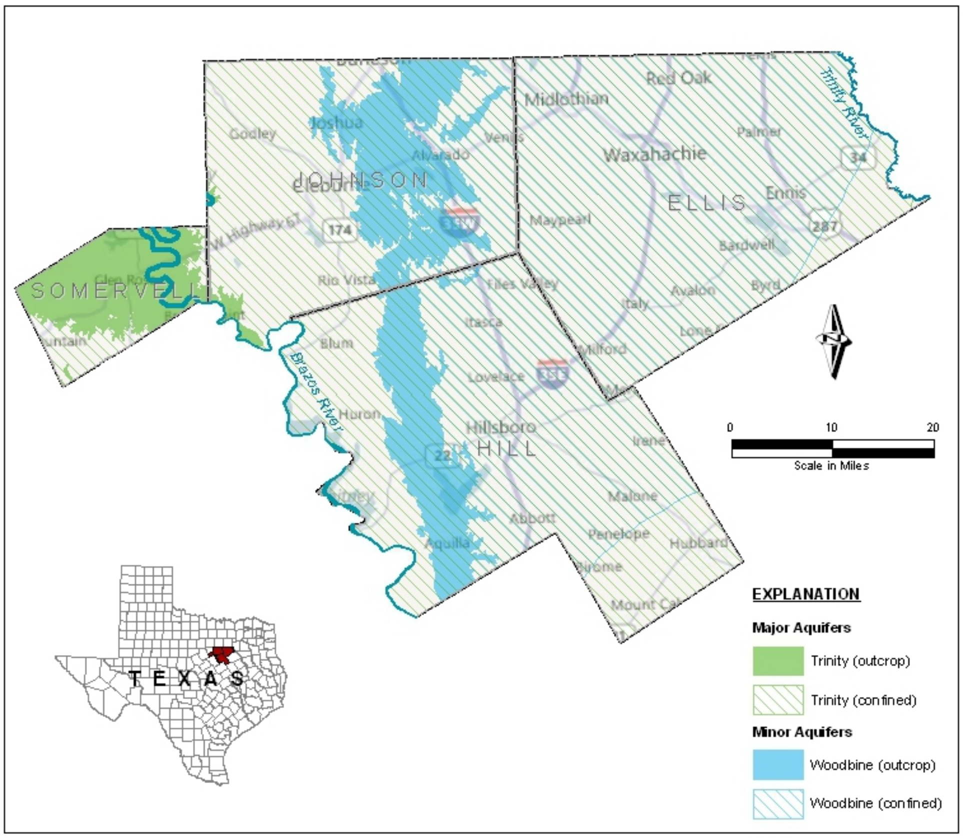
PRAIRIELANDS
GROUNDWATER CONSERVATION DISTRICT
MANAGEMENT PLAN



As Adopted on September 19, 2016

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I. DISTRICT MISSION

The Mission of the Prairielands 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, ensure that the residents of Ellis, Hill, Johnson, and Somervell Counties maintain local control over their groundwater, respect and protect the property rights of landowners in groundwater, and operate the District in a fair and equitable manner for all residents of the District.

II. HISTORY AND PURPOSE OF THE MANAGEMENT PLAN

The purpose of the management plan is to identify the goals of the District and to document the management objectives and performance standards that will be used to accomplish those goals.

The 75th Texas Legislature in 1997 enacted Senate Bill 1 (SB 1) to establish a comprehensive statewide water planning process. In particular, SB 1 contained provisions that require each groundwater conservation district (GCD) to prepare a management plan to identify the water supply resources and water demands that will shape the decisions of the GCD. SB 1 designed the management plans to include management goals for each GCD to manage and conserve the groundwater resources within their boundaries. In 2001, the Texas Legislature enacted Senate Bill 2 (SB 2) to build on the planning requirements of SB 1 and to further clarify the actions necessary for GCDs to manage and conserve the groundwater resources of the state of Texas.

The Texas Legislature enacted significant changes to the management of groundwater resources in Texas with the passage of House Bill 1763 (HB 1763) in 2005. HB 1763 created a long-term planning process in which GCDs in each Groundwater Management Area (GMA) were required to meet and determine the Desired Future Conditions (DFCs) for the groundwater resources within their boundaries by September 1, . In 2011, Senate Bills 660 and 737 further modified these groundwater laws and GCD management requirements in Texas.

Texas groundwater law is clear in establishing the sequence that a GCD is to follow in accomplishing statutory responsibilities related to the conservation and management of groundwater resources. The three primary steps, each of which must occur at least once every five years, are the following: (1) to adopt desired future conditions (Texas Water Code Section 36.108(c)), (2) to develop and adopt a management plan that includes goals designed to achieve the desired future conditions (Texas Water Code Section 36.1071(a)(8)), (3) to amend and adopt rules necessary to achieve goals included in the management plan (Texas Water Code Section 36.101(a)(5)).

The District's management plan satisfies the statutory requirements of the Texas Water Code Section 36.1071 and the administrative requirements of the Texas Water Development Board's rules set forth in Texas Administrative Code, Title 31, Chapter 356.

III. DISTRICT INFORMATION

Creation

The District was created by the 81st 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 (Water Code), by the Act of May 31, 2009, 81st Leg., R.S., Ch. 1208, 2009 Tex. Gen. Laws 3859, codified at TEX. SPEC. DIST. LOC. LAWS CODE ANN. Ch. 8855 (the District Act). The District is a governmental agency and a body politic and corporate. 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.

Directors

The District's Board of Directors (Board) consists of eight members who are appointed by the county commissioners courts for four-year terms. There are two members on the Board for each of the four counties in the District. One director is appointed per county every two years; therefore, each county has one director with a term that expires every two years.

Authority

The District has the rights and responsibilities provided for in Chapter 36 of the Texas Water Code and Chapter 356, Title 31 of the Texas Administrative Code. The District is charged with conducting hydrogeological studies, adopting a management plan, providing for the permitting of certain water wells and implementing programs to achieve statutory mandates. The District has rulemaking authority to implement the policies and procedures needed to manage the groundwater resources of Ellis, Hill, Johnson, and Somervell counties.

Location and Extent

The District's boundaries are coextensive with the boundaries of Ellis, Hill, Johnson, and Somervell Counties, Texas. The District covers an area of approximately 2,864 square miles. A map is included as Figure 1.

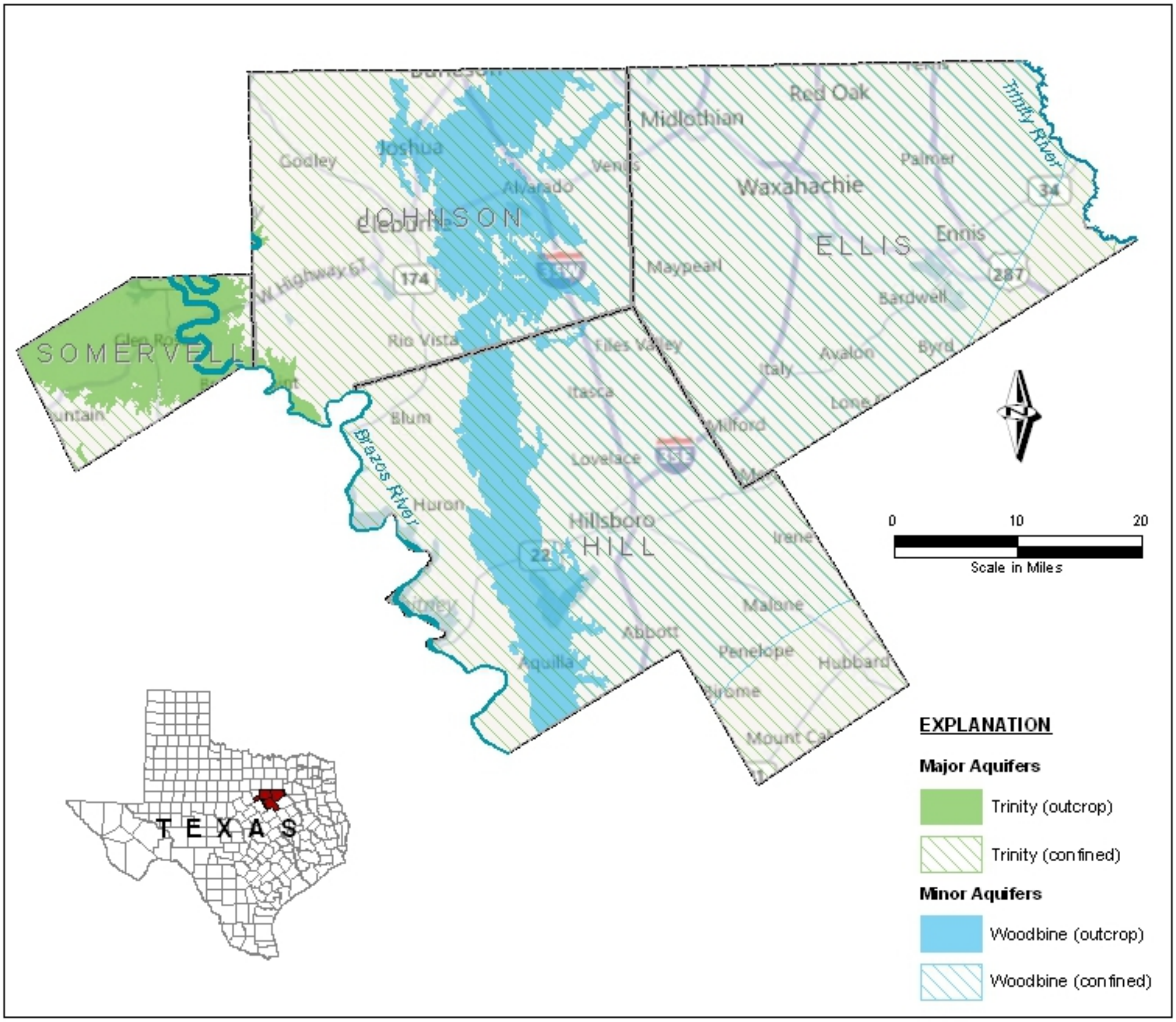

Figure 1. Prairielands Groundwater Conservation District Location Map

Topography and Drainage

The District is located within the Brazos and Trinity River Basins. Runoff on the west side of the District flows primarily west to the Brazos River, and runoff on the east side of the District drains primarily to the east to the Trinity River. Elevations in the District range from approximately 400 to 1,000 ft. above mean sea level (amsl) and the physiography consists primarily of gently rolling prairieland, woodlands, and wooded bottomlands in the river valleys.

Groundwater Resources of Ellis, Hill, Johnson, and Somervell Counties

A map showing the extent of the aquifers in the District is included as Figure 1. Cross sections through both the Woodbine and Trinity aquifers are included as Figures 2 and 3.

The Trinity aquifer consists of early Cretaceous age formations of the Trinity Group where they occur in a band extending through the central part of the state in all or parts of 55 counties, from the Red River in North Texas to the Hill Country of South-Central Texas. Trinity Group deposits also occur in the Panhandle and Edwards Plateau regions where they are included as part of the Edwards-Trinity (High Plains and Plateau) aquifers.

Formations comprising the Trinity Group are (from youngest to oldest) the Paluxy, Glen Rose, and Twin Mountains-Travis Peak. Updip, where the Glen Rose thins or is missing, the Paluxy and Twin Mountains coalesce to form the Antlers Formation. The Antlers consists of up to 900 feet of sand and gravel, with clay beds in the middle section. Water from the Antlers is mainly used for irrigation in the outcrop area of North and Central Texas. Forming the upper unit of the Trinity Group, the Paluxy Formation consists of up to 400 feet of predominantly fine-to-coarse-grained sand interbedded with clay and shale. The formation pinches out downdip and does not occur south of the Colorado River.

Underlying the Paluxy, the Glen Rose Formation forms a gulf-ward-thickening wedge of marine carbonates consisting primarily of limestone. South of the Colorado River, the Glen Rose is the upper unit of the Trinity Group and is divisible into an upper and lower member. In the north, the downdip portion of the aquifer becomes highly mineralized and is a source of contamination to wells that are drilled into the underlying Twin Mountains.

The basal unit of the Trinity Group consists of the Twin Mountains and Travis Peak formations, which are laterally separated by a facies change. To the north, the Twin Mountains formation consists mainly of medium- to coarse-grained sands, silty clays, and conglomerates. The Twin Mountains is the most prolific of the Trinity aquifers in North-Central Texas; however, the quality of the water is generally not as good as that from the Paluxy or Antlers Formations. To the south, the Travis Peak Formation contains calcareous sands and silts, conglomerates, and limestones. The formation is subdivided into the following members in descending order: Hensell, Pearsall, Cow Creek, Hammett, Sligo, Hosston, and Sycamore.

Extensive development of the Trinity aquifer has occurred in the Dallas-Fort Worth region where water levels have historically dropped as much as 550 feet. Since the mid-1970s, many public supply entities have inactivated wells and shifted to surface water supplies, and water levels in some areas have responded with slight rises. Water-level declines are still occurring in areas. The Trinity aquifer is most extensively developed from the Hensell and Hosston members in the Waco area, where the water level has declined by as much as 400 feet.

The Woodbine aquifer extends from McLennan County in North-Central Texas northward to Cooke County and eastward to Red River County, paralleling the Red River. Groundwater produced from the aquifer furnishes municipal, industrial, domestic, livestock, and small irrigation supplies throughout its North Texas extent. The Woodbine Formation is composed of water-bearing sandstone beds interbedded with shale and clay. The aquifer dips eastward into the subsurface where it reaches a maximum depth of 2,500 feet below land surface and a maximum thickness of approximately 700 feet.

The Woodbine aquifer is divided into three water-bearing zones that differ considerably in productivity and quality. Only the lower two zones of the aquifer are developed to supply water for domestic and municipal uses. Chemical quality deteriorates rapidly in well depths below 1,500 feet. In areas between the outcrop and this depth, quality is considered good overall as long as ground water from the upper Woodbine is sealed off. The upper Woodbine contains water of extremely poor quality in downdip locales and contains excessive iron concentrations along the outcrop.

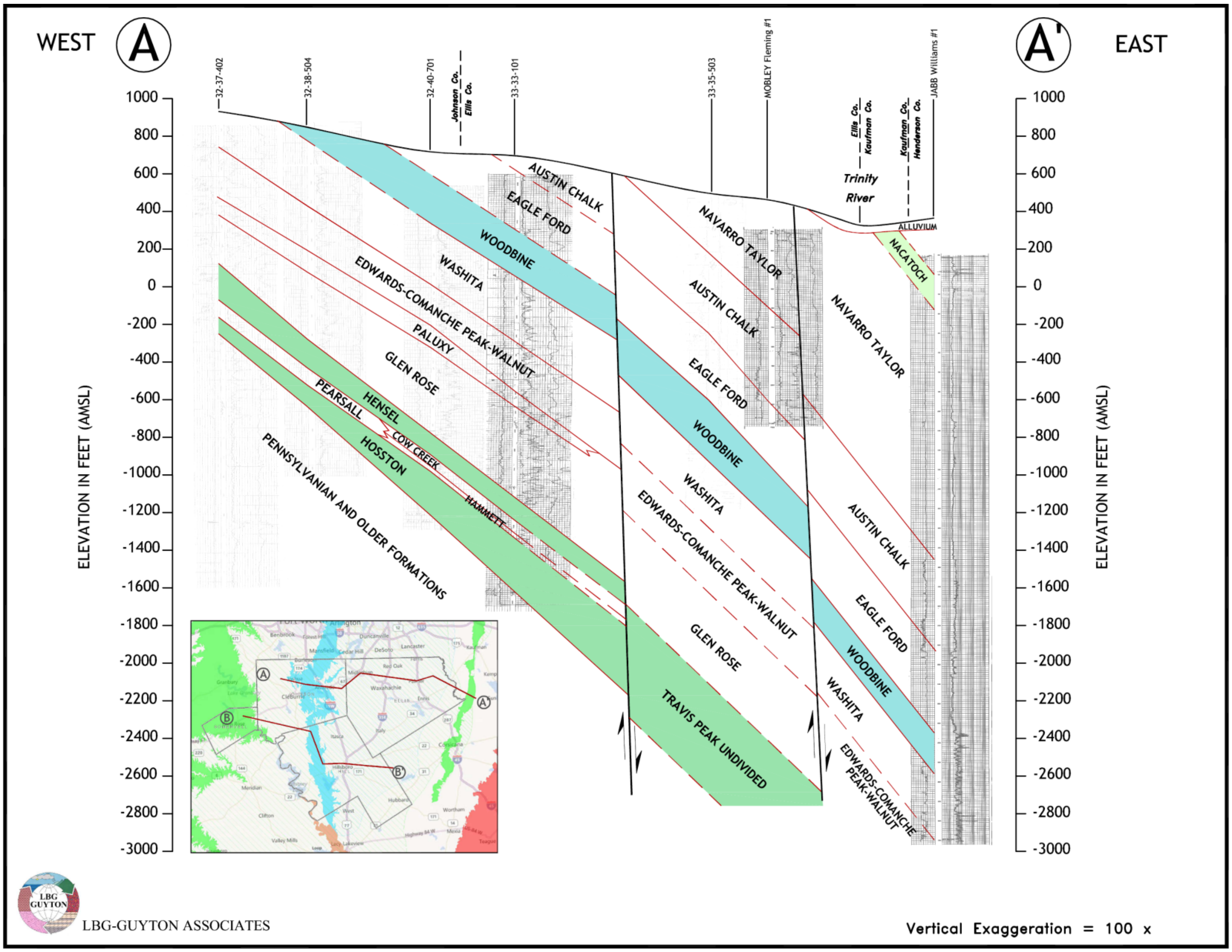

Figure 2. Cross section A-A' through the Trinity and Woodbine aquifers.

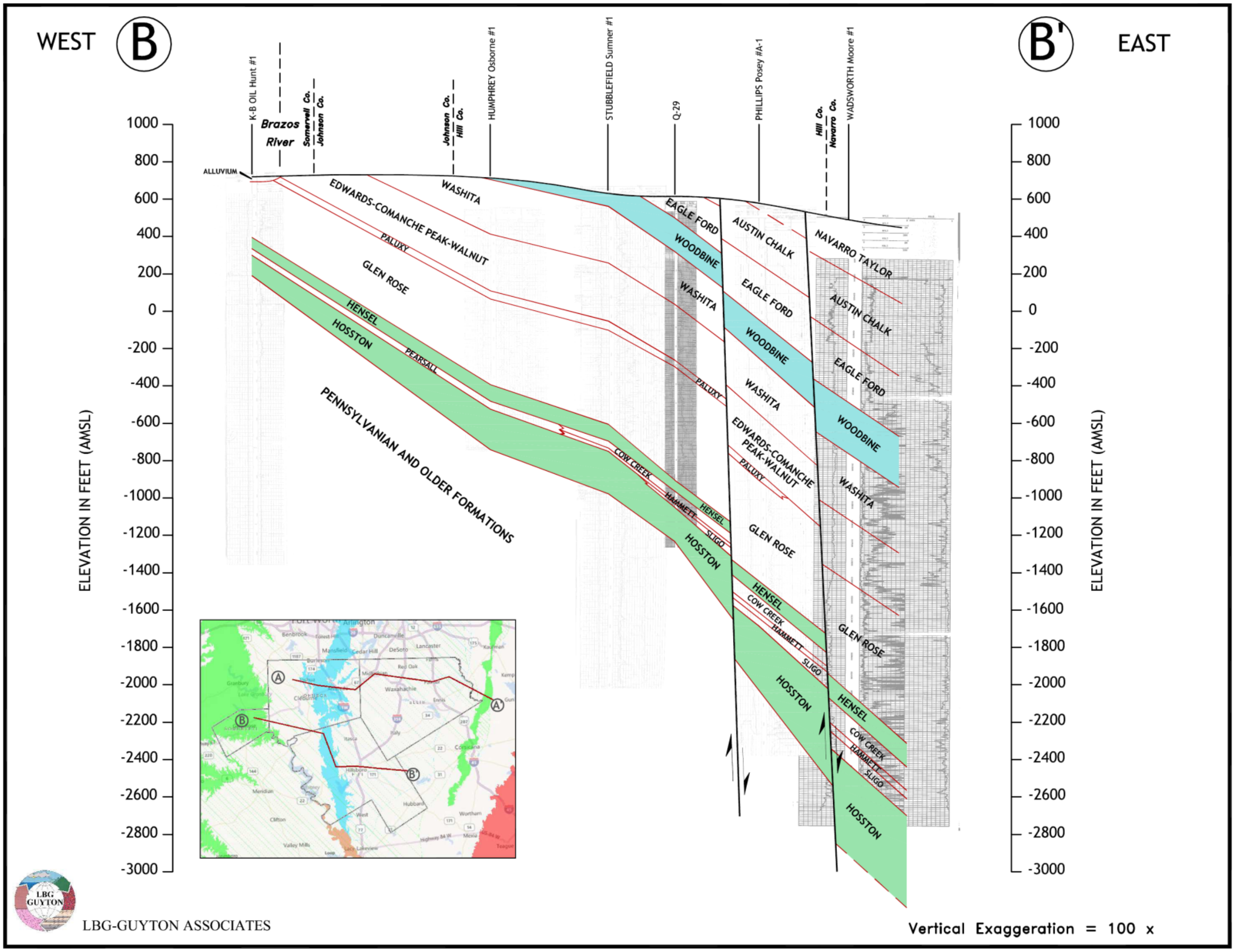

Figure 3. Cross section B-B' through the Trinity and Woodbine aquifers.

IV. STATEMENT OF GUIDING PRINCIPLES

The District is committed to manage and protect the groundwater resources within its jurisdiction and to work with others to ensure a sustainable, adequate, high quality, and cost-effective supply of water, now and in the future. The District will strive to develop, promote, and implement water conservation, augmentation, and management strategies to protect water resources for the benefit of the citizens, economy, and environment of the District. The preservation of this valuable resource can be managed in a prudent and cost effective manner through conservation, education, and appropriate rules. Any action taken by the District shall only be after full consideration and respect has been afforded to the individual property rights of all citizens of the District.

V. CRITERIA FOR PLAN CERTIFICATION

A. Planning Horizon

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

B. Board Resolution

A certified copy of the Prairielands Groundwater Conservation District resolution adopting the plan is located in Appendix A – District Resolution.

C. Plan Adoption

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

D. Coordination with Surface Management Entities

A template letter transmitting copies of this plan to the surface water management entities in the District along with a list of the surface water management entities to which the plan was sent are located in Appendix C – Letters to Surface Water Management Entities.

VI. ESTIMATES OF TECHNICAL INFORMATION

A. Modeled Available Groundwater based on the Desired Future Conditions

The amount of water that may be permitted from an aquifer is not the same amount as the total amount that can be pumped from an aquifer. Total pumping includes uses of water both subject to permitting and exempt from permitting (exempt use). Examples of exempt use include: domestic, livestock, and some types of water use associated with oil and gas exploration.

The DFCs of the aquifer are determined through joint planning with other GCDs in the same GMA as required by the 79th legislature with the passage of HB 1763. The Prairielands Groundwater Conservation District is located in GMA 8. In 2008, the GCDs of GMA 8 completed the first round of joint planning to establish the DFCs of the aquifers in the GMA. In 2011, the DFCs as adopted in 2008 were readopted without change.

To determine the DFCs, a series of simulations using the TWDB's Groundwater Availability Model (GAM) for the Northern Trinity and Woodbine aquifers were completed. Each GAM simulation was done by iteratively applying various amounts of simulated groundwater pumping from the aquifer over a predictive period that included a simulated repeat of the drought of record. Pumping was increased until the amount of pumping that could be sustained by the aquifer without impairing the aquifer conditions selected for consideration as the indicator of the aquifer desired future condition was identified.

There are three subdivisions in the Trinity aquifer – the Upper, Middle and Lower. In the Prairielands District, the geologic units comprising the Trinity are: the Paluxy Sand, the Glen Rose Limestone, the Hensell Sand and the Hosston Conglomerate of the Travis Peak Formation. The DFCs of the Northern Trinity aquifer in GMA 8 are documented in Table 1 of GAM Run 10-063-MAG, which is included as Appendix D. The DFCs are based on average drawdown in feet after 50 years from the year 2000 for each of the following Trinity aquifer units: Paluxy (Upper Trinity), Glen Rose (Upper Trinity), Hensell (Middle Trinity) and the Hosston (Lower Trinity). The DFCs for the Woodbine aquifer are documented in Table 1 of GAM Run 10-064-MAG, which is included as Appendix E.

Additionally, there are two other MAG reports included in Appendix F. The Nacatoch aquifer MAG volumes are included in GR 11-011 MAG and the Brazos River alluvium aquifer MAG volumes are addressed by AA 10-18 MAG.

The current DFCs as adopted in 2011 are listed in Table 1. These values are the maximum drawdown (in feet) allowed over the 50-year planning period.

Table 1. Summary of Desired Future Conditions in Prairielands GCD

	Woodbine	Paluxy	Glen Rose	Hensell	Hosston
Ellis	102	265	283	336	362
Hill	87	209	253	381	406
Johnson	4	37	83	208	234
Somervell	Not present	1	4	53	113

Note: All values are in feet of drawdown after 50 years.

(Please note that once new DFCs are adopted by GMA 8, and subsequently the District, and new MAGs are issued by the TWDB, the District may submit a one-page amendment to this plan listing them.)

Amount of Groundwater Being Used Within the District

Each year the TWDB conducts an annual survey of ground and surface water use by municipal and industrial entities within the state of Texas. The information obtained is then utilized by the TWDB for water resources planning. The historical water use estimates are subject to revision as additional data and corrections are made available to the TWDB.

The amount of groundwater used in Ellis, Hill, Johnson and Somervell Counties in the years 2000 through 2014 is presented in Appendix G. Data for calendar year 2015 will be provided by TWDB at a later date. TWDB data included in Appendix G do not differentiate between exempt and non-exempt use.

Annual Amount of Recharge from Precipitation

Recharge from precipitation falling on the outcrop of the aquifer (where the aquifer is exposed to the surface) within the Prairielands GCD was estimated by the TWDB in the GAM Run 16-007 dated May 16, 2016. Water budget values of recharge extracted for the transient model period indicate that precipitation accounts for 15,668 acre-feet per year of recharge to the Trinity aquifer and 22,392 acre-feet per year of recharge to the Woodbine aquifer within the boundaries of the Prairielands GCD (Appendix H). The model assumes average rainfall as measured during the calibration and verification time period (years 1980 through 2012).

Annual Volume of Discharge from the Aquifer to Springs and Surface Water Bodies

The total water discharged from the aquifer to surface water features such as streams, reservoirs, and springs is defined as the surface water outflow. Water budget values of surface water outflow within the Prairielands GCD were estimated by the TWDB in the GAM Run 16-007 (Appendix H). Values from the transient model period (years 1980 through 2012) are 27,122 acre-feet per year of discharge from the Trinity aquifer and 16,865 acre-feet per year of discharge from the Woodbine aquifer to surface water bodies that are located within the Prairielands GCD.

Annual Volume of Flow into and out of the District within Each Aquifer and between Aquifers in the District

Flow into and out of the District is defined as the lateral flow within an aquifer between the District and adjacent counties. Flow between aquifers is defined as the vertical flow between aquifers or confining units that occurs within the boundaries of the District. The flow is controlled by hydrologic properties as well as relative water levels in the aquifers and confining units. Water budget values of flow for the Prairielands GCD were estimated by the TWDB in the GAM Run 16-007 (Appendix H). Values extracted from the transient model period represent the model's calibration and verification time period (years 1980 through 2012).

Projected Surface Water Supply in the District

The 2017 Texas State Water Plan, the most recent plan available, provides an estimate of projected surface water supplies in Ellis, Hill, Johnson, and Somervell counties. These estimates are included in Appendix G.

Projected Total Demand for Water in the District

Appendix G contains an estimate of projected net water demand in Ellis, Hill, Johnson, and Somervell counties based on the 2017 Texas State Water Plan.

VII. WATER SUPPLY NEEDS AND WATER MANAGEMENT STRATEGIES INCLUDED IN THE ADOPTED STATE WATER PLAN

Projected Water Supply Needs

Projected water needs for the counties in the District were developed for the 2017 State Water Plan. Those needs reflect conditions when projected water demands exceed projected water supplies in the event of a drought of record. Projected water needs were estimated on the county-basin level for all water user group categories for every decade from 2020 through 2070. Appendix G lists the total water supply needs for Ellis, Hill, Johnson and Somervell counties as adopted in the TWDB 2017 State Water Plan.

Water Management Strategies

The 2017 State Water Plan assessed and recommended water management strategies to meet the identified needs for every decade from 2020 through 2070. Potential strategies include water conservation, developing additional groundwater and surface water supplies, expanding and improving management of existing water supplies, water reuse, and alternative approaches such as desalination. The projected water management strategies for the counties in the District from the 2017 State Water Plan are shown in Appendix G by water user group (WUG).

VIII. DISTRICT MANAGEMENT OF GROUNDWATER

The Texas Legislature has declared in Chapter 36 of the Texas Water Code that GCDs are the state's preferred method of groundwater management in order to protect property rights, balance the conservation and development of groundwater to meet the needs of this state, and use the best available science in the conservation and development of groundwater. TEX. WATER CODE ANN. § 36.0015(b) (2015). Pursuant to Chapter 36 of the Texas Water Code, GCDs manage groundwater resources through management plans and rules that they develop and implement. Chapter 36 gives directives to GCDs and the statutory authority to carry out such directives, so that GCDs are provided the proper tools to protect and manage the groundwater resources within their boundaries.

However, groundwater management cannot go from zero to full implementation overnight. The citizens, businesses, and water suppliers of the District have been pumping groundwater unrestricted under the rule of capture for over a century. While the District is fully cognizant of the severe impacts that this unbridled pumping has caused to the aquifers in the District, which have among the greatest declines in water levels of any area of the state of Texas, the District Board does not wish to rush in and try to solve the problem in haste. The impacts of a groundwater management system are too important and can have too many far-reaching impacts to the citizens and local and regional economies to be approached in any way other than a careful, well-analyzed approach that is based upon sound science and a thorough understanding of the nature of the groundwater resources in the District.

In that regard, the District's initial efforts in its early years have been focused on getting organized, assembling a management structure and administrative staff, retaining well-qualified technical and legal consultants to provide it with sound advice, and beginning to gather data on groundwater use and the nature, location, extent, and hydraulic properties of the various layers of the aquifers that are located within its boundaries. The District has adopted temporary rules that will allow it to gather information on groundwater production throughout the District through a well registration program and metering and production reporting requirements for non-exempt wells. The District has also constructed a geodatabase to serve as a repository for that information. The District has also commissioned studies to map, characterize, and model the groundwater resources within its boundaries. This approach is largely reflected in the "Goals, Management Objectives, and Performance Standards" section of this management plan, as well as in the meeting minutes and other records of the District.

Simply stated, the legal framework in which the District must manage the groundwater resources within its boundaries is as follows: establishing desired future conditions (DFCs) for the aquifers through the joint planning process with other groundwater conservation districts located in Groundwater Management Area 8 and then adopting and enforcing rules to manage groundwater resources in a manner that will achieve those DFCs. Failure to do so, as expressly stated in Chapter 36, Texas Water Code, can lead to management of the resource through orders and actions by the Texas Commission on Environmental Quality (TCEQ). The District Board has no desire to take any course of action that will open the door to groundwater regulatory action by the TCEQ. Yet, once again, managing the groundwater resources in a responsible manner that will achieve DFCs necessarily implies that it will take several years to get to a point where sound permanent rules can be developed.

The District was created in 2009. Prairielands GCD had no hand whatsoever in the initial adoption of the inaugural round of DFCs for the aquifers in its boundaries, which were developed and adopted by the other existing GCDs in GMA 8 in 2008. There were a number of newly created GCDs in GMA 8 in a similar situation, having been created late in the inaugural round of DFC development with either little or no opportunity for any input in the DFCs they would be expected to implement. Those inaugural desired future conditions were re-adopted verbatim by the GCDs in GMA 8 in early 2011 for the sole purpose of extending the time by which they must be formally re-adopted under state law, thus allowing the District and other interested districts in GMA 8 a new five-year period in which to gather the appropriate data and science to develop and adopt DFCs that are applicable to them and that they are expected to achieve through rules implementation.

The GCDs in GMA 8 are currently in the final stages of the joint planning process to consider, propose, and adopt new DFCs for the aquifers in GMA 8 as required by Section 36.108 of the Texas Water

Code. As part of this effort, some of the GCDs in GMA 8, including Prairielands GCD, invested in an extensive overhaul of the Northern Trinity/Woodbine Groundwater Availability Model for use by the GMA 8 GCDs, in coordination with the TWDB, during the current round of DFC development and adoption. Although the new DFCs have not yet been formally adopted by the GCDs in GMA 8, the updated model has been utilized for purposes of this management plan to provide important technical information, including annual amount of recharge from precipitation, annual volume of discharge from the aquifer to springs and surface water bodies, and annual volume of flow into and out of the District within each aquifer and between aquifers in the District, as set forth in Section VI of this plan.

Once the new DFCs are formally adopted by the GCDs in GMA 8 at the end of the current five-year planning period, the District will turn to the important and arduous task of developing permanent rules to achieve them. Because of the District's diverse population and land use portfolio and its location on the periphery of the Dallas-Fort Worth Metroplex, it is expected that development of its regulatory approach and permanent rules will be an extremely complex process involving numerous stakeholders. As set forth in the management goals, the District intends that this be accomplished by 2022, or as required by state law.

The District seeks to understand just how much pumping can be sustained by each layer of each aquifer on a long-term basis so that the production from each resource can be maximized, but in a manner that is also sustainable on a long-term basis—without going into a scenario of overproduction that ultimately results in the depletion of the resource. The District has already conducted the aquifer characterization and modeling studies to try to get a good handle on that information. The District is also determined to successfully tackle the difficult task of managing the groundwater resources in a manner that will be protective of private property rights in the region, including protecting the investments of both existing well owners and other property owners.

In addition to obvious threats to the long-term viability of the aquifers and property values in the District from long-term over-pumping, the District is also concerned about protecting the limited available groundwater resources from other threats, such as contamination, that may render the supplies unusable. In that regard, the District is particularly concerned with potential impacts of oil and gas development activities on groundwater resources, especially including both the localized and cumulative impacts from injection well waste disposal activities, and the future implications of those activities to both freshwater and brackish groundwater supplies in the District. The District Board is very supportive of the exploration and development of domestic energy supplies. At the same time, however, there are a large number of operators in both the resource development and waste injection markets with varying levels of sophistication, and state agencies are too understaffed to meaningfully and thoroughly evaluate and track all proposed and ongoing projects. The District Board wishes to do its part to monitor these projects within its boundaries to ensure that practices being used by the operators located within its boundaries will not threaten the long-time viability of freshwater and brackish groundwater resources as water supplies.

The District is committed to undertake the important and complex task it has been given to manage, conserve, and protect the groundwater resources of the region so that they are viable sources of supply both now and for future generations. In doing so, the District Board intends to rely upon the best information and science available to it and to act reasonably and prudently in everything it does.

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

In order to implement the management plan, the District continually works to develop, maintain, review, and update the District's rules and procedures for the various activities contained in the management plan. In order to monitor performance: (a) the General Manager routinely meets with staff to track progress on the various objectives and standards adopted in this management plan, and (b) on an annual basis, staff prepares and submits an annual report documenting progress made towards implementation of the management plan to the Board for its review and approval.

The District will work diligently to ensure that all landowners and groundwater users within the District's jurisdictional boundaries are treated as equitably as possible. The District, as needed, will work with federal, state, regional, and local water management entities in the implementation of this management plan and management of groundwater supplies. The District will continue to enforce its rules to conserve, preserve, protect, and prevent the waste of groundwater resources within its jurisdiction. Texas Water Code Chapter 36.1071(a) (1-8) requires that all management plans address the following management goals, as applicable:

- providing the most efficient use of groundwater;
- controlling and preventing waste of groundwater;
- controlling and preventing subsidence;
- addressing conjunctive surface water management issues;
- addressing natural resource issues;
- addressing drought conditions;
- addressing conservation, recharge enhancement, rainwater harvesting, precipitation enhancement, or brush control, where appropriate and cost-effective; and
- addressing the desired future conditions adopted by the District under Section 36.108 of the Texas Water Code.

The following management goals, management objectives, and performance standards have been developed and adopted to ensure the management and conservation of groundwater resources within the District's jurisdiction.

X. METHODOLOGY FOR TRACKING DISTRICT PROGRESS IN ACHIEVING MANAGEMENT GOALS

The District's General Manager and staff will prepare an annual report (Annual Report) and will submit the Annual Report to members of the Board of the District. The Annual Report covers the activities of the District including information on the District's performance in regards to achieving the District's management goals and objectives. The Annual Report will be delivered to the Board by July 1 following the completion of the District's fiscal year. A copy of the Annual Report will be kept on file and available for public inspection at the District's offices upon approval by the Board.

XI. GOALS, MANAGEMENT OBJECTIVES, AND PERFORMANCE STANDARDS

A. Providing the most efficient use of groundwater

The Board of Directors and staff work to assist water users in protecting, preserving, and conserving groundwater resources. The Board strives to use scientific data and logical methods to make decisions that allow for reasonable groundwater use. The Board determines what programs and activities the staff and contractors will undertake to best implement water conservation and management services to the District. District rules will be developed to protect the quantity and quality of the groundwater and to prevent the waste of groundwater.

Management Objective 1

The District will require that all wells be registered in accordance with its rules.

Performance Standard

Each year the staff will report well registration statistics. A summary of registration activity by county and by aquifer will be included in the District's Annual Report.

Management Objective 2

Each year the District will monitor annual production from all non-exempt wells within the District. The District will compile records and develop a database of non-exempt wells to help assess the aquifer units from which groundwater production occurs.

Performance Standard

The District will require installation of meters on all non-exempt wells and reporting of production to the District.

Management Objective 3

The District will compile records and develop a database of non-exempt wells to help assess in which aquifer units groundwater production occurs.

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.

Management Objective 4
The District will develop a methodology to quantify current and projected annual groundwater production from exempt wells.

Performance Standard
The District will provide the TWDB with its methodology and estimates of current and projected annual groundwater production from exempt wells. The District will also utilize the information in the future in developing and achieving desired future conditions and in developing and implementing its production allocation and permitting system and rules. Information related to implementation of this objective will be included in the Annual Report to the Board of Directors.

B. Controlling and preventing waste of groundwater

Management Objective 1
Each year the District will monitor annual production from all non-exempt wells within the District.

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.

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

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

Management Objective 3
District will identify well owners that are not in compliance with District well registration, reporting, and fee payment requirements, and bring them into compliance.

Performance Standard
District will compare existing state records and field staff observations with the well registration database to identify noncompliant well owners.

Management Objective 4
The District will investigate instances of potential waste of groundwater.

Performance Standard

Report to the Board as needed and include the number of investigations in the Annual Report.

C. Addressing conjunctive surface water management issues

Management Objective 1

The District will actively participate in the Region C and Region G regional water planning processes to stay abreast of water demand projections and supply strategies in the District and to coordinate the District's groundwater management strategies with the regional water planning groups and foster an understanding of regional management practices.

Performance Standard

The District will review the most recently approved State Water Plan to gain an understanding of water demand projections and supply strategies in the District. The District will monitor future proposed amendments to the Region C and Region G regional water plans as they pertain to the District and insure that supply strategies impacting groundwater resources in the District are identified in the appropriate regional water plan. The District's General Manager or designated representative will attend meetings of the Region C and Region G regional water planning groups when feasible. A summary of the District's interactions with the regional water planning groups will be included in the Annual Report provided to the Board of Directors.

Management Objective 2

The District will: 1) seek to better understand groundwater and surface water interactions, including groundwater base flow discharges to surface water courses and aquifer recharge from surface water flows; 2) identify existing and planned surface water and other alternative supplies to meet anticipated demand growth; 3) explore possible groundwater to surface water conversions in the District and facilitate the process, and 4) understand current and planned surface water supplies and how they affect groundwater demands.

Performance Standard

A summary of the progress and interaction with RWPGs will be included in each Annual Report.

D. Addressing natural resource issues that impact the use and availability of groundwater and which are impacted by the use of groundwater

Management Objective 1

The District will develop a program to monitor and assess injection well activities in the District.

Performance Standard

The District will monitor and review injection well applications filed with the Railroad Commission of Texas and the Texas Commission on Environmental Quality that propose injection wells to be located within the boundaries of the District to identify contamination threats to groundwater resources in the District. The General Manager will bring to the attention of the Board any applications that the General Manager determines in his discretion threaten the groundwater resources in the District and any outcomes of actions taken by the District. A summary of District's injection well monitoring activities and actions taken by the District will be included in each Annual Report.

Management Objective 2

The District will monitor compliance by oil and gas companies of the well registration, metering, production reporting, and fee payment requirements of the District's rules.

Performance Standard

As with other types of wells, instances of non-compliance by owners and operators of water wells for oil and gas activities will be reported to the Board of Directors as appropriate for enforcement action. A summary of such enforcement activities will be included in the Annual Report.

E. Addressing drought conditions

Management Objective 1

Monthly review of drought conditions within the District using the Texas Water Development Board's Monthly Drought Conditions available at:

http://www.twdb.texas.gov/surfacewater/conditions/report/index.asp

Performance Standard

An annual review of drought conditions within the District will be included in the Annual Report provided to the Board of Directors. Reports will be provided more frequently to the Board as deemed appropriate by the General Manager to timely respond to drought conditions as they occur.

Management Objective 2

The District will develop information to understand the relationships between drought conditions, increased pumping, and the impacts of both on water levels and shallow wells in the outcrops and subcrops of the aquifer subdivisions in the District. Determine areas where it may be suitable for the District to implement pumping restrictions during drought times in order to protect public safety and welfare, as well as areas in which the District may wish to allow over-pumping during drought periods to promote conjunctive management when surface water supplies become unavailable to water user groups due to drought conditions.

Performance Standard

Monitor and assess drought impacts on aquifer outcrops and subcrops, including effects of increased pumping. By 2022, the District will complete studies and rules and regulatory plan development for drought pumping restrictions or over-pumping allowables.

F. Where appropriate and cost effective address conservation, recharge enhancement, rainwater harvesting, precipitation enhancement, and brush control

Management Objective 1

The District will annually submit at least one article regarding water conservation, rainwater harvesting, or brush control for publication to at least one newspaper of general circulation in the District counties.

Performance Standard

Each year, a copy of each conservation article will be included in the District's Annual Report to be given to the District's Board of Directors.

Management Objective 2

Each year, the District will include at least one informative flier on water conservation, rain water harvesting, or brush control within at least one mail out to groundwater non-exempt water users distributed in the normal course of business for the District. The District will also consider additional fliers or initiating other public awareness campaigns and outreach efforts on water conservation during drought conditions.

Performance Standard

Each year, a copy of each mail-out flyer and a summary of all other public awareness water conservation campaigns and outreach efforts will be included in the District's Annual Report to be given to the District's Board of Directors.

Management Objective 3

The District will investigate the feasibility of recharge enhancement and aquifer storage and recovery projects in the District.

Performance Standard

By 2022, the District will complete studies and an initial assessment regarding the feasibility of recharge enhancement and aquifer storage and recovery projects in the District.

Management Objective 4

The District will periodically support or sponsor an education seminar addressing conservation, recharge enhancement, rainwater harvesting, precipitation enhancement, or brush control.

Performance Standard

The District shall support or sponsor such a seminar at least once every other year. A summary of such educational activities will be included in the District's Annual Report.

Management Objective 4

Each year, the District will seek to provide an educational outreach regarding water conservation to at least one elementary school in each county of the district.

Performance Standard

Each year, a list of schools that participate in the educational outreach will be included in the District's Annual Report to be given to the District's Board of Directors.

G. Addressing the desired future conditions adopted by the district under TWC §36.108; TWC §36.1071(a)(8)

Management Objective 1

The District will develop a Groundwater Monitoring Program within the District to monitor water well levels (and baseline water quality) in wells in each aquifer and subdivision thereof in the District. The District will review the geographic and vertical distribution of existing monitoring wells in the District with historical data from the TWDB, USGS, TCEQ, and other agencies and develop a plan to partner with those agencies as appropriate to ensure continued availability of the monitoring wells and data from them to the District. The District will also develop a plan to acquire or install new monitoring wells to fill in gaps in geographic or vertical distribution. The District will then develop an annual goal of how many monitoring wells it will add each year and a priority system for their installation based upon data deficiencies and needs for the geodatabase. The District will take periodic readings from the monitoring wells and input the data into the District's geodatabase. The District will utilize the information to help implement its regulatory and permitting program and monitor water level trends and actual achievement of DFCs.

Performance Standard

Upon development, a summary of the District Groundwater Monitoring Program will be included in the District's Annual Report to be given to the District's Board of Directors.

Management Objective 2

Upon approval of the District Monitoring Program – conduct water level measurements as specified in the Monitoring Program within the District.

Performance Standard

Annual evaluation of water-level trends and the adequacy of the monitoring network to monitor aquifer conditions within the District and to monitor achievement of applicable desired future conditions. The evaluation will be included in the District's Annual Report to be given to the District's Board of Directors.

Management Objective 3

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

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.

Management Objective 4

Develop permanent rules including a water well permitting and groundwater allocation system that will achieve the desired future conditions of the aquifers in the District. In doing so, the District will strive to protect private property rights, including investments by existing well owners.

Performance Standard

By 2022, the District will develop and adopt permanent rules that will achieve the desired future conditions of the aquifers in the District.

XII. MANAGEMENT GOALS DETERMINED NON-APPLICABLE TO THE DISTRICT

Controlling and preventing subsidence

This management goal is not relevant due to the compacted geologic units in the District.

Appendix A

District Resolution

RESOLUTION ADOPTING DISTRICT MANAGEMENT PLAN

THE STATE OF TEXAS §
§
PRAIRIELANDS GROUNDWATER CONSERVATION DISTRICT §

WHEREAS, Whereas, the Prairielands Groundwater Conservation District (the "District") was created as a groundwater conservation district by the 81st 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 31, 2009, 81st Leg., R.S., ch. 1208, 2009 Tex. Gen. Laws 3859, codified at TEX. SPEC. DIST. LOC. LAWS CODE ANN. ch. 8855 ("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 for re-adoption;

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 a public hearing on September 19, 2016, to receive public and written comments on the Management Plan at the District's office located at 205 S. Caddo Street, Cleburne, 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, the Board of Directors met in a public hearing on September 19, 2016, properly noticed in accordance with appropriate law, and considered adoption of the attached Management Plan and approval of this resolution after due consideration of all comments received.

NOW THEREFORE BE IT RESOLVED THAT:

1. The above recitals are true and correct.

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

3. The General Manager of the District is further authorized to take all steps necessary to implement this resolution and submit the Management Plan to the TWDB for its approval, including without limitation making any minor technical or clerical correctioons; and

4. The General Manager of the District is 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 Maurice Osborn, and seconded by Director Paul Tischler, and upon discussion, the Board of Directors voted 7 in favor and 0 opposed, 0 abstained, and 1 absent, and the motion thereby PASSED on this 19 day of September, 2016.

PRAIRIELANDS GROUNDWATER CONSERVATION DISTRICT

By: Charles Beseda
President

Secretary

Appendix B

Notice of Meetings

NOTICE OF WORK SESSION, PUBLIC HEARING, AND REGULAR BOARD MEETING

OF THE BOARD OF DIRECTORS
of the

PRAIRIELANDS GROUNDWATER CONSERVATION DISTRICT

at the
District Office located at
205 S. Caddo, Cleburne, Texas 76031

Monday, September 19, 2016

Board Work Session

The Board Work Session will begin at 8:30 a.m.

Work Sessions are primarily for the benefit of the Board, although they are open to the public. During work sessions of the Board, no public comment will be heard, unless specifically requested by a Director and recognized by the President. Public comment may be made at the time the item is set for discussion at a regular Board Meeting.

The following items will be discussed and considered by the Board of Directors:

1. **Call meeting to order and establish a quorum.**

2. **Discuss and consider any items set forth in the Regular Board Meeting agenda listed below.**

3. **Adjourn Work Session.**

Public Hearing on District Management Plan

The Public Hearing will begin at 9:00 a.m. or upon adjournment of the Work Session.

Notice is hereby given that the Board of Directors of the Prairielands Groundwater Conservation District ("District") will hold a public hearing, accept public comment, and may discuss, consider, and take all necessary action regarding development and adoption of the District Management Plan.

1. Call meeting to order and establish a quorum.

2. Summary presentation and review of proposed District Management Plan.

3. Public Comment (verbal comments limited to five (5) minutes each; written comments may also be submitted for the Board's consideration).

4. Consider adoption of the proposed District Management Plan in the form presented or as amended based upon comments received from the public, the Texas Water Development Board, District staff, attorneys, consultants, or members of the Board of Directors.

5. Adjourn or continue public hearing on the District Management Plan.

If the public hearing is continued, the proposed Management Plan may be adopted at any future special or regular meeting of the board of directors with or without further amendments based upon comments received.

Regular Board Meeting

The Regular Board Meeting will begin at 9:00 a.m. or upon adjournment of the Public Hearing on the District Management Plan.

The Board of Directors may discuss, consider, and take all necessary action, including possible expenditure of funds, regarding each of the agenda items below:

1. **Call to order, declare meeting open to the public, and take roll.**

2. **Public Comment (verbal comments limited to 3 minutes each).**

3. **Administrative and Financials:**

   A. Consent Agenda (Note: These items may be considered and approved by one motion of the Board. Directors may request to have any consent item removed from the consent agenda for consideration and possible action as a separate agenda item):

      1. Approve minutes of the August 15, 2016 work session and board meeting.
      2. Approve current budget report.
      3. Approve reimbursement of director expenses.
      4. Approve employee reimbursements.
      5. Approve monthly invoices and payment of bills.

   B. Approve any item removed from Consent Agenda.

4. **Committee Reports to the Board of Directors (the Board may discuss and take action on any item listed under a committee report):**

   A. **Rules and Bylaws Committee:**
      1. Brief the Board on the Committee's activities since the last regular Board meeting.
      2. Discuss and consider adoption of proposed amendments to the District Bylaws.

   B. **Budget and Finance Committee:**
      1. Brief the Board on the Committee's activities since the last regular Board meeting.
      2. Update on District's current banking activities and accounts.
      3. Discuss and consider using Gilliam, Wharram, and Company as the District's financial auditors for the 2016 audit.
      4. Discuss and consider approval of the 2017 budget at the recommendation of the committee.

   C. **Policy and Personnel Committee:**
      1. Brief the Board on the Committee's activities since the last regular Board meeting.
      2. Discuss and consider approving a lump sum payment to Texas County and District Retirement System.

   D. **Building and Facilities Committee:**
      1. Brief the Board on the Committee's activities since the last regular Board meeting.
      2. Discuss and consider renewal of office lease.

   E. **Conservation and Public Awareness Committee:**
      1. Brief the Board on the Committee's activities since the last regular Board meeting.

   F. **Groundwater Monitoring and Database Committee:**
      1. Brief the Board on the Committee's activities since the last regular Board meeting.

   G. **DFC Planning and Development Committee:**
      1. Brief the Board on the Committee's activities since the last regular Board meeting.
      2. Update on GMA-8 activities.

   H. **General Manager/District Staff Report:**
      1. Brief the Board on activities since the last regular Board meeting.
      2. Texas Groundwater Summit report.
      3. Discuss and consider participation in the winter meeting of Groundwater Management Districts Association (GMDA).

5. **Discussion of any other organizational matters of the District, including strategic near-term and long-term planning regarding District operations and management of groundwater resources, including desired future condition development for aquifers.**

6. **Update on any compliance and enforcement activities for violations of District Rules, including ordering any show cause hearings under District Rule 9.6**.

7. **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 Board meeting, and legal**

counsel's activities on behalf of the District, including without limitation waste injection well monitoring activities including any protests of injection well applications with the Railroad Commission of Texas or the Texas Commission on Environmental Quality; District rules enforcement activities; rules and management plan implementation issues; groundwater-related legislative activities; joint planning and DFC development activities; developments in groundwater case law and submission of legal briefs to courts; state agency rulemakings or other water-related policy initiatives or permitting activities at the Texas Commission on Environmental Quality, Texas Water Development Board, or the Railroad Commission of Texas and the District's submission of comments or other actions regarding same; 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.

8. **Open forum / discussion of new business for future meeting agendas.**

9. **Adjourn public meeting.**

The above agenda schedule represents an estimate of the order for the indicated items and is subject to change at any time. Public hearings and public meetings of the District are available to all persons regardless of disability. If you require special assistance to attend a hearing or meeting, please call (817)556-2299 at least 24 hours in advance of the hearing or meeting to coordinate any special physical access arrangements.

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

Prairielands Groundwater Conservation District

September 19, 2016

MINUTES OF THE PUBLIC HEARING
AND MEETING OF THE BOARD OF DIRECTORS

The Board of Directors (the "Board") of Prairielands Groundwater Conservation District (the "District") met in a public hearing and board meeting in the conference room at The Liberty Hotel, 205 S. Caddo Street, Cleburne, TX, 76031, at 8:39 a.m., Monday, September 19, 2016.

At 8:39 a.m. President Beseda called the work session to order and established a quorum. The following board members were present: Charles Beseda, Dennis Erinakes, Craig Dodson, Randel Kirk, Paul Tischler, Barney Pustejovsky, and Maurice Osborn. Director Marty McPherson had notified the staff that he would not be able to attend. Also present were Jim Conkwright, Rosetta Douthitt, Stephanie Rexrode, Shawn Davis, and Karen Siddall from the staff of Prairielands; Mr. Brian Sledge, the District's legal counsel from Sledge Law Group, Mr. Mike Keester, the District's hydrogeologist from LBG-Guyton, and a member of the public.

President Beseda called the work session to order at 8:40 a.m., established that a quorum was present, and promptly announced, "the Board will recess into a Closed Executive Session under Government Code Section 551.071 and 551.072, to discuss items on today's agenda. No action will be taken in closed session. We will reconvene in open session at the conclusion of the closed session." The Executive Session and work session concluded at 9:21 a.m.

At 9:29 a.m., President Beseda called the Public Hearing to order. Roll was called and the following board members were present: Charles Beseda, Dennis Erinakes, Craig Dodson, Randel Kirk, Paul Tischler, Barney Pustejovsky, and Maurice Osborn. Director Marty McPherson was absent. Also present were Jim Conkwright, Rosetta Douthitt, Stephanie Rexrode, Shawn Davis, and Karen Siddall from the staff of Prairielands; Mr. Brian Sledge, the District's legal counsel from Sledge Law Group, Mr. Mike Keester, the District's hydrogeologist from LBG-Guyton, and a member of the public.

Mr. Conkwright began the hearing, stating that it was a summary presentation and review of the proposed District Management Plan, and asked Mr. Sledge to provide a brief history and explain the District's decision to adopt it early.

Mr. Sledge said the District's original Management Plan had been adopted in 2012 after Desired Future Conditions (DFC's) were implemented by the Groundwater Management Area 8 (GMA-8) in 2011. The State's groundwater conservation districts are required to review their management plans every five years, so the next date to review and readopt was scheduled for May of 2017. However, the Texas Water Development Board (TWDB) anticipated an enormous workload in reviewing management plans from districts across the state as new DFC's are determined in the next few months. Thus, to avoid a "bottleneck", the TWDB provided the option to readopt early as a place holder and allow the District to add a one-page amendment when new Managed Available Groundwater (MAG) information is established. Mr. Sledge said that Groundwater districts are allowed two years to review and readopt their management plans once final DFC's are determined.

Mr. Sledge said a new request had been received just last week from the TWDB that the District must also include the Nacatoch Aquifer and the Brazos Alluvium in the re-adoption of the Management Plan, but those would likely be declared non-relevant by GMA-8 at a later date. Mr. Sledge pointed out that another significant change is to allow the Annual Report to be due on July 1st, instead of April 1st, allowing time for all customer payments from the prior year to be received and included in the report.

President Beseda asked if there were any public comments to be made regarding the District's proposed Management Plan, and no comments were made. At this time, Director Osborn moved to approve the resolution adopting the proposed Management Plan in the form presented. Director Tischler seconded the motion, and it carried.

At 9:42 a.m., Director Tischler moved to adjourn the public hearing, Director Dodson seconded, and the motion carried.

At 9:42 a.m., President Beseda called the regular session to order. Roll was called and the following board members were present: Charles Beseda, Dennis Erinakes, Craig Dodson, Randel Kirk, Paul Tischler, Barney Pustejovsky, and Maurice Osborn. Director

Marty McPherson was absent. Also present were Jim Conkwright, Rosetta Douthitt, Stephanie Rexrode, Shawn Davis, and Karen Siddall from the staff of Prairielands; Mr. Brian Sledge, the District's legal counsel from Sledge Law Group, Mr. Mike Keester, the District's hydrogeologist from LBG-Guyton, and a member of the public.

Under Item #2 Public Comment, there were no comments from the public.

Pertaining to Item #3, President Beseda asked if any board member would entertain the motion to approve the Consent Agenda. Director Pustejovsky inquired about new furniture purchased, if it could be used in another location, and asked about moving costs that had been incurred. Mr. Conkwright clarified that the furniture was purchased for the breakroom and could be moved to a new location, and the costs of moving furniture were the result of hiring a company to move an office to the conference room and moving other furniture within the respective offices. Without further discussion, Director Dodson moved to approve the Consent Agenda. Director Kirk seconded, and the motion carried.

The following Item #4A Rules and Bylaws, Mr. Kirk said the committee had met and asked Mr. Conkwright to discuss proposed changes to the District's Bylaws. Mr. Conkwright read aloud each proposed change, asked if there were any questions or comments, and explained that the changes would bring the Bylaws up to date and facilitate a more consistent work flow. Director Kirk moved to approve the resolution adopting the amendments to the District Bylaws. Director Tischler seconded the motion, and it carried.

Concerning Item #4B Budget and Finance, Mr. Osborn said the committee had met and asked Mr. Conkwright to elaborate concerning the engagement letter received from Gilliam Wharram, the District's financial auditor. Mr. Conkwright pointed out that their quote was slightly higher to include extra work on their part concerning the TCDRS reporting, since 2016 was the first full year to have the plan in effect. Mr. Conkwright praised Gilliam Wharram for their thoroughness and recommended that the District continue with their auditing services. Director Osborn moved to employ Gilliam Wharram and Company as the District's financial auditor for the 2016 audit and to authorize the General Manager to execute the agreement. Director Tischler seconded the motion, and it carried.

Another item under Budget and Finance was to consider and approve a proposed budget for 2017. Director Osborn pointed out that it was a balanced budget as included in each board member's packet. Mr. Conkwright praised the committee's work, drew the Board's attention to items with an asterisk alongside, and explained that those items would be funded through a budget amendment when the District acquires property. Director Tischler inquired whether there would be additional staff, asked about the amount budgeted for Legislative and Governmental Relations, and the proposed property purchase amount. Mr. Conkwright said there would be no additional staff added, the Legislative costs were estimated compared to 2015 when the legislature was in session, and the property purchase amount was projected as earnest money to hold real property, if located. Mr. Conkwright added that the budget can be amended, as necessary. Following the brief explanation, Director Tischler moved to approve the resolution to adopt the 2017 budget as recommended by the committee. Director Osborn seconded, and the motion carried. President Beseda thanked the committee for bringing the matter before the Board early on.

Regarding Item #4C Policy and Personnel, Director Pustejovsky spoke about a lump sum to pay Texas County and District Retirement System (TCDRS) to fully fund the employer account and asked Mr. Conkwright to provide more details. Mr. Conkwright spoke about the option to pay a determined lump sum which would bring down the percentage rate of employer contributions for next year. He said it is prudent to pay the additional amount when funds are available and will provide a cushion should actuarial rates vary significantly. Director Pustejovsky moved to approve the lump sum of $14,094.00 to TCDRS, Director Kirk seconded the motion, and it carried.

Item #4D brought up the subject of Building and Facilities. Director Dodson said the contract regarding the office lease was up for renewal, and moved to renew it for a 24-month period, effective through 2018. Director Osborn seconded the motion, and it carried. Director Dodson said the District obtained a verbal option to extend beyond, if necessary. Concerning property search, Director Dodson said parcels of property are being reviewed, but did not have any to bring before the Board at the present time. In reference to Item #4E Conservation and Public Awareness, Mr. Conkwright said the Conservation/Education trailer was currently having a safety rail installed, along with better material on the ramp and permanent steps would be attached, in place of the portable ones. Mr. Conkwright said the damaged wiring has been replaced with heavier wiring and lighter fuses. The trailer will be picked up later in the week for a scheduled event occurring on Saturday.

The subsequent Item #4F involved Groundwater Monitoring and Database. Director Erinakes said the committee had not met and there are no matters for discussion.

Moving along to item #4G DFC Planning and Development, Director Erinakes reminded the Board of the GMA-8 meeting next week on September 29th at the Liberty Event Center and touched on items in their agenda to be covered. Mr. Conkwright added that another GMA-8 Meeting would be scheduled in the following months and the minor aquifers, Nacatoch and Brazos River Alluvium will be on the agenda.

Pertaining to Item #4H General Manager/District Staff Report, Mr. Conkwright briefly spoke about committees that had met during the prior month, conferences he had attended, and upcoming events of interest. He brought up a new subject, that of Groundwater Management Districts Association (GMDA), and asked the Board to consider participating in their winter meeting which would be held in Fort Worth this year. He said it is a national gathering of groundwater districts, very worthwhile, and recommended that the Board consider contributing $500.00 - $1,000.00 as a sponsorship to assist in expenses, adding that other districts are also contributing, and he named some of those districts. Director Erinakes moved that Prairielands GCD participate in the winter meeting of GMDA and contribute a $1,000.00 sponsorship. Director Dodson seconded, and the motion carried. Mr. Conkwright urged board members to consider attending the event.

At this time, Mr. Conkwright asked Ms. Siddall to speak about activities involving the Conservation/Education trailer. Ms. Siddall said she would be taking the trailer to an event on Saturday in Waxahachie from 9:00 – 5:00 and that she would also have the trailer at the GMA-8 Meeting on September 29th for viewing by attendees.

Mr. Conkwright asked Mr. Davis to speak about monitor wells and software that has recently been installed. Mr. Davis said he is locating new wells not previously discovered and some potential monitor wells. He met with the Rockett Special Utility District Manager to address the issue of removing existing equipment from some of their wells so that the District may install its own equipment in order to monitor the wells. Mr. Davis said he is working to become more familiar with the Texian GeoSpatial software recently installed, and spoke about changing out some Stephens data loggers for Sutron data loggers for better accuracy and reliability.

Under item #5 regarding any other organizational matters of the District, there was no discussion.

Item #6 Update on compliance and enforcement activities for violations of District Rules, there were no items to discuss.

Under Item #7 General Counsel's report, Mr. Sledge said he had assisted in the preparation of comments made by the General Manager to TWDB in reference to 31 TAC Chapter 357 Rules, which is two-fold:

- The District is requesting that the TWDB maintain the integrity of the Regional Water Planning Process. If flexibility is allowed for over-utilization of groundwater during a wet season, it should be recognized that there will be years in which groundwater supplies will be under-utilized during dry seasons so that the total cumulative pumping over the 50-year planning horizon will not exceed the average annual amount that can be pumped in order to achieve the DFC's.
- Additionally, the District is requesting the TWDB to maintain the discretion of Groundwater Conservation Districts (GCD's) so that it is made clear in the rules GCD's are to approve the fluctuations in their respective areas so the authority of GCD's to responsibly and effectively manage the resources within their jurisdiction be maintained and not hindered. The TWDB rules should also show that GCD approval is only applicable to planning and does not affect the GCD permitting process.

Mr. Sledge briefly touched on the subject of State Representative Dewayne Burns, member of House Natural Resources and its subcommittee on Special Water Districts, holding public hearings at Fort Stockton and Del Rio regarding groundwater concerns in those areas of West Texas and Texas, in general.

At 11:00 a.m., Director Kirk moved to adjourn, Director Tischler seconded, and the motion carried.

PASSED, APPROVED, and ADOPTED by the BOARD of DIRECTORS this 17th day of October, 2016.

Charles Beseda

Charles Beseda, President

Maurice Osborn

Maurice Osborn, Secretary/Treasurer

Appendix C

Letters to Surface Water Management Entities

Because of the large size of the management plan and its appendices and supporting documents, it is physically impractical to mail or email to surface water management entities in the region. Therefore, the District sent a copy of the attached email, which includes a link to the management plan, appendices, and supporting information, to all surface water management entities in the region—as those entities were identified for the District by the Texas Commission on Environmental Quality on September 20, 2016, as well as to other possible surface water management entities of which the District was aware. Texas Water Development Board staff was courtesy copied on each of those emails.

RE: Prairielands Groundwater Conservation District Adopted Management Plan

To Whom It May Concern:

This email is to notify you of the recent adoption of the Prairielands Groundwater Conservation District ("District") Management Plan, developed and adopted in accordance with Chapter 36 of the Texas Water Code and Title 31 Texas Administrative Code Chapter 356. The District's boundaries are coextensive with the boundaries of Ellis, Hill, Johnson, and Somervell counties. The purpose of the District Management Plan is to identify the water supplies and demands within the District and to define the goals that the District will use to manage the groundwater resources in the District.

The District Management Plan is the product of a public planning process that culminated in the adoption of the plan by the District's board of directors at the conclusion of a public hearing held on September 19, 2016, following appropriate public notice. The District submits the Management Plan to you in accordance with Section 36.1071(a) of the Texas Water Code in an effort to coordinate with you on the District's management goals. Due to the extensive size of the Management Plan, we are not mailing a hard copy but instead are providing the following link that will allow you to access the plan electronically. (Link to the District Management Plan was provided to surface water management entities in the email)

Because the Desired Future Conditions ("DFCs") of the Trinity and Woodbine aquifers remain unchanged since the adoption of the previous Management Plan on May 21, 2012, there are very few changes to the new plan. With the exception of some updated technical information included from the 2017 State Water Plan and the updated Northern Trinity / Woodbine Groundwater Availability Model approved by the Texas Water Development Board and some other minor changes, the new District Management Plan is essentially a re-adoption of its 2012 plan. Groundwater Management Area 8 ("GMA 8") is presently developing a new round of DFCs, which should be completed and subsequently adopted by the various groundwater conservation districts in GMA 8 in early 2017. The District will update its Management Plan within two years of adoption of the new DFCs, at which time you will receive notice and access to that plan.

Please feel free to contact me if you have any questions or comments regarding the District Management Plan or other District activities.

Jim Conkwright
General Manager

cc: Stephen Allen, Texas Water Development Board
Brian L. Sledge, SledgeLaw Group PLLC

Surface Water Management Entity E-mail List

District Name	Contact Name	Contact Type	Email address
Johnson County FWSD 2	Rory Norrell/A. Adams	Atty	aadams@crawlaw.net
Ellis County FWSD 1	Ward Eastman/A. Adams	Atty	aadams@crawlaw.net
Ellis County FWSD 2	Clay Crawford	Atty	ccrawford@crawlaw.net
Ellis County FWSD 3	Clay Crawford	Atty	ccrawford@crawlaw.net
Aquilla WSD	Henry Moore	Atty	hm@smhglaw.com
Ellis County MUD 1A	Angela Stepherson	Atty	astepherson@coatsrose.com

District Name	Contact Name	Contact Type	Email address
Acton MUD	Richard English	General Manager	renglish@amud.com
Buena Vista-Bethel SUD	Joe Buchanan	General Manager	Buchananjoe26@yahoo.com
Ellis County LID 2	Jerry Glaspy	Non-atty	bjglaspy@aol.com
Ellis County LID 3	Billy Downey	Non-atty	bdranch@gmail.com
Aquilla Hackberry Creek CD	Blair Russell	Board Member	gbrussellag@yahoo.com
McLennan and Hill Counties Tehuacana Creek WCID 1	Dr. Larry Lehr	Non-atty	Larry_lehr@baylor.edu
Post Oak SUD	Kerry Feller	Board President	kfeller@citizensstatebanktx.com
Ellis County LID 4	Lesley Gerron	Non-atty	Les_gerron@yahoo.com
Windsor Hills MMD	Kenneth Davis	Engineer	ken@kdatexas.com
Somervell County Water District	Kevin Taylor	General Manager	ktaylor@scwd.com
Mountain Peak SUD	Randel Kirk	General Manager	randelkirk@gmail.com
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Appendix D

GAM Run 10-063-MAG (Trinity)

GAM Run 10-063 MAG

by Mr. Wade Oliver and Mr. Robert G. Bradley, P.G.

Texas Water Development Board
Groundwater Availability Modeling Section
(512) 463-3132
December 14, 2011

Cynthia K. Ridgeway, the Manager of the Groundwater Availability Modeling Section and Interim Director of the Groundwater Resources Division, is responsible for oversight of work performed by employees under her direct supervision. The seal appearing on this document was authorized by Cynthia K. Ridgeway, P.G. 471 on December 14, 2011.

Robert G. Bradley, P.G. is responsible for the water budget approach for Comanche and Erath counties within Middle Trinity Groundwater Conservation District. The seal appearing on this document was authorized by Robert G. Bradley, P.G. 707 on December 14, 2011.

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EXECUTIVE SUMMARY:

In response to receiving the adopted desired future conditions for the Trinity Aquifer in Groundwater Management Area 8, the Texas Water Development Board completed Groundwater Availability Model (GAM) Run 08-84mag, which reported the "managed available groundwater" that achieves the adopted desired future conditions. Subsequent to the release of GAM Run 08-84mag, the Middle Trinity Groundwater Conservation District requested that the Texas Water Development Board reevaluate the "managed available groundwater" for Comanche and Erath counties. This resulted in the completion of Aquifer Assessment 09-07, which addressed these counties. In April 2011, the groundwater conservation districts in Groundwater Management Area 8 readopted the desired future conditions for the Trinity Aquifer previously adopted in September 2008.

This report, an update to GAM Run 08-84mag and Aquifer Assessment 09-07, incorporates the changes above and addresses the readopted desired future conditions. In addition, the pumping estimates previously reported as "managed available groundwater" in the above reports are reported here as "modeled available groundwater" to reflect changes in statute effective September 1, 2011. The modeled available groundwater for the Trinity Aquifer as a result of the desired future conditions adopted by the members of Groundwater Management Area 8 is approximately 261,000 acre-feet per year.

REQUESTOR:

Mr. Eddy Daniel of North Texas Groundwater Conservation District on behalf of Groundwater Management Area 8

DESCRIPTION OF REQUEST:

In a letter dated August 31, 2011, Mr. Eddy Daniel provided the Texas Water Development Board (TWDB) with the desired future conditions of the Trinity Aquifer adopted in a resolution, dated April 27, 2011, by the members of Groundwater Management Area 8. This resolution referenced the desired future conditions previously adopted for the aquifer on September 17, 2008 by the groundwater conservation districts within Groundwater Management Area 8. These are summarized in Table 1.

In response to receiving the initially adopted desired future conditions from September 2008, the Texas Water Development Board completed Groundwater Availability Model (GAM) Run 08-84mag, which reported the "managed available groundwater" that achieves the above desired future conditions (Wade, 2009). On June 12, 2009, the general manager and consultants for the Middle Trinity Groundwater Conservation District met with Texas Water Development Board staff to discuss issues they had concerning GAM Run 08-84mag. After discussion, staff reevaluated pumping estimates using a water-budget approach based on the desired future conditions for Comanche and Erath counties and released this analysis as Aquifer Assessment 09-07 on November 22, 2010 (Bradley, 2010). This report, an update to GAM Run 08-84mag and Aquifer Assessment 09-07, incorporates the two changes above. In addition, the pumping estimates previously reported as "managed available groundwater" in the above reports are reported here as "modeled available groundwater" to reflect changes in statute effective September 1, 2011.

METHODS:

Groundwater Management Area 8 contains the Trinity Aquifer, a major aquifer in Texas as defined in the 2007 State Water Plan (TWDB, 2007). The location of Groundwater Management Area 8, the Trinity Aquifer, and the groundwater availability model cells that represent the aquifer are shown in Figure 1.

Modeled Available Groundwater and Permitting

As defined in Chapter 36 of the Texas Water Code, "modeled available groundwater" is the estimated average amount of water that may be produced annually to achieve a desired future condition. This is distinct from "managed available groundwater," shown in the draft version of this report dated December 20, 2010, which was a permitting value and accounted for the estimated use of the aquifer exempt from permitting. This change was made to reflect changes in statute by the 82nd Texas Legislature, effective September 1, 2011.

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. The estimated amount of pumping exempt from permitting, which the Texas Water Development Board is now required to develop after soliciting input from applicable groundwater conservation districts, will be provided in a separate report.

PARAMETERS AND ASSUMPTIONS:

The groundwater availability model for the northern portion of the Trinity Aquifer was used for the results presented in this report outside of Comanche and Erath counties. In those counties, a water budget approach was used. The parameters and assumptions for developing the modeled available groundwater are described below:

Groundwater Availability Model for the Northern Portion of the Trinity Aquifer

- The results for modeled available groundwater presented here are based on the results reported as "managed available groundwater" in GAM Run 08-84mag (Wade, 2009) for all areas except Comanche and Erath counties. See GAM Run 08-84mag for a full description of the methods and assumptions associated with the model simulation. Because GAM Run 08-84mag presented constant pumping from 2000 to 2050, it was assumed for the purposes of this analysis that pumping from 2051 to 2060 was also constant at the same level. As summarized in Table 1, desired future conditions were defined by the groundwater conservation districts in Groundwater Management Area 8 for 2050. It is expected that pumping from 2051 to 2060 would cause additional drawdown, but this analysis does not estimate drawdown in 2060. Pumping estimates for 2060 were important to include for purposes of regional water planning.

- Version 1.01 of the groundwater availability model for the northern portion of the Trinity Aquifer was used for this analysis. See Bené and others (2004) for assumptions and limitations of the model.

- The model includes seven layers which generally correspond to the Woodbine Aquifer (Layer 1), the Washita and Fredericksburg Groups (Layer 2), the Paluxy Formation (Layer 3), the Glen Rose Formation (Layer 4), the Hensell Formation (Layer 5), the Pearsall/Cow Creek/Hammett/Sligo Members (Layer 6), and the Hosston Formation (Layer 7).

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

- Average annual recharge conditions based on climate data from 1980 to 1999 were assumed for the first 47 years of the simulation. The last three years of the simulation drought-of-record recharge conditions were assumed, which were defined as the years 1954 to 1956.

- Groundwater conservation district boundaries were updated since the release of GAM Run 08-84mag. The results presented here correspond to the official district boundaries as of the date of this report.

Water Budget Approach for Comanche and Erath Counties

- The modeled available groundwater presented for Comanche and Erath counties is based on Aquifer Assessment 09-07 (Bradley, 2010). See Aquifer Assessment 09-07 for a full description of the methods and assumptions associated with the water budget calculations.

- The Hensell and Hosston members were grouped as the Twin Mountains Formation in Aquifer Assessment 09-07. To be consistent with the desired future conditions, however, it was necessary to split the pumping in Aquifer Assessment 09-07 into the Hensell and Hosston members. In Comanche County, 10 percent of the pumping in the Twin Mountains Formation was assigned to the Hensell member while 90 percent was assigned to the Hosston. In Erath County, 35 percent of the pumping in Aquifer Assessment 09-07 was assigned to the Hensell with the remaining 65 percent assigned to the Hosston. These percentages were developed after a preliminary review of available pumping information and discussion with Joe Cooper of Middle Trinity Groundwater Conservation District.

RESULTS:

The modeled available groundwater for the Trinity Aquifer in Groundwater Management Area 8 as a result of the desired future conditions is approximately 261,000 acre-feet per year between 2010 and 2060. This pumping has been divided by county, regional water planning area, and river basin for each decade between 2010 and 2060 for use in the regional water planning process (Table 2). These areas are shown in Figure 2.

Since the desired future conditions are specified for individual units of the Trinity Aquifer (Paluxy, Glen Rose, Hensell, and Hosston) based on the layering used in the model, the modeled available groundwater is shown for each unit in the subsequent tables. Tables 3, 4, 5, and 6 show the modeled available groundwater summarized by county in the Paluxy, Glen Rose, Hensell, and Hosston units of the Trinity Aquifer, respectively. Tables 7, 8, 9, and 10 show the modeled available groundwater summarized by regional water planning area for the same units, respectively. Tables 11, 12, 13, and 14 show the modeled available groundwater summarized by river basin for each of the above units, respectively. The modeled available groundwater summarized by groundwater conservation district is shown for the Paluxy, Glen Rose, Hensell, and Hosston units in tables 15, 16, 17, and 18, respectively. Notice that the pumping is totaled both excluding and including areas outside of a groundwater conservation district.

LIMITATIONS:

The groundwater model used in developing estimates of modeled available groundwater is the best available scientific tool that can be used to estimate the pumping that will achieve the desired future conditions. Although the groundwater model used in this analysis is the best available scientific tool for this purpose, it, like all models, has limitations. 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 develop estimates of modeled available groundwater is the need to make assumptions about the location in the aquifer where future pumping will occur. As actual pumping changes in the future, it will be necessary to evaluate the amount of that pumping as well as its location in the context of the assumptions associated with this analysis. Evaluating the amount and location of future pumping is as important as evaluating the changes in groundwater levels, spring flows, and other metrics that describe the condition of the groundwater resources in the area that relate to the adopted desired future condition(s).

Given these limitations, users of this information are cautioned that the modeled available groundwater numbers should not be considered a definitive, permanent description of the amount of groundwater that can be pumped to meet the adopted desired future condition. 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 future groundwater pumping as well as whether or not they are achieving their desired future conditions. Because of the limitations of the model and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine the modeled available groundwater numbers given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future.

REFERENCES:

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

Bradley, R.G., 2010, GTA Aquifer Assessment 09-07: Texas Water Development Board, GTA Aquifer Assessment 09-07 Report, 19 p.

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

Texas Water Development Board, 2007, Water for Texas – 2007—Volumes I-III; Texas Water Development Board Document No. GP-8-1, 392 p.

Wade, S., 2009, GAM Run 08-84mag, Texas Water Development Board GAM Run 08-84mag Report, 37 p.

Table 1. Desired future conditions (in feet of drawdown) for each unit of the Trinity Aquifer adopted by members of Groundwater Management Area 8.

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

Table 2. Modeled available groundwater in acre-feet for the Trinity Aquifer in Groundwater Management Area 8 by county, regional water planning area, and river basin.

County	Regional Water Planning Area	Basin	Year					
			2010	2020	2030	2040	2050	2060
Bell	G	Brazos	7,068	7,068	7,068	7,068	7,068	7,068
Bosque	G	Brazos	5,849	5,849	5,849	5,849	5,849	5,849
Brown	F	Brazos	28	28	28	28	28	28
		Colorado	2,017	2,017	2,017	2,017	2,017	2,017
Burnet	K	Brazos	2,723	2,723	2,723	2,723	2,723	2,723
		Colorado	823	823	823	823	823	823
Callahan	G	Brazos	1,792	1,792	1,792	1,792	1,792	1,792
		Colorado	1,985	1,985	1,985	1,985	1,985	1,985
Collin	C	Sabine	0	0	0	0	0	0
		Trinity	2,104	2,104	2,104	2,104	2,104	2,104
Comanche	G	Brazos	32,115	32,115	32,115	32,115	32,115	32,115
		Colorado	120	120	120	120	120	120
Cooke	C	Red	1,284	1,284	1,284	1,284	1,284	1,284
		Trinity	5,566	5,566	5,566	5,566	5,566	5,566
Coryell	G	Brazos	3,716	3,716	3,716	3,716	3,716	3,716
Dallas	C	Trinity	5,458	5,458	5,458	5,458	5,458	5,458
Delta	D	Sulphur	362	362	362	362	362	362
Denton	C	Trinity	19,333	19,333	19,333	19,333	19,333	19,333
Eastland	G	Brazos	4,489	4,489	4,489	4,489	4,489	4,489
		Colorado	231	231	231	231	231	231
Ellis	C	Trinity	3,959	3,959	3,959	3,959	3,959	3,959
Erath	G	Brazos	32,926	32,926	32,926	32,926	32,926	32,926
Falls	G	Brazos	169	169	169	169	169	169
Fannin	C	Red	617	617	617	617	617	617
		Sulphur	0	0	0	0	0	0
		Trinity	83	83	83	83	83	83
Franklin	D	Sulphur	0	0	0	0	0	0
Grayson	C	Red	7,722	7,722	7,722	7,722	7,722	7,722
		Trinity	1,678	1,678	1,678	1,678	1,678	1,678
Hamilton	G	Brazos	2,144	2,144	2,144	2,144	2,144	2,144
Hill	G	Brazos	3,086	3,086	3,086	3,086	3,086	3,086
		Trinity	61	61	61	61	61	61
Hood	G	Brazos	11,081	11,081	11,081	11,081	11,081	11,081
		Trinity	64	64	64	64	64	64
Hunt	D	Sabine	0	0	0	0	0	0
		Sulphur	0	0	0	0	0	0
		Trinity	551	551	551	551	551	551
Johnson	G	Brazos	4,940	4,940	4,940	4,940	4,940	4,940
		Trinity	7,931	7,931	7,931	7,931	7,931	7,931
Kaufman	C	Sabine	45	45	45	45	45	45
		Trinity	1,136	1,136	1,136	1,136	1,136	1,136

Table 2. Continued.

County	Regional Water Planning Area	Basin	Year					
			2010	2020	2030	2040	2050	2060
Lamar	D	Red	1,320	1,320	1,320	1,320	1,320	1,320
		Sulphur	2	2	2	2	2	2
Lampasas	G	Brazos	2,925	2,925	2,925	2,925	2,925	2,925
		Colorado	192	192	192	192	192	192
Limestone	G	Brazos	69	69	69	69	69	69
		Trinity	0	0	0	0	0	0
McLennan	G	Brazos	20,690	20,690	20,690	20,690	20,690	20,690
Milam	G	Brazos	288	288	288	288	288	288
Mills	K	Brazos	1,273	1,273	1,273	1,273	1,273	1,273
		Colorado	1,128	1,128	1,128	1,128	1,128	1,128
Montague	B	Brazos	0	0	0	0	0	0
		Red	129	129	129	129	129	129
		Trinity	2,545	2,545	2,545	2,545	2,545	2,545
Navarro	C	Trinity	1,873	1,873	1,873	1,873	1,873	1,873
Parker	C	Brazos	2,799	2,799	2,799	2,799	2,799	2,799
		Trinity	12,449	12,449	12,449	12,449	12,449	12,449
Red River	D	Red	263	263	263	263	263	263
		Sulphur	267	267	267	267	267	267
Rockwall	C	Sabine	0	0	0	0	0	0
		Trinity	958	958	958	958	958	958
Somervell	G	Brazos	2,485	2,485	2,485	2,485	2,485	2,485
Tarrant	C	Trinity	18,747	18,747	18,747	18,747	18,747	18,747
Taylor	G	Brazos	153	153	153	153	153	153
		Colorado	278	278	278	278	278	278
Travis	K	Brazos	8	8	8	8	8	8
		Colorado	3,882	3,882	3,882	3,882	3,882	3,882
Williamson	G	Brazos	1,514	1,514	1,514	1,514	1,514	1,514
		Colorado	68	68	68	68	68	68
	K	Brazos	157	157	157	157	157	157
		Colorado	61	61	61	61	61	61
Wise	C	Trinity	9,282	9,282	9,282	9,282	9,282	9,282
Total			**261,061**	**261,061**	**261,061**	**261,061**	**261,061**	**261,061**

Table 3. Modeled available groundwater for the Paluxy unit of the Trinity Aquifer summarized by county in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

County	Year					
	2010	2020	2030	2040	2050	2060
Bell	96	96	96	96	96	96
Bosque	1,013	1,013	1,013	1,013	1,013	1,013
Brown	18	18	18	18	18	18
Burnet	182	182	182	182	182	182
Collin	1,762	1,762	1,762	1,762	1,762	1,762
Comanche	2,292	2,292	2,292	2,292	2,292	2,292
Cooke	3,528	3,528	3,528	3,528	3,528	3,528
Coryell	254	254	254	254	254	254
Dallas	433	433	433	433	433	433
Delta	0	0	0	0	0	0
Denton	9,822	9,822	9,822	9,822	9,822	9,822
Eastland	4	4	4	4	4	4
Ellis	400	400	400	400	400	400
Erath	13,614	13,614	13,614	13,614	13,614	13,614
Falls	0	0	0	0	0	0
Fannin	288	288	288	288	288	288
Grayson	4,708	4,708	4,708	4,708	4,708	4,708
Hamilton	291	291	291	291	291	291
Hill	1,254	1,254	1,254	1,254	1,254	1,254
Hood	942	942	942	942	942	942
Hunt	551	551	551	551	551	551
Johnson	9,493	9,493	9,493	9,493	9,493	9,493
Kaufman	102	102	102	102	102	102
Lamar	0	0	0	0	0	0
Lampasas	13	13	13	13	13	13
Limestone	0	0	0	0	0	0
McLennan	231	231	231	231	231	231
Milam	0	0	0	0	0	0
Mills	5	5	5	5	5	5
Montague	505	505	505	505	505	505
Navarro	413	413	413	413	413	413
Parker	9,800	9,800	9,800	9,800	9,800	9,800
Red River	473	473	473	473	473	473
Rockwall	958	958	958	958	958	958
Somervell	120	120	120	120	120	120
Tarrant	10,544	10,544	10,544	10,544	10,544	10,544
Travis	3	3	3	3	3	3
Williamson	11	11	11	11	11	11
Wise	2,559	2,559	2,559	2,559	2,559	2,559
Total	**76,682**	**76,682**	**76,682**	**76,682**	**76,682**	**76,682**

Table 4. Modeled available groundwater for the Glen Rose unit of the Trinity Aquifer summarized by county in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

County	Year					
	2010	2020	2030	2040	2050	2060
Bell	880	880	880	880	880	880
Bosque	258	258	258	258	258	258
Brown	0	0	0	0	0	0
Burnet	205	205	205	205	205	205
Collin	0	0	0	0	0	0
Comanche	0	0	0	0	0	0
Cooke	0	0	0	0	0	0
Coryell	784	784	784	784	784	784
Dallas	0	0	0	0	0	0
Delta	0	0	0	0	0	0
Denton	0	0	0	0	0	0
Eastland	0	0	0	0	0	0
Ellis	0	0	0	0	0	0
Erath	41	41	41	41	41	41
Falls	2	2	2	2	2	2
Fannin	0	0	0	0	0	0
Franklin	0	0	0	0	0	0
Grayson	0	0	0	0	0	0
Hamilton	46	46	46	46	46	46
Hill	10	10	10	10	10	10
Hood	4	4	4	4	4	4
Hunt	0	0	0	0	0	0
Johnson	24	24	24	24	24	24
Kaufman	0	0	0	0	0	0
Lamar	0	0	0	0	0	0
Lampasas	773	773	773	773	773	773
Limestone	4	4	4	4	4	4
McLennan	265	265	265	265	265	265
Milam	149	149	149	149	149	149
Mills	66	66	66	66	66	66
Montague	0	0	0	0	0	0
Navarro	0	0	0	0	0	0
Parker	192	192	192	192	192	192
Red River	0	0	0	0	0	0
Rockwall	0	0	0	0	0	0
Somervell	134	134	134	134	134	134
Tarrant	112	112	112	112	112	112
Travis	2,612	2,612	2,612	2,612	2,612	2,612
Williamson	760	760	760	760	760	760
Wise	5	5	5	5	5	5
Total	**7,326**	**7,326**	**7,326**	**7,326**	**7,326**	**7,326**

Table 5. Modeled available groundwater for the Hensell unit of the Trinity Aquifer summarized by county in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

County	Year					
	2010	2020	2030	2040	2050	2060
Bell	1,099	1,099	1,099	1,099	1,099	1,099
Bosque	1,749	1,749	1,749	1,749	1,749	1,749
Brown	79	79	79	79	79	79
Burnet	690	690	690	690	690	690
Callahan	123	123	123	123	123	123
Collin	103	103	103	103	103	103
Comanche	2,995	2,995	2,995	2,995	2,995	2,995
Cooke	1,611	1,611	1,611	1,611	1,611	1,611
Coryell	1,765	1,765	1,765	1,765	1,765	1,765
Dallas	1,121	1,121	1,121	1,121	1,121	1,121
Delta	181	181	181	181	181	181
Denton	3,112	3,112	3,112	3,112	3,112	3,112
Eastland	79	79	79	79	79	79
Ellis	1,142	1,142	1,142	1,142	1,142	1,142
Erath	6,745	6,745	6,745	6,745	6,745	6,745
Falls	22	22	22	22	22	22
Fannin	203	203	203	203	203	203
Grayson	2,345	2,345	2,345	2,345	2,345	2,345
Hamilton	1,109	1,109	1,109	1,109	1,109	1,109
Hill	933	933	933	933	933	933
Hood	3,595	3,595	3,595	3,595	3,595	3,595
Hunt	0	0	0	0	0	0
Johnson	1,065	1,065	1,065	1,065	1,065	1,065
Kaufman	240	240	240	240	240	240
Lamar	661	661	661	661	661	661
Lampasas	885	885	885	885	885	885
Limestone	15	15	15	15	15	15
McLennan	4,190	4,190	4,190	4,190	4,190	4,190
Milam	36	36	36	36	36	36
Mills	946	946	946	946	946	946
Montague	362	362	362	362	362	362
Navarro	256	256	256	256	256	256
Parker	1,441	1,441	1,441	1,441	1,441	1,441
Red River	19	19	19	19	19	19
Rockwall	0	0	0	0	0	0
Somervell	741	741	741	741	741	741
Tarrant	2,535	2,535	2,535	2,535	2,535	2,535
Travis	156	156	156	156	156	156
Williamson	415	415	415	415	415	415
Wise	1,480	1,480	1,480	1,480	1,480	1,480
Total	**46,244**	**46,244**	**46,244**	**46,244**	**46,244**	**46,244**

Table 6. Modeled available groundwater for the Hosston unit of the Trinity Aquifer summarized by county in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

County	Year					
	2010	2020	2030	2040	2050	2060
Bell	4,993	4,993	4,993	4,993	4,993	4,993
Bosque	2,829	2,829	2,829	2,829	2,829	2,829
Brown	1,948	1,948	1,948	1,948	1,948	1,948
Burnet	2,469	2,469	2,469	2,469	2,469	2,469
Callahan	3,654	3,654	3,654	3,654	3,654	3,654
Collin	239	239	239	239	239	239
Comanche	26,948	26,948	26,948	26,948	26,948	26,948
Cooke	1,711	1,711	1,711	1,711	1,711	1,711
Coryell	913	913	913	913	913	913
Dallas	3,904	3,904	3,904	3,904	3,904	3,904
Delta	181	181	181	181	181	181
Denton	6,399	6,399	6,399	6,399	6,399	6,399
Eastland	4,637	4,637	4,637	4,637	4,637	4,637
Ellis	2,417	2,417	2,417	2,417	2,417	2,417
Erath	12,526	12,526	12,526	12,526	12,526	12,526
Falls	145	145	145	145	145	145
Fannin	209	209	209	209	209	209
Franklin	0	0	0	0	0	0
Grayson	2,347	2,347	2,347	2,347	2,347	2,347
Hamilton	698	698	698	698	698	698
Hill	950	950	950	950	950	950
Hood	6,604	6,604	6,604	6,604	6,604	6,604
Hunt	0	0	0	0	0	0
Johnson	2,289	2,289	2,289	2,289	2,289	2,289
Kaufman	839	839	839	839	839	839
Lamar	661	661	661	661	661	661
Lampasas	1,446	1,446	1,446	1,446	1,446	1,446
Limestone	50	50	50	50	50	50
McLennan	16,004	16,004	16,004	16,004	16,004	16,004
Milam	103	103	103	103	103	103
Mills	1,384	1,384	1,384	1,384	1,384	1,384
Montague	1,807	1,807	1,807	1,807	1,807	1,807
Navarro	1,204	1,204	1,204	1,204	1,204	1,204
Parker	3,815	3,815	3,815	3,815	3,815	3,815
Red River	38	38	38	38	38	38
Rockwall	0	0	0	0	0	0
Somervell	1,490	1,490	1,490	1,490	1,490	1,490
Tarrant	5,556	5,556	5,556	5,556	5,556	5,556
Taylor	431	431	431	431	431	431
Travis	1,119	1,119	1,119	1,119	1,119	1,119
Williamson	614	614	614	614	614	614
Wise	5,238	5,238	5,238	5,238	5,238	5,238
Total	**130,809**	**130,809**	**130,809**	**130,809**	**130,809**	**130,809**

Table 7. Modeled available groundwater for the Paluxy unit of the Trinity Aquifer summarized by regional water planning area in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

Regional Water Planning Area	Year					
	2010	2020	2030	2040	2050	2060
B	505	505	505	505	505	505
C	45,317	45,317	45,317	45,317	45,317	45,317
D	1,024	1,024	1,024	1,024	1,024	1,024
F	18	18	18	18	18	18
G	29,628	29,628	29,628	29,628	29,628	29,628
K	190	190	190	190	190	190
Total	**76,682**	**76,682**	**76,682**	**76,682**	**76,682**	**76,682**

Table 8. Modeled available groundwater for the Glen Rose unit of the Trinity Aquifer summarized by regional water planning area in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

Regional Water Planning Area	Year					
	2010	2020	2030	2040	2050	2060
B	0	0	0	0	0	0
C	309	309	309	309	309	309
D	0	0	0	0	0	0
F	0	0	0	0	0	0
G	4,016	4,016	4,016	4,016	4,016	4,016
K	3,001	3,001	3,001	3,001	3,001	3,001
Total	**7,326**	**7,326**	**7,326**	**7,326**	**7,326**	**7,326**

Table 9. Modeled available groundwater for the Hensell unit of the Trinity Aquifer summarized by regional water planning area in Groundwater Management Area 12 for each decade between 2010 and 2060. Results are in acre-feet per year.

Regional Water Planning Area	Year					
	2010	2020	2030	2040	2050	2060
B	362	362	362	362	362	362
C	15,589	15,589	15,589	15,589	15,589	15,589
D	861	861	861	861	861	861
F	79	79	79	79	79	79
G	27,514	27,514	27,514	27,514	27,514	27,514
K	1,839	1,839	1,839	1,839	1,839	1,839
Total	**46,244**	**46,244**	**46,244**	**46,244**	**46,244**	**46,244**

Table 10. Modeled available groundwater for the Hosston unit of the Trinity Aquifer summarized by regional water planning area in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

Regional Water Planning Area	Year					
	2010	2020	2030	2040	2050	2060
B	1,807	1,807	1,807	1,807	1,807	1,807
C	33,878	33,878	33,878	33,878	33,878	33,878
D	880	880	880	880	880	880
F	1,948	1,948	1,948	1,948	1,948	1,948
G	87,271	87,271	87,271	87,271	87,271	87,271
K	5,025	5,025	5,025	5,025	5,025	5,025
Total	**130,809**	**130,809**	**130,809**	**130,809**	**130,809**	**130,809**

Table 11. Modeled available groundwater for the Paluxy unit of the Trinity Aquifer summarized by river basin in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

River Basin	Year					
	2010	2020	2030	2040	2050	2060
Brazos	23,223	23,223	23,223	23,223	23,223	23,223
Colorado	193	193	193	193	193	193
Red	4,943	4,943	4,943	4,943	4,943	4,943
Sabine	4	4	4	4	4	4
Sulphur	267	267	267	267	267	267
Trinity	48,052	48,052	48,052	48,052	48,052	48,052
Total	**76,682**	**76,682**	**76,682**	**76,682**	**76,682**	**76,682**

Table 12. Modeled available groundwater for the Glen Rose unit of the Trinity Aquifer summarized by river basin in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

River Basin	Year					
	2010	2020	2030	2040	2050	2060
Brazos	4,263	4,263	4,263	4,263	4,263	4,263
Colorado	2,753	2,753	2,753	2,753	2,753	2,753
Red	0	0	0	0	0	0
Sabine	0	0	0	0	0	0
Sulphur	0	0	0	0	0	0
Trinity	310	310	310	310	310	310
Total	**7,326**	**7,326**	**7,326**	**7,326**	**7,326**	**7,326**

Table 13. Modeled available groundwater for the Hensell unit of the Trinity Aquifer summarized by river basin in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

River Basin	Year					
	2010	2020	2030	2040	2050	2060
Brazos	29,030	29,030	29,030	29,030	29,030	29,030
Colorado	585	585	585	585	585	585
Red	3,129	3,129	3,129	3,129	3,129	3,129
Sabine	9	9	9	9	9	9
Sulphur	182	182	182	182	182	182
Trinity	13,309	13,309	13,309	13,309	13,309	13,309
Total	**46,244**	**46,244**	**46,244**	**46,244**	**46,244**	**46,244**

Table 14. Modeled available groundwater for the Hosston unit of the Trinity Aquifer summarized by river basin in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

River Basin	Year					
	2010	2020	2030	2040	2050	2060
Brazos	87,971	87,971	87,971	87,971	87,971	87,971
Colorado	7,254	7,254	7,254	7,254	7,254	7,254
Red	3,263	3,263	3,263	3,263	3,263	3,263
Sabine	32	32	32	32	32	32
Sulphur	182	182	182	182	182	182
Trinity	32,107	32,107	32,107	32,107	32,107	32,107
Total	**130,809**	**130,809**	**130,809**	**130,809**	**130,809**	**130,809**

Table 15. Modeled available groundwater for the Paluxy unit of the Trinity Aquifer summarized by groundwater conservation district (GCD) in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year. UWCD refers to Underground Water Conservation District. WD refers to Water District.

Groundwater Conservation District	Year					
	2010	2020	2030	2040	2050	2060
Central Texas GCD	182	182	182	182	182	182
Clearwater UWCD	96	96	96	96	96	96
Fox Crossing WD	5	5	5	5	5	5
Middle Trinity GCD	17,173	17,173	17,173	17,173	17,173	17,173
North Texas GCD	15,112	15,112	15,112	15,112	15,112	15,112
Northern Trinity GCD	10,544	10,544	10,544	10,544	10,544	10,544
Post Oak Savannah GCD	0	0	0	0	0	0
Prairielands GCD	11,267	11,267	11,267	11,267	11,267	11,267
Red River GCD	4,996	4,996	4,996	4,996	4,996	4,996
Saratoga UWCD	13	13	13	13	13	13
Southern Trinity GCD	231	231	231	231	231	231
Upper Trinity GCD	13,806	13,806	13,806	13,806	13,806	13,806
Total (excluding non-district areas)	**73,425**	**73,425**	**73,425**	**73,425**	**73,425**	**73,425**
No District	3,257	3,257	3,257	3,257	3,257	3,257
Total (including non-district areas)	**76,682**	**76,682**	**76,682**	**76,682**	**76,682**	**76,682**

Table 16. Modeled available groundwater for the Glen Rose unit of the Trinity Aquifer summarized by groundwater conservation district (GCD) in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year. UWCD refers to Underground Water Conservation District. WD refers to Water District.

Groundwater Conservation District	Year					
	2010	2020	2030	2040	2050	2060
Central Texas GCD	205	205	205	205	205	205
Clearwater UWCD	880	880	880	880	880	880
Fox Crossing WD	66	66	66	66	66	66
Middle Trinity GCD	1,083	1,083	1,083	1,083	1,083	1,083
North Texas GCD	0	0	0	0	0	0
Northern Trinity GCD	112	112	112	112	112	112
Post Oak Savannah GCD	149	149	149	149	149	149
Prairielands GCD	168	168	168	168	168	168
Red River GCD	0	0	0	0	0	0
Saratoga UWCD	773	773	773	773	773	773
Southern Trinity GCD	265	265	265	265	265	265
Upper Trinity GCD	201	201	201	201	201	201
Total (excluding non-district areas)	**3,902**	**3,902**	**3,902**	**3,902**	**3,902**	**3,902**
No District	3,424	3,424	3,424	3,424	3,424	3,424
Total (including non-district areas)	**7,326**	**7,326**	**7,326**	**7,326**	**7,326**	**7,326**

Table 17. Modeled available groundwater for the Hensell unit of the Trinity Aquifer summarized by groundwater conservation district (GCD) in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year. UWCD refers to Underground Water Conservation District. WD refers to Water District.

Groundwater Conservation District	Year					
	2010	2020	2030	2040	2050	2060
Central Texas GCD	690	690	690	690	690	690
Clearwater UWCD	1,099	1,099	1,099	1,099	1,099	1,099
Fox Crossing WD	946	946	946	946	946	946
Middle Trinity GCD	13,254	13,254	13,254	13,254	13,254	13,254
North Texas GCD	4,826	4,826	4,826	4,826	4,826	4,826
Northern Trinity GCD	2,535	2,535	2,535	2,535	2,535	2,535
Post Oak Savannah GCD	36	36	36	36	36	36
Prairielands GCD	3,881	3,881	3,881	3,881	3,881	3,881
Red River GCD	2,548	2,548	2,548	2,548	2,548	2,548
Saratoga UWCD	885	885	885	885	885	885
Southern Trinity GCD	4,190	4,190	4,190	4,190	4,190	4,190
Upper Trinity GCD	6,878	6,878	6,878	6,878	6,878	6,878
Total (excluding non-district areas)	**41,768**	**41,768**	**41,768**	**41,768**	**41,768**	**41,768**
No District	4,476	4,476	4,476	4,476	4,476	4,476
Total (including non-district areas)	**46,244**	**46,244**	**46,244**	**46,244**	**46,244**	**46,244**

Table 18. Modeled available groundwater for the Hosston unit of the Trinity Aquifer summarized by groundwater conservation district (GCD) in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year. UWCD refers to Underground Water Conservation District. WD refers to Water District.

Groundwater Conservation District	Year					
	2010	2020	2030	2040	2050	2060
Central Texas GCD	2,469	2,469	2,469	2,469	2,469	2,469
Clearwater UWCD	4,993	4,993	4,993	4,993	4,993	4,993
Fox Crossing WD	1,384	1,384	1,384	1,384	1,384	1,384
Middle Trinity GCD	43,216	43,216	43,216	43,216	43,216	43,216
North Texas GCD	8,349	8,349	8,349	8,349	8,349	8,349
Northern Trinity GCD	5,556	5,556	5,556	5,556	5,556	5,556
Post Oak Savannah GCD	103	103	103	103	103	103
Prairielands GCD	7,146	7,146	7,146	7,146	7,146	7,146
Red River GCD	2,556	2,556	2,556	2,556	2,556	2,556
Saratoga UWCD	1,446	1,446	1,446	1,446	1,446	1,446
Southern Trinity GCD	16,004	16,004	16,004	16,004	16,004	16,004
Upper Trinity GCD	17,464	17,464	17,464	17,464	17,464	17,464
Total (excluding non-district areas)	**110,686**	**110,686**	**110,686**	**110,686**	**110,686**	**110,686**
No District	20,123	20,123	20,123	20,123	20,123	20,123
Total (including non-district areas)	**130,809**	**130,809**	**130,809**	**130,809**	**130,809**	**130,809**

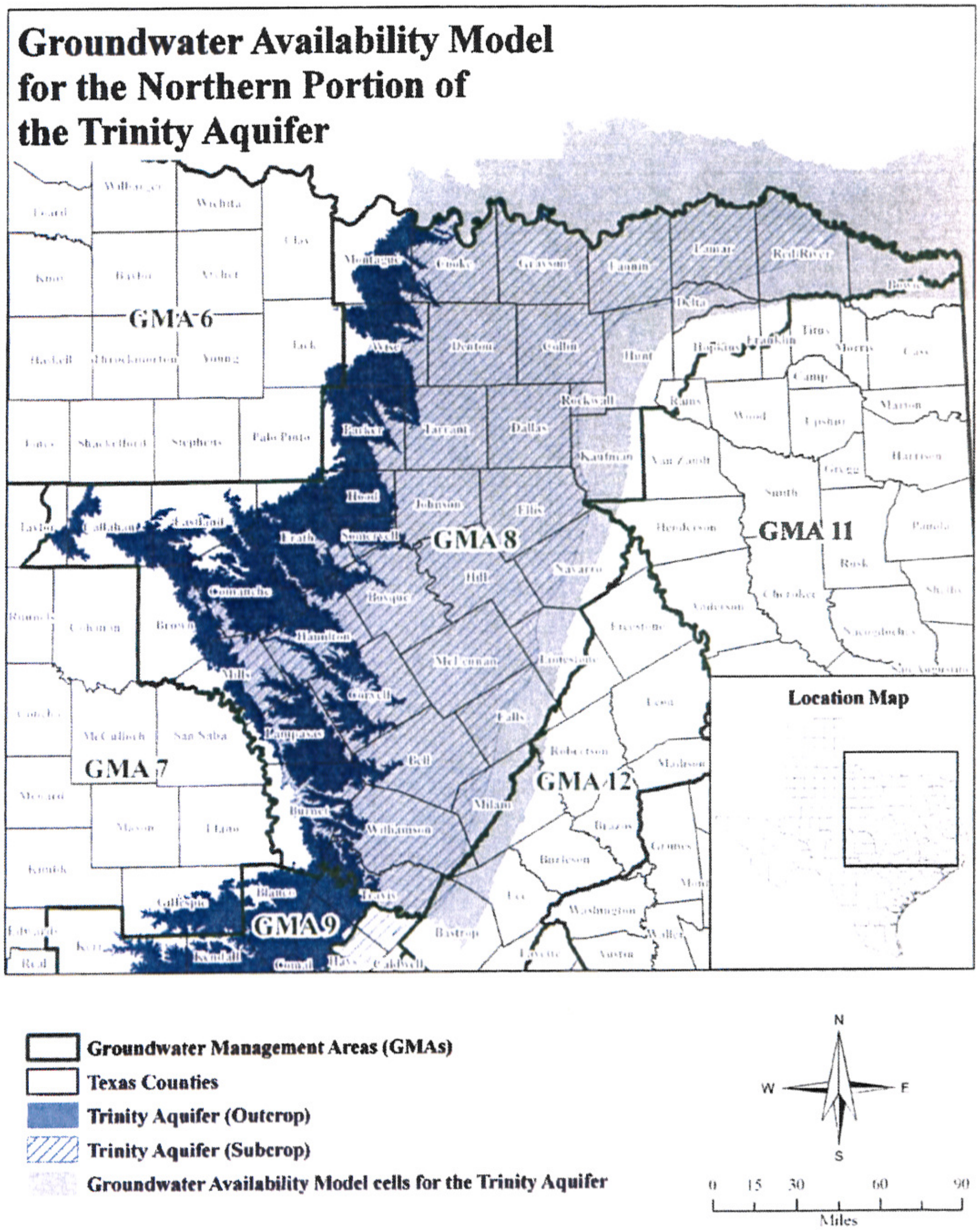

Figure 1. Map showing the areas of the groundwater availability model representing the northern portion of the Trinity Aquifer and the boundary of Groundwater Management Area 8.

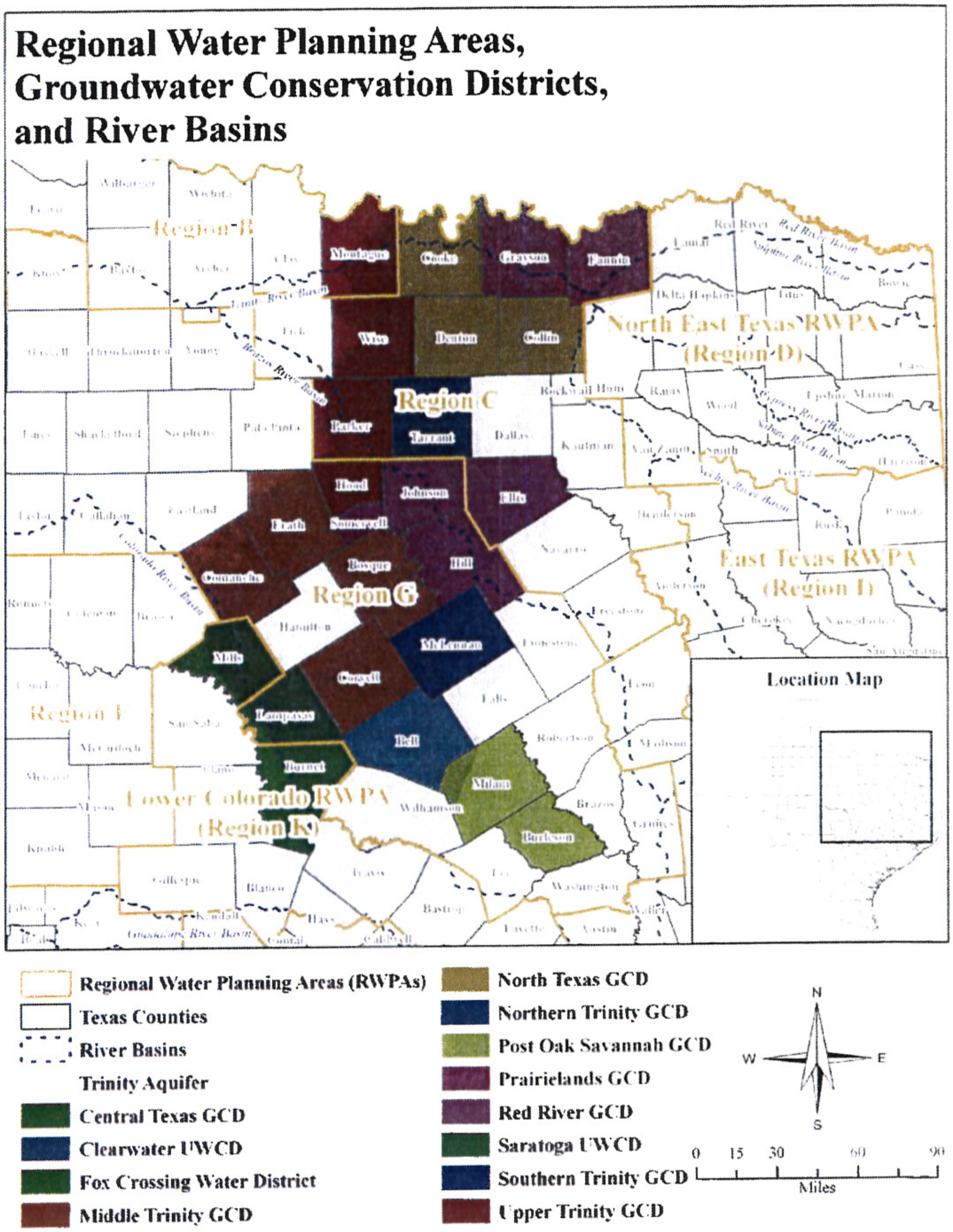

Figure 2. Map showing regional water planning areas (RWPAs), groundwater conservation districts (GCDs), counties, and river basins in and neighboring Groundwater Management Area 8.

Appendix E

GAM Run 10-064-MAG (Woodbine)

GAM Run 10-064 MAG

by Wade Oliver and Shirley Wade

Texas Water Development Board
Groundwater Availability Modeling Section
(512) 936-0883
June 29, 2012

STATE OF TEXAS
SHIRLEY C. WADE
GEOLOGY
No. 525
LICENSED
PROFESSIONAL GEOSCIENTIST

Shirley C. Wade
6/29/12

The seal appearing on this document was authorized by Shirley C. Wade, P.G. 525 on June 29, 2012.

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EXECUTIVE SUMMARY:

The modeled available groundwater for the Woodbine Aquifer as a result of the desired future conditions adopted by the districts of Groundwater Management Area 8 is approximately 44,900 acre-feet per year. This is shown divided by county, regional water planning area, and river basin in Table 1 for use in the regional water planning process. Modeled available groundwater is summarized by county, regional water planning area, river basin, and groundwater conservation district in tables 2 through 5. The estimates were extracted from Groundwater Availability Model Run 07-30 (Wade, 2007) which simulates the desired future conditions adopted by the districts of Groundwater Management Area 8. The modeled available groundwater estimates presented in this report are intended to replace the estimates previously reported in GAM Run 08-14mag which included estimates for non-relevant areas.

REQUESTOR:

Mr. Eddy Daniel of North Texas Groundwater Conservation District on behalf of Groundwater Management Area 8

DESCRIPTION OF REQUEST:

In a letter dated August 31, 2011, Mr. Eddy Daniel provided the Texas Water Development Board (TWDB) with a resolution dated June 23, 2011 to retain the previously adopted desired future conditions of the Woodbine Aquifer adopted by the districts of Groundwater Management Area 8 [on December 17, 2007], except for the Southern Trinity Groundwater Conservation District, which adopted a resolution dated June 23, 2011 to declare the Woodbine Aquifer non-relevant for joint planning purposes [within their district]. Therefore, the relevant desired future conditions, adopted December 27, 2007 and re-adopted June 23, 2011, are shown below:

- From estimated year 2000 conditions, the average drawdown should not exceed approximately 154 feet after 50 years in Collin County.
- From estimated year 2000 conditions, the average drawdown should not exceed approximately 0 feet after 50 years in Cooke County.
- From estimated year 2000 conditions, the average drawdown should not exceed approximately 112 feet after 50 years in Dallas County.
- From estimated year 2000 conditions, the average drawdown should not exceed approximately 16 feet after 50 years in Denton County.
- From estimated year 2000 conditions, the average drawdown should not exceed approximately 102 feet after 50 years in Ellis County.
- From estimated year 2000 conditions, the average drawdown should not exceed approximately 186 feet after 50 years in Fannin County.
- From estimated year 2000 conditions, the average drawdown should not exceed approximately 28 feet after 50 years in Grayson County.
- From estimated year 2000 conditions, the average drawdown should not exceed approximately 87 feet after 50 years in Hill County.

- From estimated year 2000 conditions, the average drawdown should not exceed approximately 353 feet after 50 years in Hunt County.
- From estimated year 2000 conditions, the average drawdown should not exceed approximately 4 feet after 50 years in Johnson County.
- From estimated year 2000 conditions, the average drawdown should not exceed approximately 211 feet after 50 years in Kaufman County.
- From estimated year 2000 conditions, the average drawdown should not exceed approximately 297 feet after 50 years in Lamar County.
- From estimated year 2000 conditions, the average drawdown should not exceed approximately 177 feet after 50 years in Navarro County.
- From estimated year 2000 conditions, the average drawdown should not exceed approximately 202 feet after 50 years in Red River County.
- From estimated year 2000 conditions, the average drawdown should not exceed approximately 241 feet after 50 years in Rockwall County.
- From estimated year 2000 conditions, the average drawdown should not exceed approximately 2 feet after 50 years in Tarrant County.

In response to receiving the adopted desired future conditions, the TWDB completed Groundwater Availability Model (GAM) Run 08-14mag in May 2008, which reported the "managed available groundwater" that achieves the above desired future conditions (Wade, 2008). However, GAM Run 08-14mag also included estimates for Delta, Limestone, and McLennan counties. We excluded those estimates from this report since Delta and Limestone counties were never issued a desired future condition for the Woodbine Aquifer and the Woodbine Aquifer was declared non-relevant in McLennan County.

METHODS:

The location of Groundwater Management Area 8, the Woodbine Aquifer, and the groundwater availability model cells that represent the aquifer are shown in Figure 1.

Modeled Available Groundwater and Permitting

As defined in Chapter 36 of the Texas Water Code, "modeled available groundwater" is the estimated average amount of water that may be produced annually to achieve a desired future condition. This is distinct from "managed available groundwater," shown in the draft version of this report dated December 20, 2010, which was a permitting value and accounted for the estimated use of the aquifer exempt from permitting. This change was made to reflect changes in statute by the 82nd Texas Legislature, effective September 1, 2011.

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. The estimated amount of pumping exempt from permitting, which the TWDB is now required to develop after soliciting input from applicable groundwater conservation districts, will be provided in a separate report. It should be noted that groundwater conservation district boundaries have also been updated since GAM Run 08-14mag. The results presented here correspond to the official district boundaries as of the date of this report.

PARAMETERS AND ASSUMPTIONS:

The groundwater availability model for the northern portion of the Trinity Aquifer and the Woodbine Aquifer was used for the results presented in this report. The parameters and assumptions for this model are described below:

- The results for total pumping presented here are based on the results reported as "managed available groundwater" in GAM Run 08-14mag (Wade, 2008). See GAM Run 08-14mag for a full description of the methods and assumptions associated with the model simulation. Because GAM Run 08-14mag presented constant pumping from 2000 to 2050, it was assumed for the purposes of this analysis that pumping from 2051 to 2060 was also constant at this same level. As described above, desired future conditions were defined by the groundwater conservation districts in Groundwater Management Area 8 for 2050. It is expected that pumping from 2051 to 2060 would cause additional drawdown, but this analysis does not estimate drawdown in 2060. Pumping estimates were extended to 2060 for the purposes of regional water planning.

- Version 1.01 of the groundwater availability model for the northern portion of the Trinity Aquifer and the Woodbine Aquifer was used for this analysis. See Bené and others (2004) for assumptions and limitations of the model.

- The model includes seven layers which generally correspond to the Woodbine Aquifer (Layer 1), the Washita and Fredericksburg Groups (Layer 2), the Paluxy Formation (Layer 3), the Glen Rose Formation (Layer 4), the Hensell Formation (Layer 5), the Pearsall/Cow Creek/Hammett/Sligo Members (Layer 6), and the Hosston Formation (Layer 7).

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

RESULTS:

The estimated total pumping from the Woodbine Aquifer in Groundwater Management Area 8 that achieves the above desired future conditions is approximately 44,900 acre-feet per year between 2010 and 2060. This pumping has been divided by county, regional water planning area, and river basin for each decade between 2010 and 2060 for use in the regional water planning process (Table 1). These areas are shown in Figure 2.

Tables 2, 3, 4, and 5 show the total pumping summarized by county, regional water planning area, river basin, and groundwater conservation district, respectively. Notice in Table 5 that the pumping is totaled both excluding and including areas outside of a groundwater conservation district.

LIMITATIONS:

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

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

A key aspect of using the groundwater model to evaluate the impacts of future pumping is the need to make assumptions about the location in the aquifer where future pumping will occur. As actual pumping changes in the future, it will be necessary to evaluate the amount of that pumping as well as its location in the context of the assumptions associated with this analysis. Evaluating the amount and location of future pumping is as important as evaluating the changes in groundwater levels, spring flows, and other metrics that describe the impacts of that pumping. This analysis does not assess the possible impacts of pumping such as reduced water quality or land surface subsidence.

In addition, certain assumptions have been made regarding future precipitation, recharge, and streamflow in evaluating the impacts of future pumping. Those assumptions also need to be considered and compared to actual future data.

Given these limitations, users of this information are cautioned that the results should not be considered a definitive, permanent prediction of the changes in groundwater storage, streamflow, and spring flow. Because the application of the groundwater availability 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 future groundwater pumping and overall conditions of the aquifer. Because of the limitations of the groundwater availability 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.

REFERENCES:

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Table 1. Modeled available groundwater in acre-feet per year for the Woodbine Aquifer in Groundwater Management Area 8 by county, regional water planning area, and river basin.

County	Regional Water Planning Area	River Basin	Year					
			2010	2020	2030	2040	2050	2060
Collin	C	Sabine	40	40	40	40	40	40
		Trinity	2,469	2,469	2,469	2,469	2,469	2,469
Cooke	C	Red	18	18	18	18	18	18
		Trinity	136	136	136	136	136	136
Dallas	C	Trinity	2,313	2,313	2,313	2,313	2,313	2,313
Denton	C	Trinity	4,126	4,126	4,126	4,126	4,126	4,126
Ellis	C	Trinity	5,441	5,441	5,441	5,441	5,441	5,441
Fannin	C	Red	2,676	2,676	2,676	2,676	2,676	2,676
		Sulphur	21	21	21	21	21	21
		Trinity	600	600	600	600	600	600
Grayson	C	Red	6,590	6,590	6,590	6,590	6,590	6,590
		Trinity	5,497	5,497	5,497	5,497	5,497	5,497
Hill	G	Brazos	1,249	1,249	1,249	1,249	1,249	1,249
		Trinity	1,012	1,012	1,012	1,012	1,012	1,012
Hunt	D	Sabine	1,867	1,867	1,867	1,867	1,867	1,867
		Sulphur	849	849	849	849	849	849
		Trinity	124	124	124	124	124	124
Johnson	G	Brazos	141	141	141	141	141	141
		Trinity	4,591	4,591	4,591	4,591	4,591	4,591
Kaufman	C	Sabine	0	0	0	0	0	0
		Trinity	200	200	200	200	200	200
Lamar	D	Red	1,910	1,910	1,910	1,910	1,910	1,910
		Sulphur	1,734	1,734	1,734	1,734	1,734	1,734
Navarro	C	Trinity	300	300	300	300	300	300
Red River	D	Red	162	162	162	162	162	162
		Sulphur	4	4	4	4	4	4
Rockwall	C	Sabine	0	0	0	0	0	0
		Trinity	144	144	144	144	144	144
Tarrant	C	Trinity	632	632	632	632	632	632
Total			**44,846**	**44,846**	**44,846**	**44,846**	**44,846**	**44,846**

Table 2. Modeled available groundwater for the Woodbine Aquifer summarized by county in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

County	Year					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Collin	2,509	2,509	2,509	2,509	2,509	2,509
Cooke	154	154	154	154	154	154
Dallas	2,313	2,313	2,313	2,313	2,313	2,313
Denton	4,126	4,126	4,126	4,126	4,126	4,126
Ellis	5,441	5,441	5,441	5,441	5,441	5,441
Fannin	3,297	3,297	3,297	3,297	3,297	3,297
Grayson	12,087	12,087	12,087	12,087	12,087	12,087
Hill	2,261	2,261	2,261	2,261	2,261	2,261
Hunt	2,840	2,840	2,840	2,840	2,840	2,840
Johnson	4,732	4,732	4,732	4,732	4,732	4,732
Kaufman	200	200	200	200	200	200
Lamar	3,644	3,644	3,644	3,644	3,644	3,644
Navarro	300	300	300	300	300	300
Red River	166	166	166	166	166	166
Rockwall	144	144	144	144	144	144
Tarrant	632	632	632	632	632	632
Total	**44,846**	**44,846**	**44,846**	**44,846**	**44,846**	**44,846**

Table 3. Modeled available groundwater for the Woodbine Aquifer summarized by regional water planning area in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

Regional Water Planning Area	Year					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
C	31,203	31,203	31,203	31,203	31,203	31,203
D	6,650	6,650	6,650	6,650	6,650	6,650
G	6,993	6,993	6,993	6,993	6,993	6,993
Total	**44,846**	**44,846**	**44,846**	**44,846**	**44,846**	**44,846**

Table 4. Modeled available groundwater for the Woodbine Aquifer summarized by river basin in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

River Basin	Year					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Brazos	1,390	1,390	1,390	1,390	1,390	1,390
Red	11,356	11,356	11,356	11,356	11,356	11,356
Sabine	1,907	1,907	1,907	1,907	1,907	1,907
Sulphur	2,608	2,608	2,608	2,608	2,608	2,608
Trinity	27,585	27,585	27,585	27,585	27,585	27,585
Total	**44,846**	**44,846**	**44,846**	**44,846**	**44,846**	**44,846**

Table 5. Modeled available groundwater for the Woodbine Aquifer summarized by groundwater conservation district (GCD) in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

Groundwater Conservation District	Year					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
North Texas GCD	6,789	6,789	6,789	6,789	6,789	6,789
Northern Trinity GCD	632	632	632	632	632	632
Prairielands GCD	12,434	12,434	12,434	12,434	12,434	12,434
Red River GCD	15,384	15,384	15,384	15,384	15,384	15,384
Total (excluding non-district areas)	**35,239**	**35,239**	**35,239**	**35,239**	**35,239**	**35,239**
No District	9,607	9,607	9,607	9,607	9,607	9,607
Total (including non-district areas)	**44,846**	**44,846**	**44,846**	**44,846**	**44,846**	**44,846**

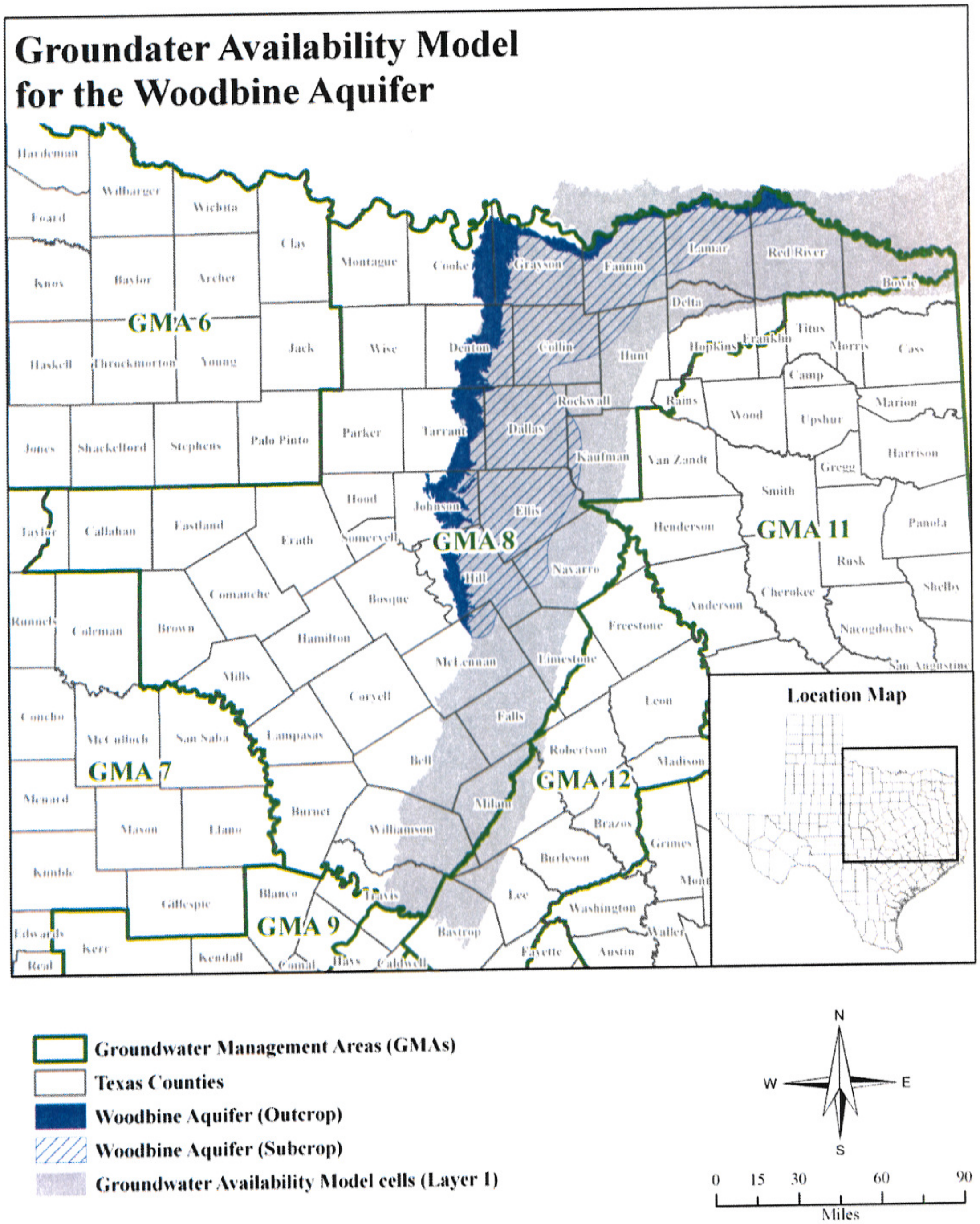

Figure 1. Map showing the areas of the groundwater availability model representing the Woodbine Aquifer and the boundary of Groundwater Management Area 8.

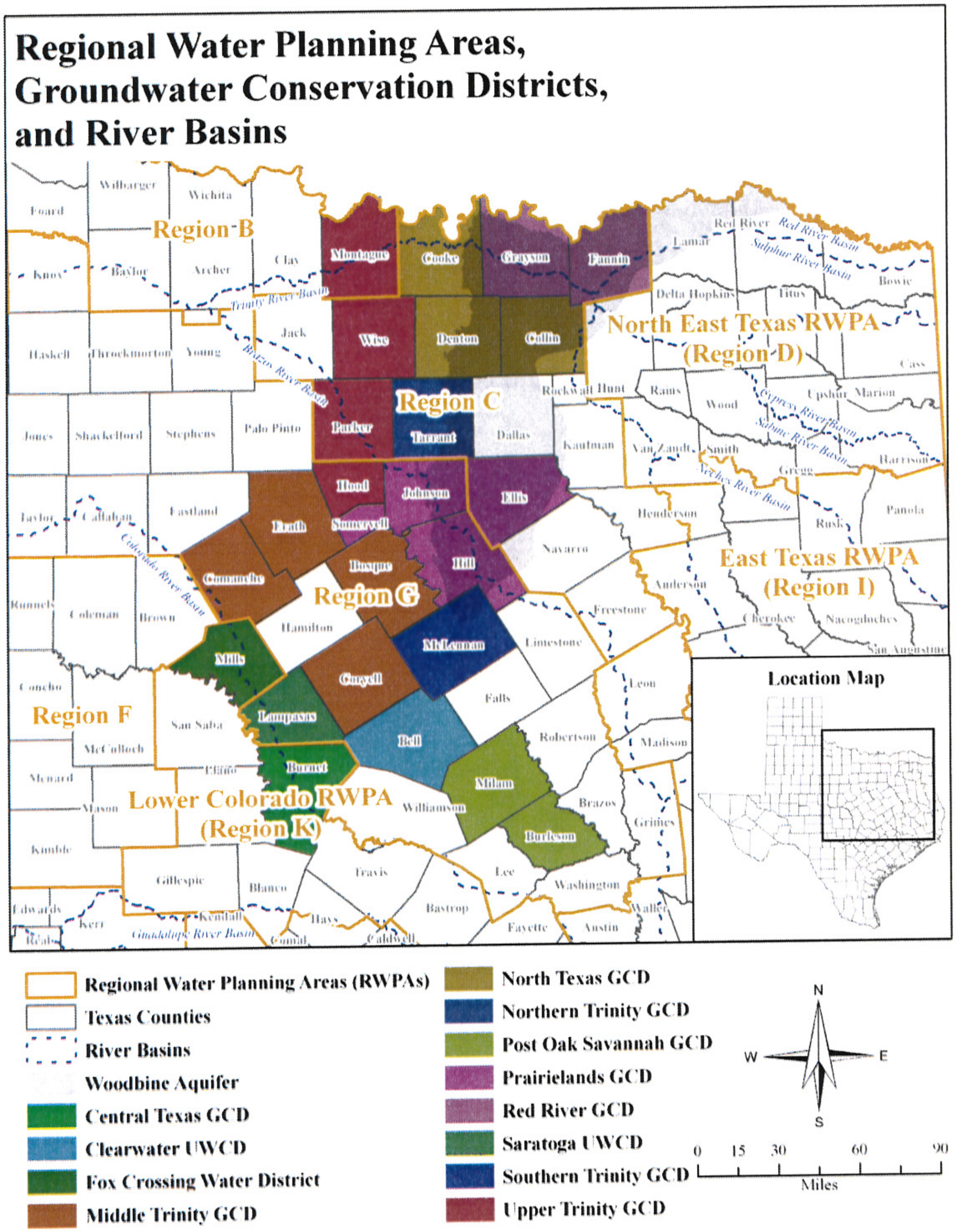

Figure 2. Map showing regional water planning areas (RWPAs), groundwater conservation districts (GCDs), counties, and river basins in and neighboring Groundwater Management Area 8.

Appendix F

GR 11-011 MAG (Nacatoch)

AA 10-18 MAG (Brazos River Alluvium)

GAM RUN 11-011 MAG: MODELED AVAILABLE GROUNDWATER FOR THE NACATOCH AQUIFER IN GROUNDWATER MANAGEMENT AREA 8

by Wade Oliver
Texas Water Development Board
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 463-3132
December 14, 2011

STATE OF TEXAS
CYNTHIA K. RIDGEWAY
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Cynthia K. Ridgeway, the Manager of the Groundwater Availability Modeling Section and Interim Director of the Groundwater Resources Division, is responsible for oversight of work performed by employees under her direct supervision. The seal appearing on this document was authorized by Cynthia K. Ridgeway, P.G. 471 on December 14, 2011.

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GAM Run 11-011 MAG: Modeled Available Groundwater for the Nacatoch Aquifer in Groundwater Management Area 8

by Wade Oliver
Texas Water Development Board
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 463-3132
December 14, 2011

EXECUTIVE SUMMARY:

The modeled available groundwater for the Nacatoch Aquifer as a result of the desired future conditions adopted by the members of Groundwater Management Area 8 is approximately 13,800 acre-feet per year and is summarized by county, river basin, and regional water planning area in Table 2. The pumping estimates were extracted from Groundwater Availability Model Run 10-006, Scenario 4, which Groundwater Management Area 8 used as the basis for developing their desired future conditions.

REQUESTOR:

Mr. Eddy Daniel of North Texas Groundwater Conservation District on behalf of Groundwater Management Area 8

DESCRIPTION OF REQUEST:

In a letter dated August 31, 2011, Mr. Daniel provided the Texas Water Development Board (TWDB) with the desired future conditions of the Nacatoch Aquifer in Groundwater Management Area 8. The desired future conditions for the Nacatoch Aquifer, adopted June 23, 2011 by the groundwater conservation districts in Groundwater Management Area 8, are shown in Table 1.

METHODS:

Groundwater Management Area 8 contains a portion of the Nacatoch Aquifer, a minor aquifer in Texas according to the 2007 State Water Plan (TWDB, 2007). The locations of Groundwater Management Area 8, the Nacatoch Aquifer, and the groundwater availability model cells that represent the aquifer are shown in Figure 1.

The Texas Water Development Board previously completed a series of simulations using the groundwater availability model (GAM) for the Nacatoch Aquifer to assist the members of Groundwater Management Area 8 in developing desired future conditions. These are documented in draft GAM Run 10-006 (Hassan, 2011). As shown in the desired future condition resolution, the simulation on which the desired future conditions above are based is Scenario 4 of GAM Run 10-006. The estimates of modeled available groundwater for the Nacatoch Aquifer presented here, taken directly from the above scenario, have been divided by county, regional water planning area, river basin, and groundwater conservation district. These areas are shown in Figure 2.

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. The estimated amount of pumping exempt from permitting, which the Texas Water Development Board is required to develop after soliciting input from applicable groundwater conservation districts, will be provided in a separate report.

PARAMETERS AND ASSUMPTIONS:

- The results presented in this report are based on Scenario 4 in Draft GAM Run 10-006 (Hassan, 2011). See Draft GAM Run 10-006 for a full description of the methods, assumptions, and results of the groundwater availability model run.

- We used version 1.01 of the groundwater availability model for the Nacatoch Aquifer (Beach and others, 2009). See Beach and others (2009) for assumptions and limitations of the model

- The groundwater availability model contains two layers, which generally correspond to:

    - o the Kemp Clay and Midway Units (Layer 1)

    - o the Nacatoch Aquifer (Layer 2)

- The mean absolute error (a measure of the difference between simulated and measured water levels during model calibration) for the Nacatoch Aquifer is 30 feet (Beach and others, 2009).

- The average recharge between 1980 and 1997, the historical-calibration period of the model, was applied each year during the 2011 to 2060 predictive simulation.

RESULTS:

The modeled available groundwater for the Nacatoch Aquifer in Groundwater Management Area 8 that achieves the above desired future conditions is approximately 13,800 acre-feet per year. Table 2 contains the modeled available groundwater by decade subdivided by county, regional water planning area, and river basin for use in the regional water planning process. Note that the minor differences in pumping shown in Table 2 compared with Hassan (2011) are due to rounding. Tables 3, 4, 5, and 6 show the modeled available groundwater for the Nacatoch Aquifer summarized by county, regional water planning area, river basin, and groundwater conservation district, respectively, within Groundwater Management Area 8.

LIMITATIONS:

The groundwater model used in developing estimates of modeled available groundwater is the best available scientific tool that can be used to estimate the pumping that will achieve the desired future conditions. Although the groundwater model used in this analysis is the best available scientific tool for this purpose, it, like all models, has limitations. 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 develop estimates of modeled available groundwater is the need to make assumptions about the location in the aquifer where future pumping will occur. As actual pumping changes in the future, it will be necessary to evaluate the amount of that pumping as well as its location in the context of the assumptions associated with this analysis. Evaluating the amount and location of future pumping is as important as evaluating the changes in groundwater levels, spring flows, and other metrics that describe the condition of the groundwater resources in the area that relate to the adopted desired future condition.

Given these limitations, users of this information are cautioned that the modeled available groundwater numbers should not be considered a definitive, permanent description of the amount of groundwater that can be pumped to meet the adopted desired future condition. 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 future groundwater pumping as well as whether or not they are achieving their desired future conditions. Because of the limitations of the model and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine the modeled available groundwater numbers given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future.

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Texas Water Development Board, 2007, Water for Texas – 2007—Volumes I-III; Texas Water Development Board Document No. GP-8-1, 392 p.

TABLE 1: DESIRED FUTURE CONDITIONS FOR THE NACATOCH AQUIFER ADOPTED BY THE GROUNDWATER CONSERVATION DISTRICTS IN GROUNDWATER MANAGEMENT AREA 8.

County	*Basin*	*Drawdown (feet)*
Bowie	Red	10
	Sulphur	17
Delta	Sulphur	5
Ellis	Trinity	4
Franklin	Sulphur	6
Hopkins	Sabine	10
	Sulphur	12
Hunt	Sabine	10
	Sulphur	6
Kaufman	Sabine	7
	Trinity	4
Lamar	Sulphur	5
Navarro	Trinity	4
Rains	Sabine	13
Red River	Red	10
	Sulphur	8
Rockwall	Trinity	5
Groundwater Management Area 8 Average		**9**

TABLE 2: MODELED AVAILABLE GROUNDWATER FOR THE NACATOCH AQUIFER IN GROUNDWATER MANAGEMENT AREA 8. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE DIVIDED BY COUNTY, REGIONAL WATER PLANNING AREA, AND RIVER BASIN.

County	Region	Basin	Year					
			2010	2020	2030	2040	2050	2060
Bowie	D	Red	3,071	3,071	3,071	3,071	3,071	3,071
		Sulphur	1,942	1,942	1,942	1,942	1,942	1,942
Delta	D	Sulphur	575	575	575	575	575	575
Ellis	C	Trinity	20	20	20	20	20	20
Franklin	D	Sulphur	30	30	30	30	30	30
Hopkins	D	Sabine	291	291	291	291	291	291
		Sulphur	916	916	916	916	916	916
Hunt	D	Sabine	3,303	3,303	3,303	3,303	3,303	3,303
		Sulphur	491	491	491	491	491	491
Kaufman	C	Sabine	49	49	49	49	49	49
		Trinity	877	877	877	877	877	877
Lamar	D	Sulphur	110	110	110	110	110	110
Navarro	C	Trinity	980	980	980	980	980	980
Rains	D	Sabine	1	1	1	1	1	1
Red River	D	Red	58	58	58	58	58	58
		Sulphur	1,047	1,047	1,047	1,047	1,047	1,047
Rockwall	C	Sabine	0	0	0	0	0	0
		Trinity	13	13	13	13	13	13
Total			**13,774**	**13,774**	**13,774**	**13,774**	**13,774**	**13,774**

TABLE 3: MODELED AVAILABLE GROUNDWATER FOR THE NACATOCH AQUIFER BY COUNTY FOR EACH DECADE BETWEEN 2010 AND 2060. RESULTS ARE IN ACRE-FEET PER YEAR.

County	Year					
	2010	2020	2030	2040	2050	2060
Bowie	5,013	5,013	5,013	5,013	5,013	5,013
Delta	575	575	575	575	575	575
Ellis	20	20	20	20	20	20
Franklin	30	30	30	30	30	30
Hopkins	1,207	1,207	1,207	1,207	1,207	1,207
Hunt	3,794	3,794	3,794	3,794	3,794	3,794
Kaufman	926	926	926	926	926	926
Lamar	110	110	110	110	110	110
Navarro	980	980	980	980	980	980
Rains	1	1	1	1	1	1
Red River	1,105	1,105	1,105	1,105	1,105	1,105
Rockwall	13	13	13	13	13	13
Total	**13,774**	**13,774**	**13,774**	**13,774**	**13,774**	**13,774**

TABLE 4: MODELED AVAILABLE GROUNDWATER FOR THE NACATOCH AQUIFER BY REGIONAL WATER PLANNING AREA FOR EACH DECADE BETWEEN 2010 AND 2060. RESULTS ARE IN ACRE-FEET PER YEAR.

Region	Year					
	2010	2020	2030	2040	2050	2060
C	1,939	1,939	1,939	1,939	1,939	1,939
D	11,835	11,835	11,835	11,835	11,835	11,835
Total	**13,774**	**13,774**	**13,774**	**13,774**	**13,774**	**13,774**

TABLE 5: MODELED AVAILABLE GROUNDWATER FOR THE NACATOCH AQUIFER BY RIVER BASIN FOR EACH DECADE BETWEEN 2010 AND 2060. RESULTS ARE IN ACRE-FEET PER YEAR.

Basin	Year					
	2010	2020	2030	2040	2050	2060
Red	3,129	3,129	3,129	3,129	3,129	3,129
Sabine	3,644	3,644	3,644	3,644	3,644	3,644
Sulphur	5,111	5,111	5,111	5,111	5,111	5,111
Trinity	1,890	1,890	1,890	1,890	1,890	1,890
Total	**13,774**	**13,774**	**13,774**	**13,774**	**13,774**	**13,774**

TABLE 6: MODELED AVAILABLE GROUNDWATER FOR THE NACATOCH AQUIFER BY GROUNDWATER CONSERVATION DISTRICT (GCD) FOR EACH DECADE BETWEEN 2010 AND 2060. RESULTS ARE IN ACRE-FEET PER YEAR.

District	Year					
	2010	2020	2030	2040	2050	2060
Prairielands GCD	20	20	20	20	20	20
No District	13,754	13,754	13,754	13,754	13,754	13,754
Total	**13,774**	**13,774**	**13,774**	**13,774**	**13,774**	**13,774**

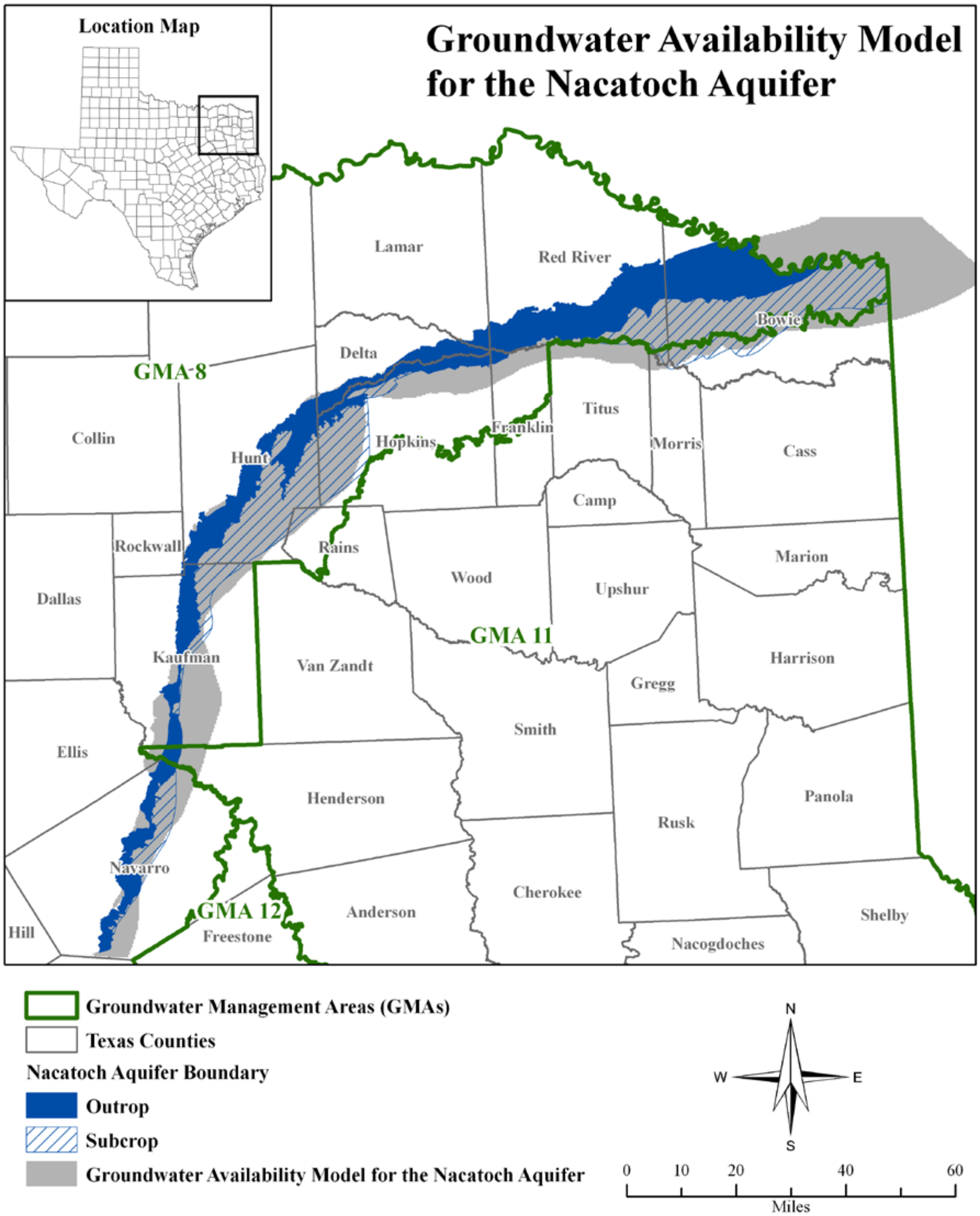

FIGURE 1: MAP SHOWING GROUNDWATER MANAGEMENT AREA 8 AND THE BOUNDARY OF THE NACATOCH AQUIFER ACCORDING TO THE 2007 STATE WATER PLAN (TWDB, 2007).

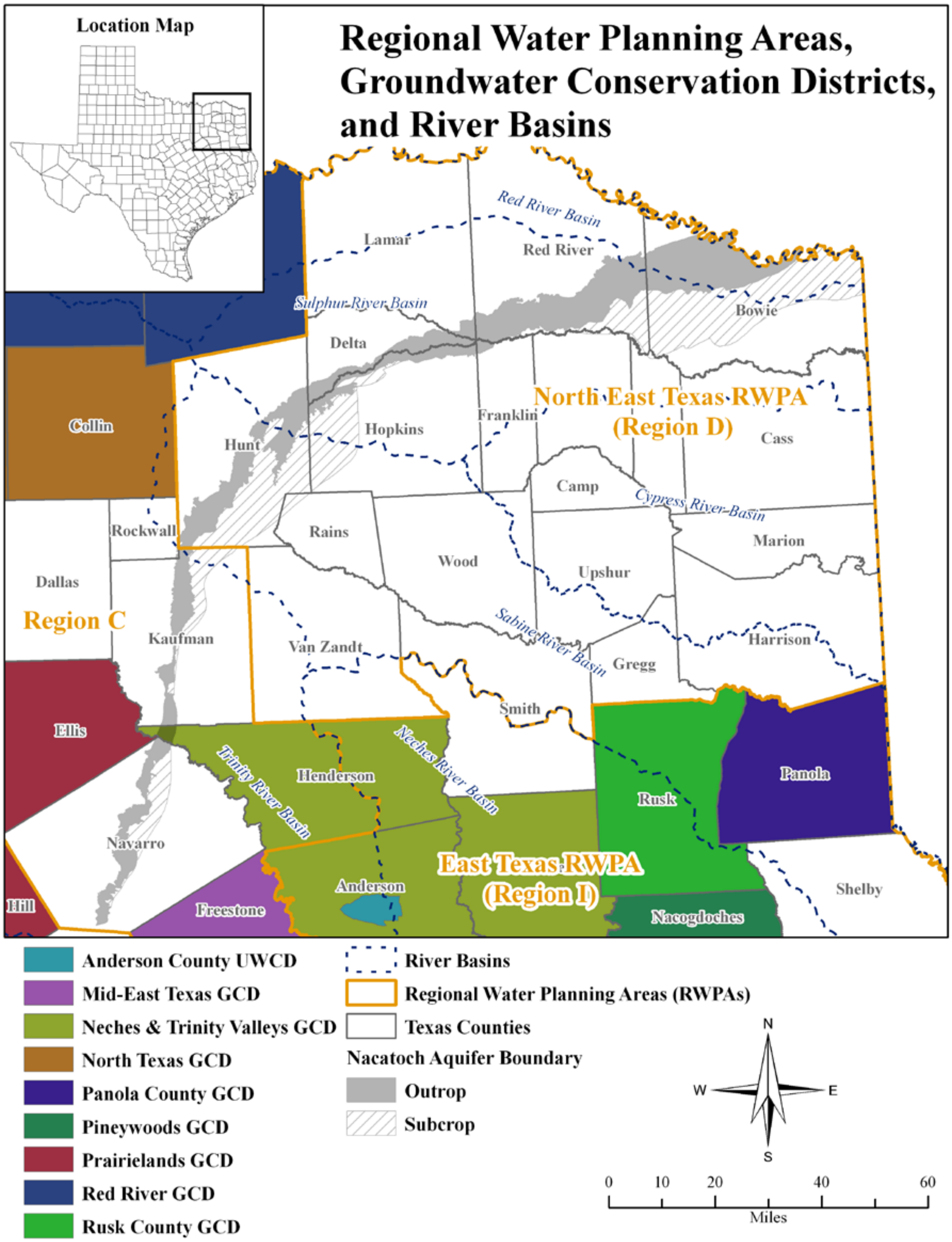

FIGURE 2: MAP SHOWING GROUNDWATER CONSERVATION DISTRICTS, REGIONAL WATER PLANNING AREAS, COUNTIES, AND RIVER BASINS IN AND NEIGHBORING GROUNDWATER MANAGEMENT AREA 8.

GTA Aquifer Assessment 10-18 MAG

by Robert G. Bradley, P.G.
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STATE OF TEXAS
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Robert G. Bradley, P.G. 707, authorized the seal appearing on this document on December 9, 2011

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EXECUTIVE SUMMARY:

The estimated modeled available groundwater from the Brazos River Alluvium Aquifer that achieves the desired future condition adopted by members of Groundwater Management Area 8 is approximately 33,169 acre-feet per year and is summarized by county, regional water planning area, and river basin as shown in Tables 1-5. The modeled available groundwater estimates for the groundwater conservation districts within Groundwater Management Area 8 for the aquifer is approximately 16,485 acre-feet per year between 2010 and 2060 and are shown in Table 5.

REQUESTOR:

Mr. Eddy Daniel of the North Texas Groundwater Conservation District acting on the behalf of Groundwater Management Area 8.

DESCRIPTION OF REQUEST:

In a letter dated August 31, 2011, Mr. Eddy Daniel provided the Texas Water Development Board (TWDB) with the desired future condition of the Brazos River Alluvium Aquifer that were adopted in a resolution, dated April 27, 2011, by the members of Groundwater Management Area 8. This resolution referenced the previously adopted desired future conditions for Brazos River Alluvium Aquifer, as described in a resolution adopted December 17, 2007 by the groundwater conservation districts in Groundwater Management Area 8.

However, following readopting the previous desired future conditions, the Groundwater Management area 8 representatives, in a resolution dated June 23, 2011, made that the portion of the Brazos River Alluvium Aquifer in Milam County non-relevant for joint planning purposes. Therefore, the current desired future conditions are:

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

Because the desired future conditions were identical to the previous submission, the modeled available groundwater estimates in this report are identical to the previously released “managed available groundwater” estimates that were in GTA Aquifer Assessment 07-05mag.

METHODS:

Groundwater Management Area 8, located in central Texas, includes part of the Brazos River Alluvium Aquifer (Figure 1). The desired future condition requested for the Brazos River Alluvium Aquifer was based on the desired future condition adopted by Groundwater Management Area 8. The pumping results presented here for Groundwater Management Area 8 are taken directly from GTA Aquifer Assessment 07-05mag.

PARAMETERS AND ASSUMPTIONS:

- Parameters, assumptions, volumetric calculations, and areas were obtained from GTA Aquifer Assessment 07-05mag (Bradley, 2008).

MODELED AVAILABLE GROUNDWATER AND PERMITTING:

As defined in Chapter 36 of the Texas Water Code, “modeled available groundwater” is the estimated average amount of water that may be produced annually to achieve a desired future condition. This is distinct from “managed available groundwater,” shown in the draft version of this report dated January 25, 2011, which was a permitting value and accounted for the estimated use of the aquifer exempt from permitting. This change was made to reflect changes in statute by the 82nd Texas Legislature, effective September 1, 2011. The previous version of this report was completed prior to the readopting of the desired future conditions.

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. The estimated amount of pumping exempt from permitting, which the Texas Water Development Board is now required to develop after soliciting input from applicable groundwater conservation districts, will be provided in a separate report.

RESULTS:

The estimated modeled available groundwater from the Brazos River Alluvium Aquifer in Groundwater Management Area 8 that achieves the adopted desired future condition is approximately 33,169 acre-feet per year. This pumping has been divided by county, regional water planning area, and river basin for each decade between 2010 and 2060 for use in the regional water planning process (Table 1).

The modeled available groundwater estimates are also summarized by county, regional water planning area, river basin, and groundwater conservation district and are shown in tables 2, 3, 4, and 5, respectively.

Table 1. Estimated modeled available groundwater by decade for the Brazos River Alluvium Aquifer in Groundwater Management Area 8. Results are in acre-feet per year and are divided by county, regional water planning area, and river basin.

County	Regional Water Planning Area	River Basin	Year					
			2010	2020	2030	2040	2050	2060
Bosque	G	Brazos	830	830	830	830	830	830
Falls	G	Brazos	16,684	16,684	16,684	16,684	16,684	16,684
Hill	G	Brazos	632	632	632	632	632	632
McLennan	G	Brazos	15,023	15,023	15,023	15,023	15,023	15,023
		Total	**33,169**	**33,169**	**33,169**	**33,169**	**33,169**	**33,169**

Table 2. Estimated modeled available groundwater for the Brazos River Alluvium Aquifer summarized by county in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

County	Year					
	2010	2020	2030	2040	2050	2060
Bosque	830	830	830	830	830	830
Falls	16,684	16,684	16,684	16,684	16,684	16,684
Hill	632	632	632	632	632	632
McLennan	15,023	15,023	15,023	15,023	15,023	15,023
Total	**33,169**	**33,169**	**33,169**	**33,169**	**33,169**	**33,169**

Table 3. Estimated modeled available groundwater for the Brazos River Alluvium Aquifer summarized by regional water planning area in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

Regional Water Planning Area	**Year**					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
G	33,169	33,169	33,169	33,169	33,169	33,169

Table 4. Estimated modeled available groundwater for the Brazos River Alluvium Aquifer summarized by river basin in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

Basin	**Year**					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Brazos	33,169	33,169	33,169	33,169	33,169	33,169

Table 5. Estimated modeled available groundwater for the Brazos River Alluvium Aquifer summarized by groundwater conservation district in Groundwater Management Area 8 for each decade between 2010 and 2060. Results are in acre-feet per year.

Groundwater Conservation District	**Year**					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Middle Trinity GCD	830	830	830	830	830	830
Prairielands GCD	632	632	632	632	632	632
Southern Trinity GCD	15,023	15,023	15,023	15,023	15,023	15,023
Total (excluding non-district areas)	**16,485**	**16,485**	**16,485**	**16,485**	**16,485**	**16,485**
No district	16,684	16,684	16,684	16,684	16,684	16,684
Total (including non-district areas)	**33,169**	**33,169**	**33,169**	**33,169**	**33,169**	**33,169**

LIMITATIONS:

The water budget used by Bradley (2008) was determined to be the best method to calculate estimates of modeled available groundwater; however, this method has limitations and should be replaced with better tools, including groundwater models and additional data that are not currently available, whenever possible.

This analysis assumes homogeneous and isotropic aquifers; however, aquifer conditions may not be uniform. The analysis further assumes that precipitation is the only source of aquifer recharge that lateral inflow to the aquifer is equal to lateral outflow from the aquifer, and that future pumping will not alter this balance. In addition, certain assumptions have been made regarding future precipitation, recharge, and streamflow in developing modeled available groundwater estimates. These assumptions need to be considered and compared to actual future data when evaluating achievement of the desired future condition.

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

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

REFERENCES:

Bradley, R. G., 2008, GTA Aquifer Assessment 07-05mag: Texas Water Development Board, GTA Aquifer Assessment Report, 8 p.

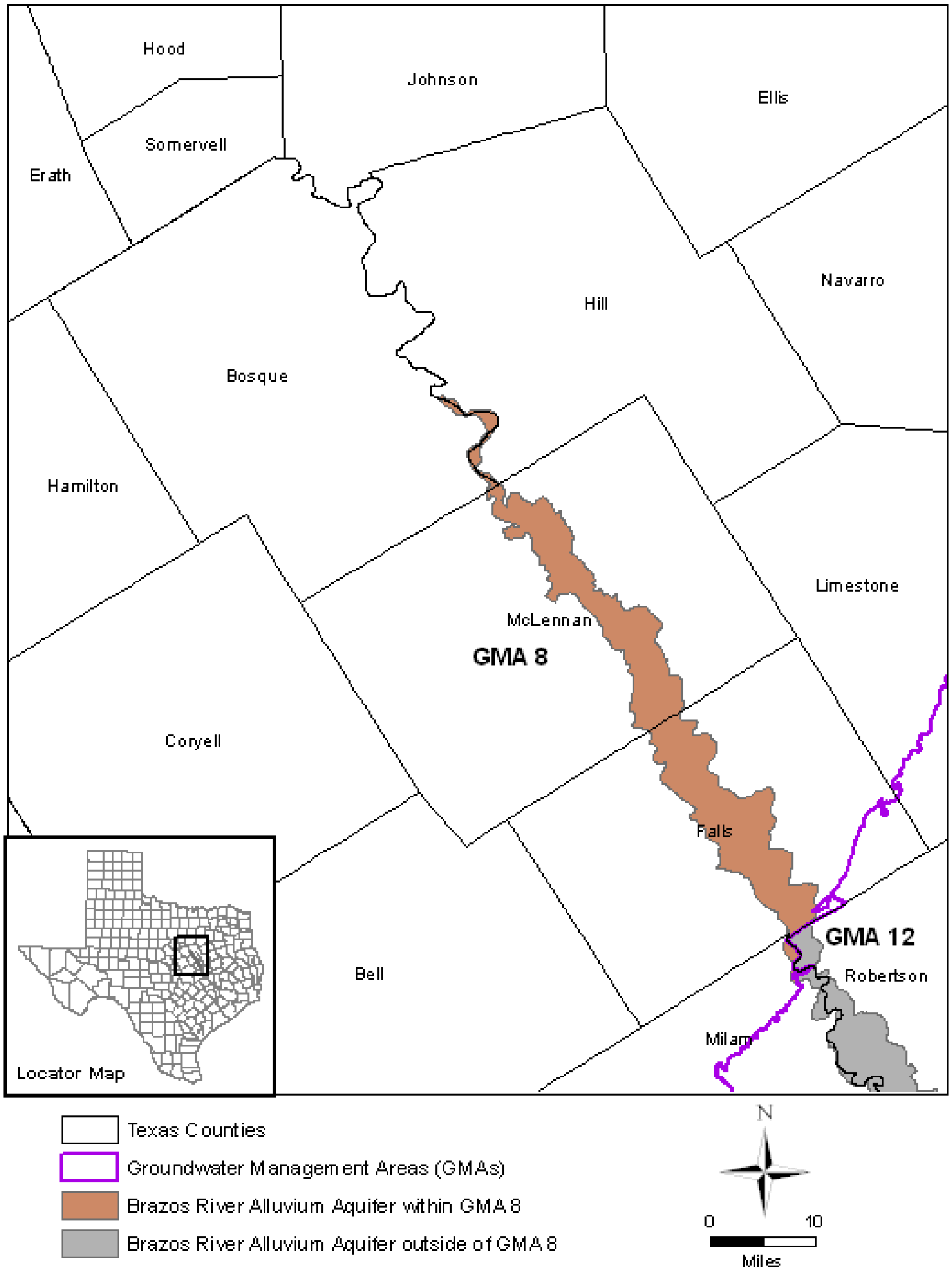

Figure 1. Map showing the area covered by the Brazos River Alluvium Aquifer in Groundwater Management Area 8.

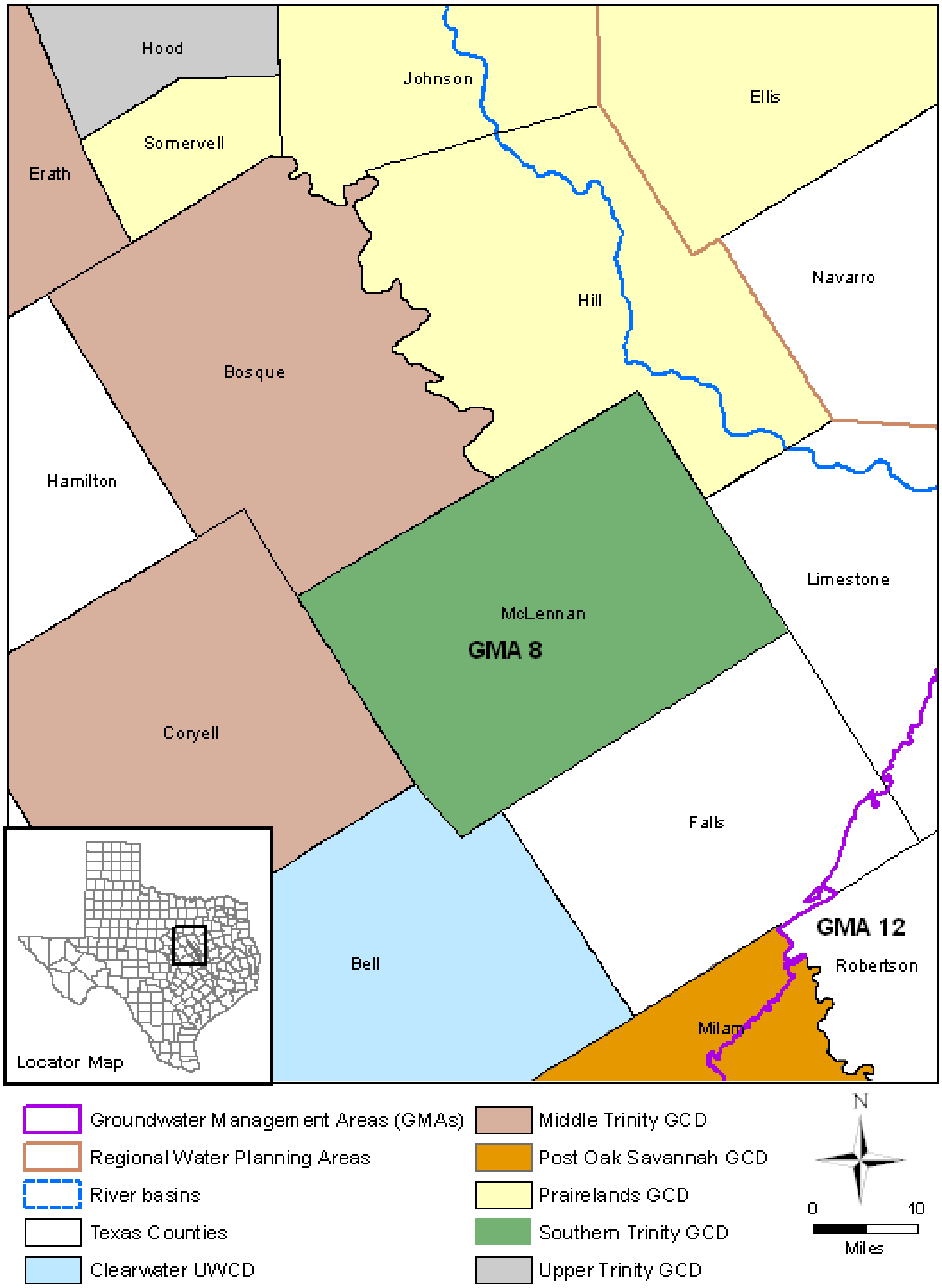

Figure 2. Map showing regional water planning areas, river basins, groundwater conservation districts and counties in and neighboring the Groundwater Management Area 8 assessment area. GCD = Groundwater Conservation District, UWCD = Underground Water Conservation District.

Appendix G

Estimated Historical Water Use and 2017 State Water Plan Datasets

Estimated Historical Water Use And 2017 State Water Plan Datasets:

Prairielands Groundwater Conservation District

by Stephen Allen
Texas Water Development Board
Groundwater Division
Groundwater Technical Assistance Section
stephen.allen@twdb.texas.gov
(512) 463-7317
September 1, 2016

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 this part 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)
   from the 2017 Texas State Water Plan (SWP)

Part 2 of the 2-part package is the groundwater availability model (GAM) report for the District (checklist items 3 through 5). 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 2017 SWP data available as of 9/1/2016. Although it does not happen frequently, either of these datasets are subject to change pending the availability of more accurate WUS data or an amendment to the 2017 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 2017 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 2015. TWDB staff anticipates the calculation and posting of these estimates at a later date.

ELLIS COUNTY

All values are in acre-feet

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2014	GW	6,233	2,226	0	0	1,249	17	9,725
	SW	17,384	2,962	0	901	51	855	22,153
2013	GW	5,753	2,704	0	0	1,229	18	9,704
	SW	19,840	2,417	0	0	0	891	23,148
2012	GW	7,073	1,946	0	0	1,933	15	10,967
	SW	20,193	2,070	0	0	44	724	23,031
2011	GW	8,047	2,069	22	0	1,499	32	11,669
	SW	19,812	2,923	34	83	0	1,564	24,416
2010	GW	6,407	1,316	136	0	270	32	8,161
	SW	17,045	2,830	239	77	0	1,554	21,745
2009	GW	7,936	1,116	87	0	1,019	19	10,177
	SW	15,752	2,163	159	0	0	930	19,004
2008	GW	7,697	1,844	1,209	0	1,155	18	11,923
	SW	16,706	2,251	1,847	0	0	864	21,668
2007	GW	7,012	2,117	0	0	166	19	9,314
	SW	16,305	2,992	33	0	0	929	20,259
2006	GW	8,002	2,326	0	0	261	22	10,611
	SW	19,827	3,609	23	0	51	1,093	24,603
2005	GW	7,340	2,652	0	0	208	21	10,221
	SW	18,004	1,488	23	0	0	1,041	20,556
2004	GW	6,224	2,543	0	0	208	97	9,072
	SW	14,646	1,182	23	0	0	872	16,723
2003	GW	5,974	2,112	0	0	208	120	8,414
	SW	15,157	2,286	23	0	0	1,075	18,541
2002	GW	5,962	2,185	0	0	68	136	8,351
	SW	15,919	1,375	25	0	688	1,222	19,229
2001	GW	6,445	1,593	0	0	52	164	8,254
	SW	15,853	1,630	21	0	531	1,474	19,509
2000	GW	6,143	1,539	0	0	58	78	7,818
	SW	15,446	1,032	15	0	525	702	17,720

HILL COUNTY

All values are in acre-feet

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2014	GW	4,296	0	2	0	407	55	4,760
	SW	2,351	0	0	0	1,717	1,041	5,109
2013	GW	4,051	0	2	0	64	51	4,168
	SW	2,398	0	0	0	1,587	979	4,964
2012	GW	4,390	0	2	0	823	46	5,261
	SW	2,448	0	0	0	1,568	871	4,887
2011	GW	4,641	1	188	0	18	92	4,940
	SW	2,774	0	244	0	1,817	1,750	6,585
2010	GW	3,377	1	593	0	181	91	4,243
	SW	2,757	0	772	0	569	1,709	5,807
2009	GW	3,152	0	608	0	99	68	3,927
	SW	2,662	0	792	0	232	1,296	4,982
2008	GW	2,481	0	623	0	324	61	3,489
	SW	2,679	0	812	0	27	1,161	4,679
2007	GW	2,851	0	0	0	0	46	2,897
	SW	2,392	0	0	0	881	882	4,155
2006	GW	3,105	0	0	0	0	59	3,164
	SW	2,565	8	0	0	1,073	1,118	4,764
2005	GW	2,995	1	0	0	108	61	3,165
	SW	2,503	8	0	0	238	1,166	3,915
2004	GW	3,250	0	0	0	150	74	3,474
	SW	2,365	10	0	0	15	1,216	3,606
2003	GW	3,333	0	0	0	132	76	3,541
	SW	2,444	1	0	0	320	1,238	4,003
2002	GW	2,980	0	0	0	287	74	3,341
	SW	2,656	5	0	0	0	1,222	3,883
2001	GW	3,255	0	0	0	151	79	3,485
	SW	2,837	8	0	0	0	1,288	4,133
2000	GW	3,371	4	0	0	43	140	3,558
	SW	3,175	46	0	0	0	1,261	4,482

JOHNSON COUNTY

All values are in acre-feet

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2014	GW	6,317	796	36	0	107	494	7,750
	SW	14,428	687	69	327	427	1,153	17,091
2013	GW	6,770	776	136	0	210	431	8,323
	SW	14,475	621	458	312	453	1,005	17,324
2012	GW	7,102	725	362	0	289	388	8,866
	SW	14,701	632	1,049	448	625	905	18,360
2011	GW	6,925	786	2,057	0	192	437	10,397
	SW	17,005	791	2,807	487	126	1,018	22,234
2010	GW	6,139	698	1,762	0	130	428	9,157
	SW	14,129	849	2,468	644	269	999	19,358
2009	GW	6,227	731	2,818	0	304	533	10,613
	SW	14,001	921	3,990	469	96	1,245	20,722
2008	GW	6,376	987	3,963	0	95	468	11,889
	SW	12,793	811	5,361	480	69	1,095	20,609
2007	GW	6,483	998	0	0	29	440	7,950
	SW	12,411	802	0	465	9	1,026	14,713
2006	GW	7,802	1,017	0	0	17	493	9,329
	SW	15,682	892	17	207	33	1,151	17,982
2005	GW	8,045	79	2	0	0	483	8,609
	SW	12,947	1,471	195	261	51	1,128	16,053
2004	GW	6,361	136	0	0	0	395	6,892
	SW	10,501	1,264	221	855	21	1,184	14,046
2003	GW	6,372	219	0	0	0	418	7,009
	SW	11,186	1,010	602	895	0	1,252	14,945
2002	GW	7,382	244	0	0	0	483	8,109
	SW	10,988	1,092	462	722	0	1,451	14,715
2001	GW	7,787	269	0	0	0	477	8,533
	SW	10,354	1,212	510	854	0	1,431	14,361
2000	GW	8,173	635	0	0	0	1,059	9,867
	SW	10,485	1,167	0	459	0	1,059	13,170

SOMERVELL COUNTY

All values are in acre-feet

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2014	GW	677	3	38	0	0	54	772
	SW	861	0	84	52,490	234	125	53,794
2013	GW	702	2	164	1	128	42	1,039
	SW	577	0	81	65,315	260	100	66,333
2012	GW	773	1	128	2	526	41	1,471
	SW	550	0	121	70,360	0	94	71,125
2011	GW	1,288	2	368	23	582	56	2,319
	SW	441	0	466	19,959	97	129	21,092
2010	GW	1,202	2	691	21	130	54	2,100
	SW	339	0	935	21,283	95	127	22,779
2009	GW	1,195	4	634	23	0	46	1,902
	SW	0	0	699	20,142	34	108	20,983
2008	GW	1,138	8	628	22	0	46	1,842
	SW	0	0	507	19,235	39	107	19,888
2007	GW	989	8	386	25	20	55	1,483
	SW	0	0	55	38,184	88	129	38,456
2006	GW	1,217	9	430	28	83	46	1,813
	SW	0	0	167	46,746	84	108	47,105
2005	GW	1,113	6	433	29	0	43	1,624
	SW	0	0	137	39,137	70	101	39,445
2004	GW	1,058	4	253	24	2	64	1,405
	SW	0	0	58	44,989	81	64	45,192
2003	GW	1,061	4	253	29	0	64	1,411
	SW	0	0	19	41,635	96	64	41,814
2002	GW	1,050	5	188	35	0	81	1,359
	SW	0	0	7	32,127	590	81	32,805
2001	GW	1,052	7	155	33	0	79	1,326
	SW	0	0	0	58,303	452	79	58,834
2000	GW	1,065	5	178	39	0	83	1,370
	SW	0	0	80	56,585	475	83	57,223

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

ELLIS COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
C	BRANDON-IRENE WSC	TRINITY	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	9	11	14	15	18	20
C	BUENA VISTA - BETHEL SUD	TRINITY	BARDWELL LAKE/RESERVOIR	279	244	255	286	389	458
C	BUENA VISTA - BETHEL SUD	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	170	142	143	376	620	728
C	BUENA VISTA - BETHEL SUD	TRINITY	WAXAHACHIE LAKE/RESERVOIR	181	157	166	187	257	292
C	CEDAR HILL	TRINITY	FORK LAKE/RESERVOIR	16	20	24	29	29	29
C	CEDAR HILL	TRINITY	RAY HUBBARD LAKE/RESERVOIR	15	18	20	21	19	17
C	CEDAR HILL	TRINITY	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	37	39	42	44	38	33
C	CEDAR HILL	TRINITY	TAWAKONI LAKE/RESERVOIR	55	62	67	72	64	58
C	COUNTY-OTHER, ELLIS	TRINITY	BARDWELL LAKE/RESERVOIR	481	438	365	579	682	745
C	COUNTY-OTHER, ELLIS	TRINITY	JOE POOL LAKE/RESERVOIR	162	106	69	48	40	50
C	COUNTY-OTHER, ELLIS	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	519	415	317	580	705	822
C	COUNTY-OTHER, ELLIS	TRINITY	WAXAHACHIE LAKE/RESERVOIR	200	178	150	149	144	165
C	ENNIS	TRINITY	BARDWELL LAKE/RESERVOIR	3,714	3,588	3,502	3,395	3,325	3,296
C	ENNIS	TRINITY	JOE POOL LAKE/RESERVOIR	1	1	1	0	0	0
C	ENNIS	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	285	704	883	1,611	1,842	1,867
C	FERRIS	TRINITY	JOE POOL LAKE/RESERVOIR	7	8	7	7	10	15
C	FERRIS	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	69	96	113	130	241	397

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
C	FILES VALLEY WSC	TRINITY	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	259	336	385	433	484	536
C	GARRETT	TRINITY	BARDWELL LAKE/RESERVOIR	317	363	442	309	231	329
C	GARRETT	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	23	64	88	146	128	186
C	GLENN HEIGHTS	TRINITY	FORK LAKE/RESERVOIR	39	50	62	76	92	141
C	GLENN HEIGHTS	TRINITY	RAY HUBBARD LAKE/RESERVOIR	39	45	50	55	60	85
C	GLENN HEIGHTS	TRINITY	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	93	99	106	114	121	164
C	GLENN HEIGHTS	TRINITY	TAWAKONI LAKE/RESERVOIR	136	155	171	185	202	281
C	GRAND PRAIRIE	TRINITY	FORK LAKE/RESERVOIR	1	1	1	1	2	2
C	GRAND PRAIRIE	TRINITY	JOE POOL LAKE/RESERVOIR	1	1	1	1	2	2
C	GRAND PRAIRIE	TRINITY	RAY HUBBARD LAKE/RESERVOIR	1	1	1	1	1	1
C	GRAND PRAIRIE	TRINITY	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	2	2	2	2	2	2
C	GRAND PRAIRIE	TRINITY	TAWAKONI LAKE/RESERVOIR	3	3	3	3	4	4
C	GRAND PRAIRIE	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	2	2	2	2	2	2
C	IRRIGATION, ELLIS	TRINITY	TRINITY RUN-OF-RIVER	3	3	3	3	3	3
C	JOHNSON COUNTY SUD	TRINITY	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	18	19	20	20	20	20
C	JOHNSON COUNTY SUD	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	37	37	37	33	33	32
C	LIVESTOCK, ELLIS	TRINITY	TRINITY LIVESTOCK LOCAL SUPPLY	1,112	1,112	1,112	1,112	1,112	1,112

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
C	MANSFIELD	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	24	25	27	30	34	38
C	MANUFACTURING, ELLIS	TRINITY	BARDWELL LAKE/RESERVOIR	1,419	1,274	1,003	756	549	408
C	MANUFACTURING, ELLIS	TRINITY	JOE POOL LAKE/RESERVOIR	94	67	52	43	35	29
C	MANUFACTURING, ELLIS	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	764	694	564	876	796	631
C	MANUFACTURING, ELLIS	TRINITY	WAXAHACHIE LAKE/RESERVOIR	602	524	413	323	257	200
C	MIDLOTHIAN	TRINITY	JOE POOL LAKE/RESERVOIR	1,584	1,675	1,711	1,694	1,650	1,585
C	MIDLOTHIAN	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	2,632	2,872	3,023	3,085	3,088	3,034
C	MILFORD	TRINITY	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	84	84	84	84	84	84
C	MOUNTAIN PEAK SUD	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	260	451	586	712	842	983
C	OAK LEAF	TRINITY	FORK LAKE/RESERVOIR	11	13	15	23	35	44
C	OAK LEAF	TRINITY	JOE POOL LAKE/RESERVOIR	4	2	2	1	1	0
C	OAK LEAF	TRINITY	RAY HUBBARD LAKE/RESERVOIR	11	11	12	16	23	27
C	OAK LEAF	TRINITY	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	27	24	25	34	47	51
C	OAK LEAF	TRINITY	TAWAKONI LAKE/RESERVOIR	39	38	39	56	78	89
C	OAK LEAF	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	35	28	23	20	15	12
C	OVILLA	TRINITY	FORK LAKE/RESERVOIR	108	139	168	203	244	451
C	OVILLA	TRINITY	RAY HUBBARD LAKE/RESERVOIR	107	122	134	147	161	271
C	OVILLA	TRINITY	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	258	269	288	306	322	521

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
C	OVILLA	TRINITY	TAWAKONI LAKE/RESERVOIR	377	425	461	498	537	897
C	PALMER	TRINITY	JOE POOL LAKE/RESERVOIR	19	15	12	10	8	10
C	PALMER	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	182	183	182	191	197	267
C	PECAN HILL	TRINITY	JOE POOL LAKE/RESERVOIR	7	6	5	4	3	3
C	PECAN HILL	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	70	70	70	74	76	83
C	RED OAK	TRINITY	FORK LAKE/RESERVOIR	7	30	108	214	301	578
C	RED OAK	TRINITY	JOE POOL LAKE/RESERVOIR	79	52	33	23	16	10
C	RED OAK	TRINITY	RAY HUBBARD LAKE/RESERVOIR	7	27	86	155	198	348
C	RED OAK	TRINITY	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	14	59	184	322	399	670
C	RED OAK	TRINITY	TAWAKONI LAKE/RESERVOIR	24	94	295	524	664	1,153
C	RED OAK	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	777	636	519	445	358	265
C	RICE WSC	TRINITY	BARDWELL LAKE/RESERVOIR	39	36	29	20	12	7
C	RICE WSC	TRINITY	NAVARRO MILLS LAKE/RESERVOIR	517	415	476	527	568	597
C	RICE WSC	TRINITY	RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	103	83	95	105	114	120
C	RICE WSC	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	2	6	7	10	7	4
C	ROCKETT SUD	TRINITY	JOE POOL LAKE/RESERVOIR	243	195	155	134	117	90
C	ROCKETT SUD	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	3,623	3,437	3,286	3,307	3,453	3,635
C	SARDIS-LONE ELM WSC	TRINITY	JOE POOL LAKE/RESERVOIR	139	128	111	87	63	39
C	SARDIS-LONE ELM WSC	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	1,369	1,579	1,725	1,665	1,444	1,066

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
C	STEAM ELECTRIC POWER, ELLIS	TRINITY	BARDWELL LAKE/RESERVOIR	460	420	324	226	138	82
C	STEAM ELECTRIC POWER, ELLIS	TRINITY	JOE POOL LAKE/RESERVOIR	79	55	42	34	27	23
C	STEAM ELECTRIC POWER, ELLIS	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	172	191	175	187	145	108
C	WAXAHACHIE	TRINITY	BARDWELL LAKE/RESERVOIR	2,595	2,587	2,473	2,349	2,274	2,251
C	WAXAHACHIE	TRINITY	JOE POOL LAKE/RESERVOIR	39	26	17	12	8	5
C	WAXAHACHIE	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	1,965	1,818	1,641	3,316	3,805	3,707
C	WAXAHACHIE	TRINITY	WAXAHACHIE LAKE/RESERVOIR	1,682	1,667	1,606	1,539	1,504	1,435
	Sum of Projected Surface Water Supplies (acre-feet)			**30,939**	**31,072**	**30,910**	**34,412**	**35,619**	**37,805**

HILL COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
G	BRANDON-IRENE WSC	BRAZOS	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	43	48	46	46	45	44
G	BRANDON-IRENE WSC	TRINITY	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	158	172	169	166	162	158
G	COUNTY-OTHER, HILL	BRAZOS	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	229	237	237	238	239	240
G	COUNTY-OTHER, HILL	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	53	53	53	53	53	53
G	COUNTY-OTHER, HILL	BRAZOS	NAVARRO MILLS LAKE/RESERVOIR	358	243	232	215	193	171
G	COUNTY-OTHER, HILL	BRAZOS	RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	72	49	46	43	39	34

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
G	COUNTY-OTHER, HILL	TRINITY	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	29	30	31	31	31	31
G	COUNTY-OTHER, HILL	TRINITY	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	7	7	7	7	7	7
G	COUNTY-OTHER, HILL	TRINITY	NAVARRO MILLS LAKE/RESERVOIR	45	30	29	27	24	21
G	COUNTY-OTHER, HILL	TRINITY	RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	9	6	6	5	5	4
G	FILES VALLEY WSC	BRAZOS	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	264	285	268	254	240	225
G	FILES VALLEY WSC	TRINITY	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	619	668	636	602	565	528
G	HILL COUNTY WSC	BRAZOS	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	210	230	230	230	230	230
G	HILLSBORO	BRAZOS	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	3,833	3,633	3,631	3,630	3,629	3,628
G	HUBBARD	TRINITY	NAVARRO MILLS LAKE/RESERVOIR	126	82	76	71	63	57
G	HUBBARD	TRINITY	RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	25	17	15	14	13	11
G	IRRIGATION, HILL	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	1,000	1,000	1,000	1,000	1,000	1,000
G	IRRIGATION, HILL	BRAZOS	BRAZOS RUN-OF-RIVER	9	9	9	9	9	9

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
G	JOHNSON COUNTY SUD	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	16	13	12	10	8	7
G	JOHNSON COUNTY SUD	BRAZOS	TRWD LAKE/RESERVOIR SYSTEM	32	26	22	17	14	12
G	JOHNSON COUNTY SUD	TRINITY	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	3	3	2	2	2	2
G	JOHNSON COUNTY SUD	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	7	5	4	3	3	3
G	LIVESTOCK, HILL	BRAZOS	BRAZOS LIVESTOCK LOCAL SUPPLY	944	944	944	944	944	944
G	LIVESTOCK, HILL	TRINITY	TRINITY LIVESTOCK LOCAL SUPPLY	240	240	240	240	240	240
G	MINING, HILL	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	1,000	952	843	901	878	855
G	MINING, HILL	TRINITY	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	0	32	124	50	56	63
G	PARKER WSC	BRAZOS	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	24	21	18	16	14	13
G	PARKER WSC	TRINITY	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	5	5	4	3	3	3
G	WHITNEY	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	0	0	0	0	0	0
			Sum of Projected Surface Water Supplies (acre-feet)	**9,360**	**9,040**	**8,934**	**8,827**	**8,709**	**8,593**

JOHNSON COUNTY

All values are in acre-feet

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
G	ACTON MUD	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	112	98	102	116	128	138
G	ALVARADO	TRINITY	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	2,241	2,241	2,241	2,241	2,241	2,241
G	BETHANY WSC	TRINITY	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	1,120	1,120	1,120	1,120	1,120	1,120
G	BETHESDA WSC	BRAZOS	TRWD LAKE/RESERVOIR SYSTEM	43	45	48	52	58	63
G	BETHESDA WSC	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	858	916	962	1,060	1,168	1,270
G	BURLESON	BRAZOS	TRWD LAKE/RESERVOIR SYSTEM	4	4	4	4	4	4
G	BURLESON	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	3,869	3,982	4,016	3,836	3,765	3,769
G	CLEBURNE	BRAZOS	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	5,300	5,235	5,039	4,864	4,691	4,501
G	CLEBURNE	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	0	0	0	0	0	0
G	CLEBURNE	BRAZOS	PAT CLEBURNE LAKE/RESERVOIR	3,801	3,412	3,148	2,904	2,662	2,402
G	COUNTY-OTHER, JOHNSON	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	438	438	438	438	438	438
G	CROWLEY	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	7	8	10	11	10	11
G	FORT WORTH	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	0	0	0	371	527	586
G	IRRIGATION, JOHNSON	BRAZOS	PAT CLEBURNE LAKE/RESERVOIR	102	100	99	97	96	94

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
G	IRRIGATION, JOHNSON	TRINITY	PAT CLEBURNE LAKE/RESERVOIR	100	99	97	96	94	93
G	JOHNSON COUNTY SUD	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	827	787	744	694	639	576
G	JOHNSON COUNTY SUD	BRAZOS	TRWD LAKE/RESERVOIR SYSTEM	1,710	1,567	1,402	1,175	1,062	961
G	JOHNSON COUNTY SUD	TRINITY	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	2,282	2,173	2,053	1,917	1,761	1,594
G	JOHNSON COUNTY SUD	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	4,718	4,325	3,867	3,242	2,929	2,652
G	JOSHUA	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	577	676	784	906	1,045	1,194
G	JOSHUA	TRINITY	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	374	439	508	588	677	774
G	KEENE	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	156	157	157	156	156	156
G	KEENE	TRINITY	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	964	963	963	964	964	964
G	LIVESTOCK, JOHNSON	BRAZOS	BRAZOS LIVESTOCK LOCAL SUPPLY	1,290	1,290	1,290	1,290	1,290	1,290
G	LIVESTOCK, JOHNSON	TRINITY	TRINITY LIVESTOCK LOCAL SUPPLY	323	323	323	323	323	323
G	MANSFIELD	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	537	677	766	786	868	939
G	MANUFACTURING, JOHNSON	BRAZOS	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	6	72	270	446	620	811
G	MANUFACTURING, JOHNSON	BRAZOS	PAT CLEBURNE LAKE/RESERVOIR	1,037	1,357	1,552	1,727	1,900	2,091

Projected Surface Water Supplies
TWDB 2017 State Water Plan Data

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
G	MANUFACTURING, JOHNSON	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	2	2	2	2	2	2
G	MINING, JOHNSON	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	10	10	10	10	10	10
G	MINING, JOHNSON	TRINITY	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	10	10	10	10	10	10
G	PARKER WSC	BRAZOS	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	236	239	242	244	246	247
G	PARKER WSC	TRINITY	BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	71	71	72	73	73	73
G	VENUS	TRINITY	TRWD LAKE/RESERVOIR SYSTEM	269	274	262	260	261	268
	Sum of Projected Surface Water Supplies (acre-feet)			**33,394**	**33,110**	**32,601**	**32,023**	**31,838**	**31,665**

SOMERVELL COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
G	COUNTY-OTHER, SOMERVELL	BRAZOS	BRAZOS RUN-OF-RIVER	1,400	1,400	1,400	1,400	1,400	1,400
G	LIVESTOCK, SOMERVELL	BRAZOS	BRAZOS LIVESTOCK LOCAL SUPPLY	158	158	158	158	158	158
G	STEAM ELECTRIC POWER, SOMERVELL	BRAZOS	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	40,000	40,000	40,000	40,000	40,000	40,000
G	STEAM ELECTRIC POWER, SOMERVELL	BRAZOS	SQUAW CREEK LAKE/RESERVOIR	9,285	9,272	9,260	9,247	9,234	9,222
	Sum of Projected Surface Water Supplies (acre-feet)			**50,843**	**50,830**	**50,818**	**50,805**	**50,792**	**50,780**

Projected Water Demands
TWDB 2017 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.

All values are in acre-feet

ELLIS COUNTY

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
C	BARDWELL	TRINITY	71	86	105	129	158	348
C	BRANDON-IRENE WSC	TRINITY	11	14	16	20	24	29
C	BUENA VISTA - BETHEL SUD	TRINITY	1,249	1,509	1,772	2,173	3,119	4,154
C	CEDAR HILL	TRINITY	142	178	221	272	272	272
C	COUNTY-OTHER, ELLIS	TRINITY	745	762	815	3,058	6,623	11,645
C	ENNIS	TRINITY	4,148	4,789	5,447	7,397	11,879	19,748
C	FERRIS	TRINITY	460	537	619	712	1,176	2,201
C	FILES VALLEY WSC	TRINITY	119	148	182	223	272	330
C	GARRETT	TRINITY	346	438	546	674	827	1,970
C	GLENN HEIGHTS	TRINITY	383	476	590	725	888	1,352
C	GRAND PRAIRIE	TRINITY	10	12	15	18	22	27
C	IRRIGATION, ELLIS	TRINITY	572	572	572	572	572	572
C	ITALY	TRINITY	314	386	473	580	733	976
C	JOHNSON COUNTY SUD	TRINITY	28	34	42	51	63	76
C	LIVESTOCK, ELLIS	TRINITY	905	905	905	905	905	905
C	MANSFIELD	TRINITY	32	38	47	65	81	100
C	MANUFACTURING, ELLIS	TRINITY	5,247	5,403	5,560	5,716	5,716	5,716
C	MAYPEARL	TRINITY	117	135	145	143	143	143
C	MIDLOTHIAN	TRINITY	4,198	5,429	7,069	8,589	9,956	10,995
C	MILFORD	TRINITY	66	67	69	74	80	89
C	MINING, ELLIS	TRINITY	147	213	164	123	82	55
C	MOUNTAIN PEAK SUD	TRINITY	1,671	2,109	2,627	3,240	3,971	4,820
C	OAK LEAF	TRINITY	155	165	186	262	385	468
C	OVILLA	TRINITY	966	1,213	1,507	1,857	2,275	4,188
C	PALMER	TRINITY	289	353	432	529	675	1,242
C	PECAN HILL	TRINITY	111	136	167	205	257	384
C	RED OAK	TRINITY	1,845	2,052	2,750	3,741	4,595	7,170
C	RICE WSC	TRINITY	662	812	995	1,218	1,490	1,806
C	ROCKETT SUD	TRINITY	3,756	4,621	5,678	6,963	9,043	11,160
C	SARDIS-LONE ELM WSC	TRINITY	3,904	4,793	5,824	6,338	6,688	6,686

Projected Water Demands
TWDB 2017 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	2020	2030	2040	2050	2060	2070
C	STEAM ELECTRIC POWER, ELLIS	TRINITY	698	1,450	3,741	5,754	7,878	10,786
C	VENUS	TRINITY	16	20	25	31	37	45
C	WAXAHACHIE	TRINITY	6,872	7,741	9,320	11,299	13,749	16,715
	Sum of Projected Water Demands (acre-feet)		**40,255**	**47,596**	**58,626**	**73,656**	**94,634**	**127,173**

HILL COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
G	BRANDON-IRENE WSC	BRAZOS	55	57	57	59	61	62
G	BRANDON-IRENE WSC	TRINITY	201	205	208	214	220	225
G	COUNTY-OTHER, HILL	BRAZOS	860	898	926	957	982	1,005
G	COUNTY-OTHER, HILL	TRINITY	108	113	116	120	123	126
G	FILES VALLEY WSC	BRAZOS	121	125	127	131	135	138
G	FILES VALLEY WSC	TRINITY	284	294	301	310	318	325
G	HILL COUNTY WSC	BRAZOS	425	444	457	473	486	497
G	HILLSBORO	BRAZOS	1,945	2,027	2,077	2,144	2,204	2,255
G	HUBBARD	TRINITY	151	153	152	158	162	166
G	IRRIGATION, HILL	BRAZOS	392	392	392	392	382	379
G	IRRIGATION, HILL	TRINITY	190	190	190	190	186	184
G	ITASCA	BRAZOS	145	147	147	150	154	156
G	ITASCA	TRINITY	11	11	11	11	11	12
G	JOHNSON COUNTY SUD	BRAZOS	24	24	25	26	26	27
G	JOHNSON COUNTY SUD	TRINITY	5	5	5	5	6	6
G	LIVESTOCK, HILL	BRAZOS	944	944	944	944	944	944
G	LIVESTOCK, HILL	TRINITY	240	240	240	240	240	240
G	MANUFACTURING, HILL	BRAZOS	45	50	55	60	65	70
G	MINING, HILL	BRAZOS	1,307	952	620	322	349	378
G	MINING, HILL	TRINITY	327	238	155	81	87	94
G	PARKER WSC	BRAZOS	27	27	27	28	29	30
G	PARKER WSC	TRINITY	5	6	6	6	6	6
G	WHITE BLUFF COMMUNITY WS	BRAZOS	434	458	474	491	505	517
G	WHITNEY	BRAZOS	431	449	461	475	488	500

Projected Water Demands
TWDB 2017 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	2020	2030	2040	2050	2060	2070
G	WOODROW-OSCEOLA WSC	BRAZOS	384	385	388	402	412	421
	Sum of Projected Water Demands (acre-feet)		**9,061**	**8,834**	**8,561**	**8,389**	**8,581**	**8,763**

JOHNSON COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
G	ACTON MUD	BRAZOS	56	76	98	122	149	177
G	ALVARADO	TRINITY	456	493	536	589	653	722
G	BETHANY WSC	TRINITY	367	396	430	472	524	581
G	BETHESDA WSC	BRAZOS	154	173	194	219	246	275
G	BETHESDA WSC	TRINITY	3,105	3,506	3,932	4,422	4,972	5,566
G	BURLESON	BRAZOS	6	7	8	8	9	10
G	BURLESON	TRINITY	5,309	6,326	7,290	7,912	8,773	9,845
G	CLEBURNE	BRAZOS	5,927	6,446	7,010	7,678	8,445	9,276
G	COUNTY-OTHER, JOHNSON	BRAZOS	833	996	1,163	1,161	1,182	1,221
G	COUNTY-OTHER, JOHNSON	TRINITY	780	533	371	230	195	170
G	CRESSON	BRAZOS	8	10	13	16	19	22
G	CRESSON	TRINITY	16	21	26	31	38	45
G	CROWLEY	TRINITY	10	14	19	25	31	37
G	FORT WORTH	TRINITY	0	0	0	951	1,520	1,899
G	GODLEY	BRAZOS	115	125	137	151	167	184
G	GRANDVIEW	TRINITY	182	197	214	234	260	287
G	IRRIGATION, JOHNSON	BRAZOS	71	71	71	71	71	71
G	IRRIGATION, JOHNSON	TRINITY	70	70	70	70	70	70
G	JOHNSON COUNTY SUD	BRAZOS	1,279	1,431	1,596	1,790	2,011	2,250
G	JOHNSON COUNTY SUD	TRINITY	3,529	3,948	4,403	4,938	5,546	6,207
G	JOSHUA	BRAZOS	577	676	784	906	1,045	1,194
G	JOSHUA	TRINITY	374	439	508	588	677	774
G	KEENE	BRAZOS	68	79	91	103	117	132
G	KEENE	TRINITY	419	485	557	638	725	817
G	LIVESTOCK, JOHNSON	BRAZOS	1,290	1,290	1,290	1,290	1,290	1,290
G	LIVESTOCK, JOHNSON	TRINITY	323	323	323	323	323	323
G	MANSFIELD	TRINITY	721	1,024	1,337	1,681	2,055	2,455

Projected Water Demands
TWDB 2017 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	2020	2030	2040	2050	2060	2070
G	MANUFACTURING, JOHNSON	BRAZOS	2,499	2,883	3,272	3,620	3,966	4,344
G	MANUFACTURING, JOHNSON	TRINITY	18	20	23	26	28	31
G	MINING, JOHNSON	BRAZOS	2,075	1,402	762	510	584	672
G	MINING, JOHNSON	TRINITY	2,051	1,386	753	503	577	664
G	MOUNTAIN PEAK SUD	TRINITY	613	737	868	1,013	1,172	1,342
G	PARKER WSC	BRAZOS	256	310	366	431	503	580
G	PARKER WSC	TRINITY	77	92	109	128	149	173
G	RIO VISTA	BRAZOS	150	178	207	241	279	320
G	STEAM ELECTRIC POWER, JOHNSON	BRAZOS	7,000	7,000	7,000	7,000	7,000	7,000
G	VENUS	TRINITY	624	710	801	904	1,016	1,137
	Sum of Projected Water Demands (acre-feet)		**41,408**	**43,873**	**46,632**	**50,995**	**56,387**	**62,163**

SOMERVELL COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
G	COUNTY-OTHER, SOMERVELL	BRAZOS	822	892	941	982	1,022	1,056
G	GLEN ROSE	BRAZOS	583	638	677	709	738	763
G	IRRIGATION, SOMERVELL	BRAZOS	83	82	82	81	80	79
G	LIVESTOCK, SOMERVELL	BRAZOS	158	158	158	158	158	158
G	MANUFACTURING, SOMERVELL	BRAZOS	8	9	10	11	12	13
G	MINING, SOMERVELL	BRAZOS	1,112	1,279	1,146	1,060	998	971
G	STEAM ELECTRIC POWER, SOMERVELL	BRAZOS	84,817	84,817	84,817	84,817	84,817	84,817
	Sum of Projected Water Demands (acre-feet)		**87,583**	**87,875**	**87,831**	**87,818**	**87,825**	**87,857**

Projected Water Supply Needs
TWDB 2017 State Water Plan Data

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

All values are in acre-feet

ELLIS COUNTY

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
C	BARDWELL	TRINITY	-24	-44	-68	-97	-130	-320
C	BRANDON-IRENE WSC	TRINITY	4	5	7	6	6	5
C	BUENA VISTA - BETHEL SUD	TRINITY	480	135	-39	-64	-425	-1,143
C	CEDAR HILL	TRINITY	-7	-22	-48	-78	-89	-98
C	COUNTY-OTHER, ELLIS	TRINITY	1,411	1,177	899	-849	-4,197	-8,946
C	ENNIS	TRINITY	-148	-496	-1,061	-2,391	-6,712	-14,585
C	FERRIS	TRINITY	-32	-81	-148	-223	-573	-1,437
C	FILES VALLEY WSC	TRINITY	140	188	203	210	212	206
C	GARRETT	TRINITY	-6	-11	-16	-219	-468	-1,455
C	GLENN HEIGHTS	TRINITY	-16	-59	-125	-198	-284	-478
C	GRAND PRAIRIE	TRINITY	0	-1	-4	-7	-7	-12
C	IRRIGATION, ELLIS	TRINITY	0	0	0	0	0	0
C	ITALY	TRINITY	0	-72	-159	-266	-419	-662
C	JOHNSON COUNTY SUD	TRINITY	39	34	27	17	8	-6
C	LIVESTOCK, ELLIS	TRINITY	304	304	304	304	304	304
C	MANSFIELD	TRINITY	-8	-13	-20	-35	-47	-62
C	MANUFACTURING, ELLIS	TRINITY	1,000	530	-173	-433	-907	-1,379
C	MAYPEARL	TRINITY	38	20	10	12	12	12
C	MIDLOTHIAN	TRINITY	18	-882	-2,335	-3,810	-5,218	-6,376
C	MILFORD	TRINITY	50	49	47	42	36	27
C	MINING, ELLIS	TRINITY	66	0	49	90	131	158
C	MOUNTAIN PEAK SUD	TRINITY	-154	-401	-784	-1,271	-1,872	-2,580
C	OAK LEAF	TRINITY	-21	-40	-60	-93	-149	-193
C	OVILLA	TRINITY	-45	-161	-340	-531	-756	-1,522
C	PALMER	TRINITY	-64	-131	-214	-304	-446	-941
C	PECAN HILL	TRINITY	-34	-60	-92	-127	-178	-298
C	RED OAK	TRINITY	-377	-577	-895	-1,321	-1,789	-2,914
C	RICE WSC	TRINITY	-1	-272	-388	-556	-789	-1,078
C	ROCKETT SUD	TRINITY	110	-989	-2,237	-3,522	-5,473	-7,435
C	SARDIS-LONE ELM WSC	TRINITY	-658	-1,348	-2,250	-2,848	-3,443	-3,843
C	STEAM ELECTRIC POWER, ELLIS	TRINITY	922	125	-2,291	-4,398	-6,659	-9,664

Projected Water Supply Needs
TWDB 2017 State Water Plan Data

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

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
C	VENUS	TRINITY	-16	-20	-25	-31	-37	-45
C	WAXAHACHIE	TRINITY	1,499	758	-723	-907	-2,917	-6,082
	Sum of Projected Water Supply Needs (acre-feet)		**-1,611**	**-5,680**	**-14,495**	**-24,579**	**-43,984**	**-73,554**

HILL COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
G	BRANDON-IRENE WSC	BRAZOS	19	22	20	17	14	11
G	BRANDON-IRENE WSC	TRINITY	72	80	73	62	50	39
G	COUNTY-OTHER, HILL	BRAZOS	437	264	218	163	109	55
G	COUNTY-OTHER, HILL	TRINITY	55	33	29	22	15	8
G	FILES VALLEY WSC	BRAZOS	143	160	141	123	105	87
G	FILES VALLEY WSC	TRINITY	335	374	335	292	247	203
G	HILL COUNTY WSC	BRAZOS	427	428	415	399	386	375
G	HILLSBORO	BRAZOS	1,888	1,606	1,554	1,486	1,425	1,373
G	HUBBARD	TRINITY	29	-25	-32	-44	-57	-69
G	IRRIGATION, HILL	BRAZOS	822	822	822	822	832	835
G	IRRIGATION, HILL	TRINITY	10	10	10	10	14	16
G	ITASCA	BRAZOS	79	77	77	75	71	68
G	ITASCA	TRINITY	6	6	6	5	5	5
G	JOHNSON COUNTY SUD	BRAZOS	34	24	18	9	2	-2
G	JOHNSON COUNTY SUD	TRINITY	7	5	3	1	0	0
G	LIVESTOCK, HILL	BRAZOS	0	0	0	0	0	0
G	LIVESTOCK, HILL	TRINITY	0	0	0	0	0	0
G	MANUFACTURING, HILL	BRAZOS	0	0	0	0	0	0
G	MINING, HILL	BRAZOS	-307	0	223	579	529	477
G	MINING, HILL	TRINITY	-296	-175	0	0	0	0
G	PARKER WSC	BRAZOS	17	11	6	1	-3	-6
G	PARKER WSC	TRINITY	4	3	1	0	-1	-1
G	WHITE BLUFF COMMUNITY WS	BRAZOS	166	142	126	109	95	83
G	WHITNEY	BRAZOS	169	151	139	125	112	100
G	WOODROW-OSCEOLA WSC	BRAZOS	221	220	217	203	193	184
	Sum of Projected Water Supply Needs (acre-feet)		**-603**	**-200**	**-32**	**-44**	**-61**	**-78**

Projected Water Supply Needs
TWDB 2017 State Water Plan Data

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

All values are in acre-feet

JOHNSON COUNTY

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
G	ACTON MUD	BRAZOS	85	47	30	24	12	-4
G	ALVARADO	TRINITY	2,095	2,058	2,015	1,962	1,898	1,829
G	BETHANY WSC	TRINITY	1,186	1,157	1,123	1,081	1,029	972
G	BETHESDA WSC	BRAZOS	-43	-60	-77	-97	-118	-140
G	BETHESDA WSC	TRINITY	-874	-1,203	-2,580	-3,136	-3,613	-4,102
G	BURLESON	BRAZOS	-2	-3	-4	-4	-5	-6
G	BURLESON	TRINITY	-1,440	-2,344	-3,274	-4,076	-5,008	-6,076
G	CLEBURNE	BRAZOS	3,174	2,201	1,177	90	-1,092	-2,373
G	COUNTY-OTHER, JOHNSON	BRAZOS	0	0	0	0	0	0
G	COUNTY-OTHER, JOHNSON	TRINITY	87	171	166	309	323	309
G	CRESSON	BRAZOS	2	0	-3	-3	-2	-5
G	CRESSON	TRINITY	3	0	-1	-3	-7	-8
G	CROWLEY	TRINITY	-2	-4	-7	-12	-19	-24
G	FORT WORTH	TRINITY	0	0	0	-356	-647	-893
G	GODLEY	BRAZOS	44	34	22	8	-8	-25
G	GRANDVIEW	TRINITY	187	172	155	135	109	82
G	IRRIGATION, JOHNSON	BRAZOS	119	117	116	114	113	111
G	IRRIGATION, JOHNSON	TRINITY	39	38	36	35	33	32
G	JOHNSON COUNTY SUD	BRAZOS	1,776	1,442	1,070	599	211	-191
G	JOHNSON COUNTY SUD	TRINITY	4,901	3,982	2,951	1,658	582	-521
G	JOSHUA	BRAZOS	0	0	0	0	0	0
G	JOSHUA	TRINITY	0	0	0	0	0	0
G	KEENE	BRAZOS	147	137	125	112	98	72
G	KEENE	TRINITY	907	840	768	688	601	447
G	LIVESTOCK, JOHNSON	BRAZOS	0	0	0	0	0	0
G	LIVESTOCK, JOHNSON	TRINITY	0	0	0	0	0	0
G	MANSFIELD	TRINITY	-184	-347	-571	-895	-1,187	-1,516
G	MANUFACTURING, JOHNSON	BRAZOS	78	80	84	87	88	92
G	MANUFACTURING, JOHNSON	TRINITY	13	11	8	5	3	0
G	MINING, JOHNSON	BRAZOS	-636	37	677	931	856	768
G	MINING, JOHNSON	TRINITY	-628	37	670	918	845	758

Projected Water Supply Needs
TWDB 2017 State Water Plan Data

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

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
G	MOUNTAIN PEAK SUD	TRINITY	800	676	545	400	241	71
G	PARKER WSC	BRAZOS	172	124	73	12	-56	-132
G	PARKER WSC	TRINITY	52	37	22	4	-17	-40
G	RIO VISTA	BRAZOS	99	71	42	8	-30	-71
G	STEAM ELECTRIC POWER, JOHNSON	BRAZOS	-5,656	-5,656	-5,656	-5,656	-5,656	-5,656
G	VENUS	TRINITY	-144	-225	-328	-433	-544	-658
	Sum of Projected Water Supply Needs (acre-feet)		**-9,609**	**-9,842**	**-12,501**	**-14,671**	**-18,009**	**-22,441**

SOMERVELL COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	2020	2030	2040	2050	2060	2070
G	COUNTY-OTHER, SOMERVELL	BRAZOS	578	508	459	418	378	344
G	GLEN ROSE	BRAZOS	141	86	47	15	-14	-39
G	IRRIGATION, SOMERVELL	BRAZOS	21	22	22	23	24	25
G	LIVESTOCK, SOMERVELL	BRAZOS	0	0	0	0	0	0
G	MANUFACTURING, SOMERVELL	BRAZOS	12	11	10	9	8	7
G	MINING, SOMERVELL	BRAZOS	-407	-574	-441	-355	-293	-266
G	STEAM ELECTRIC POWER, SOMERVELL	BRAZOS	-35,496	-35,509	-35,521	-35,534	-35,547	-35,559
	Sum of Projected Water Supply Needs (acre-feet)		**-35,903**	**-36,083**	**-35,962**	**-35,889**	**-35,854**	**-35,864**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

ELLIS COUNTY

WUG, Basin (RWPG)

All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
BARDWELL, TRINITY (C)							
CONSERVATION - BARDWELL	DEMAND REDUCTION [ELLIS]	1	1	1	2	3	7
CONSERVATION, WATER LOSS CONTROL - BARDWELL	DEMAND REDUCTION [ELLIS]	0	0	0	0	0	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	288
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	22	40	98
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	14	11	12	8	10	13
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	9	3	3	3	3	17
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	29	35	47	36	61
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	17	26	12	29
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	46	0
		24	**44**	**68**	**108**	**150**	**513**
BRANDON-IRENE WSC, TRINITY (C)							
CONSERVATION - BRANDON-IRENE WSC	DEMAND REDUCTION [ELLIS]	0	0	0	0	0	0
CONSERVATION, WATER LOSS CONTROL - BRANDON-IRENE WSC	DEMAND REDUCTION [ELLIS]	0	0	0	0	0	0
		0	**0**	**0**	**0**	**0**	**0**
BUENA VISTA - BETHEL SUD, TRINITY (C)							
CONSERVATION - BUENA VISTA - BETHEL SUD	DEMAND REDUCTION [ELLIS]	16	33	53	72	114	166
CONSERVATION, WATER LOSS CONTROL - BUENA VISTA - BETHEL SUD	DEMAND REDUCTION [ELLIS]	6	6	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	0	0	312	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	977

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

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

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	312	0
		22	**39**	**53**	**72**	**738**	**1,143**
CEDAR HILL, TRINITY (C)							
ANRA-COL - LAKE COLUMBIA	COLUMBIA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	13
CONSERVATION - CEDAR HILL	DEMAND REDUCTION [ELLIS]	2	4	7	9	10	11
CONSERVATION – WASTE PROHIBITION, CEDAR HILL	DEMAND REDUCTION [ELLIS]	0	1	1	1	1	1
CONSERVATION, WATER LOSS CONTROL - CEDAR HILL	DEMAND REDUCTION [ELLIS]	1	1	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	4	4	10	35	37	36
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	13	32	33	29	26
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	13	11
		7	**23**	**50**	**78**	**90**	**98**
COUNTY-OTHER, ELLIS, TRINITY (C)							
CONSERVATION - ELLIS COUNTY	DEMAND REDUCTION [ELLIS]	2	5	8	41	110	233
CONSERVATION, WATER LOSS CONTROL - ELLIS COUNTY	DEMAND REDUCTION [ELLIS]	4	4	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	0	0	573	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	5,252
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	458	826	1,778
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	1,262	729	721	644	743	1,406
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	772	121	108	79	145	974
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	1,330	1,035	981	750	1,105
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	489	542	243	522

WUG, Basin (RWPG)							All values are in acre-feet
Water Management Strategy	**Source Name [Origin]**	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	923	0
		2,040	**2,189**	**2,361**	**2,745**	**4,313**	**11,270**
ENNIS, TRINITY (C)							
CONSERVATION - ENNIS	DEMAND REDUCTION [ELLIS]	55	104	163	247	436	790
CONSERVATION – WASTE PROHIBITION, ENNIS	DEMAND REDUCTION [ELLIS]	5	13	17	28	52	94
CONSERVATION, IRRIGATION RESTRICTIONS – ENNIS	DEMAND REDUCTION [ELLIS]	1	4	5	8	15	28
CONSERVATION, WATER LOSS CONTROL - ENNIS	DEMAND REDUCTION [ELLIS]	99	292	308	418	672	1,117
ENNIS INDIRECT REUSE	INDIRECT REUSE [ELLIS]	0	0	518	1,392	3,696	3,696
ENNIS UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	144	1,536	1,558
MIDLOTHIAN UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	5	8	9	11	12	14
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	3,004
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	993
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	20	0	0	0	0
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	63	49	153	304	2,245
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	1,061
		165	**504**	**1,069**	**2,401**	**6,723**	**14,600**
FERRIS, TRINITY (C)							
CONSERVATION - FERRIS	DEMAND REDUCTION [ELLIS]	2	4	6	10	20	44
CONSERVATION, WATER LOSS CONTROL - FERRIS	DEMAND REDUCTION [ELLIS]	2	2	0	0	0	0
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	28	0	0	0	0	0
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	75	142	213	553	1,393
		32	**81**	**148**	**223**	**573**	**1,437**

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

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
FILES VALLEY WSC, TRINITY (C)							
CONSERVATION - FILES VALLEY WSC	DEMAND REDUCTION [ELLIS]	0	0	1	1	2	3
CONSERVATION, WATER LOSS CONTROL - FILES VALLEY WSC	DEMAND REDUCTION [ELLIS]	0	0	0	0	0	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	33
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	7	11	11
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	15	11	6	6	3
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	3	2	1	2	4
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	37	31	31	19	14
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	15	18	6	7
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	9	0
		0	**55**	**60**	**64**	**55**	**75**
GARRETT, TRINITY (C)							
CONSERVATION - GARRETT	DEMAND REDUCTION [ELLIS]	4	10	16	24	30	78
CONSERVATION, WATER LOSS CONTROL - GARRETT	DEMAND REDUCTION [ELLIS]	2	2	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	0	0	233	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	1,377
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	0	0	64	205	0
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	0	132	0	0
		6	**12**	**16**	**220**	**468**	**1,455**
GLENN HEIGHTS, TRINITY (C)							
ANRA-COL - LAKE COLUMBIA	COLUMBIA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	71
CONSERVATION - GLENN HEIGHTS	DEMAND REDUCTION [ELLIS]	1	3	6	10	15	27

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

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
CONSERVATION, WATER LOSS CONTROL - GLENN HEIGHTS	DEMAND REDUCTION [ELLIS]	2	2	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	13	13	29	98	126	188
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	41	91	90	99	133
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	44	59
		16	**59**	**126**	**198**	**284**	**478**

GRAND PRAIRIE, TRINITY (C)

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
ANRA-COL - LAKE COLUMBIA	COLUMBIA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	1
ARLINGTON UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	1	1
CONSERVATION - GRAND PRARIE	DEMAND REDUCTION [ELLIS]	0	0	0	0	0	1
CONSERVATION, WATER LOSS CONTROL - GRAND PRAIRIE	DEMAND REDUCTION [ELLIS]	0	0	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	1	4	2	3
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	1	2	2	2	2
MANSFIELD UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	1	1	1	1	1	1
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	1
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	0	0	0	0	1
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	1	1
		1	**2**	**4**	**7**	**7**	**12**

ITALY, TRINITY (C)

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
CONSERVATION - ITALY	DEMAND REDUCTION [ELLIS]	1	3	5	8	12	20
CONSERVATION, WATER LOSS CONTROL - ITALY	DEMAND REDUCTION [ELLIS]	2	2	0	0	0	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	592

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG)

All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	60	130	200
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	18	28	23	31	27
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	4	7	6	12	36
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	46	81	129	117	124
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	38	70	38	59
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	144	0
		3	**73**	**159**	**296**	**484**	**1,058**

JOHNSON COUNTY SUD, TRINITY (C)

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
ANRA-COL - LAKE COLUMBIA	COLUMBIA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	2
ARLINGTON UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	1	1
CONSERVATION - JOHNSON COUNTY SUD	DEMAND REDUCTION [ELLIS]	0	0	0	0	0	0
CONSERVATION, WATER LOSS CONTROL - JOHNSON COUNTY SUD	DEMAND REDUCTION [ELLIS]	0	0	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	1	2	18	2
FORT WORTH UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	1	1	0	0	0
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TRINITY AQUIFER [DALLAS]	11	12	14	15	16	18
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TRINITY AQUIFER [TARRANT]	11	12	14	15	16	18
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	INDIRECT REUSE [DENTON]	1	1	1	1	2	2
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	FORK LAKE/RESERVOIR [RESERVOIR]	1	1	1	1	1	2
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	JOE POOL LAKE/RESERVOIR [RESERVOIR]	1	1	1	1	1	2
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	RAY HUBBARD LAKE/RESERVOIR [RESERVOIR]	1	1	1	1	1	1

Projected Water Management Strategies
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WUG, Basin (RWPG)

All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM [RESERVOIR]	2	2	2	2	2	2
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TAWAKONI LAKE/RESERVOIR [RESERVOIR]	3	4	4	3	3	3
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	2	2	2	2	2	2
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	1	2	2	1	1
MANSFIELD UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	2	2	2	2	2	2
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	18
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	2	4	6
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	0	0	0	0	0
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	0	0	0	0	0
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	1	1
		35	**40**	**46**	**49**	**71**	**83**

MANSFIELD, TRINITY (C)

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
CONSERVATION - MANSFIELD	DEMAND REDUCTION [ELLIS]	0	1	1	2	3	4
CONSERVATION, WATER LOSS CONTROL - MANSFIELD	DEMAND REDUCTION [ELLIS]	0	0	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	0	0	12	0
MANSFIELD UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	8	10	11	15	17	18
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	18
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	2	4	6

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

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	1	1	2	1	2
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	1	2
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	1	5	10	7	9
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	2	4	3	3
		8	**13**	**20**	**35**	**48**	**62**

MANUFACTURING, ELLIS, TRINITY (C)

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
CONSERVATION, MANUFACTURING - ELLIS COUNTY	DEMAND REDUCTION [ELLIS]	0	6	63	88	90	90
DREDGE LAKE WAXAHACHIE	WAXAHACHIE LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	171	563
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	0	0	25	0
MIDLOTHIAN UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	4	43	51	56	57	56
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	40
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	6	11	13
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	4	28	4	5	4
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	1	116	1	2	5
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	10	89	144	164	17
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	8	59	165	408
WAXAHACHIE UNALLOCATED SUPPLY UTILIZATION	WAXAHACHIE LAKE/RESERVOIR [RESERVOIR]	0	0	74	76	218	183
		4	**64**	**429**	**434**	**908**	**1,379**

MAYPEARL, TRINITY (C)

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
CONSERVATION - MAYPEARL	DEMAND REDUCTION [ELLIS]	0	1	1	2	2	3
CONSERVATION, WATER LOSS CONTROL - MAYPEARL	DEMAND REDUCTION [ELLIS]	1	1	0	0	0	0

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG)

All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	64
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	16	22	22
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	71	36	26	12	10	6
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	45	8	7	4	4	8
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	90	75	71	41	27
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	36	38	13	13
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	50	0
		117	**136**	**145**	**143**	**142**	**143**

MIDLOTHIAN, TRINITY (C)

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
CONSERVATION - MIDLOTHIAN	DEMAND REDUCTION [ELLIS]	56	117	212	287	365	440
CONSERVATION – WASTE PROHIBITION, MIDLOTHIAN	DEMAND REDUCTION [ELLIS]	15	41	57	71	84	93
CONSERVATION, IRRIGATION RESTRICTIONS – MIDLOTHIAN	DEMAND REDUCTION [ELLIS]	4	12	17	21	24	27
CONSERVATION, WATER LOSS CONTROL - MIDLOTHIAN	DEMAND REDUCTION [ELLIS]	21	21	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	0	0	914	0
MIDLOTHIAN UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	523	1,273	1,804	2,163	2,276
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	1,630
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	189	410	552
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	44	152	144	195	148
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	10	36	45	77	199
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	114	406	809	744	686
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	192	448	243	325

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

All values are in acre-feet

WUG, Basin (RWPG) / Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
		96	**882**	**2,345**	**3,818**	**5,219**	**6,376**
MILFORD, TRINITY (C)							
CONSERVATION - MILFORD	DEMAND REDUCTION [ELLIS]	0	0	1	1	1	2
CONSERVATION, WATER LOSS CONTROL - MILFORD	DEMAND REDUCTION [ELLIS]	0	0	0	0	0	0
		0	**0**	**1**	**1**	**1**	**2**
MOUNTAIN PEAK SUD, TRINITY (C)							
CONSERVATION - MOUNTAIN PEAK SUD	DEMAND REDUCTION [ELLIS]	6	14	26	75	126	192
CONSERVATION, WATER LOSS CONTROL - MOUNTAIN PEAK SUD	DEMAND REDUCTION [ELLIS]	6	6	0	88	328	404
MIDLOTHIAN UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	139	325	516	717	970	1,033
MOUNTAIN PEAK SUD ADDITIONAL WELLS (WOODBINE)	WOODBINE AQUIFER [ELLIS]	7	7	7	7	7	7
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	491
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	44	70	131
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	14	44	34	34	35
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	4	11	10	13	48
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	37	127	191	127	162
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	60	105	41	77
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	156	0
		158	**407**	**791**	**1,271**	**1,872**	**2,580**
OAK LEAF, TRINITY (C)							
ANRA-COL - LAKE COLUMBIA	COLUMBIA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	22
CONSERVATION - OAK LEAF	DEMAND REDUCTION [ELLIS]	1	1	2	3	6	9
CONSERVATION, WATER LOSS CONTROL - OAK LEAF	DEMAND REDUCTION [ELLIS]	1	1	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	4	3	7	29	48	59

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WUG, Basin (RWPG)

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Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	10	20	27	38	42
MIDLOTHIAN UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	16	25	31	34	40	42
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	17	19
		22	**40**	**60**	**93**	**149**	**193**
OVILLA, TRINITY (C)							
ANRA-COL - LAKE COLUMBIA	COLUMBIA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	213
CONSERVATION - OVILLA	DEMAND REDUCTION [ELLIS]	13	26	46	62	83	167
CONSERVATION, WATER LOSS CONTROL - OVILLA	DEMAND REDUCTION [ELLIS]	4	4	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	28	30	71	246	316	564
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	101	224	225	248	401
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	109	179
		45	**161**	**341**	**533**	**756**	**1,524**
PALMER, TRINITY (C)							
CONSERVATION - PALMER	DEMAND REDUCTION [ELLIS]	1	2	4	7	11	25
CONSERVATION, WATER LOSS CONTROL - PALMER	DEMAND REDUCTION [ELLIS]	1	1	0	0	0	0
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	86	0	0	0	0	0
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	151	234	321	459	940
		88	**154**	**238**	**328**	**470**	**965**
PECAN HILL, TRINITY (C)							
CONSERVATION - PECAN HILL	DEMAND REDUCTION [ELLIS]	0	1	2	3	4	8
CONSERVATION, WATER LOSS CONTROL - PECAN HILL	DEMAND REDUCTION [ELLIS]	1	1	0	0	0	0
MIDLOTHIAN UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	33	59	90	124	174	290
		34	**61**	**92**	**127**	**178**	**298**

All values are in acre-feet

WUG, Basin (RWPG) / Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
RED OAK, TRINITY (C)							
ANRA-COL - LAKE COLUMBIA	COLUMBIA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	299
CONSERVATION - RED OAK	DEMAND REDUCTION [ELLIS]	6	14	28	50	77	143
CONSERVATION, WATER LOSS CONTROL - RED OAK	DEMAND REDUCTION [ELLIS]	9	9	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	6	50	283	426	794
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	21	159	259	335	566
MIDLOTHIAN UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	23	238	348	348	290	127
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	341	289	311	381	515	229
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	504
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	147	252
		379	**577**	**896**	**1,321**	**1,790**	**2,914**
RICE WSC, TRINITY (C)							
CONSERVATION - RICE WSC	DEMAND REDUCTION [ELLIS]	2	5	10	17	25	36
CONSERVATION, WATER LOSS CONTROL - RICE WSC	DEMAND REDUCTION [ELLIS]	3	3	0	0	0	0
CORSICANA - HALBERT/RICHLAND CHAMBERS NEW WTP	RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION [RESERVOIR]	0	0	0	197	472	692
CORSICANA UNALLOCATED SUPPLY UTILIZATION	NAVARRO MILLS LAKE/RESERVOIR [RESERVOIR]	0	264	370	328	267	317
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	14	25	33
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	0	8	0	0	0
		5	**272**	**388**	**556**	**789**	**1,078**
ROCKETT SUD, TRINITY (C)							
CONSERVATION - ROCKETT SUD	DEMAND REDUCTION [ELLIS]	13	31	57	93	151	223
CONSERVATION, WATER LOSS CONTROL - ROCKETT SUD	DEMAND REDUCTION [ELLIS]	18	18	0	0	0	0

WUG, Basin (RWPG)

All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	0	0	231	0
MIDLOTHIAN UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	694	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	8,049
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	2,091	1,913	2,565
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	847	619	638	110	534	34
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	684	247	321	250	385	506
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	1,428	1,444	1,095	1,212	155
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	1,687	539	87	91
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	266	0
		1,562	**2,343**	**4,147**	**4,178**	**5,473**	**11,623**

SARDIS-LONE ELM WSC, TRINITY (C)

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
CONSERVATION - SARDIS-LONE ELM WSC	DEMAND REDUCTION [ELLIS]	52	104	174	212	245	268
CONSERVATION, WATER LOSS CONTROL - SARDIS-LONE ELM WSC	DEMAND REDUCTION [ELLIS]	20	20	0	0	0	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	1,032
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	260	356	350
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	685	298	205	99	85	47
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	436	68	53	30	33	63
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	2,103	2,836	3,038	2,327	2,464
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	277	465	1,296	1,699
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	398	0
		1,193	**2,593**	**3,545**	**4,104**	**4,740**	**5,923**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

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

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
STEAM ELECTRIC POWER, ELLIS, TRINITY (C)							
DREDGE LAKE WAXAHACHIE	WAXAHACHIE LAKE/RESERVOIR [RESERVOIR]	0	0	96	705	534	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	0	0	1,026	0
MIDLOTHIAN UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	5	38	54	58	58	54
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	1,633
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	439	1,078	376
TRINITY RIVER AUTHORITY ELLIS COUNTY REUSE (SEP)	DIRECT REUSE [ELLIS]	0	0	0	0	2,200	4,700
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	3	559	638	328	321
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	1	63	82	188	430
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	8	300	1,248	981	1,475
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	191	385	602	697
WAXAHACHIE UNALLOCATED SUPPLY UTILIZATION	INDIRECT REUSE [ELLIS]	0	0	455	593	471	0
WAXAHACHIE UNALLOCATED SUPPLY UTILIZATION	BARDWELL LAKE/RESERVOIR [RESERVOIR]	0	0	393	438	331	0
WAXAHACHIE UNALLOCATED SUPPLY UTILIZATION	WAXAHACHIE LAKE/RESERVOIR [RESERVOIR]	0	0	181	211	0	0
		5	**50**	**2,292**	**4,797**	**7,797**	**9,686**
VENUS, TRINITY (C)							
CONSERVATION - VENUS	DEMAND REDUCTION [ELLIS]	0	0	0	0	0	0
CONSERVATION, WATER LOSS CONTROL - VENUS	DEMAND REDUCTION [ELLIS]	0	0	0	0	0	0
MIDLOTHIAN UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	4	5	7	8	10	11
MUNICIPAL WATER CONSERVATION (SUBURBAN) - VENUS	DEMAND REDUCTION [ELLIS]	13	3	3	4	5	6
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	7

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

All values are in acre-feet

WUG, Basin (RWPG) Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	1	2	2
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	12	12	13	17	14
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	1
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	1	2	3	3	3
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	1	2	1	1
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	4	0
		17	**21**	**25**	**31**	**42**	**45**
WAXAHACHIE, TRINITY (C)							
CONSERVATION - WAXAHACHIE	DEMAND REDUCTION [ELLIS]	92	168	279	377	504	668
CONSERVATION, IRRIGATION RESTRICTIONS – WAXAHACHIE	DEMAND REDUCTION [ELLIS]	4	9	12	16	20	26
CONSERVATION, WATER LOSS CONTROL - WAXAHACHIE	DEMAND REDUCTION [ELLIS]	34	34	0	0	0	0
DREDGE LAKE WAXAHACHIE	WAXAHACHIE LAKE/RESERVOIR [RESERVOIR]	0	0	609	0	0	142
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	0	0	152	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	2,329
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	352	995	1,660
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	0	0	0	148	189
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	175
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	0	442	284	842	604
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	209	584	199	285
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	756	0
WAXAHACHIE UNALLOCATED SUPPLY UTILIZATION	INDIRECT REUSE [ELLIS]	0	0	0	0	0	413

WUG, Basin (RWPG)							All values are in acre-feet
Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
WAXAHACHIE UNALLOCATED SUPPLY UTILIZATION	BARDWELL LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	288
		130	**211**	**1,551**	**1,613**	**3,616**	**6,779**
Sum of Projected Water Management Strategies (acre-feet)		**6,214**	**11,106**	**21,466**	**29,844**	**47,946**	**83,792**

HILL COUNTY

WUG, Basin (RWPG)							All values are in acre-feet
Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
BRANDON-IRENE WSC, BRAZOS (G)							
CONSERVATION - BRANDON-IRENE WSC	DEMAND REDUCTION [HILL]	0	0	0	0	0	0
CONSERVATION, WATER LOSS CONTROL - BRANDON-IRENE WSC	DEMAND REDUCTION [HILL]	0	0	0	0	0	0
		0	**0**	**0**	**0**	**0**	**0**
BRANDON-IRENE WSC, TRINITY (G)							
CONSERVATION - BRANDON-IRENE WSC	DEMAND REDUCTION [HILL]	0	0	0	1	1	1
CONSERVATION, WATER LOSS CONTROL - BRANDON-IRENE WSC	DEMAND REDUCTION [HILL]	0	0	0	0	0	0
		0	**0**	**0**	**1**	**1**	**1**
COUNTY-OTHER, HILL, BRAZOS (G)							
CORSICANA - HALBERT/RICHLAND CHAMBERS NEW WTP	RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION [RESERVOIR]	0	0	0	83	166	204
CORSICANA UNALLOCATED SUPPLY UTILIZATION	NAVARRO MILLS LAKE/RESERVOIR [RESERVOIR]	0	158	185	139	93	94
WTP UPGRADE FOR ARSENIC REMOVAL	WOODBINE AQUIFER [HILL]	222	222	222	222	222	222
		222	**380**	**407**	**444**	**481**	**520**
COUNTY-OTHER, HILL, TRINITY (G)							
CORSICANA - HALBERT/RICHLAND CHAMBERS NEW WTP	RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION [RESERVOIR]	0	0	0	10	21	26
CORSICANA UNALLOCATED SUPPLY UTILIZATION	NAVARRO MILLS LAKE/RESERVOIR [RESERVOIR]	0	20	23	17	12	12

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

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

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
WTP UPGRADE FOR ARSENIC REMOVAL	WOODBINE AQUIFER [HILL]	28	28	28	28	28	28
		28	**48**	**51**	**55**	**61**	**66**
FILES VALLEY WSC, BRAZOS (G)							
CONSERVATION - FILES VALLEY WSC	DEMAND REDUCTION [HILL]	0	0	0	1	1	1
CONSERVATION, WATER LOSS CONTROL - FILES VALLEY WSC	DEMAND REDUCTION [HILL]	0	0	0	0	0	0
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	0	0	0	0	0
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	4	0
		0	**0**	**0**	**1**	**5**	**1**
FILES VALLEY WSC, TRINITY (G)							
CONSERVATION - FILES VALLEY WSC	DEMAND REDUCTION [HILL]	0	1	1	1	2	3
CONSERVATION, WATER LOSS CONTROL - FILES VALLEY WSC	DEMAND REDUCTION [HILL]	1	1	0	0	0	0
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	0	0	0	0	0
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	11	0
		1	**2**	**1**	**1**	**13**	**3**
HILLSBORO, BRAZOS (G)							
MUNICIPAL WATER CONSERVATION (URBAN) - HILLSBORO	DEMAND REDUCTION [HILL]	79	230	385	495	506	517
		79	**230**	**385**	**495**	**506**	**517**
HUBBARD, TRINITY (G)							
CORSICANA - HALBERT/RICHLAND CHAMBERS NEW WTP	RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION [RESERVOIR]	0	0	0	27	55	67
CORSICANA UNALLOCATED SUPPLY UTILIZATION	NAVARRO MILLS LAKE/RESERVOIR [RESERVOIR]	0	54	61	46	31	31
		0	**54**	**61**	**73**	**86**	**98**
JOHNSON COUNTY SUD, BRAZOS (G)							
ANRA-COL - LAKE COLUMBIA	COLUMBIA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
ARLINGTON UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0

Projected Water Management Strategies
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WUG, Basin (RWPG)

All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
CONSERVATION - JOHNSON COUNTY SUD	DEMAND REDUCTION [HILL]	0	0	0	0	0	0
CONSERVATION, WATER LOSS CONTROL - JOHNSON COUNTY SUD	DEMAND REDUCTION [HILL]	0	0	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	0	1	1	1
FORT WORTH UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TRINITY AQUIFER [DALLAS]	10	9	8	8	7	6
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TRINITY AQUIFER [TARRANT]	10	9	8	8	7	6
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	INDIRECT REUSE [DENTON]	1	1	1	1	1	1
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	FORK LAKE/RESERVOIR [RESERVOIR]	1	1	1	1	1	1
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	JOE POOL LAKE/RESERVOIR [RESERVOIR]	1	1	1	1	1	1
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	RAY HUBBARD LAKE/RESERVOIR [RESERVOIR]	1	1	1	1	0	0
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM [RESERVOIR]	2	2	1	1	1	1
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TAWAKONI LAKE/RESERVOIR [RESERVOIR]	3	3	2	2	1	1
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	2	1	1	1	1	1
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	1	1	1	1	1
MANSFIELD UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	2	2	1	1	0	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	6
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	1	2	2
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	0	0	0	0	0
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
		33	**31**	**26**	**28**	**24**	**31**

WUG, Basin (RWPG)

All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	0	0	0	0	3
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	0	0
		33	**31**	**26**	**28**	**24**	**31**

JOHNSON COUNTY SUD, TRINITY (G)

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
ANRA-COL - LAKE COLUMBIA	COLUMBIA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
ARLINGTON UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
CONSERVATION - JOHNSON COUNTY SUD	DEMAND REDUCTION [HILL]	0	0	0	0	0	0
CONSERVATION, WATER LOSS CONTROL - JOHNSON COUNTY SUD	DEMAND REDUCTION [HILL]	0	0	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	0	0	0	0
FORT WORTH UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TRINITY AQUIFER [DALLAS]	2	2	2	1	2	1
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TRINITY AQUIFER [TARRANT]	2	2	2	1	2	1
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	INDIRECT REUSE [DENTON]	0	0	0	0	0	0
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	FORK LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	JOE POOL LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	RAY HUBBARD LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TAWAKONI LAKE/RESERVOIR [RESERVOIR]	1	1	0	0	0	0
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0

All values are in acre-feet

WUG, Basin (RWPG)							
Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
MANSFIELD UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	1
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	0	0	0	0	0
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	0	0	0	0	1
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	0	0
		5	**5**	**4**	**2**	**4**	**4**
MINING, HILL, BRAZOS (G)							
INDUSTRIAL WATER CONSERVATION	DEMAND REDUCTION [HILL]	39	48	0	0	0	0
WOODBINE AQUIFER DEVELOPMENT	WOODBINE AQUIFER [HILL]	274	397	0	0	0	0
		313	**445**	**0**	**0**	**0**	**0**
MINING, HILL, TRINITY (G)							
INDUSTRIAL WATER CONSERVATION	DEMAND REDUCTION [HILL]	10	12	0	0	0	0
WOODBINE AQUIFER DEVELOPMENT	WOODBINE AQUIFER [HILL]	286	163	0	0	0	0
		296	**175**	**0**	**0**	**0**	**0**
PARKER WSC, BRAZOS (G)							
WOODBINE AQUIFER DEVELOPMENT	WOODBINE AQUIFER [JOHNSON]	0	0	0	0	7	6
		0	**0**	**0**	**0**	**7**	**6**
PARKER WSC, TRINITY (G)							
WOODBINE AQUIFER DEVELOPMENT	WOODBINE AQUIFER [JOHNSON]	0	0	0	0	2	2
		0	**0**	**0**	**0**	**2**	**2**

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

All values are in acre-feet

WUG, Basin (RWPG) / Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
WHITE BLUFF COMMUNITY WS, BRAZOS (G)							
MUNICIPAL WATER CONSERVATION (RURAL) - WHITE BLUFF COMMUNITY WS	DEMAND REDUCTION [HILL]	24	63	103	125	128	132
		24	**63**	**103**	**125**	**128**	**132**
WHITNEY, BRAZOS (G)							
MUNICIPAL WATER CONSERVATION (URBAN) - WHITNEY	DEMAND REDUCTION [HILL]	17	50	70	68	69	71
		17	**50**	**70**	**68**	**69**	**71**
Sum of Projected Water Management Strategies (acre-feet)		**1,018**	**1,483**	**1,108**	**1,293**	**1,387**	**1,452**

JOHNSON COUNTY

All values are in acre-feet

WUG, Basin (RWPG) / Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
ACTON MUD, BRAZOS (G)							
REALLOCATION OF SWATS CAPACITY TO ACTON MUD	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	5
		0	**0**	**0**	**0**	**0**	**5**
BETHESDA WSC, BRAZOS (G)							
ARLINGTON UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	42	44	45	45	46	46
CONSERVATION - BETHESDA WSC	DEMAND REDUCTION [JOHNSON]	1	1	2	3	3	4
CONSERVATION, WATER LOSS CONTROL - BETHESDA WSC	DEMAND REDUCTION [JOHNSON]	0	0	0	0	0	0
FORT WORTH UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	6	8	8	7	6
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	14	0
MUNICIPAL WATER CONSERVATION (SUBURBAN) - BETHESDA WSC	DEMAND REDUCTION [JOHNSON]	4	12	23	31	35	40
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	64
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	16	17	21

WUG, Basin (RWPG)

All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	18	11	11	8	8	5
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	12	3	3	2	4	8
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	5	11	15	17	16
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	15	8	10	13
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	17	0
		77	**82**	**118**	**136**	**178**	**223**

BETHESDA WSC, TRINITY (G)

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
ARLINGTON UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	852	895	985	913	929	940
CONSERVATION - BETHESDA WSC	DEMAND REDUCTION [JOHNSON]	15	28	42	51	62	73
CONSERVATION, WATER LOSS CONTROL - BETHESDA WSC	DEMAND REDUCTION [JOHNSON]	6	6	0	0	0	0
FORT WORTH UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	118	270	164	146	117
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	247	0
MUNICIPAL WATER CONSERVATION (SUBURBAN) - BETHESDA WSC	DEMAND REDUCTION [JOHNSON]	76	249	468	631	714	808
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	1,289
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	321	351	438
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	380	225	225	149	166	119
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	241	52	57	44	66	157
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	99	230	692	375	327
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	303	171	206	257
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	351	0
		1,570	**1,672**	**2,580**	**3,136**	**3,613**	**4,525**

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

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
BURLESON, BRAZOS (G)							
CONSERVATION - BURLESON	DEMAND REDUCTION [JOHNSON]	0	0	0	0	0	0
CONSERVATION, WATER LOSS CONTROL - BURLESON	DEMAND REDUCTION [JOHNSON]	0	0	0	0	0	0
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	4
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	1	1	1
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	2	1	1	1	0	0
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	1	1	1	0	0	0
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	2	2	2	2	1
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	2	1	1	2
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	1	0
		3	**4**	**6**	**5**	**5**	**8**
BURLESON, TRINITY (G)							
CONSERVATION - BURLESON	DEMAND REDUCTION [JOHNSON]	3	7	12	21	32	43
CONSERVATION, WATER LOSS CONTROL - BURLESON	DEMAND REDUCTION [JOHNSON]	6	6	0	0	0	0
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	1,764	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	3,683
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	655	1,069	1,248
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	1,524	955	864	499	506	337
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	970	220	221	150	200	451
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	1,570	1,706	2,015	1,433	1,170

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

All values are in acre-feet

WUG, Basin (RWPG) / Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	1,166	1,116	628	732
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	623	0
		2,503	**2,758**	**3,969**	**4,456**	**6,255**	**7,664**
CLEBURNE, BRAZOS (G)							
BRA SYSTEM OPERATION MAIN STEM	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	72	144	216	288	1,189
LAKE AQUILLA AUGMENTATION - A (SURPLUS)	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM [RESERVOIR]	6,285	6,353	6,421	6,349	6,277	5,016
MUNICIPAL WATER CONSERVATION (SUBURBAN) - CLEBURNE	DEMAND REDUCTION [JOHNSON]	207	685	736	749	809	883
		6,492	**7,110**	**7,301**	**7,314**	**7,374**	**7,088**
CRESSON, BRAZOS (G)							
CONSERVATION - CRESSON	DEMAND REDUCTION [JOHNSON]	0	0	0	0	0	0
CONSERVATION, WATER LOSS CONTROL - CRESSON	DEMAND REDUCTION [JOHNSON]	0	0	0	0	0	0
CRESSON NEW WELLS IN TRINITY AQUIFER	TRINITY AQUIFER [PARKER]	6	6	7	8	8	8
TRINITY AQUIFER DEVELOPMENT	TRINITY AQUIFER [HOOD]	0	0	4	4	4	4
		6	**6**	**11**	**12**	**12**	**12**
CRESSON, TRINITY (G)							
CONSERVATION - CRESSON	DEMAND REDUCTION [JOHNSON]	0	0	0	0	0	0
CONSERVATION, WATER LOSS CONTROL - CRESSON	DEMAND REDUCTION [JOHNSON]	0	0	0	0	0	0
CRESSON NEW WELLS IN TRINITY AQUIFER	TRINITY AQUIFER [PARKER]	12	13	14	15	16	17
TRINITY AQUIFER DEVELOPMENT	TRINITY AQUIFER [HOOD]	0	0	7	8	8	9
		12	**13**	**21**	**23**	**24**	**26**
CROWLEY, TRINITY (G)							
CONSERVATION - CROWLEY	DEMAND REDUCTION [JOHNSON]	0	0	0	0	1	1
CONSERVATION, WATER LOSS CONTROL - CROWLEY	DEMAND REDUCTION [JOHNSON]	0	0	0	0	0	0

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

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

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	6	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	11
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	1	3	4
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	1	1	1	1	1	1
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	1	0	0	0	1	1
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	3	4	5	6	5
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	2	6	2	2
		2	**4**	**7**	**13**	**20**	**25**
FORT WORTH, TRINITY (G)							
CONSERVATION - FORT WORTH	DEMAND REDUCTION [JOHNSON]	0	0	0	44	75	99
CONSERVATION, WATER LOSS CONTROL - FORT WORTH	DEMAND REDUCTION [JOHNSON]	0	0	0	19	15	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	0	0	18	0
FORT WORTH ALLIANCE DIRECT REUSE	DIRECT REUSE [TARRANT]	0	1	0	24	35	40
FORT WORTH DIRECT REUSE	DIRECT REUSE [TARRANT]	0	0	0	3	4	5
FORT WORTH FUTURE DIRECT REUSE	DIRECT REUSE [TARRANT]	0	0	0	25	36	42
FORT WORTH UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	41	38	15
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	330
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	93	179	121
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	0	0	20	16	9
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	6	14	29
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	0	0	58	130	147

All values are in acre-feet

WUG, Basin (RWPG) / Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	0	28	84	66
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	4	0
		0	**1**	**0**	**361**	**648**	**903**
GODLEY, BRAZOS (G)							
WOODBINE AQUIFER DEVELOPMENT	WOODBINE AQUIFER [JOHNSON]	0	0	0	0	30	30
		0	**0**	**0**	**0**	**30**	**30**
JOHNSON COUNTY SUD, BRAZOS (G)							
ANRA-COL - LAKE COLUMBIA	COLUMBIA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	24
ARLINGTON UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	19	16	18	16	19	17
CONSERVATION - JOHNSON COUNTY SUD	DEMAND REDUCTION [JOHNSON]	0	0	0	0	0	0
CONSERVATION, WATER LOSS CONTROL - JOHNSON COUNTY SUD	DEMAND REDUCTION [JOHNSON]	0	0	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	12	12	23	64	391	63
FORT WORTH UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	4	4	4	3	2
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TRINITY AQUIFER [DALLAS]	524	524	525	525	526	527
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TRINITY AQUIFER [TARRANT]	523	524	525	525	526	527
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	INDIRECT REUSE [DENTON]	30	35	34	41	49	55
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	FORK LAKE/RESERVOIR [RESERVOIR]	46	50	49	49	47	47
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	JOE POOL LAKE/RESERVOIR [RESERVOIR]	55	48	45	45	45	45
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	RAY HUBBARD LAKE/RESERVOIR [RESERVOIR]	45	44	40	35	31	28
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM [RESERVOIR]	109	97	85	73	62	55
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TAWAKONI LAKE/RESERVOIR [RESERVOIR]	159	153	136	119	103	94

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG)

All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	100	80	70	65	59	54
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	38	73	58	52	46
MANSFIELD UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	92	74	58	59	55	50
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	524
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	87	152	177
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	5	9	8	8	6
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	1	2	2	4	8
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	133	252	358	279	223
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	116	191	85	99
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	23	20
		1,714	**1,838**	**2,064**	**2,324**	**2,519**	**2,691**

JOHNSON COUNTY SUD, TRINITY (G)

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
ANRA-COL - LAKE COLUMBIA	COLUMBIA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	66
ARLINGTON UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	53	43	50	44	53	48
CONSERVATION - JOHNSON COUNTY SUD	DEMAND REDUCTION [JOHNSON]	0	0	0	0	0	0
CONSERVATION, WATER LOSS CONTROL - JOHNSON COUNTY SUD	DEMAND REDUCTION [JOHNSON]	0	0	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	34	35	63	177	1,044	174
FORT WORTH UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	12	12	10	8	5
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TRINITY AQUIFER [DALLAS]	1,443	1,446	1,446	1,450	1,451	1,453
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TRINITY AQUIFER [TARRANT]	1,444	1,446	1,446	1,450	1,451	1,453
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	INDIRECT REUSE [DENTON]	81	95	93	113	135	152

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

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

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	FORK LAKE/RESERVOIR [RESERVOIR]	126	138	137	134	129	130
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	JOE POOL LAKE/RESERVOIR [RESERVOIR]	152	132	123	123	125	124
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	RAY HUBBARD LAKE/RESERVOIR [RESERVOIR]	125	122	109	97	85	79
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM [RESERVOIR]	300	268	234	202	171	150
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TAWAKONI LAKE/RESERVOIR [RESERVOIR]	440	422	375	329	287	260
GRAND PRAIRIE UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	275	222	193	179	163	147
LAKE PALESTINE	PALESTINE LAKE/RESERVOIR [RESERVOIR]	0	105	201	161	142	126
MANSFIELD UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	251	205	163	162	149	137
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	1,447
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	238	417	491
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	17	27	19	21	16
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	4	7	7	9	21
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	387	734	1,038	760	613
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	348	576	253	298
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	63	56
		4,724	**5,099**	**5,761**	**6,509**	**6,916**	**7,446**

MANSFIELD, TRINITY (G)

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
CONSERVATION - MANSFIELD	DEMAND REDUCTION [JOHNSON]	10	21	38	53	72	93
CONSERVATION, WATER LOSS CONTROL - MANSFIELD	DEMAND REDUCTION [JOHNSON]	3	4	0	0	0	0
DWU - MAIN STEM REUSE	INDIRECT REUSE [DALLAS]	0	0	0	0	240	0

WUG, Basin (RWPG)

All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
MANSFIELD UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	178	257	311	402	428	444
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	450
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	51	109	153
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	17	41	39	52	41
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	4	10	12	20	55
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	44	116	219	198	190
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	55	121	68	90
		191	**347**	**571**	**897**	**1,187**	**1,516**

MINING, JOHNSON, BRAZOS (G)

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
INDUSTRIAL WATER CONSERVATION	DEMAND REDUCTION [JOHNSON]	62	0	0	0	0	0
WOODBINE AQUIFER DEVELOPMENT	WOODBINE AQUIFER [JOHNSON]	574	0	0	0	0	0
		636	**0**	**0**	**0**	**0**	**0**

MINING, JOHNSON, TRINITY (G)

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
INDUSTRIAL WATER CONSERVATION	DEMAND REDUCTION [JOHNSON]	62	0	0	0	0	0
WOODBINE AQUIFER DEVELOPMENT	WOODBINE AQUIFER [JOHNSON]	566	0	0	0	0	0
		628	**0**	**0**	**0**	**0**	**0**

MOUNTAIN PEAK SUD, TRINITY (G)

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
CONSERVATION, WATER LOSS CONTROL - MOUNTAIN PEAK SUD	DEMAND REDUCTION [JOHNSON]	2	2	0	28	97	112
MIDLOTHIAN UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	15	0	0	0	0	0
MOUNTAIN PEAK SUD ADDITIONAL WELLS (WOODBINE)	WOODBINE AQUIFER [ELLIS]	0	0	0	0	0	0
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0

All values are in acre-feet

WUG, Basin (RWPG) / Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	0	0	0	0	0
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	0	0	0	0	0
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	0	0	0	0	0
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	0
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	0	0
		17	**2**	**0**	**28**	**97**	**112**
PARKER WSC, BRAZOS (G)							
WOODBINE AQUIFER DEVELOPMENT	WOODBINE AQUIFER [JOHNSON]	0	0	0	0	132	132
		0	**0**	**0**	**0**	**132**	**132**
PARKER WSC, TRINITY (G)							
WOODBINE AQUIFER DEVELOPMENT	WOODBINE AQUIFER [JOHNSON]	0	0	0	0	39	40
		0	**0**	**0**	**0**	**39**	**40**
RIO VISTA, BRAZOS (G)							
WOODBINE AQUIFER DEVELOPMENT	WOODBINE AQUIFER [JOHNSON]	0	0	0	0	1,179	1,179
		0	**0**	**0**	**0**	**1,179**	**1,179**
STEAM ELECTRIC POWER, JOHNSON, BRAZOS (G)							
BRA SYSTEM OPERATION MAIN STEM	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM [RESERVOIR]	3,415	3,275	3,135	3,135	3,135	3,135
INDUSTRIAL WATER CONSERVATION	DEMAND REDUCTION [JOHNSON]	210	350	490	490	490	490
LAKE AQUILLA AUGMENTATION - A (SURPLUS)	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM [RESERVOIR]	3,415	3,275	3,135	3,135	3,135	3,135
		7,040	**6,900**	**6,760**	**6,760**	**6,760**	**6,760**
VENUS, TRINITY (G)							
CONSERVATION - VENUS	DEMAND REDUCTION [JOHNSON]	0	0	1	1	2	2
CONSERVATION, WATER LOSS CONTROL - VENUS	DEMAND REDUCTION [JOHNSON]	0	0	0	0	0	0
MIDLOTHIAN UNALLOCATED SUPPLY UTILIZATION	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	156	193	225	247	263	270

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

WUG, Basin (RWPG)

All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
MUNICIPAL WATER CONSERVATION (SUBURBAN) - VENUS	DEMAND REDUCTION [JOHNSON]	17	87	112	123	135	150
SULPHUR BASIN SUPPLY	MARVIN NICHOLS LAKE/RESERVOIR [RESERVOIR]	0	0	0	0	0	186
SULPHUR BASIN SUPPLY	WRIGHT PATMAN LAKE/RESERVOIR [RESERVOIR]	0	0	0	23	47	63
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	INDIRECT REUSE [NAVARRO]	0	0	10	5	6	4
TRWD - ADDITIONAL CEDAR CREEK AND RICHLAND-CHAMBERS	TRWD LAKE/RESERVOIR SYSTEM [RESERVOIR]	0	3	6	6	8	23
TRWD - CEDAR CREEK WETLANDS	INDIRECT REUSE [HENDERSON]	0	30	60	101	86	78
TRWD - TEHUACANA	TEHUACANA LAKE/RESERVOIR [RESERVOIR]	0	0	28	54	28	37
UNM-ROR-NECHES RUN OF RIVER	NECHES RUN-OF-RIVER [ANDERSON]	0	0	0	0	105	0
		173	**313**	**442**	**560**	**680**	**813**
Sum of Projected Water Management Strategies (acre-feet)		**25,788**	**26,149**	**29,611**	**32,534**	**37,668**	**41,198**

SOMERVELL COUNTY

WUG, Basin (RWPG)

All values are in acre-feet

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
GLEN ROSE, BRAZOS (G)							
MUNICIPAL WATER CONSERVATION (URBAN) - GLEN ROSE	DEMAND REDUCTION [SOMERVELL]	24	73	128	167	172	178
		24	**73**	**128**	**167**	**172**	**178**
MINING, SOMERVELL, BRAZOS (G)							
INDUSTRIAL WATER CONSERVATION	DEMAND REDUCTION [SOMERVELL]	33	64	80	74	70	68
TRINITY AQUIFER DEVELOPMENT	TRINITY AQUIFER [SOMERVELL]	550	550	550	550	550	550
		583	**614**	**630**	**624**	**620**	**618**
STEAM ELECTRIC POWER, SOMERVELL, BRAZOS (G)							
BRA SYSTEM OPERATION MAIN STEM	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM [RESERVOIR]	76,120	76,120	76,120	76,120	76,120	76,120

Projected Water Management Strategies
TWDB 2017 State Water Plan Data

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

Water Management Strategy	Source Name [Origin]	2020	2030	2040	2050	2060	2070
HOOD COUNTY SE REALLOCATION TO SOMERVELL COUNTY SE	BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM [RESERVOIR]	27,133	27,133	27,133	27,133	27,133	27,133
SOMERVELL COUNTY WSP	BRAZOS RUN-OF-RIVER [SOMERVELL]	300	300	484	484	484	484
		103,553	**103,553**	**103,737**	**103,737**	**103,737**	**103,737**
Sum of Projected Water Management Strategies (acre-feet)		**104,160**	**104,240**	**104,495**	**104,528**	**104,529**	**104,533**

Appendix H

GAM Run 16-007

GAM Run 16-007: Prairielands Groundwater Conservation District Management Plan

Radu Boghici, P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Section
(512)463-5808
May 16, 2016

STATE OF TEXAS
RADU BOGHICI
GEOLOGY
No. 4882
LICENSED
PROFESSIONAL GEOSCIENTIST

5/16/2016

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GAM RUN 16-007: PRAIRIELANDS GROUNDWATER CONSERVATION DISTRICT MANAGEMENT PLAN

Radu Boghici, P.G.
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Section
(512)463-5808
May 16, 2016

EXECUTIVE SUMMARY:

Texas State Water Code, Section 36.1071, Subsection (h) (Texas Water Code, 2015), states that, in developing its groundwater management plan, a groundwater conservation district shall use groundwater availability modeling information provided by the executive administrator of the Texas Water Development Board (TWDB) in conjunction with any available site-specific information provided by the district for review and comment to the executive administrator. Information derived from groundwater availability models that shall be included in the groundwater management plan includes:

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

This report—Part 2 of a two-part package of information from the TWDB to the Prairielands Groundwater Conservation District—fulfills the requirements noted above. Part 1 of the two-part package is the Estimated Historical Water Use/State Water Plan data report. The district will receive this data report from the TWDB Groundwater Technical Assistance Section. Questions about the data report can be directed to Mr. Stephen Allen, stephen.allen@twdb.texas.gov, (512)463-7317.

The groundwater management plan for the Prairielands Groundwater Conservation District should be adopted by the district on or before May 1, 2017, and submitted to the Executive Administrator of the TWDB on or before May 31, 2017. The current management plan for the Prairielands Groundwater Conservation District expires on July 30, 2017.

This report discusses the methods, assumptions, and results from a model run using version 2.01 of the groundwater availability model for the northern portion of the Trinity and Woodbine aquifers (Kelley and others, 2014). This model run replaces the results of GAM Run 11-004 (Wade, 2011). GAM Run 11-004 was completed using version 1.01 of the groundwater availability model for the northern portion of the Trinity and Woodbine aquifers (Bené and others, 2004). Table 1 and Table 2 summarize the groundwater availability model data required by statute. Figure 1 and Figure 2 show the area of the model from which the values in the tables were extracted. If after review of the figures Prairielands Groundwater Conservation District determines that the district boundaries used in the assessment do not reflect current conditions, please notify the TWDB at your earliest convenience.

METHODS:

In accordance with the provisions of the Texas State Water Code, Section 36.1071, Subsection (h), the groundwater availability model for the northern portion of the Trinity and Woodbine aquifers was used for this analysis. The water budget for the Prairielands Groundwater Conservation District was extracted for selected years of the historical model period (1980 to 2012) using ZONEBUDGET Version 3.01 (Harbaugh, 2009). The average annual water budget values for recharge, surface-water outflow, inflow to the district, and outflow from the district for the Trinity Aquifer and Woodbine Aquifer within the district are summarized in this report.

PARAMETERS AND ASSUMPTIONS:

Trinity Aquifer and Woodbine Aquifer

- We used version 2.01 of the updated groundwater availability model for the northern portion of the Trinity and Woodbine aquifers. See Kelley and others (2014) for assumptions and limitations of the model.

- The groundwater availability model for the northern portion of the Trinity and Woodbine aquifers contains eight layers: Layer 1 (the surficial outcrop area of the units in layers 2 through 8 and units younger than Woodbine Aquifer), Layer 2 (Woodbine Aquifer and pass-through cells), Layer 3

(Washita and Fredericksburg, Edwards (Balcones Fault Zone), and pass-through cells), and Layers 4 through 8 (Trinity Aquifer).

- Perennial rivers and reservoirs were simulated using MODFLOW-NWT river package. Ephemeral streams, flowing wells, springs, and evapotranspiration in riparian zones along perennial rivers were simulated using MODFLOW-NWT drain package. For this management plan, groundwater discharge to surface water includes groundwater leakage to all of the river and drain boundaries except for the groundwater loss along the riparian zone.

- The model was run with MODFLOW-NWT (Niswonger and others, 2011).

RESULTS:

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

- Precipitation recharge—the areally-distributed recharge sourced from precipitation falling on the outcrop areas of the aquifers—where the aquifer is exposed at land surface—within the district.

- Surface-water outflow—the total water discharging from the aquifer (outflow) to surface-water features such as streams, reservoirs, and drains (springs).

- Flow into and out of district—the lateral flow within the aquifer between the district and adjacent counties.

- Flow between aquifers—the net vertical flow between aquifers or confining units. This flow is controlled by the relative water levels in each aquifer or confining unit and aquifer properties of each aquifer or confining unit that define the amount of leakage that occurs. Please note that the model assumes no cross-formational flow at the base of the Trinity Aquifer. Therefore, no cross-formational flow between the Trinity Aquifer and underlying hydrogeologic units was calculated by the model.

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

TABLE 1: SUMMARIZED INFORMATION FOR THE TRINITY AQUIFER THAT IS NEEDED FOR PRAIRIELANDS GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Trinity Aquifer	15,668
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Trinity Aquifer	27,122
Estimated annual volume of flow into the district within each aquifer in the district	Trinity Aquifer	35,709[1]
Estimated annual volume of flow out of the district within each aquifer in the district	Trinity Aquifer	15,754[2]
Estimated net annual volume of flow between each aquifer in the district	From overlying younger units to Trinity Aquifer	8,066

[1] The estimated volume of flow from the brackish portion of the Trinity Group into the Trinity Aquifer in eastern Ellis County is 69 acre-feet per year and was not included in the management plan requirement results.

[2] The estimated volume of flow from the Trinity Aquifer into the brackish portion of the Trinity Group in eastern Ellis County is 16 acre-feet per year and was not included in the management plan requirement results.

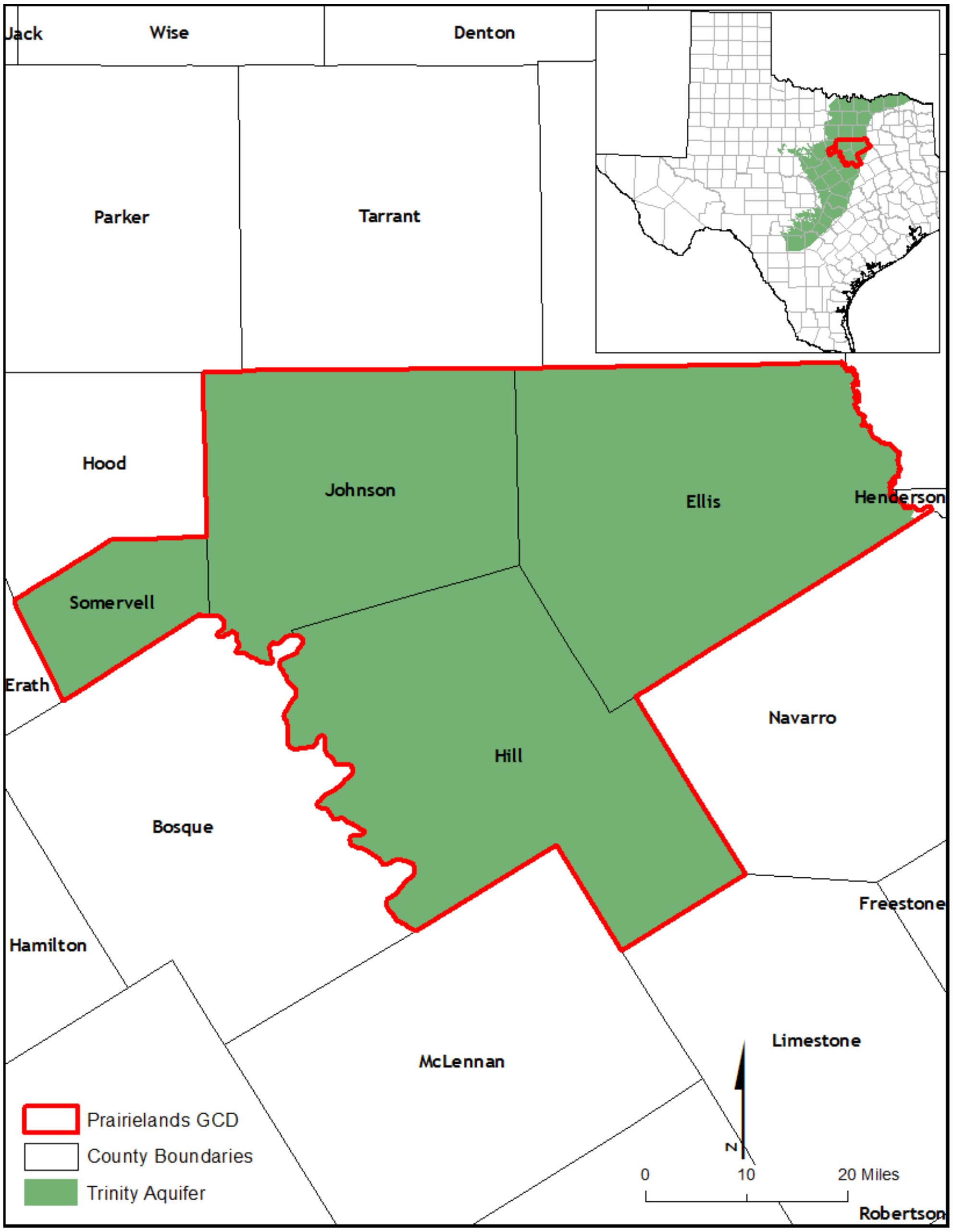

FIGURE 1: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE TRINITY AQUIFER FROM WHICH THE INFORMATION IN TABLE 1 WAS EXTRACTED FOR THE PRAIRIELANDS GROUNDWATER CONSERVATION DISTRICT (GCD).

TABLE 2: SUMMARIZED INFORMATION FOR THE WOODBINE AQUIFER THAT IS NEEDED FOR PRAIRIELANDS GROUNDWATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT.

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Woodbine Aquifer	22,392
Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers	Woodbine Aquifer	16,865
Estimated annual volume of flow into the district within each aquifer in the district	Woodbine Aquifer	8,089[1]
Estimated annual volume of flow out of the district within each aquifer in the district	Woodbine Aquifer	12,781[2]
Estimated net annual volume of flow between each aquifer in the district	From younger units to Woodbine Aquifer	2,024
	From Woodbine Aquifer to Washita and Fredericksburg confining units	7,334

[1] The estimated volume of flow from the brackish portion of the Woodbine Formation into the Woodbine Aquifer in Ellis and Hill counties is 42 acre-feet per year and was not included in the management plan requirement results.

[2] The estimated volume of flow from the Woodbine Aquifer into the brackish portion of the Woodbine Formation in Ellis and Hill counties is 23 acre-feet per year and was not included in the management plan requirement results.

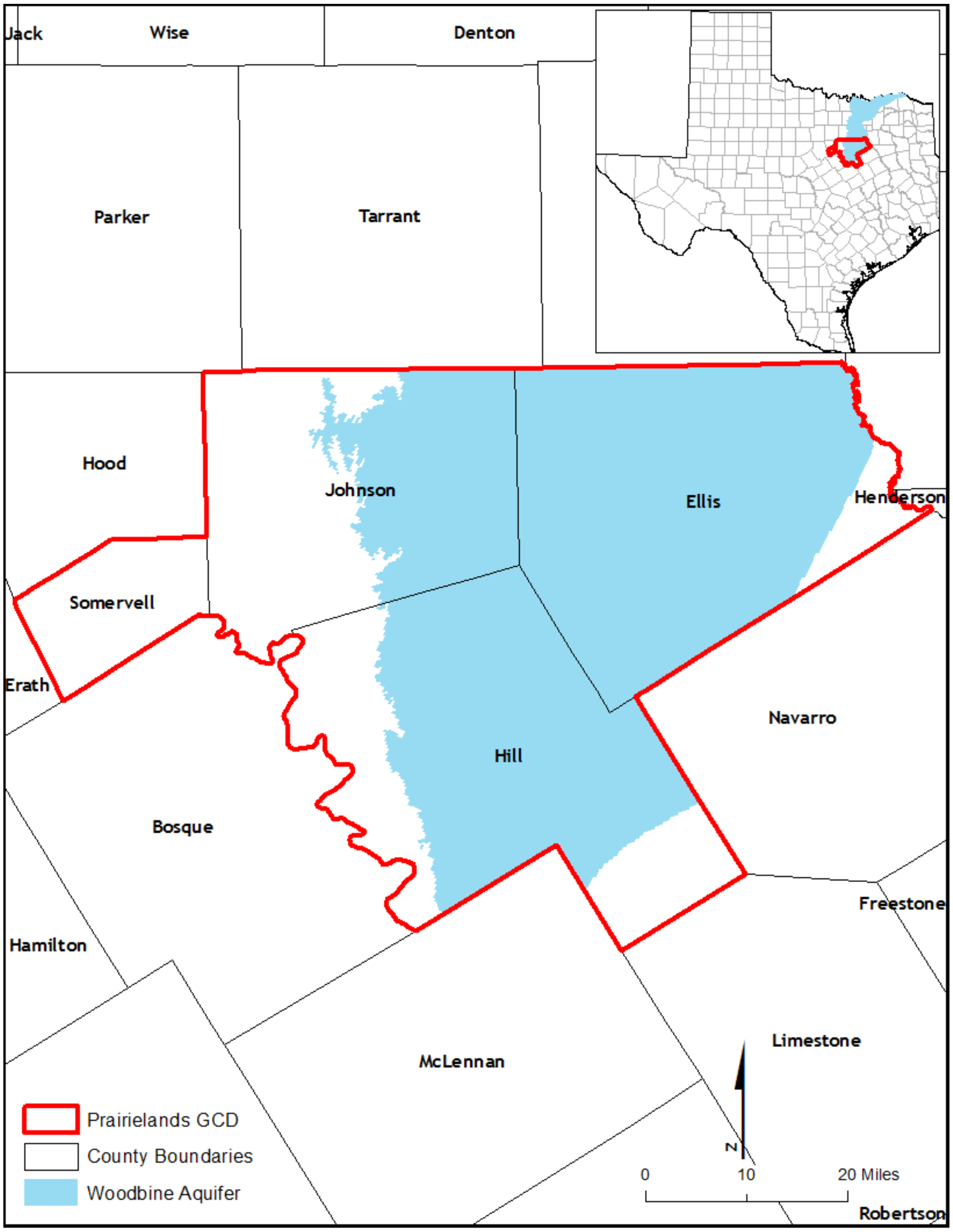

FIGURE 2: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE WOODBINE AQUIFER FROM WHICH THE INFORMATION IN TABLE 2 WAS EXTRACTED FOR THE PRAIRIELANDS GROUNDWATER CONSERVATION DISTRICT (GCD).

LIMITATIONS:

The groundwater models used in completing this analysis are the best available scientific tools 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 interaction with streams are specific to particular historic time periods.

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

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

REFERENCES:

Bené, J., Harden, B., O'Rourke, D., Donnelly, A., and Yelderman, J., 2004, Northern Trinity/Woodbine Groundwater Availability Model: contract report to the Texas Water Development Board by R.W. Harden and Associates, 391 p., http://www.twdb.texas.gov/groundwater/models/gam/trnt_n/TRNT_N_Model_Report.pdf.

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Kelley, V.A., Ewing, J., Jones, T.L., Young, S.C., Deeds, N., and Hamlin, S., 2014, Updated Groundwater Availability Model of the Northern Trinity and Woodbine Aquifers – Draft Final Model Report (May 2014), 984 p.

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Niswonger, R.G., Panday, S., and Ibaraki, M., 2011, MODFLOW-NWT, a Newton formulation for MODFLOW-2005: USGS, Techniques and Methods 6-A37, 44 p.

Texas Water Code, 2015, http://www.statutes.legis.state.tx.us/docs/WA/pdf/WA.36.pdf.

Wade S., 2011, GAM Run 11-004: Texas Water Development Board GAM Run 10-004 Report, 6 p., http://www.twdb.texas.gov/groundwater/docs/GAMruns/GR11-004.pdf.

Appendix I

Website Link to District Rules

The Prairielands Groundwater Conservation District's amended temporary rules may be viewed on the District's website at http://www.prairielandsgcd.org/Rules_and_Bylaws.html.