GONZALES COUNTY
UNDERGROUND WATER CONSERVATION DISTRICT

MANAGEMENT PLAN

Original: February 1998

Revision 1.0: September 2003

Revision 2.0: May 14, 2009

Revision 3.0: -----------, 2014

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1.0 DISTRICT MISSION

The mission of the Gonzales County Underground Water Conservation District ("GCUWCD" or "District") is to conserve, preserve, protect, and prevent waste of groundwater resources. It shall be the policy of the Board of Directors that the most efficient use of groundwater in the District is to provide for the needs of the citizens and ensure growth for future generations. The Board of Directors, with the cooperation of the citizens of the District, shall implement this management plan and its accompanying rules to achieve this goal. GCUWCD shall also establish, as part of this plan, the policies of water conservation, public information and technical research by cooperation and coordination with the citizens of the District and equitable enforcement of this plan and its accompanying rules.

2.0 PURPOSE OF THE MANAGEMENT PLAN

Senate Bill 1, enacted in 1997, and Senate Bill 2, enacted in 2001, established a comprehensive statewide planning process, including requirements for groundwater conservation districts ("GCDs") under the Texas Water Code Chapter 36 to manage and conserve the groundwater resources of the State of Texas. Section 36.1071, Water Code, requires that each groundwater conservation district develop a management plan that addresses the following management goals, as applicable: (1) providing the most efficient use of groundwater, (2) controlling and preventing waste of groundwater, (3) controlling and preventing subsidence, (4) addressing conjunctive surface water management issues, (5) addressing natural resource issues, (6) addressing drought conditions, (7) addressing conservation, recharge enhancement, rainwater, precipitation enhancement, or brush control, where appropriate and cost-effective, and (8) addressing the desired future conditions adopted by the district under Section 36.108.

House Bill 1763, enacted in 2005, requires joint planning among GCDs within the same Groundwater Management Area ("GMA"). These Districts must establish the Desired Future Conditions ("DFCs") of the aquifers within their respective GMAs. Through this process, the GCDs will submit the DFCs of the aquifer to the executive administrator of the Texas Water Development Board ("TWDB"). The TWDB will calculate the modeled available groundwater ("MAG") in each District within the management area based upon the submitted DFCs of the aquifer within the GMA. Technical information, such as the DFCs of the aquifers within the District's jurisdiction and the amount of MAG from such aquifers is required by statute to be included in the District's management plan and will guide the District's regulatory and management policies.

3.0 DISTRICT INFORMATION

3.1 Creation

The GCUWCD was created on an order of the Texas Commission on Environmental Quality (TCEQ), formerly the Texas Natural Resource Conservation Commission (TNRCC), on November 19, 1993. A copy of TNRCC order number 101692-DO4, approving the petition for creation of the GCUWCD, is available on the District's website at: http://www.gcuwcd.org/documentsandforms.html. .

3.2 Directors

The GCUWCD Board of Directors is comprised of five (5) members elected from single member districts. Election of directors is held in May of the same year as the U.S. Presidential election. The Board of Directors meets in regular sessions on the second Tuesday each month in the City of Gonzales, Texas. All meetings of the Board of Directors are open to the public as set forth in the Texas Open Meetings Act, Title 5, Chapter 551 of the Texas Government Code, and advanced written notices of such meetings are posted as required.

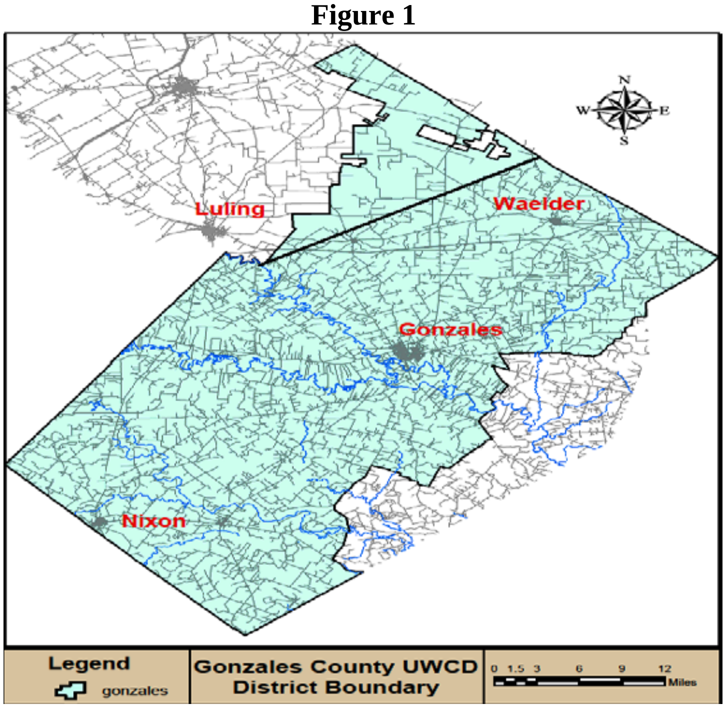
3.3 Authority of the District

As stated in TNRCC order number 101692-DO4, the GCUWCD has all the rights, powers, privileges, authority, and functions conferred by, and subject to all duties imposed by, the TCEQ and the general laws of the State of Texas relating to groundwater conservation districts. The District is governed by the provisions of Texas Water Code (TWC) Chapter 36 and 31 Texas Administrative Code (TAC) Chapter 356.

3.4 District Boundaries

GCUWCD serves the areas of Gonzales County and the southeast portion of Caldwell County (**Figure 1**). Gonzales County is bounded by Guadalupe, Wilson, Karnes, DeWitt, Lavaca, Fayette and Caldwell counties. There are approximately 677,000 acres in Gonzales County, of which 101,000 acres are excluded from the District as they lie over the zones of undesirable groundwater, leaving 576,000 acres within the boundaries of the county. Incorporated towns within Gonzales County include Gonzales, Waelder, Nixon, and Smiley. In December 2007, GCUWCD approved a resolution to annex the southeastern portion of Caldwell County into the District. An election was held in Caldwell County on May 10, 2008, with voters approving the annexation. The Board approved the canvass of the proposition election to ratify the annexation on May 13, 2008. The annexed area of Caldwell County encompassed approximately 77,440 acres. A dispute with the Plum Creek Conservation District over portions of this annexed territory was settled through the passage of Senate Bill No. 1225 (2011) leaving approximately 72,767 acres within the GCUWCD. Delhi and Taylorsville are the principal communities in the area. The District's economy is primarily agricultural, with poultry production being the primary income producer, followed by beef cattle and farming. Oil and gas production also contributes to the local economy.

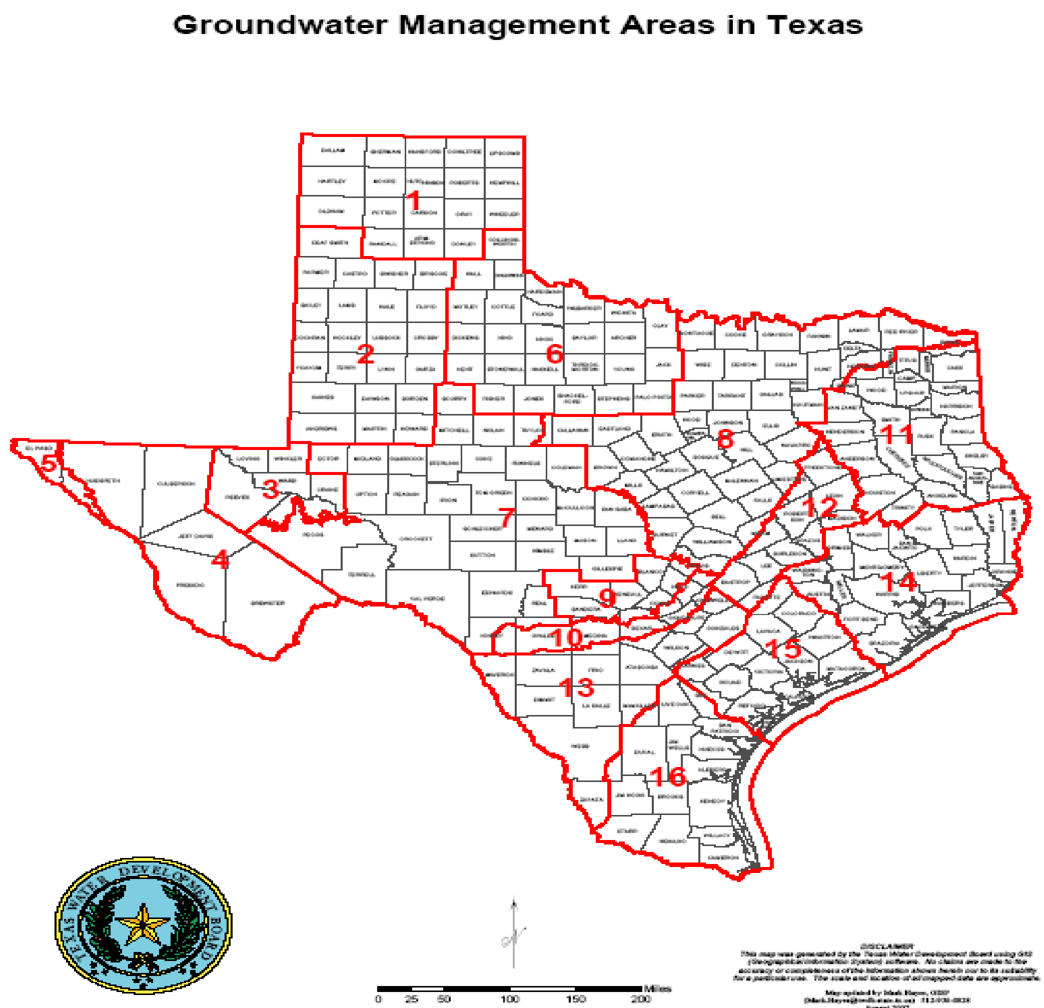
Figure 1



The GCUWCD is located within Groundwater Management Area 13 ("GMA 13"). GMA 13 includes seventeen counties and nine GCDs (**Figure 2**). Section 36.108, Water Code, requires joint planning among the GCDs within GMA 13. The District is actively engaged in the joint planning process and provides input to GMA 13. The District has a joint management agreement with Evergreen Underground

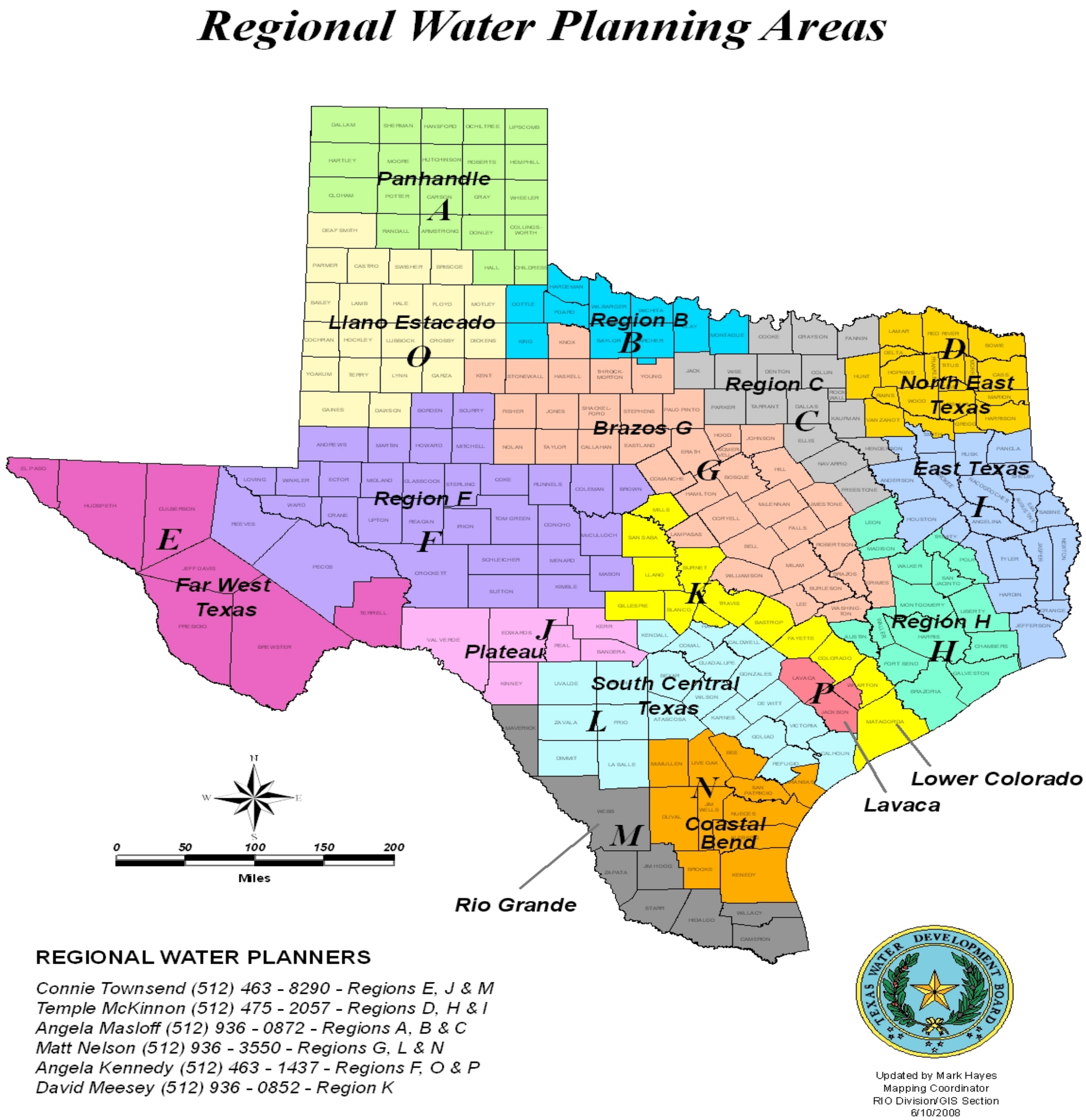
Water Conservation District, Guadalupe County Underground Water Conservation District, Medina County Groundwater Conservation District, and Wintergarden Groundwater Conservation District. This agreement, signed on August 8, 2000, states that the GCDs will cooperate in managing the groundwater resources of the Carrizo aquifer. The District has provided and will continue to provide the other GCDs in the aquifer management area with copies of its management plan and rules when changes are made.

Figure 2



The GCUWCD is located within planning Region L (South Central Texas Regional Planning Group). Region L includes all or parts of 21 counties, portions of nine river and coastal basins, the Guadalupe Estuary, and San Antonio Bay (**Figure 3**). The Board of Directors unanimously supports the concept of a grassroots planning effort. The District will actively provide input to the regional plan and participate in the planning effort.

Figure 3



3.5 Topography and Drainage

The GCUWCD lies within south-central Texas on the Gulf Coastal Plain. In most of the District the topography ranges from flat to rolling. However, two prominent lines of hills extend across parts of Gonzales County – one along the northwestern boundary from Ottine to about seven (7) miles northwest of Dewville and the other along the boundary with Lavaca County. In Caldwell County, the minimum elevation, about 295 feet, is at the southern tip of the County where Plum Creek joins the San Marcos River. The maximum elevation is in the area of the so-called “Iron Mountains” peaks southeast and south of McMahan.

Most of the District lies in the drainage basin of the Guadalupe River. Two small areas in the eastern and southeastern parts of the District are drained by the Colorado River. Most of the southern and southwestern parts of Gonzales County are drained by Sandies Creek, which flows southeastward and enters the Guadalupe River near Cuero in Dewitt County. Most of the northern and northeastern parts of Gonzales County are drained by Peach Creek, which flows southward, entering the Guadalupe River about ten (10) miles southeast of Gonzales. Plum Creek, the major tributary to the San Marcos River in Caldwell County, drains about 310 square miles (about 60 percent) of the County.

3.6 Groundwater Resources

The Wilcox Group yields small to moderate quantities of fresh to slightly saline water to a few wells in and near the outcrop in the northwestern part of Gonzales County. In Caldwell County, the Wilcox yields small to large quantities of water to many wells for domestic and stock purposes, public supply, and some irrigation. The Wilcox Group crops out in a small area in the GCUWCD near Ottine. The Wilcox is composed of clay, silt, fine to medium-grained sand and sandstone, sandy shale, and thin beds of lignite. The thickness of the Wilcox ranges from about 1,300 to 3,200 feet, with a maximum thickness of 2,000 feet occurring in an erosional channel in the southeastern part of the District. This erosional channel is filled largely with silty shale.

The principal water-bearing formation in the GCUWCD is the Carrizo Aquifer, which yields moderate to large quantities of fresh to slightly saline water throughout a large part of its subsurface extent. Most of the Carrizo in the GCUWCD has at least 80 percent sand. Portions of the Carrizo in the eastern half of the GCUWCD have 60 to 80 percent sand, generally corresponding to the area of the Yoakum Channel. Geologic thickness maps produced for the GCUWCD indicate that the Carrizo varies from less than 200 feet over the San Marcos Arch in the central portion of the county to more than 600 feet in the western portion of the GCUWCD and about 800 feet in the Yoakum Channel in the eastern portion of the GCUWCD. The Carrizo crops out in a small area along the western edge of Gonzales County and across the southeast portion of Caldwell County in a belt 1.5 to 3.5 miles wide. The Carrizo consists of beds of massive, commonly cross-bedded coarse sand and some minor amounts of sandstone and clay.

The Queen City aquifer yields small to moderate quantities of fresh to slightly saline water to wells in the area of the outcrop and downdip for a distance of about 5 to 8 miles. The Queen City aquifer crops out in a northeastward trending belt across Gonzales and Caldwell Counties about 2 to 4 miles wide and is composed of massive to thin bedded medium to fine sand and clay. The thickness of the Queen City ranges from about 400 to 825 feet where the entire section is present.

The Sparta aquifer yields small to moderate quantities of fresh to slightly saline water in the outcrop and for a few miles downdip. The Sparta aquifer crops out in a belt about 1 mile wide trending northeastward across Gonzales County and consists of fine to medium grained sand with some shale. The thickness of the Sparta aquifer averages about 100 feet.

The Yegua-Jackson aquifer runs approximately parallel to the Gulf of Mexico coastline and is aligned across the south-central portion of the GCUWCD in a narrow band approximately 7 to 10 miles wide. In Gonzales County, the Yegua Formation yields small quantities of slightly to moderately saline water for domestic use and for livestock. At some places in the County, sands in the Jackson also yield small quantities of fresh to slightly saline water for domestic use and for livestock. The Yegua Formation is composed of medium to fine sand, clay, silt, small amounts of gypsum, and beds of lignite. The Yegua has a maximum thickness of about 1,000 feet. The Jackson Group conformably overlies the Yegua Formation and consists of clay, silt, tuffaceous sand, sandstone, bentonitic clay, and some volcanic ash, and has a maximum thickness of at least 950 feet and possibly as much as 1,200 feet.

4.0 CRITERIA FOR PLAN APPROVAL

4.1 Planning Horizon

This plan shall be used for the ten (10) year period following approval as administratively complete by the Texas Water Development Board (TWDB) as required by *31 TAC §356.52(a)*. The GCUWCD shall implement these goals and policies for a planning period of ten (10) years and will review the plan in five (5) years or sooner as circumstances warrant.

4.2 Board Resolution

A certified copy of the GCUWCD's resolution adopting this plan as required by *31 TAC §356.53(a)(2)* is included in **Appendix 1**.

4.3 Plan Adoption

Public notices documenting that this plan was adopted following appropriate public meetings and hearings, as required by *31 TAC §356.53(a)(3)*, are included in **Appendix 2**.

4.4 Coordination with Surface Water Management Entities

Letters transmitting copies of this plan to the Guadalupe Blanco River Authority and Region L are included in **Appendix 3** as required by *31 TAC §356.51*.

5.0 DESIRED FUTURE CONDITIONS AND MODELED AVAILABLE GROUNDWATER

Section 36.108, Texas Water Code, requires joint planning among the groundwater conservation districts within GMA 13. A key part of joint planning is determining "desired future conditions" (DFCs) that are used to calculate "modeled available groundwater" (MAG). These conditions and volumes are used for regional water plans, groundwater management plans, and permitting. DFCs are the desired, quantified conditions of groundwater resources (such as water levels, water quality, spring flows, or volumes) at a specified time or times in the future or in perpetuity.

The district members of GMA13 adopted Scenario 4 (from GAM Run 09-034) and an average drawdown of 23 feet, for the Sparta, Weches, Queen City, Reklaw, Carrizo, and the Wilcox Aquifers on April 9, 2010. The district members of GMA13 adopted Scenario 4 (from GAM Run T10-012) and an average drawdown of 2 feet for the Yegua-Jackson Aquifer on August 12, 2010.

The current DFCs are based on water level drawdown relative to 1999, the final year of the calibration period in the scenario 4 model results and cover a 61-year simulation period extending from 1999 to 2060. For each aquifer, the DFC average drawdowns encompass the full extent of the aquifers within the District, from the outcrop to the downdip limit of the aquifer within the District boundary. The GMA13 wide DFCs equate to drawdowns in the District's aquifers as shown in **Table 1** below.

Table 1
Desired Future Conditions
Appendix 4: GAM Run 09-34 Addendum/GAM Task 10-012 Model Run Report
Gonzales County Underground Water Conservation District

Aquifer	Average Drawdown (feet)
Wilcox (overall)	91
Carrizo	97
Queen City	30
Sparta	21
Yegua Jackson	1

Modeled Available Groundwater (MAG) is defined in the Texas Water Code, Section 36.001, Subsection (25) as "the amount of water that the executive administrator determines may be produced on an average annual basis to achieve a desired future condition established under Section 36.108." MAG estimates for the Wilcox, Carrizo, Queen City, and Sparta Aquifers were received from the TWDB in August 2012 and for the Yegua Jackson Aquifer in December 2011. Presentation of this data in the management plan is required by *31 TAC §356.52 (a)(5)(A)*.

Table 2
Modeled Available Groundwater
Gonzales County Underground Water Conservation District
Appendix 5: GAM Run 10-012 MAG/GAM Run 10-041 MAG

Aquifer	Year					
	2010 (ac-ft/yr)	2020 (ac-ft/yr)	2030 (ac-ft/yr)	2040 (ac-ft/yr)	2050 (ac-ft/yr)	2060 (ac-ft/yr)
Upper Wilcox	0	0	0	0	0	0
Middle Wilcox	12,159	12,159	12,159	12,159	12,159	12,159
Lower Wilcox	19,902	19,902	19,902	19,902	19,902	19,902
Carrizo	45,884	55,717	63,718	69,192	69,371	69,371
Queen City	5,349	5,349	5,349	5,349	5,349	5,349
Sparta	3,552	3,552	3,552	3,552	3,552	3,552
Yegua Jackson	865	865	865	865	865	865

The GAM run used to determine the MAG included all groundwater from the outcrop to the downdip extent within the GCUWCD for all of the aquifers. The quality of the water was not taken into account so the MAG volumes include water with total dissolved solids concentrations (TDS) up to and possibly exceeding 3,000 ppm.

According to information included in the Final Reports of Groundwater Availability Models for the Carrizo-Wilcox. Queen City and Sparta Aquifers, prepared for the TWDB, limitations are intrinsic to models. Model limitations can be grouped into several categories including: (1) limitations in the data supporting a model, (2) limitations in the implementation of a model which may include assumptions inherent to the model application, and (3) limitations regarding model applicability. The report also states that the GAMs were developed on a regional scale and are applicable for assessing regional aquifer conditions resulting from groundwater development over a fifty-year time period. At this scale, the models are not capable of precisely predicting aquifer responses at specific points such as a particular well. Thus, the estimation of available groundwater calculated by the Southern Carrizo-Wilcox Queen City and Sparta (SCWQCS) GAM should be considered as a tool to assist the District in managing the aquifers to comply with the District's adopted DFCs.

6.0 Estimated Historical Groundwater Use and 2012 State Water Plan Datasets

The TWDB provides a package of data reports (Parts 1 and 2) to groundwater conservation districts to assist them in meeting the requirements for approval of their five-year groundwater Management Plan. Each report in the package addresses a specific numbered requirement in the TWDB's groundwater Management Plan checklist. The five reports in Part 1 are:

1. **Estimated Historical Groundwater Use -** the TWDB Uses Unit operates an annual survey of ground and surface water use by municipal and industrial entities within the state of Texas. This survey collects the volume of both ground and surface water used, the source of the water, water sales and other pertinent data from the users. The data provides an important source of information in helping guide water supply studies and regional and state water planning. Presentation of this data in the management plan is required by *§36.1071(e)(3)(B), Texas Water Code.*
2. **Projected Surface Water Supplies -** estimates of projected water supplies represent the estimated capacity of water systems to deliver water to meet user needs on an annual basis. Estimates of projected water supplies are compared with estimates of projected water demand to determine if the existing infrastructure is capable of meeting the expected needs of the water user group. Presentation of this data in the management plan is required by *§36.1071(e)(3)(F), Texas Water Code.*
3. **Projected Water Demand -** the Projected Water Demand estimates are derived from the TWDB 2012 State Water Plan. These water demand projections are separated into the following designated uses: municipal, manufacturing, steam electric, irrigation, mining, and livestock. Water demand is the total volume of water required to meet the needs of the specified user groups located within the District's planning area. Presentation of this data in the management plan is required by *§36.1071(e)(3)(G), Texas Water Code.*
4. **Projected Water Supply Needs -** the projected Water Supply Needs estimates are derived from the 2012 State Water Plan. Estimates of Projected Water Supplies are compared with estimates of Projected Water Demand to determine if the existing infrastructure is capable of meeting the expected Water Supply Needs of the water user group. Presentation of Water Supply Needs in the management plan is required by *§36.1071(e)(4), Texas Water Code.*
5. **Projected Water Management Strategies -** water Management Strategies are specific plans to increase water supply or maximize existing supply to meet a specific need. Municipal water conservation strategies focus on reducing residential, commercial, and institutional water use through a variety of social or technological approaches. Local Carrizo-Wilcox temporary overdraft strategies involve temporarily over-drafting the aquifer during drought conditions to supplement water supplies. Presentation of Water Management Strategies in the management plan is required by *§36.1071(e)(4), Texas Water Code.*

The Part 1 data package reports are included in **Appendix 6**.

7.0 Groundwater Availability Model Report

Part 2 of the TWDB data package is the Groundwater Availability Model report. Texas Water Code, Section 36.1071, Subsection (h) states that, in developing a groundwater management plan, GCDs shall use groundwater availability modeling provided by the TWDB. Information derived from the groundwater availability models that shall be included in the management plan includes:

1. the annual amount of recharge from precipitation, if any, to the groundwater resources within the District – required by *§36.1071(e)(3)(E), Texas Water Code.*
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 – required by *§36.1071(e)(3)(E), Texas Water Code.*
3. the annual volume of flow into and out of the District within each aquifer and between aquifers in the District – required by *§36.1071(e)(3)(E), Texas Water Code.*

The TWDB ran a groundwater availability model (GAM Run 13-014) for the central and southern Carrizo-Wilcox, Queen City, and Sparta aquifers, the Yegua-Jackson Aquifer, and the central portion of the Gulf Coast Aquifer to create a groundwater budget. A groundwater budget summarizes water entering and leaving the aquifer according to input parameters assigned in the models to simulate the groundwater flow system. The components of the water budgets include:

1. **Precipitation Recharge** – this is the aerially distributed recharge sourced from precipitation falling on the outcrop areas of the aquifers (where the aquifer is exposed at the land surface) within the District.
2. **Surface Water Outflow** – this is the total water exiting the aquifer (outflow) to surface water features such as streams, reservoirs, and drains (springs).
3. **Flow Into and Out of District** – this component describes lateral flow within the aquifer between the District and adjacent counties.
4. **Flow Between Aquifers** – this describes the vertical flow, or leakage, between aquifers or confining units. Inflow to an aquifer from an overlying aquifer will always equal the outflow from the other aquifer.

The Part 2 data package is included in **Appendix 7**.

8.0 MANAGEMENT OF GROUNDWATER RESOURCES

The GCUWCD will manage groundwater resources consistent with the intent and purpose of the District to conserve, preserve, protect and prevent waste of groundwater resources so that the economy of the areas within the District will be ensured of growth for future generations. Details of how the District will manage groundwater supplies, as required by *31 TAC 356.52(a)(4)*, as well as the actions, procedures, performance and avoidance necessary to effectuate the management plan, including specifications and the proposed rules, as required by *§36.1071(e)(2), Texas Water Code* are presented below.

8.1 Regulatory Action Plan

Pursuant to Chapter 36 of the Texas Water Code, the District has adopted rules limiting groundwater production based on tract size and the spacing of wells, to provide for conserving, preserving, protecting, preventing degradation of water quality and to prevent the waste of groundwater. This District will enforce the rules of the District to meet the goals of regulating the production of groundwater within the District. These rules will govern the permitting of wells to be drilled and the production of water from permitted wells. The rules shall be adhered to and shall be based on the best technical evidence available. Copies of the District's Rules and the Management Plan shall be available at the District's office at no charge to residents of the District.

The District will monitor water levels in selected observation wells and evaluate whether the annual average change in water levels is in conformance with the DFCs adopted by GMA 13 for each aquifer. The observation wells for each aquifer will be selected based on an as evenly spaced distribution of wells as possible. The observation wells will be vetted prior to use to ensure they are completed solely within the aquifer intended to be monitored.

The starting water level date for the district's DFCs is January 2000. The District will measure water levels in each designated observation well in each aquifer during the winter months (November through February). Water level measurements will be obtained by automatic or manual water level monitoring equipment. The District will calculate the change in water level from the previous year's water level for each observation well in each aquifer and then an average yearly change in water level for each aquifer based on all of the wells in the observation well network. These changes will be summed each year over the DFC planning period. The average water level declines over time will be compared to production amounts to assist in predicting future water level declines.

The District will estimate total annual groundwater production for each aquifer based on water use reports, estimated exempt use, and other relevant information and compare these production estimates to the MAGs. The District will base future permitting decisions on the amount of existing water permitted, amount existing water being produced, and the condition of the aquifer (average water level drawdown) at the time the permit application is filed in order to achieve the DFC.

8.2 Permits and Enforcement

The District may deny permits or limit groundwater withdrawals following the guidelines stated in the rules of the District and this plan. In determining whether to issue a permit or limit groundwater withdrawal, the District will consider the public benefit against individual hardship after considering all relevant evidence, appropriate testimony and all relevant factors.

In carrying out its purpose, the District may require the reduction of groundwater withdrawal to amounts that will not cause the water table or artesian pressure to drop to a level that would cause harm to the aquifer or exceed the specified drawdown limitations under the adopted Desired Future Conditions. To achieve this purpose the District may, at its discretion and based on information obtained through its groundwater monitoring procedures, amend or revoke any permits after notice and hearing. The monitoring procedures include calculation of yearly average drawdowns which will ensure that the District and permit holders are fully aware of the condition of the aquifers and corrective action measures can be reasonably implemented over appropriate intervals without causing harm to human health.

The District will enforce the terms and conditions of permits and its rules by enjoining the permittee in a court of competent jurisdiction as provided for in Section 36.102 of the Texas Water Code.

8.3 Exempt Use Wells

This plan and its accompanying rules shall exempt certain uses from the permit requirement as provided for in Section 36.117 of the Texas Water Code. The District, by rule, also provides exemptions for other categories of groundwater use including agricultural use and monitoring wells.

8.4 Permit Fees

The District will assess reasonable fees for processing a permit application to drill a test hole, for processing drilling and production permit applications, for processing transportation permit applications, and for processing permit applications to rework, re-equip, or alter a water well. No application fees are required for registering and recording the location of an existing well with the District.

8.5 Equity and Discretion

The District shall treat all citizens and entities of the District equally. Upon applying for a permit to drill a water well or a permit to increase the capacity of an existing well, the Board of Directors shall take into consideration all circumstances concerning the applicant's situation. The Board may grant an exception to the rules of the District when granting permits to prevent hardship or economic loss, also taking into consideration hydrological, physical or geophysical characteristics. Therefore, temporary exceptions to the general rule for a specific area may be necessary if an economic hardship will be created that is significantly greater for one person than for others in the District. In considering a request for an exception, the Board will also consider any potential adverse impacts on adjacent landowners. The exercising of discretion by the Board may not be construed to limit the power of the Board.

8.6 Spacing Requirements

Spacing of wells from the property line shall be in accordance with the rules of the District. Spacing of new wells from an existing well shall be in accordance with the classifications as set forth in the rules of the District.

8.7 Production Ratios

The District may adopt rules to regulate groundwater withdrawals by means of production limits. The District may deny a well permit or limit groundwater withdrawals in accordance with guidelines stated in the rules of the District. In making a determination to deny a permit or reduce the amount of groundwater withdrawals authorized in an existing permit, the District may weigh the public benefit in managing the aquifer to be derived from denial of a groundwater withdrawal permit or the reduction of the amount of authorized groundwater withdrawals against the individual hardship imposed by the permit denial or authorization reduction.

8.8 Cooperation and Coordination

Public cooperation is essential for this plan to accomplish its objectives. The District will work with the public and local and state governments to achieve the goals set forth in this plan. The District will coordinate activities with all public water suppliers, private water suppliers, industrial users and agricultural users to help them conserve groundwater. The Guadalupe Blanco River Authority is the local entity regulating all surface water in the District and the District will work closely with this agency to achieve our mutual water related goals. The TCEQ is the agency charged with protecting the state's water resources, and the TWDB is the agency responsible for water resources planning and promotion of water conservation practices. The District will continue to work with both of these agencies to conserve, preserve and protect water resources and to prevent waste as outlined in this plan.

8.9 Subsidence

Subsidence is not a relevant factor with the aquifers managed by this District; the District includes a portion of the Gulf Coast Aquifer, which is known for its susceptibility to subsidence, but the District's creation order does not give the District any jurisdiction over the Gulf Coast Aquifer.

8.10 Transportation of Water from the District

In accordance with Section 36.122 of the Texas Water Code, if the proposed use of a water well or wells is for transportation of water outside the District additional information shall be required and a transportation permit must be obtained from the Board before operating a transportation facility. The District may, in considering renewal of a transportation permit, review the amount of water that may be transferred out of the District. At any time during the term of a transportation permit, the District may revise or revoke a permit if the use of water unreasonably affects existing groundwater and surface water resources or existing Permit Holders.

8.11 Groundwater Protection

Section 26.401 of the Texas Water Code states that: "In order to safeguard present and future groundwater supplies, usable and potential usable groundwater must be protected and maintained."

Groundwater contamination may result from many sources, including current and past oil and gas production, agricultural activities, industrial and manufacturing processes, commercial and business endeavors, domestic activities and natural sources that may be influenced by or may result from human activities. The District will take appropriate measures to monitor activities that are either causing, or have the potential threat to cause groundwater contamination. Due to permeability of aquifer outcrops and recharge zones, there is a greater threat of groundwater contamination from surface pollution in recharge and outcrop regions, and the District will monitor those areas more closely.

8.12 Drought Management

Periodic drought is a condition that plagues the GCUWCD. The Board of Directors of the District is very concerned that water will be available for the needs of the citizens during times of drought. The General Manager of the District will update the Board at every monthly meeting on drought conditions in the District. The General Manager will report the Palmer Drought Severity Index to the Board during the manager's report for the month. The Board of Directors will instruct the General Manager of the appropriate actions to be taken upon notification of moderate to severe drought. The possible actions to be taken may include public service announcements on the radio, newspaper articles on conditions of the aquifer, water conservation information, and/or notices to municipal suppliers to implement their drought plan.

8.13 Technical Research and Studies

The District, in cooperation with the TWDB and the TCEQ, will conduct studies to monitor the water level in the Yegua Jackson, Sparta, Queen City, Carrizo, and Wilcox aquifers to determine if there is any danger of damaging these aquifers due to over production. The District will also establish water quality monitoring wells through out the District to determine if any degradation of water quality is occurring. The District is currently cooperating with the Texas Water Development Board with its monitoring of the Wilcox, Carrizo, Queen City, Sparta and Yegua Jackson aquifers.

8.14 Groundwater Recharge

The GCUWCD is prohibited from financing any groundwater recharge enhancement projects by order of the Texas Natural Resource Conservation Commission number 101692-DO4. The District has adopted rules to regulate Aquifer Storage and Recovery (ASR) projects.

8.15 Public Information

A well informed public is vital to the proper operation of a groundwater conservation district. The District will keep the citizens of the District informed by means of a website, timely newspaper articles and/or public service radio announcements. As part of the public information program the directors of the District and the District manager will make presentations to public gatherings, as requested, in order to keep the citizens informed about District activities and to promote proper use of available groundwater. The District has an ongoing program to assist teachers at public schools with the education of children on issues of groundwater conservation and the hydrology of our area.

8.16 Conservation and Natural Resource Issues

Water is the most precious natural resource on Earth. The District will promote conservation as a way of life in order to conserve fresh water for future generations. The District will require wells in areas that are in danger of over producing groundwater and damaging the aquifers to restrict production by means of production permits and metering of the amount of water produced. The District will work with water utilities, agricultural and industrial users to promote the efficient use of water so that we may conserve water. The District will keep abreast of developments in water conservation and update requirements as needed. The District will, upon request, provide information on wells and water levels to the Natural Resources Conservation Servic to develop waste management plans for the poultry producers.

Abandoned oil wells pose the greatest threat to the aquifers of the District. District personnel will monitor oilfield activity and notify the public that they may report abandoned oil wells and other problems associated with oil production to the District.

9.0 METHODOLOGY FOR TRACKING DISTRICT PROGRESS IN ACHIEVING MANAGEMENT GOALS

The District manager will prepare and present an Annual Report to the Board of Directors on District performance in regards to achieving management goals and objectives. The Annual Report will be presented to the Board during the first 60 days of each year. The report will include the number of instances in which each of the activities specified in the District's 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 District's operations may be evaluated. The Board will maintain the report on file for public inspection at the District's offices upon adoption. This methodology will apply to all management goals contained within this plan.

10.0 GOALS, MANAGEMENT OBJECTIVES, PERFORMANCE STANDARDS AND METHODOLOGY FOR TRACKING PROGRESS

The District's management goals, objectives, performance standards, and methodology for tracking progress, as specified in *36.1071(e)(2), Texas Water Code* are addressed below.

10.1 Plan Elements Required by State Law and Rule

Providing the Most Efficient Use of Groundwater
31 TAC 356.52(a)(1)(A)

The District's goal is to provide for the most efficient use of the groundwater resources of the GCUWCD.

Management Objective 1: The District will register at least 20 exempt use wells and will compile the data into a database.

> **Performance:** Record the date and number of exempt use wells registered in a database and include the information in the District's Annual Report**.**

Management Objective 2: The District will measure water levels in at least 40 observation wells to provide coverage across the Wilcox, Carrizo, Queen City, Sparta, and Yegua-Jackson Aquifers three times a year and will compile the water level data into a database.

> **Performance:** Record the number of wells and water level measurements measured for each aquifer annually in a database and include this information in the District's Annual Report.

Management Objective 3: The District will meet with the cities of Gonzales, Nixon, Smiley, and Waelder, and the Gonzales Area Development Corporation at least once a year to inform them on water availability for economic development.

> **Performance:** Record the date and number of meetings annually and include a copy of the meeting attendee's sheet and information on the topics of discussion with each entity in the District's Annual Report.

Management Objective 4: A District representative will attend all Groundwater Management Area 13 meetings annually.

> **Performance:** Record the number of GMA13 meetings attended annually and include a copy of each GMA13 meeting agenda and a copy of the meeting minutes in the District's Annual Report.

Management Objective 5: The District will gather water production data from local public water suppliers including the Gonzales County Water Supply Corporation, City of Gonzales, City of Nixon, City of Smiley, and City of Waelder, ten permitted or registered irrigation wells, and two livestock production facilities annually and compile the data into a database.

> **Performance:** Record the amount of water used by each public water supplier, irrigation well, and livestock production facility and include the information into the District's Annual Report.

Controlling and Preventing Waste of Groundwater
31 TAC 356.52(a)(1)(B)

Management Objective 1: The District will provide educational resources to citizens within the District on controlling and preventing waste of groundwater. The District will, at least annually, submit an information article on controlling and preventing waste of groundwater within the District for publication in a newspaper of general circulation in the District or may publish the article on the District's website. The District may also make a presentation to the public through local service organizations or public schools describing measures that can be taken by water users within the District.

> **Performance:** Record the dates of each control and prevention of waste article submitted for publication, published on the District's website, or presentation made to the public and include this information in the District's Annual Report.

Controlling and Preventing Subsidence
31 TAC 356.52(a)(1)(C)

Because of the rigid geologic framework of the aquifers regulated by the District subsidence is not a relevant issue within the GCUWCD. The District includes a portion of the Gulf Coast Aquifer, which is known for its susceptibility to subsidence, but the District's creation order does not give the District any jurisdiction over the Gulf Coast Aquifer. Therefore, the management goal is not relevant or applicable.

Conjunctive Surface Water Management
31 TAC 356.52(a)(1)(D)

The District's goal is to maximize the efficient use of groundwater and surface water for the benefit of the residents of the District.

Management Objective 1: The District will meet with the staff of the Guadalupe Blanco River Authority ("GBRA"), at least once a year, to share information updates about conjunctive use potential.

> **Performance:** Record the number of GBRA meetings attended annually and include a copy of the meeting attendee's sheet and information on the topics of discussion in the District's Annual Report.

Management Objective 2: The District will attend at least one Regional Water Planning Group ("RWPG") meeting annually to share information updates about conjunctive use potential.

> **Performance:** Record the number of RWPG meetings attended annually and include a copy of each RWPG meeting agenda and a copy of the meeting minutes in the District's Annual Report.

Addressing Natural Resource Issues
31 TAC 356.52(a)(1)(E)

The District's goal is to protect the Natural Resources of the GCUWCD. The District believes that preventing the contamination of groundwater is the single most important waste prevention activity it can undertake.

Management Objective 1: The District will collect water quality data in at least 20 wells annually at locations throughout the District and will compile the data into a database. In selecting wells the District will emphasize the wells at or near the zone of bad water or potential pollution sources based on best available data. The District may conduct field measurements using hand held meters and/or collect samples for laboratory analysis from each well.

> **Performance:** Record the number of wells in which water quality measurements were collected and the water quality results for each well and include this information in the District's Annual Report.

Management Objective 2: The District will monitor new facilities and activities on the recharge zones of the Carrizo/Wilcox, Queen City, Sparta, and Yegua-Jackson aquifers on at least an annual basis for point source and non-point source pollution and compile this data into a database.

> **Performance:** Record the date and results of the visual survey of all recharge zones for point source and nonpoint source activities and facilities and include the information in the District's Annual Report.

Management Objective 3: The District will meet with the local Texas Railroad Commission ("TRC") engineering technician at least once annually to review oil well permits and oil related activity that could endanger the aquifers and coordinate its efforts with this agency in locating abandoned or deteriorated oil wells.

Performance: Record the date and number of meetings with the TRC, the number of oil related activities that endangered the aquifers, the number of abandoned or deteriorated wells filed with the District and include the information in the District's Annual Report.

Management Objective 4: The District will meet with Natural Resources Conservation Service representatives to exchange information on wells and water levels at least once annually.

Performance: Record the date and number of meetings with the Natural Resources Conservation Service representatives and include the information in the District's Annual Report.

Addressing Drought Conditions
31 TAC 356.52(a)(1)(F)

The District's goal is to provide information and coordinate an appropriate response with local water users and water managers regarding the existence of extreme drought events in the District.

Management Objective 1: The General Manager will access the National Weather Service – Climate Prediction Center website (http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.shtml) to determine the Palmer Drought Severity Index and will submit a report to the Board of Directors monthly. The District will provide information to and coordinate with local water users and water managers regarding drought response activities.

Performance: Record the number of monthly reports made to the District Board of Directors and the date and number of times when the District was under extreme drought conditions and the number of times letters were sent to public water suppliers. Include this information in the District's Annual Report.

Addressing Conservation, Recharge Enhancement, Rainwater Harvesting, Precipitation Enhancement, Brush Control
31 TAC 356.52(a)(1)(G)

The District believes that the most efficient and effective ways to facilitate conservation within the District are through sound data collection, dissemination, and the distribution of public information about the groundwater resources in the GCUWCD, its current use and more effective ways to use it.

Management Objective 1: The District will, at least annually, submit an information article describing conservation measures that can be taken by water users within the District for publication in a newspaper of general circulation in the District or may publish the article on the District's website.

Performance: Record the dates of each conservation article submitted for publication or published on the District's website and include this information in the District's Annual Report.

Management Objective 2: The District will, at least annually, submit an information article describing recharge enhancement measures for publication in a newspaper of general circulation in the District or may publish the article on the District's website.

Performance: Record the dates of each recharge enhancement article submitted for publication or published on the District's website and include this information in the District's Annual Report.

Management Objective 3: The District will, at least annually, submit an information article describing rainwater harvesting measures that can be taken by water users within the District for publication in a newspaper of general circulation in the District or may publish the article on the District's website.

Performance: Record the dates of each rainwater harvesting article submitted for publication or published on the District's website and include this information in the District's Annual Report.

Management Objective 4: The District will, at least annually, submit an information article describing precipitation enhancement measures for publication in a newspaper of general circulation in the District or may publish the article on the District's website.

Performance: Record the dates of each precipitation enhancement article submitted for publication or published on the District's website and include this information in the District's Annual Report.

Management Objective 5: The District will publish an information article in a publication of wide circulation in the District or on its website, at least annually, describing brush control measures that can be used by landowners within the District

Performance: Record the date and number of brush control articles published and include this information in the Annual Report.

Addressing the Desired Future Conditions of the Groundwater Resources
31 TAC 356.52(a)(1)(H)

Management Objective: The District will monitor water levels and evaluate whether the average 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 water use reports, estimated exempt use, and other relevant information and compare these production estimates to the MAGs.

Performance: Record the water level data and average annual change in water levels for each aquifer and compare to the DFCs. Include this information in the District's Annual Report.

Performance: Record the total estimated annual production for each aquifer and compare these amounts to the MAG. Include this information in the District's Annual Report.

10.2 Plan Elements Developed at the Discretion of the District

Transportation of Water from the District

The District will seek an accurate accounting of water transported from the District to users outside its boundaries.

Management Objective: The District will obtain monthly usage reports from individuals or entities that transport groundwater out of the District and will compile this data into a database.

Performance: Record the monthly transporter usage reports and present the results in the District's Annual Report.

This Management Plan is approved by the undersigned on January 14, 2014. This Management Plan takes effect on approval by the Texas Water Development Board.

Gonzales County Underground Water Conservation District
Board of Directors

Bruce Tieken, President

Steve Ehrig, Vice President

Barry Miller, Secretary

Bruce Patteson, Director

Kermit Thiele, Director

Location of District Office:

Gonzales County UWCD
920 Saint Joseph Street, RM 129
P.O. Box 1919
Gonzales, TX 78629

Telephone: 830.672.1047
Fax: 830.672.1387

Email: greg.sengelmann@gcuwcd.org

APPENDIX 1

Certified Copy of GCUWCD Resolution Adopting Management Plan

Gonzales County Underground
Water Conservation District

Board Resolution 2014-01-14
Adoption of the Revised Management Plan

Whereas the Board of Directors of the Gonzales County Underground Water Conservation District wishes to adopt a revised Management Plan, pursuant to chapter 36.1071 of the Texas Water Code, to replace the Management Plan adopted on May 14, 2009.

Now therefore be it resolved that, the Board of Directors of the Gonzales County Underground Water Conservation District does hereby adopt this revised Management Plan for a ten year period following approval as administratively complete by the Texas Water Development Board.

Passed, adopted and approved this the 14th day of January 2014.

Bruce Tieken, President
Gonzales County Underground Water Conservation District

Barry Miller, Secretary
Gonzales County Underground Water Conservation District

GCUWCD
I hereby certify the attached document is a true and correct copy of the identical document as it appears in the records of the district.
Date: 01-14-2014
By: [signature]
Its Authorized Custodian
GCUWCD

APPENDIX 2

Public Notices For Adoption of Management Plan

NOTICE OF PUBLIC HEARING
OF
GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT

on

Proposed Additions and Amendments to the District's Management Plan

The Gonzales County Underground Water Conservation District (GCUWCD) will hold a public hearing for the purpose of receiving comments on the proposed adoption of the Management Plan of the District.

The Board of Directors will take public comments on the proposed Management Plan on January 7, 2014, at the Commissioner's Courtroom in the Gonzales County Courthouse, Gonzales, Texas. The public hearing will begin at 5:30 p.m. Agenda is as follows:

1. Call to order.
2. President of the Board to make comments.
3. Receive comments from the public on the GCUWCD proposed Management Plan.
4. Adjourn.

Copies of the proposed Management Plan are available at the offices of the Gonzales County Underground Water Conservation District, 920 Saint Joseph, Room 129, Gonzales, Texas, from 8:00 a.m. to 5:00 p.m., Monday through Friday. A copy is also available for download on the GCUWCD website at www.gcuwcd.org.

Written comments should be submitted to the General Manager, P.O. Box 1919, Gonzales, Texas 78629. The deadline for submission of written comments is January 3, 2014 at 5:00 p.m.

The above agenda schedule represents an estimate of the order for the indicated items and is subject to change at any time. These public meetings are available to all persons regardless of disability. If you require special assistance to attend the meeting, please call 830.672.1047 at least 24 hours in advance of the meeting to coordinate any special physical access arrangements.

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NOTICE OF PUBLIC MEETING
GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT
MEETING OF THE BOARD OF DIRECTORS

The Directors of the Gonzales County Underground Water Conservation District will meet in a public session on January 14, 2014, at 5:30 p.m. at the Gonzales County Court House in the Commissioner's Court Room, Gonzales, Texas.

The agenda is as follows:

1. Call to Order.
2. Public Comments. Limit to 3 minutes per person.
3. Review and approve minutes of December 10, 2013 Board Meeting.
4. Review and approve minutes of January 7, 2014 Public Hearing on Management Plan.
5. Discuss and take action on the Financial Report.
6. Discuss and take action on the District's bills to be paid.
7. Discuss and take action on the Mitigation Fund bills to be paid.
8. Discuss and take action on selecting a designated alternate for the Regional Planning Group.
9. Discuss and take action on revising the Eastern Mitigation Fund budget.
10. Consider a report from the General Manager and General Counsel on comments received on the proposed Management Plan and any recommended amendments.
11. Discuss and consider a resolution adopting the proposed Management Plan.
12. Manager's Report (monthly report, transporter usage, drought index, annual report).
13. Discuss and take action on paying the District's (Manager, Administrative Staff, and Board Members) expenses.
14. Well Mitigation Manager's Report (well mitigation progress, annual report).
15. Discuss and take action on paying the Well Mitigation Manager's expenses.
16. Discussion of other items of interest by the Board and direction to management based on the items set forth above.
17. Adjourn.

The above agenda schedule represents an estimate of the order for the indicated items and is subject to change at any time. These public meetings are available to all persons regardless of disability. If you require special assistance to attend the meeting, please call 830.672.1047 at least 24 hours in advance of the meeting to coordinate any special physical access arrangements.

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

POSTED THIS THE 8th DAY OF JANUARY 2014 AT _____ O'CLOCK by _____________.

POSTED

JAN 0 8 2014
10:30 AM

LEE RIEDEL
COUNTY CLERK, GONZALES COUNTY TEXAS
BY ____________ DEPUTY

NOTICE OF PUBLIC MEETING
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POSTED THIS THE 8th DAY OF JANUARY 2014 AT _____ O'CLOCK by _____________.

FILED this 8th day of Jan 2014
10:30 A M
CAROL HOLCOMB
COUNTY CLERK, CALDWELL COUNTY, TEXAS
By AF Deputy

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DEADLINES

ad in the Tuesday edition is
eadline to place an ad in the
dnesday at 12:00 pm.

RORS

ble for the first incorrect insertion of
to notify of a needed correction.

TODAY
72-2861

NOTICE OF PUBLIC HEARING OF GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT on Proposed Additions and Amendments to the District's Management Plan

The Gonzales County Underground Water Conservation District (GCUWCD) will hold a public hearing for the purpose of receiving comments on the proposed adoption of the Management Plan of the District.

The Board of Directors will take public comments on the proposed Management Plan on January 7, 2014, at the Commissioner's Courtroom in the Gonzales County Courthouse, Gonzales, Texas. The public hearing will begin at 5:30 p.m. Agenda is as follows:

1. Call to order.
2. President of the Board to make comments.
3. Receive comments from the public on the GCUWCD proposed Management Plan.
4. Adjourn.

Copies of the proposed Management Plan are available at the offices of the Gonzales County Underground Water Conservation District, 920 Saint Joseph, Room 129, Gonzales, Texas, from 8:00 a.m. to 5:00 p.m., Monday through Friday. A copy is also available for download on the GCUWCD website at www.gcuwcd.org.

Written comments should be submitted to the General Manager, P.O. Box 1919, Gonzales, Texas 78629. The deadline for submission of written comments is January 3, 2014 at 5:00 p.m.

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Farm & Ranch

Wild Hogs? We Buy! You deliver and we pay top $$. Candelaria Ranch, 9537 TX 97, Waelder. 830-540-3352

For Lease

For Lease Waelder-5 stall horse barn with 1/1 apartment on 15 acres. 361-676-6114

1. PUBLIC NOTICES

LEGAL NOTICE

Application has been made with the Texas Alcoholic Beverage Commission for a Beer and Wine Permit by Delia Rodriguez dba Garcia's Mexican Restaurant, to be located at 1711 S. Colorado St, Lockhart, Caldwell County, Texas. Owner of said corporation is Delia Rodriguez.

NOTICE OF APPLICATION FOR OIL AND GAS WASTE DISPOSAL WELL PERMIT

O.G.O. Refining, 300 South Walnut St., Luling, Texas 78648 is applying to the Railroad Commission of Texas for a permit to dispose of produced salt water or other oil and gas waste, including hydrogen sulfide, by well injection into a porous formation not productive of oil or gas. The applicant proposes to dispose of oil and gas waste into the Lower Edwards Formation, J. J. Davis Estate Lease, Well Number 1SW. The proposed disposal well is located 3 miles northeast of Luling, Texas in the Salt Flat (Edwards) Field, in Caldwell County. The wastewater will be injected into strata in the subsurface depth interval from 2997 to 3600 feet.

LEGAL AUTHORITY: Chapter 27 of the Texas Water Code, as amended, Title 3 of the Texas Natural Resources Code, as amended, and the Statewide Rules of the Oil and Gas Division of the Railroad Commission of Texas.

Requests for a public hearing from persons who can show they are adversely affected, or requests for further information concerning any aspect of the application should be submitted in writing, within fifteen days of publication, to the Environmental Services Section, Oil and Gas Division, Railroad Commission of Texas, P.O. Box 12967, Capitol Station, Austin, Texas 78711 (Telephone 512-463-6792).

NOTICE OF PUBLIC HEARING OF GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT

on Proposed Additions and Amendments to the District's Management Plan

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Written comments should be submitted to the General Manager, P.O. Box 1919, Gonzales, Texas 78629. The deadline for submission of written comments is January 3, 2014 at 5:00p.m.

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NOTICE OF PUBLIC HEARING
Lockhart ISD 2012-2013 Texas Academic Performance Report (TAPR)

Due to changes in legislation, the performance report formerly known as the Academic Excellence Indicator System (AEIS) report is now the Texas Academic Performance Report (TAPR).

The TAPRs were previously known as the Academic Excellence Indicator System (AEIS) Reports. Those reports were published from 1990-91 to 2011-12. The AEIS and TPAR reports may be found on the Lockhart ISD website.

Lockhart ISD will present the new Lockhart ISD 2012-2013 Texas Academic Performance Report (TAPR) during the regularly scheduled School Board Meeting on Monday, December 16, 2013. The meeting will be held at 6:30 PM in the Conference Center at Lockhart High School, 906 Center Street, Lockhart, TX 78644. Public discussion is welcomed.

NOTICE OF PUBLIC HEARING ON CREATION OF COUNTY ENERGY TRANSPORTATION REINVESTMENT ZONE

The Caldwell County Commissioners Court intends to create a County Energy Transportation Reinvestment Zone under section 222.1071 of the Transportation Code. At 9:45a.m., Thursday, December , 2013, in the Commissioners Courtroom located at 1403 Blackjack Street, Lockhart, Texas, the Commissioners Court will conduct a public hearing on the creation of a County Energy Transportation Reinvestment Zone and on its benefits to the county and to property in the proposed zone. At the hearing an interested person may speak.

BID NOTICE

Lockhart ISD requests proposals from qualified Superintendent Search Firms to guide the district in its search for a Superintendent. Instructions for submission can be obtained at the Lockhart ISD Administration Office at 105 S. Colorado, Lockhart, TX 78644 or by contacting Tanya Homann at 512-398-0052 or fax 512-398-0031. Proposals will be accepted by the district until January 7, 2014, at 2:00 p.m. CST. All proposals are to be sent to Tanya Homann at Lockhart ISD, P.O. Box 120, Lockhart, TX 78644. No faxed or emailed proposals will be accepted. Lockhart ISD reserves the right to reject any or all proposals.

LEGAL ADVERTISEMENT

Lockhart ISD requests statements of qualifications from those interested in a Contracted Service position as a Physical Therapist. For the qualification package, please contact Tanya Homann at 512-398-0052 or fax 512-398-0025. The qualification statements are due January 9, 2014, at 2:00 p.m. CST at Attn: Tanya Homann, Lockhart ISD, P.O. Box 120, Lockhart, TX 78644. No faxed or emailed proposals will be accepted. Lockhart ISD reserves the right to reject any or all proposals.

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2. LOST & FOUND

LOST CAT: Male, gray with gray stripes and white chest and paws. Answers to Mistle or Mistletoe. Last seen on Ross Circle 12/2/13. 512-665-1575.

Brown Paint Stud picked up 12/4/13 at Plant Rd and Horseshoe Bend. Flea bit Grey Gelding picked up 12/3/13 on Reata Ranch Rd. For more information please call Sheriff Dept. 512-398-6777 ext. 228.

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6. SERVICE

Pasture Mowing & mesquite spraying. Hoppy 512-213-8983.

TIM'S LAWN SERVICE

Mowing, weeding, pruning, flower beds, low limbs, shredding small acreage. No mesquite.
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7. HELP WANTED

Vacuum Truck Driver wanted. Must have Class A CDL with tanker endorsement. Call Keith 830-263-2553.

Dental Receptionist/Assistant

Seeking dental receptionist/assistant with responsible work ethic and team attitude. Must be great with people, have excellent communication skills, detailed, and able to multitask. Experience with MS Office required, EagleSoft preferred. Pay commensurate with experience. References required. Please submit resumes to lwhitedds@austin.rr.com.

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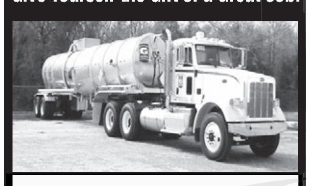
7. HELP WANTED

Give Yourself the Gift of a Great Job!



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Livengood Feeds Mill Store now hiring full time position - register/warehouse. Apply in person at 1312 S. Colorado. No phone calls please.

Need part-time weekend help with chores on horse property near Lytton Springs. (512) 376-6251

GEO Group, Inc.
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Lockhart Correctional Facility has immediate openings for persons seeking a career in corrections. Paid benefits and training. Must have a high school diploma or GED. Must pass drug screening, physical, and background check.
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Luling Care Center is accepting application for Housekeeping and Dietary help. Please apply in person @ 501 W. Austin Street, Luling Texas. No phone calls please.

DAVIS PROCESSING - Luling Plant now taking applications for mechanic's helper. Apply in person 152 Meridian, Prairie Lea, TX. Drug test required.

ADMINISTRATIVE ASSISTANT Monday-Thursday from 2-6, Event and meeting planning, make travel arrangements,running errands,setting appointments,monitor expenses. Attach resume with references and salary expectations: rduffey13@yahoo.com

---

Business is Booming at Parkview Nursing & Rehab! We are now accepting applications for Certified Nurse Aides. Sign on Bonus! We also offer 100% tuition reimbursement for new Certified Nurse's Aides! See us for the details. Parkview is located at 1501 S Main in Lockhart, TX. Please come by the facility to apply. Drug Screen and Background Check Required. EOE AA

Drivers: Excellent Benefits & Bonus Program! Earn $.425-$.525cpm. Haul Flatbed loads for Trinity Logistics Group. CDL-A, 2yrs exp. EOE/AA 800-533-7862 or www.trinitytrucking.com

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I Am Looking For . . .

A person to represent Farm Bureau Insurance in Caldwell County. The person we seek is probably employed, but may be experiencing job dissatisfaction because of insufficient income or lack of potential for professional growth.

- College degree preferred
- 3 year bonus program
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If you would like to represent one of the most respected companies in the industry. . .

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Lockhart, TX 78644
Office 512-398-2427
Fax 512-398-7764
Email: mtate@txfb-ins.com

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Fax 512-376-3301

12. GARAGE/YARD SALES

12.GARAGE/YARD SALE

2400 Night Sky Cove

Friday & Saturday: Christmas stuff, coats, sweaters, lots of nice things.

---

716 Bois D' Arc

Christmas & Bake Sale
Saturday, Dec 14th
8 am – 2 pm
Lots of pretty things

---

917 N. Blanco

Christmas Craft Show
Saturday, Dec 14th
8 am – 3 pm
Tamales, baked goods, crafts. We are indoors!

1205 FM 20 East, Lockhart Thrift Store

Xmas Gifts, Beer and Coffee Mugs, wine, cocktail, shot glasses, any sports logo or personalized, Lockhart Lions. M-F, 9-3.

1605 Paintbrush Dr.

Moving Sale: Friday, Dec 13th & Saturday, Dec 14th. BBQ pit, wooden swing set, housewares, toys, men's/women's/children's clothes and lots more!

---

1 Mile South of Lockhart FLEAMARKET TEXAS TRADERS POST

Appliances, couches, houseware, great gift shop and Razor Cuts, western boots, hats and blankets, fruit cups, snowcones, card reading, Spanish music store, Acuna's collectibles, booth 518 leather goods, handmade rustic furniture. Layaway, and credit cards excepted. 50% off select items at NU2U. 512-213-5365.

12.GARAGE/YARD SALE

China cabinet, old wooden chairs, jewelry, one stuffed chair and lamps for sale. Call 361-205-5000 in Lockhart.

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Silver Threads Resale: 901 Bois D'Arc, Tuesday-Friday noon-3:00 p.m. Saturday 11:00 a.m.-2 p.m. WINTER CLOTHES AVAILABLE! Donations accepted during business hours.

---

15. MISC FOR SALE

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APPENDIX 3

Certified Mail Receipts From Surface Water Management Entities

Gonzales Co. Underground Water Conservation Dist.

920 Saint Joseph
P.O. Box 1919
Gonzales, Texas 78629
Phone 830 672 1047

January 23, 2014

Mr. W. E. West, Jr., General Manager
Guadalupe-Blanco River Authority
933 East Court Street
Seguin, TX 78155

Re: Transmittal of Gonzales County Underground Water Conservation District Management Plan to Surface Water Management Entities

Dear Mr. West:

In accordance with 31 TAC 356.6(a)(4) and TWC 36.1071(a), the Gonzales County Underground Water Conservation District (GCUWCD) is submitting our amended Management Plan which was adopted by the Board of Directors on January 14, 2014.

If you have any questions concerning this Management Plan please contact me at 830.672.1047.

Sincerely,

Greg Sengelmann, P.G.
General Manager
Gonzales County UWCD

GS:sb

Enclosure

Gonzales Co. Underground Water Conservation Dist.

920 Saint Joseph
P.O. Box 1919
Gonzales, Texas 78629
Phone 830 672 1047

January 23, 2014

Mr. Steven J. Raabe, P.E.
South Central Texas Regional Water Planning Group
San Antonio River Authority
P.O. Box 839980
San Antonio, TX 78283-9980

Re: Transmittal of Gonzales County Underground Water Conservation District Management Plan to Surface Water Management Entities

Dear Mr. Raabe:

In accordance with 31 TAC 356.6(a)(4) and TWC 36.1071(a), the Gonzales County Underground Water Conservation District (GCUWCD) is submitting our amended Management Plan which was adopted by the Board of Directors on January 14, 2014.

If you have any questions concerning this Management Plan please contact me at 830.672.1047.

Sincerely,

Greg Sengelmann, P.G.
General Manager
Gonzales County UWCD

GS:sb

Enclosure

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City, State, ZIP

Mr. Steven J. Raabe, P.E.
South Central TX RWPG
San Antonio River Authority
PO Box 839980
San Antonio, TX 78283-9980

PS Form 3800, August 2006 — See Reverse for Instructions

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Sent To
Street, Apt. No., or PO Box No.
City, State, ZIP

Mr. W. E. West, Jr., G.M.
Guadalupe-Blanco River Authority
933 East Court Street
Seguin, TX 78155

PS Form 3800, August 2006 — See Reverse for Instructions

APPENDIX 4

GAM Run 09-34 Addendum/GAM Task 10-012 Model Run Report

GAM Run 09-34 Addendum: Additional Information for Predictive Scenario Run in the Carrizo-Wilcox, Queen City, and Sparta Aquifers for Groundwater Management Area 13

by Shirley Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 936-0883
June 27, 2012

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

6/27/12

The seal appearing on this document was authorized by Shirley C. Wade, P.G. 525, on June 27, 2012.

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GAM RUN 09-34 ADDENDUM: ADDITIONAL INFORMATION FOR PREDICTIVE SCENARIO RUN IN THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS FOR GROUNDWATER MANAGEMENT AREA 13

by Shirley Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 936-0883
June 27, 2012

EXECUTIVE SUMMARY:

We summarized average drawdown per groundwater district based on the updated district boundaries for Plum Creek Conservation District and Gonzales County Underground Water Conservation District in order to be consistent with the boundaries used to summarize the modeled available groundwater (MAG) amounts in GAM Run 10-012 MAG. The average drawdown in Plum Creek Conservation District is about 10 percent greater (109 feet versus 97 feet) in the Carrizo Aquifer and somewhat less in the other units as compared with scenario 4 drawdown averages in GAM Run 09-034. For all other groundwater conservation districts the drawdown averages are the same as reported in GAM Run 09-34.

REQUESTOR:

This report is supplemental information for a run requested by Mr. Mike Mahoney from the Evergreen Underground Water Conservation District acting on behalf of Groundwater Management Area 13.

DESCRIPTION:

Tables of average drawdown per groundwater conservation district shown in GAM Run 09-34 (Wade and Jigmond, 2010) were based on groundwater district boundaries from September 2009. In early 2012, the boundaries for Plum Creek Conservation District and Gonzales County Underground Water Conservation District were revised and draft modeled available groundwater amounts (Wade, 2012) were released based on the new boundaries. This addendum presents groundwater district average drawdown for scenario 4 based on the same groundwater district boundaries that the modeled available groundwater amounts were based on.

PARAMETERS AND ASSUMPTIONS:

Details on the parameters and assumptions are provided in the report for GAM Run 09-034 (Wade and Jigmond, 2010).

METHODS AND RESULTS:

We extracted water level drawdown relative to 1999, the final year of the calibration period, from the scenario 4 model results and summarized average drawdown per groundwater conservation district at the end of the 61-year simulation period (Table 1). The average drawdown in Plum Creek Conservation District is about 10 percent greater (109 feet versus 97 feet) in the Carrizo Aquifer and somewhat less in the other units as compared with scenario 4 drawdown in GAM Run 09-034 (Wade and Jigmond, 2010). However, for all other groundwater conservation districts the drawdown averages are the same as reported in GAM Run 09-34 (Wade and Jigmond, 2010).

TABLE 1. AVERAGE 2060 DRAWDOWN IN FEET PER GROUNDWATER CONSERVATION DISTRICT FOR GAM RUN 09-034 (WADE AND JIGMOND, 2010) SCENARIO 4.

Groundwater Conservation District	Groundwater Management Area 13 drawdown (feet) - GR 09-034 scenario 4								
	Sparta	Weches	Queen City	Reklaw	Carrizo	Layer 6	Layer 7	Layer 8	Wilcox Overall
Evergreen UWCD	9	12	9	35	63	62	64	107	78
Gonzales County UWCD	21	25	30	57	97	97	90	85	91
Guadalupe County GCD	0	0	-11	5	54	52	20	31	30
McMullen GCD	25	29	32	39	45	44	12	9	22
Medina County GCD	0	0	0	-1	29	29	28	28	28
Plum Creek CD	0	0	0	18	109	108	35	69	57
Uvalde County UWCD	0	0	0	0	1	0	12	30	22
Wintergarden GCD	5	6	0	-4	0	0	-9	-10	-7

LIMITATIONS:

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

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

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

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

It is important for groundwater conservation districts to monitor groundwater pumping and 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:

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

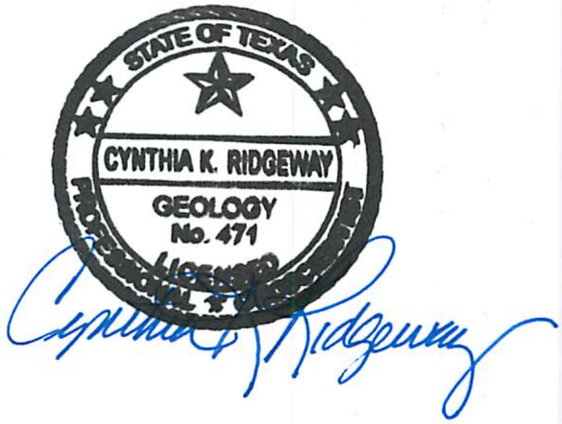
Wade S., 2012 Draft GAM Run 10-012 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, and Sparta Aquifers in Groundwater Management Area 13, Texas Water Development Board GAM Run Report, 19 p.

Wade S.C. and Jigmond, M., 2010, GAM Run 09-034, Texas Water Development Board GAM Run Report, 146 p.

GAM Task 10-012 Model Run Report

by Mr. Wade Oliver

Texas Water Development Board
Groundwater Availability Modeling Section
(512) 463-3132
August 9, 2010



Cynthia K. Ridgeway is the Manager of the Groundwater Availability Modeling Section and is responsible for oversight of work performed by employees under her direct supervision. The seal appearing on this document was authorized by Cynthia K. Ridgeway, P.G. 471 on August 9, 2010.

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EXECUTIVE SUMMARY:

The newly released groundwater availability model for the Yegua-Jackson Aquifer was run from 1998 to 2060 assuming pumping from the 2007 State Water Plan, where applicable. In areas containing the Yegua-Jackson Aquifer but without pumping specified in the state water plan, pumping was left at the level during the last year of the historical period of the model (1997). Additionally, pumping in this "base" run was ramped up and down to investigate how the aquifer responds to different levels of pumping.

Results are presented by groundwater management area with the exception of Groundwater Management Area 16. Results for this area are not included because the Yegua-Jackson Aquifer is contained in a soon-to-be-released model specifically for Groundwater Management Area 16. The pumping above yields results ranging from an average water level increase of 2 feet in Groundwater Management Area 11 to an average decline of 3 feet in Groundwater Management Area 15. For the 0.4 scenario (pumping decreased by a factor of 0.4), results range from an average water level rise of 7 feet in Groundwater Management Area 11 to an average decline of 2 feet in Groundwater Management Area 15. For the 4.0 scenario (pumping increased by a factor of 4.0), results range from an average water level decline of 1 foot in Groundwater Management Area 12 to an average decline of 18 feet in Groundwater Management Area 11.

PURPOSE OF MODEL RUNS:

The model runs contained in this report were performed using the newly released groundwater availability model for the Yegua-Jackson Aquifer to determine how the model performs during predictive simulations. These runs will also serve as a source of information for groundwater management areas that need to establish desired future conditions for the Yegua-Jackson Aquifer.

DESCRIPTION OF MODEL RUNS:

A predictive simulation was run using pumping from the 2007 State Water Plan (TWDB, 2007) where applicable and pumping from the historical-calibration portion of the model elsewhere. This "base" scenario was then adjusted up and down to determine how the aquifer responds under different levels of pumping.

METHODS:

The groundwater availability model for the Yegua-Jackson Aquifer was extended from the end of the historical-calibration period (1997) to 2060. Each MODFLOW package in the model was changed as appropriate to enable predictive simulations through 2060. Some assumptions made during this process are discussed below:

- For the reservoir package, the average reservoir stage during the historical-calibration period of the model (1980 to 1997) was determined and held constant through the predictive period.

- The general-head boundary package is used to simulate flow from the Jasper Aquifer portion of the Gulf Coast Aquifer into the Catahoula unit represented by portions of layer 1 in the Yegua-Jackson Aquifer model. Though general-head boundary head values change through time in the historical period, the volume of flow that enters the top of the Upper Jackson (Layer 2) does not exhibit large fluctuations and is a relatively small portion of the overall budget (Deeds and others, 2010). For this reason the general-head boundary head values for 1997 (the stress period containing the median general-head boundary inflow between 1980, 1990, and 1997) were assigned to the predictive stress periods.

- For the well package, pumping from the last year of the historical-calibration period of the model was assigned to the interim period (1998 to 2009) prior to the predictive simulation. This was considered an appropriate assumption after a preliminary investigation of available water level measurements in the TWDB Groundwater Database. This investigation showed neither a consistent trend in water level changes nor a sufficient amount of information to support reevaluating the pumping distribution. For the predictive simulation (2010 to 2060), pumping was assigned as described below.

PARAMETERS AND ASSUMPTIONS:

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

- 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.

- The model includes five layers representing the Yegua-Jackson Aquifer and the overlying Catahoula unit.

- As reported in Deeds and others (2010), the mean absolute errors (a measure of the difference between simulated and measured water levels during model calibration) for the Jackson Group (combined upper and lower Jackson units), Upper Yegua, and Lower Yegua portions of the Yegua-Jackson Aquifer for the historical-calibration period of the model are 31.1, 23.9, and 24.5 feet, respectively. These represent 10.3, 5.7 and 6.3 percent of the hydraulic head drop across each model area, respectively.

- Cells were assigned to individual counties and groundwater conservation districts as shown in the March 23, 2010 version of the model grid for the Yegua-Jackson Aquifer.

- The recharge used for the model run represents average recharge as described in Deeds and others (2010).

- The model results presented in this report were extracted from all areas of the model representing the units comprising the Yegua-Jackson Aquifer. This includes some areas outside the "official" boundary of the aquifer shown in the 2007 State Water

Plan (TWDB, 2007). For this reason, the reported drawdowns may reflect water of quality ranging from fresh to brackish and saline. This is especially true for the subcrop portions of the aquifer in groundwater management areas 14 and 15.

Pumping

The pumping values in the groundwater availability model in each county for the “base” predictive model run were determined using values in the 2007 State Water Plan, where applicable (TWDB, 2007). These values are shown in Table 1. In areas where the 2007 State Water Plan did not define pumping in the Yegua-Jackson Aquifer, pumping was kept at the levels in the model for the last year of the historical-calibration period (1997). When distributing the new pumping in each county, the percent of pumping in each model layer was preserved. Where a decrease from the 1997 level of pumping was required, the pumping for each cell in the county was decreased by a uniform factor, preserving the original pumping distribution. Where an increase in pumping was required, pumping was uniformly increased over all model cells in the layer that contained pumping during the last year of the historical-calibration portion of the model.

The one exception to the assignment of pumping described above was in Jim Hogg County. The 2007 State Water Plan specifies 100 acre feet of pumping per year for this area. However, the historical-calibration portion of the model did not contain any pumping in the county. Because the pumping volume was relatively small and only a small portion of the Yegua-Jackson Aquifer is present in Jim Hogg County, pumping was not applied for this analysis. Additionally, results for Jim Hogg County (part of Groundwater Management Area 16) are not presented in this report because this area of the Yegua-Jackson Aquifer is included in an upcoming model designed specifically for Groundwater Management Area 16.

The “base” pumping distribution described above was also adjusted up and down in order to provide insight into the relationship between pumping and drawdown in the Yegua-Jackson Aquifer. The pumping input to the model in each county was multiplied by a factor to increase (factors of 1.3, 1.6, 1.9, 2.5, 3.0, and 4.0) or decrease (factors of 0.8, 0.6, and 0.4) the pumping in these areas. These factors were chosen in order to provide results from a broad range of pumping between less than half of the “base” (the 0.4 scenario) to 4 times the base. The relationships generated are presented in the Results section below.

RESULTS:

Figure 1 below is a location map that shows the location of the Yegua-Jackson Aquifer and those areas included in the groundwater availability model. Figure 1 also includes the locations of each groundwater management area and county in the model area.

The pumping output from the model for each scenario described in the Pumping section above is shown in Table 2 for each groundwater management area in the model with the exception of Groundwater Management Area 16. Results for Groundwater Management Area 16 are not presented in this report because the Yegua-Jackson Aquifer in this area is modeled together with the Gulf Coast Aquifer in a separate groundwater availability model that is expected to be released shortly after this report. Pumping for the last year of the historical-calibration period is also included as a reference to indicate how the 2007 State Water Plan pumping compares to the estimated pumping for 1997 in the model.

Table 2 also includes the average drawdown between 2010 and 2060 for each scenario by groundwater management area. The drawdown values presented reflect the drop in water levels from the beginning of 2010 to the end of 2060 (a 51-year simulation period). Notice that some areas exhibit a water level decline under the base pumping scenario (for example, Groundwater Management Area 14). Other areas exhibit a water level rise (for example, Groundwater Management Area 11).

Though only a groundwater management area-wide summary of results is presented in Table 2, appendices to this report containing results for each groundwater management area have been included to provide more details on pumping and drawdown for each county. Appendices A, B, C, D, and E contain detailed predictive model run results for groundwater management areas 11, 12, 13, 14, and 15, respectively.

To better illustrate how the model responds through time during the "Base" run, each appendix also contains figures of each of the major water budget terms between 1998 and 2060 for the groundwater management area. The components of the water budget are described below:

- Recharge— areally distributed recharge due to precipitation. Recharge is always shown as "Inflow" into the water budget. Recharge is modeled using the MODFLOW Recharge package.

- Pumping—water produced from wells in the aquifer. This component is always shown as "Outflow" from the water budget.

- Net Change in Storage—changes in the water stored in the aquifer. This component of the budget is often seen as water both going into and out of the aquifer because water levels may decline in some areas (water is being removed from storage) and rise in others (water is being added to storage). The "net" change in storage refers to the difference between the storage inflows and outflows.

- Evapotranspiration—water that naturally discharges from the aquifer by direct evaporation or transpiration through plants. This occurs in areas where the water level in the aquifer is near the land surface, primarily near rivers and streams. Evapotranspiration is always shown as an "Outflow" from the water budget and is modeled using the MODFLOW Evapotranspiration package.

- Net Surface Water Flow—describes the total interaction of the aquifer with surface water features such as streams, reservoirs, and springs. For streams and reservoirs, interaction with surface water can be either an inflow from the surface water (for example, a losing stream) or an outflow to the surface water (for example, a gaining stream). Springs, alternatively, can only be an outflow from the aquifer. Streams, reservoirs, and springs are modeled using the MODFLOW Stream, Reservoir, and Drain packages, respectively.

- Vertical Flow from Overlying Catahoula—describes the vertical flow, or leakage, between the overlying Catahoula unit and the Yegua-Jackson Aquifer. This flow is controlled by the water levels in each aquifer and aquifer properties that define the amount of leakage that can occur. The Catahoula unit overlies the subcrop portions of the Yegua-Jackson Aquifer and interacts with the Gulf Coast Aquifer that overlies it using the MODFLOW General-Head Boundary package.

- Lateral flow—describes lateral flow within an aquifer between one area and an adjacent area (for example, lateral flow into and out of a groundwater management area).

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 (e.g. a county) 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.

Groundwater Management Area 11

Results for Groundwater Management Area 11 are shown in Appendix A. Table A-1 shows the pumping and drawdown by county and for Groundwater Management Area 11 as a whole. Notice that the 2007 State Water Plan pumping was over 2000 acre-feet per year less than the pumping in 1997. This decline in pumping led to the overall increase in water levels of 2 feet between 2010 and 2060 over the area in the “base” scenario. Figure A-1 depicts these same values graphically, showing the trend between the average drawdown over Groundwater Management Area 11 and the annual pumping. Drawdown in Groundwater Management Area 11 is sensitive to pumping, increasing to 18 feet for the “4.0” scenario where pumping is 4 times higher than the “base” scenario.

The water budget figures for Groundwater Management Area 11 depict these same trends. Figure A-2 shows how the pumping was lowered in 2010 and kept constant throughout the predictive period. Figure A-3 shows recharge through time, which was kept constant in the model. Figure A-4 shows the net change in storage in the model through time. For the whole period water levels area rising. The rate of water level rise increases in 2010 as the pumping is reduced before slowly leveling off. Figure A-5 shows outflow by evapotranspiration, which increases through time corresponding to increasing water levels. Figure A-6, showing outflow to surface water, also increases through time for the same reason. Figure A-7 shows the net inflow from the overlying Catahoula unit, which increases slightly through time. This response is counterintuitive with rising water levels, but the magnitude of flow is very small and the flow only occurs in the subcrop portions of the Yegua-Jackson Aquifer, which are limited to the far southern portions of Trinity, Angelina, San Augustine, and Sabine counties. Finally, Figure A-8 shows the lateral flow from areas neighboring Groundwater Management Area 11. The net later flow is always inflow toward Groundwater Management Area 11, but the magnitude of the inflow decreases with time as water levels rise.

Groundwater Management Area 12

Results for Groundwater Management Area 12 are shown in Appendix B. Table B-1 shows the pumping and drawdown by county and for Groundwater Management Area 12 as a whole. Notice that the "base" scenario pumping was essentially the same as the 1997 pumping. This is because the 2007 State Water Plan does not specifically address pumping from the Yegua-Jackson Aquifer in these counties. Figure B-1 depicts the values in Table B-1 graphically, showing the trend between the average drawdown in Groundwater Management Area 12 and the annual pumping. In general the change in water levels is very small for the various scenarios, ranging from an increase of less than 1 foot to a decline of just over 1 foot.

The water budget figures for Groundwater Management Area 12 provide more insight into the response of the aquifer to the "base" pumping scenario. Figure B-2 shows that pumping was kept constant throughout the period. Figure B-3 shows recharge through time, which was kept constant in the model. Figure B-4 shows the net change in storage in the model through time. For the whole period water levels are rising, but the rate of water level rise declines with time. Figure B-5 shows outflow by evapotranspiration, which increases through time corresponding to increasing water levels.

Figure B-6, showing outflow to surface water, is relatively stable through the predictive period. Figure B-7 shows the net outflow to the overlying Catahoula unit, which increases slightly through time due to the increasing water levels. Lastly, Figure B-8 shows the lateral flow into Groundwater Management Area 12. The net lateral flow is always in inflow from neighboring areas and the magnitude of flow increases through time. Though an overall average water level rise should result in a reduction in lateral inflow (all else being equal), lateral flow is also dependent on the change in water level in neighboring areas and the water levels along the boundary of Groundwater Management Area 12.

Groundwater Management Area 13

Results for Groundwater Management Area 13 are shown in Appendix C. Table C-1 shows the pumping and drawdown by county and for Groundwater Management Area 13 as a whole. Notice that the 2007 State Water Plan pumping was almost 7000 acre-feet per year more than the pumping in 1997. This increase is not uniform, however, because the state water plan only defines pumping from the Yegua-Jackson Aquifer in Webb and Zapata counties in Groundwater Management Area 13. Figure C-1 depicts pumping and the associated drawdown for each of the scenarios. Drawdown over Groundwater Management Area 13 as a whole for the "base" scenario is less than half a foot and increases to almost 2 feet for the "4.0" scenario.

The water budget figures for Groundwater Management Area 13 provide more insight into the response of the aquifer to the "base" pumping scenario. Figure C-2 shows how the pumping was increased in 2010 and kept constant throughout the predictive period. Figure C-3 shows recharge through time, which was kept constant in the model. Figure C-4 shows the net change in storage in the model through time. During the period before the predictive model run, water levels were rising slowly. However, with the increased pumping beginning in 2010, water levels began to fall as shown by the net reduction in storage. Figure C-5 shows outflow by evapotranspiration, which decreases through time corresponding to declining water levels. Figure C-6 shows net outflow to surface water, which increases through time. Though this is a counterintuitive response for the groundwater management area as a whole, the increases in surface water outflow are restricted to McMullen County, which has very little pumping and exhibits slightly increasing water levels. Figure C-7 shows the net inflow from the overlying Catahoula unit, which shows a small increase before leveling out over time. Lastly, Figure C-8 shows the net lateral flow into Groundwater Management Area 13. The net lateral flow is always inflow toward Groundwater Management Area 13, but the magnitude of flow decreases before slowly rising toward the end of the predictive period. This is the opposite response one would expect with an increase in pumping, but it also is dependent on the changes in water levels in surrounding areas. While water levels in Groundwater Management Area 13 show a slight decline in the “base” scenario, water levels in surrounding areas are declining at faster rates (for example, Fayette, Lavaca, and DeWitt counties). This leads to the reduction in the rate of lateral inflow shown in Figure C-8.

Groundwater Management Area 14

Results for Groundwater Management Area 14 are shown in Appendix D. Table D-1 shows the pumping and drawdown by county and for Groundwater Management Area 14 as a whole. Notice that the 2007 State Water Plan pumping was over 6,000 acre-feet per year more than the pumping in 1997. This increase is not uniform, however, because the state water plan only defines pumping from the Yegua-Jackson Aquifer in Walker, Polk, and Tyler counties in Groundwater Management Area 14. Figure D-1 depicts pumping and the associated drawdown for each of the scenarios described in the Pumping section above. Drawdown over Groundwater Management Area 14 as a whole for the “base” scenario is approximately 3 feet and ranges between 2 feet and 7 feet for the various scenarios presented.

Notice that in Figure D-1, the line representing the relationship between pumping and drawdown bends downward between the “base” and “1.3” scenarios. This is due to a cell in the model with a large amount of pumping going “dry.” A cell goes dry when the water level in the cell drops below the bottom of the aquifer in the cell. In this situation pumping can no longer occur and the pumping output from the model is reduced.

The water budget figures for Groundwater Management Area 14 provide more insight into the response of the aquifer to the “base” pumping scenario. Figure D-2 shows how the pumping was increased in 2010 and kept constant throughout the predictive period. Figure D-3 shows recharge through time, which was kept constant in the model. Figure D-4 shows the net change in storage in the model through time. During the period before the predictive model run, water levels were rising slowly. However, with the increased pumping beginning in 2010, water levels began to fall as shown by the net reduction in storage.

Figure D-5 shows outflow by evapotranspiration which increases through time beginning in 2021 even though all inputs to the model are constant with time. As with the evapotranspiration for Groundwater Management Area 13 described above, this is due to the different locations of the pumping and the evapotranspiration. Evapotranspiration can only occur when the water level in the aquifer is close to the ground-surface. Most areas of the model exhibit a water level decline. However, Washington County, an area with relatively little pumping and portions of the Yegua-Jackson Aquifer outcrop, shows increasing water levels. The water levels in Washington County prior to 2021 were low enough such that no evapotranspiration could occur. However, beginning in 2021, water levels had raised enough to allow evapotranspiration, causing the increase in the middle of the predictive period shown in Figure D-5.

Figure D-6 shows net outflow to surface water, which declines through time with declining water levels. Figure D-7 shows the net inflow from the overlying Catahoula unit, which shows a slow increase as water levels decline in the subcrop portion of the aquifer in Groundwater Management Area 14. Finally, Figure D-8 shows the net lateral flow out of Groundwater Management Area 14. Though the direction of lateral flow is always outflow to adjacent areas, the magnitude of the outflow declines during the predictive period due to declining water levels.

Groundwater Management Area 15

Results for Groundwater Management Area 15 are shown in Appendix E. Table E-1 shows the pumping and drawdown by county for Groundwater Management Area 15 as a whole. Notice that the "base" scenario pumping is the same as the 1997 pumping. This is because the 2007 State Water Plan does not specifically address pumping from the Yegua-Jackson Aquifer in the counties in Groundwater Management Area 15. Figure E-1 depicts pumping and the associated drawdown for each of the scenarios described in the pumping section above. Drawdown over the area as a whole for the "base" scenario is approximately 3 feet and ranges from 2 to 5 feet between the "0.4" to "4.0" scenarios.

The water budget figures for Groundwater Management Area 15 provide more insight into the response of the aquifer to the "base" pumping scenario. Figure E-2 shows how the pumping was kept constant at levels from the historical-calibration portion of the model through the predictive period. Figure E-3 shows recharge through time, which was kept constant in the model. Figure E-4 shows the net change in storage in the model through time. Over the whole period water levels are declining. However, the rate of water-level decline slows with time during the predictive simulation. Figure E-5 shows that no evapotranspiration occurs from the Yegua-Jackson Aquifer in Groundwater Management Area 15 in the model. Figure E-6 shows the net inflow from surface water, which exclusively consists of inflow from streams in the model. The rate of inflow from streams increases slightly with time as water-levels decline. Figure E-7 shows the net inflow from the overlying Catahoula unit, which also shows a slow increase with time as water levels decline. Lastly, Figure E-8 shows the net lateral flow out of Groundwater Management Area 15. The net lateral flow is always an outflow to adjacent areas, but the magnitude of flow decreases with time as water levels decline.

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Deeds, N.E., Yan, T., Singh, A., Jones, T.L., Kelley, V.A., Knox, P.R., Young, S.C., 2010, Groundwater availability model for the Yegua-Jackson Aquifer: Final report prepared for the Texas Water Development Board by INTERA, Inc., 582 p.

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

Table 1. Annual pumping from the Yegua-Jackson Aquifer by county in the 2007 State Water Plan (TWDB, 2007). Pumping is in acre-feet per year.

County	Annual Pumping
Angelina	4,860
Houston	1,380
Jim Hogg	100
Nacogdoches	60
Polk	360
Sabine	1,100
San Augustine	540
Starr	2,000
Trinity	740
Tyler	180
Walker	6,400
Webb	5,000
Zapata	2,000

Table 2. Pumping and drawdown for each scenario for each groundwater management area (GMA) in the model. Pumping is in acre-feet per year. Drawdown is in feet. Negative values indicate a rise in water levels.

GMA	1997 Pumping	Pumping by Scenario 0.4	0.6	0.8	Base	1.3	1.6	1.9	2.5	3	4
GMA 11	10,833	3,470	5,204	6,939	8,673	11,275	13,637	15,998	20,722	24,658	32,145
GMA 12	4,612	1,844	2,765	3,687	4,610	5,995	7,380	8,766	11,537	13,846	18,463
GMA 13	1,006	3,173	4,759	6,345	7,931	10,310	12,689	15,067	19,825	23,789	31,718
GMA 14	1,637	3,117	4,676	6,234	7,793	8,231	10,131	12,030	15,829	18,995	25,327
GMA 15	685	274	411	548	685	889	1,094	1,298	1,706	2,047	2,728
		Drawdown by Scenario									
GMA 11		-7	-5	-4	-2	0	2	4	8	11	18
GMA 12		-1	-1	0	0	0	0	0	1	1	1
GMA 13		0	0	0	0	0	1	1	1	1	2
GMA 14		2	2	3	3	3	4	4	5	5	7
GMA 15		2	2	2	3	3	3	4	4	4	5

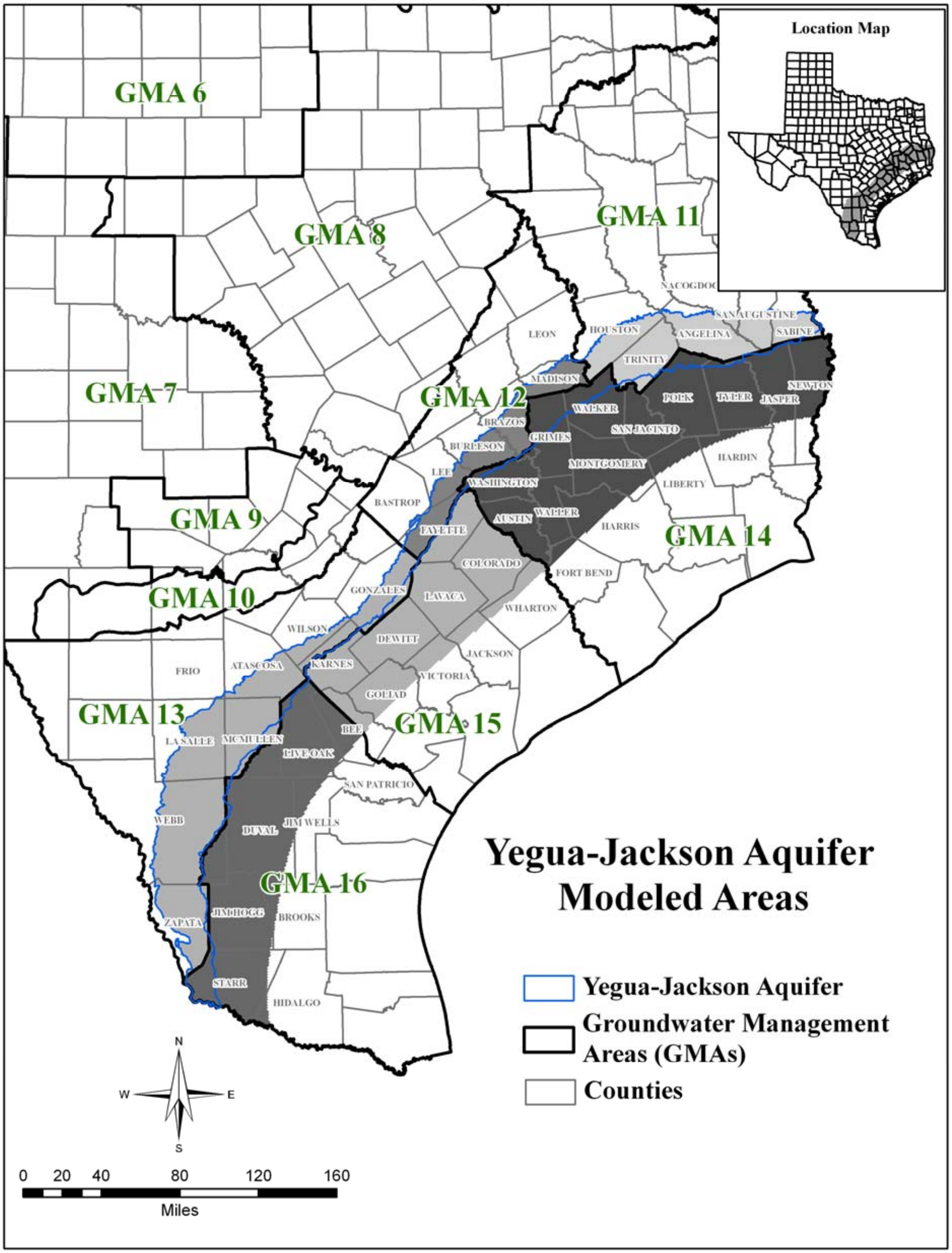

Figure 1. Location map showing model grid cells representing the Yegua-Jackson Aquifer, groundwater management areas, and the Yegua-Jackson Aquifer boundary.

Appendix C

Spread Analysis Results for Groundwater Management Area 13

Table C-1. Pumping and average drawdown between 2010 and 2060 for each county in Groundwater Management Area 13 (GMA 13) by scenario. Pumping is in acre-feet per year. Drawdown is in feet.

		1997	Pumping by Scenario										Drawdown by Scenario									
GMA	**County**	**Pumping**	**0.4**	**0.6**	**0.8**	**Base**	**1.3**	**1.6**	**1.9**	**2.5**	**3**	**4**	**0.4**	**0.6**	**0.8**	**Base**	**1.3**	**1.6**	**1.9**	**2.5**	**3**	**4**
GMA 13		1,006	3,173	4,759	6,345	7,931	10,310	12,689	15,067	19,825	23,789	31,718	0	0	0	0	0	1	1	1	1	2
	Atascosa	215	86	128	171	214	278	342	407	535	642	856	0	0	0	0	0	0	0	0	0	0
	Frio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gonzales	245	97	146	195	244	317	390	463	609	731	975	0	1	1	1	1	1	1	1	1	1
	Karnes	196	78	118	157	196	254	312	370	486	583	776	0	0	0	0	0	0	0	0	1	1
	La Salle	24	9	14	18	23	30	37	44	57	69	92	0	0	0	0	0	0	0	0	0	0
	Mcmullen	46	18	27	36	45	58	72	85	112	135	180	0	0	0	0	0	0	0	0	0	0
	Webb	28	2,000	3,000	4,000	5,000	6,500	8,000	9,500	12,500	15,000	19,999	0	0	0	0	1	1	1	2	2	3
	Wilson	211	84	126	168	210	273	336	399	525	630	840	0	0	0	0	0	0	0	0	1	1
	Zapata	41	800	1,200	1,600	2,000	2,600	3,200	3,800	5,000	6,000	8,000	0	0	0	0	1	1	1	2	2	3

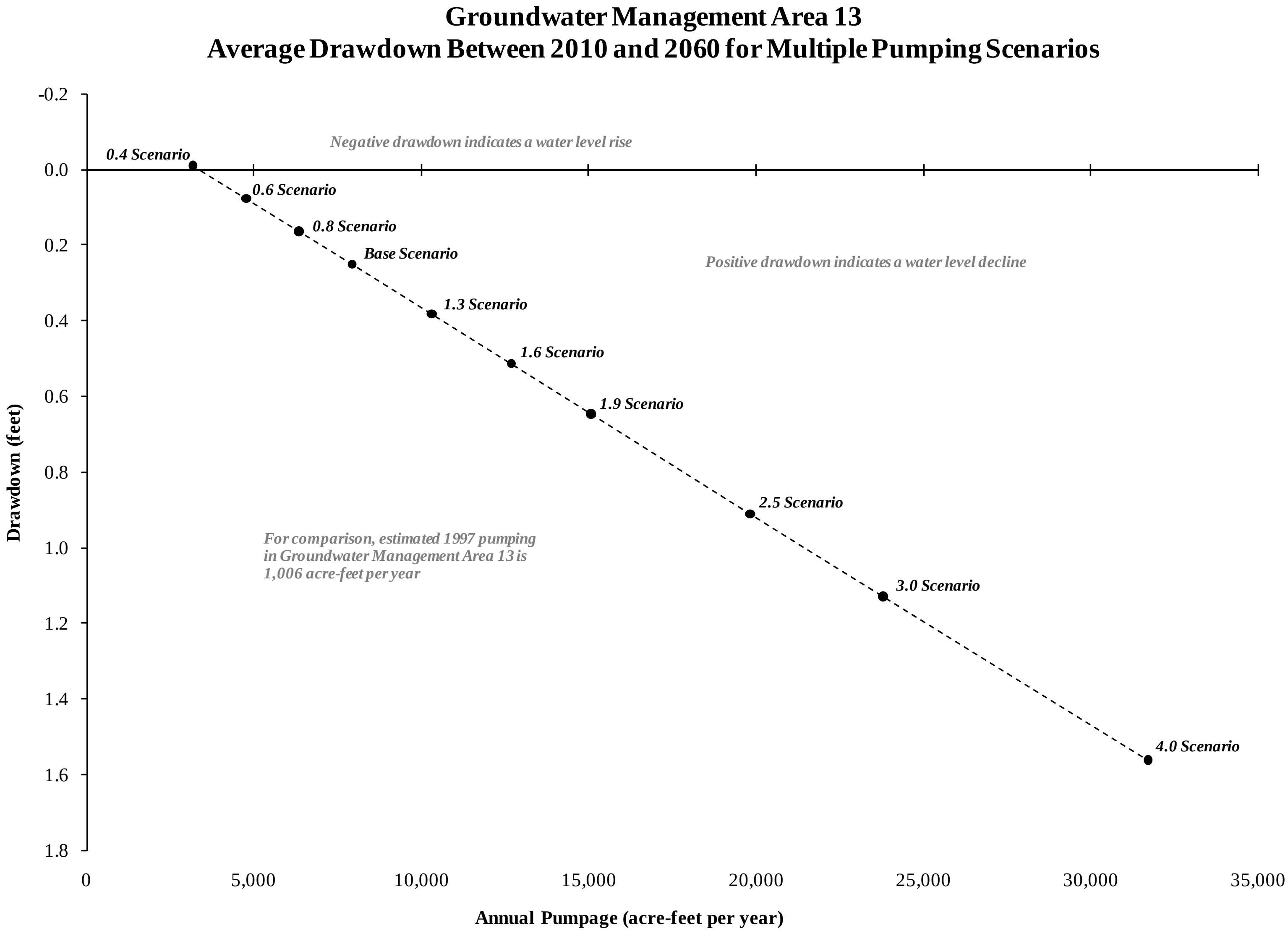

Figure C-1. Average drawdown (decline in water levels) between 2010 and 2060 in the Yegua-Jackson Aquifer for each pumping scenario for Groundwater Management Area 13.

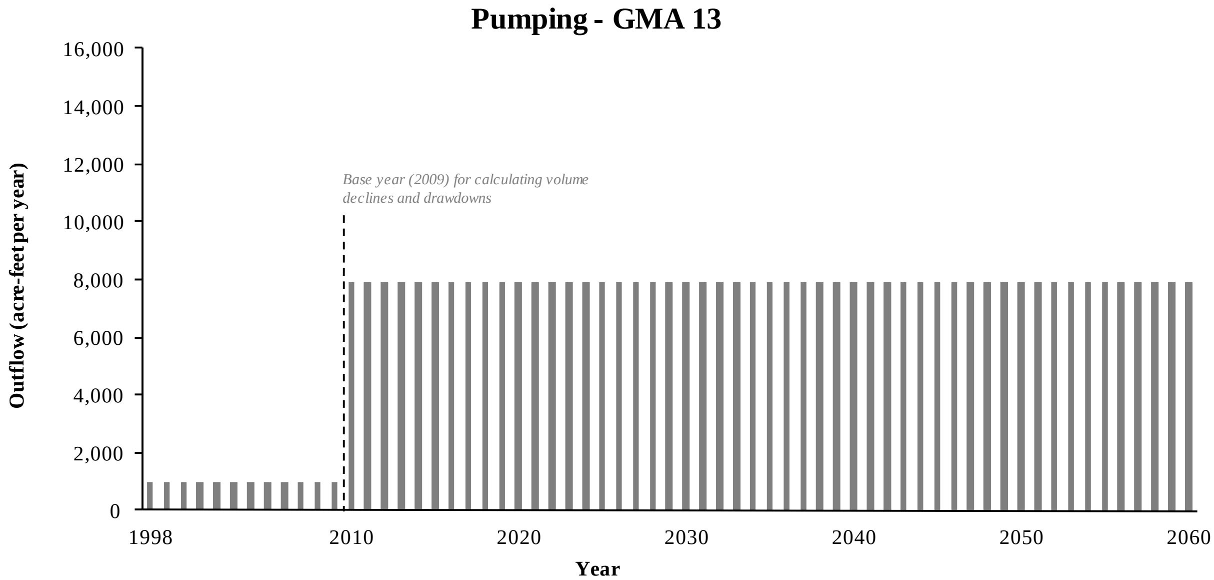

Figure C-2. Pumping output from the Yegua-Jackson Aquifer for the “base” scenario by year for Groundwater Management Area (GMA) 13.

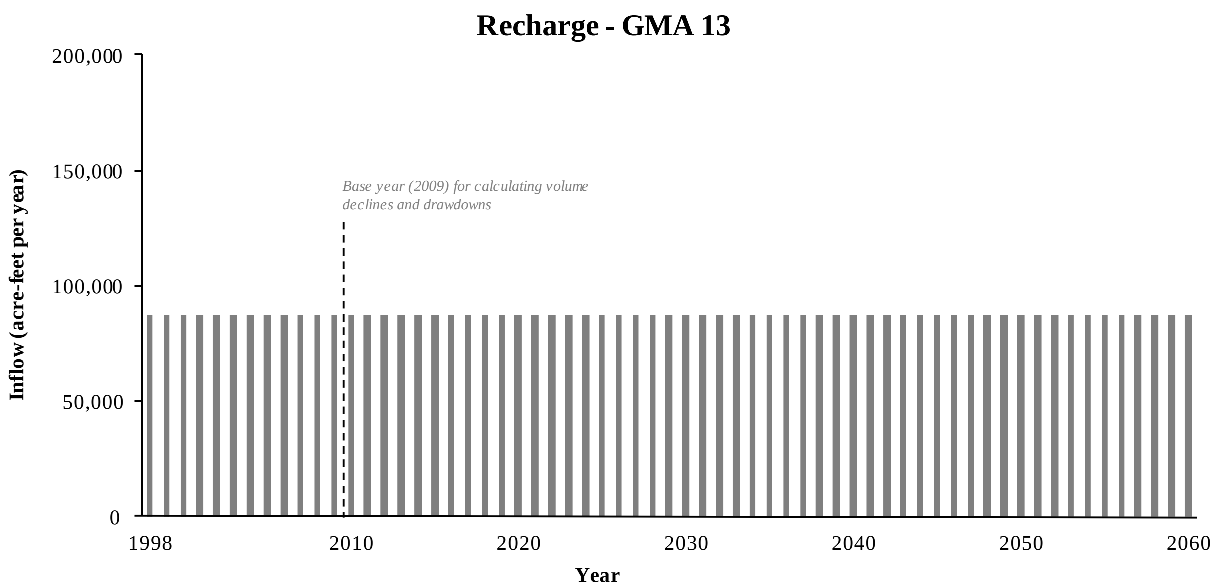

Figure C-3. Recharge into the Yegua-Jackson Aquifer for the “base” scenario by year for Groundwater Management Area 13.

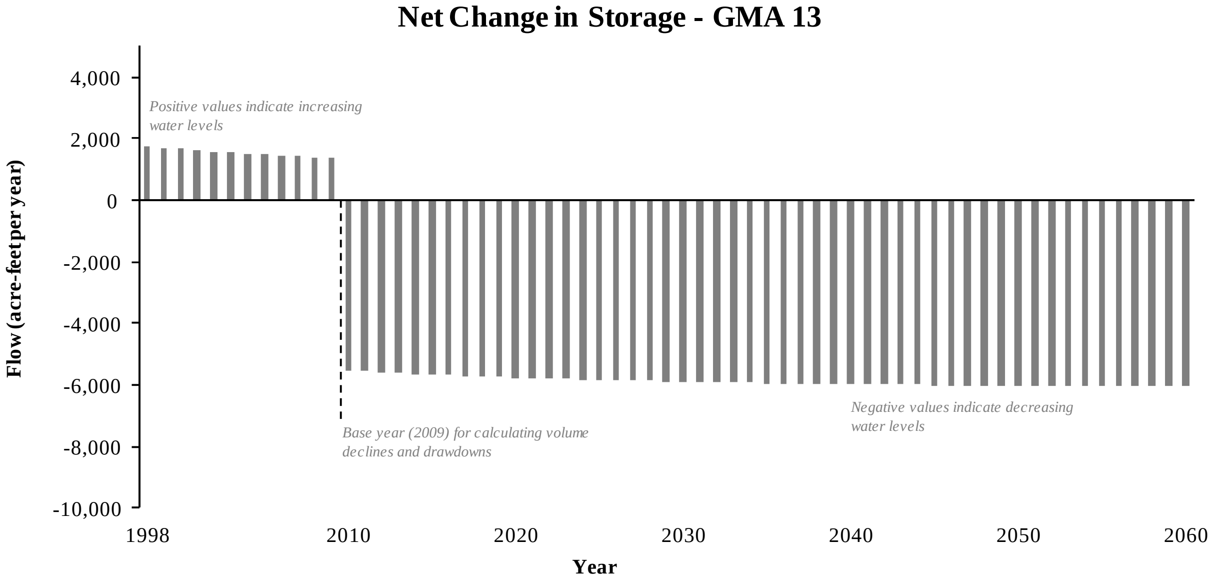

Figure C-4. Net change in storage (the volume of water stored in the aquifer) by year in the Yegua-Jackson Aquifer for the "base" scenario for Groundwater Management Area 13.

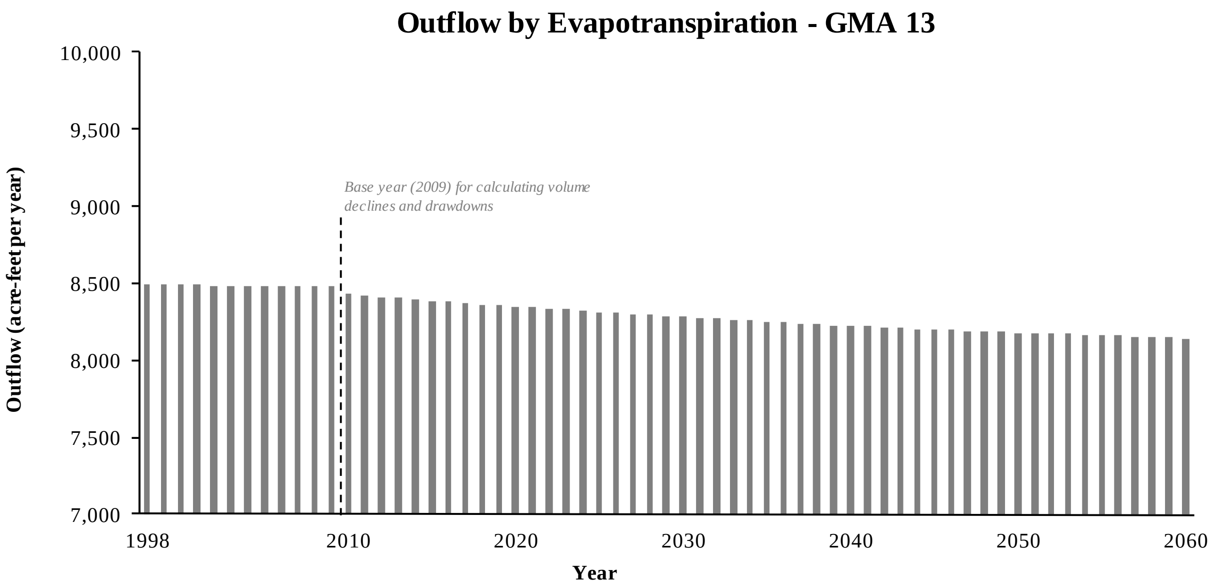

Figure C-5. Outflow by evapotranspiration from the Yegua-Jackson Aquifer for the "base" scenario by year for Groundwater Management Area 13.

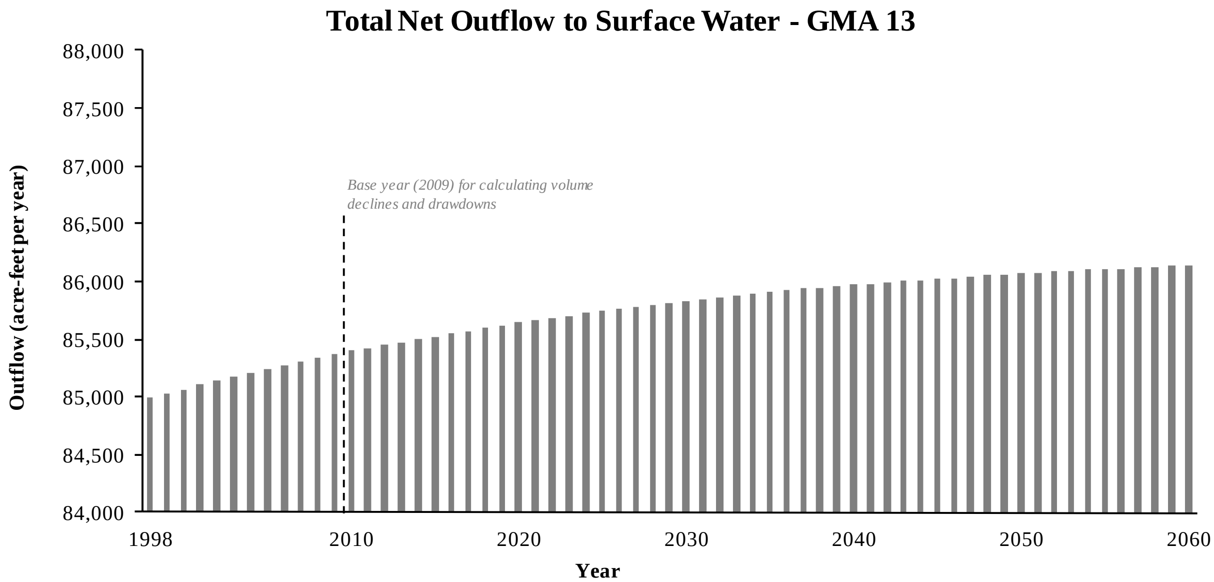

Figure C-6. Total net outflow to surface water from the Yegua-Jackson Aquifer for the "base" scenario by year for Groundwater Management Area 13. Total net outflow is the total flow to reservoirs, streams, and springs.

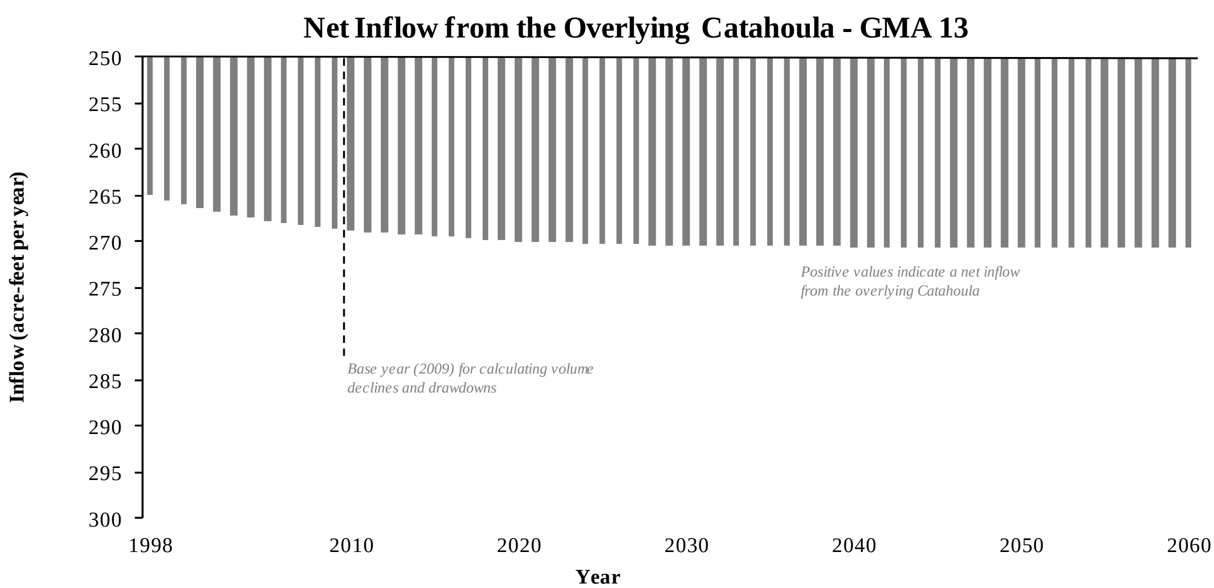

Figure C-7. Net flow from the overlying Catahoula unit into the Yegua-Jackson Aquifer for the "base" scenario by year for Groundwater Management Area 13.

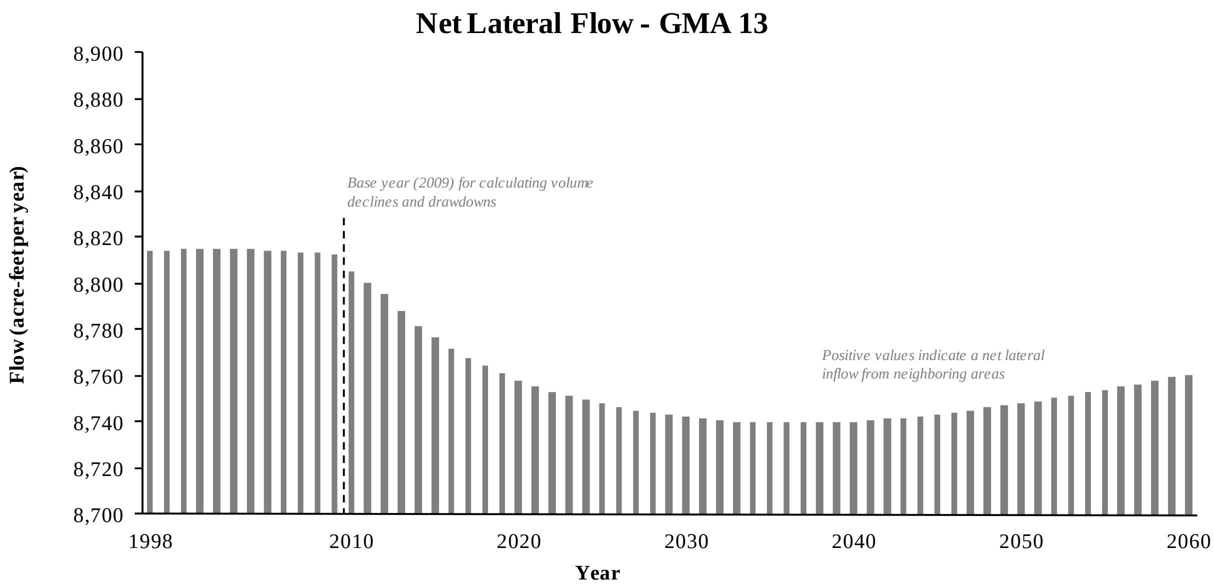

Figure C-8. Net lateral flow each year between Groundwater Management Area 13 and adjacent areas for the "base" scenario.

APPENDIX 5

GAM Run 10-012 MAG/GAM Run 10-041 MAG

RECEIVED AUG 08 2012

Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

August 3, 2012

Mr. Greg Sengelmann
General Manager
Gonzales County Underground Water Conservation District
P.O. Box 1919
Gonzales, TX 78629

Re: Modeled available groundwater estimates for the Carrizo-Wilcox, Queen City, and Sparta aquifers in Groundwater Management Area 13

Dear Mr. Sengelmann:

The Texas Water Code, Section 36.1084, Subsection (b), states that the Texas Water Development Board's (TWDB) executive administrator shall provide each groundwater conservation district and regional water planning group located wholly or partly in the groundwater management area with the modeled available groundwater in the management area based upon the desired future conditions adopted by the districts. This letter and the attached report (GAM Run 10-012 MAG) are in response to this directive.

As noted in the letter received by the TWDB on April 15, 2010, from Mike Mahoney of the Evergreen Underground Water Conservation District on behalf of Groundwater Management Area 13, desired future conditions were adopted for the Sparta, Weches, Queen City, Reklaw, and Carrizo-Wilcox aquifers on April 9, 2010.

Modeled available groundwater is defined in the Texas Water Code, Section 36.001, Subsection (25), as "the amount of water that the executive administrator determines may be produced on an average annual basis to achieve a desired future condition established under Section 36.108." For use in the regional water planning process, modeled available groundwater estimates have been reported by aquifer, county, river basin, regional water planning area, groundwater conservation district, and any other subdivision of the aquifer designated by the management area (if applicable).

We encourage open communication and coordination between groundwater conservation districts, regional water planning groups, and the TWDB to ensure that the modeled available groundwater reported in regional water plans and groundwater management plans are not in conflict. We estimated modeled available groundwater that would have to occur to achieve the desired future conditions using the best available scientific tools. However, these estimates are based on assumptions of the magnitude and distribution of projected pumping in the aquifer. It is, therefore, important for groundwater conservation districts to monitor whether their management of pumping is achieving their desired future conditions. Districts are encouraged to continue to work with the TWDB to better define available groundwater as additional information may help better assess responses of the aquifer to pumping and its distribution now and in the future.

If you have any questions, please contact Ms. Rima Petrossian of my staff at 512-936-2420 or rima.petrossian@twdb.texas.gov for further information.

Sincerely,

Melanie Callahan

Melanie Callahan
Executive Administrator

Attachment: GAM Run 10-012 MAG

c w/att.: L'Oreal Stepney, Deputy Director, Office of Water, Texas Commission of Environmental Quality
Kellye Rila, Texas Commission of Environmental Quality
Kelly Mills, Texas Commission of Environmental Quality
Kristi Shaw, HDR Engineering
Sam Vaugh, HDR Engineering
David Anderson, Black & Veatch Corporation
Rocky Freund, Nueces River Authority
Deborah Morales, Lower Rio Grande Valley Development Council
Steve Raabe, San Antonio River Authority
Bill West, Guadalupe-Blanco River Authority
Robert E. Mace, Ph.D, P.G., Deputy Executive Administrator, Water Science and Conservation
Larry French, P.G., Groundwater Resources
Cindy Ridgeway, P.G., Groundwater Resources
Rima Petrossian, P.G., Groundwater Resources
Shirley Wade, Ph.D, P.G., Groundwater Resources
Dan Hardin, Water Resources Planning
Matt Nelson, Water Resources Planning
Temple McKinnon, Water Resources Planning
Angela Kennedy, Water Resources Planning
Connie Townsend, Water Resources Planning
Wendy Barron, Water Resources Planning

GAM RUN 10-012 MAG: MODELED AVAILABLE GROUNDWATER FOR THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS IN GROUNDWATER MANAGEMENT AREA 13

by Shirley C. Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 936-0883
August 2, 2012

The seal appearing on this document was authorized by Shirley C. Wade, P.G. 525, on August 2, 2012.

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GAM Run 10-012 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, and Sparta Aquifers in Groundwater Management Area 13

by Shirley C. Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 936-0883
August 2, 2012

EXECUTIVE SUMMARY:

The modeled available groundwater for Groundwater Management Area 13 for the Carrizo-Wilcox, Queen City, and Sparta aquifers is summarized in Table 1, 2, and 3 for use in the regional water planning process. These values are also listed by decade for each aquifer by county (Table 4), river basin (Table 5), regional water planning group (Table 6), and groundwater conservation district (Table 7). The modeled available groundwater estimates for the Queen City, Sparta, and Carrizo-Wilcox aquifers range from approximately 399,000 acre-feet per year in 2010 to 425,000 acre-feet per year in 2060 (Table 4). The estimates were extracted from results of Groundwater Availability Model Run 09-034, scenario 4, which meets the desired future conditions adopted by members of Groundwater Management Area 13.

This report reflects the official release of the revised groundwater district boundaries by the Texas Commission on Environmental Quality (TCEQ). Specifically, this report reflects the division of modeled available groundwater between the Gonzales County Underground Water Conservation District and Plum Creek Conservation District based on the new groundwater conservation district boundaries.

REQUESTOR:

Mr. Mike Mahoney from the Evergreen Underground Water Conservation District acting on behalf of Groundwater Management Area 13.

DESCRIPTION OF REQUEST:

In a letter dated April 13, 2010 and received by the Texas Water Development Board (TWDB) on April 15, 2010, Mr. Mike Mahoney provided the TWDB with the desired future conditions of the Carrizo-Wilcox, Queen City, and Sparta aquifers adopted by the groundwater conservation districts in Groundwater Management Area 13. The desired future conditions for the Carrizo-Wilcox, Queen City, and Sparta aquifers, as described in Resolution R 2010-01 and adopted April 9, 2010 by the groundwater conservation districts within Groundwater Management Area 13, are described below:

- "In reference to GAM Run 09-034, the committee has considered, the base scenario of an average drawdown of 22 feet, scenario 2 an average drawdown of 22 feet, scenario 3 an average drawdown of 23 feet and scenario 4 an average drawdown of 23 feet;"
- "The district members of Groundwater Management Area 13, adopt scenario 4, and an average drawdown of 23 feet for the Sparta, Weches, Queen City, Reklaw, Carrizo, and the Wilcox Aquifers"

In response to receiving the adopted desired future conditions, TWDB has estimated the modeled available groundwater for the Carrizo-Wilcox, Queen City, and Sparta Aquifers in Groundwater Management Area 13.

METHODS:

Groundwater Management Area 13, located in south central Texas, includes the southern part of the Queen City, Sparta, and Carrizo-Wilcox aquifers (Figure 1). For the previously completed Groundwater Availability Model Run 09-034 (Wade and Jigmond, 2010) average recharge and evapotranspiration rates and initial streamflows based on the historical calibration-verification runs, representing 1981 to 1999 were summarized. These averages were then used for each year of the 61-year predictive simulations along with pumping specified by Groundwater Management Area 13 members in four scenarios. The results of the pumping scenarios were reviewed by members of Groundwater Management Area 13 to develop their desired future conditions. Model scenario 4 resulted in an overall average drawdown of 23 feet for the Queen City, Sparta, and Carrizo-Wilcox aquifers and for the Weches and Reklaw confining units. The pumping for scenario 4 was extracted from the model results and divided by county, river basin, regional water planning area and groundwater conservation district within Groundwater Management Area 13 (Figure 2).

Modeled Available Groundwater and Permitting

As defined in Chapter 36 of the Texas Water Code, "modeled available groundwater" is the estimated average amount of water that may be produced annually to achieve a desired future condition. Groundwater conservation districts are required to consider modeled available groundwater, along with several other factors, when issuing permits in order to manage groundwater production to achieve the desired future condition(s). The other factors districts must consider include annual precipitation and production patterns, the estimated amount of pumping exempt from permitting, existing permits, and a reasonable estimate of actual groundwater production under existing permits. The estimated amount of pumping exempt from permitting, which the Texas Water Development Board is required to develop after soliciting input from applicable groundwater conservation districts, will be provided in a separate report.

PARAMETERS AND ASSUMPTIONS:

The parameters and assumptions for the groundwater availability model for the southern part of the Queen City, Sparta, and Carrizo-Wilcox aquifers are described below:

- Version 2.01 of the groundwater availability model for the southern part of the Queen City, Sparta, and Carrizo-Wilcox aquifers was used for this analysis
- See Deeds and others (2003) and Kelley and others (2004) for assumptions and limitations of the groundwater availability model for the southern part of the Queen City, Sparta, and Carrizo-Wilcox aquifers.
- The model includes eight layers representing:
- the Sparta Aquifer (layer 1),
- the Weches Formation (layer 2),
- the Queen City Aquifer (layer 3),
- the Reklaw Formation (layer 4),
- the Carrizo Aquifer (layer 5),
- the upper and where the upper is missing, the middle Wilcox Aquifer (layer 6),
- the middle Wilcox Aquifer (layer 7), and
- the lower Wilcox Aquifer (layer 8).

- Groundwater in the groundwater availability model for the southern portion of the Queen City, Sparta, and Carrizo-Wilcox aquifers ranges from fresh to saline (Kelley and others, 2004).

- The root mean square error (a measure of the difference between simulated and measured water levels during model calibration) in the entire model for 1999 is 23 feet for the Sparta Aquifer, 18 feet for the Queen City aquifer, and 33 feet for the Carrizo aquifer (Kelley and others, 2004).

- Recharge rates, evapotranspiration rates, and initial streamflows are averages of historic estimates from 1981 to 1999.

RESULTS:

The modeled available groundwater for the Carrizo-Wilcox Aquifer that achieves the desired future conditions adopted by Groundwater Management Area 13 increases from 375,654 to 404,000 acre-feet per year between 2010 and 2060 (Table 1). The modeled available groundwater for the Queen City Aquifer in Groundwater Management Area 13 declines from 16,311 to 14,538 acre-feet per year over the same time period (Table 2). The modeled available groundwater for the Sparta Aquifer in Groundwater Management Area 13 declines from 6,800 to 6,365 acre-feet per year (Table 3). The modeled available groundwater in tables 1, 2, and 3 has been summarized by county, river basin, and regional water planning area for use in the regional water planning process.

The modeled available groundwater is also summarized by county (Table 4), river basin (Table 5), regional water planning area (Table 6), and groundwater conservation district (Table 7). In Table 7, the modeled available groundwater among all districts has been calculated both excluding and including areas outside the jurisdiction of a groundwater conservation district.

LIMITATIONS:

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

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

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

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

It is important for groundwater conservation districts to monitor groundwater pumping and 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.

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Wade S.C. and Jigmond, M., 2010, GAM Run 09-034, Texas Water Development Board GAM Run Report, 146 p.

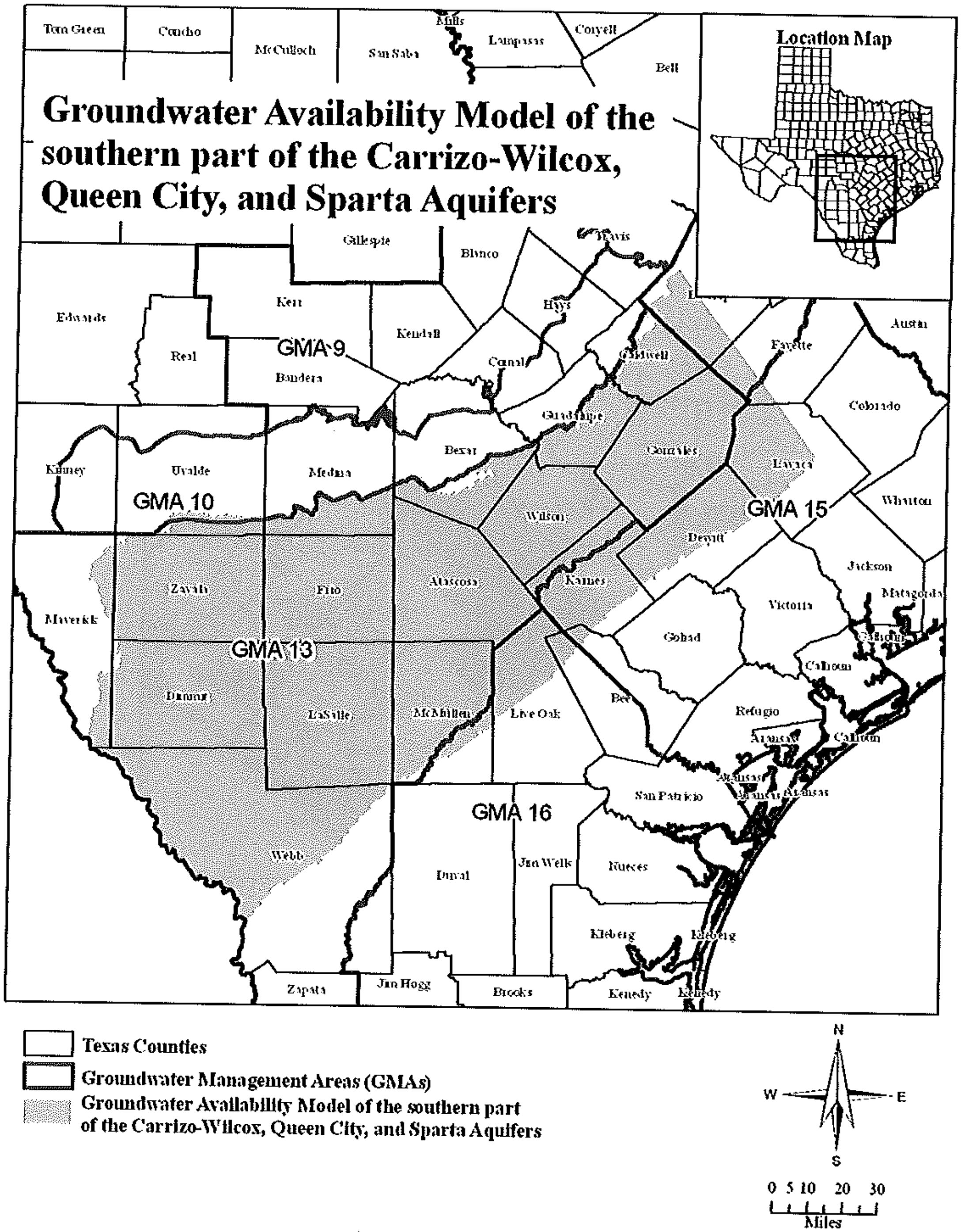

FIGURE 1.MAP SHOWING THE AREAS COVERED BY THE GROUNDWATER AVAILABILITY MODEL FOR THE SOUTHERN PART OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS.

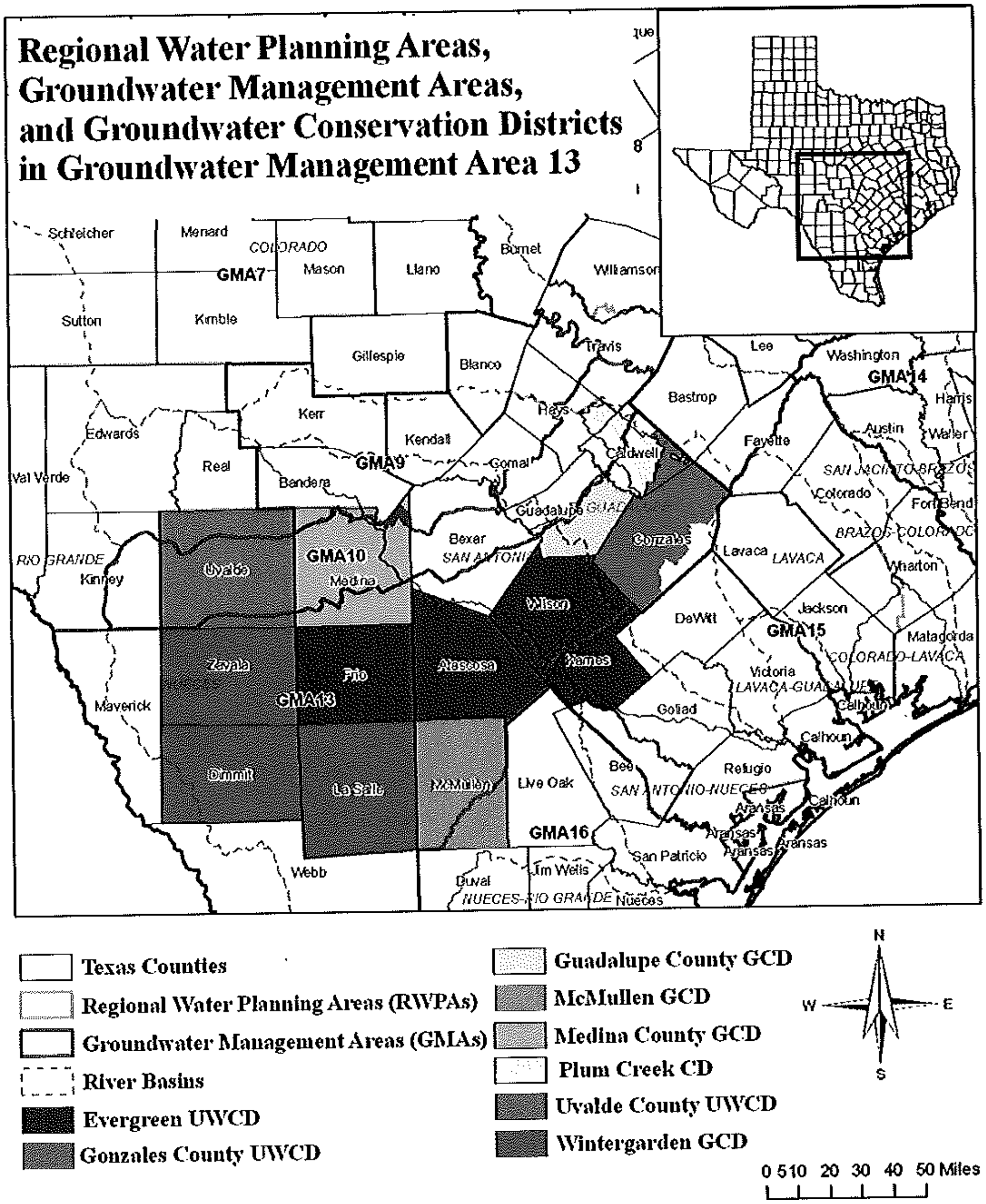

FIGURE 2. MAP SHOWING REGIONAL WATER PLANNING AREAS, GROUNDWATER MANAGEMENT AREAS, GROUNDWATER CONSERVATION DISTRICTS (GCDS), COUNTIES, AND RIVER BASINS IN AND NEIGHBORING GROUNDWATER MANAGEMENT AREA 13. UWCD REFERS TO UNDERGROUND WATER CONSERVATION DISTRICT.

TABLE 1. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE CARRIZO-WILCOX AQUIFER IN GROUNDWATER MANAGEMENT AREA 13. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE DIVIDED BY COUNTY, RIVER BASIN, AND REGIONAL WATER PLANNING AREA.

County	Regional Water Planning Area	Basin	Year					
			2010	2020	2030	2040	2050	2060
Atascosa	L	Nueces	67,829	68,656	70,249	71,827	73,666	75,688
		San Antonio	120	120	120	120	120	120
Bexar	L	Nueces	14,198	14,198	14,198	14,198	14,198	14,198
		San Antonio	12,080	12,080	12,080	12,080	12,080	11,909
Caldwell	L	Colorado	593	593	593	593	593	593
		Guadalupe	43,951	43,951	43,543	43,543	42,967	42,967
Dimmit	L	Nueces	3,253	3,253	3,253	3,253	3,253	3,253
		Rio Grande	106	106	106	106	106	106
Frio	L	Nueces	81,551	79,089	76,734	74,439	72,222	70,030
Gonzales	L	Guadalupe	52,268	62,101	70,102	75,576	75,755	75,755
		Lavaca	215	215	215	215	215	215
Guadalupe	L	Guadalupe	8,868	9,460	9,910	11,648	12,168	12,668
		San Antonio	1,373	1,373	1,373	1,373	1,373	1,373
Karnes	L	Guadalupe	185	195	207	215	220	224
		Nueces	87	92	97	101	103	105
		San Antonio	787	830	878	915	936	951
La Salle	L	Nueces	6,454	6,454	6,454	6,454	6,454	6,454
Maverick	M	Nueces	777	777	777	472	472	472
		Rio Grande	1,266	1,266	1,247	1,205	1,098	1,060
McMullen	N	Nueces	1,819	1,819	1,819	1,819	1,819	1,819
Medina	L	Nueces	2,542	2,519	2,507	2,507	2,507	2,507
		San Antonio	26	26	26	26	26	26
Uvalde	L	Nueces	2,971	1,230	828	828	828	828
Webb	M	Nueces	92	92	92	92	92	92
		Rio Grande	824	824	824	824	824	824
Wilson	L	Guadalupe	624	672	731	791	861	938
		Nueces	7,151	7,311	7,505	7,703	7,932	8,185
		San Antonio	27,785	29,003	30,481	31,992	33,738	35,671
Zavala	L	Nueces	35,859	35,859	35,521	35,388	35,288	34,969
Total			**375,654**	**384,164**	**392,470**	**400,303**	**401,914**	**404,000**

TABLE 2. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE QUEEN CITY AQUIFER IN GROUNDWATER MANAGEMENT AREA 13. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE DIVIDED BY COUNTY, RIVER BASIN, AND REGIONAL WATER PLANNING AREA.

County	Regional Water Planning Area	Basin	Year					
			2010	2020	2030	2040	2050	2060
Atascosa	L	Nueces	4,546	4,546	4,513	4,405	4,300	4,202
Caldwell	L	Guadalupe	306	306	306	306	306	306
Dimmit	L	Nueces	0	0	0	0	0	0
		Rio Grande	0	0	0	0	0	0
Frio	L	Nueces	4,748	4,582	4,422	4,270	4,124	3,983
Gonzales	L	Guadalupe	5,030	5,030	5,030	5,030	5,030	5,030
		Lavaca	35	35	35	35	35	35
Guadalupe	L	Guadalupe	0	0	0	0	0	0
Karnes	L	Guadalupe	0	0	0	0	0	0
		Nueces	0	0	0	0	0	0
		San Antonio	0	0	0	0	0	0
La Salle	L	Nueces	1	1	1	1	1	1
McMullen	N	Nueces	136	136	136	136	136	136
Webb	M	Nueces	0	0	0	0	0	0
		Rio Grande	0	0	0	0	0	0
Wilson	L	Guadalupe	128	114	101	90	80	72
		Nueces	148	132	117	104	93	83
		San Antonio	1,233	1,094	973	866	772	690
Zavala	L	Nueces	0	0	0	0	0	0
Total			**16,311**	**15,976**	**15,634**	**15,243**	**14,877**	**14,538**

TABLE 3. MODELED AVAILABLE GROUNDWATER BY DECADE FOR THE SPARTA AQUIFER IN GROUNDWATER MANAGEMENT AREA 13. RESULTS ARE IN ACRE-FEET PER YEAR AND ARE DIVIDED BY COUNTY, RIVER BASIN, AND REGIONAL WATER PLANNING AREA.

County	Regional Water Planning Area	Basin	Year					
			2010	2020	2030	2040	2050	2060
Atascosa	L	Nueces	1,191	1,130	1,082	1,042	1,013	994
Dimmit	L	Nueces	0	0	0	0	0	0
Frio	L	Nueces	729	698	674	650	624	601
Gonzales	L	Guadalupe	3,529	3,529	3,529	3,529	3,529	3,529
		Lavaca	23	23	23	23	23	23
Karnes	L	Guadalupe	0	0	0	0	0	0
		Nueces	0	0	0	0	0	0
		San Antonio	0	0	0	0	0	0
La Salle	L	Nueces	987	987	987	987	987	987
McMullen	N	Nueces	90	90	90	90	90	90
Webb	M	Nueces	0	0	0	0	0	0
		Rio Grande	0	0	0	0	0	0
Wilson	L	Guadalupe	23	20	18	16	14	13
		Nueces	55	49	44	39	34	31
		San Antonio	173	154	137	121	108	97
Zavala	L	Nueces	0	0	0	0	0	0
Total			**6,800**	**6,680**	**6,584**	**6,497**	**6,422**	**6,365**

TABLE 4. MODELED AVAILABLE GROUNDWATER FOR THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS SUMMARIZED BY COUNTY IN GROUNDWATER MANAGEMENT AREA 13 FOR EACH DECADE BETWEEN 2010 AND 2060. RESULTS ARE IN ACRE-FEET PER YEAR.

County	Year					
	2010	2020	2030	2040	2050	2060
Atascosa	73,686	74,452	75,964	77,394	79,099	81,004
Bexar	26,278	26,278	26,278	26,278	26,278	26,107
Caldwell	44,850	44,850	44,442	44,442	43,866	43,866
Dimmit	3,359	3,359	3,359	3,359	3,359	3,359
Frio	87,028	84,369	81,830	79,359	76,970	74,614
Gonzales	61,100	70,933	78,934	84,408	84,587	84,587
Guadalup	10,241	10,833	11,283	13,021	13,541	14,041
Karnes	1,059	1,117	1,182	1,231	1,259	1,280
La Salle	7,442	7,442	7,442	7,442	7,442	7,442
Maverick	2,043	2,043	2,024	1,677	1,570	1,532
McMullen	2,045	2,045	2,045	2,045	2,045	2,045
Medina	2,568	2,545	2,533	2,533	2,533	2,533
Uvalde	2,971	1,230	828	828	828	828
Webb	916	916	916	916	916	916
Wilson	37,320	38,549	40,107	41,722	43,632	45,780
Zavala	35,859	35,859	35,521	35,388	35,288	34,969
Total	**398,765**	**406,820**	**414,688**	**422,043**	**423,213**	**424,903**

TABLE 5. MODELED AVAILABLE GROUNDWATER FOR THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS SUMMARIZED BY RIVER BASIN IN GROUNDWATER MANAGEMENT AREA 13 FOR EACH DECADE BETWEEN 2010 AND 2060. RESULTS ARE IN ACRE-FEET PER YEAR.

Basin	Year					
	2010	2020	2030	2040	2050	2060
Colorado	593	593	593	593	593	593
Guadalupe	114,912	125,378	133,477	140,744	140,930	141,502
Lavaca	273	273	273	273	273	273
Nueces	237,214	233,700	232,100	230,805	230,236	229,708
Rio Grande	2,196	2,196	2,177	2,135	2,028	1,990
San Antonio	43,577	44,680	46,068	47,493	49,153	50,837
Total	**398,765**	**406,820**	**414,688**	**422,043**	**423,213**	**424,903**

TABLE 6. MODELED AVAILABLE GROUNDWATER FOR THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS SUMMARIZED BY REGIONAL WATER PLANNING AREA IN GROUNDWATER MANAGEMENT AREA 13 FOR EACH DECADE BETWEEN 2010 AND 2060. RESULTS ARE IN ACRE-FEET PER YEAR.

Regional Water	Year					
	2010	2020	2030	2040	2050	2060
L	393,761	401,816	409,703	417,405	418,682	420,410
M	2,959	2,959	2,940	2,593	2,486	2,448
N	2,045	2,045	2,045	2,045	2,045	2,045
Total	**398,765**	**406,820**	**414,688**	**422,043**	**423,213**	**424,903**

TABLE 7. MODELED AVAILABLE GROUNDWATER FOR THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS SUMMARIZED BY GROUNDWATER CONSERVATION DISTRICT (GCD) IN GROUNDWATER MANAGEMENT AREA 13 FOR EACH DECADE BETWEEN 2010 AND 2060. RESULTS ARE IN ACRE-FEET PER YEAR. UWCD REFERS TO UNDERGROUND WATER CONSERVATION DISTRICT.

Groundwater Conservation District	Year					
	2010	2020	2030	2040	2050	2060
Evergreen UWCD	199,093	198,487	199,083	199,706	200,960	202,678
Gonzales County UWCD*	86,846	96,679	104,680	110,154	110,333	110,333
Guadalupe County	10,241	10,833	11,283	13,021	13,541	14,041
McMullen	2,045	2,045	2,045	2,045	2,045	2,045
Medina County	2,568	2,545	2,533	2,533	2,533	2,533
Plum Creek	18,122	18,122	17,714	17,714	17,138	17,138
Uvalde County UWCD	2,971	1,230	828	828	828	828
Wintergarden	46,660	46,660	46,322	46,189	46,089	45,770
Total (excluding non-district areas)	**368,546**	**376,601**	**384,488**	**392,190**	**393,467**	**395,366**
No District	30,219	30,219	30,200	29,853	29,746	29,537
Total (including non-district areas)	**398,765**	**406,820**	**414,688**	**422,043**	**423,213**	**424,903**

*Note: Gonzales County UWCD includes area in Caldwell County

Appendix A

Estimates of total pumping split by aquifer layers for Groundwater Conservation Districts

Evergreen Underground Water Conservation District		**Year**					
	Unit or Layer	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Pumping	Sparta	2,171	2,051	1,955	1,868	1,793	1,736
	Queen City	10,803	10,468	10,126	9,735	9,369	9,030
	Carrizo	151,373	151,222	152,256	153,357	155,052	157,166
	Wilcox (Layer 6)	375	375	375	375	375	375
	Wilcox (Layer 7)	371	371	371	371	371	371
	Wilcox (Layer 8)	34,000	34,000	34,000	34,000	34,000	34,000
	Total	**199,093**	**198,487**	**199,083**	**199,706**	**200,960**	**202,678**

Gonzales County Underground Water Conservation District		**Year**					
	Unit or Layer	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Pumping	Sparta	3,552	3,552	3,552	3,552	3,552	3,552
	Queen City	5,349	5,349	5,349	5,349	5,349	5,349
	Carrizo	45,884	55,717	63,718	69,192	69,371	69,371
	Wilcox (Layer 6)	0	0	0	0	0	0
	Wilcox (Layer 7)	12,159	12,159	12,159	12,159	12,159	12,159
	Wilcox (Layer 8)	19,902	19,902	19,902	19,902	19,902	19,902
	Total	**86,846**	**96,679**	**104,680**	**110,154**	**110,333**	**110,333**

Guadalupe County Groundwater Conservation District		**Year**					
	Unit or Layer	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Pumping	Carrizo	5,500	6,239	6,689	8,427	9,000	9,500
	Wilcox (Layer 6)	0	0	0	0	0	0
	Wilcox (Layer 7)	3,194	3,047	3,047	3,047	2,994	2,994
	Wilcox (Layer 8)	1,547	1,547	1,547	1,547	1,547	1,547
	Total	**10,241**	**10,833**	**11,283**	**13,021**	**13,541**	**14,041**

McMullen Groundwater Conservation District		Year					
	Unit or Layer	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Pumping	Sparta	90	90	90	90	90	90
	Queen City	136	136	136	136	136	136
	Carrizo	1,819	1,819	1,819	1,819	1,819	1,819
	Total	**2,045**	**2,045**	**2,045**	**2,045**	**2,045**	**2,045**

Medina County Groundwater Conservation District		Year					
	Unit or Layer	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Pumping	Carrizo	400	400	400	400	400	400
	Wilcox (Layer 6)	0	0	0	0	0	0
	Wilcox (Layer 7)	1,248	1,248	1,248	1,248	1,248	1,248
	Wilcox (Layer 8)	920	897	885	885	885	885
	Total	**2,568**	**2,545**	**2,533**	**2,533**	**2,533**	**2,533**

Plum Creek Conservation District		Year					
	Unit or Layer	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Pumping	Queen City	22	22	22	22	22	22
	Carrizo	3,498	3,498	3,498	3,498	3,498	3,498
	Wilcox (Layer 6)	0	0	0	0	0	0
	Wilcox (Layer 7)	4,869	4,869	4,869	4,869	4,293	4,293
	Wilcox (Layer 8)	9,733	9,733	9,325	9,325	9,325	9,325
	Total	**18,122**	**18,122**	**17,714**	**17,714**	**17,138**	**17,138**

Uvalde County Underground Water Conservation District		**Year**					
	Unit or Layer	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Pumping	Carrizo	828	828	828	828	828	828
	Wilcox (Layer 6)	2,143	402	0	0	0	0
	Total	**2,971**	**1,230**	**828**	**828**	**828**	**828**

Wintergarden Groundwater Conservation District		**Year**					
	Unit or Layer	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Pumping	Sparta	987	987	987	987	987	987
	Queen City	1	1	1	1	1	1
	Carrizo	31,990	31,990	31,652	31,519	31,419	31,100
	Wilcox (Layer 6)	9,259	9,259	9,259	9,259	9,259	9,259
	Wilcox (Layer 7)	4,007	4,007	4,007	4,007	4,007	4,007
	Wilcox (Layer 8)	416	416	416	416	416	416
	Total	**46,660**	**46,660**	**46,322**	**46,189**	**46,089**	**45,770**

Texas Water Development Board
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Austin, TX 78711-3231, www.twdb.state.tx.us
Phone (512) 463-7847, Fax (512) 475-2053

December 9, 2011

Mr. Greg Sengelmann
General Manager
Gonzales County Underground Water Conservation District
P.O. Box 1919
Gonzales, TX 78629

Re: Modeled available groundwater estimates for the Yegua-Jackson Aquifer in Groundwater Management Area 13

Dear Mr. Sengelmann:

The Texas Water Code, Section 36.1084, Subsection (b), states that the Texas Water Development Board's (TWDB) Executive Administrator shall provide each groundwater conservation district and regional water planning group located wholly or partly in the groundwater management area with the modeled available groundwater in the management area based upon the desired future conditions adopted by the districts. This letter and the attached report (GAM Run 10-041 MAG) are in response to this directive.

As noted in the letter received by the TWDB on September 2, 2010, from Mike Mahoney of the Evergreen Underground Water Conservation District on behalf of Groundwater Management Area 13, desired future conditions were adopted for the Yegua-Jackson Aquifer on August 12, 2010.

Modeled available groundwater is defined in the Texas Water Code, Section 36.001, Subsection (25), as "the amount of water that the executive administrator determines may be produced on an average annual basis to achieve a desired future condition established under Section 36.108." This is different from "managed available groundwater," shown in the draft version of this report, which was a permitting value and accounted for the estimated use exempt from permitting. This change was made to reflect changes in statute by the 82nd Legislature, effective September 1, 2011. For use in the regional water planning process, modeled available groundwater estimates have been reported by aquifer, county, river basin, regional water planning area, groundwater conservation district, and any other subdivision of the aquifer designated by the management area (if applicable).

We encourage open communication and coordination between groundwater conservation districts, regional water planning groups, and the TWDB to ensure that the modeled available groundwater reported in regional water plans and groundwater management plans are not in conflict. We estimated modeled available groundwater that would have to occur to achieve the desired future condition using the best available scientific tools. However, these estimates are based on assumptions of the magnitude and distribution of projected pumping in the aquifer. It is, therefore, important for groundwater conservation districts to monitor whether their management of pumping is achieving their desired future conditions. Districts are encouraged to continue to work with the TWDB to better define available groundwater as additional information may help better assess responses of the aquifer to pumping and its distribution now and in the future.

If you have any questions, please contact Ms. Rima Petrossian of my staff at 512-936-2420 or rima.petrossian@twdb.state.tx.us for further information.

Sincerely,

Melanie Callahan

Melanie Callahan
Interim Executive Administrator

Attachments: GAM Run 10-041 MAG

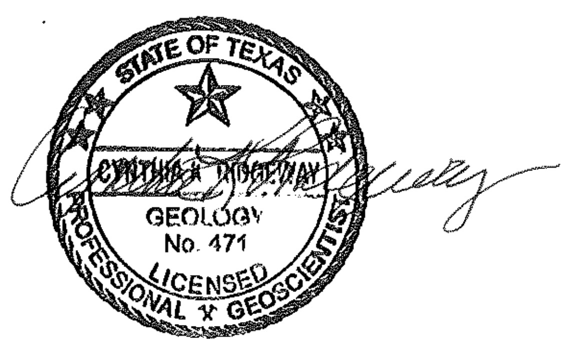
c w/atts.: L'Oreal Stepney, Deputy Director, Office of Water, Texas Commission of Environmental Quality
Kellye Rila, Texas Commission of Environmental Quality
Kelly Mills, Texas Commission of Environmental Quality
Ken Choffel, HDR Engineering
Sam Vaugh, HDR Engineering
Rocky Freund, Nueces River Authority
Ken Jones, Lower Rio Grande Valley Development Council
Suzanne Scott, San Antonio River Authority
Bill West, Guadalupe-Blanco River Authority
Robert E. Mace, Ph.D, P.G., Deputy Executive Administrator, Water Science and Conservation
Cindy Ridgeway, P.G., Groundwater Resources
Rima Petrossian, P.G., Groundwater Resources
Wade Oliver, Groundwater Resources
Dan Hardin, Water Resources Planning
Matt Nelson, Water Resources Planning
Temple McKinnon, Water Resources Planning
Angela Kennedy, Water Resources Planning
Connie Townsend, Water Resources Planning
Wendy Barron, Water Resources Planning

GAM Run 10-041 MAG

By Mohammad Masud Hassan, P.E.

Edited and finalized by Marius Jigmond to reflect statutory changes effective September 1, 2011

Texas Water Development Board
Groundwater Availability Modeling Section
(512) 463-8499
December 8, 2011



Cynthia K. Ridgeway, the Manager of the Groundwater Availability Modeling Section and Interim Director of the Groundwater Resources Division, is responsible for oversight of work performed by employees under her direct supervision. The seal appearing on this document was authorized by Cynthia K. Ridgeway, P.G. 471 on December 8, 2011.

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EXECUTIVE SUMMARY:

The modeled available groundwater for the Yegua-Jackson Aquifer as a result of the desired future condition adopted by the members of Groundwater Management Area 13 is approximately 31,700 acre-feet per year. This is shown divided by county, regional water planning area, and river basin in Table 1 for use in the regional water planning process. Modeled available groundwater is summarized by county, regional water planning area, river basin, and groundwater conservation district in tables 2 through 5. The estimates were extracted from Groundwater Availability Modeling Task 10-012, Scenario 4, which Groundwater Management Area 13 used as the basis for developing their desired future condition for the Yegua-Jackson Aquifer.

REQUESTOR:

Mr. Mike Mahoney of Evergreen Underground Water Conservation District on behalf of Groundwater Management Area 13

DESCRIPTION OF REQUEST:

In a letter dated August 31, 2010 and received September 2, 2010, Mr. Mike Mahoney provided the Texas Water Development Board (TWDB) with the desired future condition of the Yegua-Jackson Aquifer adopted by the members of Groundwater Management Area 13. The desired future condition for the Yegua-Jackson Aquifer in Groundwater Management Area 13, as shown in Resolution No. R 2010-02, is as follows:

> *"In reference to* [Groundwater Availability Model] *Run T10-012, Table C-1, the committee has considered, the base scenario of an average drawdown of 0.0 feet, Scenario 2.5 an average drawdown of 1 foot, Scenario 3.0 an average drawdown of 1 foot, and Scenario 4.0 an average drawdown of 2 feet for the Yegua-Jackson Aquifer; and*
>
> [...] *the district members of the Groundwater Management Area 13, adopt Scenario 4.0, and an average drawdown of 2 feet for the Yegua-Jackson Aquifer."*

In response to receiving the adopted desired future condition, the Texas Water Development Board has estimated the modeled available groundwater for the Yegua-Jackson Aquifer in Groundwater Management Area 13.

METHODS:

The Texas Water Development Board previously completed several predictive groundwater availability model simulations of the Yegua-Jackson Aquifer to assist the members of Groundwater Management Area 13 in developing a desired future condition for this aquifer. The location of Groundwater Management Area 13, the Yegua-Jackson Aquifer, and the groundwater availability model cells that represent the aquifer are shown in Figure 1. As described in Resolution No. R 2010-02, the management area considered Scenario 4 of Groundwater Availability Modeling (GAM) Task 10-012 when developing a desired future condition for the

Yegua-Jackson Aquifer (Oliver, 2010). Since the above desired future condition is met in Scenario 4 of GAM Task 10-012, the estimated pumping for Groundwater Management Area 13 presented here was taken directly from this simulation. The pumping was then divided by county, regional water planning area, river basin, and groundwater conservation district (Figure 2).

PARAMETERS AND ASSUMPTIONS:

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

- The results presented in this report are taken from Scenario 4 in GAM Task 10-012 (Oliver, 2010). See GAM Task 10-012 for a full description of the methods, assumptions, and results for the groundwater availability model run.

- Version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer was used for this analysis. See Deeds and others (2010) for assumptions and limitations of the groundwater availability model.

- Cells were assigned to individual counties, river basins, regional water planning areas, and groundwater conservation districts as shown in the March 23, 2010 version of the file that associates the model grid to political and natural boundaries for the Yegua-Jackson Aquifer.

- The model results presented in this report were extracted from all areas of the model representing the units comprising the Yegua-Jackson Aquifer. This includes some areas outside the "official" boundary of the aquifer shown in the 2007 State Water Plan (TWDB, 2007).

Modeled Available Groundwater and Permitting

As defined in Chapter 36 of the Texas Water Code, "modeled available groundwater" is the estimated average amount of water that may be produced annually to achieve a desired future condition. This is distinct from "managed available groundwater," shown in the draft version of this report dated December 15, 2010, which was a permitting value and accounted for the estimated use of the aquifer exempt from permitting. This change was made to reflect changes in statute by the 82nd Texas Legislature, effective September 1, 2011.

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

RESULTS:

The modeled available groundwater for the Yegua-Jackson Aquifer in Groundwater Management Area 13 consistent with the desired future condition is approximately 31,700 acre-feet per year. This has been divided by county, regional water planning area, and river basin for each decade between 2010 and 2060 for use in the regional water planning process (Table 1).

The modeled available groundwater is also summarized by county, regional water planning area, river basin, and groundwater conservation district as shown in tables 2 through 5. In Table 5, the modeled available groundwater both excluding and including areas outside of a groundwater conservation district is shown.

LIMITATIONS:

The groundwater model used in developing estimates of modeled available groundwater is the best available scientific tool that can be used to estimate the pumping that will achieve the desired future conditions. Although the groundwater model used in this analysis is the best available scientific tool for this purpose, it, like all models, has limitations. In reviewing the use of models in environmental regulatory decision-making, the National Research Council (2007) noted:

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

A key aspect of using the groundwater model to develop estimates of modeled available groundwater is the need to make assumptions about the location in the aquifer where future pumping will occur. As actual pumping changes in the future, it will be necessary to evaluate the amount of that pumping as well as its location in the context of the assumptions associated with this analysis. Evaluating the amount and location of future pumping is as important as evaluating the changes in groundwater levels, spring flows, and other metrics that describe the condition of the groundwater resources in the area that relate to the adopted desired future condition(s).

Given these limitations, users of this information are cautioned that the modeled available groundwater numbers should not be considered a definitive, permanent description of the amount of groundwater that can be pumped to meet the adopted desired future condition. Because the application of the groundwater model was designed to address regional scale questions, the results are most effective on a regional scale. The TWDB makes no warranties or representations relating to the actual conditions of any aquifer at a particular location or at a particular time.

It is important for groundwater conservation districts to monitor future groundwater pumping as well as whether or not they are achieving their desired future conditions. Because of the limitations of the model and the assumptions in this analysis, it is important that the groundwater conservation districts work with the TWDB to refine the modeled available groundwater numbers given the reality of how the aquifer responds to the actual amount and location of pumping now and in the future.

REFERENCES:

Oliver, W., 2010, GAM Task 10-012 Model Run Report: Texas Water Development Board, GAM Task 10-012 Report, 48 p.

Deeds, N.E., Yan, T., Singh, A., Jones, T.L., Kelley, V.A., Knox, P.R., Young, S.C., 2010, Groundwater availability model for the Yegua-Jackson Aquifer: Final report prepared for the Texas Water Development Board by INTERA, Inc., 582 p.

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

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

Table 1: Modeled available groundwater for the Yegua-Jackson Aquifer in Groundwater Management Area 13. Results are in acre-feet per year and are divided by county, regional water planning area, and river basin.

County	Regional Water Planning Area	River Basin	Year					
			2010	2020	2030	2040	2050	2060
Atascosa	L	Nueces	855	855	855	855	855	855
Frio	L	Nueces	0	0	0	0	0	0
Gonzales	L	Guadalupe	980	980	980	980	980	980
		Lavaca	3	3	3	3	3	3
Karnes	L	Guadalupe	112	112	112	112	112	112
		Nueces	34	34	34	34	34	34
		San Antonio	628	628	628	628	628	628
La Salle	L	Nueces	91	91	91	91	91	91
McMullen	N	Nueces	179	179	179	179	179	179
Webb	M	Nueces	11,969	11,969	11,969	11,969	11,969	11,969
		Rio Grande	8,030	8,030	8,030	8,030	8,030	8,030
Wilson	L	Guadalupe	48	48	48	48	48	48
		Nueces	184	184	184	184	184	184
		San Antonio	606	606	606	606	606	606
Zapata	M	Rio Grande	7,999	7,999	7,999	7,999	7,999	7,999
Total			**31,718**	**31,718**	**31,718**	**31,718**	**31,718**	**31,718**

Table 2: Modeled available groundwater for the Yegua-Jackson Aquifer summarized by county in Groundwater Management Area 13 for each decade between 2010 and 2060. Results are in acre-feet per year.

County	Year					
	2010	2020	2030	2040	2050	2060
Atascosa	855	855	855	855	855	855
Frio	0	0	0	0	0	0
Gonzales	983	983	983	983	983	983
Karnes	774	774	774	774	774	774
La Salle	91	91	91	91	91	91
McMullen	179	179	179	179	179	179
Webb	19,999	19,999	19,999	19,999	19,999	19,999
Wilson	838	838	838	838	838	838
Zapata	7,999	7,999	7,999	7,999	7,999	7,999
Total	**31,718**	**31,718**	**31,718**	**31,718**	**31,718**	**31,718**

Table 3: Modeled available groundwater for the Yegua-Jackson Aquifer summarized by regional water planning area in Groundwater Management Area 13 for each decade between 2010 and 2060. Results are in acre-feet per year.

Regional Water Planning Area	Year					
	2010	2020	2030	2040	2050	2060
L	3,541	3,541	3,541	3,541	3,541	3,541
M	27,998	27,998	27,998	27,998	27,998	27,998
N	179	179	179	179	179	179
Total	**31,718**	**31,718**	**31,718**	**31,718**	**31,718**	**31,718**

Table 4: Modeled available groundwater for the Yegua-Jackson Aquifer summarized by river basin in Groundwater Management Area 13 for each decade between 2010 and 2060. Results are in acre-feet per year.

River Basin	Year					
	2010	2020	2030	2040	2050	2060
Guadalupe	1,140	1,140	1,140	1,140	1,140	1,140
Lavaca	3	3	3	3	3	3
Nueces	13,312	13,312	13,312	13,312	13,312	13,312
Rio Grande	16,029	16,029	16,029	16,029	16,029	16,029
San Antonio	1,234	1,234	1,234	1,234	1,234	1,234
Total	**31,718**	**31,718**	**31,718**	**31,718**	**31,718**	**31,718**

Table 5: Modeled available groundwater for the Yegua-Jackson Aquifer summarized by groundwater conservation district (GCD) in Groundwater Management Area 13 for each decade between 2010 and 2060. Results are in acre-feet per year. UWCD refers to Underground Water Conservation District.

Groundwater Conservation District	Year					
	2010	2020	2030	2040	2050	2060
Evergreen UWCD	2,467	2,467	2,467	2,467	2,467	2,467
Gonzales County UWCD	865	865	865	865	865	865
McMullen GCD	179	179	179	179	179	179
Wintergarden GCD	91	91	91	91	91	91
Total (excluding non-district areas)	**3,602**	**3,602**	**3,602**	**3,602**	**3,602**	**3,602**
No District	28,116	28,116	28,116	28,116	28,116	28,116
Total (including non-district areas)	**31,718**	**31,718**	**31,718**	**31,718**	**31,718**	**31,718**

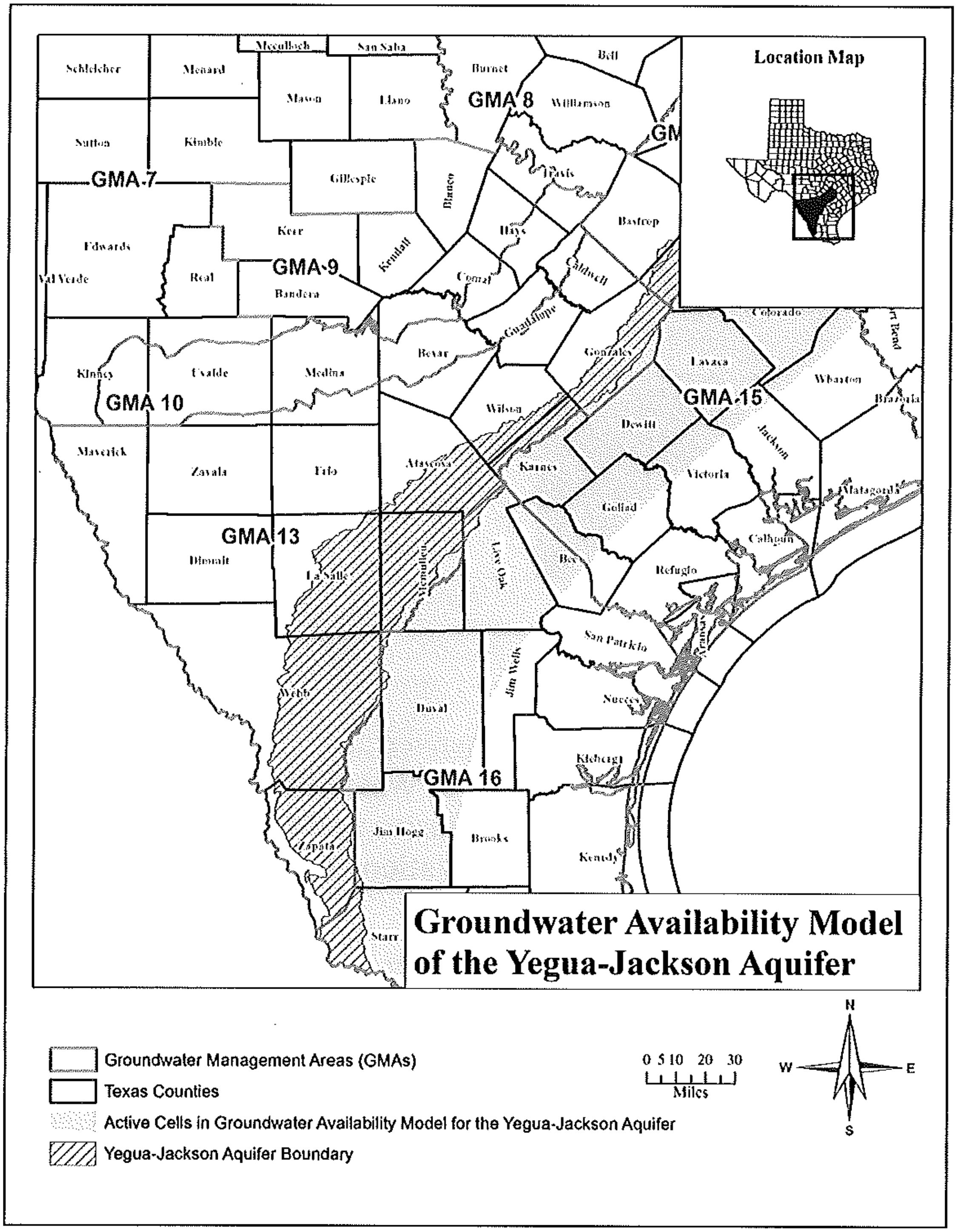

Figure 1: Map showing the areas covered by the groundwater availability model for the Yegua-Jackson Aquifer.

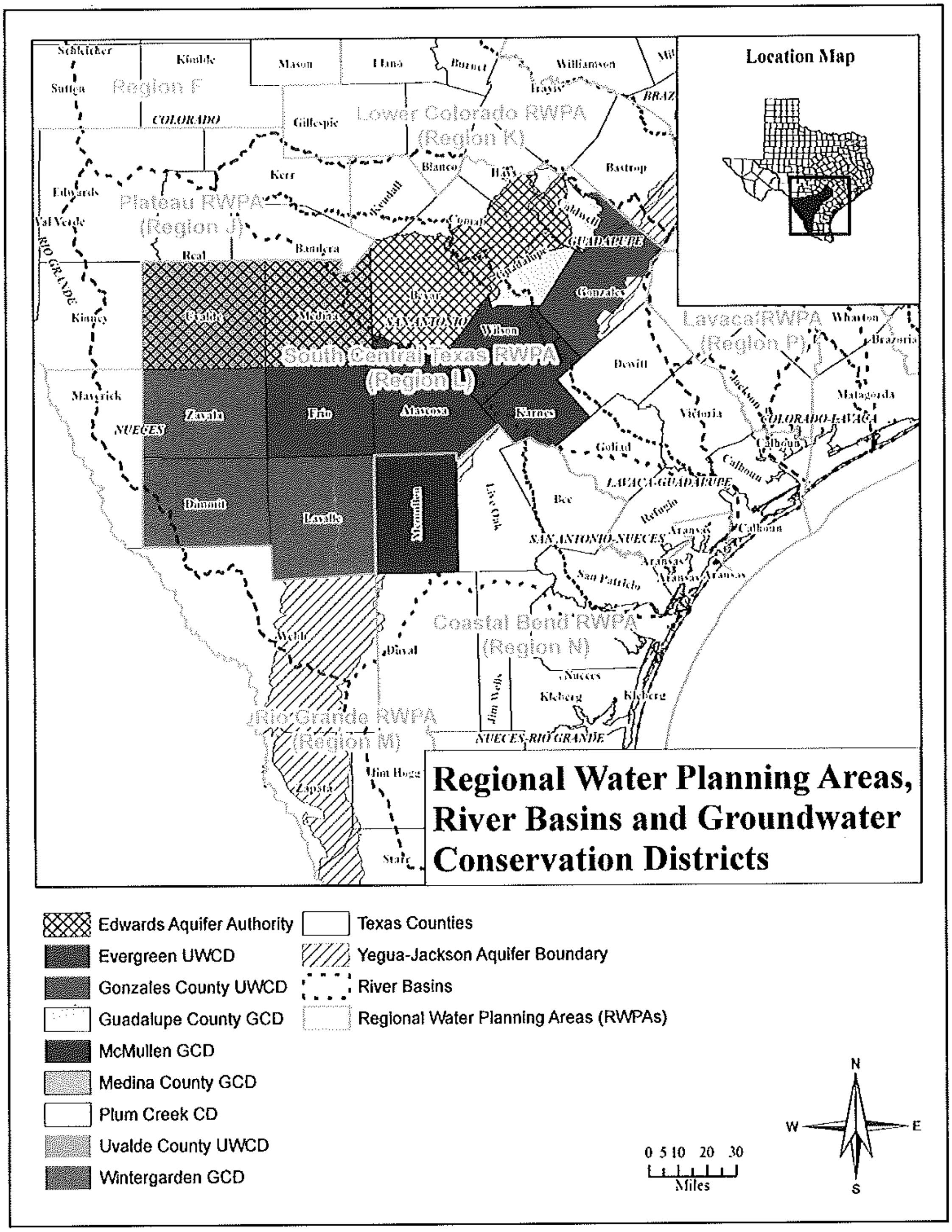

Figure 2: Map showing regional water planning areas (RWPAs), groundwater conservation districts (GCDs), counties, and river basins in Groundwater Management Area 13.

APPENDIX 6

Part 1
Estimated Historical Groundwater Use
And
2012 State Water Plan Datasets

Estimated Historical Groundwater Use And 2012 State Water Plan Datasets:

Gonzales County Underground Water Conservation District

by Stephen Allen
Texas Water Development Board
Groundwater Resources Division
Groundwater Technical Assistance Section
stephen.allen@twdb.texas.gov
(512) 463-7317
May 22, 2013

GROUNDWATER MANAGEMENT PLAN DATA:

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

http://www.twdb.state.tx.us/groundwater/doc/GCD/GMPChecklist0113.pdf

The five reports included in part 1 are:

1. Estimated Historical Groundwater Use (checklist Item 2)

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

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

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

DISCLAIMER:

The data presented in this report represents the most updated Historical Groundwater Use and 2012 State Water Planning data available as of 5/22/2013. Although it does not happen frequently, neither of these datasets are static and are subject to change pending the availability of more accurate data (Historical Water Use Survey data) or an amendment to the 2012 State Water Plan (2012 State Water Planning data). District personnel must review these datasets and correct any discrepancies in order to ensure approval of their groundwater management plan.

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

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

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

The values presented in the data tables of this report are county-based. In cases where groundwater conservation districts cover only a portion of one or more counties the data values are modified with an apportioning multiplier to create new values that more accurately represent district conditions. The multiplier used as part of the following formula is a land area ratio: (data value * (land area of district in county / land area of county)). For two of the four State Water Plan tables (Projected Surface Water Supplies and Projected Water Demands) only the county-wide water user group (WUG) data values (county other, manufacturing, steam electric power, irrigation, mining and livestock) are modified using the multiplier. WUG values for municipalities, water supply corporations, and utility districts are not apportioned; instead, their full values are retained when they are located within the district, and eliminated when they are located outside (we ask each district to identify these locations).

The two other SWP tables (Projected Water Supply Needs and Projected Water Management Strategies) are not apportioned because district-specific values are not statutorily required. Each district needs only "consider" the county values in those tables.

In the Historical Groundwater Use table every category of water use (including municipal) is apportioned. Staff determined that breaking down the annual municipal values into individual WUGs was too complex.

TWDB recognizes that the apportioning formula used is not perfect but it is the best available process with respect to time and staffing constraints. If a district believes it has data that is more accurate it has the option of including those data in the plan with an explanation of how the data were derived. Apportioning percentages are listed above each applicable table.

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

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

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

CALDWELL COUNTY *21.83 % (multiplier)* All values are in acre-feet/year

Year	Source	Municipal	Manufacturing	Steam Electric	Irrigation	Mining	Livestock	Total
1974	GW	670	45	0	21	15	55	806
1980	GW	585	7	0	22	0	37	651
1984	GW	799	8	0	45	1	18	871
1985	GW	710	8	0	31	6	16	771
1986	GW	740	8	0	32	0	18	798
1987	GW	720	0	0	32	6	17	775
1988	GW	730	0	0	32	5	18	785
1989	GW	744	0	0	32	6	18	800
1990	GW	783	0	0	147	6	18	954
1991	GW	678	0	0	0	3	18	699
1992	GW	700	0	0	162	3	18	883
1993	GW	762	0	0	32	3	17	814
1994	GW	751	2	0	32	3	19	807
1995	GW	744	2	0	48	3	20	817
1996	GW	867	3	0	50	3	17	940
1997	GW	777	2	0	44	3	19	845
1998	GW	828	2	0	156	3	18	1,007
1999	GW	823	2	0	134	3	20	982
2000	GW	817	2	0	30	3	20	872
2001	GW	704	44	0	49	1	14	812
2002	GW	669	1	0	49	1	15	735
2003	GW	773	0	0	28	1	15	817
2004	GW	740	0	0	35	1	16	792
2006	GW	364	0	0	76	0	42	482
2007	GW	332	0	0	14	0	45	391
2008	GW	666	0	0	57	0	38	761
2009	GW	592	0	0	32	0	36	660
2010	GW	575	0	0	156	1	33	765

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

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

GONZALES COUNTY *84.64 % (multiplier)* All values are in acre-feet/year

Year	Source	Municipal	Manufacturing	Steam Electric	Irrigation	Mining	Livestock	Total
1974	GW	1,235	693	0	1,320	8	1,005	4,261
1980	GW	854	551	0	508	0	1,664	3,577
1984	GW	750	537	0	922	15	319	2,543
1985	GW	787	482	0	796	15	323	2,403
1986	GW	668	530	0	711	0	341	2,250
1987	GW	939	526	0	826	17	339	2,647
1988	GW	1,136	592	0	1,210	18	320	3,276
1989	GW	1,048	609	0	1,131	18	325	3,131
1990	GW	1,259	523	0	1,798	18	347	3,945
1991	GW	1,213	329	0	1,096	28	355	3,021
1992	GW	1,048	293	0	1,164	28	429	2,962
1993	GW	1,312	346	0	135	28	460	2,281
1994	GW	1,298	398	0	152	28	383	2,259
1995	GW	1,275	533	0	215	28	409	2,460
1996	GW	1,421	741	0	315	28	289	2,794
1997	GW	1,553	858	0	139	28	341	2,919
1998	GW	1,706	978	0	236	28	355	3,303
1999	GW	1,525	880	0	320	28	388	3,141
2000	GW	1,608	1,433	0	1,574	28	377	5,020
2001	GW	1,779	1,203	0	963	25	366	4,336
2002	GW	1,599	1,099	0	1,004	25	384	4,111
2003	GW	2,223	2,003	0	901	25	393	5,545
2004	GW	1,820	1,127	0	965	25	389	4,326
2006	GW	1,658	1,353	0	2,222	0	3,133	8,366
2007	GW	1,331	1,295	0	1,517	0	2,917	7,060
2008	GW	2,117	1,247	0	2,426	0	3,006	8,796
2009	GW	1,971	1,657	0	1,410	3	2,880	7,921
2010	GW	3,147	1,232	0	3,028	175	2,808	10,390

Projected Surface Water Supplies
TWDB 2012 State Water Plan Data

CALDWELL COUNTY

21.83 % (multiplier)

All values are in acre-feet/year

RWPG	WUG	WUG Basin	Source Name	2010	2020	2030	2040	2050	2060
L	COUNTY LINE WSC	GUADALUPE	CANYON LAKE/RESERVOIR						
L	COUNTY LINE WSC	GUADALUPE	GUADALUPE RIVER RUN-OF-RIVER						
L	COUNTY-OTHER	GUADALUPE	GUADALUPE RIVER RUN-OF-RIVER	109	109	109	109	109	109
L	GOFORTH WSC	GUADALUPE	CANYON LAKE/RESERVOIR						
L	GONZALES COUNTY WSC	GUADALUPE	CANYON LAKE/RESERVOIR	21	21	21	21	21	21
L	LIVESTOCK	COLORADO	LIVESTOCK LOCAL SUPPLY	17	17	17	17	17	17
L	LIVESTOCK	GUADALUPE	LIVESTOCK LOCAL SUPPLY	83	83	83	83	83	83
L	MARTINDALE	GUADALUPE	GUADALUPE RIVER RUN-OF-RIVER						
L	MARTINDALE WSC	GUADALUPE	CANYON LAKE/RESERVOIR						
L	MARTINDALE WSC	GUADALUPE	GUADALUPE RIVER RUN-OF-RIVER						
L	MAXWELL WSC	GUADALUPE	CANYON LAKE/RESERVOIR						
L	MAXWELL WSC	GUADALUPE	GUADALUPE RIVER RUN-OF-RIVER						
	Sum of Projected Surface Water Supplies (acre-feet/year)			**230**	**230**	**230**	**230**	**230**	**230**

GONZALES COUNTY

84.64 % (multiplier)

All values are in acre-feet/year

RWPG	WUG	WUG Basin	Source Name	2010	2020	2030	2040	2050	2060
L	GONZALES	GUADALUPE	GUADALUPE RIVER RUN-OF-RIVER	2,240	2,240	2,240	2,240	2,240	2,240
L	GONZALES COUNTY WSC	GUADALUPE	CANYON LAKE/RESERVOIR	630	630	630	630	630	630
L	IRRIGATION	GUADALUPE	CANYON LAKE/RESERVOIR	6	6	6	6	6	6
L	IRRIGATION	GUADALUPE	GUADALUPE RIVER COMBINED RUN-OF-RIVER IRRIGATION	1,524	1,524	1,524	1,524	1,524	1,524
L	LIVESTOCK	GUADALUPE	LIVESTOCK LOCAL SUPPLY	2,371	2,371	2,371	2,371	2,371	2,371
L	LIVESTOCK	LAVACA	LIVESTOCK LOCAL SUPPLY	62	62	62	62	62	62

Sum of Projected Surface Water Supplies (acre-feet/year)	**6,833**	**6,833**	**6,833**	**6,833**	**6,833**	**6,833**

Projected Water Demands
TWDB 2012 State Water Plan Data

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

CALDWELL COUNTY

21.83 % (multiplier)

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
L	COUNTY-OTHER	COLORADO	5	5	5	5	5	5
L	MINING	COLORADO	2	2	2	2	2	2
L	IRRIGATION	COLORADO	3	3	3	2	2	2
L	LIVESTOCK	COLORADO	34	34	34	34	34	34
L	CREEDMOOR-MAHA WSC	COLORADO						
L	MUSTANG RIDGE	COLORADO						
L	POLONIA WSC	COLORADO						
L	LOCKHART	GUADALUPE						
L	LULING	GUADALUPE						
L	COUNTY-OTHER	GUADALUPE	47	44	39	34	30	27
L	MANUFACTURING	GUADALUPE	3	4	5	5	6	6
L	MINING	GUADALUPE	1	1	2	2	2	2
L	MUSTANG RIDGE	GUADALUPE						
L	NIEDERWALD	GUADALUPE						
L	AQUA WSC	GUADALUPE	267	339	396	458	518	580
L	COUNTY LINE WSC	GUADALUPE						
L	CREEDMOOR-MAHA WSC	GUADALUPE						
L	GOFORTH WSC	GUADALUPE						
L	GONZALES COUNTY WSC	GUADALUPE	63	79	94	108	122	136
L	IRRIGATION	GUADALUPE	224	200	177	158	140	124
L	LIVESTOCK	GUADALUPE	166	166	166	166	166	166
L	POLONIA WSC	GUADALUPE						
L	MARTINDALE	GUADALUPE						
L	MAXWELL WSC	GUADALUPE						
L	MARTINDALE WSC	GUADALUPE						
	Sum of Projected Water Demands (acre-feet/year)		**815**	**877**	**923**	**974**	**1,027**	**1,084**

GONZALES COUNTY

84.64 % (multiplier)

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
L	COUNTY-OTHER	GUADALUPE	325	265	218	179	167	168

Projected Water Demands
TWDB 2012 State Water Plan Data

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

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
L	LIVESTOCK	GUADALUPE	4,532	4,532	4,532	4,532	4,532	4,532
L	IRRIGATION	GUADALUPE	1,104	951	820	707	609	526
L	GONZALES COUNTY WSC	GUADALUPE	1,578	1,805	1,982	2,102	2,133	2,120
L	MINING	GUADALUPE	21	21	20	19	19	19
L	MANUFACTURING	GUADALUPE	2,031	2,224	2,389	2,549	2,689	2,879
L	NIXON	GUADALUPE	438	460	479	488	490	488
L	WAELDER	GUADALUPE	154	175	190	202	204	203
L	GONZALES	GUADALUPE	1,545	1,644	1,710	1,756	1,765	1,759
L	COUNTY-OTHER	LAVACA	8	6	5	4	4	4
L	MINING	LAVACA	3	2	2	2	2	2
L	LIVESTOCK	LAVACA	84	84	84	84	84	84
	Sum of Projected Water Demands (acre-feet/year)		**11,823**	**12,169**	**12,431**	**12,624**	**12,698**	**12,784**

Projected Water Supply Needs
TWDB 2012 State Water Plan Data

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

CALDWELL COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
L	AQUA WSC	GUADALUPE	-49	-121	-178	-240	-300	-362
L	COUNTY LINE WSC	GUADALUPE	137	33	-64	-160	-259	-354
L	COUNTY-OTHER	COLORADO	6	7	7	7	8	8
L	COUNTY-OTHER	GUADALUPE	494	507	531	554	572	586
L	CREEDMOOR-MAHA WSC	COLORADO	-61	-102	-138	-175	-212	-250
L	CREEDMOOR-MAHA WSC	GUADALUPE	-44	-73	-100	-127	-153	-181
L	GOFORTH WSC	GUADALUPE	59	-26	-99	-174	-252	-328
L	GONZALES COUNTY WSC	GUADALUPE	87	71	56	42	28	14
L	IRRIGATION	COLORADO	0	1	3	4	5	6
L	IRRIGATION	GUADALUPE	1	115	217	307	388	460
L	LIVESTOCK	COLORADO	0	0	0	0	0	0
L	LIVESTOCK	GUADALUPE	0	0	0	0	0	0
L	LOCKHART	GUADALUPE	322	-321	-856	-1,407	-1,952	-2,512
L	LULING	GUADALUPE	21	-122	-211	-296	-398	-506
L	MANUFACTURING	GUADALUPE	14	11	8	5	2	0
L	MARTINDALE	GUADALUPE	33	24	19	15	8	0
L	MARTINDALE WSC	GUADALUPE	-29	-40	-45	-49	-57	-66
L	MAXWELL WSC	GUADALUPE	264	89	-77	-229	-399	-564
L	MINING	COLORADO	3	2	2	1	1	1
L	MINING	GUADALUPE	2	2	1	1	0	0
L	MUSTANG RIDGE	COLORADO	-17	-55	-89	-123	-157	-191
L	MUSTANG RIDGE	GUADALUPE	-2	-7	-10	-14	-18	-22
L	NIEDERWALD	GUADALUPE	-8	-25	-43	-60	-77	-93
L	POLONIA WSC	COLORADO	219	153	96	37	-20	-80
L	POLONIA WSC	GUADALUPE	504	352	221	86	-46	-185
	Sum of Projected Water Supply Needs (acre-feet/year)		**-210**	**-892**	**-1,910**	**-3,054**	**-4,300**	**-5,694**

GONZALES COUNTY

All values are in acre-feet/year

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
L	COUNTY-OTHER	GUADALUPE	175	246	302	347	362	360
L	COUNTY-OTHER	LAVACA	4	6	7	8	8	8

Projected Water Supply Needs
TWDB 2012 State Water Plan Data

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

RWPG	WUG	WUG Basin	2010	2020	2030	2040	2050	2060
L	GONZALES	GUADALUPE	1,040	941	875	829	820	826
L	GONZALES COUNTY WSC	GUADALUPE	645	418	241	121	90	103
L	IRRIGATION	GUADALUPE	2,118	2,298	2,453	2,587	2,702	2,801
L	LIVESTOCK	GUADALUPE	0	0	0	0	0	0
L	LIVESTOCK	LAVACA	0	0	0	0	0	0
L	MANUFACTURING	GUADALUPE	1,135	907	713	524	358	133
L	MINING	GUADALUPE	6	6	7	8	9	9
L	MINING	LAVACA	0	1	1	1	1	1
L	NIXON	GUADALUPE	2,282	2,260	2,241	2,232	2,230	2,232
L	WAELDER	GUADALUPE	444	423	408	396	394	395
	Sum of Projected Water Supply Needs (acre-feet/year)		**0**	**0**	**0**	**0**	**0**	**0**

Projected Water Management Strategies
TWDB 2012 State Water Plan Data

CALDWELL COUNTY

WUG, Basin (RWPG)

All values are in acre-feet/year

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
AQUA WSC, GUADALUPE (L)							
DROUGHT MANAGEMENT	DROUGHT MANAGEMENT [CALDWELL]	13	0	0	0	0	0
LOCAL GROUNDWATER CARRIZO-WILCOX AQUIFER (INCLUDES OVERDRAFTS)	CARRIZO-WILCOX AQUIFER [CALDWELL]	403	403	403	403	403	403
MUNICIPAL WATER CONSERVATION	CONSERVATION [CALDWELL]	0	0	0	0	6	19
COUNTY LINE WSC, GUADALUPE (L)							
HAYS/CALDWELL PUA PROJECT (INCL. GONZALES CO.)	CARRIZO-WILCOX AQUIFER [CALDWELL]	0	285	285	285	285	285
LOCAL GROUNDWATER (TRINITY AQUIFER)	TRINITY AQUIFER [CALDWELL]	0	10	10	10	10	10
MUNICIPAL WATER CONSERVATION	CONSERVATION [HAYS]	0	0	64	160	259	354
COUNTY-OTHER, GUADALUPE (L)							
FACILITIES EXPANSION	GUADALUPE RIVER RUN-OF-RIVER [CALDWELL]	0	0	0	0	0	0
MUNICIPAL WATER CONSERVATION	CONSERVATION [CALDWELL]	21	37	36	31	28	29
CREEDMOOR-MAHA WSC, COLORADO (L)							
GBRA MID BASIN (SURFACE WATER)	GUADALUPE RIVER RUN-OF-RIVER [GONZALES]	0	102	138	175	212	250
PURCHASE FROM WWP (GUADALUPE-BLANCO RIVER AUTHORITY)	GUADALUPE RIVER RUN-OF-RIVER [CALHOUN]	61	0	0	0	0	0
CREEDMOOR-MAHA WSC, GUADALUPE (L)							
GBRA MID BASIN (SURFACE WATER)	GUADALUPE RIVER RUN-OF-RIVER [GONZALES]	0	73	100	127	153	181
MUNICIPAL WATER CONSERVATION	CONSERVATION [CALDWELL]	0	0	0	0	0	11
PURCHASE FROM WWP (GUADALUPE-BLANCO RIVER AUTHORITY)	GUADALUPE RIVER RUN-OF-RIVER [CALHOUN]	44	0	0	0	0	0
GOFORTH WSC, GUADALUPE (L)							
HAYS/CALDWELL PUA PROJECT (INCL. GONZALES CO.)	CARRIZO-WILCOX AQUIFER [GONZALES]	0	26	99	174	252	328

Projected Water Management Strategies
TWDB 2012 State Water Plan Data

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

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
LOCKHART, GUADALUPE (L)							
DROUGHT MANAGEMENT	DROUGHT MANAGEMENT [CALDWELL]	123	0	0	0	0	0
GBRA MID BASIN (SURFACE WATER)	GUADALUPE RIVER RUN-OF-RIVER [GONZALES]	0	1,120	1,120	1,120	1,120	1,120
LOCAL GROUNDWATER CARRIZO-WILCOX AQUIFER (INCLUDES OVERDRAFTS)	CARRIZO-WILCOX AQUIFER [CALDWELL]	0	403	1,210	1,613	2,016	2,823
MUNICIPAL WATER CONSERVATION	CONSERVATION [CALDWELL]	0	0	28	103	195	333
LULING, GUADALUPE (L)							
DROUGHT MANAGEMENT	DROUGHT MANAGEMENT [CALDWELL]	53	0	0	0	0	0
GBRA MID BASIN (SURFACE WATER)	GUADALUPE RIVER RUN-OF-RIVER [GONZALES]	0	1,680	1,680	1,680	1,680	1,680
LOCAL GROUNDWATER CARRIZO-WILCOX AQUIFER (INCLUDES OVERDRAFTS)	CARRIZO-WILCOX AQUIFER [CALDWELL]	0	403	403	403	403	807
MUNICIPAL WATER CONSERVATION	CONSERVATION [CALDWELL]	70	90	108	117	148	192
MARTINDALE, GUADALUPE (L)							
DROUGHT MANAGEMENT	DROUGHT MANAGEMENT [CALDWELL]	6	0	0	0	0	0
MARTINDALE WSC, GUADALUPE (L)							
CRWA WELLS RANCH PROJECT PHASE II (INCL. GONZALES CO.)	CARRIZO-WILCOX AQUIFER [GUADALUPE]	257	257	444	568	568	568
DROUGHT MANAGEMENT	DROUGHT MANAGEMENT [CALDWELL]	9	0	0	0	0	0
MAXWELL WSC, GUADALUPE (L)							
HAYS/CALDWELL PUA PROJECT (INCL. GONZALES CO.)	CARRIZO-WILCOX AQUIFER [CALDWELL]	0	300	600	900	1,200	1,500
MUNICIPAL WATER CONSERVATION	CONSERVATION [CALDWELL]	0	0	0	0	11	55
MUSTANG RIDGE, COLORADO (L)							
DROUGHT MANAGEMENT	DROUGHT MANAGEMENT [CALDWELL]	6	0	0	0	0	0
GBRA MID BASIN (SURFACE WATER)	GUADALUPE RIVER RUN-OF-RIVER [GONZALES]	0	55	89	123	157	191
MUNICIPAL WATER CONSERVATION	CONSERVATION [CALDWELL]	10	26	48	74	98	116

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

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
PURCHASE FROM WWP (GUADALUPE-BLANCO RIVER AUTHORITY)	CANYON LAKE/RESERVOIR [RESERVOIR]	17	0	0	0	0	0
MUSTANG RIDGE, GUADALUPE (L)							
GBRA MID BASIN (SURFACE WATER)	GUADALUPE RIVER RUN-OF-RIVER [GONZALES]	0	7	10	14	18	22
PURCHASE FROM WWP (GUADALUPE-BLANCO RIVER AUTHORITY)	CANYON LAKE/RESERVOIR [RESERVOIR]	2	0	0	0	0	0
NIEDERWALD, GUADALUPE (L)							
GBRA MID BASIN (SURFACE WATER)	GUADALUPE RIVER RUN-OF-RIVER [GONZALES]	0	25	43	60	77	93
PURCHASE FROM WWP (GUADALUPE-BLANCO RIVER AUTHORITY)	CANYON LAKE/RESERVOIR [RESERVOIR]	8	0	0	0	0	0
POLONIA WSC, COLORADO (L)							
LOCAL GROUNDWATER CARRIZO-WILCOX AQUIFER (INCLUDES OVERDRAFTS)	CARRIZO-WILCOX AQUIFER [CALDWELL]	0	0	0	0	48	97
POLONIA WSC, GUADALUPE (L)							
LOCAL GROUNDWATER CARRIZO-WILCOX AQUIFER (INCLUDES OVERDRAFTS)	CARRIZO-WILCOX AQUIFER [CALDWELL]	0	0	0	0	113	226
Sum of Projected Water Management Strategies (acre-feet/year)		**1,103**	**5,302**	**6,918**	**8,140**	**9,460**	**11,693**

GONZALES COUNTY

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

Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
COUNTY-OTHER, GUADALUPE (L)							
MUNICIPAL WATER CONSERVATION	CONSERVATION [GONZALES]	6	7	5	0	0	3
GONZALES, GUADALUPE (L)							
MUNICIPAL WATER CONSERVATION	CONSERVATION [GONZALES]	116	245	325	353	381	414
GONZALES COUNTY WSC, GUADALUPE (L)							
MUNICIPAL WATER CONSERVATION	CONSERVATION [GONZALES]	143	312	505	693	858	1,002

Projected Water Management Strategies
TWDB 2012 State Water Plan Data

All values are in acre-feet/year

WUG, Basin (RWPG) Water Management Strategy	Source Name [Origin]	2010	2020	2030	2040	2050	2060
TWA REGIONAL CARRIZO (INCL. GONZALES CO.)	CARRIZO-WILCOX AQUIFER [GONZALES]	0	500	500	500	500	500
NIXON, GUADALUPE (L)							
MUNICIPAL WATER CONSERVATION	CONSERVATION [GONZALES]	35	64	72	75	83	93
WAELDER, GUADALUPE (L)							
MUNICIPAL WATER CONSERVATION	CONSERVATION [GONZALES]	0	0	0	3	7	11
Sum of Projected Water Management Strategies (acre-feet/year)		**300**	**1,128**	**1,407**	**1,624**	**1,829**	**2,023**

APPENDIX 7

Part 2
Groundwater Availability Model Report

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Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

June 25, 2013

Mr. Greg Sengelmann, General Manager
Gonzales County Underground Water Conservation District
P.O. Box 1919
Gonzales, TX 78629

Re: Groundwater Availability Model Run 13-014 in support of the Gonzales County Underground Water Conservation District Groundwater Management Plan

Dear Mr. Sengelmann:

Texas Water Code, Section 36.1071, Subsection (h), states that, in developing its groundwater management plan, a groundwater conservation district shall use groundwater availability modeling information provided by the executive administrator of the Texas Water Development Board in conjunction with any available site-specific information provided by the district for review and comment to the executive administrator before being used in the plan. Information for your groundwater management plan that was derived from groundwater availability model(s) in the attached report 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 attached groundwater availability model run (Part 2 of a two-part package of information from the TWDB to Gonzales County Underground Water Conservation District) fulfills the requirements noted above. Part 1 of the two-part package is the Historical Water Use/State Water Plan data report. The District will receive this data report from the Groundwater Technical Assistance Section. Questions about the data report can be directed to Mr. Stephen Allen, Stephen.Allen@twdb.texas.gov, (512) 463-7317. This model run replaces the results of GAM Run 08-22. GAM Run 13-014 meets current standards set after the release of GAM Run 08-22 and includes results for the groundwater availability model for the Yegua-Jackson Aquifer. Slight differences in the results of the two model run reports are due to differences in the method of extracting data from the models.

The groundwater management plan for the Gonzales County Underground Water Conservation District is due to be adopted by the district on or before February 13, 2014, and submitted to the executive administrator of the TWDB on or before March 15, 2014. The current management plan for the Gonzales County Underground Water Conservation District expires on May 14, 2014.

If you have any further questions or concerns about the model run, please feel free to contact Dr. Shirley Wade at (512) 936-0883 or Shirley.Wade@twdb.texas.gov or Ms. Cindy Ridgeway at (512) 936-2386 or Cindy.Ridgeway@twdb.texas.gov.

Sincerely,

Melanie Callahan

Melanie Callahan
Executive Administrator

MC/CR:gr

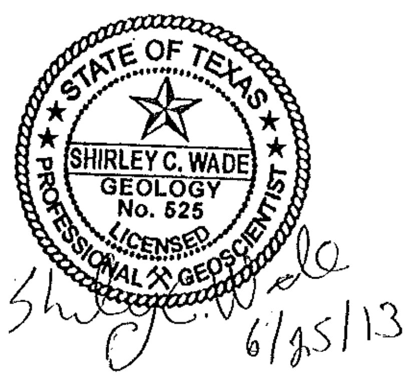
Attachment

c: Cindy Ridgeway, P.G., Manager, Groundwater Availability Modeling
Rima Petrossian, Ph.D., P.G., Manager, Groundwater Technical Assistance
Shirley Wade, Ph.D., P.G., Hydrologist, Groundwater Availability Modeling

GAM Run 13-014: Gonzales County Underground Water Conservation District Management Plan

by Shirley Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 936-0883

June 25, 2013



The seal appearing on this document was authorized by Shirley Wade, P.G. 525 on June 25, 2013.

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GAM RUN 13-014: GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT MANAGEMENT PLAN

by Shirley Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Resources Division
Groundwater Availability Modeling Section
(512) 936-0883
June 25, 2013

EXECUTIVE SUMMARY:

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

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

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

The groundwater management plan for the Gonzales County Underground Water Conservation District should be adopted by the district on or before February 13, 2014 and submitted to the executive administrator of the TWDB on or before March 15, 2014. The current management plan for the Gonzales County Underground Water Conservation District expires on May 14, 2014.

This report discusses the methods, assumptions, and results from model runs using the groundwater availability models for the southern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers, the Yegua-Jackson Aquifer, and the central portion of the Gulf Coast Aquifer. Tables 1 through 5 summarize the groundwater availability model data required by the statute, and Figures 1 through 5 show the area of each model from which the values in the tables were extracted. This model run replaces the results of GAM Run 08-22 (Oliver, 2008). GAM Run 13-014 meets current standards set after the release of GAM Run 08-22 including use of the extent of the official aquifer boundaries within the district rather than the entire active area of the model within the district. If after review of the figures, Gonzales County Underground Water Conservation District determines that the district boundaries used in the assessment do not reflect current conditions, please notify the Texas Water Development Board immediately. Per statute TWDB is required to provide the districts with data from the official groundwater availability models; however, the TWDB has also approved, for planning purposes, the fully penetrating alternative model for the central portion of the Gulf Coast Aquifer. Please contact the author of this report if a comparison table using this alternative model is desired.

METHODS:

In accordance with the provisions of the Texas State Water Code, Section 36.1071, Subsection (h), the groundwater availability models for the central and southern Carrizo-Wilcox, Queen City, and Sparta aquifers, the Yegua-Jackson Aquifer, and the central portion of the Gulf Coast Aquifer were run for this analysis. Gonzales County Underground Water Conservation District water budgets for the historical model periods were extracted using ZONEBUDGET Version 3.01 (Harbaugh, 2009). The average annual water budget values for recharge, surface water outflow, inflow to the district, outflow from the district, net inter-aquifer flow (upper), and net inter-aquifer flow (lower) for the portions of the aquifers located within the district are summarized in this report. We compared water budgets for the models of the central and southern Carrizo-Wilcox, Queen City, and Sparta aquifers and chose the water budget for the southern model because the southern model was used to assess desired future conditions for Groundwater Management Area 13.

PARAMETERS AND ASSUMPTIONS:

Carrizo-Wilcox, Queen City, and Sparta aquifers

- We used version 2.01 of the groundwater availability model for the southern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers. See Deeds and others (2003) and Kelley and others (2004) for assumptions and limitations of the groundwater availability model for the southern 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 Confining Unit (Layer 2), the Queen City Aquifer (Layer 3), the Reklaw Confining Unit (Layer 4), the Carrizo Aquifer (Layer 5), the Upper Wilcox (Layer 6), the Middle Wilcox (Layer 7), and the Lower Wilcox (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 (Layer 5 through Layer 8 collectively).

- Groundwater in the Carrizo-Wilcox, Queen City, and Sparta aquifers ranges from fresh to brackish in composition (Kelley and others, 2004). Groundwater with total dissolved solids of less than 1,000 milligrams per liter are considered fresh and total dissolved solids of 1,000 to 10,000 milligrams per liter are considered brackish.

- 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 section for the Yegua-Jackson Aquifer and younger overlying units (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).

Gulf Coast Aquifer

- Version 1.01 of the groundwater availability model for the central portion of the Gulf Coast Aquifer was used for this analysis. See Chowdhury and others (2004) and Waterstone and others (2003) for assumptions and limitations of the groundwater availability model.

- The model for the central portion of the Gulf Coast Aquifer assumes partially penetrating wells in the Evangeline Aquifer due to a lack of data for aquifer properties in the deeper section of the aquifer located closer to the Gulf of Mexico.

- This groundwater availability model includes four layers, which generally represent the Chicot Aquifer (Layer 1), the Evangeline Aquifer (Layer 2), the Burkeville Confining Unit (Layer 3), and the Jasper Aquifer including parts of the Catahoula Formation (Layer 4).

- The model was run with MODFLOW-96 (Harbaugh and McDonald, 1996).

RESULTS:

A groundwater budget summarizes the amount of water entering and leaving the aquifer according to the groundwater availability model. Selected groundwater budget components listed below were extracted from the model results for the aquifers located within the district and averaged over the duration of the calibration and verification portion of the model runs in the district, as shown in Tables 1 through 5.

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

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

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

- Flow between aquifers—The net vertical flow between aquifers or confining units. This flow is controlled by the relative water levels in each aquifer or confining unit and aquifer properties of each aquifer or confining unit that define the amount of leakage that occurs. "Inflow" to an aquifer from an overlying or underlying aquifer will always equal the "Outflow" from the other aquifer. In some cases this flow term includes lateral flow between the official aquifer and adjacent portions of the same hydrogeologic units which are not part of the official aquifer and may contain brackish water.

The information needed for the District's management plan is summarized in Tables 1 through 5. It is important to note that sub-regional water budgets are not exact. This is due to the size of the model cells and the approach used to extract data from the model. To avoid double accounting, a model cell that straddles a political boundary, such as a district or county boundary, is assigned to one side of the boundary based on the location of the centroid of the model cell. For example, if a cell contains two counties, the cell is assigned to the county where the centroid of the cell is located (Figures 1 through 5).

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

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Carrizo-Wilcox Aquifer	7,767
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	8,493
Estimated annual volume of flow into the district within each aquifer in the district	Carrizo-Wilcox Aquifer	14,269
Estimated annual volume of flow out of the district within each aquifer in the district	Carrizo-Wilcox Aquifer	4,401
Estimated net annual volume of flow between each aquifer in the district	From the Carrizo-Wilcox Aquifer into the Reklaw confining unit.	1,774
	From the Carrizo-Wilcox Aquifer to the brackish Carrizo-Wilcox Aquifer	5,371

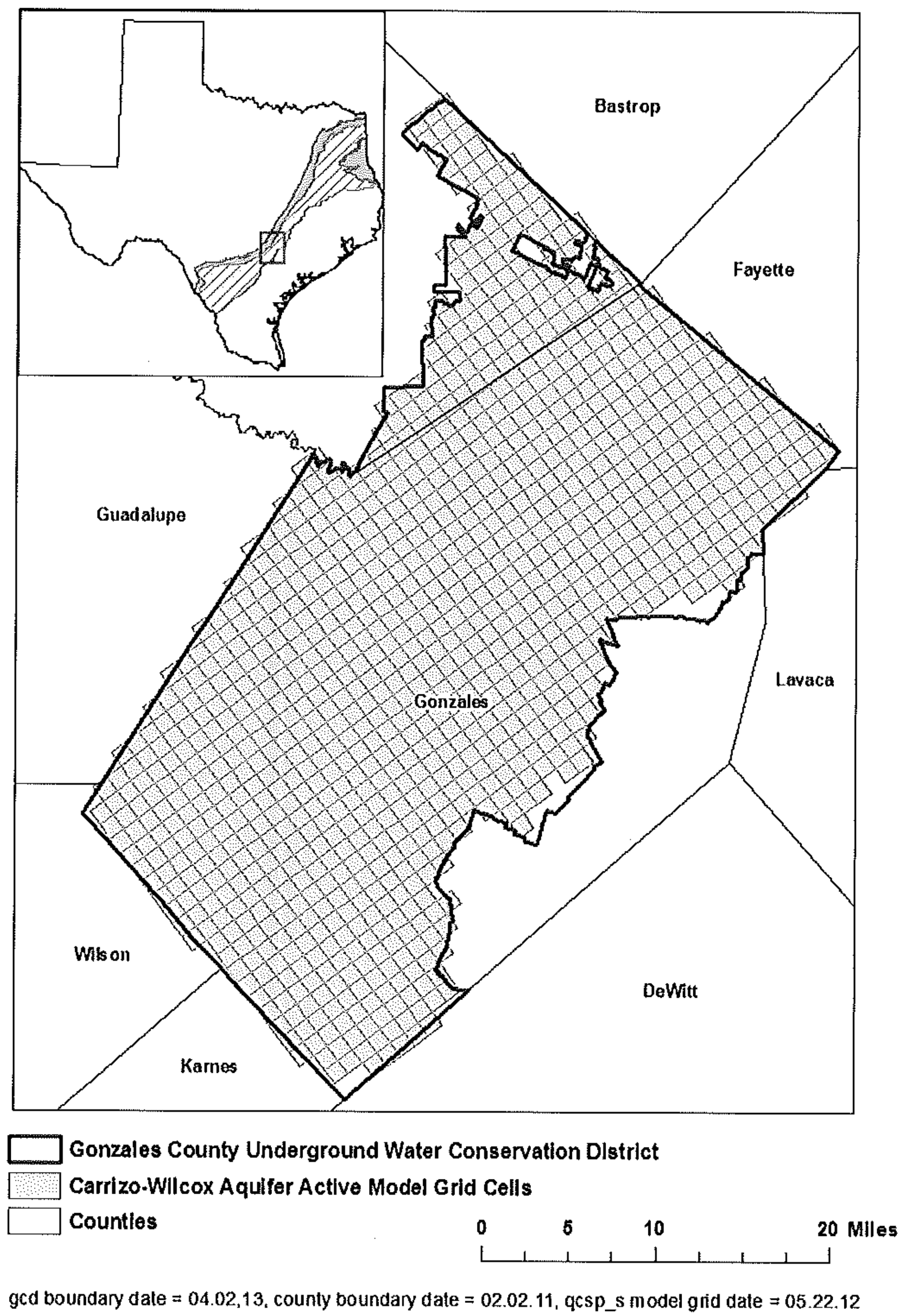

FIGURE 1: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS FROM WHICH THE INFORMATION FOR THE CARRIZO-WILCOX AQUIFER WAS EXTRACTED.

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

<table>
<tr><th>Management Plan requirement</th><th>Aquifer or confining unit</th><th>Results</th></tr>
<tr><td>Estimated annual amount of recharge from precipitation to the district</td><td>Queen City Aquifer</td><td>7,025</td></tr>
<tr><td>Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers</td><td>Queen City Aquifer</td><td>3,534</td></tr>
<tr><td>Estimated annual volume of flow into the district within each aquifer in the district</td><td>Queen City Aquifer</td><td>1,056</td></tr>
<tr><td>Estimated annual volume of flow out of the district within each aquifer in the district</td><td>Queen City Aquifer</td><td>56</td></tr>
<tr><td rowspan="3">Estimated net annual volume of flow between each aquifer in the district</td><td>From the Queen City Aquifer into the Weches Formation confining unit.</td><td>1,785</td></tr>
<tr><td>From the Reklaw Formation confining unit into the Queen City Aquifer</td><td>1,631</td></tr>
<tr><td>From the Queen City Aquifer to the brackish Queen City Aquifer</td><td>899</td></tr>
</table>

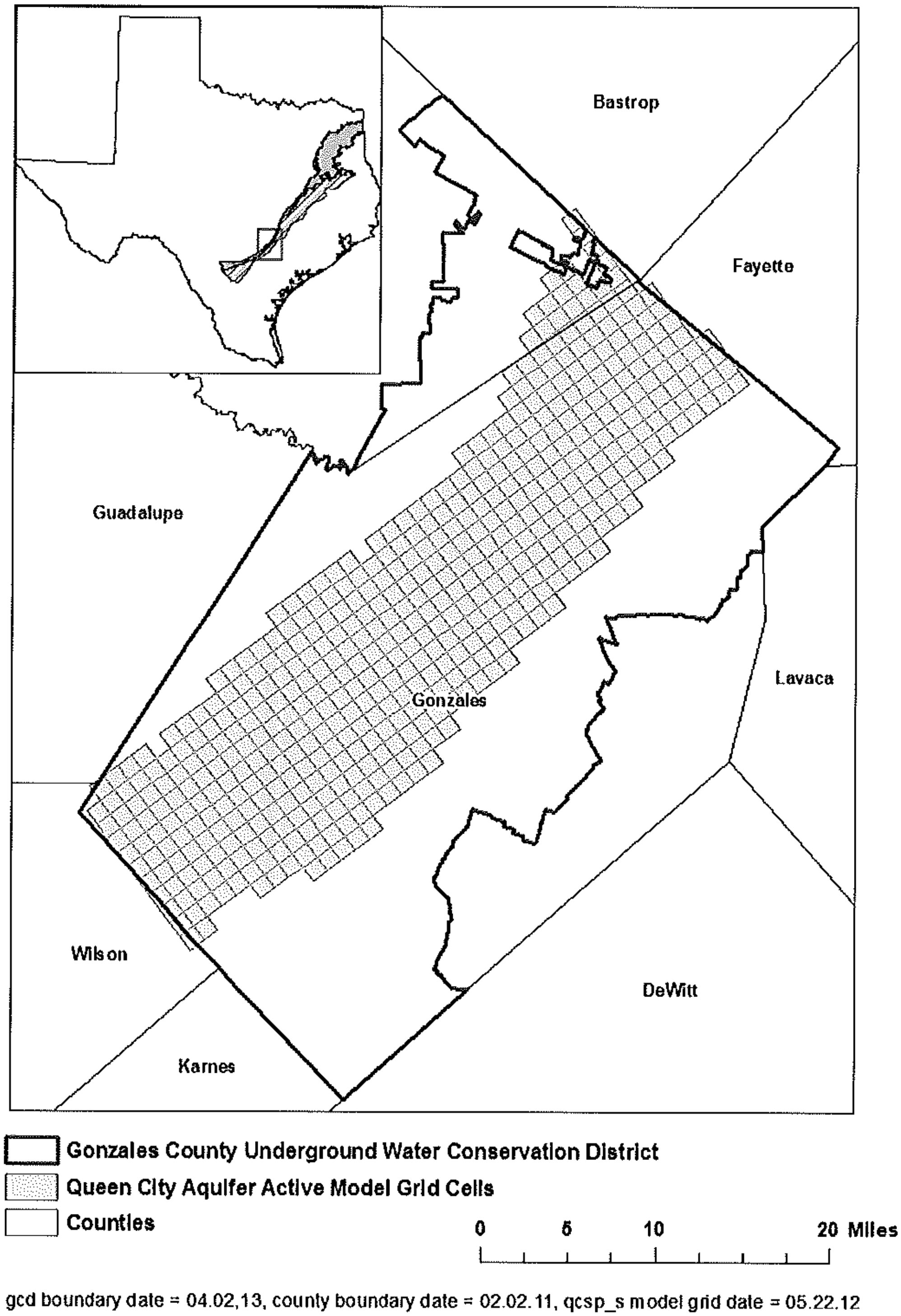

FIGURE 2: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS FROM WHICH THE INFORMATION FOR THE QUEEN CITY AQUIFER WAS EXTRACTED.

TABLE 3: SUMMARIZED INFORMATION FOR THE SPARTA AQUIFER THAT IS NEEDED FOR THE GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT. THESE FLOWS MAY INCLUDE BRACKISH WATERS.

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Sparta Aquifer	3,021
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Sparta Aquifer	2,012
Estimated annual volume of flow into the district within each aquifer in the district	Sparta Aquifer	197
Estimated annual volume of flow out of the district within each aquifer in the district	Sparta Aquifer	0
Estimated net annual volume of flow between each aquifer in the district	From the Sparta Aquifer into younger overlying units	2,330
	From the Weches Formation confining unit into the Sparta Aquifer	2,034
	From Sparta Aquifer to brackish Sparta Aquifer	579

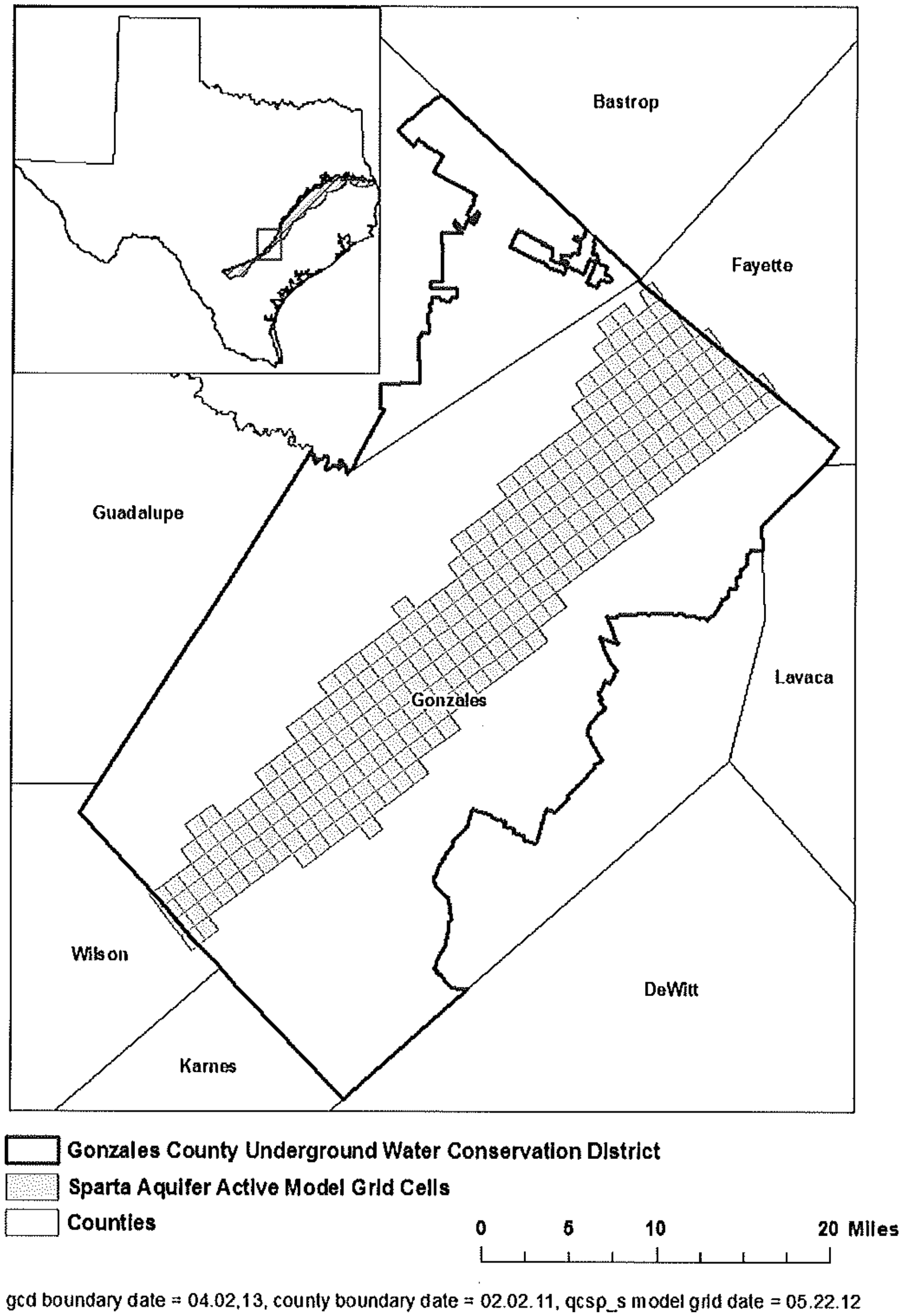

FIGURE 3: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS FROM WHICH THE INFORMATION FOR THE SPARTA AQUIFER WAS EXTRACTED.

TABLE 4: SUMMARIZED INFORMATION FOR THE YEGUA-JACKSON AQUIFER THAT IS NEEDED FOR THE GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT. THESE FLOWS MAY INCLUDE BRACKISH WATERS.

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Yegua-Jackson Aquifer	25,756
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	41,092
Estimated annual volume of flow into the district within each aquifer in the district	Yegua-Jackson Aquifer	9,341
Estimated annual volume of flow out of the district within each aquifer in the district	Yegua-Jackson Aquifer	570
Estimated net annual volume of flow between each aquifer in the district	From Yegua-Jackson Aquifer into the Catahoula	1,402
	From confined portions of the Yegua-Jackson Units into the Yegua-Jackson Aquifer	305

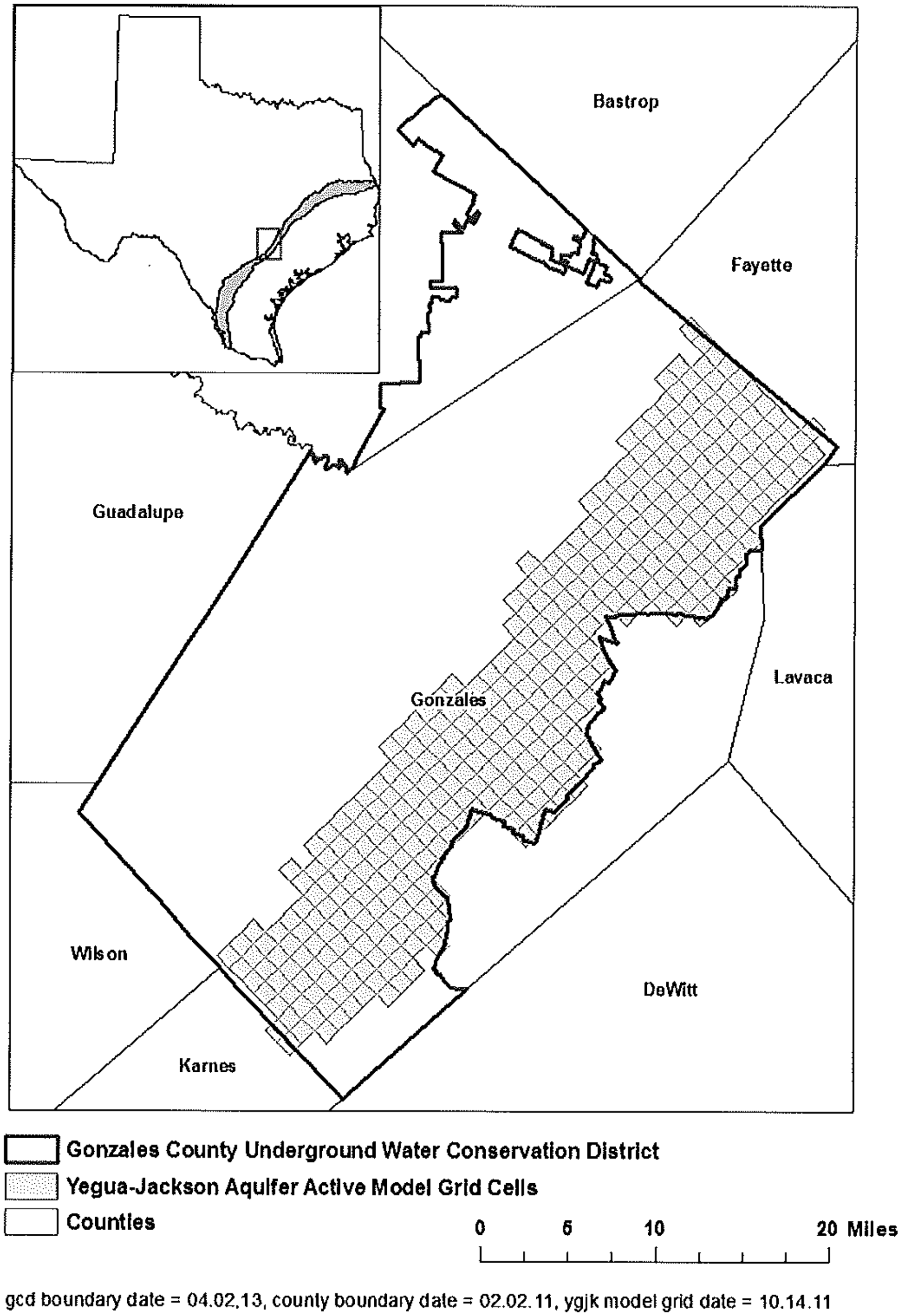

FIGURE 4: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE YEGUA-JACKSON AQUIFER FROM WHICH THE INFORMATION FOR THE YEGUA-JACKSON AQUIFER WAS EXTRACTED.

TABLE 5: SUMMARIZED INFORMATION FOR THE GULF COAST AQUIFER THAT IS NEEDED FOR THE GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT'S GROUNDWATER MANAGEMENT PLAN. ALL VALUES ARE REPORTED IN ACRE-FEET PER YEAR AND ROUNDED TO THE NEAREST 1 ACRE-FOOT. THESE FLOWS MAY INCLUDE BRACKISH WATERS.

Management Plan requirement	*Aquifer or confining unit*	*Results*
Estimated annual amount of recharge from precipitation to the district	Gulf Coast Aquifer	29
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Gulf Coast Aquifer	57
Estimated annual volume of flow into the district within each aquifer in the district	Gulf Coast Aquifer	46
Estimated annual volume of flow out of the district within each aquifer in the district	Gulf Coast Aquifer	67
Estimated net annual volume of flow between each aquifer in the district	From the Gulf Coast Aquifer into underlying units	23[1]

1) Estimated from the groundwater availability model for the Yegua-Jackson Aquifer

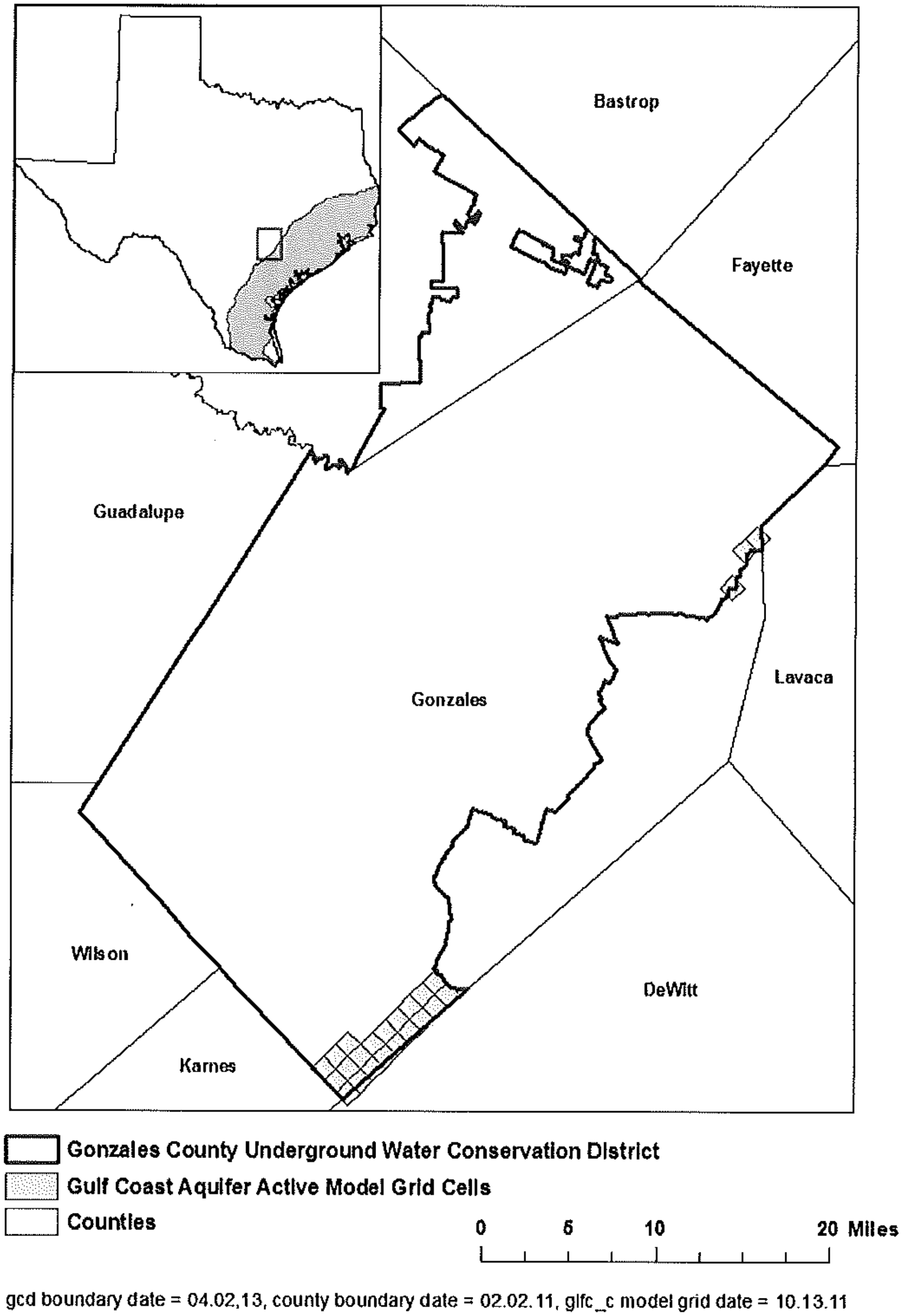

FIGURE 5: AREA OF THE GROUNDWATER AVAILABILITY MODEL FOR THE GULF COAST AQUIFER FROM WHICH THE INFORMATION FOR THE GULF COAST AQUIFER WAS EXTRACTED.

LIMITATIONS

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

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

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

Because the application of the groundwater 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.

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APPENDIX 8

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