

**GONZALES COUNTY UNDERGROUND WATER  
CONSERVATION DISTRICT  
MANAGEMENT PLAN**

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**PURPOSE AND INTENT**

The Gonzales County Underground Water Conservation District was created to conserve, preserve, protect and prevent waste of the groundwater resources of Gonzales County. The district was created on an order of the Texas Natural Resource Conservation Commission number 101692-DO4 and is charged specifically with managing the Sparta, Queen City, and the Carrizo/Wilcox aquifers in Gonzales County. The goal of managing these aquifers shall be accomplished by this management plan and its accompanying rules. The district 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.

**This plan shall be used for the 10 year period following approval as administratively complete by the Texas Water Development Board. The Gonzales County Underground Water Conservation District shall implement these goals and policies for a planning period of ten years and will review the plan in five years or sooner as circumstances warrant.**

It is further noted that the rules and policies of the district support this plan and its effective implementation.

**AREA TO BE SERVED**

Gonzales County lies in south-central Texas on the Gulf Coastal Plain and is bounded by Guadalupe, Wilson, Karnes, DeWitt, Lavaca, Fayette and Caldwell counties. There are approximately 677,000 acres in the county of which 101,000 acres are excluded from the district, as they lie over the zones of unusable groundwater, leaving 576,000 acres within the boundaries of the district. The boundaries of the district include the incorporated towns of Gonzales, Waelder, Nixon and Smiley. The district's economy is primarily agricultural, with poultry production being the primary income producer, followed by beef cattle and farming.

**POLICY**

It shall be the policy of the board of directors that the most efficient use of groundwater in Gonzales County is to provide for the future groundwater needs of the citizens. Groundwater shall be conserved, preserved, protected and waste prevented so that the economy of Gonzales County will be ensured of 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.

**TECHNICAL RESEARCH AND STUDIES**

The district, in cooperation with the Texas Water Development Board and the Texas Commission on Environmental Quality, shall conduct studies to monitor the water level in the Sparta, Queen City, and Carrizo/Wilcox aquifers to determine if there is any danger of damaging these aquifers due to over production. The district shall also establish 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 Carrizo Aquifer, Queen City, Sparta and other minor aquifers.

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**The district will identify fifty existing wells per year and the strata from which they are producing and add these wells to the existing database of registered wells.**

**The district will continue to gather data and improve the data gathering methods to ensure all future district plans are based on the best information available. The district, as part of its data gathering plan, will monitor thirty wells in the district annually for water levels and conduct chemical analyses of twenty selected wells to check water quality annually in cooperation with the Texas Water Development Board.**

**REGIONAL PLANNING GROUP**

The Gonzales County Underground Water Conservation District is in planning region L (South Central Texas Regional Planning Group). The board of directors unanimously supports the concept of a grassroots planning effort. The district will continue to provide input to the regional plan and participate in the planning effort.

**District personnel will attend as many of the regional planning meetings as possible. The District's management plan development will be coordinated with the Region L (South Central) Regional Planning Group to insure consistency with the Region L plan and the effective management of the groundwater within the District.**

**GROUNDWATER RECHARGE**

**The Gonzales County Underground Water Conservation District is prohibited from engaging in any groundwater recharge enhancement projects at this time by order of the Texas Natural Resource Conservation Commission number 101692-DO4.**

**AQUIFER MANAGEMENT AREA**

The Gonzales County Underground Water Conservation District is in the Southern Carrizo Management Area.

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 districts will cooperate in managing the groundwater resources of the Carrizo aquifer. The district has and will continue to provide the other districts in the aquifer management area with copies of its management plan and rules when changes are made. The district has reviewed the management plans of the other districts and finds their plans to be effective in conserving, preserving and preventing waste of water in their areas. The district has exchanged letters of intent with Evergreen Water Conservation District to annually share water level measurements in adjoining areas. The district will exchange letters with the Guadalupe Groundwater Conservation District and Plum Creek Conservation District stating that the district will share water level information on an annual basis.

**The district will share water level information each January with all adjoining districts.**

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**PUBLIC INFORMATION**

A well informed public is vital to the proper operation of a groundwater district. The district will keep the citizens of the district informed by means of timely newspaper articles and public service radio announcements. As part of the public information program the directors of the district and the district manager will make presentations to any public gathering, 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.

**USEABLE GROUNDWATER RESOURCES OF GONZALES COUNTY**

Required Element

The Texas Water Development Board issued a report in 1965 (TWDB #4) of the groundwater resources in all aquifers of Gonzales County. In 2002, the district authorized a study of the Carrizo aquifer in the county. This study used recent water level information and available geologic data to update the groundwater availability in the Carrizo aquifer, as well as input data and results of groundwater flow modeling sponsored by the TWDB. In late 2002, the TWDB issued draft reports on the groundwater availability models (GAMs) which simulate groundwater flow in the Southern Carrizo-Wilcox and Central Carrizo-Wilcox aquifer systems. Gonzales County is included in both of these regional models. A key finding of the Carrizo aquifer groundwater availability study was that the aquifer in Gonzales County should be divided into two zones: West Gonzales County and East Gonzales County. These zones in the Carrizo aquifer, divided by the San Marcos Arch structural feature (roughly coinciding with the San Marcos and Guadalupe Rivers), have different groundwater flow characteristics and relatively little exchange of groundwater flow in non-pumping conditions. The GAM for the Southern Carrizo-Wilcox aquifer was used to estimate groundwater availability in the Carrizo aquifer for the two zones. Recharge and inflow to the Carrizo aquifer under a no-pumping scenario is estimated to be approximately 12,300 acre-feet per year in West Gonzales County and approximately 9,300 acre-feet per year in East Gonzales County (Table 1). It is assumed that pumpage up to this amount can be sustained. Total groundwater in storage in the Carrizo aquifer (estimated from TWDB Report #4) is 80 million acre-feet but is not all recoverable to wells.

The Queen City Sand and Sparta Sand are the two minor aquifers in Gonzales County. It is estimated using the Southern GAM (which includes the Queen City Sand) that annual net recharge for the Queen City aquifer is 11,500 acre-feet per year, and it is assumed that pumpage up to this amount can be sustained. The total groundwater in storage in these two aquifers is estimated at 10 million acre-feet but not all is recoverable to wells.

Total estimated useable groundwater in the district is 40,192 Acre feet per year (see Table 1).

The technical memorandum describing the Carrizo aquifer groundwater availability study is attached to this plan.

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**Table 1**

**Useable Amount of Groundwater of Gonzales County  
Based on Southern Carrizo-Wilcox GAM**

Aquifer	Recharge	Horizontal Exchange	River Discharge	Net Cross-Formation	Release Storage (100 ft drop)	Sustainable Yield 100 FT DRAWDOWN	
Eastern Carrizo	1100	8250	-2796	-6601	13625	13578	
Western Carrizo	2548	9784	-1407	-10736	15175	15364	
Total Carrizo						28942	
Queen City/Sparta	11250	Number from Southern GAM					11250
Total Useable Groundwater Available						40192	

Source: Technical Inputs for this evaluation are from the Southern Carrizo Groundwater Availability Model.

**CURRENT AND PROJECTED WATER USE**

Gonzales County is the number four county in the State of Texas in agricultural receipts. The need for water is expanding at a rapid pace due to expansion in the poultry industry. The South Central Texas Regional Water Planning Group's current and projected water use numbers for the district and the water use compiled by the district are summarized in the following tables (Table 2). The tables also include the needs of the Schertz Seguin Local Government Corp. in the 2010 and 2013 projected water needs and the projected needs of the Guadalupe County Groundwater Conservation District, which is the summary water balance for the district (Table 3).

For the purpose of this plan and to maintain consistency with regional planning efforts, the district is using the Region L 2010 estimate for its assumed water supply from all sources. That number is 50,136 acre feet per year (see Table 2).

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**Table 2**

**Water Supply—User and Source (All Sources, Ground and Surface)**

User	Source	2000 Region L	2002 Actual Report*	2010 Region L	2013 Projected
Gonzales	Surface	2240	1988	2240	2700
Gonzales	CZ	272	223	223	272
Nixon	CZ	1508	801	1508	1076
Waelder	CZ	173	218	173	292
County Other	Surface	700	700	700	700
County Other	CZ	1104	1200	21104	21200
County Other	QC/Sparta	527	527	527	600
Livestock	Surface	5945	5945	6277	6277
Livestock	CZ	10000	11000	11000	11000
Livestock	QC/Sparta	250	250	250	250
Manufacturing	CZ	811	811	811	811
Manufacturing	QC/Sparta	387	387	387	387
Mining	CZ	26	26	26	26
Mining	QC/Sparta	11	11	11	11
Irrigation	Surface	1929	1000	1929	1929
Irrigation	CZ	2010	1500	2010	2010
Irrigation	QC/Sparta	960	500	960	960
<b>Total Surface</b>		<b>10814</b>	<b>9633</b>	<b>11146</b>	<b>11606</b>
<b>Total CZ</b>		<b>15904</b>	<b>15779</b>	<b>36855</b>	<b>36687</b>
<b>Total QC/Sparta</b>		<b>2135</b>	<b>1675</b>	<b>2135</b>	<b>2208</b>
<b>TOTAL USAGE</b>		<b>28853</b>	<b>27087</b>	<b>50136</b>	<b>50501</b>

\*Actual Water Usage Compiled from water users in Gonzales County

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**Table 3**

**Projected Water Demand for the Gonzales County Underground Water  
Conservation District**

	2000	2002	2010	2013 Projected	Surplus 2013 (Shortage)
Current Surface water Demand	10814	9633	11146	11146	11606
* Carrizo Demand District Total	15904	15779	36855	36855	(-7913)
**Guadalupe County Carrizo Demand	1500	1500	2100	2100	
Queen City/Sparta Demand	2135	1675	2135	2208	9042
Total Demand	30353	28587	52236	52826	

\*2010 & 2013 numbers include 20K ac/ft for SSLGC  
 \*\* Guadalupe Co. numbers from LBG Guyton Assc. August, 2002.  
 Estimated Guadalupe Co. demand applied to Carrizo availability because of aquifer flow path.

As noted in Tables 1 and 3, projected demand and available supply from the groundwater resources in the District (defined in the GAM and Regional Plan) will essentially balance in 2010 (the discrepancy is not considered material by the District). The District has used supply and demand projections from the approved Region L plan (2010). The District has also used, as a basis for its groundwater availability numbers, the Southern Carrizo-Wilcox Groundwater Availability Model which it believes reflects the best current information, as defined by statute and TWDB rule. Therefore, the District believes this plan is consistent with the most recent approved regional plan and the most recent State Water Plan.

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**Table 4**

**Projected Groundwater Demand in the Carrizo Management Zones**

	2000	2002	2010	2013 Projected	Surplus 2013 (Shortage)
Carrizo Demand Eastern Dist.	2651	2630	6143	6143	7435.5
* Carrizo Demand Western Dist.	13253	13149	30713	30713	(-15349)
**Guadalupe County Carrizo Demand	1500	1500	2100	2325	
*** Western Dist. & Guadalupe Co. Demand Totals	14753	14649	32813	33038	(-17674)

\* 2010 & 2013 number include 20K ac/ft for SSLGC  
 \*\*Guadalupe County District numbers are from a report prepared by LBG-GUYTON ASSOCIATES August 2002  
 \*\*\* Guadalupe Co. Demand applied to Western availability because of aquifer flow path.

**CONSERVATION AND NATURAL RESOURCE ISSUES**

Water is the most precious natural resource on Earth. The district shall promote conservation as a way of life in order to conserve fresh water for future generations. The district shall 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 its requirements as needed. The district shall, upon request, provide information on wells and water levels to the Natural Resources Conservation Service in order to develop waste management plans for the poultry producers.

**The district will meet with Natural Resources Conservation Service representatives to exchange information on wells and water levels annually.**

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.

**The district will meet with the local engineering technician for the Railroad Commission of Texas to discuss oil related activities that could endanger the groundwater.**



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**REGULATION**

The goal of this plan is to ensure that the citizens of the district will have adequate water for the future. Therefore, every entity must be regulated. The district will adopt regulations to control groundwater withdrawals by means of spacing and production limits. In regulating groundwater withdrawals, the district shall take into account several factors, including:

1. Economic and domestic impact of conservation measures.
2. The degree and effect of water table conditions in any given area and its effect on neighboring wells.
3. The different hydrological characteristics of the aquifers within the district.

The district will use all technical resources at its disposal to evaluate the effectiveness of regulation and determine if any further action is warranted to have water available for future generations.

**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.

**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 appropriate testimony and all relevant factors that include:

1. The purpose of the rules of the district.
2. The objectives and requirements of the plan.
3. The economic impact on the applicant from grant or denial of the permit or terms prescribed by the permit.
4. The equitable distribution of available groundwater.

In carrying out its purpose, the district may require the reduction of groundwater withdrawal to amounts that will not cause the water table to drop to a level that would cause harm to the aquifer. To achieve this purpose the district may, on its discretion and based on information obtained through its monitoring procedures, amend or revoke any permits after notice and hearing.

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 Chapter 36.102 of the Texas Water Code.

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**EQUITY AND DISCRETION**

The district shall treat all citizens of the district with equality. 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 the granting of an exception, the Board will factor any adverse impact on adjacent landowners. The exercising of discretion by the board shall not be construed so as to limit the power of the Board.

This plan prescribes a production ratio of groundwater withdrawal based upon the number of acres of land owned by a property owner or water rights holder. The number of acres of land and the population of any incorporated city that are within the Certificate of Convenience and Necessity (CCN) of a public or private water utility may be taken into consideration when granting a permit to produce water providing that the proposed well is within the city limits of that city.

**SPACING REQUIREMENTS AND PRODUCTION RATIOS**

**1. EXEMPT WELLS**

This plan and its accompanying rules shall exempt wells from permits as provided for in Chapter 36.117 of the Texas Water Code. The district shall exempt all domestic and livestock wells.

**2. SPACING**

No permitted well shall be drilled such that said well shall be located closer than five hundred (500) feet to the property line. Spacing of new wells from an existing well shall be in accordance with the classification of as set forth in RULE 13 in the rules of the district.

**EXAMPLES**

Actual Pumping Capacity Of Proposed Well (GPM)	Classification	Minimum Distance From Nearest Existing Well or Authorized Well Site	
		Carrizo/Wilcox	Queen City/Sparta
Less than 25 GPM	Domestic	None	None
25-100 GPM	A	600 FT	2000FT
101-250 GPM	B	1500 FT	4850FT
251-500 GPM	C	3000 FT	8400FT
501-1000 GPM	D	6000 FT	9600FT
1001 GPM and over	E	12000 FT	>18000FT

**3. PRODUCTION**

A person may be permitted to produce wells on their property, or property on which a person can show possession of groundwater rights may produce up to a maximum production of two acre-feet of water per acre, per year. Cumulative annual production shall be computed by district personnel according to acres of ground water rights possessed by the applicant at the time the application is filed.

## **SUBSIDENCE**

**Subsidence is not a factor with these aquifers.**

## **TRANSPORTATION OF WATER FROM THE DISTRICT**

Transportation of water from the district requires an addendum to the production permit, as stated in district rule number 11. The district may, every five years, 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 the permit if the use of water unreasonably affects existing groundwater and surface water resources or existing Permit Holders.

## **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." 7

A change of more than 100 feet in the historical average level of any well monitored semiannually by the district may necessitate a change in pumping in an area to be designated by the Board of Directors. The Board shall publish a notice in a newspaper of general circulation in the district of its intent to hold a public hearing on any proposed changes in pumping in any area to be designated by the board. The board shall, after notice and hearing at a regular or special called meeting, consider changes in the permitted pumping amounts.

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 shall 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.

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**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 government 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 Texas Commission on Environmental Quality is the agency charged with protecting the state's water resources, and the Texas Water Development Board 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.

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**DROUGHT MANAGEMENT**

Drought is a condition that plagues Gonzales County periodically. The directors of the district are very concerned that water will be available for the needs of the citizens during times of drought. The manager of the district will update the board at every monthly meeting on drought conditions in the district. The manager shall report the Palmer Drought Severity Index to the board during the manager's report for the month. The board shall instruct the 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 notices to municipal suppliers to implement their drought plan.

The manager will access the Texas Water Development Board website monthly to determine the Palmer Drought Severity Index and report to the board of directors monthly.

**FEES**

A deposit of \$100 is required with notice of intent to drill a test hole and is fully refundable upon receipt of the driller's log and proof of proper plugging of the test hole or the deposit may be applied to the permit to drill a water well.

Water well drilling permits require a deposit of \$100 and is fully refundable upon receipt of the driller's log and completed production permit.

A permit to rework, reequip or alter a water well is the same as a water well drilling permit and shall be accompanied by a deposit of \$100 which is fully refundable upon receipt of an updated production permit.

There shall be no charge of any kind for recording the location of an existing well with the district.

Copies of district rules or the district's management plan shall be available at the district's office at no charge.

**PLAN IMPLEMENTATION**

**Required Plan Element**

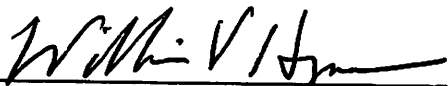
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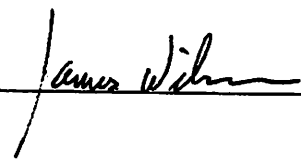
**GONZALES COUNTY UNDERGROUND WATER  
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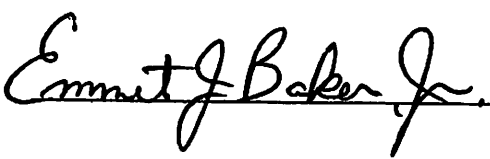
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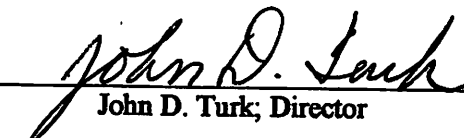
This Management Plan shall become effective on : July 8, 2003

**Gonzales County Underground Water Conservation District  
Board of Directors**

  
\_\_\_\_\_  
William V. Hyman, President  
Attest:

  
\_\_\_\_\_  
James Wilson, Vice President

  
\_\_\_\_\_  
Emmet J. Baker Jr., Secretary

  
\_\_\_\_\_  
John D. Turk, Director

  
\_\_\_\_\_  
Morgan Barnett, Director

**LOCATION OF DISTRICT OFFICES:**

**GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT  
920 ST. JOSEPH ROOM 129  
P.O. BOX 1919  
GONZALES, TEXAS 78629**

**TELEPHONE (830) 672 1047**

**Email: GCUWCD@GVEC.net**

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**GOALS, MANAGEMENT OBJECTIVES PERFORMANCE STANDARDS  
and Methodology for Tracking Progress**

**Plan Elements Required by State Law and Rule**

**Providing the Most Efficient Use of Groundwater**

Goal: The district will provide for the most efficient use of the groundwater resources of Gonzales County.

Management Objective: The district will identify at least 50 existing wells annually and the strata from which they are producing and incorporate this data into a database of wells in the district.

Performance: Enter wells in database within 30 working days of inspection.

Method for Tracking Progress: Maintain all well information in files of the District.

Management Objective: The district will check 20 wells semiannually for water levels in western Gonzales County.

Performance: Check wells for water level within the same 60 day period semiannually.

Method for Tracking Progress: Maintain all water level information in files of the District and transmit to the Texas Water Development Board annually

Management Objective: The district will check 10 wells annually for water levels in eastern Gonzales County.

Performance: Check wells for water level within the same 60 day period annually.

Method for Tracking Progress: Maintain all water level information in files of the District and transmit to the Texas Water Development Board annually.

Management Objective: The district will meet with the cities of Gonzales, Nixon, Smiley and Waelder annually update future plans and areas of mutual concern.

Performance: Meet with the city councils annually to review water needs.

Method for Tracking Progress: Maintain records of correspondence and records of meetings with the municipalities in the files of the district.

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Management Objective: The district will meet with Gonzales County Commissioners annually to update future plans and areas of mutual concern.

Performance: Meet with Gonzales County Commissioners within 30 days of the request.

Method for Tracking Progress: Maintain records of correspondence and records of meetings with the commissioners in the files of the district.

Management Objective: The district will meet with the Gonzales Area Development Corporation (GADC) as requested to inform the GADC on water availability for economic development.

Performance: Meet with the Gonzales Area Development Corporation within 30 days of request.

Method for Tracking Progress: Maintain records of correspondence and records of meetings with the GADC in the files of the district.

**Controlling and Preventing Waste of Groundwater**

The district believes that preventing the contamination of groundwater within the district is the single most important waste prevention activity it can undertake.

Goal: Proactively prevent and control waste of district groundwater through a focused monitoring program.

Management Objective: The district will continue to monitor 5 wells in the Nixon-Smiley area to be checked annually for water quality. The district will monitor 15 additional wells, at locations throughout the district, to be checked annually for water quality. (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).

Performance: Check wells for chemical analysis in coordination with the Texas Water Development Board annually.

Performance: Sample wells for chemical analysis during the same period every year in coordination with the Texas Water Development Board.

Method for Tracking Progress: Maintain all chemical analysis records in files of the District and note on analysis sheet chemical constituents that exceed the Contaminant Maximum level for drinking water.

Management Objective: The district will monitor new facilities and activities on the recharge zones of the Carrizo/Wilcox, Queen City and Sparta aquifers on at least an annual basis for point source and non-point source pollution.

Performance: At a minimum, conduct an annual visual survey of all recharge zones for point source and nonpoint source activities and facilities.



## **Controlling and Preventing Subsidence**

Subsidence is not an issue within the Gonzales County district. Therefore, the district will not address this issue through its management plan.

## **Conjunctive Surface Water Management**

Goal: Maximize the efficient use of groundwater and surface water for the benefit of the residents of Gonzales County.

Management Objective: The manager of the district will meet annually with the staff of the Guadalupe Blanco River Authority to share information updates about conjunctive use potential.

Performance: Meet with GBRA representatives annually.

Method for Tracking Progress: Maintain the minutes of the meetings in the files of the district.

Management Objective: The district will gather water production data from public water suppliers, and will compile these figures into a database of groundwater usage in order to better project the needs of the district.

Performance: Enter production in database within 2 working days of receipt.

Method for Tracking Progress: Maintain the production data in the files of the district.

Management Objective: The district will compile records from other users in order to project future water use.

Performance: Enter production in database within 2 working days of receipt.

Method for Tracking Progress: Maintain the production data in the files of the district.

**GONZALES COUNTY UNDERGROUND WATER  
CONSERVATION DISTRICT  
MANAGEMENT PLAN**

**Addressing Drought Conditions**

24-37

Goal: The district will provide information to and coordinate an appropriate response with local water users and water managers regarding the existence of extreme drought events in the district.

Management Objective: The district will, under extreme drought conditions, as defined by the Palmer Drought Severity Index, provide information to and coordinate with local water users and water managers regarding drought response activities.

Performance: Send letter by certified mail to all public suppliers informing them of extreme drought conditions and potential actions they might consider taking within seven days of such determination by the board of directors at any regular or special called meeting.

Method for Tracking Progress: Maintain minutes of the meeting and the certified mailing receipts and copies of the letters in the files of the district.

**Addressing Natural Resource Issues**

30-33

Goal: Protect the Natural Resources of Gonzales County.

Management Objective: The district will meet with Natural Resources Conservation Service representatives to exchange information on wells and water levels annually.

Performance: Meet with the Natural Resources Conservation Service representatives annually to review water well information and water levels annually.

Method for Tracking Progress: Maintain minutes of the meeting in the files of the district.

Management Objective: The manager of the district will meet with the local Texas Railroad Commission engineering technician annually to review oil well permits and oil related activity that could endanger the aquifers.

Performance: Meet with Railroad Commission engineering technician annually to review oil well plugging activities, oil well drilling activity and operation of salt water injection wells within the district.

Method for Tracking Progress: Maintain records of the meeting in the files of the district.

**GONZALES COUNTY UNDERGROUND WATER  
CONSERVATION DISTRICT  
MANAGEMENT PLAN**

**Addressing Conservation**

38-41

The district believes that the most efficient and effective ways to facilitate conservation within the district are through sound data collection and dissemination and the distribution of public information about the groundwater resources in Gonzales County, its current use and more effective ways to use it. The methods to accomplish this goal are several and include other goals, objectives, performance measures, and action of the district in addition to the ones specifically described below.

Goal: Effectively conserve the groundwater of Gonzales County.

Management Objective: The district will publish an information article in a publication of wide circulation in the county every summer describing conservation measures that can be taken by water users within the district.

Performance: Publish at least one article every summer.

Method for Tracking Progress: Maintain copies of the articles published in the files of the district.

Management Objective: The district will meet with consumers of groundwater, within 7 days of their request, to review water use and possible voluntary conservation measures that could be initiated.

Performance: Number of Gonzales County consumers met with as requested

Methodology for Tracking Progress: The district will maintain a file of requested meetings and a record of when meetings occurred.

**Plan Elements Developed at the Discretion of the District**

**Transportation of Water from the District**

42-44

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

Management Objective: The district will receive monthly reports from individuals or entities that transport groundwater out of the district and provide this information to the Board of Directors.

Performance: The General Manager will provide the board with monthly reports developed from the records of exporters.

Methodology for Tracking Progress: The district will record these reports within 2 working days in a database of water exported from the district and maintain this database in the files of the district.

**GONZALES COUNTY UNDERGROUND WATER  
CONSERVATION DISTRICT  
MANAGEMENT PLAN**

**Management Plan Goals for the Manager of the District**

45-47

**Goal: Insure the effective and efficient management of the District.**

**Management Objective: The manager of the district will report to the Board of Directors every January on the number of new wells permitted.**

**Performance: The General Manager will provide the board with an annual report concerning the number of new wells permitted.**

**Methodology for Tracking Progress: The district will maintain a copy of this report in the files of the district.**

**Management Objective: The manager will also report to the Board of Directors the levels in monitoring wells and the chemical analysis from selected wells in the district which are checked on an annual basis.**

**Performance: The General Manager will provide the board with an annual report concerning water levels in monitoring wells and the chemical analysis from selected wells in the district which are checked annually.**

**Methodology for Tracking Progress: The district will maintain a copy of this report in the files of the district.**

**Management Objective: The manager will also report to the Board on activities that could endanger the aquifers in the previous year and the solutions to those problems which are either ongoing or complete.**

**Performance: The General Manager will provide the board with an annual report concerning activities that could endanger the aquifers in the district and the solutions to those problems which are either ongoing or complete.**

**Methodology for Tracking Progress: The district will maintain a copy of this report in the files of the district.**

**Management Objective: The manager will, upon approval by the Board, post these reports at the district offices for public viewing.**

**Performance: The General Manager will post these reports at the district offices for public viewing.**

**Methodology for Tracking Progress: Post reports in the district office for one year until the next**

**GONZALES COUNTY UNDERGROUND WATER  
CONSERVATION DISTRICT  
MANAGEMENT PLAN**

report is approved by the board of directors.

Management Objective: The district will advise the public water suppliers serving the citizens of the district on the best locations for new supply wells based on chemical analysis and water availability.

Performance: Aid the public water suppliers serving the citizens of the district in achieving the best location for future water production for producing water at the least cost.

**GONZALES COUNTY UNDERGROUND WATER  
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Method for Tracking Progress: Maintain all notes and photos of monitoring trips.

Management Objective: The district will contact the Railroad Commission annually and coordinate its efforts with this agency in locating abandoned or deteriorated oil wells.

Performance: Survey sites of an abandoned or deteriorated oil wells within 30 days of identifying such sites.

Efficiency: Act on complaints within 30 days.

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Complaint file in the files of the District



## Technical Memorandum

**Date:** February 19, 2003

**To:** Mr. Barry Miller  
Gonzales County Underground Water Conservation District  
920 St. Joseph Street, Room 129  
Gonzales, Texas 78629

**From:** L. French  
URS – Austin

**Subject:** **Carrizo Aquifer Water Availability**  
**Gonzales County, Texas**

### 1 Introduction

#### Background and Purpose

This technical memorandum presents an evaluation of the availability of groundwater in the Carrizo aquifer in Gonzales County. The evaluation was requested by the Gonzales County Underground Water Conservation District (GCUWD) to provide a technical basis for the update of the District's Groundwater Management Plan. This plan will outline the management strategy and how it will be implemented to protect, conserve, and manage the groundwater resources within the District. Although the District is responsible for management of all groundwater within its boundaries, the Carrizo aquifer forms the largest and heaviest utilized groundwater aquifer in the District. The boundaries of the district and the extent of the Carrizo aquifer in the District, as well as Carrizo wells in the District, are illustrated on Figure 1. This groundwater evaluation is built on at least two main conditions:

1. Hydrostratigraphic and groundwater flow conditions in the Carrizo aquifer are different in the west and east portions of the county. Therefore, availability estimates have been prepared for these two areas of the county.
2. Technical inputs to this evaluation are based on and consistent with the Southern Carrizo Groundwater Availability Model (GAM) approved by the Texas Water Development Board.

An important consideration in the evaluation and use of the groundwater balance estimates is the fact that changes (e.g., climatic changes, locations and magnitude of water development (pumping) projects) will alter the assumptions and conditions used in this evaluation. Thus, the groundwater balance in the Carrizo aquifer will change. We recommend that proposed projects that exceed the District's management plan limits should use the applicable Groundwater Availability Model (GAM) to fully evaluate the projected impacts of the project(s).



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Groundwater in the Carrizo aquifer is being increasingly viewed as a significant resource, and in recent years has been evaluated for export to the expanding San Antonio metropolitan area. The largest project in the county is nearly completed, and will eventually export approximately 20,000 acre-ft/yr to Schertz-Seguin Local Government Corporation (SSLGC) from a well field in western Gonzales County (Camp, 1999). The San Antonio Water System is beginning an evaluation of Carrizo aquifer conditions in the western portion of the county for possible development for the city of San Antonio. Bexar Metropolitan Water District is also evaluating Carrizo groundwater resources in Gonzales and Guadalupe Counties. This evaluation of Carrizo groundwater availability in Gonzales County is not an evaluation of groundwater availability for these or any other specific projects, nor does it endorse or critique of the technical merits of these potential projects.

The Carrizo aquifer in Gonzales County has been the subject of several investigations. A county-wide study was performed in the 1960s (Shafer, 1965), and provides the geologic and hydrogeologic context for much of the recent investigations. The Region L Regional Planning Group also prepared an evaluation of groundwater availability. A series of regional studies of the Carrizo aquifer, often combined with the Wilcox Group, have been performed.

The Groundwater Availability Model (GAM) studies of the Carrizo-Wilcox aquifer system incorporated Gonzales County in two of the studies: the central Carrizo-Wilcox GAM (BEG, 2002) and the southern Carrizo-Wilcox GAM (INTERA, 2002). These studies were made public in draft form in September 2002. The final version of the Southern Carrizo-Wilcox GAM (approved by the TWDB as of February 10, 2003) was used for this evaluation.

### Method of Evaluation

The following steps were followed to estimate the availability of groundwater in the Carrizo aquifer:

1. Available information on water wells and construction features was gathered from published sources and file records with the GCUWCD.
2. Information on recharge rates was gathered from various published sources, primarily the Southern and Central Carrizo GAM reports, and secondarily from other regional studies (e.g., LBG-Guyton and HDR Engineering, 1998, the Region L Water Plan).
3. A generalized potentiometric surface map of the Carrizo aquifer was prepared using water level data gathered in August-October 2002.
4. General groundwater flow directions were estimated based on the potentiometric surface map.
5. A GIS database was set up from TWDB well information, GCUWCD well data, file records with the Texas Water Well drillers database, and other information.
6. Aquifer pumping test data (LBG-Guyton, 1998a, 1998b, and 2002) from the SSLGC program were obtained and integrated into the data set.
7. Based on the evaluation of groundwater flow conditions, Gonzales County was divided into two groundwater zones: West Gonzales County and East Gonzales County. The Southern Carrizo-Wilcox GAM was run for both portions of





Gonzales County to develop steady-state estimates of recharge, cross-formational flow, horizontal exchange, and stream leakage.

## 2 Geologic Setting

The Carrizo aquifer in Gonzales County consists of massive, commonly crossbedded coarse sand and some minor amounts of sandstone and clay (Shafer, 1965). Most of the Carrizo in Gonzales County has at least 80 percent sand. Portions of the Carrizo in eastern Gonzales County have 60 to 80 percent sand, generally corresponding to the area of the Yoakum Channel. Mapping for the Southern Carrizo-Wilcox GAM indicates that the thickness 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 western Gonzales County and about 800 feet in the Yoakum Channel (see Figure 4.2.12 in INTERA, 2002). Figure 2 illustrates the locations of the main geologic features that influence the occurrence and availability of groundwater in the Carrizo aquifer.

The top of the Carrizo ranges from about 300 feet above sea level (msl) at the outcrop to greater than -3000 feet msl in eastern Gonzales County. Although the Carrizo occurs deeper to the east, it is not a source of groundwater. There are a series of northeast-southwest trending faults in the county that are related to the Karnes Fault Zone (BEG, 2002). These faults intersect the Carrizo, but do not have sufficient displacement to completely offset the formation.

## 3 Aquifer Characteristics and Conditions

The Carrizo aquifer characteristics are well-known on a regional scale, but less well established on a county level of detail. In addition, there are more data on aquifer characteristics in western Gonzales County.

### Transmissivity

Transmissivity estimates are available both for specific sites within the county, and developed for regional studies (e.g., Mace, 1999). The specific sites provide detailed information on the behavior of the aquifer, and the compilation of these data yield insight into the variability of the aquifer characteristics. However, these data are typically expensive to develop and are limited in area. However, the Carrizo-Wilcox GAM projects have compiled this information, and used the BEG research on the transmissivity values derived from specific capacity tests, which are numerous and easy to find.

Figure 8.1.3 in INTERA (2002) illustrates the calibrated horizontal hydraulic conductivity field of the Carrizo, which ranges from 10 to 50 ft/day over most of the study area. The greatest hydraulic conductivity values are in the western portion of the county, which coincides with the portion of the aquifer with higher percentages of sand content.

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Aquifer pumping tests conducted by LGB-Guyton (1998a, 1998b, and 2002) for the SSLGC project yielded estimated transmissivity values ranging from about 130,000 gpd/ft to 144,000 gpd/ft.

### **Storativity**

Evaluation of aquifer pumping test results (LGB-Guyton, 1998a, 1998b, and 2002) used an estimated storativity of 0.0005.

### **Potentiometric Surface Map**

Figure 3 is a potentiometric surface map of the Carrizo aquifer in Gonzales County, based on data collected primarily in August-October 2002 by the GCUWCD. Other potentiometric surface maps of the Carrizo aquifer have been prepared (e.g., BEG (2002) and INTERA (2002)), but generally on a regional, multi-county basis with relatively few data points that represent a "composite" of water level times. Hydraulic head in the Carrizo ranges from nearly 400 feet above mean sea level (msl) along the western boundary of the county at the outcrop to less than 330 feet msl downdip toward the southeast.

The pattern and spacing of the potentiometric surface contour lines reveal two distinct areas of groundwater flow in the Carrizo aquifer. In the western portion of the county west of the San Marcos arch, the contour lines are generally oriented north-south, indicating that the direction of groundwater flow is toward the east. Tracing the groundwater flow paths upgradient to the west, the originating zone of groundwater recharge is from the portion of the Carrizo outcrop in Guadalupe County south of the Guadalupe River. Recharge at this outcrop segment supplies water to the Carrizo flow system in the western portion of the county.

The Carrizo aquifer north of the Guadalupe River clearly reveals a different pattern of groundwater flow than the western portion of the county. Potentiometric surface contours in this area exhibit a general east-west orientation with some undulations that may be due to sparser well control or possibly the structural influence of the San Marcos arch on aquifer thickness and transmissivity. Regardless, these contour lines suggest that the general direction of groundwater flow in this area of the county is predominantly to the south-southeast. Downgradient flow in this portion of the Carrizo aquifer would be attributable to recharge on the outcrop portion located north of the Guadalupe River.

There are many possible controlling factors (such as variations in aquifer transmissivity due to changes in thickness and lithology, existence of localized cones of depression from pumping operations) that can affect the configuration of the potentiometric surface. It is likely that implementation of groundwater development projects in the western portion of the county will alter the configuration of the potentiometric surface (see Figures 94-98 of BEG, 2002). Therefore, to evaluate the different groundwater flow conditions in the county, the San Marcos Arch was selected as the "boundary" between the groundwater flow zones since the transmissivity characteristics, unlike the potentiometric surface, will be constant or nearly constant through time regardless of the factors influencing the configuration of the potentiometric surface.

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#### Recharge

Recharge to the Carrizo aquifer is predominantly at the outcrop of the formation that for the most part is west of the county in eastern Guadalupe County. The Southern and Central Carrizo-Wilcox GAMs include recharge as a major component of the groundwater balance. Recharge on the outcrop that contributes to the Carrizo flow system in Gonzales County is estimated to range from less than 1 inch per year to perhaps more than 3 inches per year. For this evaluation, the treatment of recharge in the Southern Carrizo-Wilcox GAM was used in the estimate of the Carrizo groundwater balance. Recharge values are based on the soil water assessment tool (SWAT), as presented in the GAM report. Figure 8.18 (INTERA, 2002) and Figure 39 (BEG, 2002) illustrate the outcrop recharge ranges for each grid cell of the Southern and Central Carrizo-Wilcox GAMs.

The GAM recharge rates presented above are in general agreement with recent estimates of recharge for the Carrizo-Wilcox aquifer system. LBG-Guyton and HDR (1998) presented county-by-county estimates for the Carrizo-Wilcox based on the results of groundwater modeling. The "potential" Carrizo-Wilcox recharge for Gonzales County is estimated at 7.15 in/yr, although INTERA (2002) noted that this estimate may be in error due to the relatively small outcrop area. The recharge rate for Guadalupe County was estimated to be 1.04 in/yr, and Caldwell County was estimated at 0.19 in/yr. BEG (2002) estimated that the net recharge (gross recharge minus evapotranspiration of groundwater) rate to the Carrizo aquifer in the central model area is 0.2 in/yr.

Steady-state simulation of groundwater flow in the Carrizo aquifer by the Southern Carrizo-Wilcox GAM resulted in an estimated recharge of 2,548 ac-ft/yr in West Gonzales County and 1,100 ac-ft/yr in East Gonzales County. These values are for the outcrop of the Carrizo in Gonzales County only; based on area and location of the Carrizo outcrop, most of the recharge entering the Carrizo flow system is in Guadalupe and Caldwell counties.

#### **Surface Water/Groundwater Relationship**

Groundwater in the Carrizo aquifer may be replenished by or discharged to major rivers and streams. This subject has been evaluated by HDR and LBG-Guyton (1998) in their study of the regional Carrizo and Wilcox aquifer system in South Texas, including Gonzales County. This work considered both base flow conditions and flood flow. The Southern Carrizo-Wilcox GAM built on this work and published values of stream leakance, expressed in cubic feet/day per grid cell, for the San Marcos and Guadalupe Rivers interacting with the Carrizo aquifer. Figure 8.2.7 of the GAM provides the values of leakance that were used to calibrate the groundwater flow model. In Gonzales County, the major streams receive water from the aquifer, as can be seen from the configuration of the Carrizo potentiometric surface contours which bend upstream near these rivers. The GAM concluded "there is a depression in the head surface in Gonzales County. This depression is considered the results of a large number of streams running through that area (p.8-17)."

The Southern Carrizo-Wilcox GAM stream leakance values were used for this evaluation. The GAM estimates that under steady-state conditions discharge of Carrizo groundwater to streams is 1,407 ac-ft/yr in West Gonzales County and 2,796 ac-ft/yr in East Gonzales County.



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### **Cross-Formational Flow**

Most groundwater flowing downdip in the Carrizo aquifer ultimately exits upward as cross-formational flow through the overlying Reklaw and Queen City formations. This potential for upward flow in western Gonzales County is supported by the existence of flowing Carrizo wells. The quantity of groundwater that flows out of the Carrizo is dependent upon the hydraulic head relationships between the Carrizo and the overlying formations and the vertical hydraulic conductivity of the upper confining units. As heads decrease in the aquifer as groundwater development progresses, the potential for water exiting the aquifer through overlying strata will tend to decrease. It is possible that some groundwater flows into the Carrizo from the underlying Wilcox strata, although this amount is believed to be very small in comparison to the contribution of outcrop recharge (INTERA, 2002). Klemt (1976) estimated that cross-formational flow from younger strata to the regional Carrizo aquifer southwest of Gonzales County is approximately 10,000 ac-ft/yr. BEG (2002) estimated that cross-formational flow discharged from the Carrizo is approximately 36,300 ac-ft/yr over the central GAM model area.

The most specific estimate available for Gonzales County is based on the Southern Carrizo-Wilcox GAM simulation. For steady state conditions, the steady-state GAM simulations estimate that a net of 10,736 ac-ft/yr of groundwater flows out of the top of the Carrizo in West Gonzales County, and a net of 6,601 ac-ft/yr of groundwater flows out of the top of the Carrizo in East Gonzales County. These net cross-formational flow estimates take into account the relatively small amount of groundwater that flows into the Carrizo from below.

### **Horizontal Exchange**

In addition to groundwater input to the Carrizo due to recharge at the outcrop, there is groundwater inflow to the Carrizo from upgradient locations in adjacent counties (principally Guadalupe and Caldwell Counties, but also Wilson and Fayette Counties). This contribution, called horizontal exchange by the GAM, represents additional groundwater input under pre-development or early-development conditions that could be significantly altered by the implementation of future groundwater development projects. Based on the Southern Carrizo-Wilcox GAM, the horizontal exchange for West Gonzales County is 9,784 ac-ft/yr of groundwater flow into the area, and for East Gonzales County is 8,250 ac-ft/yr. These are net values of groundwater flow into the areas, and include exchange of flow between the two areas of the county, as well as groundwater flow in and out of the Carrizo across the county boundaries.

The GAM simulation predicts that under steady-state conditions there will be some hydraulic communication over the San Marcos Arch between the west and east portions of the county. The model estimates that 749 ac-ft/yr will flow from the west to the east.

### **Water Quality Issues**

Figure 3 is a contour map of total dissolved solids (TDS) concentrations in the Carrizo aquifer. Overall, the available data show that the quality of water in the Carrizo is very good over most of the county. However, there is an abrupt increase in TDS concentrations in the southwestern portion of the county near the Karnes fault zone. It is not known what relationship this fault zone has to the occurrence of poorer quality groundwater, and whether future groundwater

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development and changing hydraulic conditions will alter the current distribution of high TDS groundwater.

### 4 Carrizo Groundwater Availability

Groundwater availability for the Carrizo aquifer in Gonzales County has been estimated by using the steady-state simulation of the Southern Carrizo-Wilcox GAM for two groundwater flow areas within the county. The following points summarize the principal issues related to groundwater availability in the Carrizo aquifer:

- The Carrizo aquifer is currently completely saturated and under artesian pressure.
- The southwest area of the county is much better characterized than northeast area of the county. Based on the configuration of the potentiometric surface of the Carrizo, two groundwater flow systems may be defined separated approximately by the San Marcos arch. The Carrizo aquifer thins significantly over the arch. These flow systems are supplied by different Carrizo outcrop recharge sources and exhibit different groundwater flow directions. Because of the different characteristics of these groundwater flow systems, it is appropriate to develop separate groundwater balance estimates for these two areas. These groundwater balances may be used as input to decisions regarding the management of groundwater in these two areas.
- Countywide, volume of groundwater in Carrizo aquifer exceeds the projected demands. Within the county two groundwater flow system areas will experience very different impacts depending on the location and magnitude of groundwater development projects.
- The unavoidable consequence of increasing pumping for groundwater development is decreasing water levels. There will likely be a decrease in Carrizo water levels on the order of one hundred to several hundred feet (depending on proximity to pumping centers) in the southwest area if all proposed projects are developed. Based on an overall decrease in hydraulic head, distributed evenly across the county, approximately 15,175 ac-ft in the west and 13,625 ac-ft in the east would be released from storage in the Carrizo aquifer if the potentiometric surface decreased 100 feet. These values are based on the relationship between aquifer storativity and hydraulic head; actual decreases in the potentiometric surface would be unevenly distributed and dependant on actual pumping rates and the configuration of wells fields.
- The possible consequences (if any) of lowered hydraulic head to water quality in southwest area of county are not known.

The hydrostratigraphic and groundwater flow conditions in the Carrizo aquifer support the concept of defining separate groundwater management zones for the western and eastern portions of Gonzales County. Tables 1 and 2 summarize the approximate groundwater balance for the two

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groundwater flow systems in the Carrizo aquifer in  
Gonzales County. Table 3 provides a complete listing of the output of the Southern Carrizo-  
Wilcox GAM for the west and east portions of the county, as well as the entire county.



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**Table 1. Summary of Estimated Carrizo  
Groundwater Water Balance  
West Gonzales County  
(all numbers in acre-feet/year)**

<u>Water Balance Components</u>	<u>Remarks</u>
Recharge: +2,548	Southern Carrizo-Wilcox GAM-based recharge values – for Gonzales County Carrizo outcrop only
Net Horizontal Exchange: +9,784	Southern Carrizo-Wilcox GAM estimate (includes recharge on Carrizo outcrop in adjacent counties, plus net inflow of Carrizo groundwater from adjacent counties and eastern Gonzales County)
River Discharge: -1,407	Southern Carrizo-Wilcox GAM-based leakage values – applied to rivers and streams.
Net Cross-Formational Flow: -10,736	Based on steady-state simulation of groundwater flow in the Carrizo aquifer in West Gonzales County by the Southern Carrizo-Wilcox GAM
Release from Storage (h = 100 ft drop): +15,175	Depends on water level decrease; volume of water released from aquifer based on storativity (S) from pumping tests: $V = S \times \text{Area} \times h$ . Area of aquifer south of San Marcos arch estimated to be 303,550 acres.

### Notes

1. Positive values represent Carrizo groundwater inflow, negative values represent groundwater outflow.
2. The 1% difference in the groundwater inflow/outflow balance are due to the small values of evapotranspiration not considered, plus model variability.



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**Table 2. Summary of Estimated Carrizo Groundwater Water Balance  
East Gonzales County**  
(all numbers in acre-feet/year)

<u>Water Balance Components</u>	<u>Remarks</u>
Recharge: +1,100	Southern Carrizo-Wilcox GAM-based recharge values – Gonzales County Carrizo outcrop only.
Net Horizontal Exchange: +8,250	Southern Carrizo-Wilcox GAM estimate (includes recharge on Carrizo outcrop in adjacent counties, plus net inflow of Carrizo groundwater from adjacent counties and western Gonzales County)
River Discharge: -2,796	Southern Carrizo-Wilcox GAM-based leakance values - applied to rivers and streams.
Net Cross-Formational Flow: -6,601	Based on steady-state simulation of groundwater flow in the Carrizo aquifer in East Gonzales County by the Southern Carrizo-Wilcox GAM
Release from Storage (h = 100 ft drop): +13,625	Depends on water level decrease; volume of water released from aquifer based on storativity (S) from pumping tests: $V = S \times \text{Area} \times h$ . Area of aquifer north of San Marcos arch estimated to be 272,500 acres.

Note:

1. Positive values represent Carrizo groundwater inflow, negative values represent groundwater outflow.
2. The less than 0.5% difference in the groundwater inflow/outflow balance are due to the small values of evapotranspiration not considered, plus model variability.



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**Table 3. Gonzales County Groundwater Budget  
for Carrizo Aquifer  
based on Southern Carrizo-Wilcox GAM**

<b>Western County</b>			
Budget Term	IN (AFY)	OUT (AFY)	IN-OUT (AFY)
Horiz. Exchange (external)	11,584	1,050	10,533
Horiz. Exchange (internal east-west)	1,287	2,036	-749
Exchange (upper)	2,877	14,204	-11,327
Exchange (lower)	685	97	597
Recharge	2,548	0	2,548
ET	0	5	-5
Stream Leakage	0	1,407	-1,407
<b>Total</b>	<b>18,990</b>	<b>18,800</b>	<b>191</b>
Percent Discrepancy			1.01
<b>Eastern County</b>			
Budget Term	IN (AFY)	OUT (AFY)	IN-OUT (AFY)
Horiz. Exchange (external)	8,551	1,050	7,501
Horiz. Exchange (internal east-west)	2,036	1,287	749
Exchange (upper)	1,996	8,921	-6,925
Exchange (lower)	364	40	324
Recharge	1,100	0	1,100
ET	0	14	-14
Stream Leakage	0	2,796	-2,796
<b>Total</b>	<b>14,047</b>	<b>14,108</b>	<b>-61</b>
Discrepancy			-0.43
<b>Entire County</b>			
Budget Term	IN (AFY)	OUT (AFY)	IN-OUT (AFY)
Horiz. Exchange (external)	20,135	2,101	18,034
Exchange (upper)	4,873	23,125	-18,252
Exchange (lower)	1,058	137	921
Recharge	3,648	0	3,648
ET	0	19	-19
Stream Leakage	0	4,202	-4,202
<b>Total</b>	<b>29,715</b>	<b>29,585</b>	<b>130</b>
Discrepancy			0.44

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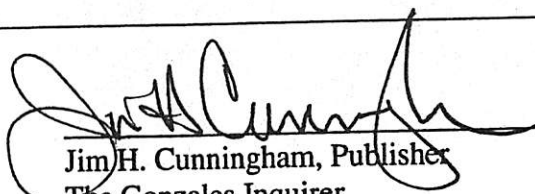
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- Shafer, G.H., 1965, Ground-Water Resources of Gonzales County, Texas: TWDB Report 4, 89 pages.
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- Thorkildsen, R., and R. Price, 1991, Ground-Water Resources of the Carrizo-Wilcox aquifer in the Central Texas Region: Texas Water Development Board Report No. 332.
- Bureau of Economic Geology, 2002, Groundwater Availability Model for the Central Part of the Carrizo-Wilcox Aquifer in Texas: prepared for the Texas Water Development Board, draft report September 2002.
- INTERA, 2002, Groundwater Availability Model for the Southern Carrizo-Wilcox Aquifer: prepared for the Texas Water Development Board, draft report September 2002.

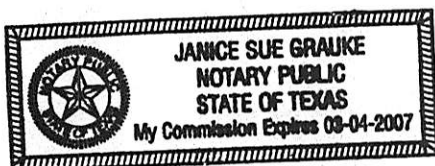
## PUBLISHER'S AFFIDAVIT


THE STATE OF TEXAS, County of Gonzales, BEFORE ME, the undersigned Authority, on this day personally appeared Jim H. Cunningham of THE GONZALES INQUIRER, a newspaper published at Gonzales, County of Gonzales and State of Texas, who, being by me duly sworn on oath, states that the advertisement of which the hereto attached clipping is a true and correct copy, was published in said newspaper in one (1) issues thereof on the following dates

March 4, 2003

  
Jim H. Cunningham, Publisher  
The Gonzales Inquirer

Subscribed and sworn to before me, this the 14th day of July, 2003



  
Janice Sue Grauke  
Notary Public, State of Texas

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**NOTICE OF PUBLIC HEARING OF GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT**  
Will hold a public hearing on a Proposed Changes to the District's Management Plan

The Gonzales County Underground Water Conservation District will hold a public hearing for the purpose of receiving comment on proposed changes to the District Management Plan. Copies of the proposed changes are available at the District Office for public review. The Board of Directors will take public comment on these proposed changes on Tuesday, March 11, 2003, at the American National Bank Hospitality Room, 1606 N. Sarah DeWitt, Gonzales, TX. The public hearing is to commence after the first two posted hearings to be held 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 proposed change to the District Management Plan.

Asylum

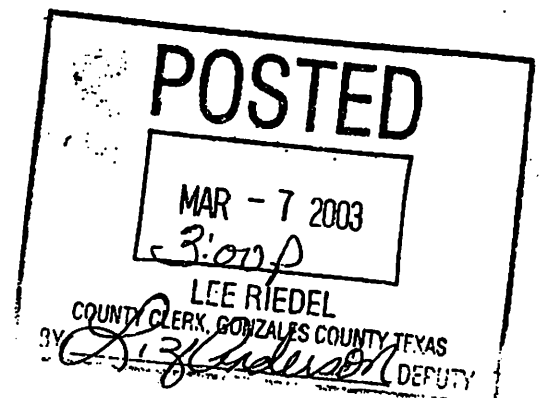
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THE ORIGINAL WORK

**NOTICE OF PUBLIC HEARING  
OF  
GONZALES COUNTY UNDERGROUND  
WATER CONSERVATION DISTRICT  
Will hold a public hearing on a  
Proposed changes to the  
District's Management Plan**

The Gonzales County Underground Water Conservation District will hold a public hearing for the purpose of receiving comment on proposed changes to the District Management Plan. Copies of the proposed changes are available at the District office for public review. The Board of Directors will take public comment on these proposed changes on Tuesday, March 11, 2003 at the American National Bank Hospitality Room, 1606 N. Sarah DeWitt, Gonzales, TX. The public hearing is to commence after the first two posted hearings to be held 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 proposed change to the District Management Plan.
4. Adjourn.



**Gonzales County Underground Water Conservation District**  
**Minutes of the Board of Directors**  
**March 11, 2003**  
**Public Hearing**

The Board of Directors of the Gonzales County Underground Water Conservation District (the District) was called to order. Present for the meeting were directors: Jim Wilson, Morgan Barnett, and Emmet Baker Jr. Also present for the meeting was GCUWCD manager Mr. Barry Miller, Bill Klemt, Crockett Camp, Kennon Lee Cantley, Donnie Janciek, Donna Bustos, N. Patterson, Larry French, Craig Hines, Linda Duncan and J. Hamlett.

There was a public hearing on proposed changes to the District Management Plan. Bill Klemt asked will there be no more water after the stored water is used.

The motion was made by Mr. Morgan Barnett and seconded by Mr. Emmet Baker Jr. to adjourn the meeting, and was approved unanimously.

Approved by:



3-8-03  
Date

BM:ss

**Gonzales Co. Underground Water Conservation Dist.**

920 Saint Joseph  
P. O. 1919  
Gonzales, Texas 78629

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Phone 830 672 1047

June 2, 2003

Mr. William West  
General Manager  
Guadalupe Blanco River Authority  
933 East Court Street  
Seguin, Texas 78155

Dear Mr. West,

The Gonzales County Underground Water Conservation District would like very much for you to attend the next board meeting. The directors would like to discuss water supply issues and future plans for water supply. The meeting will be held on June 10, 2003 at 5:30 p.m. in the American National Bank hospitality room at 1606 North Sarah Dewitt. If you have any questions or concerns, please give me a call.

We are looking forward to meeting with you.

Sincerely,

Barry Miller,  
Manager GCUWCD

BM:ss

William V. Hyman  
President  
830/672-3468

Jim Wilson  
Vice President  
830/424-3785

Emmet J. Baker  
Secretary  
830/672-6468

John D. Turk  
Director  
830/672-6454

Morgan Barnett  
Director  
830/437-2240

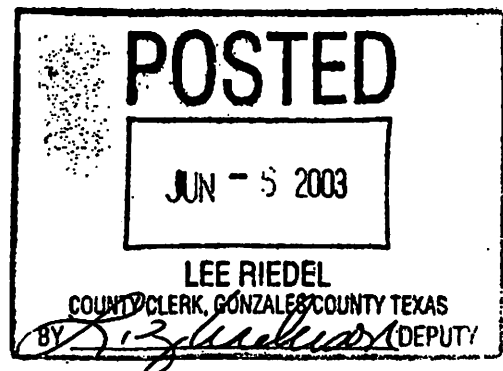
**NOTICE OF PUBLIC MEETING  
GONZALES COUNTY UNDERGROUND WATER  
CONSERVATION DISTRICT  
MEETING OF THE BOARD OF DIRECTORS**

The Directors of the Gonzales County Underground Water Conservation District will meet in public session on June 10, 2003 at 5:30 p.m. at the American National Bank Community Room, 1606 N. Sarah DeWitt, Gonzales, Texas.

The agenda is as follows:

1. Call to order.
2. Review minutes of May 13, 2003 board meeting and public hearing.
3. Discuss and take action on the District's bills to be paid.
4. Discuss and consider extending Dorothy Ploeger's well permit
5. Discuss conjunctive water use issues with the GBRA representatives.
6. Discuss and consider delineation of mitigation areas.
7. Presentation from Dewville Underground Water and Property Rights Association
8. Update on the status of the Management Plan for the GCUWCD
9. Manager's Report
10. Public Comment
11. Adjourn

POSTED THIS THE 6 DAY OF June 6, 2003 AT 2:30 O'CLOCK



**Gonzales County Underground Water Conservation District  
Minutes of the Board of Directors  
March 11, 2003  
Board Minutes**

The Board of Directors of the Gonzales County Underground Water Conservation District (the District) was called to order. Present for the meeting were directors: Jim Wilson, Morgan Barnett and Emmet Baker Jr. Also present for the meeting was GCUWCD manager Mr. Barry Miller, Crockett Camp, Bill Klemt, Donnie Janicek, Kennon Lee Cantley, Donna Bustos, N. Patterson, Larry French, Craig Hines, Linda Duncan and J. Hamlett.

The minutes from February 11, 2003 Board meeting were reviewed and approved with changes. The motion was made to approve the minutes by Mr. Morgan Barnett and seconded by Mr. Emmet Baker Jr.. The motion was passed unanimously.

The Board then reviewed the district's outstanding bills. The bills were as follows: \$368.00 for office rent from the US Post Office, \$96.76 to McLeod for local and long distance telephone service, \$36.19 to Cingular Wireless for Barry's basic mobile bill, \$123.61 to Viking for office supplies, \$30.00 to TGWA for renewal, \$735.00 to Fisher Scientific for lab equipment (PH meter) and \$836.88 to Appraisal District for quarterly payment. Mr. Emmet Baker Jr.. made a motion, and seconded by Mr. Morgan Barnett to pay the district's outstanding bills. The motion was passed unanimously.

The Board reviewed Nixon's new well permit. It was approved with exception to spacing to their other wells. The motion was made to approve the well with an exception to the spacing by Mr. Emmet Baker Jr., and seconded by Mr. Morgan Barnett and was passed unanimously.

The Board discussed and took action on the proposed production permit filed by City of Smiley. The motion was made to approve the permit by Mr. Morgan Barnett and seconded by Mr. Emmet Baker Jr. The motion was passed unanimously.

The Board discussed and considered extending Schertz-Seguin Local Government's #7 & #8 well permits. The motion was made to approve the extension by Mr. Emmet Baker Jr. and seconded by Mr. Morgan Barnett. The motion was passed unanimously.

The Board discussed and considered adopting the revised Management Plan for the District. The motion was to approve the Management Plan with changes by Mr. Morgan Barnett and seconded by Mr. Emmet Baker Jr. The motion was passed unanimously.

**Other Items of Interest & Manager's Report:**

The manager reported the Palmer drought index shows 6+ which is extremely wet. Schertz-Seguin 's pumpage report showed 622.16 AF YTD, and the transportation fee amounted to \$2,552.03 for the month to GCUWCD. Bob McCurdy from Pecan Valley had been in contact with Mr. Miller concerning district operation. Plum Creek Water Conservation District is adapting Gonzales County's rules to their district. The motion was made to pay Mr. Miller's expenses by Mr. Morgan Barnett and seconded by Mr. Emmet Baker Jr. and passed unanimously.

The motion was made by Mr. Morgan Barnett and seconded by Mr. Emmet Baker Jr. to adjourn the meeting and was passed unanimously.

Approved By:



4-8-03

Date  
BM:ss



**Gonzales County Underground Water Conservation District**  
**Minutes of the Board of Directors**  
**June 10, 2003**  
**Board Minutes**

The Board of Directors of the Gonzales County Underground Water Conservation District (the District) was called to order. Present for the meeting were directors: Bill Hyman, Jim Wilson, Morgan Barnett and Emmet Baker Jr. Also present for the meeting was GCUWCD manager Mr. Barry Miller. Other Attendees: (See Attached List)

The minutes from May 13, 2003 Board meeting were reviewed and approved with changes. The motion was made to approve the minutes by Mr. Morgan Barnett and seconded by Mr. Emmet Baker Jr.. The motion was passed unanimously.

The Board then reviewed the district's outstanding bills. The bills were as follows: \$368.00 for office rent from the US Post Office, \$102.86 to McLeod for local and long distance telephone service, \$36.81 to Cingular Wireless for Barry's basic mobile bill, \$168.18 to Viking for office supplies and \$836.88 to Gonzales Appraisal District for quarterly dues. Mr. Emmet Baker Jr. made a motion, and seconded by Mr. Jim Wilson to pay the district's outstanding bills. The motion was passed unanimously.

The Board reviewed Mrs. Dorothy Ploeger's permit. It was approved to extend the permit for 6 months from this date. The motion was made by Mr. Morgan Barnett and seconded by Mr. Emmet Baker Jr.. The motion was passed unanimously.

Fred Blumberg gave presentation on GBRA service area. Three customers in Gonzales County are using Canyon Water, - 2 irrigators and GCWSC. Mr. Blumberg outlined water supplies in the Guadalupe basin and spoke about the Guadalupe river division to supply San Antonio and the need for Carrizo water to make up for the shortfall.

Andy Batey spoke representing Dewville Underground Water and Property Rights Association. Andy says more people are being affected than are being paid for their water. Guadalupe County has lowered the pumping limit to .2 a/ft. The group is concerned with ownership and property rights and that landowners have no bargaining leverage. (Detailed letter is included). The group believes that irrigators should have to buy water just like cities.

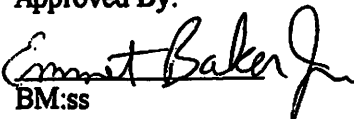
The board then reviewed the status of the management plan. It has been resubmitted to the Texas Water Development Board for precertification review.

**Other Items of Interest & Manager's Report:**

Schertz-Seguin Local Government Corporation has adopted a policy to mitigate well owners for lower water levels. There have been lots of complaints on the lower water levels. The artesian pressure at the City of Smiley's wells has dropped but it recently rebounded and no explanation could be found for the initial pressure drop. The district has been checking many water levels in the western portion of Gonzales County. Barry further reported that H.T. Littlefield's well, supplying water to livestock, has quit flowing. The pumping report for Schertz-Seguin indicated that they have pumped 110% of their allowable for the month of May. Schertz-Seguin will make available forms for mitigation and provide the district with copies for landowners. The motion was made to pay Mr. Miller's expenses by Mr. Emmet Baker Jr. and seconded by Mr. Morgan Barnett.

The motion was made by Mr. Emmet Baker Jr. and seconded by Mr. Morgan Barnett to adjourn the meeting and was passed unanimously.

Approved By:

  
BM:ss

7-8-03  
Date

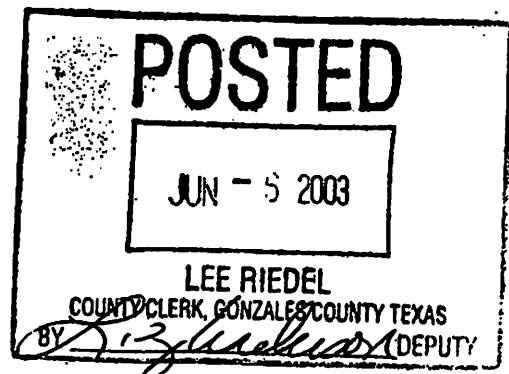
**NOTICE OF PUBLIC MEETING  
GONZALES COUNTY UNDERGROUND WATER  
CONSERVATION DISTRICT  
MEETING OF THE BOARD OF DIRECTORS**

The Directors of the Gonzales County Underground Water Conservation District will meet in public session on June 10, 2003 at 5:30 p.m. at the American National Bank Community Room, 1606 N. Sarah DeWitt, Gonzales, Texas.

The agenda is as follows:

1. Call to order.
2. Review minutes of May 13, 2003 board meeting and public hearing.
3. Discuss and take action on the District's bills to be paid.
4. Discuss and consider extending Dorothy Ploeger's well permit
5. Discuss conjunctive water use issues with the GBRA representatives.
6. Discuss and consider delineation of mitigation areas.
7. Presentation from Dewville Underground Water and Property Rights Association
8. Update on the status of the Management Plan for the GCUWCD
9. Manager's Report
10. Public Comment
11. Adjourn

POSTED THIS THE 6 DAY OF June 6, 2003 AT 2:30p O'CLOCK



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

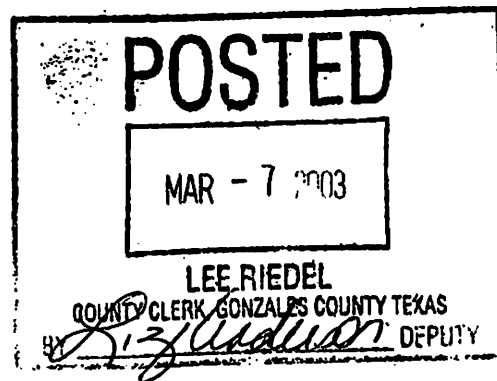
**THE ORIGINAL WAS**

The Directors of the Gonzales County Underground Water Conservation District will meet in public session on March 11, 2003 immediately following the public hearings set for 5:30 p.m. at the American National Bank Community Room, 1606 N. Sarah DeWitt, Gonzales, Texas.

The agenda is as follows:

1. Call to order.
2. Review minutes of February 11, 2003 board meeting.
3. Discuss and take action on the District's bills to be paid.
4. Discuss and take action on the proposed permit to drill a new well filed by City of Nixon
5. Discuss and take action on the proposed production permit filed by City of Smiley
6. Discuss and consider extending Schertz-Seguin Local Government's #7 & #8 Well permits.
7. Discuss and consider adopting the revised Management Plan for the District.
8. Manager's Report.
9. Public Comment
10. Adjourn

POSTED THIS THE 7 DAY OF March 6, 2003 AT 3:00 O'CLOCK




**Gonzales County Underground  
Water Conservation District**

**Board Resolution 03-03  
Adoption of the revised Management Plan**

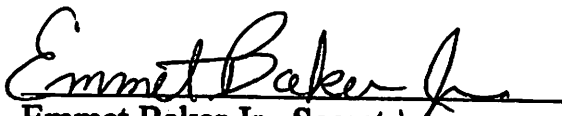
Be it resolved the Board of Directors of the Gonzales County Underground Water Conservation District do hereby adopt a new Management Plan pursuant to chapter 36.1071 of the water code. This Management Plan will replace the Management Plan adopted on November 26, 1997.

Be it resolved the Board of Directors of the Gonzales County Underground Water Conservation District do hereby adopt this Management Plan for a ten year following approval as administratively complete by the Texas Water Development Board.

This Resolution shall become effective on 03/11/03.



\_\_\_\_\_  
William V. Hyman, President  
Gonzales County Underground Water Conservation District



\_\_\_\_\_  
Emmet Baker Jr., Secretary  
Gonzales County Underground Water Conservation District

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PS Form 3800, June 2002 See Reverse for Instructions

Phone 830 672 1047

July 14, 2003

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

RE: Gonzales County Underground Water Conservation District  
Groundwater Management Plan

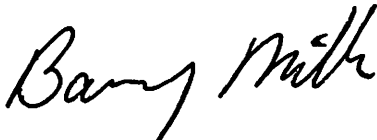
Dear Mr. West,

Enclosed please find a copy of the final version of the Groundwater Management Plan for the Gonzales County Underground Water Conservation District adopted on June 10, 2003 for your review and comment. Rules and Technical Memorandum are attached.

Thank you for your assistance and we hope to meet with you in 2004 to discuss groundwater availability, and the interface of your management of surface water and the groundwater resources within the Gonzales County district.

If you have any questions please do not hesitate to contact me.

Thank you,



Barry Miller  
Mgr. Gonzales County Underground  
Water Conservation District

William V. Hyman  
President  
830/672-3468

Jim Wilson  
Vice President  
830/424-3785

Emmet J. Baker  
Secretary  
830/672-6468

John D. Turk  
Director  
830/672-6454

Morgan Barnett  
Director  
830/437-2240

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 City, State, ZIP+4<sup>®</sup> **Seuling, R. 78155**  
 PS Form 3800, June 2002  
 See Reverse for Instructions

Gonzales Co. Underground Water Conservation Dist.

920 Saint Joseph  
P. O. 1919  
Gonzales, Texas 78629

Phone 830 672 1047

July 15, 2003

Ms. Evelyn Bonavita  
Chairman Region L Planning Committee  
C/c San Antonio River Authority  
P.O. Box 839980  
San Antonio, Texas 78283-9980

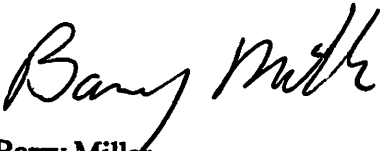
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Dear Ms. Bonavita,

In compliance with statute, enclosed please find the proposed management plan of the Gonzales County Underground Water Conservation District. Please review same for any conflict with the Region L Plan and advise us of any problems you see. Should you need additional information, please let me know. The technical memorandum and the rules of the district are also enclosed so that you maybe fully informed about the groundwater management efforts of the Gonzales County Underground Water Conservation District.

If you have any questions please do not hesitate to contact me.

Thank You,



Barry Miller  
Mgr. Gonzales County Underground  
Water Conservation District

William V. Hyman  
President  
830/672-3468

Jim Wilson  
Vice President  
830/424-3785

Emmet J. Baker  
Secretary  
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830/437-2240