

Wintergarden Groundwater Conservation District Groundwater Management Plan

Adopted _____ TEXAS WATER DEVELOPMENT BOARD approval on _____

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Table of Contents

	Page
I. District's Mission	1
II. Purpose of the Management Plan	1
III. District Information	1
IV. Criteria for Plan Approval	3
V. Desired Future Conditions and Modeled Available Groundwater	3
VI. Groundwater Budget	5
VII. Projected Total Demand for Water in the District	5
VIII. Projected Surface Water Supply	5
IX. Water Management Strategies	5
X. Estimated Historical Water Use Summary	6
XI. Management of Groundwater Resources	6
XII. Methodology the District Will Use to Track Progress on an Annual Basis in Achieving All Management Goals	8
XIII. Goals and Objectives	8
XIV. References	11
Appendix A House Bill 3602	
Appendix B Map of Boundaries of Wintergarden Groundwater Conservation District	
Appendix C Public Notices Related to Adoption of the Management Plan	
Appendix D Certified Copy of the Board Resolution Adopting the Management Plan	
Appendix E Correspondence to Surface Water Management Entities	
Appendix F GAM Run 10-012 MAG (2012)	
Appendix G GAM Run 10-041 MAG (2011)	
Appendix H GAM Run 15-007 (2015)	
Appendix I Estimated Historical Water Use and 2012 State Water Plan Datasets (TWDB August 10, 2015)	

I. District's Mission

The mission of the Wintergarden Groundwater Conservation District ("District") is to manage, preserve and protect the groundwater resources within the District's boundaries. The District will work to minimize the further drawdown of water levels, prevent the waste of groundwater, prevent interference between wells, protect the existing and historic use of groundwater, prevent the degradation of the quality of groundwater, use public education to promote water conservation, give consideration to the needs of the agricultural community and carry out the powers and duties conferred under Chapter 36 of the Texas Water Code. Any action taken by the District shall be only after full consideration and respect has been afforded to the individual property rights of all citizens of the District.

II. Purpose of the Management Plan

The purpose of this Management Plan is to provide a planning tool for the District as it moves forward to manage, protect and conserve the groundwater resources within its boundaries. This Management Plan currently contains the hydrogeological and technical information provided by the Texas Water Development Board ("TWDB") regarding the groundwater resources of the District. As the District obtains more site-specific groundwater information, the District will update and amend this Management Plan, as necessary.

The development of the District's Management Plan will enable the District to comply with the requirements of state law. The Texas Legislature created a statewide water planning process with the passage of Senate Bill 1 ("SB 1") in 1997, Senate Bill 2 ("SB 2") in 2001, and Senate Bill 3 ("SB 3") in 2007. The development of management plans by each groundwater conservation district ("GCD") in Texas is an integral part of the statewide water planning process. The District's Management Plan satisfies all the requirements established for GCD's by SB 1, SB 2, SB 3, the requirements of Chapter 36 of the Texas Water Code, and the requirements of the rules of the TWDB.

III. District Information

A. Creation

The District was created in 1997 by the 75th Legislature with the enactment of House Bill 3602 ("Appendix A"). In its enabling legislation, the District was provided the powers and duties provided by the general law of the state of Texas, including Chapter 36 of the Texas Water Code, applicable to groundwater conservation districts created under Section 59, Article XVI of the Texas Constitution. The District was confirmed by election in January 1998. The initial tax rate was \$0.04 per \$100.00 valuation. The District's current tax rate is \$0.00573 per \$100.00 valuation. The District retains the authority and responsibilities specified in its enabling act, Chapter 36 of the Texas Water Code, the TWDB rules, this groundwater Management Plan, and the District rules as they may be amended.

B. Board of Directors

The Board of Directors is made up of seven (7) members. Two (2) directors are elected from each of the three (3) counties within the district, Dimmit, Zavala and La Salle counties in addition to one director at large from the District. Board members serve staggered terms and Board elections are every two years.

C. Authority

The District has the rights and responsibilities provided for in Texas Water Code Chapter 36 and 31 Texas Administrative Code Chapter 356. The District exercises the authority given to preserve and protect the groundwater resources of the District through the adoption and implementation of District Rules.

D. Location and Extent of District Boundaries

The boundaries of the District are coextensive with the boundaries of Zavala, Dimmit and La Salle counties. This includes approximately 2,685,148 acres, or 4,195 square miles. A map showing the District boundaries is contained in "Appendix B".

E. Groundwater Resources of District

The aquifers within the District include the Sparta, Queen City, Carrizo-Wilcox, and Yegua-Jackson. The Carrizo Sand is the principal aquifer in Dimmit, La Salle, and Zavala counties supplying large quantities of water to wells throughout the District. The primary use of Carrizo groundwater within the District is for irrigation, municipal use, and oil and gas activities. The Carrizo outcrops in a belt extending from the Rio Grande through the western part of Dimmit County to the Zavala County line. In the vicinity of the Carrizo Springs anticline, west and southwest of the City of Carrizo Springs, the outcrop has a maximum width of about nine (9) miles narrowing again to about two (2) miles at the Zavala County line. The Carrizo Sand consists of beds of massive, commonly cross bedded, loosely cemented, remarkably clean sand and some minor amount of sand stone and clay. The average thickness of the Carrizo Sand in Dimmit County is about 265 feet; however, the thickness ranges from 0 at the outcrop to a maximum of 360 feet. See Texas Board of Water Engineers, Bulletin 6003, Geology and Ground-Water Resources of Dimmit County, TX 1960.

In Dimmit County, water levels and wells tapping the Carrizo Sand fluctuate in response to changes in groundwater storage and changes in artisan pressure. Water recharging the aquifer in the outcrop tends to make water levels rise, whereas withdrawals from wells tend to make water levels decline. The Carrizo Sand contains water of generally good quality.

The Wilcox portion of the Carrizo-Wilcox Aquifer contains water of acceptable quality, but the Wilcox is not as prolific as the Carrizo Aquifer. As one moves easterly in the District, the Wilcox Group is deeper and the water quality degenerates.

Based on Texas Water Commission Bulletin 6520, August 1965 the Carrizo Sand is, by far, the largest potential source of groundwater in La Salle County. The chemical quality of water from wells in La Salle ranges from fresh to moderately saline. The Carrizo Sand contains the largest quantity of fresh to slightly saline water in this area. According to the published report, yields of up to 1000 GPM might be obtained from the Queen City Sand in much of La

Salle County. The Sparta Sand probably is capable of yielding as much as 400 GPM to wells in the western two-thirds of La Salle County. The water from both the Queen City Sand and Sparta Sand is of doubtful quality for irrigation. However, the water from the Sparta, especially above a depth of about 100 feet, is of better quality than the water from the Queen City Aquifer. Other geologic formations in La Salle are capable of yielding only small quantities of water, and most of the water is saline. There is minor pumping of the Yegua-Jackson Aquifer in La Salle County.

The primary source of usable groundwater in Zavala County is the Carrizo-Wilcox Aquifer. The Yegua-Jackson Aquifer is not present in Zavala or Dimmit counties. According to published reports, the Leona Formation, which is limited in thickness, has been a source of irrigation water in Zavala County. See U.S. Department of the Interior-Texas Board of Water Engineers; Geology and Groundwater Resources of the Winter Garden District, Texas, 1948.

IV. Criteria for Plan Approval

A. Planning Horizon

The Management Plan is adopted to be effective for a ten (10) year planning period, which will begin on the date TWDB approves this plan. In accordance with Section 36.1072(e) of the Texas Water Code and TWDB rules (in 31 TAC §356.3), the District will review and re-adopt its Management Plan with or without amendments, every five (5) years and will re-submit its Management Plan for TWDB approval after re-adoption. This Management Plan will be effective until replaced by a revised plan that has been approved by the TWDB.

B. Plan Adoption

Public notices demonstrating that this Management Plan was adopted after the required public hearing and Board Meeting are attached to this plan as “Appendix C”.

C. Board Resolution

A certified copy of the resolution of the Board of Directors of the District adopting this Management Plan is attached to this plan as “Appendix D”.

D. Coordination with Surface Management Entities

Letters transmitting copies of this Management Plan to the Nueces River Authority and the Region L Regional Water Planning Group are located in “Appendix E” -Correspondence to Surface Water Management Entities.

V. Desired Future Conditions and Modeled Available Groundwater

Modeled available groundwater (“MAG”) is defined in Texas Water Code § 36.001(25) as “the amount of water that may be produced on an average annual basis to achieve a desired future condition established under Section 36.108.” Under Texas Water Code § 36.108(d), the desired future condition (“DFC”) may only be determined through joint planning with other groundwater conservation districts (“GCDs”) in the same groundwater management area (“GMA”). The District is located in GMA-13.

The district members of GMA-13 adopted Scenario 4 (from GAM Run 09-034) an average annual drawdown of 23 feet for the Sparta, Weches, Queen City, Reklaw, Carrizo and the Wilcox Aquifers on April 9, 2010. The district members of GMA-13 adopted Scenario 4 (from GAM Task T10-012) and an average annual drawdown of two (2) feet for the Yegua-Jackson Aquifer on August 12, 2010. Only La Salle County was pumping from the Yegua-Jackson Aquifer within the District; this pumping is only about 12 acre-feet/year and there was no drawdown anticipated in that aquifer within the District.

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 61year simulation period extending from 1999 to 2060. For each aquifer, the DFC average drawdowns encompassed the full extent of the aquifers within the District, from the outcrop to the down dip limits of the aquifer within the District boundary. The GMA-13 wide DFCs equate to drawdowns in the District aquifers as shown below in Table 1.

TABLE 1. AVERAGE 2060 DRAWDOWN IN FEET FOR WINTERGARDEN GROUNDWATER CONSERVATION DISTRICT FROM 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
Wintergarden GCD	5	6	0	-4	0	0	-9	-10	-7

The MAG for the Carrizo-Wilcox, Queen City and Sparta Aquifers in the District is set out in GAM Run 10-012 MAG (Wade, 2012) see Appendix F. The MAG was extracted from results of GAM Model Run 09-034, Scenario 4 and meets the DFCs adopted by members of GMA-13. Table 2 below includes the modeled available groundwater for Wintergarden Groundwater Conservation District.

TABLE 2. MODELED AVAILABLE GROUNDWATER FOR THE CARRIZO-WILCOX, QUEEN CITY AND SPARTA AQUIFERS FOR EACH DECADE BETWEEN 2010 AND 2060 (GAM RUN 10-012 MAG Wade, 2012). RESULTS ARE IN ACRE-FEET PER YEAR.

Groundwater Conservation District	Year					
	2010	2020	2030	2040	2050	2060
Wintergarden	46,660	46,660	46,322	46,189	46,089	45,770

The MAG for the Yegua-Jackson Aquifer for the District is 91 acre-feet per year for each decade between 2010 and 2060 as set forth in GAM Run 10-041 MAG (Hassan, 2011). See Appendix G.

VI. Groundwater Budget

The groundwater budget summarizes how the GAM model estimates water entering and leaving the aquifer. It was derived from GAM Run 15-007, July 29, 2015. See Appendix H.

The total recharge (rainfall/distributed) for Dimmit, La Salle, and Zavala counties from the GAM Run 15-007 is 22,503 acre-feet per year. See Appendix H. Total estimated flow into the District aquifers other than distributed recharge is 29,448 acre feet for a total of 51,951 acre feet per year.

VII. Projected Total Demand for Water in the District

The District's three counties include the following municipalities;

Dimmit: Asherton, Big Wells, Brundage, Catarina, and Carrizo Springs

La Salle: Artesia Wells, Cotulla, Encinal, Fowlerton, Los Angeles, Millett, and Woodward.

Zavala: Batesville, Crystal City, and La Pryor

Based on available data from the 2012 State Water Plan, annual water demands (acre feet/year) in the District have been projected to be:

	2010	2020	2030	2040	2050	2060
Dimmit	14,727	14,611	14,584	14,157	13,677	13,157
La Salle	8,277	8,276	8,245	8,210	8,176	8,134
Zavala	76,832	74,250	71,752	69,283	66,906	64,634
District Total	99,836	97,137	94,581	91,650	88,759	85,925

See Appendix I

Water Supply Needs - Total Water Needs Data (Dimmit, La Salle, and Zavala Counties) - (2012 State Water Plan Supply)

The Projected Water Supply Needs from the TWDB 2012 State Water Plan Data for the District is attached as Appendix I.

VIII. Projected Surface Water Supply (Dimmit, La Salle, and Zavala Counties) – (2012 State Water Plan - Total County Surface Water Supplies)

The Projected Surface Water Supply in the District according to the 2012 State Water Plan is attached as Appendix I.

IX. Water Management Strategies

The following table identifies from 2012 State Water Plan various strategies for Dimmit, La Salle, and Zavala Counties. All the strategies involve conservation. The District has considered the following management strategies and will periodically review them as the State Water Plan is updated.

Projected Water Management Strategies - Total County Water Strategies Data (Dimmit, La Salle, and Zavala Counties) - (2012 State Water Plan)

AWAG	WUG	WUG County	Aver Basin	Water Management Strategy	Source Name	Source County	2010	2020	2030	2040	2050	2060
L	ASHEARD	DIMMIT	NUECES	MUNICIPAL WATER CONSERVATION	CONSERVATION	DIMMIT	20	43	58	59	62	64
L	BIGWELLS	DIMMIT	NUECES	MUNICIPAL WATER CONSERVATION	CONSERVATION	DIMMIT	11	23	30	30	32	33
L	CARRIZO SPRINGS	DIMMIT	NUECES	MUNICIPAL WATER CONSERVATION	CONSERVATION	DIMMIT	152	312	464	590	700	777
Total Projected Water Management Strategies (acre-feet per year) =							183	378	552	679	794	874

AWAG	WUG	WUG County	Aver Basin	Water Management Strategy	Source Name	Source County	2010	2020	2030	2040	2050	2060
L	ENCINAL	LA SALLE	NUECES	MUNICIPAL WATER CONSERVATION	CONSERVATION	LA SALLE	9	9	10	10	11	14
L	COYULLA	LA SALLE	NUECES	MUNICIPAL WATER CONSERVATION	CONSERVATION	LA SALLE	118	248	369	488	615	745
L	COUNTY-OTHER	LA SALLE	NUECES	MUNICIPAL WATER CONSERVATION	CONSERVATION	LA SALLE	3	4	11	17	29	42
Total Projected Water Management Strategies (acre-feet per year) =							130	261	390	515	655	801

AWAG	WUG	WUG County	Aver Basin	Water Management Strategy	Source Name	Source County	2010	2020	2030	2040	2050	2060
L	COUNTY-OTHER	ZAVALA	NUECES	MUNICIPAL WATER CONSERVATION	CONSERVATION	ZAVALA	42	54	71	89	115	149
L	CRYSTAL CITY	ZAVALA	NUECES	MUNICIPAL WATER CONSERVATION	CONSERVATION	ZAVALA	192	364	543	695	850	1,002
L	IRRIGATION	ZAVALA	NUECES	IRRIGATION WATER CONSERVATION	CONSERVATION	ZAVALA	6948	6948	6948	6948	6948	6948
Total Projected Water Management Strategies (acre-feet per year) =							7182	7366	7562	7732	7913	8099

X. Estimated Historical Water Use Summary by Groundwater and Surface Water
Unit: Acre Feet ((acre-feet) - TWDB Water Use Survey Dataset I)

The Estimated Historical water use in the District from 2000 through 2013 derived from the 2012 State Water Plan Dataset is attached as Appendix I.

XI. Management of Groundwater Resources / Actions, Procedures, Performance and Avoidance Necessary to Effectuate the Plan

The Texas Legislature has established that GCDs are the state's preferred method of groundwater management. The Texas Legislature codified this policy decision in Section 36.0015 of the Texas Water Code, which establishes that districts will manage groundwater resources through rules developed and implemented in accordance with Chapter 36 of the Texas Water Code. Chapter 36 gives districts the tools to protect and manage the groundwater resources within their boundaries. The District will use the regulatory rules provided by Chapter 36 and the Texas Legislature to manage the groundwater resources within its boundaries.

The District will manage the groundwater supply within the District to conserve the resource while seeking to maintain the economic viability of all resource user groups, public and private. In consideration of the economic and cultural activities occurring within the District, the District will identify and engage in such activities and practices, that if implemented, would result in a

reduction of groundwater use. A groundwater monitoring well observation network has been established to be maintained by the District in order to monitor changing storage conditions of groundwater supplies within the District. The District will make a regular assessment of water supply and groundwater storage conditions and will report those conditions to the Board and to the public. The District will undertake, if necessary, and cooperate with investigations of the groundwater resources within the District and will make the results of the investigation available to the public upon adoption by the Board.

The District has adopted rules to regulate groundwater withdrawals by means of spacing and production limits: <http://wgcd.net/sites/wgcd.net/files/file/13/wgcd-rules-adopted-november-10-2014a-1.pdf>. In making a determination, the District may deny a well permit or limit groundwater withdrawals via unanimous vote in accordance with the guidelines stated in the rules of the District. In addition, the District will monitor water levels and 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 District will estimate the total annual groundwater production for each aquifer based on water use reports, estimated exempt use, and other relevant information and compare those production estimates to the MAG's. The District will base future permitting decisions on the amount of existing water permitted, amount of existing water being produced, and the condition of the aquifer (average water level drawdown) at the time a permit application is filed in order to achieve the DFC.

The District may deny or limit groundwater withdrawals via unanimous vote following the guideline stated in the rules of the District and this Management Plan. In determining whether to issue a permit other than a groundwater withdrawal, the District will consider the public benefit against individual hardship after considering all relevant evidence, appropriate testimony and all relevant factors.

Water conservation has become a strong initiative throughout the state of Texas. It has been recognized that freshwater is a valued commodity that can only last through preservation. The District may require a conservation plan as a condition to permitting to wells in order to be sure that the groundwater produced is put to a beneficial use and not wasted. The District will work with water utilities, industry, oil and gas sector, and agricultural users to promote the most efficient use of water so that the District may preserve one of its most valuable resources. The District will explore other conservation methods and options and will adopt new requirements as they become necessary.

The District will seek the cooperation and implementation of this Management Plan and the management of groundwater supplies within the District. All activities of the District will be undertaken in cooperation and coordinated with the appropriate state, regional or local water management entities.

Periodic drought is a condition that plagues the District. The Board of Directors of the District is very concerned that water might not be available for the needs of its 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.

A well-informed public is vital to the proper operation of a GCD. 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 District Manager may make presentations to public gathers, as requested, in order to keep the citizens informed about District activities and promote proper use of available groundwater.

Abandoned oil wells and injection wells for oil and gas waste pose the greatest threat to the aquifers of the District. District personnel will monitor oilfield activities and notify the public that they may report abandoned oil wells and other problems associated with oil production to the District. In addition, the District will review all applications filed with the Texas Railroad Commission ("RRC") for injection wells for oil and gas waste proposed to be located within the District. If the District deems a proposed injection well to pose a threat to the groundwater resources of the District, the District will intervene in Texas Railroad Commission proceedings to oppose proposed RRC injection well permits.

XII. Methodology the District Will Use to Track Progress on an Annual Basis in Achieving All Management Goals

The District Manager will prepare an annual report on District performances in achieving the management goals. The annual report will be presented to the Board of Directors during the first quarter of each calendar year. The report will include the number of instances each objective activity was engaged in during the year, referenced to the expenditure of staff time and budget so that the effectiveness and efficiency of each activity may be evaluated. The annual report will be maintained on file at the District Office and made available to the public upon adoption by the Board.

XIII. Goals and Objectives

Goal 1.0 Providing the Most Efficient Use of Groundwater

Management Objectives: District will continue monitoring and recording data from the seven (7) Carrizo Aquifer continuous well water level recorders. A large decrease in water levels could indicate unsustainable mining of groundwater.

Performance Standards: The District will assimilate data from the continuous well water level recorders and present to the Board monthly.

Goal 2.0 Controlling and Preventing Waste of Groundwater

Management Objectives: The District will at least on two (2) occasions each year provide public information on water conservation and waste prevention through public speaking appearances at public schools, and civic organizations or newspaper articles.

Performance Standards:

- A. The number of speaking appearances made by the District each year.
- B. The number of newspaper articles published by the District each year.

Goal 3.0 Controlling and Preventing Subsidence This management goal is not applicable to the District due to the fact that subsidence is not a problem identified in the District or region.

Goal 4.0 Addressing Conjunctive Surface Water Management Issues

Management Objectives: Each year the District will confer at least on one occasion with the Nueces River Authority on cooperative opportunities for conjunctive resource management.

Performance Standard: The number of conferences on conjunctive resource management opportunities held with Nueces River Authority each year.

Goal 5.0 Addressing Natural Resource Issues that Impact the Use and Availability of Groundwater

Management Objectives: Each year the District will insure that all new wells permitted for construction within the District and exempt wells that are registered comply with the District construction standards through monitoring of the State of Texas water well report required to be provided to the District by water well drillers.

Performance Standard: The number of newly permitted water wells within the District monitored for compliance will be reported to the Board annually.

Management Objectives: The District will review all applications filed with the Texas Railroad Commission (TRC) for oil and gas waste disposal or recycling within The District. Where a threat to groundwater resources is posed by a proposed oil and gas waste disposal or recycling project, the District will file a protest of the application with the TRC and, if necessary to protect groundwater resources, participate in contested case hearings.

Performance Standard: Annual Report to the Board summarizing The District's protests of TRC oil and gas waste disposal or recycling applications.

Goal 6.0 Addressing Water Conservation

Management Objectives: The District will promote water conservation by promoting water stewardship by raising public awareness of the necessity and importance of water conservation.

Performance Standard: Annual Report to the Board indicating the number of individuals or schools addressed.

Performance Standard: The number of newspaper articles published encouraging water conservation.

Goal 6.1 Addressing Recharge Enhancement

Management Objectives: The District will monitor existing recharge structure and evaluate how natural or artificial recharge may be increased for the groundwater resources within the District via the existing structure and/or new sites.

Performance Standard: The number of recharge sites monitored will be at least one site annually.

Performance Standard: The number of acre feet of captured rainwater in the recharge pit will be documented and reported to the Board of Directors annually.

Goal 6.2 Addressing Precipitation Enhancement - The Board of Directors feel that precipitation enhancement is not cost effective and is not appropriate for our District at this time.

Goal 6.3 Addressing Brush Control

Management Objective – Recharge Enhancement and Conservation Project with landowners, along with guidance from local Natural Resource Conservation Service (NRCS) and chemical companies, will sponsor, in part, with the landowners’ operations to control brush and provide conservation and recharge. This will include spray, root plowing, roller chopping, and other brush control methods to be approved by the Board of Directors on an individual basis.

Performance Standard: District will verify controls have been followed and report to the Board of Directors on accomplishment of project, cost-to-date per county and other relevant factors.

Goal 6.4 Rainwater Harvesting

Management Objective: The District, in conjunction with other entities, will sponsor, in part, with the entity a rainwater harvesting system for their use, public observation, and education.

Performance Standard: The District will acquire the volume of rainwater captured per year and include this information in the annual report to the Board of Directors.

Goal 7.0 Addressing Drought Conditions

Management Objectives: Each month the District will download the Palmer Drought Severity Index (PDSI) map by accessing the National Weather Service - Climate Prediction Center website http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.shtml. The District will check for updates on the TWDB web page <http://waterdatafortexas.org/drought/>.

Performance Standard: The staff will assess the status of drought in the District and prepare a briefing with maps and situation reports for the Board of Directors. Monthly downloads will be filed for future use. Currently engaged with Southwest Research Institute to develop and prepare a drought contingency plan.

Goal 8.0 Addressing the Desired Future Conditions

Management Objectives: The District will annually compile well monitoring data from seven (7) wells within the District, and will determine seven (7) year water well averages for the Carrizo/Wilcox Aquifer based on this data.

Performance Standard: The District's Annual Report will include a discussion of the newly permitted wells along with water level data as it relates to the 50-year Desired Future Conditions.

References

1. Bulletin 6003 Geology and Ground-Water Resources of Dimmit County; Texas Board of Water Engineers; June 1960
2. Bulletin 6520 Ground-Water Resources of La Salle and Mc Mullen Counties, Texas; Texas Water Commission, August 1965
3. Geology and Ground-Water Resources of the Winter Garden District Texas 1948; Geologic Survey Water-Supply Paper 1481; U.S. Department of the Interior
4. GAM Run 09-034 (TWDB Wade and Jigmound June 29, 2010)
5. GAM Task 10-012 (TWDB Oliver August 9, 2010)
6. GAM Run 10-012 MAG (TWDB Wade August 2, 2012)
7. GAM Run 15-007 Wintergarden Groundwater Conservation District Management Plan (TWDB Bagans and Wade July 29, 2015)
8. GAM Run 10-041 MAG (TWDB Hassan December 11, 2011)
9. Estimated Historical Water Use and 2012 State Water Plan Datasets