
# Groundwater Management Plan

**Adopted August 1, 2017**

**Post Oak Savannah Groundwater Conservation District**
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## 1. DISTRICT MISSION

The Post Oak Savannah Groundwater Conservation District (POSGCD) mission is to provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater, and to protect groundwater users, by adopting and enforcing Rules consistent with state law. The District will accomplish this mission by imposing spacing requirements, regulating production, requiring permits for wells and production, establishing water drawdown levels and monitoring groundwater levels and production, making appropriate adjustments to allowable and permitted production, and encouraging conservation.

## 2. TIME PERIOD OF THIS PLAN

This plan will become effective upon adoption by the POSGCD Board of Directors ("Board") and approval as administratively complete by the Texas Water Development Board. The plan will remain in effect for five (5) years after the date of certification, and thereafter until a revised plan is adopted and approved.

## 3. BACKGROUND

The POSGCD was created in Milam and Burleson counties by HB 1784, 77th Legislature, 2001, and a local confirmation election in November 2002. The purpose of this bill is to provide a locally controlled groundwater district to conserve and preserve groundwater, protect groundwater users, protect and recharge groundwater, prevent pollution or waste of groundwater in the central Carrizo-Wilcox area, control subsidence caused by withdrawal of water from the groundwater reservoirs in that area, and regulate the transport of water out of the boundaries of the districts. The POSGCD has 10 directors, 5 from each county. It does not have the power to tax and receives all of its revenue from fees imposed on municipal/commercial pumpers and transporters of groundwater. Successful confirmation elections were held in November 2002 in both counties in accordance with Sections 36.017, 36.018, and 36.019, Water Code, and Section 41.001, Election Code.

The POSGCD is a member of Groundwater Management Area 12 (GMA 12) and Groundwater Management Area 8 (GMA 8), whose areal extents are shown in Figure 1. To help establish desired future conditions (DFCs) for the relevant aquifers within the boundaries of GMA 12 and GMA 8, POSGCD will consider groundwater availability models (GAMs) and other data or information. As part of the joint planning process, POSGCD will establish management goals and objectives that are consistent with the DFCs adopted by GMA 8 and GMA 12.

## 4. GROUNDWATER RESOURCES

Located within the District's boundaries are portions of the Trinity, Wilcox, Carrizo, Queen City, Sparta, Yegua/Jackson, and the Brazos River Alluvium aquifers. Figure 2 shows the locations of the outcrops of these aquifers based on the surface geology mapped by Barnes (1994), Kelley and others (2004), Deeds and others (2010), and Shah and Houston (2007). In Figure 2, the outcrop area for the Carrizo Aquifer includes the outcrop area associated with the Reklaw Formation, the outcrop area for the Queen City Aquifer includes

the outcrop area associated with the Weches Formation, and the outcrop area for the Sparta Aquifer includes the outcrop area for the Catahoula Formation. Within the District, the Trinity Aquifer does not outcrop and is overlaid primarily by the Midway Formation. Table 4-1 provides the area associated with each aquifer outcrop.

**Table 4-1. Aquifer Outcrop Areas in the District**

| Aquifer and/or Geologic Formation | Outcrop Area (square miles) |
|---|---|
| Midway Formation | 346 |
| Wilcox | 348 |
| Carrizo/Reklaw | 70 |
| Queen City/Weches | 159 |
| Sparta | 76 |
| Cook Mountain/Yegua-Jackson /Catahoula | 321 |
| Brazos River Alluvium | 161 |
| Shallow Alluvium | 215 |
| Total | 1,699 |

**(a) Northern Trinity Aquifer.** The northern Trinity Aquifer is located in the northwest corner of Milam County. The Trinity Aquifer comprises five geological formations considered to be relevant aquifers by GMA 8. These geologic formations are the Paluxy Aquifer, the Glen Rose Aquifer, the Travis Peak Aquifer, the Hensell Aquifer, and the Hosston Aquifer. The top and bottom surfaces for these geological formations are defined by the Updated Northern Trinity and Woodbine Aquifers GAM (Kelley and others, 2014).

**(b) Wilcox Aquifer.** The Wilcox aquifer is a major regional aquifer system. The outcrop of the Wilcox Aquifer forms a southwest to northeast trending belt through central Milam County; the downdip portion of the Wilcox Aquifer underlies southern Milam County and all of Burleson County. Freshwater exists in the Wilcox Aquifer in both Milam County and Burleson County. The Wilcox Aquifer comprises three geological formations that are considered to be relevant aquifers by GMA 12. These three geologic formations are the Hooper, the Simsboro, and the Calvert Bluff. The top and bottom surfaces for these three geological formations are defined by their model layer in the Central Carrizo GAM (Dutton and others, 2003). The Upper Wilcox Aquifer is associated with the Calvert Bluff Formation. The Middle Wilcox Aquifer is associated with the Simsboro Formation. The Lower Wilcox Aquifer is associated with the Hooper Formation.

The unconfined portion of the Upper Wilcox Aquifer is where the Central Carrizo GAM (Dutton and others, 2003) simulates the water level in the Calvert Bluff Formation to be below the top of the Calvert Bluff Formation at January 2000. The unconfined portion of the Middle Wilcox Aquifer is where the Central Carrizo GAM (Dutton and others, 2003) simulates the water level in the Simsboro Formation to be below the top of the Simsboro Formation at January 2000. The unconfined portion of the Lower Wilcox Aquifer is where the Central Carrizo GAM (Dutton and others, 2003) simulates the water level in the Hooper Formation to be below the top of the Hooper Formation at

January 2000.

**(c) Carrizo Aquifer.** The Carrizo Aquifer is a regional aquifer system that occurs throughout most of the District. The outcrop of the Carrizo Aquifer forms a southwest to northeast trending belt through southern Milam County; the downdip portion of the Carrizo Aquifer underlies southern Milam County and all of Burleson County. Freshwater exists in the Carrizo Aquifer in both Milam County and Burleson County. The aquifer is a source of groundwater for numerous domestic wells and several large public water supply systems. The top and bottom surfaces for the Carrizo Aquifer are represented by its model layer in the Central Carrizo GAM (Dutton and others, 2003). The unconfined portion of the Carrizo Aquifer is where the Central Carrizo GAM (Dutton and others, 2003) simulates the water level in the Carrizo Formation to be below the top of the Carrizo Formation at January 2000.

**(d) Queen City.** The Queen City Aquifer outcrops across a 5- to 8-mile-wide zone that is generally aligned along the Milam-Burleson County line. The aquifer extends down dip in Burleson County and is a source of groundwater for domestic wells and some public water supply wells. Freshwater exists in the Queen City Aquifer in both Milam County and Burleson County. The top and bottom surfaces for the Queen City Aquifer are represented by its model layer in the Central Carrizo GAM (Kelley and others, 2004). The unconfined portion of the Queen City Aquifer is defined as the area where the Central Carrizo GAM (Kelly and others, 2004) simulates the water table to be below the top of the Queen City Aquifer at January 2000.

**(e) Sparta Aquifer.** The Sparta Aquifer outcrops across a 3- to 5-mile-wide zone trending southwest- northeast just north of Highway 21 in Burleson County. The Sparta extends downdip to the southeast throughout much of Burleson County. Like the Queen City Aquifer, the Sparta is used for numerous domestic water wells and some small public water supply systems in the District. Freshwater exists in the Sparta Aquifer in Burleson County. The top and bottom surfaces for the Sparta Aquifer are represented by its model layer in the Central Carrizo GAM (Kelley and others, 2004). The unconfined portion of the Sparta Aquifer is defined as the area where the Central Carrizo GAM (Kelly and others, 2004) simulates the water table to be below the top of the Sparta Aquifer at January 2000.

**(f) Yegua/Jackson Aquifer.** The Yegua/Jackson Aquifer outcrops across a 6- to 10-mile-wide zone trending southwest-northeast south of Highway 21 in Burleson County. The Yegua/Jackson Aquifer extends down-dip to the southeast through much of Burleson County. The Yegua/Jackson Aquifer includes to all four geologic units (the upper Yegua, the lower Yegua, the upper Jackson, and the lower Jackson), represented by the model layers in the Yegua/Jackson GAM (Deeds and others, 2010). In Burleson County, the Yegua/Jackson Aquifer provides small to moderate amounts of freshwater to domestic and irrigation wells and to a few public water systems.

**(g) Brazos River Alluvium Aquifer.** The Brazos River Alluvium Aquifer is comprised of floodplain and terrace deposits of the Brazos River along the eastern boundary of Milam and Burleson counties. The Brazos River Alluvium Aquifer occurs only as an unconfined aquifer in POSGCD, and the majority of it exists in Burleson County. The Brazos River Alluvium supplies freshwater to many irrigation wells and several domestic wells. For

the most part, the water discharges from the alluvium mainly through seepage to the Brazos River, evapotranspiration, and wells. The bottom surface for the Brazos River Alluvium is represented by the Brazos River Alluvium Aquifer GAM (Ewing and Jigmond, 2016).

**(h) Shallow Alluvium Aquifers.** Shallow alluvium aquifers have not been completely mapped across POSGCD. The aquifers represent floodplain and terrace deposits near major tributaries to the Brazos River. These aquifers are generally less than 30 feet thick, are characterized by mixtures of coarse sands and fine-grain materials, and are often well connected hydrologically to nearby streams. The areas of these aquifers are denoted by alluvium deposits denoted in the Bureau of Economic Geology map of surface geology (Proctor and others, 1974).

## 5. MANAGEMENT ZONES

The District is divided into groundwater management zones for the purpose of evaluating and managing groundwater resources recognizing the different characteristics and anticipated future development of the aquifers in the District.

The District will establish and enforce Rules for the spacing of wells, the maximum allowable production of groundwater per acre of land located over an aquifer, require permits for production, regulate drawdown and provide for a reduction in the maximum allowable production and permitted production of groundwater per acre of land based on the different surface and subsurface characteristics and different evaluation and monitoring within the Management Zones.

The Management Zones are as follows:

**(a) Brazos River Alluvium Management Zone.** This management zone is located along the eastern boundaries of the District in Milam and Burleson counties and is coterminous with the boundaries of the Brazos Alluvium outcrop in Figure 2. This zone extends to the depth of the water bearing alluvial sediments of the Brazos River Alluvium.

**(b) Trinity Management Zone.** This management zone includes the northern Trinity Aquifer, which is located beneath the footprint of the Midway outcrop shown in Figure 2. This management zone also includes the Midway Formation, which is generally a clayey deposit with low transmissivity.

**(c) Sparta Management Zone.** The Sparta Management Zone includes all of the water-bearing formations of the Sparta Aquifer found in the District.

**(d) Queen City Management Zone.** The Queen City Management Zone includes all of the water-bearing formations of the Queen City Aquifer found in the District.

**(e) Carrizo Management Zone.** The Carrizo Management Zone includes all of the water-bearing formations of the Carrizo Aquifer found in the District.

**(f) Upper Wilcox Management Zone.** The Upper Wilcox Management Zone includes all of the water-bearing formations of the Calvert Bluff Formation found in the District.

**(g) Middle Wilcox Management Zone.** The Middle Wilcox Management Zone includes all of the water-bearing formations of the Simsboro Formation found in the District.

**(h) Lower Wilcox Management Zone.** The Lower Wilcox Management Zone includes all of the water-bearing formations of the Hooper Formation found in the District.

**(i) Yegua/Jackson Management Zone.** This zone includes the outcrop and downdip portions of the geologic units of the Yegua and the Jackson formations of the Yegua/Jackson Aquifer, which occur in the southern portion of Burleson County.

**(j) Shallow Management Zone for each Management Zone listed above items (b) through (i).** This management zone corresponds to all deposits that occur at a depth of 400 feet or less, as measured from land surface, except for deposits associated with the Brazos River Alluvium. The Shallow Management Zone is not mutually exclusive from the aquifer management zones (b) through (i) but the uppermost portion of those management zones. The purpose of monitoring the Shallow Management zone is to characterize the water levels in the unconfined portions of the aquifers.

## 6. MANAGEMENT OF GROUNDWATER SUPPLIES

The District will evaluate and monitor groundwater conditions and regulate production consistent with this plan and the District Rules. Production will be regulated, as needed, to conserve groundwater, and protect groundwater users, in a manner not to unnecessarily and adversely limit production or impact the economic viability of the public, landowners and private groundwater users. In consideration of the importance of groundwater to the economy and culture of the District, the District will identify and engage in activities and practices that will permit groundwater production and, as appropriate, protect the aquifer and groundwater in accordance with this Management Plan and the District's rules. A monitoring well network will be maintained to monitor aquifer conditions within the District. The District will make a regular assessment of water supply and groundwater storage conditions and will report those conditions, as appropriate, in public meetings of the Board or public announcements. The District will undertake investigations, and cooperate with third-party investigations, of the groundwater resources within the District, and the results of the investigations will be made available to the public upon being presented at a meeting of the Board.

The District will adopt rules to regulate groundwater withdrawals by means of well spacing and production limits as appropriate to implement this Plan. In making a determination to grant a permit or limit groundwater withdrawals, the District will consider the available evidence and, as appropriate and applicable, weigh the public benefit against the individual needs and hardship.

The factors that the District may consider in making a determination to grant a drilling and operating or operating permit or limit groundwater withdrawals will include:

1. The purpose of the rules of the District;
2. The equitable distribution of the resource;
3. The economic hardship resulting from grant or denial of a permit, or the terms prescribed by the permit;
4. This Management Plan and DFCs of the District as adopted in Joint Planning under Tex. Water Code, Sec. 36.108; and
5. The potential effect the permit may have on the aquifer, and groundwater users.

The transport of groundwater out of the District will be regulated by the District according to the Rules of the District.

In pursuit of the District's mission of protecting the groundwater resources, the District may require adjustment of groundwater withdrawals in accordance with the Rules and Management Plan. To achieve this purpose, the District may, at the Board's discretion after notice and hearing, amend or revoke any permit for non- compliance, or reduce the production authorized by permit for the purpose of protecting the aquifer and groundwater availability. The determination to seek the amendment of a permit will be based on aquifer conditions observed by the District as stated in the District's rules. The determination to seek revocation of a permit will be based on compliance and non-compliance with the District's rules and regulations. The District will enforce the terms and conditions of permits and the rules of the District, as necessary, by fine and enjoining the permit holder in a court of competent jurisdiction as provided for in Texas Water Code (TWC) Ch. 36.102, etc.

A contingency plan to cope with the effects of water supply deficits due to climatic or other conditions will be developed by the District and will be adopted by the Board after notice and hearing. In developing the contingency plan, the District will consider all relevant factors, including, but not limited to, the economic effect of conservation measures upon all water resource user groups, the local implications of the degree and effect of changes in water storage conditions, the unique hydrogeologic conditions of the aquifers within the District and the appropriate conditions under which to implement the contingency plan.

The District will employ reasonable and necessary technical resources at its disposal to evaluate the groundwater resources available within the District and to determine the effectiveness of regulatory or conservation measures. A public or private user may appeal to the Board for discretion in enforcement of the provisions of the water supply deficit contingency plan on grounds of adverse economic hardship or unique local conditions. The exercise of discretion by the Board shall not be construed as limiting the power of the Board.

## 7. DESIRED FUTURE CONDITIONS

The District shall participate in the joint planning process in GMAs 8 and 12 as defined per TWC § 36.108, including establishment of DFCs for management areas within the District. In its evaluation of potential DFCs, the District shall consider results from GAMs, scientific reports, and the conditions of the aquifer within the management zones.

**(a) DFCs Adopted by GMA 12.** The District's DFCs for the area covered by GMA 12 are provided in Tables 7-1, 7-2, and 7-3 for both the 2010 and 2015 Joint Planning cycles. For each of the aquifers, the DFC average drawdowns are for the area covered by each aquifer in Milam and Burleson counties.

For the Queen City, Sparta, Carrizo and Wilcox aquifers (Table 7-1), the stratigraphy was defined using the TWDB GAM for the Queen City and Sparta Aquifers (Kelley and others, 2004) during both planning cycles. The DFCs from the 2010 Joint Planning cycle correspond with the Modeled Available Groundwater (MAG) values provided in Section 8. These DFCs are average drawdowns calculated by the Kelley and others (2004) model for a 60-year period beginning January 2000 and ending December 2059. The DFCs from the 2015 Joint Planning cycle are the most current POSGCD DFCs, but at the time of the current plan, the MAG values have not yet been calculated using these DFCs. These DFCs are average drawdowns calculated by the Kelley and others (2004) model for a 70-year period beginning January 2000 and ending December 2069.

For the Yegua-Jackson Aquifer (Table 7-2), the stratigraphy was defined using the TWDB GAM for the Yegua-Jackson Aquifer (Deeds and others, 2010) during both planning cycles. The DFCs from the 2010 Joint Planning cycle correspond with the MAG values provided in Section 8. These DFCs are average drawdowns calculated by the Deeds and others (2010) model for the 60-year period beginning January 2000 and ending December 2059. The DFCs from the 2015 Joint Planning cycle are the most current POSGCD DFCs, but at the time of the current plan, the MAG values have not yet been calculated using these DFCs. These DFCs are average drawdowns calculated by the Deeds and others (2010) model for a 60-year period beginning January 2010 and ending December 2069.

For the Brazos River Alluvium Aquifer (Table 7-3), there was no TWDB GAM available during the either joint planning period for GMA 12. The DFCs for the 2010 Joint Planning cycle represent declines in the saturated thickness measured in District monitoring well network over a 50-year period. The 50-year period begins January 2010 and ends December 2059. The DFCs for the 2015 Joint Planning cycle represent declines in the saturated thickness measured in District monitoring well network over a 60-year period. The 60-year period begins in January 2010 and ends on December 2069.

**Table 7-1. Adopted DFCs for the Queen City, Sparta, Carrizo and Wilcox aquifers**

| Aquifer | 2010 Joint Planning | 2015 Joint Planning |
|---|---|---|
| | Average Drawdown between January 2000 and December 2059 (ft) | Average Drawdown between January 2000 and December 2069 (ft) |
| Sparta | 30 | 28 |
| Queen City | 30 | 30 |
| Carrizo | 65 | 67 |
| Upper Wilcox (Calvert Bluff Fm) | 140 | 149 |
| Middle Wilcox (Simsboro Fm) | 300 | 318 |
| Lower Wilcox (Hooper Fm) | 180 | 205 |

**Table 7-2. Adopted DFCs for the Yegua-Jackson Aquifer**

| Aquifer | 2010 Joint Planning | 2015 Joint Planning |
|---|---|---|
| | Average Drawdown between January 2000 and December 2059 (ft) | Average Drawdown between January 2010 and December 2069 (ft) |
| Yegua-Jackson | 100 | 100 |

**Table 7-3. Adopted DFCs for the Brazos River Alluvium Aquifer**

| County | 2010 Joint Planning | 2015 Joint Planning |
|---|---|---|
| | Average Decrease in Saturated Thickness between January 2010 and December 2059 (ft) | Average Decrease in Saturated Thickness between January 2010 and December 2069 (ft) |
| Milam in GMA 12 | 5 | 5 |
| Burleson in GMA 12 | 6 | 6 |

**(b) DFCs Adopted by GMA 8.** On the date of this Plan's adoption, the District did not have any permitted wells in the portion of the Brazos River Alluvium Aquifer and the Trinity Aquifer in GMA 8. POSGCD participated in the GMA 8 joint planning process to help establish DFCs for the Brazos River Alluvium Aquifer and the Trinity Aquifer within the District boundaries, but for the purpose of this Plan, the District considers the portion of the Brazos River Alluvium Aquifer within GMA 8 as a non-relevant aquifer. The District will not monitor water levels in the GMA 8 portion of the Brazos River Alluvium until the GMA 8 portion of the Brazos River Alluvium is deemed as a relevant aquifer by the District. The District will also not monitor water levels in the Trinity Aquifer until there is at least one permitted well that pumps from the Trinity Aquifer.

The District's DFCs for the area covered by GMA 8 are provided in Table 7-4 for both the 2010 and 2015 Joint Planning cycles. The DFCs from the 2010 Joint Planning cycle correspond with the MAG values provided in Section 8. These DFCs are average

drawdowns for a 50-year period that begins January 2000 and ends December 2049. The average drawdowns are for areas covered by each aquifer in Milam County as defined by the stratigraphy provided by the TWDB GAM for the Northern Trinity Aquifer (Bené and others, 2004). The DFCs from the 2015 Joint Planning cycle are the most current POSGCD DFCs, but at the time of the current plan, the MAG values have not yet been calculated using these DFCs. These DFCs are average drawdowns for a 60-year period that begins on January 2010 and ends on December 2070. The average drawdowns are for areas covered by each aquifer in Milam County as defined by the stratigraphy provided by the TWDB Updated GAM for the Northern Trinity and Woodbine Aquifers (Kelley and others, 2014).

**Table 7-4. Adopted DFCs for the Trinity Aquifer.**

| Aquifer | 2010 Joint Planning | 2015 Joint Planning |
|---|---|---|
| | Average Drawdown between January 2000 and December 2049 (ft) | Average Drawdown between January 2010 and December 2070 (ft) |
| Paluxy | 252 | -- |
| Glen Rose | 294 | 212 |
| Travis Peak | -- | 345 |
| Hensell | 337 | 229 |
| Hosston | 344 | 345 |

**(c) Protective Drawdown Limits (PDLs) for Shallow Management Zone Water Levels**
On the date of this Plan's adoption, neither GMA 12 nor 8 has established DFCs for the shallow unconfined sections of the aquifers within the GMAs. The District therefore developed the PDLs in Table 7-5 independently in order to limit drawdown in the shallow up-dip regions of the aquifers within the District. These PDLs were developed to help protect the production capacity of existing wells in the shallow unconfined portions of the aquifer where the water level above the well screen tends to be less than in the deep confined portions of the aquifer.

**Table 7-5 PDL Threshold values for Average Drawdown for the Shallow Management Zones**

| Aquifer | Average Drawdown (ft) that Occurs between January 2000 and December 2069 in the Shallow Management Zone |
|---|---|
| Sparta | 20 |
| Queen City | 20 |
| Carrizo | 20 |
| Upper Wilcox (Calvert Bluff Fm) | 20 |
| Middle Wilcox (Simsboro Fm) | 20 |
| Lower Wilcox (Hooper Fm) | 20 |
| Yegua | 20 |
| Jackson | 20 |

## 8. MODELED AVAILABLE GROUNDWATER (MAG)

Based on DFCs adopted by GMA 8 and GMA 12, the TWDB is required by TWC § 36.108 9(o) to provide the District with a MAG for each DFC. Table 8-1 lists the MAGs received by the District from the TWDB based on DFCs from the 2010 planning cycle. The TWDB has not yet provided GMA 8 nor GMA 12 with revised MAGs based on DFCs from the 2015 joint planning cycle.

**Table 8-1. Modeled Available Groundwater Values Calculated by the TWDB based on the DFCs adopted by GMA 8 and 12**

| GAM | Aquifer | Modeled available groundwater in acre-ft/year (AFY) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 2010 | 2020 | 2030 | 2040 | 2050 | 2060 |
| ***Brazos River Alluvium*** | GMA 8: Declared a Non-Relevant Aquifer | NA | NA | NA | NA | NA | NA |
| | GMA 12: Milam and Burleson County[1] | 25,138 | 25,138 | 25,138 | 25,138 | 25,138 | 25,138 |
| ***Aquifers in Trinity GAM*** | Paluxy[2] | 0 | 0 | 0 | 0 | 0 | 0 |
| | Glen Rose[2] | 149 | 149 | 149 | 149 | 149 | 149 |
| | Hensell[2] | 36 | 36 | 36 | 36 | 36 | 36 |
| | Hosston[2] | 103 | 103 | 103 | 103 | 103 | 103 |
| | *Subtotal* | *288* | *288* | *288* | *288* | *288* | *288* |
| ***Aquifers in the Queen City/ Sparta GAM*** | Sparta[3] | 1,570 | 2,245 | 4,041 | 5,612 | 6,734 | 6,734 |
| | Queen City[4] | 430 | 468 | 502 | 502 | 502 | 502 |
| | Carrizo[5] | 4,025 | 4,706 | 5,177 | 6,118 | 6,353 | 7,059 |
| | Upper Wilcox (Calvert | 502 | 1,038 | 1,038 | 1,038 | 1,038 | 1,038 |
| | Middle Wilcox | 36,507 | 38,468 | 37,899 | 40,041 | 46,027 | 48,501 |
| | Lower Wilcox (Hooper | 899 | 2,960 | 4,139 | 4,433 | 4,433 | 4,422 |
| | *Subtotal* | *43,933* | *49,885* | *52,796* | *57,744* | *65,087* | *68,256* |
| ***Yegua-Jackson Aquifer*** | Yegua-Jackson Aquifer[6] | 12,923 | 12,923 | 12,923 | 12,923 | 12,923 | 12,923 |
| | *TOTAL* | *82,282* | *88,234* | *91,145* | *96,093* | *103,43* | *106,605* |

[1] GTA Aquifer Assessment 10-20 MAG (Bradley, 2011)
[2] GAM RUN 10-063 MAG (Oliver and Bradley, 2011)
[3] GAM RUN 10-046 MAG (Oliver, 2012c)
[4] GAM RUN 10-045 MAG (Oliver, 2012b)
[5] GAM RUN 10-044 MAG (Oliver, 2012a)
[6] GAM RUN 10-060MAG (Oliver, 2012d)
NA – not applicable

## 9. WATER WELL INVENTORY

The District will assign permitted wells to a management zone and to an aquifer based on the location of the well's screen or well depth using the Rules of the District. If no well screen information is available, then a permitted well will be assigned to a management zone and to an aquifer based on the total depth of the well. The assignment of the permitted well will be made at the time of permit. The District will assign exempt wells to a management zone and to an aquifer based on available information for the exempt well. The District will use the assignments to help track the permitted pumping and production for each aquifer and for each management zone.

## 10. GROUNDWATER MONITORING

The District will maintain a monitoring well network that will be used by the District to obtain measured water levels. Groundwater monitoring will be designed to monitor changes

in groundwater conditions over time. The District encourages well owners to volunteer wells to be used as part of the monitoring network. The District will accept wells into, or replace an existing well in, the monitoring network. The selection process will consider the well proximity to other monitoring wells, to permitted and exempt wells, to streams, and to geographic and political boundaries. If no suitable well locations can be found to meet the monitoring objectives in a specific aquifer or management zone, the District may evaluate the benefits of converting an oil and gas well to a water well, drilling and installing a new well, or using modeled water levels for that area until such time as a suitable well can be obtained for monitoring.

The District shall perform groundwater monitoring. The monitoring of the wells will be performed under the direction of the general manager, by trained personnel using a Standard Operating Procedure adopted by the District. The District may coordinate with the neighboring groundwater conservation districts for the purpose of supplementing its monitoring data and of improving the consistency in the collection, management, and analysis of hydrogeological data in GMA 12.

## 11. THRESHOLD LEVELS AND ANALYSIS OF GROUNDWATER LEVEL DATA

The District shall use threshold levels to help achieve its DFCs and to conserve and preserve groundwater availability and protect groundwater users. The District shall administer separate threshold levels for each management zone based on the Rules of the District. As part of its evaluation and determinations, the District may also consider the pumping-induced impacts to groundwater resources, including production occurring outside of the District. The District will consider threshold levels based on one or more of the following metrics: estimated total annual production, measured water level change, and predicted water level change.

Among the factors to be considered to guide the District's actions are evaluating thresholds for declines in water levels established in the District's Rules. District actions which can be initiated if a threshold level has been exceeded are: additional aquifer studies to collect and analyze additional information, a re-evaluation of the Management Plan or rules, and/or a change in the Management Plan or rules.

## 12. PRODUCTION AND SPACING OF WELLS

Production and spacing of all wells within the District will be regulated by the District according to the Rules of the District. Well spacing and the rate of production of the well will be dependent on the management zone and the aquifer associated with the well, and other factors included in the Rules of the District.

## 13. ACTIONS, PROCEDURES, PERFORMANCE AND AVOIDANCE FOR PLAN IMPLEMENTATION

The District will implement this plan and utilize it as a guide for the ongoing evaluation, and the planning and establishing, of priorities for all District conservation and regulatory activities. All programs, permits and related operations of the District, and any additional planning efforts in which the District may participate will be consistent with this plan.

The District will adopt rules relating to the permitting of wells, the production and transport

of groundwater and reducing permitted production. The rules adopted by the District shall be adopted pursuant to TWC Chapter 36 and provisions of this plan. All rules will be adhered to and enforced. The promulgation and enforcement of the rules will be based on technical data recommended by competent professionals and accepted by the Board.

The District shall treat all citizens equally. Citizens may apply to the District for a variance in enforcement of the rules on grounds of adverse economic effect or unique local conditions. In granting a variance to any rule, the Board shall consider the potential for adverse effect on adjacent landowners and the aquifer(s). The exercise of discretion by the Board shall not be construed as limiting the power of the Board.

The District will endeavor to cooperate with other agencies in the implementation of this plan and the management of groundwater supplies within the District. All activities of the District will be undertaken in a spirit of cooperation and coordination with the appropriate state and regional agencies.

## 14. METHODOLOGY FOR TRACKING DISTRICT PROGRESS IN ACHIEVING MANAGEMENT GOALS

The general manager of the District will prepare and present to the Board an annual report on the District's performance and accomplishment of the management goals and objectives. The presentation of the report will occur during the last monthly Board meeting each fiscal year, beginning after the adoption and certification of this plan. The report will include the number of instances in which each of the activities specified in the management objectives was engaged in during the fiscal year. Each activity will be referenced to the estimated expenditure of staff time and budget in accomplishment of the activity. The notations of activity frequency, staff time and budget will be referenced to the appropriate performance standard for each management objective describing the activity, so that the effectiveness and efficiency of the Districts operations may be evaluated. The Board will maintain the adopted report on file, for public inspection, at the District's offices. This methodology will apply to all management goals contained within this plan.

## 15. AQUIFER STORAGE AND RECOVERY PROJECTS

An Aquifer Storage and Recovery (ASR) project involves the injection of water into a geological formation for subsequent recovery and beneficial use. The District acknowledges that ASR projects can help to improve the overall management of water resources in GMA 12. However, the District also recognizes that poorly designed and instrumented ASR project can be operated in such a manner as to adversely affect the production capacity of existing wells located near the ASR project. As ASR projects are identified, the District will coordinate with the Texas Commission on Environmental Quality to provide data and/or technical expertise that could assist with the evaluation of the proposed ASR project.

## 16. MANAGEMENT GOALS, OBJECTIVES, & PERFORMANCE STANDARDS

### 16.1 Efficient Use of Groundwater

**Management Objectives:**

1. The District will maintain a monitoring well network with at least 100 monitoring wells to provide coverage across management zones and aquifers within the District. The District will measure water levels at the monitoring well locations at least once every calendar year. A written analysis of the water level measurements from the monitoring wells will be made available through a presentation to the Board of the District at least once every three years.
2. The District will provide educational leadership to citizens within the District concerning this subject. The activity will be accomplished annually through at least one printed publication, such as a brochure, and public speaking at service organizations and public schools as provided for in the District's Public Education Program.

**Performance Standards:**

1. Maintain a monitoring well network and its criteria, and measure at least 100 monitoring wells at least once every calendar year.
2. Number of monitoring wells measured annually by the District.
3. Written report presented to the Board to document that water levels at these monitoring wells have been measured a minimum of once each year.
4. The number of publications and speaking appearances by the District each year under the District's Public Education Program.

### 16.2 Controlling and Preventing Waste of Groundwater.

**Management Objectives:**

The District will provide educational leadership to citizens within the District concerning this subject. The activity will be accomplished annually through at least one printed publication, such as a brochure, and public speaking at service organizations and public schools as provided for in the District's Public Education Program. During years when District revenues are sufficient, the District will consider funding a grant to obtain a review, study, or report of pertinent groundwater issues, or to sponsor the attendance of students at summer camps/seminars that place emphasis on the conservation of water resources.

**Performance Standards:**

The number of publications and speaking appearances by the District each year, and the number of grants considered and students actually accepting and attending an educational summer camp or seminar.

### 16.3 Control and Prevent Subsidence

**Management Objectives:**

The District will monitor drawdowns with due consideration to the potential for land subsidence. At least once every three years, the District will assess the potential for land subsidence for areas where water levels have decreased more than 100 feet since the year 2000.

**Performance Standards:**

Within three years of the approval of this plan and every three years thereafter, the District will map any region where more than 100 feet of drawdown has occurred since the year 2000 and assess the potential for land subsidence. The results of the assessment will be discussed in a District Board meeting and be document in a presentation or a report.

### 16.4 Conservation of Groundwater including Rainwater Harvesting, Precipitation Enhancement, Brush Control, Conjunctive Use, and/or Recharge Enhancement of Groundwater Resources in the District

**Management Objectives:**

1. The District will provide educational leadership to citizens within the District concerning this subject. The educational efforts will be through at least one printed publication, such as a brochure, and at least one public speaking program at a service organization and/or public school as provided for in the District's Public Education Program. Each of the following topics will be addressed in that program:
    A. Conservation
    B. Rainwater Harvesting
    C. Brush Control
    D. Recharge Enhancement
    E. Conjunctive Use
    F. Precipitation Enhancement
2. During years when District revenues are sufficient, the District will consider sponsoring the attendance of students and/or teachers at summer camps/seminars that place emphasis on the conservation of groundwater, rainwater harvesting, brush control, groundwater recharge enhancement, conjunctive use, precipitation enhancement of water resources, or a combination of such groundwater management programs.
3. The District will encourage and support projects and programs to conserve and/or preserve groundwater, and/or enhance groundwater recharge, by annually funding the District's Groundwater Conservation and Enhancement Grant Program, during years when the District's revenues remain at a level sufficient to fund the program. The objective of this program is to obtain the active participation and cooperation of local water utilities, fire departments and public

agencies in the funding and successful completion of programs and projects that will result in the conservation of groundwater and the protection or enhancement of the aquifers in the District. The qualifying water conservation projects and programs will include, as appropriate, projects that: result in the conservation of groundwater, reduce the loss or waste of groundwater, recharge enhancement, rainwater harvesting, precipitation enhancement, brush control, or any combination thereof. The District's objective is to benefit the existing and future users of groundwater in the District by providing for the more efficient use of water, increasing recharge to aquifers, reducing waste, limiting groundwater level declines, and maintaining or increasing the amount of groundwater available, by awarding at least one grant under the program in each county annually.

**Performance Standards:**

1. The number of publications and speaking appearances by the District each year under the District's Public Education Program.
2. The number of students sponsored to attend a summer camp/seminar emphasizing the conservation of water.
3. Annual funding, when applicable, for the District's Groundwater Conservation and Enhancement Grant Program, and the number of projects and programs reviewed, approved, and funded under that program. A written report providing estimated benefit of the amount of groundwater conserved, of the recharge enhancement, and/or of addition groundwater protection provided by the program.
4. The number and content of reports submitted regarding sponsored programs.

### 16.5 Conjunctive Use of Surface and Groundwater

**Management Objective:**

The District will confer annually with the Brazos River Authority (BRA) on cooperative opportunities for conjunctive resource management.

**Performance Standard:**

1. The number of conferences with the BRA on conjunctive resource management.
2. The number of times each year in which the applicant, general manager or the Board considers conjunctive use in the permitting process.

### 16.6 Drought Management Strategy

The aquifers within the District are substantially resistant to water level declines during drought conditions. As a result, the District does not have a drought management strategy based on precipitation metrics such as the Palmer Drought Index. The District management strategy is to review and to verify enforcement of Drought Management Plans adopted by District permit holders and entities that contract to purchase water from District permit holders.

**Management Objective:**

When permits or contracts are issued, as applicable, the District will confirm that all entities have an Drought Management Plan or Drought Contingency Plan that has been

approved by the Texas Commission on Environmental Quality or another regulatory agency in the State of Texas.

**Performance Standard:**

State approved Drought Management Plans or Drought Contingency Plans on file at the District Offices.

### 16.7 Natural Resource Issues That Impact the Use and Availability of Groundwater and Which are Impacted by the Use of Groundwater

**Management Objectives:**

1. The District will confer at least once every two years with appropriate agencies on the impact of groundwater resources in the District.
2. The District will evaluate permit applications for new wells and the information submitted by the applicants on those wells prior to drilling. The District will assess the impact of these wells on the groundwater resources in the District.
3. The District will implement the POSGCD Well Closure Program. The objective of the well closure program is to obtain the closure and plugging of derelict and abandoned wells in a manner that is consistent with state law, for the protection of the aquifers, the environment, and the public safety. The District will conduct a program to identify, inspect, categorize and cause abandoned and derelict water, oil and gas wells to be closed and plugged, by annually funding the program or segments or phases of the program appropriate to be funded in such fiscal year. The District will fund the closure of at least one abandoned well during years when the District's revenues remain at a level sufficient to fund the program.

**Performance Standards:**

1. The number of conferences with a representative of appropriate agencies.
2. Reports to the Board on the number of new well permit applications filed, and the possible impacts of those new wells on the groundwater resources in the District.
3. Annual funding, when applicable, for the District's Well Closure Program, and the number of wells closed and plugged as a result of the Well Closure Program.

### 16.8 Groundwater Well Assistance Program

**Management Objective:**

Beginning in 2018, the District will maintain a Groundwater Well Assistance Program (GWAP). The primary purpose of the GWAP is to help restore a water supply to well owners in the District who own wells that have experienced significant adverse impacts, and where applicable to address well conditions to prevent significant adverse impacts, from groundwater level declines caused by aquifer-wide groundwater pumping in GMA 12. A secondary purpose of the GWAP is to improve the POSGCD monitoring program and the POSGCD's understanding of groundwater aquifer systems in POSGCD by increasing the number of monitoring wells in the monitoring well network and by performing localized hydrogeological studies at these monitoring locations.

**Performance Standard:**

GWAP adopted before the end of 2018.

### 16.9 Mitigation

**Management Objective:**

The District will require filing with the District of mitigation plans required by the District or any State agency regarding impacts caused by groundwater pumping in the District.

**Performance Standards:**

1. Mitigation plans on file at the District that are related to groundwater pumping in the District.
2. Report of impacts and predicted impacts on well owners in the District on file at the District Offices.

### 16.10 Desired Future Conditions (DFCs)

**Management Objective:**

At least once every three years, the District will monitor water levels and evaluate whether the change in water levels is in conformance with the DFCs adopted by the District. The District will estimate total annual groundwater production for each aquifer based on the water use reports, estimated exempted use, and other relevant information, and compare these production estimates to the MAGs listed in Table 8-1.

**Performance Standards:**

1. At least once every three years, the general manager will report to the Board the measured water levels obtained from the monitoring wells within each Management Zone, the average measured drawdown for each Management Zone calculated from the measured water levels of the monitoring wells within the Management Zone, a comparison of the average measured drawdowns for each Management Zone with the DFCs for each Management Zone, and the District's progress in conforming with the DFCs.
2. At least once every three years, the general manager will report to the Board the total permitted production and the estimated total annual production for each aquifer and compare these amounts to the MAGs listed in Table 8-1 for each aquifer.

## 17. PROJECTED WATER DEMANDS

The projected net water demands (in acre-feet) within the District based on the 2017 State Water Plan are compiled in Allen (2017), provided as **Appendix A**. The District also established future Municipal Groundwater Use Demands in the District for planning purposes. The methodology and results of that effort are as follows:

**Method for Establishing Future Municipal Use Demands of Groundwater.** The District adopted a resolution, dated March 11, 2003, establishing production rights for Local Water Utilities within the District (water supply corporations, special utility districts, municipal

utility districts and cities), as a rule. This rule allowed these Local Water Utilities to obtain a permit to produce a volume of water annually according to one of two methods:

1. An amount equal to the highest annual pumpage it reported from wells within the District in any consecutive twelve months prior to September 31, 2001; or
2. The Local Water Utility could present to the Board a Long-Term Plan prepared by a qualified engineer that projects the annualized long-term water needs as the official projection of the water required by that Local Water Utility in the planning period (for not more than forty [40] years) for providing retail water service within that Local Water Utility's defined service area. If a Local Water Utility adopted this plan on or before March 30, 2004, and the Board found the highest annual pumpage projected in the Long-Term Plan (the "Plan Amount") was not unreasonable, the Local Water Utility was authorized to obtain a permit to pump and produce up to the Plan Amount. Table 17-1 below contains the results of this effort.

**Table 17-1 Municipal Use Groundwater Demands Projected through 2044**

| Producer | Estimated Acre-Feet per |
|---|---|
| **Burleson County** | |
| Apache Hills | 11 |
| Birch Creek | 16 |
| Burl. Co. MUD | 73 |
| Burl. Investm. | 7 |
| Cade Lakes | 123 |
| Centerline | 21 |
| Caldwell | 1,969 |
| Snook | 154 |
| Somerville | 670 |
| Clara Hills | 5 |
| Clay | 7 |
| Cooks Point | 10 |
| Deanville | 350 |
| Lakeview | 21 |
| Little Oak Forrest | 5 |
| Lyons | 106 |
| Post Oak Hill | 11 |
| Shupak Utilities | 19 |
| Tunis | 108 |
| Whispering Woods | 7 |
| Wilderness Sound | 15 |
| Total for Burleson Co. | 3,708 |
| **Milam County** | |
| Alcoa | 702 |
| Rockdale | 2,129 |
| Gause | 74 |
| Marlow | 108 |
| Milano | 673 |
| Minerva | 28 |
| North Milam | 369 |
| Southwest Milam | 2,492 |
| Total for Milam Co. | 6,575 |
| DISTRICT TOTALS | 10,283 |

## 18. PROJECTED WATER SUPPLIES WITHIN THE DISTRICT

The projected surface water supplies (in acre-feet) within the District based on the 2017 State Water Plan are compiled in Allen (2017), provided as **Appendix A**.

Table 18-1 lists the projected groundwater supplies within the District in acre-feet per year according to the 2017 State Water Plan Data. The District has participated and will

participate in future regional water planning, and will consider the water supply needs and water management strategies included in the adopted state water plan.

**Table 18-1. Projected Groundwater Supplies in acre-feet per year Within the District According the 2017 State Water Plan data**

| WUG Entity Name | Source Name | Source Subtype | 2020 | 2030 | 2040 | 2050 | 2060 | 2070 |
|---|---|---|---|---|---|---|---|---|
| **Burleson County** | | | | | | | | |
| Caldwell | Carrizo-Wilcox Aquifer | Groundwater | 2,352 | 2,352 | 2,352 | 2,352 | 2,352 | 2,352 |
| County-Other, Burleson | Carrizo-Wilcox Aquifer | Groundwater | 550 | 550 | 550 | 550 | 550 | 550 |
| County-Other, Burleson | Queen City Aquifer | Groundwater | 323 | 323 | 323 | 323 | 323 | 323 |
| Deanville WSC | Carrizo-Wilcox Aquifer | Groundwater | 701 | 701 | 701 | 701 | 701 | 701 |
| Irrigation, Burleson | Brazos River Alluvium Aquifer | Groundwater | 21,640 | 21,640 | 21,640 | 21,640 | 21,640 | 21,640 |
| Irrigation, Burleson | Carrizo-Wilcox Aquifer | Groundwater | 204 | 204 | 204 | 204 | 204 | 204 |
| Irrigation, Burleson | Yegua-Jackson Aquifer | Groundwater | 1,118 | 1,118 | 1,118 | 1,118 | 1,118 | 1,118 |
| Manufacturing, Burleson | Sparta Aquifer | Groundwater | 139 | 139 | 139 | 139 | 139 | 139 |
| Milano WSC | Carrizo-Wilcox Aquifer | Groundwater | 250 | 234 | 232 | 232 | 241 | 245 |
| Mining, Burleson | Carrizo-Wilcox Aquifer | Groundwater | 0 | 0 | 0 | 0 | 0 | 0 |
| Snook | Sparta Aquifer | Groundwater | 475 | 475 | 475 | 475 | 475 | 475 |
| Somerville | Sparta Aquifer | Groundwater | 891 | 891 | 891 | 891 | 891 | 891 |
| Southwest Milam WSC | Carrizo-Wilcox Aquifer | Groundwater | 205 | 184 | 154 | 167 | 167 | 158 |
| | | *TOTAL* | *28,848* | *28,811* | *28,779* | *28,792* | *28,801* | *28,796* |
| **Milam County** | | | | | | | | |
| Bell-Milam Falls WSC | Trinity Aquifer | Groundwater | 79 | 79 | 77 | 77 | 76 | 74 |
| Bell-Milam Falls WSC | Trinity Aquifer | Groundwater | 352 | 349 | 343 | 342 | 336 | 329 |
| Buckholts | Trinity Aquifer | Groundwater | 122 | 122 | 122 | 122 | 122 | 122 |
| Irrigation, Milam | Brazos River Alluvium Aquifer | Groundwater | 3,082 | 3,082 | 3,082 | 3,082 | 3,082 | 3,082 |
| Irrigation, Milam | Carrizo-Wilcox Aquifer | Groundwater | 2,221 | 2,066 | 1,828 | 2,043 | 2,135 | 2,135 |
| Irrigation, Milam | Queen City Aquifer | Groundwater | 53 | 56 | 56 | 56 | 56 | 56 |
| Milano WSC | Carrizo-Wilcox Aquifer | Groundwater | 260 | 240 | 237 | 237 | 249 | 255 |
| Mining, Milam | Carrizo-Wilcox Aquifer | Groundwater | 14 | 14 | 14 | 14 | 14 | 14 |
| Mining, Milam | Trinity Aquifer | Groundwater | 0 | 0 | 0 | 0 | 0 | 0 |
| Rockdale | Carrizo-Wilcox Aquifer | Groundwater | 2,000 | 1,860 | 1,396 | 1,589 | 1,672 | 1,672 |
| Southwest Milam WSC | Carrizo-Wilcox Aquifer | Groundwater | 1,625 | 1,443 | 1,202 | 1,307 | 1,314 | 1,261 |

| WUG Entity Name | Source Name | Source Subtype | 2020 | 2030 | 2040 | 2050 | 2060 | 2070 |
|---|---|---|---|---|---|---|---|---|
| Thorndale | Carrizo-Wilcox Aquifer | Groundwater | 229 | 229 | 229 | 229 | 229 | 229 |
| Steam Electric Power, Milam | Carrizo-Wilcox Aquifer | Groundwater | 15,786 | 13,009 | 12,943 | 14,444 | 15,084 | 15,074 |
| | | *TOTAL* | *25,823* | *22,549* | *21,529* | *23,542* | *24,369* | *24,303* |

## 19. PROJECTED WATER NEEDS AND WATER STRATEGIES

The projected water supply needs and water management strategies (in acre-feet) within the District based on the 2017 State Water Plan are compiled in Allen (2017), provided as **Appendix A**.

## 20. ESTIMATED GROUNDWATER USE WITHIN THE DISTRICT

The estimated historical water use (in acre-feet) within the District based on the TWDB Historical Water Use Survey is compiled in Allen (2017), provided as **Appendix A**.

## 21. ESTIMATED ANNUAL RECHARGE OF GROUNDWATER RESOURCES WITHIN THE DISTRICT

The estimated annual recharge from precipitation to groundwater by aquifer (in acre-feet) within the District is compiled in GAM Run 16-015 (Ballew, 2017), provided as **Appendix B**.

## 22. ESTIMATED ANNUAL DISCHARGES FROM THE AQUIFER TO SPRINGS AND ANY SURFACE WATER BODIES, INCLUDING LAKES, STREAMS AND RIVERS

The estimated annual discharges from each aquifer to springs and any surface water bodies, including lakes, streams, and rivers (in acre-feet) within the District are compiled in GAM Run 16-015 (Ballew, 2017), provided as **Appendix B**.

## 23. ESTIMATED ANNUAL GROUNDWATER FLOW INTO AND OUT OF THE DISTRICT WITHIN EACH AQUIFER AND BETWEEN AQUIFERS IN THE DISTRICT

The estimated annual groundwater flow into and out of the District within each aquifer and between aquifers (in acre-feet) within the District is compiled in GAM Run 16-015 (Ballew, 2017), provided as **Appendix B**.

## 24. REFERENCES


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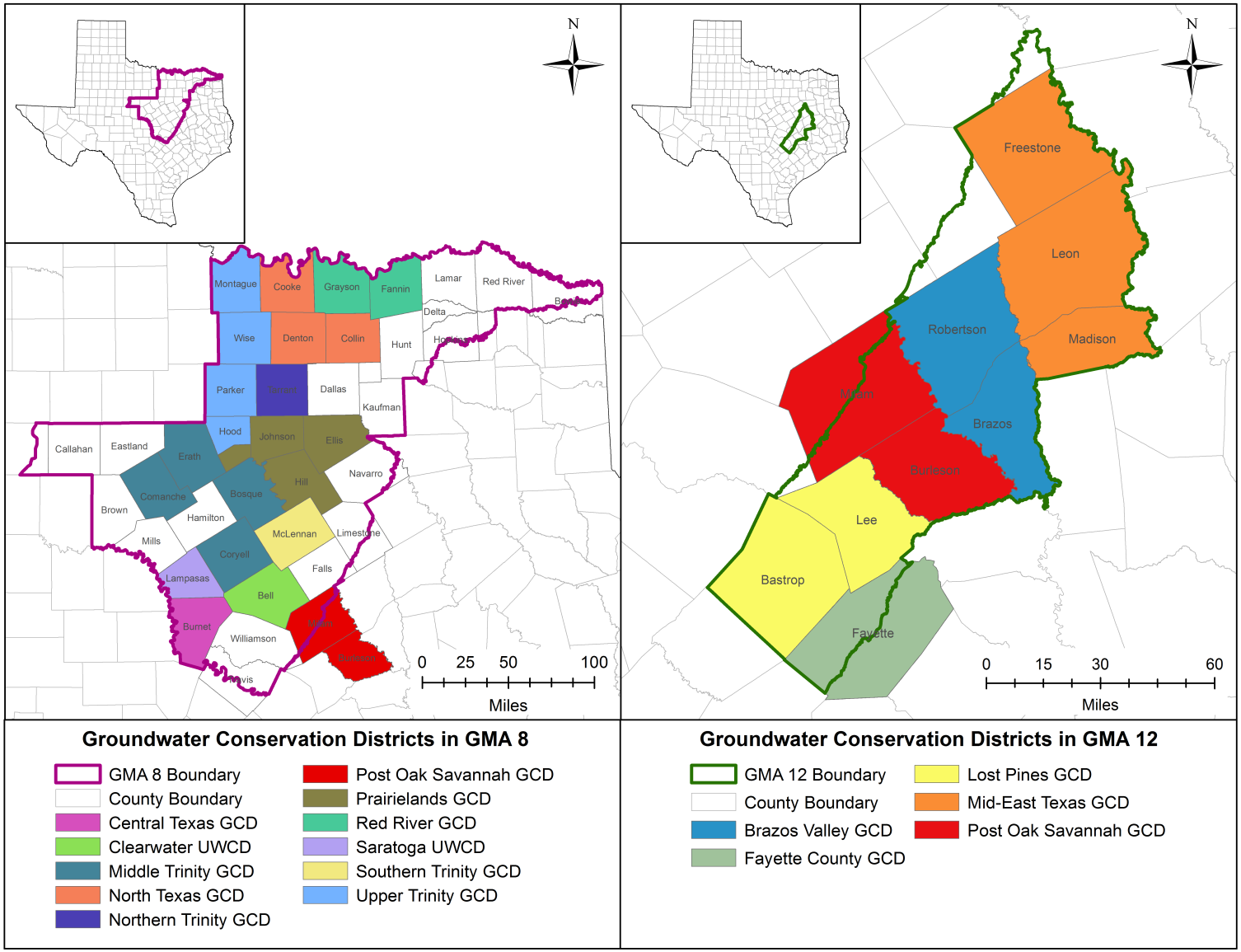


**Figure 1.** **Counties and Groundwater Districts Associated with Groundwater Management Areas 8 and 12**

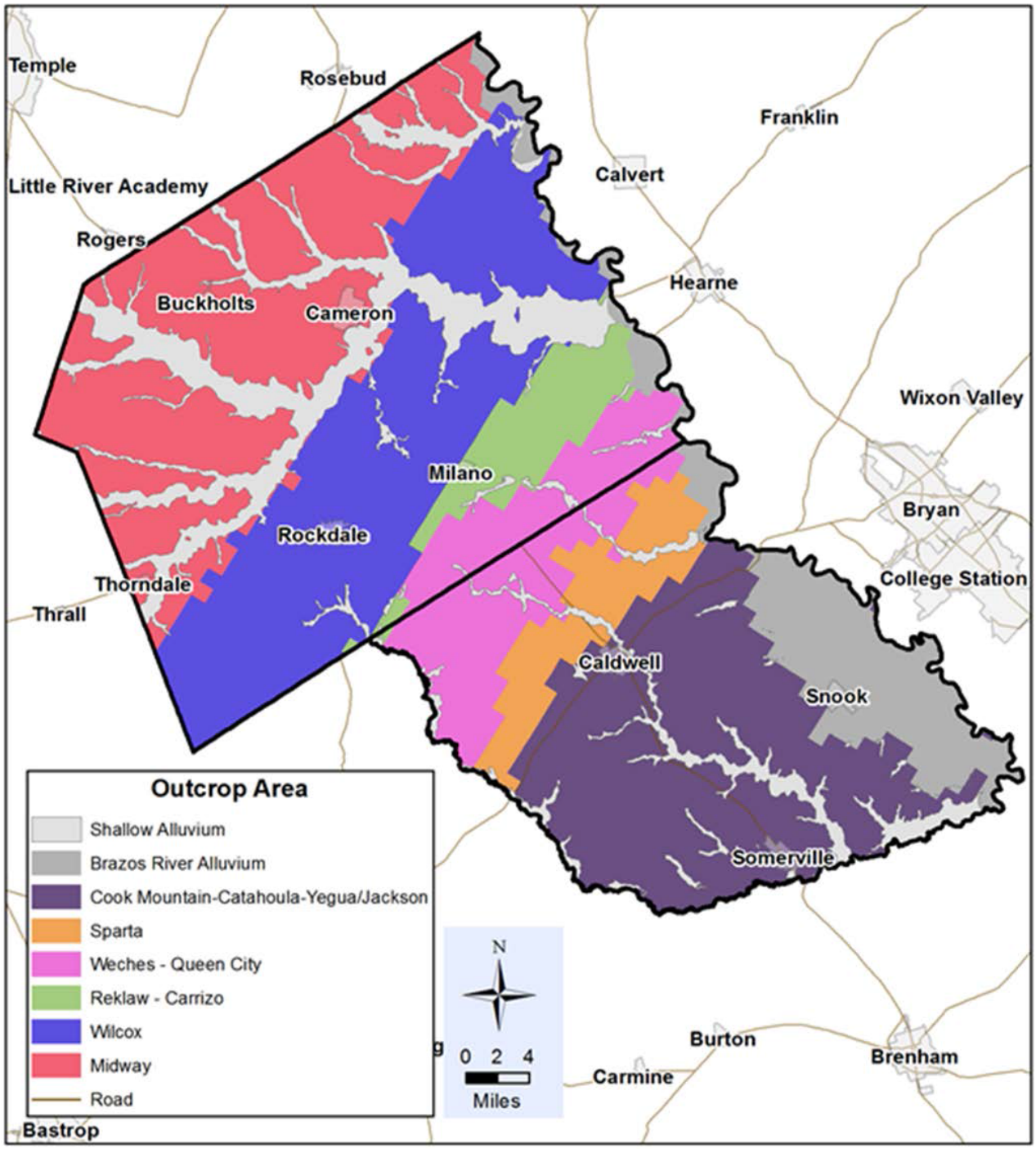


**Figure 2. Outcrops Associated with Aquifers and Geological Formations in the District**

# Estimated Historical Water Use And 2017 State Water Plan Datasets:

## Post Oak Savannah 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 15, 2017

### *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 9/15/2017. 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).

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

Groundwater and surface water historical use estimates are currently unavailable for calendar year 2016. TWDB staff anticipates the calculation and posting of these estimates at a later date.

## BURLESON COUNTY

All values are in acre-feet

| Year | Source | Municipal | Manufacturing | Mining | Steam Electric | Irrigation | Livestock | Total |
|---|---|---|---|---|---|---|---|---|
| 2015 | GW | 2,722 | 111 | 2,018 | 0 | 8,311 | 332 | 13,494 |
| | SW | 0 | 0 | 224 | 0 | 4,351 | 775 | 5,350 |
| 2014 | GW | 2,754 | 111 | 1,351 | 0 | 16,476 | 319 | 21,011 |
| | SW | 0 | 0 | 150 | 0 | 2,640 | 745 | 3,535 |
| 2013 | GW | 2,935 | 111 | 127 | 0 | 23,875 | 304 | 27,352 |
| | SW | 0 | 0 | 14 | 0 | 3,518 | 710 | 4,242 |
| 2012 | GW | 3,299 | 111 | 24 | 0 | 26,456 | 320 | 30,210 |
| | SW | 0 | 0 | 2 | 0 | 4,363 | 746 | 5,111 |
| 2011 | GW | 3,549 | 111 | 248 | 0 | 22,182 | 579 | 26,669 |
| | SW | 0 | 0 | 15 | 0 | 7,413 | 1,350 | 8,778 |
| 2010 | GW | 2,974 | 117 | 17 | 0 | 18,749 | 563 | 22,420 |
| | SW | 0 | 0 | 1 | 0 | 8,350 | 1,314 | 9,665 |
| 2009 | GW | 2,978 | 117 | 42 | 0 | 22,893 | 356 | 26,386 |
| | SW | 0 | 0 | 2 | 0 | 4,695 | 830 | 5,527 |
| 2008 | GW | 2,763 | 117 | 66 | 0 | 15,567 | 392 | 18,905 |
| | SW | 0 | 0 | 4 | 0 | 6,868 | 914 | 7,786 |
| 2007 | GW | 2,550 | 117 | 0 | 0 | 5,758 | 489 | 8,914 |
| | SW | 0 | 0 | 0 | 0 | 15,313 | 1,141 | 16,454 |
| 2006 | GW | 2,877 | 117 | 0 | 0 | 22,065 | 505 | 25,564 |
| | SW | 0 | 0 | 0 | 0 | 2,435 | 1,178 | 3,613 |
| 2005 | GW | 2,791 | 117 | 0 | 0 | 17,060 | 520 | 20,488 |
| | SW | 0 | 0 | 0 | 0 | 6,612 | 1,215 | 7,827 |
| 2004 | GW | 2,519 | 117 | 0 | 0 | 20,665 | 589 | 23,890 |
| | SW | 0 | 0 | 0 | 0 | 6,106 | 885 | 6,991 |
| 2003 | GW | 2,561 | 172 | 0 | 0 | 15,308 | 613 | 18,654 |
| | SW | 0 | 0 | 0 | 0 | 2,860 | 921 | 3,781 |
| 2002 | GW | 2,657 | 147 | 0 | 0 | 9,591 | 551 | 12,946 |
| | SW | 0 | 0 | 0 | 0 | 2,250 | 826 | 3,076 |
| 2001 | GW | 2,592 | 144 | 0 | 0 | 8,705 | 536 | 11,977 |
| | SW | 0 | 0 | 0 | 0 | 2,042 | 804 | 2,846 |
| 2000 | GW | 2,716 | 150 | 0 | 0 | 14,845 | 569 | 18,280 |
| | SW | 0 | 0 | 0 | 0 | 3,394 | 853 | 4,247 |

## MILAM COUNTY

All values are in acre-feet

| Year | Source | Municipal | Manufacturing | Mining | Steam Electric | Irrigation | Livestock | Total |
|---|---|---|---|---|---|---|---|---|
| 2015 | GW | 2,866 | 0 | 2 | 8,968 | 4,981 | 766 | 17,583 |
| | SW | 1,356 | 0 | 0 | 12,105 | 284 | 1,788 | 15,533 |
| 2014 | GW | 3,103 | 0 | 25 | 11,747 | 5,883 | 745 | 21,503 |
| | SW | 1,327 | 0 | 3 | 12,962 | 522 | 1,739 | 16,553 |
| 2013 | GW | 3,307 | 0 | 139 | 9,800 | 6,085 | 746 | 20,077 |
| | SW | 1,340 | 0 | 3 | 17,712 | 615 | 1,740 | 21,410 |
| 2012 | GW | 6,982 | 0 | 259 | 0 | 8,844 | 826 | 16,911 |
| | SW | 7,872 | 12 | 2 | 19,273 | 446 | 1,928 | 29,533 |
| 2011 | GW | 4,228 | 0 | 32 | 13,716 | 5,273 | 912 | 24,161 |
| | SW | 1,729 | 12 | 2 | 13,034 | 1,350 | 2,127 | 18,254 |
| 2010 | GW | 3,698 | 0 | 15 | 12,653 | 1,920 | 912 | 19,198 |
| | SW | 1,450 | 12 | 1 | 19,601 | 1,574 | 2,128 | 24,766 |
| 2009 | GW | 3,536 | 11,206 | 0 | 0 | 2,613 | 552 | 17,907 |
| | SW | 1,470 | 8,903 | 0 | 0 | 2,155 | 1,287 | 13,815 |
| 2008 | GW | 2,890 | 11,171 | 0 | 0 | 3,099 | 538 | 17,698 |
| | SW | 1,557 | 8,876 | 0 | 0 | 1,782 | 1,257 | 13,472 |
| 2007 | GW | 2,603 | 24,678 | 0 | 0 | 4,210 | 509 | 32,000 |
| | SW | 1,365 | 4,482 | 0 | 0 | 3 | 1,188 | 7,038 |
| 2006 | GW | 3,298 | 30,116 | 0 | 0 | 5,655 | 564 | 39,633 |
| | SW | 1,601 | 12,568 | 0 | 0 | 492 | 1,315 | 15,976 |
| 2005 | GW | 3,268 | 34,762 | 0 | 0 | 4,752 | 570 | 43,352 |
| | SW | 1,400 | 11,177 | 0 | 0 | 860 | 1,329 | 14,766 |
| 2004 | GW | 2,399 | 36,435 | 0 | 0 | 3,589 | 755 | 43,178 |
| | SW | 1,338 | 11,607 | 0 | 0 | 1,672 | 1,132 | 15,749 |
| 2003 | GW | 3,073 | 36,329 | 0 | 0 | 4,469 | 756 | 44,627 |
| | SW | 1,655 | 15,166 | 0 | 0 | 756 | 1,134 | 18,711 |
| 2002 | GW | 2,912 | 35,496 | 0 | 0 | 900 | 743 | 40,051 |
| | SW | 1,655 | 12,861 | 0 | 0 | 1,827 | 1,114 | 17,457 |
| 2001 | GW | 2,924 | 31,903 | 0 | 0 | 787 | 719 | 36,333 |
| | SW | 1,816 | 12,625 | 0 | 0 | 1,597 | 1,078 | 17,116 |
| 2000 | GW | 3,164 | 31,968 | 0 | 0 | 779 | 712 | 36,623 |
| | SW | 1,916 | 14,447 | 0 | 0 | 1,613 | 1,068 | 19,044 |

# Projected Surface Water Supplies
# TWDB 2017 State Water Plan Data

## BURLESON COUNTY

All values are in acre-feet

| RWPG | WUG | WUG Basin | Source Name | 2020 | 2030 | 2040 | 2050 | 2060 | 2070 |
|---|---|---|---|---|---|---|---|---|---|
| G | LIVESTOCK, BURLESON | BRAZOS | BRAZOS LIVESTOCK LOCAL SUPPLY | 1,508 | 1,508 | 1,508 | 1,508 | 1,508 | 1,508 |
| | **Sum of Projected Surface Water Supplies (acre-feet)** | | | **1,508** | **1,508** | **1,508** | **1,508** | **1,508** | **1,508** |

## MILAM COUNTY

All values are in acre-feet

| RWPG | WUG | WUG Basin | Source Name | 2020 | 2030 | 2040 | 2050 | 2060 | 2070 |
|---|---|---|---|---|---|---|---|---|---|
| G | BELL-MILAM FALLS WSC | BRAZOS | BRAZOS RIVER AUTHORITY LITTLE RIVER LAKE/RESERVOIR SYSTEM | 352 | 349 | 343 | 342 | 336 | 329 |
| G | BUCKHOLTS | BRAZOS | BRAZOS RIVER AUTHORITY LITTLE RIVER LAKE/RESERVOIR SYSTEM | 122 | 122 | 122 | 122 | 122 | 122 |
| G | CAMERON | BRAZOS | BRAZOS RUN-OF-RIVER | 2,615 | 2,615 | 2,615 | 2,615 | 2,615 | 2,615 |
| G | COUNTY-OTHER, MILAM | BRAZOS | BRAZOS RIVER AUTHORITY LITTLE RIVER LAKE/RESERVOIR SYSTEM | 793 | 793 | 793 | 793 | 793 | 793 |
| G | COUNTY-OTHER, MILAM | BRAZOS | BRAZOS RUN-OF-RIVER | 163 | 163 | 163 | 163 | 163 | 163 |
| G | IRRIGATION, MILAM | BRAZOS | BRAZOS RUN-OF-RIVER | 42 | 42 | 42 | 42 | 42 | 42 |
| G | LIVESTOCK, MILAM | BRAZOS | BRAZOS LIVESTOCK LOCAL SUPPLY | 1,822 | 1,822 | 1,822 | 1,822 | 1,822 | 1,822 |
| G | MANUFACTURING, MILAM | BRAZOS | BRAZOS RUN-OF-RIVER | 14 | 14 | 14 | 14 | 14 | 14 |
| G | STEAM ELECTRIC POWER, MILAM | BRAZOS | ALCOA LAKE/RESERVOIR | 14,000 | 14,000 | 14,000 | 14,000 | 14,000 | 14,000 |
| G | STEAM ELECTRIC POWER, MILAM | BRAZOS | BRAZOS RIVER AUTHORITY LITTLE RIVER LAKE/RESERVOIR SYSTEM | 2,683 | 4,329 | 4,352 | 4,673 | 4,609 | 4,508 |
| G | STEAM ELECTRIC POWER, MILAM | BRAZOS | BRAZOS RUN-OF-RIVER | 650 | 650 | 650 | 650 | 650 | 650 |
| | **Sum of Projected Surface Water Supplies (acre-feet)** | | | **23,256** | **24,899** | **24,916** | **25,236** | **25,166** | **25,058** |

# 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.

## BURLESON COUNTY

All values are in acre-feet

| RWPG | WUG | WUG Basin | 2020 | 2030 | 2040 | 2050 | 2060 | 2070 |
|---|---|---|---|---|---|---|---|---|
| G | CALDWELL | BRAZOS | 1,027 | 1,043 | 1,073 | 1,073 | 1,091 | 1,108 |
| G | COUNTY-OTHER, BURLESON | BRAZOS | 615 | 673 | 703 | 771 | 809 | 841 |
| G | DEANVILLE WSC | BRAZOS | 465 | 471 | 490 | 487 | 493 | 499 |
| G | IRRIGATION, BURLESON | BRAZOS | 22,855 | 21,904 | 21,057 | 20,115 | 19,216 | 18,469 |
| G | LIVESTOCK, BURLESON | BRAZOS | 1,508 | 1,508 | 1,508 | 1,508 | 1,508 | 1,508 |
| G | MANUFACTURING, BURLESON | BRAZOS | 139 | 161 | 183 | 203 | 221 | 241 |
| G | MILANO WSC | BRAZOS | 212 | 220 | 224 | 231 | 237 | 243 |
| G | MINING, BURLESON | BRAZOS | 995 | 1,923 | 1,512 | 1,100 | 686 | 428 |
| G | SNOOK | BRAZOS | 184 | 195 | 201 | 209 | 216 | 221 |
| G | SOMERVILLE | BRAZOS | 266 | 277 | 285 | 296 | 305 | 313 |
| G | SOUTHWEST MILAM WSC | BRAZOS | 129 | 135 | 138 | 143 | 147 | 151 |
| | **Sum of Projected Water Demands (acre-feet)** | | **28,395** | **28,510** | **27,374** | **26,136** | **24,929** | **24,022** |

## MILAM COUNTY

All values are in acre-feet

| RWPG | WUG | WUG Basin | 2020 | 2030 | 2040 | 2050 | 2060 | 2070 |
|---|---|---|---|---|---|---|---|---|
| G | BELL-MILAM FALLS WSC | BRAZOS | 255 | 264 | 269 | 279 | 290 | 300 |
| G | BUCKHOLTS | BRAZOS | 68 | 70 | 71 | 73 | 76 | 79 |
| G | CAMERON | BRAZOS | 1,359 | 1,409 | 1,441 | 1,500 | 1,556 | 1,612 |
| G | COUNTY-OTHER, MILAM | BRAZOS | 300 | 313 | 324 | 339 | 351 | 364 |
| G | IRRIGATION, MILAM | BRAZOS | 5,081 | 5,040 | 4,995 | 4,956 | 4,915 | 4,875 |
| G | LIVESTOCK, MILAM | BRAZOS | 1,822 | 1,822 | 1,822 | 1,822 | 1,822 | 1,822 |
| G | MANUFACTURING, MILAM | BRAZOS | 12 | 12 | 12 | 14 | 14 | 14 |
| G | MILANO WSC | BRAZOS | 220 | 225 | 228 | 236 | 244 | 253 |
| G | MINING, MILAM | BRAZOS | 14 | 14 | 14 | 14 | 14 | 14 |
| G | ROCKDALE | BRAZOS | 1,159 | 1,198 | 1,222 | 1,269 | 1,317 | 1,364 |
| G | SOUTHWEST MILAM WSC | BRAZOS | 1,021 | 1,055 | 1,078 | 1,121 | 1,163 | 1,204 |
| G | STEAM ELECTRIC POWER, MILAM | BRAZOS | 32,023 | 32,023 | 32,023 | 40,989 | 40,989 | 40,989 |
| G | THORNDALE | BRAZOS | 184 | 188 | 190 | 197 | 204 | 211 |
| | **Sum of Projected Water Demands (acre-feet)** | | **43,518** | **43,633** | **43,689** | **52,809** | **52,955** | **53,101** |

# Projected Water Supply Needs
# TWDB 2017 State Water Plan Data

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

## BURLESON COUNTY

All values are in acre-feet

| RWPG | WUG | WUG Basin | 2020 | 2030 | 2040 | 2050 | 2060 | 2070 |
|---|---|---|---|---|---|---|---|---|
| G | CALDWELL | BRAZOS | 1,325 | 1,309 | 1,279 | 1,279 | 1,261 | 1,244 |
| G | COUNTY-OTHER, BURLESON | BRAZOS | 258 | 200 | 170 | 102 | 64 | 32 |
| G | DEANVILLE WSC | BRAZOS | 236 | 230 | 211 | 214 | 208 | 202 |
| G | IRRIGATION, BURLESON | BRAZOS | 107 | 1,058 | 1,905 | 2,847 | 3,746 | 4,493 |
| G | LIVESTOCK, BURLESON | BRAZOS | 0 | 0 | 0 | 0 | 0 | 0 |
| G | MANUFACTURING, BURLESON | BRAZOS | 0 | -22 | -44 | -64 | -82 | -102 |
| G | MILANO WSC | BRAZOS | 38 | 14 | 8 | 1 | 4 | 2 |
| G | MINING, BURLESON | BRAZOS | -995 | -1,923 | -1,512 | -1,100 | -686 | -428 |
| G | SNOOK | BRAZOS | 291 | 280 | 274 | 266 | 259 | 254 |
| G | SOMERVILLE | BRAZOS | 625 | 614 | 606 | 595 | 586 | 578 |
| G | SOUTHWEST MILAM WSC | BRAZOS | 76 | 49 | 16 | 24 | 20 | 7 |
| | **Sum of Projected Water Supply Needs (acre-feet)** | | **-995** | **-1,945** | **-1,556** | **-1,164** | **-768** | **-530** |

## MILAM COUNTY

All values are in acre-feet

| RWPG | WUG | WUG Basin | 2020 | 2030 | 2040 | 2050 | 2060 | 2070 |
|---|---|---|---|---|---|---|---|---|
| G | BELL-MILAM FALLS WSC | BRAZOS | 528 | 513 | 494 | 482 | 458 | 432 |
| G | BUCKHOLTS | BRAZOS | 176 | 174 | 173 | 171 | 168 | 165 |
| G | CAMERON | BRAZOS | 1,256 | 1,206 | 1,174 | 1,115 | 1,059 | 1,003 |
| G | COUNTY-OTHER, MILAM | BRAZOS | 656 | 643 | 632 | 617 | 605 | 592 |
| G | IRRIGATION, MILAM | BRAZOS | 317 | 206 | 13 | 267 | 400 | 440 |
| G | LIVESTOCK, MILAM | BRAZOS | 0 | 0 | 0 | 0 | 0 | 0 |
| G | MANUFACTURING, MILAM | BRAZOS | 2 | 2 | 2 | 0 | 0 | 0 |
| G | MILANO WSC | BRAZOS | 40 | 15 | 9 | 1 | 5 | 2 |
| G | MINING, MILAM | BRAZOS | 0 | 0 | 0 | 0 | 0 | 0 |
| G | ROCKDALE | BRAZOS | 841 | 662 | 174 | 320 | 355 | 308 |
| G | SOUTHWEST MILAM WSC | BRAZOS | 604 | 388 | 124 | 186 | 151 | 57 |
| G | STEAM ELECTRIC POWER, MILAM | BRAZOS | 1,096 | -35 | -78 | -7,222 | -6,646 | -6,757 |
| G | THORNDALE | BRAZOS | 45 | 41 | 39 | 32 | 25 | 18 |
| | **Sum of Projected Water Supply Needs (acre-feet)** | | **0** | **-35** | **-78** | **-7,222** | **-6,646** | **-6,757** |

# Projected Water Management Strategies
# TWDB 2017 State Water Plan Data

## BURLESON COUNTY

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

| Water Management Strategy | Source Name [Origin] | 2020 | 2030 | 2040 | 2050 | 2060 | 2070 |
|---|---|---|---|---|---|---|---|
| **CALDWELL, BRAZOS (G )** | | | | | | | |
| MUNICIPAL WATER CONSERVATION (SUBURBAN) - CALDWELL | DEMAND REDUCTION [BURLESON] | 40 | 121 | 203 | 240 | 242 | 246 |
| | | **40** | **121** | **203** | **240** | **242** | **246** |
| **MANUFACTURING, BURLESON, BRAZOS (G )** | | | | | | | |
| INDUSTRIAL WATER CONSERVATION | DEMAND REDUCTION [BURLESON] | 4 | 8 | 13 | 14 | 15 | 17 |
| SPARTA AQUIFER DEVELOPMENT | SPARTA AQUIFER [BURLESON] | 0 | 50 | 50 | 50 | 85 | 85 |
| | | **4** | **58** | **63** | **64** | **100** | **102** |
| **MINING, BURLESON, BRAZOS (G )** | | | | | | | |
| INDUSTRIAL WATER CONSERVATION | DEMAND REDUCTION [BURLESON] | 30 | 96 | 106 | 77 | 48 | 30 |
| SPARTA AQUIFER DEVELOPMENT | SPARTA AQUIFER [BURLESON] | 740 | 740 | 740 | 740 | 740 | 740 |
| | | **770** | **836** | **846** | **817** | **788** | **770** |
| **SNOOK, BRAZOS (G )** | | | | | | | |
| MUNICIPAL WATER CONSERVATION (RURAL) - SNOOK | DEMAND REDUCTION [BURLESON] | 11 | 26 | 42 | 59 | 76 | 91 |
| | | **11** | **26** | **42** | **59** | **76** | **91** |
| **SOMERVILLE, BRAZOS (G )** | | | | | | | |
| MUNICIPAL WATER CONSERVATION (SUBURBAN) - SOMERVILLE | DEMAND REDUCTION [BURLESON] | 8 | 26 | 23 | 23 | 23 | 24 |
| | | **8** | **26** | **23** | **23** | **23** | **24** |
| **SOUTHWEST MILAM WSC, BRAZOS (G )** | | | | | | | |
| MUNICIPAL WATER CONSERVATION (RURAL) - SOUTHWEST MILAM WSC | DEMAND REDUCTION [BURLESON] | 3 | 0 | 0 | 0 | 0 | 0 |
| | | **3** | **0** | **0** | **0** | **0** | **0** |
| **Sum of Projected Water Management Strategies (acre-feet)** | | **836** | **1,067** | **1,177** | **1,203** | **1,229** | **1,233** |

## MILAM COUNTY

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

| Water Management Strategy | Source Name [Origin] | 2020 | 2030 | 2040 | 2050 | 2060 | 2070 |
|---|---|---|---|---|---|---|---|
| **CAMERON, BRAZOS (G )** | | | | | | | |
| MUNICIPAL WATER CONSERVATION (RURAL) - CAMERON | DEMAND REDUCTION [MILAM] | 58 | 163 | 269 | 389 | 448 | 464 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | **58** | **163** | **269** | **389** | **448** | **464** |
| **ROCKDALE, BRAZOS (G )** | | | | | | | |
| MUNICIPAL WATER CONSERVATION (RURAL) - ROCKDALE | DEMAND REDUCTION [MILAM] | 43 | 128 | 198 | 195 | 200 | 207 |
| | | **43** | **128** | **198** | **195** | **200** | **207** |
| **SOUTHWEST MILAM WSC, BRAZOS (G )** | | | | | | | |
| MUNICIPAL WATER CONSERVATION (RURAL) - SOUTHWEST MILAM WSC | DEMAND REDUCTION [MILAM] | 22 | 1 | 0 | 0 | 0 | 0 |
| | | **22** | **1** | **0** | **0** | **0** | **0** |
| **STEAM ELECTRIC POWER, MILAM, BRAZOS (G )** | | | | | | | |
| INDUSTRIAL WATER CONSERVATION | DEMAND REDUCTION [MILAM] | 0 | 1,601 | 2,869 | 2,869 | 2,869 | 2,869 |
| LITTLE RIVER OCR | LITTLE RIVER OFF-CHANNEL LAKE/RESERVOIR [RESERVOIR] | 0 | 0 | 0 | 4,353 | 4,000 | 4,000 |
| | | **0** | **1,601** | **2,869** | **7,222** | **6,869** | **6,869** |
| **Sum of Projected Water Management Strategies (acre-feet)** | | **123** | **1,893** | **3,336** | **7,806** | **7,517** | **7,540** |

# GAM Run 16-015: Post Oak Savannah Groundwater Conservation District Groundwater Management Plan

Natalie Ballew, GIT
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
512-463-2779
August 31, 2017


*Cynthia K. Ridgeway is the Manager of the Groundwater Availability Modeling Section and is responsible for oversight of work performed by Natalie Ballew under her direct supervision. The seal appearing on this document was authorized by Cynthia K. Ridgeway, P.G. 471 on August 31, 2017.*

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# GAM RUN 16-015: POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT GROUNDWATER MANAGEMENT PLAN

Natalie Ballew, GIT
Texas Water Development Board
Groundwater Division
Groundwater Availability Modeling Department
512-463-2779
August 31, 2017

## *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.

The TWDB provides data and information to the Post Oak Savannah Groundwater Conservation District in two parts. Part 1 is the Estimated Historical Water Use/State Water Plan dataset report, which will be provided to you separately by the TWDB Groundwater Technical Assistance Department. Please direct questions about the water data report to Mr. Stephen Allen at 512-463-7317 or stephen.allen@twdb.texas.gov. Part 2 is the required groundwater availability modeling information and this information includes

1. the annual amount of recharge from precipitation, if any, to the groundwater resources within the district;
2. 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
3. the annual volume of flow into and out of the district within each aquifer and between aquifers in the district.

The groundwater management plan for the Post Oak Savannah Groundwater Conservation District should be adopted by the district on or before September 18, 2017, and submitted to the Executive Administrator of the TWDB on or before October 18, 2017. The current

management plan for the Post Oak Savannah Groundwater Conservation District expires on December 17, 2017.

We used four groundwater availability models to estimate the management plan information for the aquifers within the Post Oak Savannah Groundwater Conservation District. Information for the Trinity Aquifer is from version 2.01 of the groundwater availability model for the northern portion of the Trinity and Woodbine aquifers (Kelley and others, 2014). Information for the Carrizo-Wilcox, Queen City, and Sparta aquifers is from version 2.02 of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers (Kelley and others, 2004). Information for the Yegua-Jackson Aquifer is from version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer (Deeds and others, 2010). Information for the Brazos River Alluvium Aquifer is from version 1.01 of the groundwater availability model for the Brazos River Alluvium Aquifer (Ewing and Jigmond, 2016).

This report replaces the results of GAM Run 10-029 (Aschenbach, 2011). GAM Run 16-015 meets current standards set after the release of GAM Run 10-029 and includes results from recently released groundwater availability models for the northern portion of the Trinity and Woodbine aquifers (Kelley and others, 2014) and for the Brazos River Alluvium Aquifer (Ewing and Jigmond, 2016). Tables 1 through 6 summarize the groundwater availability model data required by statute and Figures 1 through 6 show the area of the model from which the values in the tables were extracted. If, after review of the figures, the Post Oak Savannah 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 four groundwater availability models mentioned above were used to estimate information for the Post Oak Savannah Groundwater Conservation District management plan. Water budgets were extracted for the historical model periods for the Trinity Aquifer (1980 through 2012), Carrizo-Wilcox, Queen City, and Sparta aquifers (1980 through 1999), Yegua-Jackson Aquifer (1980 through 1997) using ZONEBUDGET Version 3.01 (Harbaugh, 2009). The water budget for the Brazos River Alluvium Aquifer was extracted for the historical model period (1980 through 2012) using ZONEBUDGET-USG (Panday and others, 2013). The average annual water budget values for recharge, surface-water outflow, inflow to the district, and outflow from the district for the aquifers within the district are summarized in this report.

## *PARAMETERS AND ASSUMPTIONS:*

### *Trinity Aquifer*

- We used version 2.01 of the 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).
- The Woodbine Aquifer does not exist within the Post Oak Savannah Groundwater Conservation District; water budgets for this aquifer were not calculated for this report.
- The model was run with MODFLOW-NWT (Niswonger and others, 2011).

### *Carrizo-Wilcox, Queen City, and Sparta aquifers*

- We used version 2.02 of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers. See Dutton and others (2003) and Kelley and others (2004) for assumptions and limitations of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers.
- This groundwater availability model includes eight layers, which generally represent the Sparta Aquifer (Layer 1), the Weches Formation confining unit (Layer 2), the Queen City Aquifer (Layer 3), the Reklaw Formation confining unit (Layer 4), the Carrizo Formation (Layer 5), the Calvert Bluff Formation (Layer 6), the Simsboro Formation (Layer 7), and the Hooper Formation (Layer 8).
- Individual water budgets for the district were determined for the Sparta Aquifer (Layer 1), the Queen City Aquifer (Layer 3), and the Carrizo-Wilcox Aquifer (Layers 5 through 8, collectively).
- The model was run with MODFLOW-96 (Harbaugh and McDonald, 1996).

### *Yegua-Jackson Aquifer*

- We used version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer. See Deeds and others (2010) for assumptions and limitations of the groundwater availability model.
- This groundwater availability model includes five layers which represent the outcrop of the Yegua-Jackson Aquifer and younger overlying units—the Catahoula Formation (Layer 1), the upper portion of the Jackson Group (Layer 2), the lower portion of the Jackson Group (Layer 3), the upper portion of the Yegua Group (Layer 4), and the lower portion of the Yegua Group (Layer 5).
- An overall water budget for the district was determined for the Yegua-Jackson Aquifer (Layer 1 through Layer 5, collectively, for the portions of the model that represent the Yegua-Jackson Aquifer).
- The model was run with MODFLOW-2000 (Harbaugh and others, 2000).

### *Brazos River Alluvium Aquifer*

- We used version 1.01 of the groundwater availability model for the Brazos River Alluvium Aquifer released on December 16, 2016. See Ewing and Jigmond (2016) for assumptions and limitations of the model.
- The groundwater availability model for the Brazos River Alluvium Aquifer contains three layers. Layers 1 and 2 represent the Brazos River Alluvium Aquifer and Layer 3 represents the surficial portions of the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Gulf Coast aquifers as well as various geologic units of the Cretaceous System.
- Perennial rivers and streams were simulated using the MODFLOW Streamflow-Routing package and ephemeral streams were simulated using the MODFLOW River package. Springs were simulated using the MODFLOW Drain package.
- The model was run with MODFLOW-USG (unstructured grid; Panday and others, 2013).

## *RESULTS:*

A groundwater budget summarizes the amount of water entering and leaving the aquifers according to the groundwater availability model. Selected groundwater budget

components listed below were extracted from the groundwater availability model results for the Trinity, Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium aquifers located within Post Oak Savannah Groundwater Conservation District and averaged over the historical calibration periods, as shown in Tables 1 through 6.

1. 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.

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

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

4. Flow between aquifers—the net vertical flow between the aquifer and adjacent aquifers or confining units. This flow is controlled by the relative water levels in each aquifer and aquifer properties of each aquifer or confining unit that define the amount of leakage that occurs.

The information needed for the district's management plan is summarized in Tables 1 through 6. 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 FOR POST OAK SAVANNAH 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 | 0 |
| Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers | Trinity Aquifer | 0 |
| Estimated annual volume of flow into the district within each aquifer in the district | Trinity Aquifer | 740 |
| Estimated annual volume of flow out of the district within each aquifer in the district | Trinity Aquifer | 382 |
| Estimated net annual volume of flow between each aquifer in the district | | NA[1] |

[1] Not available because the model assumes a no-flow boundary condition at the base.

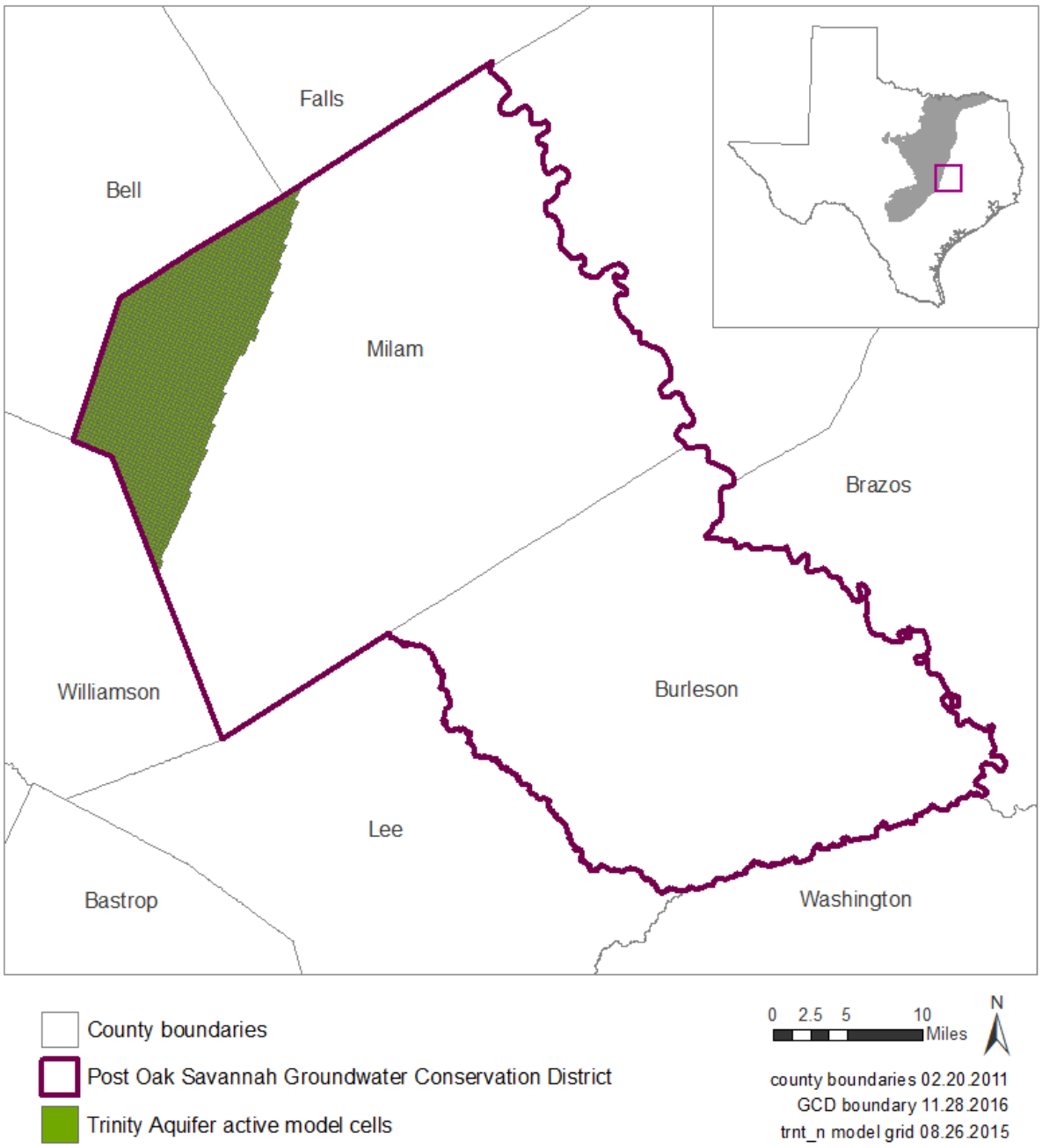


**FIGURE 1. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE TRINITY AQUIFER FROM WHICH THE INFORMATION IN TABLE 1 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).**

**TABLE 2. SUMMARIZED INFORMATION FOR THE CARRIZO-WILCOX AQUIFER FOR POST OAK SAVANNAH 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 | Carrizo-Wilcox Aquifer | 26,266 |
| Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers | Carrizo-Wilcox Aquifer | 29,010 |
| Estimated annual volume of flow into the district within each aquifer in the district | Carrizo-Wilcox Aquifer | 19,237 |
| Estimated annual volume of flow out of the district within each aquifer in the district | Carrizo-Wilcox Aquifer | 25,823 |
| Estimated net annual volume of flow between each aquifer in the district | Carrizo-Wilcox Aquifer into the overlying Reklaw Confining Unit | 237 |

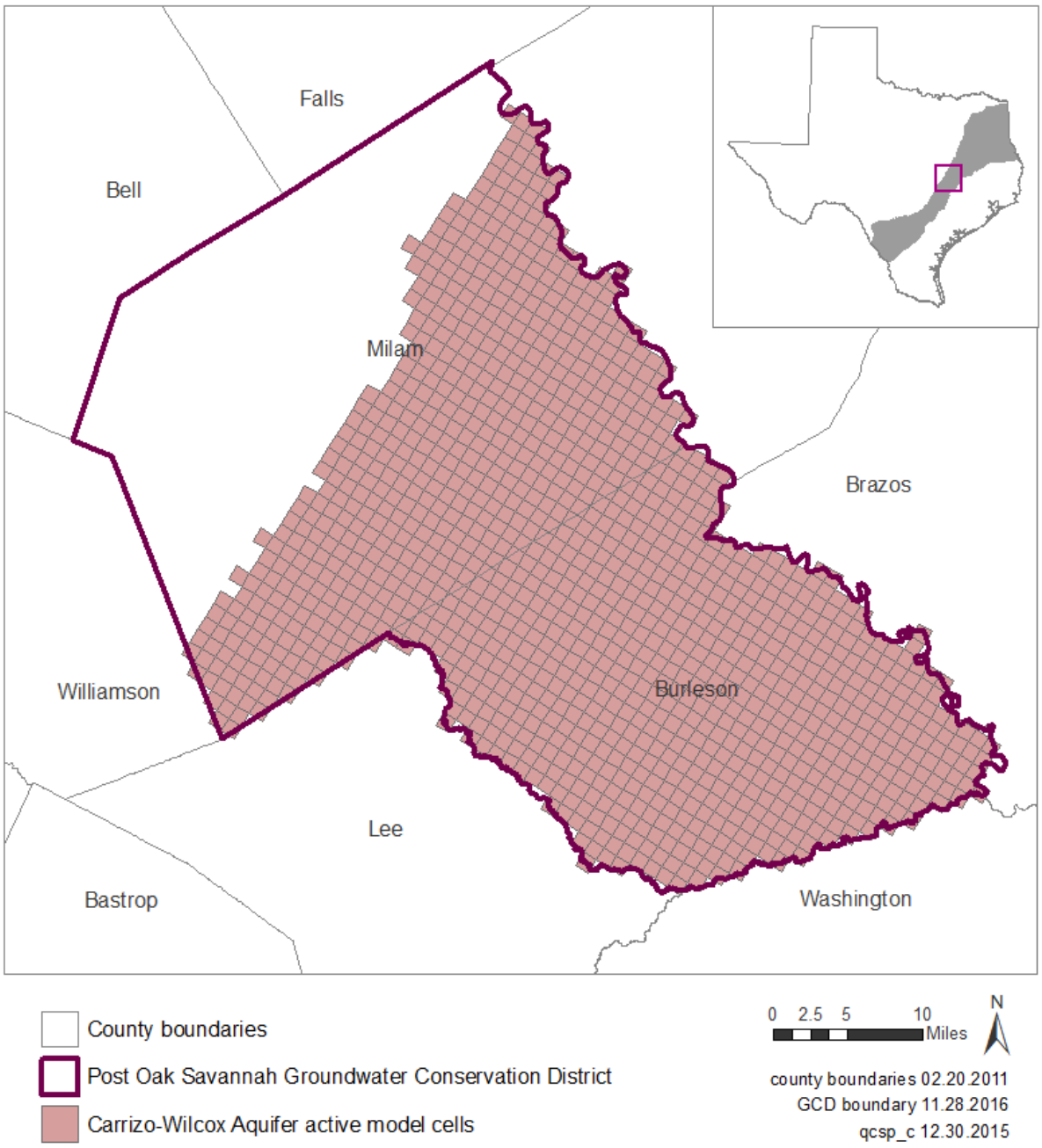


**FIGURE 2. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CARRIZO-WILCOX AQUIFER FROM WHICH THE INFORMATION IN TABLE 2 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).**

**TABLE 3. SUMMARIZED INFORMATION FOR THE QUEEN CITY AQUIFER FOR POST OAK SAVANNAH 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 | Queen City Aquifer | 8,811 |
| Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers | Queen City Aquifer | 12,030 |
| Estimated annual volume of flow into the district within each aquifer in the district | Queen City Aquifer | 1,343 |
| Estimated annual volume of flow out of the district within each aquifer in the district | Queen City Aquifer | 965 |
| Estimated net annual volume of flow between each aquifer in the district | Queen City Aquifer into the Overlying Weches Confining Unit | 1,448 |
| | Reklaw Confining Unit and adjacent underlying areas into the Queen City Aquifer | 866 |

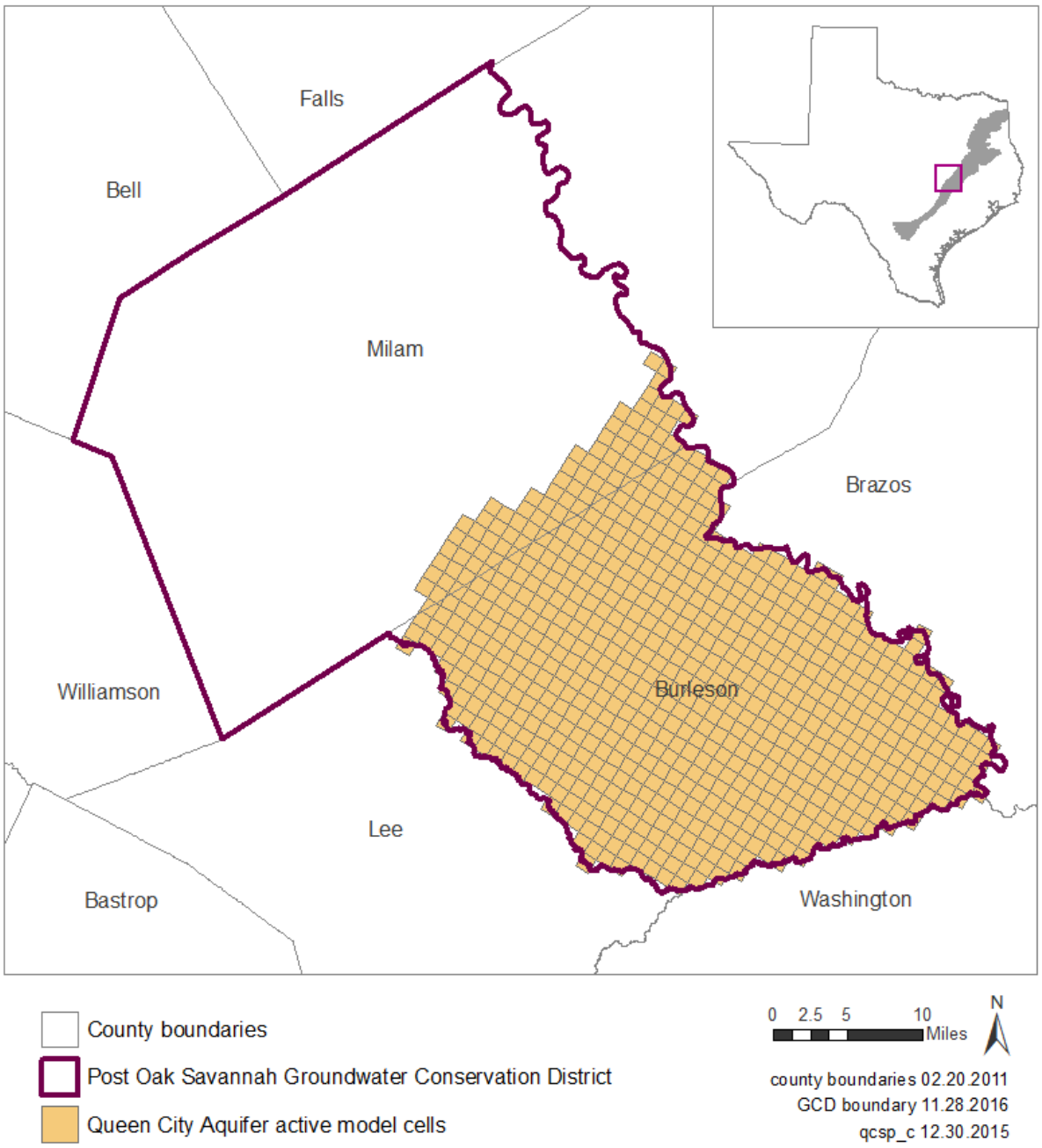


**FIGURE 3. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE QUEEN CITY AQUIFER FROM WHICH THE INFORMATION IN TABLE 3 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).**

**TABLE 4. SUMMARIZED INFORMATION FOR THE SPARTA AQUIFER FOR POST OAK SAVANNAH 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 | Sparta Aquifer | 7,423 |
| Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers | Sparta Aquifer | 4,808 |
| Estimated annual volume of flow into the district within each aquifer in the district | Sparta Aquifer | 763 |
| Estimated annual volume of flow out of the district within each aquifer in the district | Sparta Aquifer | 1,228 |
| Estimated net annual volume of flow between each aquifer in the district | Weches Confining Unit and adjacent underlying areas into the Sparta Aquifer | 1,583 |

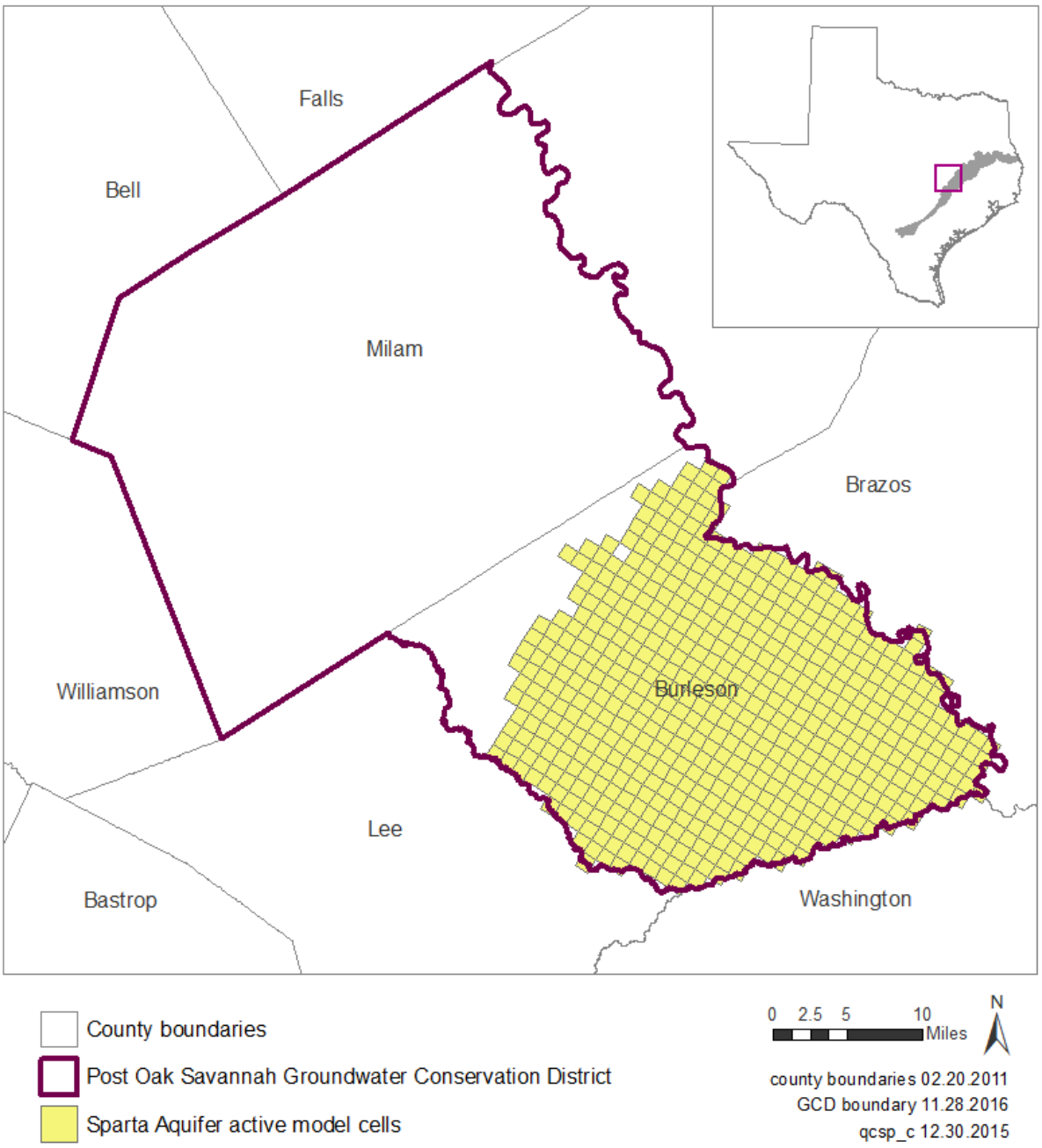


**FIGURE 4. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE SPARTA AQUIFER FROM WHICH THE INFORMATION IN TABLE 4 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).**

**TABLE 5. SUMMARIZED INFORMATION FOR THE YEGUA-JACKSON AQUIFER FOR POST OAK SAVANNAH 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 | Yegua-Jackson Aquifer | 22,459 |
| Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers | Yegua-Jackson Aquifer | 13,932 |
| Estimated annual volume of flow into the district within each aquifer in the district | Yegua-Jackson Aquifer | 5,087 |
| Estimated annual volume of flow out of the district within each aquifer in the district | Yegua-Jackson Aquifer | 8,690 |
| Estimated net annual volume of flow between each aquifer in the district | Yegua-Jackson Aquifer | NA[2] |

[2] Not available because the model assumes a no-flow boundary condition at the base.

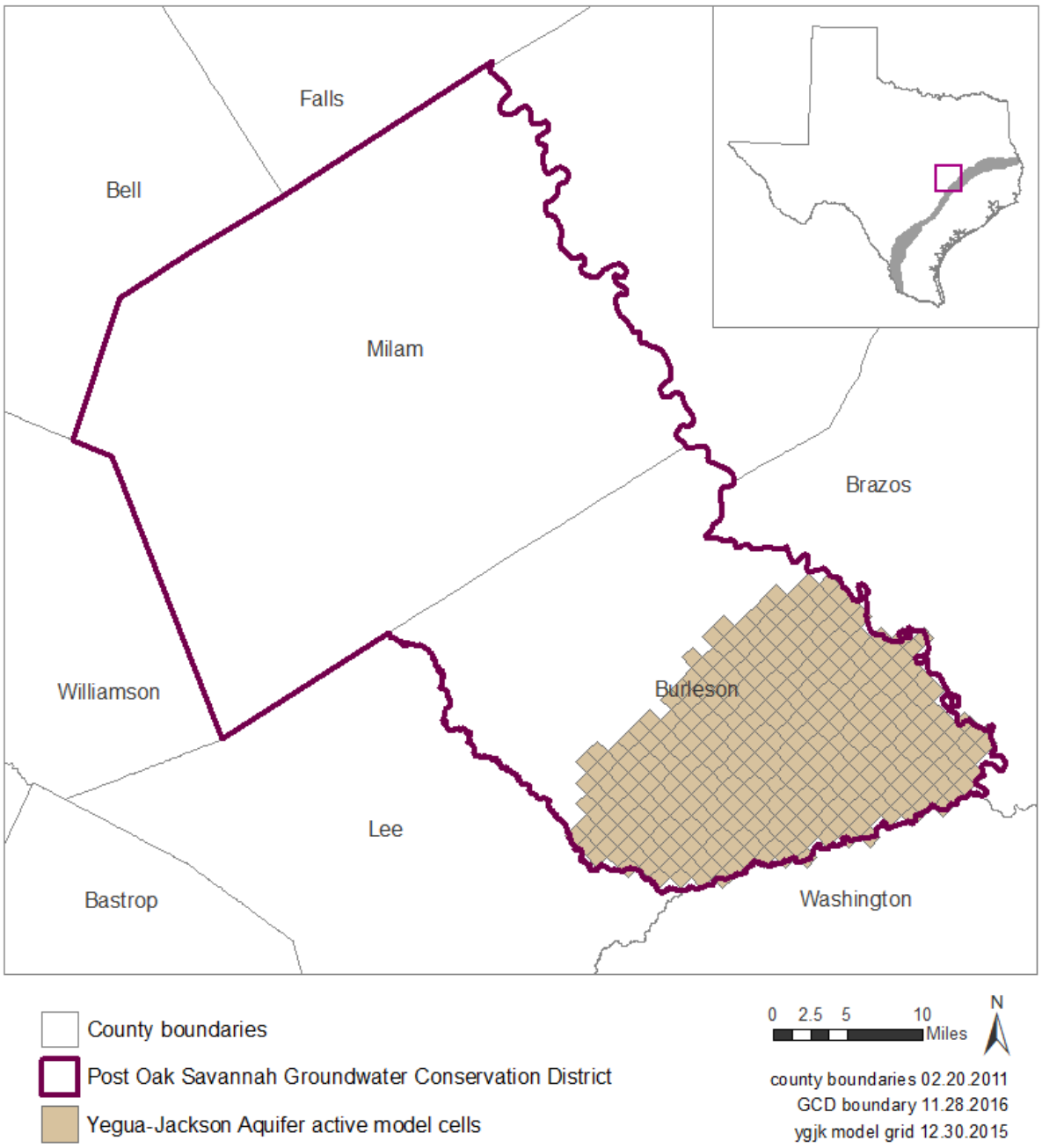


**FIGURE 5. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE YEGUA-JACKSON AQUIFER FROM WHICH THE INFORMATION IN TABLE 5 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).**

**TABLE 6. SUMMARIZED INFORMATION FOR THE BRAZOS RIVER ALLUVIUM AQUIFER FOR POST OAK SAVANNAH 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 | Brazos River Alluvium Aquifer | 15,510 |
| Estimated annual volume of water that discharges from the aquifer to springs and any surface-water body including lakes, streams, and rivers | Brazos River Alluvium Aquifer | 25,447 |
| Estimated annual volume of flow into the district within each aquifer in the district | Brazos River Alluvium Aquifer | 15,181 |
| Estimated annual volume of flow out of the district within each aquifer in the district | Brazos River Alluvium Aquifer | 19,706 |
| Estimated net annual volume of flow between each aquifer in the district | Flow into the Brazos River Alluvium Aquifer from underlying formations and geological units | 9,532 |

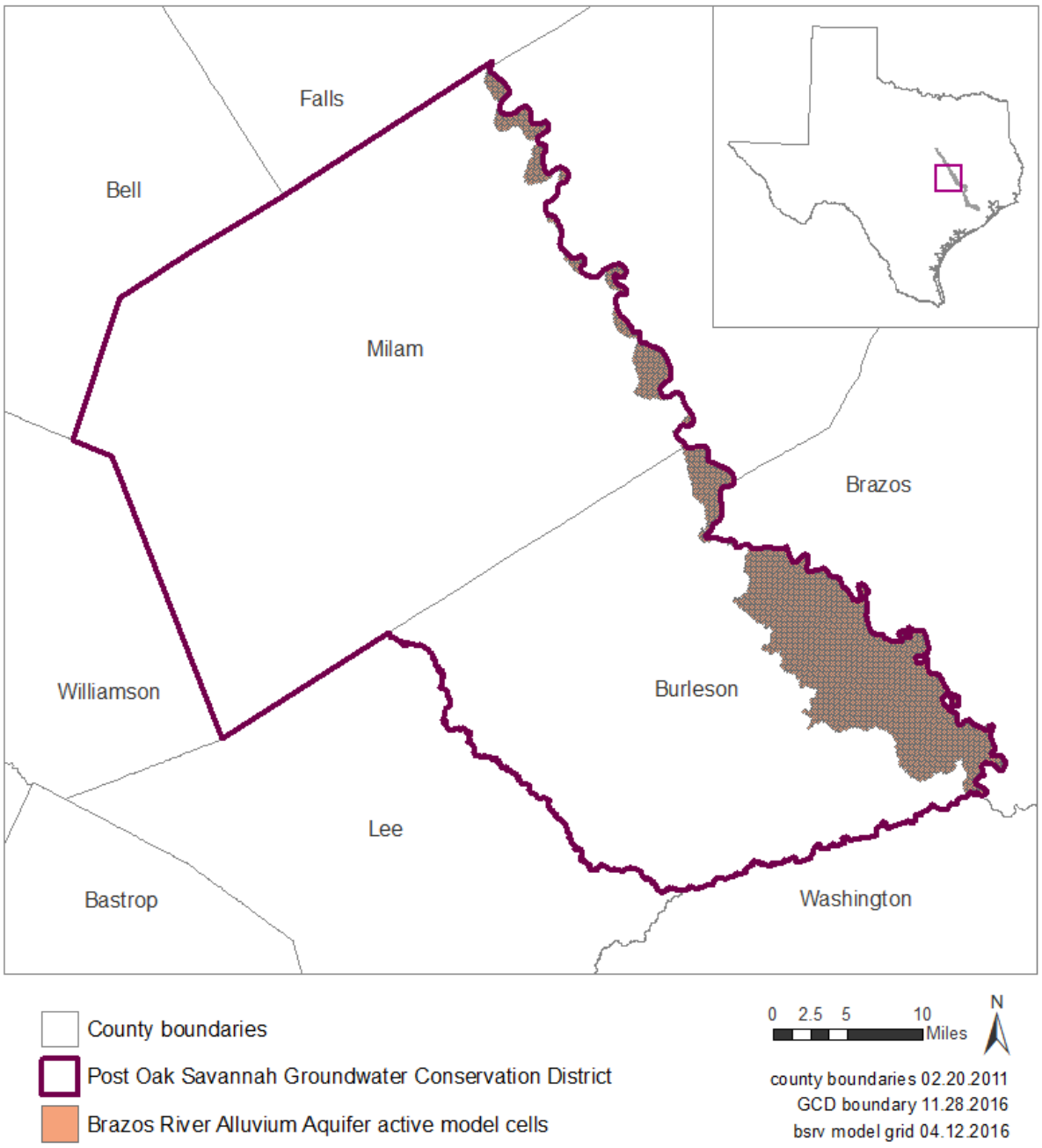


**FIGURE 6. AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE BRAZOS RIVER ALLUVIUM AQUIFER FROM WHICH THE INFORMATION IN TABLE 6 WAS EXTRACTED (THE AQUIFER SYSTEM EXTENT WITHIN THE DISTRICT BOUNDARY).**

## *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:*

Aschenbach, E., 2011, GAM Run 10-029, 14 p., http://www.twdb.texas.gov/groundwater/docs/GAMruns/GR10-029.pdf.

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

Harbaugh, A. W., Banta, E. R., Hill, M. C., and McDonald, M. G., 2000, MODFLOW-2000, the U.S. Geological Survey modular ground-water model -- User guide to modularization concepts and the Ground-Water Flow Process: U.S. Geological Survey Open-File Report 00-92, 121 p.

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Niswonger, R. G., Panday, S., and Ibaraki, M., 2011, MODFLOW-NWT, A Newtonian formulation for MODFLOW-2005: U.S. Geological Survey Survey Techniques and Methods 6-A37, 44 p.

Panday, S., Langevin, C.D., Niswonger, R.G., Ibaraki, M., and Hughes, J.D., 2013, MODFLOW-USG version 1: An unstructured grid version of MODFLOW for simulating groundwater flow and tightly coupled processes using a control volume finite-difference formulation: U.S. Geological Survey Techniques and Methods, book 6 chap. A45, 66 p.

# Post Oak Savannah Groundwater Conservation District

## Notice of Public Hearing

**Public Hearing- Adopting of the Management Plan of Post Oak Savannah Groundwater Conservation District dated October 9, 2017 (Management Plan)**
**POSGCD Offices**
**310 East Ave C, Milano, Texas**
**5:30 p.m.**
**December 5, 2017**

### Public Hearing to Consider Adopting the Management Plan

The Post Oak Savannah Groundwater Conservation District (POSGCD) will hold a public hearing on the Management Plan of Post Oak Savannah Groundwater Conservation District.

The Management Plan in its entirety is to be considered.

The Board of Directors will consider adopting the Management Plan at the Board meeting following the public hearing. The public hearing and board meeting will be conducted at the District office located at 310 East Avenue C in Milano Texas.

All interested persons are invited to attend and provide public comment. Written Comments will be filed by mail to POSGCD, P.O. Box 92, Milano, Texas 76556, by facsimile to 512-455-9909, or by email to admin@posgcd.org .

A copy of the Management Plan, dated October 9, 2012, can be accessed on the District's website- www.posgcd.org, or will be provided upon request by mail to the above POSGCD address, or by e-mail to the above e-mail address.

Information related to the above referenced items and public hearings are available to the public for inspection, review and copying at Post Oak Savannah Groundwater Conservation District offices, located at 310 E. Ave. C, Milano, Texas during office hours from 8:00 a.m. until 4:00 p.m., Monday through Friday.

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Filed 31st day of October
in 2017, At 3:25P M.
BARBARA VANSA
County Clerk, Milam County. Texas
By Jennifer Northcutt
Deputy

# Post Oak Savannah Groundwater Conservation District

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FILED
at 4:00 o'clock P M
OCT 31 2017
ANNA L. SCHIELACK
COUNTY CLERK, BURLESON CO., TEX.
By Deputy

that since there have been no fatal wrecks at the intersection to date, the current light is adequate.

Lazo said, "We're trying to be proactive, not reactive. We don't want to wait for a student to lose their life before

tronically throughout the school and community.

If you wish to support the Save Our Students petition, visit https://www.ipetitions.com/petition/stop-light-to-save-our-students.

donation is requested.

Off-street and handicap parking is provided by the City of Caldwell in the lot behind the senior center.

A handicap entrance and regular entrance are available at the rear entrance.

Burleson Tribune 11/2/17

**Post Oak Savannah Groundwater Conservation District**

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N2-1TC

# MILAM COUNTY COURTHOUSE RECORDS

## COUNTY COURT

### Warranty Deeds

Charles W. Buchanan and Elizabeth Buchanan to Richard Flores – Lot 17 and part of Lot 18, Block 126 (v. 1,320, p. 206).

Donna Douglas to Leno Cancino – 0.115 acres, Lot 26, Gause (v. 1,320, p. 252).

Judith A. Yearsley to Lon M. Dodd – 12.04 acres, Nelson Survey (v. 1,320, p. 261).

Carolyn K. Brown to Richard G. Hood and Judith H. Hood – 0.381 acres, Daniel Monroe Survey A-38 (v. 1,320, p. 662).

Charles Carl Cernuch Jr. and Shirley M. Cernuch to William L. Hardaway and Peggy S. Hardaway – 41.98 acres, Francisco Rodriguez Survey A-53 (v. 1,320, p. 665).

Carroll R. Grimm, Billy W. Grimm and Julaine Grimm to Julius Widner and Sue Widner – 2.12 acres, J.J. Liendo Grant Survey A-31 (v. 1,320, p. 825).

Leslie Alvin Hicks et al to Robert H. Griffith – 4.394 acres, S.C. Robertson Survey A-52 (v. 1,321, p. 24).

Ruby Schroeder fka Ruby Niemtschk, and Noris Schroeder to Stacey Urbanek Pasemann – 0.609 acres, Jose Justo Liendo Survey (v. 1,321, p. 30).

### Warranty Deeds With Vendor's Lien

Steve Everage and Lori Everage to ZJ Cook UE LLC – 176.974 acres (v. 1,320, p. 266).

Clifford Menzel and Mara McDowell to Kyle Kovar – 0.227 acres, Jose Justo Liendo Four League Grant Survey A-31 (v. 1,320, p. 646).

David Burg to Jim Elzner – 103.782 acres, John Nicholson Survey A-283 and George M. Giland Survey A-183 (v. 1,320, p. 687).

Chris Davis and Marla Roepke now known as Marla Roepke Davis to Richard Oris and Jennifer Oris – 13.003 acres, Moses Park Survey A-239 (v. 1,320, p. 771).

Steven Garza and Olivia Garza to Dillon Goodman – Lot 10, Block 15, Rockdale (v. 1,320, p. 835).

Roy Leonard Allen Jr. and Waylon Leslie Allen to Lindsey Lillard and Noah Lillard – Lot 8, Block 2, Coffield Addition, Section 1, Rockdale (v. 1,320, p. 854).

E.J. and Joyce K. Provasek Trust Estate, Edward Earl Provasek and Ernest Ray Provasek, each individually and as successor trustees, to Lisa Roden – 0.1691 acres, Martha Rogers Second Addition (v. 1,321, p. 1).

Wild Type Ranch LP to Wild Hermit Holdings LLC – 33.37 acres, John Dorsey Survey (v. 1,321, p. 33).

### General Warranty Deed

William A. Koster and Lori D. Koster to James G. Blair and Jane L. Blair – 21.05 acres, Miguel Davila Survey A-13 (v. 1,320, p. 873).

### Special Warranty Deeds

Francisco Segura Agundis et al to Maria Dolores Agundis – Lot 15, Fairview Subdivision (v. 1,320, p. 227).

Alcoa USA Corp. to Luminant Mining Co. LLC (v. 1,320, p. 321).

Jennifer Lynn Burns aka Jennifer Burg to David Burg – 103.782 acres, John Nicholson Survey A-283 (v. 1,320, p. 682).

### Special Warranty Deed With Vendor's Lien

John Proctor to Richard D. Veach and Mary Caldera Veach – 20 acres, J.W. Porter Survey A-289 and R. Moore Survey A-264 (v. 1,320, p. 704).

### Special Warranty Gift Deeds

Jerry Bounds to Austin David Bounds – Block 8, Charles Michals Addition (v. 1,320, p. 877).

Jerry Bounds to Rebecca Lynn Jones – Lot 3, Block 8, Charles Michalks Addition (v. 1,320, p. 880).

### Deed Without Warranty

John W. Stofila and Patricia Stofila to Fife Family Revocable Trust (June 21, 2017) – 15.015 acres, Monroe Edwards Survey (v. 1,320, p. 883).

### Mineral Deed

Jon Folmar Norris to Kathleen Mary Carter and Robert Trenton Carter (v. 1,320, p. 733).

### Quitclaim Deeds

Louise A. Johnson, Michael W. Johnson and Rebecca G. Roach to Russell Lee Muery – two tracts, Pollard Survey (v. 1,320, p. 193).

Cynthia Ruth Pate to Edmund Leroy McDonald (v. 1,320, p. 317).

### Transfer on Death Deed

Stanley N. Reece and Marsha K. Reece to surviving spouse, Reece Family Living Trust, trustee – 23 acres, J. Prewitt Survey (v. 1,320, p. 174).

### Memorandum Leases

Alcoa USA Corp. to Luminant Generation Co. LLC (v. 1,320, p. 346).

Alcoa USA Corp. to Luminant Mining Co. LLC (v. 1,320, p. 357).

Susan Blakely Brewer to Houston Petroleum Co. – 228.646 acres, M. Blakely Survey A-428, W.D. Thompson Survey A-367 and Jesse Ellison Survey A-159 (v. 1,320, p. 735).

Bill Alex Blakely Jr. to Houston Petroleum Co. – 228.646 acres, M. Blakely Survey A-428, W.D. Thompson Survey A-367 and Jesse Ellison Survey A-159 (v. 1,320, p. 737).

### Probate Cases Filed

Finis Black applied for the Lou Ann Black Estate – muniment of title (PR11359).

Rebecca Lynn Page applied for the Mary Ann Talley Estate – letters testamentary (PR11360).

## DISTRICT COURT

### Civil Cases Filed

Millard Burns vs. Angel Law – consumer commercial debt.

Zachary W. Garrison vs. Melissa Martinez et al – motor vehicle.

# OBITUARIES

## Clark

Melvin Norris Clark, 67, died Sunday, Oct. 29, 2017 in Coppell.


Mr. Clark

He was born May 24, 1950, in Rockdale.

Services will be held at 2 p.m. Saturday, Nov. 4, at New Jerusalem Interdenominational Church, 103 Mulberry, in Rockdale with Pastor Dennis Brooks officiating.

## Gadison

Isaac Grover (I.G.) Gadison was born Sept. 24, 1945 in Rockdale to the parentage of Lee Earl Gadison Sr. and Eva Margarett Richards Gadison.


Mr. Gadison

Isaac was the eldest son of nine children of a military family and traveled a lot during his formative years.

He started his public education in Rockdale and continued his education in Riverside, California, Fort Worth, graduating from the High School of Torrecon Air Force Base, near Madrid, Spain. While in high school, Isaac played football and ran track. In football, he played the positions of halfback and linebacker and led his team in rushing yards. In track and field, Isaac ran both the 100 and 220 yard dashes. In his senior year, he had the fastest time in the 100 of all the Americans living in Spain.

Upon graduation, he moved to Houston to attend Texas Southern University where he received a Bachelor of Art in Economics. While in college, he worked at NASA as a computer operator. After graduation, Isaac served in the United States Army as a computer operator in the finance department. He served for two years at Fort Lewis near Seattle, Washington. After leaving the Army, Isaac returned to Houston and spent many years as a salesman before becoming a stock broker for 30 years.

After coming to Houston for college, he united with Wheeler Avenue Baptist Church, where he served for several years as an usher.

On Tuesday, Oct. 17, 2017, Isaac Grover Gadison, beloved father, brother, uncle, cousin, and friend received his reward of eternal rest at Cypress Fairbanks Medical Center. Isaac is preceded in his journey by his parents Lee Earl Gadison Sr. and Eva Margarett Richards Gadison.

He leaves to cherish his memories a loving daughter, Lexas Elan Gadison (from the union with Debra Boney Holt) of Houston; four brothers, Jocky Earl Gadison of Seabrook, Richie Leon Gadison (Lori) of Houston, Stanley Kenneth Gadison (Melanie) of San Antonio, Lee Earl Gadison Jr. of San Antonio; four sisters, Margarett Earlene Gadison of San Antonio, Lacradia Ola Gadison of San Antonio, Eva Maria Gadison of San Antonio, Jacqueline Ann Gadison of San Antonio; and a host of aunts, uncles, nieces, nephews, relatives and friends.

Interment was Oct. 30, at Veteran Affairs Cemetery.

## Darwin

Alma Jane Denman Smith Darwin, 88, of Rockdale died Saturday, Oct. 28, 2017, in Cameron.


Mrs. Darwin

Funeral services were held Tuesday, Oct. 31, at Phillips & Luckey Funeral Home with Pastor Luther Shelander of Mt. Zion Baptist Church officiating. Burial followed at Mt. Zion Cemetery.

Mrs. Darwin was born Aug. 23, 1929, in Robertson County near Hearne to Ira Luther and Bertha Elberta (Childers) Denman.

She was a graduate of Milano High School.

She was a member of Mt. Zion Baptist Church and participated in the Women on Mission Ministry at First Baptist Church in Rockdale.

Mrs. Darwin was involved with Meals on Wheels, where she helped with cooking, serving and reading.

She worked at River Oaks State Bank in Houston and then at Rockdale Elementary School Cafeteria for over 20 years.

Mrs. Darwin was preceded in death by her first husband, Gene Owen Smith; her second husband, William E. Darwin; her parents, Ira Luther and Bertha Elberta Denman; three brothers, J.P. Denman, Ira Lee Denman and Charles L. Denman; and three sisters, Mabel Louise Edwards, Lucy Marie Dragoo and Billie Ruth Shelander.

Survivors are two sons, Owen Jay Smith and wife Donna of Hill Top Lakes, Burge Lee Darwin and wife D'Andra of Humble; three daughters, Jeanne Smith Brannon and husband Vernon, Annie Darwin Shew and husband Al, all of North Carolina, and Marion Darwin Sliwa and husband Ron of McKinney; brothers, Bobby Eugene Denman and wife Phyllis of Sharp, Texas and Johnny W. Denman and wife Eva of Lampasas, Texas; and a sister, Alice Mae Whiteley of Rockdale; also, 13 grandchildren, 23 great-grandchildren and six great-great-grandchildren.

Memorial donations may be made to the Joubert Syndrome Foundation at www.jsrdf.org or by mail at JSRDF, 9 Dorenfeld Ct, Petaluma, CA 94952.

## Talley

Earl Roy Talley, 69, of Del City, Oklahoma, died Wednesday, Oct. 25, 2017.


Mr. Talley

Graveside services will be held at 11 a.m. Thursday, Nov. 2, at I.O.O.F. Cemetery in Rockdale. There will be no visitation.

Mr. Talley was born Nov. 12, 1947, in Austin to Earl James and Ella Mae (Claus) Talley. He was known to the family as "Butch" from a very young age.

Mr. Talley enjoyed fishing, photography, and fixing computers for others, especially for senior citizens.

He served in Vietnam with the U.S. Army.

Mr. Talley was preceded in death by his parents, Earl James and Ella Mae Talley; and brother, John Patrick "J.T." Talley.

Survivors are a son, David Michael Talley of McKinney; twin sister, Earlene LaRue Baker and husband Bruce of Garland; a brother, Jim Travis Talley of Austin; two nephews, Justin Talley of Rhode Island, Kenny Talley of Austin; and a niece, Lori Stroede of Wylie.

**OBITUARY POLICY:** *The Reporter* will publish an edited version of an obituary for $20 (or with a photo for $25). It will be edited by our staff and may include birth date, birthplace and parents' names; education facts; military service; marriage date, place and spouse's name; employment facts; information about membership in organizations; hobbies and interests; survivors and those who predeceased; visiting hours and funeral services; pallbearers; and memorial contributions. More detailed obituaries will be printed at advertising rates based on column-inch length. Call 512-446-5838 for more information.

**Post Oak Savannah Groundwater Conservation District**

**Notice of Public Hearing**

**Public Hearing- Adopting of the Management Plan of Post Oak Savannah Groundwater Conservation District dated October 9, 2017 (Management Plan)**
**POSGCD Offices**
**310 East Ave C, Milano, Texas**
**5:30 p.m.**
**December 5, 2017**

**Public Hearing to Consider Adopting the Management Plan**

The Post Oak Savannah Groundwater Conservation District (POSGCD) will hold a public hearing on the Management Plan of Post Oak Savannah Groundwater Conservation District.

The Management Plan in its entirety is to be considered.

The Board of Directors will consider adopting the Management Plan at the Board meeting following the public hearing. The public hearing and board meeting will be conducted at the District office located at 310 East Avenue C in Milano Texas.

All interested persons are invited to attend and provide public comment. Written Comments will be filed by mail to POSGCD, P.O. Box 92, Milano, Texas 76556, by facsimile to 512-455-9909, or by email to admin@posgcd.org .

A copy of the Management Plan, dated October 9, 2012, can be accessed on the District's website- www.posgcd.org, or will be provided upon request by mail to the above POSGCD address, or by e-mail to the above e-mail address.

Information related to the above referenced items and public hearings are available to the public for inspection, review and copying at Post Oak Savannah Groundwater Conservation District offices, located at 310 E. Ave. C, Milano, Texas during office hours from 8:00 a.m. until 4:00 p.m., Monday through Friday.

in person to 700 Dyer, Rockdale, TX.

Cameron Nursing & Rehab
is now accepting applications for

**Assistant Director of Nurses**

Competitive Wages/Benefits
Locally Owned & Operated
Apply in person at
2202 N. Travis – Cameron, TX

mission scratch ticket game will close
You have until May 3, 2018, to redeem
e: **#1834 Willy Wonka™ Golden Ticket**
n 3.46. These Texas Lottery Commission
close on November 17, 2017. You have
deem any tickets for these games: **#1883**
ds are 1 in 4.34, **#1892 $500,000 Ca$h**
n 3.91. These Texas Lottery Commission
close on December 27, 2017. You have
deem any tickets for these games: **#1887**
odds are 1 in 4.79, **#1695 Card Suits** ($2)
8, **#1773 Rich** ($5) overall odds are 1 in
ega Bingo ($5) overall odds are 1 in 3.81,
Cashword ($5) overall odds are 1 in 3.82,
($5) overall odds are 1 in 3.93. The odds
ll odds of winning any prize in a game,
izes. Lottery retailers are authorized to
d including $599. Prizes of $600 or more
son at a lottery claim center or by mail,
Lottery claim form; however, annuity
00,000 must be claimed in person at the
rs in Austin. Call Customer Service at
lottery website at **txlottery.org** for more
of nearest claim center. The Texas Lottery
st or stolen tickets, or for tickets lost in
ctions, players and winners are subject
ers agree to abide by, all applicable laws,
lations, policies, directives, instructions,
and final decisions of the Executive
et game may continue to be sold even
have been claimed. Must be 18 years of
a Texas Lottery ticket. The Texas Lottery
n and veterans. PLAY RESPONSIBLY. For
oblem, **ncpgambling.org**. © 2017 Texas
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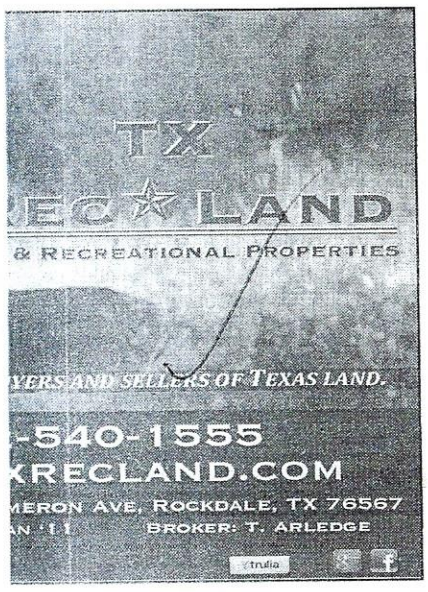


Central he~~SOLD~~nt location, so charming. $104,000
• 312 N. Central/Hwy 36 - Old Lave~~CONTRACT~~ classic home, commercial lot - $170,000
• 344 Third St., Ben Arnold, 3 or 4 BR, 1 B, brick, $62,000
• 706 ~~CONTRACT~~, large home, $57,000
• 1409 ~~CONTRACT~~ BR, 2 1/2 B, 2 living, brick, $135,000
• 1105 E. 12th, ~~SOLD~~ BR, 2 B, 1/2 block, brick, $64,500
• 309 E. 7th, Charming vintage craftsman, 3 BR, 2 B, CAC/HT $120,000
• 607 E. 13th, 3 BR, 2 B, brick,

• 25 AC, 3BR, 3B, log home, large pond, woods ~~SOLD~~ $319,000
• 22 acres, Jones Prairie, beautiful, wooded, 2 wells, 2 septic, 2 electric, immaculate 5 BR, 2 B, on cement piers, sun porch, shop, storage, ~~SOLD~~ $225,000
• 22 AC, rolling, scenic, pond, 3BR, 2B, newer home, FM 1915, Buckholts $259,900
• 2 plus acres, 3BR, 2B, 2 living, FM ~~SOLD~~ is like a park $155,000
• 11 AC, 2 BR, 2B, 2 ponds, gated community, exotic animals, Milano $189,000
• 86 AC, FM 2095, 3 BR, 2B, plus

ful, $550,000
• 52 acres, 3 BR, 2B, brick home, shop, office, garage, barn, 2 ponds, CR 138 - $300,000

**FARMS, RANCHES & ACREAGE**

• 135 AC, large pond, close to town, 2 nice homes ~~SOLD~~ $990,000
• 10 Acres, woods, PR 6030 Marlow
• 280 AC pasture, woods, ponds. CR 133, ~~SOLD~~ $2,000/AC
• 188 AC, 2BR home, rolling hills, scenic, Rogers, CR 102, lake view, $3,550/AC
•59 plus acres, CR 145 between Cameron and Temple, NICE ~~SOLD~~

207 - $4,265/acre
• 60 AC, water meter, 2 ponds, really nice, CR 207, ~~SOLD~~ $4,200/acre
• 39 AC, woods, views, ponds, water meter, Marlow area.
• 85 AC, Elm Creek, CR 119, pasture, 2 ponds $2,750/Ac

**COMMERCIAL PROPERTY**

• Duplex, 802 N. Main, 3 BR, 2B units. Nice. ~~SOLD~~ $120,000
• Cox Building - downtown Cameron - call for details.
• Approx. 4 plus acres, Hwy 77, commercial bldgs, lots of potential $675, 000
• Shop & lot on Hwy 36, $99,000

# HEAD START

**TAKING APPLICATIONS!!! (Transportation Provided)**

**Cameron Head Start is now accepting applications for the 2017-2018 school year. Head Start is a pre-school offering excellent educational opportunities along with medical, dental, developmental, and nutritional benefits at no cost. The Head Start approach of individualized care and guidance is well suited to helping children with disabilities. Children between the ages of 3 and 5 may be eligible. Transportation Available There is *no charge* for participation in Head Start. Pick up your application now at the Head Start Center at 1402 N. Austin Street. For more information, call your local center at 254/697-4240 or Hill Country Community Action Association at 325/372-5167.**

# HEAD START

**ESTA ACEPTANDO APLICACIONES !!! (Transporte Proporcionado)**

**Cameron Head Start esta aceptando aplicaciones para el ano 2017-2018. Head Start es una escuelita para ninos de edad 3-5 anos que califican. Head Start ofrece oportunidades excelentes para educacion y tambien beneficos de medico, dental, desarrollo, y de alimento. Head Start ofrece mucha ayuda para ninos y familias. Transporte Disponible. *No cuesta nada* para que su nino atiende el programa de Head Start. Puede usted recojer ahora una aplicacion para solicitar un puesto en Head Start. Para mas informacion llame a la Head Start, 1402 N. Austin Street, # del telefono: 254/697-4240 or Hill Country Community Action Association at 325/372-5167.**

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