Blanco – Pedernales Groundwater Conservation District

GROUNDWATER MANAGEMENT PLAN

Originally Adopted
November 19, 2002

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6th Revision, Adopted
November 21, 2013

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GROUNDWATER MANAGEMENT PLAN

REVISION RECORD

Date Adopted	Effective Date	Affected Sections or General Comments
11/19/02	11/19/02	Original Adoption
02/18/03	02/18/03	Rev. 1: Revisions resulting from TWDB Approval Review
04/15/03	04/15/03	Rev. 2: Revise Table 1, Table 3, & associated text to address TWDB comments
06/05/08	06/05/08	Rev. 3: 5 year statutory review, general revisions, and new Chapter 36 requirements
09/18/08	09/18/08	Rev. 4: Revisions resulting from TWDB Approval Review comments
11/20/08	11/20/08	Rev. 5: Revisions resulting from TWDB Approval Review comments
11/21/13	11/21/13	Rev. 6: 5 year statutory review, and revisions due to new Chapter 36 requirements

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I. DISTRICT MISSION

The Blanco-Pedernales Groundwater Conservation District (BPGCD or District) was created under Chapter 36 of the Texas Water Code for the purpose of conserving, preserving, recharging, protecting and preventing waste of groundwater from the aquifers within Blanco County. The District will conduct administrative and technical activities and programs to achieve these purposes. The District will use the authority granted by Chapter 36 and other state laws to collect and archive water well and aquifer data, regulate water well drilling and production, promote the capping or plugging of abandoned wells, provide information and educational material to local property owners, interact with other governmental or organizational entities, and incorporate other groundwater-related activities that may help meet the purposes of the District.

II. PURPOSE OF THE MANAGEMENT PLAN

The purpose of the Management Plan is to provide a planning tool for the District as it moves forward with its efforts to manage, conserve, and protect the groundwater resources of Blanco County. The Management Plan contains the hydrogeological and technical information provided by the TWDB regarding the groundwater resources of Blanco County. This Management Plan serves as a guideline that will ensure greater understanding of local aquifer conditions, development of groundwater management concepts and strategies, and subsequent implementation of appropriate groundwater management strategies, policies, and Rules to address groundwater conditions, characteristics, and issues within the District. This Management Plan will enable the District to comply with the requirements of state law, including Texas Water Code Chapter 36, administrative Rules of the TWDB, and to guide the District's participation in cooperative regional water resources planning.

III. DISTRICT INFORMATION

A. Creation

The BPGCD was created in accordance with the Chapter 36 petition process. On January 23, 2001, Blanco County voters approved the creation of the District, its maximum tax rate, and elected five Directors to govern the District. The District’s authority and duties are derived primarily from Chapter 36 of the Texas Water Code.

B. Directors

The Board of Directors consists of five members who are elected by the voters of Blanco County. The District utilizes the same four precinct boundaries which are used by the Blanco County Commissioners Court for County Commissioner elections. One Director is elected at-large from Blanco County as a whole. Elections are held during the May General Election in odd-numbered years. Directors are elected to a four-year term and a director may serve consecutive terms.

C. Authority

The District has the authority and duties given to Groundwater Conservation Districts under Texas Water Code Chapter 36 and under 31 Texas Administrative Code Chapter 356. The District is part of Groundwater Management Area 16 and the Lower Colorado Regional Water Planning Group (Region K).

D. Location and Extent

The boundaries of the District are the same as Blanco County, whose area is approximately 715 square miles (457,825 acres). The County Seat is Johnson City, population approximately 1,750. The City of Blanco has a population of approximately 1,850 and the rest of the population, approximately 10,500, resides in small rural communities or subdivisions, or on farms and ranches. Blanco County is bounded on the north by Llano and Burnet Counties, on the east by Travis and Hays Counties, on the south by Comal and Kendall Counties, and on the west by Gillespie County.

E. Groundwater Resources of Blanco County

1. Topography and Drainage

Blanco County has two primary watersheds: the Pedernales River, which is a tributary to the Colorado River, and the Blanco River, which is a tributary to the Guadalupe River. Surface drainage within the District is generally from west to east.

The District contains two major geologic features. The Llano Uplift extends into the northwestern portion of the District. This feature is characterized by complex faulting and is comprised of scattered granite exposures and a variety of subsequently deposited sedimentary paleozoic rocks. The other major feature is the Edwards Plateau, an elevated structure primarily comprised of Cretaceous age limestone, dolomite and marl. The Edwards Plateau extends west into many West Texas counties. Blanco County lies near the southeastern edge of the Plateau.

Elevations within the District range from a low of approximately 730 feet above sea level where the Pedernales River leaves Blanco County to over 1,900 feet northwest of the city of Blanco, on the divide between the Pedernales and Blanco River basins.

For a graphic display of this information, please refer to Appendix A - Geological and Hydrogeological Information on Blanco County.

2. Groundwater Resources and Usage in Blanco County

Within the BPGCD there are seven named aquifers which provide groundwater to county residents. These aquifers are:

Edwards-Trinity (Plateau)
Upper Trinity
Middle Trinity
Lower Trinity
Ellenburger-San Saba
Hickory
Marble Falls

Well depths vary from shallow, hand-dug wells 20-30 feet deep to drilled wells 30-1800 feet deep. Depths are highly variable even within the same aquifer and depend entirely on site-specific topography and geology. Water quality and water quantity also vary greatly throughout the District. Water quality within a specific aquifer can often be defined or characterized in a general sense, but can still be affected by local geology and hydrology.

As of August 2013, the District has not identified any wells producing significant groundwater quantities from the Edwards-Trinity (Plateau); the Upper Glen Rose (Upper Trinity), or the Marble Falls aquifers and has no current operating permits or pending applications for operating permits from those aquifers. Therefore, in order to provide for current and future demands from the few existing and anticipated domestic and livestock exempt wells that produce from these aquifers, and in order to help ensure continued flow from the seeps and springs that discharge from those aquifers and which subsequently provide base flow to local creeks and rivers, the current Rules of the District provide for the denial of any applications for drilling or permitting of any new non-exempt wells that propose to produce water from any of these aquifers.

a. Edwards-Trinity (Plateau) Aquifer

The Edwards-Trinity (Plateau) aquifer within Blanco County is scattered across the west central part of the county and is located at higher elevations along ridges. It is comprised of relatively thin layers of limestone and dolomite that is an extension of the Edwards Plateau into Blanco County from the west. Yields from the aquifer are low (<20 gpm) and the water, if used at all, is used occasionally for rural domestic and livestock demands. The Edwards-Trinity aquifer in Blanco County exists in an unconfined condition. Recharge is solely from local precipitation occurring over the outcrop. Water not pumped from wells will generally discharge from small seeps and springs at the base of the Edwards outcrop and provides base flow to small streams within the county. No non-exempt wells producing from the Edwards-Trinity (Plateau) have been identified by the District as of August 2013.

Trinity Aquifer

The Trinity aquifer in Blanco County is comprised primarily of the Upper and Lower Glen Rose Limestone, Hensell Sand, the Cow Creek Limestone, and the Sycamore Sand/Hosston Sand. It extends across the majority of Blanco County, except in the northwestern corner of the county where Paleozoic rock predominates. The Trinity aquifer receives some recharge from local precipitation on its outcrop and through the overlying units where it is in the subsurface. More localized and potentially higher rates of recharge for the Hensel Sand probably occur in Hensel Sand outcrops west of Blanco County. Yields vary greatly and are highly dependent on local subsurface physical characteristics. The Trinity Aquifer is normally divided into three sections: Upper, Middle, and Lower Trinity.

b. Upper Trinity Aquifer

The Upper Trinity Aquifer consists of the Upper Glen Rose limestone and is located generally over the lower two-thirds of Blanco County. It is an unconfined aquifer comprised of alternating layers of limestone and calcareous clays. This forms an easily

recognizable "stair-step" topography due to the differential weathering of the two layers. The Upper Glen Rose is also characterized by thin layers of gypsum/anhydrite beds which appear to be the source of the sulfate often found in many wells in central Blanco County. Some wells have concentrations of sulfate so high that reverse osmosis or other treatment options must be incorporated prior to domestic use. It is not a significant source of groundwater production in Blanco County. Groundwater yields from the Upper Glen Rose are usually small and at times intermittent. For local groundwater management purposes only, the District chooses to consider the Upper Glen Rose (Upper Trinity) as a separate aquifer and not integrate it with the rest of the Trinity aquifer.

c. Middle Trinity Aquifer

The Middle Trinity Aquifer is an unconfined aquifer covering over two-thirds of Blanco County. It consists of the Lower Glen Rose Limestone, the Hensell Sandstone, and the Cow Creek Limestone. Groundwater may be produced from all three formations, but the Hensell and Cow Creek portions are generally the most productive and reliable. Yields from the Middle Trinity are generally low, usually between 10-50 gpm, but can occasionally be significantly higher, with yields of more than 500 gpm being reported from a few wells. Water quality varies, with many wells in central Blanco County having abnormally high levels of sulfate and other constituents, while wells in other areas often have very good quality. Production from Middle Trinity wells is primarily used for municipal, rural domestic, and livestock demands. Some demand for groundwater is attributed to irrigation of flower nurseries, vegetables, hay crops, peaches, pecans, grapes, and grains.

d. Lower Trinity Aquifer

Below the Cow Creek Limestone, lies the Hammett Shale, which acts as a confining unit between the Middle Trinity and the Lower Trinity. The Lower Trinity , in Blanco County, consists of the Sligo Formation, a sandy dolomitic limestone (absent for the most part, but perhaps thinly present in the southeastern edge of Blanco County) and the Sycamore (Hosston) Formation, a silty sandstone This last formation is known as the Sycamore where it is unconfined or outcrops, and as the Hosston when subsurface and confined. Groundwater production is generally limited to a few small-volume domestic and livestock wells. Water quality is generally good.

e. Ellenburger Aquifer

The Ellenburger Aquifer is unconfined, a massive, thickly-bedded, complexly fractured and faulted mix of limestone and dolomite present in the north central portions of the county. It lies generally west of Cypress Mill and north of US 290. From the outcrop areas, the aquifer dips predominately southeastward into the subsurface at angles up to 10 degrees in some areas. It is either absent or deeply subsurface in a broad area extending from the central portion of the county toward the southern and eastern parts of Blanco County. Once again, well yields vary greatly depending on local geological conditions. Many Ellenburger wells are known for pumping rates between 3-45 gpm. In some areas though, significant localized development of subsurface solutional features has occurred within the Ellenburger resulting in groundwater production capabilities greater than 200 gpm. Water quality in the Ellenburger is almost always very good, with the only concern being the low to moderate hardness...a common issue with all Blanco County aquifers. The Ellenburger aquifer is utilized extensively by the City of Johnson City and many domestic

and livestock users in northern and northwestern Blanco County. Recharge to the Ellenburger is mainly through outcrops and porous areas in the beds of rivers and tributaries, with some cross-formational flow contributions from overlying members of other aquifers.

f. Hickory Aquifer

The Hickory aquifer is comprised of sandstone and is found unconfined in northwestern Blanco County. Exposures are highly irregular in shape, due to both faulting and the overlap of Cretaceous age rocks. This aquifer dips predominantly southeastward from the outcrop areas at angles of about 10 degrees in some areas. Well depths are highly dependent on local geology, with well depths varying between 100 feet deep to over 1000 feet. The Hickory yields low to moderate quantities of water and water quality is almost always very good. Well drillers have reported some wells capability of producing up to 50 gpm or more. Recharge to the Hickory occurs from local precipitation on its outcrop and through fractures and faults in overlying units and/or cross-formational flow where the Hickory is in the subsurface.

g. Marble Falls Aquifer

The Marble Falls aquifer is an unconfined limestone aquifer located in the general vicinity of Pedernales Falls State Park and Cypress Mill. It is reported to be highly fractured with extensive development of subsurface solutional features. This rather isolated and minor aquifer yields low to moderate quantities of water. Some wells in Blanco County have produced water with high nitrate concentrations. Due to its small surface extent, groundwater usage is limited to local domestic and livestock needs. No non-exempt wells producing from the Marble Falls have been identified by the District as of August 2013.

IV. CRITERIA FOR PLAN APPROVAL

A. Planning Horizon

This Management Plan becomes effective upon adoption by the Blanco-Pedernales Groundwater Conservation District Board of Directors (District Board) and subsequent approval by the Texas Water Development Board (TWDB). This plan incorporates a planning period of ten years. The planning period will begin on the date of approval by the TWDB. After five years, in accordance with Section 36.1072(e), the plan will be reviewed for consistency with the applicable Regional Water Plans and the State Water Plan and shall be readopted with or without amendments. The plan may be revised at anytime in order to maintain such consistency or as necessary to address any new or revised data, Groundwater Availability Models, Groundwater Management Area 9 designated Desired Future Conditions and Modeled Available Groundwater quantities, or District management strategies. This Management Plan will remain in effect until the plan is replaced by a revised plan with has been approved by the TWDB.

B. Board Resolution

A certified copy of the Blanco-Pedernales Groundwater Conservation District Board of Directors Resolution #112113-01 adopting this Management Plan is located in Appendix B - District Resolution.

C. Plan Adoption

Public Notices and Posted Agendas which demonstrate this Management Plan was adopted after the required public hearings and meetings were conducted by the District are located in Appendix C - Notice of Hearings and Meetings.

D. Coordination with Surface Water Management Entities

Correspondence with surface water management entities which demonstrates the District provided the pertinent entities with a copy of this Management Plan will be provided in Appendix D - Correspondence with Surface Water Management Entities.

V. Estimates of Technical Information Required by TWC Section 36.1071 and 31 TAC 356.52

A. Modeled Available Groundwater in the District based on the Desired Future Conditions established under TWC 36.108 --- 31 TAC 356.52(a)(5)(A) and TWC 36.1071(e)(3)(A)

Modeled Available Groundwater (MAG) is defined in TWC Section 36.001as "the amount of water that the Executive Administrator [of the TWDB] determines may be produced on an average annual basis to achieve a desired future condition established under Section 36.108." The Desired Future Condition (DFC) of an aquifer may only be determined through joint planning with other Groundwater Conservation Districts (GCDs) in the same Groundwater Management Area (GMA) in accordance with TWC 36.108. The District is part of GMA 9. The GCDs of GMA 9 completed the first round of the joint planning process on July 26, 2010. The adopted DFCs approved by GMA 9 are found in Appendix E.

The Modeled Available Groundwater numbers (in acre-feet per year) for Blanco County are found in TWDB MAG Reports and/or Aquifer Assessments in Appendix G and in the tables listed below.

Table 1. Modeled Available Groundwater for Blanco County

Trinity Aquifer (GAM 10-050 MAG Version 2)

County	RWPG	River Basin	2010	2020	2030	2040	2050	2060
Blanco	K	Colorado	1,322	1,322	1,322	1,322	1,322	1,322
Blanco	K	Blanco	1,251	1,251	1,251	1,251	1,251	1,251

Ellenburger-San Saba Aquifer (GTA Aquifer Assessment 10-01 MAG)

County	RWPG	River Basin	2010	2020	2030	2040	2050	2060
Blanco	K	Colorado	2,661	2,661	2,661	2,661	2,661	2,661

Hickory Aquifer (GTA Aquifer Assessment 10-02 MAG)

County	RWPG	River Basin	2010	2020	2030	2040	2050	2060
Blanco	K	Colorado	1,163	1,163	1,163	1,163	1,163	1,163

Marble Falls Aquifer (GTA Aquifer Assessment 10-14 MAG)

County	RWPG	River Basin	2010	2020	2030	2040	2050	2060
Blanco	K	Colorado	261	261	261	261	261	261

B. Amount of Groundwater being used within the District on an annual basis --- 31TAC 356.52(a)(5)(B) / TWC Section 36.1071(e)(3)(B)

To estimate the annual amount of groundwater being used within Blanco County, the District has looked to the TWDB Annual Water Use Survey Data. The data set includes data from 1974-2010. The annual water use for the most recent ten year period (2000-2010) varies from 739-1,987 acre-feet of groundwater per year. The Estimated Historical Water Use Survey Data from the TWDB are included in Appendix F.

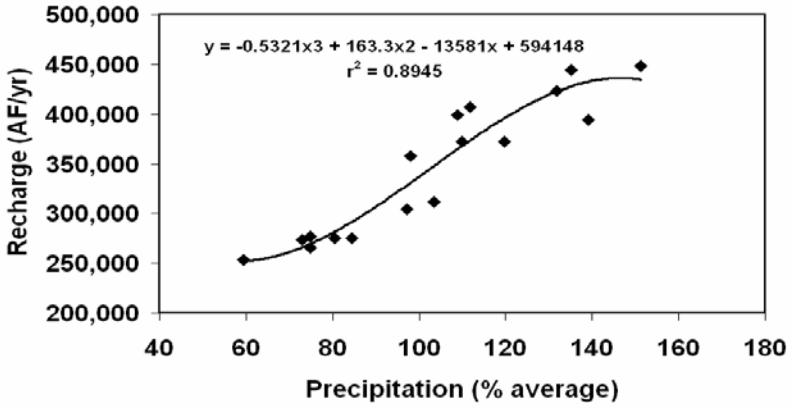
C. Annual Amount of Recharge from Precipitation to the Groundwater Resources with the District --- 31TAC 356.52(a)(5)(C) / TWC Section 36.1071(e)(3)(C)

The estimate of the annual amount of recharge from precipitation to the aquifers within the District is based on GAM Run 13-001 or aquifer assessments based on water-budget analyses conducted by the TWDB. These GAM runs and aquifer assessments from the TWDB are included in Appendix G.

Table 2. Recharge from Precipitation

Aquifer	Recharge From Precipitation	Groundwater Availability Model Run
Edwards-Trinity (Plateau)	571	GAM 13-001
Trinity	44,469	GAM 13-001
Ellenburger-San Saba	2,586	GTA Aquifer Assessment 10-01MAG
Hickory	899	GTA Aquifer Assessment 10-02 MAG
Marble Falls	261	GTA Aquifer Assessment 10-14MAG Not assessed, estimate based on recharge = withdrawals when DFC = no increase in drawdown

In addition, TWDB GAM Run Task 10-005 utilized the Hill County Trinity GAM in the creation of the graphic below which shows precipitation versus recharge in the Trinity Aquifer from 1981-1987 which provides another basis for estimating the annual amount of Trinity Aquifer recharge for Blanco County.



D. For each Aquifer, the annual volume of water that discharges from the Aquifer to Springs and any Surface Water Bodies, including Lakes, Streams, and Rivers --- 31TAC 356.52(a)(5)(D) / TWC Section 36.1071(e)(3)(D)

The estimate of the annual volume of water discharged to surface water systems by the groundwater resources of the District are based on TWDB GAM Run 13-001. The GAM run and analysis from the TWDB is included in Appendix G.

Table 3. Discharge to Surface Water Bodies

Aquifer	Discharge to Surface Water Bodies	Groundwater Availability Model Run
Edwards-Trinity (Plateau)	0	GAM 13-001
Trinity	25,450	GAM 13-001

E. Annual Volume of Flow into and out of the District within each Aquifer and between Aquifers in the District, if a Groundwater Model is Available --- 31TAC 356.52(a)(5)(E) / TWC Section 36.1071(e)(3)(E)

(1) Estimated annual volume of flow into the District.

(2) Estimated annual volume of flow out of the District.

(3) Estimated annual volume of flow between each aquifer in the District.

The estimates of these amounts of water flowing within each aquifer in the District are included in Appendix G and summarized as follows:

Table 4. Flow into, out of, and between Aquifers

Aquifer	Acre-Feet in:	Acre-Feet out	Acre-Feet between Aquifers	Groundwater Availability Model Run
Edwards-Trinity (Plateau)	0	204	164	GAM 13-001
Trinity	4,461	19,416	164	GAM 13-001

F. Projected Surface Water Supply in the District, according to most recently adopted State Water Plan --- 31TAC 356.52(a)(5)(F) / TWC Section 36.1071(e)(3)(F)

The most recently adopted State Water Plan is the 2012 State Water Plan. This Plan incorporated the 2011 Region K Water Plan, which provided projected surface water supplies in the District and Blanco County, (see 2011 Region K Water Plan, Chapter 3.4.1 Surface Water Supplies Available to Water User Groups). The Projected Surface Water Supply Survey Data from the TWDB are included in Appendix F and are summarized and included below.

Within the District, all surface water impoundments consist of relatively small ponds and a few small dams on the Pedernales River, Blanco River, and their tributaries. The City of Blanco uses surface water sources as the primary source of city municipal water. This include water from the Blanco River and water from Canyon Lake purchased from Canyon Lake Water Service Company. Johnson City maintains some surface water rights on the Pedernales River. However, Johnson City is currently relying on groundwater from a series of Ellenburger aquifer wells and is not withdrawing from the Pedernales River at this time. Local usage of surface water (usually for livestock watering or limited irrigation from small ponds or small scale diversions from surface streams) is termed “local supply” in the State and Region K Plans.

Table 5 Projected Surface Water Supplies

Projected Surface Water Supplies

BLANCO COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	Source Name	2010	2020	2030	2040	2050	2060
K	BLANCO	GUADALUPE	BLANCO LAKE/RESERVOIR	596	596	596	596	596	596
K	BLANCO	GUADALUPE	CANYON LAKE/RESERVOIR	600	600	600	600	600	600
K	CANYON LAKE WSC	GUADALUPE	CANYON LAKE/RESERVOIR	188	263	334	397	466	545
K	IRRIGATION	GUADALUPE	GUADALUPE RIVER COMBINED RUN-OF-RIVER IRRIGATION	9	9	9	9	9	9
K	LIVESTOCK	COLORADO	LIVESTOCK LOCAL SUPPLY	101	101	101	101	101	101
K	LIVESTOCK	GUADALUPE	LIVESTOCK LOCAL SUPPLY	101	101	101	101	101	101
	Sum of Projected Surface Water Supplies (acre-feet/year)			**1,595**	**1,670**	**1,741**	**1,804**	**1,873**	**1,952**

G. Projected Total Demand for Water in the District, according to most recently adopted State Water Plan --- 31TAC 356.52(a)(5)(G) / TWC Section 36.1071(e)(3)(G)

The most recently adopted State Water Plan is the 2012 State Water Plan. This Plan incorporated the 2011 Region K Water Plan, which provided projected Total Demand for Water in the District and Blanco County, (see 2011 Region K Water Plan, Chapter 2,) This data appears in Appendix F and is summarized and included below.

Table 6 Projected Total Demand for Water within District

Water User Group	2010	2020	2030	2040	2050	2060
Municipal	1,467	1,712	1,947	2,143	2,360	2,626
Manufacturing	2	2	2	2	2	2
Irrigation	69	66	62	58	56	55
Mining	5	5	5	5	5	5
Livestock	443	443	443	443	443	443
District Total	**1,986**	**2,228**	**2,459**	**2,651**	**2,866**	**3,131**

VI. Consider the Water Supply Needs and Water Management Strategies included in the Adopted State Water Plan - TWC Section 36.1071(E)(4)

The most recently adopted State Water Plan is the 2012 State Water Plan. This Plan incorporated the 2011 Region K Water Plan, which provided the estimated water supply needs in the District and Blanco County, (see 2011 Region K Water Plan, Chapter 4, Table 4.2). This data appears in Appendix F and is summarized and included below. The table provides a listing of individual WUGs with identified water supply needs (negative numbers in the table indicate a water supply shortage).

Table 7 Projected Water Supply Needs

Water User Group	2010	2020	2030	2040	2050	2060
County Other	0	0	0	0	(41)	(64)
District Total	**0**	**0**	**0**	**0**	**(41)**	**(64)**

The Water Management Strategy included in the 2012 State Water Plan and the 2011 Region K Water Plan is developing a new well field to pump water from the Ellenburger-San Saba aquifer. This data appears in Appendix F and is summarized and included below. Additional groundwater was only allocated to meet each WUG's individual shortage.

Table 8 Water Management Strategies

Water User Group	2010	2020	2030	2040	2050	2060
County Other	0	0	0	0	41	64
District Total	**0**	**0**	**0**	**0**	**41**	**64**

VII. Details on the District Management of Groundwater

A. District Authority and Management Rules and Policies

The Texas Legislature has determined that GCDs, such as the Blanco-Pedernales Groundwater Conservation District, are the state's preferred method of groundwater management. The Texas Legislature codified its groundwater management policy decision in Section 36.0015 of the Texas Water Code, which provides that GCDs will manage groundwater resources through rules developed and implemented in accordance with Chapter 36 of the Texas Water Code. Chapter 36 establishes directives for GCDs and the statutory authority to carry out such directives to enable GCDs to have the proper tools to protect and preserve the groundwater resources with their boundaries. The District will give strong consideration to the economic and cultural activities which occur within the District and which rely upon the continued use of groundwater.

The District using the regulatory tools it has been given by Chapter 36 to properly address the groundwater issues within Blanco-Pedernales, such as groundwater quality and groundwater supply. The District believes that the prevention of contamination of its groundwater resources through abandoned and deteriorated water wells is important. Wells that have been abandoned or not properly maintained provide direct conduits or pathways that allow contamination from the surface to quickly reach the groundwater resources of the District. To address the threats to the water quality of its groundwater resources, the District requires, through its rules, that all abandoned, deteriorated, or replaced wells be plugged in compliance with the Water Well Drillers

and Pump Installers Rules of the Texas Department of Licensing and Regulation. The District will also place a priority on the capping of water wells that the well owner plans to use at a later date in order to eliminate waste, prevent pollution, and stop future deterioration of the well casing.

The District has established a monitoring well network to monitor the changing storage conditions of the groundwater supplies within the District. The District will make a regular assessment of water supply and groundwater storage conditions and has reported and will continue to report those conditions to the District Board of Directors and to the public. The District has also worked and will continue to work with any local governmental entities or agencies of the State of Texas on any well monitoring efforts or well investigations which are conducted.

The District is using the regulatory tools granted to GCDs by Chapter 36 to preserve and protect the existing and historic users of groundwater within the District. The Texas Legislature empowered the District to protect existing users of groundwater, which are those individuals or entities currently invested in and using groundwater or the groundwater resources within the District for a beneficial purpose, and preserve historic use by historic users, which are those individuals or entities who used groundwater beneficially in the past. The District strives to protect and preserve such use to the extent practicable under the goals and objectives of this Management Plan. In accordance with Section 36.116 of the Texas Water Code, the District is also protecting historic use though District Rules on spacing of wells and production limits on groundwater to the extent practicable consistent with this Management Plan.

In order to better manage the groundwater resources of Blanco County during times of high demand or within areas of high demand, the District may establish Critical Groundwater Depletion Areas and adopt different Rules for those areas. The District may also adopt different Rules for each subdivision of an aquifer or geologic strata located in whole or in part within the boundaries of the District or each geographic area overlying a subdivision of an aquifer located in whole or in part within the boundaries of the District. The District has adopted Rules to regulate groundwater withdrawals by means of spacing and/or production limits. The relevant factors to be considered in making a determination to grant or deny a permit or limit groundwater withdrawals shall include those set forth in the Chapter 36 of the Texas Water Code, and the rules of the District.

B. Summary of Blanco County Water Resources 2010-2060

In general, groundwater is available throughout Blanco County. Water quantity and quality vary greatly and are highly dependent on local hydrogeological conditions. As growth occurs, there will probably be areas of Blanco County where increase in groundwater demand will be such that some aquifers, or portions thereof, with low production capability will be found in a stressed condition and may not be able to meet higher demand.

Much of the growth now occurring in Blanco County is currently focused in the southern end of the county. This area is served primarily by private water wells producing from the Middle Trinity Aquifer. This aquifer is well known for locally variable well yields…10-50 gpm seems to be the average, but some high volume wells are capable of producing 100-500 gpm.

The Middle Trinity Aquifer is also known for some water quality concerns involving hardness and odors. It is conceivable that with continued growth, this particular aquifer could be overextended during the next 50 years to the point where quantity and quality problems may increase.

The Ellenburger Aquifer, producing primarily in the northern third of Blanco County, should be able to meet future demands placed on it through the year 2060. However the District believes that the areas adjacent to Johnson City may experience seasonal shortfalls from the Ellenburger if development of small acreage lots increases. Many of these developments will be solely dependent upon the Ellenburger since the underlying Paleozoic rocks are very deep and have unpredictable groundwater availability. Consequently, the Ellenburger adjacent to Johnson City will need to be carefully monitored in order to determine how long it will be able to meet future demands of local users.

The Edwards-Trinity (Plateau), Hickory, and Marble Falls aquifers are located in areas that are not expected to undergo extensive development and are not likely to experience water quantity or quality problems during the 50 year planning horizon.

VIII. Action, Procedures, Performance And Avoidance For Plan Implementation - 31 TAC 356.52(A)(4); TWC Section 36.1071(E)(2)

The District will use the Management Plan to guide the District in its efforts to preserve and protect the groundwater resources of Blanco County. The District will ensure that all of its rules development, regulatory activities, planning effects and daily operations are consistent with the Management Plan.

The rules for the District will be developed in coordination with the management goals and technical information provided in the Management Plan. The rules shall be consistent with the provision of the Management Plan and Chapter 36 of the Texas Water Code. The enforcement of the rules will be driven by the hydrogeological and technical information available to the District, including the information provided in the Management Plan.

The District Rules can be found at the following website:

http://www.blancogw.org

Click on the Rules button and follow the link to the current Rules

The District is committed to work and plan with other GCDs in Groundwater Management Area 9. The District will use the Management Plan as part of its cooperation efforts with the neighboring GCDs. The District will manage the supply of groundwater within the District based on Desired Future Conditions and Modeled Available Groundwater resulting from the Groundwater Management Area 9 cooperative planning process, exempt and non-exempt wells and groundwater demands, and the District's best available data.

The District shall review and re-adopt this plan, with or without revisions, at least once every five years in accordance with Chapter 36.1072(e).

Any amendment to this plan shall be in accordance with Chapter 36.1073.

The District will seek cooperation and coordination in the development and implementation of this plan with the appropriate state, regional or local water management or planning entities.

The District will encourage cooperative and voluntary Rule compliance, but if Rule enforcement becomes necessary, the enforcement will be legal, fair, and impartial.

IX. Methodology For Tracking Progress In Achieving Management Goals - 31 TAC 356.52(A)(6)

The District will use the following methodology to track its progress toward achieving its management goals:

The District General Manager will present an annual report to the Board of Directors on District performance and progress in achieving management goals and objectives at a regular District Board meeting of the following calendar year beginning in Fiscal Year 2003.

X. District Goals, Management Objectives, and Performance Standards - 31 TAC 356.52

A. Providing The Most Efficient Use Of Groundwater.

A.1 Management Objective

Implement and maintain a program of issuing well operating permits for non-exempt wells within Blanco County.

Performance Standards

Annual issuance or re-issuance of one or more well operating permits each year.

A.2 Management Objective

The District will evaluate the effectiveness of current well spacing requirements in District Rules to help reduce or prevent interference between nearby wells. Spacing requirements will be coordinated to the greatest extent possible with Blanco County subdivision regulations and the Water Well Drillers Rules (16 Texas Administrative Code Chapter 76).

Performance Standards

Annual report submitted to the District Board regarding suitability of current District well spacing rules and their compatibility with Blanco County subdivision regulations and the Water Well Drillers Rules.

B. Controlling and Preventing Waste of Groundwater.

B.1 Management Objective

Each year the District will provide information on the importance of controlling and preventing waste of groundwater to groundwater users.

Performance Standards

Each year provide information to groundwater users on controlling and preventing waste of groundwater on at least one occasion by one of the following methods:

- article to local newspapers
- distribution of conservation literature handouts
- public presentation by District Staff or Directors

- distribution of school book covers with a message addressing waste of groundwater
- information on District website
- District exhibit/display booth at a public event

C. Controlling and Preventing Subsidence.

The rigid geologic framework of the region precludes significant subsidence from occurring. Therefore, this goal is not applicable to the operations of this District.

D. Addressing Conjunctive Surface Water Management Issues.

D.1 Management Objective

Assist Blanco County Commissioners Court in the evaluation of water availability reports submitted in accordance with County subdivision requirements.

Performance Standard

Annual report submitted to District Board evaluating the status of the MOU and a brief report on any water availability reports reviewed in accordance with the MOU.

D.2 Management Objective

Participate in the Regional Water Planning process by sending a representative to attend at least one meeting of the Lower Colorado Regional Water Planning Group (Region K).

Performance Standard

The dates and locations of meetings attended will be reported to the Board of Directors either monthly or annually.

E. Addressing Natural Resource Issues Which Impact The Use And Availability Of Groundwater, Or Which Are Impacted By The Use Of Groundwater.

E.1 Management Objective

Springs and seeps flowing from outcrop areas of the Edwards-Trinity (Plateau) and the Upper Glen Rose (Upper Trinity) aquifers provide water to local habitat and often provide base flow to nearby creeks and rivers. Both aquifers are known for low productivity and intermittent availability. The District intends to help extend the period of spring and seep flow during times of drought or limited rainfall by evaluating the effectiveness of current Rules to discourage utilization of those aquifers and prevent leakage from those aquifers into other aquifers.

Performance Standard

Annual report submitted to the District Board will include a summary regarding suitability of current District Rules prohibiting the drilling of new non-exempt wells in those aquifers; and, for those wells that penetrate those aquifers to produce groundwater from lower aquifers, the suitability of current Rules requiring the sealing off of those aquifers during the cementing/grouting process.

F. Addressing Drought Conditions.

F.1 Management Objective

At least quarterly, District Staff will review applicable data to determine status of drought conditions and, if necessary, report to District Board on need to implement the District Drought Rules.

Performance Standards

A monthly or quarterly report submitted to District Board on drought conditions in the District.

F.2 Management Objective

Provide to the public, upon request, drought-orientated literature handouts.

Performance Standards

Each year provide drought-orientated literature handouts on at least one occasion.

F.3 Management Objective

To evaluate groundwater availability each year the District will monitor water levels on selected wells representative of the two primary aquifers within the District in accordance with the water level monitoring schedule shown below.

Water Level Monitoring Schedule

Aquifer	# of Wells	Minimum Frequencies
Trinity	3	4 times per year
Ellenburger	2	3 times per year

Performance Standard

Number of water level records measured annually.

G. Addressing Groundwater Conservation, Recharge Enhancement, Rainwater Harvesting, Precipitation Enhancement, or Brush Control where Appropriate and Cost Effective.

G.1 Groundwater Conservation

Management Objective

Each year the District will identify the importance of water conservation and various water conservation methods available for implementation by groundwater users.

Performance Standards

Each year provide groundwater conservation information on at least one occasion by one of the following methods:

- article to local newspapers
- distribution of conservation literature handouts

- public presentation by District Staff or Directors
- distribution of school book covers with a groundwater conservation message
- information on District website
- District exhibit/display booth at a public event

G.2 Recharge Enhancement

Management Objective

Investigate potential opportunities for recharge enhancement projects, either natural or artificial.

Performance Standard

Annual report submitted to the District Board on investigation of the number of potential recharge enhancement opportunities, if any.

G.3 Rainwater Harvesting

Management Objective

The District will promote rainwater harvesting and provide advice, information, and literature regarding the benefits of rainwater harvesting.

Performance Standards

Each year provide rainwater harvesting information on at least one occasion by one of the following methods:

- article to local newspapers
- distribution of conservation literature handouts
- public presentation by District Staff or Directors
- distribution of school book covers with a rainwater harvesting message
- information on District website
- District exhibit/display booth at a public event

G.4 Precipitation Enhancement

This strategy is too costly for consideration by the District at this time. Therefore, this goal is not applicable to the operations of this District at this time.

G.5 Brush Control

This strategy is being implemented in Blanco County by the Pedernales Soil and Water Conservation District and other agencies. Therefore, this goal is not applicable to the operations of this District at this time.

H. Addressing in a Quantitative Manner the Desired Future Conditions of the Groundwater Resources.

H.1 Management Objective

For any aquifer within the District that has an approved DFC, assess whether the current District programs and actions toward meeting the DFC are sufficient or require further attention.

Performance Standards

For any aquifer with an approved DFC, measure water levels in at least one District-designated monitor wells one or more times annually and compare with the average drawdown and the allowable drawdown resulting from the DFC process. This comparison will be will be included in the General Manager's annual report to the District Board and will also be reviewed by the District at least once every five years and provided to the GMA 9 Committee as required under Texas Water Code Section 36.108.

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Blanco-Pedernales Groundwater Conservation District

601 West Main, P.O. Box 1516, Johnson City, Texas 78636 (830) 868-9196 FAX (830) 868-0376

www.blancocountygroundwater.org

manager@blancocountygroundwater.org

Blanco – Pedernales Groundwater Conservation District

GROUNDWATER MANAGEMENT PLAN

November 2013

Appendices

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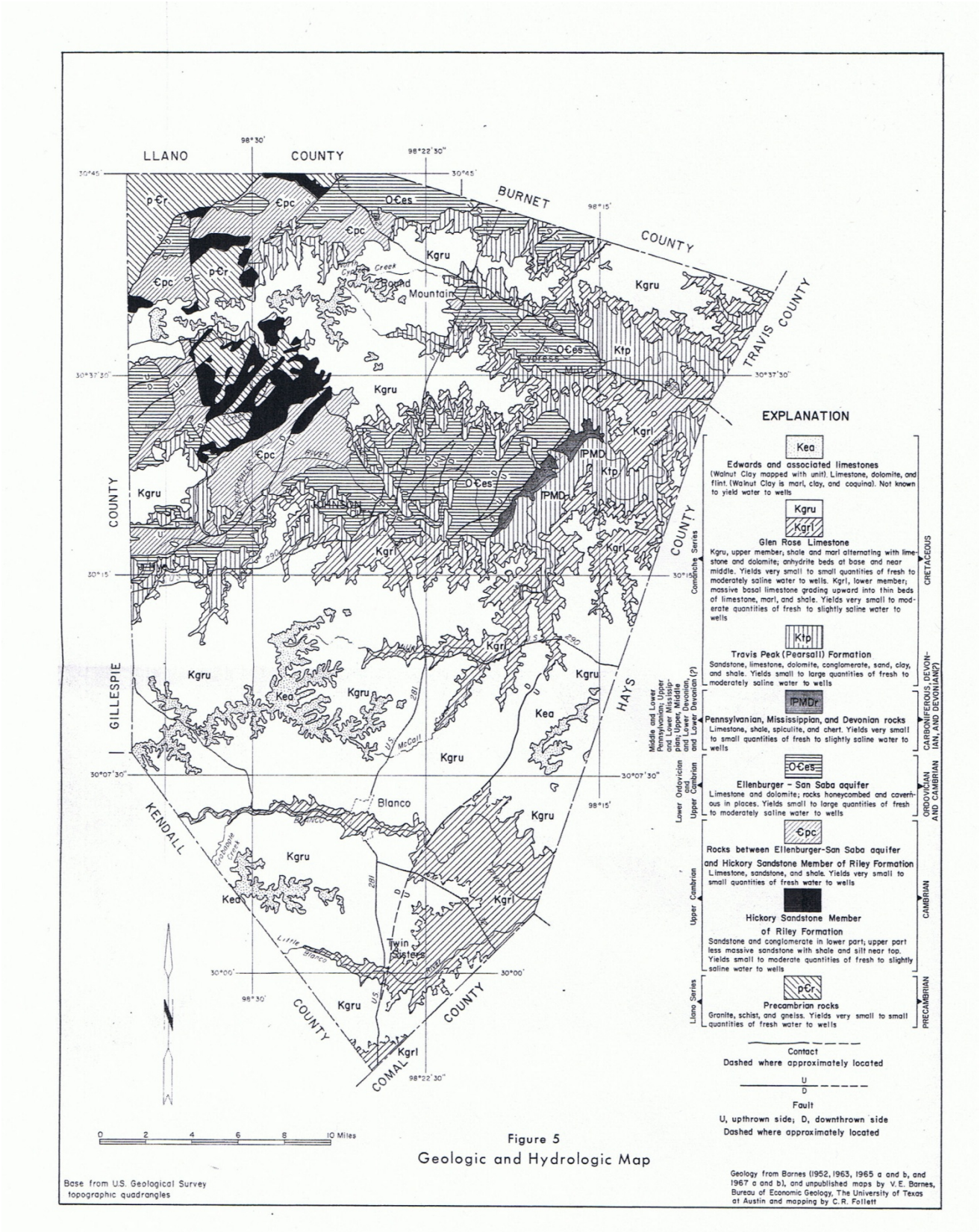
Appendix A

Geological and Hydrogeological Information on Blanco County



Geologic and Hydrologic Map of Blanco County, Texas

from

Texas Water Development Board Report 174, Groundwater Resources of Blanco County, Texas
C.R. Follett, USGS, August 1973

Table 2.--Geologic and Hydrologic Units and Their Water-Bearing Properties

SYSTEM	SERIES	GROUP	GEOLOGIC OR HYDROLOGIC UNIT	APPROXIMATE THICKNESS (FEET)	LITHOLOGY	WATER-BEARING PROPERTIES
Quaternary	Holocene and Pleistocene		Alluvium, fanglomerate, and high-level gravel	0 - 20 ?	Gravel, sand, silt, and clay.	Not known to yield water to wells in Blanco County. Alluvium probably would yield very small to small quantities of fresh water in some places along the Pedernales and Blanco Rivers.
Cretaceous	Comanche	Fredericksburg	Edwards and associated limestones	0 - 160	Hard massive limestone, nodular marly limestone, dolomite, and flint.	Not known to yield water to wells in Blanco County but may contribute some water to uncased holes tapping the Glen Rose Limestone. Yields water to springs near the base of the unit.
			Walnut Clay	0 - 13	Silty marl, clay, and basal coquina.	Not known to yield water to wells.
		Trinity	Glen Rose Limestone, Upper member	0 - 330 ?	Shale and marl alternating with thin beds of impure limestone and dolomite; impure anhydrite beds at base and near middle.	Yields very small to small quantities of fresh to moderately saline water to wells in much of the county.
			Glen Rose Limestone, Lower member	0 - 250 ?	Massive fossiliferous limestone in basal part grading upward into thin beds of limestone, marl and shale; *Salenia texana* and *Corbula texana* Whitney beds at top.	Yields very small to moderate quantities of fresh to slightly saline water to wells in much of the county.
			Travis Peak (Pearsall) Formation	0 - 285 ?	Sandstone, massive fossiliferous limestone, sandy limestone, dolomite, conglomerate, sand, clay, and shale.	Yields small to large quantities of fresh to moderately saline water to wells in much of the county.
	Coahuila	Nuevo León and Durango of Mexico	Sligo and Hosston Formations	0 - 210 ?	Shale, limestone, dolomite, sand, sandstone, and conglomerate.	Not known to yield water to wells in Blanco County.
Carboniferous, Devonian, and Devonian(?)	Middle and Lower Pennsylvanian; Upper and Lower Mississippian; Upper, Middle, and Lower Devonian; and Devonian (?)		Pennsylvanian, Mississippian, and Devonian rocks	0 - 800 ?	Massive limestone, in part cherty, shale, calcareous spiculite, lenticular biohermal limestone, crinoidal limestone, and chert.	Yields very small to small quantities of fresh to slightly saline water to a few wells near the Pedernales River south of Cypress Mills and at Cypress Mills.
Ordovician and Cambrian	Lower Ordovician and Upper Cambrian		Ellenburger - San Saba aquifer	0 - 2,310 +	Thinly to thickly bedded cherty limestone and dolomite; rocks honeycombed and cavernous in places.	Yields small to large quantities of fresh to moderately saline water to wells north of an east-west line about midway between Johnson City and Blanco.
Cambrian	Upper Cambrian		Rocks between Ellenburger - San Saba aquifer and Hickory Sandstone Member of Riley Formation	0 - 755 +	Thinly to thickly bedded limestone, in part biohermal, glauconitic, and shaley; glauconitic to nonglauconitic sandstone; and shale.	Yields very small to small quantities of fresh water to wells north of U.S. Highway 290 and west of U.S. Highway 281.
			Hickory Sandstone Member of Riley Formation	0 - 300 +	Mostly noncalcareous, nonglauconitic, crossbedded sandstone; lower part massive with conglomerate lenses near base; upper part less massive with considerable shale and silt near top.	Yields small to moderate quantities of fresh to slightly saline water to wells north of U.S. Highway 290 and west of U.S. Highway 281.
Precambrian	Llano		Precambrian rocks	--	Mostly medium to coarse-grained granite, amphibole and mica schist, and quartz diorite gneiss.	Yields very small to small quantities of fresh water to wells.

Geologic and Hydrologic Units in Blanco County, Texas

from

Texas Water Development Board Report 174, Groundwater Resources of Blanco County, Texas
C.R. Follett, USGS, August 1973

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Appendix B

District Resolution #112113-01

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STATE OF TEXAS §
§ **RESOLUTION #112113-01**
COUNTY OF BLANCO §

BLANCO–PEDERNALES GROUNDWATER CONSERVATION DISTRICT

ADOPTION OF REVISED GROUNDWATER MANAGEMENT PLAN

WHEREAS, the Blanco–Pedernales Groundwater Conservation District (BPGCD) is a groundwater conservation district created in accordance with and subject to Chapter 36, Texas Water Code and;

WHEREAS, Chapter 36.1071, Texas Water Code requires that the BPGCD, following notice and hearing, shall review its groundwater management plan every five years and revise as necessary and;

WHEREAS, the Texas Water Development Board (TWDB) certified the BPGCD Groundwater Management Plan on January 7, 2009 in accordance with the provisions of Chapter 36.1071 and;

WHEREAS, the BPGCD submitted a Revised Groundwater Management Plan to the TWDB for preliminary review and subsequently received required and suggested changes and corrections from the TWDB and;

WHEREAS, the BPGCD has subsequently incorporated all TWDB required and suggested changes into the Revised Groundwater Management Plan and;

WHEREAS, the BPGCD has, on November 15, 2013, provided public notice of the November 21, 2013 Board Meeting with an agenda item addressing proposed revisions to the previously adopted and certified Plan and an agenda item providing for a Public Hearing on those changes, by posting the Board Meeting Agenda on the door, a bulletin board, or at a place convenient to the public at the District Office and the Blanco County Courthouse, by providing a copy of the Board Meeting Agenda to the Blanco County Clerk, by emailing a copy of the Board Meeting Agenda to the current agenda email distribution list, and by posting it on the District website and;

WHEREAS, on November 21, 2013, the Board of Directors of the BPGCD held a public hearing and offered the public the opportunity to comment on the proposed revisions to the previously adopted and certified Plan at the Board of Directors Meeting and;

WHEREAS, the Board of Directors of the BPGCD has considered all public comment and;

WHEREAS, the Board of Directors of the BPGCD has determined that the proposed revisions are appropriate and contribute to the overall effectiveness of the BPGCD Groundwater Management Plan;

NOW THEREFORE BE IT RESOLVED, that the Board of Directors of the Blanco–Pedernales Groundwater Conservation District does hereby approve and adopt the revised Groundwater Management Plan with an effective date of November 21, 2013.

PASSED AND APPROVED THIS 21 DAY OF November, 2013,

with 4 ayes, 0 nays, and 0 abstentions.

J Klepac
Jimmy Klepac, Board President

Rebecca S. Brown
Rebecca Brown, Board Secretary

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Appendix C

Notice of Hearings and Meetings

Agenda for BPGCD Board of Directors Meeting
November 21, 2013

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Blanco-Pedernales Groundwater Conservation District

601 West Main, P.O. Box 1516, Johnson City, Texas 78636 (830) 868-9196 FAX (830) 868-0376
manager@blancocountygroundwater.org

Regular Board Meeting
Thursday, November 21, 2013 7:00 pm

Notice is given that a **Regular Meeting** of the Board of Directors of the Blanco-Pedernales Groundwater Conservation District will be held at the **District Office located at 601 West Main**, Johnson City, Texas on **Thursday, November 21, 2013 at 7:00 p.m.** for the following purposes:

Agenda

1. Call to Order
2. Public Comment: This is a time allocated for members of the public to make comments or statements to the Board of Directors. The time allocated to each speaker will depend on the number of speakers who have registered to speak. Although this is not a period for Board responses to questions from the public or a time for dialogue between visitors and the Board of Directors, if any Director(s) wishes to initiate a question(s) of the speaker in order to seek clarity or understanding, time will be permitted for this purpose.
3. Approval of Minutes for the October 17, 2013 Regular Board Meeting
4. Financial Report
5. General Manager's Report: This report may include comments on monitor well water levels, drought conditions, attendance and participation in meetings, matters involving District Rules, Bylaws, and Groundwater Management Plan, Rule enforcement matters, aquifer research, update on well drilling and permitting activities, GMA 9 activities, State and Local agency matters, staff and consultant matters, and recently published or distributed articles, reports, and other documents relating to groundwater, aquifers, or groundwater districts.
6. Continued Business
   a. Possible Action on Drought Status for Blanco County
7. New Business
   a. Public Hearing on proposed BPGCD Groundwater Management Plan revisions
   b. Possible Action on BPGCD Resolution #112113-01 regarding proposed BPGCD Groundwater Management Plan revisions
   c. Presentation of Award to Colleen Gardner
   d. Set Future Meeting Dates
8. Executive Session: The Board of Directors of the B-PGCD reserves the right to adjourn into Executive Session at any time during the course of this meeting to discuss any matters listed on this agenda, as authorized by Texas Government Code Sections §551.071 (Consultation with Attorney), 551.072 (Deliberations about Real Property), 551.073 (Deliberations about Gifts and Donations), 551.074 (Personnel Matters), 551.076 (Deliberations about Security Devices) and 551.086 (Economic Development). No final action or decision will be made in Executive Session.
9. Board of Directors Comments, Questions and Suggestions: This is a time allocated for Directors to ask questions of the other Directors or staff, to recommend future agenda items, to make comments, summations, suggestions, or to provide opinions on current, past, or future Board business. No action will be taken on this agenda item during this meeting.
10. Adjournment

Posted on the Front Door of the District Office, 601 West Main, Johnson City, Texas, and at the Blanco County Courthouse, Johnson City, Texas, on this, the 15 day of November 2013, at 10:40 a.m. / p.m.

General Manager, Blanco-Pedernales Groundwater Conservation District

The Blanco-Pedernales Groundwater Conservation District is committed to compliance with the Americans with Disabilities Act (ADA). Reasonable accommodations and equal opportunity for effective communications will be provided upon request. Please contact the District office at 830-868-9196 at least 24 hours in advance if accommodation is needed.

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Appendix D

Coordination with Surface Water Management Entities

Copies of Plan Transmittal Letters sent to:

Lower Colorado River Regional Planning Group (Region K)
Lower Colorado River Authority
Guadalupe-Blanco River Authority
City of Blanco
City of Johnson City
Canyon Lake Water Service Company

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Blanco-Pedernales Groundwater Conservation District

601 West Main, P.O. Box 1516 Johnson City, Texas 78636 (830) 868-9196 FAX (830) 868-0376
manager@blancocountygroundwater.org

December 6, 2013

Mr. John Burke, Chairman
Lower Colorado Regional Water Planning Group
c/o LCRA Region K
Mailstop L211
Po Box 220
Austin, Texas 78767-0220

RE: Revised Groundwater Management Plan for the Blanco-Pedernales Groundwater Conservation District

Dear Mr. Burke,

Pursuant to Chapter 36.1071(a) of the Texas Water Code and 31 Texas Administrative Code Section 356.51, the Blanco-Pedernales Groundwater Conservation District to forwarding the attached copy of our recently-revised Groundwater Management Plan to the Lower Colorado Regional Water Planning Group for coordination with the regional surface water management entities.

Proposed revisions to the existing Plan were reviewed by Texas Water Development Board staff on two occasions and were eventually determined to be ready for Public Hearing and possible adoption by the BPGCD Board of Directors.

We provided public notice on November 15, 2013 in our posting of our November 21, 2013, Regular Board Meeting Agenda. This Agenda provided an opportunity for public comment:

- Agenda Item # 7(a) Public Comment

The Board and General Manager publicly reviewed the proposed changes during the meeting under Agenda Item # 7(a). The proposed revisions to the GMP were made available for public review either at our office or on our website (www.blancocountygroundwater.org). There were two members of the public present at the Board Meeting and one of them commented that he supported the plan and the proposed revisions. No public comments were provided in writing, by phone, or email. I noted the need to make two spelling corrections and the need to replace the word "Precambrian" with "Paleozoic" in two places.

Following the Public Hearing, the Board of Directors moved on to Agenda Item # 7(b) and unanimously approved BPGCD Resolution # 112113-01: Adoption of Revised Groundwater Management Plan with the previously mentioned minor revisions.

Thank you in advance for your cooperation in this matter. If you have any questions, please feel free to call me at (830) 868-9196.

Sincerely yours,

Ronald G. Fieseler, P.G.
General Manager

Blanco-Pedernales Groundwater Conservation District

601 West Main, P.O. Box 1516 Johnson City, Texas 78636 (830) 868-9196 FAX (830) 868-0376
manager@blancocountygroundwater.org

December 6, 2013

Ms. Rebecca S. Motal, General Manager
LCRA
PO Box 220
Austin, Texas 78767

RE: Revised Groundwater Management Plan for the Blanco-Pedernales Groundwater Conservation District

Dear Ms. Motal,

Pursuant to Chapter 36.1071(a) of the Texas Water Code and 31 Texas Administrative Code Section 356.51, the Blanco-Pedernales Groundwater Conservation District to forwarding the attached copy of our recently-revised Groundwater Management Plan to the LCRA for coordination with the regional surface water management entities.

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Ronald G. Fieseler, P.G.
General Manager

Blanco-Pedernales Groundwater Conservation District

601 West Main, P.O. Box 1516 Johnson City, Texas 78636 (830) 868-9196 FAX (830) 868-0376
manager@blancocountygroundwater.org

December 6, 2013

Mr. Bill West, General Manager
GBRA
933 East Court Street
Seguin, TX 78155

RE: Revised Groundwater Management Plan for the Blanco-Pedernales Groundwater Conservation District

Dear Mr. West,

Pursuant to Chapter 36.1071(a) of the Texas Water Code and 31 Texas Administrative Code Section 356.51, the Blanco-Pedernales Groundwater Conservation District to forwarding the attached copy of our recently-revised Groundwater Management Plan to the GBRA for coordination with the regional surface water management entities.

Proposed revisions to the existing Plan were reviewed by Texas Water Development Board staff on two occasions and were eventually determined to be ready for Public Hearing and possible adoption by the BPGCD Board of Directors.

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Sincerely yours,

Ronald G. Fieseler, P.G.
General Manager

Blanco-Pedernales Groundwater Conservation District

601 West Main, P.O. Box 1516 Johnson City, Texas 78636 (830) 868-9196 FAX (830) 868-0376
manager@blancocountygroundwater.org

December 6, 2013

Ms. Bobbie Mowery, City Secretary
City of Johnson City
PO Box 750
Blanco, Texas 78606

RE: Revised Groundwater Management Plan for the Blanco-Pedernales Groundwater Conservation District

Dear Ms. Mowery,

Pursuant to Chapter 36.1071(a) of the Texas Water Code and 31 Texas Administrative Code Section 356.51, the Blanco-Pedernales Groundwater Conservation District to forwarding the attached copy of our recently-revised Groundwater Management Plan to the City of Blanco for coordination with the regional surface water management entities.

Proposed revisions to the existing Plan were reviewed by Texas Water Development Board staff on two occasions and were eventually determined to be ready for Public Hearing and possible adoption by the BPGCD Board of Directors.

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Sincerely yours,

Ronald G. Fieseler, P.G.
General Manager

Blanco-Pedernales Groundwater Conservation District

601 West Main, P.O. Box 1516 Johnson City, Texas 78636 (830) 868-9196 FAX (830) 868-0376
manager@blancocountygroundwater.org

December 6, 2013

Mr. David Dockery, City Administrator
City of Johnson City
PO Box 369
Johnson City, Texas 78636

RE: Revised Groundwater Management Plan for the Blanco-Pedernales Groundwater Conservation District

Dear Mr. Dockery,

Pursuant to Chapter 36.1071(a) of the Texas Water Code and 31 Texas Administrative Code Section 356.51, the Blanco-Pedernales Groundwater Conservation District to forwarding the attached copy of our recently-revised Groundwater Management Plan to the City of Johnson City for coordination with the regional surface water management entities.

Proposed revisions to the existing Plan were reviewed by Texas Water Development Board staff on two occasions and were eventually determined to be ready for Public Hearing and possible adoption by the BPGCD Board of Directors.

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Sincerely yours,

Ronald G. Fieseler, P.G.
General Manager

Blanco-Pedernales Groundwater Conservation District

601 West Main, P.O. Box 1516 Johnson City, Texas 78636 (830) 868-9196 FAX (830) 868-0376
manager@blancocountygroundwater.org

December 6, 2013

Mr. Larry Bittle, Director of Operations
Canyon Lake Water Service Company
PO Box 1687
Canyon Lake, Texas 78133

RE: Revised Groundwater Management Plan for the Blanco-Pedernales Groundwater Conservation District

Dear Mr. Bittle,

Pursuant to Chapter 36.1071(a) of the Texas Water Code and 31 Texas Administrative Code Section 356.51, the Blanco-Pedernales Groundwater Conservation District to forwarding the attached copy of our recently-revised Groundwater Management Plan to the Canyon Lake Water Service Company for coordination with the regional surface water management entities.

Proposed revisions to the existing Plan were reviewed by Texas Water Development Board staff on two occasions and were eventually determined to be ready for Public Hearing and possible adoption by the BPGCD Board of Directors.

We provided public notice on November 15, 2013 in our posting of our November 21, 2013, Regular Board Meeting Agenda. This Agenda provided an opportunity for public comment:

- Agenda Item # 7(a) Public Comment

The Board and General Manager publicly reviewed the proposed changes during the meeting under Agenda Item # 7(a). The proposed revisions to the GMP were made available for public review either at our office or on our website (www.blancocountygroundwater.org). There were two members of the public present at the Board Meeting and one of them commented that he supported the plan and the proposed revisions. No public comments were provided in writing, by phone, or email. I noted the need to make two spelling corrections and the need to replace the word "Precambrian" with "Paleozoic" in two places.

Following the Public Hearing, the Board of Directors moved on to Agenda Item # 7(b) and unanimously approved BPGCD Resolution # 112113-01: Adoption of Revised Groundwater Management Plan with the previously mentioned minor revisions.

Thank you in advance for your cooperation in this matter. If you have any questions, please feel free to call me at (830) 868-9196.

Sincerely yours,

Ronald G. Fieseler, P.G.
General Manager

Appendix E

Groundwater Management Area 9

Adoption of Desired Future Conditions

Adoption of DFCs for the Ellenburger, Hickory, Marble Falls, and the Edwards Group of the Edwards-Trinity (Plateau) Aquifers

Minutes of November 30, 2009 GMA 9 Meeting Clarifying the Intent of the DFCs Adopted for the Ellenburger, Hickory, and Marble Falls Aquifers

Adoption of DFCs for the Trinity Aquifer and the Edwards Group of the Edwards-Trinity (Plateau) Aquifer

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Blanco-Pedernales Groundwater Conservation District

601 West Main, P.O. Box 1516, Johnson City, Texas 78636 (830) 868-9196 FAX (830) 868-0376
manager@blancocountygroundwater.org

RECEIVED
OCT 24 2008
TWDB

October 22, 2008

Mr. J. Kevin Ward, Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, TX 78711-3231

RE: GMA 9 Desired Future Conditions

Dear Mr. Ward,

Groundwater Management Area 9 (GMA 9) is pleased to submit the attached documents in support of our adoption of Desired Future Conditions (DFCs) for four aquifers located within GMA 9.

GMA 9 met on August 29, 2008 and adopted the following DFCs:

- Ellenburger Aquifer - allow for an increase in average drawdown of no more than 2 feet
- Hickory Aquifer - allow for an increase in average drawdown of no more than 7 feet
- Marble Falls Aquifer - allow for no net increase in average drawdown
- Edward Group of the Edwards Trinity (Plateau) - allow for no net increase in average drawdown

GMA 9 appreciates the assistance and advice that we have received from the TWDB, especially from Dr. Robert Mace and members of his staff. We look forward to continued cooperative efforts with the TWDB as GMA 9 works toward the adoption of DFCs for the Trinity Aquifer during the coming months.

Please feel free to contact me if you or any of your staff have questions regarding this submission.

Sincerely yours,

Ronald G. Fieseler
General Manager, Blanco Pedernales GCD
GMA 9 Coordinator

Attachments:

Meeting Posting Notices
August 29, 2008 GMA 9 Meeting Minutes
GMA 9 Resolution # 082908-01

BANDERA COUNTY RIVER AUTHORITY AND GROUNDWATER DISTRICT

Phone: (830) 796-7260 Fax: (830) 796-8262 E-Mail: djeffery@bcragd.org

P.O. Box 177
202 Twelfth Street
Bandera, TX 78003

Bandera County River Authority & Groundwater District
202 Twelfth St, P.O. Box 177, Bandera, Texas 78003 (830) 796-7260 FAX (830) 796-8262
djeffery@bcragd.org

Groundwater Management Area Joint Planning Meeting

Friday, August 29, 2008 9:00 a.m.

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Bandera County River Authority & Groundwater District will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. This meeting will be held at the **Upper Guadalupe River Authority Classroom, located at 125 Lehmann Dr., Kerrville, Texas on Friday, August 29, 2008 at 9:00 a.m.** for the following purposes:

Agenda

1. Call to Order

2. Introduction of Member District Representatives and other meeting attendees.

3. Public Comment

4. Approval of Minutes of the April 7, 2008 GMA-9 Joint Planning Meeting.

5. Discussion regarding the results of GMA 9 GAM Runs "A", "B", and "C" by the TWDB and the Desired Future Conditions and Managed Available Groundwater of GMA-9 aquifers.

6. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Ellen burger, Hickory, and Marble Falls aquifers in Blanco County only.

7. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Edwards Plateau (Trinity) and Upper Glen Rose (Upper Trinity) aquifers in GMA 9.

8. Announcements and setting of future Committee Meeting or Public Meeting dates.

9. Adjournment

Posted on the Front Door of the District Office, 202 Twelfth St, Bandera, Texas, and at the Bandera County Courthouse, Bandera, Texas, on this, the 22nd day of August, 2008, before 4:00 pm.

General Manager, Bandera County River Authority & Groundwater District

The Bandera County River Authority & Groundwater District is committed to compliance with the Americans with Disabilities Act (ADA). Reasonable accommodations and equal opportunity for effective communications will be provided upon request. Please contact the District office at 830-796-7260 at least 24 hours in advance if accommodation is needed.

12:40 P.

HEADWATERS GROUNDWATER CONSERVATION DISTRICT
GMA # 9 MEETING

Groundwater Management Area # 9 Joint Planning Meeting

Friday, August 29, 2008 9:00 a.m.

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Headwaters Groundwater Conservation District will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. This meeting will be held at the **Guadalupe Basin Natural Resources Center - Classroom, located at 125 Lehmann Dr. Kerrville, Texas** on **Friday, August 29, 2008 at 9:00 a.m.** for the following purposes:

Agenda

1. Call to Order
2. Introduction of Member District Representatives and other meeting attendees.
3. Public Comment
4. Approval of Minutes of the April 7, 2008 GMA-9 Joint Planning Meeting.
5. Discussion regarding the results of GMA 9 GAM Runs "A", "B", and "C" by the TWDB and the Desired Future Conditions and Managed Available Groundwater of GMA-9 aquifers.
6. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Ellenburger, Hickory, and Marble Falls aquifers in Blanco County only.
7. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Edwards Plateau (Trinity) and Upper Glen Rose (Upper Trinity) aquifers in GMA 9.
8. Announcements and setting of future Committee Meeting or Public Meeting dates.
9. Adjournment

This notice is published pursuant to the Texas Open Meeting Act, Chapter 551, and Texas Government Code. Dated this 25th day of August 2008.

I hereby certify that the above Notice of Meeting of the Board of Directors for Headwaters Groundwater Conservation District is a true and correct copy of said Notice; that a true and correct copy of said Notice was posted on August 25, 2008 by 9:00 am, in its administrative office in Kerrville, Kerr County, Texas at a place convenient and readily accessible to the general public at all times; that a true and correct copy of said Notice was furnished to the County Clerk of Kerr County; the HGCD Website www.hgcd.org and that a copy of said Notice was furnished to each Director.

Gene Williams, HGCD General Manager

Filed 25th Dated Aug A.D. 20 08
JANNETT PIEPER, KERR CO. CLERK TIME 9:01 AM
By Deputy

Trinity Glen Rose Groundwater Conservation District

6335 Camp Bullis Rd. Suite #17 San Antonio, Texas 78257 (210) 698-1155 Fax (210) 698-1159

Groundwater Management Area Joint Planning Meeting

Friday August 29., 2008 9:00 A.M.

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Trinity Glenrose Groundwater Conservsation District (TGRGCD) will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. This meeting will be held at the **Upper Guadalupe River Authority Classroom, located at 125 Lehmann Dr. Kerrville, Texas on Friday, August 29, 2008 at 9:00 a.m.** for the following purposes:

Agenda

1. Call to Order
2. Introduction of Member District Representatives and other meeting attendees.
3. Public Comment
4. Approval of Minutes of the April 7, 2008 GMA-9 Joint Planning Meeting.
5. Discussion regarding the results of GMA 9 GAM Runs "A", "B", and "C" by the TWDB and the Desired Future Conditions and Managed Available Groundwater of GMA-9 aquifers.
6. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Ellenburger, Hickory, and Marble Falls aquifers in Blanco County only.
7. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Edwards Plateau (Trinity) and Upper Glen Rose (Upper Trinity) aquifers in GMA 9.
8. Announcements and setting of future Committee Meeting or Public Meeting dates.
9. Adjournment

Posted at the TGRGCD office, TGRGCD Website and the Bexar County, Kendall County and Comal County Courthouses, on this, the 25 day of AUGUST 2008, at 9:00 (a.m.) / p.m.

George Wissmann

George Wissmann, Manager, Trinity Glen Rose Groundwater Conservation District

The Trinity Glen Rose Groundwater Conservsation District is committed to compliance with the Americans with Disabilities Act (ADA). Reasonable accommodations and equal opportunity for effective communications will be provided upon request. Please contact the District Representative at 210-219-5555 at least 24 hours in advance if accommodation is needed.

NOTICE OF A MEETING OF THE COW CREEK GROUNDWATER CONSERVATION DISTRICT AND GMA #9 KENDALL COUNTY, TEXAS

NOTICE is hereby given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Cow Creek Groundwater Conservation District will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. This meeting will be held at the **Guadalupe Basin Natural Resources Center, located at 125 Lehmann Dr. Kerrville, Texas** on **Friday, August 29, 2008 at 9:00 a.m.** for the following purposes:

1. Call to Order
2. Introduction of Member District Representatives and other meeting attendees.
3. Public Comment
4. Approval of Minutes of the April 7, 2008 GMA-9 Joint Planning Meeting.
5. Discussion regarding the results of GMA 9 GAM Runs "A", "B", and "C" by the TWDB and the Desired Future Conditions and Managed Available Groundwater of GMA-9 aquifers.
6. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Ellenburger, Hickory, and Marble Falls aquifers in Blanco County only.
7. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Edwards Plateau (Trinity) and Upper Glen Rose (Upper Trinity) aquifers in GMA 9.
8. Announcements and setting of future Committee Meeting or Public Meeting dates.
9. Adjournment

Orig. Was Posted
Kendall County
Darlene Herrin
County Clerk
On: Aug 25, 2008 at 09:33A
Res

Micah Voulgaris

Micah Voulgaris
Cow Creek Groundwater Conservation District
General Manager

COW CREEK GROUNDWATER CONSERVATION DISTRICT

NOTICE OF OPEN MEETINGS

Groundwater Management Area #9 Joint Planning Meeting

As required by section 36.108(e), Texas Water Code, the **Groundwater Management Area 9 Planning Committee,** comprised of delegates from the groundwater conservation districts located wholly or partially within Groundwater Management Area 9 including the **Barton Springs/Edwards Aquifer Conservation District,** will hold a Public Meeting on **Friday, August 29, 2008 at 9:00 a.m.** Notice is given that one or more members of the Board of Directors of the Barton Springs/Edwards Aquifer Conservation District, including a possible quorum of the Board, may attend the Public Meeting. The Public Meeting will be held at the **Upper Guadalupe River Authority Classroom, located at 125 Lehmann Dr. Kerrville, Texas.**

FILED
2008 AUG 22 AM 9:52
DANA DEBEAUVOIR
COUNTY CLERK
TRAVIS CO. TX

The meeting is being held for the following purposes:

Agenda

1. Call to Order
2. Introduction of Member District Representatives and other meeting attendees.
3. Public Comment
4. Approval of Minutes of the April 7, 2008 GMA-9 Joint Planning Meeting.
5. Discussion regarding the results of GMA 9 GAM Runs "A", "B", and "C" by the TWDB and the Desired Future Conditions and Managed Available Groundwater of GMA-9 aquifers.
6. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Ellenburger, Hickory, and Marble Falls aquifers in Blanco County only.
7. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Edwards Plateau (Trinity) and Upper Glen Rose (Upper Trinity) aquifers in GMA 9.
8. Announcements and setting of future Committee Meeting or Public Meeting dates.
9. Adjournment

Came to hand and posted on a Bulletin Board in the Courthouse, Austin, Travis County, Texas on this the 22 day of August 20 08
Dana DeBeauvoir
County Clerk, Travis County, Texas
By Teresa Carter Deputy

TERESA CARTER

Came to hand and posted on a Bulletin Board in the Courthouse, Travis County, Texas, on this, the _____ day of August, 2008, at _____ .m.

_____, Deputy Clerk
Travis County, TEXAS

LT1-86-10149-1

EDWARDS AQUIFER
AUTHORITY

Groundwater Management Area # 9 Joint Planning Meeting

Friday, August 29, 2008 9:00 a.m.

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Medina County Groundwater Conservation District will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. This meeting will be held at the **Upper Guadalupe River Authority Classroom, located at 125 Lehmann Dr. Kerrville, Texas on Friday, August 29, 2008 at 9:00 a.m.** for the following purposes:

Agenda

1. Call to Order
2. Introduction of Member District Representatives and other meeting attendees.
3. Public Comment
4. Approval of Minutes of the April 7, 2008 GMA-9 Joint Planning Meeting.
5. Discussion regarding the results of GMA 9 GAM Runs "A", "B", and "C" by the TWDB and the Desired Future Conditions and Managed Available Groundwater of GMA-9 aquifers.
6. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Ellenburger, Hickory, and Marble Falls aquifers in Blanco County only.
7. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Edwards Plateau (Trinity) and Upper Glen Rose (Upper Trinity) aquifers in GMA 9.
8. Announcements and setting of future Committee Meeting or Public Meeting dates.
9. Adjournment

LT2-0-0-1

Doc# 10149 Fees: $2.00
08/25/2008 3:25PM # Pages 1
Filed & Recorded in the Official Public
Records of BEXAR COUNTY
GERARD RICKHOFF COUNTY CLERK

Medina County Groundwater Conservation District

1613 Avenue K, Suite 105
Hondo, Texas 78861
Telephone: 830.741.3162
Fax: 830.741.3540

Groundwater Management Area # 9 Joint Planning Meeting

Friday, August 29, 2008 9:00 a.m.

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Medina County Groundwater Conservation District will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. This meeting will be held at the **Upper Guadalupe River Authority Classroom, located at 125 Lehmann Dr. Kerrville, Texas** on **Friday, August 29, 2008 at 9:00 a.m.** for the following purposes:

Agenda

1. Call to Order
2. Introduction of Member District Representatives and other meeting attendees.
3. Public Comment
4. Approval of Minutes of the April 7, 2008 GMA-9 Joint Planning Meeting.
5. Discussion regarding the results of GMA 9 GAM Runs "A", "B", and "C" by the TWDB and the Desired Future Conditions and Managed Available Groundwater of GMA-9 aquifers.
6. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Ellenburger, Hickory, and Marble Falls aquifers in Blanco County only.
7. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Edwards Plateau (Trinity) and Upper Glen Rose (Upper Trinity) aquifers in GMA 9.
8. Announcements and setting of future Committee Meeting or Public Meeting dates.
9. Adjournment

Posted at the Medina County Courthouse, Hondo, Texas on this 20th day of August, 2008.

Luana Buckner, General Manager

POSTED
FILED IN MY OFFICE
LISA J. WERNETTE

AUG 20 08 PM -3 40

COUNTY CLERK, MEDINA CO.

Hays Trinity Groundwater Conservation District, Hays County, Texas

CenterLake Business Park: 14101 Hwy 290 W. Bldg.100, Ste. #212, Austin, Texas 78737
Mail: P. O. Box 1648; Dripping Springs, TX 78620
E-mail: manager@haysgroundwater.com
Phone: 512-858-9253
Fax: 512-858-2384 website: haysgroundwater.com

Notice of Open Meeting of the Groundwater Management Area # 9 Joint Planning Group

Time: Friday, August 29, 2008 at 9:00 a.m.

Place: Offices of the Upper Guadalupe River Authority,

Located at: Ste. 100, 125 Lehmann Dr., Kerrville, Texas 78028
(830) 896-5445

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Hays Trinity Groundwater Conservation District will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. The following topics will be considered for discussion and possible action:

Agenda

1. Call to Order
2. Introduction of Member District Representatives and other meeting attendees.
3. Public Comment
4. Approval of Minutes of the April 7, 2008 GMA-9 Joint Planning Meeting.
5. Discussion regarding the results of GMA 9 GAM Runs "A", "B", and "C" by the TWDB and the Desired Future Conditions and Managed Available Groundwater of GMA-9 aquifers.
6. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Ellenburger, Hickory, and Marble Falls aquifers in Blanco County only.
7. Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Edwards Plateau (Trinity) and Upper Glen Rose (Upper Trinity) aquifers in GMA 9.
8. Announcements and setting of future Committee Meeting or Public Meeting dates.
9. Adjournment

The Board of Directors of the Hays Trinity Conservation District reserves the right to go into Executive Session at any time during the course of this meeting to discuss any of the matters listed on this agenda, as authorized by the Texas Open Meetings Act, Chapter 551, Government Code. No final action or decision will be made in Executive Session.

The Hays Trinity Groundwater Conservation District is committed to compliance with the Americans with Disabilities Act (ADA). Reasonable accommodations and equal opportunity for effective communications will be provided upon request. Please contact the District office at 512-858-9253 at least 24 hours in advance if accommodation is needed.

This notice has been posted on a bulletin board at a place convenient to the public in the Hays County Courthouse and outside the main entrance to the District offices not less than three (3) days prior to the scheduled meeting in accordance with the provisions of the Texas Open Meetings Act, Chapter 551, Government Code.

Posted by:

Andrew H. Backus, Board President

Groundwater Management Area # 9 Joint Planning Meeting

Minutes of the Friday, August 29, 2008 – 9:00 a.m. Meeting
Upper Guadalupe River Authority Auditorium, 125 Lehmann Dr. Kerrville, Texas

Friday, August 29, 2008 9:00 a.m.

1. **Call to Order**. Due to higher than expected attendance, the UGRA Classroom was too small and the Meeting was moved to the larger Auditorium down the hall. Ron Fieseler called the meeting to order shortly after 9:00 a.m.

2. **Introduction of Member District Representatives and other meeting attendees.** Each attending Board President or Designated Representative introduced themselves.

3. **Public Comment.** As a prelude to allowing public comment, Ron Fieseler noted that there had been extensive emails, phone calls, and personal contacts with various Districts and organizations that expressed grave concerns that GMA 9 was ignoring the Drought of Record in its consideration of Desired Future Conditions. He then presented a PowerPoint slide show that provided a summary of GMA 9 activities and public input processes over the last three years with a focus on showing how, from the very first meetings, GMA 9 had given due consideration to the Drought of Record in its deliberative processes.

   Members of the public were then invited to address the GMA 9 Committee. Their statements are summarized below.

   - Harris Greenwood, Landowner, Blanco County: Discussed Items 5, 6, & 7: Asked what is the Desired Future Conditions? Aquifers are highly stressed and being attacked. The water belongs to State of Texas. Do the right thing and dream for our grandchildren.

   - Laura Marbury, Environmental Defense: Discussed Item 5: Use the best policies, plans, and science available. Make decisions that are right for the area.

   - John Watson, Landowner, Blanco County: Discussed Item 6: Not Desired Future Conditions, it is Tolerated Future Conditions. Was concerned about the possible action on the BPGCD desired future conditions of the minor aquifers and urged rejecting a 33 ft drawdown on these minor aquifers.

   - David Langford, Landowner:: Discussed Item 7: His family puts water into the aquifer. The desired future conditions should be based on supply and demand. Drawdown should only be 0.

   - Neill Dunn: Discussed Item 5: Wanted an explanation of why the model does not allow for any fluctuation in Kerr County.

   - Dan Opdyke, Texas Parks and Wildlife Department: Discussed Item 5: Wanted GMA 9 to include drought of record in the GAMs and provide protection and preservation of spring flows

   - Dave Collins, Preserve Our Water (POW): Discussed Item 5: Admitted that the information about GMA 9 ignoring drought of record might be because of him. Urged careful consideration of the drawdown number and encouraged the GMA to consider adding the drought of record in the GAM runs. Dry cells mean dry wells and dry springs.

- John Elliott, Headwaters GCD Board Member: Recommended that no action should be taken at this time.
- Chad Norris, Texas Parks and Wildlife Department: Discussed Item 5: Was a citizen of GMA9 and a Biologist. Wanted drought of record to be included in GAM runs.
- Jennifer Walker, Sierra Club: Discussed Item 5. She wanted GMA 9 to give due consideration to drought of record data, spring flow, and base flow to creeks and rivers. She urged GMA 9 to request a GAM Run using 90% of drought of record spring flow (outflow).
- R.E. Warren: Discussed Item 5. He believed GMA 9 did not have enough data and that nothing should be done at this time.
- Daniel Boone, resident of Canyon Lake and Democratic candidate for State Representative District 73: Discussed Items 5 and 6. He was concerned about GMA 9 ignoring the Drought of Record. He preferred that no action be taken at this time and that more data should be gathered.
- Dr. Bob Fitzgerald: Texas is becoming over-populated. He recommended that a moratorium be placed on permitting until proper data, including the drought of record, was available to solve this problem.
- Steve Beers, Travis County resident. Discussed Item 6: The climate is changing. GAM 9 should use a 50/50 probability for the model. It should also include 90% spring flow. He asked GMA 9 to please consider the climate change when running the models.
- Neil Hernandez, well owner: Discussed Item 7: His well dropped 55 ft already. How do you limit a 33 ft drawdown on something that has already dropped? He urged that GMA 9 take all the special circumstances of each area when considering the desired future conditions.
- Peggy Cole, Resident of Hayes County: Discussed Item 7. She wanted GMA 9 to consider the water cycle, soil conservation and surface of soil, when making the desired future conditions.
- Debbie Davis: Discussed Item 5: GMA 9 should incorporate both groundwater and surface water management. She believed it was everyone's responsibility to conserve the water into this area.
- Jonathan Letz, Kerr county commissioner: Believed that GMA 9 does not have the capability to consider and make decisions on something that has not been fully studied. He urged them to not vote on something that has not been studied. He recommended using the next two years to define the desired future conditions and vote when everyone is in agreement. He urged GMA 9 to not piecemeal, to go to legislature to get an extension of time, and to not rush decisions.
- Susan Beavin: Discussed Item 7 and also provided a written comment: All model runs need to be completed with the drought of record. More data and more science are needed to make decisions on desired future conditions.
- Val Anderson, resident of Northern Bexar County: Discussed Item 7. She strongly encouraged GMA 9 to include discussion on supplementing aquifer usage with rainwater catchments.

- Bebe Fenstermaker, resident of NW Bexar county: Discussed Item 6 & 7: She urged consideration of spring studies, monitor wells, range management; maintaining grass and brush; and water conservation. She believed the data is incomplete and that GMA 9 should not rush any decisions.

- Myfe Moore: Supported grassland and surface management and stated that soil is strongest cistern. She supported the idea that supply and climate characteristics should be added to model. She recommended that GCDs stop permitting wells.

4. **Approval of Minutes of the April 7, 2008 GMA-9 Joint Planning Meeting.** The minutes were not available. They will be considered at a subsequent meeting.

5. **Discussion regarding the results of GMA 9 GAM Runs "A", "B", and "C" by the TWDB and the Desired Future Conditions and Managed Available Groundwater of GMA-9 aquifers.** Mary Ellen Summerlin opened the discussion with comments from Headwaters GCD that they were not happy with how Kerr County did not get as much additional water as some of the other counties. She pointed out how the percentage increase was unfair. She also proposed an alternative method of looking at DFCs that would be fairer to Kerr County. Other Committee members then voiced their view on the GAM runs and the comments from Kerr County, most of which were only partially supportive of the Kerr County issues. The possibility of requesting future GAM runs that would incorporate spring flow and/or the Drought of Record was then discussed at some length. The Committee briefly discussed the GAM runs and how none of them were completely satisfactory. Tommy Mathews, Board President of Cow Creek GCD, recommended that the GMA 9 Committee consider convening the GMA 9 Technical Group and tasking them to review the GAM runs and provide comments and perhaps make recommendations for any future GAM run requests. The Committee reached a consensus on this idea.

6. **Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Ellenburger, Hickory, and Marble Falls aquifers in Blanco County only.** Ron Fieseler opened the discussion with a brief explanation about how these aquifers were generally limited to Blanco County. He had been consulting with neighboring GCDs and had come to agreement with both the Hill Country UWDD and the Hickory GCD on appropriate DFCs for these three aquifers.

   Ronald G. Fieseler made a motion to set DFCs as follows:
   - Ellenburger Aquifer - allow for an increase in average drawdown of no more than 2 feet
   - Hickory Aquifer - allow for an increase in average drawdown of no more than 7 feet
   - Marble Falls Aquifer - allow for no net increase in average drawdown

   The motion was seconded by Tommy Mathews.
   The motion was approved with 8 ayes and 1 nay as follows:

<u>Ayes:</u>
- Jim Chastain, Bandera RA&GCD
- Ronald G. Fieseler, Blanco Pedernales GCD
- Brad Groves, Trinity Glen Rose GCD
- Tommy Boehm, Medina County GCD
- Andrew Backus, Hays Trinity GCD
- Brian Hunt, BSEACD
- Tommy Mathews, Cow Creek GCD
- Rick Illgner, EAA

<u>Nays:</u>
- Mary Ellen Summerlin, Headwaters GCD

7. **Discussion and possible action on Blanco Pedernales GCD proposal to set Desired Future Conditions for the Edwards Plateau (Trinity) and Upper Glen Rose (Upper Trinity) aquifers in GMA 9.** Ron Fieseler opened the discussion with a brief explanation about how these aquifers were important to local spring, creek, and river base flow. He also noted that production was usually rather limited and that very few non-exempt wells were producing from these two aquifers. Committee members asked a few questions about local issues and production. Robert Mace and Ali Chowdhury from the TWDB recommended that the Upper Trinity should be considered in combination with the Middle Trinity DFCs for hydrological reasons. The Committee agreed that this was a good recommendation.

   Ronald G. Fieseler moved to set a DFC for:
   - Edward Group of the Edwards Trinity (Plateau) - no net increase in average drawdown.

   The motion was seconded by Tommy Mathews.
   The motion was approved with 8 ayes and 1 nay as follows:

Ayes:
- Jim Chastain, Bandera RA&GCD
- Ronald G. Fieseler, Blanco Pedernales GCD
- Brad Groves, Trinity Glen Rose GCD
- Tommy Boehm, Medina County GCD
- Andrew Backus, Hays Trinity GCD
- Brian Hunt, BSEACD
- Tommy Mathews, Cow Creek GCD
- Rick Illgner, EAA

Nays:
- Mary Ellen Summerlin, Headwaters GCD

8. **Announcements and Setting of future Committee Meeting or Public Meeting Dates.** Committee consensus was to await the meeting of the GMA 9 Technical Group before scheduling another meeting.

9. **Adjournment.** The meeting was adjourned at approximately 12:15 p.m.

Approved by GMA-9 Consensus October 14, 2008.

Attest: _____
Ronald G. Fieseler

Attest: _____
Luana Buckner

STATE OF TEXAS	§	
	§	**RESOLUTION # 082908-01**
GROUNDWATER	§	
MANAGEMENT AREA 9	§	

Designation of Desired Future Conditions For Groundwater Management Area 9 Aquifers

WHEREAS, Groundwater Conservation Districts (GCDs) located within or partially within Groundwater Management Area 9 (GMA 9) are required under Chapter 36.108, Texas Water Code to conduct joint planning and designate the Desired Future Conditions of aquifers within GMA 9 and;

WHEREAS, the Board Presidents or their Designated Representatives of GCDs in GMA 9 have met as a Committee in various meetings and conducted joint planning in accordance with Chapter 36.108, Texas Water Code since September 2005 and;

WHEREAS, GMA 9, having given proper and timely notice, held an open meeting of the GMA 9 Committee on August 29, 2008 at the Upper Guadalupe River Authority Auditorium, 125 Lehmann Dr. Kerrville, Texas and;

WHEREAS, GMA 9 has solicited and considered public comment at six specially called Public Meetings, a stakeholders section in the University of Texas at Austin LBJ School of Public Affairs Policy Research Project Report 161, and various Committee meetings, including the meeting on August 29, 2008 and;

WHEREAS, the GMA 9 Committee received and considered technical advice regarding local aquifers, hydrology, geology, recharge characteristics, local groundwater demands and usage, population projections, ground and surface water inter-relationships, and other considerations that affect groundwater conditions and;

WHEREAS, following public discussion and due consideration of the current and future needs and conditions of the aquifers in question, the current and projected groundwater demands, and the potential effects on springs, surface water, habitat, and water-dependent species through the year 2060, the GMA 9 Committee voted on two motions made and seconded to designate the following Desired Future Conditions through the year 2060 for the listed aquifers located in GMA 9:

- Ellenburger Aquifer - allow for an increase in average drawdown of no more than 2 feet
- Hickory Aquifer - allow for an increase in average drawdown of no more than 7 feet
- Marble Falls Aquifer - allow for no net increase in average drawdown
- Edwards Group of the Edwards Trinity (Plateau) - allow for no net increase in average drawdown

NOW THEREFORE BE IT RESOLVED, that the Groundwater Management Area 9 Committee does hereby document, record, and confirm the above described designation of the Desired Future Conditions for the listed Aquifers which were approved by the following votes of the Committee Members present and voting on August 29, 2008:

Ayes:

Ronald G. Fieseler - Designated Representative for the Blanco Pedernales GCD

Jim Chastain - President of the Bandera County River Authority and Groundwater Conservation District

Tommy Boehme - President of the Medina County GCD

Andrew Backus - President of the Hays Trinity GCD

Brian Hunt - Designated Representative for the Barton Springs/Edwards Aquifer Conservation District

Tommy Mathews - President of the Cow Creek GCD

Brad Groves - President of the Trinity Glen Rose GCD

Rick Illgner - Designated Representative for the Edwards Aquifer Authority

Nays:

Mary Ellen Summerlin - Designated Representative for the Headwaters GCD

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Groundwater Management Area # 9 Joint Planning Meeting

Minutes of the Monday, November 30, 2009 – 10:00 a.m. Meeting
Upper Guadalupe River Authority Auditorium, 125 Lehmann Dr. Kerrville, Texas

Monday, November 30, 2009 10:00 a.m.

1. **Call to Order.**

   Ronald G. Fieseler, GMA 9 Coordinator called the Meeting to Order at approximately 10:05 am.

2. **Introduction of Member District Representatives and other meeting attendees.**

   The GMA 9 Committee Members introduced themselves and other attendees were recognized or introduced themselves. Committee Members attending were:

   David Jeffery – Bandera River Authority and Groundwater District
   Neill Binford – Blanco Pedernales Groundwater Conservation District
   Mary Ellen Summerlin – Headwaters Groundwater Conservation District
   Doug Wierman – Hays Trinity Groundwater Conservation District
   Jorge Gonzalez – Trinity Glen Rose Groundwater Conservation District
   Brian Hunt – Barton Springs/Edwards Aquifer Conservation District
   Tommy Mathews – Cow Creek Groundwater Conservation District

3. **Public Comment**

   Dick Connors asked that the TWDB incorporate a statement of confidence levels used in GAM runs and MAG statements.

   Jonathan Letz stated that the Kerr County Commissioners Court was supportive of the proposed agenda item and motion clarifying the August 29, 2008 Resolution and that the Court plans to consider an agenda item to withdraw their petition appealing the DFCs set for the Ellenburger and Hickory Aquifers.

   Gene Williams introduced Stuart Barron, City of Kerrville Water and Wastewater Manager.

4. **Discussion and possible action to clarify language on GMA 9 RESOLUTION # 082908-01. The clarification under consideration is that the DFCs approved by GMA 9 under the above referenced Resolution for the Ellenburger, Hickory, and Marble Falls aquifers were intended to apply only to Blanco County and, since there are no known wells producing groundwater from those aquifers in the rest of GMA 9, that these three aquifers are considered by GMA 9 to be not relevant at this time for areas of GMA 9 outside of Blanco County and consequently do not require the designation of any DFCs by GMA 9 or the development of MAG quantities by the TWDB.**

   Following discussion by the GMA 9 Committee and after giving due consideration to public comments and TWDB comments, Doug Wierman made the following motion:

"I move that the GMA 9 Committee hereby clarifies that the language used in GMA 9 Resolution # 082908-01 had the following intent: that the DFCs approved by GMA 9 in GMA 9 Resolution # 082908-01 for the Ellenburger, Hickory, and Marble Falls aquifers were intended to apply only to Blanco County and, since there are no known wells producing groundwater from those aquifers in the rest of GMA 9, that these three aquifers are considered by GMA 9 to be not relevant aquifers at this time for areas of GMA 9 outside of Blanco County and consequently do not require the designation of any DFCs by GMA 9 or the development of MAG quantities by the TWDB."

The motion was seconded by Mary Ellen Summerlin. The motion was approved by a vote of 7 ayes, 0 nays, and 0 abstentions.

5. **Recess Meeting to prepare and print Minutes of this meeting.**

The Meeting was recessed at 10:26 a.m. in order to prepare and print the Minutes.

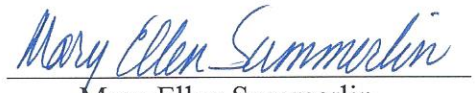
6. **Return to Open Meeting following the Recess**

The Meeting returned from recess to open session at 10:40 a.m.

7. **Discussion and possible action on the Minutes of the November 2, 2009 GMA 9 Meeting, the Minutes of this meeting and, if approved, followed immediately by Adjournment.**

Following a brief discussion, Tommy Mathews moved to approve the Minutes of the Draft November 2, 2009 GMA 9 Meeting with corrections and the Draft November 30, 2009 Meeting with corrections; and adjourn the November 30, 2009 GMA 9 Meeting. This motion was seconded by David Jeffery. The motion was approved by a vote of 7 ayes, 0 nays, and 0 abstentions and the Meeting was adjourned at 10:48 a.m.

Attest: 
Ronald G. Fieseler

Attest: 
Mary Ellen Summerlin

Blanco-Pedernales Groundwater Conservation District

601 West Main, P.O. Box 1516, Johnson City, Texas 78636 (830) 868-9196 FAX (830) 868-0376
manager@blancocountygroundwater.org

August 26, 2010

Mr. J. Kevin Ward, Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, TX 78711-3231

RE: GMA 9 Desired Future Conditions

Dear Mr. Ward,

Groundwater Management Area 9 (GMA 9) is pleased to submit the attached documents in support of our adoption of Desired Future Conditions (DFCs) for the following aquifers located within GMA 9.

GMA 9 met on July 26, 2010 and adopted the following DFCs:

- Trinity Aquifer (Upper, Middle, and Lower undifferentiated) - ***Allow for an increase in average drawdown of approximately 30 feet through 2060 consistent with "Scenario 6" in TWDB Draft GAM Task 10-005***
- Edwards Group of the Edwards Trinity (Plateau) in Kendall and Bandera Counties - ***Allow for no net increase in average drawdown in the Edwards Group of the Edwards-Trinity (Plateau) Aquifer in Kendall and Bandera Counties.***

In addition, GMA 9 declared the Edwards Group of the Edwards Trinity (Plateau) to be ***"Not Relevant" in Kerr and Blanco Counties***

Additional information and rationales regarding the DFCs set for the Edwards Group of the Edwards Trinity (Plateau)

The DFC(s) set for the Edwards Group of the Edwards Trinity (Plateau) is a result of an appeal of the DFC originally set for that aquifer on August 29, 2008, which was: ***allow for no net increase in average drawdown"*** in the Edwards Group of the Edwards-Trinity (Plateau). In January 2010, the TWDB declared that DFC to be "not reasonable" because such a DFC was not attainable in that TWDB projections of future exempt well demands would not be met under such a DFC. As part of that decision, the TWDB recommendation to GMA 9 was that a more reasonable DFC for the Edwards Group would be to: ***"Allow for 9 feet of increase in average drawdown (from current conditions)"***

Since then, in accordance with Chapter 36 and TWDB Chapter 356 requirements, we have conducted a Public Hearing on the matter, discussed it at several GMA 9 Committee Meetings, and solicited additional oral and written public input as part of three Public Meetings held in Kerrville, Boerne, and Dripping Springs during June 2010 (see attachment).

In addition, the GMA 9 Committee considered and discussed a variety of topics involving the Edwards Group DFC: the TWDB's "not reasonable" decision; the TWDB recommendation to set 9 feet of drawdown as the DFC for the Edwards Group; extensive public input, the Regional Water Plans of Regions J, K, and L; local Groundwater Conservation District Groundwater

Management Plans; the relationship and interdependency of groundwater, springs, creeks, and rivers; local demographic and socio-economic considerations, environmental flow needs, and local hydrogeological characteristics.

The DFC decisions made by GMA 9 varied from the TWDB recommendation for allowing up to 9 feet of drawdown in the Edwards Group. Therefore, in accordance with TAC Chapter 356.46(e), GMA 9 provides the following rationales for varying from the TWDB recommendation:

Blanco County Rationale

GMA 9 declared the portion of the Edward Group of the Edwards-Trinity (Plateau) located within Blanco County to be "not relevant". The rationale for this decision is based on TWDB GAM Run 08-90 which states:

> "The Edwards Group of the Edwards-Trinity (Plateau) Aquifer also extends out to a small area in the central part of Blanco County. However, this portion of the aquifer was not considered in the calculation of managed available groundwater as the aquifer was considered to be too thin to be suitable for meaningful groundwater production."

The Blanco Pedernales Groundwater Conservation District agrees with the TWDB analysis and also notes that the District currently has no record of any well producing water from the Edwards Group, which is limited to an approximate thickness of 30-60 feet, and caps some of the hills in west-central Blanco County.
(This rationale provided by the Blanco Pedernales Groundwater Conservation District.)

Kerr County Rationale

In the Headwaters Groundwater Conservation District (HGCD) Board meeting July 14, 2010, the Board voted to submit to the GMA 9 committee on July 26, 2010 a vote to declare the Edwards Group of the Edwards-Trinity (Plateau) Aquifer (the Edwards) not relevant at this time and no Desired Future Condition (DFC) set. The HGCD Board of Directors considered oral and written comments from the public meeting in Kerrville, along with a summation of other public comments heard in Boerne and Dripping Springs submitted by the GMA 9 coordinator.

In response to a petition filed regarding a DFC set by the GMA 9 committee on August 29, 2008, the Texas Water Development Board (TWDB) considered the "0" drawdown set for the Edwards through the year 2060. The TWDB concluded the "0" drawdown did not allow for future population growth resulting in more Exempt wells being drilled and produced. It further concluded that the original DFC was unreasonable because it could not be achieved. The TWDB also determined that the Edwards supplies less than 10 percent of all groundwater used in Kerr County. In its subsequent report, the TWDB recommended "an average drawdown of 9 feet in Kerr County" for the Edwards, which would allow for a Managed Available Groundwater volume of about 4,000 acre feet per year to accommodate the probable growth of Exempt pumping in the county.

The HGCD rules prohibit Non-exempt wells to be drilled in the Edwards. Only Exempt wells are allowed in this aquifer. They are not metered, and regulation of these wells is limited to spacing, pumping rate and construction. Thus, no accurate knowledge can be obtained of the current or future drawdown due to pumping from the Edwards, and HGCD has no authority to obtain this data without a change in state law.

At this time, the HGCD has only one measuring point in the Edwards to monitor any water well level relative to a DFC that might be set. Per Texas Water Code Chapter 36.1132, "a district, to the extent possible, shall issue permits up to the point that the total volume of groundwater permitted equals the MAG." This could become an issue if the district were given a MAG of 4,000 acre feet to permit when the district's rules do not allow Non-exempt wells to be drilled in the Edwards.

For these reasons, it is the rationale of HGCD that because the Edwards is considered to be less than 10 percent of the groundwater use in Kerr County and because the pumping is from Exempt wells used primarily for domestic and livestock, the Edwards should be declared not relevant. *(This rationale provided by the Headwaters Groundwater Conservation District.)*

Kendall and Bandera Counties Rationale

Groundwater Management Area 9 (GMA 9) recently adopted the Desired Future Conditions (DFC's) for the aquifer systems within GMA 9. GMA 9 utilized a methodical process to engage and obtain public and stakeholder input, to evaluate the technical issues associated with potential DFC's, and to develop updated pumpage/usage estimates for each Groundwater Conservation District (GCD) within the GMA, before adopting these DFC's. In the process of reaching these consensus-based and thoughtful conclusions, GMA 9 has held numerous meetings, public forums, solicited public comments and in all cases carefully weighed the facts and information. The results of these efforts are reasonable, achievable, scientifically based and technically sound DFC's.

Throughout this nearly five (5) year process there were several common threads. The two most significant of these were to ensure that the final DFC's did not mine the aquifers and that spring flows, which sustain our Hill Country creeks, streams and rivers be considered and reasonably protected. Many of these springs originate from the Edwards Group of the Edwards-Trinity Plateau).

In the southern portion of GMA 9, the Edwards Group of the Edwards-Trinity (Plateau) (herein called Edwards), commonly analogous with the Fort Terrett Limestone, consists of a thin section of massively bedded limestone. Total thicknesses range from approximately 45' to 90', and the unit can be found in limited portions of western and northern Kendall and eastern and northern Bandera Counties. Contrastingly, in the northwestern portion of GMA 9 (Kerr County), the Edwards can be several hundred feet thick and it covers tens of thousands of acres, extending far west beyond Kerr County.

In the thicker Kerr portion of the Edwards, a 9-10 drawdown does not represent as significant a change in the overall water table as it does in the Kendall/Bandera portion. The Edwards in Kerr County also represents thicker production zone and a more viable source for exempt wells than drilling through this section to lower aquifers. The opposite generally holds true in the Kendall/Bandera portion where an exempt well can drill and case through the thinner Edwards and cost effectively reach lower aquifers.

The Edwards in Kendall and Bandera Counties has a very limited recharge zone, which essentially consists of the limits of the Edwards outcrop, found on the highest elevations in each county. Contrastingly, the recharge zone for the Kerr County section of the Edwards is vast. Due to the thinner section of Edwards and limited recharge zones in Kendall and Bandera Counties, the Edwards will be more sensitive to even limited increases in pumpage/withdrawals, than its counterpart in Kerr County. Finally, and most importantly the Edwards in Kendall and

in Bandera Counties does not share a significant hydrologic connection with its counterpart in Kerr County. Given these geologic truths the two resource areas, the Kerr County Edwards and the Kendall/Bandera County Edwards should be managed differently, with separate DFC's.

During the entire GMA process, public comments and stakeholder inputs have been in favor of protecting springs and base flows, including those from the Kendall and Bandera Edwards. In Kendall County the Edwards provides some of the county's most visible and valuable spring flows. Spring flows from the Edwards form the base flow for the Cibolo Creek and contribute a significant amount of base flow to the Guadalupe River. Flows to the Cibolo Creek provide year round flow to Boerne City Lake and ultimately large recharge features in southern Kendall and Northern Bexar Counties. These recharge features provide critical recharge back into the Trinity Aquifer System. Flows to the Guadalupe River ultimately flow to Canyon Lake which provides surface water across the region. These flows also provide recharge back into the Trinity Aquifer system in losing stretches of the Guadalupe River. In Bandera County, spring flow from the Edwards provides important base flow to numerous creeks and streams, including the Medina River. The spring flow to the Medina River provides important base flow to Medina Lake, which provides valuable surface water to agricultural and municipal interests in Bexar, Medina and Atascosa Counties.

The City of Boerne is the largest groundwater permittee in the Cow Creek Groundwater Conservation District (CCGCD). Boerne City Lake serves as the primary alternative water supply for the City of Boerne (Boerne). It has an annual firm yield of 833 acre-feet (AF). Boerne relies heavily on the lake during the summer months, when demands on the aquifer and groundwater resources are at their highest. Conversely, Boerne typically reduces their groundwater pumpage during summer months. By utilizing this management strategy, peak demands on the aquifer are reduced and other groundwater users within the CCGCD benefit. Boerne is able to implement this strategy because of the 833AF firm yield of the City Lake. This yield however is predicated on spring flows to the lake throughout the year. Flood flows into Boerne City Lake cause a spike in the magnesium levels in the lake water. This is due to increased magnesium levels in the flood flows themselves and by the agitation of sediments on the bottom of the lake. Currently, the lake is managed to allow these flood flows to be slowly released downstream, rather than be retained as part of the 833 AF annual firm yield. The impacts of residual magnesium are diluted by the introduction of fresh spring water into the system. Flood flows that are released downstream provide valuable environmental flows, nutrients to aquatic systems and ultimately recharge to other portions of the system.

The water treatment plant at the Boerne City Lake has been designed based on a year round water source dependant on fresh spring flows. If water levels in the Edwards were allowed to draw down it would have a significant impact on both the quantity and quality of the water in Boerne City Lake. A drawdown of 9-10 feet, such as that suggested by the Texas Water Development Board, would amount to a 20% or greater reduction in the water table associated with the springs that feed the Cibolo Creek. If this were to occur, Boerne would be faced with replacing water from the City Lake with groundwater, especially during the peak summer months when the impacts on springs would be greatest. This would have a compounding effect, placing escalating and increased pressure on the Middle Trinity Aquifer during the summer months when groundwater levels are typically at their lowest. Alternatively, Boerne could opt to continue to rely heavily on the lake, but they would be required to expand their water treatment capacity to adjust for the diminished water quality caused by the reduction of fresh spring water into the system. This would require significant upgrades or complete replacement of Boerne's existing water treatment plant. A replacement water treatment plant should reasonably be expected to range in the tens of millions of dollars. More flood flows would be captured to provide for the 833 AF firm yield, while downstream there would be reduced

environmental flows, diminished nutrients for aquatic systems and diminished recharge in southern Kendall and northern Bexar Counties.

Likewise, reductions in flows to Canyon and Medina Lakes would necessitate changes in the management of both of these lakes. Significant portions of the surface water in both lakes are obligated to supply municipal, agricultural, industrial, recreational and environmental uses. To date, management of these surface water resources has depended on the base flow provided by springs, many of which originate from the Edwards in Kendall and Bandera Counties. Reductions due to a drawdown of 9-10 feet will dramatically reduce these spring flows and just as in the case of Boerne City Lake necessitate changes in the management of these regionally critical surface water resources.

The CCGCD has a Board Order in place prohibiting any new wells in the Edwards. Recently adopted Cow Creek rules provide for protection of the Edwards, particularly the portion where Edwards springs feed Boerne City Lake.

In 2009, the TWDB approved the CCGCD Management Plan which called for zero drawdown in the Edwards Group of the Edwards-Trinity (Plateau).

Each of the aforementioned, if considered alone, would be enough to recognize the importance and the relevance of these Edwards discharges (springs). When considered collectively, they provide a preponderance of evidence to support the declaration of relevance and the establishment of a zero or no net increase in drawdown of the Edwards portion of the Edwards Trinity Aquifer in Kendall and Bandera Counties. A zero or no net increase in drawdown for Kendall and Bandera portions of the Edwards thereby represents the only reasonable and prudent Desired Future Condition that protects these critical springs and their contribution to the water resources in the region.
(This rationale provided by the Cow Creek Groundwater Conservation District.)

GMA 9 appreciates the assistance and advice that we have received from the TWDB, especially from Dr. Robert Mace, Dr. Bill Hutchison, Rima Petrossian, Ali Chowdhury, Robert Bradley, and other members of the TWDB staff. We look forward to continued cooperative efforts with the TWDB.

Please feel free to contact me if you or any of your staff have questions regarding this submission.

Sincerely yours,

Ronald G. Fieseler
General Manager, Blanco Pedernales GCD
GMA 9 Coordinator

Attachments:

- Meeting Posting Notices
- July 26, 2010 GMA 9 Meeting Minutes
- GMA 9 Resolution # 072610-01
- Summary of Total Public Comments Received June 2010

Blanco-Pedernales Groundwater Conservation District

601 West Main, P.O. Box 1516, Johnson City, Texas 78636 (830) 868-9196 FAX (830) 868-0376
manager@blancocountygroundwater.org

Groundwater Management Area # 9 Joint Planning Meeting

Monday, July 26, 2010 10:00 a.m.

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Blanco-Pedernales Groundwater Conservation District will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. This meeting will be held at the **Boerne High School Auditorium, located at 1 Greyhound Lane, Boerne, Texas** on **Monday, July 26, 2010 at 10:00 a.m.** for the following purposes:

Agenda

1. Call to Order.
2. Introduction of Member District Representatives and other meeting attendees.
3. Consider Minutes of GMA 9 Meeting of June 3, 2010, and GMA 9 Public Meetings of June 21, 23, and 24, 2010.
4. Consider:
   (a) public comments received by GMA 9 at three Public Meetings held in June 2010
   (b) relevancy or non-relevancy of aquifers within GMA 9
   (c) GAM Runs prepared by the TWDB for aquifers within GMA 9
   (d) Draft DFCs proposed for aquifers within GMA 9
   (e) Designation of DFCs proposed for aquifers within GMA 9
5. Consider GMA 9 Resolution 072610-1 setting DFCs for aquifers within GMA 9.
6. Consider tasking the GMA 9 Technical Group with preparing recommendations on monitoring strategies, Groundwater Management Plan goals and objectives, and other relevant tasks to aide GMA 9 and its Member Districts in ongoing cooperative regional groundwater planning efforts.
7. Recess Meeting to prepare and print Minutes of this July 26, 2010 meeting.
8. Return to Open Meeting following the Recess.
9. Discussion and possible action on the Minutes of the July 26, 2010 GMA 9 Meeting followed immediately by Adjournment.

Posted on the Front Door of the District Office, 601 West Main, Johnson City, Texas, and at the Blanco County Courthouse, Johnson City, Texas, on this, the 15 day of July 2010, at 4:00 a.m. (p.m.)

General Manager, Blanco-Pedernales Groundwater Conservation District

The Blanco-Pedernales Groundwater Conservation District is committed to compliance with the Americans with Disabilities Act (ADA). Reasonable accommodations and equal opportunity for effective communications will be provided upon request. Please contact the District office at 830-868-9196 at least 24 hours in advance if accommodation is needed.

NOTICE OF A GMA9 MEETING ATTENDED BY THE
COW CREEK GROUNDWATER CONSERVATION DISTRICT
KENDALL COUNTY, TEXAS

Groundwater Management Area # 9 Public Meetings

Monday, July 26, 2010 10:00 a.m.

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Cow Creek Groundwater Conservation District will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. The meeting will be held at the **Boerne High School Auditorium, located at 1 Greyhound Lane, Boerne, Texas** on **Monday, July 26, 2010 at 10:00 a.m.** for the following purposes:

1. Call to Order.
2. Introduction of Member District Representatives and other meeting attendees.
3. Consider Minutes of GMA 9 Meeting of June 3, 2010, and GMA 9 Public Meetings of June 21, 23, and 24, 2010.
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   - ii. relevancy or non-relevancy of aquifers within GMA 9
   - iii. GAM Runs prepared by the TWDB for aquifers within GMA 9
   - iv. Draft DFCs proposed for aquifers within GMA 9
   - v. Designation of DFCs proposed for aquifers within GMA 9

Kendall County
DARLENE HERRIN
COUNTY CLERK
On: 07/15/2010 4:15PM
By: Harriet P Seidensticker, Deputy

5. Consider GMA 9 Resolution 072610-1 setting DFCs for aquifers within GMA 9.
6. Consider tasking the GMA 9 Technical Group with preparing recommendations on monitoring strategies, Groundwater Management Plan goals and objectives, and other relevant tasks to aide GMA 9 and its Member Districts in ongoing cooperative regional groundwater planning efforts.
7. Recess Meeting to prepare and print Minutes of this July 26, 2010 meeting.
8. Return to Open Meeting following the Recess.
9. Discussion and possible action on the Minutes of the July 26, 2010 GMA 9 Meeting followed immediately by Adjournment.

Micah Voulgaris
Cow Creek Groundwater Conservation District
General Manager

Edwards Aquifer Authority

1615 N. St. Mary's San Antonio, TX 78215 (210) 222-2204 FAX (210) 222-9748
rillgner@edwardsaquifer.org

Groundwater Management Area # 9 Joint Planning Meeting

Monday, July 26, 2010 10:00 a.m.

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Edwards Aquifer Authority will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. This meeting will be held at the **Boerne High School Auditorium, located at 1 Greyhound Lane, Boerne, Texas on Monday, July 26, 2010 at 10:00 a.m. for the following purposes:**

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6. Consider tasking the GMA 9 Technical Group with preparing recommendations on monitoring strategies, Groundwater Management Plan goals and objectives, and other relevant tasks to aide GMA 9 and its Member Districts in ongoing cooperative regional groundwater planning efforts.
7. Recess Meeting to prepare and print Minutes of this July 26, 2010 meeting.
8. Return to Open Meeting following the Recess.
9. Discussion and possible action on the Minutes of the July 26, 2010 GMA 9 Meeting followed immediately by Adjournment.

Came to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the____ day of July, 2010 at _____ .m.

_____, Deputy Clerk

_____ County, TEXAS

_____
Assistant to Board Secretary, Edwards Aquifer Authority

B: ndera County River Authority and Groundwater Distri :t

440 FM 3240 Bandera, Texas 78003 (830) 796-7260 FAX (830) 796-8262
djeffery@bcragd.org

Groundwater Management Area # 9 Joint Planning Meeting

Monday, July 26, 2010 10:00 a.m.

Notice is iven that one or more members of the Board of Directors and/or their designated representatives a d/or Staff of t : Bandera County River Authority and Groundwater District will attend a meeting of Groundwater Conserv on Districts which are located within the State of Texas Groundwater Management Area #9 for pu poses of discus :ng and/or conducting joint planning in compliance with the requirements of HB 1763, which was ; assed during th 2005 Texas Legislative Session. This meeting will be held at the **Boerne High School Auditoriu n, located : 1 Greyhound Lane, Boerne, Texas on Monday, July 26, 2010 at 10:00 a.m.** for the following purposes

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7. Rec :s Meeting to prepare and print Minutes of this July 26, 2010 meeting.
8. Ret n to Open Meeting following the Recess.
9. Dis . ssion and possible action on the Minutes of the July 26, 2010 GMA 9 Meeting followed imm :diately by Adjournment.

Posted c the Front Door of the District Office, 440 FM 3240, Bandera, Texas, and at the Bandera County :ourthouse, Bandera, Texas, on this, the 15 day of July 20__ ______ _ a.m. / p.m.

FILED AT _ O'CLOCK _ M. ON
JUL 15 2010
CANDY WHEELER, COUNTY CLERK
BANDERA COUNTY, TEXAS
BY _______ DEPUTY

General Manager, Bandera County River Authority and Groundwater District

The Band :a County River Authority and Groundwater District is committed to compliance with the Americans with Di :ab lities Act (AD/) Reasonable accommodations and equal opportunity for effective communications will be provided upon re ue :t. Please co :act the District office at 830-796-7260 at least 24 hours in advance if accommodation is needed.

NOTICE OF OPEN MEETINGS

Groundwater Management Area # 9 Joint Planning Meeting

Monday, July 26, 2010 at 10:00 a.m.

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Barton Springs Edwards Aquifer Conservation District will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. This meeting will be held at the **Boerne High School Auditorium, located at 1 Greyhound Lane, Boerne, Texas** on **Monday, July 26, 2010 at 10:00 a.m.** for the following purposes:

Agenda

1. Call to Order.

2. Introduction of Member District Representatives and other meeting attendees.

3. Consider Minutes of GMA 9 Meeting of June 3, 2010, and GMA 9 Public Meetings of June 21, 23, and 24, 2010.

4. Consider:
   - i. public comments received by GMA 9 at three Public Meetings held in June 2010
   - ii. relevancy or non-relevancy of aquifers within GMA 9
   - iii. GAM Runs prepared by the TWDB for aquifers within GMA 9
   - iv. Draft DFCs proposed for aquifers within GMA 9
   - v. Designation of DFCs proposed for aquifers within GMA 9

5. Consider GMA 9 Resolution 072610-1 setting DFCs for aquifers within GMA 9.

6. Consider tasking the GMA 9 Technical Group with preparing recommendations on monitoring strategies, Groundwater Management Plan goals and objectives, and other relevant tasks to aide GMA 9 and its Member Districts in ongoing cooperative regional groundwater planning efforts.

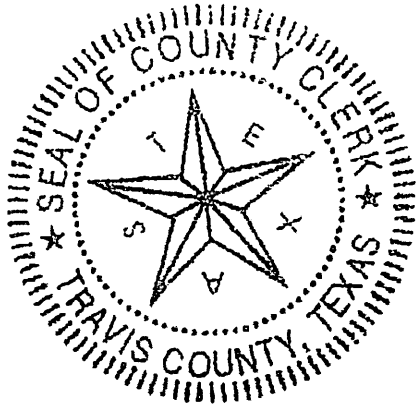
7. Recess Meeting to prepare and print Minutes of this July 26, 2010 meeting.

8. Return to Open Meeting following the Recess.

9. Discussion and possible action on the Minutes of the July 26, 2010 GMA 9 Meeting followed immediately by Adjournment.

Came to hand and posted on a Bulletin Board in the Courthouse, Travis County, Texas, on this, the 15th day of July, 2010, at 1:54 .m.

_____, Deputy Clerk
Travis County, TEXAS
CASEY HOLM



July 15 10

Dana DeBeauvoir

County Clerk, Travis County, Texas

By _____ Deputy

CASEY HOLM

FILED AND RECORDED

OFFICIAL PUBLIC RECORDS

Dana DeBeauvoir

Jul 15, 2010 01:54 PM 201080220

HOLMC: $3.00

Dana DeBeauvoir, County Clerk

Travis County TEXAS

Hays Trinity Groundwater Conservation District

Notice of Groundwater Management Area # 9 Joint Planning Meeting

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Hays Trinity Groundwater Conservation District will attend one or more meetings of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. This meeting will be held at the **Boerne High School Auditorium, located at 1 Greyhound Lane, Boerne, Texas on Monday, July 26, 2010 at 10:00 a.m.** for the following purposes:

Date: Monday, July 26, 2010, 10:00 a.m.
Place: Boerne High School Auditorium
Location: 1 Greyhound Lane, Boerne, Texas

Accepted for Filing in:
Hays County
On: Jul 13,2010 at 04:01P
By,
Rose Robinson

Agenda

1. Call to Order.
2. Introduction of Member District Representatives and other meeting attendees.
3. Consider Minutes of GMA 9 Meeting of June 3, 2010, and GMA 9 Public Meetings of June 21, 23, and 24, 2010.
4. Consider:
   i. public comments received by GMA 9 at three Public Meetings held in June 2010
   ii. relevancy or non-relevancy of aquifers within GMA 9
   iii. GAM Runs prepared by the TWDB for aquifers within GMA 9
   iv. Draft DFCs proposed for aquifers within GMA 9
   v. Designation of DFCs proposed for aquifers within GMA 9
5. Consider GMA 9 Resolution 072610-1 setting DFCs for aquifers within GMA 9.
6. Consider tasking the GMA 9 Technical Group with preparing recommendations on monitoring strategies, Groundwater Management Plan goals and objectives, and other relevant tasks to aide GMA 9 and its Member Districts in ongoing cooperative regional groundwater planning efforts.
7. Recess Meeting to prepare and print Minutes of this July 26, 2010 meeting.
8. Return to Open Meeting following the Recess.
9. Discussion and possible action on the Minutes of the July 26, 2010 GMA 9 Meeting followed immediately by Adjournment.

Adjourn

The Board of Directors of the Hays Trinity Conservation District reserves the right to go into Executive Session at any time during the course of this meeting to discuss any of the matters listed on this agenda, as authorized by the Texas Open Meetings Act, Chapter 551, Government Code. No final action or decision will be made in Executive Session.

The Hays Trinity Groundwater Conservation District is committed to compliance with the Americans with Disabilities Act (ADA). Reasonable accommodations and equal opportunity for effective communications will be provided upon request. Please contact the District office at 512-858-9253 at least 24 hours in advance if accommodation is needed.

This notice has been posted on a bulletin board at a place convenient to the public in the Hays County Courthouse and outside the main entrance to the District offices not less than three (3) days prior to the scheduled meeting in accordance with the provisions of the Texas Open Meetings Act, Chapter 551, Government Code.

Posted by: Jack D. Brown

Center Lake Business Park: 14101 Hwy 290 W. Bldg 100, Ste. #212, Austin, Texas 78737
Mail: P. O. Box 1642 Dripping Springs, TX 78620
E-mail: manager@haysgroundwater.com Phone: 512-858-9253 Fax: 512-858-2384 website: haysgroundwater.com

TRANSMISSION VERIFICATION REPORT

TIME : 07/13/2010 15:55
NAME : HAYS TRINITY GCD
FAX : 5128582384
TEL : 5128589253
SER.# : C8J257986

DATE,TIME	07/13 15:54
FAX NO./NAME	15123937332
DURATION	00:00:26
PAGE(S)	02
RESULT	OK
MODE	STANDARD ECM

FAX

Date: 7/13/2010

To: **Hays County Clerk's Office: Attn: Lynn Curry**

Fax No.: 1-512-393-7332

From: Rick Broun

No. Pages: 2
(Including cover page)

Comments:
Lynn,
Please post this GMA# 9

Thank you,

Rick Broun
General Manager
Hays Trinity Groundwater Conservation District

HEADWATERS GROUNDWATER CONSERVATION DISTRICT
125 Lehmann Dr. Ste. 102 Kerrville, Texas 78028 (830) 896/4110 Fax (830) 257/3201
e-mail hgcd@hgcd.org

Groundwater Management Area # 9 Joint Planning Meeting

Monday, July 26, 2010 10:00 a.m.

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Headwaters Groundwater Conservation District will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. This meeting will be held at the **Boerne High School Auditorium, located at 1 Greyhound Lane, Boerne, Texas on Monday, July 26, 2010 at 10:00 a.m.** for the following purposes:

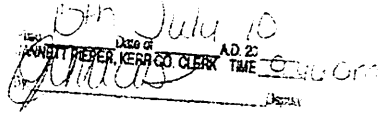
Agenda

1. Call to Order.
2. Introduction of Member District Representatives and other meeting attendees.
3. Consider Minutes of GMA 9 Meeting of June 3, 2010, and GMA 9 Public Meetings of June 21, 23, and 24, 2010.
4. Consider:
   (a) public comments received by GMA 9 at three Public Meetings held in June 2010
   (b) relevancy or non-relevancy of aquifers within GMA 9
   (c) GAM Runs prepared by the TWDB for aquifers within GMA 9
   (d) Draft DFCs proposed for aquifers within GMA 9
   (e) Designation of DFCs proposed for aquifers within GMA 9
5. Consider GMA 9 Resolution 072610-1 setting DFCs for aquifers within GMA 9.
6. Consider tasking the GMA 9 Technical Group with preparing recommendations on monitoring strategies, Groundwater Management Plan goals and objectives, and other relevant tasks to aide GMA 9 and its Member Districts in ongoing cooperative regional groundwater planning efforts.
7. Recess Meeting to prepare and print Minutes of this July 26, 2010 meeting.
8. Return to Open Meeting following the Recess.
9. Discussion and possible action on the Minutes of the July 26, 2010 GMA 9 Meeting followed immediately by Adjournment.

This notice is published pursuant to the Texas Open Meeting Act, Chapter 551, and Texas Government Code, Dated this15th day of July 2010

I hereby certify that the above Notice of Meeting of the Board of Directors for Headwaters Groundwater Conservation District is a true and correct copy of said Notice; that a true and correct copy of said Notice was posted on July 15, 2010 by 5:00 PM, in its administrative office in Kerrville, Kerr County, Texas at a place convenient and readily accessible to the general public at all times; that a true and correct copy of said Notice was furnished to the County Clerk of Kerr County; the HGCD Website www.hgcd.org and that a copy of said Notice was furnished to each Director.

Gene Williams, General Manager
Headwaters Groundwater Conservation District



Groundwater Management Area # 9 Joint Planning Meeting

Monday, July 26, 2010 10:00 a.m.

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the **Medina County Groundwater Conservation District** will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. This meeting will be held at the **Boerne High School Auditorium, located at 1 Greyhound Lane, Boerne, Texas on Monday, July 26, 2010 at 10:00 a.m.** for the following purposes:

Agenda

1. Call to Order.
2. Introduction of Member District Representatives and other meeting attendees.
3. Consider Minutes of GMA 9 Meeting of June 3, 2010, and GMA 9 Public Meetings of June 21, 23, and 24, 2010.
4. Consider:
   (a) public comments received by GMA 9 at three Public Meetings held in June 2010
   (b) relevancy or non-relevancy of aquifers within GMA 9
   (c) GAM Runs prepared by the TWDB for aquifers within GMA 9
   (d) Draft DFCs proposed for aquifers within GMA 9
   (e) Designation of DFCs proposed for aquifers within GMA 9
5. Consider GMA 9 Resolution 072610-1 setting DFCs for aquifers within GMA 9.
6. Consider tasking the GMA 9 Technical Group with preparing recommendations on monitoring strategies, Groundwater Management Plan goals and objectives, and other relevant tasks to aide GMA 9 and its Member Districts in ongoing cooperative regional groundwater planning efforts.
7. Recess Meeting to prepare and print Minutes of this July 26, 2010 meeting.
8. Return to Open Meeting following the Recess.
9. Discussion and possible action on the Minutes of the July 26, 2010 GMA 9 Meeting followed immediately by Adjournment.

Posted at the District Office, 1613 Ave. K, Ste. 105 Hondo, Texas, and at the Medina County Courthouse, Hondo, Texas, on this, the 15th day of July 2010, at _____ a.m. / p.m.

Liana Bueb

General Manager, Medina County Groundwater Conservation District

POSTED IN MY OFFICE
LISA J. WERNETTE

JUL 16 '10 PM -2 20

COUNTY CLERK, MEDINA CO.

Trinity Glen Rose Groundwater Conservation District

6335 Camp Bullis Rd. Suite #25 San Antonio, Texas 78257 (210) 698-1155 Fax (210) 698-1159

Groundwater Management Area Joint Planning Meeting

Monday, July 26, 2010 10:00 A.M.

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Trinity Glen Rose Groundwater Conservation District (TGRGCD) will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. This meeting will be held at the Boerne High School Auditorium, located at 1 Greyhound Lane, Boerne, Texas on Monday, July 26, 2010 at 10:00 a.m. for the following purposes:

Agenda

1. Call to Order.
2. Introduction of Member District Representatives and other meeting attendees.
3. Consider Minutes of GMA 9 Meeting of June 3, 2010, and GMA 9 Public Meetings of June 21, 23, and 24, 2010.
4. Consider:
   (a) public comments received by GMA 9 at three Public Meetings held in June 2010
   (b) relevancy or non-relevancy of aquifers within GMA 9
   (c) GAM Runs prepared by the TWDB for aquifers within GMA 9
   (d) Draft DFCs proposed for aquifers within GMA 9
   (e) Designation of DFCs proposed for aquifers within GMA 9
5. Consider GMA 9 Resolution 072610-1 setting DFCs for aquifers within GMA 9.
6. Consider tasking the GMA 9 Technical Group with preparing recommendations on monitoring strategies, Groundwater Management Plan goals and objectives, and other relevant tasks to aide GMA 9 and its Member Districts in ongoing cooperative regional groundwater planning efforts.
7. Recess Meeting to prepare and print Minutes of this July 26, 2010 meeting.
8. Return to Open Meeting following the Recess.
9. Discussion and possible action on the Minutes of the July 26, 2010 GMA 9 Meeting followed immediately by Adjournment.

Posted at the TGRGCD office, TGRGCD Website and the Bexar County, Kendall County and Comal County Courthouses, on this, the 19 day of July, 2010.

George Wissmann

George Wissmann, Manager
Trinity Glen Rose Groundwater Conservation District

The Trinity Glen Rose Groundwater Conservation District is committed to compliance with the Americans with Disabilities Act (ADA). Reasonable accommodations and equal opportunity for effective communications will be provided upon request. Please contact the District Representative at 210-219-5555 at least 24 hours in advance if accommodation is needed.

Trinity Glen Rose Groundwater Conservation District

6335 Camp Bullis Rd. Suite #25 San Antonio, Texas 78257 (210) 698-1155 Fax (210) 698-1159

Groundwater Management Area Joint Planning Meeting

Monday, July 26, 2010 10:00 A.M.

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Trinity Glen Rose Groundwater Conservation District (TGRGCD) will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. This meeting will be held at the **Boerne High School Auditorium, located at 1 Greyhound Lane, Boerne, Texas on Monday, July 26, 2010 at 10:00 a.m.** for the following purposes:

Agenda

Kendall County
DARLENE HERRIN
COUNTY CLERK
On: 07/19/2010 11:10AM
By: Harriet P Seidenstricker Deputy

1. Call to Order.
2. Introduction of Member District Representatives and other meeting attendees.
3. Consider Minutes of GMA 9 Meeting of June 3, 2010, and GMA 9 Public Meetings of June 21, 23, and 24, 2010.
4. Consider:
   (a) public comments received by GMA 9 at three Public Meetings held in June 2010
   (b) relevancy or non-relevancy of aquifers within GMA 9
   (c) GAM Runs prepared by the TWDB for aquifers within GMA 9
   (d) Draft DFCs proposed for aquifers within GMA 9
   (e) Designation of DFCs proposed for aquifers within GMA 9
5. Consider GMA 9 Resolution 072610-1 setting DFCs for aquifers within GMA 9.
6. Consider tasking the GMA 9 Technical Group with preparing recommendations on monitoring strategies, Groundwater Management Plan goals and objectives, and other relevant tasks to aide GMA 9 and its Member Districts in ongoing cooperative regional groundwater planning efforts.
7. Recess Meeting to prepare and print Minutes of this July 26, 2010 meeting.
8. Return to Open Meeting following the Recess.
9. Discussion and possible action on the Minutes of the July 26, 2010 GMA 9 Meeting followed immediately by Adjournment.

Posted at the TGRGCD office, TGRGCD Website and the Bexar County, Kendall County and Comal County Courthouses, on this, the 19 day of July, 2010.

George Wissmann, Manager
Trinity Glen Rose Groundwater Conservation District

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Trinity Glen Rose Groundwater Conservation District

6335 Camp Bullis Rd. Suite #25 San Antonio, Texas 78257 (210) 698-1155 Fax (210) 698-1159

Groundwater Management Area Joint Planning Meeting

Monday, July 26, 2010 10:00 A.M.

Notice is given that one or more members of the Board of Directors and/or their designated representatives and/or Staff of the Trinity Glen Rose Groundwater Conservation District (TGRGCD) will attend a meeting of Groundwater Conservation Districts which are located within the State of Texas Groundwater Management Area #9 for purposes of discussing and/or conducting joint planning in compliance with the requirements of HB 1763, which was passed during the 2005 Texas Legislative Session. This meeting will be held at the Boerne High School Auditorium, located at 1 Greyhound Lane, Boerne, Texas on Monday, July 26, 2010 at 10:00 a.m. for the following purposes:

Agenda

LT1-86-14014-1

1. Call to Order.
2. Introduction of Member District Representatives and other meeting attendees.
3. Consider Minutes of GMA 9 Meeting of June 3, 2010, and GMA 9 Public Meetings of June 21, 23, and 24, 2010.
4. Consider:
   (a) public comments received by GMA 9 at three Public Meetings held in June 2010
   (b) relevancy or non-relevancy of aquifers within GMA 9
   (c) GAM Runs prepared by the TWDB for aquifers within GMA 9
   (d) Draft DFCs proposed for aquifers within GMA 9
   (e) Designation of DFCs proposed for aquifers within GMA 9

LT2-0-0-1

5. Consider GMA 9 Resolution 072610-1 setting DFCs for aquifers within GMA 9.
6. Consider tasking the GMA 9 Technical Group with preparing recommendations on monitoring strategies, Groundwater Management Plan goals and objectives, and other relevant tasks to aide GMA 9 and its Member Districts in ongoing cooperative regional groundwater planning efforts.
7. Recess Meeting to prepare and print Minutes of this July 26, 2010 meeting.
8. Return to Open Meeting following the Recess.
9. Discussion and possible action on the Minutes of the July 26, 2010 GMA 9 Meeting followed immediately by Adjournment.

Posted at the TGRGCD office, TGRGCD Website and the Bexar County, Kendall County and Comal County Courthouses, on this, the 19 day of July, 2010.

George Wissmann, Manager
Trinity Glen Rose Groundwater Conservation District

The Trinity Glen Rose Groundwater Conservation District is committed to compliance with the Americans with Disabilities Act (ADA). Reasonable accommodations and equal opportunity for effective communications will be provided upon request. Please contact the District Representative at 210-219-5555 at least 24 hours in advance if accommodation is needed.

Groundwater Management Area # 9 Joint Planning Meeting

Minutes

Thursday, July 26, 2010 – 10:00 a.m.
Boerne High School Auditorium, 1 Greyhound Lane, Boerne, Texas

1. **Call to Order.** Ron Fieseler, GMA 9 Coordinator, called the meeting to order at approximately 10:00 a.m.

2. **Introduction of Member District Representatives and other meeting attendees.** The attending Board Presidents or Designated Representatives introduced themselves:
   - Blanco-Pedernales Groundwater Conservation District - Neill Binford, Pres.
   - Bandera County River Authority and Groundwater District - Jim Chastain, Pres.
   - Medina County Groundwater Conservation District – Tommy Boehme, Pres.
   - Hays-Trinity Groundwater Conservation District - Jimmy Skipton, Pres.
   - Barton Springs/Edwards Aquifer Conservation District - Brian Hunt, P.G. and DR
   - Cow Creek Groundwater Conservation District - Micah Voulgaris, DR.
   - Trinity-Glen Rose Groundwater Conservation District - Jorge Gonzalez, DR
   - Headwaters Groundwater Conservation District - Gene Williams, GM and DR
   - Edwards Aquifer Authority - Luana Buckner, Chairman.

   Other Elected Officials in the audience were introduced.

3. **Consider Minutes of GMA 9 Meeting of June 3, 2010, and GMA 9 Public Meetings of June 21, 23, and 24, 2010.** The Minutes were approved by consensus with one change.

4. **Consider:**
   - i. **public comments received by GMA 9 at three Public Meetings held in June 2010**
     The GMA 9 Committee discussed and considered public comments received during June 2010.
   - ii. **relevancy or non-relevancy of aquifers within GMA 9**
     The GMA 9 Committee discussed and considered the proposal to declare the Edwards Group of the Hill Country Trinity Aquifer "relevant" or "not relevant".
   - iii. **GAM Runs prepared by the TWDB for aquifers within GMA 9**
     The GMA 9 Committee discussed and considered TWDB GAM Runs and various pumping/drawdown scenarios.
   - iv. **Draft DFCs proposed for aquifers within GMA 9**
     The GMA 9 Committee discussed and considered a variety of DFC proposals.
   - v. **Designation of DFCs proposed for aquifers within GMA.**
     Following discussion and due consideration of the current and future needs and conditions of the aquifers in question, the current and projected groundwater demand estimates from local GCDs, the TWDB, and Regional Water Planning Groups J, K, and L, and the potential effects on springs, and surface water for DFCs set through the year 2060, the following motions were made:

Motion #1:
Moved by Tommy Boehme and seconded by Gene Williams to designate the following Desired Future Condition through the year 2060 for the Trinity aquifer located in GMA 9:

- Hill Country Trinity Aquifer -
  allow for an increase in average drawdown of approximately 30 feet through 2060 consistent with "Scenario 6" in TWDB Draft GAM Task 10-005

the vote on the motion was 8 ayes, 1 nays, and 0 abstentions, and the Motion Passed.

Ayes: Jimmy Skipton, HTGCD
Neill Binford, BPGCD
Gene Williams, HGCD
Micah Voulgaris, CCGCD
Luana Buckner, EAA
Tommy Boehme, MCGCD
Brian Hunt, BSEACD
Jorge Gonzales, TGRGCD

Nays Jim Chastain. BCRAGD

Motion #2
Moved by Gene Williams and seconded by Luana Buckner to declare the Edwards Group of the Hill Country Aquifer located in Kerr County as a not-relevant aquifer:

the vote on the motion was 7 ayes, 2 nays, and 0 abstentions, and the Motion Passed.

Ayes: Jimmy Skipton, HTGCD
Gene Williams, HGCD
Luana Buckner, EAA
Tommy Boehme, MCGCD
Brian Hunt, BSEACD
Jorge Gonzales, TGRGCD
Jim Chastain. BCRAGD

Nays Neill Binford, BPGCD
Micah Voulgaris, CCGCD

Motion #3
Moved by Micah Voulgaris and seconded by Luana Buckner to declare the Edwards Group of the Hill Country Aquifer located in Kendall County as a relevant aquifer:

the vote on the motion was 9 ayes, 0 nays, and 0 abstentions, and the Motion Passed.

Ayes: Jimmy Skipton, HTGCD
Neill Binford, BPGCD
Gene Williams, HGCD
Micah Voulgaris, CCGCD
Luana Buckner, EAA
Tommy Boehme, MCGCD
Brian Hunt, BSEACD
Jorge Gonzales, TGRGCD
Jim Chastain. BCRAGD

Motion #4
Moved by Jim Chastain and seconded by Luana Buckner to declare the Edwards Group of the Hill Country Aquifer located in Bandera County as a relevant aquifer:

the vote on the motion was 9 ayes, 0 nays, and 0 abstentions, and the Motion Passed.

Ayes: Jimmy Skipton, HTGCD
Neill Binford, BPGCD
Gene Williams, HGCD
Micah Voulgaris, CCGCD

Luana Buckner, EAA
Tommy Boehme, MCGCD
Brian Hunt, BSEACD
Jorge Gonzales, TGRGCD
Jim Chastain. BCRAGD

Motion #5
Moved by Micah Voulgaris and seconded by Jim Chastain to designate the following Desired Future Condition through the year 2060 for the Edwards Group of the Hill Country Aquifer located in Kendall and Bandera County:

- Edward Group of the Edwards Trinity (Plateau) – no net increase in average drawdown for those portions located in Kendall and Bandera County

the vote on the motion was 9 ayes, 0 nays, and 0 abstentions, and the Motion Passed.
Ayes: Jimmy Skipton, HTGCD
Neill Binford, BPGCD
Gene Williams, HGCD
Micah Voulgaris, CCGCD
Luana Buckner, EAA
Tommy Boehme, MCGCD
Brian Hunt, BSEACD
Jorge Gonzales, TGRGCD
Jim Chastain. BCRAGD

Motion #6
Moved by Neill Binford and seconded by Luana Buckner to declare the Edwards Group of the Hill Country Aquifer located in Blanco County as a not-relevant aquifer:

the vote on the motion was 9 ayes, 0 nays, and 0 abstentions, and the Motion Passed.
Ayes: Jimmy Skipton, HTGCD
Neill Binford, BPGCD
Gene Williams, HGCD
Micah Voulgaris, CCGCD
Luana Buckner, EAA
Tommy Boehme, MCGCD
Brian Hunt, BSEACD
Jorge Gonzales, TGRGCD
Jim Chastain. BCRAGD

5. **Consider GMA 9 Resolution 072610-1 setting DFCs for aquifers within GMA 9.** Following the Motions made under Agenda Item 4(v), the votes were recorded and memorialized on GMA 9 Resolution 072610-01 and the Resolution was adopted by concensus.

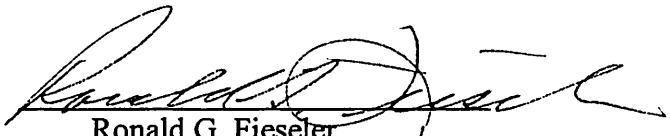
6. **Consider tasking the GMA 9 Technical Group with preparing recommendations on monitoring strategies, Groundwater Management Plan goals and objectives, and other relevant tasks to aide GMA 9 and its Member Districts in ongoing cooperative regional groundwater planning efforts.** The GMA 9 Committee considered various tasks that the GMA 9 Technical Group might be assigned. The following tasks were assigned: (1) develop monitoring strategies, (2) consider Groundwater Management Plans goals and objectives, (3) work on auditing 2008/2010 GMA 9 pumping by GCDs.

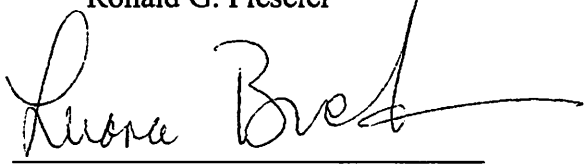
7. **Recess Meeting to prepare and print Minutes of this July 26, 2010 meeting.** The GMA 9 Committee recessed from Open Meeting at 11:55 a.m. to allow the GMA 9 Coordinator time to prepare and print the Minutes of this meeting.

8. **Return to Open Meeting following the Recess.** The GMA 9 Committee returned to Open Meeting at 2:00 p.m.

9. **Discussion and possible action on the Minutes of the July 26, 2010 GMA 9 Meeting followed immediately by Adjournment.** The Minutes of the July 26, 2010 GMA 9 Meeting were approved by consensus and the Meeting was immediately adjourned at approximately 2:15 pm with no further business being transacted.

Approved by GMA-9 Consensus July 26, 2010.

Attest: 
Ronald G. Fieseler

Attest: 
Luana Buckner

STATE OF TEXAS	§	
	§	**RESOLUTION # 072610-01**
GROUNDWATER	§	
MANAGEMENT AREA 9	§	

Designation of Desired Future Conditions For Groundwater Management Area 9 Aquifers

WHEREAS, Groundwater Conservation Districts (GCDs) located within or partially within Groundwater Management Area 9 (GMA 9) are required under Chapter 36.108, Texas Water Code to conduct joint planning and designate the Desired Future Conditions of aquifers within GMA 9 and;

WHEREAS, the Board Presidents or their Designated Representatives of GCDs in GMA 9 have met as a Committee in various meetings and conducted joint planning in accordance with Chapter 36.108, Texas Water Code since September 2005 and;

WHEREAS, GMA 9, having given proper and timely notice, held an open meeting of the GMA 9 Committee on July 26, 2010 at the Boerne High School Auditorium, 1 Greyhound Lane, Boerne, Texas and;

WHEREAS, since September 20, 2005, GMA 9 has solicited and considered public comment at various GMA 9 Committee meetings, at nine special Public Meetings, one Public Hearing on the Edwards Group of the Edwards Trinity (Plateau), and from a stakeholders section in the University of Texas at Austin LBJ School of Public Affairs Policy Research Project Report 161, and;

WHEREAS, the GMA 9 Committee received and considered technical advice regarding local aquifers, hydrology, geology, recharge characteristics, local groundwater demands and usage, population projections, ground and surface water inter-relationships, and other considerations that affect groundwater conditions from the Texas Water Development Board (TWDB), Regional Water Planning Groups J, K, and L, consultants, hydrologists, geologists, and other groundwater professionals, and;

WHEREAS, following public discussion and due consideration of the current and future needs and conditions of the aquifers in question, the current and projected groundwater demand estimates from local GCDs, the TWDB, and Regional Water Planning Groups J, K, and L, and the potential effects on springs, surface water, habitat, and water-dependent species for DFCs set through the year 2060, the following motions were made:

Motion #1:
Moved by Tommy Boehme and seconded by Gene Williams to designate the following Desired Future Condition through the year 2060 for the Trinity aquifer located in GMA 9:

- Hill Country Trinity Aquifer -
  allow for an increase in average drawdown of approximately 30 feet through 2060 consistent with "Scenario 6" in TWDB Draft GAM Task 10-005

the vote on the motion was 8 ayes, 1 nays, and 0 abstentions, and the Motion Passed.

Motion #2
Moved by Gene Williams and seconded by Luana Buckner to declare the Edwards Group of the Hill Country Aquifer located in Kerr County as a not-relevant aquifer:

the vote on the motion was 7 ayes, 2 nays, and 0 abstentions, and the Motion Passed.

Motion #3
Moved by Micah Voulgaris and seconded by Luana Buckner to declare the Edwards Group of the Hill Country Aquifer located in Kendall County as a relevant aquifer:

the vote on the motion was 9 ayes, 0 nays, and 0 abstentions, and the Motion Passed.

Motion #4
Moved by Jim Chastain and seconded by Luana Buckner to declare the Edwards Group of the Hill Country Aquifer located in Bandera County as a relevant aquifer:

the vote on the motion was 9 ayes, 0 nays, and 0 abstentions, and the Motion Passed.

Motion #5
Moved by Micah Voulgaris and seconded by Jim Chastain to designate the following Desired Future Condition through the year 2060 for the Edwards Group of the Hill Country Aquifer located in Kendall and Bandera County:

- Edward Group of the Edwards Trinity (Plateau) – no net increase in average drawdown for those portions located in Kendall and Bandera County

the vote on the motion was 9 ayes, 0 nays, and 0 abstentions, and the Motion Passed.

Motion #6
Moved by Neill Binford and seconded by Luana Buckner to declare the Edwards Group of the Hill Country Aquifer located in Blanco County as a not-relevant aquifer:

the vote on the motion was 9 ayes, 0 nays, and 0 abstentions, and the Motion Passed, and,

Whereas, the above Motions and votes of each Committee Member have been recorded in the Minutes of the July 26, 2010 GMA 9 Committee Meeting,

NOW THEREFORE BE IT RESOLVED, Groundwater Management Area 9 Committee Members present and voting on July 26, 2010 do hereby document, record, and confirm the above described Motions and votes.

Approved by consensus and signed on July 26, 2010 by the following Voting GMA 9 Committee Members,

Neill Binford - President of the Blanco Pedernales GCD

Jim Chastain - President of the Bandera County River Authority and Groundwater Conservation District

Tommy Boehme - President of the Medina County GCD

Jimmy Skipton - President of the Hays Trinity GCD

Brian Hunt - Designated Representative for the Barton Springs/Edwards Aquifer Conservation District

Micah Voulgaris – General Manager and Designated Representative for the Cow Creek GCD

Jorge Gonzales – Vice President and Designated Representative for the Trinity Glen Rose GCD

Luana Buckner - Chairman of the Edwards Aquifer Authority

Gene Williams - Designated Representative for the Headwaters GCD

Summary of Public Comments Received

GMA-9 Public Meetings
Kerrville, Monday June 21, 2010
Boerne, Wednesday June 23, 2010
Dripping Springs, Thursday, June 24,2010

Oral and Written Comments Interpretive Tally Sheet
Total of 76 Submissions

DFC	Edwards Group
No net increase in average drawdown through 2060	20
No more than a 9' increase in average drawdown through 2060	0
Declare the Edwards Group "not relevant" for all or part of GMA 9	3
No Specific DFC Recommendation	53

DFC	**Trinity Aquifer**
No net increase in average drawdown through 2060	35
No more than a 20' increase in average drawdown through 2060 (Scenario 5)	11
No more than a 30' increase in average drawdown through 2060 (Scenario 6)	2
No more than a 40' increase in average drawdown through 2060 (Scenario 7)	6
None stated, but comments trending toward no net increase in average drawdown through 2060	5
None stated, but comments trending toward 20'-30'-40' increase in average drawdown through 2060	4
Other Recommendation (% of rainfall, recharge, spring flow, etc.)	5
No Specific DFC Recommendation	8

Appendix F

Texas Water Development Board Estimated Historical Water Use and 2012 State Water Plan Datasets:

Blanco-Pedernales Groundwater Conservation District

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Estimated Historical Water Use And 2012 State Water Plan Datasets:

Blanco-Pedernales Groundwater Conservation District

by Stephen Allen
Texas Water Development Board
Groundwater Resources Division
Groundwater Technical Assistance Section
stephen.allen@twdb.texas.gov
(512) 463-7317
February 6, 2013

GROUNDWATER MANAGEMENT PLAN DATA:

This package of water data reports (part 1 of a 2-part package of information) is being provided to groundwater conservation districts to help them meet the requirements for approval of their five-year groundwater management plan. Each report in the package addresses a specific numbered requirement in the Texas Water Development Board's groundwater management plan checklist. The checklist can be viewed and downloaded from this web address:

https://www.twdb.state.tx.us/groundwater/docs/GCD/GMPchecklist0113.pdf

The five reports included in part 1 are:

1. Estimated Historical Water Use (checklist Item 2)

   from the TWDB Historical Water Use Survey (WUS)
2. Projected Surface Water Supplies (checklist Item 6)
3. Projected Water Demands (checklist Item 7)
4. Projected Water Supply Needs (checklist Item 8)
5. Projected Water Management Strategies (checklist Item 9)

   reports 2-5 are from the 2012 State Water Plan (SWP)

Part 2 of the 2-part package is the groundwater availability model (GAM) report. The District should have received, or will receive, this report from the Groundwater Availability Modeling Section. Questions about the GAM can be directed to Dr. Shirley Wade, shirley.wade@twdb.texas.gov, (512) 936-0883.

DISCLAIMER:

The data presented in this report represents the most updated Historical Water Use and 2012 State Water Planning data available as of 2/6/2013. Although it does not happen frequently, neither of these datasets are static and are subject to change pending the availability of more accurate data (Historical Water Use data) or an amendment to the 2012 State Water Plan (2012 State Water Planning data). District personnel must review these datasets and correct any discrepancies in order to ensure approval of their groundwater management plan.

The Historical Water Use dataset can be verified at this web address:

http://www.twdb.texas.gov/waterplanning/waterusesurvey/estimates/

The 2012 State Water Planning dataset can be verified by contacting Wendy Barron (wendy.barron@twdb.texas.gov or 512-936-0886).

For additional questions regarding this data, please contact Stephen Allen (stephen.allen@twdb.texas.gov or 512-463-7317) or Rima Petrossian (rima.petrossian@twdb.texas.gov or 512-936-2420).

Estimated Historical Water Use
TWDB Historical Water Use Survey (WUS) Data

Groundwater and surface water historical use estimates are currently unavailable for calendar years 2005, 2011 and 2012. TWDB staff anticipates the calculation and posting of these estimates at a later date.

BLANCO COUNTY

All values are in acre-feet/year

Year	Source	Municipal	Manufacturing	Steam Electric	Irrigation	Mining	Livestock	Total
1974	GW	220	31	0	83	38	636	1,008
	SW	347	0	0	35	0	0	382
1980	GW	350	0	0	149	0	387	886
	SW	386	1	0	76	0	87	550
1984	GW	453	1	0	357	0	327	1,138
	SW	400	2	0	62	0	81	545
1985	GW	491	0	0	254	0	341	1,086
	SW	310	0	0	45	0	85	440
1986	GW	593	2	0	255	0	384	1,234
	SW	287	1	0	45	0	95	428
1987	GW	635	1	0	255	0	381	1,272
	SW	275	1	0	45	0	95	416
1988	GW	691	1	0	255	0	400	1,347
	SW	290	0	0	45	0	99	434
1989	GW	691	1	0	453	0	405	1,550
	SW	316	1	0	61	0	100	478
1990	GW	646	0	0	425	0	443	1,514
	SW	258	0	0	58	0	110	426
1991	GW	644	1	0	425	6	451	1,527
	SW	282	0	0	58	0	113	453
1992	GW	650	0	0	425	6	536	1,617
	SW	277	0	0	58	0	134	469
1993	GW	668	1	0	425	6	522	1,622
	SW	276	0	0	53	0	131	460
1994	GW	702	1	0	424	6	421	1,554
	SW	271	0	0	77	0	106	454
1995	GW	799	1	0	451	6	467	1,724
	SW	304	0	0	56	0	116	476
1996	GW	811	0	0	449	6	382	1,648
	SW	267	0	0	55	0	95	417
1997	GW	801	1	0	449	6	395	1,652

Estimated Historical Water Use
TWDB Historical Water Use Survey (WUS) Data

Groundwater and surface water historical use estimates are currently unavailable for calendar years 2005, 2011 and 2012. TWDB staff anticipates the calculation and posting of these estimates at a later date.

Year	Source	Municipal	Manufacturing	Steam Electric	Irrigation	Mining	Livestock	Total
1997	SW	296	0	0	55	0	98	449
1998	GW	839	0	0	449	6	374	1,668
	SW	307	0	0	55	0	93	455
1999	GW	888	0	0	449	6	371	1,714
	SW	371	0	0	55	0	93	519
2000	GW	896	1	0	31	6	354	1,288
	SW	319	0	0	42	0	89	450
2001	GW	742	2	0	68	6	236	1,054
	SW	337	0	0	94	0	225	656
2002	GW	816	2	0	68	6	261	1,153
	SW	838	0	0	94	0	248	1,180
2003	GW	773	0	0	52	6	192	1,023
	SW	832	0	0	254	0	182	1,268
2004	GW	475	1	0	59	6	198	739
	SW	277	0	0	254	0	188	719
2006	GW	883	1	0	35	0	293	1,212
	SW	269	1	0	250	0	125	645
2007	GW	801	1	0	190	0	363	1,355
	SW	265	0	0	0	0	155	420
2008	GW	949	1	0	68	0	469	1,487
	SW	327	0	0	0	0	201	528
2009	GW	1,037	0	0	405	0	545	1,987
	SW	281	0	0	0	0	234	515
2010	GW	1,094	0	0	369	0	270	1,733
	SW	285	0	0	10	0	115	410

Projected Surface Water Supplies
TWDB 2012 State Water Plan Data

BLANCO COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	Source Name	2010	2020	2030	2040	2050	2060
K	BLANCO	GUADALUPE	BLANCO LAKE/RESERVOIR	596	596	596	596	596	596
K	BLANCO	GUADALUPE	CANYON LAKE/RESERVOIR	600	600	600	600	600	600
K	CANYON LAKE WSC	GUADALUPE	CANYON LAKE/RESERVOIR	188	263	334	397	466	545
K	IRRIGATION	GUADALUPE	GUADALUPE RIVER COMBINED RUN-OF-RIVER IRRIGATION	9	9	9	9	9	9
K	LIVESTOCK	COLORADO	LIVESTOCK LOCAL SUPPLY	101	101	101	101	101	101
K	LIVESTOCK	GUADALUPE	LIVESTOCK LOCAL SUPPLY	101	101	101	101	101	101
	Sum of Projected Surface Water Supplies (acre-feet/year)			**1,595**	**1,670**	**1,741**	**1,804**	**1,873**	**1,952**

Projected Water Demands
TWDB 2012 State Water Plan Data

Please note that the demand numbers presented here include the plumbing code savings found in the Regional and State Water Plans.

BLANCO COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
K	COUNTY-OTHER	COLORADO	297	323	347	367	399	441
K	MINING	COLORADO	5	5	5	5	5	5
K	IRRIGATION	COLORADO	54	52	48	45	44	43
K	LIVESTOCK	COLORADO	341	341	341	341	341	341
K	MANUFACTURING	COLORADO	1	1	1	1	1	1
K	JOHNSON CITY	COLORADO	382	445	503	554	601	657
K	BLANCO	GUADALUPE	440	508	576	628	679	745
K	COUNTY-OTHER	GUADALUPE	160	173	187	197	215	238
K	IRRIGATION	GUADALUPE	15	14	14	13	12	12
K	LIVESTOCK	GUADALUPE	102	102	102	102	102	102
K	CANYON LAKE WSC	GUADALUPE	188	263	334	397	466	545
K	MANUFACTURING	GUADALUPE	1	1	1	1	1	1
	Sum of Projected Water Demands (acre-feet/year)		**1,986**	**2,228**	**2,459**	**2,651**	**2,866**	**3,131**

Projected Water Supply Needs
TWDB 2012 State Water Plan Data

Negative values (in red) reflect a projected water supply need, positive values a surplus.

BLANCO COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
K	BLANCO	GUADALUPE	781	713	645	593	542	476
K	CANYON LAKE WSC	GUADALUPE	0	0	0	0	0	0
K	COUNTY-OTHER	COLORADO	1,061	1,035	1,011	991	752	710
K	COUNTY-OTHER	GUADALUPE	0	0	0	0	-41	-64
K	IRRIGATION	COLORADO	613	615	619	622	623	624
K	IRRIGATION	GUADALUPE	83	84	84	85	73	73
K	JOHNSON CITY	COLORADO	505	442	384	333	286	230
K	LIVESTOCK	COLORADO	509	509	509	509	509	509
K	LIVESTOCK	GUADALUPE	68	68	68	68	55	55
K	MANUFACTURING	COLORADO	0	0	0	0	0	0
K	MANUFACTURING	GUADALUPE	8	8	8	8	6	6
K	MINING	COLORADO	280	280	280	280	280	280
	Sum of Projected Water Supply Needs (acre-feet/year)		**0**	**0**	**0**	**0**	**-41**	**-64**

Projected Water Management Strategies
TWDB 2012 State Water Plan Data

BLANCO COUNTY

WUG, Basin (RWPG)

All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
COUNTY-OTHER, GUADALUPE (K)							
DEVELOPMENT OF ELLENBURGER-SAN SABA AQUIFER	ELLENBURGER-SAN SABA AQUIFER [BLANCO]	0	0	0	0	41	64
Sum of Projected Water Management Strategies (acre-feet/year)		**0**	**0**	**0**	**0**	**41**	**64**

Appendix G

TWDB GAM Runs/MAG Reports and Aquifer Assessments

- **GAM RUN 13-001:**
  (Blanco-Pedernales Groundwater Conservation District Management Plan)

- **GAM Run 10-050 MAG Version 2:**
  (Modeled Available Groundwater - Trinity Aquifer)

- **GTA Aquifer Assessment 10-01 MAG**
  (Ellenburger-San Saba Aquifer)

- **GTA Aquifer Assessment 10-02 MAG**
  (Hickory Aquifer)

- **GTA Aquifer Assessment 10-14 MAG**
  (Marble Falls Aquifer)

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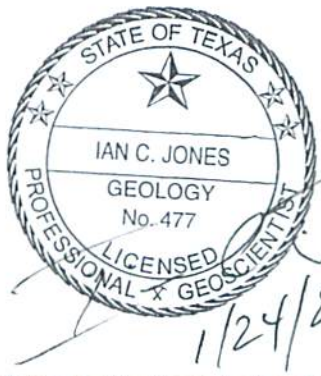
GAM Run 13-001: Blanco-Pedernales Groundwater Conservation District Management Plan

by Ian C. Jones, Ph.D., P.G.
Texas Water Development Board
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 463-6641
January 24, 2013



The seal appearing on this document was authorized by Ian C. Jones, P.G. 477 on January 24, 2013.

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GAM RUN 13-001: BLANCO-PEDERNALES GROUNDWATER CONSERVATION DISTRICT MANAGEMENT PLAN

by Ian C. Jones, Ph.D., P.G.
Texas Water Development Board
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 463-6641
January 24, 2013

EXECUTIVE SUMMARY:

Texas State Water Code, Section 36.1071, Subsection (h), states that, in developing its groundwater management plan, a groundwater conservation district shall use groundwater availability modeling information provided by the executive administrator of the Texas Water Development Board (TWDB) in conjunction with any available site-specific information provided by the district for review and comment to the executive administrator. Information derived from groundwater availability models that shall be included in the groundwater management plan includes:

- the annual amount of recharge from precipitation to the groundwater resources within the district, if any;
- for each aquifer within the district, the annual volume of water that discharges from the aquifer to springs and any surface water bodies, including lakes, streams, and rivers; and
- the annual volume of flow into and out of the district within each aquifer and between aquifers in the district.

The purpose of this report is to provide Part 2 of a two-part package of information from the TWDB to the Blanco-Pedernales Groundwater Conservation District to fulfill the requirements noted above. The groundwater management plan for the Blanco-Pedernales Groundwater Conservation District is due for approval by the executive administrator of the TWDB before January 7, 2014.

This report discusses the methods, assumptions, and results from a model run using the groundwater availability model for the Edwards-Trinity (Plateau) and Pecos Valley aquifers. This groundwater availability model also includes part of the Trinity Aquifer. Tables 1 and 2 summarize the groundwater availability model data required by the statute, and Figures 1 and 2 show the areas of the model from which the values in the tables were extracted. This model run replaces the results of GAM Run 08-11. This model run—GAM Run 13-001—meets current standards set after the release of GAM Run 08-11.

If after review of the figures, Blanco-Pedernales Groundwater Conservation District determines that the district boundaries used in the assessment do not reflect current conditions, please notify the TWDB immediately. The TWDB has also approved, for planning purposes, an alternative model that can have water budget information extracted for the district. The alternative model is the 1-layer alternative model for the Edwards-Trinity (Plateau) and Pecos Valley aquifers. Please contact the author of this report if a comparison report using these models is desired.

The Hickory, Marble Falls, and Ellenburger-San Saba aquifers also underlie the Blanco-Pedernales Groundwater Conservation District. If the district would like information for the Hickory, Marble Falls, and Ellenburger-San Saba aquifers, they may request it from the Groundwater Technical Assistance Section of the TWDB.

METHODS:

In accordance with the provisions of the Texas State Water Code, Section 36.1071, Subsection (h), the groundwater availability model for the Edwards-Trinity (Plateau) and Pecos Valley aquifers was run for this analysis. The groundwater availability model for the Hill Country portion of the Trinity Aquifer was considered but not used because it does not include parts of northern Blanco County. Water budgets within Blanco-Pedernales Groundwater Conservation District for 1981 through 1999 were extracted using ZONEBUDGET Version 3.01 (Harbaugh, 2009). The average annual water budget values for recharge, surface water outflow, inflow to the district, outflow from the district, net inter-aquifer flow (upper), and net inter-aquifer flow (lower)—where applicable—for the portions of the aquifers located within the district are summarized in this report.

PARAMETERS AND ASSUMPTIONS:

Edwards-Trinity (Plateau) Aquifer

- We used version 1.01 of the groundwater availability model for the Edwards-Trinity (Plateau) Aquifer. See Anaya and Jones (2009) for assumptions and limitations of this model.
- The Edwards-Trinity (Plateau) Aquifer model includes two layers representing the Edwards Group and equivalent limestone hydrostratigraphic units (Layer 1) and the undifferentiated Trinity Group hydrostratigraphic units (Layer 2) in the district.
- We elected to use the groundwater availability model for the Edwards-Trinity (Plateau) Aquifer instead of the groundwater availability model for the Hill Country portion of the Trinity Aquifer because the model for the Edwards-Trinity (Plateau) Aquifer covers the entire district. Because the two models are aligned in slightly different orientations, we could not combine the results from each without either double accounting or omitting important information.
- The model was run with MODFLOW-96 (Harbaugh and McDonald, 1996).

RESULTS:

A groundwater budget summarizes the amount of water entering and leaving the aquifer according to the groundwater availability model. Selected groundwater budget components listed below were extracted from the model results for the aquifers located within the district and averaged over the duration of the calibration and verification portion of the model run in the district, as shown in Tables 1 and 2.

- Precipitation recharge—The areally distributed recharge sourced from precipitation falling on the outcrop areas of the aquifers (where the aquifer is exposed at land surface) within the district.
- Surface water outflow—The total water discharging from the aquifer (outflow) to surface water features such as streams, reservoirs, and drains (springs).
- Flow into and out of district—The lateral flow within the aquifer between the district and adjacent counties.

- Flow between aquifers—The net vertical flow between aquifers or confining units. This flow is controlled by the relative water levels in each aquifer or confining unit and aquifer properties of each aquifer or confining unit that define the amount of leakage that occurs. "Inflow" to an aquifer from an overlying or underlying aquifer will always equal the "Outflow" from the other aquifer.

The information needed for the District's management plan is summarized in Tables 1 and 2. It is important to note that sub-regional water budgets are not exact. This is due to the size of the model cells and the approach used to extract data from the model. To avoid double accounting, a model cell that straddles a political boundary, such as a district or county boundary, is assigned to one side of the boundary based on the location of the centroid of the model cell. For example, if a cell contains two counties, the cell is assigned to the county where the centroid of the cell is located (Figures 1 and 2).

TABLE 1: SUMMARIZED INFORMATION FOR THE EDWARDS-TRINITY (PLATEAU) AQUIFER THAT IS NEEDED FOR BLANCO-PEDERNALES GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT. THESE FLOWS MAY INCLUDE BRACKISH WATERS.

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Edwards-Trinity (Plateau) Aquifer	571
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Edwards-Trinity (Plateau) Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Edwards-Trinity (Plateau) Aquifer	0
Estimated annual volume of flow out of the district within each aquifer in the district	Edwards-Trinity (Plateau) Aquifer	204
Estimated net annual volume of flow between each aquifer in the district	From Trinity Aquifer into Edwards-Trinity (Plateau) Aquifer	164

TABLE 2: SUMMARIZED INFORMATION FOR THE TRINITY AQUIFER THAT IS NEEDED FOR BLANCO-PEDERNALES GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT. THESE FLOWS MAY INCLUDE BRACKISH WATERS.

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Trinity Aquifer	44,469
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Trinity Aquifer	25,450
Estimated annual volume of flow into the district within each aquifer in the district	Trinity Aquifer	4,461
Estimated annual volume of flow out of the district within each aquifer in the district	Trinity Aquifer	19,416
Estimated net annual volume of flow between each aquifer in the district	From the Trinity Aquifer into the Edwards-Trinity (Plateau) Aquifer	164

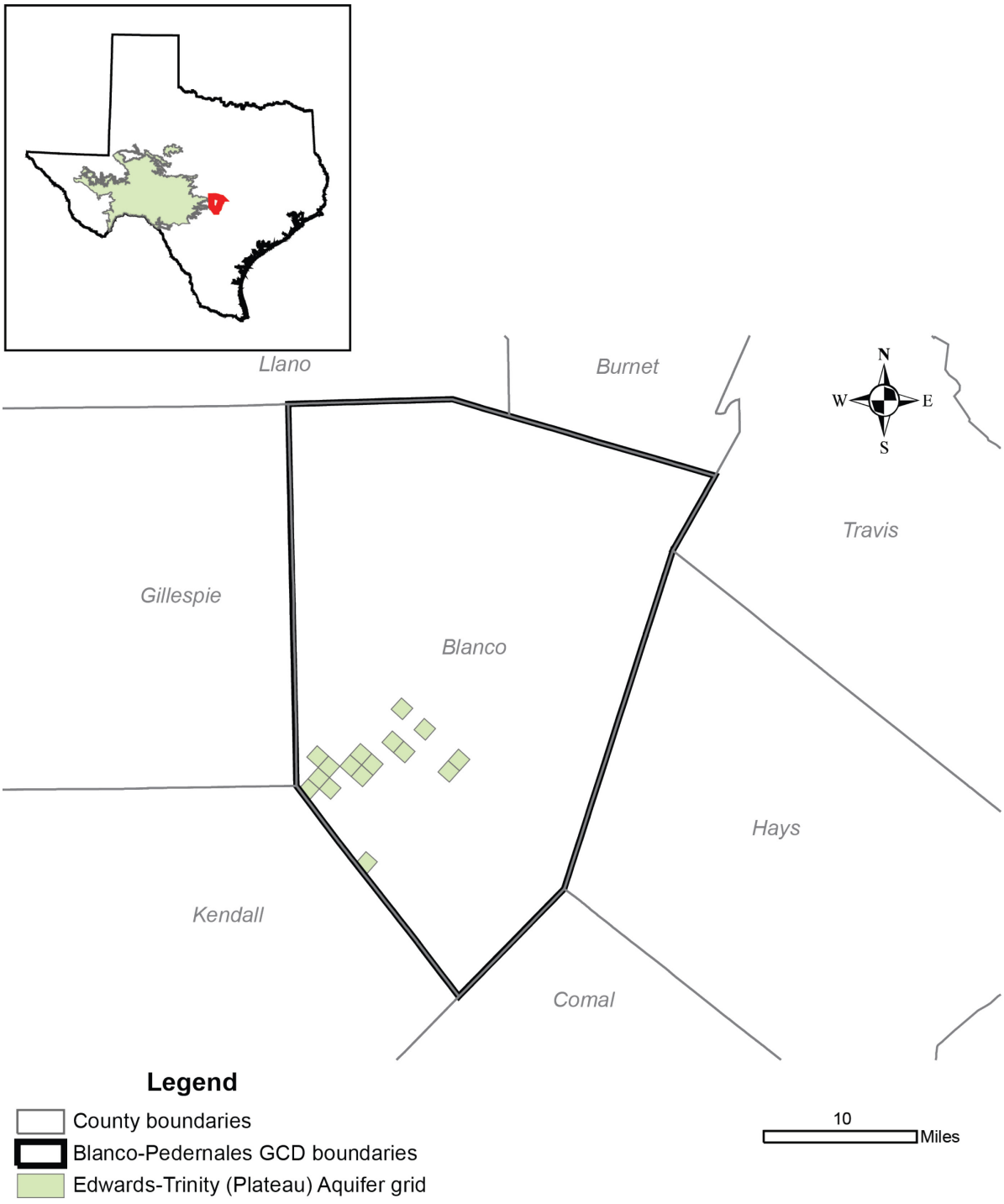

FIGURE 1: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE EDWARDS-TRINITY (PLATEAU) AND PECOS VALLEY AQUIFERS FROM WHICH THE INFORMATION IN TABLE 1 WAS EXTRACTED (THE EDWARDS-TRINITY (PLATEAU) AQUIFER EXTENT WITHIN THE DISTRICT BOUNDARY).

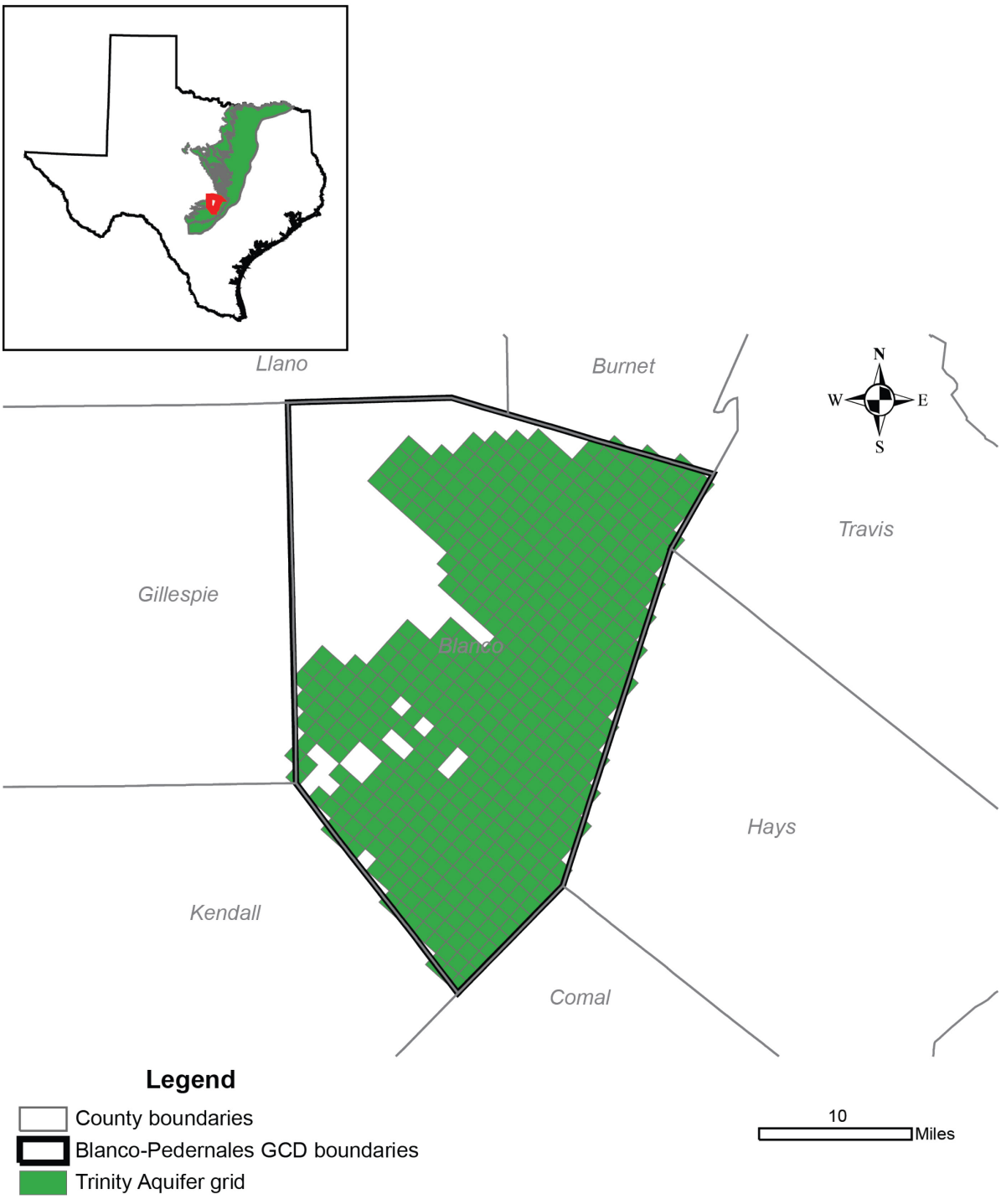

FIGURE 2: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE TRINITY AQUIFER FROM WHICH THE INFORMATION IN TABLE 2 WAS EXTRACTED (THE TRINITY AQUIFER EXTENT WITHIN THE DISTRICT BOUNDARY).

LIMITATIONS

The groundwater model(s) used in completing this analysis is the best available scientific tool that can be used to meet the stated objective(s). To the extent that this analysis will be used for planning purposes and/or regulatory purposes related to pumping in the past and into the future, it is important to recognize the assumptions and limitations associated with the use of the results. In reviewing the use of models in environmental regulatory decision making, the National Research Council (2007) noted:

> *"Models will always be constrained by computational limitations, assumptions, and knowledge gaps. They can best be viewed as tools to help inform decisions rather than as machines to generate truth or make decisions. Scientific advances will never make it possible to build a perfect model that accounts for every aspect of reality or to prove that a given model is correct in all respects for a particular regulatory application. These characteristics make evaluation of a regulatory model more complex than solely a comparison of measurement data with model results."*

A key aspect of using the groundwater model to evaluate historic groundwater flow conditions includes the assumptions about the location in the aquifer where historic pumping was placed. Understanding the amount and location of historic pumping is as important as evaluating the volume of groundwater flow into and out of the district, between aquifers within the district (as applicable), interactions with surface water (as applicable), recharge to the aquifer system (as applicable), and other metrics that describe the impacts of that pumping. In addition, assumptions regarding precipitation, recharge, and interaction with streams are specific to particular historic time periods.

Because the application of the groundwater model was designed to address regional scale questions, the results are most effective on a regional scale. The TWDB makes no warranties or representations related to the actual conditions of any aquifer at a particular location or at a particular time.

It is important for groundwater conservation districts to monitor groundwater pumping and overall conditions of the aquifer. Because of the limitations of the groundwater model and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine this analysis in the future given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future. Historic precipitation patterns also need to be placed in context as future climatic conditions, such as dry and wet year precipitation patterns, may differ and affect groundwater flow conditions.

REFERENCES:

Anaya, R., and Jones, I., 2009, Groundwater availability model for the Edwards-Trinity (Plateau) and Pecos Valley aquifers of Texas: Texas Water Development Board, Report 373, 103 p.

Harbaugh, A. W., 2009, Zonebudget Version 3.01, A computer program for computing subregional water budgets for MODFLOW ground-water flow models, U.S. Geological Survey Groundwater Software.

Harbaugh, A. W., and McDonald, M.G., 1996, User's documentation for MODFLOW-96, an update to the U.S. Geological Survey modular finite-difference ground-water flow model: U.S. Geological Survey Open-File Report 96–485, 56 p.

National Research Council, 2007, Models in Environmental Regulatory Decision Making Committee on Models in the Regulatory Decision Process, National Academies Press, Washington D.C., 287 p.

Ridgeway, C., 2008, GAM run 08-11: Texas Water Development Board, GAM Run 08-11 Report, 4 p.

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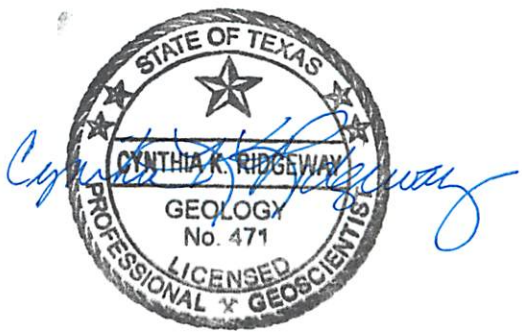
GAM Run 10-050 MAG version 2

By Mohammad Masud Hassan, P.E.

Edited and finalized by Radu Boghici to reflect statutory changes effective September 1, 2011

Texas Water Development Board
Groundwater Availability Modeling Section
(512) 463-5808
March 30, 2012



Cynthia K. Ridgeway, the Manager of the Groundwater Availability Modeling Section is responsible for oversight of work performed by employees under her direct supervision. The seal appearing on this document was authorized by Cynthia K. Ridgeway, P.G. 471 on March 30, 2012

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EXECUTIVE SUMMARY:

The modeled available groundwater for the Trinity Aquifer as a result of the desired future condition adopted by the members of Groundwater Management Area 9 declines from approximately 93,000 acre-feet per year to approximately 90,500 acre-feet per year between 2010 and 2060. This is shown divided by county, regional water planning area, and river basin in Table 1 for use in the regional water planning process. Modeled available groundwater is summarized by county, regional water planning area, river basin, and groundwater conservation district in tables 2 though 5. The estimates were extracted from Scenario 6 of Groundwater Availability Modeling Task 10-005 (Hutchison, 2010), which meets the desired future condition adopted by the members of Groundwater Management Area 9.

REQUESTOR:

Mr. Ronald G. Fieseler of the Blanco Pedernales Groundwater Conservation District on behalf of Groundwater Management Area 9

DESCRIPTION OF REQUEST:

In a letter dated August 26, 2010 and received August 30, 2010, Mr. Ronald G. Fieseler provided the Texas Water Development Board (TWDB) with the desired future condition of the Trinity Aquifer adopted by the members of Groundwater Management Area 9. The desired future condition for the Trinity Aquifer in Groundwater Management Area 9, as described in Resolution No. 07-26-10-1, is:

"Hill Country Trinity Aquifer - allow for an increase in average drawdown of approximately 30 feet through 2060 consistent with "Scenario 6" in TWDB Draft GAM Task 10-005"

The TWDB has used this adopted desired future condition to estimate the modeled available groundwater for the Trinity Aquifer for each groundwater conservation district within Groundwater Management Area 9.

METHODS:

The TWDB previously completed several predictive groundwater availability model simulations of the Trinity Aquifer to assist the members of Groundwater Management Area 9 in developing a desired future condition. The location of Groundwater Management Area 9, the Trinity Aquifer, and the groundwater availability model cells that represent the aquifer are shown in Figure 1. As stated in Resolution No. 07-26-10-1, the management area considered Groundwater Availability Modeling (GAM) Task 10-005 (Hutchison, 2010) when developing a desired future condition for the Trinity Aquifer. Since the desired future condition above is met in Scenario 6 of GAM Task 10-005, the modeled available groundwater for Groundwater Management Area 9 presented here was taken directly from that simulation. Please note that in GAM Task 10-005 the pumping was presented as an average of all years (2010 to 2060). We have reported this pumping by decade in the results shown in tables 1-5. The modeled available groundwater was then divided by county, regional water planning area, river basin, and groundwater conservation district (Figure 2).

PARAMETERS AND ASSUMPTIONS:

The parameters and assumptions for the model run using the groundwater availability model for the Trinity Aquifer are described below:

- The results presented in this report are based on Scenario 6 of GAM Task 10-005 (Hutchison, 2010). See Hutchison (2010) for a full description of the methods, assumptions, and results of the model simulations.
- The recently updated groundwater availability model (version 2.01) for the Hill Country portion of the Trinity Aquifer developed by Jones and others (2009) was used for the simulations in GAM Task 10-005. See Mace and others (2000) and Jones and others (2009) for details on model construction, recharge, discharge, assumptions, and limitations.
- The model has four layers: Layer 1 represents the Edwards Group of the Edwards-Trinity (Plateau) Aquifer, Layer 2 represents the Upper Trinity Aquifer, Layer 3 represents the Middle Trinity Aquifer, and Layer 4 represents the Lower Trinity Aquifer. Each scenario in GAM Task 10-005 consisted of a series of 387 separate 50-year model simulations, each with a different recharge configuration. Though the pumping input to the model was the same for each of the 387 simulations, the pumping output differed depending on the occurrence of inactive (or dry) cells. The results below represent the average pumping for the year shown among the simulations comprising Scenario 6 in Hutchison (2010).

Modeled Available Groundwater and Permitting

As defined in Chapter 36 of the Texas Water Code, "modeled available groundwater" is the estimated average amount of water that may be produced annually to achieve a desired future condition. This is distinct from "managed available groundwater", shown in the draft version of this report dated December 1, 2010, which was a permitting value, and accounted for the estimated use of the aquifer exempt from permitting.

Groundwater conservation districts are required to consider modeled available groundwater, along with several other factors, when issuing permits in order to manage groundwater production to achieve the desired future condition(s). The other factors the districts must consider include annual precipitation and production patterns, the estimated amount of pumping exempt from permitting, existing permits, and a reasonable estimate of actual groundwater production under existing permits. The estimated amount of pumping exempt from permitting, which the Texas Water Development Board is now required to develop after soliciting input from applicable groundwater conservation districts, will be provided in a separate report.

RESULTS:

The modeled available groundwater for the Trinity Aquifer in Groundwater Management Area 9 consistent with the desired future condition decreases from 93,052 acre-feet per year in 2010 to 90,503 acre-feet per year in 2060. The modeled available groundwater has been divided by county, regional water planning area, and river basin for each decade between 2010 and 2060 for use in the regional water planning process (Table 1).

The modeled available groundwater is also summarized by county, regional water planning area, river basin, and groundwater conservation district as shown in tables 2, 3, 4, and 5, respectively. In Table 5, note that modeled available groundwater is totaled for both groundwater conservation district areas and areas without groundwater conservation districts.

REFERENCES:

Hutchison, William R., 2010, GAM Task 10-005, Texas Water Development Board GAM Task 10-005 Report, 13 p.

Jones, I.C., Anaya, R. and Wade, S., 2009, Groundwater Availability Model for the Hill Country portion of the Trinity Aquifer System, Texas, Texas Water Development Board unpublished report,193 p.

Mace, R.E., Chowdhury, A.H., Anaya, R., and Way, S-C., 2000, Groundwater availability of the Trinity Aquifer, Hill Country Area, Texas—Numerical simulations through 2050: Texas Water Development Board Report 353, 119 p.

TABLE 1. MODELED AVAILABLE GROUNDWATER FOR THE TRINITY AQUIFER IN GROUNDWATER MANAGEMENT AREA 9 DIVIDED BY COUNTY, REGIONAL WATER PLANNING AREA, AND RIVER BASIN. RESULTS ARE IN ACRE-FEET PER YEAR.

County	Regional Water Planning Area	River Basin	Year					
			2010	2020	2030	2040	2050	2060
Bandera	J	Guadalupe	76	76	76	76	76	76
		Nueces	903	903	903	903	903	903
		San Antonio	6,305	6,305	6,305	6,305	6,305	6,305
Bexar	L	San Antonio	24,856	24,856	24,856	24,856	24,856	24,856
Blanco	K	Colorado	1,322	1,322	1,322	1,322	1,322	1,322
		Guadalupe	1,251	1,251	1,251	1,251	1,251	1,251
Comal	L	Guadalupe	6,906	6,906	6,906	6,906	6,906	6,906
		San Antonio	3,308	3,308	3,308	3,308	3,308	3,308
Hays	K	Colorado	4,721	4,710	4,707	4,706	4,706	4,706
	L	Guadalupe	4,410	4,410	4,410	4,410	4,410	4,410
Kendall	L	Colorado	135	135	135	135	135	135
		Guadalupe	6,028	6,028	6,028	6,028	6,028	6,028
		San Antonio	4,976	4,976	4,976	4,976	4,976	4,976
Kerr	J	Colorado	318	318	318	318	318	318
		Guadalupe	15,646	14,129	14,056	13,767	13,450	13,434
		Nueces	0	0	0	0	0	0
		San Antonio	471	471	471	471	471	471
Medina	L	Nueces	1,575	1,575	1,575	1,575	1,575	1,575
		San Antonio	925	925	925	925	925	925
Travis	K	Colorado	8,920	8,672	8,655	8,643	8,627	8,598
Total			**93,052**	**91,276**	**91,183**	**90,881**	**90,548**	**90,503**

TABLE 2: MODELED AVAILABLE GROUNDWATER FOR THE TRINITY AQUIFER SUMMARIZED BY COUNTY IN GROUNDWATER MANAGEMENT AREA 9 FOR EACH DECADE BETWEEN 2010 AND 2060. RESULTS ARE IN ACRE-FEET PER YEAR.

County	Year					
	2010	2020	2030	2040	2050	2060
Bandera	7,284	7,284	7,284	7,284	7,284	7,284
Bexar	24,856	24,856	24,856	24,856	24,856	24,856
Blanco	2,573	2,573	2,573	2,573	2,573	2,573
Comal	10,214	10,214	10,214	10,214	10,214	10,214
Hays	9,131	9,120	9,117	9,116	9,116	9,116
Kendall	11,139	11,139	11,139	11,139	11,139	11,139
Kerr	16,435	14,918	14,845	14,556	14,239	14,223
Medina	2,500	2,500	2,500	2,500	2,500	2,500
Travis	8,920	8,672	8,655	8,643	8,627	8,598
Total	**93,052**	**91,276**	**91,183**	**90,881**	**90,548**	**90,503**

TABLE 3: MODELED AVAILABLE GROUNDWATER FOR THE TRINITY AQUIFER SUMMARIZED BY REGIONAL WATER PLANNING AREA IN GROUNDWATER MANAGEMENT AREA 9 FOR EACH DECADE BETWEEN 2010 AND 2060. RESULTS ARE IN ACRE-FEET PER YEAR.

Regional Water Planning Area	Year					
	2010	2020	2030	2040	2050	2060
J	23,719	22,202	22,129	21,840	21,523	21,507
K	16,214	15,955	15,935	15,922	15,906	15,877
L	53,119	53,119	53,119	53,119	53,119	53,119
Total	**93,052**	**91,276**	**91,183**	**90,881**	**90,548**	**90,503**

TABLE 4: MODELED AVAILABLE GROUNDWATER FOR THE TRINITY AQUIFER SUMMARIZED BY RIVER BASIN IN GROUNDWATER MANAGEMENT AREA 9 FOR EACH DECADE BETWEEN 2010 AND 2060. RESULTS ARE IN ACRE-FEET PER YEAR.

River Basin	Year					
	2010	2020	2030	2040	2050	2060
Colorado	15,416	15,157	15,137	15,124	15,108	15,079
Guadalupe	34,317	32,800	32,727	32,438	32,121	32,105
Nueces	2,478	2,478	2,478	2,478	2,478	2,478
San Antonio	40,841	40,841	40,841	40,841	40,841	40,841
Total	**93,052**	**91,276**	**91,183**	**90,881**	**90,548**	**90,503**

TABLE 5: MODELED AVAILABLE GROUNDWATER FOR THE TRINITY AQUIFER SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) IN GROUNDWATER MANAGEMENT AREA 9 FOR EACH DECADE BETWEEN 2010 AND 2060. RESULTS ARE IN ACRE-FEET PER YEAR. RA REFERS TO RIVER AUTHORITY. GWD REFERS TO GROUNDWATER DISTRICT.

Groundwater Conservation District	Year					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Bandera County RA & GWD	7,284	7,284	7,284	7,284	7,284	7,284
Blanco-Pedernales GCD	2,573	2,573	2,573	2,573	2,573	2,573
Cow Creek GCD	10,622	10,622	10,622	10,622	10,622	10,622
Hays Trinity GCD	9,109	9,098	9,095	9,094	9,094	9,094
Headwaters GCD	16,435	14,918	14,845	14,556	14,239	14,223
Medina County GCD	2,500	2,500	2,500	2,500	2,500	2,500
Trinity Glen Rose GCD	25,511	25,511	25,511	25,511	25,511	25,511
Total (district areas)	**74,034**	**72,506**	**72,430**	**72,140**	**71,823**	**71,807**
No District	19,018	18,770	18,753	18,741	18,725	18,696
Total (including non-district areas)	**93,052**	**91,276**	**91,183**	**90,881**	**90,548**	**90,503**

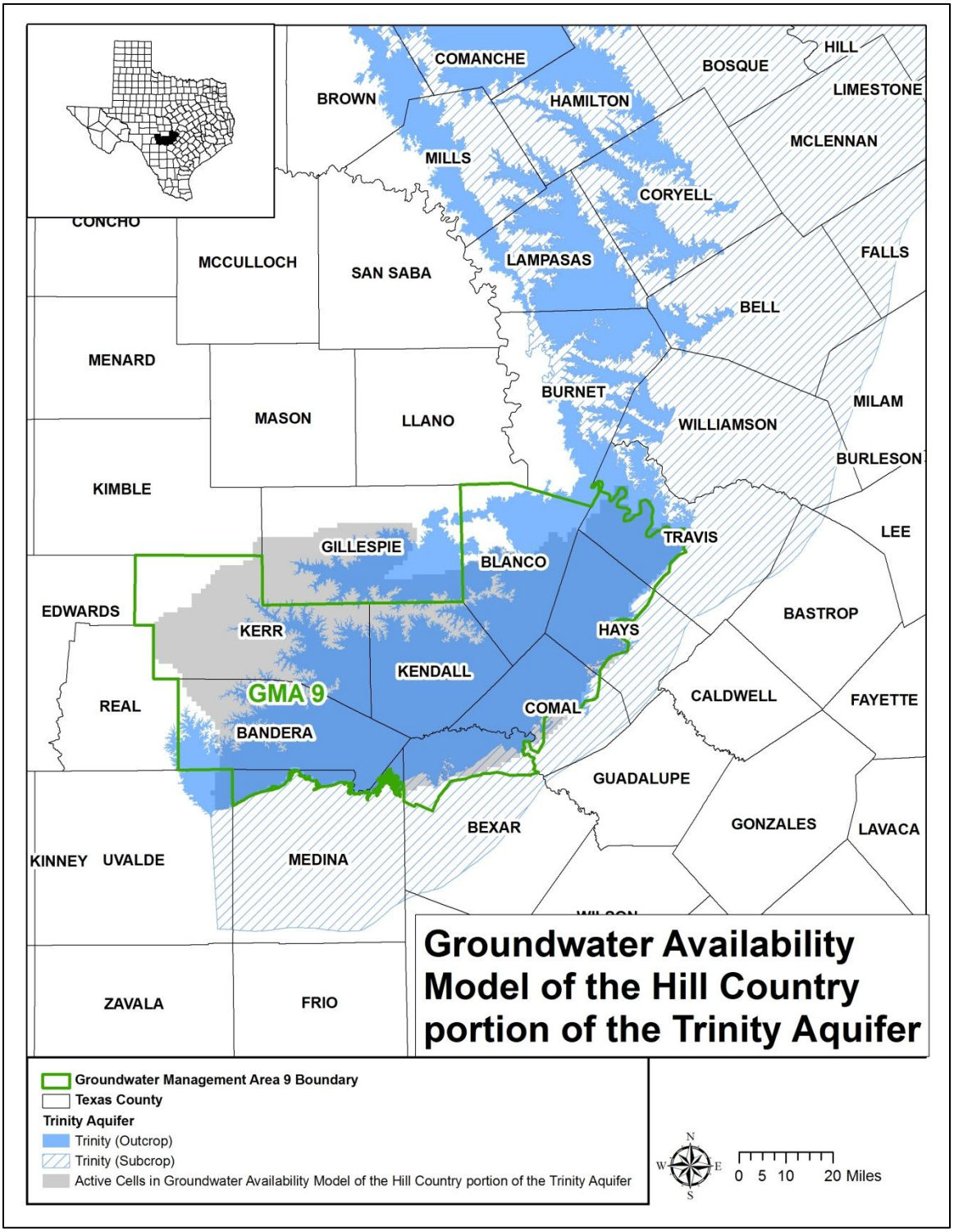

Figure 1: Map showing the areas covered by the groundwater availability model for the Trinity Aquifer.

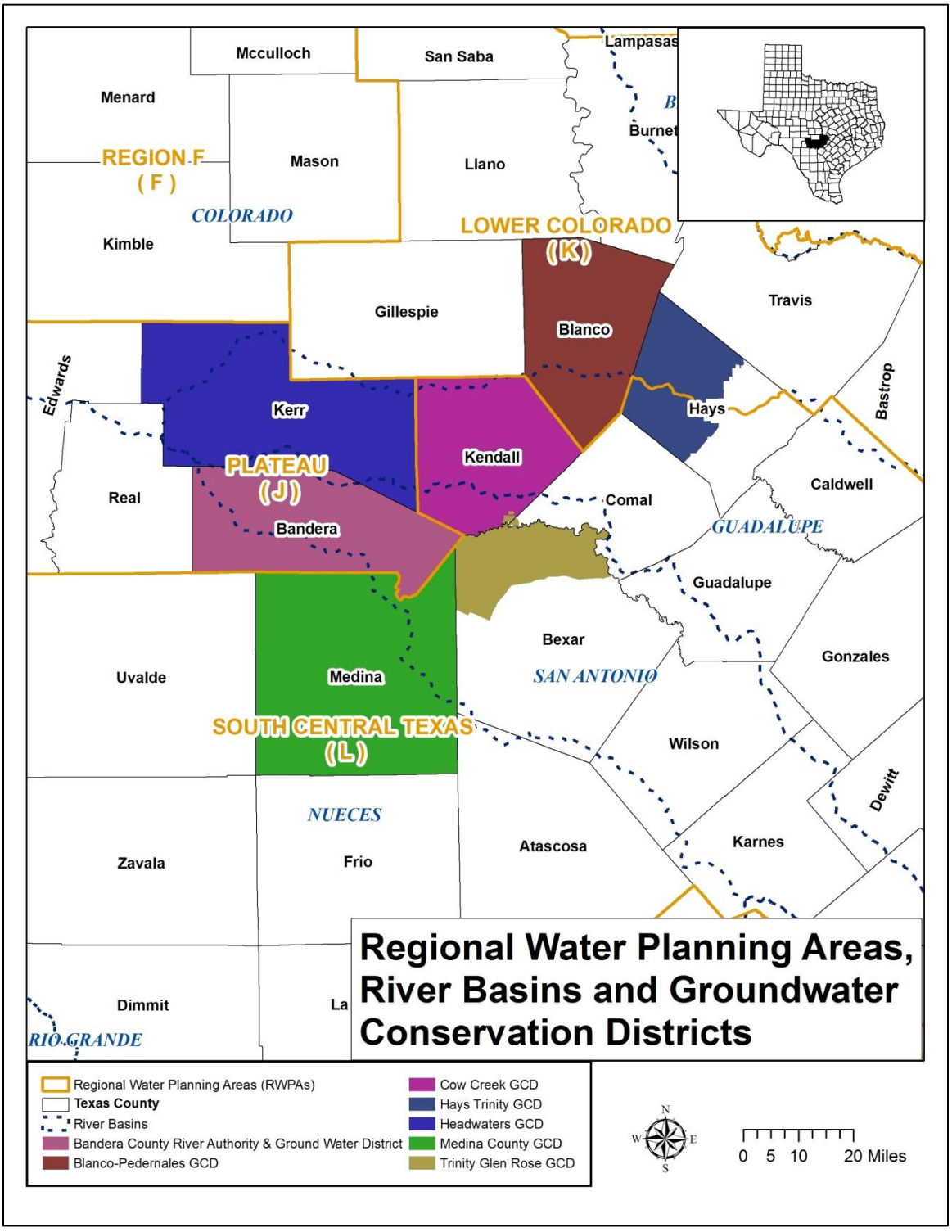

Figure 2: Map showing regional water planning areas (RWPAs), groundwater conservation districts (GCDs), counties, and river basins in Groundwater Management Area 9.

GTA Aquifer Assessment 10-01 MAG

by Robert G. Bradley, P.G.
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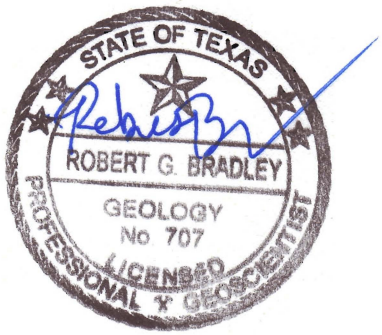

Robert G. Bradley, P.G. 707, authorized the seal appearing on this document on June 22, 2011.

REQUESTOR:

Ron Fieseler, of the Blanco-Pedernales Groundwater Conservation District (GCD) acting on behalf of Groundwater Management Area 9.

DESCRIPTION OF REQUEST:

In a letter dated October 22, 2008, Mr. Ron Fieseler submitted to the Texas Water Development Board (TWDB) the adopted desired future conditions (DFCs) for the Ellenburger-San Saba, Hickory, and Marble Falls aquifers in Groundwater Management Area (GMA) 9.

Petitioners appealed the reasonableness of these DFCs to the TWDB. On, November 30, 2009, representatives of the GCDs in GMA 9 met and passed a motion clarifying the area of the DFCs for the Ellenburger-San Saba Aquifer to be limited to Blanco County. Based on this action, the Petitioners withdrew their petitions relating to the DFCs for the Ellenburger-San Saba Aquifer on December 14, 2009.

This report provides estimates of the managed available groundwater for the Ellenburger-San Saba Aquifer for Blanco County. Previously these calculations were part of Aquifer Assessment 08-09mag.

DESIRED FUTURE CONDITIONS:

Ellenburger [-San Saba] Aquifer – Allow for an increase in average drawdown of no more than 2 feet [through 2060 and limited to Blanco County].

METHODS:

A transient hydrologic budget for the saturated portion of an aquifer is described by Freeze and Cherry (1979, p.365):

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

where Q(t)= total rate of groundwater withdrawal
R(t)= total rate of groundwater recharge to the basin
D(t)= total rate of groundwater discharge from the basin
$\frac{dS}{dt}$ = rate of change of storage in the saturated zone of the basin

For this analysis, it is assumed that:

$$R(t) = R(r) + R(e)$$

where R(r) = rejected recharge for the basin
R(e) = effective recharge

Effective recharge is the amount of water that enters an aquifer and is available for development (Muller and Price, 1978, p. 5). Rejected recharge is the amount of total (or potential) recharge that discharges from an aquifer because it is over-full and cannot accept more water (Theis, 1940, p.1).

In addition, it is assumed that

$$R(r) \cong D(t)$$

Therefore, the total rate of groundwater withdrawal equals effective recharge plus the change in storage of the aquifer, or:

$$Q(t) = R(e) + \frac{dS}{dt}$$

County, river basin, and groundwater conservation district boundaries split the aquifer into map areas (Figure 1). The areal extent of each aquifer map area was calculated. These areas were used to calculate estimated average effective recharge and pumped volumes.

These map areas were multiplied by the estimated aquifer storativity, and then by uniform water level decline of two feet. In those cases where unconfined and confined conditions existed in the same aquifer, those were calculated separately.

Average annual pumping to achieve the desired future condition was estimated by multiplying each map area by the average precipitation (1971 to 2000) and an estimated effective recharge rate.

The final calculations were completed in a Microsoft Excel worksheet.

PARAMETERS AND ASSUMPTIONS:

- Water level decline of 2 feet were estimated to be uniform across the aquifer in Blanco County.
- The areas for each map area were calculated from the Texas Water Development Board (TWDB) shapefile for the Ellenburger-San Saba Aquifer, projected into the groundwater availably modeling (GAM) projection (Anaya, 2001).
- Areas, in acres, were calculated within ArcGIS 9.2.
- Average annual precipitation was used to calculate annual effective recharge volumes.
- The average annual precipitation (1971-2000) for the each aquifer map area (Table 1) was determined from the Texas Climatic Atlas (Narasimhan and others, 2008).
- Average effective recharge from precipitation is estimated to be 2 percent of annual precipitation (Preston and others, 1996) and is only applied to outcrop areas.
- The managed available groundwater volume estimates are the sum of the annual average effective recharge amount and the volume of water depleted from the aquifer based on the desired future condition.
- Annual volumes are calculated by dividing the total volume by 50 years.
- Specific yield of the aquifer is estimated as 0.03 (LBG-Guyton Associates, 2003) and the storage coefficient is estimated as 0.002 (TWDB, 2009; Bluntzer, 1992; LBG-Guyton Associates, 2003).
- Outcrop areas are calculated as unconfined areas of the aquifer and subcrop areas are calculated as confined areas of the aquifer.

Determining Managed Available Groundwater:

As defined in Chapter 36 of the Texas Water Code, “managed available groundwater” is the amount of water that may be permitted. The total volume from water budget calculations represents the total amount of pumping from the aquifer to achieve the desired future condition. The total pumping includes both permitted and exempt uses. Examples of exempt uses include domestic, livestock, and oil and gas exploration. Each district may also exempt additional uses as defined by its rules or enabling legislation.

Because exempt uses are not available for permitting, it is necessary to account for them when determining managed available groundwater. To do this the Texas Water Development Board developed a standardized method for estimating exempt use for domestic and livestock purposes based on projected changes in population and the ratio of domestic and livestock wells in an areas to the total number of wells.

Because other exempt uses can vary significantly from district to district and there is much higher uncertainty associated with estimating use due to oil and gas exploration, estimates of exempt pumping outside domestic and livestock uses have not been included.

If the district believes it has a more appropriate estimate of exempt pumping, they may submit it, along with a description of how it was developed, to the Texas Water Development Board for consideration. Once established, the estimates of exempt pumping are subtracted from the total pumping calculations to yield the estimated managed available groundwater for permitting purposes.

RESULTS:

The annual effective recharge estimate for the Ellenburger-San Saba Aquifer in Groundwater Management Area 9 is 2,586 acre-feet per year (Table 1).

The total pumping for the Ellenburger-San Saba Aquifer in Groundwater Management Area 9 (for Blanco County) to achieve the adopted desired future condition is 2,661 acre-feet per year (tables 2–4).

Estimates of exempt use for Blanco County are listed by decades from 2010 to 2060 in Table 5. The managed available groundwater estimates for the Ellenburger-San Saba Aquifer within the Blanco-Pedernales Groundwater Conservation District is listed in Table 6 by decades from 2010 to 2060.

Table 1. Estimated total annual effective recharge volume for the Ellenburger-San Saba Aquifer by map areas (See Figure 1).

GMA	Aquifer	County	GCD	Map area	Areal extent (acres)	Average annual precipitation (inches)	Average annual precipitation (feet)	Effective recharge rate (percent)	Estimated annual effective recharge (ac-ft/yr)
9	Ellenburger-San Saba	Blanco	Blanco-Pedernales GCD	1	47,889	32	2.7	2	2,586
								Total	2,586

GMA = groundwater management area GCD= groundwater conservation district ac-ft/yr = acre-feet per year
The formula for this table is: areal extent (acres) * estimated average annual precipitation (feet) * effective recharge rate = estimated annual effective recharge (ac-ft/yr).

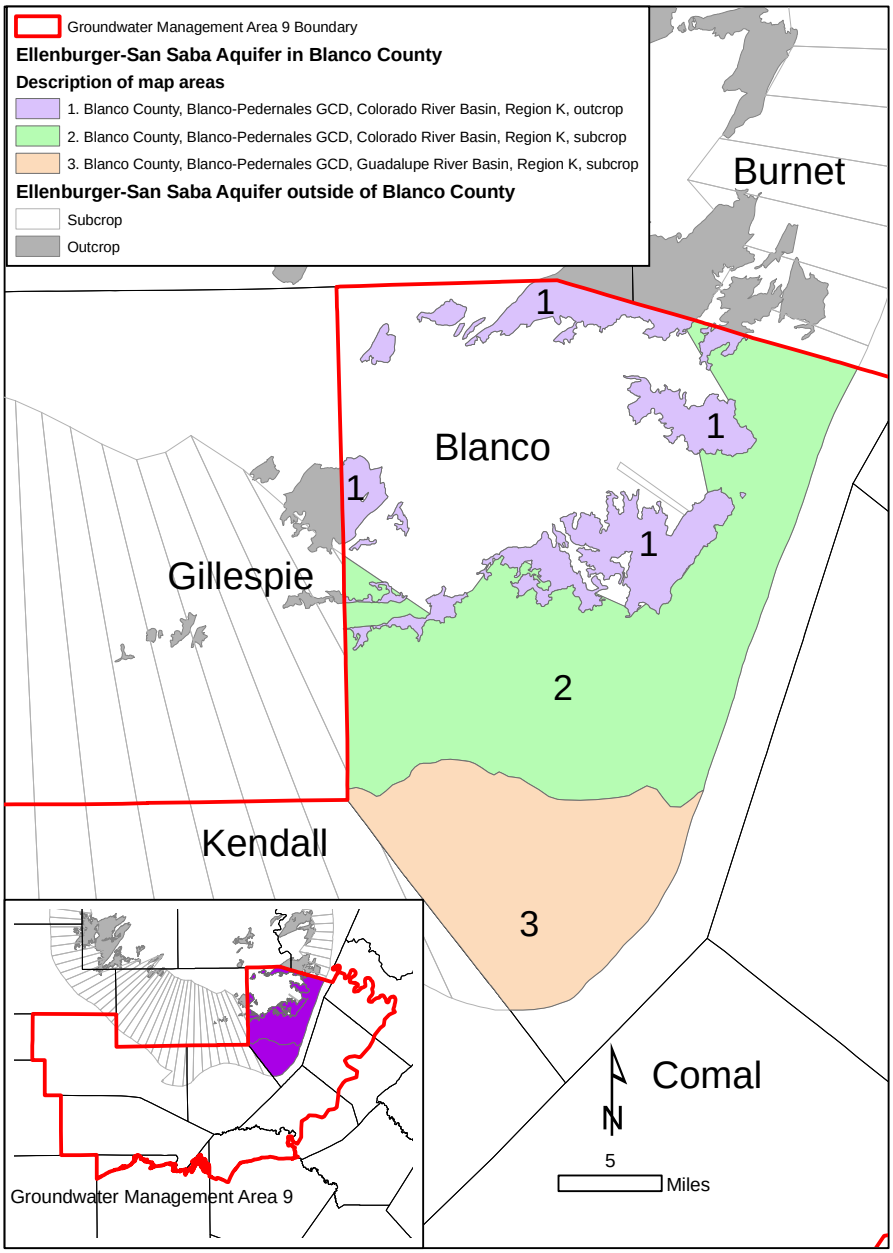

Figure 1. Map areas for calculating total pumping for the Ellenburger-San Saba Aquifer in Blanco County.
GMA = groundwater management area, GCD = groundwater conservation district.

Table 2. Estimates of total pumping for the Ellenburger-San Saba Aquifer by map areas (see Figure 1).

GMA	Aquifer	County	GCD	Map area	Storage coefficient	Areal extent (acres)	Desired total aquifer drawdown (feet)	Estimated volume (acre-feet)	Estimated annual volume (ac-ft/yr)	Estimated annual effective recharge[1] (ac-ft/yr)	Estimated annual total pumping (ac-ft/yr)
9	Ellenburger-San Saba	Blanco	Blanco-Pedernales GCD	1	0.03	47,889	2	2,873	57	2,586	2,643
				2	0.002	147,599	2	590	12	0	12
				3	0.002	76,805	2	307	6	0	6
					Total	272,293		3,770	75	2,586	2,661

GMA = groundwater management area GCD= groundwater conservation district ac-ft/yr = acre-feet per year

1 - This is the estimated total annual effective recharge volume for the Ellenburger-San Saba Aquifer by map areas as shown in Table 1.

The formulas for this table are: storage coefficient * areal extent * desired total aquifer drawdown = estimated volume. Estimated volume /50 = estimated annual volume. Then estimated annual volume + estimated annual effective recharge = estimated annual total pumping

Table 3. Estimates of total pumping for the Ellenburger-San Saba Aquifer in Blanco County. Results are in acre-feet per year and are divided by regional water planning area (RWPA) and river basin.

County	RWPA	Basin	Year					
			2010	2020	2030	2040	2050	2060
Blanco	K	Colorado	2,655	2,655	2,655	2,655	2,655	2,655
		Guadalupe	6	6	6	6	6	6
Total			2,661	2,661	2,661	2,661	2,661	2,661

Table 4. Estimates of total pumping (acre-feet per year) for the Ellenburger-San Saba Aquifer in Blanco County. Results are in acre-feet per year.

County	Year					
	2010	2020	2030	2040	2050	2060
Blanco	2,661	2,661	2,661	2,661	2,661	2,661

Table 5. Estimates of exempt use for the Ellenburger-San Saba Aquifer within the Blanco-Pedernales GCD for each decade between 2010 and 2060. Results are in acre-feet per year.

District	Source	Year					
		2010	2020	2030	2040	2050	2060
Blanco-Pedernales GCD	TA	245	284	322	354	390	431

GCD = Groundwater Conservation District Source: TA = Estimated exempt use calculated byTWDB and accepted by the district

Table 6. Estimates of managed available groundwater for the Ellenburger-San Saba Aquifer within the Blanco-Pedernales GCD for each decade between 2010 and 2060. Results are in acre-feet per year.

District	Year					
	2010	2020	2030	2040	2050	2060
Blanco-Pedernales GCD	2,416	2,377	2,339	2,307	2,271	2,230

LIMITATIONS:

Managed available groundwater numbers included in this report are the result of subtracting the estimated future exempt use from the estimated total pumping that would achieve the desired future condition adopted by the groundwater conservation districts in the groundwater management area. These numbers, therefore, are the result of (1) using a simplified water budget to estimate the total pumping which achieves the desired future condition and (2) estimating the future exempt use in the area.

The water budget in this analysis was determined to be the best method to calculate a total pumping estimate, however this method has limitations and should be replaced with better tools, including groundwater models and additional data that are not currently available, whenever possible. This analysis assumes homogeneous and isotropic aquifers; however, aquifer conditions may not be uniform. The analysis further assumes that precipitation is the only source of aquifer recharge that lateral inflow to the aquifer is equal to lateral outflow from the aquifer, and that future pumping will not alter this balance. In addition, certain assumptions have been made regarding future precipitation, recharge, and streamflow in developing these total pumping estimates. Those assumptions also need to be considered and compared to actual future data when evaluating achievement of the desired future condition.

In the case of TWDB's estimates of future exempt use, key assumptions were made as to the pattern of population growth relative to the need for domestic wells or supplied water, per capita use from domestic wells, and livestock use of water. In the case of district estimates of future exempt use, including exempt use associated with the exploration of oil and gas, the assumptions are specific to that district. In any case, these assumptions will need to be considered when reviewing future data related to exempt use.

Given these limitations, users of this information are cautioned that the total pumping numbers should not be considered a definitive, permanent description of the amount of groundwater that can be pumped to meet the adopted desired future condition. The TWDB makes no warranties or representations relating to the actual conditions of any aquifer at a particular location or at a particular time.

It is important for groundwater conservation districts to monitor future groundwater pumping and water levels to know if they are achieving their desired future conditions. Because of the limitations of using a water budget and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine these managed available groundwater numbers given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future.

REFERENCES:

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GTA Aquifer Assessment 10-02 MAG

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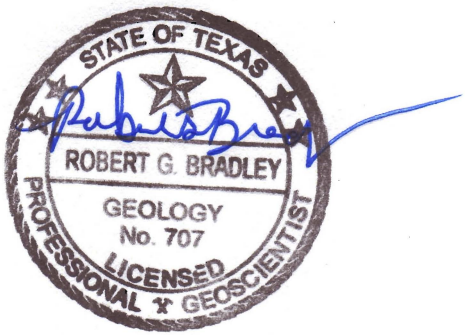

Robert G. Bradley, P.G. 707, authorized the seal appearing on this document on June 22, 2011.

REQUESTOR:

Ron Fieseler, of the Blanco-Pedernales Groundwater Conservation District acting on behalf of Groundwater Management Area 9.

DESCRIPTION OF REQUEST:

In a letter dated October 22, 2008, Mr. Ron Fieseler submitted to the Texas Water Development Board (TWDB) the adopted desired future conditions (DFCs) for the Ellenburger-San Saba, Hickory, and Marble Falls aquifers in Groundwater Management Area (GMA) 9.

Petitioners appealed the reasonableness of these DFCs to the TWDB. On, November 30, 2009, representatives of the GCDs in GMA 9 met and passed a motion clarifying the area of the DFCs for the Ellenburger and the Hickory aquifers to be limited to Blanco County. Based on this action, the Petitioners withdrew their petitions relating to the DFCs for the Ellenburger and Hickory aquifers on December 14, 2009.

This report provides estimates of the managed available groundwater for the Hickory Aquifer for Blanco County. Previously these calculations were part of Aquifer Assessment 08-10mag.

DESIRED FUTURE CONDITIONS:

Hickory Aquifer – Allow for an increase in average drawdown of no more than 7 feet [through 2060].

METHODS:

A transient hydrologic budget for the saturated portion of an aquifer is described by Freeze and Cherry (1979, p.365):

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

where Q(t)= total rate of groundwater withdrawal
R(t)= total rate of groundwater recharge to the basin
D(t)= total rate of groundwater discharge from the basin
$\frac{dS}{dt}$ = rate of change of storage in the saturated zone of the basin

For this analysis, it is assumed that:

$$R(t) = R(r) + R(e)$$

where R(r) = rejected recharge for the basin
R(e) = effective recharge

Effective recharge is the amount of water that enters an aquifer and is available for development (Muller and Price, 1978, p. 5). Rejected recharge is the amount of total (or potential) recharge that discharges from an aquifer because it is over-full and cannot accept more water (Theis, 1940, p.1).

In addition, it is assumed that

$$R(r) \cong D(t)$$

Therefore, the total rate of groundwater withdrawal equals effective recharge plus the change in storage of the aquifer, or:

$$Q(t) = R(e) + \frac{dS}{dt}$$

County, river basin, and groundwater conservation district boundaries split the aquifer into map areas (Figure 1). The areal extent of each aquifer map area was calculated. These areas were used to calculate estimated average effective recharge and pumped volumes.

These map areas were multiplied by the estimated aquifer storativity, and then by uniform water level decline of seven feet. In those cases where unconfined and confined conditions existed in the same aquifer, those were calculated separately.

Average annual pumping to achieve the desired future condition was estimated by multiplying each map area by the average precipitation (1971 to 2000) and an estimated effective recharge rate.

The final calculations were completed in a Microsoft Excel worksheet.

PARAMETERS AND ASSUMPTIONS:

- Water level decline of 7 feet were estimated to be uniform across the aquifer.
- The areas for each area were calculated from the Texas Water Development Board (TWDB) shapefile for the Hickory Aquifer, projected into the groundwater availably modeling (GAM) projection (Anaya, 2001).
- Areas, in acres, were calculated within ArcGIS 9.2.
- Average annual precipitation was used to calculate annual effective recharge volumes.
- The average annual precipitation (1971-2000) for the aquifer outcrop map area (Table 1) was determined from the Texas Climatic Atlas (Narasimhan and others, 2008).
- Average effective recharge from precipitation is estimated to be 2.7 percent of annual precipitation (Bluntzer, 1992; Preston and others, 1996) and is only applied to outcrop areas.
- The managed available groundwater volume estimates are the sum of the annual average effective recharge amount and the volume of water depleted from the aquifer based on the desired future condition.
- Annual volumes are calculated by dividing the total volume by 50 years.
- Specific yield of the aquifer is estimated as 0.15 (LBG-Guyton Associates, 2003) and the storage coefficient is estimated as 0.0001 (TWDB, 2009; Bluntzer, 1992; LBG-Guyton Associates, 2003).
- Outcrop areas are calculated as unconfined areas of the aquifer and subcrop areas are calculated as confined areas of the aquifer.

Determining Managed Available Groundwater:

As defined in Chapter 36 of the Texas Water Code, “managed available groundwater” is the amount of water that may be permitted. The total volume from water budget calculations represents the total amount of pumping from the aquifer to achieve the desired future condition. The total pumping includes both permitted and exempt uses. Examples of exempt uses include domestic, livestock, and oil and gas exploration. Each district may also exempt additional uses as defined by its rules or enabling legislation.

Because exempt uses are not available for permitting, it is necessary to account for them when determining managed available groundwater. To do this the Texas Water Development Board developed a standardized method for estimating exempt use for domestic and livestock purposes based on projected changes in population and the ratio of domestic and livestock wells in an areas to the total number of wells.

Because other exempt uses can vary significantly from district to district and there is much higher uncertainty associated with estimating use due to oil and gas exploration, estimates of exempt pumping outside domestic and livestock uses have not been included.

If the district believes it has a more appropriate estimate of exempt pumping, they may submit it, along with a description of how it was developed, to the Texas Water Development Board for consideration. Once established, the estimates of exempt pumping are subtracted from the total pumping calculations to yield the estimated managed available groundwater for permitting purposes.

RESULTS:

The annual effective recharge estimate for the Hickory Aquifer in Groundwater Management Area 9 is 899 acre-feet per year.

The results (Tables 2 and 3) show 1,163 acre-feet per year of managed available groundwater for the Hickory Aquifer in Groundwater Management Area 9. The Blanco-Pedernales Groundwater Conservation District in Blanco County has 1,163 acre-feet per year of managed available groundwater in the Hickory Aquifer.

Table 1. Estimated total annual effective recharge volume for the Hickory Aquifer by map areas (See Figure 1).

GMA	Aquifer	County	GCD	Map area	Areal extent (acres)	Average annual precipitation (inches)	Average annual precipitation (feet)	Effective recharge rate (percent)	Estimated annual effective recharge (ac-ft/yr)
9	Hickory	Blanco	Blanco-Pedernales GCD	1	12,337	32	2.7	2.7	899
								Total	899

GMA = groundwater management area GCD= groundwater conservation district ac-ft/yr = acre-feet per year
The formula for this table is: areal extent (acres) * estimated average annual precipitation (feet) * effective recharge rate = estimated annual effective recharge (ac-ft/yr).

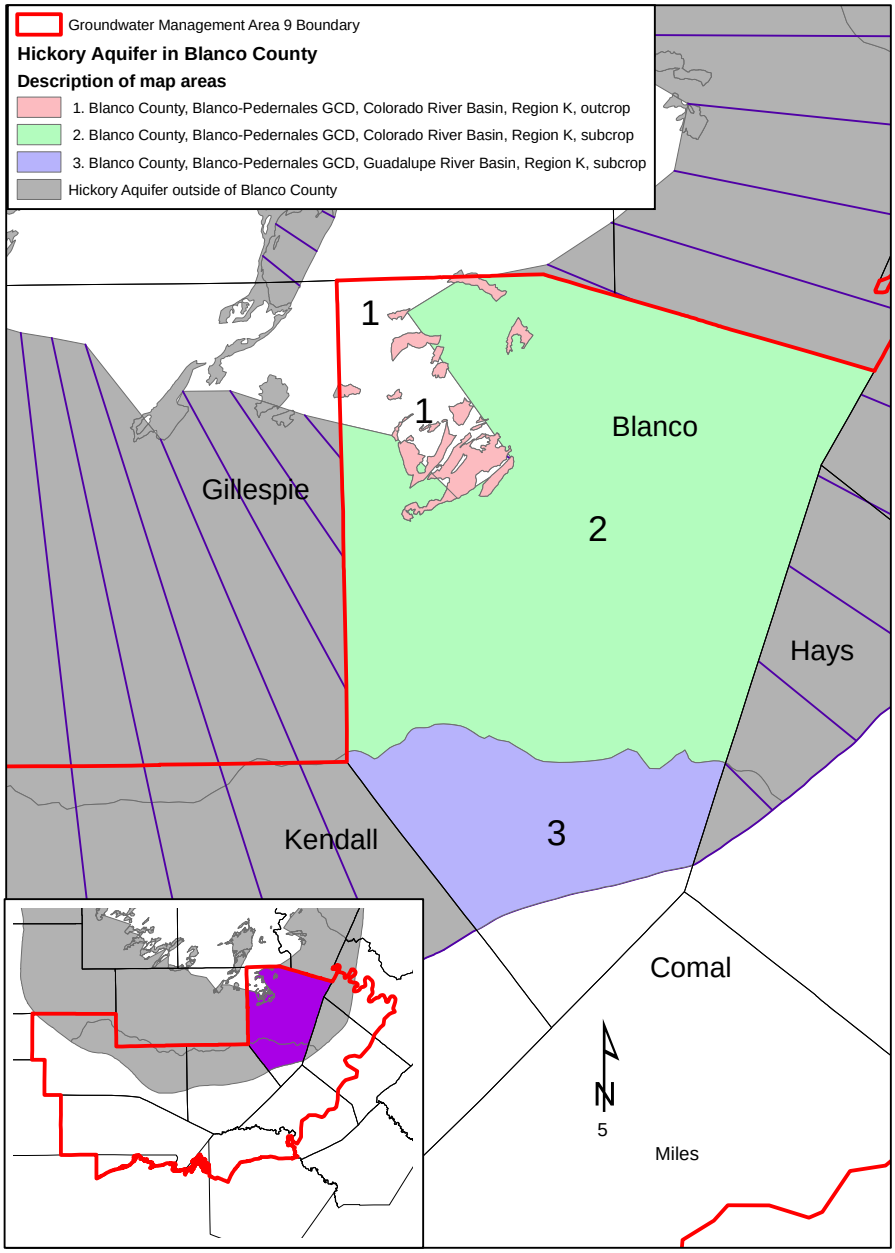

Figure 1. Map areas for calculating total pumping for the Hickory Aquifer in Blanco County. GMA = groundwater management area, GCD = groundwater conservation district.

Table 2. Estimates of total pumping for the for the Hickory Aquifer by map areas (see Figure 1).

GMA	Aquifer	County	GCD	Map area	Storage coefficient	Areal extent (acres)	Desired total aquifer drawdown (feet)	Estimated volume (acre-feet)	Estimated annual volume (ac-ft/yr)	Estimated annual effective recharge[1] (ac-ft/yr)	Estimated annual total pumping (ac-ft/yr)
9	Hickory	Blanco	Blanco-Pedernales GCD	1	0.15	12,337	7	12,954	259	899	1,158
				2	0.0001	312,552	7	219	4	0	4
				3	0.0001	78,067	7	55	1	0	1
			Total			402,956		13,228	264	899	1,163

GMA = groundwater management area GCD= groundwater conservation district ac-ft/yr = acre-feet per year

1 - This is the estimated total annual effective recharge volume for the Ellenburger-San Saba Aquifer by map areas as shown in Table 1.

The formulas for this table are: storage coefficient * areal extent * desired total aquifer drawdown = estimated volume. Estimated volume /50 = estimated annual volume. Then estimated annual volume + estimated annual effective recharge = estimated annual total pumping

Table 3. Estimates of total pumping for the Hickory Aquifer in Blanco County. Results are in acre-feet per year and are divided by regional water planning area (RWPA) and river basin.

County	RWPA	Basin	Year					
			2010	2020	2030	2040	2050	2060
Blanco	K	Colorado	1,162	1,162	1,162	1,162	1,162	1,162
		Guadalupe	1	1	1	1	1	1
Total			1,163	1,163	1,163	1,163	1,163	1,163

Table 4. Estimates of total pumping (acre-feet per year) for the Hickory Aquifer in Blanco County. Results are in acre-feet per year.

County	Year					
	2010	2020	2030	2040	2050	2060
Blanco	1,163	1,163	1,163	1,163	1,163	1,163

Table 5. Estimates of exempt use for the Hickory Aquifer within the Blanco-Pedernales GCD for each decade between 2010 and 2060. Results are in acre-feet per year.

District	Source	Year					
		2010	2020	2030	2040	2050	2060
Blanco-Pedernales GCD	TA	80	93	105	116	128	141

GCD = Groundwater Conservation District Source: TA = Estimated exempt use calculated by TWDB and accepted by the district

Table 6. Estimates of managed available groundwater for Hickory Aquifer within the Blanco-Pedernales GCD for each decade between 2010 and 2060. Results are in acre-feet per year.

District	Year					
	2010	2020	2030	2040	2050	2060
Blanco-Pedernales GCD	1,083	1,070	1,058	1,047	1,035	1,022

GCD = Groundwater Conservation District

LIMITATIONS:

Managed available groundwater numbers included in this report are the result of subtracting the estimated future exempt use from the estimated total pumping that would achieve the desired future condition adopted by the groundwater conservation districts in the groundwater management area. These numbers, therefore, are the result of (1) using a simplified water budget to estimate the total pumping which achieves the desired future condition and (2) estimating the future exempt use in the area.

The water budget in this analysis was determined to be the best method to calculate a total pumping estimate, however this method has limitations and should be replaced with better tools, including groundwater models and additional data that are not currently available, whenever possible. This analysis assumes homogeneous and isotropic aquifers; however, aquifer conditions may not be uniform. The analysis further assumes that precipitation is the only source of aquifer recharge that lateral inflow to the aquifer is equal to lateral outflow from the aquifer, and that future pumping will not alter this balance. In addition, certain assumptions have been made regarding future precipitation, recharge, and streamflow in developing these total pumping estimates. Those assumptions also need to be considered and compared to actual future data when evaluating achievement of the desired future condition.

In the case of TWDB's estimates of future exempt use, key assumptions were made as to the pattern of population growth relative to the need for domestic wells or supplied water, per capita use from domestic wells, and livestock use of water. In the case of district estimates of future exempt use, including exempt use associated with the exploration of oil and gas, the assumptions are specific to that district. In any case, these assumptions will need to be considered when reviewing future data related to exempt use.

Given these limitations, users of this information are cautioned that the total pumping numbers should not be considered a definitive, permanent description of the amount of groundwater that can be pumped to meet the adopted desired future condition. The TWDB makes no warranties or representations relating to the actual conditions of any aquifer at a particular location or at a particular time.

It is important for groundwater conservation districts to monitor future groundwater pumping and water levels to know if they are achieving their desired future conditions. Because of the limitations of using a water budget and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine these managed available groundwater numbers given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future.

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Anaya, R., 2001, GAM technical memo 01-01(rev a): Texas Water Development Board technical memorandum, 2p.

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Muller, D. A. and Price, R. D., 1979, Ground-water availability in Texas, estimates and projections through 2030: Texas Department of Water Resources Report 238, 77 p.

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Theis, C.V., 1940, The source of water derived from wells: Essential factors controlling the response of an aquifer to development: Civil Engineering 10, pp.277-280.

GTA Aquifer Assessment 10-14 MAG

by David Wuerch, P.G. and Sarah Backhouse
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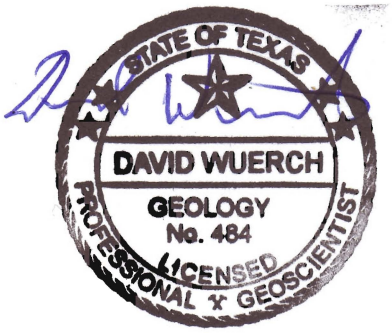

David Wuerch, P.G. 484, authorized the seal appearing on this document on June 22, 2011.

EXECUTIVE SUMMARY:

The estimated total pumping from the Marble Falls Aquifer that achieves the desired future condition adopted by members of Groundwater Management Area 9 is approximately 261 acre-feet per year and is summarized by county, regional water planning area, and river basin as shown in Tables 1-4. The estimated managed available groundwater for the Blanco-Pedernales Groundwater Conservation District in Groundwater Management Area 9 for the aquifer is 261 acre-feet per year between 2010 and 2060 and is shown in Table 4. The total pumping estimates were extracted from GTA Aquifer Assessment 08-11mag, which used a desired future condition that would "allow for no net increase in average drawdown [through 2060]".

REQUESTOR:

Mr. Ronald G. Fieseler, of the Blanco-Pedernales Groundwater Conservation acting on behalf of the member groundwater conservation districts of Groundwater Management Area 9.

DESCRIPTION OF REQUEST:

In a letter received October 22, 2008, Mr. Fieseler provided the Texas Water Development Board (TWDB) with the desired future condition of the Marble Falls Aquifer adopted by the members of Groundwater Management Area 9. The desired future condition for the Marble Falls Aquifer, as described in Resolution No. 082908-1 and adopted August 29, 2008 by the groundwater conservation districts in Groundwater Management Area 9 is described below:

1) *Allow for no net increase in average drawdown [through 2060].*

In response to receiving the adopted desired future condition, TWDB provided Groundwater Management Area 9 a draft managed available groundwater report in June 2009 (GTA Aquifer Assessment 08-11mag). Due to a recent change in TWDB Board policy, calculations of managed available groundwater no longer includes exempt pumping. This report reassesses the managed available groundwater that achieves the above desired future condition for Groundwater Management Area 9.

METHODS:

Groundwater Management Area 9, located in the Hill Country area of Texas, includes part of the Marble Falls Aquifer (Figure 1). The desired future condition requested for the Marble Falls Aquifer was based on maintaining current

drawdown rates in the aquifer within Groundwater Management Area 9. The pumping results presented here for Groundwater Management Area 9 are taken directly from GTA Aquifer Assessment 08-11mag. The Marble Falls Aquifer in Groundwater Management Area 9 is located in a small portion of Blanco County and is entirely within the Blanco-Pedernales Groundwater Conservation District and the Colorado River Basin. These areas are shown in Figure 2.

PARAMETERS AND ASSUMPTIONS:

- Parameters, assumptions, volumetric calculations, and areas were obtained from GTA Aquifer Assessment 08-11mag (Wuerch and Davidson, 2010).

DETERMINING MANAGED AVAILABLE GROUNDWATER:

As defined in Chapter 36 of the Texas Water Code, “managed available groundwater” is the amount of water that may be permitted by a groundwater conservation district. The estimated total annual volume of groundwater calculated, however, represents the total amount of pumping from the aquifer. The total pumping includes uses of water both subject to permitting and exempt from permitting. Examples of exempt uses include domestic, livestock, and oil and gas exploration. Each district may also exempt additional uses as defined by its rules or enabling legislation.

Because exempt uses are not available for permitting, it is necessary to account for them when determining managed available groundwater. To do this the Texas Water Development Board developed a standardized method for estimating exempt use for domestic and livestock purposes based on projected changes in population and the ratio of domestic and livestock wells in an area to the total number of wells. Because other exempt uses can vary significantly from district to district and there is much higher uncertainty associated with estimating use due to oil and gas exploration, estimates of exempt pumping outside domestic and livestock uses have not been included. If a district believes it has a more appropriate estimate of exempt pumping, they may submit it, along with a description of how it was developed, to the Texas Water Development Board for consideration. Once established, the estimates of exempt pumping are subtracted from the total pumping calculation to yield the estimated managed available groundwater for permitting purposes.

RESULTS:

The estimated total pumping from the Marble Falls Aquifer in Groundwater Management Area 9 that achieves the adopted desired future condition is approximately 261 acre-feet per year. This pumping has been divided by county,

regional water planning area, and river basin for each decade between 2010 and 2060 for use in the regional water planning process (Table 1). The total pumping estimate is also summarized by county as shown in Table 2.

Table 3 contains the estimates of exempt pumping in Blanco-Pedernales Groundwater Conservation District for domestic and livestock uses. The managed available groundwater for the groundwater conservation district is the difference between the total pumping (Table 2) and the estimated exempt use (Table 3) and is shown in Table 4.

Table 1. Estimated total pumping by decade for the Marble Falls Aquifer in Groundwater Management Area 9. Results are in acre-feet per year and are divided by county, regional water planning area, and river basin.

County	Regional Water Planning Area	River Basin	Year					
			2010	2020	2030	2040	2050	2060
Blanco	K	Colorado	261	261	261	261	261	261

Table 2. Estimated total pumping for the Marble Falls Aquifer in Blanco County for each decade between 2010 and 2060. Results are in acre-feet per year.

County	Year					
	2010	2020	2030	2040	2050	2060
Blanco	261	261	261	261	261	261

Table 3. Estimates of exempt use for the Marble Falls Aquifer within the Blanco-Pedernales Groundwater Conservation District for each decade between 2010 and 2060. Results are in acre-feet per year.

District	Source	Year					
		2010	2020	2030	2040	2050	2060
Blanco-Pedernales GCD	TA	0	0	0	0	0	0

GCD = Groundwater Conservation District

TA = Estimated exempt use calculated by TWDB and accepted by the district

Table 4. Estimates of managed available groundwater for the Marble Falls Aquifer within the Blanco-Pedernales Groundwater Conservation District for each decade between 2010 and 2060. Results are in acre-feet per year.

District	Year					
	2010	2020	2030	2040	2050	2060
Blanco-Pedernales GCD	261	261	261	261	261	261

GCD = Groundwater Conservation District

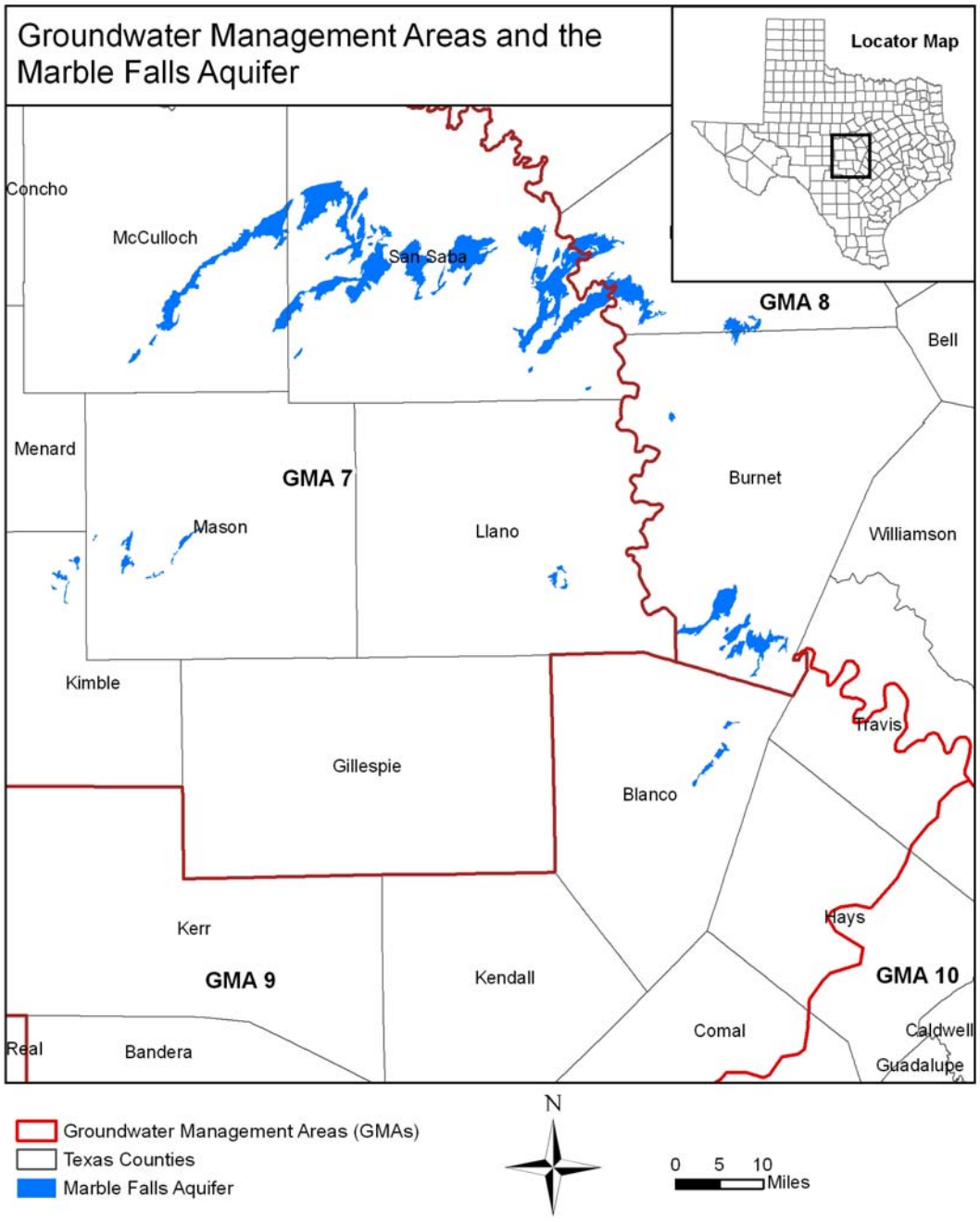

Figure 1. Map showing the areas covered by the Marble Falls Aquifer.

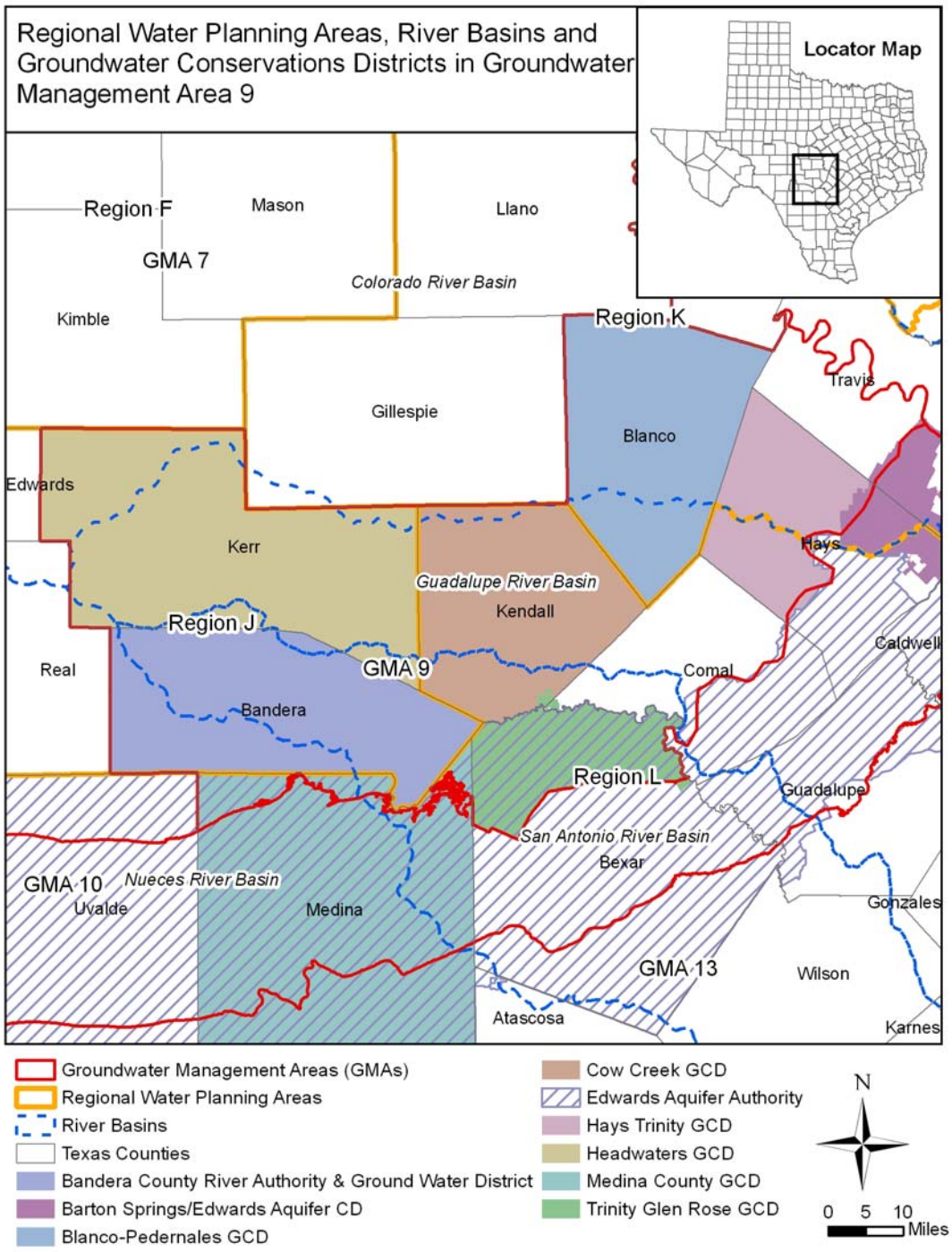

Figure 2. Map showing regional water planning areas, river basins, groundwater conservation districts and counties in and neighboring the Groundwater Management Area 9 assessment area. CD = Conservation District, GCD = Groundwater Conservation District

LIMITATIONS:

Managed available groundwater numbers included in this report are the result of subtracting the estimated future exempt use from the estimated total pumping that would achieve the desired future condition adopted by the groundwater conservation districts in the groundwater management area. These numbers, therefore, are the result of (1) using a simplified water budget to estimate the total pumping which achieves the desired future condition and (2) estimating the future exempt use in the area.

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REFERENCES:

Wuerch, D. and Davidson, S., 2010, GTA Aquifer Assessment 08-11mag: Texas Water Development Board, GTA Aquifer Assessment 08-11mag Report, 6 p.

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