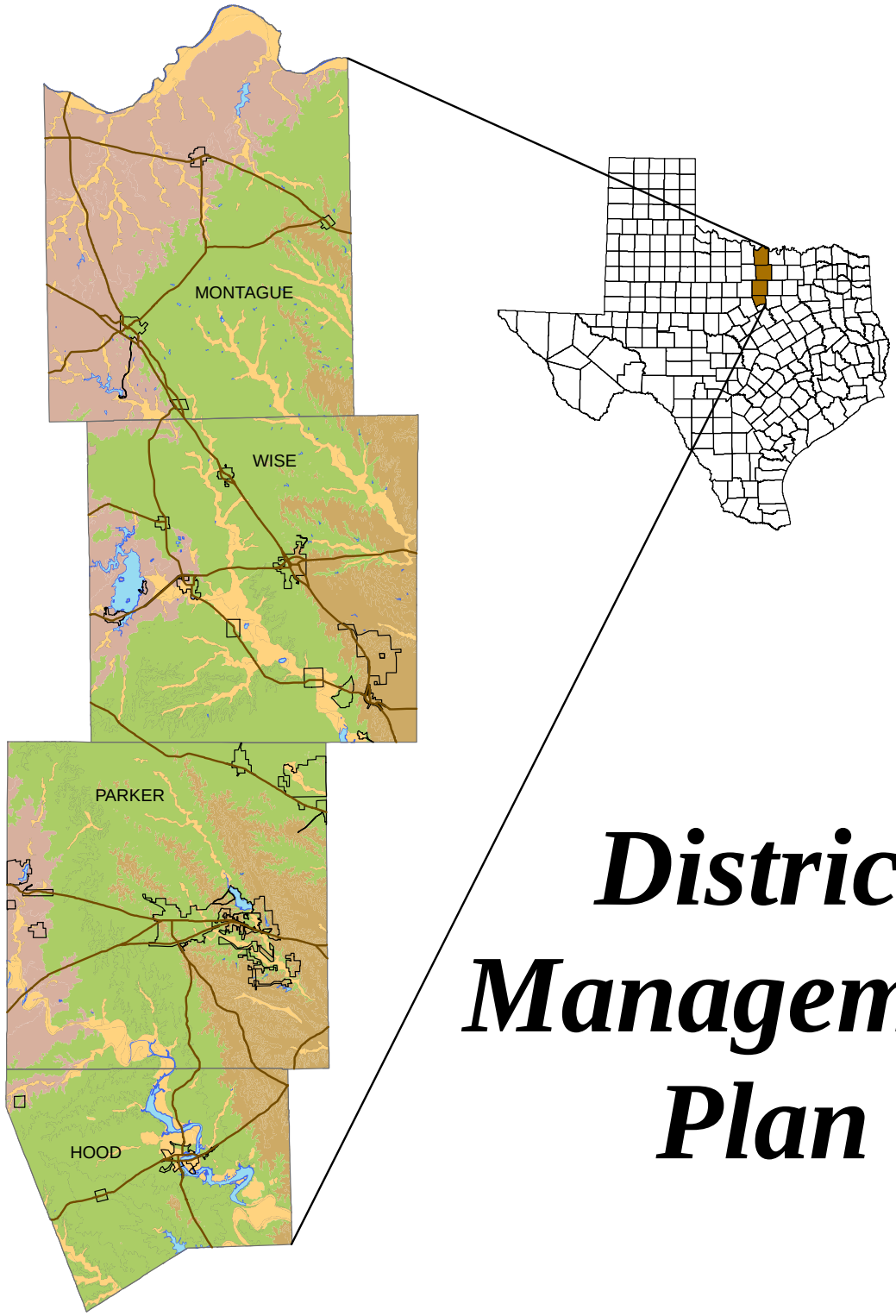
Upper Trinity Groundwater Conservation District



District Management Plan

Adopted – October 15, 2018

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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.

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

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 "Modeled 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 modeled 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 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, and serve staggered four-year terms. Each Director is eligible for multiple consecutive terms.

C. Location, Topography and Drainage

The area encompassed by the District is approximately 3,200 square miles and is coextensive with the boundaries of Hood, Montague, Parker and Wise counties. The topography of the District can be generally classified as high to gently rolling prairies with elevations ranging from approximately 850 to 1,300 feet above mean sea level in Montague County, an average of 800 feet in Wise County, 700 to 1,200 feet in Parker County and 600 to 1,000 feet above sea level in Hood County.

The District falls in the drainage area of three separate major river basins. The northern part of Montague County is drained by the Red River, while 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.

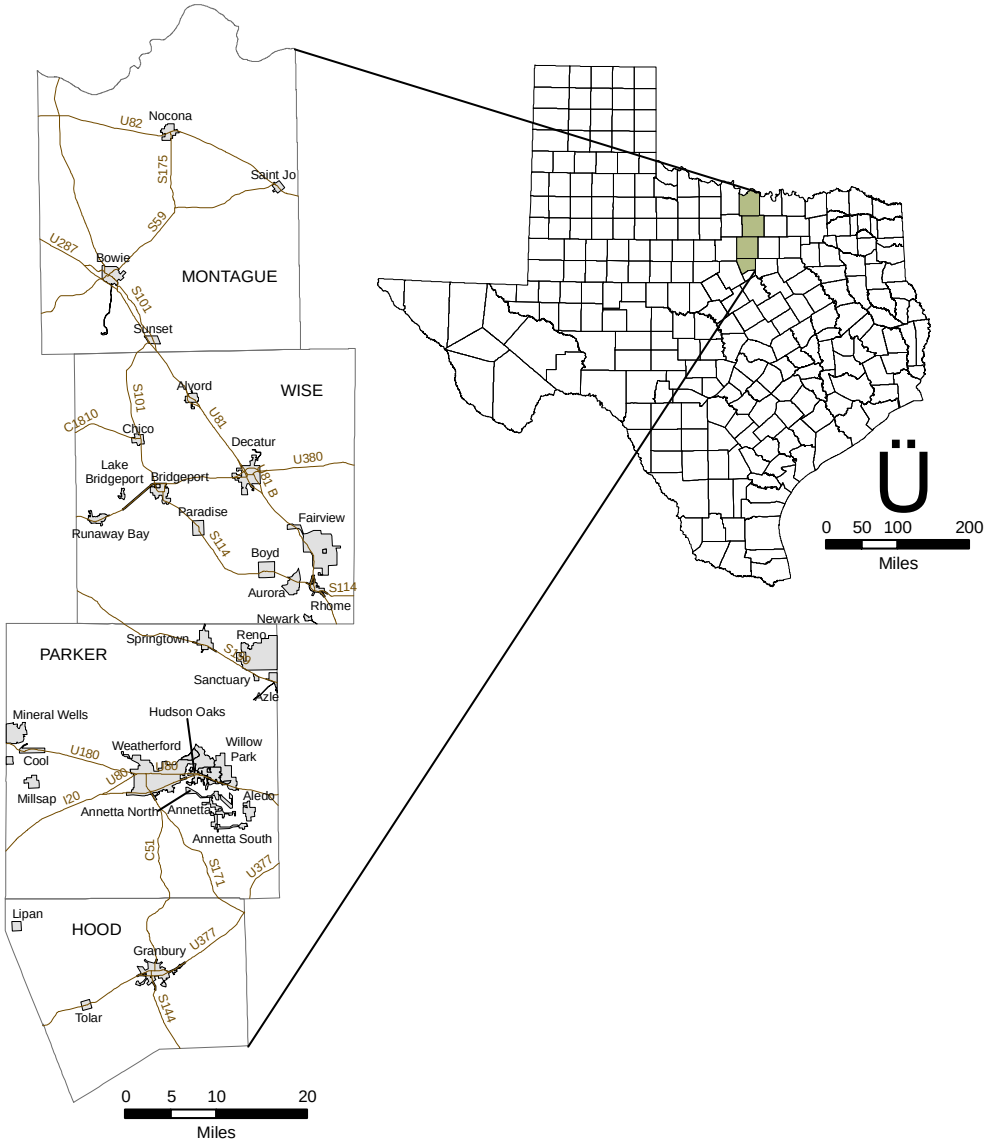


Figure 1. Locations and boundaries of the District.

D. Groundwater Resources in 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**.

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 Groups are generally considered confining units and they overlie the subcrop 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.

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	

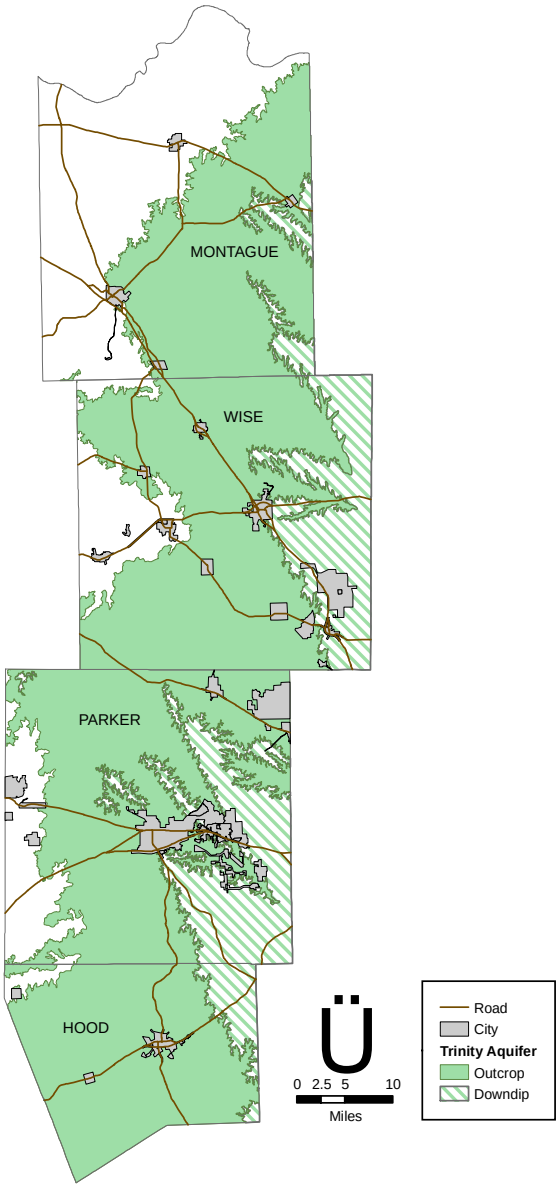


Figure 2. Outcrop and subcrop of the Trinity Aquifer in the District.

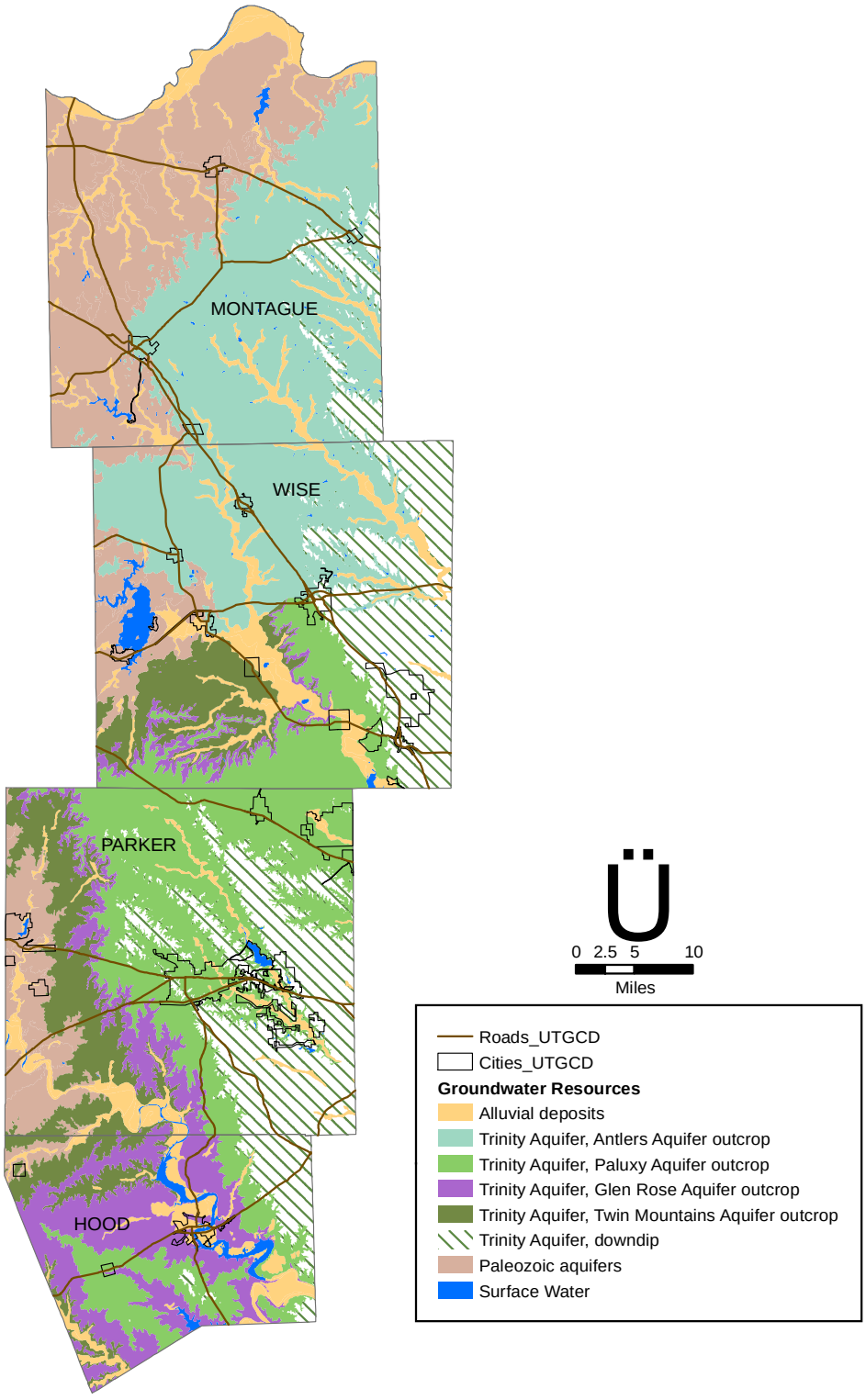


Figure 3. Groundwater resources in the District.

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). Considerably 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 subcrop 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. ESTIMATES OF TECHNICAL INFORMATION REQUIRED BY 31TAC 356.52/TWC § 36.1071

A. Modeled Available Groundwater in the District based on adopted Desired Future Conditions – 31TAC 356.52(a)(5)(A)/TWC §36.1071(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.

Modeled available groundwater is defined as: "the amount of water that the executive administrator determines may be produced on an average annual basis to achieve a desired future condition established under Section 36.108."

In 2005 the Texas legislature recognized that aquifers may need to be managed based on hydrologic boundaries, and not just the political boundaries, such as county boundaries, that defined many groundwater conservation districts. That year legislation was passed requiring joint planning among groundwater conservation districts within a common groundwater management area (GMA). These GMAs are required to meet at least annually, and are charged with developing desired future conditions (DFCs) by which any aquifer deemed relevant by a GMA will be managed. 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 adopted DFC's for the northern Trinity and Woodbine aquifers on January 31, 2017 that submittal package can be found here: http://www.twdb.texas.gov/groundwater/dfc/docs/GMA8_DFCExpRep.pdf. The TWDB MAG report has been provided in Table 3, and can be found here: http://www.twdb.texas.gov/groundwater/docs/GAMruns/GR17-029_MAG.pdf

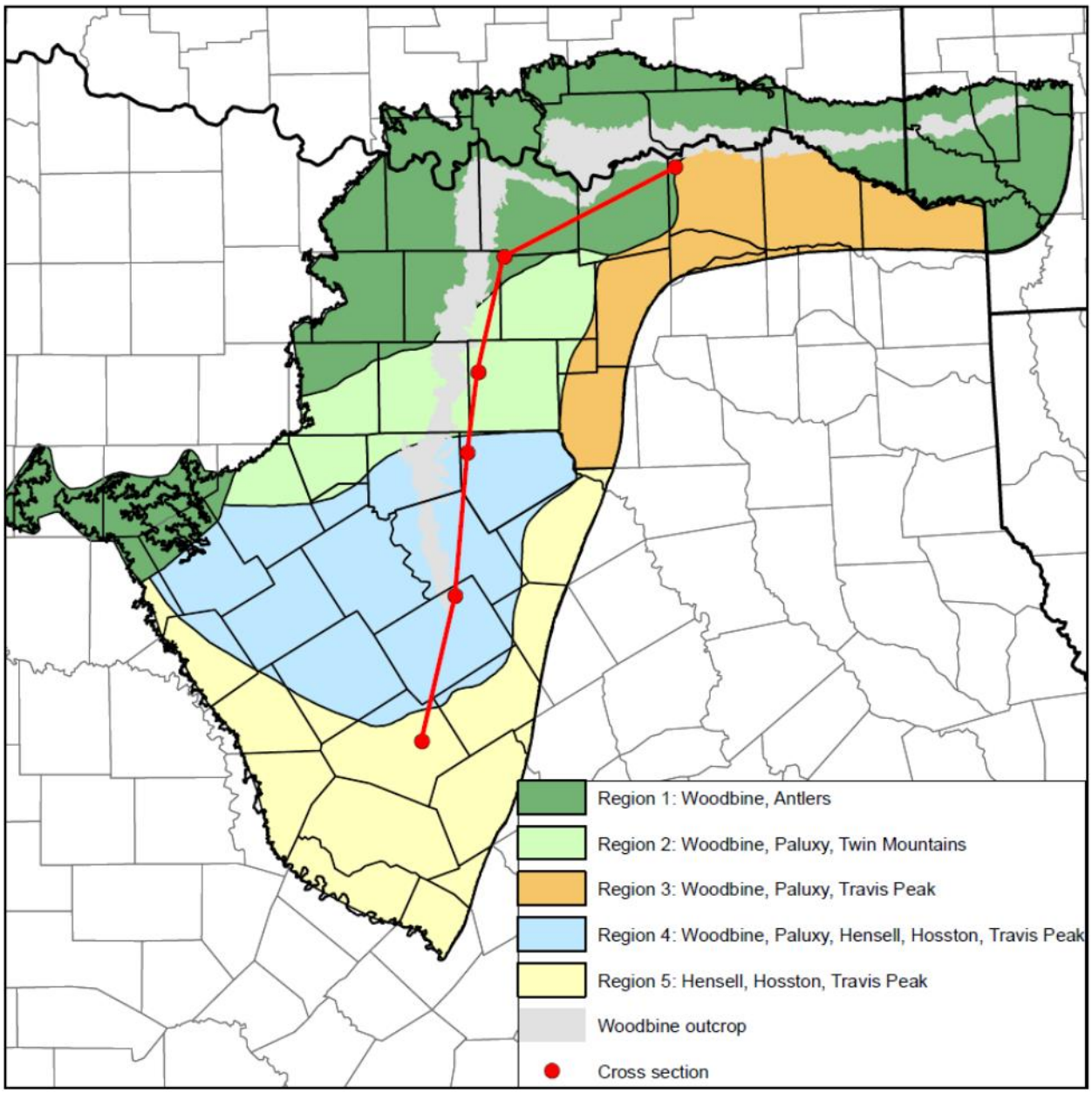
Selected Management Conditions

The different hydrogeologic units comprising the Trinity Aquifer within each of the five hydrogeologic regions have been evaluated according to their hydrostratigraphy, hydraulic properties, and lithology and the extent to which those hydrogeologic units are differentiable at different locations. Based upon that evaluation, the GMA 8 district representatives utilized the aquifer definitions in **Table 2** to define the spatial and vertical extent for which to adopt DFCs for GMA 8.. A map showing the regions identified in **Table 2** can be found in **Figure 4.**

Table 2. Spatial and Vertical extents for which to adopt DFCs for GMA 8.

Model Terminology	Region 1	Region 2	Region 3	Region 4	Region 5
Woodbine Aquifer	Woodbine	Woodbine	Woodbine	Woodbine	Woodbine (no sand)
Washita/ Fredericksburg Groups	Washita/ Fredericksburg	Washita/ Fredericksburg	Washita/ Fredericksburg	Washita/ Fredericksburg	Washita/ Fredericksburg
Paluxy Aquifer	Antlers	Paluxy	Paluxy	Paluxy	Paluxy (no sand)
Glen Rose Formation	Antlers	Glen Rose	Glen Rose	Glen Rose	Glen Rose
Hensell Aquifer	Antlers	Twin Mountains	Travis Peak	Hensell/ Travis Peak	Hensell/ Travis Peak
Pearsall Formation	Antlers	Twin Mountains	Travis Peak	Pearsall/ Sligo	Pearsall/ Sligo
Hosston Aquifer	Antlers	Twin Mountains	Travis Peak	Hosston/ Travis Peak	Hosston/ Travis Peak

Figure 4. Hydrogeologic Regions for the Trinity and Woodbine Aquifer in GMA 8.



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 2010 through the year 2070 on a county, District and aquifer (model layer) basis. **Table 3** summarizes the desired future conditions for the four counties comprising the District for the Northern Trinity Aquifer. For example, for the Downdip portion of the Twin Mountains aquifer in Hood County, the specified management goal (desired future condition) is defined "from estimated year 2010 conditions, the average drawdown of the

Downdip portion of the Twin Mountains Aquifer should not exceed approximately 46 feet after 50 years" (Shi, 2017). All of the desired future conditions are specified in (Shi, 2017) in a similar format.

Furthermore, as part of the GMA 8 joint planning process, the District requested that DFCs within their boundaries (Hood, Montague, Parker and Wise counties) be stated in terms of outcrop and downdip, rather than an average of the two. This request was based on recommendations submitted by the District in response to the 90- day public comment period. GMA 8 District Representatives unanimously approved this request at the September 29, 2016, GMA 8 meeting.

Table 3. Desired Future Conditions and Modeled Available Groundwater for the northern Trinity Aquifer in the District.

County	Trinity Sub-Aquifer	Desired Future Condition[(1)] Outcrop	Desired Future Condition[(1)] Downdip	Modeled Available Groundwater[(2)] Outcrop (AFY)	Modeled Available Groundwater[(2)] Downndip (AFY)
Hood	Paluxy	5	NA	159	NA
	Glen Rose	7	28	653	103
	Twin Mountains	4	46	3,662	7,848
	Hensell	NA		36[(3)]	
	Hosston	NA		53[(3)]	
Hood County Total		NA	NA	4,474	8,040
Parker	Antlers	11	NA	2,897	NA
	Paluxy	5	1	2,607	50
	Glen Rose	10	28	2,289	873
	Twin Mountains	1	46	1,066	2,082
Parker County Total		NA	NA	8,859	3,005
Wise	Antlers	34	142	7,677	2,057
Wise County Total		NA	NA	7,677	2,057
Montague	Antlers	18	NA	3,875	NA
Montague County Total		NA	NA	3,875	NA
District Total		NA	NA	24,885	13,102

(1) Average drawdown in feet after 50 years from the year 2010(DFC Report dated 01/19/2018)

(2) from GAM Run 17-029 MAG (Shi, 2018)

(3) GAM Run 17-029 MAG includes MAG values for the Hensell (36) & Hosston (53) for Hood County, however no DFCs were set for these sub-aquifers within the Upper Trinity as they only occur in a very small portion in Southeast Hood County. That area will be managed as the Twin Mountains.

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. However, in Montague County, use is dominantly from the Paleozoic Aquifer relative to the total pumping in the county. GMA-8 has not proposed a desired future condition for the Paleozoic aquifers. However, due to its importance as a source within their boundaries, the District has contracted with Intera to develop a model of the Paleozoic aquifer to be used as a management tool.

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

See Appendix A

C. Annual amount of recharge from precipitation to the groundwater resources within the District–31TAC 356.52(a)(5)(C)/TWC §36.1071(e)(3)(C)

See Appendix B

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 – 31 TAC 356.52(a)(5)(D)/TWC §36.1071(e)(3)(D)

See Appendix B

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 – 31 TAC 356.52(a)(5)(E)/TWC §36.1071(e)(3)(E)

See Appendix B

F. Projected surface water supply in the District, according to the most recently adopted State Water Plan – 31 TAC 356.52(a)(5)(F)/TWC §36.1071(e)(3)(F)

See Appendix A

G. Projected total demand for water in the District according to the most recently adopted State Water Plan – 31 TAC 356.52(a)(5)(G)/TWC §36.1071(e)(3)(G)

See Appendix A

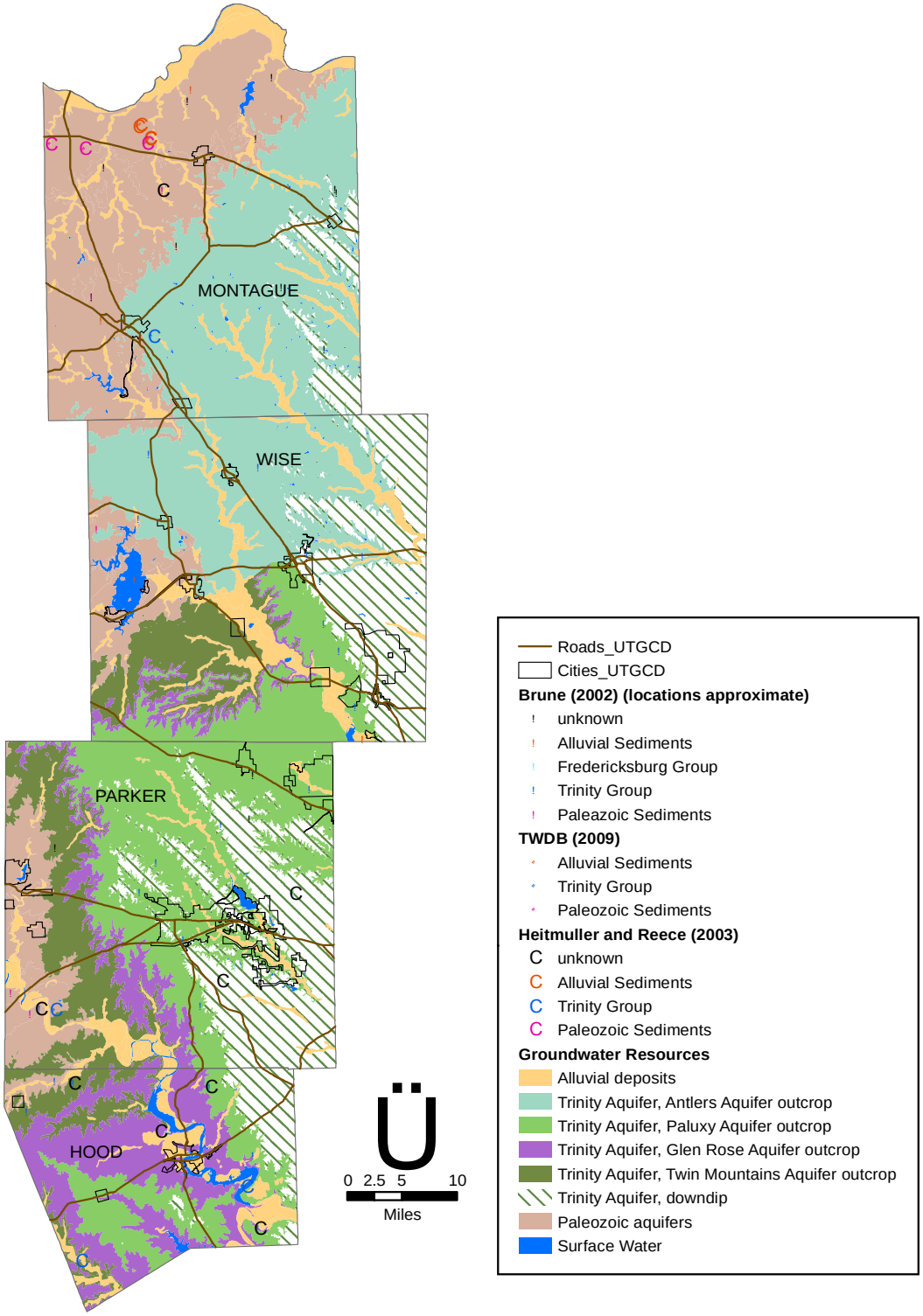
H. Consider the Water supply needs included in the most recently adopted State Water Plan – TWC §36.1071(E)(4)

See Appendix A

I. Consider the Water Management Strategies included in the most recently adopted State Water Plan – TWC §36.1071(E)(4)

See Appendix A

Figure 5. Documented springs in the District.



V. Details on the District Management of Groundwater

The District is acutely aware that its decisions regarding the possible 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 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 may impose permitting or groundwater production regulations on water wells.

The District began its initial studies and analysis of the aquifers and groundwater use patterns within its boundaries 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. The District is currently working to develop permanent rules. Among other things, the rules require non-exempt 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. These 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 has also established 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 in order 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 may 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 has and will continue 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.

VI. 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. A copy of the rules is included in Appendix C, and can be found here: http://www.uppertrinitygcd.com/pdf/temprules.pdf.

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.

VII. METHODOLOGY FOR TRACKING DISTRICT PROGRESS IN ACHIEVING MANAGEMENT GOALS

The General Manager of the District will prepare and submit an Annual Report which 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.

VIII. GOALS, MANAGEMENT OBJECTIVES AND PERFORMANCE STANDARDS

Management Goals

A. Providing the Most Efficient Use of Groundwater – 31TAC 356.52(a)(1)(A)/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 356.52(a)(1)(B)/ 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 356.52 (a)(1)(D)/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 – 31TAC 356.52 (a)(1)(F)/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://waterdatafortexas.org/drought/drought-monitor)

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 and on the District website.

E. Addressing Conservation, Recharge Enhancement, Rainwater Harvesting, Precipitation Enhancement, or Brush Control, where Appropriate and Cost Effective – 31TAC 356.52 (a)(1)(G)/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 the Desired Future Conditions of the Groundwater Resources – 31TAC (a)(1)(H)/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. The District may also take into consideration any measurements made by the TWDB groundwater measurement team.

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.

IX. 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 356.52 (a)(1)(E)/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 356.52 (a)(1)(C)/ TWC §36.1071(a)(3)

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

Estimated Historical Water Use And 2012 State Water Plan Datasets:

Upper Trinity Groundwater Conservation District

by Stephen Allen
Texas Water Development Board
Groundwater Resources Division
Groundwater Technical Assistance Section
stephen.allen@twdb.texas.gov
(512) 463-7317
June 19, 2015

GROUNDWATER MANAGEMENT PLAN DATA:

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

http://www.twdb.texas.gov/groundwater/docs/GCD/GMPChecklist0113.pdf

The five reports included in part 1 are:

1. Estimated Historical Water Use (checklist Item 2)

   from the TWDB Historical Water Use Survey (WUS)

2. Projected Surface Water Supplies (checklist Item 6)
3. Projected Water Demands (checklist Item 7)
4. Projected Water Supply Needs (checklist Item 8)
5. Projected Water Management Strategies (checklist Item 9)

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

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

DISCLAIMER:

The data presented in this report represents the most up-to-date WUS and 2012 SWP data available as of 6/19/2015. Although it does not happen frequently, neither of these datasets are static so they are subject to change pending the availability of more accurate WUS data or an amendment to the 2012 SWP. District personnel must review these datasets and correct any discrepancies in order to ensure approval of their groundwater management plan.

The WUS dataset can be verified at this web address:

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

The 2012 SWP dataset can be verified by contacting Sabrina Anderson (sabrina.anderson@twdb.texas.gov or 512-936-0886).

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

Estimated Historical Water Use

TWDB Historical Water Use Survey (WUS) Data

Groundwater and surface water historical use estimates are currently unavailable for calendar year 2013. TWDB staff anticipates the calculation and posting of these estimates at a later date.

HOOD COUNTY

All values are in acre-fee/year

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2013	GW	6,848	12	27	13	3,102	207	10,209
	SW	840	0	325	3,056	5,000	255	9,476
2012	GW	6,859	14	96	9	3,640	197	10,815
	SW	903	0	496	563	5,355	240	7,557
2011	GW	7,083	13	700	9	397	246	8,448
	SW	1,602	0	876	439	10,916	300	14,133
2010	GW	6,708	6	1,216	6	675	240	8,851
	SW	664	0	1,522	485	7,500	293	10,464
2009	GW	5,823	12	1,313	26	404	247	7,825
	SW	917	0	1,643	593	8,298	301	11,752
2008	GW	5,337	20	1,410	41	0	238	7,046
	SW	1,533	0	1,765	487	6,083	292	10,160
2007	GW	5,085	25	0	150	498	184	5,942
	SW	919	0	0	1,652	5,044	225	7,840
2006	GW	5,232	25	0	77	2,776	260	8,370
	SW	1,667	0	0	39	5,641	317	7,664
2005	GW	5,276	22	0	93	0	245	5,636
	SW	1,329	0	0	293	7,960	299	9,881
2004	GW	4,704	17	0	53	0	275	5,049
	SW	545	0	0	302	5,540	281	6,668
2003	GW	4,782	15	0	44	0	255	5,096
	SW	762	0	0	1,489	8,726	261	11,238
2002	GW	4,145	16	0	39	0	361	4,561
	SW	1,920	0	0	3,070	2,691	371	8,052
2001	GW	3,807	24	0	46	0	299	4,176
	SW	1,988	0	0	3,339	2,691	307	8,325
2000	GW	3,362	20	0	47	10	311	3,750
	SW	2,142	0	0	3,884	3,230	311	9,567

MONTAGUE COUNTY

All values are in acre-fee/year

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2013	GW	1,188	0	507	0	465	56	2,216
	SW	1,435	0	2,031	0	0	1,066	4,532
2012	GW	1,393	0	690	0	530	50	2,663
	SW	1,675	1	2,130	0	0	958	4,764
2011	GW	1,526	0	1,644	0	739	59	3,968
	SW	1,801	1	1,919	0	0	1,127	4,848
2010	GW	1,354	0	616	0	695	59	2,724
	SW	1,751	1	719	0	0	1,110	3,581
2009	GW	1,261	0	530	0	874	66	2,731
	SW	1,593	1	620	0	0	1,255	3,469
2008	GW	1,131	0	444	0	131	63	1,769
	SW	1,594	1	520	0	0	1,204	3,319
2007	GW	983	0	0	0	91	76	1,150
	SW	1,426	1	0	0	0	1,442	2,869
2006	GW	1,255	0	0	0	387	67	1,709
	SW	1,829	1	0	0	12	1,272	3,114
2005	GW	1,195	0	0	0	172	69	1,436
	SW	1,697	1	0	0	0	1,310	3,008
2004	GW	1,091	0	0	0	158	72	1,321
	SW	1,884	1	0	0	0	1,345	3,230
2003	GW	1,139	0	0	0	57	75	1,271
	SW	1,725	1	0	0	0	1,393	3,119
2002	GW	1,124	0	0	0	268	74	1,466
	SW	1,426	1	0	0	0	1,370	2,797
2001	GW	1,159	0	0	0	147	83	1,389
	SW	1,539	1	0	0	0	1,528	3,068
2000	GW	1,212	0	0	0	60	150	1,422
	SW	1,460	6	0	0	0	1,351	2,817

PARKER COUNTY

All values are in acre-fee/year

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2013	GW	7,103	16	123	0	919	115	8,276
	SW	10,480	30	1,190	0	152	1,048	12,900
2012	GW	8,798	20	341	0	28	97	9,284
	SW	7,850	49	1,773	565	156	869	11,262
2011	GW	9,047	25	989	0	185	229	10,475
	SW	8,102	62	2,198	604	77	2,060	13,103
2010	GW	7,938	16	2,450	0	182	226	10,812
	SW	6,756	54	3,414	464	27	2,035	12,750
2009	GW	7,285	16	1,926	0	44	157	9,428
	SW	6,536	53	3,009	741	88	1,408	11,835
2008	GW	6,196	15	1,401	0	73	129	7,814
	SW	7,476	40	2,393	2	117	1,164	11,192
2007	GW	6,508	7	0	0	60	177	6,752
	SW	6,578	89	887	2	20	1,591	9,167
2006	GW	7,130	14	0	0	474	178	7,796
	SW	8,542	98	887	9	16	1,601	11,153
2005	GW	5,901	11	0	0	206	132	6,250
	SW	7,818	73	698	3	190	1,185	9,967
2004	GW	5,192	10	0	0	130	65	5,397
	SW	7,182	78	840	0	124	1,242	9,466
2003	GW	5,365	8	0	0	39	74	5,486
	SW	6,676	85	1,269	703	381	1,389	10,503
2002	GW	5,302	8	0	0	64	89	5,463
	SW	6,568	72	2,431	703	293	1,685	11,752
2001	GW	5,257	12	0	0	64	90	5,423
	SW	2,977	91	1,466	10,970	293	1,693	17,490
2000	GW	5,277	21	0	0	74	185	5,557
	SW	6,151	182	403	4,568	348	1,670	13,322

WISE COUNTY

All values are in acre-fee/year

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2013	GW	4,206	179	440	1	1,261	224	6,311
	SW	3,768	43	2,874	2,593	39	899	10,216
2012	GW	4,550	160	613	0	1,516	210	7,049
	SW	3,989	44	2,808	2,879	46	841	10,607
2011	GW	4,873	162	3,662	0	1,458	257	10,412
	SW	3,854	292	5,126	0	10	1,027	10,309
2010	GW	4,383	176	5,135	0	830	254	10,778
	SW	3,642	53	6,821	0	761	1,017	12,294
2009	GW	3,263	187	4,454	0	692	321	8,917
	SW	2,215	97	6,090	0	831	1,285	10,518
2008	GW	2,218	418	3,773	0	0	267	6,676
	SW	2,141	121	5,316	0	1,070	1,067	9,715
2007	GW	2,085	120	14	0	130	405	2,754
	SW	2,016	52	966	0	1,220	1,618	5,872
2006	GW	2,280	93	1	0	290	288	2,952
	SW	2,443	70	977	0	1,000	1,150	5,640
2005	GW	2,196	99	1	0	62	295	2,653
	SW	2,103	62	977	0	1,323	1,178	5,643
2004	GW	1,934	69	12	0	128	713	2,856
	SW	1,774	72	1,003	0	152	713	3,714
2003	GW	1,767	283	1	0	45	780	2,876
	SW	1,946	235	266	0	430	780	3,657
2002	GW	1,810	66	1	0	129	782	2,788
	SW	1,436	456	8,298	0	316	782	11,288
2001	GW	1,721	391	1	0	116	841	3,070
	SW	1,168	928	24,627	0	284	841	27,848
2000	GW	1,704	220	1	0	147	857	2,929
	SW	1,652	553	14,699	0	355	857	18,116

Projected Surface Water Supplies
TWDB 2012 State Water Plan Data

HOOD COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	Source Name	2010	2020	2030	2040	2050	2060
G	ACTON MUD	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	3,733	3,734	3,735	3,734	3,729	3,717
G	COUNTY-OTHER	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	949	949	949	949	949	949
G	DECORDOVA	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	593	592	591	592	597	608
G	GRANBURY	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	226	226	226	226	226	226
G	IRRIGATION	BRAZOS	BRAZOS RIVER COMBINED RUN-OF-RIVER IRRIGATION	12,644	12,648	12,651	12,655	12,658	12,662
G	LIVESTOCK	BRAZOS	LIVESTOCK LOCAL SUPPLY	617	617	617	617	617	617
G	LIVESTOCK	TRINITY	LIVESTOCK LOCAL SUPPLY	6	6	6	6	6	6
G	MANUFACTURING	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	10,000	10,000	10,000	10,000	10,000	10,000
G	MINING	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	300	300	300	300	300	300
G	STEAM ELECTRIC POWER	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	43,447	43,447	43,447	43,447	43,447	43,447
	Sum of Projected Surface Water Supplies (acre-feet/year)			72,515	72,519	72,522	72,526	72,529	72,532

Projected Surface Water Supplies
TWDB 2012 State Water Plan Data

MONTAGUE COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	Source Name	2010	2020	2030	2040	2050	2060
B	BOWIE	TRINITY	AMON G. CARTER LAKE/RESERVOIR	1,302	1,229	1,160	1,092	1,027	961
B	COUNTY-OTHER	RED	FARMERS CREEK/NOCONA LAKE/RESERVOIR	52	55	56	56	55	56
B	COUNTY-OTHER	TRINITY	AMON G. CARTER LAKE/RESERVOIR	131	137	139	140	138	139
B	IRRIGATION	RED	FARMERS CREEK/NOCONA LAKE/RESERVOIR	100	100	100	100	100	100
B	IRRIGATION	RED	RED RIVER COMBINED RUN-OF-RIVER IRRIGATION	108	108	108	108	108	108
B	IRRIGATION	TRINITY	TRINITY RIVER COMBINED RUN-OF-RIVER IRRIGATION	0	0	0	0	0	0
B	LIVESTOCK	RED	LIVESTOCK LOCAL SUPPLY	949	949	949	949	949	949
B	LIVESTOCK	TRINITY	LIVESTOCK LOCAL SUPPLY	716	716	716	716	716	716
B	MANUFACTURING	RED	FARMERS CREEK/NOCONA LAKE/RESERVOIR	11	14	18	23	29	29
B	MINING	RED	AMON G. CARTER LAKE/RESERVOIR	0	0	0	0	0	0
B	MINING	TRINITY	AMON G. CARTER LAKE/RESERVOIR	0	0	0	0	0	0
B	NOCONA	RED	FARMERS CREEK/NOCONA LAKE/RESERVOIR	1,097	1,091	1,086	1,081	1,076	1,075
	Sum of Projected Surface Water Supplies (acre-feet/year)			4,466	4,399	4,332	4,265	4,198	4,133

PARKER COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	Source Name	2010	2020	2030	2040	2050	2060
C	AZLE	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	332	305	272	241	222	218
C	COUNTY-OTHER	BRAZOS	PALO PINTO LAKE/RESERVOIR	479	479	479	479	479	479
C	COUNTY-OTHER	BRAZOS	TRWD LAKE/RESERVOIR SYSTEM	0	145	129	113	95	81

Projected Surface Water Supplies
TWDB 2012 State Water Plan Data

RWPG	WUG	WUG Basin	Source Name	2010	2020	2030	2040	2050	2060
C	COUNTY-OTHER	BRAZOS	WEATHERFORD LAKE/RESERVOIR	0	86	74	64	53	43
C	FORT WORTH	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	3,016	12,161	15,886	15,942	15,476	14,546
C	HUDSON OAKS	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	109	178	230	265	290	302
C	IRRIGATION	BRAZOS	BRAZOS RIVER COMBINED RUN-OF-RIVER IRRIGATION	117	117	117	117	117	117
C	IRRIGATION	TRINITY	TRINITY RIVER COMBINED RUN-OF-RIVER IRRIGATION	122	122	122	122	122	122
C	LIVESTOCK	BRAZOS	LIVESTOCK LOCAL SUPPLY	903	903	903	903	903	903
C	LIVESTOCK	TRINITY	LIVESTOCK LOCAL SUPPLY	1,019	1,019	1,019	1,019	1,019	1,019
C	MANUFACTURING	BRAZOS	OTHER LOCAL SUPPLY	0	0	0	0	0	0
C	MANUFACTURING	BRAZOS	PALO PINTO LAKE/RESERVOIR	25	25	25	24	25	25
C	MANUFACTURING	BRAZOS	TRWD LAKE/RESERVOIR SYSTEM	185	192	180	171	161	152
C	MANUFACTURING	BRAZOS	WEATHERFORD LAKE/RESERVOIR	45	45	45	45	45	45
C	MANUFACTURING	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	423	453	428	406	383	362
C	MANUFACTURING	TRINITY	WEATHERFORD LAKE/RESERVOIR	191	221	207	197	185	174
C	MINERAL WELLS	BRAZOS	MINERAL WELLS LAKE/RESERVOIR	0	0	0	0	0	0
C	MINERAL WELLS	BRAZOS	PALO PINTO LAKE/RESERVOIR	756	734	719	703	697	694
C	MINING	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	2,000	2,000	2,000	2,000	2,000	2,000
C	MINING	BRAZOS	OTHER LOCAL SUPPLY	16	16	15	15	14	14
C	MINING	TRINITY	OTHER LOCAL SUPPLY	4	4	5	5	6	6
C	RENO	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	148	141	121	104	95	88

Projected Surface Water Supplies
TWDB 2012 State Water Plan Data

RWPG	WUG	WUG Basin	Source Name	2010	2020	2030	2040	2050	2060
C	SANCTUARY	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	90	198	245	250	252	246
C	SPRINGTOWN	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	246	388	445	489	518	534
C	STEAM ELECTRIC POWER	TRINITY	WEATHERFORD LAKE/RESERVOIR	24	20	22	38	44	53
C	WALNUT CREEK SUD	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	2,259	2,264	1,862	1,557	1,308	1,133
C	WEATHERFORD	BRAZOS	TRWD LAKE/RESERVOIR SYSTEM	106	151	172	185	198	207
C	WEATHERFORD	BRAZOS	WEATHERFORD LAKE/RESERVOIR	94	113	116	116	117	117
C	WEATHERFORD	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	2,214	3,240	3,515	3,673	3,801	3,910
C	WEATHERFORD	TRINITY	WEATHERFORD LAKE/RESERVOIR	1,982	2,372	2,325	2,267	2,223	2,175
	Sum of Projected Surface Water Supplies (acre-feet/year)			16,905	28,092	31,678	31,510	30,848	29,765

WISE COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	Source Name	2010	2020	2030	2040	2050	2060
C	BOLIVAR WSC	TRINITY	CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	49	24	21	23	26	34
C	BOLIVAR WSC	TRINITY	RAY ROBERTS LAKE/RESERVOIR NON-SYSTEM PORTION	15	0	0	0	0	0
C	BOLIVAR WSC	TRINITY	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	31	65	69	72	75	89
C	BOYD	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	62	117	147	167	183	159
C	BRIDGEPORT	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	1,337	1,700	1,700	1,700	1,700	1,700
C	CHICO	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	81	102	111	111	111	111
C	COMMUNITY WSC	TRINITY	TRWD	18	16	13	11	9	8

			LAKE/RESERVOIR SYSTEM						
C	COUNTY-OTHER	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	1,863	1,955	1,646	1,398	1,212	1,057
C	DECATUR	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	1,614	1,754	1,754	1,754	1,754	1,754
C	FORT WORTH	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	503	2,339	2,780	3,119	3,537	3,794
C	IRRIGATION	TRINITY	TRINITY RIVER COMBINED RUN-OF-RIVER IRRIGATION	139	139	139	139	139	139
C	IRRIGATION	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	212	195	165	143	125	109
C	LIVESTOCK	TRINITY	LIVESTOCK LOCAL SUPPLY	1,117	1,117	1,117	1,117	1,117	1,117
C	MANUFACTURING	TRINITY	OTHER LOCAL SUPPLY	0	0	0	0	0	0
C	MANUFACTURING	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	2,299	2,429	2,313	2,202	2,083	1,981
C	MINING	TRINITY	OTHER LOCAL SUPPLY	0	0	0	0	0	0
C	MINING	TRINITY	TRINITY RIVER COMBINED RUN-OF-RIVER MINING	51	51	51	51	51	51
C	MINING	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	7,943	7,961	7,395	6,961	6,603	6,175
C	PARADISE	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	71	82	85	90	98	104
C	RHOME	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	330	654	1,012	1,130	1,130	1,130
C	RUNAWAY BAY	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	293	327	335	330	323	313
C	STEAM ELECTRIC POWER	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	1,751	1,143	948	1,267	1,207	1,416
C	WALNUT CREEK SUD	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	289	296	243	198	169	151
C	WEST WISE RURAL SUD	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	478	481	442	417	402	390
	Sum of Projected Surface Water Supplies (acre-feet/year)			20,546	22,947	22,486	22,400	22,054	21,782

Projected Water Demands
TWDB 2012 State Water Plan Data

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

HOOD COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
G	COUNTY-OTHER	BRAZOS	2,854	3,290	3,677	4,081	4,582	5,167
G	DECORDOVA	BRAZOS	593	592	591	592	597	608
G	LIPAN	BRAZOS	171	239	333	467	656	924
G	TOLAR	BRAZOS	143	179	213	246	289	342
G	GRANBURY	BRAZOS	2,795	3,456	4,058	4,708	5,524	6,485
G	CRESSON	BRAZOS	37	44	53	63	77	94
G	OAK TRAIL SHORES SUBDIVISION	BRAZOS	511	504	492	484	480	480
G	ACTON MUD	BRAZOS	2,425	2,912	3,363	3,851	4,464	5,204
G	MANUFACTURING	BRAZOS	25	28	30	32	34	37
G	STEAM ELECTRIC POWER	BRAZOS	4,000	5,862	6,853	8,062	9,535	11,331
G	LIVESTOCK	BRAZOS	617	617	617	617	617	617
G	IRRIGATION	BRAZOS	3,179	3,120	3,062	3,005	2,948	2,893
G	MINING	BRAZOS	162	161	160	159	158	157
G	CRESSON	TRINITY	6	8	9	11	13	16
G	COUNTY-OTHER	TRINITY	9	11	12	13	15	17
G	LIVESTOCK	TRINITY	6	6	6	6	6	6
	Sum of Projected Water Demands (acre-feet/year)		17,533	21,029	23,529	26,397	29,995	34,378

MONTAGUE COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
B	COUNTY-OTHER	RED	441	463	469	473	467	469
B	LIVESTOCK	RED	1,054	1,054	1,054	1,054	1,054	1,054
B	IRRIGATION	RED	59	59	59	59	59	59
B	MANUFACTURING	RED	9	12	15	19	24	24
B	MINING	RED	491	467	459	463	476	476
B	NOCONA	RED	693	681	671	664	657	660
B	SAINT JO	TRINITY	99	101	98	97	96	96
B	COUNTY-OTHER	TRINITY	866	909	920	927	917	920
B	BOWIE	TRINITY	1,027	987	966	952	941	943
B	LIVESTOCK	TRINITY	796	796	796	796	796	796

Projected Water Demands
TWDB 2012 State Water Plan Data

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

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
B	MINING	TRINITY	14	14	14	14	14	14
B	IRRIGATION	TRINITY	238	238	238	238	238	238
	Sum of Projected Water Demands (acre-feet/year)		5,787	5,781	5,759	5,756	5,739	5,749

PARKER COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
C	WEATHERFORD	BRAZOS	251	302	361	418	479	547
C	LIVESTOCK	BRAZOS	872	872	872	872	872	872
C	IRRIGATION	BRAZOS	408	408	408	408	408	408
C	COUNTY-OTHER	BRAZOS	2,252	2,389	2,703	2,931	2,888	2,867
C	MANUFACTURING	BRAZOS	231	261	289	317	341	370
C	MINERAL WELLS	BRAZOS	766	753	744	730	726	726
C	MINING	BRAZOS	5,628	1,641	1,623	1,638	1,640	1,651
C	CRESSON	BRAZOS	28	34	42	51	62	76
C	AZLE	TRINITY	353	438	533	614	708	811
C	ANNETTA	TRINITY	218	265	305	339	374	416
C	COUNTY-OTHER	TRINITY	2,483	2,169	1,888	1,616	1,364	1,129
C	WALNUT CREEK SUD	TRINITY	2,310	3,355	5,215	6,407	6,757	6,990
C	WEATHERFORD	TRINITY	5,258	6,315	7,246	8,136	9,082	10,194
C	SPRINGTOWN	TRINITY	504	659	807	961	1,113	1,272
C	RENO	TRINITY	319	321	322	321	327	337
C	HUDSON OAKS	TRINITY	394	475	576	674	771	867
C	ALEDO	TRINITY	455	957	1,532	2,106	2,213	2,213
C	ANNETTA SOUTH	TRINITY	91	105	116	124	135	147
C	FORT WORTH	TRINITY	3,328	14,576	22,773	26,034	28,518	30,423
C	CRESSON	TRINITY	28	34	41	50	61	75
C	SANCTUARY	TRINITY	92	216	314	370	426	478
C	LIVESTOCK	TRINITY	984	984	984	984	984	984
C	IRRIGATION	TRINITY	14	14	14	14	14	14
C	WILLOW PARK	TRINITY	681	934	1,298	1,557	1,731	1,855
C	MINING	TRINITY	240	61	69	64	72	69
C	STEAM ELECTRIC POWER	TRINITY	24	22	28	56	75	102
C	MANUFACTURING	TRINITY	548	618	685	751	809	878
	Sum of Projected Water Demands (acre-feet/year)		28,760	39,178	51,788	58,543	62,950	66,771

WISE COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
C	PARADISE	TRINITY	73	89	109	134	165	202
C	WEST WISE RURAL SUD	TRINITY	483	524	567	618	681	756
C	WALNUT CREEK SUD	TRINITY	296	439	680	815	874	932
C	RUNAWAY BAY	TRINITY	296	356	430	489	547	608
C	FORT WORTH	TRINITY	555	2,803	3,985	5,094	6,518	7,936
C	COMMUNITY WSC	TRINITY	18	17	17	16	16	16
C	BOLIVAR WSC	TRINITY	187	238	303	440	612	918
C	IRRIGATION	TRINITY	502	502	502	502	502	502
C	LIVESTOCK	TRINITY	1,714	1,714	1,714	1,714	1,714	1,714
C	MINING	TRINITY	26,477	28,924	31,620	34,393	37,258	39,956
C	STEAM ELECTRIC POWER	TRINITY	1,751	1,245	1,216	1,878	2,042	2,748
C	COUNTY-OTHER	TRINITY	3,776	4,261	4,221	4,142	4,103	4,103
C	MANUFACTURING	TRINITY	2,313	2,660	2,979	3,277	3,539	3,858
C	BOYD	TRINITY	215	278	339	397	459	459
C	BRIDGEPORT	TRINITY	1,361	1,899	2,702	3,187	3,713	4,444
C	AURORA	TRINITY	187	218	237	253	292	338
C	ALVORD	TRINITY	199	214	228	243	263	287
C	NEWARK	TRINITY	154	232	301	418	564	787
C	NEW FAIRVIEW	TRINITY	201	272	340	409	488	579
C	RHOME	TRINITY	590	955	1,541	2,151	2,760	3,369
C	CHICO	TRINITY	208	235	276	333	405	495
C	DECATUR	TRINITY	1,639	2,011	2,748	3,537	4,580	5,385
	Sum of Projected Water Demands (acre-feet/year)		43,195	50,086	57,055	64,440	72,095	80,392

Projected Water Supply Needs
TWDB 2012 State Water Plan Data

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

HOOD COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
G	ACTON MUD	BRAZOS	2,833	2,341	1,885	1,390	764	1
G	COUNTY-OTHER	BRAZOS	2,655	2,219	1,832	1,428	927	342
G	COUNTY-OTHER	TRINITY	15	13	12	11	9	7
G	CRESSON	BRAZOS	63	56	47	37	23	6
G	CRESSON	TRINITY	34	32	31	29	27	24
G	DECORDOVA	BRAZOS	0	0	0	0	0	0
G	GRANBURY	BRAZOS	-1,806	-2,467	-3,109	-3,799	-4,615	-5,576
G	IRRIGATION	BRAZOS	9,478	9,541	9,602	9,663	9,723	9,782
G	LIPAN	BRAZOS	68	0	-94	-228	-417	-685
G	LIVESTOCK	BRAZOS	0	0	0	0	0	0
G	LIVESTOCK	TRINITY	0	0	0	0	0	0
G	MANUFACTURING	BRAZOS	10,015	10,012	10,010	10,008	10,006	10,003
G	MINING	BRAZOS	347	348	349	350	351	352
G	OAK TRAIL SHORES SUBDIVISION	BRAZOS	-364	-357	-345	-337	-333	-333
G	STEAM ELECTRIC POWER	BRAZOS	39,506	37,644	36,653	35,444	33,971	32,175
G	TOLAR	BRAZOS	52	16	-18	-51	-94	-147
	Sum of Projected Water Supply Needs (acre-feet/year)		-2,170	-2,824	-3,566	-4,415	-5,459	-6,741

MONTAGUE COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
B	BOWIE	TRINITY	275	242	194	140	86	18
B	COUNTY-OTHER	RED	-89	-108	-113	-117	-112	-113
B	COUNTY-OTHER	TRINITY	-135	-172	-181	-187	-179	-181
B	IRRIGATION	RED	154	154	154	154	154	154
B	IRRIGATION	TRINITY	1	1	1	1	1	1
B	LIVESTOCK	RED	1	1	1	1	1	1
B	LIVESTOCK	TRINITY	0	0	0	0	0	0
B	MANUFACTURING	RED	2	2	3	4	5	5
B	MINING	RED	-163	-139	-131	-135	-148	-148
B	MINING	TRINITY	-14	-14	-14	-14	-14	-14
B	NOCONA	RED	404	410	415	417	419	415

Projected Water Supply Needs
TWDB 2012 State Water Plan Data

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

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
B	SAINT JO	TRINITY	112	110	113	114	115	115
	Sum of Projected Water Supply Needs (acre-feet/year)		-401	-433	-439	-453	-453	-456

PARKER COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
C	ALEDO	TRINITY	46	-456	-1,031	-1,605	-1,712	-1,712
C	ANNETTA	TRINITY	22	-25	-65	-99	-134	-176
C	ANNETTA SOUTH	TRINITY	9	-5	-16	-24	-35	-47
C	AZLE	TRINITY	-21	-133	-261	-373	-486	-593
C	COUNTY-OTHER	BRAZOS	145	239	0	0	0	0
C	COUNTY-OTHER	TRINITY	1,464	1,778	1,956	1,974	2,240	2,472
C	CRESSON	BRAZOS	55	49	41	32	21	7
C	CRESSON	TRINITY	55	49	42	33	22	8
C	FORT WORTH	TRINITY	-122	-1,754	-6,048	-9,305	-12,332	-15,255
C	HUDSON OAKS	TRINITY	-4	-16	-65	-128	-200	-284
C	IRRIGATION	BRAZOS	232	232	232	232	232	232
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	24	1	-39	-77	-110	-148
C	MANUFACTURING	TRINITY	84	74	-32	-130	-223	-324
C	MINERAL WELLS	BRAZOS	-10	-19	-25	-27	-29	-32
C	MINING	BRAZOS	2,020	6,186	6,196	6,186	6,176	6,168
C	MINING	TRINITY	0	0	0	0	0	0
C	RENO	TRINITY	-4	-13	-34	-50	-65	-82
C	SANCTUARY	TRINITY	-2	-18	-69	-120	-174	-232
C	SPRINGTOWN	TRINITY	-206	-219	-310	-420	-543	-686
C	STEAM ELECTRIC POWER	TRINITY	0	-2	-6	-18	-31	-49
C	WALNUT CREEK SUD	TRINITY	-51	-1,091	-3,353	-4,850	-5,449	-5,857
C	WEATHERFORD	BRAZOS	-51	-38	-73	-117	-164	-223
C	WEATHERFORD	TRINITY	-1,062	-703	-1,406	-2,196	-3,058	-4,109
C	WILLOW PARK	TRINITY	76	-177	-541	-800	-974	-1,098
	Sum of Projected Water Supply Needs (acre-feet/year)		-1,533	-4,669	-13,374	-20,339	-25,719	-30,907

WISE COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
C	ALVORD	TRINITY	117	102	88	73	53	29
C	AURORA	TRINITY	65	34	15	-1	-40	-86
C	BOLIVAR WSC	TRINITY	74	-24	-120	-264	-431	-700
C	BOYD	TRINITY	-3	-11	-42	-80	-126	-150
C	BRIDGEPORT	TRINITY	-24	-199	-1,002	-1,487	-2,013	-2,744
C	CHICO	TRINITY	-3	-9	-41	-98	-170	-260
C	COMMUNITY WSC	TRINITY	0	-1	-4	-5	-7	-8
C	COUNTY-OTHER	TRINITY	1,071	678	409	240	93	-62
C	DECATUR	TRINITY	-25	-257	-994	-1,783	-2,826	-3,631
C	FORT WORTH	TRINITY	-20	-337	-1,058	-1,821	-2,819	-3,980
C	IRRIGATION	TRINITY	139	122	92	70	52	36
C	LIVESTOCK	TRINITY	210	210	210	210	210	210
C	MANUFACTURING	TRINITY	0	-217	-652	-1,061	-1,442	-1,863
C	MINING	TRINITY	0	-4,285	-9,469	-14,185	-18,815	-23,116
C	NEW FAIRVIEW	TRINITY	20	-51	-119	-188	-267	-358
C	NEWARK	TRINITY	15	-63	-132	-249	-395	-618
C	PARADISE	TRINITY	-2	-7	-24	-44	-67	-98
C	RHOME	TRINITY	-17	-58	-286	-778	-1,387	-1,996
C	RUNAWAY BAY	TRINITY	-3	-29	-95	-159	-224	-295
C	STEAM ELECTRIC POWER	TRINITY	0	-102	-268	-611	-835	-1,332
C	WALNUT CREEK SUD	TRINITY	-7	-143	-437	-617	-705	-781
C	WEST WISE RURAL SUD	TRINITY	-5	-43	-125	-201	-279	-366
	Sum of Projected Water Supply Needs (acre-feet/year)		-109	-5,836	-14,868	-23,632	-32,848	-42,444

Projected Water Management Strategies
TWDB 2012 State Water Plan Data

HOOD COUNTY

WUG, Basin (RWPG) — All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
GRANBURY, BRAZOS (G)							
INCREASE TREATMENT CAPACITY	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM [RESERVOIR]	3,920	3,920	3,920	3,920	7,840	7,840
MUNICIPAL WATER CONSERVATION	CONSERVATION [HOOD]	55	158	148	156	165	193
LIPAN, BRAZOS (G)							
ADDITIONAL TRINITY AQUIFER DEVELOPMENT (INCLUDES OVERDRAFTING)	TRINITY AQUIFER [HOOD]	0	0	100	227	418	685
MUNICIPAL WATER CONSERVATION	CONSERVATION [HOOD]	5	16	19	23	31	44
OAK TRAIL SHORES SUBDIVISION, BRAZOS (G)							
VOLUNTARY REDISTRIBUTION	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM [RESERVOIR]	390	390	390	390	390	390
TOLAR, BRAZOS (G)							
ADDITIONAL TRINITY AQUIFER DEVELOPMENT (INCLUDES OVERDRAFTING)	TRINITY AQUIFER [HOOD]	0	0	100	100	100	150
MUNICIPAL WATER CONSERVATION	CONSERVATION [HOOD]	6	15	16	14	13	15
Sum of Projected Water Management Strategies (acre-feet/year)		4,376	4,499	4,693	4,830	8,957	9,317

MONTAGUE COUNTY

WUG, Basin (RWPG) — All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
BOWIE, TRINITY (B)							
MUNICIPAL CONSERVATION	CONSERVATION [MONTAGUE]	8	34	34	61	69	72
WASTEWATER REUSE	AMON G. CARTER LAKE/RESERVOIR [RESERVOIR]	0	0	0	171	171	171
COUNTY-OTHER, RED (B)							
DEVELOP OTHER AQUIFER SUPPLIES	OTHER AQUIFER [MONTAGUE]	160	160	160	160	160	160

Projected Water Management Strategies
TWDB 2012 State Water Plan Data

WUG, Basin (RWPG) / Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
		All values are in acre-feet/year					
DEVELOP TRINITY AQUIFER SUPPLIES (INCLUDES OVERDRAFTING)	TRINITY AQUIFER [MONTAGUE]	68	68	68	68	68	68
MUNICIPAL CONSERVATION	CONSERVATION [MONTAGUE]	9	46	47	47	48	48
COUNTY-OTHER, TRINITY (B)							
DEVELOP OTHER AQUIFER SUPPLIES	OTHER AQUIFER [MONTAGUE]	85	85	85	85	85	85
DEVELOP TRINITY AQUIFER SUPPLIES	TRINITY AQUIFER [MONTAGUE]	271	271	271	271	271	271
MUNICIPAL CONSERVATION	CONSERVATION [MONTAGUE]	9	32	33	33	33	33
MINING, RED (B)							
PURCHASE WATER FROM LOCAL PROVIDER	FARMERS CREEK/NOCONA LAKE/RESERVOIR [RESERVOIR]	163	163	163	163	163	163
MINING, TRINITY (B)							
PURCHASE WATER FROM LOCAL PROVIDER	AMON G. CARTER LAKE/RESERVOIR [RESERVOIR]	14	14	14	14	14	14
Sum of Projected Water Management Strategies (acre-feet/year)		787	873	875	1,073	1,082	1,085

PARKER COUNTY

WUG, Basin (RWPG) / Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
		All values are in acre-feet/year					
ALEDO, TRINITY (C)							
CONVEYANCE PROJECT (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	96	322	472	454
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	5	54	108	167	193	212
MUNICIPAL CONSERVATION-EXPANDED	CONSERVATION [PARKER]	5	14	24	33	35	35
OKLAHOMA WATER TO NTMWD, TRWD, UTRWD	OKLAHOMA LAKE/RESERVOIR [RESERVOIR - OKLAHOMA]	0	0	0	0	0	129
PURCHASE FROM WATER PROVIDER (1)	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	419	804	1,083	1,012	882
SUPPLEMENTAL WELLS	TRINITY AQUIFER [PARKER]	0	0	0	0	0	0
ANNETTA, TRINITY (C)							
CONVEYANCE PROJECT (2)	INDIRECT REUSE	0	14	49	80	89	112

	[NAVARRO]						
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	3	11	16	19	23	27
PURCHASE FROM WATER PROVIDER (1)	TOLEDO BEND LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	22	37
SUPPLEMENTAL WELLS	TRINITY AQUIFER [PARKER]	0	0	0	0	0	0
ANNETTA SOUTH, TRINITY (C)							
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	1	4	6	8	9	10
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	0	1	10	16	26	37
SUPPLEMENTAL WELLS	TRINITY AQUIFER [PARKER]	0	0	0	0	0	0
AZLE, TRINITY (C)							
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	18	15	21	27	34	41
MUNICIPAL CONSERVATION-EXPANDED	CONSERVATION [PARKER]	3	4	4	5	6	7
PURCHASE FROM WATER PROVIDER (1)	TOLEDO BEND LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	12
PURCHASE FROM WATER PROVIDER (1)	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	96	144	175	196	201
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	79	18	0	3	0	13
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	92	165	250	321
COUNTY-OTHER, BRAZOS (C)							
CONVEYANCE PROJECT (1)	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	500	500	500	500	500
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	21	87	137	163	172	180
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	38	61	74	83
COUNTY-OTHER, TRINITY (C)							
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	23	79	96	90	81	71
SUPPLEMENTAL WELLS	TRINITY AQUIFER [PARKER]	0	0	0	0	0	0
CRESSON, BRAZOS (C)							
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	1	2	2	3	4	5
CRESSON, TRINITY (C)							
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	0	1	2	2	3	4
FORT WORTH, TRINITY (C)							
DIRECT REUSE	DIRECT REUSE [TARRANT]	30	627	1,354	1,268	1,147	1,003
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	92	675	1,319	1,735	2,141	2,537

Projected Water Management Strategies
TWDB 2012 State Water Plan Data

WUG, Basin (RWPG) — All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
MUNICIPAL CONSERVATION-EXPANDED	CONSERVATION [PARKER]	0	37	108	148	162	172
PURCHASE FROM WATER PROVIDER (1)	OKLAHOMA LAKE/RESERVOIR [RESERVOIR - OKLAHOMA]	0	0	0	0	0	2,551
PURCHASE FROM WATER PROVIDER (1)	TOLEDO BEND LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
PURCHASE FROM WATER PROVIDER (1)	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	0	415	0	135	0	0
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	3,267	6,019	8,882	8,992
HUDSON OAKS, TRINITY (C)							
MARVIN NICHOLS RESERVOIR	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	29	79	139	208
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	4	23	36	49	61	76
SUPPLEMENTAL WELLS	TRINITY AQUIFER [PARKER]	0	0	0	0	0	0
IRRIGATION, TRINITY (C)							
SUPPLEMENTAL WELLS	TRINITY AQUIFER [PARKER]	0	0	0	0	0	0
LIVESTOCK, TRINITY (C)							
SUPPLEMENTAL WELLS	TRINITY AQUIFER [PARKER]	0	0	0	0	0	0
MANUFACTURING, BRAZOS (C)							
MANUFACTURING CONSERVATION	CONSERVATION [PARKER]	0	1	2	3	3	3
PURCHASE FROM WATER PROVIDER (1)	TOLEDO BEND LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	4
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	37	74	107	141
MANUFACTURING, TRINITY (C)							
MANUFACTURING CONSERVATION	CONSERVATION [PARKER]	0	0	4	6	7	7
PURCHASE FROM WATER PROVIDER (1)	TOLEDO BEND LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	9

Projected Water Management Strategies
TWDB 2012 State Water Plan Data

WUG, Basin (RWPG) — All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	28	124	216	308
SUPPLEMENTAL WELLS	TRINITY AQUIFER [PARKER]	0	0	0	0	0	0
MINERAL WELLS, BRAZOS (C)							
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	10	19	25	27	29	32
MINING, TRINITY (C)							
SUPPLEMENTAL WELLS	TRINITY AQUIFER [PARKER]	0	0	0	0	0	0
RENO, TRINITY (C)							
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	4	13	17	19	21	22
PURCHASE FROM WATER PROVIDER (1)	TOLEDO BEND LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	17	32	44	60
SUPPLEMENTAL WELLS	TRINITY AQUIFER [PARKER]	0	0	0	0	0	0
SANCTUARY, TRINITY (C)							
MARVIN NICHOLS RESERVOIR	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	53	101	149	203
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	2	10	16	20	25	29
TRWD THIRD PIPELINE AND REUSE	INDIRECT REUSE [NAVARRO]	0	8	0	0	0	0
SPRINGTOWN, TRINITY (C)							
CONVEYANCE PROJECT (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	53	137	236	351
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	20	48	71	94	117	144
MUNICIPAL CONSERVATION-EXPANDED	CONSERVATION [PARKER]	3	4	4	5	6	7
NEW WELLS - TRINITY AQUIFER	TRINITY AQUIFER [PARKER]	184	184	184	184	184	184
SUPPLEMENTAL WELLS	TRINITY AQUIFER [PARKER]	0	0	0	0	0	0
WATER TREATMENT PLANT - EXPANSION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
WATER TREATMENT PLANT - NEW	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0

Projected Water Management Strategies
TWDB 2012 State Water Plan Data

WUG, Basin (RWPG) — All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
STEAM ELECTRIC POWER, TRINITY (C)							
CONVEYANCE PROJECT (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	6	18	31	50
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	0	2	0	0	0	0
WALNUT CREEK SUD, TRINITY (C)							
CONVEYANCE PROJECT (1)	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
MARVIN NICHOLS RESERVOIR	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	838	1,618	2,313	2,614
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	35	141	272	361	404	440
MUNICIPAL CONSERVATION-EXPANDED	CONSERVATION [PARKER]	17	24	37	46	48	50
PURCHASE FROM WATER PROVIDER (1)	TOLEDO BEND LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	138
PURCHASE FROM WATER PROVIDER (1)	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	816	2,206	2,767	2,684	2,469
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	0	111	0	58	0	146
WATER TREATMENT PLANT - EXPANSION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
WATER TREATMENT PLANT - NEW	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
WEATHERFORD, BRAZOS (C)							
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	8	17	25	33	42	52
MUNICIPAL CONSERVATION-EXPANDED	CONSERVATION [PARKER]	2	3	5	6	7	8
PURCHASE FROM WATER PROVIDER (1)	TOLEDO BEND LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	63	68
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	68	127	122	133	117	129
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
WEATHERFORD, TRINITY (C)							
FACILITY IMPROVEMENTS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	165	353	502	637	791	975
MUNICIPAL CONSERVATION-EXPANDED	CONSERVATION [PARKER]	48	72	95	117	131	146

Projected Water Management Strategies
TWDB 2012 State Water Plan Data

WUG, Basin (RWPG) — All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
PURCHASE FROM WATER PROVIDER (1)	TOLEDO BEND LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	1,188	1,269
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	1,323	2,556	2,400	2,543	2,210	2,396
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	413	1,066	1,798	2,497
WATER TREATMENT PLANT - EXPANSION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
WILLOW PARK, TRINITY (C)							
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [PARKER]	8	51	57	74	88	100
MUNICIPAL CONSERVATION-EXPANDED	CONSERVATION [PARKER]	4	8	8	9	10	11
PURCHASE FROM WATER PROVIDER (1)	TOLEDO BEND LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	20
PURCHASE FROM WATER PROVIDER (1)	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	118	422	540	576	566
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	0	0	0	0	0	19
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	54	177	307	382
SUPPLEMENTAL WELLS	TRINITY AQUIFER [PARKER]	0	0	0	0	0	0
Sum of Projected Water Management Strategies (acre-feet/year)		2,186	7,782	16,235	23,384	29,685	34,961

WISE COUNTY

WUG, Basin (RWPG) — All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
ALVORD, TRINITY (C)							
CONVEYANCE PROJECT (1)	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	2	7	10	12	14	17
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	23	37	47	56
SUPPLEMENTAL WELLS	TRINITY AQUIFER [WISE]	0	0	0	0	0	0
TRWD THIRD PIPELINE AND REUSE	INDIRECT REUSE [HENDERSON]	0	5	0	0	0	0
AURORA, TRINITY (C)							

MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	3	9	13	15	18	22
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	0	50	50	50	50	86
SUPPLEMENTAL WELLS	TRINITY AQUIFER [WISE]	0	0	0	0	0	0
BOLIVAR WSC, TRINITY (C)							
LAKE RALPH HALL - INDIRECT REUSE	INDIRECT REUSE [DENTON]	0	2	16	48	64	85
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	3	10	15	23	34	54
MUNICIPAL CONSERVATION-EXPANDED	CONSERVATION [WISE]	2	2	2	4	5	7
PURCHASE FROM WATER PROVIDER (1)	CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION [RESERVOIR]	0	3	10	19	25	30
PURCHASE FROM WATER PROVIDER (1)	OKLAHOMA LAKE/RESERVOIR [RESERVOIR - OKLAHOMA]	0	0	0	0	0	69
PURCHASE FROM WATER PROVIDER (1)	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	12	51	104	148	254
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [DENTON]	0	2	6	10	14	17
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	62	81
PURCHASE FROM WATER PROVIDER (3)	RALPH HALL LAKE/RESERVOIR [RESERVOIR]	0	13	45	88	120	158
SUPPLEMENTAL WELLS	TRINITY AQUIFER [WISE]	0	0	0	0	0	0
BOYD, TRINITY (C)							
MARVIN NICHOLS RESERVOIR	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	26	60	101	123
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	3	10	16	20	25	27
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	0	1	0	0	0	0
SUPPLEMENTAL WELLS	TRINITY AQUIFER [WISE]	0	0	0	0	0	0
BRIDGEPORT, TRINITY (C)							
MARVIN NICHOLS RESERVOIR	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	407	784	1,195	1,729
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	11	83	150	205	270	360
MUNICIPAL CONSERVATION-EXPANDED	CONSERVATION [WISE]	13	23	38	47	55	65
TRWD THIRD PIPELINE AND REUSE	INDIRECT REUSE [NAVARRO]	0	50	0	0	0	0
WATER TREATMENT PLANT - EXPANSION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
WATER TREATMENT PLANT - NEW	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	43	407	451	494	590

Projected Water Management Strategies
TWDB 2012 State Water Plan Data

WUG, Basin (RWPG) — All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
CHICO, TRINITY (C)							
MARVIN NICHOLS RESERVOIR	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	19	50	92	150
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	2	8	13	16	21	28
MUNICIPAL CONSERVATION-EXPANDED	CONSERVATION [WISE]	1	1	1	2	2	2
PURCHASE FROM WATER PROVIDER (1)	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	8	30	55	80
SUPPLEMENTAL WELLS	TRINITY AQUIFER [WISE]	0	0	0	0	0	0
COMMUNITY WSC, TRINITY (C)							
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	0	1	1	1	2	2
PURCHASE FROM WATER PROVIDER (1)	TOLEDO BEND LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	3	4	5	6
COUNTY-OTHER, TRINITY (C)							
MARVIN NICHOLS RESERVOIR	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	356	557	717	865
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	49	166	216	232	245	259
PURCHASE FROM WATER PROVIDER (1)	TOLEDO BEND LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	149	92	0	0	0	0
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	356	557	717	865
SUPPLEMENTAL WELLS	TRINITY AQUIFER [WISE]	0	0	0	0	0	0
TRWD THIRD PIPELINE AND REUSE	INDIRECT REUSE [NAVARRO]	0	92	0	0	0	0
DECATUR, TRINITY (C)							
MARVIN NICHOLS RESERVOIR	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	416	872	1,476	2,096
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	13	88	158	234	342	446
MUNICIPAL CONSERVATION-EXPANDED	CONSERVATION [WISE]	12	20	32	45	58	68
PURCHASE FROM WATER PROVIDER (1)	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	92	389	633	952	1,021

Projected Water Management Strategies
TWDB 2012 State Water Plan Data

WUG, Basin (RWPG) — All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	0	57	0	0	0	0
WATER TREATMENT PLANT - EXPANSION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
FORT WORTH, TRINITY (C)							
DIRECT REUSE	DIRECT REUSE [TARRANT]	5	120	236	249	263	262
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	15	130	231	339	489	662
MUNICIPAL CONSERVATION-EXPANDED	CONSERVATION [WISE]	0	7	19	29	37	45
PURCHASE FROM WATER PROVIDER (1)	OKLAHOMA LAKE/RESERVOIR [RESERVOIR - OKLAHOMA]	0	0	0	0	0	665
PURCHASE FROM WATER PROVIDER (1)	TOLEDO BEND LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
PURCHASE FROM WATER PROVIDER (1)	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	0	80	0	26	0	0
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	572	1,178	2,030	2,346
IRRIGATION, TRINITY (C)							
GOLF COURSE CONSERVATION	CONSERVATION [WISE]	0	5	10	13	15	18
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	21	17	0	0	0	0
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	47	69	87	103
SUPPLEMENTAL WELLS	TRINITY AQUIFER [WISE]	0	0	0	0	0	0
LIVESTOCK, TRINITY (C)							
SUPPLEMENTAL WELLS	TRINITY AQUIFER [WISE]	0	0	0	0	0	0
MANUFACTURING, TRINITY (C)							
MANUFACTURING CONSERVATION	CONSERVATION [WISE]	0	1	12	18	19	21
MARVIN NICHOLS RESERVOIR	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	640	1,043	1,423	1,842
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [HENDERSON]	0	216	0	0	0	0
SUPPLEMENTAL WELLS	OTHER AQUIFER [WISE]	0	0	0	0	0	0

Projected Water Management Strategies
TWDB 2012 State Water Plan Data

WUG, Basin (RWPG) — All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
MINING, TRINITY (C)							
DIRECT REUSE	DIRECT REUSE [WISE]	0	3,569	7,378	10,828	14,241	17,304
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	0	716	0	0	0	0
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	2,091	3,357	4,574	5,812
SUPPLEMENTAL WELLS	TRINITY AQUIFER [WISE]	0	0	0	0	0	0
NEW FAIRVIEW, TRINITY (C)							
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	4	13	20	26	32	40
PURCHASE FROM WATER PROVIDER (1)	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	47	93	127	158	184
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	6	36	77	134
SUPPLEMENTAL WELLS	TRINITY AQUIFER [WISE]	0	0	0	0	0	0
NEWARK, TRINITY (C)							
CONVEYANCE PROJECT (2)	INDIRECT REUSE [NAVARRO]	0	0	0	0	0	0
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	2	9	15	22	32	47
MUNICIPAL CONSERVATION-EXPANDED	CONSERVATION [WISE]	1	2	3	4	5	7
PURCHASE FROM WATER PROVIDER (1)	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	58	103	168	233	318
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	12	55	125	246
SUPPLEMENTAL WELLS	TRINITY AQUIFER [WISE]	0	0	0	0	0	0
PARADISE, TRINITY (C)							
MARVIN NICHOLS RESERVOIR	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	18	37	57	86
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	2	4	6	7	10	12
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	0	3	0	0	0	0
RHOME, TRINITY (C)							
MARVIN NICHOLS RESERVOIR	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	201	483	831	1,155
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	17	43	85	137	199	270

Projected Water Management Strategies
TWDB 2012 State Water Plan Data

WUG, Basin (RWPG) — All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
PURCHASE FROM WATER PROVIDER (1)	TOLEDO BEND LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	44
PURCHASE FROM WATER PROVIDER (1)	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	158	357	481
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	0	15	0	0	0	47
SUPPLEMENTAL WELLS	TRINITY AQUIFER [WISE]	0	0	0	0	0	0
RUNAWAY BAY, TRINITY (C)							
MARVIN NICHOLS RESERVOIR	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	70	127	183	245
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	3	16	25	32	41	50
PURCHASE FROM WATER PROVIDER (1)	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	0	13	0	0	0	0
WATER TREATMENT PLANT - EXPANSION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
STEAM ELECTRIC POWER, TRINITY (C)							
CONVEYANCE PROJECT (2)	DIRECT REUSE [WISE]	0	0	0	0	0	0
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	1,098	102	0	0	0	0
PURCHASE FROM WATER PROVIDER (3)	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	268	611	835	1,332
WALNUT CREEK SUD, TRINITY (C)							
MARVIN NICHOLS RESERVOIR	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	109	206	299	349
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	5	19	36	46	53	60
MUNICIPAL CONSERVATION-EXPANDED	CONSERVATION [WISE]	2	3	5	6	6	7
PURCHASE FROM WATER PROVIDER (1)	TOLEDO BEND LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	18
PURCHASE FROM WATER PROVIDER (1)	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	107	288	352	347	329
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	0	14	0	7	0	19

Projected Water Management Strategies
TWDB 2012 State Water Plan Data

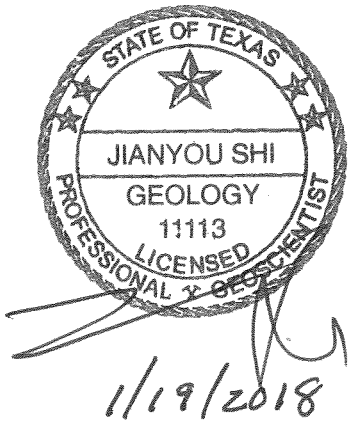
WUG, Basin (RWPG) — All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
WEST WISE RURAL SUD, TRINITY (C)							
MARVIN NICHOLS RESERVOIR	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	98	169	241	321
MUNICIPAL CONSERVATION-BASIC	CONSERVATION [WISE]	5	18	27	32	38	45
PURCHASE FROM WATER PROVIDER (2)	INDIRECT REUSE [NAVARRO]	0	25	0	0	0	0
WATER TREATMENT PLANT - EXPANSION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
WATER TREATMENT PLANT - NEW	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
Sum of Projected Water Management Strategies (acre-feet/year)		1,443	6,314	15,977	25,207	34,762	44,644

Appendix B

GAM Run 17-029 MAG: Modeled Available Groundwater for the Trinity, Woodbine, Edwards (Balcones Fault Zone), Marble Falls, Ellenburger-San Saba, and Hickory aquifers in Groundwater Management Area 8

Jerry Shi, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
(512) 463-5076
January 19, 2018



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GAM RUN 17-029 MAG: MODELED AVAILABLE GROUNDWATER FOR THE TRINITY, WOODBINE, EDWARDS (BALCONES FAULT ZONE), MARBLE FALLS, ELLENBURGER-SAN SABA, AND HICKORY AQUIFERS IN GROUNDWATER MANAGEMENT AREA 8

Jerry Shi, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
(512) 463-5076
January 19, 2018

EXECUTIVE SUMMARY:

The Texas Water Development Board (TWDB) has calculated the modeled available groundwater estimates for the Trinity, Woodbine, Edwards (Balcones Fault Zone), Marble Falls, Ellenburger-San Saba, and Hickory aquifers in Groundwater Management Area 8. The modeled available groundwater estimates are based on the desired future conditions for these aquifers adopted by groundwater conservation district representatives in Groundwater Management Area 8 on January 31, 2017. The district representatives declared the Nacatoch, Blossom, and Brazos River Alluvium aquifers to be non-relevant for purposes of joint planning. The TWDB determined that the explanatory report and other materials submitted by the district representatives were administratively complete on November 2, 2017.

The modeled available groundwater values for the following relevant aquifers in Groundwater Management Area 8 are summarized below:

- Trinity Aquifer (Paluxy) – The modeled available groundwater ranges from approximately 24,500 to 24,600 acre-feet per year between 2010 and 2070, and is

summarized by groundwater conservation districts and counties in Table 1, and by river basins, regional planning areas, and counties in Table 13.

- Trinity Aquifer (Glen Rose) – The modeled available groundwater is approximately 12,700 acre-feet per year between 2010 and 2070, and is summarized by groundwater conservation districts and counties in Table 2, and by river basins, regional planning areas, and counties in Table 14.
- Trinity Aquifer (Twin Mountains) – The modeled available groundwater ranges from approximately 40,800 to 40,900 acre-feet per year between 2010 and 2070, and is summarized by groundwater conservation districts and counties in Table 3, and by river basins, regional planning areas, and counties in Table 15.
- Trinity Aquifer (Travis Peak) – The modeled available groundwater ranges from approximately 93,800 to 94,000 acre-feet per year between 2010 and 2070, and is summarized by groundwater conservation districts and counties in in Table 4, and by river basins, regional planning areas, and counties in Table 16.
- Trinity Aquifer (Hensell) – The modeled available groundwater is approximately 27,300 acre-feet per year from 2010 to 2070, and is summarized by groundwater conservation districts and counties in Table 5, and by river basins, regional planning areas, and counties in Table 17.
- Trinity Aquifer (Hosston) – The modeled available groundwater ranges from approximately 64,900 to 65,100 acre-feet per year from 2010 to 2070, and is summarized by groundwater conservation districts and counties in Table 6, and by river basins, regional planning areas, and counties in Table 18.
- Trinity Aquifer (Antlers) – The modeled available groundwater ranges from approximately 74,500 to 74,700 acre-feet per year between 2010 and 2070, and is summarized by groundwater conservation districts and counties in Table 7, and by river basins, regional planning areas, and counties in Table 19.
- Woodbine Aquifer – The modeled available groundwater is approximately 30,600 acre-feet per year from 2010 to 2070, and is summarized by groundwater conservation districts and counties in Table 8, and by river basins, regional planning areas, and counties in Table 20.
- Edwards (Balcones Fault Zone) Aquifer – The modeled available groundwater is 15,168 acre-feet per year from 2010 to 2060, and is summarized by groundwater conservation districts and counties in Table 9, and by river basins, regional planning areas, and counties in Table 21.

- Marble Falls Aquifer – The modeled available groundwater is approximately 5,600 acre-feet per year from 2010 to 2070, and is summarized by groundwater conservation districts and counties in Table 10, and by river basins, regional planning areas, and counties in Table 22.
- Ellenburger-San Saba Aquifer – The modeled available groundwater is approximately 14,100 acre-feet per year between 2010 and 2070, and is summarized by groundwater conservation districts and counties in Table 11, and by river basins, regional planning areas, and counties in Table 23.
- Hickory Aquifer – The modeled available groundwater is approximately 3,600 acre-feet per year from 2010 to 2070, and is summarized by groundwater conservation districts and counties in Table 12, and by river basins, regional planning areas, and counties in Table 24.

The modeled available groundwater values for the Trinity Aquifer (Paluxy, Glen Rose, Twin Mountains, Travis Peak, Hensell, Hosston, and Antlers subunits), Woodbine Aquifer, and Edwards (Balcones Fault Zone) Aquifer are based on the official aquifer boundaries defined by the TWDB. The modeled available groundwater values for the Marble Falls, Ellenburger-San Saba, and Hickory aquifers are based on the modeled extent, as clarified by Groundwater Management Area 8 on October 9, 2017.

The modeled available groundwater values estimated for counties may be slightly different from those estimated for groundwater conservation districts because of the process for rounding the values. The modeled available groundwater values for the longer leap years (2020, 2040, and 2060) are slightly higher than shorter non-leap years (2010, 2030, 2050, and 2070).

REQUESTOR:

Mr. Drew Satterwhite, General Manager of North Texas Groundwater Conservation District and Groundwater Management Area 8 Coordinator.

DESCRIPTION OF REQUEST:

In a letter dated February 17, 2017, Mr. Drew Satterwhite provided the TWDB with the desired future conditions of the Trinity (Paluxy), Trinity (Glen Rose), Trinity (Twin Mountains), Trinity (Travis Peak), Trinity (Hensell), Trinity (Hosston), Trinity (Antlers), Woodbine, Edwards (Balcones Fault Zone), Marble Falls, Ellenburger-San Saba, and Hickory aquifers. The desired future conditions were adopted as Resolution No. 2017-01 on January 31, 2017 by the groundwater conservation district representatives in

Groundwater Management Area 8. The following sections present the adopted desired future conditions for these aquifers:

Trinity and Woodbine Aquifers

The desired future conditions for the Trinity and Woodbine aquifers are expressed as water level decline or drawdown in feet over the planning period 2010 to 2070 relative to the baseline year 2009, based on a predictive simulation by Beach and others (2016).

The county-based desired future conditions for the Trinity Aquifer subunits, excluding counties in the Upper Trinity Groundwater Conservation District, are listed below (dashes indicate areas where the subunits do not exist and therefore no desired future condition was proposed):

County	Adopted Desired Future Condition (feet of drawdown below 2009 levels)							
	Woodbine	Paluxy	Glen Rose	Twin Mountains	Travis Peak	Hensell	Hosston	Antlers
Bell	—	19	83	—	300	137	330	—
Bosque	—	6	49	—	167	129	201	—
Brown	—	—	2	—	1	1	1	2
Burnet	—	—	2	—	16	7	20	—
Callahan	—	—	—	—	—	—	—	1
Collin	459	705	339	526	—	—	—	570
Comanche	—	—	1	—	2	2	3	9
Cooke	2		—	—	—		—	176
Coryell	—	7	14	—	99	66	130	—
Dallas	123	324	263	463	348	332	351	—
Delta	—	264	181	—	186	—	—	—
Denton	22	552	349	716	—	—	—	395
Eastland	—	—	—	—	—	—	—	3
Ellis	61	107	194	333	301	263	310	—
Erath	—	1	5	6	19	11	31	12
Falls	—	144	215	—	462	271	465	—
Fannin	247	688	280	372	269	—	—	251
Grayson	160	922	337	417	—	—	—	348
Hamilton	—	2	4	—	24	13	35	—
Hill	20	38	133	—	298	186	337	—
Hunt	598	586	299	370	324	—	—	—

County	Adopted Desired Future Condition (feet of drawdown below 2009 levels)							
	Woodbine	Paluxy	Glen Rose	Twin Mountains	Travis Peak	Hensell	Hosston	Antlers
Johnson	2	-61	58	156	179	126	235	—
Kaufman	208	276	269	381	323	309	295	—
Lamar	38	93	97	—	114	—	—	122
Lampasas	—	—	1	—	6	1	11	—
Limestone	—	178	271	—	392	183	404	—
McLennan	6	35	133	—	471	220	542	—
Milam	—	—	212	—	345	229	345	—
Mills	—	1	1	—	7	2	13	—
Navarro	92	119	232	—	290	254	291	—
Red River	2	21	36	—	51	—	—	13
Rockwall	243	401	311	426	—	—	—	—
Somervell	—	1	4	31	51	26	83	—
Tarrant	7	101	148	315	—	—	—	148
Taylor	—	—	—	—	—	—	—	0
Travis	—	—	85	—	141	50	146	—
Williamson	—	—	77	—	173	74	177	—

The desired future conditions for the counties in the Upper Trinity Groundwater Conservation District are further divided into outcrop and downdip areas, and are listed below (dashes indicate areas where the subunits do not exist):

Upper Trinity GCD County (crop)	Adopted Desired Future Conditions (feet of drawdown below 2009 levels)			
	Antlers	Paluxy	Glen Rose	Twin Mountains
Hood (outcrop)	—	5	7	4
Hood (downdip)	—	—	28	46
Montague (outcrop)	18	—	—	—
Montague (downdip)	—	—	—	—
Parker (outcrop)	11	5	10	1
Parker (downdip)	—	1	28	46
Wise (outcrop)	34	—	—	—
Wise (downdip)	142	—	—	—

Edwards (Balcones Fault Zone) Aquifer

The desired future conditions adopted by Groundwater Management Area 8 for the Edwards (Balcones Fault Zone) Aquifer are intended to maintain minimum stream and spring flows under the drought of record in Bell, Travis, and Williamson counties over the planning period 2010 to 2070. The desired future conditions are listed below:

County	Adopted Desired Future Condition
Bell	Maintain at least 100 acre-feet per month of stream/spring flow in Salado Creek during a repeat of the drought of record
Travis	Maintain at least 42 acre-feet per month of aggregated stream/spring flow during a repeat of the drought of record
Williamson	Maintain at least 60 acre-feet per month of aggregated stream/spring flow during a repeat of the drought of record

Marble Falls, Ellenburger-San Saba, and Hickory Aquifers

The desired future conditions for the Marble Falls, Ellenburger-San Saba, and Hickory aquifers in Brown, Burnet, Lampasas, and Mills counties are intended to maintain 90 percent of the aquifer saturated thickness over the planning period 2010 to 2070 relative to the baseline year 2009.

Supplemental Information from Groundwater Management Area 8

After review of the explanatory report and model files, the TWDB emailed a request for clarifications to Mr. Drew Satterwhite on August 7, 2017. On September 8, 2017, Mr. Satterwhite provided the TWDB with a technical memorandum from James Beach, Jeff Davis, and Brant Konetchy of LBG-Guyton Associates. On October 9, 2017, Mr. Satterwhite sent the TWDB two emails with additional information and clarifications. The information and clarifications are summarized below:

a. For the Trinity and Woodbine aquifers, an additional error tolerance defined as five feet of drawdown between the adopted desired future condition and the simulated drawdown is included with the original error tolerance of five percent. Thus, if the drawdown from the predictive simulation is within five feet or five percent from the desired future condition, then the predictive simulation is considered to meet the desired future condition.

   Groundwater Management Area 8 provided a new MODFLOW-NWT well package, simulated head file, and simulated budget file on October 9, 2017. The TWDB determined that the distribution of pumping in the new model files was consistent with the explanatory report.

The TWDB evaluates if the simulated drawdown from the predictive simulation meets the desired future condition by county. However, Groundwater Management Area 8 also provided desired future conditions based on groundwater conservation district and the whole groundwater management area.

b. For the Edwards (Balcones Fault Zone) Aquifer in Bell, Travis, and Williamson counties, the coordinator for Groundwater Management Area 8 clarified that TWDB uses GAM Run 08-010 MAG by Anaya (2008) from the last cycle of desired future conditions with all associated assumptions including a baseline year of 2000.

c. For the Marble Falls, Ellenburger-San Saba, and Hickory aquifers in Brown, Burnet, Lampasas, and Mills counties, Groundwater Management Area 8 adjusted the desired future condition from "maintain 90 percent of the saturated thickness" to "maintain *at least* 90 percent of the saturated thickness". Groundwater Management Area 8 also provided estimated pumping to use for the predictive simulation by TWDB.

d. The Trinity, Woodbine, and Edwards (Balcones Fault Zone) aquifers are based on the official aquifer boundary while the Marble Falls, Ellenburger-San Saba, and Hickory aquifers include the portions both inside and outside the official aquifer boundaries (modeled extent).

e. The sliver of the Edwards-Trinity (Plateau) Aquifer was declared to be non-relevant by Groundwater Management Area 8.

METHODS:

The desired future conditions for Groundwater Management Area 8 are based on multiple criteria. For the Trinity and Woodbine aquifers, the desired future conditions are defined as water-level declines or drawdowns over the course of the planning period 2010 through 2070 relative to the baseline year 2009. The desired future conditions for the Edwards (Balcones Fault Zone) Aquifer are based on stream and spring flows under the drought of record over the planning period 2010 to 2070. For the Marble Falls, Ellenburger-San Saba, and Hickory aquifers, the desired future conditions are to maintain aquifer saturated thickness between 2010 and 2070 relative to the baseline year 2009. The methods to calculate the desired future conditions are discussed below.

Trinity and Woodbine Aquifers

The desired future conditions for the Trinity and Woodbine aquifers in Groundwater Management Area 8 are based on a predictive simulation by Beach and others (2016), which used the groundwater availability model for the northern portion of the Trinity and Woodbine aquifers (Kelley and others, 2014). The predictive simulation contained 61 annual stress periods corresponding to 2010 through 2070, with an initial head equal to 2009 of the calibrated groundwater availability model. The desired future conditions are the drawdowns between 2009 and 2070.

Because the baseline year 2009 for the desired future conditions falls within the calibration period 1890 to 2012 of the groundwater availability model, the water levels for the baseline year have been calibrated to observed data and, thus, they were directly used as the initial water level (head) condition of the predictive simulation.

The drawdowns between 2009 and 2070 are calculated from composite heads. Appendix A presents additional details on methods used to calculate composite head and associated average drawdown values for the Trinity and Woodbine aquifers.

Edwards (Balcones Fault Zone) Aquifer

Per Groundwater Management Area 8 (clarification dated September 1, 2017), the results from GAM Run 08-010 MAG by Anaya (2008) are used for the current round of joint planning. The following summarizes the approach used:

- Ran the model for 141 years, starting with a 100-year initial stress period (pre-1980) followed by 21 years of historical monthly stress periods (1980 to 2000), then 10 years of predictive annual stress periods (2001 to 2010), and ending with 10 years of predictive monthly stress periods (2011 to 2020) to represent a simulated repeat of the 1950s' drought of record.

- Used pumpage and recharge distributions provided to TWDB by the Groundwater Management Area 8 consultant.

- Adjusted pumpage in Williamson County to meet the desired future conditions.

- Extracted projected discharge for drain cells representing Salado Creek in Bell County and drain cells representing aggregated springs and streams in Williamson and Travis counties, respectively, for each of the stress periods from 2011 through 2020 to verify that the desired future conditions were met.

- Determined which stress period reflected the worst case monthly scenario for Salado Springs during a repeat of the 1950s' drought of record.

- Generated modeled available groundwater for all three desired future conditions based on the lowest monthly springflow volume for Salado Springs during a simulated repeat of the 1950s' drought of record.

Marble Falls, Ellenburger-San Saba, and Hickory Aquifers

The TWDB constructed a predictive simulation to analyze the desired future conditions for the Marble Falls, Ellenburger-San Saba, and Hickory aquifers in Brown, Burnet, Lampasas, and Mills counties within Groundwater Management Area 8. This simulation used the groundwater availability model for the minor aquifers in the Llano Uplift region by Shi and others (2016). The predictive simulation contains 61 annual stress periods corresponding to the planning period 2010 through 2070 with an initial head condition from 2009.

Because the baseline year 2009 for the desired future conditions falls within the model calibration period 1980 to 2010, and the water levels for the baseline year have been calibrated to observed data, the simulated head from 2009 of the calibrated groundwater availability model was directly used as the initial water level (head) condition of the predictive simulation.

Additional details on the predictive simulation and methods to estimate the drawdowns between 2009 and 2070 are described in Appendix B.

Modeled Available Groundwater

Once the predictive simulations met the desired future conditions, the modeled available groundwater values were extracted from the MODFLOW cell-by-cell budget files. Annual pumping rates were then divided by county, river basin, regional water planning area, and groundwater conservation district within Groundwater Management Area 8 (Figures 1 through 13 and Tables 1 through 24).

Modeled Available Groundwater and Permitting

As defined in Chapter 36 of the Texas Water Code, "modeled available groundwater" is the estimated average amount of water that may be produced annually to achieve a desired future condition. Groundwater conservation districts are required to consider modeled available groundwater, along with several other factors, when issuing permits in order to manage groundwater production to achieve the desired future condition(s). The other factors districts must consider include annual precipitation and production patterns, the

estimated amount of pumping exempt from permitting, existing permits, and a reasonable estimate of actual groundwater production under existing permits.

PARAMETERS AND ASSUMPTIONS:

The parameters and assumptions for the groundwater availability simulations are described below:

Trinity and Woodbine Aquifers

- Version 2.01 of the updated groundwater availability model for the northern Trinity and Woodbine aquifers by Kelley and others (2014) was used to construct the predictive model simulation for this analysis (Beach and others, 2016).
- The predictive model was run with MODFLOW-NWT (Niswonger and others, 2011).
- The model has eight layers that represent units younger than the Woodbine Aquifer and the shallow outcrop of all aquifers (Layer 1), the Woodbine Aquifer (Layer 2), the Fredericksburg and Washita units (Layer 3), and various combinations of the subunits that comprise the Trinity Aquifer (Layers 4 to 8).
- Multiple model layers could represent an aquifer where it outcrops. For example, the Woodbine Aquifer could span Layers 1 to 2 and the Trinity Aquifer (Hosston) could contain Layers 1 through 8. The aquifer designation in model layers was defined in the model grid files produced by TWDB.
- The predictive model simulation contains 61 transient annual stress periods with an initial head equal to 2009 of the calibrated groundwater availability model.
- The predictive simulation had the same hydrogeological properties and hydraulic boundary conditions as the calibrated groundwater availability model except groundwater recharge and pumping.
- The groundwater recharge for the predictive model simulation was the same as stress period 1 of the calibrated groundwater availability model (steady state period) except stress periods representing 2058 through 2060, which contained lower recharge representing severe drought conditions.
- In the predictive simulation, additional pumping was added to certain counties and some pumping in Layer 1 was moved to lower layer(s) to avoid the automatic pumping reduction enacted by the MODFLOW-NWT code (Beach and others, 2016).

- During the predictive simulation model run, some model cells went dry (Appendix C). Dry cells occur during a model run when the simulated water level in a cell falls below the bottom of the cell.
- Estimates of modeled drawdown and available groundwater from the model simulation were rounded to whole numbers.

Edwards (Balcones Fault Zone) Aquifer

- Version 1.01 of the groundwater availability model for the northern segment of the Edwards (Balcones Fault Zone) Aquifer (Jones, 2003) was used to construct the predictive model simulation for the analysis by Anaya (2008).
- The model has one layer that represents the Edwards (Balcones Fault Zone) Aquifer.
- The model was run with MODFLOW-96 (Harbaugh and McDonald, 1996).
- The predictive model simulation contains the calibrated groundwater availability model (253 monthly stress periods), stabilization (10 annual stress periods), and drought conditions (120 monthly stress periods).
- The boundary conditions for the stabilization and drought periods (except recharge and pumping) were the same in the predictive simulation as the last stress period (stress period 253) of the calibrated groundwater availability model.
- The groundwater recharge for the stabilization and drought periods and pumping information were from Groundwater Management Area 8 consultant.
- The groundwater pumping in Williamson County was adjusted as needed during the predictive model run simulation to match the desired future conditions.
- Estimates of modeled spring and stream flows from the model simulation were rounded to whole numbers.

Marble Falls, Ellenburger-San Saba, and Hickory Aquifers

- Version 1.01 of the groundwater availability model for the minor aquifers in Llano Uplift region by Shi and others (2016) was used to develop the predictive model simulation used for this analysis.
- The model has eight layers: Layer 1 (the Trinity Aquifer, Edwards-Trinity (Plateau) Aquifer, and younger alluvium deposits), Layer 2 (confining units), Layer 3 (the Marble Falls Aquifer and equivalent unit), Layer 4 (confining units), Layer 5 (Ellenburger-San Saba Aquifer and equivalent unit), Layer 6 (confining units), Layer 7 (the Hickory Aquifer and equivalent unit), and Layer 8 (Precambrian units).

- The model was run with MODFLOW-USG beta (development) version (Panday and others, 2013).
- The predictive model simulation contains 61 annual stress periods (2010 to 2070) with the initial head equal to 2009 of the calibrated groundwater availability model.
- The boundary conditions for the predictive model except recharge and pumping were the same in the predictive simulation of the last stress period of the calibrated groundwater availability model.
- The groundwater recharge for the predictive model simulation was set equal to the average of all stress periods (1982 to 2010) of the calibrated model except the first stress period.
- The groundwater pumping was initially set to the last stress period of the calibrated groundwater availability model. Additional pumping per county was then added to the model cells of the three aquifers based on the modeled extent to match the total pumping data for each aquifer provided by Groundwater Management area 8.
- During the predictive model run, some active model cells went dry (Appendix D). Dry cells occur during a model run when the simulated water level in a cell falls below the bottom of the cell.
- Estimates of modeled saturated aquifer thickness values were rounded to one decimal point.

RESULTS:

The modeled available groundwater for the Trinity Aquifer (Paluxy) that achieves the desired future condition adopted by Groundwater Management Area 8 ranges from 24,499 acre-feet per year for the non-leap (shorter) years (2010, 2030, 2050, and 2070) to 24,565 acre-feet per year for the leap (longer) years (2020, 2040, and 2060). The modeled available groundwater is summarized by groundwater conservation district and county in Table 1. Table 13 summarizes the modeled available groundwater by county, river basin, and regional water planning area for use in the regional water planning process.

The modeled available groundwater for the Trinity Aquifer (Glen Rose) that achieves the desired future condition adopted by Groundwater Management Area 8 ranges from 12,701 acre-feet per year for the non-leap years (2010, 2030, 2050, and 2070) to 12,736 acre-feet per year for the leap years (2020, 2040, and 2060). The modeled available groundwater is summarized by groundwater conservation district and county in Table 2. Table 14

summarizes the modeled available groundwater by county, river basin, and regional water planning area for use in the regional water planning process.

The modeled available groundwater for the Trinity Aquifer (Twin Mountains) that achieves the desired future condition adopted by Groundwater Management Area 8 ranges from 40,827 acre-feet per year for the non-leap years (2010, 2030, 2050, and 2070) to 40,939 acre-feet per year for the leap years (2020, 2040, and 2060). The modeled available groundwater is summarized by groundwater conservation district and county in Table 3. Table 15 summarizes the modeled available groundwater by county, river basin, and regional water planning area for use in the regional water planning process.

The modeled available groundwater for the Trinity Aquifer (Travis Peak) that achieves the desired future condition adopted by Groundwater Management Area 8 ranges from 93,757 acre-feet per year for the non-leap years (2010, 2030, 2050, and 2070) to 94,016 acre-feet per year for the leap years (2020, 2040, and 2060). The modeled available groundwater is summarized by groundwater conservation district and county in Table 4. Table 16 summarizes the modeled available groundwater by county, river basin, and regional water planning area for use in the regional water planning process.

The modeled available groundwater for the Trinity Aquifer (Hensell) that achieves the desired future condition adopted by Groundwater Management Area 8 ranges from 27,257 acre-feet per year for the non-leap years (2010, 2030, 2050, and 2070) to 27,331 acre-feet per year for the leap years (2020, 2040, and 2060). The modeled available groundwater is summarized by groundwater conservation district and county in Table 5. Table 17 summarizes the modeled available groundwater by county, river basin, and regional water planning area for use in the regional water planning process.

The modeled available groundwater for the Trinity Aquifer (Hosston) that achieves the desired future condition adopted by Groundwater Management Area 8 ranges from 64,922 acre-feet per year for the non-leap years (2010, 2030, 2050, and 2070) to 65,098 acre-feet per year for the leap years (2020, 2040, and 2060). The modeled available groundwater is summarized by groundwater conservation district and county in Table 6. Table 18 summarizes the modeled available groundwater by county, river basin, and regional water planning area for use in the regional water planning process.

The modeled available groundwater for the Trinity Aquifer (Antlers) that achieves the desired future condition adopted by Groundwater Management Area 8 ranges from 74,471 acre-feet per year for the non-leap years (2010, 2030, 2050, and 2070) to 74,677 acre-feet per year for the leap years (2020, 2040, and 2060). The modeled available groundwater is

summarized by groundwater conservation district and county in Table 7. Table 19 summarizes the modeled available groundwater by county, river basin, and regional water planning area for use in the regional water planning process.

The modeled available groundwater for the Woodbine Aquifer that achieves the desired future condition adopted by Groundwater Management Area 8 ranges from 30,554 acre-feet per year for the non-leap years (2010, 2030, 2050, and 2070) to 30,636 acre-feet per year for the leap years (2020, 2040, and 2060). The modeled available groundwater is summarized by groundwater conservation district and county in Table 8. Table 20 summarizes the modeled available groundwater by county, river basin, and regional water planning area for use in the regional water planning process.

The modeled available groundwater for the Edwards (Balcones Fault Zone) Aquifer that achieves the desired future condition adopted by Groundwater Management Area 8 remains at 15,168 acre-feet per year from 2010 to 2060. The modeled available groundwater is summarized by groundwater conservation district and county in Table 9. Table 21 summarizes the modeled available groundwater by county, river basin, and regional water planning area for use in the regional water planning process.

The modeled available groundwater for the Marble Falls Aquifer that achieves the desired future condition adopted by Groundwater Management Area 8 ranges from 5,623 acre-feet per year for the non-leap years (2010, 2030, 2050, and 2070) to 5,639 acre-feet per year for the leap years (2020, 2040, and 2060). The modeled available groundwater is summarized by groundwater conservation district and county in Table 10. Table 22 summarizes the modeled available groundwater by county, river basin, and regional water planning area for use in the regional water planning process.

The modeled available groundwater for the Ellenburger-San Saba Aquifer that achieves the desired future condition adopted by Groundwater Management Area 8 ranges from 14,050 acre-feet per year for the non-leap years (2010, 2030, 2050, and 2070) to 14,089 acre-feet per year for the leap years (2020, 2040, and 2060). The modeled available groundwater is summarized by groundwater conservation district and county in Table 11. Table 23 summarizes the modeled available groundwater by county, river basin, and regional water planning area for use in the regional water planning process.

The modeled available groundwater for the Hickory Aquifer that achieves the desired future condition adopted by Groundwater Management Area 8 ranges from 3,574 acre-feet per year for the non-leap years (2010, 2030, 2050, and 2070) to 3,585 acre-feet per year for the leap years (2020, 2040, and 2060). The modeled available groundwater is

summarized by groundwater conservation district and county in Table 12. Table 24 summarizes the modeled available groundwater by county, river basin, and regional water planning area for use in the regional water planning process.

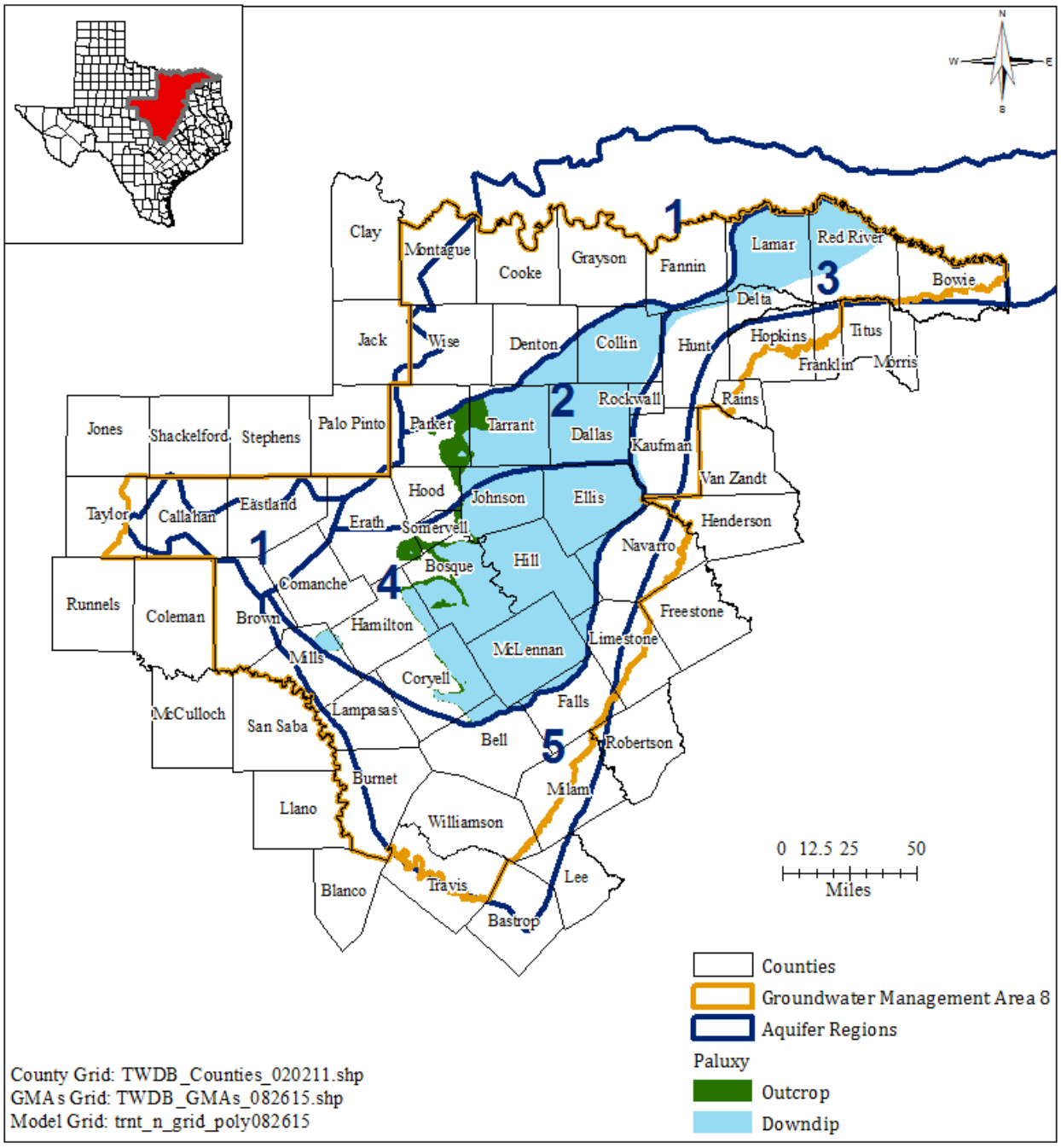

FIGURE 1. MAP SHOWING THE TRINITY AQUIFER (PALUXY) WITHIN GROUNDWATER MANAGEMENT AREA 8 FROM THE GROUNDWATER AVAILABILITY MODEL FOR THE NORTHERN PORTION OF THE TRINITY AND WOODBINE AQUIFERS.

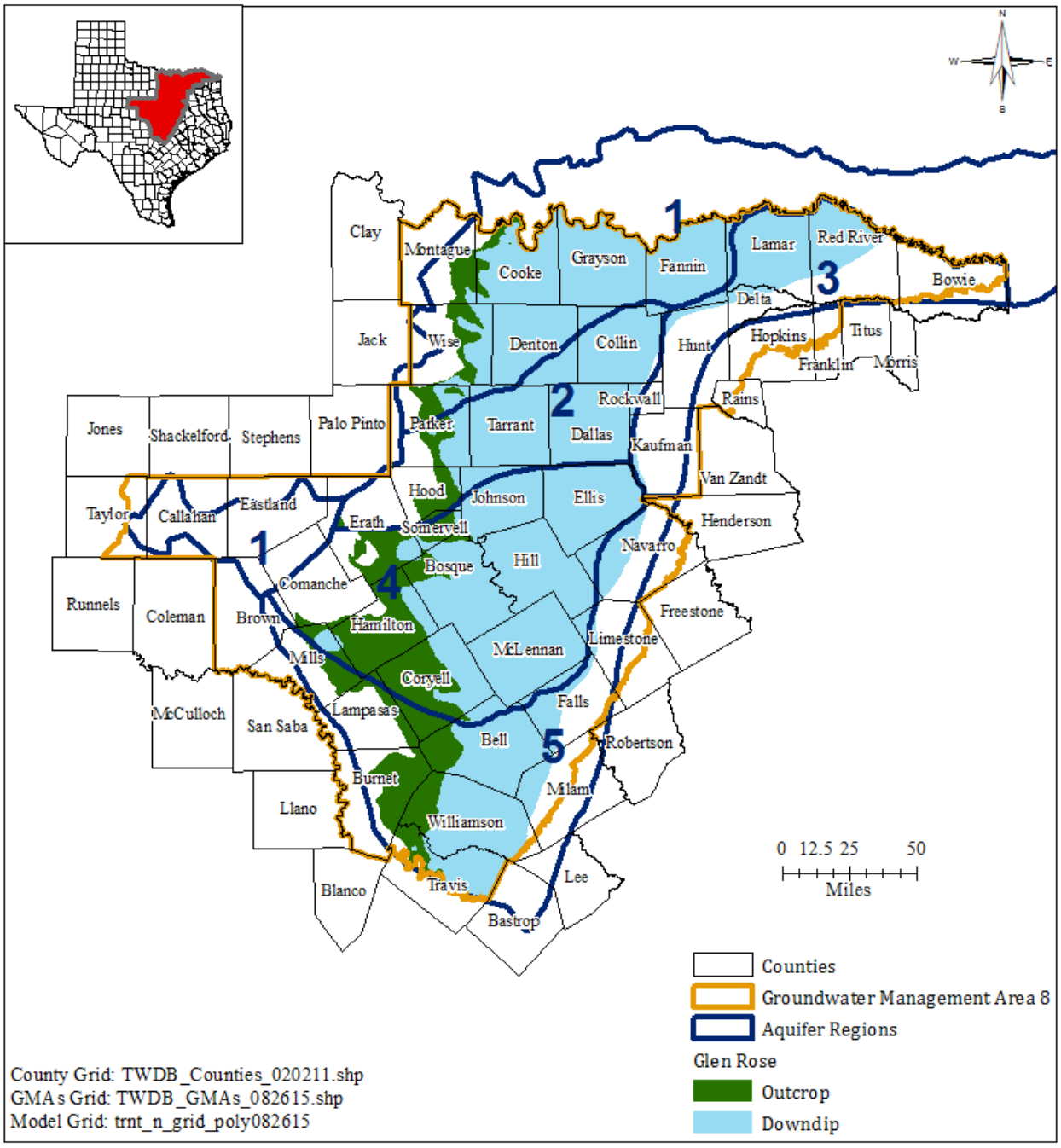

FIGURE 2. MAP SHOWING THE TRINITY AQUIFER (GLEN ROSE) WITHIN GROUNDWATER MANAGEMENT AREA 8 FROM THE GROUNDWATER AVAILABILITY MODEL FOR THE NORTHERN PORTION OF THE TRINITY AND WOODBINE AQUIFERS.

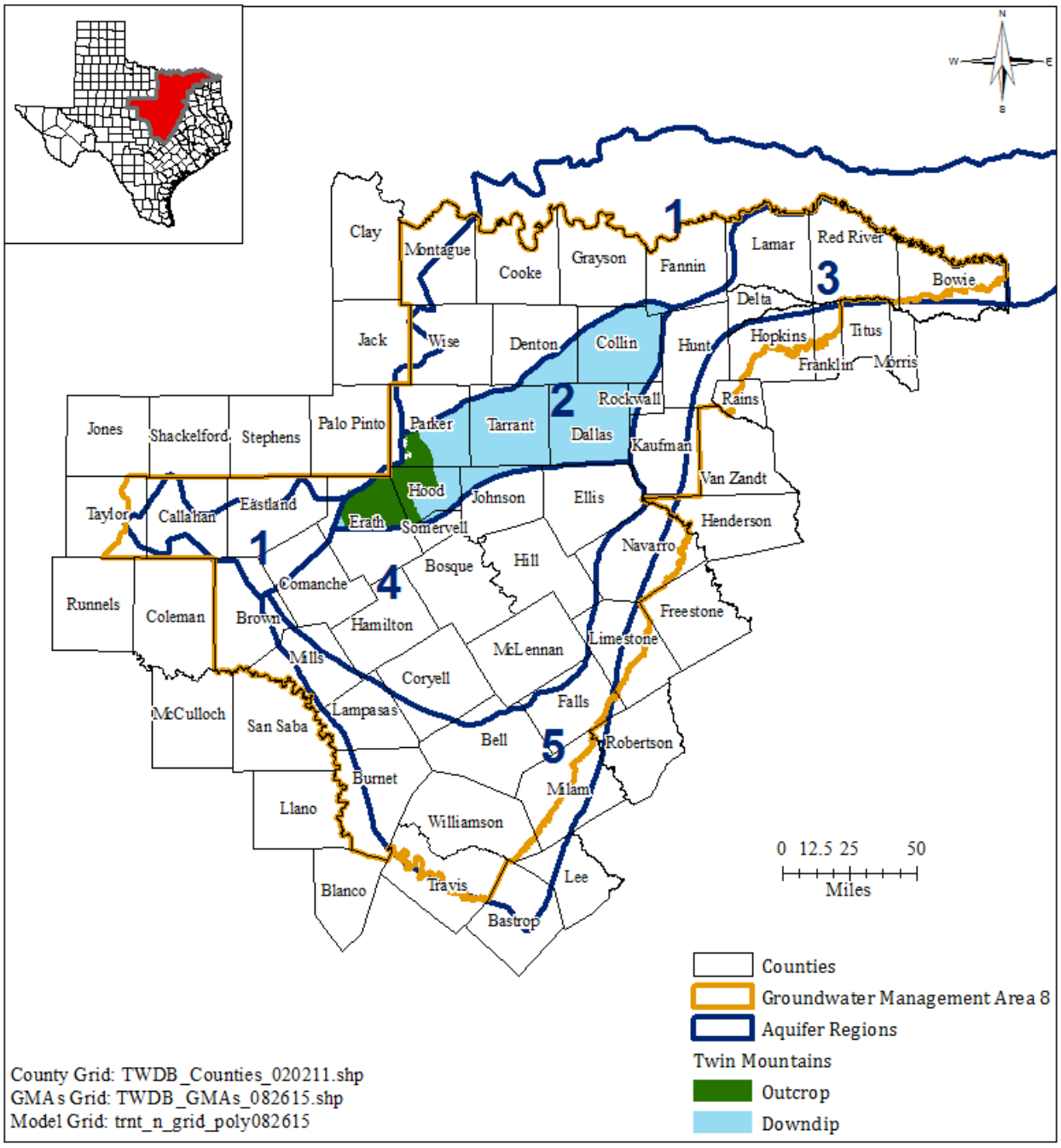

FIGURE 3. MAP SHOWING THE TRINITY AQUIFER (TWIN MOUNTAINS) WITHIN GROUNDWATER MANAGEMENT AREA 8 FROM THE GROUNDWATER AVAILABILITY MODEL FOR THE NORTHERN PORTION OF THE TRINITY AND WOODBINE AQUIFERS.

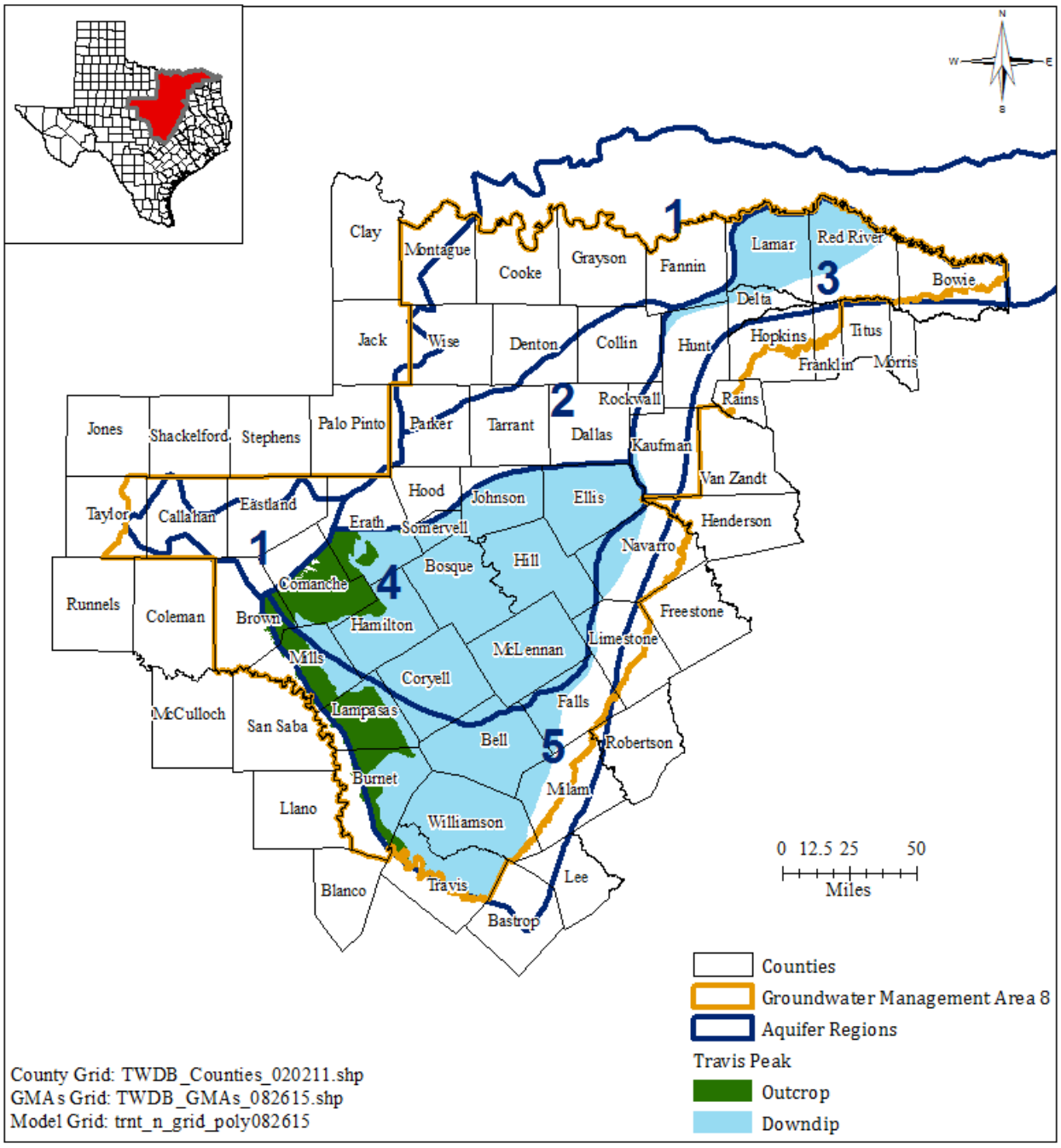

FIGURE 4. MAP SHOWING THE TRINITY AQUIFER (TRAVIS PEAK) WITHIN GROUNDWATER MANAGEMENT AREA 8 FROM THE GROUNDWATER AVAILABILITY MODEL FOR THE NORTHERN PORTION OF THE TRINITY AND WOODBINE AQUIFERS.

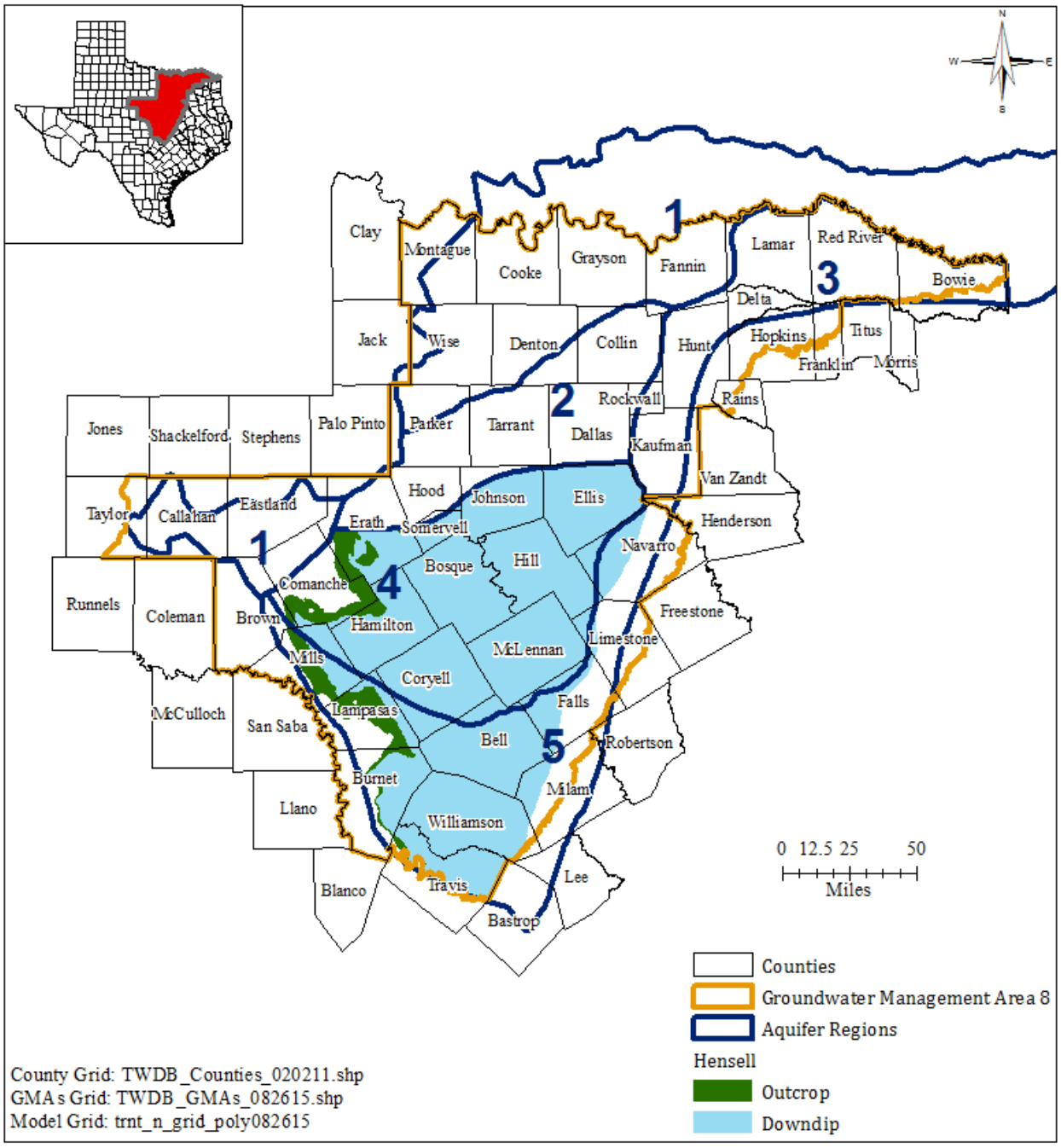

FIGURE 5. MAP SHOWING THE TRINITY AQUIFER (HENSELL) WITHIN GROUNDWATER MANAGEMENT AREA 8 FROM THE GROUNDWATER AVAILABILITY MODEL FOR THE NORTHERN PORTION OF THE TRINITY AND WOODBINE AQUIFERS.

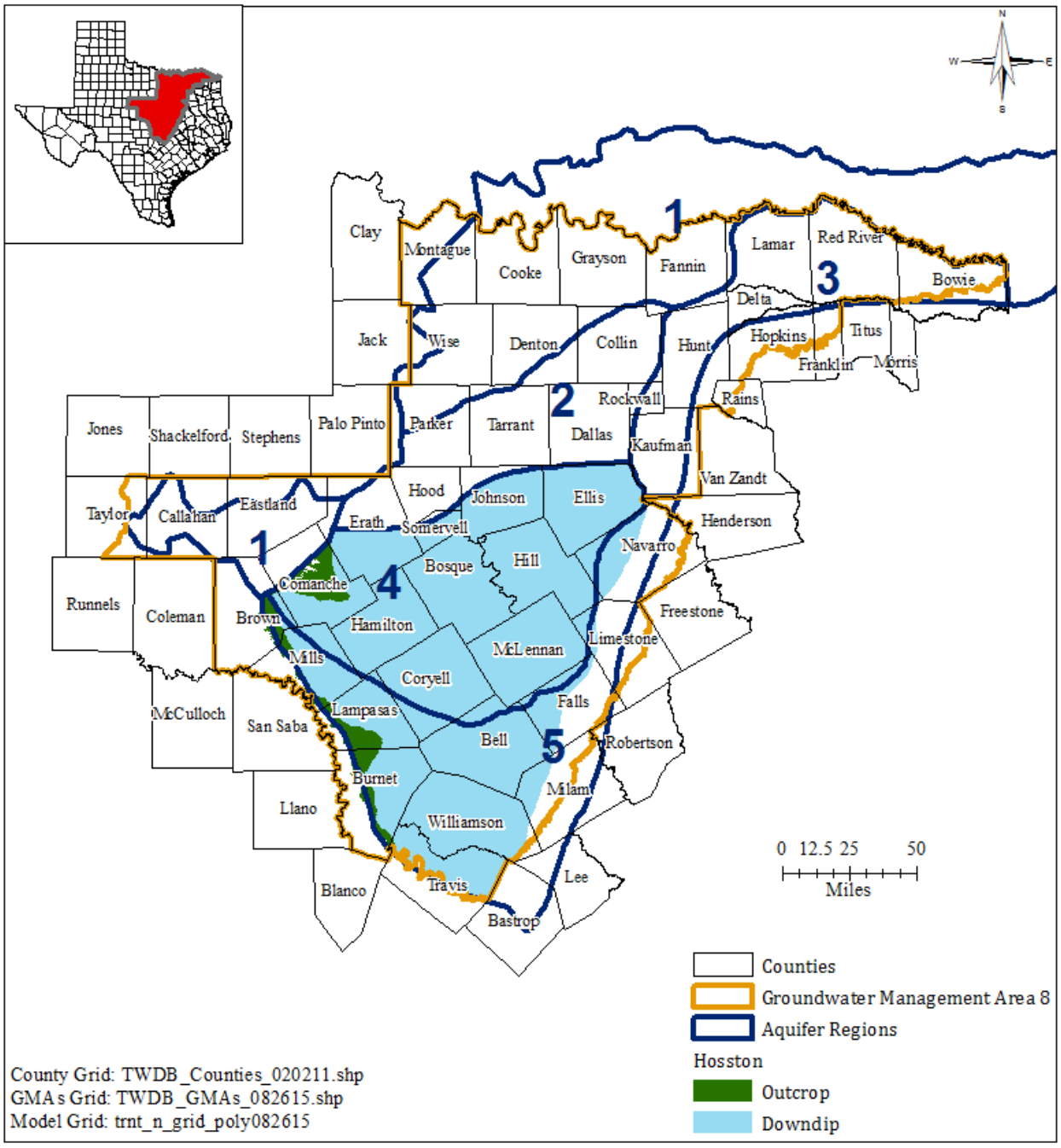

FIGURE 6. MAP SHOWING THE TRINITY AQUIFER (HOSSTON) WITHIN GROUNDWATER MANAGEMENT AREA 8 FROM THE GROUNDWATER AVAILABILITY MODEL FOR THE NORTHERN PORTION OF THE TRINITY AND WOODBINE AQUIFERS.

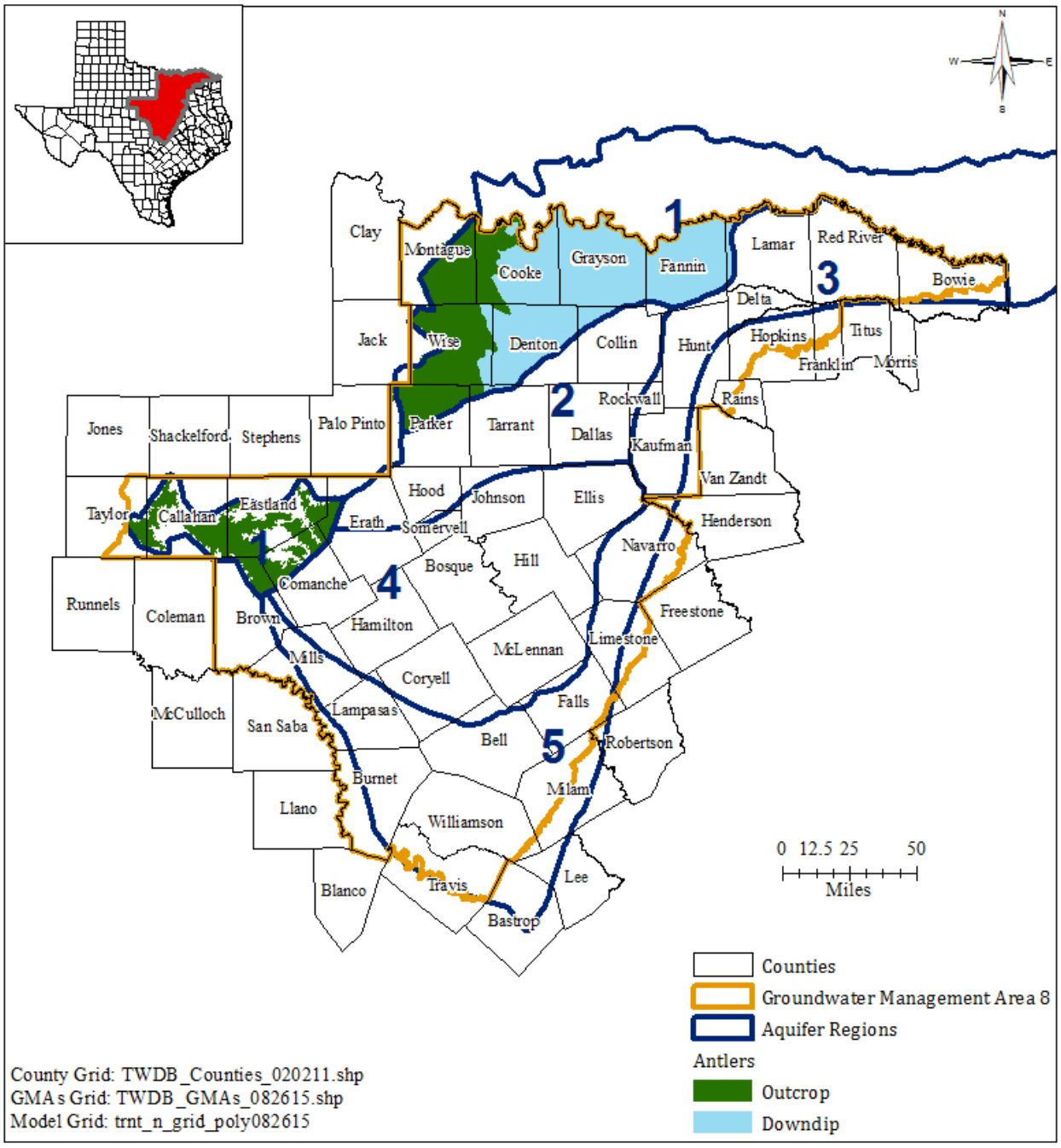

FIGURE 7. MAP SHOWING THE TRINITY AQUIFER (ANTLERS) WITHIN GROUNDWATER MANAGEMENT AREA 8 FROM THE GROUNDWATER AVAILABILITY MODEL FOR THE NORTHERN PORTION OF THE TRINITY AND WOODBINE AQUIFERS.

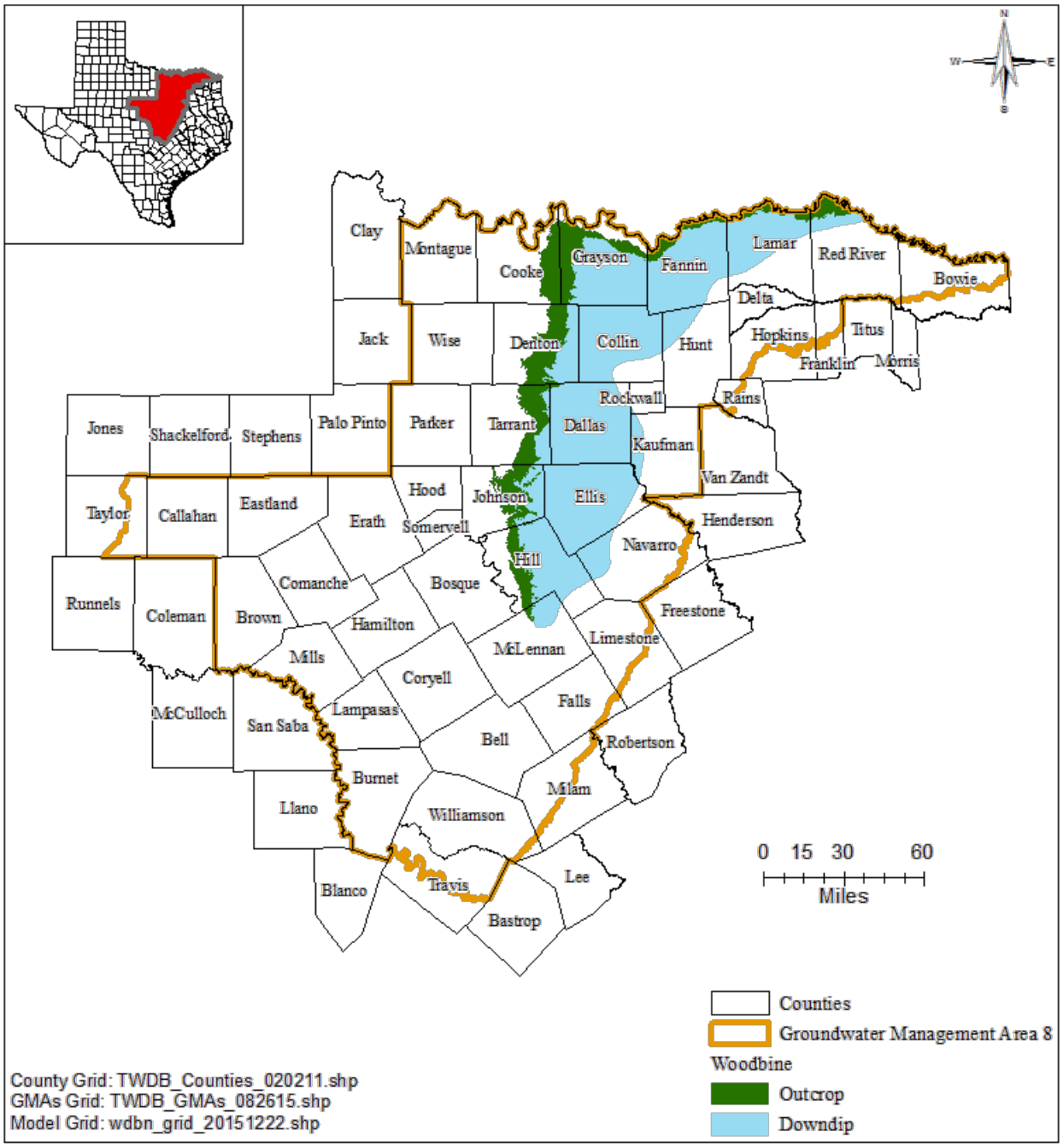

FIGURE 8. MAP SHOWING THE WOODBINE AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 8 FROM THE GROUNDWATER AVAILABILITY MODEL FOR THE NORTHERN PORTION OF THE TRINITY AND WOODBINE AQUIFERS.

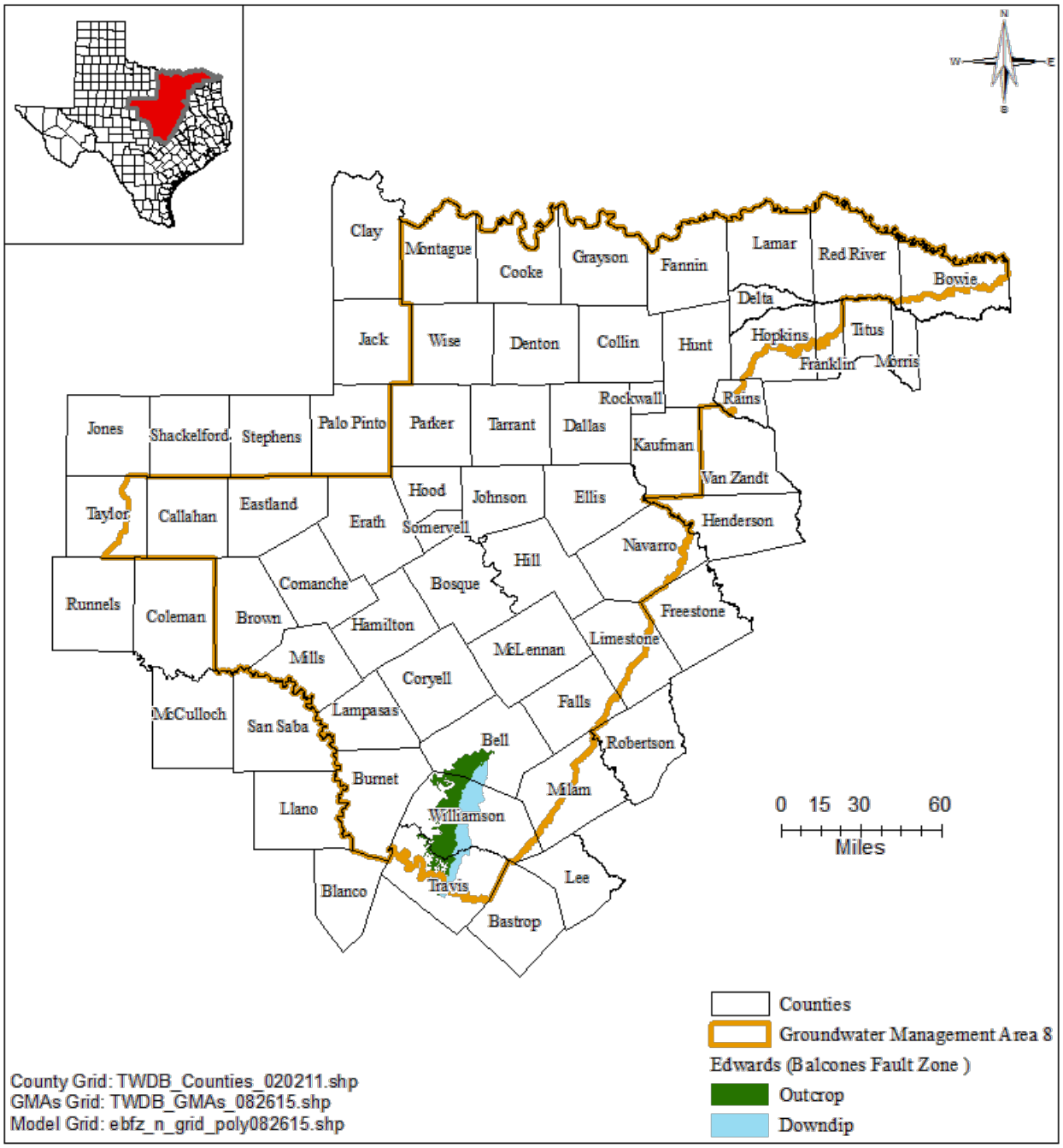

FIGURE 9. MAP SHOWING THE EDWARDS (BALCONES FAULT ZONE) AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 8 FROM THE GROUNDWATER AVAILABILITY MODEL FOR THE NORTHERN SEGMENT OF THE EDWARDS (BALCONES FAULT ZONE) AQUIFER.

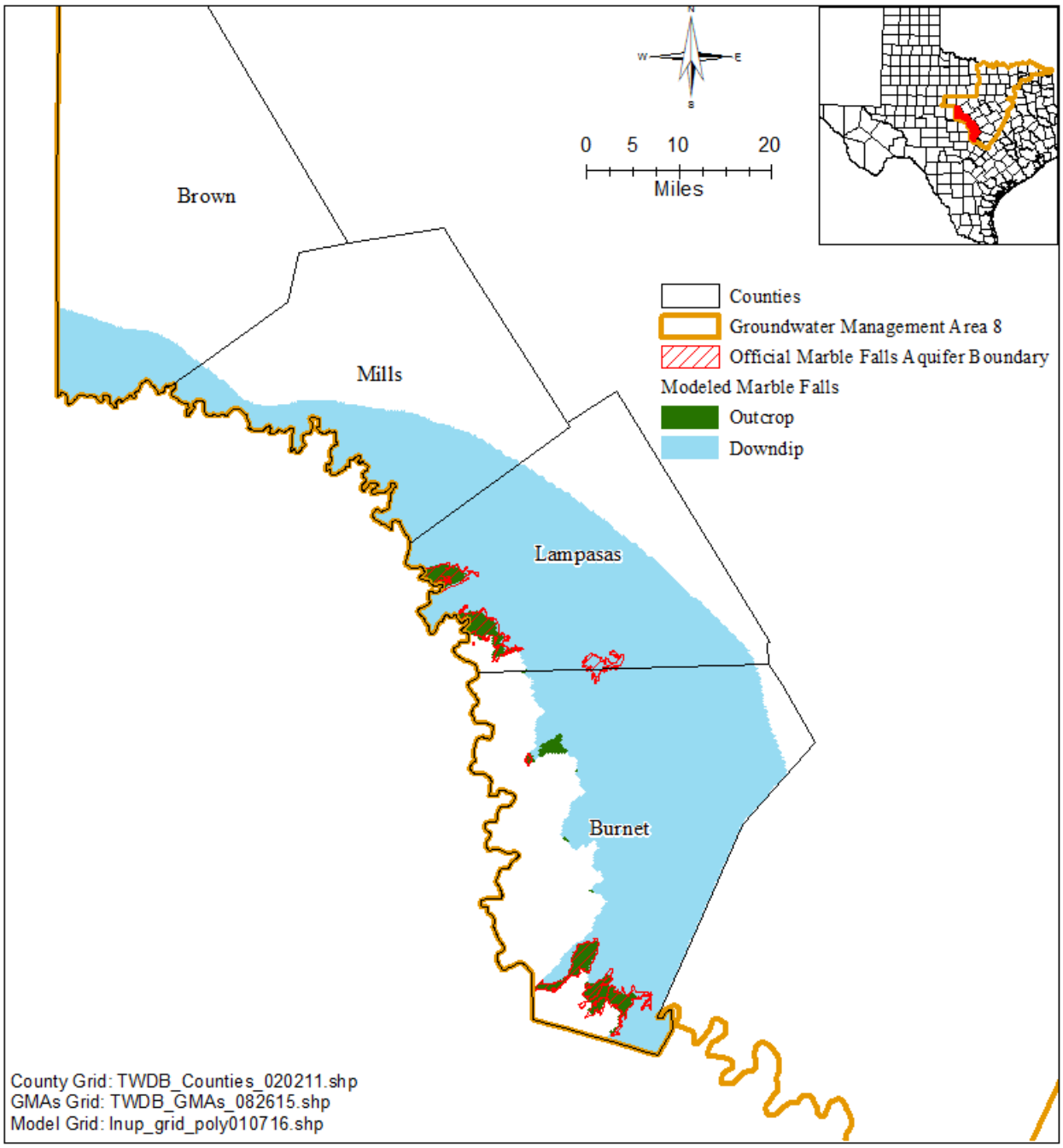

FIGURE 10. MAP SHOWING THE MARBLE FALLS AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 8 FROM THE GROUNDWATER AVAILABILITY MODEL FOR THE MINOR AQUIFERS IN LLANO UPLIFT REGION.

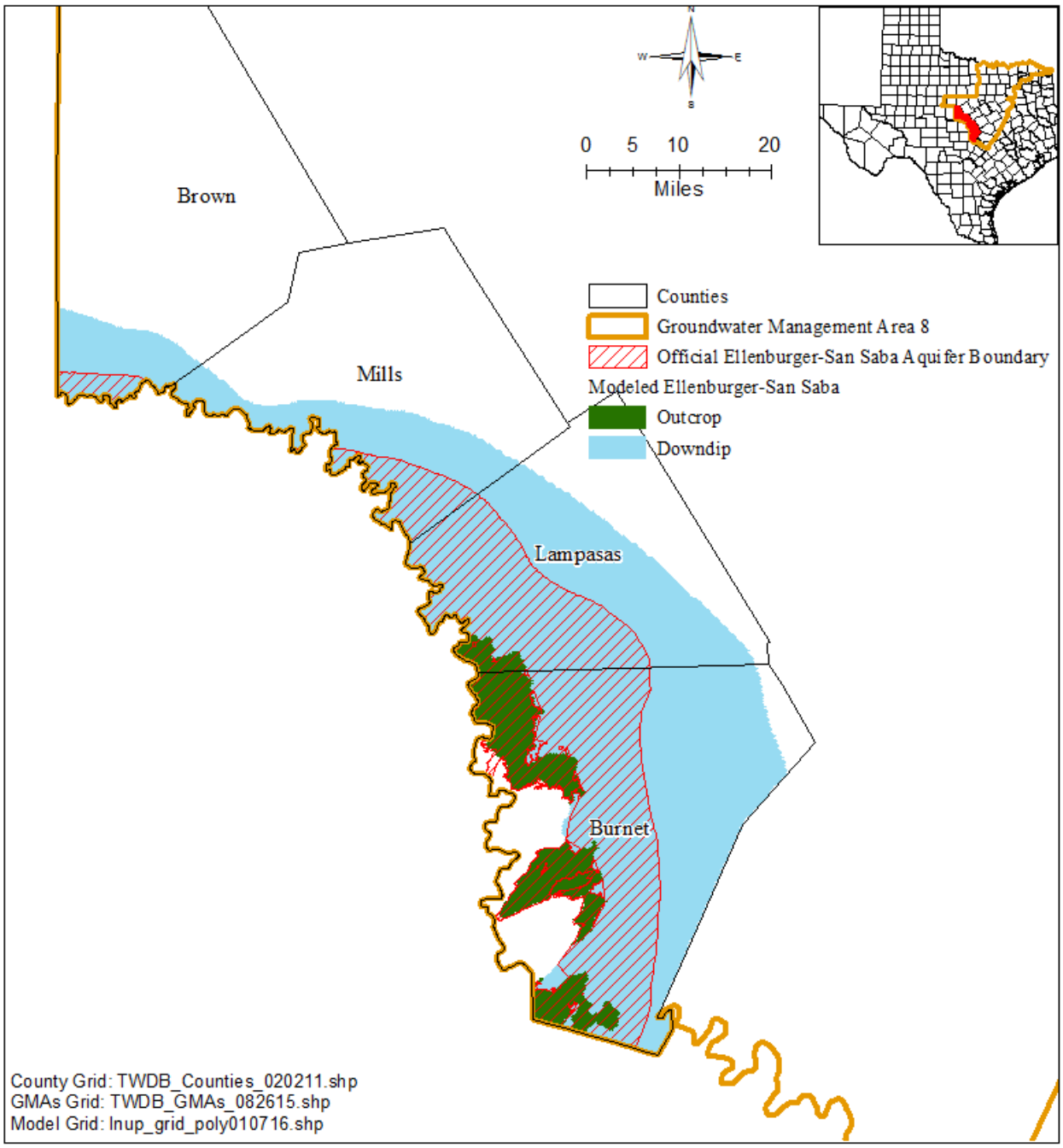

FIGURE 11. MAP SHOWING THE ELLENBURGER-SAN SABA AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 8 FROM THE GROUNDWATER AVAILABILITY MODEL FOR THE MINOR AQUIFERS IN LLANO UPLIFT REGION.

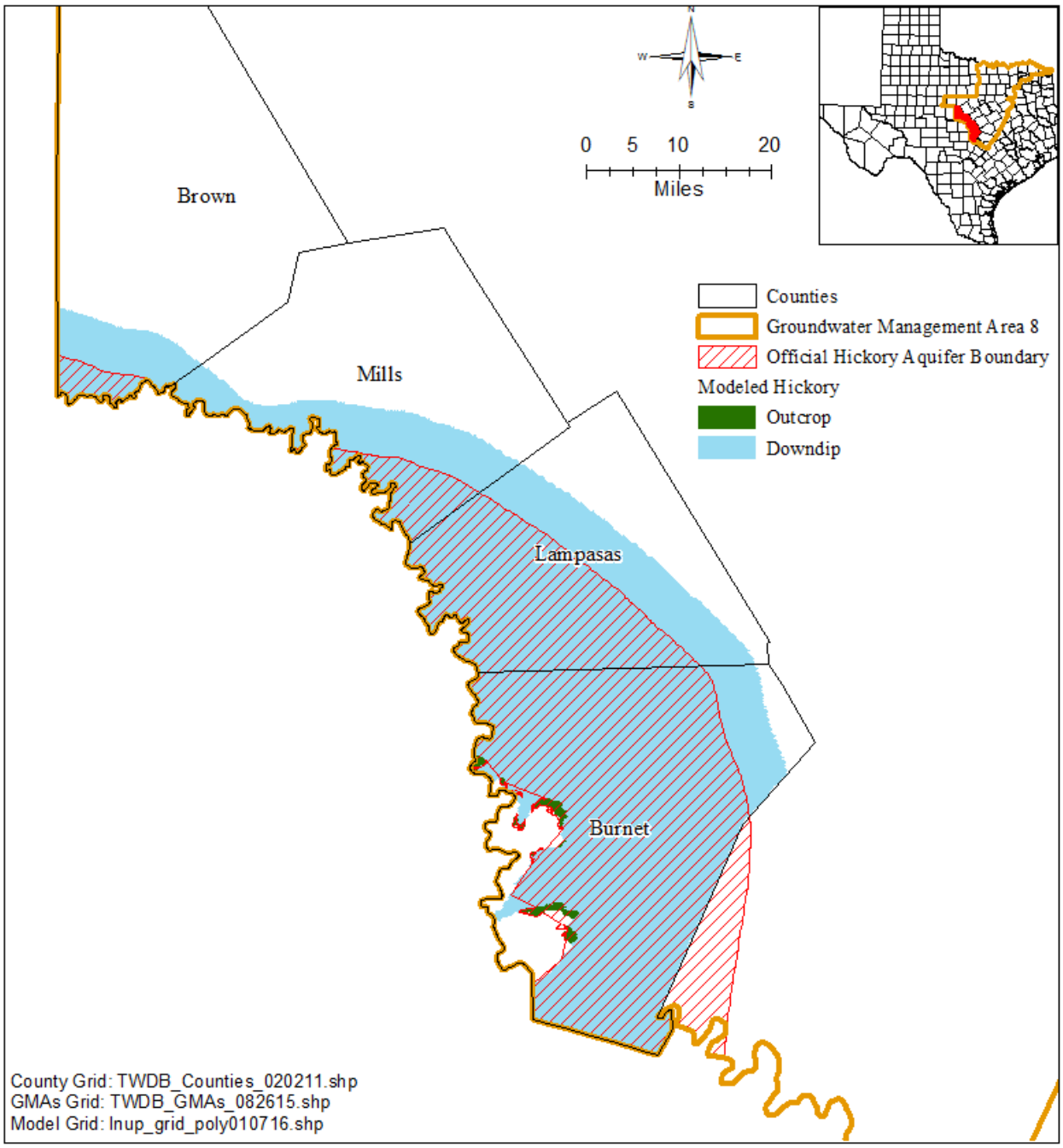

FIGURE 12. MAP SHOWING THE HICKORY AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 8 FROM THE GROUNDWATER AVAILABILITY MODEL FOR THE MINOR AQUIFERS IN LLANO UPLIFT REGION.

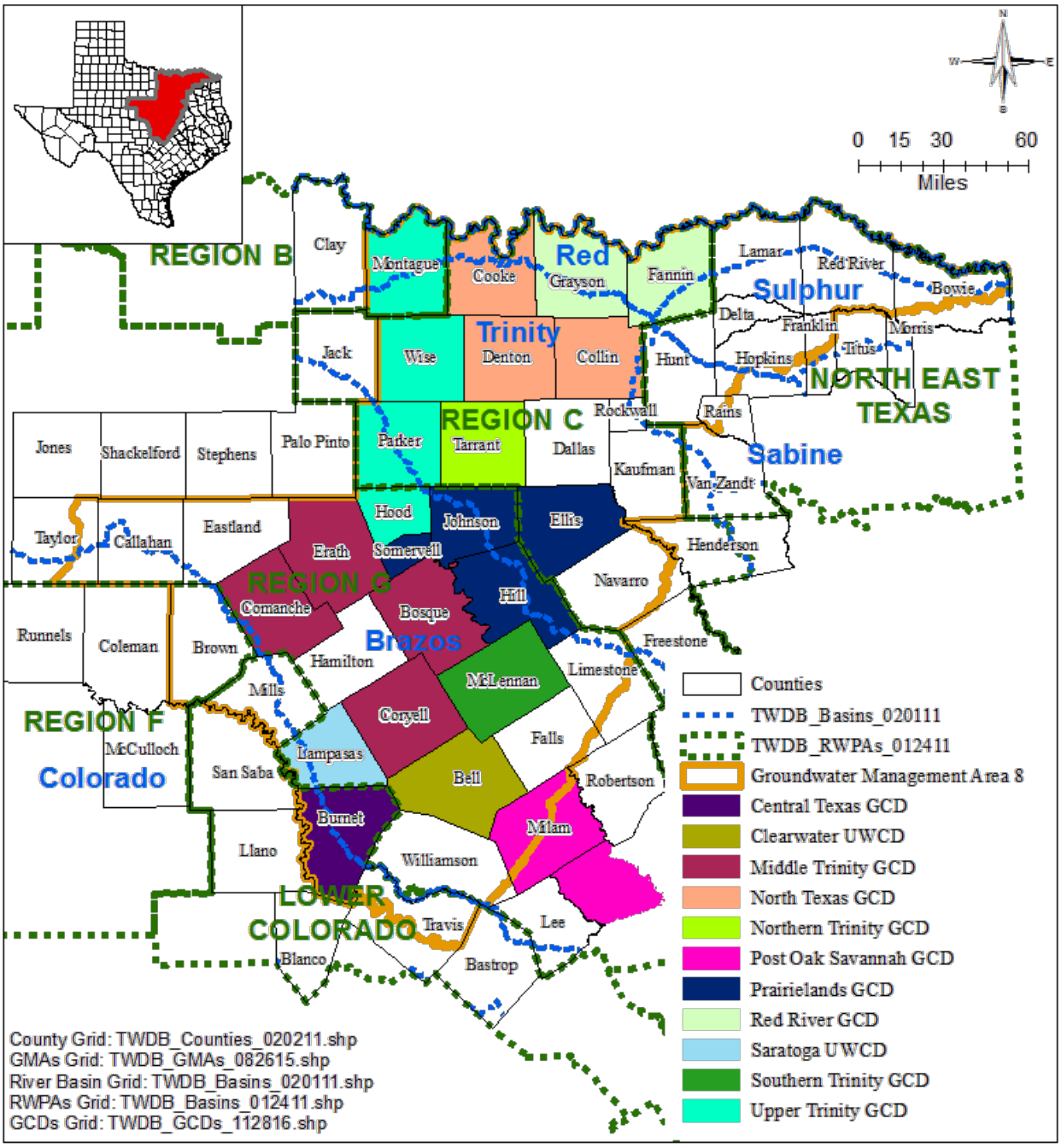

FIGURE 13. MAP SHOWING REGIONAL WATER PLANNING AREAS (RWPAS), GROUNDWATER CONSERVATION DISTRICTS (GCDS), AND RIVER BASINS ASSOCIATED WITH GROUNDWATER MANAGEMENT AREA 8.

TABLE 1. MODELED AVAILABLE GROUNDWATER FOR THE TRINITY AQUIFER (PALUXY) IN GROUNDWATER MANAGEMENT AREA 8 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2070 WITH BASELINE YEAR 2009. VALUES ARE IN ACRE-FEET PER YEAR.

GCD	County	2009	2010	2020	2030	2040	2050	2060	2070
Clearwater UWCD	Bell	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Middle Trinity GCD	Bosque	204	356	358	356	358	356	358	356
Middle Trinity GCD	Coryell	0	0	0	0	0	0	0	0
Middle Trinity GCD	Erath	38	61	61	61	61	61	61	61
Middle Trinity GCD Total		**242**	**417**	**419**	**417**	**419**	**417**	**419**	**417**
North Texas GCD	Collin	616	1,547	1,551	1,547	1,551	1,547	1,551	1,547
North Texas GCD	Denton	1,532	4,819	4,832	4,819	4,832	4,819	4,832	4,819
North Texas GCD Total		**2,148**	**6,366**	**6,383**	**6,366**	**6,383**	**6,366**	**6,383**	**6,366**
Northern Trinity GCD	Tarrant	**11,285**	**8,957**	**8,982**	**8,957**	**8,982**	**8,957**	**8,982**	**8,957**
Prairielands GCD	Ellis	510	442	443	442	443	442	443	442
Prairielands GCD	Hill	400	352	353	352	353	352	353	352
Prairielands GCD	Johnson	4,851	2,440	2,447	2,440	2,447	2,440	2,447	2,440
Prairielands GCD	Somervell	3	14	14	14	14	14	14	14
Prairielands GCD Total		**5,764**	**3,248**	**3,257**	**3,248**	**3,257**	**3,248**	**3,257**	**3,248**
Red River GCD	Fannin	389	2,087	2,092	2,087	2,092	2,087	2,092	2,087
Red River GCD	Grayson	0	0	0	0	0	0	0	0
Red River GCD Total		**389**	**2,087**	**2,092**	**2,087**	**2,092**	**2,087**	**2,092**	**2,087**
Southern Trinity GCD	McLennan	**319**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Upper Trinity GCD	Hood (outcrop)	106	159	159	159	159	159	159	159
Upper Trinity GCD	Parker (outcrop)	2,100	2,607	2,614	2,607	2,614	2,607	2,614	2,607
Upper Trinity GCD	Parker (downdip)	221	50	50	50	50	50	50	50
Upper Trinity GCD Total		**2,427**	**2,816**	**2,823**	**2,816**	**2,823**	**2,816**	**2,823**	**2,816**
No District	Dallas	231	358	359	358	359	358	359	358
No District	Delta	56	56	56	56	56	56	56	56
No District	Falls	0	0	0	0	0	0	0	0
No District	Hamilton	0	0	0	0	0	0	0	0
No District	Hunt	3	3	3	3	3	3	3	3
No District	Kaufman	0	0	0	0	0	0	0	0
No District	Lamar	16	8	8	8	8	8	8	8

GCD	County	2009	2010	2020	2030	2040	2050	2060	2070
No District	Limestone	0	0	0	0	0	0	0	0
No District	Mills	3	6	6	6	6	6	6	6
No District	Navarro	0	0	0	0	0	0	0	0
No District	Red River	190	177	177	177	177	177	177	177
No District	Rockwall	0	0	0	0	0	0	0	0
No District Total		**499**	**608**	**609**	**608**	**609**	**608**	**609**	**608**
Groundwater Management Area 8		**23,073**	**24,499**	**24,565**	**24,499**	**24,565**	**24,499**	**24,565**	**24,499**

UWCD: Underground Water Conservation District.

TABLE 2. MODELED AVAILABLE GROUNDWATER FOR THE TRINITY AQUIFER (GLEN ROSE) IN GROUNDWATER MANAGEMENT AREA 8 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2070 WITH BASELINE YEAR 2009. VALUES ARE IN ACRE-FEET PER YEAR.

GCD	County	2009	2010	2020	2030	2040	2050	2060	2070
Central Texas GCD	Burnet	**35**	**423**	**425**	**423**	**425**	**423**	**425**	**423**
Clearwater UWCD	Bell	**775**	**971**	**974**	**971**	**974**	**971**	**974**	**971**
Middle Trinity GCD	Bosque	576	728	731	728	731	728	731	728
Middle Trinity GCD	Comanche	3	41	41	41	41	41	41	41
Middle Trinity GCD	Coryell	0	120	120	120	120	120	120	120
Middle Trinity GCD	Erath	263	1,078	1,081	1,078	1,081	1,078	1,081	1,078
Middle Trinity GCD Total		**842**	**1,967**	**1,973**	**1,967**	**1,973**	**1,967**	**1,973**	**1,967**
North Texas GCD	Collin	84	83	83	83	83	83	83	83
North Texas GCD	Denton	121	338	339	338	339	338	339	338
North Texas GCD Total		**205**	**421**	**422**	**421**	**422**	**421**	**422**	**421**
Northern Trinity GCD	Tarrant	**1,070**	**793**	**795**	**793**	**795**	**793**	**795**	**793**
Post Oak Savannah GCD	Milam	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Prairielands GCD	Ellis	58	50	50	50	50	50	50	50
Prairielands GCD	Hill	116	115	115	115	115	115	115	115
Prairielands GCD	Johnson	1,780	1,632	1,636	1,632	1,636	1,632	1,636	1,632
Prairielands GCD	Somervell	81	146	146	146	146	146	146	146
Prairielands GCD Total		**2,035**	**1,943**	**1,947**	**1,943**	**1,947**	**1,943**	**1,947**	**1,943**
Red River GCD	Fannin	0	0	0	0	0	0	0	0
Red River GCD	Grayson	0	0	0	0	0	0	0	0
Red River GCD Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Saratoga UWCD	Lampasas	**65**	**68**	**68**	**68**	**68**	**68**	**68**	**68**
Southern Trinity GCD	McLennan	**845**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Upper Trinity GCD	Hood (outcrop)	483	653	655	653	655	653	655	653
Upper Trinity GCD	Hood (downdip)	81	103	103	103	103	103	103	103
Upper Trinity GCD	Parker (outcrop)	2,593	2,289	2,295	2,289	2,295	2,289	2,295	2,289
Upper Trinity GCD	Parker (downdip)	1,063	873	876	873	876	873	876	873
Upper Trinity GCD Total		**4,220**	**3,918**	**3,929**	**3,918**	**3,929**	**3,918**	**3,929**	**3,918**

GCD	County	2009	2010	2020	2030	2040	2050	2060	2070
No District	Brown	0	0	0	0	0	0	0	0
No District	Dallas	135	131	132	131	132	131	132	131
No District	Delta	0	0	0	0	0	0	0	0
No District	Falls	0	0	0	0	0	0	0	0
No District	Hamilton	168	218	218	218	218	218	218	218
No District	Hunt	0	0	0	0	0	0	0	0
No District	Kaufman	0	0	0	0	0	0	0	0
No District	Lamar	0	0	0	0	0	0	0	0
No District	Limestone	0	0	0	0	0	0	0	0
No District	Mills	12	189	189	189	189	189	189	189
No District	Navarro	0	0	0	0	0	0	0	0
No District	Red River	0	0	0	0	0	0	0	0
No District	Rockwall	0	0	0	0	0	0	0	0
No District	Travis	898	971	974	971	974	971	974	971
No District	Williamson	695	688	690	688	690	688	690	688
No District Total		**1,908**	**2,197**	**2,203**	**2,197**	**2,203**	**2,197**	**2,203**	**2,197**
Groundwater Management Area 8		**12,000**	**12,701**	**12,736**	**12,701**	**12,736**	**12,701**	**12,736**	**12,701**

UWCD: Underground Water Conservation District.

TABLE 3. MODELED AVAILABLE GROUNDWATER FOR THE TRINITY AQUIFER (TWIN MOUNTAINS) IN GROUNDWATER MANAGEMENT AREA 8 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2070 WITH BASELINE YEAR 2009. VALUES ARE IN ACRE-FEET PER YEAR.

GCD	County	2009	2010	2020	2030	2040	2050	2060	2070
Middle Trinity GCD	Erath	**3,443**	**5,017**	**5,031**	**5,017**	**5,031**	**5,017**	**5,031**	**5,017**
North Texas GCD	Collin	163	2,201	2,207	2,201	2,207	2,201	2,207	2,201
North Texas GCD	Denton	997	8,366	8,389	8,366	8,389	8,366	8,389	8,366
North Texas GCD Total		**1,160**	**10,567**	**10,596**	**10,567**	**10,596**	**10,567**	**10,596**	**10,567**
Northern Trinity GCD	Tarrant	**7,329**	**6,917**	**6,936**	**6,917**	**6,936**	**6,917**	**6,936**	**6,917**
Prairielands GCD	Ellis	0	0	0	0	0	0	0	0
Prairielands GCD	Johnson	539	384	385	384	385	384	385	384
Prairielands GCD	Somervell	150	174	174	174	174	174	174	174
Prairielands GCD Total		**689**	**558**	**559**	**558**	**559**	**558**	**559**	**558**
Red River GCD	Fannin	0	0	0	0	0	0	0	0
Red River GCD	Grayson	0	0	0	0	0	0	0	0
Red River GCD Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Upper Trinity GCD	Hood (outcrop)	3,379	3,662	3,672	3,662	3,672	3,662	3,672	3,662
Upper Trinity GCD	Hood (downdip)	7,143	7,759	7,780	7,759	7,780	7,759	7,780	7,759
Upper Trinity GCD	Parker (outcrop)	1,600	1,066	1,069	1,066	1,069	1,066	1,069	1,066
Upper Trinity GCD	Parker (downdip)	3,459	2,082	2,088	2,082	2,088	2,082	2,088	2,082
Upper Trinity GCD Total		**15,581**	**14,569**	**14,609**	**14,569**	**14,609**	**14,569**	**14,609**	**14,569**
No District	Dallas	2,282	3,199	3,208	3,199	3,208	3,199	3,208	3,199
No District	Hunt	0	0	0	0	0	0	0	0
No District	Kaufman	0	0	0	0	0	0	0	0
No District	Rockwall	0	0	0	0	0	0	0	0
No District Total		**2,282**	**3,199**	**3,208**	**3,199**	**3,208**	**3,199**	**3,208**	**3,199**
Groundwater Management Area 8		**30,484**	**40,827**	**40,939**	**40,827**	**40,939**	**40,827**	**40,939**	**40,827**

TABLE 4. MODELED AVAILABLE GROUNDWATER FOR THE TRINITY AQUIFER (TRAVIS PEAK) IN GROUNDWATER MANAGEMENT AREA 8 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2070 WITH BASELINE YEAR 2009. VALUES ARE IN ACRE-FEET PER YEAR.

GCD	County	2009	2010	2020	2030	2040	2050	2060	2070
Central Texas GCD	Burnet	**1,906**	**3,464**	**3,474**	**3,464**	**3,474**	**3,464**	**3,474**	**3,464**
Clearwater UWCD	Bell	**1,957**	**8,270**	**8,293**	**8,270**	**8,293**	**8,270**	**8,293**	**8,270**
Middle Trinity GCD	Bosque	5,255	7,678	7,699	7,678	7,699	7,678	7,699	7,678
Middle Trinity GCD	Comanche	9,793	6,160	6,177	6,160	6,177	6,160	6,177	6,160
Middle Trinity GCD	Coryell	3,350	4,371	4,383	4,371	4,383	4,371	4,383	4,371
Middle Trinity GCD	Erath	8,263	11,815	11,849	11,815	11,849	11,815	11,849	11,815
Middle Trinity GCD Total		**26,661**	**30,024**	**30,108**	**30,024**	**30,108**	**30,024**	**30,108**	**30,024**
Post Oak Savannah GCD	Milam	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Prairielands GCD	Ellis	5,583	5,032	5,046	5,032	5,046	5,032	5,046	5,032
Prairielands GCD	Hill	3,700	3,550	3,559	3,550	3,559	3,550	3,559	3,550
Prairielands GCD	Johnson	5,602	4,941	4,955	4,941	4,955	4,941	4,955	4,941
Prairielands GCD	Somervell	2,560	2,847	2,854	2,847	2,854	2,847	2,854	2,847
Prairielands GCD Total		**17,445**	**16,370**	**16,414**	**16,370**	**16,414**	**16,370**	**16,414**	**16,370**
Red River GCD	Fannin	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Saratoga UWCD	Lampasas	**1,669**	**1,599**	**1,603**	**1,599**	**1,603**	**1,599**	**1,603**	**1,599**
Southern Trinity GCD	McLennan	**13,252**	**20,635**	**20,691**	**20,635**	**20,691**	**20,635**	**20,691**	**20,635**
Upper Trinity GCD	Hood (downdip)	**70**	**89**	**89**	**89**	**89**	**89**	**89**	**89**
No District	Brown	680	394	395	394	395	394	395	394
No District	Dallas	0	0	0	0	0	0	0	0
No District	Delta	0	0	0	0	0	0	0	0
No District	Falls	1,158	1,434	1,438	1,434	1,438	1,434	1,438	1,434
No District	Hamilton	1,685	2,207	2,213	2,207	2,213	2,207	2,213	2,207
No District	Hunt	0	0	0	0	0	0	0	0
No District	Kaufman	0	0	0	0	0	0	0	0
No District	Lamar	0	0	0	0	0	0	0	0
No District	Limestone	0	0	0	0	0	0	0	0
No District	Mills	1,011	2,275	2,282	2,275	2,282	2,275	2,282	2,275
No District	Navarro	0	0	0	0	0	0	0	0
No District	Red River	0	0	0	0	0	0	0	0
No District	Travis	3,442	4,113	4,125	4,113	4,125	4,113	4,125	4,113
No District	Williamson	3,026	2,883	2,891	2,883	2,891	2,883	2,891	2,883

GCD	County	2009	2010	2020	2030	2040	2050	2060	2070
No District Total		**11,002**	**13,306**	**13,344**	**13,306**	**13,344**	**13,306**	**13,344**	**13,306**
Groundwater Management Area 8		**73,962**	**93,757**	**94,016**	**93,757**	**94,016**	**93,757**	**94,016**	**93,757**

UWCD: Underground Water Conservation District.

TABLE 5. MODELED AVAILABLE GROUNDWATER FOR THE TRINITY AQUIFER (HENSELL) IN GROUNDWATER MANAGEMENT AREA 8 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2070 WITH BASELINE YEAR 2009. VALUES ARE IN ACRE-FEET PER YEAR.

GCD	County	2009	2010	2020	2030	2040	2050	2060	2070
Central Texas GCD	Burnet	**51**	**1,888**	**1,894**	**1,888**	**1,894**	**1,888**	**1,894**	**1,888**
Clearwater UWCD	Bell	**355**	**1,096**	**1,099**	**1,096**	**1,099**	**1,096**	**1,099**	**1,096**
Middle Trinity GCD	Bosque	2,909	3,835	3,845	3,835	3,845	3,835	3,845	3,835
Middle Trinity GCD	Comanche	188	204	204	204	204	204	204	204
Middle Trinity GCD	Coryell	1,679	2,196	2,202	2,196	2,202	2,196	2,202	2,196
Middle Trinity GCD	Erath	3,446	5,137	5,151	5,137	5,151	5,137	5,151	5,137
Middle Trinity GCD Total		**8,222**	**11,372**	**11,402**	**11,372**	**11,402**	**11,372**	**11,402**	**11,372**
Post Oak Savannah GCD	Milam	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Prairielands GCD	Ellis	0	0	0	0	0	0	0	0
Prairielands GCD	Hill	237	225	226	225	226	225	226	225
Prairielands GCD	Johnson	1,530	1,083	1,086	1,083	1,086	1,083	1,086	1,083
Prairielands GCD	Somervell	1,822	1,973	1,978	1,973	1,978	1,973	1,978	1,973
Prairielands GCD Total		**3,589**	**3,281**	**3,290**	**3,281**	**3,290**	**3,281**	**3,290**	**3,281**
Saratoga UWCD	Lampasas	**730**	**712**	**715**	**712**	**715**	**712**	**715**	**712**
Southern Trinity GCD	McLennan	**3,018**	**4,698**	**4,711**	**4,698**	**4,711**	**4,698**	**4,711**	**4,698**
Upper Trinity GCD	Hood (downdip)	**45**	**36**	**36**	**36**	**36**	**36**	**36**	**36**
No District	Brown	6	4	4	4	4	4	4	4
No District	Dallas	0	0	0	0	0	0	0	0
No District	Falls	0	0	0	0	0	0	0	0
No District	Hamilton	1,221	1,671	1,675	1,671	1,675	1,671	1,675	1,671
No District	Kaufman	0	0	0	0	0	0	0	0
No District	Limestone	0	0	0	0	0	0	0	0
No District	Mills	224	607	608	607	608	607	608	607
No District	Navarro	0	0	0	0	0	0	0	0
No District	Travis	919	1,141	1,144	1,141	1,144	1,141	1,144	1,141
No District	Williamson	772	751	753	751	753	751	753	751
No District Total		**3,142**	**4,174**	**4,184**	**4,174**	**4,184**	**4,174**	**4,184**	**4,174**
Groundwater Management Area 8		**19,152**	**27,257**	**27,331**	**27,257**	**27,331**	**27,257**	**27,331**	**27,257**

UWCD: Underground Water Conservation District.

TABLE 6. MODELED AVAILABLE GROUNDWATER FOR THE TRINITY AQUIFER (HOSSTON) IN GROUNDWATER MANAGEMENT AREA 8 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2070 WITH BASELINE YEAR 2009. VALUES ARE IN ACRE-FEET PER YEAR.

GCD	County	2009	2010	2020	2030	2040	2050	2060	2070
Central Texas GCD	Burnet	**1,799**	**1,379**	**1,382**	**1,379**	**1,382**	**1,379**	**1,382**	**1,379**
Clearwater UWCD	Bell	**1,375**	**7,174**	**7,193**	**7,174**	**7,193**	**7,174**	**7,193**	**7,174**
Middle Trinity GCD	Bosque	2,289	3,762	3,772	3,762	3,772	3,762	3,772	3,762
Middle Trinity GCD	Comanche	9,504	5,864	5,881	5,864	5,881	5,864	5,881	5,864
Middle Trinity GCD	Coryell	1,661	2,161	2,167	2,161	2,167	2,161	2,167	2,161
Middle Trinity GCD	Erath	4,637	6,383	6,400	6,383	6,400	6,383	6,400	6,383
Middle Trinity GCD Total		**18,091**	**18,170**	**18,220**	**18,170**	**18,220**	**18,170**	**18,220**	**18,170**
Post Oak Savannah GCD	Milam	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Prairielands GCD	Ellis	5,575	5,026	5,040	5,026	5,040	5,026	5,040	5,026
Prairielands GCD	Hill	3,413	3,272	3,281	3,272	3,281	3,272	3,281	3,272
Prairielands GCD	Johnson	4,061	3,853	3,863	3,853	3,863	3,853	3,863	3,853
Prairielands GCD	Somervell	736	843	845	843	845	843	845	843
Prairielands GCD Total		**13,785**	**12,994**	**13,029**	**12,994**	**13,029**	**12,994**	**13,029**	**12,994**
Saratoga UWCD	Lampasas	**907**	**857**	**859**	**857**	**859**	**857**	**859**	**857**
Southern Trinity GCD	McLennan	**10,212**	**15,937**	**15,980**	**15,937**	**15,980**	**15,937**	**15,980**	**15,937**
Upper Trinity GCD	Hood (downdip)	**25**	**53**	**53**	**53**	**53**	**53**	**53**	**53**
No District	Brown	624	356	358	356	358	356	358	356
No District	Dallas	0	0	0	0	0	0	0	0
No District	Falls	1,157	1,434	1,438	1,434	1,438	1,434	1,438	1,434
No District	Hamilton	325	385	386	385	386	385	386	385
No District	Kaufman	0	0	0	0	0	0	0	0
No District	Limestone	0	0	0	0	0	0	0	0
No District	Mills	650	1,467	1,471	1,467	1,471	1,467	1,471	1,467
No District	Navarro	0	0	0	0	0	0	0	0
No District	Travis	2,357	2,783	2,791	2,783	2,791	2,783	2,791	2,783
No District	Williamson	2,050	1,933	1,938	1,933	1,938	1,933	1,938	1,933
No District Total		**7,163**	**8,358**	**8,382**	**8,358**	**8,382**	**8,358**	**8,382**	**8,358**
Groundwater Management Area 8		**53,357**	**64,922**	**65,098**	**64,922**	**65,098**	**64,922**	**65,098**	**64,922**

UWCD: Underground Water Conservation District.

TABLE 7. MODELED AVAILABLE GROUNDWATER FOR THE TRINITY AQUIFER (ANTLERS) IN GROUNDWATER MANAGEMENT AREA 8 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2070 WITH BASELINE YEAR 2009. VALUES ARE IN ACRE-FEET PER YEAR.

GCD	County	2009	2010	2020	2030	2040	2050	2060	2070
Middle Trinity GCD	Comanche	9,320	5,839	5,855	5,839	5,855	5,839	5,855	5,839
Middle Trinity GCD	Erath	1,663	2,628	2,636	2,628	2,636	2,628	2,636	2,628
Middle Trinity GCD Total		**10,983**	**8,467**	**8,491**	**8,467**	**8,491**	**8,467**	**8,491**	**8,467**
North Texas GCD	Collin	629	1,961	1,966	1,961	1,966	1,961	1,966	1,961
North Texas GCD	Cooke	4,117	10,514	10,544	10,514	10,544	10,514	10,544	10,514
North Texas GCD	Denton	11,427	16,545	16,591	16,545	16,591	16,545	16,591	16,545
North Texas GCD Total		**16,173**	**29,020**	**29,101**	**29,020**	**29,101**	**29,020**	**29,101**	**29,020**
Northern Trinity GCD	Tarrant	**1,908**	**1,248**	**1,251**	**1,248**	**1,251**	**1,248**	**1,251**	**1,248**
Red River GCD	Fannin	0	0	0	0	0	0	0	0
Red River GCD	Grayson	6,872	10,708	10,738	10,708	10,738	10,708	10,738	10,708
Red River GCD Total		**6,872**	**10,708**	**10,738**	**10,708**	**10,738**	**10,708**	**10,738**	**10,708**
Upper Trinity GCD	Montague (outcrop)	1,421	3,875	3,886	3,875	3,886	3,875	3,886	3,875
Upper Trinity GCD	Parker (outcrop)	3,321	2,897	2,905	2,897	2,905	2,897	2,905	2,897
Upper Trinity GCD	Wise (outcrop)	9,080	7,677	7,698	7,677	7,698	7,677	7,698	7,677
Upper Trinity GCD	Wise (downdip)	3,699	2,057	2,062	2,057	2,062	2,057	2,062	2,057
Upper Trinity GCD Total		**17,521**	**16,506**	**16,551**	**16,506**	**16,551**	**16,506**	**16,551**	**16,506**
No District	Brown	1,743	1,052	1,055	1,052	1,055	1,052	1,055	1,052
No District	Callahan	1,804	1,725	1,730	1,725	1,730	1,725	1,730	1,725
No District	Eastland	5,613	5,732	5,747	5,732	5,747	5,732	5,747	5,732
No District	Lamar	0	0	0	0	0	0	0	0
No District	Red River	0	0	0	0	0	0	0	0
No District	Taylor	17	13	13	13	13	13	13	13
No District Total		**9,177**	**8,522**	**8,545**	**8,522**	**8,545**	**8,522**	**8,545**	**8,522**
Groundwater Management Area 8		**62,634**	**74,471**	**74,677**	**74,471**	**74,677**	**74,471**	**74,677**	**74,471**

TABLE 8. MODELED AVAILABLE GROUNDWATER FOR THE WOODBINE AQUIFER IN GROUNDWATER MANAGEMENT AREA 8 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2070 WITH BASELINE YEAR 2009. VALUES ARE IN ACRE-FEET PER YEAR.

GCD	County	2009	2010	2020	2030	2040	2050	2060	2070
North Texas GCD	Collin	2,427	4,251	4,263	4,251	4,263	4,251	4,263	4,251
North Texas GCD	Cooke	1,646	800	802	800	802	800	802	800
North Texas GCD	Denton	3,797	3,607	3,616	3,607	3,616	3,607	3,616	3,607
North Texas GCD Total		**7,870**	**8,658**	**8,681**	**8,658**	**8,681**	**8,658**	**8,681**	**8,658**
Northern Trinity GCD	Tarrant	**2,646**	**1,138**	**1,141**	**1,138**	**1,141**	**1,138**	**1,141**	**1,138**
Prairielands GCD	Ellis	2,471	2,073	2,078	2,073	2,078	2,073	2,078	2,073
Prairielands GCD	Hill	752	586	588	586	588	586	588	586
Prairielands GCD	Johnson	3,880	1,980	1,985	1,980	1,985	1,980	1,985	1,980
Prairielands GCD Total		**7,103**	**4,639**	**4,651**	**4,639**	**4,651**	**4,639**	**4,651**	**4,639**
Red River GCD	Fannin	5,495	4,920	4,934	4,920	4,934	4,920	4,934	4,920
Red River GCD	Grayson	5,056	7,521	7,541	7,521	7,541	7,521	7,541	7,521
Red River GCD Total		**10,551**	**12,441**	**12,475**	**12,441**	**12,475**	**12,441**	**12,475**	**12,441**
Southern Trinity GCD	McLennan	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
No District	Dallas	1,957	2,796	2,804	2,796	2,804	2,796	2,804	2,796
No District	Hunt	463	763	765	763	765	763	765	763
No District	Kaufman	0	0	0	0	0	0	0	0
No District	Lamar	61	49	49	49	49	49	49	49
No District	Navarro	65	68	68	68	68	68	68	68
No District	Red River	3	2	2	2	2	2	2	2
No District	Rockwall	0	0	0	0	0	0	0	0
No District Total		**2,549**	**3,678**	**3,688**	**3,678**	**3,688**	**3,678**	**3,688**	**3,678**
Groundwater Management Area 8		**30,719**	**30,554**	**30,636**	**30,554**	**30,636**	**30,554**	**30,636**	**30,554**

TABLE 9. MODELED AVAILABLE GROUNDWATER FOR THE EDWARDS (BALCONES FAULT ZONE) AQUIFER IN GROUNDWATER MANAGEMENT AREA 8 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2070 WITH BASELINE YEAR 2009. VALUES ARE IN ACRE-FEET PER YEAR.

GCD	County	2000	2010	2020	2030	2040	2050	2060	2070
Clearwater UWCD	Bell	**949**	**6,469**	**6,469**	**6,469**	**6,469**	**6,469**	**6,469**	**6,469**
No District	Travis	1,201	5,237	5,237	5,237	5,237	5,237	5,237	5,237
No District	Williamson	13,813	3,462	3,462	3,462	3,462	3,462	3,462	3,462
Groundwater Management Area 8		**15,981**	**15,168**	**15,168**	**15,168**	**15,168**	**15,168**	**15,168**	**15,168**

UWCD: Underground Water Conservation District.

TABLE 10. MODELED AVAILABLE GROUNDWATER FOR THE MARBLE FALLS AQUIFER IN GROUNDWATER MANAGEMENT AREA 8 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2070 WITH BASELINE YEAR 2009. VALUES ARE IN ACRE-FEET PER YEAR.

GCD	County	2009	2010	2020	2030	2040	2050	2060	2070
Central Texas GCD	Burnet	**2,220**	**2,736**	**2,744**	**2,736**	**2,744**	**2,736**	**2,744**	**2,736**
Saratoga UWCD	Lampasas	**363**	**2,837**	**2,845**	**2,837**	**2,845**	**2,837**	**2,845**	**2,837**
No District	Brown	0	25	25	25	25	25	25	25
No District	Mills	20	25	25	25	25	25	25	25
No District Total		**20**	**50**	**50**	**50**	**50**	**50**	**50**	**50**
Groundwater Management Area 8		**2,603**	**5,623**	**5,639**	**5,623**	**5,639**	**5,623**	**5,639**	**5,623**

UWCD: Underground Water Conservation District.

TABLE 11. MODELED AVAILABLE GROUNDWATER FOR THE ELLENBURGER-SAN SABA AQUIFER IN GROUNDWATER MANAGEMENT AREA 8 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2070 WITH BASELINE YEAR 2009. VALUES ARE IN ACRE-FEET PER YEAR.

GCD	County	2009	2010	2020	2030	2040	2050	2060	2070
Central Texas GCD	Burnet	**5,256**	**10,827**	**10,857**	**10,827**	**10,857**	**10,827**	**10,857**	**10,827**
Saratoga UWCD	Lampasas	**351**	**2,593**	**2,601**	**2,593**	**2,601**	**2,593**	**2,601**	**2,593**
No District	Brown	1	131	131	131	131	131	131	131
No District	Mills	0	499	500	499	500	499	500	499
No District Total		**1**	**630**	**631**	**630**	**631**	**630**	**631**	**630**
Groundwater Management Area 8		**5,608**	**14,050**	**14,089**	**14,050**	**14,089**	**14,050**	**14,089**	**14,050**

UWCD: Underground Water Conservation District.

TABLE 12. MODELED AVAILABLE GROUNDWATER FOR THE HICKORY AQUIFER IN GROUNDWATER MANAGEMENT AREA 8 SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) AND COUNTY FOR EACH DECADE BETWEEN 2010 AND 2070 WITH BASELINE YEAR 2009. VALUES ARE IN ACRE-FEET PER YEAR.

GCD	County	2009	2010	2020	2030	2040	2050	2060	2070
Central Texas GCD	Burnet	**1,088**	**3,413**	**3,423**	**3,413**	**3,423**	**3,413**	**3,423**	**3,413**
Saratoga UWCD	Lampasas	**0**	**113**	**114**	**113**	**114**	**113**	**114**	**113**
No District	Brown	0	12	12	12	12	12	12	12
No District	Mills	0	36	36	36	36	36	36	36
No District Total		**0**	**48**	**48**	**48**	**48**	**48**	**48**	**48**
Groundwater Management Area 8		**1,088**	**3,574**	**3,585**	**3,574**	**3,585**	**3,574**	**3,585**	**3,574**

UWCD: Underground Water Conservation District.

TABLE 13. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE TRINITY AQUIFER (PALUXY) IN GROUNDWATER MANAGEMENT AREA 8. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN.

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Counties Not in Upper Trinity GCD								
Bell	Region G	Brazos	0	0	0	0	0	0
Bosque	Region G	Brazos	358	356	358	356	358	356
Collin	Region C	Sabine	0	0	0	0	0	0
Collin	Region C	Trinity	1,551	1,547	1,551	1,547	1,551	1,547
Coryell	Region G	Brazos	0	0	0	0	0	0
Dallas	Region C	Trinity	359	358	359	358	359	358
Delta	Northeast Texas	Sulphur	56	56	56	56	56	56
Denton	Region C	Trinity	4,832	4,819	4,832	4,819	4,832	4,819
Ellis	Region C	Trinity	443	442	443	442	443	442
Erath	Region G	Brazos	61	61	61	61	61	61
Falls	Region G	Brazos	0	0	0	0	0	0
Fannin	Region C	Sulphur	2,092	2,087	2,092	2,087	2,092	2,087
Fannin	Region C	Trinity	0	0	0	0	0	0
Grayson	Region C	Trinity	0	0	0	0	0	0
Hamilton	Region G	Brazos	0	0	0	0	0	0
Hill	Region G	Brazos	348	347	348	347	348	347
Hill	Region G	Trinity	5	5	5	5	5	5
Hunt	Northeast Texas	Sabine	0	0	0	0	0	0
Hunt	Northeast Texas	Sulphur	3	3	3	3	3	3
Hunt	Northeast Texas	Trinity	0	0	0	0	0	0
Johnson	Region G	Brazos	880	878	880	878	880	878
Johnson	Region G	Trinity	1,567	1,562	1,567	1,562	1,567	1,562
Kaufman	Region C	Trinity	0	0	0	0	0	0
Lamar	Northeast Texas	Red	0	0	0	0	0	0
Lamar	Northeast Texas	Sulphur	8	8	8	8	8	8
Limestone	Region G	Brazos	0	0	0	0	0	0
Limestone	Region G	Trinity	0	0	0	0	0	0
McLennan	Region G	Brazos	0	0	0	0	0	0
Mills	Lower Colorado	Brazos	6	6	6	6	6	6
Mills	Lower Colorado	Colorado	0	0	0	0	0	0
Navarro	Region C	Trinity	0	0	0	0	0	0
Red River	Northeast Texas	Red	52	52	52	52	52	52
Red River	Northeast Texas	Sulphur	125	125	125	125	125	125

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Rockwall	Region C	Trinity	0	0	0	0	0	0
Somervell	Region G	Brazos	14	14	14	14	14	14
Tarrant	Region C	Trinity	8,982	8,957	8,982	8,957	8,982	8,957
Subtotal			**21,742**	**21,683**	**21,742**	**21,683**	**21,742**	**21,683**
Counties in Upper Trinity GCD								
Hood (outcrop)	Region G	Brazos	159	158	159	158	159	158
Hood (outcrop)	Region G	Trinity	0	0	0	0	0	0
Parker (outcrop)	Region C	Brazos	34	34	34	34	34	34
Parker (outcrop)	Region C	Trinity	2,580	2,573	2,580	2,573	2,580	2,573
Parker (downdip)	Region C	Trinity	50	50	50	50	50	50
Subtotal			**2,823**	**2,815**	**2,823**	**2,815**	**2,823**	**2,815**
Groundwater Management Area 8			**24,565**	**24,498**	**24,565**	**24,498**	**24,565**	**24,498**

TABLE 14. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE TRINITY AQUIFER (GLEN ROSE) IN GROUNDWATER MANAGEMENT AREA 8. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN.

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Counties Not in Upper Trinity GCD								
Bell	Region G	Brazos	974	971	974	971	974	971
Bosque	Region G	Brazos	731	728	731	728	731	728
Brown	Region F	Colorado	0	0	0	0	0	0
Burnet	Lower Colorado	Brazos	188	188	188	188	188	188
Burnet	Lower Colorado	Colorado	236	235	236	235	236	235
Collin	Region C	Sabine	0	0	0	0	0	0
Collin	Region C	Trinity	83	83	83	83	83	83
Comanche	Region G	Brazos	22	22	22	22	22	22
Comanche	Region G	Colorado	18	18	18	18	18	18
Coryell	Region G	Brazos	120	120	120	120	120	120
Dallas	Region C	Trinity	132	131	132	131	132	131
Delta	Northeast Texas	Sulphur	0	0	0	0	0	0
Denton	Region C	Trinity	339	338	339	338	339	338
Ellis	Region C	Trinity	50	50	50	50	50	50
Erath	Region G	Brazos	1,081	1,078	1,081	1,078	1,081	1,078
Falls	Region G	Brazos	0	0	0	0	0	0
Fannin	Region C	Sulphur	0	0	0	0	0	0
Fannin	Region C	Trinity	0	0	0	0	0	0
Grayson	Region C	Trinity	0	0	0	0	0	0
Hamilton	Region G	Brazos	218	218	218	218	218	218
Hill	Region G	Brazos	115	114	115	114	115	114
Hill	Region G	Trinity	1	1	1	1	1	1
Hunt	Northeast Texas	Sabine	0	0	0	0	0	0
Hunt	Northeast Texas	Sulphur	0	0	0	0	0	0
Hunt	Northeast Texas	Trinity	0	0	0	0	0	0
Johnson	Region G	Brazos	953	950	953	950	953	950
Johnson	Region G	Trinity	683	681	683	681	683	681
Kaufman	Region C	Trinity	0	0	0	0	0	0
Lamar	Northeast Texas	Red	0	0	0	0	0	0
Lamar	Northeast Texas	Sulphur	0	0	0	0	0	0
Lampasas	Region G	Brazos	68	68	68	68	68	68
Limestone	Region G	Brazos	0	0	0	0	0	0
Limestone	Region G	Trinity	0	0	0	0	0	0

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
McLennan	Region G	Brazos	0	0	0	0	0	0
Milam	Region G	Brazos	0	0	0	0	0	0
Mills	Lower Colorado	Brazos	96	96	96	96	96	96
Mills	Lower Colorado	Colorado	93	93	93	93	93	93
Navarro	Region C	Trinity	0	0	0	0	0	0
Red River	Northeast Texas	Red	0	0	0	0	0	0
Red River	Northeast Texas	Sulphur	0	0	0	0	0	0
Rockwall	Region C	Trinity	0	0	0	0	0	0
Somervell	Region G	Brazos	146	146	146	146	146	146
Tarrant	Region C	Trinity	795	793	795	793	795	793
Travis	Lower Colorado	Brazos	0	0	0	0	0	0
Travis	Lower Colorado	Colorado	974	971	974	971	974	971
Williamson	Region G	Brazos	623	621	623	621	623	621
Williamson	Region G	Colorado	0	0	0	0	0	0
Williamson	Lower Colorado	Brazos	0	0	0	0	0	0
Williamson	Lower Colorado	Colorado	67	67	67	67	67	67
Subtotal			**8,806**	**8,781**	**8,806**	**8,781**	**8,806**	**8,781**
Counties in Upper Trinity GCD								
Hood (outcrop)	Region G	Brazos	655	653	655	653	655	653
Hood (downdip)	Region G	Brazos	83	83	83	83	83	83
Hood (downdip)	Region G	Trinity	20	20	20	20	20	20
Parker (outcrop)	Region C	Brazos	87	87	87	87	87	87
Parker (downdip)	Region C	Brazos	7	7	7	7	7	7
Parker (outcrop)	Region C	Trinity	2,208	2,202	2,208	2,202	2,208	2,202
Parker (downdip)	Region C	Trinity	869	866	869	866	869	866
Subtotal			**3,929**	**3,918**	**3,929**	**3,918**	**3,929**	**3,918**
Groundwater Management Area 8			**12,735**	**12,699**	**12,735**	**12,699**	**12,735**	**12,699**

TABLE 15. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE TRINITY AQUIFER (TWIN MOUNTAINS) IN GROUNDWATER MANAGEMENT AREA 8. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN.

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Counties Not in Upper Trinity GCD								
Collin	Region C	Sabine	0	0	0	0	0	0
Collin	Region C	Trinity	2,207	2,201	2,207	2,201	2,207	2,201
Dallas	Region C	Trinity	3,208	3,199	3,208	3,199	3,208	3,199
Denton	Region C	Trinity	8,389	8,366	8,389	8,366	8,389	8,366
Ellis	Region C	Trinity	0	0	0	0	0	0
Erath	Region G	Brazos	5,031	5,017	5,031	5,017	5,031	5,017
Fannin	Region C	Sulphur	0	0	0	0	0	0
Fannin	Region C	Trinity	0	0	0	0	0	0
Grayson	Region C	Trinity	0	0	0	0	0	0
Hunt	Northeast Texas	Sabine	0	0	0	0	0	0
Hunt	Northeast Texas	Trinity	0	0	0	0	0	0
Johnson	Region G	Brazos	133	133	133	133	133	133
Johnson	Region G	Trinity	252	251	252	251	252	251
Kaufman	Region C	Trinity	0	0	0	0	0	0
Rockwall	Region C	Trinity	0	0	0	0	0	0
Somervell	Region G	Brazos	174	174	174	174	174	174
Tarrant	Region C	Trinity	6,936	6,917	6,936	6,917	6,936	6,917
Subtotal			**26,330**	**26,258**	**26,330**	**26,258**	**26,330**	**26,258**
Counties in Upper Trinity GCD								
Hood (outcrop)	Region G	Brazos	3,672	3,662	3,672	3,662	3,672	3,662
Hood (downdip)	Region G	Brazos	7,761	7,740	7,761	7,740	7,761	7,740
Hood (downdip)	Region G	Trinity	19	19	19	19	19	19
Parker (outcrop)	Region C	Brazos	1,069	1,066	1,069	1,066	1,069	1,066
Parker (downdip)	Region C	Brazos	778	776	778	776	778	776
Parker (downdip)	Region C	Trinity	1,310	1,306	1,310	1,306	1,310	1,306
Subtotal			**14,609**	**14,569**	**14,609**	**14,569**	**14,609**	**14,569**
Groundwater Management Area 8			**40,939**	**40,827**	**40,939**	**40,827**	**40,939**	**40,827**

TABLE 16. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE TRINITY AQUIFER (TRAVIS PEAK) IN GROUNDWATER MANAGEMENT AREA 8. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN.

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Counties Not in Upper Trinity GCD								
Bell	Region G	Brazos	8,293	8,270	8,293	8,270	8,293	8,270
Bosque	Region G	Brazos	7,699	7,678	7,699	7,678	7,699	7,678
Brown	Region F	Brazos	3	3	3	3	3	3
Brown	Region F	Colorado	392	391	392	391	392	391
Burnet	Lower Colorado	Brazos	2,950	2,943	2,950	2,943	2,950	2,943
Burnet	Lower Colorado	Colorado	523	521	523	521	523	521
Comanche	Region G	Brazos	6,128	6,111	6,128	6,111	6,128	6,111
Comanche	Region G	Colorado	49	49	49	49	49	49
Coryell	Region G	Brazos	4,383	4,371	4,383	4,371	4,383	4,371
Dallas	Region C	Trinity	0	0	0	0	0	0
Delta	Northeast Texas	Sulphur	0	0	0	0	0	0
Ellis	Region C	Trinity	5,046	5,032	5,046	5,032	5,046	5,032
Erath	Region G	Brazos	11,849	11,815	11,849	11,815	11,849	11,815
Falls	Region G	Brazos	1,438	1,434	1,438	1,434	1,438	1,434
Fannin	Region C	Sulphur	0	0	0	0	0	0
Fannin	Region C	Trinity	0	0	0	0	0	0
Hamilton	Region G	Brazos	2,213	2,207	2,213	2,207	2,213	2,207
Hill	Region G	Brazos	3,304	3,295	3,304	3,295	3,304	3,295
Hill	Region G	Trinity	256	255	256	255	256	255
Hunt	Northeast Texas	Sabine	0	0	0	0	0	0
Hunt	Northeast Texas	Sulphur	0	0	0	0	0	0
Hunt	Northeast Texas	Trinity	0	0	0	0	0	0
Johnson	Region G	Brazos	1,932	1,927	1,932	1,927	1,932	1,927
Johnson	Region G	Trinity	3,022	3,014	3,022	3,014	3,022	3,014
Kaufman	Region C	Trinity	0	0	0	0	0	0
Lamar	Northeast Texas	Red	0	0	0	0	0	0
Lamar	Northeast Texas	Sulphur	0	0	0	0	0	0
Lampasas	Region G	Brazos	1,528	1,523	1,528	1,523	1,528	1,523
Lampasas	Region G	Colorado	76	75	76	75	76	75
Limestone	Region G	Brazos	0	0	0	0	0	0
Limestone	Region G	Trinity	0	0	0	0	0	0
McLennan	Region G	Brazos	20,691	20,635	20,691	20,635	20,691	20,635
Milam	Region G	Brazos	0	0	0	0	0	0

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Mills	Lower Colorado	Brazos	706	703	706	703	706	703
Mills	Lower Colorado	Colorado	1,576	1,572	1,576	1,572	1,576	1,572
Navarro	Region C	Trinity	0	0	0	0	0	0
Red River	Northeast Texas	Red	0	0	0	0	0	0
Red River	Northeast Texas	Sulphur	0	0	0	0	0	0
Somervell	Region G	Brazos	2,854	2,847	2,854	2,847	2,854	2,847
Travis	Lower Colorado	Brazos	1	1	1	1	1	1
Travis	Lower Colorado	Colorado	4,124	4,112	4,124	4,112	4,124	4,112
Williamson	Region G	Brazos	2,885	2,877	2,885	2,877	2,885	2,877
Williamson	Region G	Colorado	5	5	5	5	5	5
Williamson	Lower Colorado	Brazos	0	0	0	0	0	0
Williamson	Lower Colorado	Colorado	0	0	0	0	0	0
Subtotal			**93,926**	**93,666**	**93,926**	**93,666**	**93,926**	**93,666**
Counties in Upper Trinity GCD								
Hood (downdip)	Region G	Brazos	89	89	89	89	89	89
Subtotal			**89**	**89**	**89**	**89**	**89**	**89**
Groundwater Management Area 8			**94,015**	**93,755**	**94,015**	**93,755**	**94,015**	**93,755**

TABLE 17. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE TRINITY AQUIFER (HENSELL) IN GROUNDWATER MANAGEMENT AREA 8. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN.

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Counties Not in Upper Trinity GCD								
Bell	Region G	Brazos	1,099	1,096	1,099	1,096	1,099	1,096
Bosque	Region G	Brazos	3,845	3,835	3,845	3,835	3,845	3,835
Brown	Region F	Colorado	4	4	4	4	4	4
Burnet	Lower Colorado	Brazos	1,761	1,757	1,761	1,757	1,761	1,757
Burnet	Lower Colorado	Colorado	133	132	133	132	133	132
Comanche	Region G	Brazos	181	180	181	180	181	180
Comanche	Region G	Colorado	24	24	24	24	24	24
Coryell	Region G	Brazos	2,202	2,196	2,202	2,196	2,202	2,196
Dallas	Region C	Trinity	0	0	0	0	0	0
Ellis	Region C	Trinity	0	0	0	0	0	0
Erath	Region G	Brazos	5,151	5,137	5,151	5,137	5,151	5,137
Falls	Region G	Brazos	0	0	0	0	0	0
Hamilton	Region G	Brazos	1,675	1,671	1,675	1,671	1,675	1,671
Hill	Region G	Brazos	225	224	225	224	225	224
Hill	Region G	Trinity	1	1	1	1	1	1
Johnson	Region G	Brazos	618	616	618	616	618	616
Johnson	Region G	Trinity	468	467	468	467	468	467
Kaufman	Region C	Trinity	0	0	0	0	0	0
Lampasas	Region G	Brazos	713	711	713	711	713	711
Lampasas	Region G	Colorado	1	1	1	1	1	1
Limestone	Region G	Brazos	0	0	0	0	0	0
Limestone	Region G	Trinity	0	0	0	0	0	0
McLennan	Region G	Brazos	4,711	4,698	4,711	4,698	4,711	4,698
Milam	Region G	Brazos	0	0	0	0	0	0
Mills	Lower Colorado	Brazos	172	172	172	172	172	172
Mills	Lower Colorado	Colorado	436	435	436	435	436	435
Navarro	Region C	Trinity	0	0	0	0	0	0
Somervell	Region G	Brazos	1,978	1,973	1,978	1,973	1,978	1,973
Travis	Lower Colorado	Brazos	1	1	1	1	1	1
Travis	Lower Colorado	Colorado	1,144	1,141	1,144	1,141	1,144	1,141
Williamson	Region G	Brazos	753	751	753	751	753	751
Williamson	Region G	Colorado	0	0	0	0	0	0
Williamson	Lower Colorado	Brazos	0	0	0	0	0	0

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Williamson	Lower Colorado	Colorado	0	0	0	0	0	0
Subtotal			**27,296**	**27,223**	**27,296**	**27,223**	**27,296**	**27,223**
Counties in Upper Trinity GCD								
Hood (downdip)	Region G	Brazos	36	36	36	36	36	36
Subtotal			**36**	**36**	**36**	**36**	**36**	**36**
Groundwater Management Area 8			**27,332**	**27,259**	**27,332**	**27,259**	**27,332**	**27,259**

TABLE 18. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE TRINITY AQUIFER (HOSSTON) IN GROUNDWATER MANAGEMENT AREA 8. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN.

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Counties Not in Upper Trinity GCD								
Bell	Region G	Brazos	7,193	7,174	7,193	7,174	7,193	7,174
Bosque	Region G	Brazos	3,772	3,762	3,772	3,762	3,772	3,762
Brown	Region F	Brazos	3	3	3	3	3	3
Brown	Region F	Colorado	355	353	355	353	355	353
Burnet	Lower Colorado	Brazos	1,027	1,025	1,027	1,025	1,027	1,025
Burnet	Lower Colorado	Colorado	355	354	355	354	355	354
Comanche	Region G	Brazos	5,875	5,858	5,875	5,858	5,875	5,858
Comanche	Region G	Colorado	6	6	6	6	6	6
Coryell	Region G	Brazos	2,167	2,161	2,167	2,161	2,167	2,161
Dallas	Region C	Trinity	0	0	0	0	0	0
Ellis	Region C	Trinity	5,040	5,026	5,040	5,026	5,040	5,026
Erath	Region G	Brazos	6,400	6,383	6,400	6,383	6,400	6,383
Falls	Region G	Brazos	1,438	1,434	1,438	1,434	1,438	1,434
Hamilton	Region G	Brazos	386	385	386	385	386	385
Hill	Region G	Brazos	3,026	3,018	3,026	3,018	3,026	3,018
Hill	Region G	Trinity	255	254	255	254	255	254
Johnson	Region G	Brazos	1,311	1,307	1,311	1,307	1,311	1,307
Johnson	Region G	Trinity	2,553	2,546	2,553	2,546	2,553	2,546
Kaufman	Region C	Trinity	0	0	0	0	0	0
Lampasas	Region G	Brazos	786	783	786	783	786	783
Lampasas	Region G	Colorado	72	72	72	72	72	72
Limestone	Region G	Brazos	0	0	0	0	0	0
Limestone	Region G	Trinity	0	0	0	0	0	0
McLennan	Region G	Brazos	15,980	15,937	15,980	15,937	15,980	15,937
Milam	Region G	Brazos	0	0	0	0	0	0
Mills	Lower Colorado	Brazos	376	375	376	375	376	375
Mills	Lower Colorado	Colorado	1,096	1,093	1,096	1,093	1,096	1,093
Navarro	Region C	Trinity	0	0	0	0	0	0
Somervell	Region G	Brazos	845	843	845	843	845	843
Travis	Lower Colorado	Brazos	0	0	0	0	0	0
Travis	Lower Colorado	Colorado	2,791	2,783	2,791	2,783	2,791	2,783
Williamson	Region G	Brazos	1,933	1,928	1,933	1,928	1,933	1,928
Williamson	Region G	Colorado	5	5	5	5	5	5

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Williamson	Lower Colorado	Brazos	0	0	0	0	0	0
Williamson	Lower Colorado	Colorado	0	0	0	0	0	0
Subtotal			**65,046**	**64,868**	**65,046**	**64,868**	**65,046**	**64,868**
Counties in Upper Trinity GCD								
Hood (downdip)	Region G	Brazos	53	53	53	53	53	53
Subtotal			**53**	**53**	**53**	**53**	**53**	**53**
Groundwater Management Area 8			**65,099**	**64,921**	**65,099**	**64,921**	**65,099**	**64,921**

TABLE 19. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE TRINITY AQUIFER (ANTLERS) IN GROUNDWATER MANAGEMENT AREA 8. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN.

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Counties Not in Upper Trinity GCD								
Brown	Region F	Brazos	48	48	48	48	48	48
Brown	Region F	Colorado	1,007	1,004	1,007	1,004	1,007	1,004
Callahan	Region G	Brazos	444	443	444	443	444	443
Callahan	Region G	Colorado	1,285	1,282	1,285	1,282	1,285	1,282
Collin	Region C	Trinity	1,966	1,961	1,966	1,961	1,966	1,961
Comanche	Region G	Brazos	5,855	5,839	5,855	5,839	5,855	5,839
Cooke	Region C	Red	2,191	2,184	2,191	2,184	2,191	2,184
Cooke	Region C	Trinity	8,353	8,330	8,353	8,330	8,353	8,330
Denton	Region C	Trinity	16,591	16,545	16,591	16,545	16,591	16,545
Eastland	Region G	Brazos	5,194	5,180	5,194	5,180	5,194	5,180
Eastland	Region G	Colorado	553	552	553	552	553	552
Erath	Region G	Brazos	2,636	2,628	2,636	2,628	2,636	2,628
Fannin	Region C	Red	0	0	0	0	0	0
Fannin	Region C	Sulphur	0	0	0	0	0	0
Fannin	Region C	Trinity	0	0	0	0	0	0
Grayson	Region C	Red	6,678	6,660	6,678	6,660	6,678	6,660
Grayson	Region C	Trinity	4,059	4,048	4,059	4,048	4,059	4,048
Lamar	Northeast Texas	Red	0	0	0	0	0	0
Lamar	Northeast Texas	Sulphur	0	0	0	0	0	0
Red River	Northeast Texas	Red	0	0	0	0	0	0
Tarrant	Region C	Trinity	1,251	1,248	1,251	1,248	1,251	1,248
Taylor	Region G	Brazos	5	5	5	5	5	5
Taylor	Region G	Colorado	9	9	9	9	9	9
Subtotal			**58,125**	**57,966**	**58,125**	**57,966**	**58,125**	**57,966**
Counties in Upper Trinity GCD								
Montague (outcrop)	Region B	Red	154	154	154	154	154	154
Montague (outcrop)	Region B	Trinity	3,732	3,721	3,732	3,721	3,732	3,721
Parker (outcrop)	Region C	Brazos	257	256	257	256	257	256
Parker (outcrop)	Region C	Trinity	2,648	2,640	2,648	2,640	2,648	2,640
Wise (outcrop)	Region C	Trinity	7,698	7,677	7,698	7,677	7,698	7,677

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Wise (downdip)	Region C	Trinity	2,062	2,057	2,062	2,057	2,062	2,057
Subtotal			**16,551**	**16,505**	**16,551**	**16,505**	**16,551**	**16,505**
Groundwater Management Area 8			**74,676**	**74,471**	**74,676**	**74,471**	**74,676**	**74,471**

TABLE 20. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE WOODBINE AQUIFER IN GROUNDWATER MANAGEMENT AREA 8. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN.

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Collin	Region C	Sabine	0	0	0	0	0	0
Collin	Region C	Trinity	4,263	4,251	4,263	4,251	4,263	4,251
Cooke	Region C	Red	262	261	262	261	262	261
Cooke	Region C	Trinity	540	538	540	538	540	538
Dallas	Region C	Trinity	2,804	2,796	2,804	2,796	2,804	2,796
Denton	Region C	Trinity	3,616	3,607	3,616	3,607	3,616	3,607
Ellis	Region C	Trinity	2,078	2,073	2,078	2,073	2,078	2,073
Fannin	Region C	Red	3,553	3,544	3,553	3,544	3,553	3,544
Fannin	Region C	Sulphur	551	550	551	550	551	550
Fannin	Region C	Trinity	829	827	829	827	829	827
Grayson	Region C	Red	5,615	5,599	5,615	5,599	5,615	5,599
Grayson	Region C	Trinity	1,926	1,922	1,926	1,922	1,926	1,922
Hill	Region G	Brazos	285	284	285	284	285	284
Hill	Region G	Trinity	303	302	303	302	303	302
Hunt	Northeast Texas	Sabine	269	268	269	268	269	268
Hunt	Northeast Texas	Sulphur	165	165	165	165	165	165
Hunt	Northeast Texas	Trinity	330	329	330	329	330	329
Johnson	Region G	Brazos	24	24	24	24	24	24
Johnson	Region G	Trinity	1,961	1,956	1,961	1,956	1,961	1,956
Kaufman	Region C	Trinity	0	0	0	0	0	0
Lamar	Northeast Texas	Red	0	0	0	0	0	0
Lamar	Northeast Texas	Sulphur	49	49	49	49	49	49
McLennan	Region G	Brazos	0	0	0	0	0	0
Navarro	Region C	Trinity	68	68	68	68	68	68
Red River	Northeast Texas	Red	2	2	2	2	2	2
Rockwall	Region C	Trinity	0	0	0	0	0	0
Tarrant	Region C	Trinity	1,141	1,138	1,141	1,138	1,141	1,138
Groundwater Management Area 8			**30,634**	**30,553**	**30,634**	**30,553**	**30,634**	**30,553**

TABLE 21. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE EDWARDS (BALCONES FAULT ZONE) AQUIFER IN GROUNDWATER MANAGEMENT AREA 8. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN. MODELED AVAILABLE GROUNDWATER VALUES ARE FROM GAM RUN 08-010MAG BY ANAYA (2008).

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Bell	Region G	Brazos	6,469	6,469	6,469	6,469	6,469	6,469
Travis	Lower Colorado	Brazos	275	275	275	275	275	275
Travis	Lower Colorado	Colorado	4,962	4,962	4,962	4,962	4,962	4,962
Williamson	Region G	Brazos	3,351	3,351	3,351	3,351	3,351	3,351
Williamson	Region G	Colorado	101	101	101	101	101	101
Williamson	Lower Colorado	Brazos	6	6	6	6	6	6
Williamson	Lower Colorado	Colorado	4	4	4	4	4	4
Groundwater Management Area 8			**15,168**	**15,168**	**15,168**	**15,168**	**15,168**	**15,168**

TABLE 22. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE MARBLE FALLS AQUIFER IN GROUNDWATER MANAGEMENT AREA 8. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN.

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Brown	Region F	Colorado	25	25	25	25	25	25
Burnet	Lower Colorado	Brazos	1,387	1,383	1,387	1,383	1,387	1,383
Burnet	Lower Colorado	Colorado	1,357	1,353	1,357	1,353	1,357	1,353
Lampasas	Region G	Brazos	1,958	1,952	1,958	1,952	1,958	1,952
Lampasas	Region G	Colorado	887	885	887	885	887	885
Mills	Lower Colorado	Brazos	1	1	1	1	1	1
Mills	Lower Colorado	Colorado	24	24	24	24	24	24
Groundwater Management Area 8			**5,639**	**5,623**	**5,639**	**5,623**	**5,639**	**5,623**

TABLE 23. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE ELLENBURGER-SAN SABA AQUIFER IN GROUNDWATER MANAGEMENT AREA 8. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN.

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Brown	Region F	Colorado	131	131	131	131	131	131
Burnet	Lower Colorado	Brazos	3,833	3,822	3,833	3,822	3,833	3,822
Burnet	Lower Colorado	Colorado	7,024	7,005	7,024	7,005	7,024	7,005
Lampasas	Region G	Brazos	1,685	1,680	1,685	1,680	1,685	1,680
Lampasas	Region G	Colorado	916	913	916	913	916	913
Mills	Lower Colorado	Brazos	93	93	93	93	93	93
Mills	Lower Colorado	Colorado	407	406	407	406	407	406
Groundwater Management Area 8			**14,089**	**14,050**	**14,089**	**14,050**	**14,089**	**14,050**

TABLE 24. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE HICKORY AQUIFER IN GROUNDWATER MANAGEMENT AREA 8. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE SUMMARIZED BY COUNTY, REGIONAL WATER PLANNING AREA (RWPA), AND RIVER BASIN.

County	RWPA	River Basin	2020	2030	2040	2050	2060	2070
Brown	Region F	Colorado	12	12	12	12	12	12
Burnet	Lower Colorado	Brazos	1,240	1,236	1,240	1,236	1,240	1,236
Burnet	Lower Colorado	Colorado	2,183	2,177	2,183	2,177	2,183	2,177
Lampasas	Region G	Brazos	80	79	80	79	80	79
Lampasas	Region G	Colorado	34	34	34	34	34	34
Mills	Lower Colorado	Brazos	7	7	7	7	7	7
Mills	Lower Colorado	Colorado	29	29	29	29	29	29
Groundwater Management Area 8			**3,585**	**3,574**	**3,585**	**3,574**	**3,585**	**3,574**

LIMITATIONS:

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

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

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

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

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

REFERENCES:

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Shi, J., Boghici, R., Kohlrenken, W., and Hutchison, W.R., 2016, Numerical Model Report: Minor Aquifers of the Llano Uplift Region of Texas (Marble Falls, Ellenburger-San Saba, and Hickory). Texas Water Development Board, November 2016, 435p.

http://www.twdb.texas.gov/groundwater/models/gam/llano/Llano_Uplift_Numerical_Model_Report_Final.pdf?d=1503601525245.

Texas Water Code, 2011, http://www.statutes.legis.state.tx.us/docs/WA/pdf/WA.36.pdf.

Appendix C

Temporary Rules

http://uppertrinitygcd.com/wp-content/uploads/2017/12/UTGCD-Rules-As-Amended-Dec-18-2017.pdf

Appendix D

Resolution Adopting the Management Plan

RESOLUTION#18-008 ADOPTING A 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 October 15, 2018 in Springtown Texas to receive public and written comments on the Management Plan and received written comments at the District's office located at 1859 W. 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 hearing, the Board of Directors met in a regular board meeting on October 15, 2018, 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 Upper Trinity Groundwater Conservation 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 Nave, and seconded by Director Massey, and upon discussion, the Board of Directors voted 5 in favor, 0 opposed, 0 abstained, and 3 absent; the motion thereby PASSED on this 15 day of October, 2018.

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT

By: _____
President

_____
~~Secretary~~ Vice President

Appendix E

Evidence that the Management Plan was Adopted after Notice and Hearing

NOTICE OF REGULAR MEETING AND PUBLIC HEARING
OF THE
UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT

District Office
1859 W. Highway 199
Springtown, TX 76082

Monday, October 15, 2018
Public Hearing and Board Meeting begin at 5:00 PM
Regular Meeting begins at conclusion of Public Hearing

INTRODUCTORY MATTERS

The Board may discuss, consider, and take appropriate action, including expenditure of funds as necessary or appropriate, on any item listed on this agenda:

1. Welcome guests and members of the public.

2. Roll call, establish a quorum, call Public Hearing and Board Meeting to order; declare the hearing and board meeting open to the public.

3. Pledges of allegiance to the flags.

PUBLIC HEARING

1. Discussion and public comment on the District's 2018 Management Plan Update, including the adoption of Resolution 18-008 Adopting a Management Plan; take action as necessary.

2. Adjourn or continue Public Hearing for the District's 2018 Management Plan - At the conclusion of the hearing 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 TWDB, District staff, attorneys, consultants, or members of the Board of Directors without any additional notice.

REGULAR BOARD MEETING

1. **Consent Agenda**: Each of these items is recommended by the Staff and approval thereof will be strictly on the basis of the Staff recommendations. Approval of the Consent Agenda authorizes the General Manager or his designee to implement each item in accordance with the Staff recommendations. The consent agenda will be approved as a block. Any Board member that has questions regarding any item on the consent agenda may have the item pulled and considered as a regular item on the agenda. Any items so pulled for separate discussion will be considered as the first items following approval of the consent agenda.

   A. Approval of minutes from Public Hearing and Regular Board Meeting on September 17, 2018.

   B. Approval of bank statement ending September 28, 2018, and current financial reports of the District.

   C. Payment of bills/invoices received through October 15, 2018.

   D. Reimbursements for expenses incurred on behalf of the District through October 15, 2018.

2. Any items from consent agenda that were pulled for further discussion.

3. Discussion regarding a new well application submitted by Devon Energy at 2791 County Road 4227 Rhome, TX in Wise County; take action as necessary.

4. Discussion regarding a request from Robert and Yvonne Jamnik for a second extension to drill an approved exempt new well in Wise County (Well ID 10887); take action as necessary.

5. Discussion regarding a request for a refund for all Registration Application Fees related to Well ID 11434, submitted by Scotty Ross; take action as necessary.

6. Board consideration and possible approval of quarterly Investment Report with recommendations.

7. Update and recommendation from the Personnel Committee regarding the development of the 2019 DRAFT Budget; take action as necessary.

8. Discussion regarding the development of fiscal year 2019 Draft Budget; take action as necessary.

9. Discussion regarding adoption of proposed 2019 water use fees, in accordance with statute and District Rules, for non-exempt water wells including the adoption of Resolution 18-007 Setting Water Use Fees for 2019; take action as necessary.

10. **Management Report on Administrative and Operational Issues**: The General Manager and staff will brief the Board on the following and any other items included in the General Manager's written report, which may be discussed, considered, and acted upon by the Board, including authorizing the initiation of, managing, or resolving enforcement action or litigation where applicable.
    A. General Manager's report
    B. Report on delinquent customers of the District and take any necessary action for collection of delinquent fees.
    C. Report on Education and Outreach activities.
    D. Report on injection well applications filed with the Railroad Commission
    E. Well Registration and Groundwater Production reports

11. Review line item expenditures and adopt budget amendment(s) as necessary.

12. Discussion regarding the development of District Rules; take action as necessary.

13. General Counsel's Report: The District's legal counsel will brief the Board on pertinent legal issues and developments impacting the District since the last regular Board meeting, and legal counsel's activities on behalf of the District, including without limitation: waste injection; well monitoring activities; District rules enforcement activities; District Rules and District Management Plan development or implementation issues; groundwater-related legislative activities; joint planning and desired future conditions development activities; developments in groundwater case law and submission of legal briefs; contractual issues related to the District; open government, policy, personnel, and financial issues of the District; and other legal activities on behalf of the District, take action as necessary.

14. Determine time and place for next meeting.

15. New business to be placed on the next meeting agenda.

16. Public comment.

17. Adjourn board meeting.

The above agenda schedule represents an estimate of the order for the indicated items and is subject to change at any time. These public meetings and hearings are available to all persons regardless of disability. If you require special assistance to attend the meetings or hearings, please call or (817) 523- 5200 at least 24 hours in advance of the meeting to coordinate any special physical access arrangements.

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

--Please visit the website – www.uppertrinitygcd.com

This is to certify that I, Doug Shaw, posted this agenda on the bulletin board of the Administrative Offices of the District at 1859 W. Highway 199, Springtown TX 76082, and also provided this agenda to the County Clerk in Parker County with a request that it be posted at or before 4:00 p.m. on the 12 of October.

Doug Shaw, General Manager

Sworn and subscribed to before me this 12 of October.

JENNIFER A. MYATT
NOTARY PUBLIC
State of Texas
Comm. Exp. 03-05-2019

Jennifer Myatt, Notary Public

Appendix F

Evidence that the District Coordinated Development of the Management Plan with Surface Water Entities

Doug Shaw

From: Doug Shaw
Sent: Thursday, October 25, 2018 10:55 AM
To: renglish@amud.com; davidc@brazos.org; citymanager@cityofbowietx.com; lhenley@cityofnocona.com; shayes@weatherfordtx.gov; derrad@parkercountywater.com; randy.whiteman@rra.texas.gov; joliver@trwd.com; wardk@trinityra.org; steve@walnutcreeksud.org
Subject: 2018 Upper Trinity GCD Management Plan Update
Attachments: 2018 UTGCD Management Plan update.pdf

All,

At a Public Hearing held in conjunction with their Regular October Board meeting, the Upper Trinity Groundwater Conservation District (District) Board of Directors adopted an update to the District's Management Plan. The purpose of the update was to amend the Plan in order to include the Desired Future Conditions adopted by Groundwater Management Area 8 in January of 2017.

As required by the Texas Water Development Board, I have included a copy of the updated Management Plan to this email for your review. Please do not hesitate to contact me with any questions.

Thanks,
ds

Doug Shaw

General Manager
Upper Trinity Groundwater Conservation District
PO Box 1749, Springtown, 76082
Phone: 817-523-5200
Fax: 817-523-7687
www.uppertrinitygcd.com

Acton Municipal Utility District	renglish@amud.com
Brazos River Authority	davidc@brazos.org
City of Bowie	citymanager@cityofbowietx.com
City of Nocona	lhenley@cityofnocona.com
City of Weatherford	shayes@weatherfordtx.gov
Parker County Special Utility District	derrad@parkercountywater.com
Red River Authority	randy.whiteman@rra.texas.gov
Tarrant Regional Water District	joliver@trwd.com
Trinity River Authority	wardk@trinityra.org
Walnut Creek Special Utility District	steve@walnutcreeksud.org