confirmation election due to the high election cost.

Wyllis Ament said that Tablerock GCD is still planning on moving forward with a confirmation election.

Richard Bowers commented that he attended the meetings in Waco and urges the McLennan County GCD to get confirmed. Wyllis Ament supported Mr. Bowers' comment and added that the confirmation would get the district out of the PGMA, therefore giving the district more options and allow them more control.

Mike Massey reported that Upper Trinity GCD formed due to PGMA designation and encouraged McLennan County GCD to confirm.

Jerry Priddy announced that this would be his last time to represent Fox Crossing WD on this committee.

Wyllis Ament commented on his appreciation for the committee's patience in allowing the new district to get a handle on some of their individual challenges.

14. Discuss agenda items for next meeting

Trinity figures for new GAM run.

15. Set date, time, and place of next meeting.

Next meeting to be determined.

16. Adjourn.

Meeting was adjourned at 12:06 p.m.

The GMA 8 Committee unanimously approved the minutes on this 17th day of September, 2008.

ATTACHMENT "C"

RESOLUTION TO ADOPT DESIRED FUTURE CONDITIONS

FOR AQUIFER(S) IN GROUNDWATER MANAGEMENT AREA 8

THE STATE OF TEXAS	§
	§
GROUNDWATER MANAGEMENT AREA 8	§
	§
GROUNDWATER CONSERVATION DISTRICTS	§

WHEREAS, Texas Water Code § 36.108 requires the groundwater conservation districts located in whole or in part in a groundwater management area ("GMA") designated by the Texas Water Development Board to adopt desired future conditions for the relevant aquifers located within the management area;

WHEREAS, the groundwater conservation districts located wholly or partially within Groundwater Management Area 8 ("GMA 8"), as designated by the Texas Water Development Board, as of the date of this resolution are as follows: Central Texas Groundwater Conservation District, Clearwater Underground Water Conservation District, Fox Crossing Water District, McLennan County Groundwater Conservation District, Middle Trinity Groundwater Conservation District, Northern Trinity Groundwater Conservation District, Post Oak Savannah Groundwater Conservation District, Saratoga Underground Water Conservation District, Tablerock Groundwater Conservation District, and Upper Trinity Groundwater Conservation District (collectively hereinafter "the GMA 8 Districts");

WHEREAS, the GMA 8 Districts are each governmental agencies and bodies politic and corporate operating under Chapter 36, Water Code;

WHEREAS, the GMA 8 Districts desire to fulfill the requirements of Texas Water Code § 36.108 through mutual cooperation and joint planning efforts;

WHEREAS, the GMA 8 Districts have had numerous public meetings at which they have engaged in joint planning efforts to promote more comprehensive management of the aquifers located in whole or in part in Groundwater Management Area 8;

WHEREAS, the GMA 8 Districts may establish different desired future conditions for: (1) each aquifer, subdivision of an aquifer, or geologic strata located in whole or in part within the boundaries of GMA 8; or (2) each geographic area overlying an aquifer in whole or in part or subdivision of an aquifer within the boundaries of GMA 8;

WHEREAS, the GMA 8 Districts recognize that GMA 8 includes a geographically and hydrologically diverse area with a variety of land uses and a diverse mix of water users;

WHEREAS, the GMA 8 Districts have considered the relevant aquifers, subdivisions thereof, and geologic strata located in whole or in part within the boundaries of GMA 8, and have further considered the hydrogeologic characteristics of the same, as well as the various uses and users of groundwater produced from such aquifers, subdivisions, and strata;

WHEREAS, GMA 8 Districts held a meeting, which was open to the public, at 10:00 a.m. on Wednesday, September 17, 2008, in the Mills County State Bank Community Room located at 1101 Parker Street, Goldthwaite, Texas;

WHEREAS, notice of said September 17, 2008, meeting was properly given by each and all of the GMA 8 Districts in accordance with Chapter 36, Water Code, and Chapter 551, Government Code, and a true and correct copy of each of the notices has been attached hereto in Appendix A and is incorporated herein for all purposes;

WHEREAS, at least two-thirds of the GMA 8 Districts had a voting representative in attendance at said September 17, 2008, meeting in accordance with Section 36.108(d-1), Texas Water Code; to wit, the following districts had a voting representative in attendance at said meeting: Central Texas Groundwater Conservation District, Clearwater Underground Water Conservation District, Fox Crossing Water District, McLennan County Groundwater Conservation District, Middle Trinity Groundwater Conservation District, Northern Trinity Groundwater Conservation District, Post Oak Savannah Groundwater Conservation District, Saratoga Underground Water Conservation District, Tablerock Groundwater Conservation District, and Upper Trinity Groundwater Conservation District;

WHEREAS, it is the intent and purpose of the GMA 8 Districts by adoption of this resolution to fulfill the requirements of Texas Water Code § 36.108, including establishing "desired future conditions for the relevant aquifers" within GMA 8 for the specific aquifer(s) and desired future conditions described under "Appendix B" attached hereto and incorporated herein for all purposes;

WHEREAS, at said September 17, 2008, meeting, after a motion was duly made and seconded that the GMA 8 Districts adopt this resolution establishing desired future conditions for the aquifer described under "Appendix B", the motion prevailed by the following vote:

Trinity Aquifer: 10 Ayes and 0 Nays;

WHEREAS, in establishing these desired future conditions for the aquifer(s) set forth under Appendix B, the GMA 8 Districts have considered all of the criteria required by Chapter 36 of the Texas Water Code and other information, including without limitation groundwater availability models and runs of those models to determine the effects of various conditions and parameters, hydrogeologic reports available for the relevant aquifers, and other technical data and information;

WHEREAS, many of the groundwater availability models, runs, hydrogeologic reports, and other technical data and information considered and determined to be reliable sources of information by the GMA 8 Districts in establishing these desired future conditions for the aquifer(s) have been attached hereto or referenced in the documents attached hereto under Appendix B;

WHEREAS, in establishing these desired future conditions for the aquifer(s) set forth under Appendix B, the GMA 8 Districts have considered the uses and conditions of the aquifer(s) in different geographic areas within GMA 8 and what the effects and impacts of adopting such desired future conditions will have upon the condition of the aquifer(s) and the uses and users of groundwater from the aquifer(s) both now and in the future;

WHEREAS, after considering such anticipated effects and impacts these desired future conditions will have on the aquifer(s), uses, and users of groundwater, and considering all of the other criteria required by Chapter 36 of the Texas Water Code, including without limitation the groundwater resource management duties and responsibilities of the GMA Districts individually and collectively, the GMA 8 Districts have determined that the desired future conditions for the aquifer(s) set forth under Appendix B are reasonable;

NOW, THEREFORE, BE IT RESOLVED BY THE AUTHORIZED VOTING REPRESENTATIVES OF THE GMA 8 DISTRICTS AS FOLLOWS:

1. The above recitals are true and correct.

2. The authorized voting representatives of the GMA 8 Districts hereby establish the desired future conditions of the aquifer(s) as set forth in Appendix B by the vote reflected in the above recitals.

3. The GMA 8 Districts and their agents and representatives, individually and collectively, are further authorized to take any and all actions necessary to implement this resolution.

4. The desired future conditions of the aquifer adopted by the GMA 8 Districts and attached hereto shall be effective immediately and shall continue in effect until amended, superseded, or repealed.

AND IT IS SO ORDERED.

PASSED AND ADOPTED on this 17th day of September, 2008.

ATTEST:

Central Texas Groundwater Conservation District

Clearwater Underground Water Conservation District

Fox Crossing Water District

McLennan County Groundwater Conservation District

Middle Trinity Groundwater Conservation District

Northern Trinity Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

Saratoga Underground Water Conservation District

Tablerock Groundwater Conservation District

Upper Trinity Groundwater Conservation District

ATTACHMENTS
Appendix A: Copies of notices of September 17, 2008, meeting
Appendix B: Adopted Desired Future Conditions and supporting information

Appendix B

TCB
400 West 15th Street, Suite 500, Austin, Texas 78701
T 512.472.4519 F 512.472.7519 www.tcb.aecom.com

Memorandum

To: Cheryl Maxwell, Administrative Manager
Clearwater Underground Water Conservation District
Administrative Agent for Groundwater Management Area 8

From: Charles R. Williams, P.G. No. 526

Date: October 3, 2008

Re: Desired Future Conditions of N. Trinity Aquifer

Introduction

Groundwater Management Area 8 (GMA-8) is a groundwater management area of the State of Texas as defined by Statute with responsibility for developing a desired future condition (DFC) for aquifers within an approximately 46-County area. Membership of the GMA is composed of the groundwater conservation districts (GCDs) that occur all or in part within the GMA boundary. (Fig. 1) At the request of GMA-8, TCB Inc. (TCB) developed statements describing DFCs for the portions of the northern segment of the Trinity aquifer and the Woodbine aquifer that occur within the bounds of GMA-8. (Figs. 2 and 3)

Methodology

Clearwater Underground Water Conservation District (CUWCD) previously assessed groundwater availability in the N. Trinity aquifer of Bell County, using the Texas Water Development Board (TWDB) groundwater availability model for the N. Trinity and Woodbine aquifers (GAM). (Bene, Hardin and others, 2004) Central Texas GCD (CTGCD) later assessed the availability of groundwater in the N. Trinity aquifer of Burnet County in a similar GAM application incorporating CUWCD predictive pumping data. Saratoga Underground Water Conservation District (SUWCD) previously requested TWDB to make a series of GAM runs. GMA-8 used the CUWCD, SUWCD and CTGCD experience in adopting preferred metrics for the N. Trinity and Woodbine aquifer DFCs. Groundwater use data from TWDB, previous Regional Water Plan (RWP) assessments of availability were collected. New projections of Trinity and Woodbine aquifer pumping were considered. (Bene, Hardin and others, 2007) GMA-8 requested TWDB to perform a run of the GAM and provide a report the results to GMA-8. GMA-8 used information given in the TWDB report to develop requests for 2 additional GAM runs and provide a

report to GMA-8. (Donnelly, 2007) GMA-8 considered the results of the additional GAM runs. (Wade, 2007) Various members of GMA-8 submitted additional GAM-run requests to TWDB. GMA-8 developed DFCs for the N. Trinity and Woodbine aquifers based on the GAM-run results.

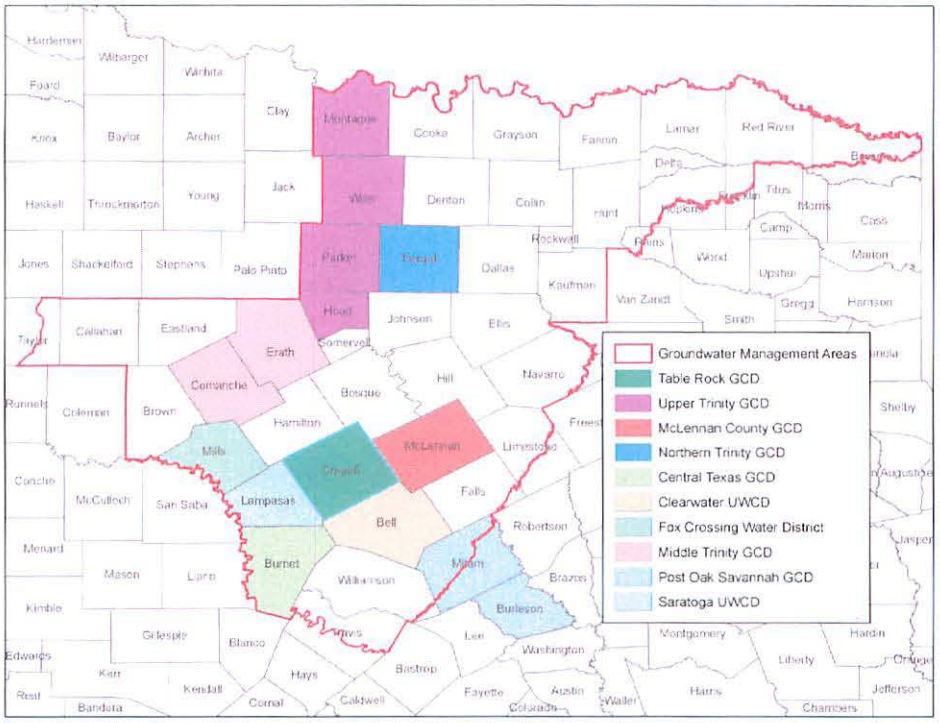


Figure 1, the Boundaries and Member GCDs of GMA-8

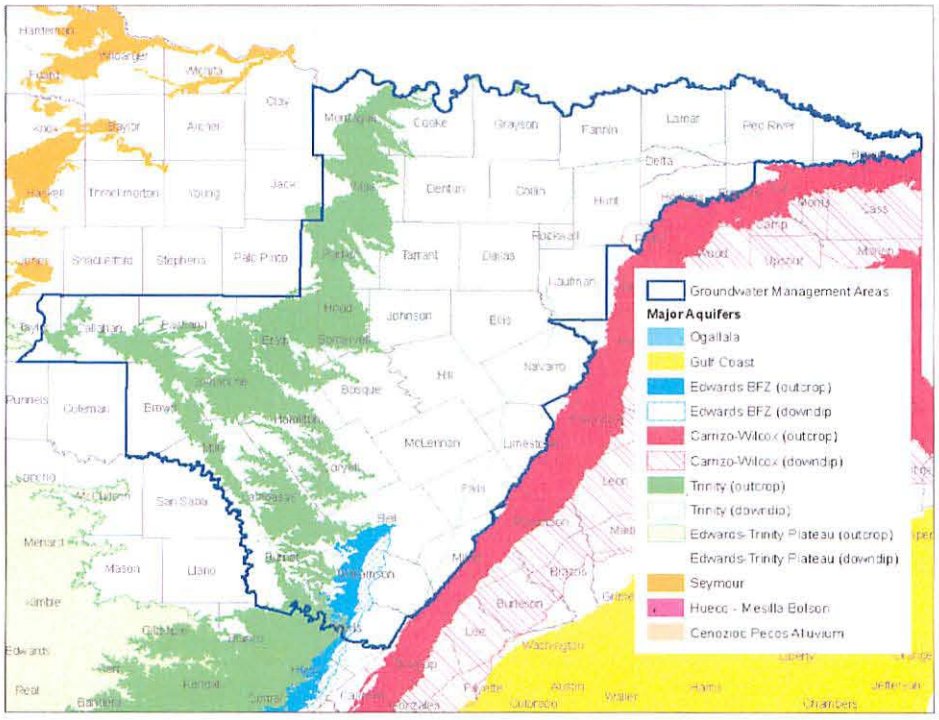


Figure 2, the Major Aquifers of GMA-8

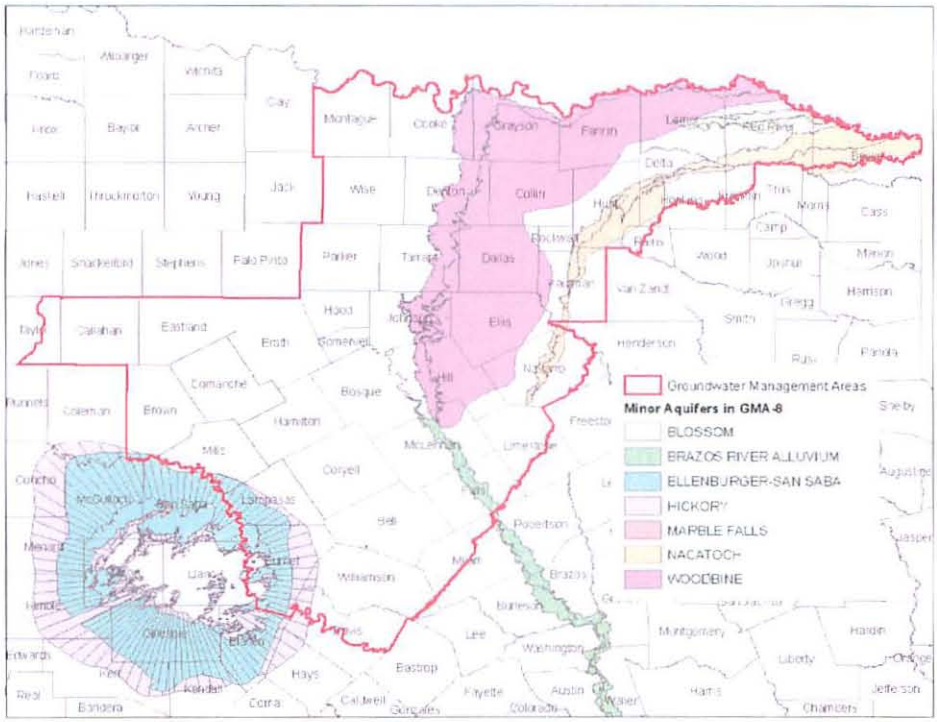


Figure 3, the Minor Aquifers of GMA-8

Discussion

The Trinity aquifer consists of three hydrologic subdivisions. Each subdivision may consist of one or more geologic units. The GAM consists of 7 layers representing the Woodbine and Trinity aquifers. Each layer in the GAM may represent an aquifer, an aquitard, or a subdivision of an aquifer. (Table 1) The pumping simulated in the GAM may be changed for each GAM run with respect to the amount of pumping applied to each layer and the spatial distribution of the pumping, if desired. Changes in the amount of pumping may be made to each layer individually, if desired, for a specific GAM run. Changes may be made to all layers collectively or to one layer while the others layers remain unchanged in successive runs.

The 50-year runs of the GAM performed by TWDB included simulation of the drought of record (DOR) by using 47 of average climatic conditions (recharge) followed by 3 drought years (simulating recharge in the 3 worst years of the 1950's drought). The GAM runs maintained the spatial and vertical distribution (by model layer) of the original model predictive pumping data set. However, a revised simulated pumping amount was specified for each County in GMA-8 for each GAM run performed by TWDB. A total of three GAM runs were requested by GMA-8 and performed by TWDB. The results of the first run (GAM-run 07-09) suggested that the existing spatial distribution of pumping in the Woodbine aquifer created an exaggerated cone of depression from the specified amount of pumping simulated in Lamar and Hunt Counties. Additionally, the simulated pumping specified for Delta (Woodbine and Trinity aquifers) and Kaufman (Trinity aquifer) Counties could not be applied because the spatial distribution of pumping in the

original model did not include pumping in those Counties. The second and third runs had similar specifications and were combined by TWDB as GAM-run 07-30. GAM-run 07-30 revised the spatial pumping distribution in Hunt, Lamar, Rains and Kaufman Counties to address the previously identified issues in those Counties while maintaining pumping amounts specified for GMA-run 07-09. Simulation Request (Simulation) 2 of GAM-run 07-30 included revised Trinity aquifer pumping specifications for Comanche, Erath and McLennan Counties. Simulation 3 of GAM-run 07-30 differed from Simulation 2 only in revised Trinity aquifer pumping specifications for Comanche and Erath Counties.

<table>
<tr><th colspan="2">Geologic Unit</th><th>GAM Layer</th><th colspan="2">Hydrologic Unit</th></tr>
<tr><td colspan="2">Woodbine Fm.</td><td>Layer 1</td><td colspan="2">Woodbine Aquifer</td></tr>
<tr><td colspan="2">Fredericksburg Group</td><td>Layer 2</td><td colspan="2"></td></tr>
<tr><td colspan="2">Paluxy Sand</td><td>Layer 3</td><td>Upper Trinity</td><td rowspan="7">Trinity Aquifer</td></tr>
<tr><td colspan="2">Glen Rose Limestone</td><td>Layer 4</td><td>Upper / Middle Trinity</td></tr>
<tr><td rowspan="5">Travis Peak Fm.</td><td>Hensell Sand</td><td>Layer 5</td><td>Middle Trinity</td></tr>
<tr><td>Cow Creek Limestone</td><td rowspan="3">Layer 6
Treated as an Aquitard</td><td rowspan="3"></td></tr>
<tr><td>Hammett Shale</td></tr>
<tr><td>Sligo Limestone</td></tr>
<tr><td>Hosston Conglomerate</td><td>Layer 7</td><td>Lower Trinity</td></tr>
</table>

Table 1, Generalized Relationships of Geologic Units to GAM Layers and Hydrologic Units

DFC Development Approach

CUWCD and CTGCD previously assessed the availability of groundwater in the Trinity aquifer within their jurisdictions. GMA-8 considered the experience gained by those GCDs in deciding to adopt the maintenance of water-levels (or stated alternatively the management of drawdown) in the Trinity aquifer subdivisions and Woodbine aquifer (as represented in the several GAM layers). The initial approach adopted by GMA-8 provided for each GCD to specify an amount of pumping to be applied to the Trinity aquifer its area and the RWP aquifer availability values for the Trinity and Woodbine aquifers to be specified for all unprotected Counties in a GAM-run request to TWDB.

During the GMA consideration of the Trinity aquifer pumping to be specified by the GCDs TWDB released a report giving new projections on use of the Trinity and Woodbine aquifers. The report also describes the use and sources of water for enhanced gas production in the Barnett Shale. (Bene, Hardin and others, 2007) GMA-8 considered the new information and decided to the new projections for use of the Trinity and Woodbine aquifers for the GMA-8 Counties included in the Medium Barnett Shale Development scenario given in the TWDB report. (Fig. 4)

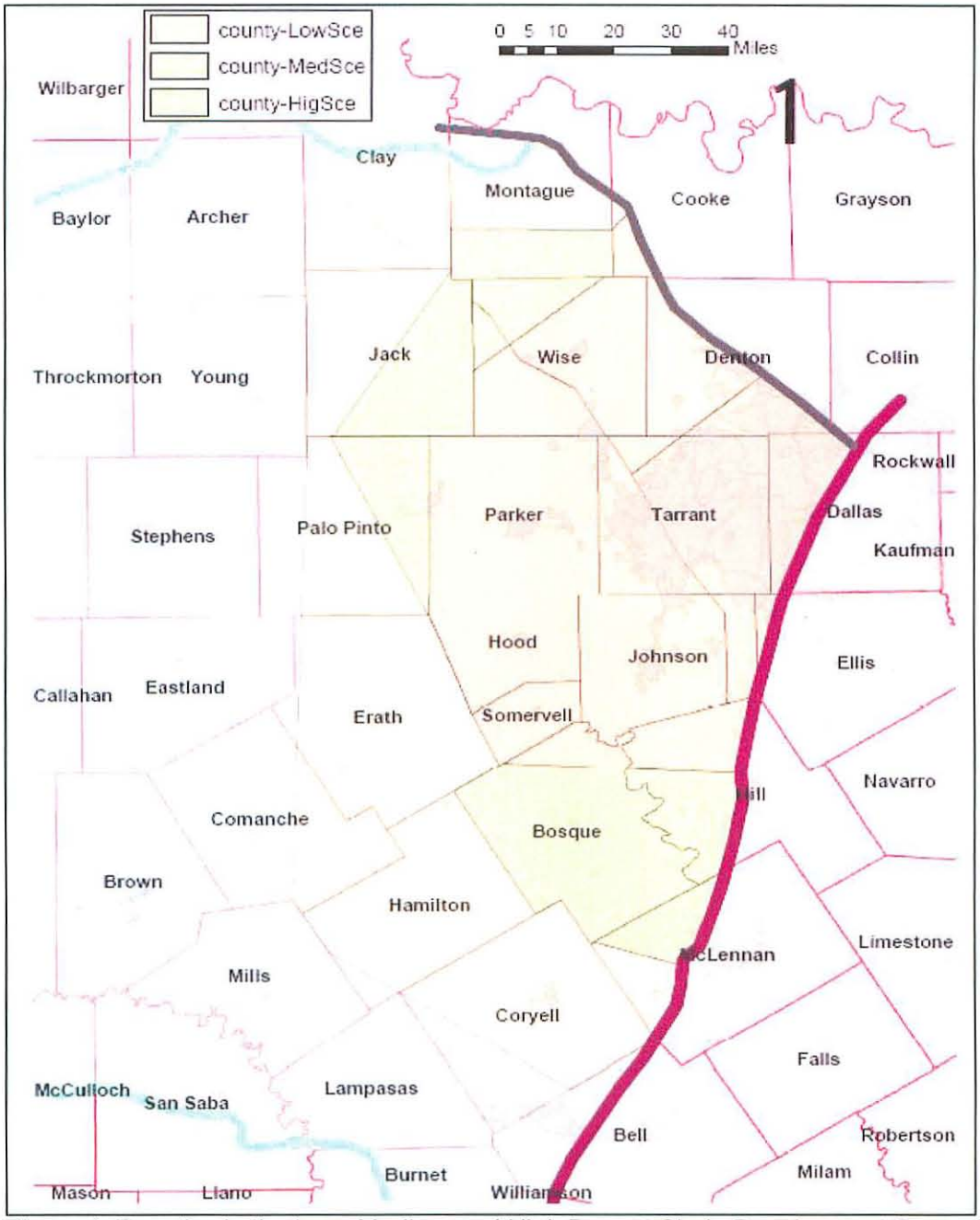


Figure 4, Counties in the Low, Medium and High Barnett Shale Development Scenarios, from Bene, Hardin and others, 2007

To develop the initial GAM-run request to TWDB, the GCDs of GMA-8 each specified the amount of Trinity aquifer pumping to be simulated in the GAM run for their area. CUWCD and CTGCD specified the pumping to be applied to GAM Layers 3, 4, 5 and 7 maintaining the existing model spatial pumping distribution in each layer. The other GCDs specified a total pumping to be applied to Trinity aquifer in their area maintaining the existing distribution of pumping as a percentage of the total pumping specified and maintaining the existing spatial pumping distribution. The specified pumping for the

Trinity aquifer or Trinity and Woodbine aquifers for the Counties in the Medium Barnett Shale scenario was equal to the highest year of the projected pumping values given in the TWDB report. The specified pumping for the Trinity aquifer or Trinity and Woodbine aquifers for the remaining Counties in GMA-8 was equal to the highest year value (after year 2000) of the aquifer availability given in the RWP. Pumping was held constant in all areas of the model where a pumping specification was provided. (Appendix A)

While TWDB processed the initial GAM-run request, the Tablerock GCD (TGCD), McLennan County GCD (MCGCD), Northern Trinity GCD (NTGCD) and Upper Trinity GCD (UTGCD) were created and became members of GMA-8. GMA-8 prepared orientation material for the new GCD members to acquaint them with the GMA process and the prior decisions made by the original members. At the next GMA meeting the new GCD members were provided with the orientation and materials.

On receipt of the report for GAM-run 07-09, GMA-8 considered the results and determined that 2 additional GAM-run requests would be necessary. The runs were considered necessary to address the issues identified in GAM-run 07-09 related to spatial pumping distribution. The additional runs allowed Middle Trinity GCD (MTGCD) and MCGCD to give further pumping specifications for their areas. In the first of the two runs, MTGCD and MCGCD specified a total pumping to for the Trinity aquifer in their area maintaining the existing distribution of pumping as a percentage of the total pumping specified and maintaining the existing spatial pumping distribution. All other previous GAM-run specifications remained unchanged. (Appendix B) In the second of the two runs, MTGCD specified a total pumping to for the Trinity aquifer in its area maintaining the existing distribution of pumping as a percentage of the total pumping specified and maintaining the existing spatial pumping distribution. All other previous GAM-run specifications remained unchanged. (Appendix C)

On receipt of the report for GAM-run 07-30, GMA-8 considered the results. GMA-8 submitted a DFC for the Woodbine aquifer based on GAM-run 07-30. After further consideration, Tablerock GCD and Middle Trinity GCD submitted requests for GAM runs to TWDB for modification of the amount of pumping applied to each respective GCD area. (Appendices D, E and F) The results of the two Tablerock GCD GAM-runs (the second of which contained an amended pumping specification for Middle Trinity GCD) are given in TWDB GAM-run 08-05 and 08-06. (Donnelly, 2008a and 2008b) The results of the additional GAM-run requested by Middle Trinity GCD were not available as of the date of this report. GMA-8 gave careful consideration to two possible strategies for development of DFCs for the Trinity aquifer. The first strategy was continuing investigation of the Trinity aquifer until the statutory deadline for DFC submission in 2010. The second strategy is to develop DFCs based on existing TWDB GAM-runs. After deliberation, GMA-8 decided to develop DFCs for the Trinity aquifer so that the MAG values could be used in the next round of RWPs while continuing Trinity and Woodbine aquifer investigations. GMA-8 decided to submit DFCs for the Trinity aquifer based on the results of GAM-run 08-06. All average draw down values provided by TWDB are from GAM-runs 07-09 and 07-30 for use in developing DFCs are rounded to the nearest 1-foot for presentation in the DFC statements using the normal rounding convention.

GMA-8 Desired Future Conditions for the N. Trinity Aquifer

Bell County (CUWCD)

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 134 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 155 feet) after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 286 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 319 feet after 50 years.

Bosque County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 26 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 33 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 201 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 220 feet after 50 years.

Brown County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 0 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 0 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 1 foot after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 2 feet after 50 years.

Burnet County (CTGCD)

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 1 foot after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 1 foot after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 11 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 29 feet after 50 years.

Callahan County

- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 0 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 2 feet after 50 years.

Collin County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 298 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 247 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 224 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 236 feet after 50 years.

Comanche County (MTGCD)

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 0 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 0 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 2 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 11 feet after 50 years.

Cooke County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 26 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 42 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 60 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 78 feet after 50 years.

Coryell County (TGCD)

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 15 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 15 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 156 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 179 feet after 50 years.

Dallas County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 240 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 224 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 263 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 290 feet after 50 years.

Delta County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 175 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 162 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 162 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 159 feet after 50 years.

Denton County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 98 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 134 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 180 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 214 feet after 50 years.

Eastland County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 0 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 0 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 0 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 0 feet after 50 years.

Ellis County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 265 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 283 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 336 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 362 feet after 50 years.

Erath County (MTGCD)

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 1 foot after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 1 foot after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 11 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 27 feet after 50 years.

Falls County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 279 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 354 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 459 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 480 feet after 50 years.

Fannin County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 212 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 196 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 182 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 181 feet after 50 years.

Grayson County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 175 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 160 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 161 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 165 feet after 50 years.

Hamilton County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 0 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 2 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 39 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 51 feet after 50 years.

Hill County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 209 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 253 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 381 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 406 feet after 50 years.

Hood County (UTGCD)

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 1 foot after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 2 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 16 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 56 feet after 50 years.

Hunt County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 286 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 245 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 215 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 223 feet after 50 years.

Johnson County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 37 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 83 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 208 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 234 feet after 50 years.

Kaufman County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 303 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 286 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 295 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 312 feet after 50 years.

Lamar County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 132 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 130 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 136 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 134 feet after 50 years.

Lampasas County (SUWCD)

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 0 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 1 foot after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 12 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 23 feet after 50 years.

Limestone County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 328 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 392 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 475 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 492 feet after 50 years.

McLennan County (MCGCD)

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 251 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 291 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 489 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 527 feet after 50 years.

Milam County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 252 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 294 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 337 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 344 feet after 50 years.

Mills County (Fox Crossing Water District)

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 0 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 0 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 3 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 12 feet after 50 years.

Montague County (UTGCD)

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 0 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 1 foot after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 3 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 12 feet after 50 years.

Navarro County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 344 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 353 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 399 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 413 feet after 50 years.

Parker County (UTGCD)

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 5 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 6 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 16 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 40 feet after 50 years.

Red River County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 82 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 77 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 78 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 78 feet after 50 years.

Rockwall County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 346 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 272 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 248 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 265 feet after 50 years.

Somervell County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 1 foot after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 4 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 53 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 114 feet after 50 years.

Tarrant County (NTGCD)

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 33 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 75 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 160 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 173 feet after 50 years.

Taylor County

- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 3 feet after 50 years.

Travis County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 124 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 61 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 98 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 116 feet after 50 years.

Williamson County

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 108 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 88 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 142 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 166 feet after 50 years.

Wise County (UTGCD)

- From estimated year 2000 conditions, the average draw down of the Paluxy aquifer should not exceed approximately 4 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Glen Rose aquifer should not exceed approximately 14 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hensell aquifer should not exceed approximately 23 feet after 50 years.
- From estimated year 2000 conditions, the average draw down of the Hosston aquifer should not exceed approximately 53 feet after 50 years.

Note: The observations and assessments made in this report were based on data supplied by the members of GMA-8, TWDB or available from referenced published sources available at the time the report preparation. The conclusions drawn in the report are based on the available data and reasonable methods of assessment. The Desired Future Conditions presented in this report reflect policy decisions made by GMA-8. If new or different data is made available the conclusions of this report may change.

Bibliography

Bene, James, Hardin, Robert and others, 2004; Northern Trinity / Woodbine Aquifer Groundwater Availability Model – Final Report to Texas Water Development Board

Bene, James, Hardin, Robert and others, 2007; Northern Trinity / Woodbine Aquifer Groundwater Availability Model – Assessment of Groundwater Use in the Northern Trinity Aquifer Due to Urban Growth and Barnett Shale Development

Donnelley, Andrew, 2007; GAM-run 07-09; Texas Water Development Board

Donnelley, Andrew, 2008a; GAM-run 08-05; Texas Water Development Board

Donnelley, Andrew, 2008b; GAM-run 08-06; Texas Water Development Board

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APPENDIX A

GMA-8 Simulation Request Specifications
For Northern Trinity/Woodbine Aquifer GAM

April 25, 2007

Clearwater Underground Water Conservation District (UWCD) acting on behalf of GMA-8 requests Texas Water Development Board (TWDB) to perform a projected pumping simulation of the N. Trinity / Woodbine aquifer Groundwater Availability Model (GAM). The N. Trinity / Woodbine aquifer GAM consists of 7-layers representing both water-producing and non water-producing zones. In the GAM, layer 1 represents the Woodbine aquifer and layers 3, 4, 5, 6 and 7 represent both the water-bearing and non water-bearing portions of the Trinity aquifer. Clearwater UWCD requests the GAM simulation be performed with the following specifications:

1. The simulation period should be for 50 years.
2. The simulation should use annual time steps.
3. The simulated climatic conditions should include 4 decades of average climatic conditions with the last decade beginning with average climatic conditions and ending in a simulated repeat of the drought of record.
4. The simulation should maintain the existing model spatial pumping distribution.
5. The simulation should maintain the existing distribution of pumping by layer (as a percentage of the total Trinity aquifer pumping within a County area) for layers 3, 4, 5, 6, and 7; except where specified otherwise.
6. Pumping should be held constant for each area for which a pumping amount is specified (*i.e.* by County total for the Trinity aquifer or by a layer specified within a County).
7. The projected pumping to be applied to layer 1 (Woodbine) by County should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Woodbine aquifer; the balance of Counties using the Woodbine aquifer are addressed in request item 9 below):
    a. Collin – 2,500 ac-ft per year
    b. Delta – 16 ac-ft per year
    c. Fannin – 3,300 ac-ft per year
    d. Grayson – 12,100 ac-ft per year
    e. Hunt – 2,840 ac-ft per year
    f. Kaufman – 200 ac-ft per year
    g. Lamar – 3,658 ac-ft per year
    h. Limestone – 33 ac-ft per year
    i. Navarro – 300 ac-ft per year
    j. Red River – 170 ac-ft per year
    k. Rockwall – 144 ac-ft per year
8. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Trinity aquifer):
    a. Brown – 2,085 ac-ft per year
    b. Callahan – 3,787 ac-ft per year
    c. Collin – 2,100 ac-ft per year

d. Coryell – 1,791 ac-ft per year
e. Delta – 364 ac-ft per year
f. Eastland – 4,853 ac-ft per year
g. Falls – 161 ac-ft per year
h. Fannin – 700 ac-ft per year
i. Grayson – 9,400 ac-ft per year
j. Hamilton – 2,146 ac-ft per year
k. Hunt – 551 ac-ft per year
l. Kaufman – 1,184 ac-ft per year
m. Lamar – 1,320 ac-ft per year
n. Limestone – 66 ac-ft per year
o. Montague – 2,682 ac-ft per year
p. Navarro – 1,873 ac-ft per year
q. Red River – 528 ac-ft per year
r. Rockwall – 958 ac-ft per year
s. Taylor – 679 ac-ft per year
t. Travis – 3,900 ac-ft per year
u. Williamson – 1,810 ac-ft per year

9. The projected pumping to be applied to layers 1, 3, 4, 5 and 7 (as applicable with totals by County for Woodbine and Trinity aquifers) should be as follows (note these projected pumping values are based on the highest year for each requested County in the High Estimate of Predictive Groundwater Use given in the TWDB report "Assessment of Groundwater Use in the Northern Trinity Aquifer Due to Urban Growth and Barnett Shale Development"):
    a. Bosque – 7,509 ac-ft per year
    b. Cooke – 7,018 ac-ft per year
    c. Dallas – 7,807 ac-ft per year
    d. Denton – 23,442 ac-ft per year
    e. Ellis – 9,403 ac-ft per year
    f. Hill – 5,412 ac-ft per year
    g. Hood – 11,064 ac-ft per year
    h. Johnson – 17,767 ac-ft per year
    i. Mc Lennan - 15,234 ac-ft per year
    j. Parker – 15,389 ac-ft per year
    k. Somervell – 2,485 ac-ft per year
    l. Tarrant – 19,615 ac-ft per year
    m. Wise – 9,801 ac-ft per year
10. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Middle Trinity Groundwater Conservation District (GCD) should be as follows:
    a. Comanche – 25,000 ac-ft per year
    b. Erath – 30,000 ac-ft per year
11. The projected pumping to be applied to layers 3, 4, 5, and 7 (Trinity aquifer with total by County) in Lampasas County (Saratoga UWCD) should be – 3,164 ac-ft per year.
12. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Milam County (Post Oak Savannah GCD) should be – 321 ac-ft per year.
13. The projected pumping to be applied to layers 3, 4, 5 and 7 (total by County) in Mills County (Fox Crossing Water District) should be – 2,400 ac-ft per year.

14. The projected pumping to be applied to the Trinity aquifer in Bell County (Clearwater UWCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 112 ac-ft per year
    b. Layer 4 (Glen Rose) – 880 ac-ft per year
    c. Layer 5 (Hensell) – 1,100 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 5,000 ac-ft per year
15. The projected pumping to be applied to the Trinity aquifer in Burnet County (Central Texas GCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 200 ac-ft per year
    b. Layer 4 (Glen Rose) – 200 ac-ft per year
    c. Layer 5 (Hensell) – 700 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 2,500 ac-ft per year

APPENDIX B

GMA-8 2nd Simulation Request Specifications
For Northern Trinity/Woodbine Aquifer GAM

October 4, 2007

Clearwater Underground Water Conservation District (UWCD) acting on behalf of GMA-8 requests Texas Water Development Board (TWDB) to perform a projected pumping simulation of the N. Trinity / Woodbine aquifer Groundwater Availability Model (GAM). The N. Trinity / Woodbine aquifer GAM consists of 7-layers representing both water-producing and non water-producing zones. In the GAM, layer 1 represents the Woodbine aquifer and layers 3, 4, 5, 6 and 7 represent both the water-bearing and non water-bearing portions of the Trinity aquifer. Clearwater UWCD requests the GAM simulation be performed with the following specifications:

16. The simulation period should be for 50 years.
17. The simulation should use annual time steps.
18. The simulated climatic conditions should include 4 decades of average climatic conditions with the last decade beginning with average climatic conditions and ending in a simulated repeat of the drought of record.
19. The simulation should maintain the existing model spatial pumping distribution, where possible. It is understood from TWDB GAM Run 07-09 that the existing model spatial distribution does not provide for pumping in the Woodbine aquifer in Delta County nor provide for pumping in the Trinity aquifer of Delta and Kaufman Counties. It is further understood from TWDB GAM Run 07-09 that the existing model spatial distribution of pumping in the Woodbine aquifer in Hunt and Lamar Counties may contribute to extreme draw down resulting in concentrated areas. TWDB is requested to suggest an appropriate methodology or methodologies by which the requested amounts of pumping may be reasonably distributed in the above mentioned Counties and aquifers.
20. The simulation should maintain the existing distribution of pumping by layer (as a percentage of the total Trinity aquifer pumping within a County area) for layers 3, 4, 5, 6, and 7; except where specified otherwise.
21. Pumping should be held constant for each area for which a pumping amount is specified (*i.e.* by County total for the Trinity aquifer or by a layer specified within a County).
22. The projected pumping to be applied to layer 1 (Woodbine) by County should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Woodbine aquifer; the balance of Counties using the Woodbine aquifer are addressed in request item 9 below):
    a. Collin – 2,500 ac-ft per year
    b. Delta – 16 ac-ft per year
    c. Fannin – 3,300 ac-ft per year
    d. Grayson – 12,100 ac-ft per year
    e. Hunt – 2,840 ac-ft per year
    f. Kaufman – 200 ac-ft per year
    g. Lamar – 3,658 ac-ft per year
    h. Limestone – 33 ac-ft per year
    i. Navarro – 300 ac-ft per year

j. Red River – 170 ac-ft per year
k. Rockwall – 144 ac-ft per year

23. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Trinity aquifer):
    a. Brown – 2,085 ac-ft per year
    b. Callahan – 3,787 ac-ft per year
    c. Collin – 2,100 ac-ft per year
    d. Coryell – 1,791 ac-ft per year
    e. Delta – 364 ac-ft per year
    f. Eastland – 4,853 ac-ft per year
    g. Falls – 161 ac-ft per year
    h. Fannin – 700 ac-ft per year
    i. Grayson – 9,400 ac-ft per year
    j. Hamilton – 2,146 ac-ft per year
    k. Hunt – 551 ac-ft per year
    l. Kaufman – 1,184 ac-ft per year
    m. Lamar – 1,320 ac-ft per year
    n. Limestone – 66 ac-ft per year
    o. Montague – 2,682 ac-ft per year
    p. Navarro – 1,873 ac-ft per year
    q. Red River – 528 ac-ft per year
    r. Rockwall – 958 ac-ft per year
    s. Taylor – 679 ac-ft per year
    t. Travis – 3,900 ac-ft per year
    u. Williamson – 1,810 ac-ft per year
24. The projected pumping to be applied to layers 1, 3, 4, 5 and 7 (as applicable with totals by County for Woodbine and Trinity aquifers) should be as follows (note these projected pumping values are based on the highest year for each requested County in the High Estimate of Predictive Groundwater Use given in the TWDB report "Assessment of Groundwater Use in the Northern Trinity Aquifer Due to Urban Growth and Barnett Shale Development"):
    a. Bosque – 7,509 ac-ft per year
    b. Cooke – 7,018 ac-ft per year
    c. Dallas – 7,807 ac-ft per year
    d. Denton – 23,442 ac-ft per year
    e. Ellis – 9,403 ac-ft per year
    f. Hill – 5,412 ac-ft per year
    g. Hood – 11,064 ac-ft per year
    h. Johnson – 17,767 ac-ft per year
    i. Parker – 15,389 ac-ft per year
    j. Somervell – 2,485 ac-ft per year
    k. Tarrant – 19,615 ac-ft per year
    l. Wise – 9,801 ac-ft per year
25. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in McLennan County (McLennan County Groundwater Conservation District (GCD)) should be – 20,694 ac-ft per year
26. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Middle Trinity GCD should be as follows:
    a. Comanche – 30,000 ac-ft per year

   b. Erath – 36,000 ac-ft per year
27. The projected pumping to be applied to layers 3, 4, 5, and 7 (Trinity aquifer with total by County) in Lampasas County (Saratoga UWCD) should be – 3,164 ac-ft per year.
28. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Milam County (Post Oak Savannah GCD) should be – 321 ac-ft per year.
29. The projected pumping to be applied to layers 3, 4, 5 and 7 (total by County) in Mills County (Fox Crossing Water District) should be – 2,400 ac-ft per year.
30. The projected pumping to be applied to the Trinity aquifer in Bell County (Clearwater UWCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 112 ac-ft per year
    b. Layer 4 (Glen Rose) – 880 ac-ft per year
    c. Layer 5 (Hensell) – 1,100 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 5,000 ac-ft per year
31. The projected pumping to be applied to the Trinity aquifer in Burnet County (Central Texas GCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 200 ac-ft per year
    b. Layer 4 (Glen Rose) – 200 ac-ft per year
    c. Layer 5 (Hensell) – 700 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 2,500 ac-ft per year

APPENDIX C

GMA-8 3rd Simulation Request Specifications
For Northern Trinity/Woodbine Aquifer GAM

October 4, 2007

Clearwater Underground Water Conservation District (UWCD) acting on behalf of GMA-8 requests Texas Water Development Board (TWDB) to perform a projected pumping simulation of the N. Trinity / Woodbine aquifer Groundwater Availability Model (GAM). The N. Trinity / Woodbine aquifer GAM consists of 7-layers representing both water-producing and non water-producing zones. In the GAM, layer 1 represents the Woodbine aquifer and layers 3, 4, 5, 6 and 7 represent both the water-bearing and non water-bearing portions of the Trinity aquifer. Clearwater UWCD requests the GAM simulation be performed with the following specifications:

32. The simulation period should be for 50 years.
33. The simulation should use annual time steps.
34. The simulated climatic conditions should include 4 decades of average climatic conditions with the last decade beginning with average climatic conditions and ending in a simulated repeat of the drought of record.
35. The simulation should maintain the existing model spatial pumping distribution, where possible. It is understood from TWDB GAM Run 07-09 that the existing model spatial distribution does not provide for pumping in the Woodbine aquifer in Delta County nor provide for pumping in the Trinity aquifer of Delta and Kaufman Counties. It is further understood from TWDB GAM Run 07-09 that the existing model spatial distribution of pumping in the Woodbine aquifer in Hunt and Lamar Counties may contribute to extreme draw down resulting in concentrated areas. TWDB is requested to suggest an appropriate methodology or methodologies by which the requested amounts of pumping may be reasonably distributed in the above mentioned Counties and aquifers.
36. The simulation should maintain the existing distribution of pumping by layer (as a percentage of the total Trinity aquifer pumping within a County area) for layers 3, 4, 5, 6, and 7; except where specified otherwise.
37. Pumping should be held constant for each area for which a pumping amount is specified (*i.e.* by County total for the Trinity aquifer or by a layer specified within a County).
38. The projected pumping to be applied to layer 1 (Woodbine) by County should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Woodbine aquifer; the balance of Counties using the Woodbine aquifer are addressed in request item 9 below):
    a. Collin – 2,500 ac-ft per year
    b. Delta – 16 ac-ft per year
    c. Fannin – 3,300 ac-ft per year
    d. Grayson – 12,100 ac-ft per year
    e. Hunt – 2,840 ac-ft per year
    f. Kaufman – 200 ac-ft per year
    g. Lamar – 3,658 ac-ft per year
    h. Limestone – 33 ac-ft per year
    i. Navarro – 300 ac-ft per year

j. Red River – 170 ac-ft per year
k. Rockwall – 144 ac-ft per year

39. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Trinity aquifer):
    a. Brown – 2,085 ac-ft per year
    b. Callahan – 3,787 ac-ft per year
    c. Collin – 2,100 ac-ft per year
    d. Coryell – 1,791 ac-ft per year
    e. Delta – 364 ac-ft per year
    f. Eastland – 4,853 ac-ft per year
    g. Falls – 161 ac-ft per year
    h. Fannin – 700 ac-ft per year
    i. Grayson – 9,400 ac-ft per year
    j. Hamilton – 2,146 ac-ft per year
    k. Hunt – 551 ac-ft per year
    l. Kaufman – 1,184 ac-ft per year
    m. Lamar – 1,320 ac-ft per year
    n. Limestone – 66 ac-ft per year
    o. Montague – 2,682 ac-ft per year
    p. Navarro – 1,873 ac-ft per year
    q. Red River – 528 ac-ft per year
    r. Rockwall – 958 ac-ft per year
    s. Taylor – 679 ac-ft per year
    t. Travis – 3,900 ac-ft per year
    u. Williamson – 1,810 ac-ft per year
40. The projected pumping to be applied to layers 1, 3, 4, 5 and 7 (as applicable with totals by County for Woodbine and Trinity aquifers) should be as follows (note these projected pumping values are based on the highest year for each requested County in the High Estimate of Predictive Groundwater Use given in the TWDB report "Assessment of Groundwater Use in the Northern Trinity Aquifer Due to Urban Growth and Barnett Shale Development"):
    a. Bosque – 7,509 ac-ft per year
    b. Cooke – 7,018 ac-ft per year
    c. Dallas – 7,807 ac-ft per year
    d. Denton – 23,442 ac-ft per year
    e. Ellis – 9,403 ac-ft per year
    f. Hill – 5,412 ac-ft per year
    g. Hood – 11,064 ac-ft per year
    h. Johnson – 17,767 ac-ft per year
    i. Parker – 15,389 ac-ft per year
    j. Somervell – 2,485 ac-ft per year
    k. Tarrant – 19,615 ac-ft per year
    l. Wise – 9,801 ac-ft per year
41. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in McLennan County (McLennan County Groundwater Conservation District (GCD)) should be – 20,694 ac-ft per year
42. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Middle Trinity GCD should be as follows:
    a. Comanche – 35,000 ac-ft per year

b. Erath – 42,000 ac-ft per year

43. The projected pumping to be applied to layers 3, 4, 5, and 7 (Trinity aquifer with total by County) in Lampasas County (Saratoga UWCD) should be – 3,164 ac-ft per year.
44. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Milam County (Post Oak Savannah GCD) should be – 321 ac-ft per year.
45. The projected pumping to be applied to layers 3, 4, 5 and 7 (total by County) in Mills County (Fox Crossing Water District) should be – 2,400 ac-ft per year.
46. The projected pumping to be applied to the Trinity aquifer in Bell County (Clearwater UWCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 112 ac-ft per year
    b. Layer 4 (Glen Rose) – 880 ac-ft per year
    c. Layer 5 (Hensell) – 1,100 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 5,000 ac-ft per year
47. The projected pumping to be applied to the Trinity aquifer in Burnet County (Central Texas GCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 200 ac-ft per year
    b. Layer 4 (Glen Rose) – 200 ac-ft per year
    c. Layer 5 (Hensell) – 700 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 2,500 ac-ft per year

APPENDIX D

GMA-8 4th Simulation Request Specifications
For Northern Trinity/Woodbine Aquifer GAM

January 18, 2008

Clearwater Underground Water Conservation District (UWCD) acting on behalf of GMA-8 requests Texas Water Development Board (TWDB) to perform a projected pumping simulation of the N. Trinity / Woodbine aquifer Groundwater Availability Model (GAM). The N. Trinity / Woodbine aquifer GAM consists of 7-layers representing both water-producing and non water-producing zones. In the GAM, layer 1 represents the Woodbine aquifer and layers 3, 4, 5, 6 and 7 represent both the water-bearing and non water-bearing portions of the Trinity aquifer. Clearwater UWCD requests the GAM simulation be performed with the following specifications:

48. The simulation period should be for 50 years.
49. The simulation should use annual time steps.
50. The simulated climatic conditions should include 4 decades of average climatic conditions with the last decade beginning with average climatic conditions and ending in a simulated repeat of the drought of record.
51. The simulation should maintain the spatial pumping distribution developed by TWDB for GAM Run 07-30 that provides for: pumping in the Woodbine aquifer in Delta County; pumping in the Trinity aquifer of Delta and Kaufman Counties and; the spatial distribution of pumping in the Woodbine aquifer in Hunt and Lamar Counties to address extreme draw down resulting in concentrated areas.
52. The simulation should maintain the existing distribution of pumping by layer (as a percentage of the total Trinity aquifer pumping within a County area) for layers 3, 4, 5, 6, and 7; except where specified otherwise or where modified by TWDB to address the issues identified in Item 4 above.
53. Pumping should be held constant for each area for which a pumping amount is specified (*i.e.* by County total for the Trinity aquifer or by a layer specified within a County).
54. The projected pumping to be applied to layer 1 (Woodbine) by County should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Woodbine aquifer; the balance of Counties using the Woodbine aquifer are addressed in request item 9 below):
    a. Collin – 2,500 ac-ft per year
    b. Delta – 16 ac-ft per year
    c. Fannin – 3,300 ac-ft per year
    d. Grayson – 12,100 ac-ft per year
    e. Hunt – 2,840 ac-ft per year
    f. Kaufman – 200 ac-ft per year
    g. Lamar – 3,658 ac-ft per year
    h. Limestone – 33 ac-ft per year
    i. Navarro – 300 ac-ft per year
    j. Red River – 170 ac-ft per year
    k. Rockwall – 144 ac-ft per year

55. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Trinity aquifer):
    a. Brown – 2,085 ac-ft per year
    b. Callahan – 3,787 ac-ft per year
    c. Collin – 2,100 ac-ft per year
    d. Delta – 364 ac-ft per year
    e. Eastland – 4,853 ac-ft per year
    f. Falls – 161 ac-ft per year
    g. Fannin – 700 ac-ft per year
    h. Grayson – 9,400 ac-ft per year
    i. Hamilton – 2,146 ac-ft per year
    j. Hunt – 551 ac-ft per year
    k. Kaufman – 1,184 ac-ft per year
    l. Lamar – 1,320 ac-ft per year
    m. Limestone – 66 ac-ft per year
    n. Montague – 2,682 ac-ft per year
    o. Navarro – 1,873 ac-ft per year
    p. Red River – 528 ac-ft per year
    q. Rockwall – 958 ac-ft per year
    r. Taylor – 679 ac-ft per year
    s. Travis – 3,900 ac-ft per year
    t. Williamson – 1,810 ac-ft per year
56. The projected pumping to be applied to layers 1, 3, 4, 5 and 7 (as applicable with totals by County for Woodbine and Trinity aquifers) should be as follows (note these projected pumping values are based on the highest year for each requested County in the High Estimate of Predictive Groundwater Use given in the TWDB report "Assessment of Groundwater Use in the Northern Trinity Aquifer Due to Urban Growth and Barnett Shale Development"):
    a. Bosque – 7,509 ac-ft per year
    b. Cooke – 7,018 ac-ft per year
    c. Dallas – 7,807 ac-ft per year
    d. Denton – 23,442 ac-ft per year
    e. Ellis – 9,403 ac-ft per year
    f. Hill – 5,412 ac-ft per year
    g. Hood – 11,064 ac-ft per year
    h. Johnson – 17,767 ac-ft per year
    i. Parker – 15,389 ac-ft per year
    j. Somervell – 2,485 ac-ft per year
    k. Tarrant – 19,615 ac-ft per year
    l. Wise – 9,801 ac-ft per year
57. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Coryell County (Tablerock Groundwater Conservation District (GCD)) should be – 3,000 ac-ft per year
58. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in McLennan County (McLennan County Groundwater Conservation District (GCD)) should be – 20,694 ac-ft per year

59. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Middle Trinity GCD should be as follows:
    a. Comanche – 27,000 ac-ft per year
    b. Erath – 32,000 ac-ft per year
60. The projected pumping to be applied to layers 3, 4, 5, and 7 (Trinity aquifer with total by County) in Lampasas County (Saratoga UWCD) should be – 3,164 ac-ft per year.
61. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Milam County (Post Oak Savannah GCD) should be – 321 ac-ft per year.
62. The projected pumping to be applied to layers 3, 4, 5 and 7 (total by County) in Mills County (Fox Crossing Water District) should be – 2,400 ac-ft per year.
63. The projected pumping to be applied to the Trinity aquifer in Bell County (Clearwater UWCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 112 ac-ft per year
    b. Layer 4 (Glen Rose) – 880 ac-ft per year
    c. Layer 5 (Hensell) – 1,100 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 5,000 ac-ft per year
64. The projected pumping to be applied to the Trinity aquifer in Burnet County (Central Texas GCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 200 ac-ft per year
    b. Layer 4 (Glen Rose) – 200 ac-ft per year
    c. Layer 5 (Hensell) – 700 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 2,500 ac-ft per year

APPENDIX E

GMA-8 5th Simulation Request Specifications
For Northern Trinity/Woodbine Aquifer GAM

January 18, 2008

Clearwater Underground Water Conservation District (UWCD) acting on behalf of GMA-8 requests Texas Water Development Board (TWDB) to perform a projected pumping simulation of the N. Trinity / Woodbine aquifer Groundwater Availability Model (GAM). The N. Trinity / Woodbine aquifer GAM consists of 7-layers representing both water-producing and non water-producing zones. In the GAM, layer 1 represents the Woodbine aquifer and layers 3, 4, 5, 6 and 7 represent both the water-bearing and non water-bearing portions of the Trinity aquifer. Clearwater UWCD requests the GAM simulation be performed with the following specifications:

65. The simulation period should be for 50 years.
66. The simulation should use annual time steps.
67. The simulated climatic conditions should include 4 decades of average climatic conditions with the last decade beginning with average climatic conditions and ending in a simulated repeat of the drought of record.
68. The simulation should maintain the spatial pumping distribution developed by TWDB for GAM Run 07-30 that provides for: pumping in the Woodbine aquifer in Delta County; pumping in the Trinity aquifer of Delta and Kaufman Counties and; the spatial distribution of pumping in the Woodbine aquifer in Hunt and Lamar Counties to address extreme draw down resulting in concentrated areas.
69. The simulation should maintain the existing distribution of pumping by layer (as a percentage of the total Trinity aquifer pumping within a County area) for layers 3, 4, 5, 6, and 7; except where specified otherwise or where modified by TWDB to address the issues identified in Item 4 above.
70. Pumping should be held constant for each area for which a pumping amount is specified (*i.e.* by County total for the Trinity aquifer or by a layer specified within a County).
71. The projected pumping to be applied to layer 1 (Woodbine) by County should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Woodbine aquifer; the balance of Counties using the Woodbine aquifer are addressed in request item 9 below):
    a. Collin – 2,500 ac-ft per year
    b. Delta – 16 ac-ft per year
    c. Fannin – 3,300 ac-ft per year
    d. Grayson – 12,100 ac-ft per year
    e. Hunt – 2,840 ac-ft per year
    f. Kaufman – 200 ac-ft per year
    g. Lamar – 3,658 ac-ft per year
    h. Limestone – 33 ac-ft per year
    i. Navarro – 300 ac-ft per year
    j. Red River – 170 ac-ft per year
    k. Rockwall – 144 ac-ft per year

72. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Trinity aquifer):
    a. Brown – 2,085 ac-ft per year
    b. Callahan – 3,787 ac-ft per year
    c. Collin – 2,100 ac-ft per year
    d. Delta – 364 ac-ft per year
    e. Eastland – 4,853 ac-ft per year
    f. Falls – 161 ac-ft per year
    g. Fannin – 700 ac-ft per year
    h. Grayson – 9,400 ac-ft per year
    i. Hamilton – 2,146 ac-ft per year
    j. Hunt – 551 ac-ft per year
    k. Kaufman – 1,184 ac-ft per year
    l. Lamar – 1,320 ac-ft per year
    m. Limestone – 66 ac-ft per year
    n. Montague – 2,682 ac-ft per year
    o. Navarro – 1,873 ac-ft per year
    p. Red River – 528 ac-ft per year
    q. Rockwall – 958 ac-ft per year
    r. Taylor – 679 ac-ft per year
    s. Travis – 3,900 ac-ft per year
    t. Williamson – 1,810 ac-ft per year
73. The projected pumping to be applied to layers 1, 3, 4, 5 and 7 (as applicable with totals by County for Woodbine and Trinity aquifers) should be as follows (note these projected pumping values are based on the highest year for each requested County in the High Estimate of Predictive Groundwater Use given in the TWDB report "Assessment of Groundwater Use in the Northern Trinity Aquifer Due to Urban Growth and Barnett Shale Development"):
    a. Bosque – 7,509 ac-ft per year
    b. Cooke – 7,018 ac-ft per year
    c. Dallas – 7,807 ac-ft per year
    d. Denton – 23,442 ac-ft per year
    e. Ellis – 9,403 ac-ft per year
    f. Hill – 5,412 ac-ft per year
    g. Hood – 11,064 ac-ft per year
    h. Johnson – 17,767 ac-ft per year
    i. Parker – 15,389 ac-ft per year
    j. Somervell – 2,485 ac-ft per year
    k. Tarrant – 19,615 ac-ft per year
    l. Wise – 9,801 ac-ft per year
74. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Coryell County (Tablerock Groundwater Conservation District (GCD)) should be – 3,777 ac-ft per year
75. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in McLennan County (McLennan County Groundwater Conservation District (GCD)) should be – 20,694 ac-ft per year

76. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Middle Trinity GCD should be as follows:
    a. Comanche – 27,000 ac-ft per year
    b. Erath – 32,000 ac-ft per year
77. The projected pumping to be applied to layers 3, 4, 5, and 7 (Trinity aquifer with total by County) in Lampasas County (Saratoga UWCD) should be – 3,164 ac-ft per year.
78. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Milam County (Post Oak Savannah GCD) should be – 321 ac-ft per year.
79. The projected pumping to be applied to layers 3, 4, 5 and 7 (total by County) in Mills County (Fox Crossing Water District) should be – 2,400 ac-ft per year.
80. The projected pumping to be applied to the Trinity aquifer in Bell County (Clearwater UWCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 112 ac-ft per year
    b. Layer 4 (Glen Rose) – 880 ac-ft per year
    c. Layer 5 (Hensell) – 1,100 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 5,000 ac-ft per year
81. The projected pumping to be applied to the Trinity aquifer in Burnet County (Central Texas GCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 200 ac-ft per year
    b. Layer 4 (Glen Rose) – 200 ac-ft per year
    c. Layer 5 (Hensell) – 700 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 2,500 ac-ft per year

APPENDIX F

GMA-8 6th Simulation Request Specifications
For Northern Trinity/Woodbine Aquifer GAM

July 25, 2008

Clearwater Underground Water Conservation District (UWCD) acting on behalf of GMA-8 requests Texas Water Development Board (TWDB) to perform a projected pumping simulation of the N. Trinity / Woodbine aquifer Groundwater Availability Model (GAM). The N. Trinity / Woodbine aquifer GAM consists of 7-layers representing both water-producing and non water-producing zones. In the GAM, layer 1 represents the Woodbine aquifer and layers 3, 4, 5, 6 and 7 represent both the water-bearing and non water-bearing portions of the Trinity aquifer. Clearwater UWCD requests the GAM simulation be performed with the following specifications:

82. The simulation period should be for 50 years.
83. The simulation should use annual time steps.
84. The simulated climatic conditions should include 4 decades of average climatic conditions with the last decade beginning with average climatic conditions and ending in a simulated repeat of the drought of record.
85. The simulation should maintain the spatial pumping distribution developed by TWDB for GAM Run 07-30 that provides for: pumping in the Woodbine aquifer in Delta County; pumping in the Trinity aquifer of Delta and Kaufman Counties and; the spatial distribution of pumping in the Woodbine aquifer in Hunt and Lamar Counties to address extreme draw down resulting in concentrated areas.
86. The simulation should maintain the existing distribution of pumping by layer (as a percentage of the total Trinity aquifer pumping within a County area) for layers 3, 4, 5, 6, and 7; except where specified otherwise or where modified by TWDB to address the issues identified in Item 4 above.
87. Pumping should be held constant for each area for which a pumping amount is specified (*i.e.* by County total for the Trinity aquifer or by a layer specified within a County).
88. The projected pumping to be applied to layer 1 (Woodbine) by County should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Woodbine aquifer; the balance of Counties using the Woodbine aquifer are addressed in request item 9 below):
    a. Collin – 2,500 ac-ft per year
    b. Delta – 16 ac-ft per year
    c. Fannin – 3,300 ac-ft per year
    d. Grayson – 12,100 ac-ft per year
    e. Hunt – 2,840 ac-ft per year
    f. Kaufman – 200 ac-ft per year
    g. Lamar – 3,658 ac-ft per year
    h. Limestone – 33 ac-ft per year
    i. Navarro – 300 ac-ft per year
    j. Red River – 170 ac-ft per year
    k. Rockwall – 144 ac-ft per year

89. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) should be as follows (note these projected pumping values are based on Regional Water Plan (RWP) groundwater availability values for the Trinity aquifer):
    a. Brown – 2,085 ac-ft per year
    b. Callahan – 3,787 ac-ft per year
    c. Collin – 2,100 ac-ft per year
    d. Delta – 364 ac-ft per year
    e. Eastland – 4,853 ac-ft per year
    f. Falls – 161 ac-ft per year
    g. Fannin – 700 ac-ft per year
    h. Grayson – 9,400 ac-ft per year
    i. Hamilton – 2,146 ac-ft per year
    j. Hunt – 551 ac-ft per year
    k. Kaufman – 1,184 ac-ft per year
    l. Lamar – 1,320 ac-ft per year
    m. Limestone – 66 ac-ft per year
    n. Navarro – 1,873 ac-ft per year
    o. Red River – 528 ac-ft per year
    p. Rockwall – 958 ac-ft per year
    q. Taylor – 679 ac-ft per year
    r. Travis – 3,900 ac-ft per year
    s. Williamson – 1,810 ac-ft per year
90. The projected pumping to be applied to layers 1, 3, 4, 5 and 7 (as applicable with totals by County for Woodbine and Trinity aquifers) should be as follows (note these projected pumping values are based on the highest year for each requested County in the High Estimate of Predictive Groundwater Use given in the TWDB report "Assessment of Groundwater Use in the Northern Trinity Aquifer Due to Urban Growth and Barnett Shale Development"):
    a. Bosque – 7,509 ac-ft per year
    b. Dallas – 7,807 ac-ft per year
    c. Ellis – 9,403 ac-ft per year
    d. Hill – 5,412 ac-ft per year
    e. Somervell – 2,485 ac-ft per year
    f. Tarrant – 19,615 ac-ft per year
91. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Coryell County (Tablerock Groundwater Conservation District (GCD)) should be – 3,714 ac-ft per year by layer (maintaining existing spatial distribution of pumping for items a through e below) as follows:
    a. Layer 3 (Paluxy) – 254 ac-ft per year
    b. Layer 4 (Glen Rose) – 783 ac-ft per year
    c. Layer 5 (Hensell) – 836 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 433 ac-ft per year
    f. An additional 928 ac-ft per year of simulated pumping should be added to layer 5 (distributed equally throughout) in the areas of western and northern Coryell Co. agreed to in the GMA 8 workshop meeting held in Belton, TX on March 24, 2008.
    g. An additional 480 ac-ft per year of simulated pumping should be added to layer 7(distributed equally throughout) in the areas of western and

northern Coryell Co. agreed to in the GMA 8 workshop meeting held in Belton, TX on March 24, 2008.

92. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in McLennan County (McLennan County Groundwater Conservation District (GCD)) should be – 20,694 ac-ft per year
93. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Middle Trinity GCD should be as follows:
    a. Comanche – 27,000 ac-ft per year
    b. Erath – 32,000 ac-ft per year
94. The projected Pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Upper Trinity GCD and adjacent counties should be as follows:
    a. Hood – 11,001 ac-ft per year
    b. Montague – 506 ac-ft per year
    c. Parker – 11,751ac-ft per year
    d. Wise – 8,414 ac-ft per year
    e. Cooke – 7,018 ac-ft per year
    f. Denton – 18,132 ac-ft per year
    g. Johnson – 16,349 ac-ft per year
95. The projected pumping to be applied to layers 3, 4, 5, and 7 (Trinity aquifer with total by County) in Lampasas County (Saratoga UWCD) should be – 3,164 ac-ft per year.
96. The projected pumping to be applied to layers 3, 4, 5 and 7 (Trinity aquifer with total by County) in Milam County (Post Oak Savannah GCD) should be – 321 ac-ft per year.
97. The projected pumping to be applied to layers 3, 4, 5 and 7 (total by County) in Mills County (Fox Crossing Water District) should be – 2,400 ac-ft per year.
98. The projected pumping to be applied to the Trinity aquifer in Bell County (Clearwater UWCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 112 ac-ft per year
    b. Layer 4 (Glen Rose) – 880 ac-ft per year
    c. Layer 5 (Hensell) – 1,100 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 5,000 ac-ft per year
99. The projected pumping to be applied to the Trinity aquifer in Burnet County (Central Texas GCD) by layer is as follows:
    a. Layer 3 (Paluxy) – 200 ac-ft per year
    b. Layer 4 (Glen Rose) – 200 ac-ft per year
    c. Layer 5 (Hensell) – 700 ac-ft per year
    d. Layer 6 (Cow Creek, Hammett, Sligo) – No change from existing predictive pumping
    e. Layer 7 (Hosston) – 2,500 ac-ft per year

APPENDIX F Cont'

GAM Request Addendum

On behalf of the Middle Trinity District, GMA 8 requests that the GAM simulation be documented in the same fashion as done for GAM Run 08-06 but that the additional tasks listed below be performed. We request that the additional work not be begun until after the GAM write-up has been submitted to GMA 8 and that the additional work be prepared as an addendum to the GAM report. We request this work because Middle Trinity's has expressed concerns the GAM results are not consistent with their field data and their assessment of groundwater availability in the Trinity Aquifer. We believe that the additional work with help Middle Trinity and other Districts to incorporate the results of the DFC process into their management plans, drought contingency plans, interactions with stakeholders, design of monitoring networks, on-going research, and planned updates of the Northern Trinity GAM.

Task 1 – Additional Data Analysis

Middle Trinity requests the following additions to the data analysis:

- Total number of dry cells in Comanche, Erath, and other Counties at the beginning (2000) and at five-year increments thereafter
- Total amount of pumping removed in each county because of the dry cells
- Map of the dry cell locations
- Map of saturated aquifer thickness at beginning (2000) and end (2050) of simulations
- Explain how dry cells are included in the calculation of average drawdown
- Calculate average drawdown at five-year increments for Erath and Comanche Counties
- Provide mass balance calculations at five-year increments for Erath and Comanche Counties

Task 2 – Additional Discussion of Results:

Middle Trinity requests the following additions to the evaluation of results:

- Discuss the possible and probable reasons for dry model cells in Comanche, Erath, and other Counties
- Discuss the likelihood that the aquifer will go dry at the location of the de-saturated cells
- Discuss the changes in the mass balance and in drawdown over time with regard to the groundwater availability and sustainability
- Discuss the reliability of the model predictions and implications for future groundwater monitoring in areas where the groundwater resource has been significantly depleted
- Identify potential areas of concern with the GAM that could limit its ability to accurately estimate MAGs from DFCs for specific counties

Meeting of the

Groundwater Management Area 8

September 17, 2008 in Goldthwaite, TX

Minutes

The Groundwater Management Area 8 consisting of the Central Texas Groundwater Conservation District (GCD), Clearwater Underground Water Conservation District (UWCD), Fox Crossing Water District (WD), McLennan County GCD, Middle Trinity GCD, Northern Trinity GCD, Post Oak Savannah GCD, Saratoga UWCD, Tablerock GCD, and Upper Trinity GCD held a meeting on Wednesday, September 17, 2008 in the City of Goldthwaite in the Mills County State Bank Community Room, located at 1101 Parker Street, Goldthwaite, Texas.

Groundwater District Representatives Present:

Central Texas GCD: Richard Bowers	Northern Trinity GCD: Jim Oliver
Clearwater UWCD: Horace Grace	Post Oak Savannah GCD: Gary Westbrook
Fox Crossing WD: Sam Beaumont	Saratoga UWCD: Dave Hamilton
McLennan Co. GCD: Rodney Kroll	Tablerock GCD: David Freeman
Middle Trinity GCD: Joe Cooper	Upper Trinity GCD: Mike Massey

1. Invocation

Gary Westbrook gave the invocation

2. Call meeting to order and establish quorum.

The Groundwater Management Area 8 (GMA 8) meeting was called to order at 10:03 a.m. at the Mills County State Bank in Goldthwaite. Horace Grace called roll and established that a quorum was present. Nine Districts were present at the time of roll call. Jim Oliver, Northern Trinity GCD Representative arrived at approximately 10:20 a.m.

3. Welcome and introductions.

Horace Grace asked members of the audience to introduce themselves. Sam Beaumont welcomed everyone on behalf of the City of Goldthwaite. Joe Cooper gave a brief overview of the creation of GMA 8, contracting with engineers, use of groundwater availability models (GAM), and desired future conditions (DFC) utilization to develop managed available groundwater (MAG) figures. He summated that there has been a lot of hard work by the groundwater conservation districts to get GMA 8 to this point of approving the Trinity aquifer DFCs. He also made note of the diligence administratively made by Clearwater UWCD to keep GMA 8 moving forward in the development of DFCs.

4. Public Comments.

There was no public comment.

5. Approve minutes of May 19, 2008 GMA 8 meeting.

Sam Beaumont moved to approve the minutes of the May 19, 2008 GMA 8 meeting, seconded by Richard Bowers. The motion carried unanimously, 9-0.

6. Presentation of proposed desired future conditions for the Trinity aquifer based on the Texas Water Development Board GAM Runs 07-30 and 08-06.

Sam Beaumont reported that Fox Crossing is concerned with the current figures in the Regional Water Plan (RWP). He noted that the current numbers underestimate the water needs and potential growth of Mills County. Due to this misrepresentation, Fox Crossing WD is hopeful that GMA 8 will approve the Trinity aquifer DFCs at this meeting and meet the deadline to include the new figures in the upcoming RWP review.

(Jim Oliver, Northern Trinity GCD, arrived at approximately 10:20 a.m.)

Randy Williams, TCB/AECOM, presented information on proposed DFCs for the Trinity aquifer based on Texas Water Development Board (TWDB) GAM runs 07-30 and 08-06. He noted that there were two GAM runs still pending with TWDB (08-64 and 08-66). If GMA 8 were to meet the timeline for their MAG numbers to be included in the revision of the RWP, then the committee would need to move forward with adopting DFCs based off of GAM runs already processed by TWDB.

Randy Williams then noted that GAM runs 07-30 and 08-06 pumping amounts for each county differ in only three counties; Coryell, Comanche and Erath.

Joe Cooper inquired on the status and dates of completion for the two GAM runs that are currently being processed by TWDB. Cheryl Maxwell responded that the estimated MAG delivery date for 08-64 is December 5, 2008 and for 08-66 is January 30, 2009. The board discussed the overall changes in the area numbers between 08-06 and 08-66.

Horace Grace noted that if GMA 8 did decide to move forward and approve a DFC for the Trinity aquifer so as to meet the deadline to have the MAGs included in the RWP, they could go back at any time and update or modify the DFCs for the Trinity with GMA 8 approval. Horace Grace commented that unlike other GCDs who are looking to increase their MAGs the Upper Trinity GCD is working to lower their MAG.

Mike Massey spoke to the reasoning behind the Upper Trinity GCD's desire to lower their MAG. He noted that after extensive study by a contractual hydro-geoscientist, reports were submitted to their board indicating that the counties within the Upper Trinity GCD were already exceeding pumping and would not sustain the DFC in their area for the Trinity aquifer. Therefore, the Upper Trinity GCD board decided to reduce their pumping requests for each county in their district.

Sam Beaumont explained that setting this DFC is only one step in the process. Once the DFCs for the aquifer are set then they can be sent to the Regional Water Planning Groups (RWPG) so they can establish areas where strategies may need to be established to plan for additional water supplies to those areas of concern.

Joe Cooper commented on the necessity of complete honesty with the RWPG so that they are able to address those water needs. Terry Kelley with the Brazos G RWPG reported that they are just trying to gather all of the data from the Water User Groups (WUG) and GCDs to establish what is going on and where additional planning is needed.

The committee discussed whether they should approve a processed GAM run or a pending GAM run. Several GCDs voiced concern with inappropriate representation in the RWP as well as some of the

individual concerns for the water issues within the different GCDs. No conclusions were made at this time.

7. <u>Public hearing</u> and possible action to adopt desired future conditions for the Trinity aquifer as described above.

Horace Grace clarified that the committee had entered a public hearing at 11:00 a.m. and explained the purpose of the public hearing.

Richard Bowers recommended that the committee approve the most current and processed GAM run at this time.

Terry Kelley, Johnson County, inquired on the MAG for Johnson County. Randy Williams responded that the accumulative MAG for Johnson County between the Trinity aquifer and the Woodbine aquifer was 17,767 acre feet/year based on GAM run 08-06 which was the most current and processed GAM run at this time.

Gary Westbrook noted that the GMA 8 committee tried to avoid causing any encumbrance upon any other counties that currently have no representation due to an absence of a GCD. The committee adopted the figures from the RWP for those counties unless those numbers adversely affected an existing GCD within GMA 8.

Horace Grace closed the public hearing at 11:07 a.m.

Joe Cooper moved to adopt DFCs based on GAM run 08-06 for the Trinity aquifer, seconded by Sam Beaumont. Mike Massey asked the committee for their assurance to support Upper Trinity in the adoption of DFCs based on GAM run 08-66 once TWDB processed the GAM and returns the MAG to GMA 8. The committee responded that they would not oppose Upper Trinity lowering their pumping figures. **The motion carried, 10-0.**

8. Discussion regarding proposed schedule for GMA 8 to complete initial phase of the joint planning process.

Cheryl Maxwell referred the committee to a handout outlining the GMA 8 original scope of work under the 2007 contract with TCB, Inc. along with additional services requests (ASR) outside of the contract parameter and their corresponding costs. ASR#1 for $4,250 covered services provided in addition to the original contract services from May 2007 through October 2007. ASR#2 for $2,750 covered services provided from August 2008 through the September 17, 2008 meeting. ASR#3 covered $7,800 for any services beyond the September 17, 2008 meeting.

Horace Grace commented that he had met with TCB, Inc. to negotiate the listed costs. He noted that although these amounts are not currently covered or included in any contract with TCB, Inc. the GMA 8 committee had charged TCB, Inc. to produce the work.

GMA 8 committee members discussed and proposed financial support to cover the costs of the ASRs #1, #2, and #3.

Randy Williams, TCB/AECOM, Inc. noted that the additional work outlined under ASR #3 may range anywhere from $1,500 to the full $7,800 depending on the amount of labor necessary to complete the task.

Dave Hamilton left the committee meeting at 11:25 a.m.

9. a. Discussion and possible action to amend contract with TCB, Inc. to develop the desired future conditions for the aquifers in GMA 8;

Joe Cooper moved to amend the contract with TCB, Inc. to develop the desired future conditions for the aquifers in GMA 8, seconded by Mike Massey. The motion carried 9-0.

b. Discussion and possible action on how future work conducted by TCB, Inc. will be funded by the committee.

Committee members proposed financial support as Agenda Item No. 8 was discussed above.

10. Discussion regarding TWDB 30 day default approval statement for draft managed available groundwater (MAG) reports.

Sam Beaumont noted that the GMA 8 committee doesn't meet every 30 days. Robert Bradley, TWDB, noted that other GMAs are modifying the statement to say "30 day or the next board meeting". The committee discussed the concern. The consensus of the committee was that TWDB has been flexible and considerate enough not to enforce that deadline with other groups and therefore there was no need to change the statement.

11. Committee member comments.

Sam Beaumont thanked the committee for approving a DFC for the Trinity aquifer.

Rodney Kroll reported that McLennon County GCD has been placed in the Central Texas Priority Groundwater Management Area (PGMA), therefore requiring them to merge with several other districts by the TCEQ.

Joe Cooper extended thanks to Fox Crossing WD for their generosity as hosts of this meeting. He also noted that Senator Kip Averitt projects that there will be regional level groundwater management in the future.

David Freeman commented that changes in water regulation and planning are on the very near horizon in Texas.

Richard Bowers asked that the committee have an update by a representative of the TWDB on how GMA 8 is progressing and how other GMAs are progressing across the state.

Mike Massey extended gratitude to the GMA 8 committee for their patience in allowing Upper Trinity the time to get up to speed on the needs of their district.

Horace Grace thanked Fox Crossing WD for hosting the meeting and commended GMA 8 for being able to come together and develop a plan for their area. He encouraged the committee to continue diligently to maintain control at the local levels in the management and planning processes.

Robert Bradley, TWDB noted that it was a very good achievement to have passed DFCs for the Trinity aquifer as well as all other aquifers within GMA 8. He said that TWDB is overwhelmed with submittals

at this time but are working diligently to process all GAMs submitted by all of the GMAs. Robert Bradley commented that official GAMs were priority over non-official GAMs, therefore the GMA 8 GAM would take precedent over those non-official GAM submittals.

Horace Grace extended the invitation to pass the administrative duties for GMA 8 to another district for a time.

12. Discuss agenda items for next meeting

No future agenda items were determined at this time.

13. Set date, time, and place of next meeting.

Next meeting to be determined.

14. Closing comments.

No additional comments were made.

15. Adjourn.

Meeting was adjourned at 12:00 noon.

The GMA 8 Committee unanimously approved the minutes on this 16th day of March, 2009.

ATTACHMENT "D"

RESOLUTION TO ADOPT DESIRED FUTURE CONDITIONS

FOR AQUIFER(S) IN GROUNDWATER MANAGEMENT AREA 8

THE STATE OF TEXAS	§
	§
GROUNDWATER MANAGEMENT AREA 8	§
	§
GROUNDWATER CONSERVATION DISTRICTS	§

WHEREAS, Texas Water Code § 36.108 requires the groundwater conservation districts located in whole or in part in a groundwater management area ("GMA") designated by the Texas Water Development Board to adopt desired future conditions for the relevant aquifers located within the management area;

WHEREAS, the groundwater conservation districts located wholly or partially within Groundwater Management Area 8 ("GMA 8"), as designated by the Texas Water Development Board, as of the date of this resolution are as follows: Central Texas Groundwater Conservation District, Clearwater Underground Water Conservation District, Fox Crossing Water District, McLennan County Groundwater Conservation District, Middle Trinity Groundwater Conservation District, Northern Trinity Groundwater Conservation District, Post Oak Savannah Groundwater Conservation District, Saratoga Underground Water Conservation District, Tablerock Groundwater Conservation District, and Upper Trinity Groundwater Conservation District (collectively hereinafter "the GMA 8 Districts");

WHEREAS, the GMA 8 Districts are each governmental agencies and bodies politic and corporate operating under Chapter 36, Water Code;

WHEREAS, the GMA 8 Districts desire to fulfill the requirements of Texas Water Code § 36.108 through mutual cooperation and joint planning efforts;

WHEREAS, the GMA 8 Districts have had numerous public meetings at which they have engaged in joint planning efforts to promote more comprehensive management of the aquifers located in whole or in part in Groundwater Management Area 8;

WHEREAS, the GMA 8 Districts may establish different desired future conditions for: (1) each aquifer, subdivision of an aquifer, or geologic strata located in whole or in part within the boundaries of GMA 8; or (2) each geographic area overlying an aquifer in whole or in part or subdivision of an aquifer within the boundaries of GMA 8;

WHEREAS, the GMA 8 Districts recognize that GMA 8 includes a geographically and hydrologically diverse area with a variety of land uses and a diverse mix of water users;

WHEREAS, the GMA 8 Districts have considered the relevant aquifers, subdivisions thereof, and geologic strata located in whole or in part within the boundaries of GMA 8, and have further considered the hydrogeologic characteristics of the same, as well as the various uses and users of groundwater produced from such aquifers, subdivisions, and strata;

WHEREAS, GMA 8 Districts held a meeting, which was open to the public, at 10:00 a.m. on Monday, March 16, 2009, in the Bellmead City Hall located at 3015 Bellmead Drive, Bellmead, Texas;

WHEREAS, notice of said March 16, 2009, meeting was properly given by each and all of the GMA 8 Districts in accordance with Chapter 36, Water Code, and Chapter 551, Government Code, and a true and correct copy of each of the notices has been attached hereto in Appendix A and is incorporated herein for all purposes;

WHEREAS, at least two-thirds of the GMA 8 Districts had a voting representative in attendance at said March 16, 2009, meeting in accordance with Section 36.108(d-1), Texas Water Code; to wit, the following districts had a voting representative in attendance at said meeting: Central Texas Groundwater Conservation District, Clearwater Underground Water Conservation District, Fox Crossing Water District, McLennan County Groundwater Conservation District, Middle Trinity Groundwater Conservation District, Post Oak Savannah Groundwater Conservation District, Saratoga Underground Water Conservation District, Tablerock Groundwater Conservation District, and Upper Trinity Groundwater Conservation District (Northern Trinity Groundwater Conservation District did not have a voting representative present);

WHEREAS, it is the intent and purpose of the GMA 8 Districts by adoption of this resolution to fulfill the requirements of Texas Water Code § 36.108, including establishing "desired future conditions for the relevant aquifers" within GMA 8 for the specific aquifer(s) and desired future conditions described under "Appendix B" attached hereto and incorporated herein for all purposes;

WHEREAS, at said March 16, 2009, meeting, after a motion was duly made and seconded that the GMA 8 Districts adopt this resolution establishing desired future conditions for the aquifer described under "Appendix B", the motion prevailed by the following vote:

Blossom Aquifer: 9 Ayes and 0 Nays;

Nacatoch Aquifer: 9 Ayes and 0 Nays;

WHEREAS, in establishing these desired future conditions for the aquifer(s) set forth under Appendix B, the GMA 8 Districts have considered all of the criteria required by Chapter 36 of the Texas Water Code and other information, including without limitation groundwater availability models and runs of those models to determine the effects of various conditions and parameters, hydrogeologic reports available for the relevant aquifers, and other technical data and information;

WHEREAS, many of the groundwater availability models, runs, hydrogeologic reports, and other technical data and information considered and determined to be reliable sources of information by the GMA 8 Districts in establishing these desired future conditions for the aquifer(s) have been attached hereto or referenced in the documents attached hereto under Appendix B;

WHEREAS, in establishing these desired future conditions for the aquifer(s) set forth under Appendix B, the GMA 8 Districts have considered the uses and conditions of the aquifer(s) in different geographic areas within GMA 8 and what the effects and impacts of adopting such desired future conditions will have upon the condition of the aquifer(s) and the uses and users of groundwater from the aquifer(s) both now and in the future;

WHEREAS, after considering such anticipated effects and impacts these desired future conditions will have on the aquifer(s), uses, and users of groundwater, and considering all of the other criteria required by Chapter 36 of the Texas Water Code, including without limitation the groundwater resource management duties and responsibilities of the GMA Districts individually and collectively, the GMA 8 Districts have determined that the desired future conditions for the aquifer(s) set forth under Appendix B are reasonable;

NOW, THEREFORE, BE IT RESOLVED BY THE AUTHORIZED VOTING REPRESENTATIVES OF THE GMA 8 DISTRICTS AS FOLLOWS:

1. The above recitals are true and correct.

2. The authorized voting representatives of the GMA 8 Districts hereby establish the desired future conditions of the aquifer(s) as set forth in Appendix B by the vote reflected in the above recitals.

3. The GMA 8 Districts and their agents and representatives, individually and collectively, are further authorized to take any and all actions necessary to implement this resolution.

4. The desired future conditions of the aquifer adopted by the GMA 8 Districts and attached hereto shall be effective immediately and shall continue in effect until amended, superseded, or repealed.

AND IT IS SO ORDERED.

PASSED AND ADOPTED on this 16th day of March, 2009.

ATTEST:

Central Texas Groundwater Conservation District

Clearwater Underground Water Conservation District

Fox Crossing Water District

McLennan County Groundwater Conservation District

Middle Trinity Groundwater Conservation District

Northern Trinity Groundwater Conservation District

Post Oak Savannah Groundwater Conservation District

Saratoga Underground Water Conservation District

Tablerock Groundwater Conservation District

Upper Trinity Groundwater Conservation District

ATTACHMENTS
Appendix A: Copies of notices of March 16, 2009, meeting
Appendix B: Adopted Desired Future Conditions and supporting information

Appendix B

Desired Future Conditions

Blossom Aquifer
Bowie, Lamar and Red River Counties

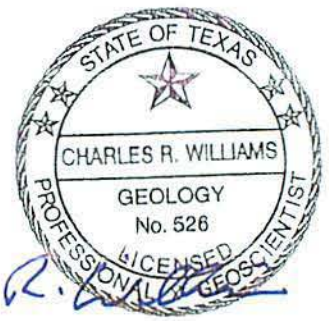
AECOM
400 West 15th Street, Suite 500, Austin, Texas 78701
T 512.472.4519 F 512.472.7519 www.tcb.aecom.com

Memorandum

To: Cheryl Maxwell, Administrative Manager
Clearwater Underground Water Conservation District

From: Charles R. Williams, P.G. No. 526

Date: March 30, 2009



Re: Re-Defined Desired Future Condition of Blossom Aquifer

Introduction

Groundwater Management Area 8 (GMA-8) is a groundwater management area of the State of Texas as defined by Statute with responsibility for developing a desired future condition (DFC) for aquifers within an approximately 46-County area. Membership of the GMA is composed of the groundwater conservation districts (GCDs) that occur all or in part within the GMA boundary. (Fig. 1) At the request of GMA-8, AECOM USA Group Inc. (AECOM) (fka TCB Inc.) developed statements describing DFCs for the portions of the Blossom aquifer recognized by the Texas Water Development Board (TWDB) to occur in whole or in part within GMA-8. (Fig. 2)

Methodology

To predict the effects of pumping in the Blossom aquifer a spreadsheet model was developed. The model uses estimates of: the area of the aquifer recharge (unconfined) and the artesian (confined) zones; the annual amount of aquifer use (pumping); and the coefficient of storage of the aquifer in the confined and unconfined zones to predict the annual volume of water that could be produced from the aquifer and result in a specified amount of aquifer draw-down after 50 years. Predictions are made for each of the sub-zones of the Blossom aquifer established in the unconfined and confined zones of the aquifer within each river basin in each County in which the aquifer occurs in GMA-8. Predictions of the estimated annual amount of groundwater that could be produced for the several sub-zones in the unconfined zone and confined zone of the aquifer in each County are summed for presentation. Aquifer-zone area estimates are from the TWDB geographic information system (GIS) coverages. Estimates of the annual aquifer use by County are from the TWDB Annual Water Use Survey data. The coefficients of storage values of the Blossom aquifer are considered to be similar to the storage coefficients of

the Nacatoch aquifer. (McLaurin, 1988) The storage coefficients used in the projections are the values for the Nacatoch aquifer given in TWDB Report 305. (Ashworth, 1988)

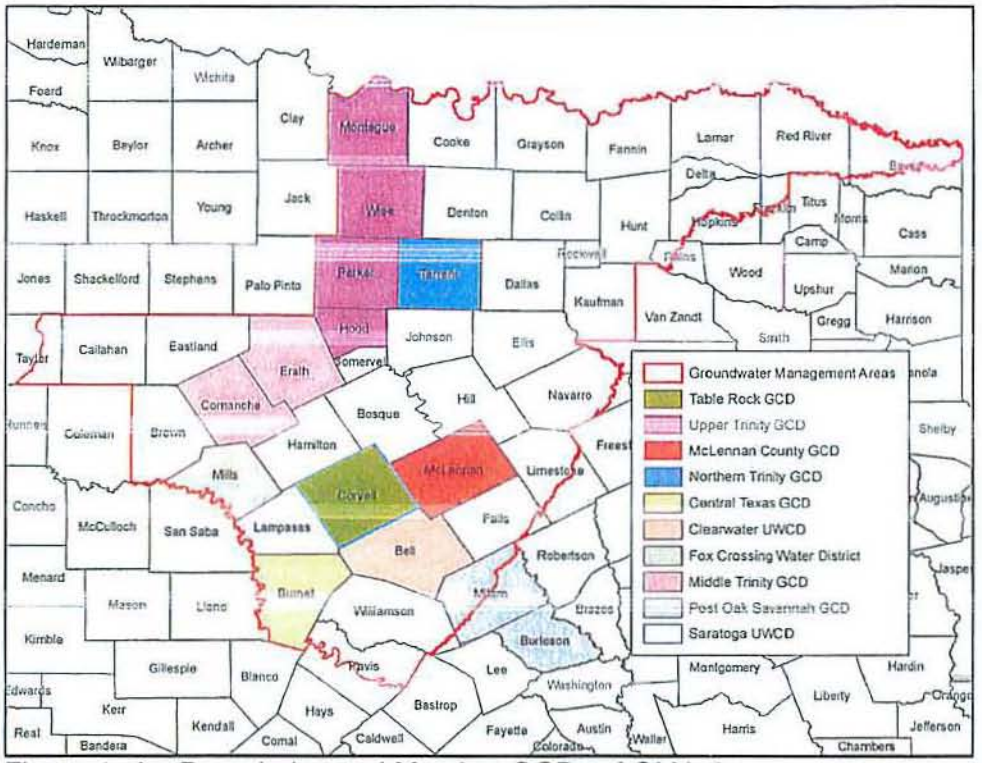


Figure 1, the Boundaries and Member GCDs of GMA-8

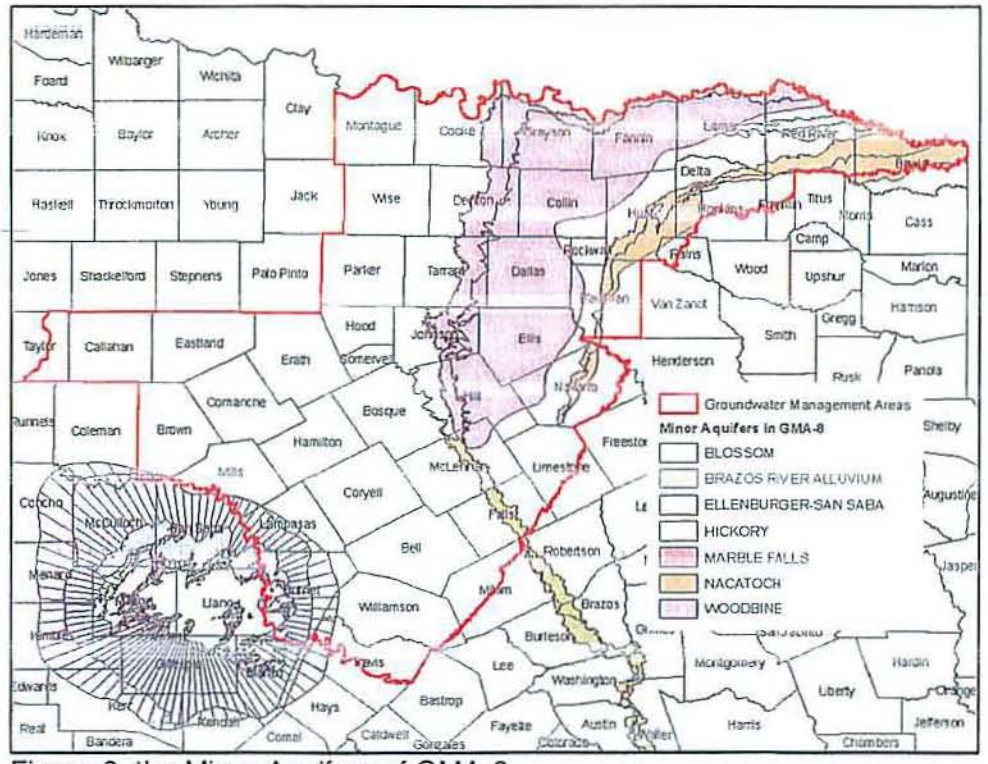


Figure 2, the Minor Aquifers of GMA-8

Discussion

The GMA-8 intent in developing a Blossom aquifer DFC is to describe a DFC resulting in a Managed Available Groundwater (MAG) value approximately equal to the sum of the County values (highest value after year 2000) for Regional Water Plan (RWP) availability for the aquifer in each County where the aquifer occurs. GMA-8 determined to take this course of action because its solicitations for public involvement brought only limited attendance with few comments and because the RWP values were adopted through a previous public process with local involvement.

In GMA-8, the Blossom aquifer occurs in Bowie, Lamar and Red River Counties. GMA-8 initially developed DFCs for the Blossom aquifer using a spreadsheet model to predict the percentage of estimated aquifer saturated thickness maintained after 50 years. (Williams, 2007) This DFC development approach resulted in a draft MAG value from TWDB significantly less than the intended amount. (Bradley, 2008) GMA-8 then determined to rescind the originally stated DFCs for the Blossom aquifer and re-adopt a revised DFC to achieve the intended MAG values.

The revised GMA-8 approach to DFC development for the Blossom aquifer is to describe a DFC in terms of the average draw down (in feet) for the unconfined and confined zone of the aquifer in each County where the aquifer occurs. GMA-8 maintains the intent to describe a DFC for the Blossom aquifer that will result in a MAG approximately equal to the sum of the County values (highest value after year 2000) for RWP availability value for the aquifer in Bowie, Lamar and Red River Counties.

DFC Development Approach

The purpose of the spreadsheet model is to conveniently predict the estimated amount of water that could be produced annually for 50 years without exceeding a specified level of draw down. The models are used to aid in the DFC development process for aquifers where a TWDB GAM is not available. Iterative trials of a range of draw down values were made until the desired amount of annual water use was achieved for each aquifer sub-zone in County. (Table 1) The results of the annual water use values from the final iteration for each aquifer sub-zone within each County were summed for comparison to the RWP availability values. (Table 2) The spreadsheet model project the effects of pumping using the following relationships:

$$\mathbf{Q(t) = R(t) - D(t) + dS/dt}$$

Where:
Q(t) = the total rate of groundwater withdrawal (ac-ft/yr)
R(t) = the total rate of groundwater recharge to the basin (aquifer) (ac-ft/yr)
D(t) = the total rate of groundwater discharge from the basin (aquifer) (ac-ft/yr)
dS/dt = change in aquifer storage of groundwater over time (draw down in feet)
(Freeze and Cherry, 1979)

The results of water-level monitoring of the Blossom aquifer appear to show little change over the period of record and suggest that annual aquifer use (pumping) is approximately equal to annual aquifer recharge. (Bradley, 2008) If annual pumping is approximately equal to annual recharge; the factors for recharge and discharge in the aquifer will cancel each other and the relationship may be simplified to:

Q(t) = dS/dt

If it is assumed that the annual amount of recharge to the aquifer is approximately equal to the most recent (2004) TWDB estimates for groundwater use from the aquifer in each County. The step-by-step description of the process to develop the DFC for each county is as follows:

1. The total area occupied by the aquifer in each county is subdivided by river basin and then by aquifer zone (confined or unconfined).
2. Within each County; the area of each aquifer sub-zone is divided by the total area occupied by the aquifer in the County to give the percentage of the total aquifer area in the County represented by each sub-zone.
3. The estimate of annual recharge (assumed to be equal to the estimate annual aquifer pumping) for each County is divided by the percentage value of the total aquifer area in the County represented by each aquifer sub-zone in the County to give an estimate of recharge to each aquifer sub-zone (in acre-feet per year).
4. The area (in acres) of each aquifer sub-zone in each County is multiplied by an estimated amount of aquifer draw-down (in feet) $_1$ and then multiplied by the storage coefficient of the aquifer sub-zone (expressed as a decimal fraction) $_2$ to give an estimate of the amount of water (in acre-feet) that could be removed from the aquifer if the estimated amount of aquifer draw-down occurred.
5. The estimated volume of water that could be produced from each aquifer sub-zone with the specified estimate of aquifer draw-down is divided by 50 (years) to estimate the amount of water that could be produced each year from the aquifer sub-zone over a 50-year period to result in the estimated amount of aquifer draw-down at the end to the 50-year time period.
6. The estimated annual amount of water that could be produced from each aquifer sub-zone in each County (in acre-feet per year) is added to the estimate of annual recharge for the sub-zone (in acre-feet per year) to give the estimated MAG value for the aquifer sub-zone (in acre-feet per year).
7. The estimated MAG values (in acre-feet per year) of the several aquifer sub-zones in each County are summed to give a total estimated MAG value for the aquifer in each County. (Table 2)

Notes:

1. The estimated average aquifer draw-down values were kept constant for the several sub-zones of the confined and unconfined zones of the aquifer within each County.
2. The storage coefficient values for the confined and unconfined zones were kept constant for all sub-zones in the aquifer zone in all Counties.

County	River Basin	Aquifer zone	Sub-zone Area (acres)	Total Aquifer Area in County (acres)	Sub-zone Percent of Total Area	Estimated Total County Pumping (ac-ft per year)	Assigned Annual Recharge Volume (ac-ft)	Estimated Average Aquifer Draw-down (ft)	Storage Co-efficient (dimen-sionless)	Total With-drawal Volume (ac-ft)	Annual With-drawal Volume (ac-ft)	MAG Estimate (ac-ft)
Lamar	Red	un-confined	2,864	43,732	7%	245	17	2.4	0.1	687	14	31
Lamar	Sulphur	un-confined	28,028	43,732	64%	245	157	2.4	0.1	6727	135	292
Red River	Sulphur	un-confined	23,629	121,043	20%	689	138	6.5	0.1	15359	307	445
Red River	Red	un-confined	52,392	121,043	43%	689	296	6.5	0.1	34055	681	977
Bowie	Red	un-confined	9,832	12,663	78%	95	74	5.4	0.1	5309	106	180
Lamar	Sulphur	confined	12,839	43,732	29%	245	71	20	0.00005	13	0	71
Red River	Sulphur	confined	31,477	121,043	26%	689	179	20	0.00005	31	1	180
Red River	Red	confined	13,548	121,043	11%	689	76	20	0.00005	14	0	76
Bowie	Red	confined	2,831	12,663	22%	95	21	20	0.00005	3	0	21
Totals			177,438				1,029			62,198	1,244	2,273

Table 1, Identification of Blossom Aquifer Sub-zones by County, Sub-zone Area, Percentage of Each Sub-zone of the Total Aquifer Area in the County, Estimated Annual Aquifer Use by County, Estimated Annual Recharge by Aquifer Sub-zone, Estimated Average Aquifer Draw Down in Each Sub-zone, Estimated Total Water Withdrawal by Sub-zone, Estimated Annual Water Withdrawal by Sub-zone and Estimated MAG by Sub-zone

County	Sum of Blossom Aquifer RWP Groundwater Availability Values (ac-ft per year)	Sum of Blossom Aquifer Sub-zone Estimated MAG Values (ac-ft per year)
Lamar	391	394
Red River	1,679	1,678
Bowie	200	201

Table 2, Sum of Regional Water Plan Blossom Aquifer Availability Values by County and Sum of Blossom Aquifer Estimated MAG Values by County

GMA-8 Desired Future Conditions for the Blossom Aquifer

Bowie County

- From estimated year 2009 conditions, the average draw down of the unconfined zone of the Blossom aquifer should not exceed approximately 5.4 feet after 50 years.
- From estimated year 2009 conditions, the average draw down of the confined zone of the Blossom aquifer should not exceed approximately 20 feet after 50 years.

Lamar County

- From estimated year 2009 conditions, the average draw down of the unconfined zone of the Blossom aquifer should not exceed approximately 2.4 feet after 50 years.
- From estimated year 2009 conditions, the average draw down of the confined zone of the Blossom aquifer should not exceed approximately 20 feet after 50 years.

Red River County

- From estimated year 2009 conditions, the average draw down of the unconfined zone of the Blossom aquifer should not exceed approximately 6.5 feet after 50 years.
- From estimated year 2009 conditions, the average draw down of the confined zone of the Blossom aquifer should not exceed approximately 20 feet after 50 years.

Note: The observations and assessments made in this report were based on data supplied by GMA-8 members, TWDB, or available from referenced published sources available at the time of the report preparation. The conclusions drawn in the report are based on the available data and reasonable methods of assessment. The Desired Future Conditions presented in this report reflect policy decisions made by GMA-8. If new or different data is made available, the conclusions of this report may change.

Bibliography

Ashworth, John B., 1988; Ground-Water Resources of the Nacatoch Aquifer; Texas Water Development Board Report 305

Bradley, Robert G., 2008; GTA Aquifer Assessment 07-5mag (Draft); Texas Water Development Board

Freeze, R. Allan and Cherry, John A., 1979; Groundwater; Prentice-Hall Inc; ISBN 0-13-365312-9

McLaurin, Celeste, 1988; Occurrence, Availability, and Chemical Quality of Ground Water in the Blossom Sand Aquifer; Texas Water Development Board Report 307

Williams, Charles R., 2007; Adopted Desired Future Conditions of Minor Aquifers (in Groundwater Management Area 8)

Desired Future Conditions

Nacatoch Aquifer

Bowie, Delta, Ellis, Franklin, Hopkins, Hunt, Kaufman, Lamar, Navarro, Rains, Red River and Rockwall Counties

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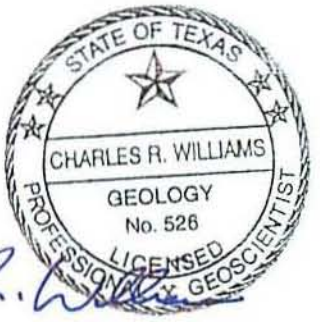
400 West 15th Street, Suite 500, Austin, Texas 78701
T 512.472.4519 F 512.472.7519 www.tcb.aecom.com

Memorandum

To: Cheryl Maxwell, Administrative Manager
Clearwater Underground Water Conservation District

From: Charles R. Williams, P.G. No. 526

Date: March 30, 2009



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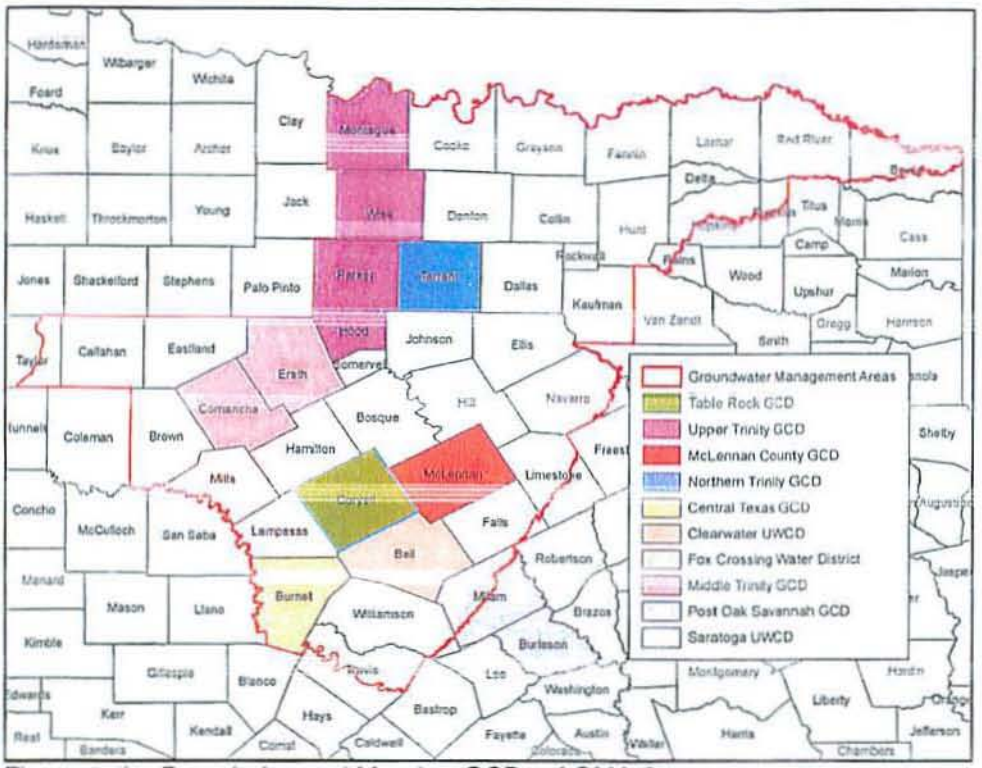
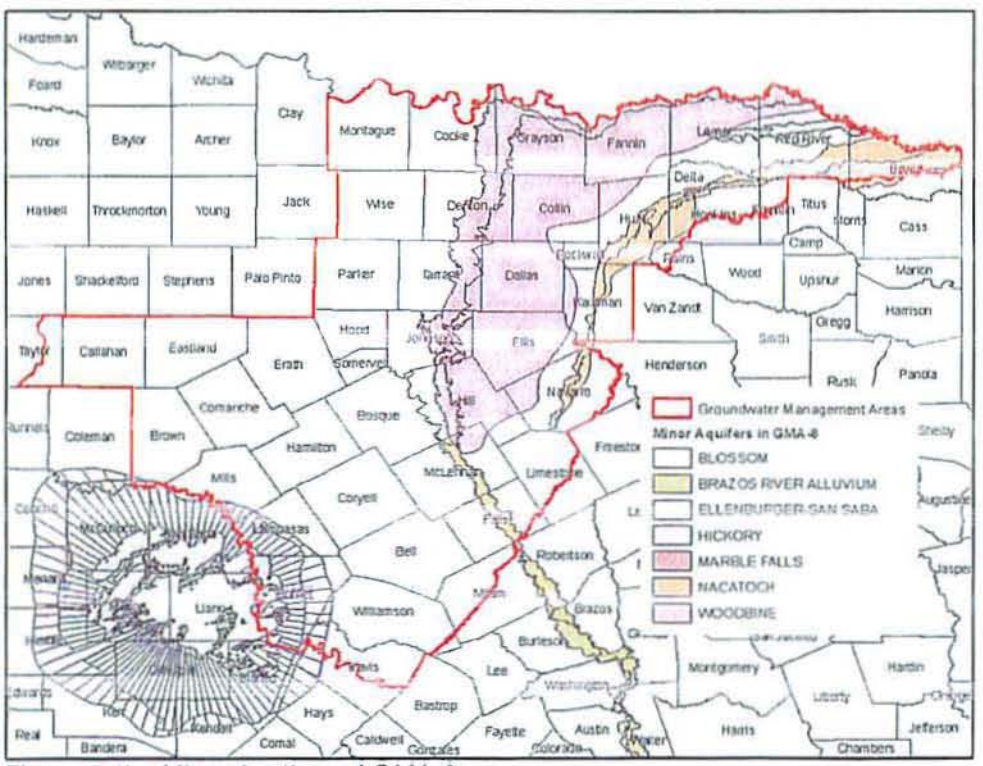


Figure 1, the Boundaries and Member GCDs of GMA-8



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The revised GMA-8 approach to DFC development for the Nacatoch aquifer is to describe a DFC in terms of the average draw down (in feet) for the unconfined and confined zone of the aquifer in each County where the aquifer occurs. GMA-8 maintains the intent to describe a DFC for the Nacatoch aquifer that will result in a MAG approximately equal to the sum of the County values (highest value after year 2000) for RWP availability value for the aquifer in Bowie, Delta, Ellis, Franklin, Hopkins, Hunt, Kaufman, Lamar, Navarro, Rains, Red River and Rockwall Counties.

DFC Development Approach

The purpose of the spreadsheet model is to conveniently predict the estimated amount of water that could be produced annually for 50 years without exceeding a specified level of draw down. The models are used to aid in the DFC development process for aquifers where a TWDB GAM is not available. Iterative trials of a range of draw down values were made until the desired amount of annual water use was achieved for each aquifer sub-zone in County. (Table 1) The results of the annual water use values from the final iteration for each aquifer sub-zone within each County were summed for comparison to the RWP availability values. (Table 2) The spreadsheet model project the effects of pumping using the following relationships:

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Where:
Q(t) = the total rate of groundwater withdrawal (ac-ft/yr)
R(t) = the total rate of groundwater recharge to the basin (aquifer) (ac-ft/yr)
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(Freeze and Cherry, 1979)

The results of water-level monitoring of the Nacatoch aquifer appear to show little change over the period of record and suggest that annual aquifer use (pumping) is approximately equal to annual aquifer recharge. (Bradley, 2008) If annual pumping is approximately equal to annual recharge; the factors for recharge and discharge in the aquifer will cancel each other and the relationship may be simplified to:

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If it is assumed that the annual amount of recharge to the aquifer is approximately equal to the most recent (2004) TWDB estimates for groundwater use from the aquifer in each County. The step-by-step description of the process to develop the DFC for each county is as follows:

1. The total area occupied by the aquifer in each county is subdivided by river basin and then by aquifer zone (confined or unconfined).
2. Within each County; the area of each aquifer sub-zone is divided by the total area occupied by the aquifer in the County to give the percentage of the total aquifer area in the County represented by each sub-zone.
3. The estimate of annual recharge (assumed to be equal to the estimate annual aquifer pumping) for each County is divided by the percentage value of the total aquifer area in the County represented by each aquifer sub-zone in the County to give an estimate of recharge to each aquifer sub-zone (in acre-feet per year).
4. The area (in acres) of each aquifer sub-zone in each County is multiplied by an estimated amount of aquifer draw-down (in feet) $_1$ and then multiplied by the storage coefficient of the aquifer sub-zone (expressed as a decimal fraction) $_2$ to give an estimate of the amount of water (in acre-feet) that could be removed from the aquifer if the estimated amount of aquifer draw-down occurred.
5. The estimated volume of water that could be produced from each aquifer sub-zone with the specified estimate of aquifer draw-down is divided by 50 (years) to estimate the amount of water that could be produced each year from the aquifer sub-zone over a 50-year period to result in the estimated amount of aquifer draw-down at the end to the 50-year time period.
6. The estimated annual amount of water that could be produced from each aquifer sub-zone in each County (in acre-feet per year) is added to the estimate of annual recharge for the sub-zone (in acre-feet per year) to give the estimated MAG value for the aquifer sub-zone (in acre-feet per year).
7. The estimated MAG values (in acre-feet per year) of the several aquifer sub-zones in each County are summed to give a total estimated MAG value for the aquifer in each County. (Table 2)

Notes:

1. The estimated average aquifer draw-down values were kept constant for the several sub-zones of the confined and unconfined zones of the aquifer within each County.
2. The storage coefficient values for the confined and unconfined zones were kept constant for all sub-zones in the aquifer zone in all Counties.

County	River Basin	Aquifer zone	Sub-zone Area (acres)	Total Aquifer Area in County (acres)	Sub-division Percent of Total Area	Estimated Total County Pumping (ac-ft per year)	Assigned Annual Recharge Volume (ac-ft)	Estimated Average Aquifer Draw-down (ft)	Storage Co-efficient (dimen-sionless)	Total With-drawal Volume (ac-ft)	Annual With-drawal Volume (ac-ft)	MAG Estimate (ac-ft)
Bowie	Sulphur	un-confined	18897	316,821	6%	1304	78	10.4	0.1	19445	389	467
Bowie	Sulphur	confined	105218	316,821	33%	1304	430	20	0.00005	105	2	432
Bowie	Red	un-confined	107929	316,821	34%	1304	443	10.4	0.1	112248	2245	2688
Bowie	Red	confined	84977	316,821	27%	1304	352	20	0.00005	85	2	354
Delta	Sulphur	un-confined	41104	41,104	100%	48	48	3	0.1	12331	247	293
Ellis	Trinity	un-confined	68	68	100%	0	0	5	0.1	43	1	1
Franklin*	Sulphur	confined	3898	3,897	100%	10	10	20	0.00005	4	0	10
Franklin*	Sulphur	confined	1	3897	0%	10	0	20	0.00005	0	0	0
Hopkins	Sulphur	un-confined	38570	128,821	30%	495	149	5.5	0.1	21214	424	573
Hopkins	Sulphur	confined	43059	128,821	33%	495	163	20	0.00005	43	1	164
Hopkins	Sulphur	confined	16378	128,821	8%	495	62	20	0.00005	16	0	40
Hopkins	Sulphur	confined	65	128,821	0%	495	0	20	0.00005	0	0	0
Hopkins	Sabine	confined	36,749	128,821	29%	495	144	20	0.00005	37	1	145
Hunt	Trinity	un-confined	13	237,240	0%	1373	0	8.1	0.1	11	0	0
Hunt	Sabine	un-confined	59,771	237,240	25%	1373	343	8.1	0.1	48415	968	1311
Hunt	Sabine	un-confined	14,398	237,240	6%	1373	82	8.1	0.1	11654	233	315
Hunt	Sabine	confined	132,699	237,240	56%	1373	769	20	0.00005	133	3	772
Hunt	Sulphur	un-confined	29	237,240	0%	1373	0	8.1	0.1	23	0	0
Hunt	Sulphur	un-confined	24856	237,240	10%	1373	137	8.1	0.1	20133	403	540
Hunt	Sulphur	confined	2,455	237,240	1%	1373	14	20	0.00005	2	0	14
Hunt	Sulphur	confined	3029	237,240	1%	1373	14	20	0.00005	3	0	14
Hunt	Sulphur	confined	0	237,240	0%	1373	0	20	0.00005	0	0	0
Kaufman	Trinity	un-confined	48,297	89,229	54%	258	135	8.8	0.1	2838	58	136
Kaufman	Trinity	confined	28,622	89,229	32%	258	77	20	0.00005	27	1	78
Kaufman	Trinity	confined	13,068	89,229	15%	258	36	20	0.00005	13	0	36
Kaufman	Sabine	un-confined	1,242	89,229	1%	258	3	8.8	0.1	75	2	5
Lamar	Sulphur	un-confined	7234	7,234	100%	0	0	3.1	0.1	2243	45	45
Navarro	Trinity	un-confined	56,464	96,870	58%	97	56	1.2	0.1	6776	136	192
Navarro	Trinity	confined	40,406	96,870	42%	97	41	20	0.00005	40	1	42
Rains*	Sabine	confined	6,590	6,590	100%	10	10	20	0.00005	7	0	10
Red River	Sulphur	un-confined	135811	180,517	75%	393	297	1.1	0.1	14917	298	595
Red River	Sulphur	confined	39897	180,517	22%	393	87	20	0.00005	39	1	88
Red River	Red	un-confined	6009	180517	3%	393	12	1.1	0.1	661	13	25
Rockwall	Trinity	un-confined	287	554	52%	0	0	1	0.1	29	1	1
Rockwall	Trinity	un-confined	195	554	35%	0	0	1	0.1	20	0	0
Rockwall	Sabine	un-confined	23	554	4%	0	0	1	0.1	2	0	0
Rockwall	Sabine	un-confined	48	554	9%	0	0	1	0.1	5	0	0
Totals			1,193,952				3,973			273,689	5,475	9,448

Table 1, Identification of Nacatoch Aquifer Sub-zones by County, Sub-zone Area, Percentage of Each Sub-zone of the Total Aquifer Area in the County, Estimated Annual Aquifer Use by County, Estimated Annual Recharge by Aquifer Sub-zone, Estimated Average Aquifer Draw Down in Each Sub-zone, Estimated Total Water Withdrawal by Sub-zone, Estimated Annual Water Withdrawal by Sub-zone and Estimated MAG by Sub-zone * Note – In the absence of TWDB Pumping Data: Pumping is Assumed to be 10 acre-feet per year

County	Sum of Nacatoch Aquifer RWP Groundwater Availability Values (ac-ft per year)	Sum of Nacatoch Aquifer Sub-zone Estimated MAG Values (ac-ft per year)	Difference Between Estimated MAG and RWP Availability Values (ac-ft per year)
Bowie	3936	3941	5
Delta	282	293	11
Ellis	0	1	1
Franklin	10	10	0
Hopkins	915	922	7
Hunt	2956	2966	10
Kaufman	318	317	-1
Lamar	45	45	0
Navarro	229	234	5
Rains	10	10	0
Red River	700	708	8
Rockwall	1	1	0

Table 2, Sum of Regional Water Plan Nacatoch Aquifer Availability Values by County and Sum of Nacatoch Aquifer Estimated MAG Values by County

GMA-8 Desired Future Conditions for the Nacatoch Aquifer

Bowie County

- From estimated year 2009 conditions, the average draw down of the unconfined zone of the Nacatoch aquifer should not exceed approximately 10.4 feet after 50 years.
- From estimated year 2009 conditions, the average draw down of the confined zone of the Nacatoch aquifer should not exceed approximately 20 feet after 50 years.

Delta County

- From estimated year 2009 conditions, the average draw down of the unconfined zone of the Nacatoch aquifer should not exceed approximately 3 feet after 50 years.

Ellis County

- From estimated year 2009 conditions, the average draw down of the unconfined zone of the Nacatoch aquifer should not exceed approximately 5 feet after 50 years.

Franklin County

- From estimated year 2009 conditions, the average draw down of the confined zone of the Nacatoch aquifer should not exceed approximately 20 feet after 50 years.

Hopkins County

- From estimated year 2009 conditions, the average draw down of the unconfined zone of the Nacatoch aquifer should not exceed approximately 5.5 feet after 50 years.
- From estimated year 2009 conditions, the average draw down of the confined zone of the Nacatoch aquifer should not exceed approximately 20 feet after 50 years.

Hunt County

- From estimated year 2009 conditions, the average draw down of the unconfined zone of the Nacatoch aquifer should not exceed approximately 8.1 feet after 50 years.
- From estimated year 2009 conditions, the average draw down of the confined zone of the Nacatoch aquifer should not exceed approximately 20 feet after 50 years.

Kaufman County

- From estimated year 2009 conditions, the average draw down of the unconfined zone of the Nacatoch aquifer should not exceed approximately 0.6 feet after 50 years.
- From estimated year 2009 conditions, the average draw down of the confined zone of the Nacatoch aquifer should not exceed approximately 20 feet after 50 years.

Lamar County

- From estimated year 2009 conditions, the average draw down of the unconfined zone of the Nacatoch aquifer should not exceed approximately 3.1 feet after 50 years.

Navarro County

- From estimated year 2009 conditions, the average draw down of the unconfined zone of the Nacatoch aquifer should not exceed approximately 1.2 feet after 50 years.
- From estimated year 2009 conditions, the average draw down of the confined zone of the Nacatoch aquifer should not exceed approximately 20 feet after 50 years.

Rains County

- From estimated year 2009 conditions, the average draw down of the confined zone of the Nacatoch aquifer should not exceed approximately 20 feet after 50 years.

Red River County

- From estimated year 2009 conditions, the average draw down of the unconfined zone of the Nacatoch aquifer should not exceed approximately 1.1 feet after 50 years.
- From estimated year 2009 conditions, the average draw down of the confined zone of the Nacatoch aquifer should not exceed approximately 20 feet after 50 years.

Rockwall County

- From estimated year 2009 conditions, the average draw down of the unconfined zone of the Nacatoch aquifer should not exceed approximately 1 foot after 50 years.

Note: The observations and assessments made in this report were based on data supplied by GMA-8 members, TWDB, or available from referenced published sources available at the time of the report preparation. The conclusions drawn in the report are based on the available data and reasonable methods of assessment. The Desired Future Conditions presented in this report reflect policy decisions made by GMA-8. If new or different data is made available, the conclusions of this report may change.

Bibliography

Ashworth, John B., 1988; Ground-Water Resources of the Nacatoch Aquifer; Texas Water Development Board Report 305

Bradley, Robert G., 2008; GTA Aquifer Assessment 07-5mag (Draft); Texas Water Development Board

Freeze, R. Allan and Cherry, John A., 1979; Groundwater; Prentice-Hall Inc; ISBN 0-13-365312-9

Williams, Charles R., 2007; Adopted Desired Future Conditions of Minor Aquifers (in Groundwater Management Area 8)

Meeting of the

Groundwater Management Area 8

March 16, 2009 in Bellmead, TX

Minutes

The Groundwater Management Area 8 consisting of the Central Texas Groundwater Conservation District, Clearwater Underground Water Conservation District, Fox Crossing Water District, McLennan County Groundwater Conservation District, Middle Trinity Groundwater Conservation District, Northern Trinity Groundwater Conservation District, Post Oak Savannah Groundwater Conservation District, Saratoga Underground Water Conservation District, Tablerock Groundwater Conservation District, and Upper Trinity Groundwater Conservation District held a meeting on Monday, March 16, 2009 in the City of Bellmead City Council Room, located at 3015 Bellmead Drive, Bellmead, Texas.

Groundwater District Representatives Present:

Central Texas GCD: Clyde Waters	Northern Trinity GCD: **Absent**
Clearwater UWCD: Horace Grace	Post Oak Savannah GCD: Gary Westbrook
Fox Crossing WD: Sam Beaumont	Saratoga UWCD: Randy McGuire
McLennan Co. GCD: Rodney Kroll	Tablerock GCD: David Freeman
Middle Trinity GCD: Joe Cooper	Upper Trinity GCD: Mike Massey

1. Invocation

Gary Westbrook gave the invocation

2. Call meeting to order and establish quorum.

The Groundwater Management Area 8 (GMA 8) meeting was called to order at 10:40 a.m. at the City Council Room in Bellmead, TX. Horace Grace called roll and established that a quorum was present. Nine Districts were present at the time of roll call.

3. Welcome and introductions.

Horace Grace asked members of the audience to introduce themselves. Joe Cooper gave a brief summary of the GMA creation through Senate Bill 1763, the GMA process, the development of desired future conditions (DFC) utilization to develop managed available groundwater (MAG) figures. Gary Westbrook reported on a meeting he had with Senator Averitt. Horace Grace noted that the GMA 8 process is ongoing and adjustments can be made at any time.

4. Public Comments.

There was no public comment.

5. Approve minutes of September 17, 2008 GMA 8 meeting.

Joe Cooper moved to approve the minutes of the September 17, 2008 GMA 8 meeting, seconded by Mike Massey. The motion carried unanimously, 9-0.

6. Texas Water Development Board presentation on joint planning process and petition process.

Robert Bradley distributed a handout and gave a presentation on the Texas Water Development Board (TWDB) joint planning and petition process. He opened the presentation with a brief history of the TWDB in relation to Regional Water Plans (RWP) and GMAs and DFCs. He continued that once the groundwater conservation districts (GCD) within a GMA adopt a DFC for an aquifer and submit the DFC to the TWDB, the TWDB calculates estimates of managed available groundwater (MAG) for each GCD within the GMA.

Mr. David Nabors inquired how an area would be able to regulate groundwater use in a county without a GCD and the significance, if any, of the RWP for that same county. Robert Bradley, Horace Grace, and Gary Westbrook responded jointly that there were no direct regulations, however, TWDB funding for projects in areas without a recommended water management strategy would be considered as not consistent with the approved regional water plan, the GCD is the regulatory manager for the county's groundwater resources, and the GCD is the only mechanism by which to implement the MAGs.

7. Summary of GMA8 progress and status of pending Managed Available Groundwater figures.

Horace Grace commented that most of this information had already been covered in previous items. He asked Randy Williams to use this time to give a brief explanation of an aquifer's saturated thickness. Randy Williams, AECOM, explained that the saturated thickness is the measurement by distance between the water table and bottom of the aquifer. Mr. Williams also explained various geographical characteristics of an aquifer such as the confined and unconfined portion of an aquifer and how those characteristics affect the potential drawdown of the saturated thickness.

Mr. Nabors inquired on what to do once the DFC is exceeded within the District. Horace Grace responded that the District must limit production and discontinue issuing new permits until the aquifer has recharged above the DFC. Mr. Nabors asked about how to provide for the water needs of the District if they exceed what is permissible by the DFC. Gary Westbrook noted that the enabling legislation for the District should contain direction for responding to such a situation. He also noted that there might be a potential for interlocal agreements between GCDs and then reiterated Mr. Grace's comments on promoting conservation within the District. Joe Cooper added that depending on the geographic location of the GCD, the DFCs look very different. He illustrated that some GCDs find themselves more in the position of managed depletion rather than preservation.

8. Discussion and possible action to rescind desired future conditions for the Blossom and Nacatoch aquifers adopted at the December 17, 2007 GMA8 meeting.

Randy Williams explained that the MAG figures from TWDB have come back considerably different than what GMA8 projected when setting the DFCs for the Blossom and Nacatoch aquifers. He stated he has conferred with members of TWDB and proposes rescinding the DFCs for these two aquifers. The proposed revised DFCs would more closely reflect what is currently published in the Regional Water Plan (RWP).

9. Presentation of revised desired future conditions for the Blossom and Nacatoch aquifers.

Randy Williams presented the proposed revised DFCs for the Blossom and Nacatoch aquifers to the Board. He noted that the DFCs would need to be defined by the confined and unconfined portions of each aquifer.

10. <u>Public hearing</u> and possible action to adopt revised desired future conditions for the Blossom and Nacatoch aquifers.

Horace Grace clarified that the Board had entered a public hearing at 12:08 p.m. and explained the purpose of the public hearing.

Mr. David Nabors expressed that Delta County is considering the creation of a GCD and questioned whether the creation of a GCD would help them in the planning process. He stated that Delta County is trying to understand the DFC but would also like to protect its residents in the process of protecting its resources.

Joe Cooper responded that Mr. Nabors and others in Delta County may want to study Chapter 36 of the Texas Water Code and the provisions for historic use and "Grandfather" existing well use.

Mr. Wendel Davis, Red River Water Supply Corporation, commented that they are currently utilizing more groundwater resources than is represented in the Regional Water Plan and have not seen the drawdown as projected by the TWDB.

Gary Westbrook asked if the Red River Water Supply Corporation would be willing to share the water level readings they take on their wells with GMA 8 and or TWDB to compare information and utilize the actual reading to refine the GAM model. Mr. Davis responded that Red River Water Supply Corporation would be glad to share that information.

Gary Westbrook reassured Mr. Davis that these DFCs may be adjusted by GMA8 at any time and are required to be reviewed every five years. He noted that due to current time constraints GMA8 would prefer to rescind these DFCs but expressed direct interest to utilize any further information that could be provided to help refine these figures to meet actual planning needs.

Horace Grace closed the public hearing at 12:25 p.m.

Item # 8.
Sam Beaumont moved to rescind the desired future conditions for the Blossom and Nacatoch aquifers, seconded by David Freeman. The motion carried, 9-0.

Item # 10.
Joe Cooper moved to adopt the revised desired future conditions for the Blossom and Nacatoch aquifers and submit these to the Texas Water Development Board, seconded by Gary Westbrook. The motion carried, 9-0.

11. Discussion and possible action on results of the Texas Water Development Board Groundwater Availability Model (GAM) simulation requests 08-64 and 08-66 for the Northern Trinity/Woodbine aquifers.

Mike Massey moved to table this item until the next board meeting, seconded by Gary Westbrook. The motion carried, 9-0.

12. Discussion of funding needed to continue and support joint planning process.

Cheryl Maxwell, Clearwater UWCD, informed the Committee that $3,251.03 is needed to cover current outstanding invoices from TCB/AECOM.

Mike Massey inquired of the status of the previous commitment from Northern Trinity GCD of $3,000. Cheryl Maxwell responded that no funding had been received to date. Rodney Kroll, McLennan County GCD, noted that if they survive the possible dissolution of their District, they may be able to contribute another $500. Gary Westbrook, Joe Cooper, and Horace Grace committed to contribute an additional $1,000 from each of their respective districts. Mike Massey, Upper Trinity GCD, commented that he would consult with his Board about making an additional contribution of $750.

Fox Crossing, Saratoga, and Tablerock GCDs all responded that with no revenue stream available to them, no contributions could be committed by their districts.

Clyde Waters, Central Texas GCD Representative, commented that he would speak with Richard Bowers, General Manager, about a $1,000 contribution.

13. Committee member comments.

No comments were made.

14. Discuss agenda items for next meeting

No future agenda items were determined at this time.

15. Set date, time, and place of next meeting.

Next meeting to be determined.

16. Closing comments.

Gary Westbrook extended his gratitude to the City of Bellmead for hosting the GMA 8 meeting and thanked the public for their interest and involvement.

Joe Cooper thanked Cheryl Maxwell for all of her diligence in functioning as the Administrative Officer for GMA 8.

Horace Grace thanked Cheryl Maxwell and Randy Williams for all of their support and hard work for GMA 8.

Cheryl Maxwell announced that there was an upcoming Region G Meeting on April 15, 2009.

17. Adjourn.

Meeting was adjourned at 12:48 p.m.

The GMA 8 Committee unanimously approved the minutes on this 10th day of March, 2010.

ATTACHMENT 2

COPIES OF AGENDAS

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 8

Notice is hereby given that the groundwater conservation districts located wholly or partially within Groundwater Management Area (GMA) 8, as designated by the Texas Water Development Board (TWDB), consisting of the Central Texas Groundwater Conservation District, Clearwater Underground Water Conservation District, Fox Crossing Water District, Middle Trinity Groundwater Conservation District, North Texas Groundwater Conservation District, Northern Trinity Groundwater Conservation District, Post Oak Savannah Groundwater Conservation District, Prairielands Groundwater Conservation District, Red River Groundwater Conservation District, Saratoga Underground Water Conservation District, Southern Trinity Groundwater Conservation District, and Upper Trinity Groundwater Conservation District will hold a ***Joint Planning meeting at 10:00 A.M. on Wednesday, April 27, 2011,*** in the City of Woodway City Hall located at 922 Estates Drive, Woodway, Texas 76712-3432. The meeting will be open to the public. The following items of business will be discussed:

1. Invocation.
2. Call meeting to order and establish quorum.
3. Welcome and introductions.
4. Public comment.
5. Approve minutes of February 22, 2011 GMA 8 meeting.
6. Discussion and possible action to re-adopt the current desired future conditions for the major and minor aquifers within GMA 8 to include some or all of the following: Edwards BFZ, Trinity, Blossom, Brazos River Alluvium, Ellenburger-San Saba, Hickory, Marble Falls, Nacatoch, and Woodbine.
7. Discussion and possible action to revise the desired future conditions for the Nacatoch Aquifer based on TWDB Scenario 4.
8. Discuss results of Groundwater Availability Model (GAM) Run 11-005 for Central Texas Groundwater Conservation District in Burnet County.
9. Discussion and possible action on desired future condition statements and managed available groundwater for Central Texas Groundwater Conservation District, Burnet County.
10. Discussion and possible action on making the Brazos River Alluvium in Milam County irrelevant.
11. Discussion and possible action regarding funding, administrative support, and a budget for GMA 8 activities.
12. Discuss agenda items for next meeting.
13. Set date, time, and place of next meeting.
14. Closing comments.
15. Adjourn.

Dated this 20th day of April, 2011

George "Butch" Henderson, President
Red River GCD

The above agenda schedules represent an estimate of the order for the indicated items and is subject to change at any time. These public meetings are available to all persons regardless of disability. If you require special assistance to attend the meeting, please call (800) 256-0935 at least 24 hours in advance of the meeting to coordinate any special physical access arrangements.

This is to certify that I, Carmen Catterson, posted this agenda on the outdoor bulletin board of the Administrative Offices of the District at 5100 Airport Drive, Denison, Texas 75020, and also provided this agenda to the County Clerks in Fannin and Grayson Counties with a request that it be posted, at or before 5:00 p.m. on April 20, 2011.

Carmen Catterson

Sworn and subscribed to before me this 20th day of April 2011.

Notary Public

E. ANNETTE RICHARDSON
Notary Public, State of Texas
My Commission Expires
December 29, 2014

(SEAL)

Carmen Catterson

From: liaison@sos.state.tx.us
Sent: Wednesday, April 20, 2011 4:35 PM
To: carmenc@gtua.org
Subject: S.O.S. Acknowledgment of Receipt

Agency: Greater Texoma Utility Authority
Liaison: Carmen Catterson

Acknowledgment of Receipt

The Office of the Secretary of State has posted notice of the following meeting:

Meeting Information:
Groundwater Management Area 8
Committee
04/27/2011 10:00 AM "TRD# 2011002804"
Notice posted: 04/20/11 04:34 PM
Proofread your current open meeting notice at:

http://info.sos.state.tx.us/pls/pub/pubomquery$omquery.queryTRD?p_trd=2011002804

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11. Discussion and possible action regarding funding, administrative support, and a budget for GMA 8 activities.
12. Discuss agenda items for next meeting.
13. Set date, time, and place of next meeting.
14. Closing comments.
15. Adjourn.

FILED FOR RECORD
2011 APR 20 PM 4:50
WILMA BLACKSHEAR BUSH
COUNTY CLERK
GRAYSON COUNTY, TX

Dated this 20th day of April, 2011

George "Butch" Henderson, President
Red River GCD

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12. Discuss agenda items for next meeting.
13. Set date, time, and place of next meeting.
14. Closing comments.
15. Adjourn.

Filed for Record at 10:15 O'Clock A M 4/21/2011
Tammy Biggar, County Clerk By [signature] Deputy

Dated this 20th day of April, 2011

George "Butch" Henderson, President
Red River GCD

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Dated this 20th day of April, 2011

Eddy Daniel, President
North Texas GCD

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This is to certify that I, Carmen Catterson, posted this agenda on the outdoor bulletin board of the Administrative Offices of the District at 5100 Airport Drive, Denison, Texas 75020, and also provided this agenda to the County Clerks in Collin, Cooke, and Denton Counties with a request that it be posted, at or before 5:00 p.m. on April 20, 2011.

Carmen Catterson

Sworn and subscribed to before me this 20th day of April 2011.

Notary Public

E. ANNETTE RICHARDSON
Notary Public, State of Texas
My Commission Expires
December 29, 2014

Carmen Catterson

From: liaison@sos.state.tx.us
Sent: Wednesday, April 20, 2011 4:35 PM
To: carmenc@gtua.org
Subject: S.O.S. Acknowledgment of Receipt

Agency: Greater Texoma Utility Authority
Liaison: Carmen Catterson

Acknowledgment of Receipt

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Committee
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Proofread your current open meeting notice at:

http://info.sos.state.tx.us/pls/pub/pubomquery$omquery.queryTRD?p_trd=2011002804

Carmen Catterson

From: publicnotices@dentoncounty.com
Sent: Wednesday, April 20, 2011 4:33 PM
To: carmenc@gtua.org
Subject: Document Approved: New Public Notice Document

Document Approved

Filename	NTGCD.PDF
Entity	Groundwater Management Area 8
Description	Committee Meeting
Date & Time Filed	4/20/2011 4:33:28 PM
Date & Time Uploaded	4/20/2011 4:32:20 PM
Event Date	4/27/2011
Created By	gtua

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FILED
2011 APR 20 PM 4:34
COLLIN COUNTY, TEXAS
DEPUTY

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Dated this 20th day of April, 2011

Eddy Daniel, President
North Texas GCD

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14. Closing comments.
15. Adjourn.

Dated this 20th day of April, 2011

Eddy Daniel, President
North Texas GCD

FILED FOR RECORD
11 APR 20 AM 4:32
COUNTY CLERK, COOKE CO. TX
BY ____ DEPUTY

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Dated this 20th day of April, 2011

Mike Massey

Mike Masseyf Board President
Upper Trinity Groundwater Conservation District

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POSTED
At 10:57 o'clock AM
APR 21 2011
SHERRY LEMON, COUNTY CLERK
WISE COUNTY, TEXAS
BY DEPUTY
Vicky Gaston

NOTICE OF MEETING- GROUNDWATER MANAGEMENT AREA 8

April 27, 2011 – 10:00 a.m.
City of Woodway City Hall
922 Estates Drive
Woodway, Texas 76712-3432

AGENDA

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Filed 21 day of April
in 2011, At 10:30 M.
BARBARA VANSA
County Clerk, Milam County, Texas
By _____ Deputy

Gary Westbrook

Dated this 21st day of April, 2011

By: _____
Gary Westbrook, General Manager, POSGCD

The Post Oak Savannah Groundwater Conservation District is committed to compliance with the Americans with Disabilities Act. Reasonable accommodations and equal opportunity for effective communications will be provided upon request. Please contact the District office at 512-455-9900 at least 24 hours in advance if accommodation is needed. During the meeting, the Committee reserves the right to go into executive session for any of the purposes authorized under V.T.C.A., Government Code, Chapter 551, for any item on the above agenda or as otherwise authorized by law.

NOTICE OF MEETING- GROUNDWATER MANAGEMENT AREA 8

April 27, 2011 – 10:00 a.m.

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FILED
at 3:40 o'clock P M
APR 21 2011
ANNA L. SCHIELACK
COUNTY CLERK, BURLESON CO., TEX.
By EDa Nelson Deputy

Gary Westbrook

Dated this 21st day of April, 2011

By: _____
Gary Westbrook, General Manager, POSGCD

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APR 21 2011
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WISE COUNTY, TEXAS
BY DEPUTY
Vicky Gac

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10. Discussion and possible action on making the Brazos River Alluvium in Milam County irrelevant.
11. Discussion and possible action regarding funding, administrative support, and a budget for GMA 8 activities.
12. Discuss agenda items for next meeting.
13. Set date, time, and place of next meeting.
14. Closing comments.
15. Adjourn.

Dated this 20th day of April, 2011

Rodney Kroll, President
Southern Trinity GCD

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RECEIVED 4:30 P M
APR 21 2011
J.A. "ANDY" HARWELL, COUNTY CLERK
McLENNAN COUNTY, TEXAS

THE STATE OF TEXAS
COUNTY OF McLENNAN COUNTY

This is to certify that the Notice of a Meeting, a copy of which is attached hereto, was posted on the official bulletin board at the Courthouse, as required by Article 62.52-17 V. T. C. S.

Executed on April 21 2011

McLENNAN COUNTY, TEXAS COUNTY COURT OF McLENNAN

J. A. "Andy" Harwell, County Clerk
McLennan County, Texas

By B. Martinez **B. Martinez Deputy**

* * * COMMUNICATION RESULT REPORT (APR.21.2011 3:54PM) * * *

TTI GTUA

FILE MODE	OPTION	ADDRESS (GROUP)	RESULT	PAGE
084 MEMORY TX		12547575146	OK	P. 2/2

REASON FOR ERROR
E-1) HANG UP OR LINE FAIL
E-2) BUSY
E-3) NO ANSWER
E-4) NO FACSIMILE CONNECTION

GROUNDWATER MANAGEMENT AREA 8

5100 Airport Drive
Denison TX 75020
Ph. (855) 426-4433
Fax (903) 786-8211
c.catterson@northtexasgcd.org

FACSIMILE NO: (254) 757-5146

SEND TO:
NAME: Bea Martinez
McClennan County Clerk

FROM: Carmen Catterson, Secretary

DATE: April 21, 2011

PROJECT: Groundwater Management Area 8 Notice of Meeting

NO. PAGES: 2 (including cover sheet)

Attached is a meeting notice for GMA 8. Please post this and fax a file-marked copy to (903) 786-8211

GROUNDWATER MANAGEMENT AREA 8

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Thank you,

Carmen

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GROUNDWATER MANAGEMENT AREA 8

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1. Invocation.
2. Call meeting to order and establish quorum.
3. Welcome and introductions.
4. Public comment.
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12. Discuss agenda items for next meeting.
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14. Closing comments.
15. Adjourn.

Dated this 20th day of April, 2011

Rodney Kroll, President
Southern Trinity GCD

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Dated this 20th day of April, 2011

Randy McGuire, President
Saratoga UWCD

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FILED

21st day of April 20 11

Connie Hartmann

COUNTY CLERK, LAMPASAS COUNTY, TEXAS

BY Joyce H Olson DEPUTY

* * * COMMUNICATION RESULT REPORT (APR.21.2011 4:01PM) * * *

TTI GTUA

FILE MODE	OPTION	ADDRESS (GROUP)	RESULT	PAGE
085 MEMORY TX		15125568270	OK	P. 2/2

REASON FOR ERROR
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5100 Airport Drive
Denison TX 75020
Ph. (855) 426-4433
Fax (903) 786-8211
c.catterson@northtexasgcd.org

FACSIMILE NO: ~~512-556-8270~~ 8960

SEND TO:
NAME: Lampasas County Clerk

FROM: Carmen Catterson, Secretary

DATE: April 21, 2011

PROJECT: Groundwater Management Area 8 Notice of Meeting

NO. PAGES: 2 (including cover sheet)

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GROUNDWATER MANAGEMENT AREA 8

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Denison TX 75020
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Saratoga UWCD

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FILED
AT 2:55 O'CLOCK P M

APR 21 2011

COUNTY CLERK, CORYELL CO., TEXAS

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 8

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Dated this 20th day of April, 2011

Joe B. Cooper III, President
Middle Trinity GCD

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Dated this 20th day of April, 2011

Joe B. Cooper III
General Manager
Middle Trinity GCD

FILED FOR RECORD
2011 APR 21 PM 2:33
Betty Outlaw
BETTY OUTLAW, COUNTY CLERK
BOSQUE COUNTY, TEXAS

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At any time during the meeting or work session and in compliance with the Texas Open Meetings Act, Chapter 551, Government Code, Vernon's Texas Codes, Annotated, the North Texas Groundwater Conservation District Board may meet in executive session on any of the above agenda items or other lawful items for consultation concerning attorney-client matters (§551.071); deliberation regarding real property (§551.072); deliberation regarding prospective gifts (§551.073); personnel matters (§551.074); and deliberation regarding security devices (§551.076). Any subject discussed in executive session may be subject to action during an open meeting.

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15. Adjourn.

FILED
AT 1:15 O'CLOCK P M
APR 21 2011
Clerk, County Court Comanche Co., Texas

Dated this 20th day of April, 2011

Joe B. Cooper III
General Manager
Middle Trinity GCD

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15. Adjourn.

POSTED
____ A.M. 2:25 P.M.

APR 21 2011
GWINDA JONES, COUNTY CLERK
ERATH COUNTY, TEXAS
BY _____ DEPUTY

Dated this 20th day of April, 2011

Joe B. Cooper III
General Manager
Middle Trinity GCD

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DBW

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14. Closing comments.
15. Adjourn.

The Northern Trinity Groundwater Conservation District is committed to public access. To request an accommodation for a person with a disability who wishes to attend the meeting, contact Mark Mendez at 817-884-2729 at least one business day prior to the posted meeting.

Corrected Date of Meeting

NOTICE OF MEETING
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Dated this 20th day of April, 2011

Eddy Daniel, President
North Texas GCD

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Certification: I, the undersigned authority, do hereby certify that on April 21, 2011 at or before 5:00 p.m., I posted and filed the above notice of meetings with the Burnet County Clerk's office and posted a copy in the hallway of the Burnet County Courthouse in a place convenient and readily accessible to the general public at all times. I also certify that a copy of the notice was posted on the door and on an outside window of the District office and that they will remain so posted continuously for at least 72 hours preceding the scheduled time of said meeting in accordance with the Texas Government Code, Chapter 551.

Dated this 21th day of April, 2011

Richard S. Bowers, General Manager
Central Texas Groundwater Conservation District

POSTED
April 21, 2011
Janet Parker
County Clerk - Burnet County, Texas
By _____ Deputy

FILED

2011 APR 21 AM 8:46

COUNTY CLERK
HUNT COUNTY, TEXAS

NOTICE OF MEETING
GROUNDWATER MANAGEMENT AREA 8

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11. Discussion and possible action regarding funding, administrative support, and a budget for GMA 8 activities.
12. Discuss agenda items for next meeting.
13. Set date, time, and place of next meeting.
14. Closing comments.
15. Adjourn.

Dated this 21st day of April, 2011

Russell Laughlin, President
Northern Trinity GCD

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FILED
TARRANT COUNTY TEXAS
2011 APR 21 AM 10 34
COUNTY CLERK
BY

This is to certify that I, Sheila Rushing, posted this agenda on the outdoor bulletin board of the Administrative Offices of the District at 1121 Mercedes St., Benbrook, Texas 76127 and also provided this agenda to the County Clerk in Tarrant County with a request that it be posted, at or before 5:00 p.m. on April 21, 2011.

Sheila L. Rushing
Sheila L. Rushing

Sworn and subscribed to before me this 21 day of April 2011.

Regenia A. Stone
Notary Public

(SEAL)

REGENIA A STONE
NOTARY PUBLIC
STATE OF TEXAS
My Comm. Exp. 05-08-2013

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FILED FOR RECORD
At 1:20 O'Clock P M
APR 21 2011
CAROLYN FOSTER County & District Clerk
Mills County, Texas
By _____ Deputy

Dated April21, 2011

Glen Love, Jr. – Chairman— Fox Crossing Board of Directors

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FILED FOR RECORD
2011 APR 21 A 9:01
SHELLEY COSTON
CO. CLK. BELL CO. TX

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Dated this 21st day of April, 2011

Cheryl Maxwell, Assistant Secretary
Clearwater UWCD

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FILED FOR RECORD
CINDY POLLEY
ELLIS COUNTY CLERK
11 APR 21 AM 9:18

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Charles Beseda, President
Prairielands GCD

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Prairielands GCD

FILED
COUNTY CLERK
COUNTY, TEXAS
2011 APR 21 A 10:25

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FILED
BECKY WILLIAMS, COUNTY CLERK
JOHNSON COUNTY, TEXAS
10:30 O'CLOCK A M

APR 21 2011

By: _____ Deputy

Dated this 21st day of April, 2011

Charles Beseda, President
Prairielands GCD

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POSTED
DATE 4/21/11
9:30 A.M. _____ P.M.
Candace Garrett
BY _____ DEPUTY

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Charles Beseda, President
Prairielands GCD

BY _____ DEPUTY
2011 APR 21 AM 9:17

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Erin Zoch

From: liaison@sos.state.tx.us
Sent: Thursday, April 21, 2011 9:46 AM
To: Erin Zoch
Subject: S.O.S. Acknowledgment of Receipt

Agency: Prairielands Groundwater Conservation District
Liaison: Erin Zoch

Acknowledgment of Receipt

The Office of the Secretary of State has posted notice of the following meeting:

Meeting Information:
Groundwater Management Area 8
Joint Planning Committee
04/27/2011 10:00 AM "TRD# 2011002814"
Notice posted: 04/21/11 09:46 AM
Proofread your current open meeting notice at:

http://info.sos.state.tx.us/pls/pub/pubomquery$omquery.queryTRD?p_trd=2011002814

ATTACHMENT 3

APPROVED MINUTES

Meeting of the

Groundwater Management Area 8

April 27, 2011 in Woodway, TX

Minutes

The Groundwater Management Area 8 consisting of the Central Texas Groundwater Conservation District, Clearwater Underground Water Conservation District, Fox Crossing Water District, Middle Trinity Groundwater Conservation District, North Texas Groundwater Conservation District, Northern Trinity Groundwater Conservation District, Post Oak Savannah Groundwater Conservation District, Prairielands Groundwater Conservation District, Red River Groundwater Conservation District, Saratoga Underground Water Conservation District, Southern Trinity Groundwater Conservation District, and Upper Trinity Groundwater Conservation District (GCD) held a ***Joint Planning meeting at 10:00 A.M. on Wednesday, April 27, 2011,*** in the City of Woodway City Hall in Woodway, Texas.

Groundwater District Representatives Present:

Central Texas GCD: Richard Bowers
Clearwater UWCD: Leland Gersbach
Fox Crossing WD: Jed Garren
Middle Trinity GCD: George Bingham
North Texas GCD: Eddy Daniel
Northern Trinity GCD: Craig Schkade
Post Oak Savannah GCD: Gary Westbrook
Prairielands GCD: Charles Beseda
Red River GCD: Butch Henderson
Saratoga UWCD: Asa Langford
Southern Trinity GCD: Glen Thurman
Upper Trinity GCD: Mike Massey

1. Invocation

Mr. Eddy Daniel, North Texas GCD, presided over the meeting. Gary Westbrook, Post Oak Savannah GCD, gave the invocation.

2. Call meeting to order and establish quorum.

The Groundwater Management Area 8 (GMA 8) meeting was called to order at 10:02 AM at the Woodway City Hall in Woodway, TX. Mr. Daniel welcomed the new members, took roll and established that a quorum was present. Eleven Districts were present at the time of roll call, with the Central Texas GCD representative absent. Richard Bowers with the Central Texas GCD arrived at 10:07 AM.

3. Welcome and introductions.

Mr. Daniel asked members of the audience to introduce themselves.

4. Public Comments.

There were no public comments.

5. Approve minutes of February 22, 2011 GMA 8 meeting.

Butch Henderson, Red River GCD, moved to approve the minutes of the February 22, 2011 GMA 8 meeting, seconded by Charles Beseda, Prairielands GCD. The motion carried unanimously, 12-0.

6. Discussion and possible action to re-adopt the current desired future conditions for the major and minor aquifers within GMA 8 to include some or all of the following: Edwards BFZ, Trinity, Blossom, Brazos River Alluvium, Ellenburger-San Saba, Hickory, Marble Falls, Nacatoch, and Woodbine.

The resolution to re-adopt the desired future conditions for aquifers in GMA 8 was approved at the last meeting. However, the agenda was not posted properly in all counties, so all actions taken are considered invalid. The resolution is unchanged from the last meeting and only needs to be reapproved.

Mike Massey, Upper Trinity GCD, moved to approve the Resolution to re-adopt the current desired future conditions for the major and minor aquifers within GMA 8, seconded by Charles Beseda, Prairielands GCD. The motion carried unanimously, 12-0.

7. Discussion and possible action to revise the desired future conditions for the Nacatoch Aquifer based on TWDB Scenario 4.

Mr. Bill Hutchison with the Texas Water Development Board (TWDB) explained that this was discussed at the last meeting and action was taken. The Nacatoch Aquifer desired future conditions that were developed and re-adopted in Item 6 did not include provisions to reflect the current groundwater usage and possible droughts in the next few years. The TWDB was requested to create a report with scenarios to reflect a variety of possibilities. The TWDB provided a series of scenarios and the Committee approved Scenario 4 at the past meeting. However, due to incorrect posting all actions taken at that meeting need to be re-approved.

The resolution language was not available at this time. Mr. Hutchison recommended that a resolution be developed after further consultation and be provided at the next meeting for review. This item was tabled until the next meeting.

8. Discuss results of Groundwater Availability Model (GAM) Run 11-005 for Central Texas Groundwater Conservation District in Burnet County

Mr. Richard Bowers, Central Texas GCD, provided the Committee with a copy of GAM Run 11-005. The Trinity GAM Run 11-005 shows a current usage of 3,600 acre feet for the Central Texas GCD. The possible scenarios included in the report include options for 10,000 acre feet of production, 20,000 acre-feet of production and 32,000 acre-feet of production. Mr. Bowers stated that the Central Texas GCD would like to see the last scenario adopted since it provides for possible drought conditions. The current desired future conditions do not allow for extreme drought conditions.

The change in the desired future conditions for Burnet County would change the amount of available groundwater for the Clearwater GCD. Leland Gersbach, Clearwater GCD, explained that their District is in the process of collecting information to determine a position on the different scenarios. Ms. Cheryl Maxwell, Clearwater GCD, stated that the District discussed the additional 20-feet of drawdown that would result in a loss of almost 2,000 acre-feet of groundwater to maintain the desired future conditions in their District. The Clearwater GCD would like to meet with the Central Texas GCD and the TWDB to consider possible options or alternatives.

9. Discussion and possible action on desired future condition statements and managed available groundwater for Central Texas Groundwater Conservation District, Burnet County

The Committee does not currently have a resolution to re-adopt the desired future condition statements for Burnet County, but will work with Mr. Hutchison to develop the resolution in time for the next meeting. This item was tabled until the next meeting, pending further discussion.

10. Discussion and possible action on making the Brazos River Alluvium in Milam County irrelevant.

Gary Westbrook, Post Oak Savannah GCD, stated that the wording is inaccurate, since the Brazos River Alluvium is non-relevant, not irrelevant. Mr. Westbrook stated that he would like to have a resolution drafted to have the Brazos River Alluvium declared non-relevant to the Post Oak Savannah GCD to save the District the cost of constructing monitoring wells and maintaining records on the Brazos River Alluvium. Mr. Hutchison clarified that this would mean that the Brazos River Alluvium is non-relevant for joint planning. This would be a way to fix a problem with a Groundwater Monitoring Plan. This can also be a step taken for water that is completely localized within a District.

Glen Thurman, Southern Trinity GCD, requested that the Woodbine Aquifer be removed from his District for joint planning purposes. Mr. Daniel recommended that all GCDs take action on any aquifer formations that they desire be removed from their District to take action and then address the GMA 8 Committee at the next meeting. This item was tabled pending development of a resolution.

Mr. Daniel requested that Mr. Hutchison provide an update from the TWDB perspective on the Legislature and the groundwater model. Mr. Hutchison reported that a meeting was held last month to discuss modifications planned for several minor aquifers in the Trinity. The planned model will also include updates to the Woodbine and Trinity Aquifers. The stakeholder meeting was for planning since no information on budget or staff is available at this time. More information will be available within the next six to ten weeks. Many groundwater bills are in Legislature currently. Several involve the desired future conditions process and groundwater modeling. There is also a proposed bill to streamline the posting process for Groundwater Management Areas. Mr. Hutchison recommended modifying any desired future conditions that need modification prior to September 1st to avoid any additional guidelines approved by the Legislature.

11. Discussion and possible action regarding funding, administrative support, and a budget for GMA 8 activities

Mr. Daniel stated that at the last meeting a budget was discussed. Ultimately, GMA 8 will need funds. The North Texas GCD has agreed to take on the costs for administrative activities for GMA 8. He expressed gratitude to the Greater Texoma Utility Authority for their assistance in this matter. He offered to begin drafting a budget to develop an idea of what kind of costs will be needed. Glen Thurman with the Southern Trinity GCD stated that this would be very beneficial to all Districts to help them with their financial planning. Mr. Daniel requested that Carmen Catterson itemize her time for GMA 8 to better determine how much time is needed for each meeting.

12. Discuss agenda items for next meeting.

Nacatoch desired future conditions, Burnet County desired future conditions, non-relevance of Brazos River Alluvium for Milam County, Southern Trinity non-relevance of Woodbine Aquifer, budget.

At this time, Jerry Chapman with the Greater Texoma Utility Authority questioned which Districts had well exemptions above 25,000 gallons per day. 5 of the 12 Districts set the exemption levels above 25,000 gallons per day. Mr. Hutchison stated that the TWDB is still waiting to receive feedback on exempt uses and requested that each District provide feedback to the TWDB stating that the District agrees with the provided numbers or a request to modify them.

13. Set date, time, and place of next meeting.

Prairielands GCD is located in the central part of GMA 8. Mr. Daniel recommended hosting the meeting near their location. The Committee agreed to host the meeting near Prairielands in mid to late June to provide planning time.

14. Closing comments.

Mr. Daniel thanked the Committee for attending the meeting. Leland Gersbach, Clearwater GCD, introduced Mr. Dirk Aaron. Mr. Aaron will be taking Ms. Maxwell's position beginning in June. Mr. Daniel thanked the North Texas GCD for taking control of the administrative duties for GMA 8. Mike Massey, Upper Trinity GCD, requested that the Committee provide donations to the Woodway City Hall to help pay for the refreshments used.

15. Adjourn.

Mike Massey, Upper Trinity GCD, motioned to adjourn the meeting, seconded by Richard Bowers, Central Texas GCD. The motion carried unanimously, 12-0 and the meeting adjourned at 11:10 a.m.

The GMA 8 Committee unanimously approved the minutes on this 23rd day of June, 2011.

Carmen Catheron

Recording Secretary