

Wintergarden Groundwater Conservation District
2023 Annual Report

April 10, 2024

2881 Hwy. 277 West

Telephone: (830) 876-3801

P. O. Box 1433

Carrizo Springs, TX 78834

Wintergarden Groundwater Conservation District 2023 Annual Report

The Wintergarden Groundwater Conservation District (District) General Manager prepares an annual report on District performance in achieving the management goals. The annual report is presented to the Board during the first quarter of each calendar year. The report discusses each applicable management objective and the associated performance standards so that the effectiveness and efficiency of the activities applied towards the management objective may be evaluated. The annual report will be maintained on file at the District office and made available to the public following presentation to the Board. The District Management Plan identifies twelve goals to guide its operation. Following are summaries of District actions as part of achieving these goals.

Goal 1.0 Providing the Most Efficient Use of Groundwater Management Objective:

The District has a groundwater monitoring well network to track the Carrizo-Wilcox Aquifer static groundwater level across the District. The names and locations of the 15 wells currently in the District monitoring well network are listed in Table 1 and mapped in Figure 1. The Board has determined that monitoring well network is to be expanded.

Table 1. Names and Locations of District Monitoring Wells.

Well	Latitude	Longitude	County	Location
Barrier	28° 27' 13	99° 54' 13	Dimmit	5 mi. SW of Carrizo Springs
Cargil	28° 55' 32.98	99° 49' 35.27	Zavala	2 mi. SE of La Pryor
Dixondale	28° 35' 54.70	99° 42' 32.84	Dimmit	3 mi. West of Brundage
Echols	28° 33' 35.1"	99° 56' 29.3"	LaSalle	8 mi. NNE of Los Angeles
Hargrove	28° 48' 53.6"	99° 46' 02.0"	Zavala	12 mi. NE of Crystal City
Hinojosa	28° 28' 46.90	99° 21' 29.52	LaSalle	8 mi. West of Cotulla
Media Luna	28° 28' 54.53	99° 8' 25.67	LaSalle	4 mi. East of Cotulla
Rutledge	29° 04' 03.3"	99° 38' 49.0"	Zavala	8 mi. North of Batesville
Shape	28° 21' 12.3"	100° 01' 35.0"	Dimmit	18 mi. SW of Carrizo Springs
SW Carrizo	28° 32' 03"	99° 52' 44"	Dimmit	1.2 mi. SW of Carrizo Springs
Briggs Ranch	28° 19' 30"	99° 35' 50"	Dimmit	3 mi. S of Catarina
SE Cotulla	28° 9' 17.4"	99° 5' 59"	La Salle	30 mi. SE of Cotulla
Westwind	28° 56' 46"	99° 41' 40"	Zavala	5.5 mi. of Batesville
Zavala Co.-Loma Alta	28° 48' 43.2"	99° 39' 47"	Zavala	1 mi. SE of Crystal City
Zavala Co.-Batesville	28° 57' 15"	99° 37' 07"	Zavala	Hwy. 117, Batesville

The wells have a variety of water-level measurement instrumentation. The District is in the process of upgrading the existing instrumentation and adding additional wells to the well monitoring network. Ideally, all wells in the District monitoring well network will record at a frequency not less than once a day with measurements transmitted to the District office at least once a day.

Measured water levels can be used to prepare a map of the potentiometric surface of the aquifer. This potentiometric surface map describes the groundwater surface of the aquifer at the time measurements were taken. Over time, changes in the potentiometric surface can be used to show increases and decreases in the water level of the aquifer.

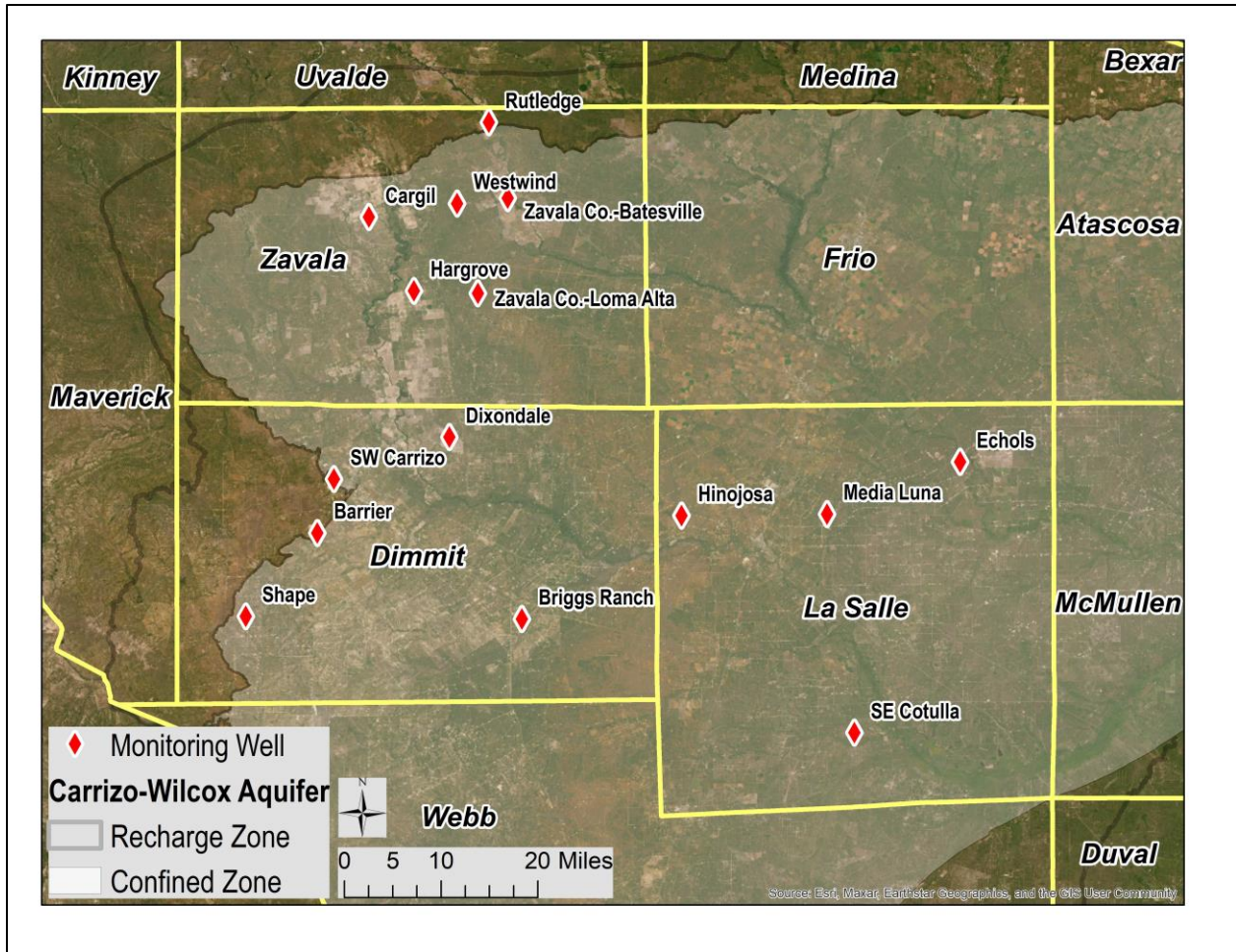


Figure 1. Mapped locations of wells in the District groundwater monitoring network

Stress on the aquifer during drought is exacerbated by reduced pressure resulting from reduced recharge coupled with increased pumping that typically occurs during periods of reduced precipitation and drought. The change in depth to water at each well in the monitoring network in calendar year 2023 is presented in Table 2. Depths to groundwater for the period of measurement for each of the wells in the groundwater monitoring network are presented in Figures 2-10.

Table 2. Net Change in Depth to Groundwater During 2023 (ft)

Well	Depth 12/31/2022	Depth 12/31/2023	Net Change (ft)
Barrier	308.98	310.63	-1.65
Cargil	423.12	418.54	4.58
Dixondale	459.72	458.12	1.60
Echols	388.94	394.33	-5.39
Hargrove	427.80	403.326	24.47
Hinojosa	534.43	534.45	-0.02
Media Luna	566.40	589.90	-23.50
Rutledge	43.49	45.35	-1.86
Shape	187.00	189.00*	-2.00

*12/30/2023

Depth to water for 9 of the 15 wells in the District Monitoring Well Network that have several years of measurements are illustrated in Figures 2-10. The remaining 6 wells in the District Monitoring Well Network were only recently installed and have not yet had sufficient measurements to illustrate trends in groundwater elevation.

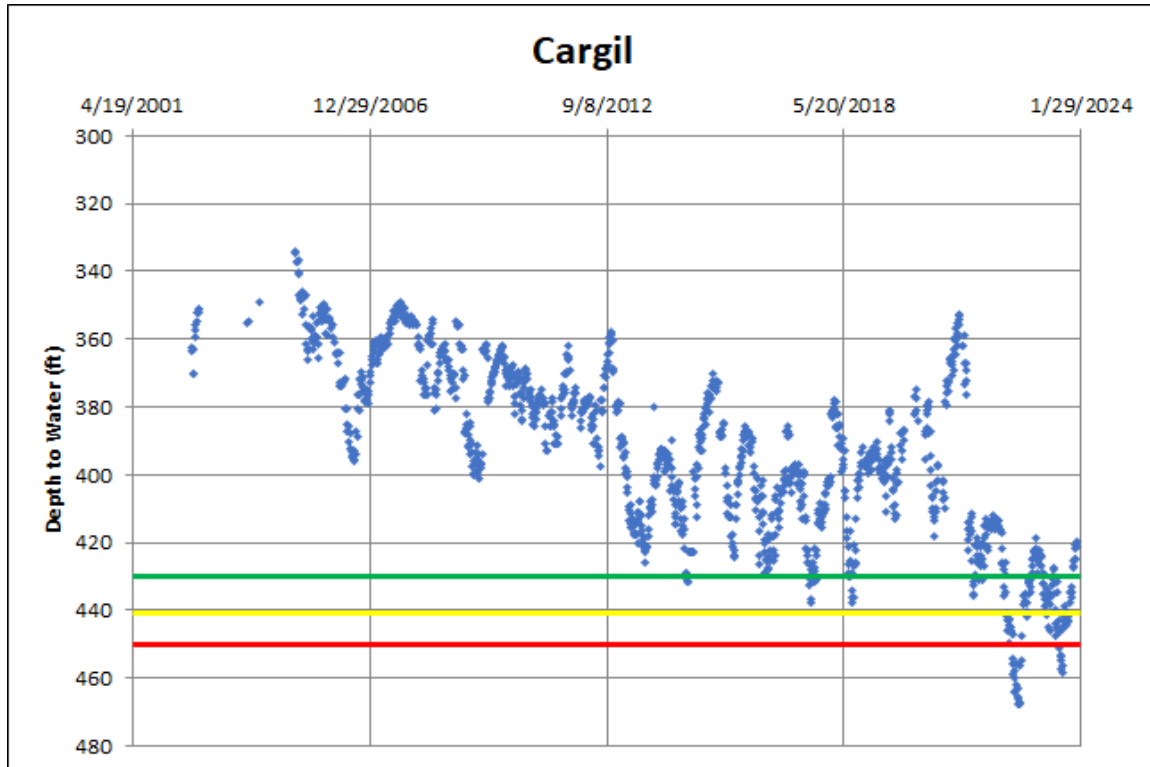


Figure 2. Depth to groundwater (ft) at the Cargil monitoring well, Zavala County

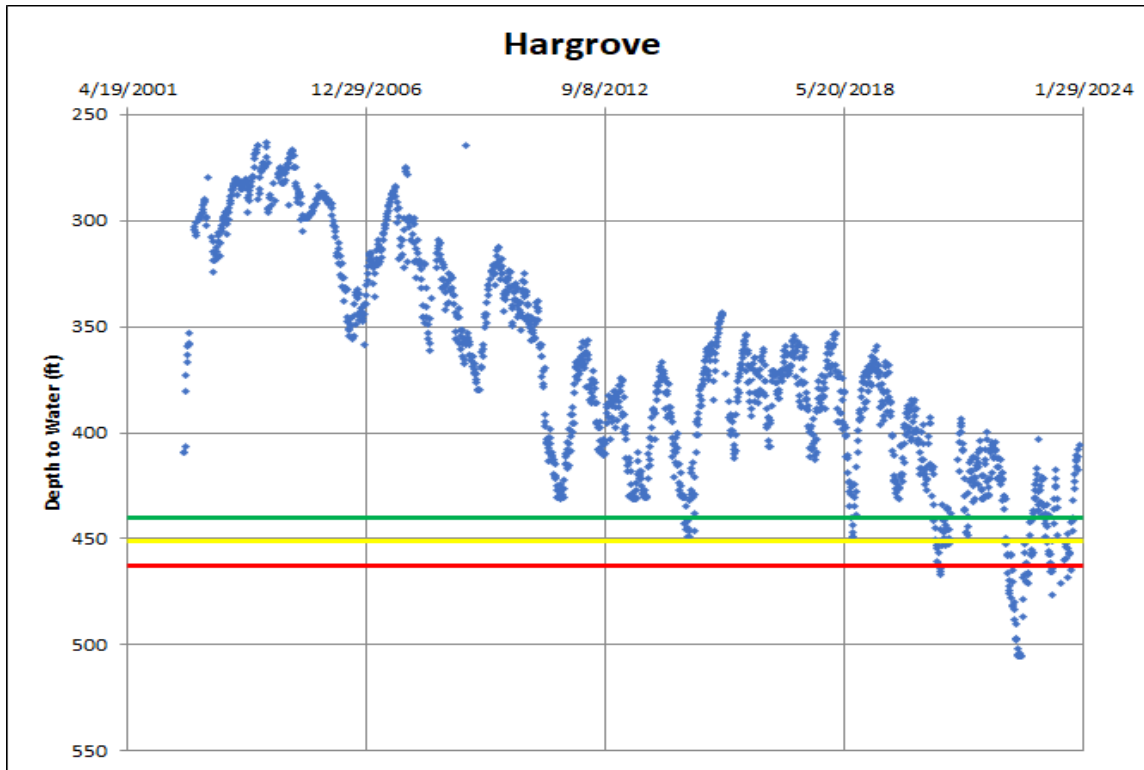


Figure 3. Depth to groundwater (ft) at the Hargrove monitoring well, Zavala County

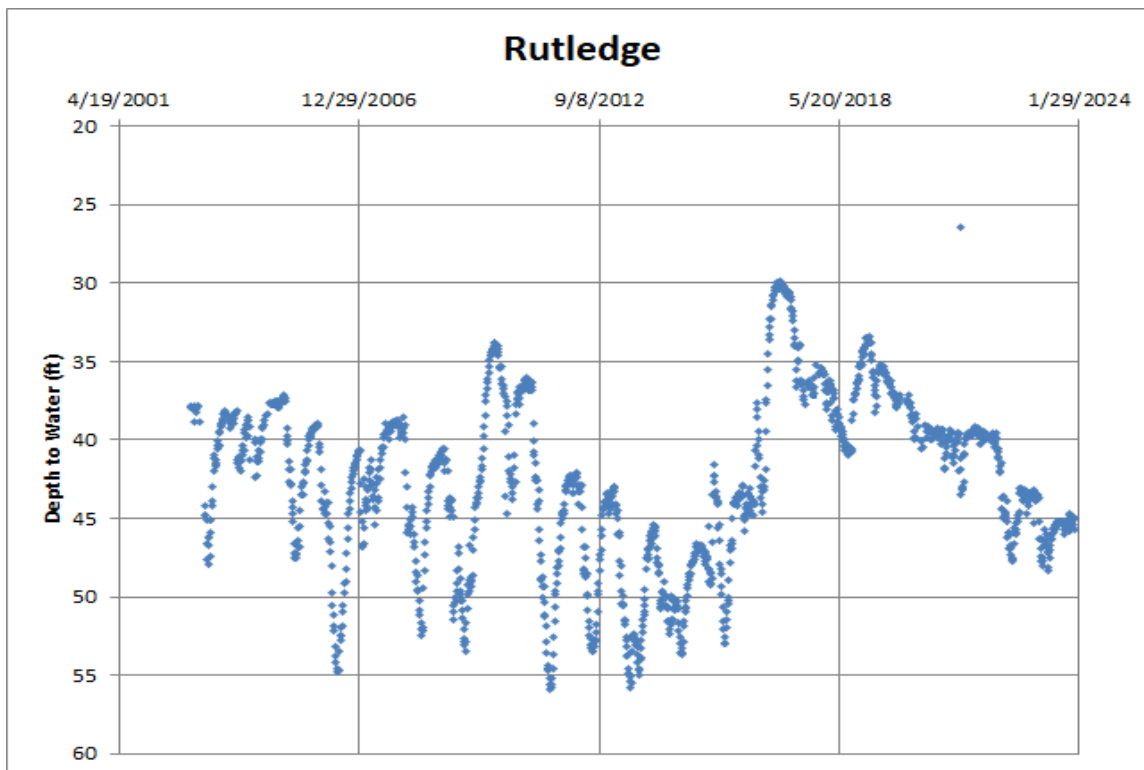


Figure 4. Depth to groundwater (ft) at the Rutledge monitoring well, Zavala County

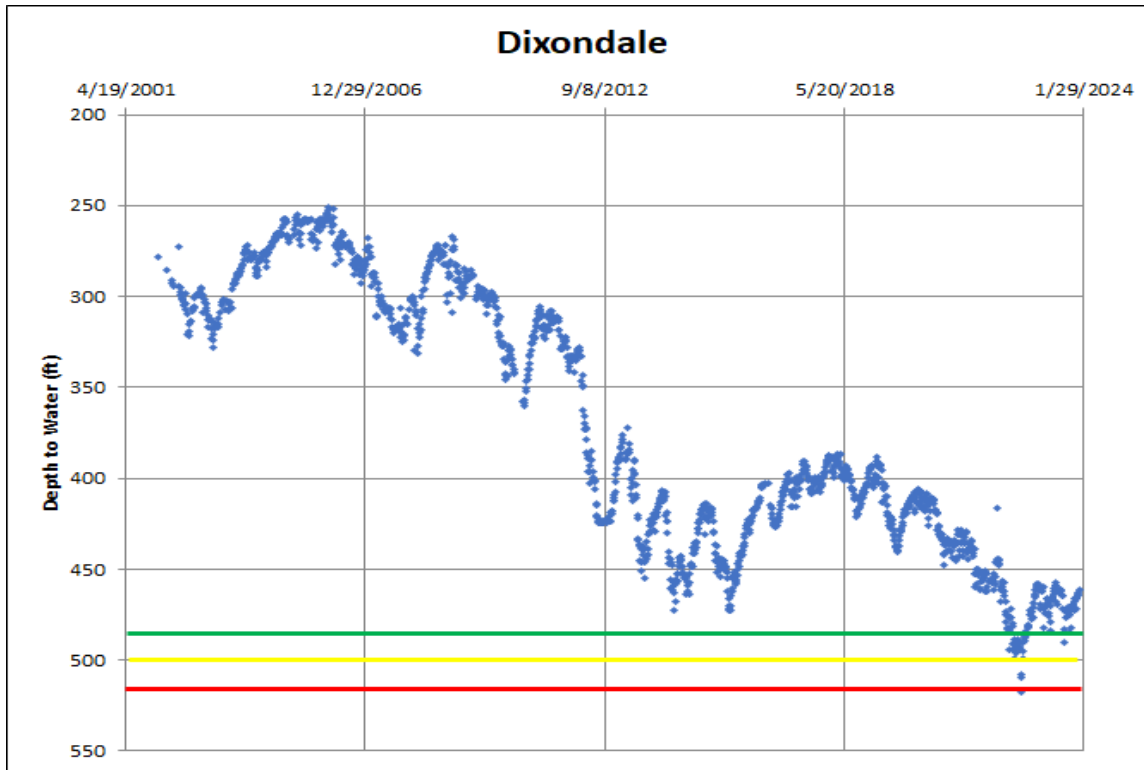


Figure 5. Depth to groundwater (ft) at the Dixondale monitoring well, Dimmit County

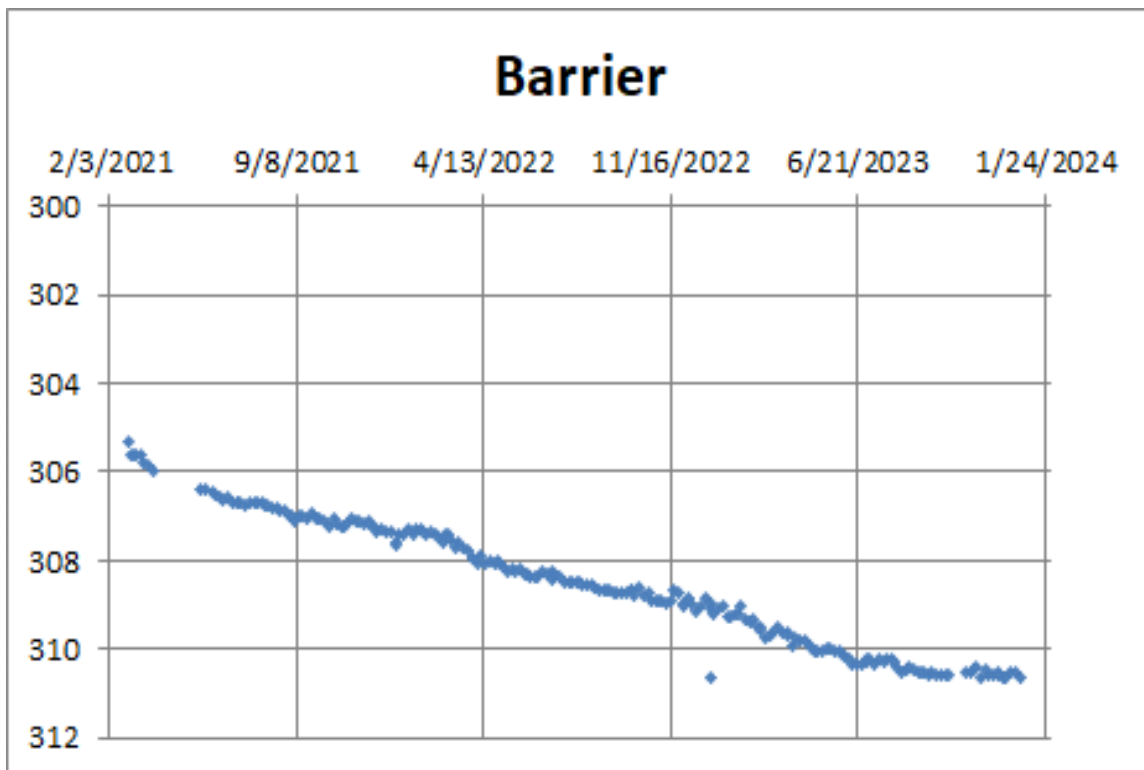


Figure 6. Depth to groundwater (ft) at the Barrier monitoring well, Dimmit County

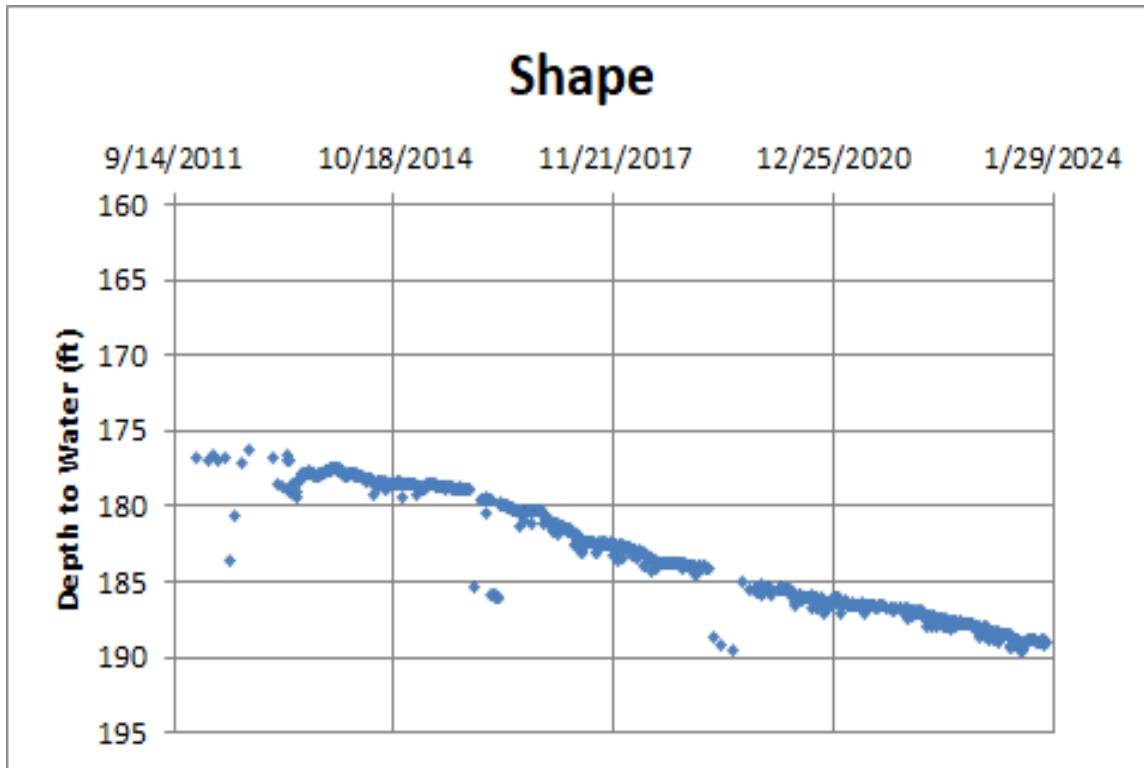


Figure 7. Depth to groundwater (ft) at the Shape monitoring well, Dimmit County

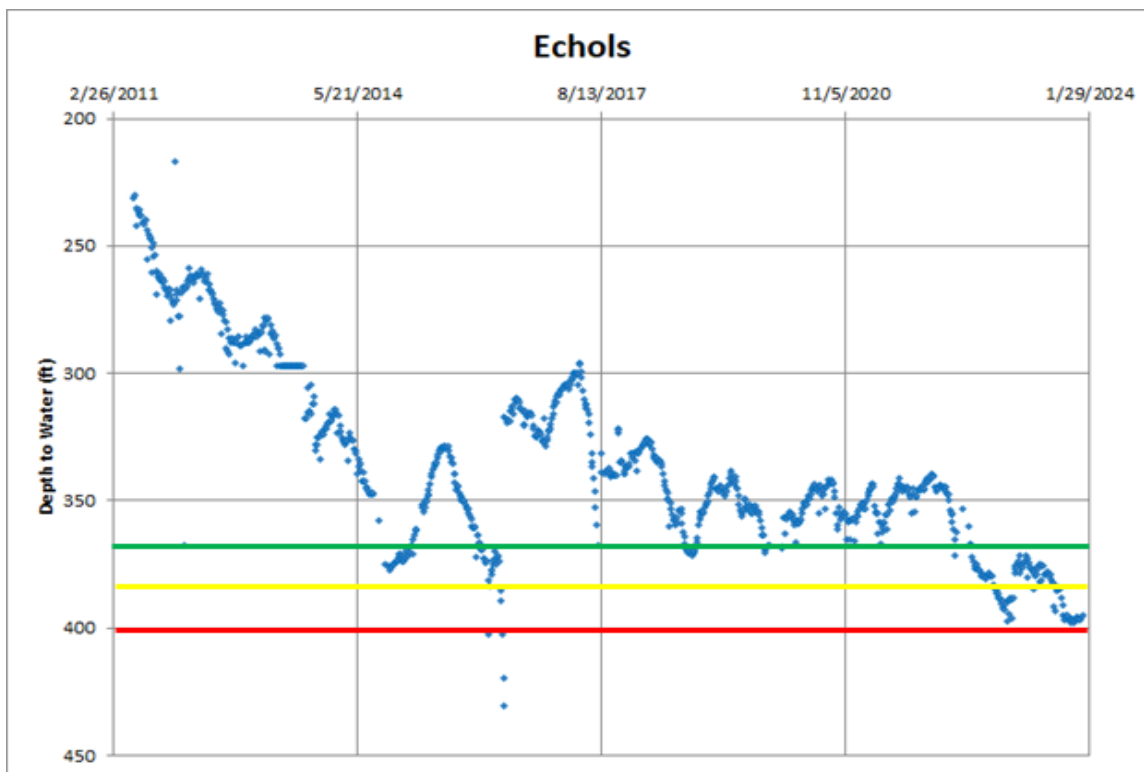


Figure 8. Depth to groundwater (ft) at the Echols monitoring well, LaSalle County

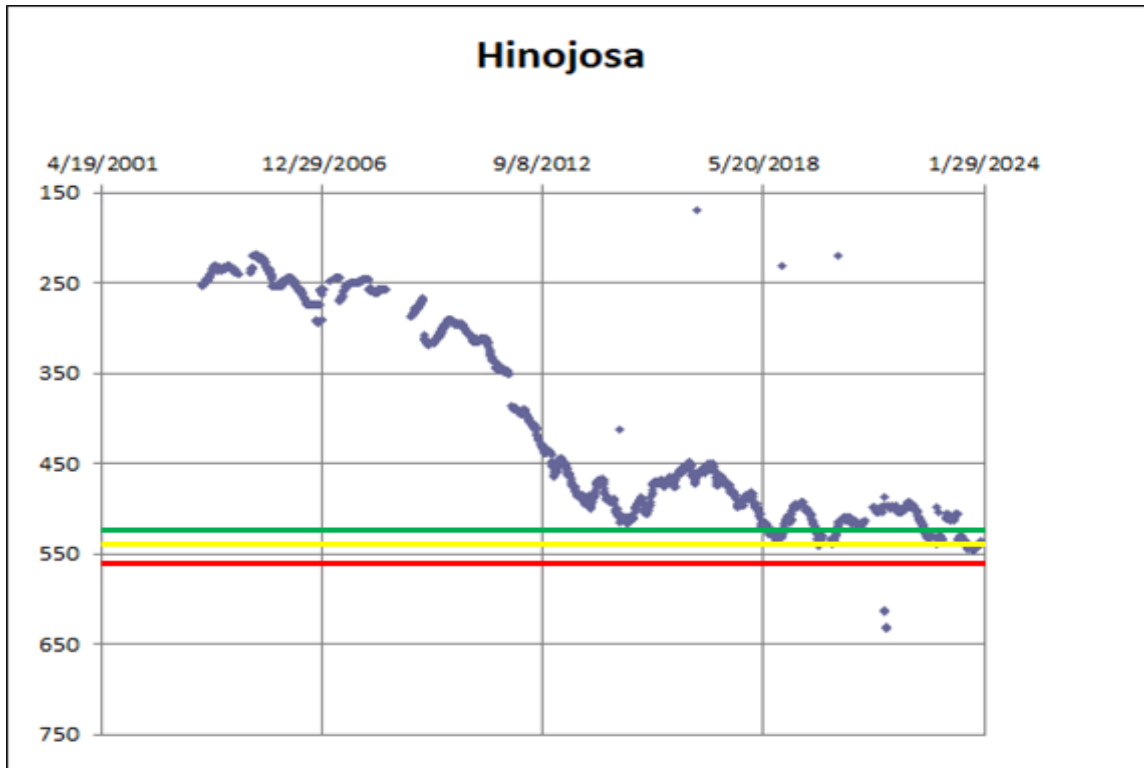


Figure 9. Depth to groundwater (ft) at the Hinojosa monitoring well, LaSalle County

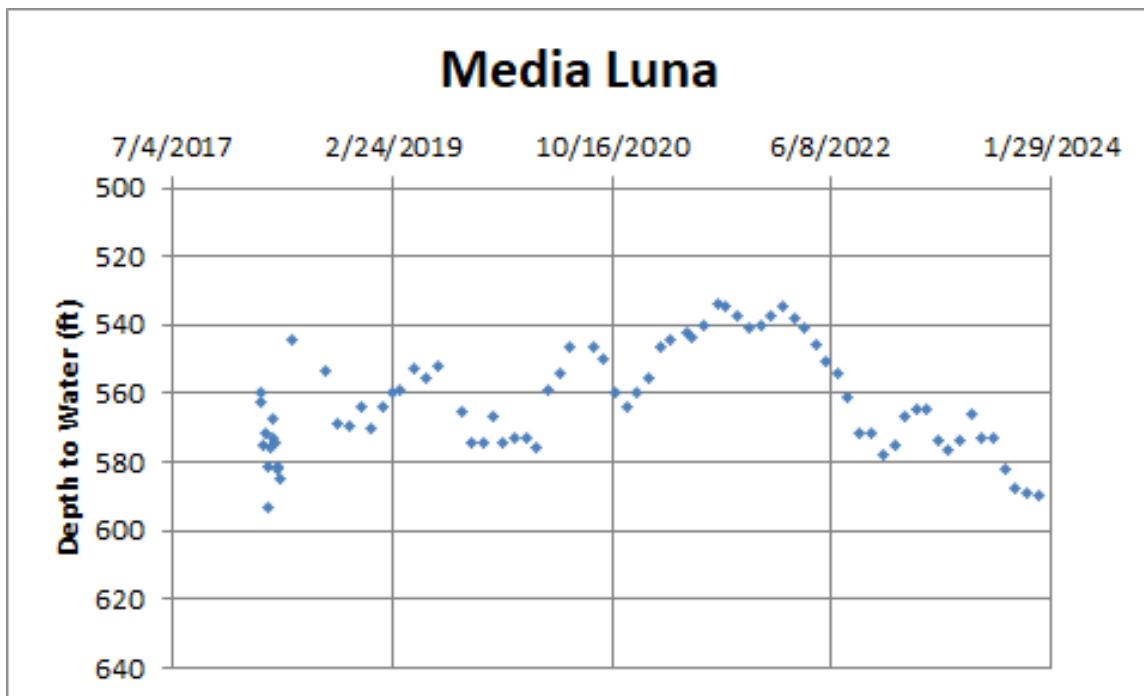


Figure 10. Depth to groundwater (ft) at the Media Luna monitoring well, LaSalle County

Goal 2.0 Controlling and Preventing Waste of Groundwater Management Objective: Quarterly news releases on water levels obtained from well monitoring were published in newspapers within the District. News releases were published in the newspapers within the District as a public information

service on “EPA & RCAD Training on Private Wells and Septic System Maintenance for Homeowners” and “Well Care 101 – How to Protect Your Family” as offered by the U.S. Environmental Protection Agency and other partners including Rural Community Assistance Corporation.

The District continued to promote and provide cost-share funding for the plugging of water wells that were deteriorated and posed threats to the groundwater. One (1) well in Dimmit County and two (2) wells in Zavala County were approved for cost-share funding.

Goal 3.0 Controlling and Preventing Subsidence: Subsidence is not a risk in the District.

Goal 4.0 Addressing Conjunctive Surface Water Management Issues Management Objective: The District continued its conjunctive management efforts with the Nueces River Authority to promote education through a Rainwater Catchment Program and Water Stewardship Education.

The General Manager participated in all scheduled Region L Water Planning Group meetings, and participated in the non-municipal water user group committee meetings for Livestock and Irrigation uses.

The General Manager participated in all scheduled Region M Water Planning Group meetings.

The District did not perform water quality testing on any water wells in the District. Public Information was posted at the District Office on Multi-County Water Well Screening and Results as announced by the Dimmit and Zavala County Extension Offices.

Goal 5.0 Addressing Natural Resource Issues that Impact the Use and Availability of Groundwater Management Objective: Water well registrations and production permits were issued according to the rules of the District. Sixty-five (65) Exempt Wells were registered in 2023, and seventy-five (75) production permits were issued in 2023. Forty-four (44) Exempt Wells and forty-eight (48) Non-Exempt Wells were registered and permitted in 2023 to bring them into compliance with District rules.

Included in Table 3 are allocation totals approved in permits issued in 2023 for new drills, new conversions, and permit amendments for change of purpose. State well reports were received from drillers on new wells and on conversion wells (oil/gas to water). Texas Railroad Commission Form P13 was received on each well conversion.

Table 3. Water Production Permits Issued in 2023

County Sub-totals	Number of Permits Issued	Water Allocation (acre-ft/yr)
Dimmit	11	1,758.28
La Salle	4	191.85
Zavala	8	1633.94
District Totals	23	3,519.55

Eleven (11) of the water production permit applications submitted to the District in 2023 were for Public Supply (Public Water Systems. Per District rules, only one (1) of the applications was required to be presented to the Board of Directors for approval. Ten (10) of the Public Supply wells were in municipalities with a population of 15,500 or less and are considered Exempt pursuant to TWC Chapter 36.121).

To prevent waste and contamination/pollution of groundwater, the District continued the review of all oil and gas waste disposal facility (SWD) and surface facility applications filed with the Texas Railroad Commission that had the potential to impact groundwater. In 2023, the District filed protest of the permit applications on eleven (11) SWD facilities, two (2) surface facilities, and one (1) H₂S and CO₂ injection well. The District continued its efforts to work with permit applicants to ensure protection of the groundwater by entering into settlement agreements and by making site visits to locations to evaluate compliance with those settlement agreements.

Goal 6.0 Addressing Water Conservation Management Objective: The District continued its education program with the Nueces River Authority to promote water stewardship education and personal responsibility for water conservation. The Nueces River Authority addressed 4th and 5th grade students, and reported that 944 students were reached with 57 education out-reach sessions.

Goal 7.0 Addressing Recharge Enhancement Management Objective: Six (6) site visits were made to the Westwind Ranch Recharge project site to maintain grass and weed control and to monitor the water level in the pit following rain events. Telephone calls were made to Westwind representative following rain events to verify rainfall amounts. The Westwind Ranch Recharge project site did not receive a sufficient amount of rainwater to gravity flow water into the injection well for the purpose of monitoring the amount of water recharged or, for the purpose of testing the quality of water monitored downstream in nearby monitor wells. A metal walkway was constructed from the recharge dam to the valves to assist in the management of the project.

The Texas Commission on Environmental Quality (“TCEQ”) granted the District an extension to its permit to operate the Westwind Ranch Recharge project as a pilot project. The new end date is October 3, 2026. In October 2023, the District filed a “draft” amendment that would allow for recharge by pump in addition to the gravity flow injection approach currently covered by the authorization. That amendment remains pending before the TCEQ.

Goal 8.0 Addressing Precipitation Enhancement: The Board determined that precipitation enhancement is not cost effective and is not appropriate for the District at this time.

Goal 9.0 Addressing Brush Control Management Objective: FY2022-2023 was the District’s ninth year to sponsor a cost-share program for landowners to control brush and enhance recharge. The Board of Directors has voted to amend the Management Plan and no longer fund this project. One (1) application was filed and approved in Zavala County in 2023. See Table 4 for details.

Table 4. Brush Control Program

County	Control Method	Acres	Cost per Control Method	Total Cost Per County
Zavala	Aerial Spray	166	\$4,980	\$4,980

Goal 10.0 Rainwater Harvesting Management Objective: In conjunction with the Nueces River Authority, a Rainwater Catchment Project continued through the end of the fiscal year for equipment inventory and teacher evaluation at 16 campuses. The program reached 460 4th-grade students and staff in 24 Outreach Sessions. The District approved replacing barrels with one (1) 305 gallon UV plastic tank at seven (7) campuses. Five (5) campuses have 5,000 gallon tanks on site, and four (4) campuses have 3,000 gallon tanks on site.

The Natural Resource Conservation Service (NRCS) in Cotulla, Texas, had two (2) 2,500 gallon tanks on site. NRCS agreed to repair the plumbing system on the tanks, and to report the rainwater harvested.

Goal 11.0 Addressing Drought Conditions Management Objective: Each month the District downloaded the Palmer Drought Severity Index 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 also checked for drought updates on the TWDB website <http://waterdatafortexas.org/drought/>. Performance Standard: The District assesses the status of drought in the District using this information and provides a briefing with maps and situation reports to the Board at the regularly scheduled Board meetings. Monthly reports are filed for future use.

The draft of the District’s proposed Drought Contingency Plan was presented to County Commissioner’s Court and City Councils in all three (3) counties within the District. The District adopted the Drought Contingency Plan on December 13, 2023. This Plan monitors groundwater elevation as an indication of drought severity. Based on groundwater elevation, the District has established three triggers as indicators of the severity of drought: moderate; exceptional; and severe. Based on the available groundwater elevation monitoring data, five monitoring wells in the confined zone of the Carrizo-Wilcox Aquifer have been assigned drought trigger levels. Additional monitoring wells will be assigned drought trigger elevations when a longer record of measurements is available. Table 5 illustrates drought trigger designations and drought stages in terms of groundwater elevation at the Drought Index Wells. Groundwater elevations associated with each trigger level are denoted with green, yellow, and red lines for designated wells in Figures 2, 3, 5, 8, and 9.

Table 5. Drought stages, Drought Index Wells, and groundwater elevations (expressed as feet below ground level) for each county

Drought Stage	County	Drought Index Well	Groundwater Elevation (ft)
Moderate Drought	Zavala	Cargil	430
		Hargrove	440
	LaSalle	Echols	370
		Hinojosa	525
	Dimmit	Dixondale	480
Exceptional Drought	Zavala	Cargil	440
		Hargrove	450
	LaSalle	Echols	385
		Hinojosa	540
	Dimmit	Dixondale	500
Severe Drought	Zavala	Cargil	450
		Hargrove	460
	LaSalle	Echols	400
		Hinojosa	555
	Dimmit	Dixondale	520

At times during 2023, the Cargil and Hargrove monitoring wells had groundwater elevations that exceeded the severe drought trigger level. At times during 2023, the Hinojosa, Dixondale, and Echols monitoring wells had groundwater elevations that exceeded the exceptional drought trigger level.

Three of the monitoring wells are located in the unconfined zone of the Carrizo-Wilcox Aquifer: Shape, Barrier, and Rutledge. The Shape and Barrier wells are located in the western portion of the Carrizo-Wilcox Aquifer recharge zone, south and east of Carrizo Springs. This portion of the recharge zone only receives limited levels of recharge (Green et al., 2008). For the entire periods of measurement for each well, both indicate a steady decline in the water level in the unconfined portion of the Carrizo-Wilcox Aquifer of slightly over 1 ft/year. The Rutledge monitoring well is located in that portion of the Carrizo-Wilcox Aquifer recharge zone that receives significant recharge along the Leona River channel. The water level at this well has varied by ± 15 ft from a depth of groundwater that has averaged approximately 40-45 ft below ground surface since 2000. There has been an average decline in the groundwater elevation level of the Rutledge monitoring well of approximately 2 ft/year since 2016. In summary, all three monitoring wells located in the Carrizo-Wilcox Aquifer recharge zone have exhibited declines in groundwater elevation for the past 3 to 13 years.

Goal 12.0 Addressing the Desired Future Conditions Management Objective: The water resources within Texas are regulated via joint planning, a process overseen by the Texas Water Development Board (Mace et al., 2006). The TWDB determines the Modeled Available Groundwater (MAG) for each Groundwater Conservation District (GCD) based on the Desired Future Conditions (DFCs) determined by the Groundwater Management Area (GMA) (Table 5). The MAG is calculated using a computer model, the Groundwater Availability Model (GAM). This process is repeated every five years. Accordingly, the MAG values of 2016 were updated in 2021.

The DFCs for the District that adopted by Groundwater Management Area 13 on April 15, 2022 are presented in Table 6 (https://www.twdb.texas.gov/groundwater/management_areas/gma13.asp). MAG values for the major and minor aquifers are presented in Tables 7-10 for comparison. As illustrated, the MAGs for 2016 (Tables 7 and 8) are only marginally different from those of 2021 (Tables 9 and 10).

Table 6. Adopted Desired Future Conditions for Relevant Aquifers

Aquifer	Desired Future Condition (DFC)	Date DFC Adopted
Carrizo-Wilcox, Queen City, and Sparta (outcrop)	75 percent of saturated thickness in the outcrop at the end of 2012 remains at the end of 2080.	4/15/2022
Carrizo-Wilcox, Queen City, and Sparta	Average drawdown of 49 feet (+/- 5 feet) for all of GMA 13 calculated from the end of 2012 conditions through the year 2080	4/15/2022

Table 7. 2016 Modeled Available Groundwater – Major Aquifer (acre-ft)

County	Aquifer	2012	2020	2030	2040	2050	2060	2070
Dimmit	Carrizo-Wilcox	4,129	4,129	4,129	4,129	4,129	4,129	4,129
LaSalle	Carrizo-Wilcox	6,863	6,863	6,863	6,863	6,863	6,863	6,863
Zavala	Carrizo-Wilcox	35,653	35,653	35,305	35,171	35,071	34,750	34,695
Total	Carrizo-Wilcox	46,645	46,645	46,297	46,163	46,063	45,742	45,687

Table 8. 2016 Modeled Available Groundwater – Minor Aquifer (acre-ft)

County	Aquifer	2012	2020	2030	2040	2050	2060	2070
LaSalle	Queen City	2	2	2	2	2	2	2
LaSalle	Sparta	0	0	0	0	0	0	0

Table 9. 2021 Modeled Available Groundwater – Major Aquifer (acre-ft)

County	Aquifer	2020	2030	2040	2050	2060	2070	2080
Dimmit	Carrizo-Wilcox	3,895	3,885	3,895	3,885	3,885	3,885	3,885
LaSalle	Carrizo-Wilcox	6,554	6,536	6,554	6,536	6,536	6,536	6,536
Zavala	Carrizo-Wilcox	38,303	36,675	35,399	35,204	35,006	34,831	34,540
Total	Carrizo-Wilcox	48,752	47,096	45,848	45,625	45,427	45,252	44,961

Table 10. 2021 Modeled Available Groundwater – Minor Aquifer (acre-ft)

County	Aquifer	2020	2030	2040	2050	2060	2070	2080
LaSalle	Queen City	1	1	1	1	1	1	1
LaSalle	Sparta	0	0	0	0	0	0	0

Water Usage in 2022

As stated in the Wintergarden Groundwater Conservation District (District) Management Plan (<https://wgcd.net/wp-content/uploads/2021/10/Management-Plan-2021-10-26.pdf>):

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 will compare those production estimates to the MAGs. In order to achieve the DFCs, the District will base permitting decisions on the amount of existing water permitted, the amount of existing water being produced, and the condition of the aquifer (average water level drawdown) at the time a permit application is filed.

Starting in 1999, the District required annual production from non-exempt permit holders to be reported to the District. Reported production for the period 2017-2023 is presented in Table 11. The number of respondents have increased over time. The annual increases in production in Table 11 may be interpreted to reflect more comprehensive reporting of production rather than an actual increases in production. Note that production for 2023 has not yet been fully reported at the time of this report. Also note that reported production for previous years differs from the 2022 Annual Report due to continued improved reporting.

Table 11. Reported Non-Exempt Production for the Carrizo-Wilcox Aquifer (acre-ft)

County	2017	2018	2019	2020	2021	2022	2023*
Dimmit	1,221	13,902	4,891	12,620	3,946	6,423	1,622
LaSalle	1,536	1,309	2,255	2,127	1,233	1,645	705
Zavala	8,288	11,328	14,253	15,130	35,614	19,315	18,407
Total	11,045	26,539	21,399	29,877	40,793	27,383	20,734

*Reported as of December 31, 2023

The District maintains a record of how much water is pumped by rig supply wells for use in oil and gas activities. These records are provided by operators that use the rig supply wells. Annual summaries for the period 2017 to 2023 based on those records are presented in Table 12.

Table 12. Reported Production from Rig Supply Wells (acre-ft)

2017	2018	2019	2020	2021	2022	2023*
3,621	2,654	15,675	5,058	4,135	4,830	6,032

*Reported as of December 31, 2023

Exempt wells are classified as wells capable of pumping less than 25,000 gal/day. This typically includes wells used for domestic and livestock purposes. Per Texas Railroad Commission regulations, rig supply wells are also classified as exempt. Exempt well production for the District was estimated by the TWDB in 2020 (TWDB, 2020) and is summarized in Table 13.

Table 13. Total Estimated Exempt Use (by aquifer) for 2020 (TWDB, 2020)(acre-ft)

Aquifer	Domestic	Livestock	Rig Supply	Combined
Carrizo-Wilcox	93	532	6,032	6,657
Other	29	77	0	106
Queen City	1	5	0	6
Sparta	22	77	0	99
Yegua-Jackson	1	21	0	22
Total	146	712	6,032	6,890

Note that the TWDB estimate of 6,562 acre-ft for rig supply production for 2020 is comparable with the production value of 6,032 acre-ft reported to the District for 2023. The rig supply production values reported to the District are used in this report.

Total Well Production

Total production for all usages for all reported or estimated exempt usages in the District in 2022 and 2023 is summarized in Table 14.

Table 14. Total Production in the District in 2022 and 2023 (acre-ft)

2022			2023		
Non-exempt	Exempt	Total	Non-exempt	Exempt	Total
27,383	7,420	34,803	20,734	6,890	27,624*

*Reported as of December 31, 2023

References

Green, R.T., F. P. Bertetti, B.P. Wilcox, and R.N. McGinnis. 2008. Investigation of the Groundwater Systems in the Wintergarden Groundwater Conservation District—Phase II. Southwest Research Institute. Contract Report to the Wintergarden Groundwater Conservation District.

Mace, R.E., R. Petrossian, R. Bradley, W.F. Mullican, and L. Christian. 2008. A Streetcar Named Desired Future Conditions: The New Groundwater Availability for Texas (Revised), in THE CHANGING FACE OF WATER RIGHTS IN TEXAS 2008 (2008), <https://www.twdb.texas.gov/groundwater/docs/Streetcar.pdf>.

Texas Water Development Board. 2020. Projected Exempt Groundwater Use Estimates. Groundwater Management Area 13. TWDB Estimates http://www.twdb.texas.gov/groundwater/management_areas/exempt_use/GMA_13_ExemptUse_2020.pdf, accessed March 2024

Texas Water Development Board. 2021. Water Use of Texas Water Utilities. Fourth Biennial Report to the Texas Legislature. 25p.