Upper Trinity Groundwater Conservation District

District Management Plan

Adopted – 8/16/2010

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I. DISTRICT MISSION

The Mission of the Upper Trinity Groundwater Conservation District ("District") is to develop rules to provide protection to existing wells, prevent waste, promote conservation, provide a framework that will allow availability and accessibility of groundwater for future generations, protect the quality of the groundwater in the recharge zone of the aquifer, insure that the residents of Montague, Wise, Parker, and Hood counties maintain local control over their groundwater, and operate the District in a fair and equitable manner for all residents of the District.

II. PURPOSE OF THE MANAGEMENT PLAN

The 75th Texas Legislature established a comprehensive regional and statewide water planning process in 1997. A critical component of that far-reaching overhaul of the Texas' water planning process included a requirement that each groundwater conservation district develop a management plan that defines the water needs and supply within each district and defines the goals the district will use to manage the groundwater in order to meet the stated needs or demonstrate that the needs exceed available groundwater supplies. Information from each district's management plan is incorporated into the regional and state water plans. The management plan is also used as the basis for the development of the district's permitting and groundwater management rules.

In addition, Chapter 36, Texas Water Code ("Chapter 36"), requires joint planning among districts located within the same Groundwater Management Area ("GMA"). Among other activities conducted pursuant to this joint planning process, the districts within each GMA must establish desired future conditions for all aquifers located in whole or in part within the GMA. The desired future conditions established through this process are then submitted to the Texas Water Development Board ("TWDB"), which is required to provide each district with estimates concerning the amount of groundwater that can be produced from each aquifer annually within each county located in the GMA in order to achieve the desired future conditions established for each aquifer. This quantified annual water budget for each aquifer is known as the "Managed Available Groundwater" or "MAG" amount. Chapter 36 requires that technical information, such as the desired future conditions of the aquifers within a district's jurisdiction and the amount of managed available groundwater from such aquifers, be included in the district's management plan. This technical information is used as a guide for a district's regulatory and management policies. This groundwater management plan for the District is required by Chapter 36 and was developed in accordance with the administrative rules of the TWDB. Chapter 36 and the TWDB require use of projections of future water demands, surface water availability, water management strategies, and groundwater use provided to the District by the TWDB from the State Water Plan in the management plan. This management plan will be used to: (1) serve as a planning tool for the District in its management and operations; (2) provide general information about the District and its groundwater resources; (3) provide technical information concerning groundwater resources, water supply, and demand; (4) establish goals, management objectives, and performance standards for the District; (5) serve as a resource to help guide the District's

development of additional technical information on local groundwater resources, use, and demand; and (5) support the District's development of its well permitting and regulatory program. The District considers the collection and development of site-specific data on groundwater use in Hood, Montague, Parker, and Wise counties and the groundwater sources of these counties to be a high priority. This plan will be updated as the District develops the site-specific data on local groundwater use and aquifer conditions. Although the District must review and readopt the plan at least once every five years, it is not restricted from doing so more frequently if deemed appropriate by the District.

III. DISTRICT INFORMATION

A. Creation

The Upper Trinity Groundwater Conservation District (the "District") was created by the passage of Senate Bill 1983 by the 80th Texas Legislature (**Appendix A**) under the authority of Section 59, Article XVI, of the Texas Constitution, and in accordance with Chapter 36, by the Act of May 25, 2007, 80th Leg., R.S., Ch. 1343, 2007 Tex. Gen. Laws 4583, codified at TEX. SPEC. DIST. LOC. LAWS CODE ANN. Ch. 8830, as amended ("the District Act"). The creation of the District was overwhelmingly confirmed by the citizens of Hood, Montague, Parker, and Wise counties on November 6, 2007, in an election called for that purpose. The District was created to serve a public use and benefit, and is essential to accomplish the objectives set forth in Section 59, Article XVI, of the Texas Constitution. The purpose of the District is to provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater, and of groundwater reservoirs or their subdivisions, consistent with the objectives of Chapter 36 and Section 59, Article XVI, Texas Constitution.

B. Directors

The Board of Directors consists of eight members, two from each of the following four counties: Hood, Montague, Parker, and Wise. The directors for each county are appointed by their respective commissioners courts. The directors serve staggered four-year terms and may serve multiple consecutive terms.

C. Authority

The District is a political subdivision of the State of Texas organized and operating under Section 59, Article XVI, Texas Constitution, Chapter 36, and the District Act. The District is a government agency and a body politic and corporate. The District has the rights and responsibilities provided for in Chapter 36, the District Act, and 31 Texas Administrative Code (TAC) Chapter 356. The District is charged with undertaking hydrogeological studies, adopting a management plan, providing for the permitting of certain water wells, and implementing rules and programs to achieve the desired future conditions of aquifers within its boundaries and other statutory mandates. The District has rulemaking authority to implement the policies and procedures needed to manage the groundwater resources of Hood, Montague, Parker, and Wise counties. The District has the authority to require metering, reporting, and assessment of fees for the production of

groundwater from water wells located within the District, including wells used by the oil and gas industry, but with the exception of certain small wells used for domestic, livestock, or poultry watering purposes. The District also has the authority to regulate the spacing and production of certain water wells, as well as all other authority conferred to it by Chapter 36 or the District Act.

D. Location and Extent

The District's boundaries are coextensive with the boundaries of Hood, Montague, Parker, and Wise counties, Texas (**Figure 1**). The area encompassed by the District is approximately 3,200 square miles (approximately 2,051,280 acres). The District is bound by Oklahoma to the north, Clay, Jack, Palo Pinto, and Erath counties to the west, Erath and Somervell counties to the south, and Cooke, Denton, Tarrant, and Johnson counties to the east.

E. Topography and Drainage

The topography in the northernmost county in the District, Montague County, ranges from about 850 to 1,318 feet above mean sea level and is gently rolling with high rolling prairies and broad valleys. The topography of Wise County consists of gently rolling hills in the east, flat and undulating terrain in the central portion of the county, and primarily hilly in the west. The average elevation in Wise County is 800 feet above mean sea level. Hood and Parker counties are characterized by undulating to hilly terrain at elevations ranging from about 600 to 1,000 feet above mean sea level for Hood County and 700 to 1,200 feet above mean sea level for Parker County.

The northern part of Montague County is drained by the Red River. The Denton-Elm and West forks of the Trinity River drain the east-central and southern parts of the county, respectively. Tributaries of the Trinity River drain Wise County, the northeastern part of Parker County, and the very northeastern corner of Hood County. The southwestern part of Parker County and the vast majority of Hood County are drained by the Brazos River and its tributaries.

F. Groundwater Resources of the District

Groundwater resources in the four counties making up the District include the Cretaceous-age Trinity Aquifer, several water-bearing units of Pennsylvanian- and Permian-age, referred to as the Paleozoic aquifers, and alluvial deposits. The Trinity Aquifer is recognized by the TWDB as a major aquifer in Texas. The Paleozoic aquifers are not recognized by the TWDB as either major or minor aquifers. No minor aquifers, as defined by the TWDB, are located in the District. The TWDB defines a major aquifer as one that supplies large quantities of water over large areas of the state and defines a minor aquifer as one that supplies relatively small quantities of water over large areas of the state or supplies large quantities of water over small areas of the state (Ashworth and Hopkins, 1995). A generalized stratigraphic section representative of the hydrogeology of the District is provided in **Table 1**.

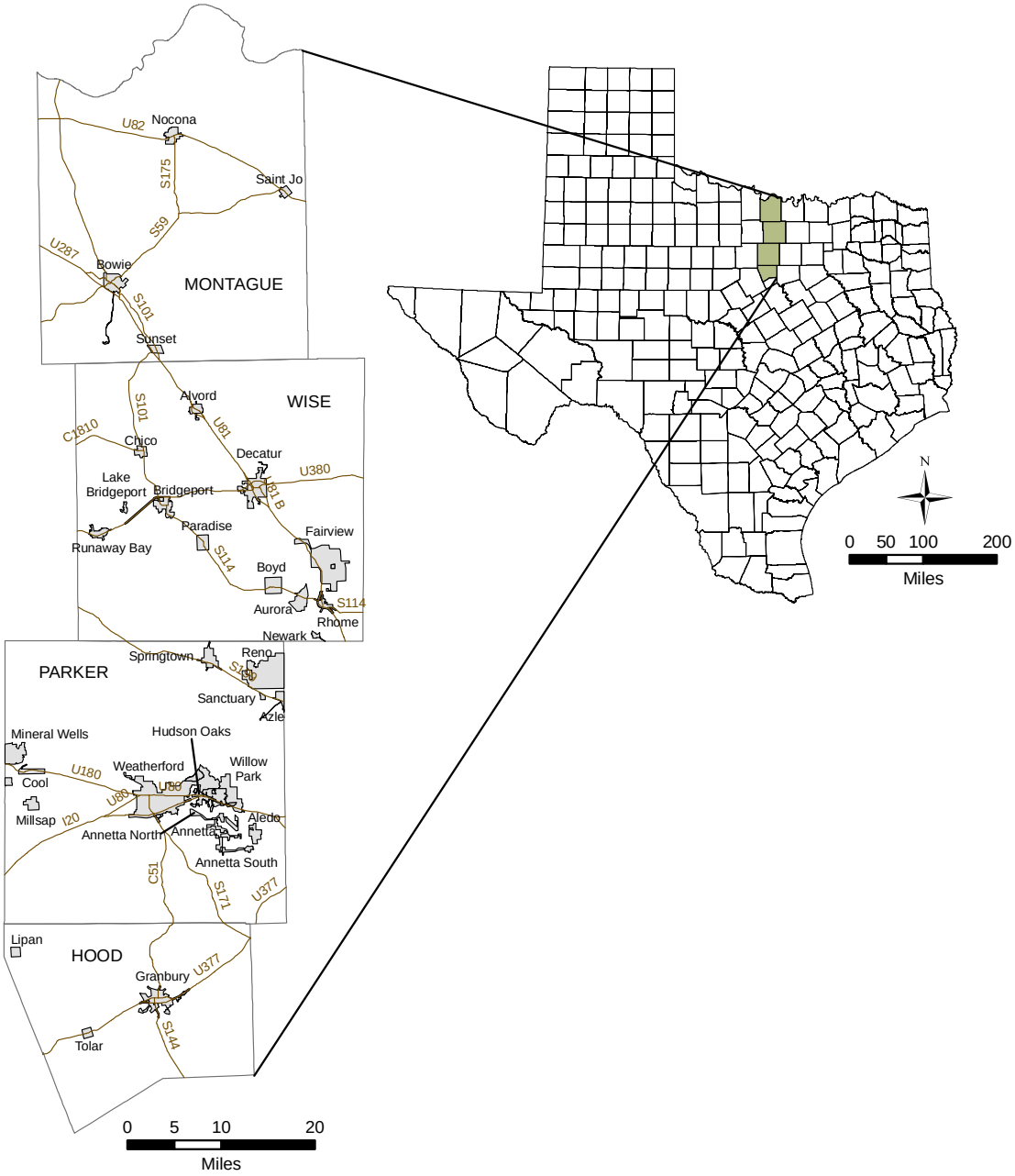

Figure 1. Locations and boundaries of the District.

Table 1. General Stratigraphy (Bené and others 2004; McGowen and others, 1967; 1972; Brown and others, 1972).

System	Hydrogeologic Characteristic	Group	Formation	
			North	South
	Water-Bearing		alluvial deposits	
Cretaceous	Confining Units (locally productive)	Washita	Weno Denton Fort Worth Duck Creek Kiamichi	
	Confining Units (locally productive)	Fredericksburg	Goodland	Edwards
				Comanche Peak
			Walnut Clay	Walnut Clay
	Aquifer	Trinity	Antlers	Paluxy
				Glen Rose
				Twin Mountains
Permian	Water-Bearing	Bowie	Nocona Archer City Markley Thrifty and Graham, undivided	
Pennsylvanian	Water-Bearing	Canyon	Colony Creek Shale	
			Ranger	
			Ventioner	
			Jasper Creek	
			Chico Ridge Limestone	
			Willow Point	
			Palo Pinto	
	Water-Bearing	Strawn	Mineral Wells	
			Brazos River	
			Mingus	
			Buck Creek Sandstone	
			Grindstone Creek	
			Lazy Bend	

Major Aquifer – the Trinity Aquifer

The Trinity Aquifer, shown in **Figure 2**, is defined by the TWDB as a major aquifer composed of several individual aquifers contained within the Trinity Group. In the District, the Trinity Aquifer consists of the aquifers of the Paluxy Sand, the Glen Rose Formation, the Twin Mountains Formation, and the Antlers Formation. The Antlers Formation is the coalescence of the Paluxy and Twin Mountains formations north of the line where the Glen Rose Formation thins to extinction. This occurs approximately in central Wise County (**Figure 3**). The Cretaceous-age Fredericksburg and Washita

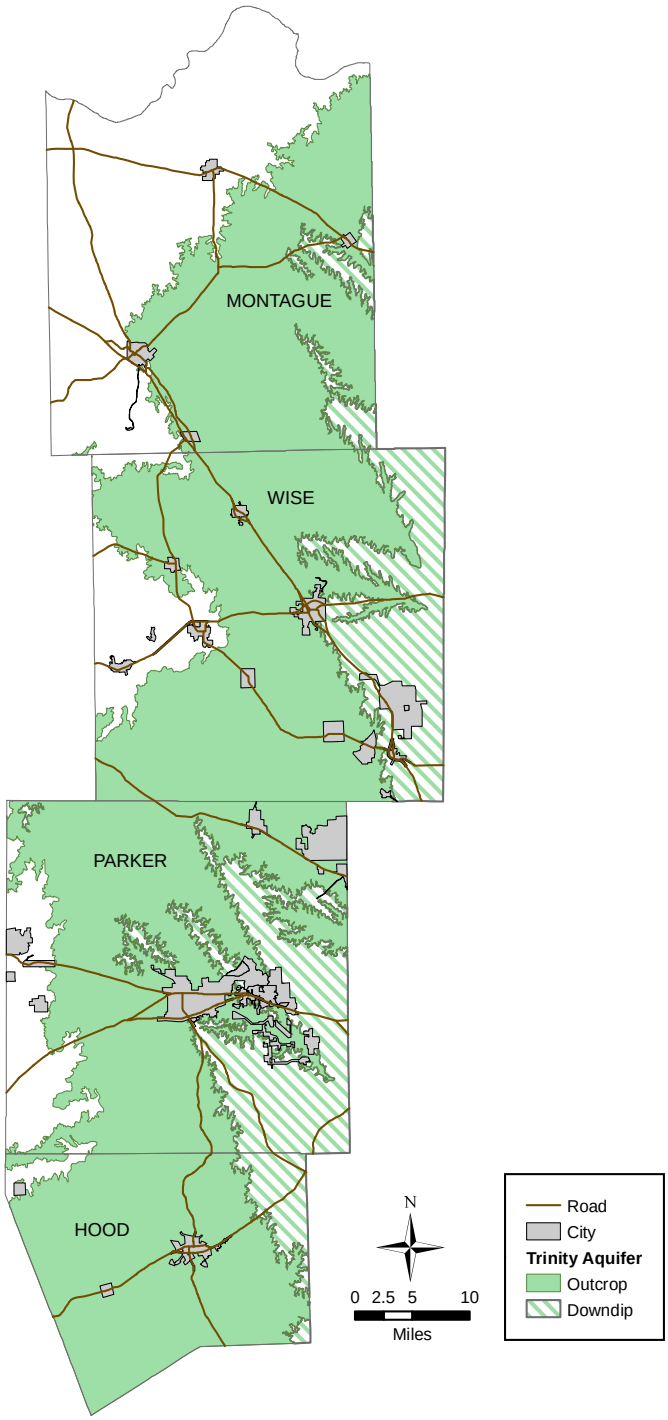

Figure 2. Outcrop and subcrop of the Trinity Aquifer in the District.

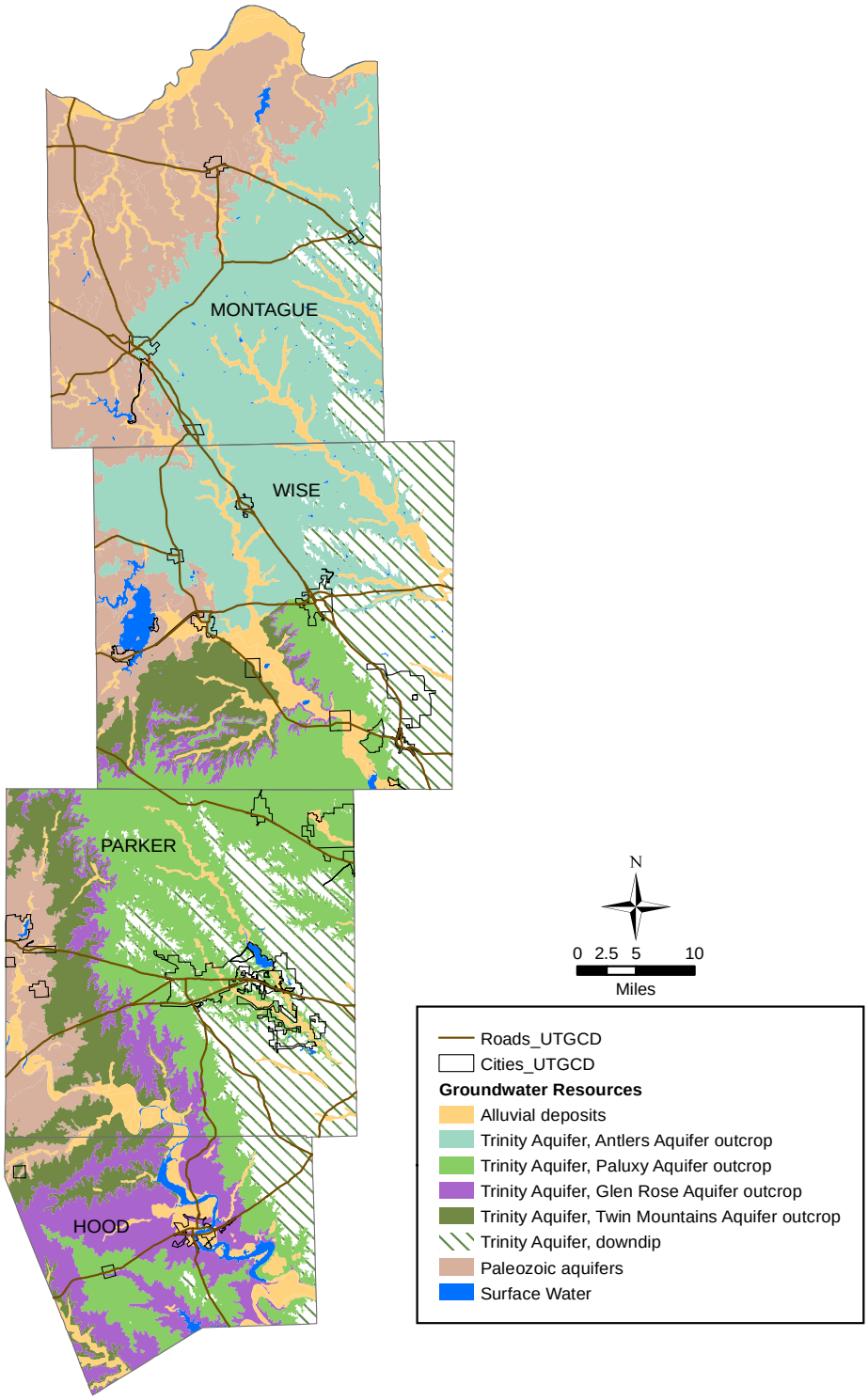

Figure 3. Groundwater resources in the District.

Groups are generally considered confining units and they overlie the downdip portion of the Trinity Aquifer in the easternmost areas of the District.

The Paluxy Sand consists of sand, silt, and clay, with sand dominating. The sand and silts in the aquifer are primarily fine-grained, well sorted, and poorly cemented (Bené and others, 2004). Coarse-grained sand is found in the lower sections grading up to fine-grained sand with shale and clay in the upper section (Nordstrom, 1982). In general, natural groundwater flow in the Paluxy Sand is east to southeast (Langley, 1999). Wells completed into the Paluxy Sand typically yield small to moderate quantities of water that is fresh to slightly saline (Nordstrom, 1982). Where the Glen Rose Formation is absent, the Paluxy Sand is equivalent to the upper sands of the Antlers Formation (Baker and others, 1990).

The Glen Rose Formation consists primarily of limestone with some shale, sandy-shale, and anhydrite. In general, the aquifer yields small quantities of water in localized areas (Baker and others, 1990). Groundwater flow in the Glen Rose Formation is generally to the east and southeast.

The Twin Mountains Formation consists predominantly of medium- to coarse-grained sand, silty clay, and conglomerates. A massive sand is found in the lower portion of the formation while less sand is found in the upper portion of the aquifer due to increased interbedding of shale and clay (Nordstrom, 1982). In general, wells are primarily completed into the lower part of the aquifer. Where the Glen Rose Formation is absent, the Twin Mountains Formation is equivalent to the lower sands of the Antlers Formation (Baker and others, 1990). Typically, wells completed into the Twin Mountains Formation yield fresh and slightly saline water in moderate to large quantities (Nordstrom, 1982). Groundwater flow in this formation is generally to the east and southeast.

Typically, the Antlers Formation consists of a basal conglomerate and sand overlain by poorly consolidated sand interbedded with discontinuous clay layers (Nordstrom, 1982). Considerable more clay is found in the middle portion of the formation than in the upper and lower portions. Limestone is also found in the middle portion near the updip limit of the Glen Rose Formation. Generally, groundwater flow in the Antlers Formation is to the east and southeast. Well yield in the Antlers Formation is similar to that in the Twin Mountains Formation with downdip wells generally more productive than those in the outcrop areas.

Minor Aquifer

No minor aquifers, as defined by the TWDB, are located in the District. However, the Paleozoic strata outcropping to the west of the Trinity Group are used as a source of groundwater within the District.

Other Water-Bearing Formations

Paleozoic Aquifers

Several Pennsylvanian- and Permian-age formations in the District are capable of producing usable quantities of groundwater. These formations are referred to collectively as the Paleozoic aquifers (see **Figure 3**). Literature regarding these formations is very limited and, therefore, information regarding their hydrologic characteristics is also limited. The Paleozoic aquifers are a significant source of groundwater in northern and western portions of Montague County, west-central Wise County, and western Parker County where the Trinity Aquifer is absent. Based on information in the TWDB groundwater database (TWDB, b) as of November 2009, the percentage of wells in the District completed into the Paleozoic aquifers is 78.2, 14.8, 5.4, and 0.0 percent for Montague, Wise, Parker, and Hood counties, respectively.

From youngest to oldest, the formations of the Bowie, Canyon, and Strawn groups make up the Paleozoic aquifers. The Bowie Group consists of the Nocona Formation (mudstone with sandstone and siltstone in thin lenticular beds throughout), the Archer City Formation (predominantly mudstone with thin siltstone beds and sandstone), the Markley Formation (mudstone with local thin beds of sandstone in upper portion and mudstone and shale with some coal and limestone below), and the undivided Thrifty and Graham formations (predominantly mudstone and shale with thin sandstone beds and some sandstone sheets locally and two limestone members).

The underlying Canyon Group is comprised of the Colony Creek Shale (shale with some siltstone, local thin to medium beds of sandstone, and limestone lentils), the Ranger Limestone (predominantly limestone with local thin shale beds), the Ventioner Formation (shale and mudstone with numerous sandy and silty lenses and thin to medium beds), the Jasper Creek Formation (upper portion predominantly shale with thin siltstone beds throughout and isolated massive sandstone lenses and lower portion shale with thin limestone lentils and local thin and lenticular thick sandstone beds), the Chico Ridge Limestone (predominantly limestone with local shale beds), the Willow Point Formation (shale and claystone locally silty and sandy with local thin beds of sandstone and several limestone beds in lower portion and a single coal bed), and the Palo Pinto Formation (predominantly limestone and marl with some sandstone and shale). Sandstone lenses found in the Canyon Group are locally important to the occurrence of groundwater (Bayha, 1967).

The Strawn Group consists of the Mineral Wells Formation (shale containing local sandstone beds and a few limestone beds), the Brazos River Formation (sandstone with local lenses of conglomerate and mudstone), the Mingus Formation (sandy shale with one thin coal seam and some limestone beds), the Buck Creek Sandstone (sandstone), the Grindstone Creek Formation (shale, in part sandy, with local thin coal beds and sandstone lentils and limestone beds with some shale), and the Lazy Bend Formation (shale, in part sandy or silty, with local coal beds and limestone beds).

The Paleozoic aquifers are the primary source of water in Montague County (Bayha, 1967) as indicated by the high percentage of wells completed into these aquifers in the county. Bayha (1967) indicates that groundwater is difficult to trace in these aquifers due to the complex depositional sequence.

Alluvial Deposits

Some alluvial deposits of Pleistocene to Recent age are capable of producing water in the District, especially along the Red River in Montague County and the Brazos River in Parker County. The majority of these sediments are stream deposits but some are of windblown origin. The alluvial deposits, consisting of sand, gravel, silt, and clay, yield small to large quantities of fresh water. Based on information in the TWDB groundwater database (TWDB, 2009b) as of November 2009, the percentage of wells in the District completed into alluvial deposits is 10.0, 0.4, 3.0, and 0.1 percent for Montague, Wise, Parker, and Hood counties, respectively.

IV. CRITERIA FOR PLAN CERTIFICATION

A. Planning Horizon

The time period for this plan is five years from the date of approval by the TWDB. This plan will be reviewed and readopted with or without amendments at least once every five years, or more frequently if deemed necessary or appropriate by the District Board. This management plan will remain in effect until it is replaced by a revised management plan approved by the TWDB.

B. Board Resolution

A certified copy of the Upper Trinity Groundwater Conservation District resolution adopting the plan is located in **Appendix B** – District Resolution.

C. Plan Adoption

Public notices documenting that the plan was adopted following appropriate public meetings and hearings are located in **Appendix C** – Notice of Meetings.

D. Coordination with Surface Water Management Entities

Letters transmitting copies of this plan to the Brazos River Authority, Red River Authority, and Trinity River Authority as well as other Surface Water Management Entities are located in **Appendix D** – Letters to Surface Water Management Entities.

V. ESTIMATES OF TECHNICAL INFORMATION REQUIRED BY TWC § 36.1071/ 31TAC 356.5

A. Managed available groundwater in the District based on the desired future condition established under TWC 36.108 – TWC § 36.10701(e)(3)(A)

The Texas Legislature has established that the preferred method of managing groundwater in Texas is through rules developed by a groundwater conservation district. A groundwater conservation district is a district created under Texas Constitution, Article III, Section 52 or Article XVI, Section 59, which has the authority to regulate the spacing of water wells, the production from water wells, or both. Many groundwater conservation districts boundaries are consistent with political boundaries such as county boundaries and, as such, are not consistent with hydrologic boundaries which would need to be considered in the cohesive management of an aquifer. Recognizing this fact, in 2005 the legislature required joint planning among groundwater conservation districts within a common groundwater management area. Groundwater management areas ("GMAs ") are defined as areas suitable for the management of groundwater resources and have been defined by the TWDB for all the major and minor aquifers in the state. The presiding officers of the groundwater conservation districts within a GMA or their designees are required to meet at least annually to integrate groundwater planning and management. The 16 regional water planning groups, which are the regional water resource planning entities for the State, must plan consistently with the desired future conditions and groundwater availability determinations established by the groundwater conservation districts within each GMA. The primary goal of joint planning within a GMA is to develop the desired future conditions of the aquifers identified within its boundaries, which will then be used by the TWDB to develop managed available groundwater for each aquifer located in the GMA.

Managed available groundwater is defined by Chapter 36 as the amount of water that may be permitted by a district for beneficial use in accordance with the desired future conditions of the aquifer. In reality, a district must consider production by both permitted wells and those exempt from permitting when considering managed available groundwater as a quantified estimate of annual production designed to achieve the desired future conditions of the aquifer. The desired future conditions of the aquifer may only be defined by joint planning between the groundwater conservation districts within a GMA. Section 36.108 (o), Water Code, states that the executive administrator of the TWDB shall provide each district and regional water planning group, located wholly or partly within a GMA, with the managed available groundwater in the management area based upon the desired future condition of the groundwater resources established pursuant to joint planning and submitted to the TWDB for that purpose. The Upper Trinity District is located within GMA-8 (see **Appendix E**).

The District only has one TWDB-designated major or minor aquifer within its boundaries—the Northern Trinity Aquifer, which is a major aquifer. GMA-8 provided the desired future conditions for the Northern Trinity Aquifer to the TWDB in a letter dated October 6, 2008, and further clarified in a memorandum written December 15, 2008, and requested that the TWDB estimate managed available groundwater. On March

31, 2009, the TWDB executive administrator provided the managed available groundwater for the Northern Trinity Aquifer within GMA-8 by letter to Ms. Cheryl Maxwell representing GMA-8 (TWDB, 2009a; http://www.gma8.org/images/stories/pdf/MAG/trinity%20mag%20final%2031mar09.pdf). These conditions and the subsequent managed available groundwater estimates for the Trinity Aquifer are described below.

Trinity Aquifer

The districts comprising GMA-8 requested the performance of several simulations using the TWDB Northern Trinity Aquifer groundwater availability model ("GAM") (Bené and others, 2004) to investigate the relationship between a range of aquifer desired future conditions and the resulting available groundwater. These simulation requests and their execution are documented and available for review on the GMA-8 website (www.gma8.org).

a. Selected Management Conditions

The selected management conditions for the District are based upon results from the Northern Trinity GAM (Bené and others, 2004). In the GAM the Trinity Aquifer is divided into four model layers generally representing the dominant hydrostratigraphy of the Trinity Aquifer in North-Central and North Texas; the Upper Trinity (Paluxy and Glen Rose aquifers), the Middle Trinity (Hensell aquifer) and the Lower Trinity (Hosston aquifer). The GAM models the Paluxy aquifer as model layer 3, the Glen Rose aquifer as model layer 4, the Hensell aquifer as model layer 5, and the Hosston aquifer as model layer 7. Model layer 6 represents the Pearsall/Cow Creek/Hammett members of the Travis Peak Formation, which are conceptualized as a confining unit. The relationship between these model layers and the formations in the District is illustrated in **Table** 2.

The Hensell and Hosston aquifers, where distinctly discernable as individual aquifers, are part of the Travis Peak Formation. In many areas of the District, however, these individual aquifers are not discernable and the Hosston aquifer (model layer 7) and the Hensell aquifer (model layer 5) are generally lumped into the Twin Mountain Formation. As one moves north of the middle of Wise County, the Glen Rose aquifer (model layer 4) also becomes unidentifiable as a distinct lithologic unit and is generally lumped with the Antlers Formation. In regions of the District north of Decatur, the entire Trinity Aquifer sequence is generally mapped as the Antlers Formation.

Because the GAM was used as a means of defining desired future conditions as well as estimating the managed available groundwater, the following discussion is couched in terms of hydrostratigraphic nomenclature and model layers consistent with the GAM.

The desired future conditions were specified based upon average drawdown from the year 2000 through the year 2050 on a county and aquifer (model layer) basis. **Table 3** defines the desired future conditions for the four counties comprising the District for the Northern Trinity Aquifer. For example, for the Hosston aquifer in Hood County, the specified management goal (desired future condition) is defined "from estimated year

Table 2. Relationship Between Model Layers in Trinity Aquifer GAM and Formations in the District.

<table>
<tr><th colspan="2">District (North and West)</th><th colspan="2">South</th><th colspan="2">GAM Model</th></tr>
<tr><td>Montague and northern Wise counties</td><td>Hood, Parker, southern Wise counties</td><td colspan="2"></td><td>Model Stratigraphy</td><td>Model Layer</td></tr>
<tr><td rowspan="8">Antlers Formation</td><td>Paluxy Sand</td><td>Paluxy Sand</td><td>Paluxy Sand</td><td>Paluxy aquifer</td><td>3</td></tr>
<tr><td>Glen Rose Formation</td><td>Glen Rose Formation</td><td>Glen Rose Formation</td><td>Glen Rose aquifer</td><td>4</td></tr>
<tr><td rowspan="6">Twin Mountains Formation</td><td rowspan="6">Travis Peak Formation</td><td>Hensell Member</td><td>Hensell aquifer</td><td>5</td></tr>
<tr><td>Pearsall Member</td><td rowspan="4">Pearsall/Cow Creek/Hammett/ Sligo confining unit</td><td rowspan="4">6</td></tr>
<tr><td>Cow Creek Member</td></tr>
<tr><td>Hammett Member</td></tr>
<tr><td>Sligo Member</td></tr>
<tr><td>Hosston Member</td><td>Hosston aquifer</td><td>7</td></tr>
</table>

2000 conditions, the average drawdown of the Hosston Aquifer should not exceed approximately 56 feet after 50 years" (Wade, 2009). All of the desired future conditions are specified in Wade (2009) in a similar format. These are summarized in **Table 3**.

b. Groundwater Availability

The estimated total groundwater available by aquifer and by county for the Northern Trinity Aquifer is defined by GAM Run 08-84mag (Wade, 2009) and attached to this plan as **Appendix F**. These values are the managed available groundwater available for production in the District by exempt and non-exempt well owners. **Table 3** summarizes the managed available groundwater by aquifer and by county for the Northern Trinity Aquifer in the District. In total there is 38,349 acre-feet per year ("AFY") of managed available groundwater available within the District for the Northern Trinity Aquifer on an annual basis.

Table 3. Desired Future Conditions and Managed Available Groundwater for the Northern Trinity Aquifer in the District.

County	Trinity Sub-Aquifer	Desired Future Condition[(1)]	Managed Available Groundwater [(2)] (AFY)
Hood	Paluxy	1	942
	Glen Rose	2	4
	Hensell	16	3,595
	Hosston	56	6,604
Hood County Total		NA	11,145
Parker	Paluxy	5	9,800
	Glen Rose	6	192
	Hensell	16	1,441
	Hosston	40	3,815
Parker County Total		NA	15,248
Wise	Paluxy	4	2,559
	Glen Rose	14	5
	Hensell	23	1,480
	Hosston	53	5,238
Wise County Total		NA	9,282
Montague	Paluxy	0	505
	Glen Rose	1	-
	Hensell	3	362
	Hosston	12	1,807
Montague County Total		NA	2,674
District Total		**NA**	**38,349**

(1) Average drawdown in feet after 50 years from the year 2000

(2) from GAM Run 08-84mag (Wade, 2009)

Other Aquifers

The TWDB currently identifies groundwater use within two aquifers which are not classified by the State as either major or minor aquifers; the Paleozoic Formations west of the Northern Trinity Aquifer outcrop and the Alluvial Aquifers described in Section F of this plan and shown in **Figure 3**. These units are lumped as "other" aquifers within the TWDB water use system. Within the outcrop of the Trinity Aquifer, it is reasonable to assume that the Trinity Aquifer and the Alluvial Aquifers are in hydraulic contact and could be considered grouped. Other aquifer usage which may be attributable to the Paleozoic Aquifers is very minor in Parker and Wise counties: 93 and 4 acre-ft ("AF"), respectively, in 2003. However, in Montague County, use is dominantly from the Paleozoic Aquifer at 1,053 AF in 2003 relative to the county total pumping of 1,353 AF. GMA-8 has not proposed a desired future condition for the Paleozoic aquifers. Because the District is still in its formative years, it has not yet been able to collect sufficient information to comfortably characterize availability numbers for these aquifers or develop management goals for them in this initial management plan. However, the District will seek to collect and develop information and data regarding the Paleozoic Aquifers, as well as the Red River Alluvial Aquifer, because of the local importance of these aquifers, and management goals and availability numbers for them will be established in further rounds of planning.

B. Amount of groundwater being used within the District on an annual basis – 31TAC356.5 (a)(5)(B) ((Implementing TWC §36.1071(e)(3)(B))

The District relied on the TWDB Annual Water Use Survey Data to estimate annual groundwater use in the District for the time periods 1980, 1984 through 2003, and 2007. Water use data from the TWDB for the years 2004, 2005 and 2006 are currently not available from the TWDB. Based upon the most recent water use survey data available from the TWDB for the year 2007, total groundwater use was 6,677 acre-feet per year in Hood County, 1,365 acre-feet per year in Montague County, 11,044 acre-feet per year in Parker County, and 6,617 acre-feet per year in Wise County, for a total groundwater use of 25,703 acre-feet per year for the entire District. Estimated historical use by year and use category is summarized in **Table 4**. In 2007, estimated use by category for the entire District was 73 percent for municipal purposes, approximately one percent for manufacturing and steam and electric uses, 3 percent for irrigation purposes, 20 percent for mining purposes, and 3 percent for livestock purposes. In the TWDB water use survey, the municipal uses category includes small water providers and rural domestic pumping in addition to municipalities.

When one compares the historical use numbers reported by the TWDB for the year 2007 to the numbers reported for 2003, one sees that overall groundwater use increased 46.1% over that three year period. Ninety-six percent of this increase is the result of use in two water user groups, mining and municipal. The mining water use, which in the District is dominated by Barnett Shale development water use, increased nearly a factor of ten (864%). Municipal water use increased 20% which again includes rural and domestic pumping and is reflecting population growth within the District. The District performed a study in 2008 to estimate groundwater pumping within the Trinity Aquifer within the

District for the calendar year 2008. The District study was based upon the recent TWDB funded report (Bené and others, 2007) documenting increased groundwater use as a result of urbanization and Barnett Shale development. The District study estimated total groundwater use within the District's four counties at approximately 24,362 acre feet in the year 2008. This compares well to the TWDB estimate of 25,703 acre feet in 2007.

This growth in groundwater use points out the need to better define groundwater use within the District to support the mission of the District. The District Rules require mandatory metering and reporting for non-exempt larger wells within the District, which the District anticipates will result in improved groundwater use data collection. The first year that meter data have been available for the District is 2009. In 2009 the groundwater production reports received by the District from well owners indicate that metered municipal groundwater was approximately 10,348 acre feet, manufacturing was approximately 162 acre feet, and mining was approximately 3,303 acre feet.

The discrepancy between the municipal groundwater use metered in 2009 (10,348 acre feet) and the TWDB reported in 2007 (18,744 acre feet) seems large. However, small rural domestic wells are not metered within the District while the TWDB municipal use estimate includes rural domestic use. In an effort to better compare the District metered municipal use to the TWDB municipal use, the District made a request of the TWDB to split the 2007 municipal groundwater use estimate of 18,744 acre feet between municipal (including water providers) and true rural domestic pumping. The TWDB estimated that of the 18,744 acre feet of municipal pumping reported in 2007 within the District, municipal pumping comprised 10,828 acre feet. This compares well with the 2009 District metered estimate of 10,348 acre feet. This also provides an estimate of rural domestic pumping within the District in 2007 of 7,916 acre feet, which is a significant percentage (31%) of total TWDB reported pumping within the District in 2007.

In summary, recent TWDB water use survey data reflect the increased groundwater pumping within the District over the last survey years. The TWDB water use data also point to the increase in mining groundwater use associated with Barnett Shale development within the District boundaries. Finally, the water use data show the importance of exempt rural domestic pumping in terms of the total pumping within the District, the importance of collecting good metered data of municipal and oil and gas water use within the District, and the need to develop accurate methods for estimating rural domestic use.

Table 4. Historical Use Groundwater Pumpage.

Year	County	Estimated Historical Groundwater Use (acre-feet per year)						
		Municipal	Manufacturing	Electric	Irrigation	Mining	Livestock	Total
1980	Hood	2,362	9	58	0	0	301	2,730
	Montague	1,070	0	0	49	191	162	1,472
	Parker	3,264	9	0	0	0	242	3,515
	Wise	1,786	18	0	75	0	798	2,677
	Total	**8,482**	**36**	**58**	**124**	**191**	**1,503**	**10,394**
1984	Hood	2,937	20	142	142	81	305	3,627
	Montague	1,033	0	0	67	299	151	1,550
	Parker	3,695	1	0	143	56	137	4,032
	Wise	2,005	19	0	115	691	838	3,668
	Total	**9,670**	**40**	**142**	**467**	**1,127**	**1,431**	**12,877**
1985	Hood	3,100	16	125	47	81	360	3,729
	Montague	1,079	0	0	58	302	140	1,579
	Parker	3,925	33	0	219	56	152	4,385
	Wise	2,110	18	0	99	606	868	3,701
	Total	**10,214**	**67**	**125**	**423**	**1,045**	**1,520**	**13,394**
1986	Hood	2,689	16	133	390	85	237	3,550
	Montague	914	0	0	88	302	135	1,439
	Parker	4,196	37	0	220	58	129	4,640
	Wise	2,258	14	0	200	495	794	3,761
	Total	**10,057**	**67**	**133**	**898**	**940**	**1,295**	**13,390**
1987	Hood	3,223	12	154	316	71	244	4,020
	Montague	968	0	0	88	330	132	1,518
	Parker	4,387	33	0	220	47	112	4,799
	Wise	2,368	12	0	193	443	756	3,772
	Total	**10,946**	**57**	**154**	**817**	**891**	**1,244**	**14,109**
1988	Hood	3,569	10	104	250	78	233	4,244
	Montague	930	0	0	88	310	136	1,464
	Parker	4,066	80	0	300	52	114	4,612
	Wise	2,426	7	0	223	405	695	3,756
	Total	**10,991**	**97**	**104**	**861**	**845**	**1,178**	**14,076**
1989	Hood	3,321	11	50	246	73	256	3,957
	Montague	998	0	0	68	290	146	1,502
	Parker	4,465	59	0	21	49	124	4,718
	Wise	2,368	10	0	132	40	764	3,314
	Total	**11,152**	**80**	**50**	**467**	**452**	**1,290**	**13,491**
1990	Hood	3,449	9	70	208	73	280	4,089
	Montague	866	0	0	68	290	152	1,376
	Parker	4,902	28	0	30	49	146	5,155
	Wise	2,517	13	0	140	40	1,078	3,788
	Total	**11,734**	**50**	**70**	**446**	**452**	**1,656**	**14,408**

Table 4, continued

Year	County	Estimated Historical Groundwater Use (acre-feet per year)						
		Municipal	Manufacturing	Electric	Irrigation	Mining	Livestock	Total
1991	Hood	2,753	10	53	0	170	285	3,271
	Montague	902	0	0	68	286	154	1,410
	Parker	5,362	28	0	30	55	146	5,621
	Wise	2,743	11	0	140	32	1,061	3,987
	Total	**11,760**	**49**	**53**	**238**	**543**	**1,646**	**14,289**
1992	Hood	3,267	12	28	0	170	261	3,738
	Montague	875	0	0	67	285	147	1,374
	Parker	5,448	27	0	32	55	129	5,691
	Wise	2,689	15	0	140	41	847	3,732
	Total	**12,279**	**54**	**28**	**239**	**551**	**1,384**	**14,535**
1993	Hood	2,976	14	46	306	167	242	3,751
	Montague	912	0	0	141	276	151	1,480
	Parker	5,546	28	0	82	55	125	5,836
	Wise	2,628	0	0	269	111	866	3,874
	Total	**12,062**	**42**	**46**	**798**	**609**	**1,384**	**14,941**
1994	Hood	2,970	20	32	93	167	333	3,615
	Montague	903	0	0	69	276	158	1,406
	Parker	5,845	28	0	57	55	152	6,137
	Wise	2,723	14	0	200	149	1,037	4,123
	Total	**12,441**	**62**	**32**	**419**	**647**	**1,680**	**15,281**
1995	Hood	3,144	20	21	81	167	314	3,747
	Montague	932	0	0	163	276	152	1,523
	Parker	5,570	0	0	52	55	150	5,827
	Wise	2,920	15	0	175	173	1,017	4,300
	Total	**12,566**	**35**	**21**	**471**	**671**	**1,633**	**15,397**
1996	Hood	3,534	10	51	80	167	309	4,151
	Montague	1,005	0	0	163	276	185	1,629
	Parker	5,173	7	0	82	55	214	5,531
	Wise	3,053	15	0	249	173	1,117	4,607
	Total	**12,765**	**32**	**51**	**574**	**671**	**1,825**	**15,918**
1997	Hood	3,767	14	45	1,509	167	319	5,821
	Montague	985	0	0	183	276	135	1,579
	Parker	5,369	16	0	82	55	131	5,653
	Wise	3,085	12	0	272	259	833	4,461
	Total	**13,206**	**42**	**45**	**2,046**	**757**	**1,418**	**17,514**
1998	Hood	3,904	16	34	1,535	167	329	5,985
	Montague	1,096	0	0	183	276	145	1,700
	Parker	6,762	11	0	82	55	189	7,099
	Wise	3,314	8	0	272	259	842	4,695
	Total	**15,076**	**35**	**34**	**2,072**	**757**	**1,505**	**19,479**

Table 4, continued

Year	County	Estimated Historical Groundwater Use (acre-feet per year)						
		Municipal	Manufacturing	Electric	Irrigation	Mining	Livestock	Total
1999	Hood	3,839	21	41	1,616	167	375	6,059
	Montague	1,001	0	0	183	276	154	1,614
	Parker	7,029	7	0	82	55	199	7,372
	Wise	3,467	11	0	272	259	876	4,885
	Total	**15,336**	**39**	**41**	**2,153**	**757**	**1,604**	**19,930**
2000	Hood	3,793	20	47	10	167	311	4,348
	Montague	1,039	0	0	60	276	151	1,526
	Parker	7,126	15	0	74	55	185	7,455
	Wise	3,555	12	0	147	63	857	4,634
	Total	**15,513**	**47**	**47**	**291**	**561**	**1,504**	**17,963**
2001	Hood	3,987	23	45	0	167	303	4,525
	Montague	979	0	0	147	276	161	1,563
	Parker	6,422	6	0	64	55	178	6,725
	Wise	3,659	0	0	116	52	841	4,668
	Total	**15,047**	**29**	**45**	**327**	**550**	**1,483**	**17,481**
2002	Hood	4,343	16	38	0	167	366	4,930
	Montague	878	0	0	268	276	144	1,566
	Parker	7,338	3	0	64	55	178	7,638
	Wise	3,609	5	0	129	91	782	4,616
	Total	**16,168**	**24**	**38**	**461**	**589**	**1,470**	**18,750**
2003	Hood	5,195	15	43	0	167	309	5,729
	Montague	893	0	0	57	276	127	1,353
	Parker	6,112	3	0	39	0	381	6,535
	Wise	3,379	4	0	45	91	454	3,973
	Total	**15,579**	**22**	**43**	**141**	**534**	**1,271**	**17,590**
2007	Hood	4,841	25	979	150	498	184	6,677
	Montague	1,033	0	165	0	91	76	1,365
	Parker	8,571	11	2,225	0	60	177	11,044
	Wise	4,299	7	1,776	0	130	405	6,617
	Total	**18,744**	**43**	**5,145**	**150**	**779**	**842**	25,703

C. Annual amount of recharge from precipitation to the groundwater resources within the District–31TAC356.5 (a)(5)(C) ((Implementing TWC §36.1071(e)(3)(C))

Trinity Aquifer

The estimate of annual recharge to the Trinity Aquifer in the District from precipitation is based on GAM Run 09-022, which was conducted by the TWDB (Aschenbach, 2009) using the Northern Trinity/Woodbine Aquifer GAM. The purpose of GAM Run 09-022 was to provide information to the District for use in development of its management plan. Specifically, the State Water Code stipulates that the TWDB will provide a groundwater

district with groundwater budget information derived from the available GAM model in conjunction with site-specific information to support development of their management plans. A groundwater budget is a summary of the amount of water entering (inflows) and leaving (outflows) the aquifer over some specified time period. For this management plan, the groundwater budget information was provided by the TWDB and represents the average annual inflows to, or outflows from, the District predicted over a simulation time period from 1980 through 1997 using the Northern Trinity GAM (Bené and others, 2004).

Table 5 provides the estimated annual amount of recharge from precipitation in the District for the Trinity Aquifer based on GAM Run 09-022 and a simulation period from 1980 through 1997.

Table 5. Estimates of Annual Volume of Recharge from Precipitation.

Aquifer or Confining Unit	Model Layer	Volume Recharge (acre-feet per year)
Washita and Fredericksburg Series	2	39,760
Paluxy Aquifer	3	83,812
Glen Rose Formation	4	28,139
Upper Travis Peak Formation (Hensell Aquifer Equivalent)	5	40,407
Middle Travis Peak Formation (Pearsall/Cow Creek/Hammett/Sligo Formations Equivalent)	6	0
Lower Travis Peak Formation (Hosston Aquifer Equivalent)	7	34,629
Total	na	**226,747**

The average recharge from precipitation in the Northern Trinity GAM ranges from approximately 1.34 to 1.84 inches per year depending on aquifer (i.e., GAM model layer) in the District counties and was estimated as annual precipitation multiplied by factors relating to soil permeability, land use, and aquifer characteristics (Bené and others, 2004). The TWDB reports that total annual recharge to the Trinity Aquifer in the District is approximately 226,747 acre-feet per year based on GAM Run 09-022. The District believes that the current GAM does not provide a reliable estimate of recharge in the Trinity Aquifer outcrop because of a general lack of calibration targets used in the District and the large uncertainty in the simulated groundwater evapotranspiration in the model across the entire aquifer outcrop. It is the considered opinion of the District that the GAM provides a non-conservative estimate of potential sustainability of pumping in the outcrop of the Trinity Aquifer based upon significant uncertainty in the recharge/discharge mechanisms in the outcrop and based upon the available groundwater levels currently monitored in developed areas. The TWDB is aware of this and is funding research on evapotranspiration and recharge in GMA-8.

Other Aquifers

Inadequate information is available to estimate recharge rates in the other aquifers within the District. The District intends to develop additional data and information regarding effective recharge rates of the aquifers within its boundaries and use the information for future planning and management decisions.

D. For each aquifer, annual volume of water that discharges from the aquifer to springs and any surface water bodies, including lakes, streams, and rivers – TWC §36.1071(e)(3)(D)

The estimate of annual discharge from the Trinity Aquifer to surface water bodies in the District is based on GAM Run 09-022, which was conducted by the TWDB (Aschenbach, 2009) using the Northern Trinity/Woodbine Aquifer GAM. The estimate of annual discharge from the Trinity Aquifer to surface water bodies in the District was provided by the TWDB and represents the average annual outflows from the aquifer to surface discharge mechanisms as predicted over a simulation time period from 1980 through 1997 using the Northern Trinity GAM (Bené and others, 2004). **Table 6** summarizes the estimated annual volume of water that discharges from the Trinity Aquifer to springs and any surface water body including lakes, streams, and rivers provided by GAM run 09-022.

Table 6. Estimates of Annual Volume of Water that Discharges into Springs and other Surface Water Bodies.

Aquifer or Confining Unit	Model Layer	Volume Discharge (acre-feet per year)
Washita and Fredericksburg Series	2	5,530
Paluxy Aquifer	3	12,318
Glen Rose Formation	4	5,588
Upper Travis Peak Formation (Hensell Aquifer Equivalent)	5	12,526
Middle Travis Peak Formation (Pearsall/Cow Creek/Hammett/Sligo Formations Equivalent)	6	0
Lower Travis Peak Formation (Hosston Aquifer Equivalent)	7	7,544
Total	na	**43,506**

Total annual discharge from the Trinity Aquifer to surface water bodies in the District was estimated to be 43,506 acre-feet per year based on GAM Run 09-022. This estimate includes some of the model predicted discharge to the MODFLOW evapotranspiration package because the authors of the GAM conceptualized this process to represent groundwater evapotranspiration, spring and seep discharge, and stream discharge for streams not modeled explicitly with the MODFLOW stream-routing package.

In support of the management plan, a literature review of spring flows within the District was performed. **Table 7** summarizes the documented springs in the District and **Figure 4** plots the locations of these springs if known. Typical spring surveys would only get a percentage of the seeps and springs which may be present. In addition, many spring flow references are dated and it is not presently known whether they are still flowing.

E. Annual volume of flow into and out of the District within each aquifer and between aquifers in the District, if a groundwater availability model is available – TWC §36.1071(e)(3)(E)

The only major aquifer in the District, and the only aquifer for which a GAM model is available, is the Trinity Aquifer. The GAM model for this aquifer consists of six layers in the District. Note that the upper layer in the GAM model, the Woodbine Aquifer, is not present in the District. Three of the six layers represent primary water-bearing units (the Paluxy Formation, and the upper and lower portions of the Travis Peak Formation) and three represent less permeable units (the Washita and Fredericksburg Groups, the Glen Rose Formation, and the middle portion of the Travis Peak Formation). Estimates of total *subsurface* groundwater flow into the District and out of the District for these six layers were provided by the TWDB based on GAM Run 09-022 (Aschenbach, 2009). Because the Trinity Aquifer outcrops within the District, subsurface inflows will generally be small relative to outflows. **Table 8** summarizes the annual volume of flow into and out of the District within the Trinity Aquifer and between model layers in the District based on GAM Run 09-022 and a simulation period from 1980 through 1997.

From a review of the net average subsurface inflow versus outflow, one can conclude that in general the District loses more groundwater to neighboring portions of the aquifer than it receives. One will also note that the total subsurface outflow is far less, by an order of magnitude, than the predicted average recharge from precipitation. This implies that the net recharge that gets downdip and moves to the confined portions of the aquifer is very small and on the order of a few tenths of an inch even in post-development.

F. Projected surface water supply in the District, according to the most recently adopted state water plan – TWC §36.1071(e)(3)(F)

The 2007 Texas State Water Plan, the most recent plan available, provides an estimate of projected surface water supplies in Hood, Montague, Parker, and Wise counties, which make up the District (**Table 9**). The estimated projections range from slightly less than 108,000 acre-feet per year in 2010 to a maximum of slightly less than 118,000 acre-feet per year in 2030 to slightly less than 114,000 acre-feet per year in 2060.

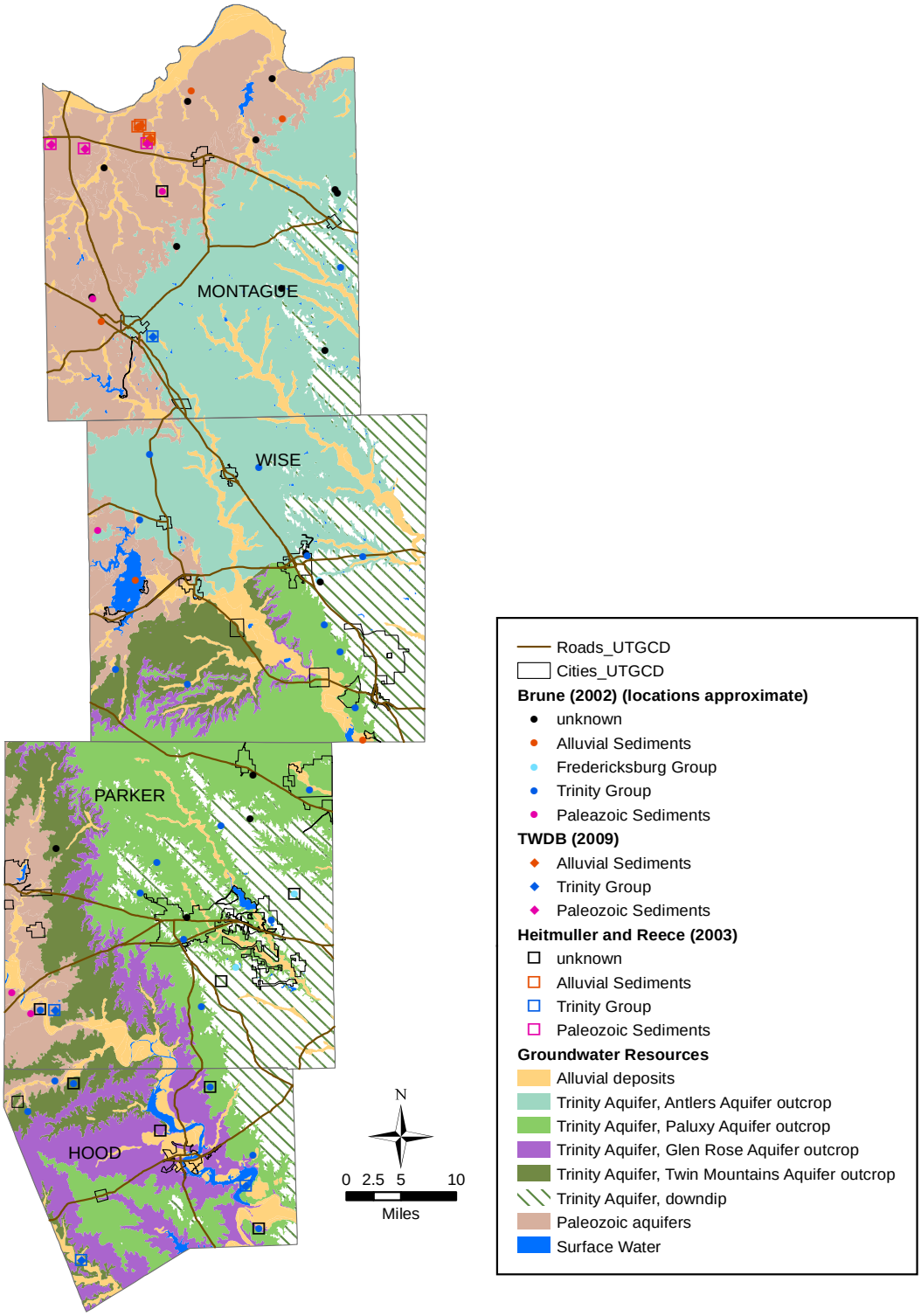

Figure 4. Documented springs in the District.

Table 7. Springs and Spring Discharge in the District.

State Spring Number	Spring Name	County	Elevation (ft)	Source Formation	Date of Flow Measure-ment	Spring Flow (lps)	Comments	Source
1909404	TR-19-09-404	Montague	879	318WCHT				TWDB (2009b) & Heitmuller and Reece (2003)
1909602	TR-19-09-602	Montague	840	318WCHT				TWDB (2009b) & Heitmuller and Reece (2003)
1910506	TR-19-10-506	Montague	830	100ALVM			Wet weather spring.	TWDB (2009b) & Heitmuller and Reece (2003)
1910507	TR-19-10-507	Montague	830	100ALVM			Wet weather spring.	TWDB (2009b) & Heitmuller and Reece (2003)
1910514	TR-19-10-514	Montague	860	110AVMW				TWDB (2009b) & Heitmuller and Reece (2003)
1910515	TR-19-10-515	Montague	860	110AVMW				TWDB (2009b) & Heitmuller and Reece (2003)
1910522	TR-19-10-522	Montague	848	319WFMP	6/22/1977	0.017	Very slow seep. Flows into creek about 20 yards north of spring.	TWDB (2009b) & Heitmuller and Reece (2003)
1910814	Barrel Springs	Montague					seeps per Brune; spring number 12 in Brune	Heitmuller and Reece (2003) & Brune (2002)
1926502	TR-19-26-502	Montague	1015	218ALRS			Water tastes salty.	TWDB (2009b) & Heitmuller and Reece (2003)
	Stoneburg Springs (2)	Montague						Brune (2002)
	Victoria Springs (3)	Montague		Permian				Brune (2002)

Table 7, continued

State Spring Number	Spring Name	County	Elevation (ft)	Source Formation	Date of Flow Measure-ment	Spring Flow (lps)	Comments	Source
	Brushy Springs (4)	Montague		Alluvium				Brune (2002)
	Boren Springs (5)	Montague			10/8/1977	0.040		Brune (2002)
	Red River Springs (7)	Montague		Alluvium	1977	0.030		Brune (2002)
	Crownover Springs (8)	Montague						Brune (2002)
	Taovaya Springs (9)	Montague						Brune (2002)
	Rock Springs (10)	Montague		Alluvium				Brune (2002)
	Dripping Springs (11)	Montague						Brune (2002)
	Rock Springs (13)	Montague						Brune (2002)
	Forestburg Springs (14)	Montague			10/9/1977	0.030		Brune (2002)
	Dye Springs (15)	Montague	1099		10/10/1977	1.500		Brune (2002)
	Bluff Springs (16)	Montague		lower Cretaceous	1977	0.075		Brune (2002)
	Head of Elm Springs (17)	Montague						Brune (2002)
	Chancey Springs (18)	Montague			1977	0.065		Brune (2002)
3124901	Jones Springs	Parker			1976	0.500	Brune says flows from Lazy Bend but water probably from Twin Mountains; spring number 15 in Brune	Heitmuller and Reece (2003) & Brune (2002)
3212401	Mary Springs	Parker					seeps per Brune; spring number 3 in Brune	Heitmuller and Reece (2003) & Brune (2002)

Table 7, continued

State Spring Number	Spring Name	County	Elevation (ft)	Source Formation	Date of Flow Measure-ment	Spring Flow (lps)	Comments	Source
3217710	UP-32-17-710	Parker	780	218TVPK			B-5103 Site No. G-11.	TWDB (2009b) & Heitmuller and Reece (2003)
3219402	Bear Creek Springs	Parker						Heitmuller and Reece (2003)
	Old Soldier's Springs (1)	Parker						Brune (2002)
	Bluff Springs (2)	Parker		Paluxy	1976	dry		Brune (2002)
	chalybeate (iron-bearing) (5)	Parker		Paluxy	1976	0.650		Brune (2002)
	Indian or Carter Springs (6)	Parker			1976	0.130		Brune (2002)
	Veal Springs (7)	Parker		Paluxy				Brune (2002)
	springs (8)	Parker						Brune (2002)
	Reno Springs (9)	Parker			1976	0.600		Brune (2002)
	Stimson Springs (10)	Parker		Paluxy	1976	0.500		Brune (2002)
	springs (11)	Parker		Paluxy	7/6/1976	3.000		Brune (2002)
	Ballou Springs (12)	Parker		Paluxy				Brune (2002)
	Soda Springs (13)	Parker		Mineral Wells	7/3/1979	0.650		Brune (2002)
	good springs (14)	Parker		Grindstone Creek	7/6/1976	1.900		Brune (2002)
	Cason Springs and Falls (16)	Parker		Grindstone Creek	7/7/1976	1.000		Brune (2002)
	many springs (17)	Parker		Goodland	1976	0.750		Brune (2002)
	Willow Springs (18)	Parker		Paluxy	7/3/1976	0.500		Brune (2002)
	Cold Springs (19)	Parker		Paluxy	6/18/1978	0.150		Brune (2002)

Table 7, continued

State Spring Number	Spring Name	County	Elevation (ft)	Source Formation	Date of Flow Measure-ment	Spring Flow (lps)	Comments	Source
	Trapp Springs (20	Parker		Paluxy				Brune (2002)
	Ball Knob Springs (1)	Wise		Antlers				Brune (2002)
	Park Springs (2)	Wise		Antlers	4/7/1976	6.000		Brune (2002)
	Bridgeport Springs (3)	Wise		alluvium				Brune (2002)
	Willow Point	Wise		Twin Mountains	1976	0.350		Brune (2002)
	unnamed springs	Wise		Twin Mountains	1976	0.500		Brune (2002)
	Isbell Spring (6)	Wise			1976	0.060		Brune (2002)
	Cold Springs (7)	Wise		Antlers	12/23/1977	4.800		Brune (2002)
	Howell	Wise		Goodland	4/8/1976	0.350		Brune (2002)
	Sweetwater Springs (9)	Wise		Antlers				Brune (2002)
	Sand Hill Springs (10)	Wise		Paluxy	4/5/1976	3.500		Brune (2002)
	Woody Springs (11)	Wise		Paluxy	4/8/1976	1.300		Brune (2002)
	Deer Springs (12)	Wise		Paluxy	5/29/1905	0.200		Brune (2002)
	springs (13)	Wise						Brune (2002)
	some springs (14)	Wise		Antlers				Brune (2002)
	Rock Springs (15)	Wise		alluvium				Brune (2002)
	Earheart or Reeder Springs (16)	Wise		Cisco	5/13/1979	2.500		Brune (2002)
3225402	Dripping Springs	Hood			7/5/1976	0.600	spring number 3 in Brune	Heitmuller and Reece (2003) & Brune (2002)

Table 7, continued

State Spring Number	Spring Name	County	Elevation (ft)	Source Formation	Date of Flow Measure-ment	Spring Flow (lps)	Comments	Source
3227707	Parkinson Springs	Hood			7/8/1976	0.250	spring number 4 in Brune	Heitmuller and Reece (2003) & Brune (2002)
3234213	Thorp Springs	Hood					Brune says covered by Lake Granbury; spring number 1 in Brune	Heitmuller and Reece (2003) & Brune (2002)
3235801	LY-32-35-801	Hood	660	218PLXY				TWDB (2009b) & Heitmuller and Reece (2003)
3241501	LY-32-41-501	Hood	812	218TWMT			Spring. Flowed 5 gpm.	TWDB (2009b) & Heitmuller and Reece (2003)
3243207	Fort Spunky Springs	Hood					Brune says flows from Glen Rose but water probably from Paluxy; spring number 5 in Brune	Heitmuller and Reece (2003) & Brune (2002)
	Kickapoo Springs	Hood		Twin Mountains	1976	0.250		Brune (2002)

Table 8. Estimates of Annual Volume of Flow.

Aquifer or Confining Unit	Model Layer	Volume Recharge (acre-feet per year)
Flow into the District		
Washita and Fredericksburg Series	2	784
Paluxy Aquifer	3	393
Glen Rose Formation	4	310
Upper Travis Peak Formation (Hensell Aquifer Equivalent)	5	1,852
Middle Travis Peak Formation (Pearsall/Cow Creek/Hammett/Sligo Formations Equivalent	6	4
Lower Travis Peak Formation (Hosston Aquifer Equivalent)	7	1,805
Total	na	**5,148**
Flow out of the District		
Washita and Fredericksburg Series	2	1,565
Paluxy Aquifer	3	3,602
Glen Rose Formation	4	1,246
Upper Travis Peak Formation (Hensell Aquifer Equivalent)	5	7,258
Middle Travis Peak Formation (Pearsall/Cow Creek/Hammett/Sligo Formations Equivalent	6	16
Lower Travis Peak Formation (Hosston Aquifer Equivalent)	7	8,462
Total	na	**22,149**
Flow Between Each Aquifer		
Washita and Fredericksburg Series into Paluxy Aquifer	from 2 into 3	190
Paluxy Aquifer into Glen Rose Formation	from 3 into 4	2,678
Glen Rose Formation into Upper Travis Peak Formation (Hensell Aquifer Equivalent)	from 4 into 5	3,937
Upper Travis Peak Formation (Hensell Aquifer Equivalent) into Middle Travis Peak Formation (Pearsall/Cow Creek/Hammett/ Sligo Formations Equivalent)	from 5 into 6	6,821
Middle Travis Peak Formation (Pearsall/Cow Creek/Hammett/ Sligo Formations Equivalent) into Lower Travis Peak Formation (Hosston Aquifer Equivalent)	from 6 into 7	7,294

Table 9. Projected Surface Water Supplies.

Water User Group	County	Water Source RWPG	Water Source River Basin	Source Name	Projected Surface Water Supplies (acre-feet per year)					
					2010	2020	2030	2040	2050	2060
Hood County										
Acton MUD	Hood	G	Brazos	Brazos River Authority Main Stem Lake/ Reservoir System	4,366	4,366	4,366	4,366	4,366	4,366
County Other	Hood	G	Brazos	Brazos River Authority Main Stem Lake/ Reservoir System	600	600	600	600	600	600
Granbury	Hood	G	Brazos	Brazos River Authority Main Stem Lake/ Reservoir System	7,560	7,560	7,560	7,560	7,560	7,560
Irrigation	Hood	G	Brazos	Brazos River Combined Run-of-River Irrigation	13,085	13,127	13,170	13,212	13,254	13,296
Livestock	Hood	G	Brazos	Livestock Local Supply	617	617	617	617	617	617
Livestock	Hood	G	Trinity	Livestock Local Supply	6	6	6	6	6	6
Steam Electric Power	Hood	G	Brazos	Brazos River Authority Main Stem Lake/ Reservoir System	43,447	43,447	43,447	43,447	43,447	43,447
				Hood County Total	**69,681**	**69,723**	**69,766**	**69,808**	**69,850**	**69,892**
Montague County										
Bowie	Montague	B	Trinity	Amon G Carter Lake/ Reservoir	1,303	1,234	1,172	1,112	1,056	997
County Other	Montague	B	Red	Farmers Creek/ Nocona Lake/Reservoir	52	55	56	56	55	56
County Other	Montague	B	Trinity	Amon G Carter Lake/ Reservoir	222	233	236	238	235	236
Irrigation	Montague	B	Red	Farmers Creek/ Nocona Lake/Reservoir	100	100	100	100	100	100
Irrigation	Montague	B	Red	Red River Combined Run-of-River Irrigation	47	47	47	47	47	47
Irrigation	Montague	B	Trinity	Trinity River Combined Run-of-River Irrigation	0	0	0	0	0	0
Livestock	Montague	B	Red	Livestock Local Supply	948	948	948	948	948	948
Livestock	Montague	B	Trinity	Livestock Local Supply	717	717	717	717	717	717
Manufacturing	Montague	B	Red	Farmers Creek/ Nocona Lake/Reservoir	11	14	18	23	29	29
Mining	Montague	B	Red	Amon G Carter Lake/ Reservoir	50	47	45	42	40	37
Mining	Montague	B	Trinity	Amon G Carter Lake/ Reservoir	14	14	14	14	14	14
Nocona	Montague	B	Red	Farmers Creek/ Nocona Lake/Reservoir	1,097	1,091	1,086	1,081	1,076	1,075
				Montague County Total	**4,561**	**4,500**	**4,439**	**4,378**	**4,317**	**4,256**
Parker County										
Azle	Parker	C	Trinity	TRWD Lake/Reservoir System	304	279	249	220	203	199
County Other	Parker	C	Brazos	Palo Pinto Lake/Reservoir	479	479	479	479	479	479
County Other	Parker	C	Trinity	TRWD Lake/Reservoir System	173	125	102	88	76	67
County Other	Parker	C	Trinity	Weatherford Lake/ Reservoir	15	12	11	9	8	8

Table 9, continued

Water User Group	County	Water Source RWPG	Water Source River Basin	Source Name	Projected Surface Water Supplies (acre-feet per year)					
					2010	2020	2030	2040	2050	2060
Parker County										
Fort Worth	Parker	C	Trinity	TRWD Lake/Reservoir System	3,046	10,512	13,577	13,281	12,775	11,881
Hudson Oaks	Parker	C	Trinity	TRWD Lake/Reservoir System	102	102	102	102	102	102
Irrigation	Parker	C	Brazos	Brazos River Combined Run-of-River Irrigation	117	117	117	117	117	117
Irrigation	Parker	C	Trinity	Trinity River Combined Run-of-River Irrigation	122	122	122	122	122	122
Livestock	Parker	C	Brazos	Livestock Local Supply	903	903	903	903	903	903
Livestock	Parker	C	Trinity	Livestock Local Supply	1,019	1,019	1,019	1,019	1,019	1,019
Manufacturing	Parker	C	Brazos	Other Local Supply	0	0	0	0	0	0
Manufacturing	Parker	C	Brazos	Palo Pinto Lake/Reservoir	25	25	25	24	25	25
Manufacturing	Parker	C	Brazos	Weatherford Lake/ Reservoir	45	45	45	45	45	45
Manufacturing	Parker	C	Trinity	TRWD Lake/Reservoir System	169	168	171	180	185	191
Manufacturing	Parker	C	Trinity	Weatherford Lake/ Reservoir	223	188	162	144	126	109
Mineral Wells	Parker	C	Brazos	Mineral Wells Lake/ Reservoir	0	0	0	0	0	0
Mineral Wells	Parker	C	Brazos	Palo Pinto Lake/Reservoir	766	753	744	730	726	726
Mining	Parker	C	Brazos	Brazos River Authority Main Stem Lake/ Reservoir System	2,000	2,000	2,000	2,000	2,000	2,000
Mining	Parker	C	Brazos	Other Local Supply	16	16	15	15	14	14
Mining	Parker	C	Trinity	Other Local Supply	4	4	5	5	6	6
Reno	Parker	C	Trinity	TRWD Lake/Reservoir System	164	129	109	93	83	75
Springtown	Parker	C	Trinity	TRWD Lake/Reservoir System	288	369	422	460	472	473
Steam Electric Power	Parker	C	Trinity	Weatherford Lake/ Reservoir	30	24	28	32	38	46
Walnut Creek SUD	Parker	C	Trinity	TRWD Lake/Reservoir System	1,743	1,595	1,516	1,463	1,439	1,407
Weatherford	Parker	C	Brazos	TRWD Lake/Reservoir System	70	77	88	97	107	117
Weatherford	Parker	C	Brazos	Weatherford Lake/ Reservoir	110	105	104	101	97	92
Weatherford	Parker	C	Trinity	TRWD Lake/Reservoir System	1,486	1,629	1,769	1,903	2,042	2,184
Weatherford	Parker	C	Trinity	Weatherford Lake/ Reservoir	2,289	2,196	2,080	1,955	1,830	1,700
				Parker County Total	**15,708**	**22,993**	**25,964**	**25,587**	**25,039**	**24,107**
Wise County										
Aurora	Wise	C	Trinity	TRWD Lake/Reservoir System	33	37	40	44	47	51
Boyd	Wise	C	Trinity	TRWD Lake/Reservoir System	56	80	75	62	53	46

Table 9, continued

Water User Group	County	Water Source RWPG	Water Source River Basin	Source Name	Projected Surface Water Supplies (acre-feet per year)					
					2010	2020	2030	2040	2050	2060
Wise County										
Bridgeport	Wise	C	Trinity	TRWD Lake/Reservoir System	1,686	1,656	1,700	1,700	1,700	1,700
Chico	Wise	C	Trinity	TRWD Lake/Reservoir System	96	101	111	111	111	111
Community WSC	Wise	C	Trinity	TRWD Lake/Reservoir System	19	15	13	10	9	7
County Other	Wise	C	Trinity	TRWD Lake/Reservoir System	1,024	926	772	647	541	458
Decatur	Wise	C	Trinity	TRWD Lake/Reservoir System	1,754	1,753	1,754	1,754	1,754	1,754
Fort Worth	Wise	C	Trinity	TRWD Lake/Reservoir System	508	2,022	2,376	2,599	2,920	3,099
Irrigation	Wise	C	Trinity	Trinity River Combined Run-of-River Irrigation	139	139	139	139	139	139
Irrigation	Wise	C	Trinity	TRWD Lake/Reservoir System	124	108	92	79	67	57
Livestock	Wise	C	Trinity	Livestock Local Supply	1,117	1,117	1,117	1,117	1,117	1,117
Manufacturing	Wise	C	Trinity	Other Local Supply	0	0	0	0	0	0
Manufacturing	Wise	C	Trinity	TRWD Lake/Reservoir System	2,469	2,307	2,191	2,072	1,895	1,755
Mining	Wise	C	Trinity	Other Local Supply	0	0	0	0	0	0
Mining	Wise	C	Trinity	Trinity River Combined Run-of-River Mining	51	51	51	51	51	51
Mining	Wise	C	Trinity	TRWD Lake/Reservoir System	2,896	2,525	2,140	1,839	1,557	1,322
New Fairview	Wise	C	Trinity	TRWD Lake/Reservoir System	0	0	0	0	0	0
Newark	Wise	C	Trinity	TRWD Lake/Reservoir System	0	0	0	0	0	0
Rhome	Wise	C	Trinity	TRWD Lake/Reservoir System	389	619	748	837	882	930
Runaway Bay	Wise	C	Trinity	TRWD Lake/Reservoir System	345	340	336	331	320	313
Steam Electric Power	Wise	C	Trinity	TRWD Lake/Reservoir System	4,600	4,010	3,400	2,920	2,473	2,100
Walnut Creek SUD	Wise	C	Trinity	TRWD Lake/Reservoir System	213	194	190	190	194	197
West Wise Rural SUD	Wise	C	Trinity	TRWD Lake/Reservoir System	521	435	383	343	306	277
				Wise County Total	**18,040**	**18,435**	**17,628**	**16,845**	**16,136**	**15,484**
District Total					**107,990**	**115,651**	**117,797**	**116,618**	**115,342**	**113,739**

G. Projected total demand for water in the District according to the most recently adopted state water plan – TWC §36.1071(e)(3)(G)

The 2007 Texas State Water Plan, the most recent plan available, provides an estimate of projected total water demand in Hood, Montague, Parker, and Wise counties, which make up the District (**Table 10**). The estimated projections range from slightly less than 90,000 acre-feet per year in 2010 to slightly more than 193,000 acre-feet per year in 2060.

VI. CONSIDER THE WATER SUPPLY NEEDS AND WATER MANAGEMENT STRATEGIES INCLUDED IN THE ADOPTED STATE WATER PLAN – TWC §36.1071(E)(4)

Projected water needs for the counties in the District were developed for the 2007 State Water Plan. Those needs reflect conditions when projected water demands exceed projected water supplies in the event of a drought of record. Projected water needs were estimated on the county-basin level for all water user group categories for every decade from 2010 through 2060. **Table 11** summarizes the projected water needs identified in the 2007 State Water Plan for the counties in the District.

In addition to identifying future water needs, the 2007 State Water Plan assessed and recommended water management strategies to meet the identified needs for every decade from 2010 through 2060. Potential strategies include water conservation, developing additional groundwater and surface water supplies, expanding and improving management of existing water supplies, water reuse, and alternative approaches such as desalination. The projected water management strategies for the counties in the District from the 2007 State Water Plan are shown in **Table 12** by water user group ("WUG").

The 2007 State Water Plan projects future water needs for the four counties located in the District as follows. For Hood County, water needs were forecasted for one municipal WUG and the county-other, manufacturing, and mining WUGs. The projected water management strategies are voluntary redistribution for the municipal and county-other WUGs and both conservation and voluntary redistribution for the manufacturing and mining WUGs.

Future needs are projected for the county-other and mining WUGs in Montague County. The projected water management strategies to meet those needs are development of supplies from the Trinity Aquifer and other aquifers, conservation for the county-other WUG, and purchase of surface water from local providers for the mining WUG. The 2007 State Water Plan also recommends water conservation and wastewater reuse for one of the municipal WUGs, which is not projected to have a need through 2060.

Table 10. Projected Total Water Demand.

Water User Group	County	Water Source RWPG	Water Source River Basin	Projected Total Water Demands (acre-feet per year)					
				2010	2020	2030	2040	2050	2060
Hood County									
Acton MUD	Hood	G	Brazos	2,425	2,912	3,363	3,851	4,464	5,204
County Other	Hood	G	Brazos	3,722	4,331	4,900	5,521	6,301	7,248
County Other	Hood	G	Trinity	12	14	16	18	21	24
Granbury	Hood	G	Brazos	2,369	2,811	3,213	3,651	4,201	4,851
Irrigation	Hood	G	Brazos	3,179	3,120	3,062	3,005	2,948	2,893
Livestock	Hood	G	Brazos	617	617	617	617	617	617
Livestock	Hood	G	Trinity	6	6	6	6	6	6
Manufacturing	Hood	G	Brazos	25	28	30	32	34	37
Mining	Hood	G	Brazos	162	161	160	159	158	157
Oak Trail Shores Subdivision	Hood	G	Brazos	511	504	492	484	480	480
Steam Electric Power	Hood	G	Brazos	6,594	8,098	9,467	11,137	13,172	15,653
Tolar	Hood	G	Brazos	96	94	93	91	90	90
Hood County Total				**19,718**	**22,696**	**25,419**	**28,572**	**32,492**	**37,260**
Montague County									
Bowie	Montague	B	Trinity	1,027	987	966	952	941	943
County Other	Montague	B	Red	441	463	469	473	467	469
County Other	Montague	B	Trinity	866	909	920	927	917	920
Irrigation	Montague	B	Red	59	59	59	59	59	59
Irrigation	Montague	B	Trinity	238	238	238	238	238	238
Livestock	Montague	B	Red	1,054	1,054	1,054	1,054	1,054	1,054
Livestock	Montague	B	Trinity	796	796	796	796	796	796
Manufacturing	Montague	B	Red	9	12	15	19	24	24
Mining	Montague	B	Red	491	467	459	463	476	476
Mining	Montague	B	Trinity	14	14	14	14	14	14
Nocona	Montague	B	Red	693	681	671	664	657	660
Saint Jo	Montague	B	Trinity	99	101	98	97	96	96
Montague County Total				**5,787**	**5,781**	**5,759**	**5,756**	**5,739**	**5,749**
Parker County									
Aledo	Parker	C	Trinity	439	591	744	879	1,029	1,195
Annetta	Parker	C	Trinity	195	236	272	302	333	370
Annetta South	Parker	C	Trinity	87	100	110	119	128	140
Azle	Parker	C	Trinity	353	438	533	614	708	811
County Other	Parker	C	Brazos	2,276	2,420	2,745	2,987	2,959	2,959
County Other	Parker	C	Trinity	2,509	2,198	1,918	1,647	1,398	1,165
Fort Worth	Parker	C	Trinity	2,836	12,057	18,370	20,920	23,758	26,021
Hudson Oaks	Parker	C	Trinity	361	511	674	817	980	1,163
Irrigation	Parker	C	Brazos	408	408	408	408	408	408
Irrigation	Parker	C	Trinity	14	14	14	14	14	14

Table 10, continued

Water User Group	County	Water Source RWPG	Water Source River Basin	Projected Total Water Demands (acre-feet per year)					
				2010	2020	2030	2040	2050	2060
Parker County									
Livestock	Parker	C	Brazos	872	872	872	872	872	872
Livestock	Parker	C	Trinity	984	984	984	984	984	984
Manufacturing	Parker	C	Brazos	231	261	289	317	341	370
Manufacturing	Parker	C	Trinity	548	618	685	751	809	878
Mineral Wells	Parker	C	Brazos	766	753	744	730	726	726
Mining	Parker	C	Brazos	94	108	117	127	136	144
Mining	Parker	C	Trinity	4	4	5	5	6	6
Reno	Parker	C	Trinity	319	321	322	321	327	337
Springtown	Parker	C	Trinity	504	659	807	961	1,113	1,272
Steam Electric Power	Parker	C	Trinity	30	4,617	5,397	6,349	7,509	8,923
Walnut Creek SUD	Parker	C	Trinity	2,017	2,562	2,975	3,342	3,762	4,222
Weatherford	Parker	C	Brazos	237	294	361	418	479	547
Weatherford	Parker	C	Trinity	4,972	6,154	7,246	8,136	9,082	10,194
Willow Park	Parker	C	Trinity	627	758	914	1,049	1,188	1,348
Parker County Total				**21,683**	**37,938**	**47,506**	**53,069**	**59,049**	**65,069**
Wise County									
Alvord	Wise	C	Trinity	172	185	197	211	227	249
Aurora	Wise	C	Trinity	136	157	177	198	221	250
Bolivar WSC	Wise	C	Trinity	187	238	303	440	612	918
Boyd	Wise	C	Trinity	215	278	298	291	288	288
Bridgeport	Wise	C	Trinity	1,570	1,899	2,702	3,187	3,713	4,444
Chico	Wise	C	Trinity	208	235	276	333	405	495
Community WSC	Wise	C	Trinity	18	17	17	16	16	16
County Other	Wise	C	Trinity	3,843	4,344	4,304	4,223	4,183	4,183
Decatur	Wise	C	Trinity	1,639	2,011	2,748	3,537	4,580	5,385
Fort Worth	Wise	C	Trinity	473	2,319	3,215	4,093	5,430	6,788
Irrigation	Wise	C	Trinity	502	502	502	502	502	502
Livestock	Wise	C	Trinity	1,714	1,714	1,714	1,714	1,714	1,714
Manufacturing	Wise	C	Trinity	2,313	2,660	2,979	3,277	3,539	3,858
Mining	Wise	C	Trinity	23,627	27,824	30,530	33,303	36,168	38,866
New Fairview	Wise	C	Trinity	201	272	340	409	488	579
Newark	Wise	C	Trinity	154	232	301	418	564	787
Rhome	Wise	C	Trinity	575	1,119	1,592	2,036	2,431	2,914
Runaway Bay	Wise	C	Trinity	321	390	455	521	595	685
Steam Electric Power	Wise	C	Trinity	3,949	5,653	6,609	7,774	9,195	10,927
Walnut Creek SUD	Wise	C	Trinity	247	312	372	433	506	590
West Wise Rural SUD	Wise	C	Trinity	497	536	571	609	656	717
Wise County Total				**42,561**	**52,897**	**60,202**	**67,525**	**76,033**	**85,155**
District Total				**89,749**	**119,312**	**138,886**	**154,922**	**173,313**	**193,233**

Table 11. Total Projected Water Needs.

RWPG	WUG	River Basin	Total Projected Water Need (acre-feet per year)[1]					
			2010	2020	2030	2040	2050	2060
Hood County								
G	Acton MUD	Brazos	3,251	2,765	2,316	1,829	1,217	478
G	County Other	Brazos	-17	-623	-1,189	-1,808	-2,585	-3,529
G	County Other	Trinity	-2	-4	-6	-8	-11	-14
G	Granbury	Brazos	5,731	5,290	4,888	4,451	3,901	3,252
G	Irrigation	Brazos	10,152	10,249	10,346	10,441	10,535	10,628
G	Livestock	Brazos	0	0	0	0	0	0
G	Livestock	Trinity	0	0	0	0	0	0
G	Manufacturing	Brazos	-3	-6	-8	-10	-12	-15
G	Mining	Brazos	-25	-25	-25	-25	-24	-24
G	Oak Trail Shores Subdivision	Brazos	-133	-126	-114	-105	-101	-101
G	Steam Electric Power	Brazos	36,853	35,349	33,980	32,310	30,275	27,794
G	Tolar	Brazos	55	57	58	60	61	62
Hood County Total Need			**-180**	**-784**	**-1,342**	**-1,956**	**-2,733**	**-3,683**
Montague County								
B	Bowie	Trinity	276	247	206	160	115	54
B	County Other	Red	-89	-108	-113	-117	-112	-113
B	County Other	Trinity	-44	-76	-84	-89	-82	-84
B	Irrigation	Red	93	93	93	93	93	93
B	Irrigation	Trinity	1	1	1	1	1	1
B	Livestock	Red	0	0	0	0	0	0
B	Livestock	Trinity	0	0	0	0	0	0
B	Manufacturing	Red	2	2	3	4	5	5
B	Mining	Red	-113	-92	-86	-93	-108	-111
B	Mining	Trinity	0	0	0	0	0	0
B	Nocona	Red	404	410	415	417	419	415
B	Saint Jo	Trinity	112	110	113	114	115	115
Montague County Total Need			**-246**	**-276**	**-283**	**-299**	**-302**	**-308**
Parker County								
C	Aledo	Trinity	-148	-300	-453	-588	-738	-904
C	Annetta	Trinity	-56	-97	-133	-163	-194	-231
C	Annetta South	Trinity	-11	-24	-34	-43	-52	-64
C	Azle	Trinity	-49	-159	-284	-394	-505	-612
C	County Other	Brazos	203	185	-140	-382	-354	-354
C	County Other	Trinity	527	661	917	1,172	1,408	1,632
C	Fort Worth	Trinity	210	-1,545	-4,793	-7,639	-10,983	-14,140
C	Hudson Oaks	Trinity	-53	-203	-366	-509	-672	-855
C	Irrigation	Brazos	1	1	1	1	1	1
C	Irrigation	Trinity	119	119	119	119	119	119
C	Livestock	Brazos	31	31	31	31	31	31
C	Livestock	Trinity	248	248	248	248	248	248
C	Manufacturing	Brazos	-161	-191	-219	-248	-271	-300
C	Manufacturing	Trinity	-138	-244	-334	-409	-480	-560
C	Mineral Wells	Brazos	0	0	0	0	0	0
C	Mining	Brazos	1,922	1,908	1,898	1,888	1,878	1,870
C	Mining	Trinity	59	59	59	59	59	59
C	Reno	Trinity	12	-25	-46	-61	-77	-95
C	Springtown	Trinity	20	-54	-149	-265	-405	-563
C	Steam Electric Power	Trinity	0	-4,593	-5,369	-6,317	-7,471	-8,877
C	Walnut Creek SUD	Trinity	-274	-967	-1,459	-1,879	-2,323	-2,815
C	Weatherford	Brazos	-57	-112	-169	-220	-275	-338
C	Weatherford	Trinity	-1,147	-2,279	-3,347	-4,228	-5,160	-6,260

Table 11, continued

RWPG	WUG	River Basin	Total Projected Water Need (acre-feet per year)[1]					
			2010	2020	2030	2040	2050	2060
C	Willow Park	Trinity	15	-116	-272	-407	-546	-706
Parker County Total Need			**-2,094**	**-10,909**	**-17,567**	**-23,752**	**-30,506**	**-37,674**
Wise County								
C	Alvord	Trinity	-58	-71	-83	-97	-113	-135
C	Aurora	Trinity	-5	-22	-39	-56	-76	-101
C	Bolivar WSC	Trinity	-46	-97	-162	-299	-471	-777
C	Boyd	Trinity	-9	-48	-73	-79	-85	-92
C	Bridgeport	Trinity	116	-243	-1,002	-1,487	-2,013	-2,744
C	Chico	Trinity	7	-15	-46	-103	-175	-265
C	Community WSC	Trinity	1	-2	-4	-6	-7	-9
C	County Other	Trinity	-658	-1,257	-1,371	-1,415	-1,481	-1,564
C	Decatur	Trinity	115	-258	-994	-1,783	-2,826	-3,631
C	Fort Worth	Trinity	35	-297	-839	-1,494	-2,510	-3,689
C	Irrigation	Trinity	12	-4	-20	-33	-45	-55
C	Livestock	Trinity	210	210	210	210	210	210
C	Manufacturing	Trinity	170	-339	-774	-1,191	-1,630	-2,089
C	Mining	Trinity	-4,511	-10,935	-15,948	-20,531	-25,085	-29,193
C	New Fairview	Trinity	-98	-169	-237	-306	-385	-476
C	Newark	Trinity	-62	-140	-209	-326	-472	-695
C	Rhome	Trinity	-61	-375	-719	-1,074	-1,424	-1,859
C	Runaway Bay	Trinity	24	-50	-119	-190	-275	-372
C	Steam Electric Power	Trinity	651	-1,643	-3,209	-4,854	-6,722	-8,827
C	Walnut Creek SUD	Trinity	-34	-118	-182	-243	-312	-393
C	West Wise Rural SUD	Trinity	24	-101	-188	-266	-350	-440
Wise County Total Need			**-5,542**	**-16,184**	**-26,218**	**-35,833**	**-46,457**	**-57,406**

[1] Positive values reflect a water surplus and negative values reflect a water need.

Table 12. Projected Water Management Strategies by Water User Group (WUG).

Region	WUG	River Basin	Water Management Strategy	Source Name	Source County	Projected Water Management Strategies (acre-feet per year)					
						2010	2020	2030	2040	2050	2060
Hood County											
G	County Other	Brazos	Voluntary Redistribution	Brazos River Authority Main Stem Lake/ Reservoir System	Reservoir	18	696	1,294	1,992	2,689	3,686
G	County Other	Trinity	Voluntary Redistribution	Brazos River Authority Main Stem Lake/ Reservoir System	Reservoir	2	4	6	8	11	14
G	Manufacturing	Brazos	Manufacturing Water Conservation	Conservation	Hood	1	1	2	2	2	3
G	Manufacturing	Brazos	Voluntary Redistribution	Brazos River Authority Main Stem Lake/ Reservoir System	Reservoir	5	10	10	15	15	20
G	Mining	Brazos	Mining Water Conservation	Conservation	Hood	5	8	11	11	11	11
G	Mining	Brazos	Voluntary Redistribution	Brazos River Authority Main Stem Lake/ Reservoir System	Reservoir	30	30	30	30	30	30
G	Oak Trail Shores Subdivision	Brazos	Voluntary Redistribution	Brazos River Authority Main Stem Lake/ Reservoir System	Reservoir	150	150	150	150	150	150
					Hood County Total	**211**	**899**	**1,503**	**2,208**	**2,908**	**3,914**
Montague County											
B	Bowie	Trinity	Municipal Conservation	Conservation	Montague	8	34	34	61	69	72
B	Bowie	Trinity	Wastewater Reuse	Amon G Carter Lake/ Reservoir	Reservoir	0	0	0	134	134	134
B	County Other	Red	Develop Other Aquifer Supplies	Other Aquifer	Montague	160	160	160	160	160	160
B	County Other	Trinity	Develop Other Aquifer Supplies	Other Aquifer	Montague	85	85	85	85	85	85
B	County Other	Red	Develop Trinity Aquifer Supplies	Trinity Aquifer	Montague	81	81	81	81	81	81
B	County Other	Trinity	Develop Trinity Aquifer Supplies	Trinity Aquifer	Montague	160	160	160	160	160	160
B	County Other	Red	Municipal Conservation	Conservation	Montague	9	46	47	47	48	48
B	County Other	Trinity	Municipal Conservation	Conservation	Montague	9	32	33	33	33	33
B	Mining	Red	Purchase Water from Local Provider	Farmers Creek / Nocona Lake / Reservoir	Reservoir	113	113	113	113	113	113
					Montague County Total	**625**	**711**	**713**	**874**	**883**	**886**

Table 12, continued

Region	WUG	River Basin	Water Management Strategy	Source Name	Source County	Projected Water Management Strategies (acre-feet per year)					
						2010	2020	2030	2040	2050	2060
Parker County											
C	Aledo	Trinity	Conveyance Project (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	162	180
C	Aledo	Trinity	Conveyance Project (2)	Indirect Reuse	Navarro	183	350	317	363	302	340
C	Aledo	Trinity	Conveyance Project (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	249	278	455	505
C	Aledo	Trinity	Municipal Conservation - Basic	Conservation	Parker	15	37	53	71	91	116
C	Aledo	Trinity	Municipal Conservation - Expanded	Conservation	Parker	0	4	6	8	10	11
C	Aledo	Trinity	Overdraft Trinity Aquifer - Existing Wells	Trinity Aquifer	Parker	149	0	0	0	0	0
C	Aledo	Trinity	Supplemental Wells	Trinity Aquifer	Parker	0	0	0	0	0	0
C	Annetta	Trinity	Conveyance Project (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	43	46
C	Annetta	Trinity	Conveyance Project (2)	Indirect Reuse	Henderson	0	113	93	101	80	87
C	Annetta	Trinity	Conveyance Project (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	73	77	120	129
C	Annetta	Trinity	Municipal Conservation - Basic	Conservation	Parker	3	13	16	19	22	26
C	Annetta	Trinity	Overdraft Trinity Aquifer - Existing Wells	Trinity Aquifer	Parker	57	0	0	0	0	0
C	Annetta	Trinity	Supplemental Wells	Trinity Aquifer	Parker	0	0	0	0	0	0
C	Annetta South	Trinity	Conveyance Project (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	11	13
C	Annetta South	Trinity	Conveyance Project (2)	Indirect Reuse	Henderson	0	28	24	27	21	24
C	Annetta South	Trinity	Conveyance Project (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	19	20	32	36
C	Annetta South	Trinity	Municipal Conservation - Basic	Conservation	Parker	1	5	6	7	9	10
C	Annetta South	Trinity	Overdraft Trinity Aquifer - Existing Wells	Trinity Aquifer	Parker	12	0	0	0	0	0
C	Annetta South	Trinity	Supplemental Wells	Trinity Aquifer	Parker	0	0	0	0	0	0
C	Azle	Trinity	Municipal Conservation - Basic	Conservation	Parker	18	16	22	27	34	41
C	Azle	Trinity	Purchase From Water Provider (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	118	127
C	Azle	Trinity	Purchase From Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	54	42	30	20	12	0
C	Azle	Trinity	Purchase From Water Provider (2)	Indirect Reuse	Navarro	79	190	218	244	219	239
C	Azle	Trinity	Purchase From Water Provider (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	170	186	330	355

Table 12, continued

Region	WUG	River Basin	Water Management Strategy	Source Name	Source County	Projected Water Management Strategies (acre-feet per year)					
						2010	2020	2030	2040	2050	2060
C	County Other	Trinity	Conveyance Project (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	154	116
C	County Other	Trinity	Conveyance Project (2)	Indirect Reuse	Henderson	0	1,284	672	509	286	219
C	County Other	Trinity	Conveyance Project (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	527	388	431	325
C	County Other	Brazos	Municipal Conservation - Basic	Conservation	Parker	26	116	143	168	178	187
C	County Other	Trinity	Municipal Conservation - Basic	Conservation	Parker	29	106	100	93	84	74
C	County Other	Brazos	Purchase From Water Provider (1)	Palo Pinto Lake/ Reservoir	Reservoir	280	280	280	280	280	280
C	County Other	Trinity	Supplemental Wells	Trinity Aquifer	Parker	0	0	0	0	0	0
C	Fort Worth	Trinity	Municipal Conservation - Basic	Conservation	Parker	79	598	1,068	1,394	1,783	2,170
C	Fort Worth	Trinity	Municipal Conservation - Expanded	Conservation	Parker	1	41	214	308	344	377
C	Fort Worth	Trinity	Purchase From Water Provider (1)	Oklahoma Lake/ Reservoir	Reservoir - Oklahoma	0	0	0	0	0	2,488
C	Fort Worth	Trinity	Purchase From Water Provider (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	2,589	2,233
C	Fort Worth	Trinity	Purchase From Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	95	275	75	300	0	0
C	Fort Worth	Trinity	Purchase From Water Provider (2)	Indirect Reuse	Henderson	0	3,290	4,899	4,780	5,146	4,547
C	Fort Worth	Trinity	Purchase From Water Provider (2)	Indirect Reuse	Navarro	371	0	0	0	0	0
C	Fort Worth	Trinity	Purchase From Water Provider (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	4,408	4,426	9,089	8,360
C	Hudson Oaks	Trinity	Municipal Conservation - Basic	Conservation	Parker	6	26	36	47	60	75
C	Hudson Oaks	Trinity	Overdraft Trinity Aquifer - Existing Wells	Trinity Aquifer	Parker	57	0	0	0	0	0
C	Hudson Oaks	Trinity	Purchase From Water Provider (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	152	173
C	Hudson Oaks	Trinity	Purchase From Water Provider (2)	Indirect Reuse	Navarro	90	254	271	320	283	326
C	Hudson Oaks	Trinity	Purchase From Water Provider (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	212	244	426	484
C	Hudson Oaks	Trinity	Supplemental Wells	Trinity Aquifer	Parker	0	0	0	0	0	0
C	Irrigation	Trinity	Supplemental Wells	Trinity Aquifer	Parker	0	0	0	0	0	0
C	Livestock	Trinity	Supplemental Wells	Trinity Aquifer	Parker	0	0	0	0	0	0
C	Manufacturing	Brazos	Manufacturing Conservation	Conservation	Parker	0	0	2	3	3	3
C	Manufacturing	Trinity	Manufacturing Conservation	Conservation	Parker	0	0	4	6	7	7
C	Manufacturing	Brazos	Purchase From Water Provider (1)	Palo Pinto Lake/ Reservoir	Reservoir	250	250	250	300	250	250

Table 12, continued

	WUG	River Basin	Water Management Strategy	Source Name	Source County	Projected Water Management Strategies (acre-feet per year)					
						2010	2020	2030	2040	2050	2060
C	Manufacturing	Brazos	Purchase From Water Provider (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	20	47
C	Manufacturing	Trinity	Purchase From Water Provider (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	85	61
C	Manufacturing	Trinity	Purchase From Water Provider (2)	Indirect Reuse	Navarro	194	291	254	251	195	203
C	Manufacturing	Trinity	Purchase From Water Provider (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	160	203	293	302
C	Manufacturing	Trinity	Supplemental Wells	Trinity Aquifer	Parker	0	0	0	0	0	0
C	Mineral Wells	Brazos	Municipal Conservation - Basic	Conservation	Parker	23	38	52	52	52	52
C	Mining	Trinity	Supplemental Wells	Trinity Aquifer	Parker	0	0	0	0	0	0
C	Reno	Trinity	Municipal Conservation - Basic	Conservation	Parker	4	16	18	19	21	22
C	Reno	Trinity	Purchase From Water Provider (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	12	13
C	Reno	Trinity	Purchase From Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	25	26	39	40	59	57
C	Reno	Trinity	Purchase From Water Provider (2)	Indirect Reuse	Navarro	15	27	26	23	22	24
C	Reno	Trinity	Purchase From Water Provider (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	21	18	34	35
C	Reno	Trinity	Supplemental Wells	Trinity Aquifer	Parker	0	0	0	0	0	0
C	Springtown	Trinity	Conveyance Project (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	110	123
C	Springtown	Trinity	Conveyance Project (2)	Indirect Reuse	Navarro	44	125	164	187	204	233
C	Springtown	Trinity	Conveyance Project (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	128	143	307	346
C	Springtown	Trinity	Municipal Conservation - Basic	Conservation	Parker	17	42	58	78	100	125
C	Springtown	Trinity	Municipal Conservation - Expanded	Conservation	Parker	4	10	16	20	23	27
C	Springtown	Trinity	Supplemental Wells	Trinity Aquifer	Parker	0	0	0	0	0	0
C	Steam Electric Power	Trinity	Conveyance Project (1)	Brazos River Authority Main Stem Lake/ Reservoir System	Reservoir	0	4,000	4,000	4,000	4,000	4,000
C	Steam Electric Power	Trinity	Indirect Reuse	Indirect Reuse	Parker	0	5,000	5,000	5,000	5,000	5,000
C	Walnut Creek SUD	Trinity	Municipal Conservation - Basic	Conservation	Parker	33	125	157	189	226	268
C	Walnut Creek SUD	Trinity	Purchase From Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	755	1,396	2,204	2,177	3,249	3,383
C	Weatherford	Brazos	Municipal Conservation - Basic	Conservation	Parker	7	16	23	30	39	49
C	Weatherford	Trinity	Municipal Conservation - Basic	Conservation	Parker	149	339	461	587	732	906
C	Weatherford	Brazos	Municipal Conservation - Expanded	Conservation	Parker	0	2	7	10	12	13
C	Weatherford	Trinity	Municipal Conservation - Expanded	Conservation	Parker	3	38	140	194	221	251

Table 12, continued

Region	WUG	River Basin	Water Management Strategy	Source Name	Source County	Projected Water Management Strategies (acre-feet per year)					
						2010	2020	2030	2040	2050	2060
C	Weatherford	Brazos	Purchase From Water Provider (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	63	68
C	Weatherford	Trinity	Purchase From Water Provider (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	1,188	1,269
C	Weatherford	Brazos	Purchase From Water Provider (2)	Indirect Reuse	Navarro	68	127	122	133	117	129
C	Weatherford	Trinity	Purchase From Water Provider (2)	Indirect Reuse	Navarro	1,323	2,556	2,400	2,543	2,210	2,396
C	Weatherford	Brazos	Purchase From Water Provider (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	96	102	175	191
C	Weatherford	Trinity	Purchase From Water Provider (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	1,918	1,980	3,327	3,554
C	Weatherford	Trinity	Supplemental Wells	Trinity Aquifer	Parker	0	0	0	0	0	0
C	Willow Park	Trinity	Conveyance Project (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	120	141
C	Willow Park	Trinity	Conveyance Project (2)	Indirect Reuse	Henderson	0	135	191	251	224	266
C	Willow Park	Trinity	Conveyance Project (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	149	192	336	394
C	Willow Park	Trinity	Municipal Conservation - Basic	Conservation	Parker	20	49	40	50	60	73
C	Willow Park	Trinity	Municipal Conservation - Expanded	Conservation	Parker	0	2	0	0	0	0
C	Willow Park	Trinity	Supplemental Wells	Trinity Aquifer	Parker	0	0	0	0	0	0
					Parker County Total	**4,539**	**21,678**	**32,301**	**33,486**	**46,452**	**49,000**
Wise County											
C	Alvord	Trinity	Conveyance Project (1)	TRWD Lake/ Reservoir System	Reservoir	72	83	104	106	141	153
C	Alvord	Trinity	Municipal Conservation - Basic	Conservation	Wise	2	8	9	11	12	14
C	Alvord	Trinity	Overdraft Trinity Aquifer - New Wells	Trinity Aquifer	Wise	137	0	0	0	0	0
C	Alvord	Trinity	Supplemental Wells	Trinity Aquifer	Wise	0	0	0	0	0	0
C	Aurora	Trinity	Municipal Conservation - Basic	Conservation	Wise	2	8	10	12	14	17
C	Aurora	Trinity	Purchase from Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	14	32	59	65	106	122
C	Aurora	Trinity	Supplemental Wells	Trinity Aquifer	Wise	0	0	0	0	0	0
C	Bolivar WSC	Trinity	Additional Trinity Aquifer - Existing Wells	Trinity Aquifer	Wise	0	0	0	50	50	50
C	Bolivar WSC	Trinity	Municipal Conservation - Basic	Conservation	Wise	3	12	15	23	34	54
C	Bolivar WSC	Trinity	New Wells - Trinity Aquifer	Trinity Aquifer	Wise	100	100	100	100	100	100
C	Bolivar WSC	Trinity	Overdraft Trinity Aquifer - Existing Wells	Trinity Aquifer	Wise	50	0	0	0	0	0
C	Bolivar WSC	Trinity	Purchase from Water Provider (1)	Hubert H Moss Lake/ Reservoir	Reservoir	0	50	100	800	800	800

Table 12, continued

Region	WUG	River Basin	Water Management Strategy	Source Name	Source County	Projected Water Management Strategies (acre-feet per year)					
						2010	2020	2030	2040	2050	2060
C	Bolivar WSC	Trinity	Supplemental Wells	Trinity Aquifer	Wise	0	0	0	0	0	0
C	Boyd	Trinity	Municipal Conservation - Basic	Conservation	Wise	3	12	14	15	16	17
C	Boyd	Trinity	Purchase from Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	25	69	110	92	119	110
C	Boyd	Trinity	Supplemental Wells	Trinity Aquifer	Wise	0	0	0	0	0	0
C	Bridgeport	Trinity	Conveyance Project (1)	TRWD Lake/ Reservoir System	Reservoir	259	562	1,678	1,773	2,643	3,136
C	Bridgeport	Trinity	Municipal Conservation - Basic	Conservation	Wise	47	99	164	221	288	382
C	Bridgeport	Trinity	Municipal Conservation - Expanded	Conservation	Wise	1	7	23	36	42	51
C	Bridgeport	Trinity	Water Treatment Plant - Expansion	TRWD Lake/ Reservoir System	Reservoir	0	0	0	0	0	0
C	Bridgeport	Trinity	Water Treatment Plant - New	TRWD Lake/ Reservoir System	Reservoir	0	0	0	0	0	0
C	Chico	Trinity	Municipal Conservation - Basic	Conservation	Wise	7	10	12	16	21	27
C	Chico	Trinity	Purchase from Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	99	124	185	222	345	415
C	Chico	Trinity	Supplemental Wells	Trinity Aquifer	Wise	0	0	0	0	0	0
C	Community WSC	Trinity	Municipal Conservation - Basic	Conservation	Wise	0	1	1	1	1	1
C	Community WSC	Trinity	Purchase from Water Provider (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	2	2
C	Community WSC	Trinity	Purchase from Water Provider (2)	Indirect Reuse	Navarro	3	5	5	4	4	4
C	Community WSC	Trinity	Purchase from Water Provider (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	4	3	6	5
C	County Other	Trinity	Municipal Conservation - Basic	Conservation	Wise	57	209	223	236	250	264
C	County Other	Trinity	Overdraft Trinity Aquifer - Existing Wells	Trinity Aquifer	Wise	676	0	0	0	0	0
C	County Other	Trinity	Purchase from Water Provider (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	232	224
C	County Other	Trinity	Purchase from Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	17	40	57	53	68	64
C	County Other	Trinity	Purchase from Water Provider (2)	Indirect Reuse	Navarro	149	1,126	692	692	433	423
C	County Other	Trinity	Purchase from Water Provider (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	541	529	651	628
C	County Other	Trinity	Supplemental Wells	Trinity Aquifer	Wise	0	0	0	0	0	0
C	Decatur	Trinity	Conveyance Project (1)	TRWD Lake/ Reservoir System	Reservoir	270	596	1,405	1,609	3,244	3,649
C	Decatur	Trinity	Municipal Conservation - Basic	Conservation	Wise	47	102	163	240	349	455
C	Decatur	Trinity	Municipal Conservation - Expanded	Conservation	Wise	1	10	35	55	71	85
C	Decatur	Trinity	Water Treatment Plant - Expansion	TRWD Lake/ Reservoir System	Reservoir	0	0	0	0	0	0

Table 12, continued

Region	WUG	River Basin	Water Management Strategy	Source Name	Source County	Projected Water Management Strategies (acre-feet per year)					
						2010	2020	2030	2040	2050	2060
C	Decatur	Trinity	Water Treatment Plant - New	TRWD Lake/ Reservoir System	Reservoir	0	0	0	0	0	0
C	Fort Worth	Trinity	Municipal Conservation - Basic	Conservation	Wise	13	115	187	273	408	566
C	Fort Worth	Trinity	Municipal Conservation - Expanded	Conservation	Wise	0	8	38	60	79	98
C	Fort Worth	Trinity	Purchase from Water Provider (1)	Oklahoma Lake/ Reservoir	Reservoir - Oklahoma	0	0	0	0	0	649
C	Fort Worth	Trinity	Purchase from Water Provider (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	592	582
C	Fort Worth	Trinity	Purchase from Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	16	53	13	59	0	0
C	Fort Worth	Trinity	Purchase from Water Provider (2)	Indirect Reuse	Navarro	62	633	857	835	1,076	1,086
C	Fort Worth	Trinity	Purchase from Water Provider (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	771	866	2,077	2,181
C	Irrigation	Trinity	Golf Course Conservation	Conservation	Wise	0	5	10	13	15	18
C	Irrigation	Trinity	Purchase from Water Provider (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	15	15
C	Irrigation	Trinity	Purchase from Water Provider (2)	Indirect Reuse	Navarro	21	37	35	32	29	28
C	Irrigation	Trinity	Purchase from Water Provider (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	28	24	43	41
C	Irrigation	Trinity	Supplemental Wells	Trinity Aquifer	Wise	0	0	0	0	0	0
C	Livestock	Trinity	Redistribution of Supplies	Trinity Aquifer	Wise	-100	-100	-100	-100	-100	-100
C	Livestock	Trinity	Supplemental Wells	Trinity Aquifer	Wise	0	0	0	0	0	0
C	Manufacturing	Trinity	Manufacturing Conservation	Conservation	Wise	0	1	12	18	19	21
C	Manufacturing	Trinity	Purchase from Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	379	783	1,516	1,484	2,321	1,395
C	Manufacturing	Trinity	Purchase from Water Provider (2)	Indirect Reuse	Henderson	0	0	0	0	175	1,208
C	Manufacturing	Trinity	Supplemental Wells	Other Aquifer	Wise	0	0	0	0	0	0
C	Mining	Trinity	Direct Reuse	Direct Reuse	Wise	14,337	14,133	22,428	19,652	24,648	28,520
C	Mining	Trinity	Purchase from Water Provider (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	1,089	1,003
C	Mining	Trinity	Purchase from Water Provider (2)	Indirect Reuse	Navarro	4,779	4,711	3,145	2,786	2,025	1,893
C	Mining	Trinity	Purchase from Water Provider (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	2,462	2,127	3,048	2,808
C	Mining	Trinity	Redistribution of Supplies	Trinity Aquifer	Wise	0	0	0	-50	-50	-50
C	Mining	Trinity	Supplemental Wells	Trinity Aquifer	Wise	0	0	0	0	0	0
C	New Fairview	Trinity	Conveyance Project (2)	Indirect Reuse	Navarro	121	197	166	189	158	179
C	New Fairview	Trinity	Municipal Conservation - Basic	Conservation	Wise	4	15	20	26	32	40

Table 12, continued

Region	WUG	River Basin	Water Management Strategy	Source Name	Source County	Projected Water Management Strategies (acre-feet per year)					
						2010	2020	2030	2040	2050	2060
C	New Fairview	Trinity	Purchase from Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	0	0	130	144	322	361
C	New Fairview	Trinity	Supplemental Wells	Trinity Aquifer	Wise	0	0	0	0	0	0
C	Newark	Trinity	Conveyance Project (2)	Indirect Reuse	Navarro	77	164	146	201	193	262
C	Newark	Trinity	Municipal Conservation - Basic	Conservation	Wise	2	10	15	22	32	47
C	Newark	Trinity	Purchase from Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	0	0	115	154	395	527
C	Newark	Trinity	Supplemental Wells	Trinity Aquifer	Wise	0	0	0	0	0	0
C	Rhome	Trinity	Municipal Conservation - Basic	Conservation	Wise	19	60	99	144	192	254
C	Rhome	Trinity	Purchase from Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	168	542	1,086	1,295	1,991	2,233
C	Rhome	Trinity	Supplemental Wells	Trinity Aquifer	Wise	0	0	0	0	0	0
C	Runaway Bay	Trinity	Municipal Conservation - Basic	Conservation	Wise	10	21	29	37	47	60
C	Runaway Bay	Trinity	Purchase from Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	53	115	233	237	421	464
C	Runaway Bay	Trinity	Water Treatment Plant - Expansion	TRWD Lake/ Reservoir System	Reservoir	0	0	0	0	0	0
C	Steam Electric Power	Trinity	Conveyance Project (2)	Direct Reuse	Wise	0	0	0	3,500	4,000	4,000
C	Steam Electric Power	Trinity	Purchase from Water Provider (1)	Toledo Bend Lake/ Reservoir	Reservoir	0	0	0	0	1,126	1,046
C	Steam Electric Power	Trinity	Purchase from Water Provider (2)	Indirect Reuse	Navarro	1,098	2,592	2,167	2,653	2,094	1,975
C	Steam Electric Power	Trinity	Purchase from Water Provider (3)	Marvin Nichols Lake/ Reservoir	Reservoir	0	0	1,696	2,026	3,152	2,930
C	Walnut Creek SUD	Trinity	Municipal Conservation - Basic	Conservation	Wise	4	15	20	25	30	37
C	Walnut Creek SUD	Trinity	Purchase from Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	93	170	276	283	436	471
C	West Wise Rural SUD	Trinity	Municipal Conservation - Basic	Conservation	Wise	6	23	27	32	36	42
C	West Wise Rural SUD	Trinity	Purchase from Water Provider (1)	TRWD Lake/ Reservoir System	Reservoir	82	159	292	277	465	487
C	West Wise Rural SUD	Trinity	Water Treatment Plant - Expansion	TRWD Lake/ Reservoir System	Reservoir	0	0	0	0	0	0
C	West Wise Rural SUD	Trinity	Water Treatment Plant - New	TRWD Lake/ Reservoir System	Reservoir	0	0	0	0	0	0
Wise County Total						**23,385**	**27,827**	**43,728**	**46,388**	**62,773**	**68,729**

For Parker County, water needs are projected for 11 municipal WUGs, as well as the county-other, manufacturing, and steam electric power WUGs. Several water management strategies are projected for the municipal WUGs. These include conveying water from another area for five of the WUGs, conservation for all of the WUGs, overdraft of the Trinity Aquifer in 2010 for four of the WUGs, and purchase of water from water providers for six of the WUGs. The projected water management strategies for the county-other WUG are conveyance of water from another area, conservation, and purchase of water from a provider. For the manufacturing WUG, the projected water management strategies are conservation and purchase of water from a provider. Conveyance from another area and reuse are the projected management strategies for the steam electric power WUG.

All WUGs, except the livestock WUG, in Wise County are projected to have water needs in the 2007 State Water Plan. The projected water management strategies for the municipal WUGs include additional pumping of the Trinity Aquifer for one WUG, overdraft of the Trinity Aquifer in 2010 for two WUGs, conveyance from another area for five WUGS, conservation for all WUGs, and purchase from water providers for 12 WUGs. For the county-other WUG, the projected water management strategies include conservation, overdraft of the Trinity Aquifer in 2010, and purchase from water providers. Purchase of water from water providers is the projected water management strategy for the irrigation and manufacturing WUGs. The projected water management strategies for the mining WUG are direct reuse and purchase from water providers. For the steam electric power WUG, conveyance from another area and purchase from water providers are the projected water management strategies.

VII. DETAILS ON THE DISTRICT MANAGEMENT OF GROUNDWATER

Because the District only recently received confirmation of its creation from the electorate in November 2007, it is still in the early stages of its development of a comprehensive system to manage the groundwater resources located within its boundaries. The District is acutely aware that the path it ultimately pursues for the permitting and regulation of water wells may have a significant impact on the manner in which water is provided to support human, animal, and plant life, land development, public water supplies, commercial and industrial operations, agriculture, and other economic growth in the District. The District Board takes its responsibilities very seriously with regard to these decisions and the impacts they may have on the property rights of the citizens of the District, and desires to undertake its approach to the development of a permitting and regulatory system in a careful, measured, and deliberate manner. In that regard, the District is determined to accumulate as much data and information as is practicable on the groundwater resources located within its boundaries before developing permanent rules and regulations that would impose permitting or groundwater production regulations on water wells.

The District began its initial studies and analysis of the aquifers and groundwater use patterns in the District in early 2008 in an attempt to both catch up with then-ongoing discussions regarding the development of desired future conditions of the aquifers by the existing groundwater conservation districts in GMA-8, and to develop some baseline information on which decisions could be made for the development of temporary rules governing water wells. In August 2008, the District adopted its first set of temporary rules, which pioneer the District's information-gathering initiative. A copy of the District's temporary rules is available on the District's

website at http://www.uppertrinitygcd.com/pdf/temprules.pdf. Among other things, the rules require most large wells to be registered with the District, have meters installed to record the amount of groundwater produced, and submit records of the amounts produced to the District. Large well owners are also required to submit fee payments to the District based upon the amount of groundwater produced.

In addition, all new wells are required to be registered with the District and comply with the minimum well spacing requirements of the District. The minimum well spacing requirements were developed by the District to try to limit the off-property impacts of new wells to existing registered wells and adjoining landowners. They include minimum tract size requirements, spacing requirements from the property line on the tract where the well is drilled, and spacing requirements from registered wells in existence at the time the new well is proposed. The spacing distances were developed through hydrogeologic modeling of the varying sizes of the cones of depression of various well capacities, and such distances naturally increase with increases in well capacities. Well interference problems caused by wells being located too close to each other have historically been one of the predominant problems for wells completed in the Trinity Aquifer in the District and throughout GMA-8 and GMA-9. The District's spacing requirements should go a long way toward prospectively limiting such well interference problems between new wells and between new and existing wells.

The District is also undertaking the establishment of a monitoring well network at key locations throughout the four counties to monitor water levels and aquifer conditions over time. Information from the well network will be assimilated along with groundwater production and use reports and estimates, well location and completion data, information on aquifer recharge rates and other hydrogeologic properties, and other information in a database that the District is developing to enable it to better understand and manage the groundwater resources of the area. Information gleaned from these efforts will be used by the District in the future in the establishment of desired future conditions for the aquifers, in the monitoring of actual conditions of the aquifers and calibration of modeled conditions, in making planning decisions, and in the development of permanent District rules that include a permitting system for water wells.

Chapter 36 requires the District to both adopt and enforce rules that will achieve the desired future conditions established for the aquifers in the District. Ideally, the District will be able to establish desired future conditions and implement rules that will promote and provide for sustainable groundwater production throughout the District for the current and future generations of citizens of the District. However, the science and information to be developed by the District may ultimately indicate that such a goal of sustainability, or perhaps even some less idealistic goal, is not achievable without reductions in groundwater production. Once again, if the District determines that groundwater production must be reduced in the future in order to achieve the desired future conditions, it will do so extremely cautiously and with due care and consideration for the possible economic impacts and other effects on the citizens and businesses of the District and their property rights and interests.

Chapter 36 and the District Act afford the District a number of options and tools for the management of groundwater and possible approaches to the regulation of production. Chapter 36 allows the District to be more protective of existing or historic wells and their use than it is of wells that have not yet been drilled. It allows the District to adopt dissimilar regulatory

approaches for wells completed in separate aquifers or in different geographic regions of the District, in order to address critical areas or to otherwise tailor-make regulations that are more suitable for a particular aquifer or area. Groundwater management strategies employed for the outcrop of the aquifer may differ from those utilized in subcrop areas. The District may adopt production regulations that authorize production from a well based upon its past or existing use, the acreage or size of the tract of the property on which it is located, the level of decline in the aquifer where the well is located, or other reasonable and appropriate criteria as authorized by law.

Because the District is in a high-density growth area near the Dallas-Fort Worth Metroplex, the District will thoroughly investigate groundwater-to-surface-water conversion management strategies similar to those that have been or are being implemented in the Harris, Galveston, and Montgomery counties growth corridor along Interstate 45 in the Gulf Coast region of Texas. These regulatory approaches, which have been studied for decades as a method to fairly reduce groundwater production in high-growth suburban and urban regions, may prove to be the most appropriate for the District to pursue if it is required to reduce groundwater in order to achieve the desired future conditions established for the aquifers. However, groundwater reduction and surface water conversion management strategies can take many years to implement and represent a considerable capital investment for water users, as securing alternate sources of water supply by economically feasible means is an arduous endeavor that typically involves a very large number of stakeholders and overcoming numerous technical, legal, and financial hurdles. The District will ensure that it has thoroughly evaluated the alternatives and implications of pursuing such management strategies before opting for them, and has allowed a reasonable and sufficient amount of time for them to be implemented. This may necessitate the short-term allowance of groundwater production in excess of annual pumping goals or limits designed to achieve desired future conditions, and nothing in this plan shall be construed to limit the ability of the District to utilize that regulatory flexibility.

The District also intends to promote water conservation and public awareness in its management efforts and may investigate and pursue conservation incentive-based management strategies that encourage or reward conservation. In many cases, conservation and public awareness strategies can be among the most cost-efficient means to reduce water use, and thus groundwater production, and will be thoroughly investigated and promoted by the District.

Water quantity issues are only part of the District's concern and regulatory purview. Water quality issues are equally important. The District is very concerned about protection of the quality of the groundwater resources in the four counties and will continue to pursue management strategies to protect those resources from contamination, which can threaten to undermine groundwater conservation efforts by rendering the resource unusable. The District has implemented an injection well monitoring program to monitor and evaluate permit applications submitted to the Railroad Commission of Texas and the Texas Commission on Environmental Quality for injection of various types of waste into the geologic formations underlying the freshwater aquifers in the District. The District works with injection well permit applicants to insure that any concerns it may have regarding threats to groundwater resources are addressed and, if necessary, will vigorously protest an injection application before those state agencies to ensure such resource protection. The District also has adopted and will enforce well

completion standards for the drilling and completion of water wells, as well as standards for the capping and plugging of abandoned or deteriorated water wells.

In summary, the District is still in its early stages of evaluating available alternatives for groundwater management. Accumulating as much reliable information and data as possible on local aquifer characteristics, groundwater production and use patterns, estimates of current and future supplies and demand, and related information are essential to the District taking a measured approach to the development of its regulatory system. The District's well registration, metering, and water use reporting requirements represent an initial step toward pulling together such valuable information. The District's forthcoming monitoring well program, as well as other future technical studies, surveys, and analyses, will further promote those efforts. In the meantime, the District's well spacing requirements will serve to mitigate the proliferation of well interference impacts from new wells on adjoining property owners and existing wells. The District will also continue to actively pursue water quality protection of the groundwater resources within its boundaries. The District will carefully weigh all available technical information, variations in groundwater resources and use in different parts of the District, its legal duties and responsibilities, all permissible management options, and impacts to the citizens and economies of the District as it develops its rules and regulatory system to achieve the desired future conditions established for the aquifers in the region.

VIII. ACTIONS, PROCEDURES, PERFORMANCE AND AVOIDANCE FOR PLAN IMPLEMENTATION

The provisions of this plan will be implemented by the District and will be used by the District as a guidepost for determining the direction or priority for all District activities. All operations of the District, all agreements entered into by the District, and any additional planning efforts in which the District may participate will be consistent with the provisions of this plan.

Rules adopted by the District for the permitting of wells and the use of groundwater shall comply with Chapter 36, the District Act, and the provisions of this management plan. All rules will be adhered to and enforced. The development and enforcement of the rules will be based on the best technical evidence available to the District.

The District will encourage cooperation and coordination in the implementation of this plan. All operations and activities of the District will be performed in a manner that best encourages and fosters cooperation with state, regional, and local water entities.

IX. METHODOLOGY FOR TRACKING DISTRICT PROGRESS IN ACHIEVING MANAGEMENT GOALS –31 TAC 356.5(a)(6)

The general manager of the District will prepare and submit an annual report ("Annual Report" to the Board of Directors of the District. The Annual Report will include an update on the District's performance in regards to achieving management goals and objectives set forth herein. The general manager of the District will annually present the Annual Report to the Board of Directors after its completion. The District will maintain a copy of the Annual Report on file at

the District's offices for members of the public to inspect upon adoption of the report by the Board.

X. GOALS, MANAGEMENT OBJECTIVES AND PERFORMANCE STANDARDS

Management Goals

A. Providing the Most Efficient Use of Groundwater – 31TAC 356.5(a)(1)(A) ((Implementing TWC §36.1071(a)(1))

A1. Objective - Each year the District will require registration of all new wells within the District.

A.1 Performance Standard - Annual reporting of well registration statistics will be included in the Annual Report provided to the Board of Directors.

A.2 Objective - Each year the District will monitor annual production from all non-exempt wells within the District.

A.2 Performance Standard - The District will require installation of meters on all non-exempt wells and reporting of production to the District. The annual production of groundwater from non-exempt wells will be included in the Annual Report provided to the Board of Directors.

B. Controlling and Preventing Waste of Groundwater – 31TAC 356.5(a)(1)(B) ((Implementing TWC §36.1071(a)(2))

B.1 Objective - Annual evaluation of the rules to determine if any amendments are recommended to decrease waste of groundwater within the District.

B.1 Performance Standard - Annual discussion of the evaluation of the rules and a reporting of whether any of the District rules require amendment to prevent waste of groundwater to be included in the Annual Report provided to the Board of Directors.

B.2 Objective - The District will encourage the elimination and reduction of groundwater waste through the collection of a water-use fee for non-exempt production wells within the District.

B.2 Performance Standard - Annual reporting of the total fees paid and total groundwater used by non-exempt wells will be included in the Annual Report provided to the Board of Directors.

B.3 Objective - Each year, the District will provide information to the public on eliminating and reducing wasteful practices in the use of groundwater by including information on groundwater waste reduction on the District's website.

B.3 Performance Standard - Each year, a copy of the information provided on the groundwater waste reduction page of the District's website will be included in the District's Annual Report to be given to the District's Board of Directors.

C. Addressing Conjunctive Surface Water Management Issues – 31TAC 356.5 (a)(1)(D) ((Implementing TWC §36.1071(a)(4))

C.1 Objective - Each year the District will participate in the regional water planning process by attending at least one of the Region B, C or G Regional Water Planning Group Meetings to encourage the development of surface water supplies to meet the needs of water user groups within the District.

C.1 Performance Standard - The attendance of a District representative at any Regional Water Planning Group meeting will be noted in the Annual Report provided to the Board of Directors.

D. Addressing Drought Conditions – 31TAC356.5(a)(1)(F) ((Implementing TWC §36.1071(a)(6))

D.1 Objective - Monthly review of drought conditions within the District using the Texas Water Development Board's Monthly Drought Conditions Presentation available at: http://www.twdb.state.tx.us/data/DROUGHT/drought_toc.asp)

D.1 Performance Standard – An annual review of drought conditions within the District will be included in the Annual Report provided to the Board of Directors.

E. Addressing Conservation, Recharge Enhancement, Rainwater Harvesting, Precipitation Enhancement, or Brush Control, where Appropriate and Cost Effective – 31TAC356.5(a)(1)(G) ((Implementing TWC §36.1071(a)(7))

Precipitation enhancement is not an appropriate or cost-effective program for the District at this time because there is not an existing precipitation enhancement program operating in nearby counties in which the District could participate and share costs. Given the relative youth of the District, development and running of a District-wide precipitation enhancement program is not considered a priority. The District has determined that addressing precipitation enhancement is not applicable to the District at this time.

Recharge enhancement is not an appropriate or cost-effective program for the District at this time. The District has determined that addressing recharge enhancement is not applicable to the District at this time.

Brush Control is not an appropriate or cost-effective program for the District at this time. The District has determined that addressing brush control is not applicable to the District at this time.

E.1 Objective - The District will annually submit an article regarding water conservation for publication to at least one newspaper of general circulation in the District counties.

E.1 Performance Standard - Each year, a copy of the conservation article will be included in the District's Annual Report to be given to the District's Board of Directors.

E.2 Objective - The District will annually submit an article regarding rain water harvesting for publication to at least one newspaper of general circulation in the District counties.

E.2 Performance Standard - Each year, a copy of the rain water harvesting article will be included in the District's Annual Report to be given to the District's Board of Directors.

E.3 Objective - Each year, the District will include an informative flier on water conservation within at least one mail out to groundwater non-exempt water users distributed in the normal course of business for the District.

E.3 Performance Standard - Each year, a copy of the water conservation mail-out flyer will be included in the District's Annual Report to be given to the District's Board of Directors.

F. Addressing in a Quantitative Manner the Desired Future Conditions of the Groundwater Resources – 31TAC(a)(1)(H) ((Implementing TWC §36.1071(a)(8))

F.1 Objective - Within 3 years of Groundwater Management Plan adoption develop a Groundwater Monitoring Program within the District.

F.1 Performance Standard - Upon development, attachment of the District Groundwater Monitoring Program to the District's Annual Report to be given to the District's Board of Directors.

F.2 Objective - Upon approval of the District Monitoring Program – conduct water level measurements at least annually on groundwater resources within the District.

F.2 Performance Standard - Annual evaluation of water-level trends and the adequacy of the monitoring network to monitor aquifer conditions within

the District and comply with the aquifer resources desired future conditions. The evaluation will be included in the District's Annual Report to be given to the District's Board of Directors.

F.3 Objective - Monitor non-exempt pumping within the District for use in evaluating District compliance with aquifer desired future conditions.

F.3 Performance Standard - Annual reporting of groundwater used by non-exempt wells will be included in the Annual Report provided to the District's Board of Directors.

XI. MANAGEMENT GOALS DETERMINED NOT-APPLICABLE TO THE DISTRICT

A. Addressing Natural Resource Issues which Impact the Use and Availability of Groundwater, and which are Impacted by the Use of Groundwater – 31TAC§356.5(a)(1)(E) ((Implementing TWC §36.1071(a)(5))

The District has not been advised as to any threatened or endangered species that exist within the boundaries of the District and are significantly impacted by groundwater usage. At this time, this goal is not considered applicable to the District.

B. Controlling and Preventing Subsidence – 31TAC§356.5(a)(1)(C)

This category of management goal is not considered applicable to the District because the formations making up the aquifers of use are consolidated with little potential for subsidence within the District as a result of groundwater withdrawal. Mace and others (1994) studied the potential for subsidence resulting from the significant historical water-level declines observed in the Northern Trinity Aquifer in central Texas. They concluded that even in the confined portions of the aquifer, where the largest declines have occurred, the subsidence expected would be only a small amount and would take a very long time to manifest itself.

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APPENDIX A

Senate Bill No. 1983 Creating the Upper Trinity Groundwater Conservation District

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S.B. No. 1983

AN ACT

relating to the creation of the Upper Trinity Groundwater Conservation District; providing authority to issue bonds.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

SECTION 1. Subtitle H, Title 6, Special District Local Laws Code, is amended by adding Chapter 8830 to read as follows:

CHAPTER 8830. UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT

SUBCHAPTER A. GENERAL PROVISIONS

Sec. 8830.001. DEFINITIONS. In this chapter:

(1) "Board" means the board of directors of the district.

(2) "Director" means a member of the board.

(3) "District" means the Upper Trinity Groundwater Conservation District.

Sec. 8830.002. NATURE OF DISTRICT; FINDINGS. (a) The district is a groundwater conservation district in Hood, Montague, Parker, and Wise Counties created under and essential to accomplish the purposes of Section 59, Article XVI, Texas Constitution.

(b) The district is created to serve a public use and benefit.

(c) All of the land and other property included within the boundaries of the district will be benefited by the works and projects that are to be accomplished by the district under powers

conferred by this chapter and by Chapter 36, Water Code.

(d) Any fees imposed by the district under this chapter are necessary to pay for the costs of accomplishing the purposes of the district, including the conservation and management of groundwater resources, as provided by this chapter and Section 59, Article XVI, Texas Constitution.

Sec. 8830.003. CONFIRMATION ELECTION REQUIRED. If the creation of the district is not confirmed at a confirmation election held under Section 8830.023 before September 1, 2009:

(1) the district is dissolved on September 1, 2009, except that:

(A) any debts incurred shall be paid;

(B) any assets that remain after the payment of debts shall be transferred in equal amounts to Hood, Montague, Parker, and Wise Counties; and

(C) the organization of the district shall be maintained until all debts are paid and remaining assets are transferred; and

(2) this chapter expires September 1, 2012.

Sec. 8830.004. INITIAL DISTRICT TERRITORY. The initial boundaries of the district are coextensive with the boundaries of Hood, Montague, Parker, and Wise Counties.

Sec. 8830.005. APPLICABILITY OF OTHER GROUNDWATER CONSERVATION DISTRICT LAW. Except as otherwise provided by this chapter, Chapter 36, Water Code, applies to the district.

Sec. 8830.006. CONSTRUCTION OF CHAPTER. This chapter shall be liberally construed to achieve the legislative intent and

purposes of Chapter 36, Water Code. A power granted by Chapter 36, Water Code, or this chapter shall be broadly interpreted to achieve that intent and those purposes.

[Sections 8830.007-8830.020 reserved for expansion]

SUBCHAPTER A-1. TEMPORARY PROVISIONS

Sec. 8830.021. APPOINTMENT OF TEMPORARY DIRECTORS. (a) The district is initially governed by a board of eight temporary directors appointed as provided by Section 8830.051(a).

(b) Temporary directors shall be appointed not later than the 90th day after the effective date of the Act enacting this chapter. If after the 90th day fewer than eight temporary directors have been appointed, each unfilled position shall be considered a vacancy and filled in accordance with Subsection (c).

(c) If a vacancy occurs on the temporary board, the remaining temporary directors shall appoint a person to fill the vacancy in a manner that meets the representational requirements of this section.

(d) To be eligible to serve as a temporary director, a person must be a registered voter in the appointing county.

(e) Each temporary director must qualify to serve as a director in the manner provided by Section 36.055, Water Code.

(f) Temporary directors serve until the earlier of:

(1) the time the temporary directors become the initial permanent directors under Section 8830.024; or

(2) the date this chapter expires under Section 8830.003.

Sec. 8830.022. ORGANIZATIONAL MEETING OF TEMPORARY

DIRECTORS. As soon as practicable after all the temporary directors have qualified under Section 36.055, Water Code, a majority of the temporary directors shall convene the organizational meeting of the district at a location in the district agreeable to a majority of the directors. If an agreement on location cannot be reached, the organizational meeting shall be at the Poolville Junior High School in Parker County.

Sec. 8830.023. CONFIRMATION ELECTION. (a) The temporary directors shall hold an election to confirm the creation of the district.

(b) Section 41.001(a), Election Code, does not apply to a confirmation election held as provided by this section.

(c) Except as provided by this section, a confirmation election must be conducted as provided by Sections 36.017(b), (c), and (e)-(g), Water Code, and by the Election Code.

(d) The ballot for the election must be printed to provide for voting for or against the proposition: "The creation of a nontaxing, locally controlled groundwater conservation district to be known as the Upper Trinity Groundwater Conservation District, in lieu and instead of anticipated action by the Texas Commission on Environmental Quality to otherwise establish a conservation and reclamation district within the same or a larger area."

(e) If a majority of the votes cast at the election are not in favor of the creation of the district, the temporary directors may order a subsequent confirmation election to be held in accordance with this section.

Sec. 8830.024. INITIAL PERMANENT DIRECTORS; INITIAL TERMS.

If creation of the district is confirmed at an election held under Section 8830.023:

(1) the temporary directors become the initial permanent directors; and

(2) the two directors appointed from each county shall draw lots to determine which director serves a term expiring June 1 of the first odd-numbered year after the confirmation election and which director serves a term expiring June 1 of the next odd-numbered year.

Sec. 8830.025. EXPIRATION OF SUBCHAPTER. This subchapter expires September 1, 2012.

[Sections 8830.026-8830.050 reserved for expansion]

SUBCHAPTER B. BOARD OF DIRECTORS

Sec. 8830.051. GOVERNING BODY; TERMS. (a) The district is governed by a board of eight directors appointed as follows:

(1) two directors appointed by the Hood County Commissioners Court;

(2) two directors appointed by the Montague County Commissioners Court;

(3) two directors appointed by the Parker County Commissioners Court; and

(4) two directors appointed by the Wise County Commissioners Court.

(b) Directors serve staggered four-year terms, with the term of one director from each of the four counties expiring on June 1 of each odd-numbered year.

(c) A director may serve multiple consecutive terms.

Sec. 8830.052. DIRECTOR ELIGIBILITY; QUALIFICATION. (a) To be eligible to serve as a director, a person must be a registered voter in the appointing county.

(b) Each director must qualify to serve in the manner provided by Section 36.055, Water Code.

Sec. 8830.053. VACANCIES. If a vacancy occurs on the board, the remaining directors shall appoint a person to fill the vacancy in a manner that meets the representational requirements of Section 8830.051.

Sec. 8830.054. COMPENSATION; REIMBURSEMENT. (a) Notwithstanding Sections 36.060(a) and (d), Water Code, a director may not receive compensation for performing the duties of director.

(b) A director is entitled to reimbursement of actual expenses reasonably and necessarily incurred while engaging in activities on behalf of the district.

[Sections 8830.055-8830.100 reserved for expansion]

SUBCHAPTER C. POWERS AND DUTIES

Sec. 8830.101. GROUNDWATER CONSERVATION DISTRICT POWERS AND DUTIES. Except as provided by this chapter, the district has the powers and duties provided by the general law of this state, including Chapter 36, Water Code, and Section 59, Article XVI, Texas Constitution, applicable to groundwater conservation districts.

Sec. 8830.102. CONTRACTS. The district may enter into a contract with any person, public or private, for any purpose authorized by law.

Sec. 8830.103. APPLICABILITY OF DISTRICT REGULATIONS. Groundwater regulation under this chapter applies to all persons except as exempted under Section 36.117, Water Code, or this chapter.

Sec. 8830.104. WELL SPACING RULES; EXEMPTIONS. (a) Except as provided by Subsection (b), the district shall exempt from the well spacing requirements adopted by the district any well that is completed on or before the effective date of those requirements.

(b) The district may provide by rule that a well may lose its exemption under this section if the well is modified in a manner that substantially increases the capacity of the well after the effective date of the well spacing requirements adopted by the district.

(c) Except as provided by this section and notwithstanding Section 8830.103, the district may require any well or class of wells exempt from permitting under Chapter 36, Water Code, to comply with the well spacing requirements adopted by the district. The district shall apply well spacing requirements uniformly to any well or class of wells based on the size or capacity of the well and without regard to the type of use of the groundwater produced by the well.

Sec. 8830.105. REGISTRATION AND REPORTING REQUIREMENTS FOR CERTAIN EXEMPT WELLS. The district may adopt rules that require the owner or operator of a well or class of wells exempt from permitting under Section 36.117, Water Code, to register the well with the district and, except for a well exempt from permitting under Subsection (b)(1) of that section, to report groundwater

withdrawals from the well using reasonable and appropriate reporting methods and frequency.

Sec. 8830.106. ENFORCEMENT. (a) The district may enforce this chapter in the manner provided by Chapter 36, Water Code. In lieu of a remedy available to the district under Section 36.102, Water Code, or in addition to those remedies, the district may impose a fee in addition to a fee assessed under Section 8830.152 on a person producing groundwater in violation of a rule of the district, including the failure or refusal to comply with any order or rule of the district to reduce or cease groundwater usage. The purpose of a fee authorized under this subsection is to serve as a disincentive to producing groundwater except as authorized by the district.

(b) A fee imposed under Subsection (a) may not exceed an amount equal to 10 times the amount of a fee assessed under Section 8830.152.

Sec. 8830.107. NO EMINENT DOMAIN POWER. The district may not exercise the power of eminent domain.

[Sections 8830.108-8830.150 reserved for expansion]

SUBCHAPTER D. GENERAL FINANCIAL PROVISIONS

Sec. 8830.151. TAXES PROHIBITED. The district may not impose a tax. Sections 36.020(a) and 36.201-36.204, Water Code, do not apply to the district.

Sec. 8830.152. DISTRICT REVENUES. (a) The district by rule, resolution, or order may establish, amend, pledge, encumber, expend the proceeds from, and assess to any person production fees based on the amount of groundwater authorized by permit to be

withdrawn from a well or on the amount of water actually withdrawn, to enable the district to fulfill its purposes and regulatory functions as provided by this chapter. The district may use revenues generated by fees it assesses for any lawful purpose.

(b) Notwithstanding any provision of general law to the contrary, a fee authorized by Subsection (a) may not exceed:

(1) $1 per acre-foot annually for groundwater used for agricultural purposes; or

(2) 30 cents per thousand gallons annually for groundwater used for nonagricultural purposes.

(c) Notwithstanding any provision of general law or this chapter to the contrary, if any, the district may assess a production fee under this section for groundwater produced from a well or class of wells exempt from permitting under Section 36.117, Water Code. A production fee assessed by the district under this subsection must be based on the amount of groundwater actually withdrawn from the well and may not exceed the amount established by the district for permitted uses under Subsection (b)(2).

(d) Notwithstanding Section 36.1071(f), Water Code, the district by rule, resolution, or order before the adoption of its management plan may:

(1) establish, assess, and enforce the collection of production fees under this section; and

(2) establish and enforce metering and reporting requirements, except for a well exempt from permitting under Section 36.117(b)(1), Water Code.

(e) The district by rule may establish a temporary or

permanent discounted fee rate for persons who prepay production fees to the district under this section on or before the dates established by district rule.

SECTION 2. (a) The legal notice of the intention to introduce this Act, setting forth the general substance of this Act, has been published as provided by law, and the notice and a copy of this Act have been furnished to all persons, agencies, officials, or entities to which they are required to be furnished under Section 59, Article XVI, Texas Constitution, and Chapter 313, Government Code.

(b) The governor has submitted the notice and Act to the Texas Commission on Environmental Quality.

(c) The Texas Commission on Environmental Quality has filed its recommendations relating to this Act with the governor, lieutenant governor, and speaker of the house of representatives within the required time.

(d) All requirements of the constitution and laws of this state and the rules and procedures of the legislature with respect to the notice, introduction, and passage of this Act are fulfilled and accomplished.

SECTION 3. This Act takes effect immediately if it receives a vote of two-thirds of all the members elected to each house, as provided by Section 39, Article III, Texas Constitution. If this Act does not receive the vote necessary for immediate effect, this Act takes effect September 1, 2007.

President of the Senate

Speaker of the House

I hereby certify that S.B. No. 1983 passed the Senate on April 27, 2007, by the following vote: Yeas 31, Nays 0; May 21, 2007, Senate refused to concur in House amendment and requested appointment of Conference Committee; May 22, 2007, House granted request of the Senate; May 25, 2007, Senate adopted Conference Committee Report by the following vote: Yeas 30, Nays 0.

Secretary of the Senate

I hereby certify that S.B. No. 1983 passed the House, with amendment, on May 17, 2007, by the following vote: Yeas 143, Nays 0, two present not voting; May 22, 2007, House granted request of the Senate for appointment of Conference Committee; May 25, 2007, House adopted Conference Committee Report by the following vote: Yeas 139, Nays 0, one present not voting.

Chief Clerk of the House

Approved:

Date

Governor

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APPENDIX B

District Resolution Adopting Management Plan

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RESOLUTION#10-002

ADOPTING MANAGEMENT PLAN

THE STATE OF TEXAS §
§
UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT §

Whereas, the Upper Trinity Groundwater Conservation District (the "District") was created as a groundwater conservation district by the 80th Texas Legislature under the authority of Section 59, Article XVI, of the Texas Constitution, and in accordance with Chapter 36 of the Texas Water Code by the Act of May 25, 2007, 80th Leg., R.S., ch. 1343, 2007 Tex. Gen. Laws 4583, codified at TEX. SPEC. DIST. LOC. LAWS CODE ANN. ch. 8830 ("the District Act");

WHEREAS, under the direction of the Board of Directors of the District (the "Board"), and in accordance with Sections 36.1071 and 36.1072 of the Texas Water Code, and 31 Texas Administrative Code Chapter 356, the District has timely undertaken the development of its Management Plan;

WHEREAS, as part of the process of developing its Management Plan, the District requested and received the assistance of the Texas Water Development Board (the "TWDB") and worked closely with the TWDB staff to obtain staff's input and comments on the draft Management Plan and its technical and legal sufficiency;

WHEREAS, the Board and the staff of the District and the District's consultants and legal counsel reviewed and analyzed the District's best available data, groundwater availability modeling information, and other information and data required by the TWDB;

WHEREAS, the District issued the notice in the manner required by state law and held public hearings on June 21, 2010 in Bowie, Texas, June 22, 2010 in Granbury, Texas, and July 19, 2010 in Springtown, Texas to receive public and written comments on the Management Plan and received written comments at the District's office located at 1250 E. Hwy. 199, Springtown, Texas;

WHEREAS, the District coordinated its planning efforts on a regional basis with the appropriate surface water management entities during the preparation of the Management Plan;

WHEREAS, the Board finds that the Management Plan meets all of the requirements of Chapter 36, Water Code, and 31 Texas Administrative Code Chapter 356; and

WHEREAS, after the public hearings, the Board of Directors met in a regular board meeting on August 16, 2010, properly noticed in accordance with appropriate law, and considered adoption of the attached Management Plan and approval of this resolution after due consideration of all comments received.

NOW THEREFORE BE IT RESOLVED THAT:

1. The above recitals are true and correct.

2. The Board of Directors of the District hereby adopts the attached Management Plan as the Management Plan for the District;

3. The Board President and the General Manager of the District are further authorized to take all steps necessary to implement this resolution and submit the Management Plan to the TWDB for its approval; and

4. The Board President and General Manager of the District are further authorized to take any and all action necessary to coordinate with the TWDB as may be required in furtherance of TWDB's approval pursuant to the provisions of Section 36.1072 of the Texas Water Code.

AND IT IS SO ORDERED.

Upon motion duly made by Director MIKE BERKLEY, and seconded by Director TRACY MESSLER, and upon discussion, the Board of Directors voted 6 in favor and Ø opposed, Ø abstained, and 2 absent, and the motion thereby PASSED on this 11TH day of August, 2010.

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT

By: Mike Massey
President

Tom Watts
Secretary

APPENDIX C

Notice of Meetings

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UPPER TRINITY
TEXAS GROUNDWATER CONSERVATION DISTRICT
HOOD · MONTAGUE · PARKER · WISE

P.O. BOX 1749
1250 E. HWY. 199
SPRINGTOWN, TX 76082

WWW.UPPERTRINITYGCD.COM

Certification

I, the undersigned authority, do hereby certify that on June 9, 2010 at or before 3:00 p.m., I posted and filed the following notice of meeting with the Montague County Clerk's office and also posted a copy in the hallway of the Montague County Courthouse in a place convenient and readily accessible to the general public at all times. I also certify that a copy of the notice was placed on the door and on an outside window of the District office and that it remained so posted continuously for at least 72 hours proceeding the scheduled time of said meeting in accordance with the Texas Government Code, Chapter 551.

Dr. Bob Patterson

Dr. Bob Patterson, General Manager
Upper Trinity Groundwater Conservation District

(817) 523-5200 PHONE (817) 523-7687 FAX TOLL FREE (877) 388-8423

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
NOTICE OF HEARINGS ON DISTRICT MANAGEMENT PLAN
June 21 and 22, 2010

NOTICE IS HEREBY GIVEN to all interested persons within Montague, Wise, Parker, and Hood Counties, Texas:

That the Board of Directors of the Upper Trinity Groundwater Conservation District ("District") will hold two public hearings to discuss, consider, receive public comments, and potentially act upon adoption of the District Management Plan. All interested members of the public are invited to attend.

The first hearing on the management plan will be held on June 21, 2010, beginning at 6:00 p.m. at the Chisholm Trail Room of Ozona National Bank at 1301 U.S. Highway 59, in Bowie, Texas. The second hearing will be held on June 22, 2010, beginning at 6:00 p.m. at the Hood County Justice Center, Justice of the Peace Courtroom, 1200 West Pearl Street, Granbury, Texas. At the conclusion of the hearings or any time or date thereafter, the proposed management plan may be adopted in the form presented or as amended based upon comments received from the public, the UTGCD staff, attorneys, engineers, or members of the Board of Directors without any additional notice.

At any time during the hearing and in compliance with the Chapter 551, Government Code, the District Board may meet in executive session on the above agenda item for consultation concerning attorney-client matters. Any subject discussed in executive secession may be subject to action during an open session of the District Board.

Any person who desires to appear at the hearing and present testimony, evidence, or other information on the proposed management plan may do so in person, by counsel, or both. In addition, persons interested in submitting written comments on the proposed management plan may do so by sending any such comments to the Upper Trinity Groundwater Conservation District, P.O. Box 1749, Springtown, Texas 76082. The hearings posted in this notice may be recessed from day to day or continued where appropriate.

The 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 (817) 523-5200 at least 24 hours in advance if accommodation is needed.

A copy of the proposed Management Plan may be requested by email at bobpatterson@uwmail.com, will be made available at the District's website at www.uppertrinitygcd.com, and may be reviewed or copied at 1250 E. Hwy. 199, Springtown, Texas. Any person who wishes to receive more detailed information on this notice should contact Dr. Bob Patterson, General Manager, at (817) 523-5200.

END OF AD

Dr. Bob Patterson, General Manager
Upper Trinity Groundwater Conservation District
P.O. Box 1749
Springtown, Texas 76082
(817) 523-5200
(877) 388-8423 (toll free)
(817) 523-7687 fax

UPPER TRINITY
TEXAS GROUNDWATER CONSERVATION DISTRICT
HOOD · MONTAGUE PARKER · WISE

P.O. BOX 1749
1280 E. HWY. 199
SPRINGTOWN, TX 76082

WWW.UPPERTRINITYGCD.COM

Certification

I, the undersigned authority, do hereby certify that on June 9, 2010 at or before 12:00 p.m., I posted and filed the following notice of meeting with the Wise County Clerk's office and also posted a copy in the hallway of the Wise County Courthouse in a place convenient and readily accessible to the general public at all times. I also certify that a copy of the notice was placed on the door and on an outside window of the District office and that it remained so posted continuously for at least 72 hours proceeding the scheduled time of said meeting in accordance with the Texas Government Code, Chapter 551.

Dr. Bob Patterson

Dr. Bob Patterson, General Manager
Upper Trinity Groundwater Conservation District

(817) 523-5200 PHONE (817) 523-7687 FAX TOLL FREE (877) 388-8423

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
NOTICE OF HEARINGS ON DISTRICT MANAGEMENT PLAN
June 21 and 22, 2010

NOTICE IS HEREBY GIVEN to all interested persons within Montague, Wise, Parker, and Hood Counties, Texas:

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The first hearing on the management plan will be held on June 21, 2010, beginning at 6:00 p.m. at the Chisholm Trail Room of Ozona National Bank at 1301 U.S. Highway 59, in Bowie, Texas. The second hearing will be held on June 22, 2010, beginning at 6:00 p.m. at the Hood County Justice Center, Justice of the Peace Courtroom, 1200 West Pearl Street, Granbury, Texas. At the conclusion of the hearings or any time or date thereafter, the proposed management plan may be adopted in the form presented or as amended based upon comments received from the public, the UTGCD staff, attorneys, engineers, or members of the Board of Directors without any additional notice.

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END OF AD

Dr. Bob Patterson, General Manager
Upper Trinity Groundwater Conservation District
P.O. Box 1749
Springtown, Texas 76082
(817) 523-5200
(877) 388-8423 (toll free)
(817) 523-7687 fax

POSTED
At 11:35 o'clock A M

JUN 0 9 2010

SHERRY PARKER-LEMON, COUNTY CLERK
WISE COUNTY, TEXAS
BY Michele Tinnell DEPUTY

UPPER TRINITY
TEXAS GROUNDWATER CONSERVATION DISTRICT
HOOD · MONTAGUE · PARKER · WISE

P.O. BOX 1749
1280 E. HWY. 199
SPRINGTOWN, TX 76082

WWW.UPPERTRINITYGCD.COM

Certification

I, the undersigned authority, do hereby certify that on June 9, 2010 at or before 10:00 a.m., I posted and filed the following notice of meeting with the Parker County Clerk's office and also posted a copy in the hallway of the Parker County Courthouse in a place convenient and readily accessible to the general public at all times. I also certify that a copy of the notice was placed on the door and on an outside window of the District office and that it remained so posted continuously for at least 72 hours proceeding the scheduled time of said meeting in accordance with the Texas Government Code, Chapter 551.

Dr. Bob Patterson

Dr. Bob Patterson, General Manager
Upper Trinity Groundwater Conservation District

(817) 523-5200 PHONE (817) 523-7687 FAX TOLL FREE (877) 388-8423

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
NOTICE OF HEARINGS ON DISTRICT MANAGEMENT PLAN
June 21 and 22, 2010

NOTICE IS HEREBY GIVEN to all interested persons within Montague, Wise, Parker, and Hood Counties, Texas:

That the Board of Directors of the Upper Trinity Groundwater Conservation District ("District") will hold two public hearings to discuss, consider, receive public comments, and potentially act upon adoption of the District Management Plan. All interested members of the public are invited to attend.

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END OF AD

Dr. Bob Patterson, General Manager
Upper Trinity Groundwater Conservation District
P.O. Box 1749
Springtown, Texas 76082
(817) 523-5200
(877) 388-8423 (toll free)
(817) 523-7687 fax

UPPER TRINITY
TEXAS GROUNDWATER CONSERVATION DISTRICT
HOOD · MONTAGUE · PARKER · WISE

P.O. BOX 1749
1280 E. HWY. 199
SPRINGTOWN, TX 76082

WWW.UPPERTRINITYGCD.COM

Certification

I, the undersigned authority, do hereby certify that on June 8, 2010 at or before 12:00 p.m., I posted and filed the following notice of meeting with the Hood County Clerk's office and also posted a copy in the hallway of the Hood County Courthouse in a place convenient and readily accessible to the general public at all times. I also certify that a copy of the notice was placed on the door and on an outside window of the District office and that it remained so posted continuously for at least 72 hours proceeding the scheduled time of said meeting in accordance with the Texas Government Code, Chapter 551.

Dr. Bob Patterson

Dr. Bob Patterson, General Manager
Upper Trinity Groundwater Conservation District

(817) 523-5200 PHONE (817) 523-7687 FAX TOLL FREE (877) 388-8423

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
NOTICE OF HEARINGS ON DISTRICT MANAGEMENT PLAN
June 21 and 22, 2010

NOTICE IS HEREBY GIVEN to all interested persons within Montague, Wise, Parker, and Hood Counties, Texas:

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END OF AD

Dr. Bob Patterson, General Manager
Upper Trinity Groundwater Conservation District
P.O. Box 1749
Springtown, Texas 76082
(817) 523-5200
(877) 388-8423 (toll free)
(817) 523-7687 fax

APPENDIX D

Letters to Surface Water Management Entities

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UPPER TRINITY
TEXAS GROUNDWATER CONSERVATION DISTRICT
HOOD · MONTAGUE · PARKER · WISE

P.O. BOX 1749
1250 E. HWY. 199
SPRINGTOWN, TX 76082

WWW.UPPERTRINITYGCD.COM

August 24, 2010

Mike Allen
Mayor
City of Mineral Wells
P.O. Box 460
Mineral Wells, TX 76068-0460

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Allen:

Enclosed you will find a CD with an electronic copy of the Upper Trinity Groundwater Conservation District ("District") Groundwater Management Plan in compliance with Chapter 36 of the Texas Water Code. Our Groundwater Management Plan is the product of a public planning process that culminated in the adoption of the plan at the August 16th Upper Trinity Groundwater Conservation District Board Meeting.

The District's boundaries are coextensive with the boundaries of Hood, Montague, Parker and Wise counties. The purpose of the District Groundwater Management Plan is to define the water needs and supply within the District and define the goals that the District will use to manage groundwater in order to meet the needs or to demonstrate that the needs exceed the available groundwater supplies. The District Groundwater Management Plan will be used as the basis for the development of the District's permitting and groundwater management rules.

Please feel free to contact me if you have any questions or comments regarding the enclosed.

Sincerely,

Bob Patterson

Bob Patterson
General Manager

Enclosure: CD with the Adopted Groundwater Management Plan

UPPER TRINITY
TEXAS GROUNDWATER CONSERVATION DISTRICT
HOOD · MONTAGUE · PARKER · WISE

P.O. BOX 1749
1250 E. HWY. 199
SPRINGTOWN, TX 76082

WWW.UPPERTRINITYGCD.COM

August 24, 2010

Curtis W. Campbell
Region B Chairman
Red River Authority
P.O. Box 240
Wichita Falls, TX 76307

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Campbell:

Enclosed you will find a CD with an electronic copy of the Upper Trinity Groundwater Conservation District ("District") Groundwater Management Plan in compliance with Chapter 36 of the Texas Water Code. Our Groundwater Management Plan is the product of a public planning process that culminated in the adoption of the plan at the August 16th Upper Trinity Groundwater Conservation District Board Meeting.

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Please feel free to contact me if you have any questions or comments regarding the enclosed.

Sincerely,

Bob Patterson

Bob Patterson
General Manager

Enclosure: CD with the Adopted Groundwater Management Plan

UPPER TRINITY
TEXAS GROUNDWATER CONSERVATION DISTRICT
HOOD MONTAGUE PARKER WISE

P.O. BOX 1749
1250 E. HWY. 199
SPRINGTOWN, TX 76082

WWW.UPPERTRINITYGCD.COM

August 24, 2010

Joe B. Cooper
Manager
Middle Trinity GCD
930 N. Wolfe Nursery Road
Stephenville, TX 76401

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Cooper:

Enclosed you will find a CD with an electronic copy of the Upper Trinity Groundwater Conservation District ("District") Groundwater Management Plan in compliance with Chapter 36 of the Texas Water Code. Our Groundwater Management Plan is the product of a public planning process that culminated in the adoption of the plan at the August 16th Upper Trinity Groundwater Conservation District Board Meeting.

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Please feel free to contact me if you have any questions or comments regarding the enclosed.

Sincerely,

Bob Patterson

Bob Patterson
General Manager

Enclosure: CD with the Adopted Groundwater Management Plan

(817) 523-5200 PHONE (817) 523-7687 FAX TOLL FREE (877) 388-8423

UPPER TRINITY
TEXAS GROUNDWATER CONSERVATION DISTRICT
HOOD MONTAGUE PARKER WISE

P.O. BOX 1749
1250 E. HWY. 199
SPRINGTOWN, TX 76082

WWW.UPPERTRINITYGCD.COM

August 24, 2010

Larry Cox
Mayor
City of Bowie
304 Lindsey Street
Bowie, TX 76230-4912

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Cox:

Enclosed you will find a CD with an electronic copy of the Upper Trinity Groundwater Conservation District ("District") Groundwater Management Plan in compliance with Chapter 36 of the Texas Water Code. Our Groundwater Management Plan is the product of a public planning process that culminated in the adoption of the plan at the August 16th Upper Trinity Groundwater Conservation District Board Meeting.

The District's boundaries are coextensive with the boundaries of Hood, Montague, Parker and Wise counties. The purpose of the District Groundwater Management Plan is to define the water needs and supply within the District and define the goals that the District will use to manage groundwater in order to meet the needs or to demonstrate that the needs exceed the available groundwater supplies. The District Groundwater Management Plan will be used as the basis for the development of the District's permitting and groundwater management rules.

Please feel free to contact me if you have any questions or comments regarding the enclosed.

Sincerely,

Bob Patterson

Bob Patterson
General Manager

Enclosure: CD with the Adopted Groundwater Management Plan

UPPER TRINITY
TEXAS GROUNDWATER CONSERVATION DISTRICT
HOOD · MONTAGUE · PARKER · WISE

P.O. BOX 1749
1250 E. HWY. 199
SPRINGTOWN, TX 76082

WWW.UPPERTRINITYGCD.COM

August 24, 2010

Eddy Daniel
President
North Texas GCD
114 McKinney Street
Farmersville, TX 75442

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Daniel:

Enclosed you will find a CD with an electronic copy of the Upper Trinity Groundwater Conservation District ("District") Groundwater Management Plan in compliance with Chapter 36 of the Texas Water Code. Our Groundwater Management Plan is the product of a public planning process that culminated in the adoption of the plan at the August 16th Upper Trinity Groundwater Conservation District Board Meeting.

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Please feel free to contact me if you have any questions or comments regarding the enclosed.

Sincerely,

Bob Patterson

Bob Patterson
General Manager

Enclosure: CD with the Adopted Groundwater Management Plan

(817) 523-5200 PHONE (817) 523-7687 FAX TOLL FREE (877) 388-8423

UPPER TRINITY
TEXAS GROUNDWATER CONSERVATION DISTRICT
HOOD MONTAGUE PARKER WISE

P.O. BOX 1749
1250 E. HWY. 199
SPRINGTOWN, TX 76082

WWW.UPPERTRINITYGCD.COM

August 24, 2010

Robert H. Fenoglio
Mayor
City of Nocona
100 Cooke Street
Nocona, TX 76255-2108

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Fenoglio:

Enclosed you will find a CD with an electronic copy of the Upper Trinity Groundwater Conservation District ("District") Groundwater Management Plan in compliance with Chapter 36 of the Texas Water Code. Our Groundwater Management Plan is the product of a public planning process that culminated in the adoption of the plan at the August 16th Upper Trinity Groundwater Conservation District Board Meeting.

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August 24, 2010

Horace Grace
GMA-8 Chairman
Clearwater UWCD
P.O. Box 729
Belton, TX 76513

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Grace:

Enclosed you will find a CD with an electronic copy of the Upper Trinity Groundwater Conservation District ("District") Groundwater Management Plan in compliance with Chapter 36 of the Texas Water Code. Our Groundwater Management Plan is the product of a public planning process that culminated in the adoption of the plan at the August 16th Upper Trinity Groundwater Conservation District Board Meeting.

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SPRINGTOWN, TX 76082

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August 24, 2010

Dennis Hooks
Mayor
City of Weatherford
P.O. Box 255
Weatherford, TX 76086-0255

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Hooks:

Enclosed you will find a CD with an electronic copy of the Upper Trinity Groundwater Conservation District ("District") Groundwater Management Plan in compliance with Chapter 36 of the Texas Water Code. Our Groundwater Management Plan is the product of a public planning process that culminated in the adoption of the plan at the August 16th Upper Trinity Groundwater Conservation District Board Meeting.

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SPRINGTOWN, TX 76082

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August 24, 2010

Doug Hughes
Mayor
City of Springtown
P.O. Box 444
Springtown, TX 76082-0444

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Hughes:

Enclosed you will find a CD with an electronic copy of the Upper Trinity Groundwater Conservation District ("District") Groundwater Management Plan in compliance with Chapter 36 of the Texas Water Code. Our Groundwater Management Plan is the product of a public planning process that culminated in the adoption of the plan at the August 16th Upper Trinity Groundwater Conservation District Board Meeting.

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SPRINGTOWN, TX 76082

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August 24, 2010

Len Jowitt
Mayor
City of Runaway Bay
101 Runaway Bay
Runaway Bay, TX 76426-9426

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Jowitt:

Enclosed you will find a CD with an electronic copy of the Upper Trinity Groundwater Conservation District ("District") Groundwater Management Plan in compliance with Chapter 36 of the Texas Water Code. Our Groundwater Management Plan is the product of a public planning process that culminated in the adoption of the plan at the August 16th Upper Trinity Groundwater Conservation District Board Meeting.

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HOOD MONTAGUE PARKER WISE

P.O. BOX 1749
1280 E. HWY. 199
SPRINGTOWN, TX 76082

WWW.UPPERTRINITYGCD.COM

August 24, 2010

Joe Lambert
Mayor
City of Decatur
P.O. Box 1299
Decatur, TX 76234-6143

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Lambert:

Enclosed you will find a CD with an electronic copy of the Upper Trinity Groundwater Conservation District ("District") Groundwater Management Plan in compliance with Chapter 36 of the Texas Water Code. Our Groundwater Management Plan is the product of a public planning process that culminated in the adoption of the plan at the August 16th Upper Trinity Groundwater Conservation District Board Meeting.

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SPRINGTOWN, TX 76082

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August 24, 2010

Donald Majka
Mayor
City of Bridgeport
900 Thompson Street
Bridgeport, TX 76426-2351

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Majka:

Enclosed you will find a CD with an electronic copy of the Upper Trinity Groundwater Conservation District ("District") Groundwater Management Plan in compliance with Chapter 36 of the Texas Water Code. Our Groundwater Management Plan is the product of a public planning process that culminated in the adoption of the plan at the August 16th Upper Trinity Groundwater Conservation District Board Meeting.

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SPRINGTOWN, TX 76082

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August 24, 2010

Mike McClendon
Upper Basin Regional Manager
Brazos River Authority
P.O. Box 7555
Waco, TX 78714

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. McClendon:

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August 24, 2010

Mark Mendez
Manager
Northern Trinity GCD
100 E. Weatherford, Suite 404
Fort Worth, TX 76196

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Mendez:

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August 24, 2010

Jim Oliver
General Manager
Tarrant Regional Water District
800 East Northside Drive
Fort Worth, TX 76102

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Oliver:

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August 24, 2010

Jim Parks
Region C Chairman
North Texas Municipal Water District
P.O. Box 2408
Wylie, TX 75908

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Parks:

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SPRINGTOWN, TX 76082

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August 24, 2010

Brian L. Sledge
Attorney
Prairielands GCD
816 Congress Avenue, Suite 1900
Austin, TX 78701

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Sledge:

Enclosed you will find a CD with an electronic copy of the Upper Trinity Groundwater Conservation District ("District") Groundwater Management Plan in compliance with Chapter 36 of the Texas Water Code. Our Groundwater Management Plan is the product of a public planning process that culminated in the adoption of the plan at the August 16th Upper Trinity Groundwater Conservation District Board Meeting.

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1250 E. HWY. 199
SPRINGTOWN, TX 76082

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August 24, 2010

David Southern
Mayor
City of Granbury
P.O. Box 969
Granbury, TX 76048-0969

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Southern:

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August 24, 2010

Dale Spurgin
Region G Chairman
Region G Water Planning Group
P.O. Box 148
Anson, TX 79501

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Spurgin:

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SPRINGTOWN, TX 76082

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August 24, 2010

Danny Vance
General Manager
Trinity River Authority of Texas
P.O. Box 60
Arlington, TX 76004

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Vance:

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SPRINGTOWN, TX 76082

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August 24, 2010

David L. Yohe
Regional Manager
Oak Trail Shores, Monarch Utilities I LP
9511 Ranch Road 620 N.
Austin, TX 78726-2908

Subject: Adopted Upper Trinity Groundwater Conservation District Groundwater Management Plan

Dear Mr. Yohe:

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General Manager

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APPENDIX E

Groundwater Management Areas in Texas

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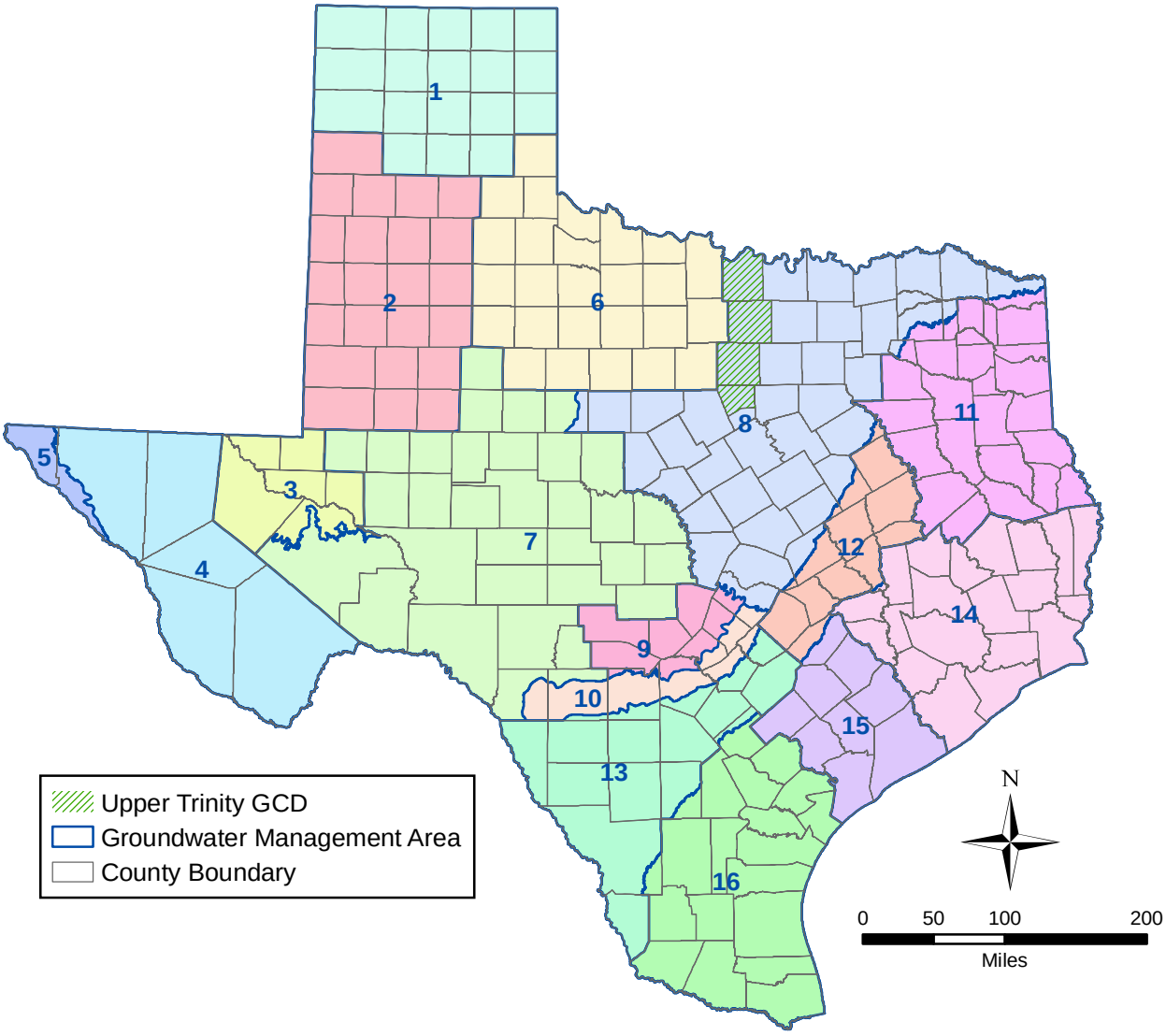
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Groundwater Management Area
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APPENDIX F

GAM Run 08-84mag

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GAM Run 08-84mag

by Shirley C. Wade, P.G.
Texas Water Development Board
Groundwater Availability Modeling Section
(512) 936-0883
March 5, 2009

REQUESTOR:

Ms. Cheryl Maxwell of the Clearwater Underground Water Conservation District acting on behalf of Groundwater Management Area 8.

DESCRIPTION OF REQUEST:

In a letter dated October 6, 2008, Ms. Cheryl Maxwell provided the Texas Water Development Board (TWDB) with the desired future conditions for the Trinity Aquifer in Groundwater Management Area 8 and requested that TWDB estimate managed available groundwater values. A memorandum dated December 15, 2008 provided clarification to the desired future conditions outlined in the letter dated October 6, 2008. In order to match the results of GAM Run 08-06 (Donnelly, 2008) that memorandum made the following corrections:

- the average drawdown for Grayson County in the Glen Rose portion of the Trinity Aquifer was changed from 160 feet to 161 feet,
- the average drawdown for Grayson County in the Hensell portion of the Trinity Aquifer was changed from 161 feet to 160 feet,
- the average drawdown for Brown County in the Hosston portion of the Trinity Aquifer was changed from 2 feet to 1 foot, and
- the average drawdown for Somervell County in the Hosston portion of the Trinity Aquifer was changed from 114 to 113 feet.

This groundwater availability modeling run presents the managed available groundwater for the Trinity Aquifer in Groundwater Management Area 8.

DESIRED FUTURE CONDITIONS:

Desired future conditions for the Trinity Aquifer submitted to TWDB by the groundwater conservation districts in Groundwater Management Area 8:

Bell County

- From estimated year 2000 conditions, the average drawdown of the Paluxy Aquifer should not exceed approximately 134 feet after 50 years.

- From estimated year 2000 conditions, the average drawdown of the Glen Rose Aquifer should not exceed approximately 155 feet after 50 years.
- From estimated year 2000 conditions, the average drawdown of the Hensell Aquifer should not exceed approximately 286 feet after 50 years.
- From estimated year 2000 conditions, the average drawdown of the Hosston Aquifer should not exceed approximately 319 feet after 50 years.

Bosque County

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

Brown County

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

Burnet County

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

Callahan County

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

Collin County

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

Comanche County

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

Cooke County

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

Coryell County

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

Dallas County

- From estimated year 2000 conditions, the average drawdown of the Paluxy Aquifer should not exceed approximately 240 feet after 50 years.
- From estimated year 2000 conditions, the average drawdown of the Glen Rose Aquifer should not exceed approximately 224 feet after 50 years.

- From estimated year 2000 conditions, the average drawdown of the Hensell Aquifer should not exceed approximately 263 feet after 50 years.
- From estimated year 2000 conditions, the average drawdown of the Hosston Aquifer should not exceed approximately 290 feet after 50 years.

Delta County

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

Denton County

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

Eastland County

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

Ellis County

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

Erath County

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

Falls County

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

Fannin County

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

Grayson County

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

Hamilton County

- From estimated year 2000 conditions, the average drawdown of the Paluxy Aquifer should not exceed approximately 0 feet after 50 years.
- From estimated year 2000 conditions, the average drawdown of the Glen Rose Aquifer should not exceed approximately 2 feet after 50 years.

- From estimated year 2000 conditions, the average drawdown of the Hensell Aquifer should not exceed approximately 39 feet after 50 years.
- From estimated year 2000 conditions, the average drawdown of the Hosston Aquifer should not exceed approximately 51 feet after 50 years.

Hill County

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

Hood County

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

Hunt County

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

Johnson County

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

Kaufman County

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

Lamar County

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

Lampasas County

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

Limestone County

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

McLennan County

- From estimated year 2000 conditions, the average drawdown of the Paluxy Aquifer should not exceed approximately 251 feet after 50 years.
- From estimated year 2000 conditions, the average drawdown of the Glen Rose Aquifer should not exceed approximately 291 feet after 50 years.

- From estimated year 2000 conditions, the average drawdown of the Hensell Aquifer should not exceed approximately 489 feet after 50 years.
- From estimated year 2000 conditions, the average drawdown of the Hosston Aquifer should not exceed approximately 527 feet after 50 years.

Milam County

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

Mills County

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

Montague County

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

Navarro County

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

Parker County

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

Red River County

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

Rockwall County

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

Somervell County

- From estimated year 2000 conditions, the average drawdown of the Paluxy Aquifer should not exceed approximately 1 foot after 50 years.
- From estimated year 2000 conditions, the average drawdown of the Glen Rose Aquifer should not exceed approximately 4 feet after 50 years.
- From estimated year 2000 conditions, the average drawdown of the Hensell Aquifer should not exceed approximately 53 feet after 50 years.
- From estimated year 2000 conditions, the average drawdown of the Hosston Aquifer should not exceed approximately 113 feet after 50 years.

Tarrant County

- From estimated year 2000 conditions, the average drawdown of the Paluxy Aquifer should not exceed approximately 33 feet after 50 years.
- From estimated year 2000 conditions, the average drawdown of the Glen Rose Aquifer should not exceed approximately 75 feet after 50 years.

- From estimated year 2000 conditions, the average drawdown of the Hensell Aquifer should not exceed approximately 160 feet after 50 years.
- From estimated year 2000 conditions, the average drawdown of the Hosston Aquifer should not exceed approximately 173 feet after 50 years.

Taylor County

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

Travis County

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

Williamson County

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

Wise County

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

This information is summarized in Table 1.

Table 1. Summary of requested desired future conditions for the Trinity Aquifer in Groundwater Management Area 8.

County	Average water level decrease (feet)			
	Paluxy	Glen Rose	Hensell	Hosston
Bell	134	155	286	319
Bosque	26	33	201	220
Brown	0	0	1	1
Burnet	1	1	11	29
Callahan	n/a	n/a	0	2
Collin	298	247	224	236
Comanche	0	0	2	11
Cooke	26	42	60	78
Coryell	15	15	156	179
Dallas	240	224	263	290
Delta	175	162	162	159
Denton	98	134	180	214
Eastland	0	0	0	0
Ellis	265	283	336	362
Erath	1	1	11	27
Falls	279	354	459	480
Fannin	212	196	182	181
Grayson	175	161	160	165
Hamilton	0	2	39	51
Hill	209	253	381	406
Hood	1	2	16	56
Hunt	286	245	215	223
Johnson	37	83	208	234
Kaufman	303	286	295	312
Lamar	132	130	136	134
Lampasas	0	1	12	23
Limestone	328	392	475	492
McLennan	251	291	489	527
Milam	252	294	337	344
Mills	0	0	3	12
Montague	0	1	3	12
Navarro	344	353	399	413
Parker	5	6	16	40
Red River	82	77	78	78
Rockwall	346	272	248	265
Somervell	1	4	53	113
Tarrant	33	75	160	173
Taylor	n/a	n/a	n/a	3
Travis	124	61	98	116
Williamson	108	88	142	166
Wise	4	14	23	53

EXECUTIVE SUMMARY:

TWDB staff ran the groundwater availability model for the northern part of the Trinity Aquifer and the Woodbine Aquifer to determine the managed available groundwater based on the desired future conditions for the Trinity Aquifer adopted by the groundwater conservation districts in Groundwater Management Area 8. The results (Tables 2, 3, 4, and 5) show 65,025 acre-feet per year of managed available groundwater for the Paluxy Aquifer (of which 89 acre-feet are outside the official aquifer boundary), 7,287 acre-feet per year of managed available groundwater for the Glen Rose Formation (of which 55 acre-feet are outside the official aquifer boundary) , 46,067 acre-feet per year of managed available groundwater for the Hensell Aquifer (of which 342 acre-feet are outside the official aquifer boundary), and 130,340 acre-feet per year of managed available groundwater for the Hosston Aquifer (of which 875 acre-feet are outside the official aquifer boundary)in Groundwater Management Area 8.

METHODS:

This request is based on previous GAM Run 08-06 (Donnelly, 2008). In that simulation, average streamflows and evapotranspiration rates were used for each year of the predictive simulation. Average recharge was used for the first forty-seven years of the simulation, followed by a three-year drought-of-record.

PARAMETERS AND ASSUMPTIONS:

The groundwater availability model for the northern part of the Trinity Aquifer was used for this model run. The parameters and assumptions for this model are described below:

- We used version 1.01 of the groundwater availability model for the northern part of the Trinity Aquifer for this run. See Bené and others (2004) for assumptions and limitations of the model.

- The model includes seven layers, representing the Woodbine Aquifer (Layer 1), the Washita and Fredericksburg Groups (Layer 2), the Paluxy Formation (Layer 3), the Glen Rose Formation (Layer 4), the Hensell Formation (Layer 5), the Pearsall/Cow Creek/Hammett/Sligo Members (Layer 6), and the Hosston Formation (Layer 7). The Trinity Aquifer is comprised of the Paluxy, Hensell, and Hosston formations. The Woodbine, Paluxy, Hensell, and Hosston layers are the main aquifers used in the region.

- The mean absolute error (a measure of the difference between simulated and actual water levels during model calibration) for the four main aquifers in the model (Woodbine, Paluxy, Hensell, and Hosston) for the calibration and verification time periods (1980 to 2000) ranged from approximately 38 to 75 feet. The root mean squared error was less than ten percent of the maximum change in water levels across the model (Bené and others, 2004).

- We used average annual recharge conditions based on climate data from 1980 to 1999 for the simulation. The last three years of the simulation used drought-of-record recharge conditions, which were defined as the years 1954 to 1956.

- The model uses the MODFLOW stream-routing package to simulate the interaction between the aquifer(s) and major intermittent streams flowing in the region. Flow both from the stream to the aquifer and from the aquifer to the stream is allowed, and the direction of flow is determined by the water levels in the aquifer and stream during each stress period in the simulation.

- Spatial and vertical pumpage distribution is described in GAM Run 08-06 (Donnelly, 2008).

Estimates of managed available groundwater were calculated for several geographic areas created by the geographic information systems overlay analysis of counties, groundwater conservation districts, regional water planning areas, major river basins, the boundary extents of Groundwater Management Area 8, and the northern portion of the Trinity Aquifer. These geographically divided sections of managed available groundwater values provide the greatest amount of flexibility to the groundwater management districts for summarizing managed available groundwater for both desired future conditions of the groundwater management area and for district level groundwater management planning. The geographically divided sections of managed available groundwater values also assist the regional water planning areas with their planning efforts. It should be noted that the model included portions of the units that comprise the Trinity Aquifer that spatially fall outside the official aquifer boundaries. We have provided estimates for these outliers separately from areas within the official aquifer boundary. These areas may contain water with total dissolved solids greater than 3,000 part per million.

Table 2. Estimates of managed available groundwater for the Paluxy Aquifer by geographic subdivisions. See Figure 1 to locate Map Reference (MapRef).

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
43	N. Trinity-Paluxy	Bell	G	Brazos	Clearwater	8	Bell	n/a	96
45	N. Trinity-Paluxy	Bosque	G	Brazos	None	8	Bosque	n/a	1,013
50	N. Trinity-Paluxy	Brown	F	Brazos	None	8	Brown	n/a	1
52	N. Trinity-Paluxy	Brown	F	Colorado	None	8	Brown	n/a	17
54	N. Trinity-Paluxy	Burnet	K	Brazos	Central Texas	8	Burnet	n/a	141
56	N. Trinity-Paluxy	Burnet	K	Colorado	Central Texas	8	Burnet	n/a	41
59	N. Trinity-Paluxy	Collin	C	Sabine	None	8	Collin	n/a	0
60	N. Trinity-Paluxy-outside	Collin	C	Sabine	None	8	Collin	n/a	0
61	N. Trinity-Paluxy	Collin	C	Trinity	None	8	Collin	n/a	1,762
62	N. Trinity-Paluxy-outside	Collin	C	Trinity	None	8	Collin	n/a	0
64	N. Trinity-Paluxy	Comanche	G	Brazos	Middle Trinity	8	Comanche	n/a	18
66	N. Trinity-Paluxy	Comanche	G	Colorado	Middle Trinity	8	Comance	n/a	1
70	N. Trinity-Paluxy	Cooke	C	Red	None	8	Cooke	n/a	640
71	N. Trinity-Paluxy	Cooke	C	Trinity	None	8	Cooke	n/a	2,888
73	N. Trinity-Paluxy	Coryell	G	Brazos	None	8	Coryell	n/a	254
74	N. Trinity-Paluxy	Dallas	C	Trinity	None	8	Dallas	n/a	433
76	N. Trinity-Paluxy	Delta	D	Sulphur	None	8	Delta	n/a	0
77	N. Trinity-Paluxy-outside	Delta	D	Sulphur	None	8	Delta	n/a	0
78	N. Trinity-Paluxy	Denton	C	Trinity	None	8	Denton	n/a	9,822
80	N. Trinity-Paluxy	Eastland	G	Brazos	None	8	Eastland	n/a	4
82	N. Trinity-Paluxy	Ellis	C	Trinity	None	8	Ellis	n/a	400
83	N. Trinity-Paluxy-outside	Ellis	C	Trinity	None	8	Ellis	n/a	0
85	N. Trinity-Paluxy	Erath	G	Brazos	Middle Trinity	8	Erath	n/a	4,230
87	N. Trinity-Paluxy	Falls	G	Brazos	None	8	Falls	n/a	0

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
88	N. Trinity-Paluxy-outside	Falls	G	Brazos	None	8	Falls	n/a	0
90	N. Trinity-Paluxy	Fannin	C	Red	None	8	Fannin	n/a	205
91	N. Trinity-Paluxy	Fannin	C	Sulphur	None	8	Fannin	n/a	0
92	N. Trinity-Paluxy	Fannin	C	Trinity	None	8	Fannin	n/a	83
95	N. Trinity-Paluxy	Grayson	C	Red	None	8	Grayson	n/a	3,863
96	N. Trinity-Paluxy	Grayson	C	Trinity	None	8	Grayson	n/a	845
98	N. Trinity-Paluxy	Hamilton	G	Brazos	None	8	Hamilton	n/a	291
99	N. Trinity-Paluxy	Hill	G	Trinity	None	8	Hill	n/a	48
100	N. Trinity-Paluxy	Hill	G	Brazos	None	8	Hill	n/a	1,206
101	N. Trinity-Paluxy	Hood	G	Trinity	Upper Trinity	8	Hood	n/a	11
103	N. Trinity-Paluxy	Hood	G	Brazos	Upper Trinity	8	Hood	n/a	931
108	N. Trinity-Paluxy	Hunt	D	Sulphur	None	8	Hunt	n/a	0
109	N. Trinity-Paluxy-outside	Hunt	D	Sulphur	None	8	Hunt	n/a	0
111	N. Trinity-Paluxy	Hunt	D	Sabine	None	8	Hunt	n/a	0
112	N. Trinity-Paluxy-outside	Hunt	D	Sabine	None	8	Hunt	n/a	0
113	N. Trinity-Paluxy	Hunt	D	Trinity	None	8	Hunt	n/a	551
114	N. Trinity-Paluxy	Johnson	G	Trinity	None	8	Johnson	n/a	6,791
115	N. Trinity-Paluxy	Johnson	G	Brazos	None	8	Johnson	n/a	2,702
117	N. Trinity-Paluxy-outside	Kaufman	C	Sabine	None	8	Kaufman	n/a	4
119	N. Trinity-Paluxy	Kaufman	C	Trinity	None	8	Kaufman	n/a	13
120	N. Trinity-Paluxy-outside	Kaufman	C	Trinity	None	8	Kaufman	n/a	85
122	N. Trinity-Paluxy	Lamar	D	Red	None	8	Lamar	n/a	0
123	N. Trinity-Paluxy	Lamar	D	Sulphur	None	8	Lamar	n/a	0
124	N. Trinity-Paluxy-outside	Lamar	D	Sulphur	None	8	Lamar	n/a	0
126	N. Trinity-Paluxy	Lampasas	G	Brazos	Saratoga	8	Lampasas	n/a	13

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
128	N. Trinity-Paluxy	Lampasas	G	Colorado	Saratoga	8	Lampasas	n/a	0
130	N. Trinity-Paluxy	Limestone	G	Trinity	None	8	Limestone	n/a	0
131	N. Trinity-Paluxy-outside	Limestone	G	Trinity	None	8	Limestone	n/a	0
133	N. Trinity-Paluxy	Limestone	G	Brazos	None	8	Limestone	n/a	0
134	N. Trinity-Paluxy-outside	Limestone	G	Brazos	None	8	Limestone	n/a	0
135	N. Trinity-Paluxy	McLennan	G	Brazos	None	8	McLennan	n/a	231
137	N. Trinity-Paluxy	Milam	G	Brazos	Post Oak Savannah	8	Milam	n/a	0
138	N. Trinity-Paluxy-outside	Milam	G	Brazos	Post Oak Savannah	8	Milam	n/a	0
140	N. Trinity-Paluxy	Mills	K	Brazos	Fox Crossing	8	Mills	n/a	3
142	N. Trinity-Paluxy	Mills	K	Colorado	Fox Crossing	8	Mills	n/a	2
145	N. Trinity-Paluxy	Montague	B	Red	Upper Trinity	8	Montague	n/a	29
147	N. Trinity-Paluxy	Montague	B	Trinity	Upper Trinity	8	Montague	n/a	476
149	N. Trinity-Paluxy	Navarro	C	Trinity	None	8	Navarro	n/a	413
150	N. Trinity-Paluxy-outside	Navarro	C	Trinity	None	8	Navarro	n/a	0
151	N. Trinity-Paluxy	Parker	C	Trinity	Upper Trinity	8	Parker	n/a	9,370
153	N. Trinity-Paluxy	Parker	C	Brazos	Upper Trinity	8	Parker	n/a	430
156	N. Trinity-Paluxy	Red River	D	Red	None	8	Red River	n/a	206
157	N. Trinity-Paluxy-outside	Red River	D	Red	None	8	Red River	n/a	0
159	N. Trinity-Paluxy	Red River	D	Sulphur	None	8	Red River	n/a	267
160	N. Trinity-Paluxy-outside	Red River	D	Sulphur	None	8	Red River	n/a	0
161	N. Trinity-Paluxy-outside	Rockwall	C	Sabine	None	8	Rockwall	n/a	0
162	N. Trinity-Paluxy	Rockwall	C	Trinity	None	8	Rockwall	n/a	958
163	N. Trinity-Paluxy-outside	Rockwall	C	Trinity	None	8	Rockwall	n/a	0

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
165	N. Trinity-Paluxy	Somervell	G	Brazos	None	8	Somervell	n/a	120
166	N. Trinity-Paluxy	Tarrant	C	Trinity	Northern Trinity	8	Tarrant	n/a	10,544
169	N. Trinity-Paluxy	Travis	K	Brazos	None	8	Travis	n/a	0
171	N. Trinity-Paluxy	Travis	K	Colorado	None	8	Travis	n/a	3
174	N. Trinity-Paluxy	Williamson	G	Colorado	None	8	Williamson	n/a	10
175	N. Trinity-Paluxy-outside	Williamson	G	Brazos	None	8	Williamson	n/a	0
176	N. Trinity-Paluxy	Williamson	K	Brazos	None	8	Williamson	n/a	0
177	N. Trinity-Paluxy	Williamson	G	Colorado	None	8	Williamson	n/a	1
178	N. Trinity-Paluxy	Williamson	K	Colorado	None	8	Williamson	n/a	0
180	N. Trinity-Paluxy	Wise	C	Trinity	Upper Trinity	8	Wise	n/a	2,559

Aquifer marked as outside with table row shaded denotes that the volume of water is from an area of the model outside the official aquifer boundary.

GCD = Groundwater conservation district.
GeoArea = Geographic areas defined by unique desired future conditions as specified by a groundwater management area.
GMA = Groundwater management area.
MAG = Managed available groundwater in units of acre-feet per year.
Clearwater = Clearwater Underground Water Conservation District
McLennan C. = McLennan County Groundwater Conservation District
N. Trinity = Northern Trinity Groundwater Conservation District
Fox Crossing = Fox Crossing Water District
Saratoga = Saratoga Underground Water Conservation District
RWPA = Regional water planning area.

Table 3. Estimates of managed available groundwater for the Glen Rose Aquifer by geographic subdivisions. See Figure 2 to locate MapRef.

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
43	N. Trinity-Glen Rose	Bell	G	Brazos	Clearwater	8	Bell	n/a	880
44	N. Trinity-Glen Rose	Bosque	G	Brazos	None	8	Bosque	n/a	258
49	N. Trinity-Glen Rose	Brown	F	Brazos	None	8	Brown	n/a	0
51	N. Trinity-Glen Rose	Brown	F	Colorado	None	8	Brown	n/a	0
53	N. Trinity-Glen Rose	Burnet	K	Brazos	Central Texas	8	Burnet	n/a	145
55	N. Trinity-Glen Rose	Burnet	K	Colorado	Central Texas	8	Burnet	n/a	60
58	N. Trinity-Glen Rose	Collin	C	Sabine	None	8	Collin	n/a	0
59	N. Trinity-Glen Rose-outside	Collin	C	Sabine	None	8	Collin	n/a	0
60	N. Trinity-Glen Rose	Collin	C	Trinity	None	8	Collin	n/a	0
61	N. Trinity-Glen Rose-outside	Collin	C	Trinity	None	8	Collin	n/a	0
63	N. Trinity-Glen Rose	Comanche	G	Brazos	Middle Trinity	8	Comanche	n/a	0
64	N. Trinity-Glen Rose	Comanche	G	Colorado	Middle Trinity	8	Comanche	n/a	0
68	N. Trinity-Glen Rose	Cooke	C	Red	None	8	Cooke	n/a	0
69	N. Trinity-Glen Rose	Cooke	C	Trinity	None	8	Cooke	n/a	0
70	N. Trinity-Glen Rose	Coryell	G	Brazos	None	8	Coryell	n/a	784
71	N. Trinity-Glen Rose	Dallas	C	Trinity	None	8	Dallas	n/a	0
73	N. Trinity-Glen Rose	Delta	D	Sulphur	None	8	Delta	n/a	0
74	N. Trinity-Glen Rose-outside	Delta	D	Sulphur	None	8	Delta	n/a	0
75	N. Trinity-Glen Rose	Denton	C	Trinity	None	8	Denton	n/a	0
77	N. Trinity-Glen Rose	Eastland	G	Brazos	None	8	Eastland	n/a	0
79	N. Trinity-Glen Rose	Ellis	C	Trinity	None	8	Ellis	n/a	0
80	N. Trinity-Glen Rose-outside	Ellis	C	Trinity	None	8	Ellis	n/a	0

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
82	N. Trinity-Glen Rose	Erath	G	Brazos	Middle Trinity	8	Erath	n/a	1
84	N. Trinity-Glen Rose	Falls	G	Brazos	None	8	Falls	n/a	2
85	N. Trinity-Glen Rose-outside	Falls	G	Brazos	None	8	Falls	n/a	0
87	N. Trinity-Glen Rose	Fannin	C	Red	None	8	Fannin	n/a	0
88	N. Trinity-Glen Rose	Fannin	C	Sulphur	None	8	Fannin	n/a	0
89	N. Trinity-Glen Rose	Fannin	C	Trinity	None	8	Fannin	n/a	0
92	N. Trinity-Glen Rose	Grayson	C	Red	None	8	Grayson	n/a	0
93	N. Trinity-Glen Rose	Grayson	C	Trinity	None	8	Grayson	n/a	0
95	N. Trinity-Glen Rose	Hamilton	G	Brazos	None	8	Hamilton	n/a	46
96	N. Trinity-Glen Rose	Hill	G	Trinity	None	8	Hill	n/a	0
97	N. Trinity-Glen Rose	Hill	G	Brazos	None	8	Hill	n/a	10
98	N. Trinity-Glen Rose	Hood	G	Trinity	Upper Trinity	8	Hood	n/a	0
100	N. Trinity-Glen Rose	Hood	G	Brazos	Upper Trinity	8	Hood	n/a	4
105	N. Trinity-Glen Rose	Hunt	D	Sulphur	None	8	Hunt	n/a	0
106	N. Trinity-Glen Rose-outside	Hunt	D	Sulphur	None	8	Hunt	n/a	0
108	N. Trinity-Glen Rose	Hunt	D	Sabine	None	8	Hunt	n/a	0
109	N. Trinity-Glen Rose-outside	Hunt	D	Sabine	None	8	Hunt	n/a	0
110	N. Trinity-Glen Rose	Hunt	D	Trinity	None	8	Hunt	n/a	0
111	N. Trinity-Glen Rose	Johnson	G	Trinity	None	8	Johnson	n/a	4
112	N. Trinity-Glen Rose	Johnson	G	Brazos	None	8	Johnson	n/a	20
114	N. Trinity-Glen Rose-outside	Kaufman	C	Sabine	None	8	Kaufman	n/a	0
116	N. Trinity-Glen Rose	Kaufman	C	Trinity	None	8	Kaufman	n/a	0
117	N. Trinity-Glen Rose-outside	Kaufman	C	Trinity	None	8	Kaufman	n/a	0

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
119	N. Trinity-Glen Rose	Lamar	D	Red	None	8	Lamar	n/a	0
120	N. Trinity-Glen Rose	Lamar	D	Sulphur	None	8	Lamar	n/a	0
121	N. Trinity-Glen Rose-outside	Lamar	D	Sulphur	None	8	Lamar	n/a	0
123	N. Trinity-Glen Rose	Lampasas	G	Brazos	Saratoga	8	Lampasas	n/a	769
125	N. Trinity-Glen Rose	Lampasas	G	Colorado	Saratoga	8	Lampasas	n/a	4
127	N. Trinity-Glen Rose	Limestone	G	Trinity	None	8	Limestone	n/a	0
128	N. Trinity-Glen Rose-outside	Limestone	G	Trinity	None	8	Limestone	n/a	0
130	N. Trinity-Glen Rose	Limestone	G	Brazos	None	8	Limestone	n/a	4
131	N. Trinity-Glen Rose-outside	Limestone	G	Brazos	None	8	Limestone	n/a	0
132	N. Trinity-Glen Rose	McLennan	G	Brazos	None	8	McLennan	n/a	265
134	N. Trinity-Glen Rose	Milam	G	Brazos	Post Oak Savannah	8	Milam	n/a	95
135	N. Trinity-Glen Rose-outside	Milam	G	Brazos	Post Oak Savannah	8	Milam	n/a	54
136	N. Trinity-Glen Rose	Mills	K	Brazos	Fox Crossing	8	Mills	n/a	59
138	N. Trinity-Glen Rose	Mills	K	Colorado	Fox Crossing	8	Mills	n/a	7
141	N. Trinity-Glen Rose	Montague	B	Red	Upper Trinity	8	Montague	n/a	0
143	N. Trinity-Glen Rose	Montague	B	Brazos	Upper Trinity	8	Montague	n/a	0
145	N. Trinity-Glen Rose	Navarro	C	Trinity	None	8	Navarro	n/a	0
146	N. Trinity-Glen Rose-outside	Navarro	C	Trinity	None	8	Navarro	n/a	0
147	N. Trinity-Glen Rose	Parker	C	Trinity	Upper Trinity	8	Parker	n/a	189
149	N. Trinity-Glen Rose	Parker	C	Brazos	Upper Trinity	8	Parker	n/a	3
152	N. Trinity-Glen Rose	Red River	D	Red	None	8	Red River	n/a	0

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
153	N. Trinity-Glen Rose-outside	Red River	D	Red	None	8	Red River	n/a	0
155	N. Trinity-Glen Rose	Red River	D	Sulphur	None	8	Red River	n/a	0
156	N. Trinity-Glen Rose-outside	Red River	D	Sulphur	None	8	Red River	n/a	0
157	N. Trinity-Glen Rose-outside	Rockwall	C	Sabine	None	8	Rockwall	n/a	0
158	N. Trinity-Glen Rose	Rockwall	C	Trinity	None	8	Rockwall	n/a	0
159	N. Trinity-Glen Rose-outside	Rockwall	C	Trinity	None	8	Rockwall	n/a	0
160	N. Trinity-Glen Rose	Somervell	G	Brazos	None	8	Somervell	n/a	134
161	N. Trinity-Glen Rose	Tarrant	C	Trinity	Northern Trinity	8	Tarrant	n/a	112
164	N. Trinity-Glen Rose	Travis	K	Brazos	None	8	Travis	n/a	4
166	N. Trinity-Glen Rose	Travis	K	Colorado	None	8	Travis	n/a	2,608
168	N. Trinity-Glen Rose	Williamson	G	Brazos	None	8	Williamson	n/a	604
169	N. Trinity-Glen Rose-outside	Williamson	G	Brazos	None	8	Williamson	n/a	1
170	N. Trinity-Glen Rose	Williamson	K	Brazos	None	8	Williamson	n/a	81
171	N. Trinity-Glen Rose	Williamson	G	Colorado	None	8	Williamson	n/a	37
172	N. Trinity-Glen Rose	Williamson	K	Colorado	None	8	Williamson	n/a	37
174	N. Trinity-Glen Rose	Wise	C	Trinity	Upper Trinity	8	Wise	n/a	5

Aquifer marked as outside with table row shaded denotes that the volume of water is from an area of the model outside the official aquifer boundary.

GCD = Groundwater conservation district.

GeoArea = Geographic areas defined by unique desired future conditions as specified by a groundwater management area.

GMA = Groundwater management area.

MAG = Managed available groundwater in units of acre-feet per year.

Clearwater = Clearwater Underground Water Conservation District

McLennan C. = McLennan County Groundwater Conservation District

N. Trinity = Northern Trinity Groundwater Conservation District

Fox Crossing = Fox Crossing Water District

Saratoga = Saratoga Underground Water Conservation District

RWPA = Regional water planning area.

Table 4. Estimates of managed available groundwater for the Hensell Aquifer by geographic subdivisions. See Figure 3 for location of MapRef.

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
43	N. Trinity-Hensell	Bell	G	Brazos	Clearwater	8	Bell	n/a	1,099
44	N. Trinity-Hensell	Bosque	G	Brazos	None	8	Bosque	n/a	1,749
48	N. Trinity-Hensell	Brown	F	Brazos	None	8	Brown	n/a	2
50	N. Trinity-Hensell	Brown	F	Colorado	None	8	Brown	n/a	77
52	N. Trinity-Hensell	Burnet	K	Brazos	Central Texas	8	Burnet	n/a	590
54	N. Trinity-Hensell	Burnet	K	Colorado	Central Texas	8	Burnet	n/a	100
56	N. Trinity-Hensell	Callahan	G	Brazos	None	8	Callahan	n/a	9
58	N. Trinity-Hensell	Callahan	G	Colorado	None	8	Callahan	n/a	114
59	N. Trinity-Hensell	Collin	C	Sabine	None	8	Collin	n/a	0
60	N. Trinity-Hensell-outside	Collin	C	Sabine	None	8	Collin	n/a	0
61	N. Trinity-Hensell	Collin	C	Trinity	None	8	Collin	n/a	103
62	N. Trinity-Hensell-outside	Collin	C	Trinity	None	8	Collin	n/a	0
64	N. Trinity-Hensell	Comanche	G	Brazos	Middle Trinity	8	Comanche	n/a	413
65	N. Trinity-Hensell	Comanche	G	Colorado	Middle Trinity	8	Comanche	n/a	6
69	N. Trinity-Hensell	Cooke	C	Red	None	8	Cooke	n/a	298
70	N. Trinity-Hensell	Cooke	C	Trinity	None	8	Cooke	n/a	1,313
71	N. Trinity-Hensell	Coryell	G	Brazos	None	8	Coryell	n/a	1,765
72	N. Trinity-Hensell	Dallas	C	Trinity	None	8	Dallas	n/a	1,121
74	N. Trinity-Hensell	Delta	D	Sulphur	None	8	Delta	n/a	50
75	N. Trinity-Hensell-outside	Delta	D	Sulphur	None	8	Delta	n/a	131
76	N. Trinity-Hensell	Denton	C	Trinity	None	8	Denton	n/a	3,112
78	N. Trinity-Hensell	Eastland	G	Brazos	None	8	Eastland	n/a	73
80	N. Trinity-Hensell	Eastland	G	Colorado	None	8	Eastland	n/a	6

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
81	N. Trinity-Hensell	Ellis	C	Trinity	None	8	Ellis	n/a	1,142
82	N. Trinity-Hensell-outside	Ellis	C	Trinity	None	8	Ellis	n/a	0
84	N. Trinity-Hensell	Erath	G	Brazos	Middle Trinity	8	Erath	n/a	9,142
86	N. Trinity-Hensell	Falls	G	Brazos	None	8	Falls	n/a	22
87	N. Trinity-Hensell-outside	Falls	G	Brazos	None	8	Falls	n/a	0
89	N. Trinity-Hensell	Fannin	C	Red	None	8	Fannin	n/a	203
90	N. Trinity-Hensell	Fannin	C	Sulphur	None	8	Fannin	n/a	0
91	N. Trinity-Hensell	Fannin	C	Trinity	None	8	Fannin	n/a	0
94	N. Trinity-Hensell	Grayson	C	Red	None	8	Grayson	n/a	1,929
95	N. Trinity-Hensell	Grayson	C	Trinity	None	8	Grayson	n/a	416
96	N. Trinity-Hensell	Hamilton	G	Brazos	None	8	Hamilton	n/a	1,109
97	N. Trinity-Hensell	Hill	G	Trinity	None	8	Hill	n/a	9
98	N. Trinity-Hensell	Hill	G	Brazos	None	8	Hill	n/a	924
99	N. Trinity-Hensell	Hood	G	Trinity	Upper Trinity	8	Hood	n/a	16
101	N. Trinity-Hensell	Hood	G	Brazos	Upper Trinity	8	Hood	n/a	3,579
106	N. Trinity-Hensell	Hunt	D	Sulphur	None	8	Hunt	n/a	0
107	N. Trinity-Hensell-outside	Hunt	D	Sulphur	None	8	Hunt	n/a	0
109	N. Trinity-Hensell	Hunt	D	Sabine	None	8	Hunt	n/a	0
110	N. Trinity-Hensell-outside	Hunt	D	Sabine	None	8	Hunt	n/a	0
111	N. Trinity-Hensell	Hunt	D	Trinity	None	8	Hunt	n/a	0
112	N. Trinity-Hensell	Johnson	G	Trinity	None	8	Johnson	n/a	349
113	N. Trinity-Hensell	Johnson	G	Brazos	None	8	Johnson	n/a	716
115	N. Trinity-Hensell-outside	Kaufman	C	Sabine	None	8	Kaufman	n/a	9
117	N. Trinity-Hensell	Kaufman	C	Trinity	None	8	Kaufman	n/a	30
118	N. Trinity-Hensell-outside	Kaufman	C	Trinity	None	8	Kaufman	n/a	201

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
120	N. Trinity-Hensell	Lamar	D	Red	None	8	Lamar	n/a	660
121	N. Trinity-Hensell	Lamar	D	Sulphur	None	8	Lamar	n/a	0
122	N. Trinity-Hensell-outside	Lamar	D	Sulphur	None	8	Lamar	n/a	1
124	N. Trinity-Hensell	Lampasas	G	Brazos	Saratoga	8	Lampasas	n/a	878
126	N. Trinity-Hensell	Lampasas	G	Colorado	Saratoga	8	Lampasas	n/a	7
128	N. Trinity-Hensell	Limestone	G	Trinity	None	8	Limestone	n/a	0
129	N. Trinity-Hensell-outside	Limestone	G	Trinity	None	8	Limestone	n/a	0
131	N. Trinity-Hensell	Limestone	G	Brazos	None	8	Limestone	n/a	15
132	N. Trinity-Hensell-outside	Limestone	G	Brazos	None	8	Limestone	n/a	0
133	N. Trinity-Hensell	McLennan	G	Brazos	None	8	McLennan	n/a	4,190
135	N. Trinity-Hensell	Milam	G	Brazos	Post Oak Savannah	8	Milam	n/a	36
136	N. Trinity-Hensell-outside	Milam	G	Brazos	Post Oak Savannah	8	Milam	n/a	0
137	N. Trinity-Hensell	Mills	K	Brazos	Fox Crossing	8	Mills	n/a	832
139	N. Trinity-Hensell	Mills	K	Colorado	Fox Crossing	8	Mills	n/a	114
142	N. Trinity-Hensell	Montague	B	Red	Upper Trinity	8	Montague	n/a	20
144	N. Trinity-Hensell	Montague	B	Trinity	Upper Trinity	8	Montague	n/a	342
146	N. Trinity-Hensell	Navarro	C	Trinity	None	8	Navarro	n/a	256
147	N. Trinity-Hensell-outside	Navarro	C	Trinity	None	8	Navarro	n/a	0
148	N. Trinity-Hensell	Parker	C	Trinity	Upper Trinity	8	Parker	n/a	884
150	N. Trinity-Hensell	Parker	C	Brazos	Upper Trinity	8	Parker	n/a	557
153	N. Trinity-Hensell	Red River	D	Red	None	8	Red River	n/a	19
154	N. Trinity-Hensell-outside	Red River	D	Red	None	8	Red River	n/a	0
156	N. Trinity-Hensell	Red River	D	Sulphur	None	8	Red River	n/a	0
157	N. Trinity-	Red River	D	Sulphur	None	8	Red River	n/a	0

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
	Hensell-outside								
158	N. Trinity-Hensell-outside	Rockwall	C	Sabine	None	8	Rockwall	n/a	0
159	N. Trinity-Hensell	Rockwall	C	Trinity	None	8	Rockwall	n/a	0
160	N. Trinity-Hensell-outside	Rockwall	C	Trinity	None	8	Rockwall	n/a	0
161	N. Trinity-Hensell	Somervell	G	Brazos	None	8	Somervell	n/a	741
162	N. Trinity-Hensell	Tarrant	C	Trinity	Northern Trinity	8	Tarrant	n/a	2,535
165	N. Trinity-Hensell	Travis	K	Brazos	None	8	Travis	n/a	2
167	N. Trinity-Hensell	Travis	K	Colorado	None	8	Travis	n/a	154
169	N. Trinity-Hensell	Williamson	G	Brazos	None	8	Williamson	n/a	363
170	N. Trinity-Hensell-outside	Williamson	G	Brazos	None	8	Williamson	n/a	0
171	N. Trinity-Hensell	Williamson	K	Brazos	None	8	Williamson	n/a	39
172	N. Trinity-Hensell	Williamson	G	Colorado	None	8	Williamson	n/a	5
173	N. Trinity-Hensell	Williamson	K	Colorado	None	8	Williamson	n/a	8
175	N. Trinity-Hensell	Wise	C	Trinity	Upper Trinity	8	Wise	n/a	1,480

Aquifer marked as outside with table row shaded denotes that the volume of water is from an area of the model outside the official aquifer boundary.

GCD = Groundwater conservation district.
GeoArea = Geographic areas defined by unique desired future conditions as specified by a groundwater management area.
GMA = Groundwater management area.
MAG = Managed available groundwater in units of acre-feet per year.
Clearwater = Clearwater Underground Water Conservation District
McLennan C. = McLennan County Groundwater Conservation District
N. Trinity = Northern Trinity Groundwater Conservation District
Fox Crossing = Fox Crossing Water District
Saratoga = Saratoga Underground Water Conservation District
RWPA = Regional water planning area.

Table 5. Estimates of managed available groundwater for the Hosston Aquifer by geographic subdivisions. See Figure 4 for location of MapRef.

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
44	N. Trinity-Hosston	Bell	G	Brazos	Clearwater	8	Bell	n/a	4,993
45	N. Trinity-Hosston	Bosque	G	Brazos	None	8	Bosque	n/a	2,829
49	N. Trinity-Hosston	Brown	F	Brazos	None	8	Brown	n/a	25
51	N. Trinity-Hosston	Brown	F	Colorado	None	8	Brown	n/a	1,923
53	N. Trinity-Hosston	Burnet	K	Brazos	Central Texas	8	Burnet	n/a	1,847
55	N. Trinity-Hosston	Burnet	K	Colorado	Central Texas	8	Burnet	n/a	622
57	N. Trinity-Hosston	Callahan	G	Brazos	None	8	Callahan	n/a	1,783
59	N. Trinity-Hosston	Callahan	G	Colorado	None	8	Callahan	n/a	1,871
60	N. Trinity-Hosston	Collin	C	Sabine	None	8	Collin	n/a	0
61	N. Trinity-Hosston-outside	Collin	C	Sabine	None	8	Collin	n/a	0
62	N. Trinity-Hosston	Collin	C	Trinity	None	8	Collin	n/a	239
63	N. Trinity-Hosston-outside	Collin	C	Trinity	None	8	Collin	n/a	0
65	N. Trinity-Hosston	Comanche	G	Brazos	Middle Trinity	8	Comanche	n/a	23,215
66	N. Trinity-Hosston	Comanche	G	Colorado	Middle Trinity	8	Comanche	n/a	68
69	N. Trinity-Hosston	Cooke	C	Red	None	8	Cooke	n/a	346
70	N. Trinity-Hosston	Cooke	C	Trinity	None	8	Cooke	n/a	1,365
71	N. Trinity-Hosston	Coryell	G	Brazos	None	8	Coryell	n/a	913
72	N. Trinity-Hosston	Dallas	C	Trinity	None	8	Dallas	n/a	3,904
74	N. Trinity-Hosston	Delta	D	Sulphur	None	8	Delta	n/a	50
75	N. Trinity-Hosston-outside	Delta	D	Sulphur	None	8	Delta	n/a	131
76	N. Trinity-Hosston	Denton	C	Trinity	None	8	Denton	n/a	6,399
78	N. Trinity-Hosston	Eastland	G	Brazos	None	8	Eastland	n/a	4,412

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
80	N. Trinity-Hosston	Eastland	G	Colorado	None	8	Eastland	n/a	225
81	N. Trinity-Hosston	Ellis	C	Trinity	None	8	Ellis	n/a	2,417
82	N. Trinity-Hosston-outside	Ellis	C	Trinity	None	8	Ellis	n/a	0
84	N. Trinity-Hosston	Erath	G	Brazos	Middle Trinity	8	Erath	n/a	15,723
86	N. Trinity-Hosston	Falls	G	Brazos	None	8	Falls	n/a	137
87	N. Trinity-Hosston-outside	Falls	G	Brazos	None	8	Falls	n/a	8
89	N. Trinity-Hosston	Fannin	C	Red	None	8	Fannin	n/a	209
90	N. Trinity-Hosston	Fannin	C	Sulphur	None	8	Fannin	n/a	0
91	N. Trinity-Hosston	Fannin	C	Trinity	None	8	Fannin	n/a	0
94	N. Trinity-Hosston	Grayson	C	Red	None	8	Grayson	n/a	1,930
95	N. Trinity-Hosston	Grayson	C	Trinity	None	8	Grayson	n/a	417
96	N. Trinity-Hosston	Hamilton	G	Brazos	None	8	Hamilton	n/a	698
97	N. Trinity-Hosston	Hill	G	Trinity	None	8	Hill	n/a	4
98	N. Trinity-Hosston	Hill	G	Brazos	None	8	Hill	n/a	946
99	N. Trinity-Hosston	Hood	G	Trinity	Upper Trinity	8	Hood	n/a	37
101	N. Trinity-Hosston	Hood	G	Brazos	Upper Trinity	8	Hood	n/a	6,567
106	N. Trinity-Hosston	Hunt	D	Sulphur	None	8	Hunt	n/a	0
107	N. Trinity-Hosston-outside	Hunt	D	Sulphur	None	8	Hunt	n/a	0
109	N. Trinity-Hosston	Hunt	D	Sabine	None	8	Hunt	n/a	0
110	N. Trinity-Hosston-outside	Hunt	D	Sabine	None	8	Hunt	n/a	0
111	N. Trinity-Hosston	Hunt	D	Trinity	None	8	Hunt	n/a	0
112	N. Trinity-Hosston	Johnson	G	Trinity	None	8	Johnson	n/a	787
113	N. Trinity-Hosston	Johnson	G	Brazos	None	8	Johnson	n/a	1,502
115	N. Trinity-Hosston-outside	Kaufman	C	Sabine	None	8	Kaufman	n/a	32
117	N. Trinity-Hosston	Kaufman	C	Trinity	None	8	Kaufman	n/a	104

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
118	N. Trinity-Hosston-outside	Kaufman	C	Trinity	None	8	Kaufman	n/a	703
120	N. Trinity-Hosston	Lamar	D	Red	None	8	Lamar	n/a	660
121	N. Trinity-Hosston	Lamar	D	Sulphur	None	8	Lamar	n/a	0
122	N. Trinity-Hosston-outside	Lamar	D	Sulphur	None	8	Lamar	n/a	1
124	N. Trinity-Hosston	Lampasas	G	Brazos	Saratoga	8	Lampasas	n/a	1,265
126	N. Trinity-Hosston	Lampasas	G	Colorado	Saratoga	8	Lampasas	n/a	181
128	N. Trinity-Hosston	Limestone	G	Trinity	None	8	Limestone	n/a	0
129	N. Trinity-Hosston-outside	Limestone	G	Trinity	None	8	Limestone	n/a	0
131	N. Trinity-Hosston	Limestone	G	Brazos	None	8	Limestone	n/a	50
132	N. Trinity-Hosston-outside	Limestone	G	Brazos	None	8	Limestone	n/a	0
133	N. Trinity-Hosston	McLennan	G	Brazos	None	8	McLennan	n/a	16,004
135	N. Trinity-Hosston	Milam	G	Brazos	Post Oak Savannah	8	Milam	n/a	102
136	N. Trinity-Hosston-outside	Milam	G	Brazos	Post Oak Savannah	8	Milam	n/a	0
137	N. Trinity-Hosston	Mills	K	Brazos	Fox Crossing	8	Mills	n/a	379
139	N. Trinity-Hosston	Mills	K	Colorado	Fox Crossing	8	Mills	n/a	1,005
142	N. Trinity-Hosston	Montague	B	Red	Upper Trinity	8	Montague	n/a	80
144	N. Trinity-Hosston	Montague	B	Trinity	Upper Trinity	8	Montague	n/a	1,727
146	N. Trinity-Hosston	Navarro	C	Trinity	None	8	Navarro	n/a	1,204
147	N. Trinity-Hosston-outside	Navarro	C	Trinity	None	8	Navarro	n/a	0
148	N. Trinity-Hosston	Parker	C	Trinity	Upper Trinity	8	Parker	n/a	2,006
150	N. Trinity-Hosston	Parker	C	Brazos	Upper Trinity	8	Parker	n/a	1,809
153	N. Trinity-Hosston	Red River	D	Red	None	8	Red River	n/a	38
154	N. Trinity-Hosston-	Red River	D	Red	None	8	Red River	n/a	0

MapRef	Aquifer	County	RWPA	River Basin	GCD	GMA	GeoArea	Year	MAG (Acre-feet per year)
	outside								
156	N. Trinity-Hosston	Red River	D	Sulphur	None	8	Red River	n/a	0
157	N. Trinity-Hosston-outside	Red River	D	Sulphur	None	8	Red River	n/a	0
158	N. Trinity-Hosston-outside	Rockwall	C	Sabine	None	8	Rockwall	n/a	0
159	N. Trinity-Hosston	Rockwall	C	Trinity	None	8	Rockwall	n/a	0
160	N. Trinity-Hosston-outside	Rockwall	C	Trinity	None	8	Rockwall	n/a	0
161	N. Trinity-Hosston	Somervell	G	Brazos	None	8	Somervell	n/a	1,490
162	N. Trinity-Hosston	Tarrant	C	Trinity	Northern Trinity	8	Tarrant	n/a	5,556
164	N. Trinity-Hosston	Taylor	G	Brazos	None	8	Taylor	n/a	153
166	N. Trinity-Hosston	Taylor	G	Colorado	None	8	Taylor	n/a	278
167	N. Trinity-Hosston	Travis	K	Brazos	None	8	Travis	n/a	2
169	N. Trinity-Hosston	Travis	K	Colorado	None	8	Travis	n/a	1,117
171	N. Trinity-Hosston	Williamson	G	Brazos	None	8	Williamson	n/a	546
172	N. Trinity-Hosston-outside	Williamson	G	Brazos	None	8	Williamson	n/a	0
173	N. Trinity-Hosston	Williamson	K	Brazos	None	8	Williamson	n/a	37
174	N. Trinity-Hosston	Williamson	G	Colorado	None	8	Williamson	n/a	15
175	N. Trinity-Hosston	Williamson	K	Colorado	None	8	Williamson	n/a	16
177	N. Trinity-Hosston	Wise	C	Trinity	Upper Trinity	8	Wise	n/a	5,238

Aquifer marked as outside with table row shaded denotes that the volume of water is from an area of the model outside the official aquifer boundary.

GCD = Groundwater conservation district.

GeoArea = Geographic areas defined by unique desired future conditions as specified by a groundwater management area.

GMA = Groundwater management area.

MAG = Managed available groundwater in units of acre-feet per year.

Clearwater = Clearwater Underground Water Conservation District

McLennan C. = McLennan County Groundwater Conservation District

N. Trinity = Northern Trinity Groundwater Conservation District
Fox Crossing = Fox Crossing Water District
Saratoga = Saratoga Underground Water Conservation District
RWPA = Regional water planning area.

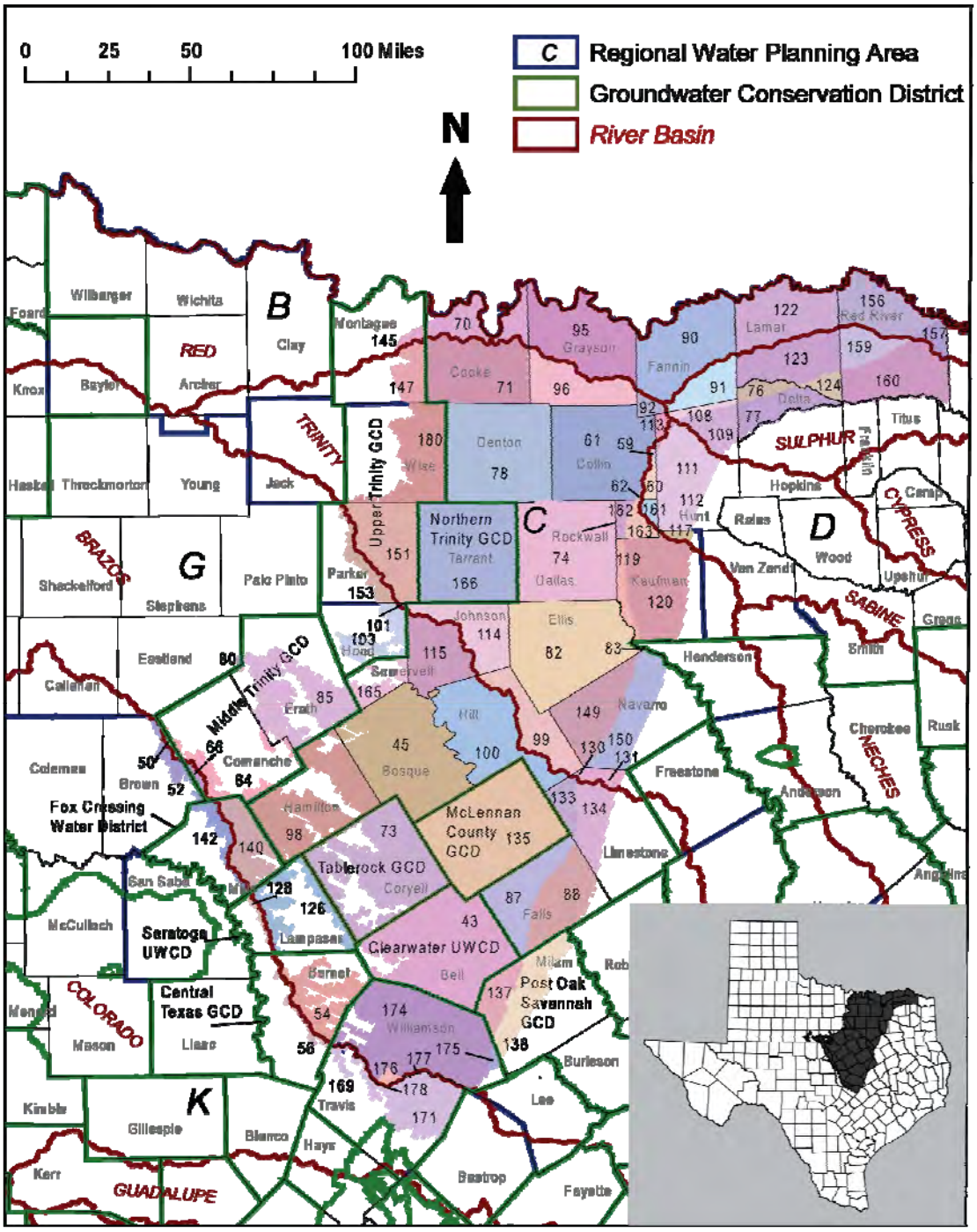


Figure 1. Geographic subdivisions of managed available groundwater for the Paluxy Aquifer. See Table 2 for descriptions of the geographic subdivisions.

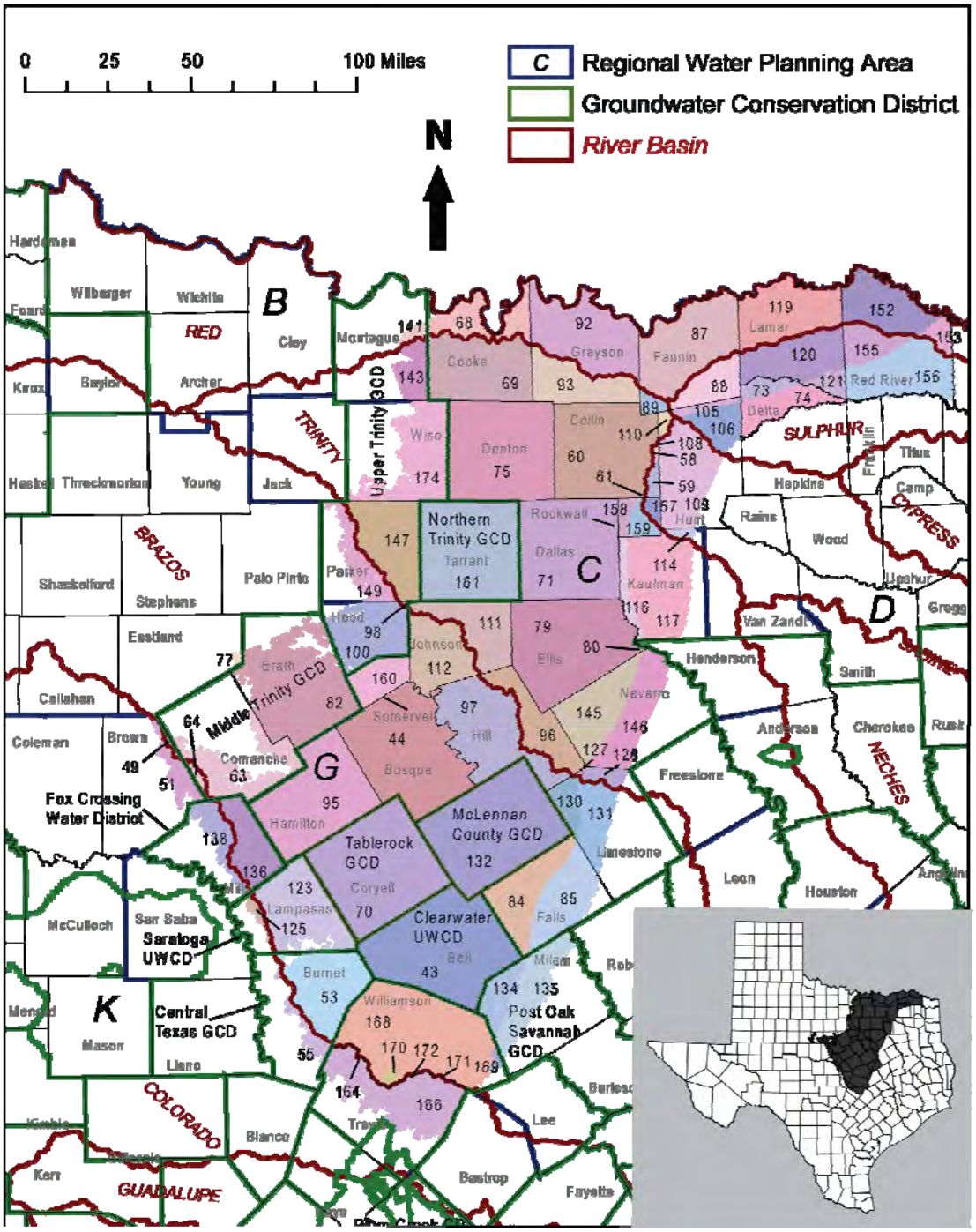


Figure 2. Geographic subdivisions of managed available groundwater for the Glen Rose Aquifer. See Table 3 for descriptions of the geographic subdivisions.

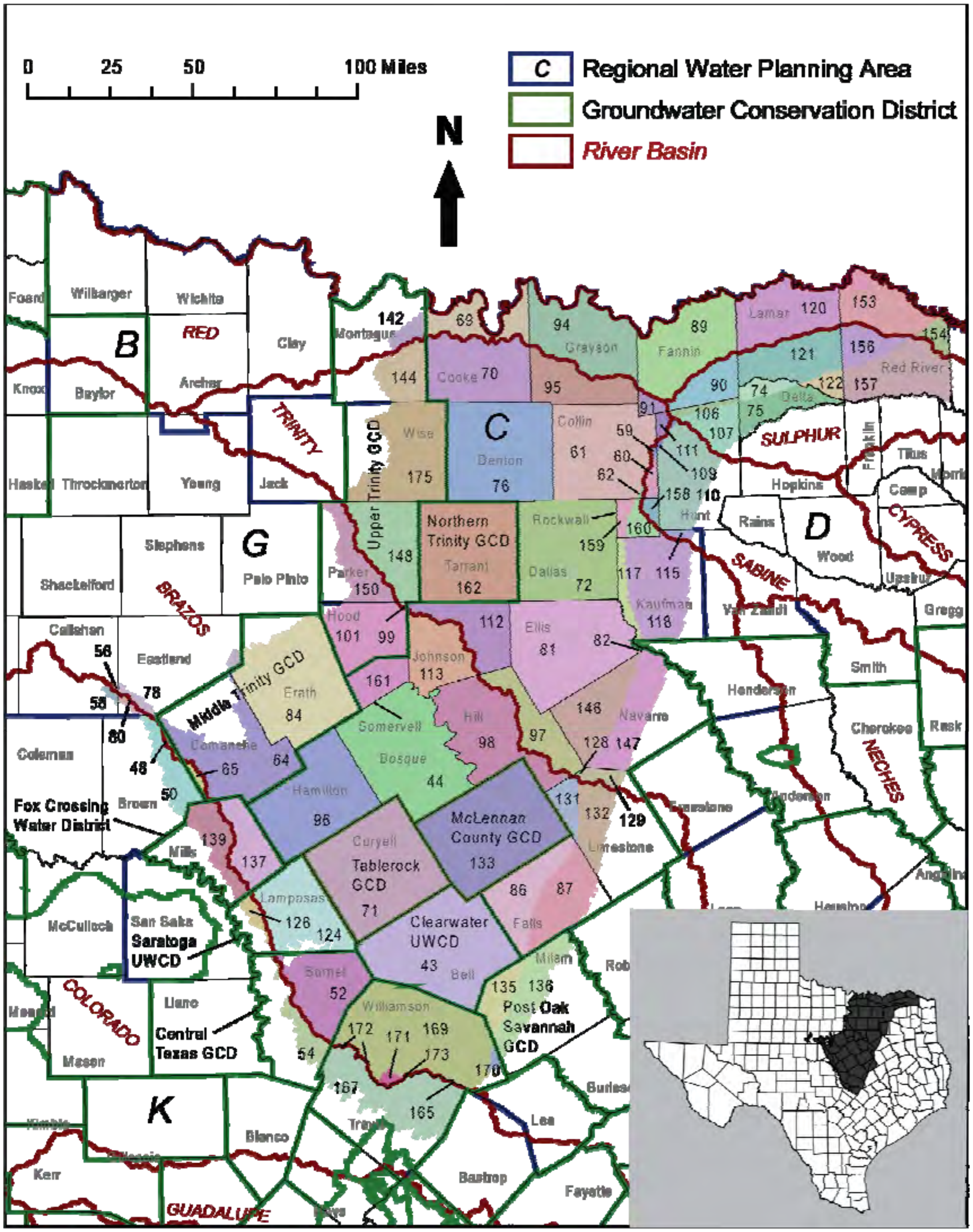


Figure 3. Geographic subdivisions of managed available groundwater for the Hensell Aquifer. See Table 4 for descriptions of the geographic subdivisions.

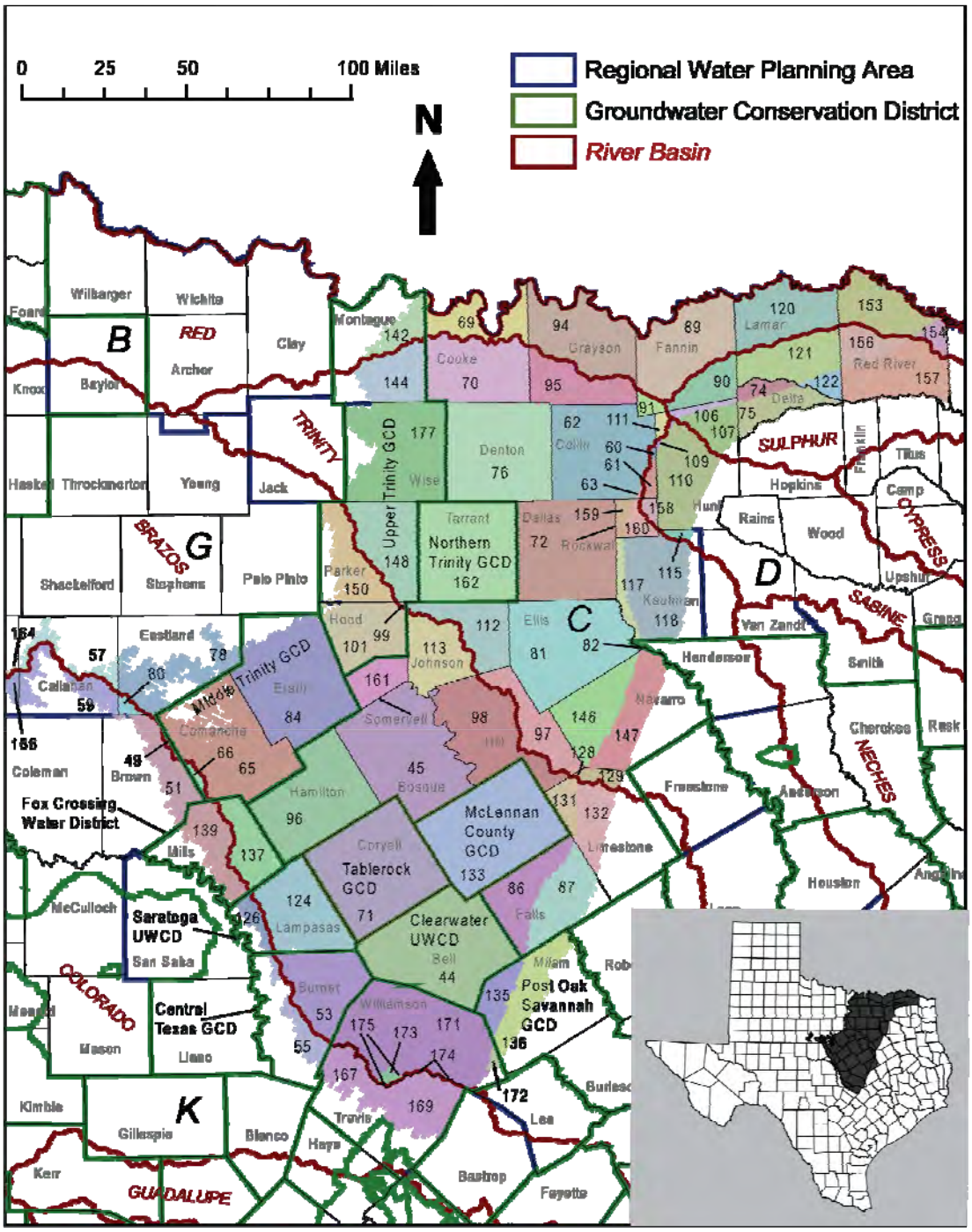


Figure 4. Geographic subdivisions of managed available groundwater for Hosston Unit of the northern part of the Trinity Aquifer. See Table 5 for descriptions of the geographic subdivisions.

RESULTS:

Water level declines in the Trinity Aquifer for the counties in Groundwater Management Area 8 were verified to meet the desired future conditions developed by groundwater conservation districts in Groundwater Management Area 8. The results (Figure 1 and Table 2) show 65,025 acre-feet per year of managed available groundwater for the Paluxy Aquifer in Groundwater Management Area 8. Of those, 89 acre-feet per year may not be fresh water. Under the jurisdiction of the Northern Trinity Groundwater Conservation District, Tarrant County has 10,544 acre-feet per year of managed available groundwater in the Paluxy Aquifer. Under the jurisdiction of the Upper Trinity Groundwater Conservation District; Montague, Wise, Parker, and Hood counties have 13,806 acre-feet per year of managed available groundwater in the Paluxy Aquifer. The remaining counties in Regional Planning Area C have 22,413 acre-feet per year of managed available groundwater in the Paluxy Aquifer. McLennan County Groundwater Conservation District has 231 acre-feet per year, Clearwater Underground Water Conservation District (Bell County) has 96 acre-feet per year, Tablerock Groundwater Conservation District (Coryell County) has 254 acre-feet per year, Saratoga Underground Water Conservation District (Lampasas County) has 13 acre-feet per year, and the Middle Trinity Groundwater Conservation District (Erath and Comanche counties) has 4,249 acre-feet per year of managed available groundwater in the Paluxy Aquifer. The remaining counties in Regional Planning Area G have 12,187 acre-feet per year of managed available groundwater. Central Texas Groundwater Conservation District (Burnet County) has 182 acre-feet per year and Fox Crossing Water District (Mills County) has 6 acre-feet per year. The remaining counties in Regional Planning Area K have 3 acre-feet per year of managed available groundwater. The counties in Regional Planning Area D have 1,024 acre-feet per year of managed available groundwater and the counties in Regional Planning Area F have 18 acre-feet per year in the Paluxy Aquifer.

The results (Figure 2 and Table 3) show 7,387 acre-feet per year of managed available groundwater for the Glen Rose Formation in Groundwater Management Area 8. Of those, 55 acre-feet per year may not be fresh water. Under the jurisdiction of the Northern Trinity Groundwater Conservation District, Tarrant County has 112 acre-feet per year of managed available groundwater in the Glen Rose Aquifer. Under the jurisdiction of the Upper Trinity Groundwater Conservation District; Montague, Wise, Parker, and Hood counties have 201 acre-feet per year of managed available groundwater in the Glen Rose Aquifer. The remaining counties in Regional Planning Area C have 0 acre-feet per year of managed available groundwater in the Glen Rose Formation. McLennan County Groundwater Conservation District has 265 acre-feet per year, Clearwater Underground Water Conservation District (Bell County) has 880 acre-feet per year, Tablerock Groundwater Conservation District (Coryell County) has 784 acre-feet per year, Saratoga Underground Water Conservation District (Lampasas County) has 774 acre-feet per year, the Middle Trinity Groundwater Conservation District (Erath and Comanche counties) has 1 acre-foot per year of managed available groundwater in the Glen Rose Formation and the Post Oak Savannah Groundwater Conservation District has 149 acre-feet per year of managed available groundwater in the Glen Rose Aquifer. The remaining counties in Regional Planning Area G have 1,122 acre-feet per year of managed available

groundwater. Central Texas Groundwater Conservation District (Burnet County) has 205 acre-feet per year and Fox Crossing Water District (Mills County) has 66 acre-feet per year. The remaining counties in Regional Planning Area K have 2,731 acre-feet per year of managed available groundwater. The counties in Regional Water Planning Area D have 0 acre-feet per year of managed available groundwater and the counties in Regional Water Planning Area F have 0 acre-feet per year in the Glen Rose Aquifer.

The results (Figure 3 and Table 4) show 46,067 acre-feet per year of managed available groundwater for the Hensell Aquifer in Groundwater Management Area 8. Of those, 342 acre-feet per year may not be fresh water. Under the jurisdiction of the Northern Trinity Groundwater Conservation District, Tarrant County has 2,535 acre-feet per year of managed available groundwater in the Hensell Aquifer. Under the jurisdiction of the Upper Trinity Groundwater Conservation District; Montague, Wise, Parker, and Hood counties have 6,879 acre-feet per year of managed available groundwater in the Hensell Aquifer. The remaining counties in Regional Planning Area C have 10,134 acre-feet per year of managed available groundwater in the Hensell Aquifer. McLennan County Groundwater Conservation District has 4,190 acre-feet per year, Clearwater Underground Water Conservation District (Bell County) has 1,099 acre-feet per year, Tablerock Groundwater Conservation District (Coryell County) has 1,765 acre-feet per year, Saratoga Underground Water Conservation District (Lampasas County) has 885 acre-feet per year, the Middle Trinity Groundwater Conservation District (Erath and Comanche counties) has 9,562 acre-foot per year of managed available groundwater in the Hensell Aquifer and the Post Oak Savannah Groundwater Conservation District has 36 acre-feet per year of managed available groundwater in the Hensell Aquifer. The remaining counties in Regional Planning Area G have 6,204 acre-feet per year of managed available groundwater. Central Texas Groundwater Conservation District (Burnet County) has 690 acre-feet per year and Fox Crossing Water District (Mills County) has 945 acre-feet per year. The remaining counties in Regional Planning Area K have 203 acre-feet per year of managed available groundwater. The counties in Regional Planning Area D have 861 acre-feet per year of managed available groundwater and the counties in Regional Planning Area F have 79 acre-feet per year in the Hensell Aquifer.

The results (Figure 4 and Table 5) show 130,340 acre-feet per year of managed available groundwater for the Hosston Aquifer in Groundwater Management Area 8. Of those, 875 acre-feet per year may not be fresh water. Under the jurisdiction of the Northern Trinity Groundwater Conservation District, Tarrant County has 5,556 acre-feet per year of managed available groundwater in the Hosston Aquifer. Under the jurisdiction of the Upper Trinity Groundwater Conservation District; Montague, Wise, Parker, and Hood counties have 17,463 acre-feet per year of managed available groundwater in the Hosston Aquifer. The remaining counties in Regional Planning Area C have 19,269 acre-feet per year of managed available groundwater in the Hosston Aquifer. McLennan County Groundwater Conservation District has 16,004 acre-feet per year, Clearwater Underground Water Conservation District (Bell County) has 4,993 acre-feet per year, Tablerock Groundwater Conservation District (Coryell County) has 913 acre-feet per year, Saratoga Underground Water Conservation District (Lampasas County) has 1,446 acre-feet per year, the Middle Trinity Groundwater Conservation District (Erath and Comanche counties) has 39,006 acre-foot per year of managed available groundwater in

the Hosston Aquifer and Post Oak Savannah Groundwater Conservation District (Milam County) has 103 acre-feet per year of managed available groundwater. The remaining counties in Regional Planning Area G have 17,734 acre-feet per year of managed available groundwater. Central Texas Groundwater Conservation District (Burnet County) has 2,469 acre-feet per year and Fox Crossing Water District (Mills County) has 1,383 acre-feet per year. The remaining counties in Regional Planning Area K have 1,172 acre-feet per year of managed available groundwater. The counties in Regional Planning Area D have 880 acre-feet per year of managed available groundwater and the counties in Regional Planning Area F have 1,948 acre-feet per year in the Hosston Aquifer.

In addition, we have reviewed the results from this model simulation and compared the results from GAM Run 08-14mag (Wade, 2008) for the Woodbine Aquifer to verify that they are physically possible, individually and collectively.

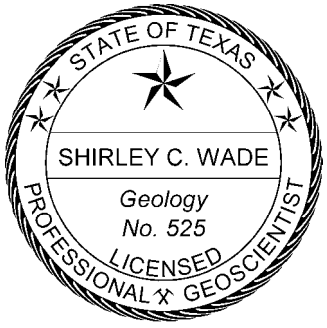
Note that estimates of managed available groundwater are based on the best available scientific tools that can be used to evaluate managed available groundwater and that these estimates can be a function of assumptions made on the magnitude and distribution of pumping in the aquifer. Therefore, it is important for groundwater conservation districts to monitor whether or not they are achieving their desired future conditions and to work with the TWDB to refine managed available groundwater given the reality of how the aquifer responds to the actual magnitude and distribution of pumping now and in the future.

REFERENCES:

Bené, J., Harden, B., O'Rourke, D., Donnelly, A., and Yelderman, J., 2004, Northern Trinity/Woodbine Groundwater Availability Model: contract report to the Texas Water Development Board by R.W. Harden and Associates, 391 p.

Donnelly, A., 2008, GAM08-06 Final Report, Texas Water Development Board GAM Run Report, October 26, 2007, 44 p.

Wade, S., 2008, GAM08-14mag Report, Texas Water Development Board GAM Run Report, May 6, 2008, 7 p.



The seal appearing on this document was authorized by Shirley C. Wade, P.G., on March 5, 2009.

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