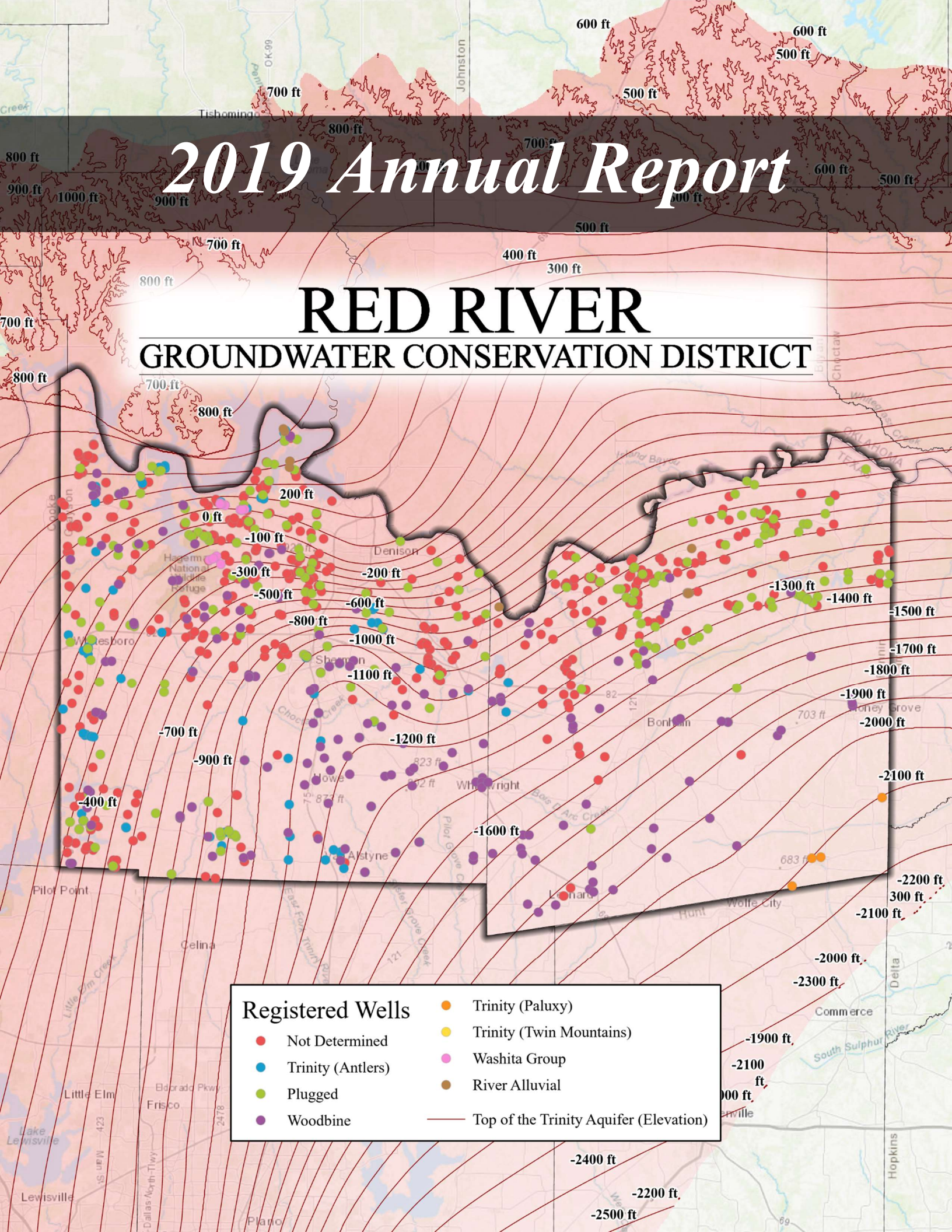
2019 Annual Report

RED RIVER
GROUNDWATER CONSERVATION DISTRICT



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Board of Directors

Fannin County	*Grayson County*
Harold Latham Vice President Commissioners Court	Mark Patterson President Other Municipalities
Mark Newhouse Groundwater Producing MUDs, SUDs and WSCs	Chuck Dodd Groundwater Producing MUDs, SUDs and WSCs
Billy Stephens Municipalities	David Gattis, P.E. City of Sherman
	Mark Gibson, P.E. Secretary/Treasurer City of Sherman

Staff

Drew Satterwhite, P.E.	General Manager
Theda Anderson	Registration Coordinator
Debi Atkins	Finance Officer
Carolyn Bennett	Administrative Manager/Project Coordinator
Allen Burks	Field Technician
Tasha Hamilton	Accountant
Wayne Parkman	Field Technician
Nichole Sims	Accountant
Paul M. Sigle, EIT	Groundwater Technical Lead
Velma Starks	Administrative Assistant

I. Introduction

In 1997 Senate Bill 1, enacted by the Texas Legislature, confirmed a state policy that "groundwater conservation districts… are the state's preferred method of groundwater management through rules developed, adopted and promulgated by a district…" Subsequently, the Texas Commission on Environmental Quality issued a report in 2007 advising that one or more groundwater conservation districts would need to be created in the 13-county area of North Central Texas, including the Counties of Fannin and Grayson. Red River Groundwater Conservation District ("District") was created by Senate Bill 2529 May 25, 2009 for Fannin and Grayson Counties. Three directors are appointed to Fannin County and four directors are appointed to Grayson County. The District's boundaries are coterminous with the boundaries of Fannin and Grayson Counties.

The Board of Directors of the District adopted its initial Temporary Rules August 29, 2011. The District's Temporary Rules were last amended effective January 1, 2017. The District's Permanent Rules were adopted November 29, 2018.

The adopted Permanent Rules provide protection to existing wells, prevent waste, promote conservation, provide a framework that will allow availability and accessibility of groundwater for future generations, protect the quality of the groundwater in the recharge zone of the aquifer, insure that the residents of Fannin and Grayson Counties maintain local control over their groundwater, and operate the District is a fair and equitable manner for all residents of the District.

The District adopted its initial Management Plan in May of 2012. As required, the District's Management Plan was updated and readopted March 16, 2017. The Texas Water Development Board subsequently approved the updated and readopted Plan. One requirement of this Plan is an Annual Report be provided to the Board of Directors. This report is presented to the Board of Directors of the Red River Groundwater Conservation District pursuant to this requirement.

The District is committed to manage and protect the groundwater resources within its jurisdiction and to work with others to ensure a sustainable, adequate, high quality and cost-effective supply of water, now and in the future. The District will strive to develop, promote, and implement water conservation, augmentation, and management strategies to protect water resources for the benefit of the citizens, economy, and environment of the District. The preservation of this most valuable resource can be managed in a prudent and cost-effective manner through conservation, education, and management. Any action taken by the District shall only be after full considerations and respect has been afforded to the individual property rights of all citizens of the District.

II. General Manager's Report

This annual report has been prepared by District staff for presentation to the Board to keep them informed of the status of goals adopted by this Plan. Mandatory well registration began April 1, 2012. This applies to all existing non-exempt wells, and all new wells drilled after April 1, 2012. All new wells must be approved and registered before construction begins.

During 2019, the Red River GCD Board of Directors and staff accomplished the following tasks:

- Continued to work with consultants on updating the District's geodatabase including development of a Water Well Management System
- Implemented the new Permanent Rules
- Compiled water use numbers through exporting meter reading data from the current database
- Improved the Hydrogeological Report Guidelines
- Continued meter inspection program, including the meter sealing policy to assure meters stay with the well for which it is assigned
- Well inspection program sustained
- Continued injection/disposal well monitoring program
- Reached agreements with multiple public water system to add to the current well monitoring program
- Continued public information program – the General Manager gave presentations on the activities and purpose of the District
    - February 18, 2019: Greater Texoma Utility Authority Board of Directors Meeting
    - June 25, 2019: TIGA

III. Management Goals

The District Management Plan provides that an Annual Report be prepared by the General Manager and staff of the District, covering the activities of the District, including information concerning the District's performance in regard to achieving the District's management goals and objectives.

Goal 1: Providing the Most Efficient Use of Water

Management Objective 1.1

The District will require that all wells be registered in accordance with its current rules. All new wells drilled after April 1, 2012 and all existing non-exempt wells are required to be registered with the District in accordance with its current rules.

Performance Standard 1.1

Subsequent to adoption of the Plan, briefings are being provided by the General Manager to the Board of Directors regarding well registration program at the monthly board meetings. In addition, a handout was developed by District staff to be provided annually to local realtor associations detailing the requirement of new property owners to register their existing wells within ninety (90) days of transfer of ownership. The table below list the wells registered with the District in 2019 and the total number of wells registered with the District as of January 1, 2020.

Table 1: Exempt and Non-Exempt Wells Registered with the District.

Use	*2019 Exempt*	*2019 Non-Exempt*	*2019 Total*	*Exempt*	*Non-Exempt*	*Total*
Agriculture	2	1	3	20	21	41
Commercial	3	4	7	12	14	26
Domestic	50	-	50	467	-	467
Golf Course Irrigation	-	-	-	2	13	15
Irrigation	-	-	-	5	2	7
Livestock	2	-	2	42	-	42
Monitoring	12	-	12	17	-	17
Oil/Gas	-	-	-	3	18	21
Public Water System	-	3	3	43	231	274
Surface Impoundment(s)	-	2	2	12	8	20
Total	***69***	***10***	***79***	***623***	***307***	***930***

Aquifers in which the wells have been completed: Trinity and Woodbine Aquifers

Management Objective 1.2

It is the goal of the District that all non-exempt wells and exempt wells be registered. Beginning in April 2012, the District launched an on-line registration program in order to register and collect important information regarding all non-exempt wells drilled on or after April 1, 2012. The District's Field Technicians manage a Field Inspections Program, with the objective of conducting field inspections of at least five (5) wells per month. These inspections confirm that a well has

been registered, accuracy of well location, flow tested to ensure the well meets the maximum flow rate requirements of the new well, and accuracy of certain other required well registration information.

Performance Standard 1.2

Quarterly briefings are provided by the General Manager to the Board of Directors regarding the number of well sites inspected each month to confirm well registration requirements have been met. Requirement to inspect/audit well sites each month to confirm well registration requirements has been met. This information is reported in Table 2.

Table 2: Well Inspections During 2019.

Month	*Fannin County*	*Grayson County*	*Total*
January	7	5	12
February	1	7	8
March	5	4	9
April	3	6	9
May	1	5	6
June	4	4	8
July	11	4	15
August	3	3	6
September	0	11	11
October	1	6	7
November	5	7	12
December	10	11	21
Total	*51*	*73*	*124*

This information is updated and presented monthly to the Board of Directors.

Management Objective 1.3(a)

A groundwater monitoring program was launched in 2017, to collect information on the quantity and quality of groundwater resources throughout the District. For the first two years, beginning in 2017, District staff began to work with Texas Water Development Board ("TWDB") staff to monitor water levels in wells the TWDB staff currently monitors on an annual basis. After the initial two-year period, District staff will assume the responsibility of monitoring these wells at least annually. District staff is working on agreements with well owners for additional monitoring wells to add wells to the District's groundwater monitoring program. Throughout 2018 and 2019, the District sent out letters to selected public water systems asking the public water system to participate in the District's monitoring program. Through this process, the District added 23 new wells to the District's monitoring program.

For the purpose of water quality sampling, the samples collected for water quality taken by the Texas Commission on Environmental Quality staff every five years will be used for monitoring purposes initially, and may be supplemented as determined by the Board in the future. All information collected will be entered into the District's geodatabase.

Performance Standard 1.3(a)(1)

Number of wells in Fannin and Grayson Counties for which water levels were measured per year:

Table 3: Wells Measured for the District's Monitoring Program.

Year	*Wells Measured*
2017	16
2018	16
2019	19

Note: The District Staff moved the timeframe for measuring wells from November to February in 2019/2020 as they felt that was the closest time of year to static conditions. The wells measured for 2019 was were actually measured in February of 2020.

Performance Standard 1.3(a)(2)

Number of wells in Fannin and Grayson Counties for which water samples were collected for testing of water quality: The Texas Commission on Environmental Quality provides a Consumer Confidence Report that provides consumers with information about the quality of drinking water. This data may be reviewed at www.tceq.texas.gov/drinkingwater/ccr/ for water systems. TWDB sampled 7 wells for water quality throughout the District in 2019. Below is a summary of the data collected by TWDB. Individual well reports are in Appendix A.

Table 4: Number of Wells Tested for Water Quality by the TWDB.

County	***Trinity Aquifer***	***Woodbine Aquifer***	***Total***
Fannin	1	0	1
Grayson	6	0	6
Total	***7***	***0***	***7***

Figure 1: Map of Water Quality Sites.

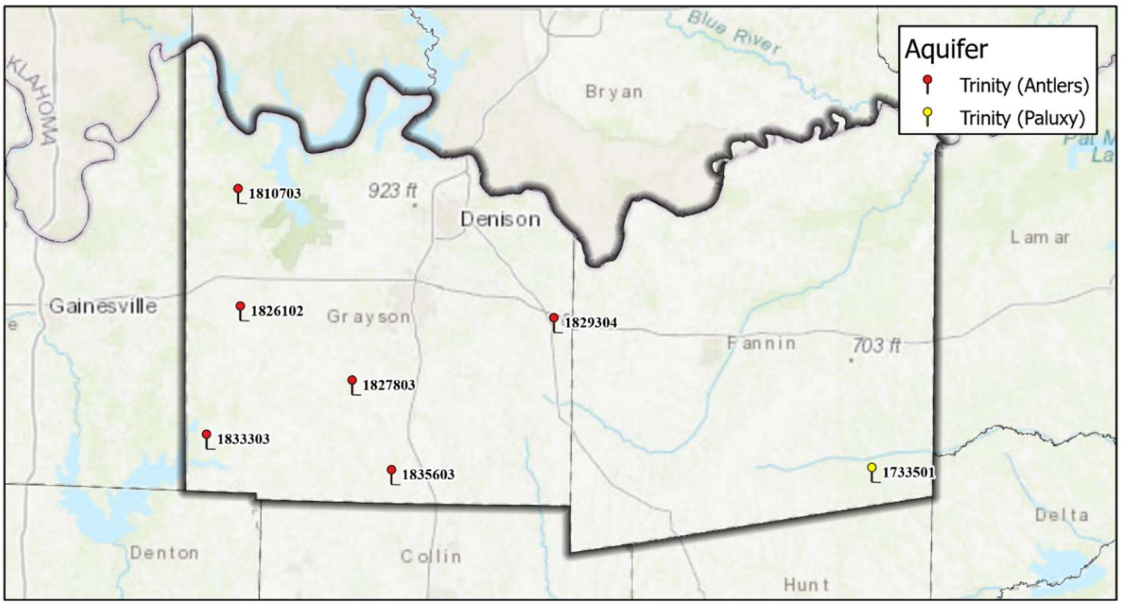


Table 5: Water Quality Data Collected by TWDB.

Parameter Description	*Trinity Average Value*	*Trinity Highest Value*	*Unit*
Temperature	31.21	50.30	C
Specific Conductance	999.14	1,289.00	MICR
PH	8.96	9.23	SU
Alkalinity, Total	416.57	502.00	mg/L
Alkalinity, Phenolphthalein	19.64	26.40	mg/L
Alkalinity, Bicarbonate	377.00	486.00	mg/L
Alkalinity, Carbonate	39.29	52.70	mg/L
Bicarbonate Ion	460.42	593.09	mg/L
Carbonate Ion	23.57	31.68	mg/L
Nitrite Plus Nitrate	0.02	0.02	mg/L
Phosphorus	0.03	0.05	mg/L
Hardness, Total	4.64	5.79	mg/L
Calcium	1.26	1.74	mg/L
Magnesium	0.34	0.45	mg/L
Sodium	241.71	326.00	mg/L
Sodium Adsorption Ration	49.68	68.13	
Potassium	0.97	1.52	mg/L
Chloride	25.84	35.50	mg/L
Sulfate	76.41	119.00	mg/L
Fluoride	1.00	2.79	mg/L
Silica	13.91	21.30	mg/L
Arsenic	1.00	1.00	ug/L
Barium	18.38	83.70	ug/L
Boron	655.57	1,330.00	ug/L
Chromium	1.00	1.00	ug/L
Iron	50.00	50.00	ug/L
Manganese	1.62	3.21	ug/L
Molybdenum	1.18	1.86	ug/L
Strontium	84.20	200.00	ug/L
Zinc	5.00	5.00	ug/L
Aluminum	8.51	14.30	ug/L
Lithium	23.91	47.60	ug/L
Selenium	5.00	5.00	ug/L
Total Dissolved Solids	611.50	804.07	mg/L
Nitrate Nitrogen	0.02	0.02	mg/L
Residual Sodium Carbonate	8.24	9.96	
Bromide	0.17	0.22	mg/L
Mercury	0.20	0.20	ug/L

Management Objective 1.3(b)

In order to ensure the efficient use of groundwater, adequate data must be collected to facilitate groundwater availability modeling activities necessary to understand current groundwater resources and the projected availability of those resources in the future. Monitoring wells will be established by the District for continuous time information on water levels in targeted locations on a schedule as determined by the District's Board of Directors, as funds become available.

Performance Standard 1.3(b)

Number of wells for which water level data is available will be accessible online after the current geodatabase improvements project is complete.

Management Objective 1.4

A critical component of the District's goal of ensuring the efficient use of groundwater is the collection of accurate water use information. The District has established by permanent rule a requirement that all non-exempt wells are to be equipped with meters to measure use of groundwater. The well owner/operator is responsible for maintaining a meter log with at least monthly records of water use. Cumulative water uses to be reported by well owner/operator on a quarterly basis. All water use information is entered and maintained in the District's geodatabase. It is the objective of the District that 95 percent of all registered non-exempt wells will report water use by the reporting deadlines established in the District's rules.

Performance Standard 1.4

Percentage of registered non-exempt wells meeting reporting requirements of water use:

Table 6: Percentage of Registered Non-Exempt Wells Meeting Reporting Requirements of Water Use.

Year	*Percentage Meeting Reporting Requirements*
2017	88%
2018	92%
2019	96%

Management Objective 1.5

In order to ensure that registered non-exempt wells have been equipped with District-approved meters and that water use is being accurately reported, a meter inspection program has been implemented by District staff. The District Field Technicians facilitate a meter inspection program to ensure that meters for all registered non-exempt wells will be inspected on at least a five-year cycle by District personnel. These inspections at a minimum verify proper installation and operational status of meters and record the meter reading at the time of inspection. This meter reading is compared to the most recent water use report for the inspected well. Any potential violation of District Rules regarding meter installation and reporting requirements will be reported to the Board of Directors at their next practicable meeting for consideration of possible enforcement actions. Information containing annual water use, by registered well, by county, and

by aquifer, will be included in the Annual Report presented by the General Manager. The report will include a comparison of reported water use versus the estimate of modeled available groundwater (the sum of exempt and permitted groundwater) established as a result of the Desired Future Conditions for aquifers in the District.

Performance Standard 1.5(a)

Percentage of registered non-exempt wells inspected by District personnel annually to verify meters meet District requirements:

Table 7: Percentage of Registered Non-Exempt Wells Inspected Annually.

Year	*Percentage of Well Inspected*
2017	44%
2018	48%
2019	15%

Performance Standard 1.5(b)

The District staff recently compiled the annual water use from exported meter readings from the current District's database. This data was compiled by county, by aquifer, and by use. The average water use was used to compare the production to the Modeled Available Groundwater. Table 8, 9, and 10 is the non-exempt production for the District from 2013 to 2019. Figure 2 and 3 is the comparison of the non-exempt and exempt production to the Modeled Available Groundwater.

Table 8: Non-Exempt Production by County (All Production is in Acre-Feet).

Year	*Grayson*	*Fannin*	*District*
2013	12,445	2,592	15,038
2014	12,650	2,719	15,369
2015	12,309	2,896	15,205
2016	11,738	3,027	14,765
2017	11,691	2,702	14,393
2018	13,721	2,913	16,634
2019	13,172	3,429	16,601
Average	*12,532*	*2,897*	*15,429*

Table 9: Non-Exempt Production by Aquifer (All Production is in Acre-Feet).

Year	*Woodbine*	*Trinity (Antlers)*	*Washita Group*	*River Alluvial*
2013	7,299	7,488	220	31
2014	8,220	6,922	204	23
2015	7,566	7,439	139	62
2016	7,872	6,662	161	69
2017	7,262	6,949	142	41
2018	8,724	7,755	131	24
2019	9,652	6,720	120	131
Average	*8,085*	*7,133*	*159*	*54*

Table 10: Non-Exempt Production by Use (All Production is in Acre-Feet).

Use	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*Average*
Public Water System	13,506	13,482	13,767	13,052	13,099	15,279	15,432	13,945
Agriculture	1,073	1,025	599	955	918	945	804	903
Golf Course Irrigation	344	519	606	312	148	197	157	326
Irrigation	0	200	194	207	198	165	155	160
Oil/Gas	112	139	35	184	4	0	1	68
Commercial	0	0	0	50	7	37	47	20
Surface Impoundment(s)	3	4	5	5	19	12	27	11

Figure 2: Average Production Compared to 2020 MAG by County.

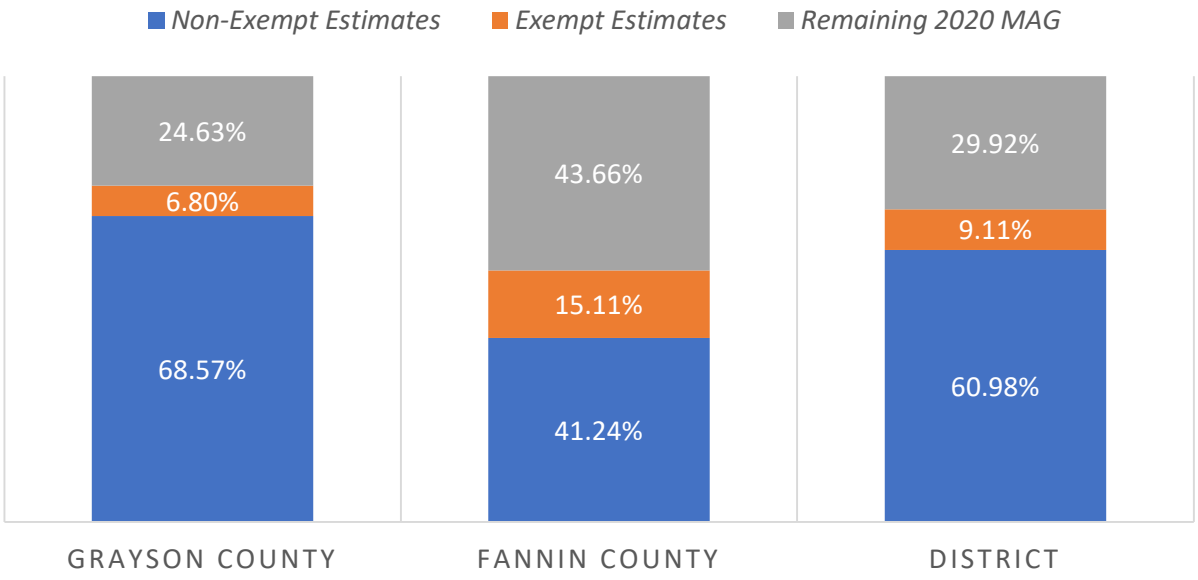
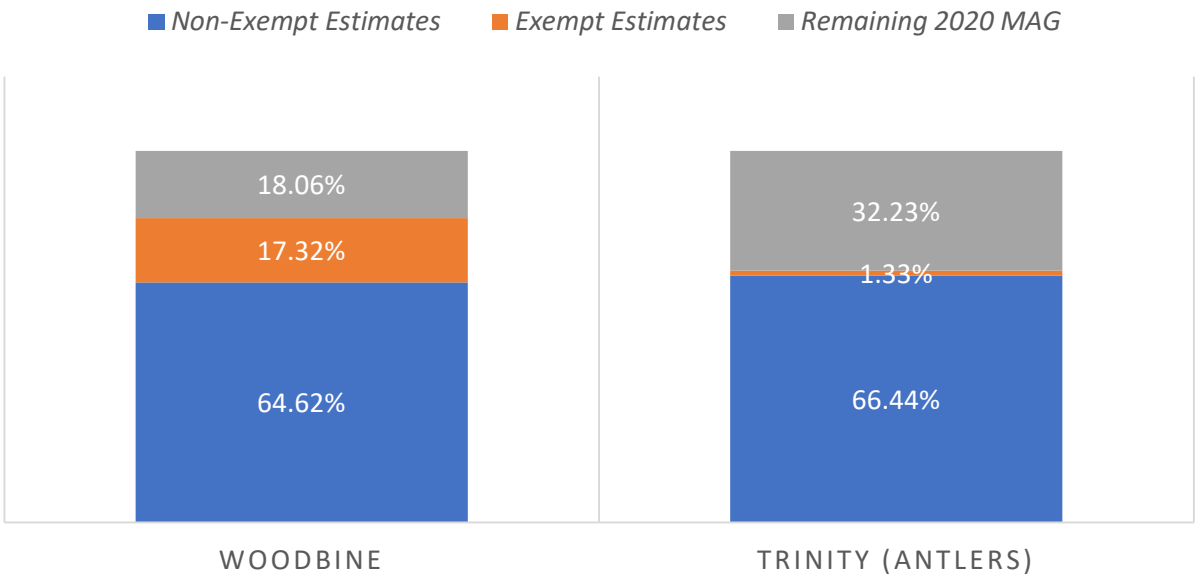


Figure 3: Average Production Compared to 2020 MAG by Aquifer.



Management Objective 1.6

A critical component to accomplishing the District's mission is to ensure that proper data is being collected and that the data is being utilized to the fullest extent and efficiently. Shortly after the District was created, the District hired a consultant to build an online geodatabase that would make workflows, data entry and data utilization easier and more efficient for well owners, well drillers, general public, District staff and Board of Directors. After several years of utilizing the geodatabase the District had built, the District staff has identified areas in which the existing system can be upgraded.

Performance Standard 1.6

The District has hired a consultant to upgrade the District's geodatabase. The consultant is in the process of completing an upgraded database to make workflows, data entry and data utilization easier and more efficient.

Management Objective 1.7

The District will develop methodology to quantify current and projected annual groundwater production from exempt wells.

Performance Standard 1.7

The District will provide the Texas Water Development Board with its methodology and estimates of current and projected annual groundwater production from exempt wells. The District will also utilize the information in the future in developing and achieving desired future conditions and in developing and implementing its production allocation and permitting system and rules. Table 11 outlines the District methodology for estimating annual groundwater production from exempt wells.

Table 11: Estimated Annual Groundwater Production from Exempt Wells.

Use	*Active Wells*	*Sum Of Capacity (GPM)*	*Estimated Production (Ac-ft)*	*Methodology*
Agriculture	19	311.5	377	Average time pumping per day of 6 hours
Commercial	16	1,238.4	8	Assumed average consumption is 150 gallons per day
Domestic	414	5,959.9	209	Assumed average consumption is 150 gallons per day
Golf Course Irrigation	2	34.7	14	Average time pumping per day of 2 hours
Irrigation	5	98.0	40	Average time pumping per day of 2 hours
Livestock	38	678.7	821	Average time pumping per day of 6 hours
Oil/Gas	3	80.0	32	Average time pumping per day of 2 hours
Surface Impoundments	17	664.4	804	Average time pumping per day of 6 hours
Total	*514*	*9,066*	*2,305*	

Note: The District assumed the registered exempt wells only accounted for one third of the actual number of exempt wells within the District.

Goal 2: Controlling and Preventing Waste of Groundwater

Management Objective 2.1

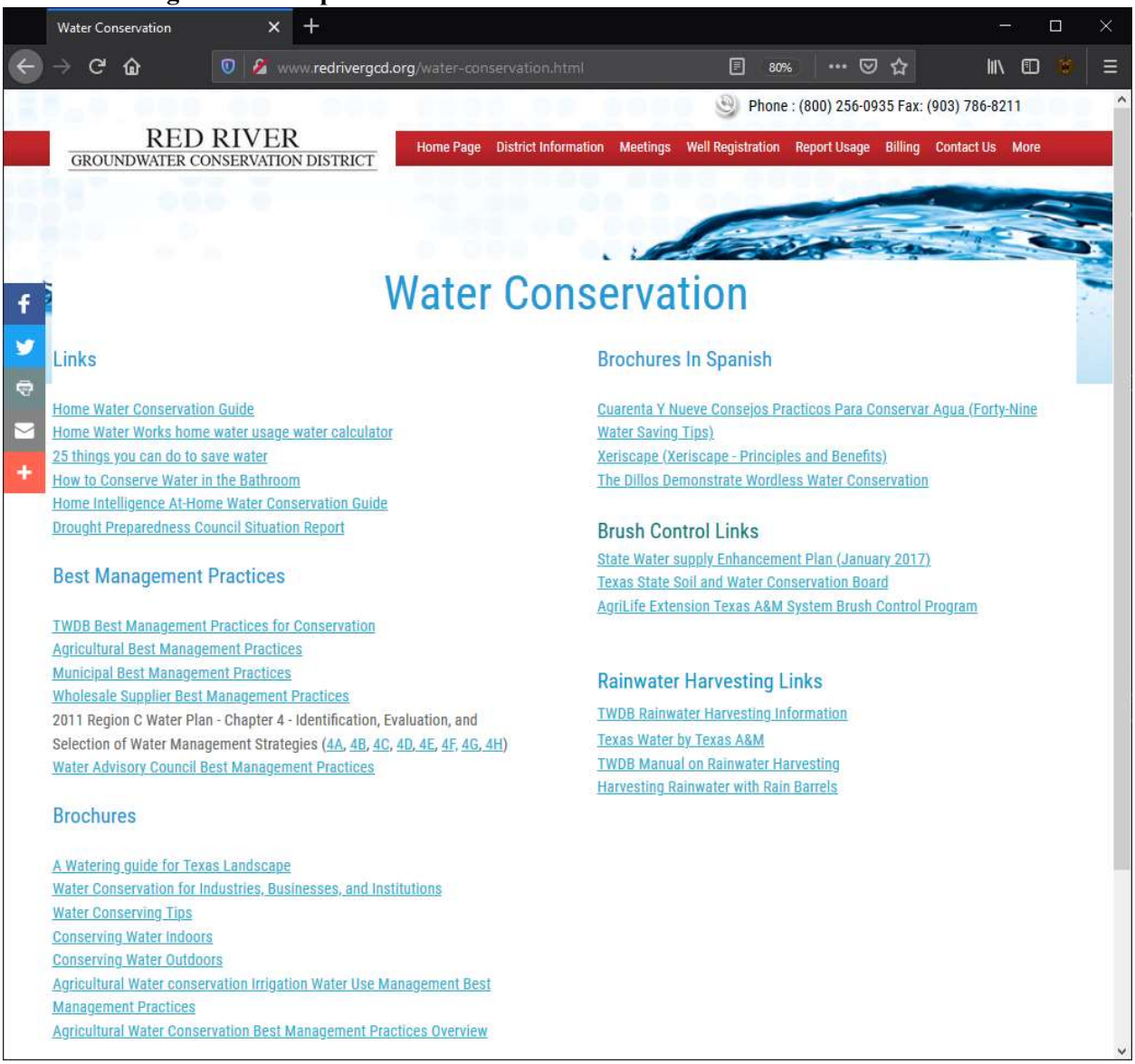
The District will annually provide information to the public on eliminating and reducing wasteful practices in the use of groundwater by publishing information on groundwater waste reduction on the District's website at least once a year.

Performance Standard 2.1

A link has been provided on the District website to Best Management Practices and helpful hints to control and prevent waste of groundwater.

The following figure is an excerpt of information available on the District website:

Figure 4: Excerpt of the Conservation Information on the District Website.



Management Objective 2.2

The District will encourage the elimination and reduction of groundwater waste through a collection of water-use fees for non-exemption production wells within the District.

Performance Standard 2.2

Table 12 list the total fees paid, and the calculated groundwater use based on the fees paid during 2013 through 2019.

Table 12: Total Fees Paid and Groundwater Usage Based on the Fees Paid.

Year	*Total Fees Paid*	*Total Groundwater Used (gallons)*
2013	$297,037.92	4,243,398,860
2014	$284,250.06	4,060,715,143
2015	$322,861.01	4,612,300,150
2016	$303,474.94	4,331,070,580
2017	$302,897.59	4,327,108,428
2018	$337,667.83	4,823,826,143
2019	$357,879.11	5,112,558,714
Average	*$315,152.64*	*4,501,568,288*

Management Objective 2.3

The District will identify well owners that are not in compliance with District well registration, reporting, and fee payment requirements, and request they comply.

Performance Standard 2.3

Table 13 is a list of violations that occurred during 2019.

Table 13: Summary of Violations.

Violator	*Violation*	*Enforcement Action*
Buena Vista Turf Farm *330 Oaks Trail Suite 100* *Garland, TX 75043*	Failure to register or permit a well	$3,200 including pervious fines from 2018
W.E. Pender *8201 North State Line Ave.* *Texarkana, TX 75503*	Failure to register or permit a well	$500 fine
Kevin Crawford *7376 Dexter Road* *Whitesboro, TX 76273*	Failure to register or permit a well	$500 fine
Porter Green *7000 Parkwood Blvd Ste E200* *Frisco, TX 75034*	Committing waste, and Two counts of failure to timely meter a well when required	The owner is required to turn off the pumps or fix the leaky pond within 30 days. After the leaky pond has been fixed, the owner should provide proof of repair efforts and then apply for a production permit.

Management Objective 2.4

The District will investigate instance of potential waste of groundwater.

Performance Standard 2.4

District staff will report to the Board of Directors as needed regarding potential waste of groundwater and include number of investigations in the Annual Report. The District staff investigated one reported case of potential waste of groundwater.

Porter Green

The District received complaints from the neighbor that the Porter Green's pond was leaking and killing trees on the adjacent properties. At the start of the investigation, the original owner, Greg Gillum, sold the property to Porter Green. The property has two wells pumping into a pond and the District staff monitored the production into the pond for a seven-week period. During the seven weeks, the wells pumped 2.96 million gallons into the pond. Based on production and evaporation rates, the District staff determined that substantially more water has been pumped into the pond than could have been evaporated during the seven-week period. The Board order Porter Green to turn off the pumps or fix the leak within 30 days of the October 24, 2019 Board Meeting. After the leak has been fixed, owner should provide proof of repair efforts and then apply for a production permit. As of this report, Porter Green has not resolved the issue.

Goal 3: Controlling and Preventing Subsidence

Due to the geology of the Northern Trinity/Woodbine Aquifers in the District, problems resulting from water level declines causing subsidence are not technically feasible and as such, a goal addressing subsidence is not applicable. The District's Hydrogeologist presented subsidence information to the Board of Directors in 2019.

Goal 4: Addressing Conjunctive Surface Water Management Issues

Management Objective 4.1

Coordinating with surface water management agencies. Designated Board Member or General Manager shall attend a minimum of 75 percent of meetings and events of Region C Water Planning Group. Participation in the regional water planning process will ensure coordination with surface water management agencies that are participating in the regional water planning process.

Performance Standard 4.1

Report on actions of Region C Water Planning Group shall be provided to the Board as appropriate. General Manager to document meetings attended and significant actions of the planning group in the Annual Report.

Region C Water Planning Group held 3 meetings in 2019, on February 25, June 24, and December 16. General Manager Drew Satterwhite and GMA 8 Representative Harold Latham attended all 3 meetings.

February 25, 2019 Region C Water Planning Group Meeting
The Group elected the slate of officers for 2019, approved the remaining scope for Task 5A, approved a request to TWDB for a notice-to-proceed, authorizing Trinity River Authority to execute a contract amendment with TWDB, approved Task 8 subcommittee recommendations, approved a letter to TWDB requesting specific hydrologic variances to the water availability models, and approved submitting a written request to the TWDB to perform the socio-economic impact analysis of not meeting identified water needs for inclusion in the 2021 Regional Water Plan. The Group discussed the progress of Bois d'Arc Lake, large water management strategies, recommendations from Region C, Uniform Standards Committee Report from TWDB, TWDB comments on technical memorandum, Chapters one through three, and Task 5B.

June 24, 2019 Region C Water Planning Group Meeting
The Group authorized Trinity River Authority to amend the Region C contract with TWDB to increase committed funds to the full contracted amount, recognized and appointed replacements for two members who resigned from their position, approved City of Springtown's request for an amendment to the 2016 Region C Water Plan, and authorized the chairman to convene a meeting of the environmental entities and consultants to determine the list of emergency interconnects to submit to the TWDB separate from the final plan. The Group discussed an update on hydrologic variance request for water management strategies, received a presentation on conservation strategies and water management strategies, and discussed Region C and D coordination.

December 16, 2019 Region C Water Planning Group Meeting
The Group elected officers for 2020, elected a new member to fill the vacancy for the member representing agricultural interests, and appointed members to a prioritization subcommittee. The Group received an update on Region C and D coordination, chapter 4 (water needs), chapter 5 (water management strategies), chapter 11 (implementation/comparison to 2016 Plan), and Region C website.

Additional information about the Region C Water Planning Group and the 2021 Region C Water Plan can be found at regioncwater.org.

Management Objective 4.2

Designated technical representative of the District will monitor and participate in all stakeholder meetings that concern water resources relevant to the District.

Performance Standard 4.2

The General Manager of the District will monitor and participate in relevant stakeholder meetings that concern water resources relevant to the District. A report on meetings attended will be included in the Annual Report to the Board of Directors.

Groundwater Management Area 8 (GMA 8) held 3 meetings in 2019, on May 6, July 26, and November 22. General Manager Drew Satterwhite, GMA 8 Representative David Gattis, Region C Member Harold Latham, and District Staff attended all three meetings.

May 6, 2019 GMA 8 Meeting
The group recognized Eddy Daniel for his service to GMA 8, approved a contract and scope of services with WSP for consulting service for DFC development, approved an interlocal agreement for splitting the funding for WSP services, discussed potential model runs of the Groundwater Availability Model of the Northern Trinity and Woodbine Aquifers (NTWGAM) for this planning cycle, discussed the joint planning schedule, and received an update on pending legislation.

July 6, 2019 GMA 8 Meeting
The group received an update on the contract and scope of services with WSP for consulting service for DFC development, discussed potential model runs of the NTWGAM for this planning cycle, discussed the plan for consideration of the nine factors required for DFC joint planning, discussed the plan for updated the explanatory report for the third round of DFC joint planning, and received an update on pending legislation.

November 22, 2019 GMA 8 Meeting
The group discussed the groundwater production inputs for a new model run of the NTWGAM, impacts from three factors (environmental, subsidence, and hydrological conditions) as they relate to the Desired Future Conditions, similar rules surveys, and an update form the TWDB.

Additional information about GMA 8 and the DFC joint planning process can be found at gma8.org.

Goal 5: Addressing Natural Resource Issues

Management Objective 5.1

The District has engaged a firm to monitor all injection well applications within the District and notify the General Manager of any potential impacts.

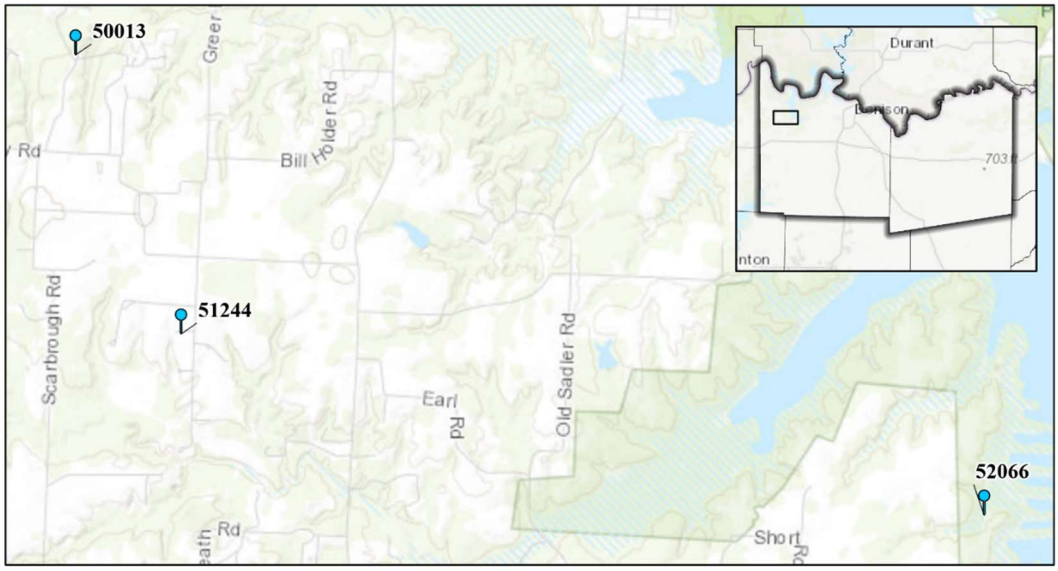
Performance Standard 5.1

General Manager will report to the Board of Directors on any information provided by the consultant engaged to monitor injection well applications within the District to the Board of Directors and document that information in the Annual Report to the Board of Directors.

Table 14: Reported Injection Wells.

ID	*Operator*	*Protested*	*Conclusion*
50013	The Little, Quintin Company, Inc.	No	Permit was approved on March 12, 2019
51244	Silver Creek Oil & Gas, LLC	No	Application withdrawn on September 18, 2019
52066	Jetta Operating Company, Inc.	The District protested the application on December 19, 2019 due to deficient and lacking information on the application. The protest was withdrawn after the operator provided the deficient and lacking information.	Permit was approved on June 9, 2020

Figure 5: Map of Reported Injection Well.



Management Objective 5.2

The District will monitor compliance by oil and gas companies of well registration, metering, production reporting, and fee payment requirements of the District's rules.

Performance Standard 5.2

As with other types of wells, instances of non-compliance by owners and operators of water wells for oil and gas activities will be reported to the Board of Directors as appropriate and for enforcement action. A summary of such enforcement activities will be included in the Annual Report to the Board of Directors.

There were no enforcement activities during 2019 concerning noncompliance by owners and operators of water wells for oil and gas activities.

Goal 6: Addressing Drought Conditions

Management Objective 6.1

The District will make available through the District's website easily accessible drought information with an emphasis on developing droughts and any current drought conditions.

Performance Standard 6.1

The District has made available through the District website easily accessible drought information with an emphasis on developing droughts and on any current drought conditions. Monthly U.S. Drought Monitor maps for Texas are available on the District website. Copies of each month's report for 2019 are in Appendix B of this report.

Goal 7: Addressing Conservation, Recharge Enhancement, Rainwater Harvesting, Precipitation Enhancement, and Brush Control

Texas Water Code §36.1071(a)(7) requires that a management plan include a goal that addressed conservation, recharge enhancement, rainwater harvesting, precipitation enhancement, or brush control, where appropriate and cost-effective. The District has determined that a goal addressing recharge enhancement and precipitation enhancement would not be appropriate or cost effective, and therefore is not applicable to the District.

Management Objective 7.1

Provide for and facilitate the conservation of groundwater resources within the District. The District will include a link on the District's website to the electronic library of water conservation resources supported by the Water Conservation Advisory Council.

Performance Standard 7.1

Link to electronic library of water conservation resources supported by the Water Conservation Advisory Council is available on the District's website. Figure 4 include the best management practice links located on the District's website.

Management Objective 7.2

The District will submit at least one article regarding water conservation for publication each year to at least one newspaper of general circulation in the District's Counties.

Performance Standard 7.2

Appendix C contains the article published during 2019 regarding water conservation.

Management Objective 7.3

The District will provide educational curriculum regarding water conservation offered by the Texas Water Development Board (Major Rivers) to at least one elementary school in each county of the District.

Performance Standard 7.3

Major Rivers curriculum purchased from the Texas Water Development Board was not available in 2018 as the Texas Water Development Board was not staffed to provide delivery of the curriculum. Curriculum that was ordered in 2018 was delivered during 2019.

Table 15: List of Schools Who Participated in the Major Rivers Program.

Fannin County	*Grayson County*
Leonard ISD	*Howe ISD*
Trenton ISD	*Gunter ISD*
	Pottsboro ISD

Management Objective 7.4

Rainwater harvesting is assuming a viable role either as a supplemental water supply or as the primary water supply in both urban and rural areas of Texas. As a result, Texas has become internationally recognized for the widespread use and innovative technologies that have been developed, primarily through efforts at the Texas Water Development Board. To ensure these educational materials are readily available to citizens in the District, a link to rainwater harvesting materials including system design specifications and water quality requirements will be maintained on the District's website.

Performance Standard 7.4

Figure 4 include the rainwater harvesting links located on the District's website. The following links are maintained on the District's website:

Rainwater Harvesting Links

TWDB Rainwater Harvesting Information
Texas Water by Texas A&M
TWDB Manual on Rainwater Harvesting
Rainwater Harvesting with Rain Barrels

Management Objective 7.5

Educate public on importance of brush controls as it related to water table consumption.

Performance Standard 7.5

Figure 4 includes the brush control links located on the District's website. The following links are maintained on the District's website:

Brush Control Links

State Water Supply Enhancement Plan (July 2014)
Texas State Soil and Water Conservation Board
AgriLife Extension Texas A&M System Brush Control Program

Goal 8: Achieving Desired Future Conditions of Groundwater Resources

The Desired Future Conditions of the aquifers of Groundwater Management Area 8 represent average water levels in the various aquifers at the end of 50-years based on meeting current and projected groundwater supply needs. The Board of Directors has adopted a strategic approach that includes adoption of the management plan and rules necessary to achieve the Desired Future Conditions. The management plan and companion rules have been designed as an integrated program that will systematically collect and review water data on water quantity, water quality, and water use, while at the same time, implementing public awareness and public education activities that will result in a better formed constituency.

Management Objective 8.1

Statute requires GCDs to review, amend as necessary, and readopt management plans at least every five years. The General Manager will annually present a summary report on the status of achieving the adopted desired future conditions.

Performance Standard 8.1(a)

Appendix D is a memo intitled "Comparison of Water Level Data and Desired Future Conditions (DFCs)" by the District's hydrogeologist consultant on the District's progress on achieving the DFCs. Table 16 is a summary of the results from the memo.

Table 16: Summary of the Progress in meeting the DFCs.

Aquifer	*Water Level Data Sites*	*Annual DFC (ft./yr. of Avg. Drawdown)*	*Current Trend (ft./yr. of Avg. Drawdown)*	*Current Status (ft./yr.)*
Woodbine	25	-4.1	1.1	5.2
Trinity (Antlers)	17	-5.8	3.7	9.5
Trinity (Paluxy)	1	-11.5	3.1	14.6

Performance Standard 8.1(b)

Beginning four years after adoption of the Plan, General Manager will work with Board of Directors to conduct a focused review to determine if any elements of this Plan or the District Rules need to be amended to achieve the adopted Desired Future Conditions, or if the Desired Future Conditions need to be reviewed/revised to better reflect the needs of the District. Possible results of the five-year review: (1) determination that current Plan and Rules are working effectively to achieve Desired Future Conditions, (2) specific amendments need to be made to the Plan and/or Rules to achieve the adopted Desired Future Conditions, (3) amendments are needed to the adopted Desired Future Conditions to better meet the needs of the District, or (4) a combination of (2) and (3). This determination to be made at a regularly scheduled meeting of the Board of Directors no later than five years after adoption of the Plan.

Appendix A: TWDB Well Water Quality Report

Texas Water Development Board

Texas Water Development Board (TWDB) Groundwater Database (GWDB)
Well Water Quality Report
Aquifer: Woodbine and Trinity
County: Collin, Cooke, and Denton

groundwater division

State Well Number	Coordinates	County	Aquifer Code	Well Depth (ft)	Date	Collection Remarks	Parameter Code	Parameter Description	Flag	Value	Unit	Plus/ Minus
1810703	33.7641667 -96.8677778	Grayson	218ALRS	1218	4/30/2019	Analysis Balanced.	39086	ALKALINITY FIELD DISSOLVED AS CACO3		416	mg/L	
							00425	ALKALINITY, BICARBONATE DISSOLVED (MG/L), LAB		362	mg/L	
							00430	ALKALINITY, CARBONATE DISSOLVED (MG/L), LAB		40.5	mg/L	
							00420	ALKALINITY, HYDROXIDE DISSOLVED (MG/L), LAB		0	mg/L	
							00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		20.2	mg/L	
							00410	ALKALINITY, TOTAL (MG/L AS CACO3)		403	mg/L	
							01106	ALUMINUM, DISSOLVED (UG/L AS AL)		6.77	ug/L	
							50938	ANION/CATION CHG BAL, PERCENT		1.42	PCT	
							01095	ANTIMONY, DISSOLVED (UG/L AS SB)	<	1	ug/L	
							01000	ARSENIC, DISSOLVED (UG/L AS AS)	<	1	ug/L	
							01005	BARIUM, DISSOLVED (UG/L AS BA)		7.49	ug/L	
							01010	BERYLLIUM, DISSOLVED (UG/L AS BE)	<	1	ug/L	
							00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		442.497	mg/L	
							01020	BORON, DISSOLVED (UG/L AS B)		570	ug/L	
							71870	BROMIDE, DISSOLVED, (MG/L AS BR)	<	0.2	mg/L	
							01025	CADMIUM, DISSOLVED (UG/L AS CD)	<	1	ug/L	
							00915	CALCIUM, DISSOLVED (MG/L AS CA)		1.5	mg/L	
							00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		24.24	mg/L	
							00941	CHLORIDE, DISSOLVED (MG/L AS CL)		27.1	mg/L	
							01030	CHROMIUM, DISSOLVED (UG/L AS CR)	<	1	ug/L	
							01035	COBALT, DISSOLVED (UG/L AS CO)	<	1	ug/L	
							01040	COPPER, DISSOLVED (UG/L AS CU)	<	1	ug/L	
							00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.518	mg/L	
							00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CACO3)		5.717	mg/L	
							01046	IRON, DISSOLVED (UG/L AS FE)	<	50	ug/L	
							01049	LEAD, DISSOLVED (UG/L AS PB)	<	1	ug/L	
							01130	LITHIUM, DISSOLVED (UG/L AS LI)		16.5	ug/L	
							00925	MAGNESIUM, DISSOLVED (MG/L AS MG)		0.447	mg/L	
							01056	MANGANESE, DISSOLVED (UG/L AS MN)		1.67	ug/L	
							71890	MERCURY, DISSOLVED (UG/L AS HG)	<	0.2	ug/L	
							01060	MOLYBDENUM, DISSOLVED (UG/L AS MO)	<	1	ug/L	
							71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.02	mg/L	
							00631	NITRITE PLUS NITRATE, DISSOLVED (MG/L AS N)	<	0.02	mg/L	
							00400	PH (STANDARD UNITS), FIELD		9.03	SU	
							00666	PHOSPHORUS, DISSOLVED (MG/L AS P)		0.0399	mg/L	
							00935	POTASSIUM, DISSOLVED (MG/L AS K)		0.961	mg/L	
							71860	RESIDUAL SODIUM CARBONATE, CALCULATED		7.949		
							01145	SELENIUM, DISSOLVED (UG/L AS SE)	<	5	ug/L	
							00955	SILICA, DISSOLVED (MG/L AS SI02)		10.4	mg/L	
							01075	SILVER, DISSOLVED (UG/L AS AG)	<	1	ug/L	
							00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		41.059		
							00932	SODIUM, CALCULATED, PERCENT		98.862	PCT	
							00930	SODIUM, DISSOLVED (MG/L AS NA)		223	mg/L	
							00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		911	MICR	
							01080	STRONTIUM, DISSOLVED (UG/L AS SR)		114	ug/L	
							00946	SULFATE, DISSOLVED (MG/L AS SO4)		62.3	mg/L	
							00010	TEMPERATURE, WATER (CELSIUS)		24.9	C	
							01057	THALLIUM, DISSOLVED (UG/L AS TL)	<	1	ug/L	
							70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		568.156	mg/L	
							22703	URANIUM, NATURAL, DISSOLVED (UG/L AS U)	<	1	ug/L	
							01085	VANADIUM, DISSOLVED (UG/L AS V)	<	1	ug/L	
							01090	ZINC, DISSOLVED (UG/L AS ZN)	<	5	ug/L	
1826102	33.6222222 -96.8644444	Grayson	218ALRS	1575	4/30/2019	Analysis Balanced.	39086	ALKALINITY FIELD DISSOLVED AS CACO3		374	mg/L	
							00425	ALKALINITY, BICARBONATE DISSOLVED (MG/L), LAB		316	mg/L	
							00430	ALKALINITY, CARBONATE DISSOLVED (MG/L), LAB		52.7	mg/L	
							00420	ALKALINITY, HYDROXIDE DISSOLVED (MG/L), LAB		0	mg/L	
							00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		26.4	mg/L	
							00410	ALKALINITY, TOTAL (MG/L AS CACO3)		369	mg/L	
							01106	ALUMINUM, DISSOLVED (UG/L AS AL)		6.13	ug/L	

State Well Number	Coordinates	County	Aquifer Code	Well Depth (ft)	Date	Collection Remarks	Parameter Code	Parameter Description	Flag	Value	Unit	Plus/ Minus
							50938	ANION/CATION CHG BAL, PERCENT		2.24	PCT	
							01095	ANTIMONY, DISSOLVED (UG/L AS SB)	<	1	ug/L	
							01000	ARSENIC, DISSOLVED (UG/L AS AS)	<	1	ug/L	
							01005	BARIUM, DISSOLVED (UG/L AS BA)		8.69	ug/L	
							01010	BERYLLIUM, DISSOLVED (UG/L AS BE)	<	1	ug/L	
							00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		385.873	mg/L	
							01020	BORON, DISSOLVED (UG/L AS B)		254	ug/L	
							71870	BROMIDE, DISSOLVED, (MG/L AS BR)		0.208	mg/L	
							01025	CADMIUM, DISSOLVED (UG/L AS CD)	<	1	ug/L	
							00915	CALCIUM, DISSOLVED (MG/L AS CA)		0.943	mg/L	
							00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		31.68	mg/L	
							00941	CHLORIDE, DISSOLVED (MG/L AS CL)		34.8	mg/L	
							01030	CHROMIUM, DISSOLVED (UG/L AS CR)	<	1	ug/L	
							01035	COBALT, DISSOLVED (UG/L AS CO)	<	1	ug/L	
							01040	COPPER, DISSOLVED (UG/L AS CU)	<	1	ug/L	
							00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.277	mg/L	
							00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CACO3)		3.58	mg/L	
							01046	IRON, DISSOLVED (UG/L AS FE)	<	50	ug/L	
							01049	LEAD, DISSOLVED (UG/L AS PB)	<	1	ug/L	
							01130	LITHIUM, DISSOLVED (UG/L AS LI)		19.1	ug/L	
							00925	MAGNESIUM, DISSOLVED (MG/L AS MG)		0.29	mg/L	
							01056	MANGANESE, DISSOLVED (UG/L AS MN)		1.46	ug/L	
							71890	MERCURY, DISSOLVED (UG/L AS HG)	<	0.2	ug/L	
							01060	MOLYBDENUM, DISSOLVED (UG/L AS MO)	<	1	ug/L	
							71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.02	mg/L	
							00631	NITRITE PLUS NITRATE, DISSOLVED (MG/L AS N)	<	0.02	mg/L	
							00400	PH (STANDARD UNITS), FIELD		9.23	SU	
							00666	PHOSPHORUS, DISSOLVED (MG/L AS P)		0.0343	mg/L	
							00935	POTASSIUM, DISSOLVED (MG/L AS K)		0.79	mg/L	
							71860	RESIDUAL SODIUM CARBONATE, CALCULATED		7.309		
							01145	SELENIUM, DISSOLVED (UG/L AS SE)	<	5	ug/L	
							00955	SILICA, DISSOLVED (MG/L AS SI02)		12.3	mg/L	
							01075	SILVER, DISSOLVED (UG/L AS AG)	<	1	ug/L	
							00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		47.587		
							00932	SODIUM, CALCULATED, PERCENT		99.215	PCT	
							00930	SODIUM, DISSOLVED (MG/L AS NA)		206	mg/L	
							00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		799	MICR	
							01080	STRONTIUM, DISSOLVED (UG/L AS SR)		26.8	ug/L	
							00946	SULFATE, DISSOLVED (MG/L AS SO4)		53.6	mg/L	
							00010	TEMPERATURE, WATER (CELSIUS)		27.3	C	
							01057	THALLIUM, DISSOLVED (UG/L AS TL)	<	1	ug/L	
							70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		530.441	mg/L	
							22703	URANIUM, NATURAL, DISSOLVED (UG/L AS U)	<	1	ug/L	
							01085	VANADIUM, DISSOLVED (UG/L AS V)	<	1	ug/L	
							01090	ZINC, DISSOLVED (UG/L AS ZN)	<	5	ug/L	
1827803	33.5325 -96.7019444	Grayson	218ALRS	2250	4/30/2019	Analysis Balanced.	39086	ALKALINITY FIELD DISSOLVED AS CACO3		416	mg/L	
							00425	ALKALINITY, BICARBONATE DISSOLVED (MG/L), LAB		366	mg/L	
							00430	ALKALINITY, CARBONATE DISSOLVED (MG/L), LAB		45.9	mg/L	
							00420	ALKALINITY, HYDROXIDE DISSOLVED (MG/L), LAB		0	mg/L	
							00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		23	mg/L	
							00410	ALKALINITY, TOTAL (MG/L AS CACO3)		412	mg/L	
							01106	ALUMINUM, DISSOLVED (UG/L AS AL)		7.52	ug/L	
							50938	ANION/CATION CHG BAL, PERCENT		1.36	PCT	
							01095	ANTIMONY, DISSOLVED (UG/L AS SB)	<	1	ug/L	
							01000	ARSENIC, DISSOLVED (UG/L AS AS)	<	1	ug/L	
							01005	BARIUM, DISSOLVED (UG/L AS BA)		5.66	ug/L	
							01010	BERYLLIUM, DISSOLVED (UG/L AS BE)	<	1	ug/L	
							00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		446.647	mg/L	
							01020	BORON, DISSOLVED (UG/L AS B)		477	ug/L	
							71870	BROMIDE, DISSOLVED, (MG/L AS BR)	<	0.2	mg/L	
							01025	CADMIUM, DISSOLVED (UG/L AS CD)	<	1	ug/L	
							00915	CALCIUM, DISSOLVED (MG/L AS CA)		1.18	mg/L	
							00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		27.6	mg/L	
							00941	CHLORIDE, DISSOLVED (MG/L AS CL)		28.8	mg/L	
							01030	CHROMIUM, DISSOLVED (UG/L AS CR)	<	1	ug/L	
							01035	COBALT, DISSOLVED (UG/L AS CO)	<	1	ug/L	
							01040	COPPER, DISSOLVED (UG/L AS CU)	<	1	ug/L	

State Well Number	Coordinates	County	Aquifer Code	Well Depth (ft)	Date	Collection Remarks	Parameter Code	Parameter Description	Flag	Value	Unit	Plus/ Minus
							00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.688	mg/L	
							00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CACO3)		4.292	mg/L	
							01046	IRON, DISSOLVED (UG/L AS FE)	<	50	ug/L	
							01049	LEAD, DISSOLVED (UG/L AS PB)	<	1	ug/L	
							01130	LITHIUM, DISSOLVED (UG/L AS LI)		20.3	ug/L	
							00925	MAGNESIUM, DISSOLVED (MG/L AS MG)		0.315	mg/L	
							01056	MANGANESE, DISSOLVED (UG/L AS MN)		3.21	ug/L	
							71890	MERCURY, DISSOLVED (UG/L AS HG)	<	0.2	ug/L	
							01060	MOLYBDENUM, DISSOLVED (UG/L AS MO)	<	1	ug/L	
							71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.02	mg/L	
							00631	NITRITE PLUS NITRATE, DISSOLVED (MG/L AS N)	<	0.02	mg/L	
							00400	PH (STANDARD UNITS), FIELD		9.06	SU	
							00666	PHOSPHORUS, DISSOLVED (MG/L AS P)		0.0267	mg/L	
							00935	POTASSIUM, DISSOLVED (MG/L AS K)		0.846	mg/L	
							71860	RESIDUAL SODIUM CARBONATE, CALCULATED		8.156		
							01145	SELENIUM, DISSOLVED (UG/L AS SE)	<	5	ug/L	
							00955	SILICA, DISSOLVED (MG/L AS SI02)		13.8	mg/L	
							01075	SILVER, DISSOLVED (UG/L AS AG)	<	1	ug/L	
							00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		50.911		
							00932	SODIUM, CALCULATED, PERCENT		99.198	PCT	
							00930	SODIUM, DISSOLVED (MG/L AS NA)		241	mg/L	
							00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		1066	MICR	
							01080	STRONTIUM, DISSOLVED (UG/L AS SR)		41.3	ug/L	
							00946	SULFATE, DISSOLVED (MG/L AS SO4)		86.4	mg/L	
							00010	TEMPERATURE, WATER (CELSIUS)		31.7	C	
							01057	THALLIUM, DISSOLVED (UG/L AS TL)	<	1	ug/L	
							70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		620.286	mg/L	
							22703	URANIUM, NATURAL, DISSOLVED (UG/L AS U)	<	1	ug/L	
							01085	VANADIUM, DISSOLVED (UG/L AS V)	<	1	ug/L	
							01090	ZINC, DISSOLVED (UG/L AS ZN)	<	5	ug/L	
1833303	33.4669444 -96.9136111	Grayson	218ALRS	1500	4/30/2019	Analysis Balanced.	39086	ALKALINITY FIELD DISSOLVED AS CACO3		356	mg/L	
							00425	ALKALINITY, BICARBONATE DISSOLVED (MG/L), LAB		280	mg/L	
							00430	ALKALINITY, CARBONATE DISSOLVED (MG/L), LAB		52.2	mg/L	
							00420	ALKALINITY, HYDROXIDE DISSOLVED (MG/L), LAB		0	mg/L	
							00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		26.1	mg/L	
							00410	ALKALINITY, TOTAL (MG/L AS CACO3)		333	mg/L	
							01106	ALUMINUM, DISSOLVED (UG/L AS AL)		6.47	ug/L	
							50938	ANION/CATION CHG BAL, PERCENT		1.83	PCT	
							01095	ANTIMONY, DISSOLVED (UG/L AS SB)	<	1	ug/L	
							01000	ARSENIC, DISSOLVED (UG/L AS AS)	<	1	ug/L	
							01005	BARIUM, DISSOLVED (UG/L AS BA)		11.7	ug/L	
							01010	BERYLLIUM, DISSOLVED (UG/L AS BE)	<	1	ug/L	
							00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		342.673	mg/L	
							01020	BORON, DISSOLVED (UG/L AS B)		201	ug/L	
							71870	BROMIDE, DISSOLVED, (MG/L AS BR)	<	0.1	mg/L	
							01025	CADMIUM, DISSOLVED (UG/L AS CD)	<	1	ug/L	
							00915	CALCIUM, DISSOLVED (MG/L AS CA)		1.02	mg/L	
							00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		31.32	mg/L	
							00941	CHLORIDE, DISSOLVED (MG/L AS CL)		10.7	mg/L	
							01030	CHROMIUM, DISSOLVED (UG/L AS CR)	<	1	ug/L	
							01035	COBALT, DISSOLVED (UG/L AS CO)	<	1	ug/L	
							01040	COPPER, DISSOLVED (UG/L AS CU)	<	1	ug/L	
							00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.178	mg/L	
							00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CACO3)		3.879	mg/L	
							01046	IRON, DISSOLVED (UG/L AS FE)	<	50	ug/L	
							01049	LEAD, DISSOLVED (UG/L AS PB)	<	1	ug/L	
							01130	LITHIUM, DISSOLVED (UG/L AS LI)		18.7	ug/L	
							00925	MAGNESIUM, DISSOLVED (MG/L AS MG)		0.31	mg/L	
							01056	MANGANESE, DISSOLVED (UG/L AS MN)		1.24	ug/L	
							71890	MERCURY, DISSOLVED (UG/L AS HG)	<	0.2	ug/L	
							01060	MOLYBDENUM, DISSOLVED (UG/L AS MO)	<	1	ug/L	
							71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.02	mg/L	
							00631	NITRITE PLUS NITRATE, DISSOLVED (MG/L AS N)	<	0.02	mg/L	
							00400	PH (STANDARD UNITS), FIELD		9.23	SU	
							00666	PHOSPHORUS, DISSOLVED (MG/L AS P)	<	0.02	mg/L	
							00935	POTASSIUM, DISSOLVED (MG/L AS K)		0.72	mg/L	
							71860	RESIDUAL SODIUM CARBONATE, CALCULATED		6.584		

State Well Number	Coordinates	County	Aquifer Code	Well Depth (ft)	Date	Collection Remarks	Parameter Code	Parameter Description	Flag	Value	Unit	Plus/ Minus
							01145	SELENIUM, DISSOLVED (UG/L AS SE)	<	5	ug/L	
							00955	SILICA, DISSOLVED (MG/L AS SI02)		11.8	mg/L	
							01075	SILVER, DISSOLVED (UG/L AS AG)	<	1	ug/L	
							00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		39.837		
							00932	SODIUM, CALCULATED, PERCENT		99.028	PCT	
							00930	SODIUM, DISSOLVED (MG/L AS NA)		179	mg/L	
							00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		786	MICR	
							01080	STRONTIUM, DISSOLVED (UG/L AS SR)		48.2	ug/L	
							00946	SULFATE, DISSOLVED (MG/L AS SO4)		58.7	mg/L	
							00010	TEMPERATURE, WATER (CELSIUS)		25.3	C	
							01057	THALLIUM, DISSOLVED (UG/L AS TL)	<	1	ug/L	
							70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		462.289	mg/L	
							22703	URANIUM, NATURAL, DISSOLVED (UG/L AS U)	<	1	ug/L	
							01085	VANADIUM, DISSOLVED (UG/L AS V)	<	1	ug/L	
							01090	ZINC, DISSOLVED (UG/L AS ZN)	<	5	ug/L	
1733501	33.4266667 -95.9463889	Fannin	218ALRS	3366	5/1/2019	Analysis Balanced.	39086	ALKALINITY FIELD DISSOLVED AS CACO3		572	mg/L	
							00425	ALKALINITY, BICARBONATE DISSOLVED (MG/L), LAB		486	mg/L	
							00430	ALKALINITY, CARBONATE DISSOLVED (MG/L), LAB		16	mg/L	
							00420	ALKALINITY, HYDROXIDE DISSOLVED (MG/L), LAB		0	mg/L	
							00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		8	mg/L	
							00410	ALKALINITY, TOTAL (MG/L AS CACO3)		502	mg/L	
							01106	ALUMINUM, DISSOLVED (UG/L AS AL)		14.3	ug/L	
							50938	ANION/CATION CHG BAL, PERCENT		-2.95	PCT	
							01095	ANTIMONY, DISSOLVED (UG/L AS SB)	<	1	ug/L	
							01000	ARSENIC, DISSOLVED (UG/L AS AS)	<	1	ug/L	
							01005	BARIUM, DISSOLVED (UG/L AS BA)		83.7	ug/L	
							01010	BERYLLIUM, DISSOLVED (UG/L AS BE)	<	1	ug/L	
							00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		593.088	mg/L	
							01020	BORON, DISSOLVED (UG/L AS B)		1330	ug/L	
							71870	BROMIDE, DISSOLVED, (MG/L AS BR)	<	0.2	mg/L	
							01025	CADMIUM, DISSOLVED (UG/L AS CD)	<	1	ug/L	
							00915	CALCIUM, DISSOLVED (MG/L AS CA)		1.74	mg/L	
							00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		9.6	mg/L	
							00941	CHLORIDE, DISSOLVED (MG/L AS CL)		30	mg/L	
							01030	CHROMIUM, DISSOLVED (UG/L AS CR)	<	1	ug/L	
							01035	COBALT, DISSOLVED (UG/L AS CO)	<	1	ug/L	
							01040	COPPER, DISSOLVED (UG/L AS CU)	<	1	ug/L	
							00950	FLUORIDE, DISSOLVED (MG/L AS F)		2.79	mg/L	
							00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CACO3)		5.793	mg/L	
							01046	IRON, DISSOLVED (UG/L AS FE)	<	50	ug/L	
							01049	LEAD, DISSOLVED (UG/L AS PB)	<	1	ug/L	
							01130	LITHIUM, DISSOLVED (UG/L AS LI)		47.6	ug/L	
							00925	MAGNESIUM, DISSOLVED (MG/L AS MG)		0.296	mg/L	
							01056	MANGANESE, DISSOLVED (UG/L AS MN)		1.31	ug/L	
							71890	MERCURY, DISSOLVED (UG/L AS HG)	<	0.2	ug/L	
							01060	MOLYBDENUM, DISSOLVED (UG/L AS MO)		1.86	ug/L	
							71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.02	mg/L	
							00631	NITRITE PLUS NITRATE, DISSOLVED (MG/L AS N)	<	0.02	mg/L	
							00400	PH (STANDARD UNITS), FIELD		8.37	SU	
							00666	PHOSPHORUS, DISSOLVED (MG/L AS P)	<	0.02	mg/L	
							00935	POTASSIUM, DISSOLVED (MG/L AS K)		1.52	mg/L	
							71860	RESIDUAL SODIUM CARBONATE, CALCULATED		9.929		
							01145	SELENIUM, DISSOLVED (UG/L AS SE)	<	5	ug/L	
							00955	SILICA, DISSOLVED (MG/L AS SI02)		21.3	mg/L	
							01075	SILVER, DISSOLVED (UG/L AS AG)	<	1	ug/L	
							00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		60.145		
							00932	SODIUM, CALCULATED, PERCENT		99.222	PCT	
							00930	SODIUM, DISSOLVED (MG/L AS NA)		326	mg/L	
							00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		1258	MICR	
							01080	STRONTIUM, DISSOLVED (UG/L AS SR)		200	ug/L	
							00946	SULFATE, DISSOLVED (MG/L AS SO4)		119	mg/L	
							00010	TEMPERATURE, WATER (CELSIUS)		50.3	C	
							01057	THALLIUM, DISSOLVED (UG/L AS TL)	<	1	ug/L	
							70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		804.067	mg/L	
							22703	URANIUM, NATURAL, DISSOLVED (UG/L AS U)	<	1	ug/L	
							01085	VANADIUM, DISSOLVED (UG/L AS V)	<	1	ug/L	
							01090	ZINC, DISSOLVED (UG/L AS ZN)	<	5	ug/L	

State Well Number	Coordinates	County	Aquifer Code	Well Depth (ft)	Date	Collection Remarks	Parameter Code	Parameter Description	Flag	Value	Unit	Plus/ Minus
1829304	33.6080556 -96.4086111	Grayson	218ALRS	1600	5/1/2019	Analysis Balanced.	39086	ALKALINITY FIELD DISSOLVED AS CACO3		582	mg/L	
							00425	ALKALINITY, BICARBONATE DISSOLVED (MG/L), LAB		478	mg/L	
							00430	ALKALINITY, CARBONATE DISSOLVED (MG/L), LAB		24	mg/L	
							00420	ALKALINITY, HYDROXIDE DISSOLVED (MG/L), LAB		0	mg/L	
							00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		12	mg/L	
							00410	ALKALINITY, TOTAL (MG/L AS CACO3)		502	mg/L	
							01106	ALUMINUM, DISSOLVED (UG/L AS AL)		8.26	ug/L	
							50938	ANION/CATION CHG BAL, PERCENT		-2.21	PCT	
							01095	ANTIMONY, DISSOLVED (UG/L AS SB)	<	1	ug/L	
							01000	ARSENIC, DISSOLVED (UG/L AS AS)	<	1	ug/L	
							01005	BARIUM, DISSOLVED (UG/L AS BA)		6.39	ug/L	
							01010	BERYLLIUM, DISSOLVED (UG/L AS BE)	<	1	ug/L	
							00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		583.325	mg/L	
							01020	BORON, DISSOLVED (UG/L AS B)		1190	ug/L	
							71870	BROMIDE, DISSOLVED, (MG/L AS BR)		0.216	mg/L	
							01025	CADMIUM, DISSOLVED (UG/L AS CD)	<	1	ug/L	
							00915	CALCIUM, DISSOLVED (MG/L AS CA)		1.07	mg/L	
							00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		14.4	mg/L	
							00941	CHLORIDE, DISSOLVED (MG/L AS CL)		35.5	mg/L	
							01030	CHROMIUM, DISSOLVED (UG/L AS CR)	<	1	ug/L	
							01035	COBALT, DISSOLVED (UG/L AS CO)	<	1	ug/L	
							01040	COPPER, DISSOLVED (UG/L AS CU)	<	1	ug/L	
							00950	FLUORIDE, DISSOLVED (MG/L AS F)		1.67	mg/L	
							00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CACO3)		3.908	mg/L	
							01046	IRON, DISSOLVED (UG/L AS FE)	<	50	ug/L	
							01049	LEAD, DISSOLVED (UG/L AS PB)	<	1	ug/L	
							01130	LITHIUM, DISSOLVED (UG/L AS LI)		22	ug/L	
							00925	MAGNESIUM, DISSOLVED (MG/L AS MG)		0.279	mg/L	
							01056	MANGANESE, DISSOLVED (UG/L AS MN)		1.45	ug/L	
							71890	MERCURY, DISSOLVED (UG/L AS HG)	<	0.2	ug/L	
							01060	MOLYBDENUM, DISSOLVED (UG/L AS MO)		1.37	ug/L	
							71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.02	mg/L	
							00631	NITRITE PLUS NITRATE, DISSOLVED (MG/L AS N)	<	0.02	mg/L	
							00400	PH (STANDARD UNITS), FIELD		8.81	SU	
							00666	PHOSPHORUS, DISSOLVED (MG/L AS P)		0.0409	mg/L	
							00935	POTASSIUM, DISSOLVED (MG/L AS K)		1.01	mg/L	
							71860	RESIDUAL SODIUM CARBONATE, CALCULATED		9.964		
							01145	SELENIUM, DISSOLVED (UG/L AS SE)	<	5	ug/L	
							00955	SILICA, DISSOLVED (MG/L AS SI02)		13.4	mg/L	
							01075	SILVER, DISSOLVED (UG/L AS AG)	<	1	ug/L	
							00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		68.126		
							00932	SODIUM, CALCULATED, PERCENT		99.43	PCT	
							00930	SODIUM, DISSOLVED (MG/L AS NA)		306	mg/L	
							00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		1289	MICR	
							01080	STRONTIUM, DISSOLVED (UG/L AS SR)		76.2	ug/L	
							00946	SULFATE, DISSOLVED (MG/L AS SO4)		81.2	mg/L	
							00010	TEMPERATURE, WATER (CELSIUS)		31.3	C	
							01057	THALLIUM, DISSOLVED (UG/L AS TL)	<	1	ug/L	
							70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		741.426	mg/L	
							22703	URANIUM, NATURAL, DISSOLVED (UG/L AS U)	<	1	ug/L	
							01085	VANADIUM, DISSOLVED (UG/L AS V)	<	1	ug/L	
							01090	ZINC, DISSOLVED (UG/L AS ZN)	<	5	ug/L	
1835603	33.4238889 -96.6447222	Grayson	218ALRS	2520	5/1/2019	Analysis Balanced.	39086	ALKALINITY FIELD DISSOLVED AS CACO3		412	mg/L	
							00425	ALKALINITY, BICARBONATE DISSOLVED (MG/L), LAB		351	mg/L	
							00430	ALKALINITY, CARBONATE DISSOLVED (MG/L), LAB		43.7	mg/L	
							00420	ALKALINITY, HYDROXIDE DISSOLVED (MG/L), LAB		0	mg/L	
							00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		21.8	mg/L	
							00410	ALKALINITY, TOTAL (MG/L AS CACO3)		395	mg/L	
							01106	ALUMINUM, DISSOLVED (UG/L AS AL)		10.1	ug/L	
							50938	ANION/CATION CHG BAL, PERCENT		2.99	PCT	
							01095	ANTIMONY, DISSOLVED (UG/L AS SB)	<	1	ug/L	
							01000	ARSENIC, DISSOLVED (UG/L AS AS)	<	1	ug/L	
							01005	BARIUM, DISSOLVED (UG/L AS BA)		5.01	ug/L	
							01010	BERYLLIUM, DISSOLVED (UG/L AS BE)	<	1	ug/L	
							00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		428.83	mg/L	
							01020	BORON, DISSOLVED (UG/L AS B)		567	ug/L	
							71870	BROMIDE, DISSOLVED, (MG/L AS BR)		0.0792	mg/L	

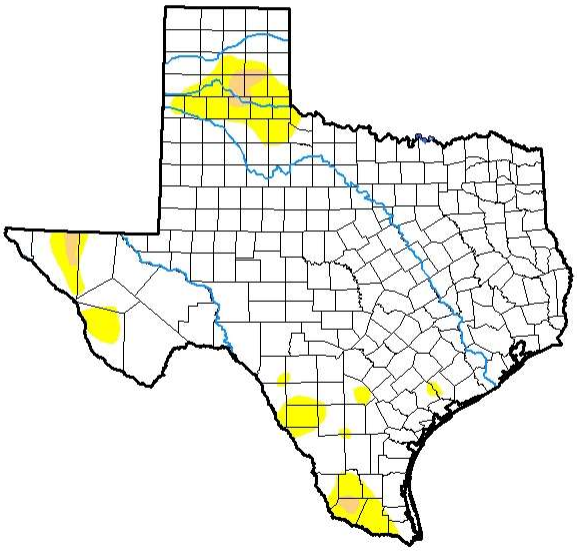
State Well Number	Coordinates	County	Aquifer Code	Well Depth (ft)	Date	Collection Remarks	Parameter Code	Parameter Description	Flag	Value	Unit	Plus/ Minus
							01025	CADMIUM, DISSOLVED (UG/L AS CD)	<	1	ug/L	
							00915	CALCIUM, DISSOLVED (MG/L AS CA)		1.37	mg/L	
							00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		26.16	mg/L	
							00941	CHLORIDE, DISSOLVED (MG/L AS CL)		14	mg/L	
							01030	CHROMIUM, DISSOLVED (UG/L AS CR)	<	1	ug/L	
							01035	COBALT, DISSOLVED (UG/L AS CO)	<	1	ug/L	
							01040	COPPER, DISSOLVED (UG/L AS CU)	<	1	ug/L	
							00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.847	mg/L	
							00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CACO3)		5.332	mg/L	
							01046	IRON, DISSOLVED (UG/L AS FE)	<	50	ug/L	
							01049	LEAD, DISSOLVED (UG/L AS PB)	<	1	ug/L	
							01130	LITHIUM, DISSOLVED (UG/L AS LI)		23.2	ug/L	
							00925	MAGNESIUM, DISSOLVED (MG/L AS MG)		0.441	mg/L	
							01056	MANGANESE, DISSOLVED (UG/L AS MN)	<	1	ug/L	
							71890	MERCURY, DISSOLVED (UG/L AS HG)	<	0.2	ug/L	
							01060	MOLYBDENUM, DISSOLVED (UG/L AS MO)		1.06	ug/L	
							71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.02	mg/L	
							00631	NITRITE PLUS NITRATE, DISSOLVED (MG/L AS N)	<	0.02	mg/L	
							00400	PH (STANDARD UNITS), FIELD		8.96	SU	
							00666	PHOSPHORUS, DISSOLVED (MG/L AS P)		0.0491	mg/L	
							00935	POTASSIUM, DISSOLVED (MG/L AS K)		0.976	mg/L	
							71860	RESIDUAL SODIUM CARBONATE, CALCULATED		7.796		
							01145	SELENIUM, DISSOLVED (UG/L AS SE)	<	5	ug/L	
							00955	SILICA, DISSOLVED (MG/L AS SI02)		14.4	mg/L	
							01075	SILVER, DISSOLVED (UG/L AS AG)	<	1	ug/L	
							00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		40.125		
							00932	SODIUM, CALCULATED, PERCENT		98.873	PCT	
							00930	SODIUM, DISSOLVED (MG/L AS NA)		211	mg/L	
							00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		885	MICR	
							01080	STRONTIUM, DISSOLVED (UG/L AS SR)		82.9	ug/L	
							00946	SULFATE, DISSOLVED (MG/L AS SO4)		73.7	mg/L	
							00010	TEMPERATURE, WATER (CELSIUS)		27.7	C	
							01057	THALLIUM, DISSOLVED (UG/L AS TL)	<	1	ug/L	
							70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		553.832	mg/L	
							22703	URANIUM, NATURAL, DISSOLVED (UG/L AS U)	<	1	ug/L	
							01085	VANADIUM, DISSOLVED (UG/L AS V)	<	1	ug/L	
							01090	ZINC, DISSOLVED (UG/L AS ZN)	<	5	ug/L	

Aquifer Code	Description
218ALRS	Trinity (Antlers)
218PLXY	Trinity (Paluxy)
218TWMT	Trinity (Twin Mountains)
212WDBN	Woodbine

Appendix B: 2019 Palmer Drought Index Maps

U.S. Drought Monitor

Texas



January 29, 2019

(Released Thursday, Jan. 31, 2019)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	90.22	9.78	1.15	0.00	0.00	0.00
Last Week 01-22-2019	90.39	9.61	2.45	0.00	0.00	0.00
3 Months Ago 10-30-2018	96.15	3.85	1.84	0.43	0.00	0.00
Start of Calendar Year 01-01-2019	92.99	7.01	1.32	0.00	0.00	0.00
Start of Water Year 09-25-2018	57.46	42.54	20.19	7.03	0.96	0.00
One Year Ago 01-30-2018	13.27	86.73	56.47	21.98	7.30	0.00

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

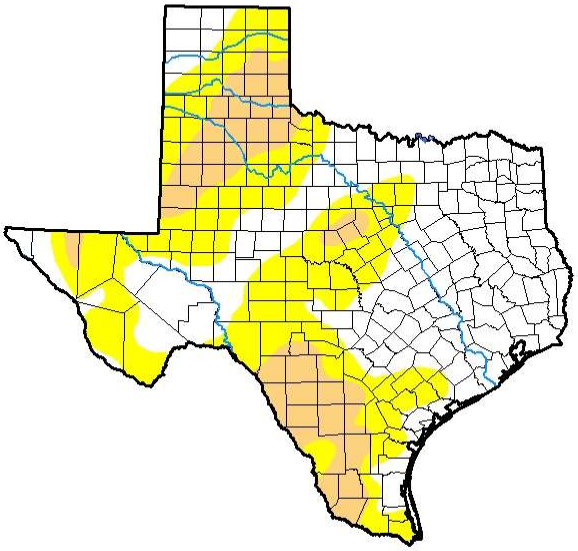
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Brian Fuchs
National Drought Mitigation Center

http://droughtmonitor.unl.edu/

U.S. Drought Monitor

Texas



February 26, 2019

(Released Thursday, Feb. 28, 2019)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	48.21	51.79	16.33	0.00	0.00	0.00
Last Week 02-19-2019	59.54	40.46	6.63	0.00	0.00	0.00
3 Months Ago 11-27-2018	97.73	2.27	0.80	0.00	0.00	0.00
Start of Calendar Year 01-01-2019	92.99	7.01	1.32	0.00	0.00	0.00
Start of Water Year 09-25-2018	57.46	42.54	20.19	7.03	0.96	0.00
One Year Ago 02-27-2018	22.75	77.25	55.19	22.04	11.47	0.00

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Brad Rippey
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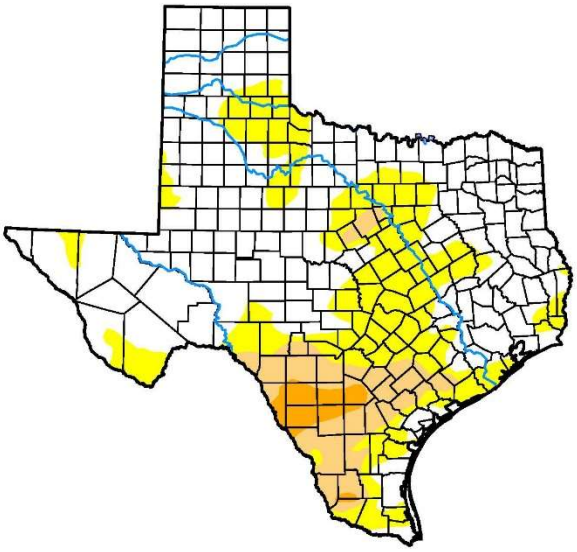
http://droughtmonitor.unl.edu/

U.S. Drought Monitor

Texas



March 26, 2019

(Released Thursday, Mar. 28, 2019)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	61.92	38.08	11.44	2.38	0.00	0.00
Last Week 03-19-2019	69.05	30.95	9.67	0.90	0.00	0.00
3 Months Ago 12-25-2018	90.02	9.98	0.80	0.00	0.00	0.00
Start of Calendar Year 01-01-2019	92.99	7.01	1.32	0.00	0.00	0.00
Start of Water Year 09-25-2018	57.46	42.54	20.19	7.03	0.96	0.00
One Year Ago 03-27-2018	26.19	73.81	64.23	28.30	15.08	1.21

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
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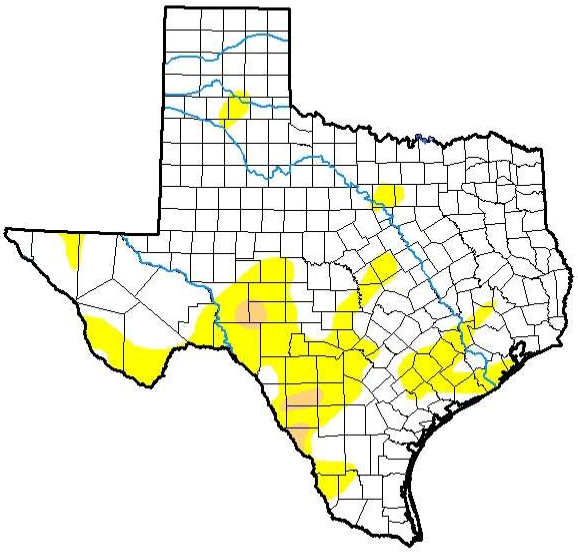
U.S. Drought Monitor

Texas



April 23, 2019

(Released Thursday, Apr. 25, 2019)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	79.75	20.25	1.29	0.00	0.00	0.00
Last Week 04-16-2019	74.85	25.15	5.22	0.00	0.00	0.00
3 Months Ago 01-22-2019	90.39	9.61	2.45	0.00	0.00	0.00
Start of Calendar Year 01-01-2019	92.99	7.01	1.32	0.00	0.00	0.00
Start of Water Year 09-25-2018	57.46	42.54	20.19	7.03	0.96	0.00
One Year Ago 04-24-2018	33.36	66.64	53.23	26.26	14.54	3.88

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
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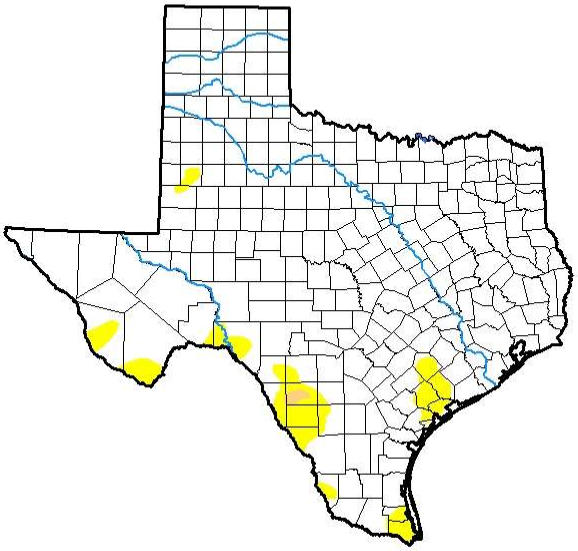
U.S. Drought Monitor

Texas



May 28, 2019

(Released Thursday, May. 30, 2019)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	94.24	5.76	0.20	0.00	0.00	0.00
Last Week 05-21-2019	97.90	2.10	0.00	0.00	0.00	0.00
3 Months Ago 02-26-2019	48.21	51.79	16.33	0.00	0.00	0.00
Start of Calendar Year 01-01-2019	92.99	7.01	1.32	0.00	0.00	0.00
Start of Water Year 09-25-2018	57.46	42.54	20.19	7.03	0.96	0.00
One Year Ago 05-29-2018	31.26	68.74	40.06	21.93	7.82	1.17

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
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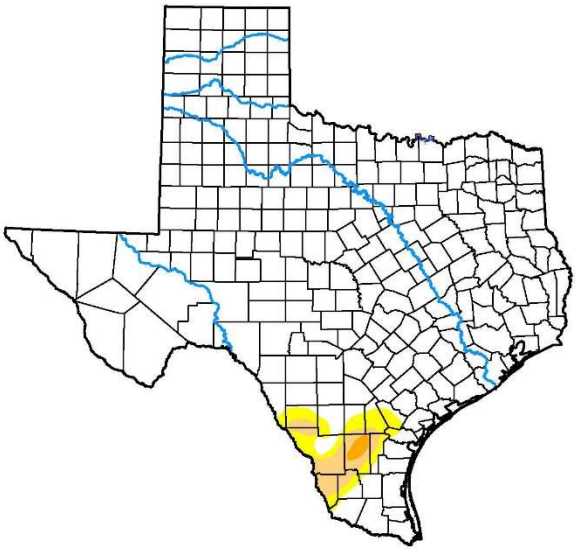
U.S. Drought Monitor

Texas



June 25, 2019

(Released Thursday, Jun. 27, 2019)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	95.84	4.16	1.93	0.23	0.00	0.00
Last Week 06-18-2019	94.17	5.83	1.59	0.00	0.00	0.00
3 Months Ago 03-26-2019	61.92	38.08	11.44	2.38	0.00	0.00
Start of Calendar Year 01-01-2019	92.99	7.01	1.32	0.00	0.00	0.00
Start of Water Year 09-25-2018	57.46	42.54	20.19	7.03	0.96	0.00
One Year Ago 06-26-2018	27.33	72.67	47.80	17.91	5.07	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
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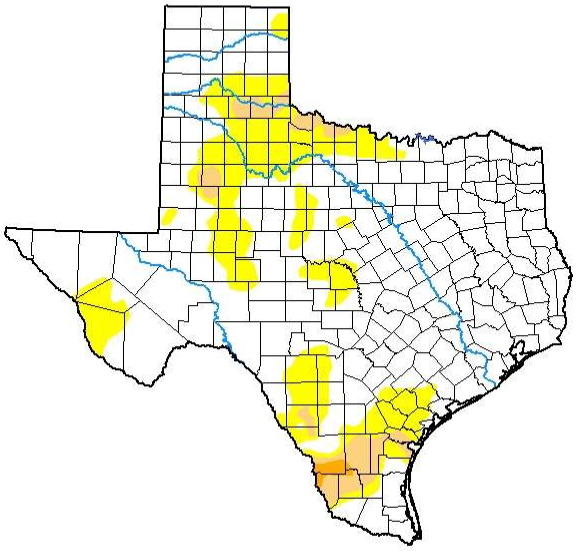
U.S. Drought Monitor

Texas



July 30, 2019

(Released Thursday, Aug. 1, 2019)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	76.49	23.51	4.31	0.42	0.00	0.00
Last Week 07-23-2019	89.88	10.12	1.99	0.66	0.00	0.00
3 Months Ago 04-30-2019	87.27	12.73	1.46	0.00	0.00	0.00
Start of Calendar Year 01-01-2019	92.99	7.01	1.32	0.00	0.00	0.00
Start of Water Year 09-25-2018	57.46	42.54	20.19	7.03	0.96	0.00
One Year Ago 07-31-2018	21.82	78.18	59.26	35.93	8.48	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

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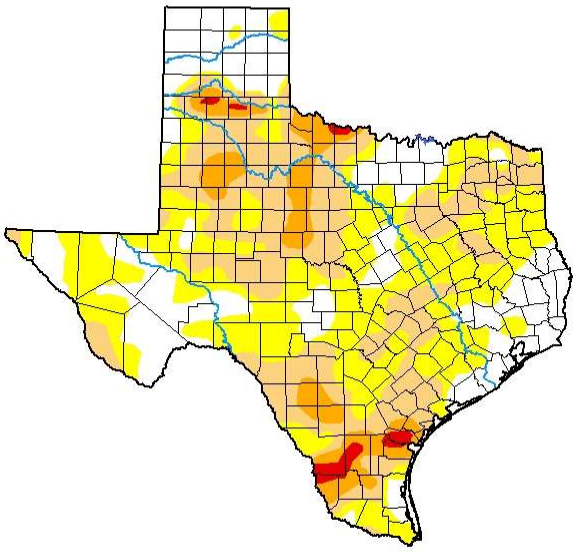
U.S. Drought Monitor

Texas



August 27, 2019

(Released Thursday, Aug. 29, 2019)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	25.90	74.10	37.58	8.75	1.21	0.00
Last Week 08-20-2019	27.48	72.52	32.00	6.75	0.56	0.00
3 Months Ago 05-28-2019	94.24	5.76	0.20	0.00	0.00	0.00
Start of Calendar Year 01-01-2019	92.99	7.01	1.32	0.00	0.00	0.00
Start of Water Year 09-25-2018	57.46	42.54	20.19	7.03	0.96	0.00
One Year Ago 08-28-2018	18.56	81.44	62.34	30.69	6.78	0.30

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
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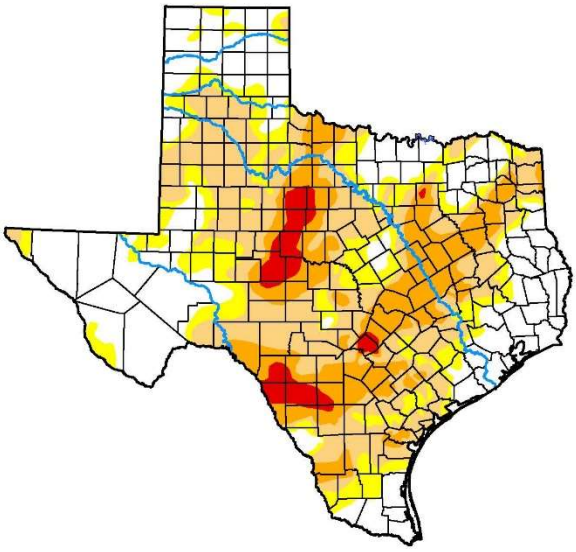

U.S. Drought Monitor

Texas

September 24, 2019

(Released Thursday, Sep. 26, 2019)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	34.78	65.22	48.33	19.69	3.50	0.00
Last Week 09-17-2019	27.74	72.26	51.75	21.20	3.07	0.00
3 Months Ago 06-25-2019	95.84	4.16	1.93	0.23	0.00	0.00
Start of Calendar Year 01-01-2019	92.99	7.01	1.32	0.00	0.00	0.00
Start of Water Year 09-25-2018	57.46	42.54	20.19	7.03	0.96	0.00
One Year Ago 09-25-2018	57.46	42.54	20.19	7.03	0.96	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

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U.S. Department of Agriculture

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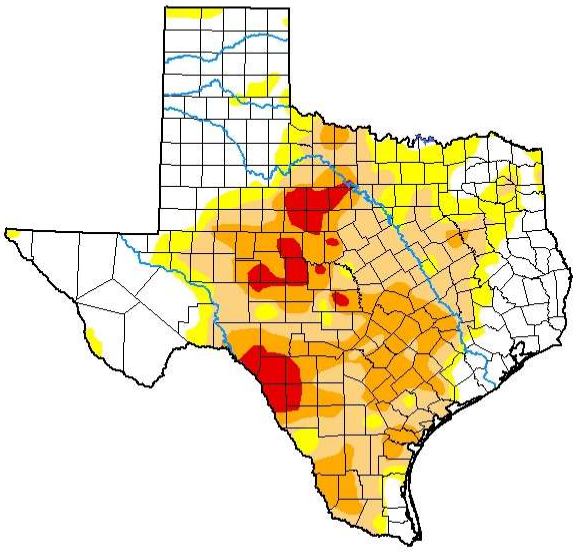

U.S. Drought Monitor

Texas

October 29, 2019

(Released Thursday, Oct. 31, 2019)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	38.98	61.02	46.55	22.40	4.65	0.00
Last Week 10-22-2019	39.30	60.70	48.74	25.85	6.68	0.00
3 Months Ago 07-30-2019	76.49	23.51	4.31	0.42	0.00	0.00
Start of Calendar Year 01-01-2019	92.99	7.01	1.32	0.00	0.00	0.00
Start of Water Year 10-01-2019	31.74	68.26	46.05	22.33	6.32	0.00
One Year Ago 10-30-2018	96.15	3.85	1.84	0.43	0.00	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

David Simeral

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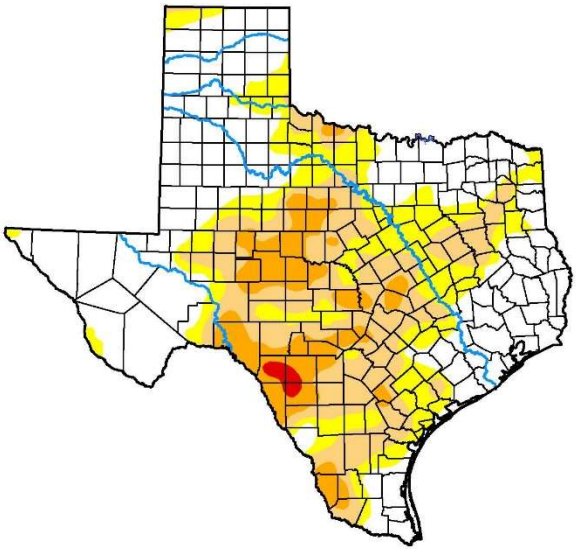
U.S. Drought Monitor

Texas



November 19, 2019

(Released Thursday, Nov. 21, 2019)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	47.81	52.19	31.96	10.46	0.53	0.00
Last Week 11-12-2019	46.76	53.24	31.97	11.04	0.56	0.00
3 Months Ago 08-20-2019	27.48	72.52	32.00	6.75	0.56	0.00
Start of Calendar Year 01-01-2019	92.99	7.01	1.32	0.00	0.00	0.00
Start of Water Year 10-01-2019	31.74	68.26	46.05	22.33	6.32	0.00
One Year Ago 11-20-2018	97.73	2.27	0.80	0.00	0.00	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:
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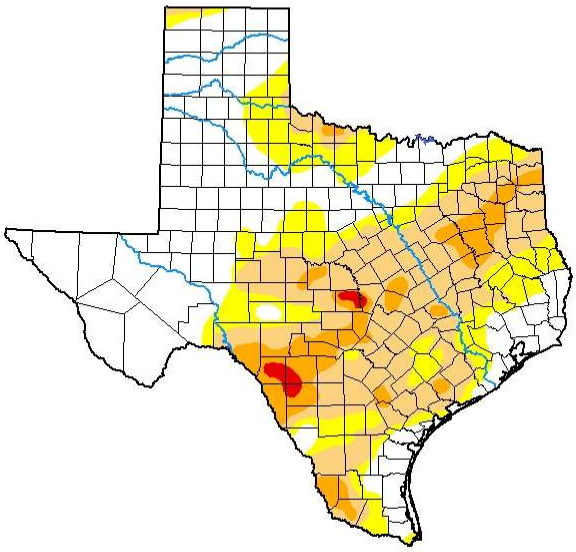
U.S. Drought Monitor

Texas



December 31, 2019

(Released Thursday, Jan. 2, 2020)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	44.69	55.31	36.12	9.19	0.74	0.00
Last Week 12-24-2019	44.13	55.87	38.62	9.46	0.67	0.00
3 Months Ago 10-01-2019	31.74	68.26	46.05	22.33	6.32	0.00
Start of Calendar Year 01-01-2019	92.99	7.01	1.32	0.00	0.00	0.00
Start of Water Year 10-01-2019	31.74	68.26	46.05	22.33	6.32	0.00
One Year Ago 01-01-2019	92.99	7.01	1.32	0.00	0.00	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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Author:
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Appendix C: Publication Affidavits

Proof of Publication

STATE OF TEXAS)
COUNTY OF GRAYSON) SS:

RED RIVER GROUND CONSERVATION DISTRICT
PO BOX 1214
SHERMAN TX 75091

Account # **91652**
Ad Number **0001261265**

Jeanine Sewell, being 1st duly sworn, deposes and says: That (s)he is the Legal Clerk for the Herald Democrat, a daily newspaper regularly issued, published and circulated in the City of Sherman, County of Grayson, State of Texas, and that the advertisement,

WATER CONSERVATION TIPS

a true copy attached for, was published in said Herald Democrat in 1 edition(s) of said newspaper issued from 08/04/2019 to 08/04/2019, on the following days:
08 / 04 / 19

/S/ Jeanine Sewell
LEGAL ADVERTISEMENT REPRESENTATIVE

Subscribed and sworn to before me on this 5th day of August, 2019

RECEIVED
AUG 08 2019
BY: RRGCD

Notary Michelle Henderson

MICHELLE HENDERSON
Notary Public, State of Texas
Comm. Expires 05-01-2021
Notary ID 129407907

we were looking in the mirror because they are very similar to Landmark Bank," Landmark Bank President and CEO Kevin Gibbens said in an exclusive interview with the Herald Democrat. "They do all the things we do, only bigger."

With the transition, Simmons will begin the process of absorbing Landmark into the Simmons network, which should be completed in early 2020. During the interim, Landmark business will continue uninterrupted as it operates as a bank subsidiary of Simmons.

The biggest effect many customers will see is new cards, checks and other banking materials that will be issued under the Simmons banner. However, Simmons Chairman and CEO George Makris with in that time had some really good products that we've been able to deploy across our system."

In the case of Landmark, Makris said one of those products is the bank system's Interactive Teller Machines, which began rolling out about three years ago. The technology allows customers to interact with a teller through video. This also has allowed Landmark to extend its hours of service for customers, Gibbens said.

"Simmons will have the benefit of the experience Landmark has with this technology," Makris said.

With regard to Landmark, Gibbens said the merger would allow its customers access to technology and features of the Simmons network. Many of these features were things Landmark has been

Water Conservation Tips

Indoor Tips

- Turn water off while brushing teeth or shaving
- Run only full loads in the washing machine and dishwasher
- Fix leaky faucets and plumbing

Outdoor Tips

- Water lawns and shrubbery during cooler parts of the day. Avoid watering between 10 a.m. and 6 p.m.
- Water lawns less frequent and for longer duration. This establishes a more drought tolerant lawn as the roots are forced to establish deeper into the soil.
- Set mower blades 2-3 inches high – longer grass shades the soil, improving moisture retention
- Visually inspect sprinkler systems at least once a month during daylight hours to make sure there are no leaks and that it is spraying the area correctly
- Leave lawn clipping on grass – this cools the ground and hold moisture
- Use a broom or blower instead of a hose to clean driveways, sidewalks, and patios.
- Use a pool cover for swimming pools – cuts down on evaporation

Red River Groundwater Conservation Districtwww.redrivergcd.org

Appendix C: Comparison of Water Level Data and Desired Future Conditions (DFCs)

MEMO

TO: Drew Satterwhite - Red River Groundwater Conservation District

FROM: James Beach, P.G., and Uvashree Mohandass

SUBJECT: **Comparison of Water Level Data and Desired Future Conditions (DFCs)**

DATE: **December 1, 2020**

WATER LEVEL CHANGE CALCULATIONS

Recent water level measurements from wells were used to compare water level declines to the declines estimated in the Desired Future Conditions (DFCs) across the District. The objective is to track the water levels of existing wells that had been monitored by TWDB and/or the District for a significant period.

For the assessment of water level changes, water level measurements were assessed from year 2000-2020. The goal of the assessment is to develop a historical perspective of water level decline in aquifers over the last 10-20 years to understand potential declines in the future. Not all wells used for this comparison had 20 years of water level data, but most wells had measurements spanning at least ten years, although some wells only had a few measurements.

Location of the wells containing appropriate water level measurements are included in Figures 1 through 3 for the Woodbine, Antlers and Paluxy aquifers respectively. The values posted on these maps are the average annual water level change over the time interval. The average annual water level change is calculated by taking the total water level change was divided by the number of years between the first and last available measurements. As shown in Table 1, the average annual DFC is calculated by dividing the long-term DFC (water level change in 2070) by 60 years. The maps post the annual water level changes measured in wells by each well. If the annual water level change exceeds the average annual DFC, the wells are circled in red.

TABLE 1. SUMMARY OF ANNUAL AVERAGE DFC BASED ON 60-YEAR DFCS

COUNTY	WOODBINE	PALUXY	ANTLERS
Fannin	4.1	11.5	N/A
Grayson	2.7	N/A	5.8

Notes:

1 All Values are in feet

2 From GAM Run 17-029 January 2018

3 N/A indicates areas where the subunits do not exist and therefore have no desired future condition

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WATER LEVEL DATA AVAILABILITY

Table 2 shows the number of wells with available water level data that meet the criteria for each county-aquifer combination. There are many more wells, but these are the number of wells that were used to compare the rate of water level decline (or rebound) on a county-aquifer basis to the rate of decline (or rebound) anticipated by the DFCs on a county-aquifer basis.

TABLE 2. WATER LEVEL DATA AVAILABILTY BY COUNTY AND AQUIFER FORMATION

COUNTY/ AQUIFER	WOODBINE	PALUXY	ANTLERS
Fannin	6	1	No DFC
Grayson	19	No DFC	17

Notes:

1 Table lists number of wells with water level data and within the given date range (2000-2020)

2 This table excludes dual completion wells.

3 "No DFC" indicates that no desired future condition was developed

RESULTS

Figure 1 shows that there are six Woodbine monitoring wells in Fannin County with average annual rebound of 0.1 feet, 0.6 feet, 3.5 feet, 5.4 feet and with average annual decline in water level for 2 wells with value of -0.1 feet and -2.6 feet. The average annual change for the individual wells were then averaged on a county-wide basis, to come up with one number as a metric for comparison. Using an arithmetic averaging technique, the county-wide annual average water level change on an annual basis over the assessment period was 1.1 feet. Note that none of the wells are circled because these wells do not exceed the DFC decline in County for the Woodbine Aquifer. The simulated annual DFC decline in this county for this aquifer is -4.1 (From GAM Run 17-029 January 2018)

Taking an arithmetic average of scattered data is not necessarily the most appropriate way to compare the status of DFCs. As the monitoring program becomes more established, more wells with a longer monitoring history will be available for assessing each county-aquifer combination. The maps also show the 1-year DFC posted next to the county-wide annual average. County-wide annual averages that exceed the anticipated water level decline based on the DFC are posted in red. Average water level declines that do not exceed the water level decline anticipated by the DFC are posted in blue. Figure 1 shows that the average annual decline in Grayson county for the Woodbine aquifer does slightly exceed the simulated average annual DFC. Most of the largest declines occur near the center of the county. Exceedance of the annual DFC during one year is not alarming, but it does point out an area to be watching in the future.

Figure 2 and 3 show the same type of results for the Antlers and Paluxy aquifers respectively.

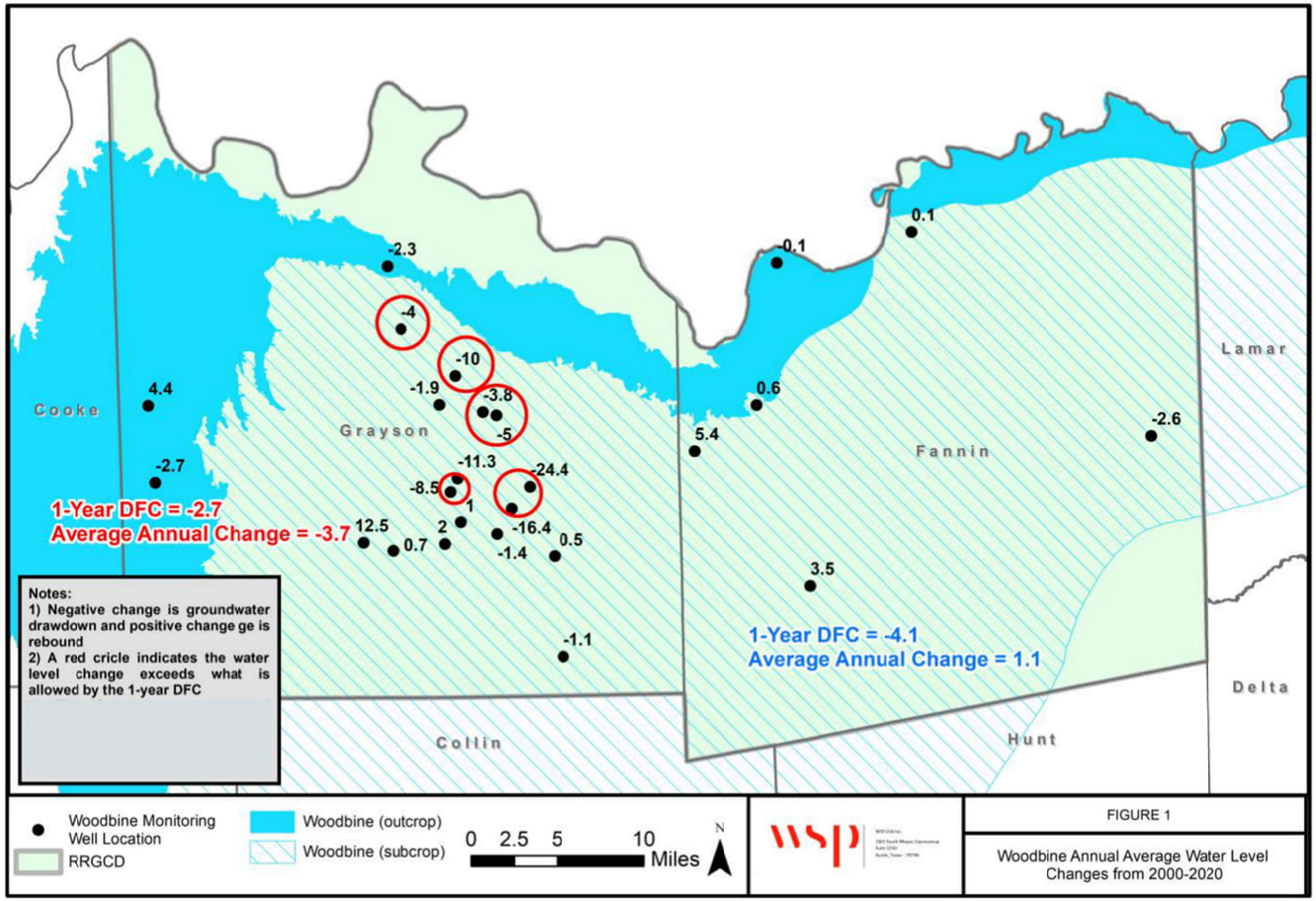

Figure 1: Woodbine Aquifer Average Annual Water Level Change 2000-2020

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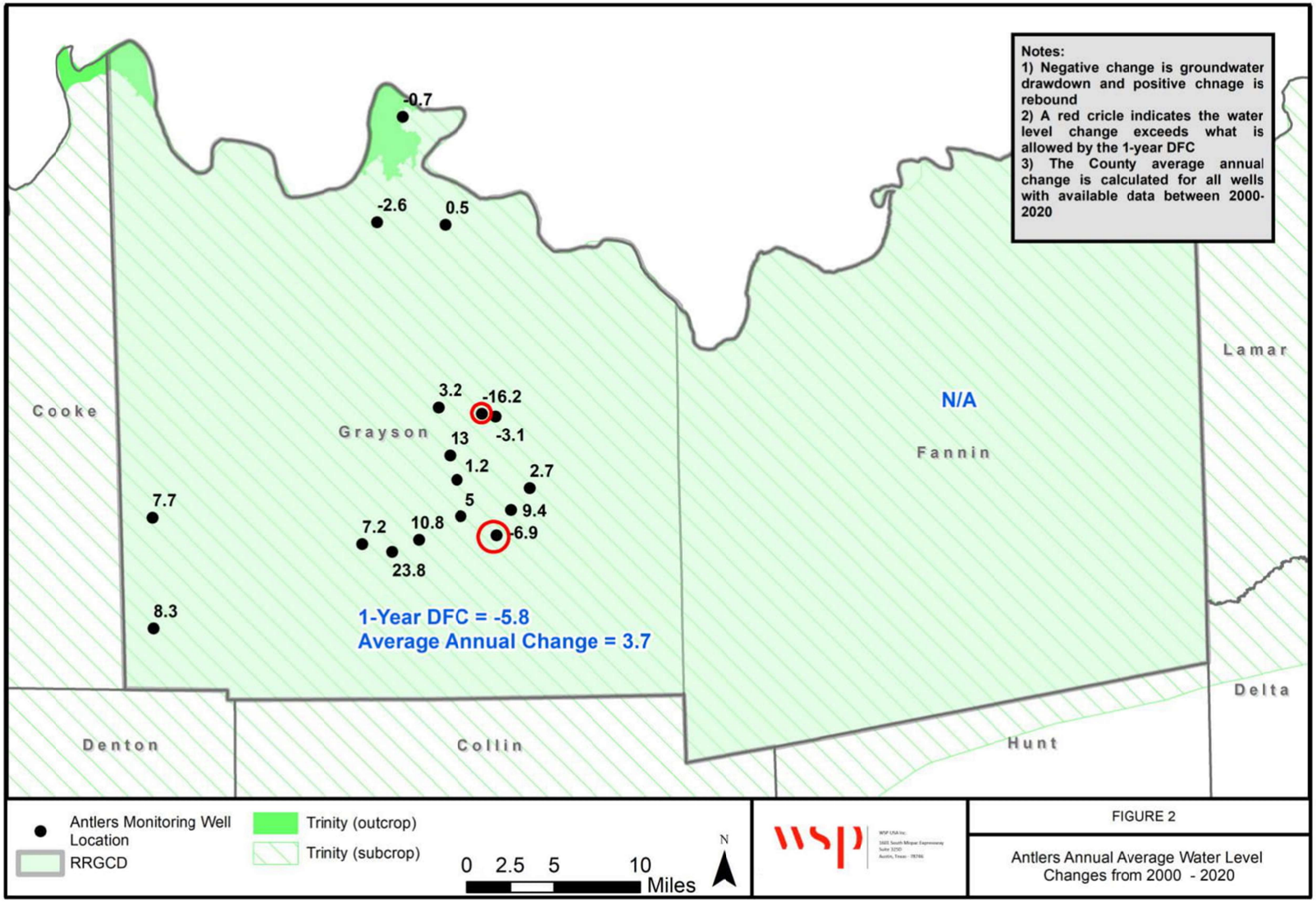

Figure 2: Antlers Aquifer Average Annual Water Level Change 2000-2020

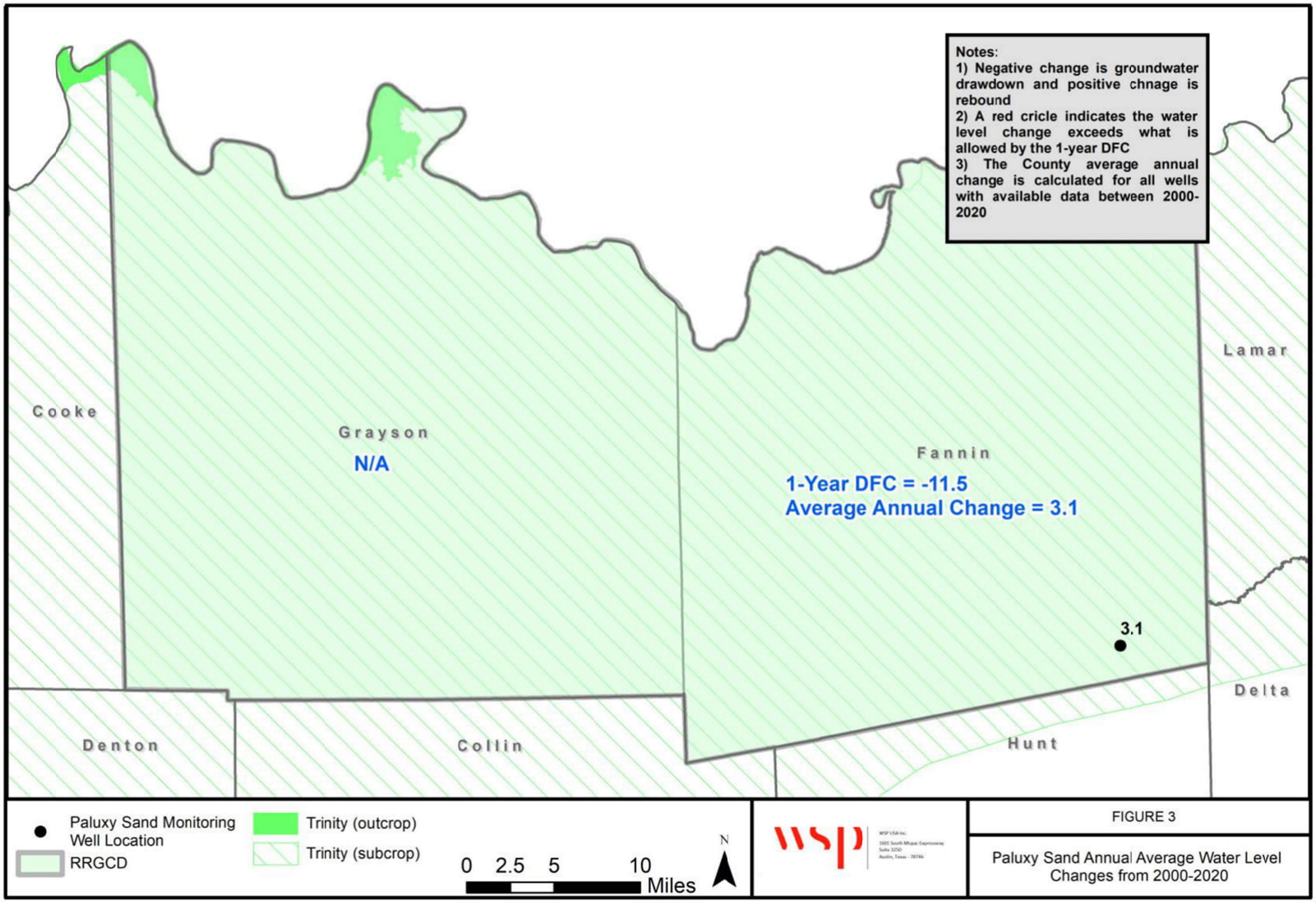

Figure 3: Paluxy Aquifer Average Annual Water Level Change 2000-2020

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DISCUSSION

The Woodbine aquifer in Grayson County is the only aquifer that is exhibiting water level decline that is above the annual average DFC decline in the recent past. Because the DFC is a long-term goal, the exceedance in this year is not a major concern, but it does indicate that it should be monitored closely in the future.

REFERENCES

- Texas Water Development Board. 2018. GAM Run 17-029 MAG for the Trinity Aquifer in Groundwater Management Area 8. Austin, Texas: Texas Water Development Board
- Texas Water Development Board. 2019. Water Use Survey Historical Groundwater Pumpage Online Data at http://www.twdb.texas.gov/waterplanning/waterusesurvey/historical-pumpage.asp