

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT



**ANNUAL REPORT FOR YEAR ENDING
DECEMBER 31, 2016**

Upper Trinity Groundwater Conservation District

Annual Report FYE 2016

Table of Contents

<u>General Manager's Report</u>	<u>2</u>
<u>Brief History & Mission Statement</u>	<u>3</u>
<u>District Staff</u>	<u>4</u>
<u>Board of Directors</u>	<u>5</u>
<u>Well Registrations</u>	<u>6</u>
<u>Groundwater Production Report</u>	<u>7</u>
<u>Waste of Groundwater</u>	<u>8</u>
<u>Water Use Fees</u>	<u>9</u>
<u>Online Access</u>	<u>10</u>
<u>Regional Water Planning Participation</u>	<u>11</u>
<u>Drought Conditions</u>	<u>12</u>
<u>Making Headlines</u>	<u>24</u>
<u>Groundwater Monitoring Program</u>	<u>34</u>
<u>Annual Audit for Fiscal Year Ending December 31, 2016</u>	<u>83</u>



General Manager's Report

I am happy to report that the District met or exceeded each Management Plan objective for 2016, as you will read in the following pages. Furthermore an independent auditor has reported favorably in regards to the District's financial position.

The one thing that I would be remiss not to mention is that there is not enough that can be said in regards to District staff, which grew from seven to eight in 2016. Not only do I firmly believe we have the most competent and talented staff of any Groundwater District in the State, we have become a family, a family that might not always see eye to eye, but will always support and stand up for one another.

Below are a few highlights from 2016:

Staff:

- In May, our Education and Outreach Coordinator Cameron Goebel took a temporary leave to complete an out of state internship.
- In September, Jillian left to pursue opportunities as a water conservation specialist with the City of Fort Worth. At that time, Jarod Briscoe was promoted to Staff Geologist.
- In November, the District welcomed Jacob Dove as Field Technician.

Other Notable Accomplishments:

- Much of 2016 was spent working with Collier Consulting to develop a new online data management system (HYDROS), which went live on January 1, 2017.
- In the Spring of 2016, the District submitted a letter to the Texas Water Development Board (TWDB) requesting the designation of the Paleozoic Aquifers of North Central Texas as a Minor Aquifer. The TWDB is set to make that designation in 2017.
- Groundwater Management Area 8 was also very active in the second half of the year preparing proposed Desired Future Conditions. The District took part in the funding of several model runs in 2016.

The staff of Upper Trinity continues to forge ahead with cooperation from other groundwater districts and conservation groups to protect the quality and quantity of our most valuable natural resource.



Doug Shaw
General Manager



Brief History

- ✓ In 2006, the Texas Water Development Board (TWDB) developed a Priority Groundwater Management Area (PGMA) for the counties of Montague, Wise, Parker, Hood, Cooke, Denton, Tarrant, Dallas, and others in the region.
- ✓ In 2007, the 80th Texas Legislature created the Upper Trinity Groundwater Conservation District (UTGCD).
- ✓ In November 2007, over 78 percent of voting residents within the District's four counties approved creation of the groundwater conservation district.
- ✓ On November 30, 2009, the Board of Directors of the UTGCD revised and adopted the Temporary Rules for Water Wells; they allow the District to enforce spacing regulations between wells and minimum distance from property boundaries for water wells drilled after January 1, 2009.
- ✓ On August 16, 2010, the Board of Directors adopted the District Management Plan. Its Objectives and Performance Standards are discussed on the following pages.
- ✓ In, 2013, the Upper Trinity Groundwater Conservation District was one of eight districts to fully achieve *all* applicable groundwater management plan goals audited by the State Auditor's Office.

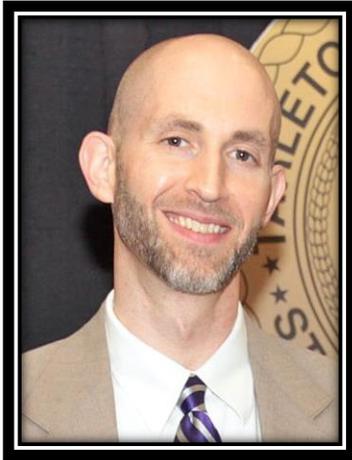
Mission Statement

The Mission of the Upper Trinity Groundwater Conservation District is to develop rules to 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, ensure that the residents of Montague, Wise, Parker, and Hood Counties maintain local control over their groundwater, respect and protect the property rights of landowners in groundwater, and operate the District in a fair and equitable manner for all residents of the District.





District Staff



Doug Shaw
General Manager



Ann Devenney
Office Manager



Cameron Goebel
*Education/Public Relations
Coordinator*



Laina Furlong
Office Assistant



Jennifer Hachtel
Data Coordinator



Jarod Briscoe
Staff Geologist



Garrett Love
Field Technician



Jacob Dove
Field Technician



Board of Directors

The Board of Directors of the Upper Trinity Groundwater Conservation District is composed of two members, per county, appointed by their county's Commissioners' Court. In a Regular Board Meeting on July 20, 2015, the Board of Directors elected District Officers to serve two year terms ending July 2017. The appointments are as follows:

Mike Massey – Assistant Secretary	Hood County
Donald Majka – Assistant Secretary	Wise County
Tim Watts – Vice President	Parker County
Mike Berkley – Assistant Secretary	Montague County
Tracy Mesler – President	Montague County
Dan Caudle – Assistant Secretary	Parker County
Billy Stout – Assistant Secretary	Wise County
Richard English – Secretary/Treasurer	Hood County



Windmill collection in Montague County

The District’s Management Plan sets forth a methodology for tracking the District’s progress in achieving management goals. The Plan requires the District to prepare an Annual Report to the District’s Board of Directors, which must contain an update on the District’s performance in regards to achieving management goals and objectives. This report is intended to satisfy the annual reporting requirements of the District’s Management Plan. After adoption by the Board of Directors, the Annual Report is made available to the public.



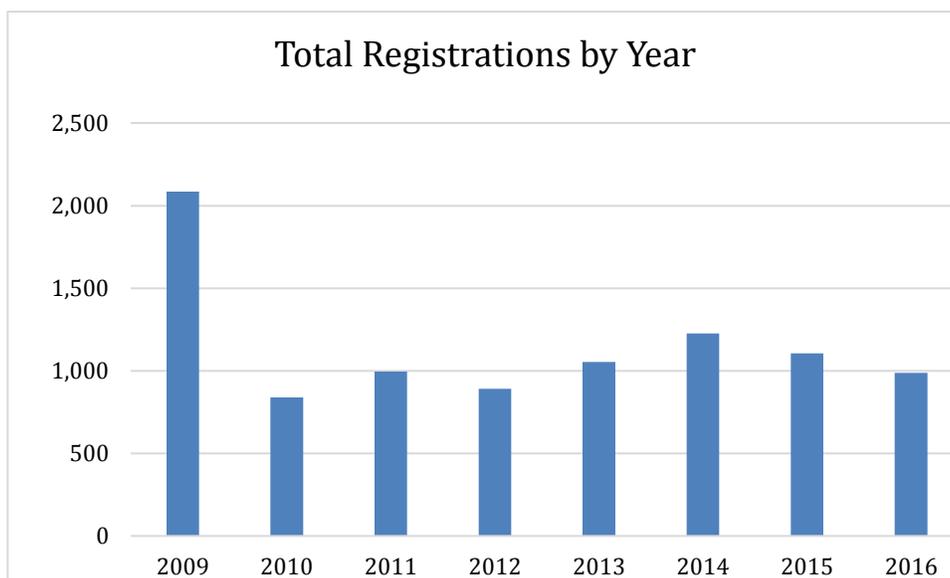
Well Registrations

A1. Objective - Each year the District will require registration of all new wells within the District.

A.1 Performance Standard - Annual reporting of well registration statistics will be included in the Annual Report provided to the Board of Directors.

The Temporary Rules for Water Wells require any water well drilled on or after January 1, 2009 to be registered with the District. Furthermore, the District requires owners of all operational nonexempt wells to register their wells and report monthly usage. Owners of any exempt well drilled prior to 2009 may voluntarily register their wells. In 2016, the District received 119 less water well registrations than in the previous year. In August, the District received an application for a new Geothermal well in Parker County.

County	Exempt	Nonexempt	Existing	New	Total*
Hood	62	2	4	60	64
Montague	79	0	0	79	92
Parker	520	0	7	513	520
Wise	322	3	2	323	335
Total:	983	5	13	975	988





Groundwater Production Report

A.2 Objective - Each year the District will monitor annual production from all non-exempt wells within the District.

A.2 Performance Standard - The District will require installation of meters on all non-exempt wells and reporting of production to the District. The annual production of groundwater from non-exempt wells will be included in the Annual Report provided to the Board of Directors.

In the Groundwater Production Report for 2016, Public Water Supply production accounts for over 97% of groundwater extracted from nonexempt water wells. Wells in Hood County continue to produce the most water for Public Water Supply usage. Parker County lead the other counties for oil and gas production and exploration, and Commercial/Business use.

The District has adopted rules requiring installation of meters on all nonexempt wells. The District remains committed to ensuring that all well owners are in compliance with the District’s rules, and the District will continue its efforts to ensure that non-exempt well owners comply with the District’s metering and reporting requirements.

Public Water Supply	Gallons Reported	Category Percentage
Hood	1,798,671,211	52.36%
Montague	68,386,263	1.99%
Parker	1,023,991,375	29.81%
Wise	449,418,421	13.08%
Total:	3,340,467,270	97.25%

Oil & Gas Production	Gallons Reported	Category Percentage
Hood	341,477	0.01%
Montague	858,671	0.02%
Parker	11,812,465	0.34%
Wise	33,805,905	0.98%
Total:	46,818,518	1.36%

Commercial/Business	Gallons Reported	Category Percentage
Hood	12,165,995	0.35%
Montague	1,858,514	0.05%
Parker	17,531,096	0.51%
Wise	16,144,971	0.47%
Total:	47,700,576	1.39%

2016 Grand Total:	3,434,986,364
--------------------------	----------------------



Waste of Groundwater

B.1 Objective - Annual evaluation of the rules to determine if any amendments are recommended to decrease waste of groundwater within the District.

B.1 Performance Standard - Annual discussion of the evaluation of the rules and a reporting of whether any of the District rules require amendment to prevent waste of groundwater to be included in the Annual Report provided to the Board of Directors.

District staff continues to monitor and evaluate the activities of well owners within the District and enforce the District's rules to promote conservation and prevent waste of groundwater. Usually, once a leak is brought to the owner's attention, the matter is fixed immediately. However, District staff will continue to evaluate whether amendments to the District's rules are necessary to decrease waste of groundwater, and impose penalties, if necessary.



Groundwater running off property



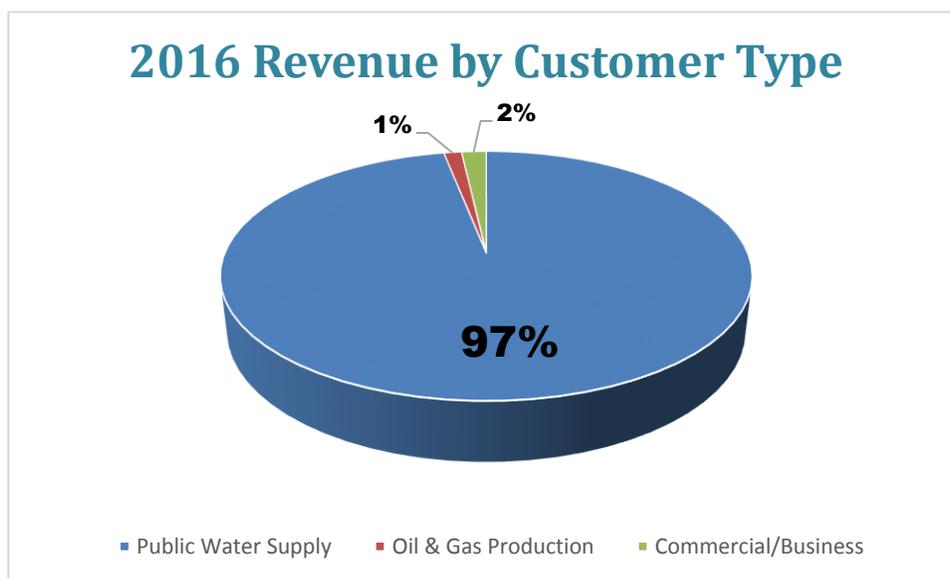
Water Use Fees

B.2 Objective - The District will encourage the elimination and reduction of groundwater waste through the collection of a water-use fee for non-exempt production wells within the District.

B.2 Performance Standard - Annual reporting of the total fees paid and total groundwater used by non-exempt wells will be included in the Annual Report provided to the Board of Directors.

UTGCD's Board of Directors set the fee for groundwater usage at a rate of .22 cents per thousand gallons (\$.22/1,000 gallons) for all commercial, municipal, and industrial users within the District that are not exempt from the metering, monitoring, reporting or payment requirements as set forth in the temporary rules adopted by the District. The following table and chart illustrate total water use fees collected by the District. Like the previous year, the top four revenue-generators for the District were all Public Water Suppliers: Aqua Texas (15.89%), City of Granbury (12.06%), Acton Municipal Utility District (11.64%), and City of Willow Park (5.28%). See Groundwater Volume section for production figures.

Year	Public Water Supply	Oil & Gas Production	Commercial/ Business	Total
2009	\$691,180	\$228,473	\$11,088	\$930,741
2010	\$797,895	\$339,867	\$11,617	\$1,149,379
2011	\$889,671	\$667,557	\$19,813	\$1,577,041
2012	\$743,855	\$599,122	\$10,562	\$1,353,539
2013	\$758,401	\$475,875	\$17,555	\$1,251,776
2014	\$838,531	\$494,510	\$47,057	\$1,380,098
2015	\$718,689	\$89,773	\$18,056	\$826,518
2016	\$732,449	\$9,675	\$13,572	\$755,697





Online Access

B.3 Objective - Each year, the District will provide information to the public on eliminating and reducing wasteful practices in the use of groundwater by including information on groundwater waste reduction on the District’s website.

B.3 Performance Standard - Each year, a copy of the information provided on the groundwater waste reduction page of the District’s website will be included in the District’s Annual Report to be given to the District’s Board of Directors.

The Upper Trinity Groundwater Conservation District’s website provides information about eliminating waste on the “Aquifer Education” page, which can be found at <http://uppertrinitygcd.com/education/>. The website is promoted through the District’s news releases, advertising, and brochures.

Additionally, local educators can schedule a free on-site visit of the aquifer exhibit through the “Aquifer Education” page. Over 2,500 middle school students and 213 people at community events toured the aquifer exhibit, well model, videos, and lessons within the UTGCD trailer. Students are encouraged to engage in critical thinking about our most precious resource. In addition to touring the exhibits, staff led 42 days of STEM-based learning that included customized lesson plans with aquifer curriculum, water pollution simulations, and water conservation principles. The Mobile Aquifer Exhibit is made available by UTGCD to local schools and entities interested in water conservation and aquifer education.

EDUCATION

Don't Waste Groundwater, Protect It. Below are some of our educational programs and resources.

LOOKING FOR A WATER WELL?

Below are some links and resources for existing water well reports.

[TWDB Water Well Viewer](#) (type in address in top left hand search bar to view well reports in the area)

[TDLR Well Report Search Tool](#)

NATIVE PLANTS ARCHIVE

UTGCD Environmental Educator, Cameron Goebel, has composed an archive of plants native to North Texas and the DFW area. Using native plants in your landscape can reduce water usage for irrigation and is considered an imperative objective for lawns and gardens throughout this region. Native Texas plants have adapted to the North Texas climate and are drought tolerant, encourage groundwater recharge, and thrive in most soils found throughout the area. Click below to access this free, educational resource.

Landscaping with Native Texas Plants

Want to know even more ways to save water? Check out the videos below for more ideas and tips.

Why use native plants

PLANT NATIVE
www.txsmartscape.com

WATER IQ
Know your water.

WATER USE IT WISELY.

TEXAS WATER DEVELOPMENT BOARD K-12 EDUCATIONAL RESOURCES
TWDB KIDS
www.twdb.texas.gov/kids



Regional Water Planning Participation

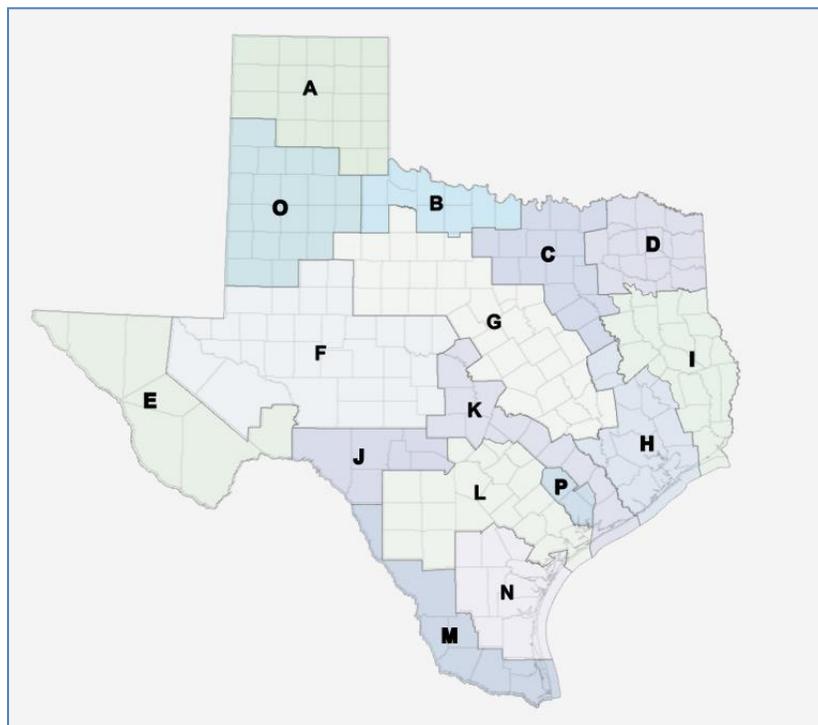
C.1 Objective - Each year the District will participate in the regional water planning process by attending at least one of the Region B, C or G Regional Water Planning Group Meetings to encourage the development of surface water supplies to meet the needs of water user groups within the District.

C.1 Performance Standard - The attendance of a District representative at any Regional Water Planning Group meeting will be noted in the Annual Report provided to the Board of Directors.

Throughout the year, the District’s staff attended various water-planning meetings. Staff and Board members also participated in meetings and/or conferences concerning public outreach or other groundwater issues. A record of attendance at regional water planning meetings by District Representatives follows.

Date	Event	Location	Representative
2/10/16	RWPG-B	Wichita Falls, TX	Doug Shaw & Tracy Mesler
5/4/16	RWPG-B	Wichita Falls, TX	Doug Shaw & Tracy Mesler
8/17/16	RWPG-B	Wichita Falls, TX	Doug Shaw & Tracy Mesler
9/14/16	RWPG-B	Waco, TX	Doug Shaw & Mike Massey

Regional Water Planning Group Map





Drought Conditions

D.1 Objective - Monthly review of drought conditions within the District using the Texas Water Development Board’s Monthly Drought Conditions Presentation available at:

<http://www.twdb.texas.gov/surfacewater/conditions/report/index.asp>

D.1 Performance Standard – An annual review of drought conditions within the District will be included in the Annual Report provided to the Board of Directors and on the District website.

The National Drought Mitigation Center defines drought as “a deficiency of precipitation over an extended period of time--usually a season or more--resulting in a water shortage for some activity, group, or environmental sector.” (Source: <http://drought.unl.edu/DroughtBasics/WhatisDrought.aspx>). The District reviews the Drought Information Summary published by the Texas Water Development Board every month. The information below summarizes their findings. The surface water reservoirs in Upper Trinity GCD remained in the ‘Normal to High’ range throughout the year.

January

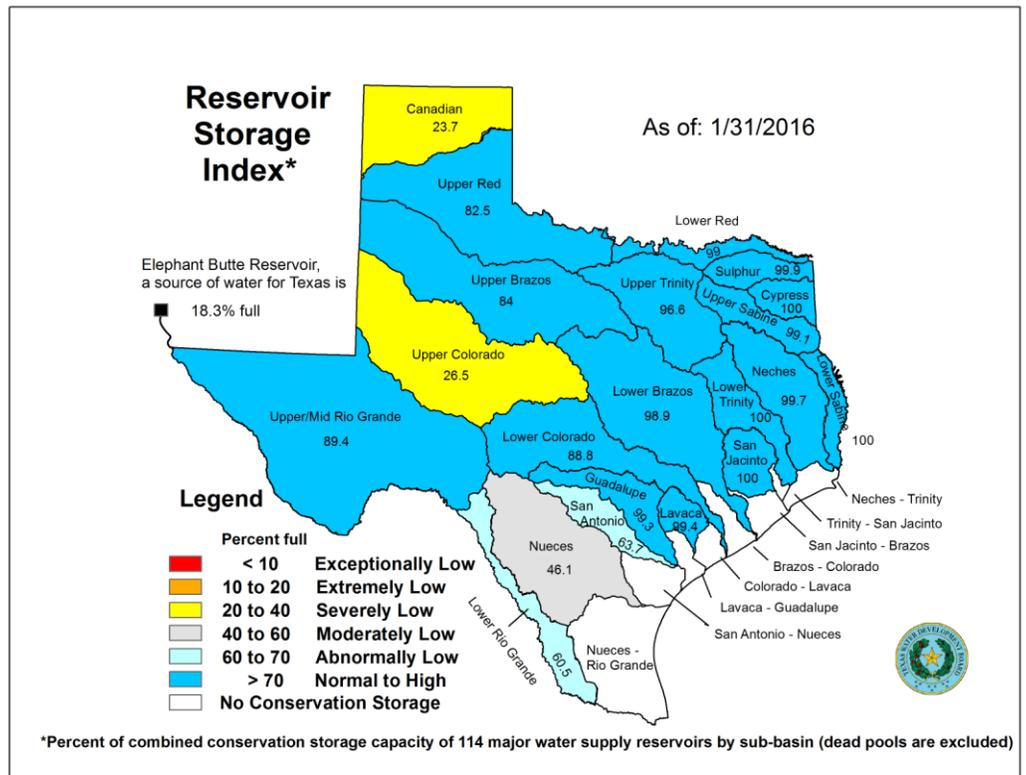
At the end of January, total storage in 114 of the state’s major water supply reservoirs was at 26.90 million acre-feet* or 86% of total conservation storage capacity. This is 4,908 acre-feet more than a month ago and 6.58 million acre-feet more than storage at this time last year.

Sixty-five (65) reservoirs held 100% of conservation storage capacity, primarily in the North Central (42) and East (19) regions. Two (2) reservoirs remain below 10% full, Palo Duro (3%) and Twin Buttes (5%).

Total combined storage was greater than 70% in the Upper Coast (100%), East (100%), North Central (98%), South Central (92%), Trans-Pecos (89%), and Low Rolling Plains (75%) regions. Regions with the lowest percentage of storage were the High Plains (24%) and Southern (50%) regions. Storage increased in four regions and decline in five regions over the past month.

Elephant Butte reservoir held 360,902 acre-feet or 18% of storage capacity. This is 39,701 acre-feet more than a month ago

* Only the Texas share of storage in border reservoirs is counted.



February

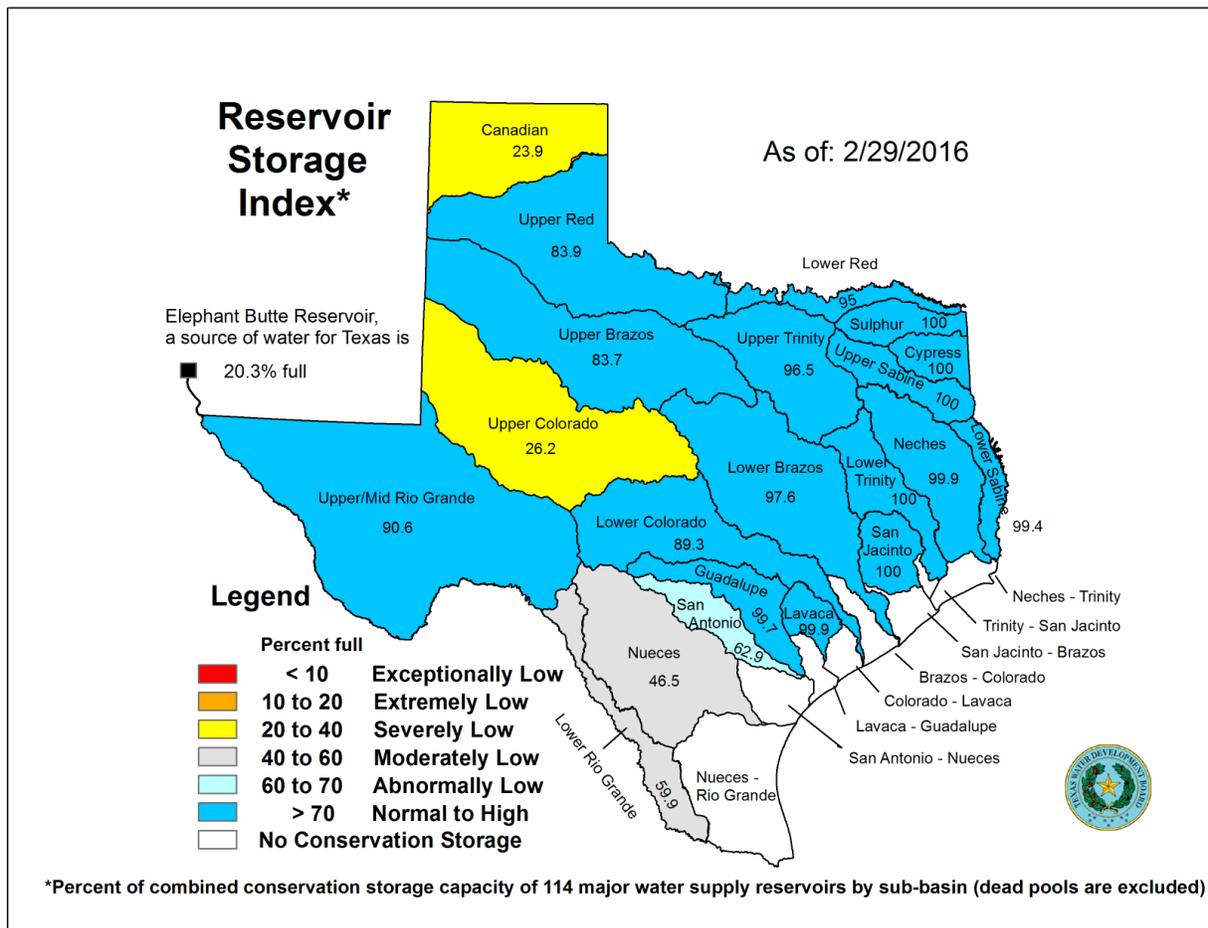
At the end of February, total storage in 114 of the state's major water supply reservoirs was at 26.82 million acre-feet* or 86% of total conservation storage capacity. This is 83,763 acre-feet less than a month ago and 6.2 million acre-feet more than storage at this time last year.

Sixty-seven (67) reservoirs held 100% of conservation storage capacity, primarily in the North Central (42) and East (19) regions. Three (3) reservoirs remain below 10% full, Palo Duro (3%), E.V. Spence (9%), and Twin Buttes (5%).

Total combined storage was greater than 70% in the Upper Coast (100%), East (100%), North Central (97%), South Central (92%), Trans-Pecos (91%), and Low Rolling Plains (76%) regions. Regions with the lowest percentage of storage were the High Plains (24%) and Southern (49%) regions. Storage increased in seven regions and decline in two regions over the past month.

Elephant Butte reservoir held 400,910 acre-feet or 20% of storage capacity. This is 40,008 acre-feet more than a month ago.

* Only the Texas share of storage in border reservoirs is counted.



March

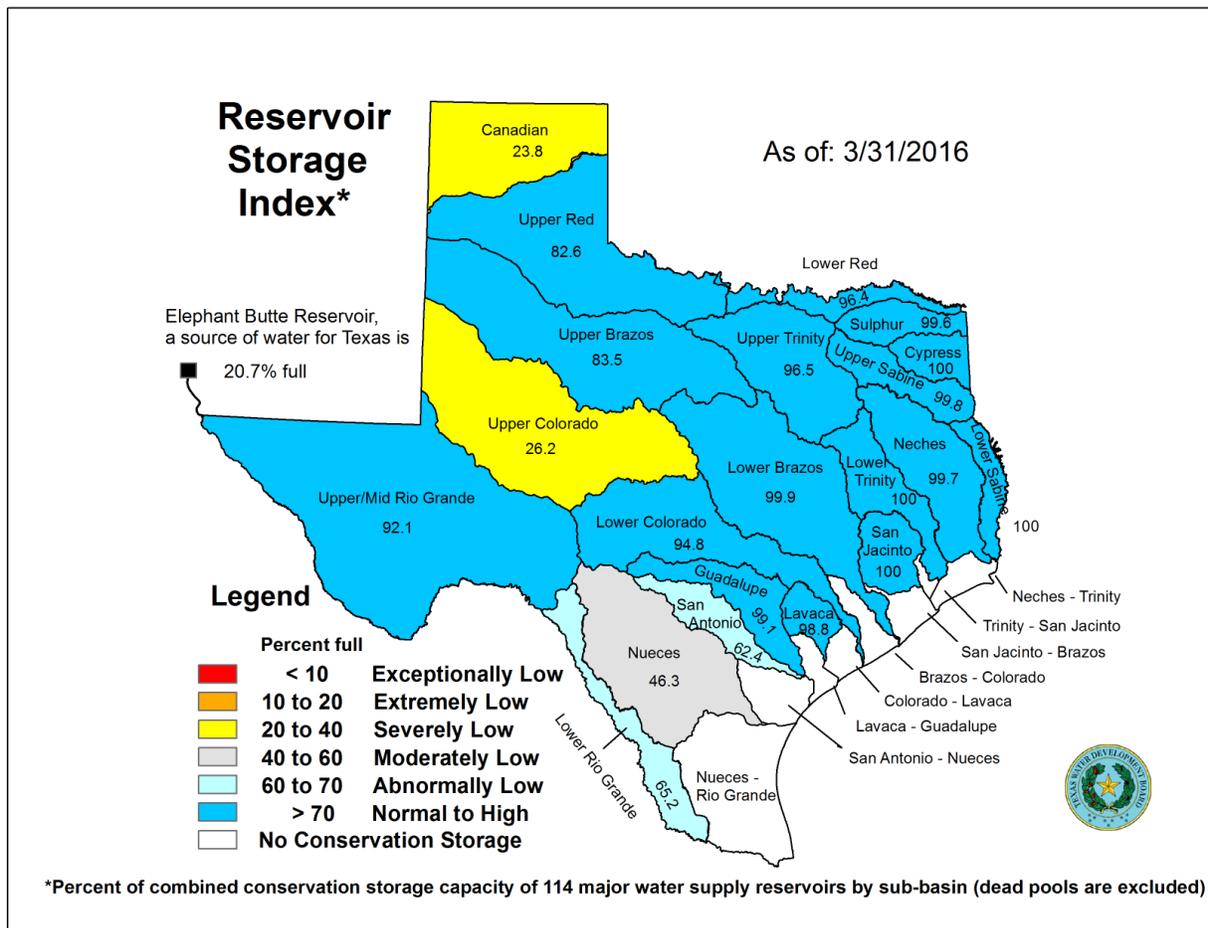
At the end of March, total storage in 114 of the state's major water supply reservoirs was at 27.17 million acre-feet* or 87% of total conservation storage capacity. This is 351,150 acre-feet more than a month ago and 5.3 million acre-feet more than storage at this time last year.

Sixty-four (64) reservoirs held 100% of conservation storage capacity, primarily in the North Central (39) and East (18) regions. Three (3) reservoirs remain below 10% full, Palo Duro (3%), E.V. Spence (9%), and Twin Buttes (6%).

Total combined storage was greater than 70% in the East (100%), Upper Coast (99%), North Central (98%), South Central (95%), Trans-Pecos (92%), and Low Rolling Plains (75%) regions. The region with the lowest percentage of storage was the High Plains (24%) region. Storage increased in six regions and decline in three regions over the past month.

Elephant Butte reservoir held 409,187 acre-feet or 21% of storage capacity. This is 8,139 acre-feet more than a month ago.

* Only the Texas share of storage in border reservoirs is counted.



April

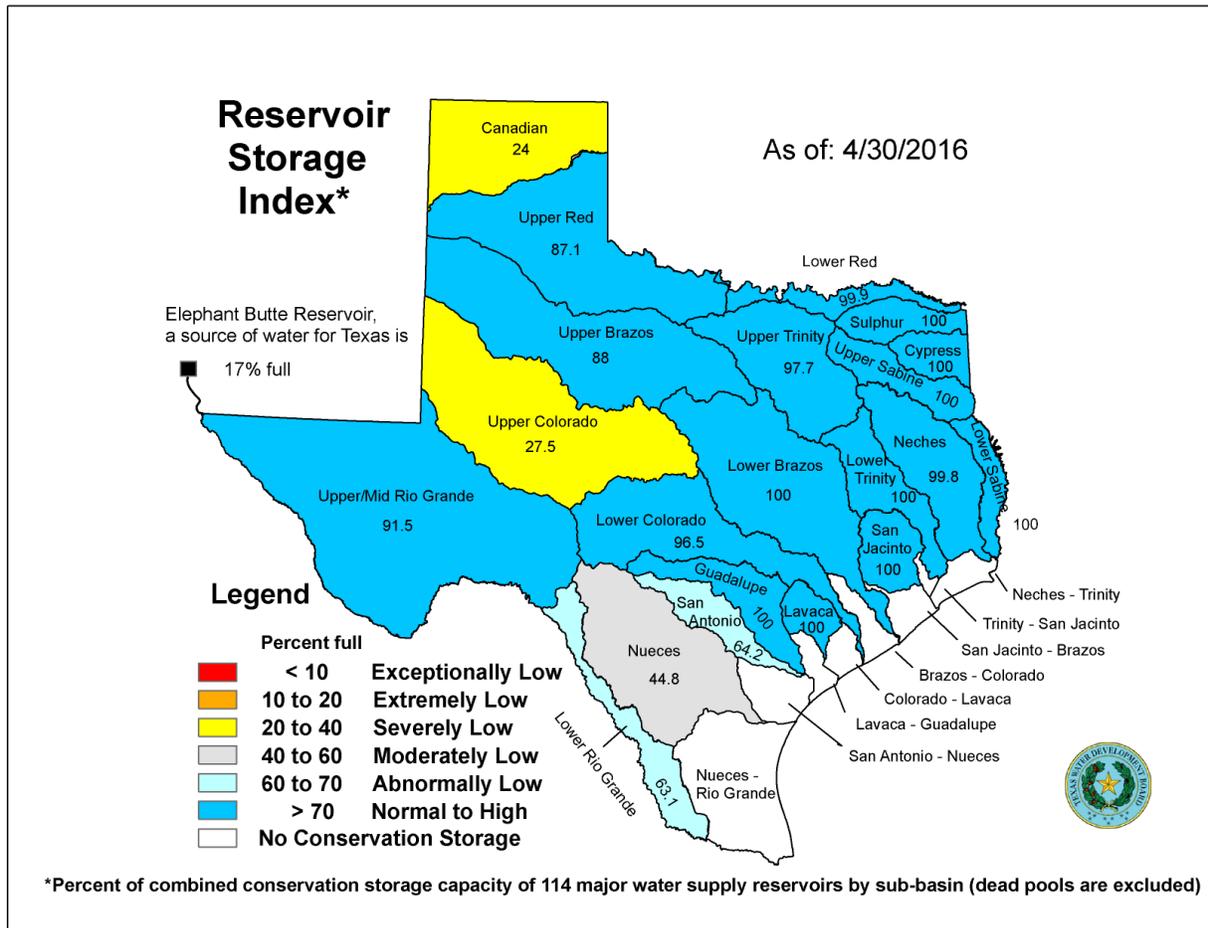
At the end of April, total storage in 114 of the state's major water supply reservoirs was at 27.49 million acre-feet* or 87% of total conservation storage capacity. This is approximately 0.3 million acre-feet more than a month ago and 4.2 million acre-feet more than storage at this time last year.

Seventy-six (76) reservoirs held 100% of conservation storage capacity, primarily in the North Central (45) and East (21) regions. Two (2) reservoirs remain below 10% full, Palo Duro (3%) and Twin Buttes (7%).

Total combined storage was greater than 70% in the East (100%), Upper Coast (100%), North Central (99%), South Central (95%), Trans-Pecos (91%), and Low Rolling Plains (79%) regions. The region with the lowest percentage of storage was the High Plains (24%) region. Storage increased in seven regions and decline in two regions over the past month.

Elephant Butte reservoir held 335,228 acre-feet or 17% of storage capacity. This is 73,744 acre-feet less than a month ago.

* Only the Texas share of storage in border reservoirs is counted.



May

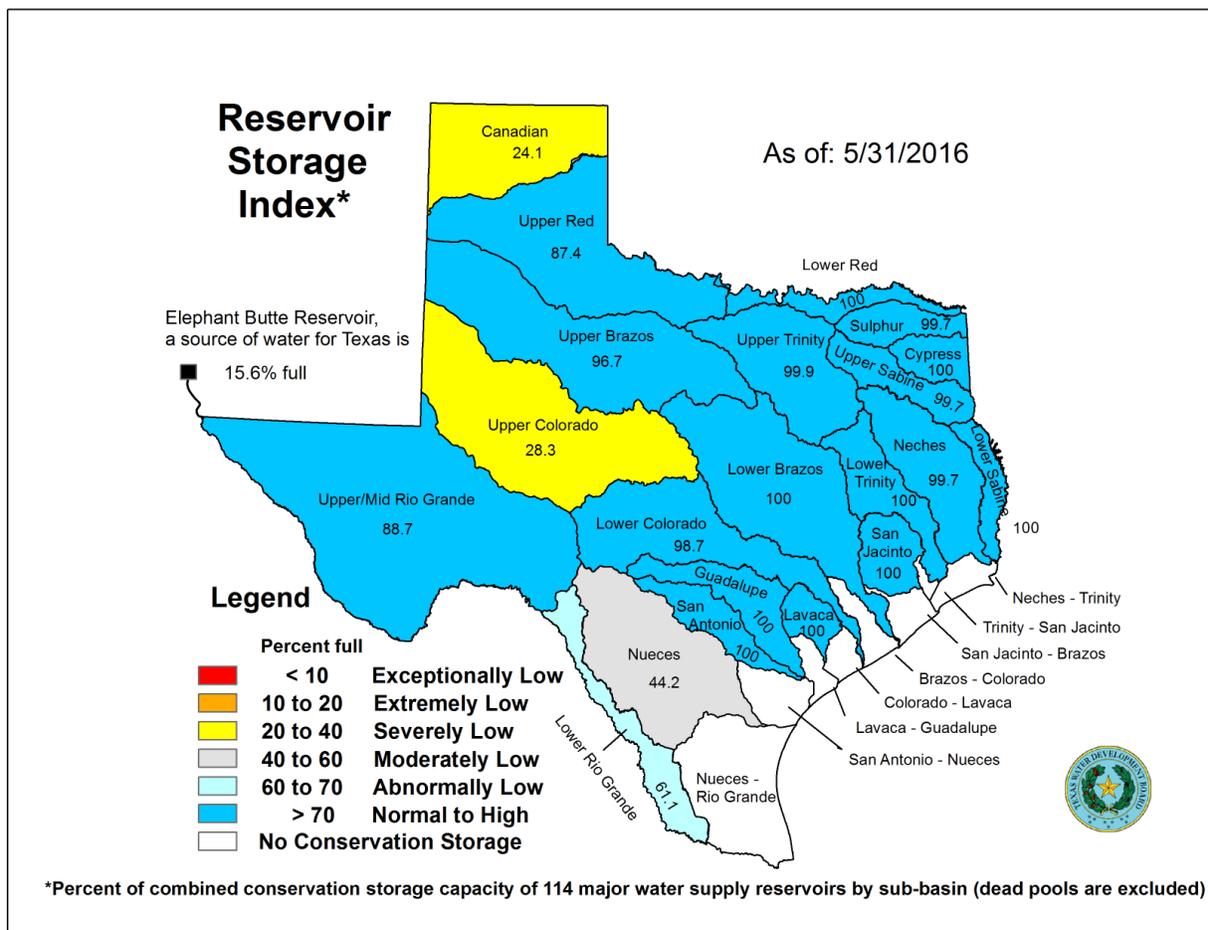
At the end of May, total conservation storage in 114 of the state's major water supply reservoirs was at 27.67 million acre-feet or 88% of total conservation storage capacity. This is approximately 0.17 million acre-feet more than a month ago and 1.5 million acre-feet more than storage at this time last year.

Eighty (80) reservoirs held 100% of conservation storage capacity, primarily in the North Central (48) and East (19) regions. Two (2) reservoirs remain below 10% full: Palo Duro (3%) and Twin Buttes (9%).

Total combined storage was greater than or equal to 70% in the East (100%), Upper Coast (100%), North Central (100%), South Central (100%), Trans-Pecos (89%), and Low Rolling Plains (80%) regions. The region with the lowest percentage of storage was the High Plains (24%) region. Storage increased in six regions and decline in two regions over the past month.

Elephant Butte reservoir held 308,153 acre-feet or 16% of storage capacity. This is 27,000 acre-feet less than a month ago.

Storage is based on end of the month data in 114 major reservoirs that represent 96% of the total conservation storage capacity of 188 major water supply reservoirs in Texas. Major reservoirs are defined as having a conservation storage capacity of 5,000 acre-feet or greater. Only the Texas share of storage in border reservoirs is counted.



June

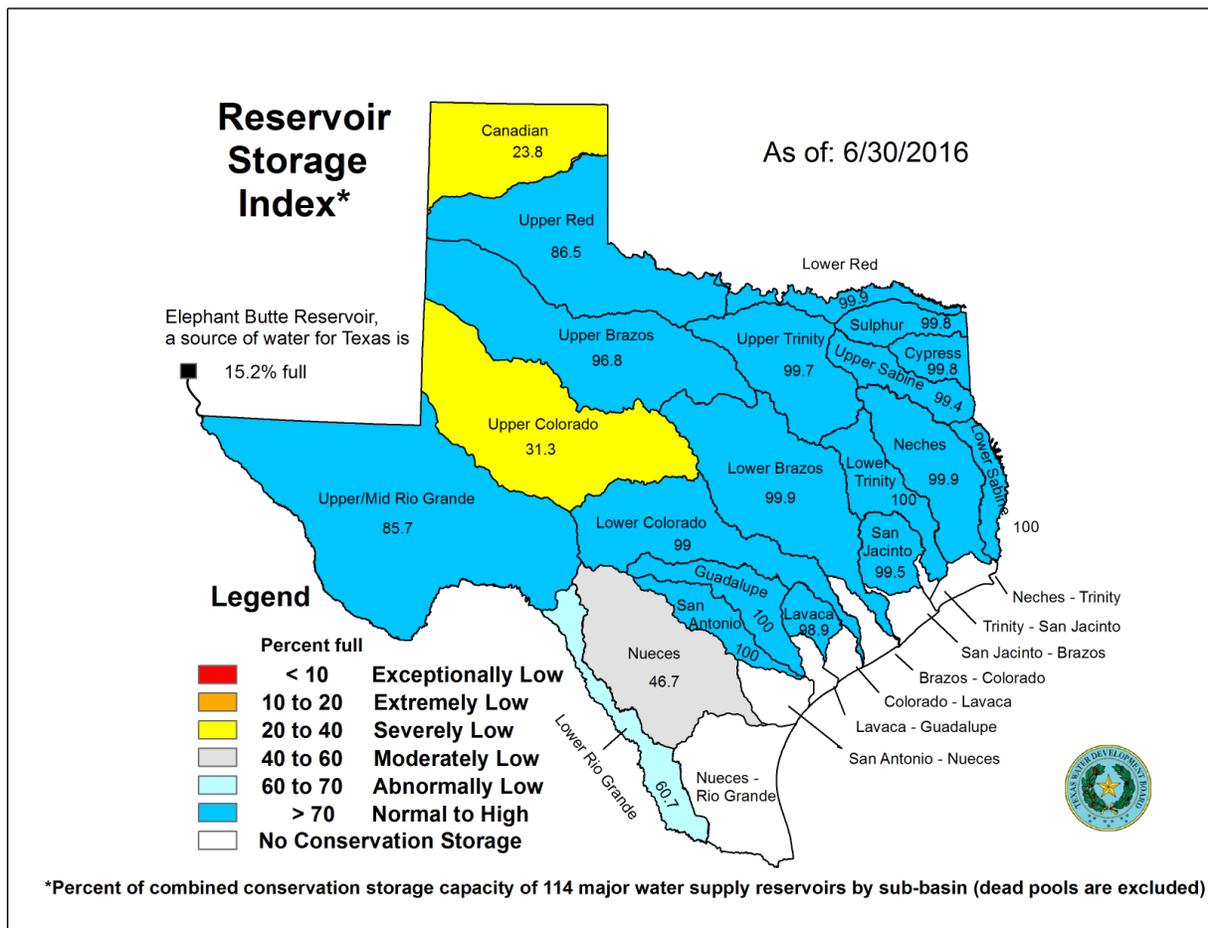
At the end of June, total conservation storage in 114 of the state's major water supply reservoirs was at 27.63 million acre-feet or 88% of total conservation storage capacity. This is approximately 0.03 million acre-feet less than a month ago and 1.15 million acre-feet more than storage at this time last year.

Sixty-five (65) reservoirs held 100% of conservation storage capacity, primarily in the North Central (40) and East (13) regions. Only one (1) reservoir remained below 10% full: Palo Duro (3%).

Total combined storage was at or above normal (storage \geq 70%) in the East (100%), North Central (100%), South Central (100%), Upper Coast (99%), Trans-Pecos (86%), and Low Rolling Plains (80%) regions. The region with the lowest percentage of storage was the High Plains (24%) region. Overall, storage increased in one but declined in eight regions over the past month.

Elephant Butte reservoir held 300,678 acre-feet or 15% of storage capacity. This is 7,759 acre-feet less than a month ago.

Storage is based on end of the month data in 114 major reservoirs that represent 96% of the total conservation storage capacity of 188 major water supply reservoirs in Texas. Major reservoirs are defined as having a conservation storage capacity of 5,000 acre-feet or greater. Only the Texas share of storage in border reservoirs is counted.



July

At the end of July, total conservation storage in 114 of the state's major water supply reservoirs was at 26.9 million acre-feet or 86% of total conservation storage capacity. This is approximately 0.7 million acre-feet less than a month ago but 0.38 million acre-feet more than the storage at this time last year.

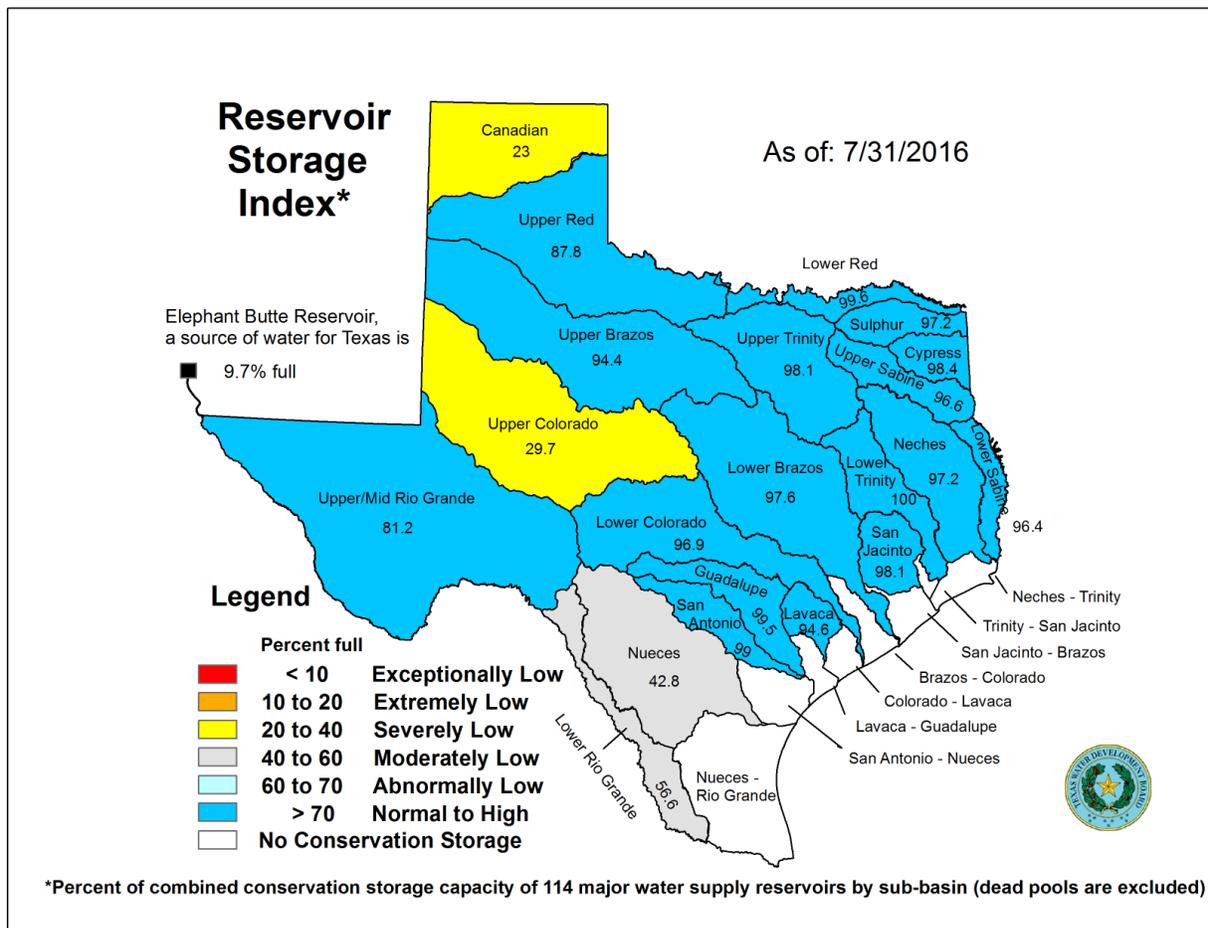
Twenty-four (24) reservoirs held 100% of conservation storage capacity, primarily in the North Central (16) and East (5) regions. Only one (1) reservoir remained below 10% full: Palo Duro (3%).

Total combined storage was at or above normal (storage $\geq 70\%$) in the North Central (98%), South Central (98%), East (97%), Upper Coast (97%), Trans-Pecos (81%), and Low Rolling Plains (77%) regions. The region with the lowest percentage of storage was the High Plains (23%) region. Overall, storage declined in all nine regions over the past month.

Elephant Butte reservoir held 191,413 acre-feet or 10% of storage capacity. This is 108,968 acre-feet less than a month ago.

Storage is based on end of the month data in 114 major reservoirs that represent 96% of the total conservation storage capacity of 188 major water supply reservoirs in Texas. Major reservoirs are defined as having a conservation storage capacity of 5,000 acre-feet or greater. Only the Texas share of storage in border reservoirs is counted.

* Only the Texas share of storage in border reservoirs is counted.



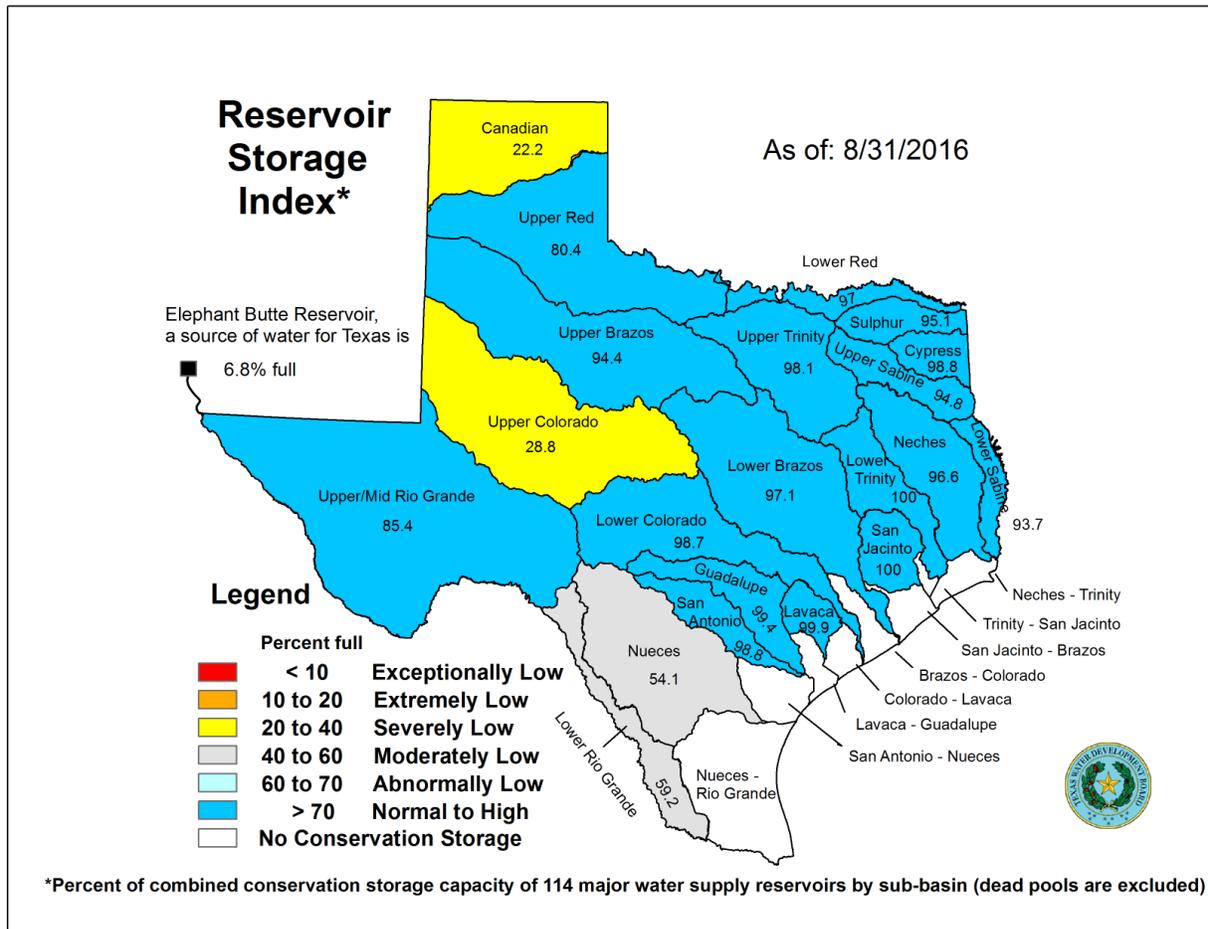
August

At the end of August, total conservation storage in 114 of the state's major water supply reservoirs was at 26.98 million acre-feet or 86% of total conservation storage capacity. This is approximately 0.06 million acre-feet more than a month ago and 1.18 million acre-feet more than the storage at this time last year.

Thirty-seven (37) reservoirs held 100% of conservation storage capacity, primarily in the North Central (24) and East (8) regions. Two (2) reservoirs remained below 10% full: Palo Duro (3%) and Twin Buttes (9%).

Total combined storage was at or above normal (storage $\geq 70\%$) in the North Central (97%), South Central (100%), East (97%), Upper Coast (100%), Trans-Pecos (85%), and Low Rolling Plains (74%) regions. The region with the lowest percentage of storage was the High Plains (22%) region. Overall, storage increased in five regions but declined in four regions over the past month.

Elephant Butte reservoir held 133,532 acre-feet or 7% of storage capacity. This is 57,881 acre-feet less than a month ago.



September

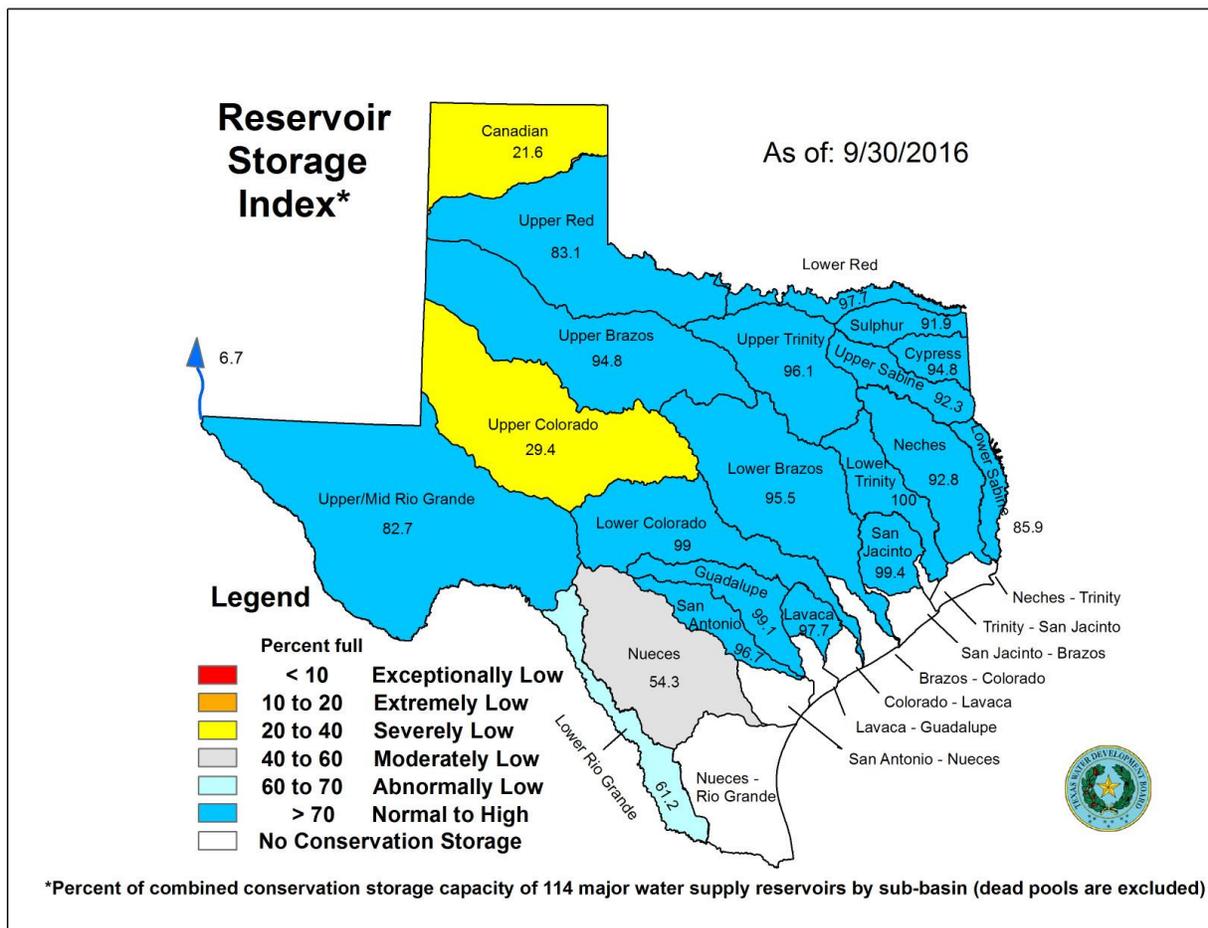
At the end of September, total conservation storage in 114 of the state's major water supply reservoirs was at 26.54 million acre-feet or 87% of total conservation storage capacity. This is approximately 0.41 million acre-feet less than a month ago but 1.64 million acre-feet more than the storage at this time last year.

Twenty-seven (27) reservoirs held 100% of conservation storage capacity, primarily in the North Central (13) and East (5) regions. One (1) reservoir, Palo Duro (2%), remained below 10% full.

Total combined storage was at or above normal (storage $\geq 70\%$) in the South Central (99%), Upper Coast (99%), North Central (96%), East (93%), Trans-Pecos (83%), and Low Rolling Plains (78%) regions. The region with the lowest percentage of storage was the High Plains (21%) region. Overall, storage increased in three regions but declined in six regions over the past month.

Elephant Butte reservoir held 131,768 acre-feet or 7% of storage capacity. This is 1,618 acre-feet less than a month ago

* Only the Texas share of storage in border reservoirs is counted.



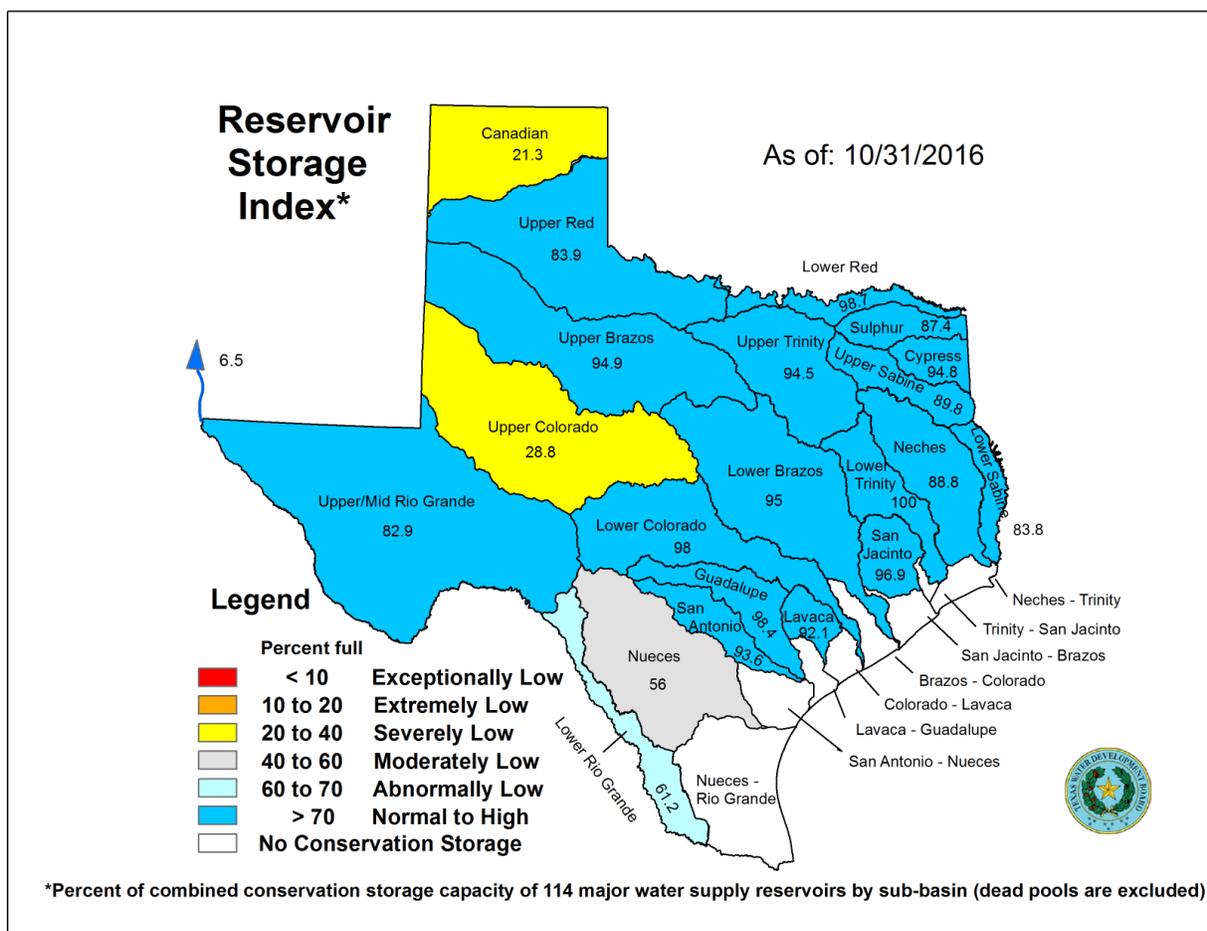
October

At the end of October, total conservation storage in 114 of the state's major water supply reservoirs was at 26 million acre-feet or 83% of total conservation storage capacity. This is approximately 0.49 million acre-feet less than a month ago but 0.58 million acre-feet more than the storage at this time last year.

Twenty-four (24) reservoirs held 100% of conservation storage capacity, primarily in the North Central (15) and East (4) regions. One (1) reservoir, Palo Duro (2%), remained below 10% full.

Total combined storage was at or above normal (storage $\geq 70\%$) in the South Central (98%), Upper Coast (95%), North Central (95%), East (91%), Trans-Pecos (83%), and Low Rolling Plains (77%) regions. The region with the lowest percentage of storage was the High Plains (21%) region. Overall, storage increased in three regions but declined in six regions over the past month.

Elephant Butte reservoir held 128,628 acre-feet or 7% of storage capacity. This is 3,140 acre-feet less than a month ago.



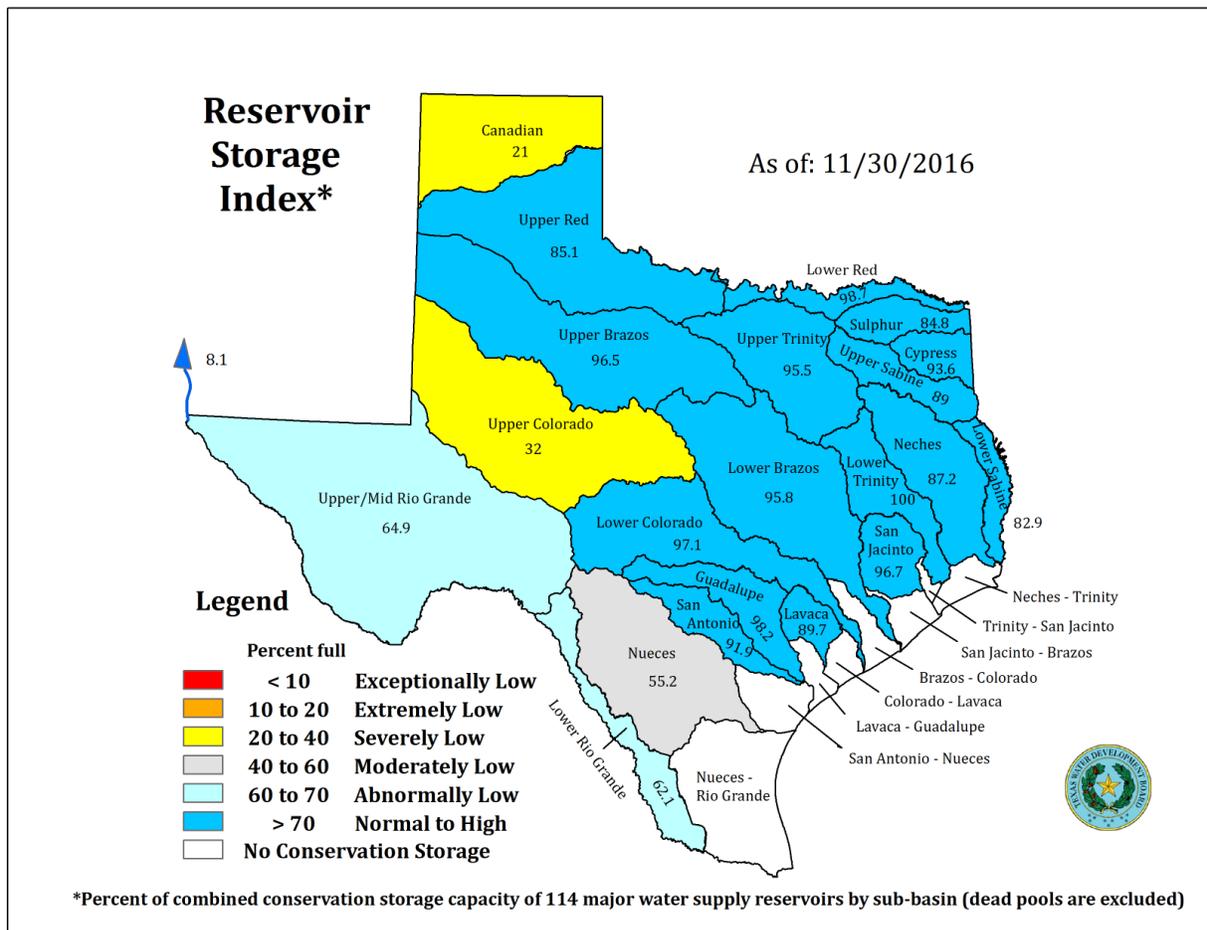
November

At the end of November, total conservation storage in 114 of the state's major water supply reservoirs was at 26.1 million acre-feet or 83 percent of total conservation storage capacity. This is approximately 0.05 million acre-feet more than a month ago but 0.33 million acre-feet less than the storage at this time last year.

Thirty (30) reservoirs held 100 percent of conservation storage capacity, primarily in the North Central (19 reservoirs) and East (5 reservoirs) regions. One reservoir, Palo Duro (2 percent), remained below 10 percent full.

Total combined storage was at or above normal (storage \geq 70 percent) in the South Central (99 percent), Upper Coast (94 percent), North Central (96 percent), East (90 percent), and Low Rolling Plains (80 percent) regions. The region with the lowest percentage of storage was the High Plains (21 percent) region. Overall, storage increased in five regions but declined in four regions over the past month.

Elephant Butte reservoir held 159,945 acre-feet or 8 percent of storage capacity. This is 31,310 acre-feet more than a month ago.



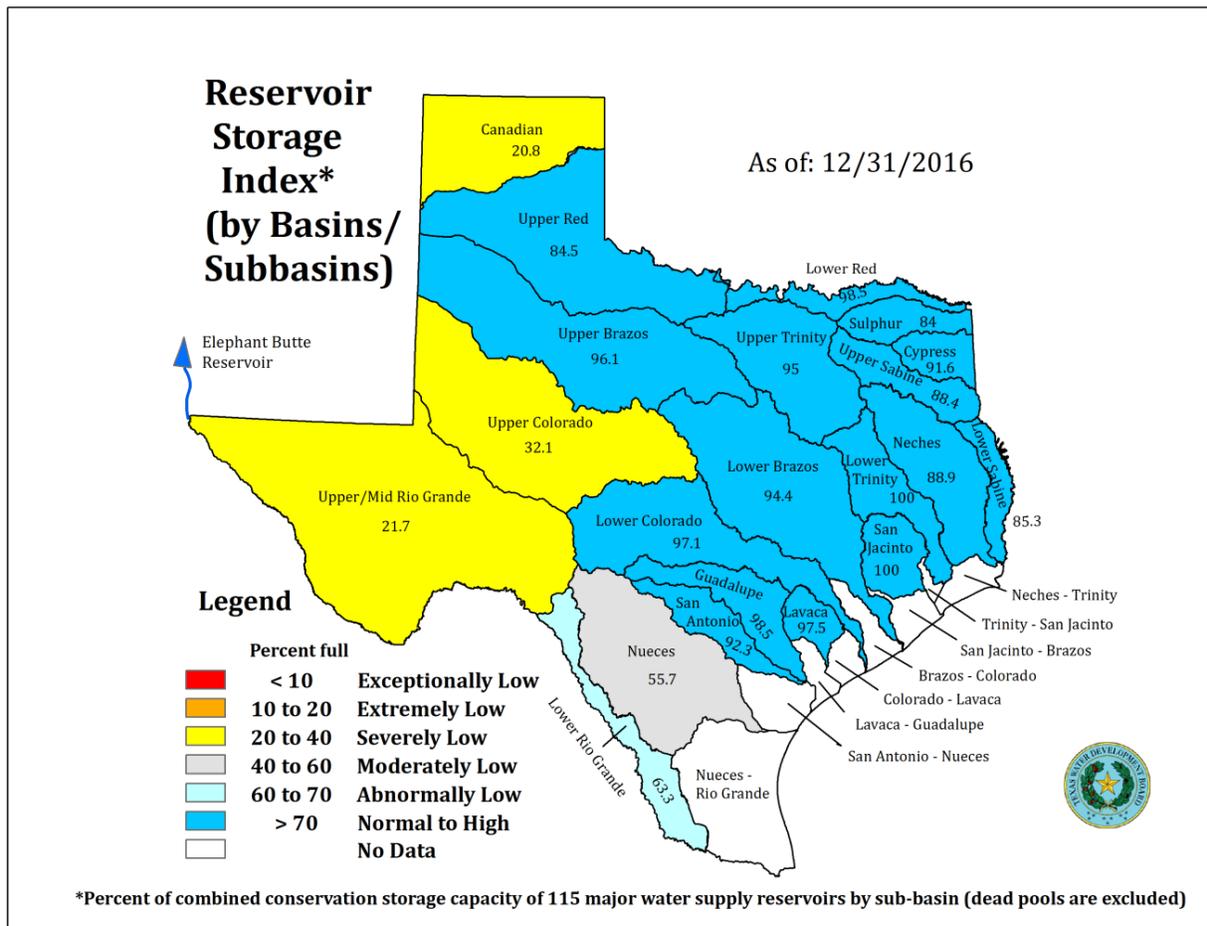
December

At the end of December 2016, total conservation storage* in 115 of the state's major water supply reservoirs was at 26.3 million acre-feet or 82 percent of total conservation storage capacity. This is approximately 0.11 million acre-feet more than a month ago but 0.70 million acre-feet less than storage at this time last year.

Twenty-eight (28) reservoirs held 100 percent of conservation storage capacity, primarily in the North Central (16 reservoirs) and East (six reservoirs) regions. One reservoir, Palo Duro (2 percent), remained below 10 percent full.

Total combined storage was at or above normal (storage ≥ 70 percent) in the South Central (99 percent), Upper Coast (99 percent), North Central (95 percent), East (91 percent), and Low Rolling Plains (80 percent) regions. The High Plains region had the lowest percentage of storage at 21 percent. Overall, storage increased in six regions but declined in three regions over the past month.

*Storage is based on end of the month data in 114 major reservoirs that represent 96 percent of the total conservation storage capacity of 188 major water supply reservoirs in Texas plus Elephant Butte reservoir in New Mexico. Major reservoirs are defined as having a conservation storage capacity of 5,000 acre-feet or greater. Only the Texas share of storage in border reservoirs is counted.





Making Headlines

E.1 Objective - The District will annually submit an article regarding water conservation for publication to at least one newspaper of general circulation in the District counties.

E.1 Performance Standard - Each year, a copy of the conservation article will be included in the District's Annual Report to be given to the District's Board of Directors.

E.2 Objective - The District will annually submit an article regarding rain water harvesting for publication to at least one newspaper of general circulation in the District counties.

E.2 Performance Standard - Each year, a copy of the rain water harvesting article will be included in the District's Annual Report to be given to the District's Board of Directors.

E.3 Objective - Each year, the District will include an informative flier on water conservation within at least one mail out to groundwater non-exempt water users distributed in the normal course of business for the District.

E.3 Performance Standard - Each year, a copy of the water conservation mail-out flyer will be included in the District's Annual Report to be given to the District's Board of Directors.

There are several newspapers in the District that routinely publish information about UTGCD, including meeting notifications and conservation ideas. In addition, District staff routinely monitors the newspapers for any other water-related articles. The following pages are examples of information released by the District to fulfill our management objectives in 2016.

MONTAGUE VOTES

Uncontested Races
& Party Propositions

Republican



Total vote 4,981
13th Cong. Dist.
 Mac Thornberry 3,807

68th St. Rep.
 Drew Springer 3,734

97th District Judge
 Jack McGaughey 3,702

County Atty.
 Clay V. Riddle 3,102

Tax Assess-Collector
 Sydney Nowell 3,767

Commissioner Pct. 3
 Mark Murphey 924

Constable Pct. 1
 Stefanie Horton 1,396

Constable Pct. 2
 Ronnie Reynolds 2,122

County Chairman
 Mari-Kathryn Braswell 3,130

Propositions

#1 on Alternative to Property Tax
 In favor 3,026
 Against 1,386

#2 County Compliance With Immigration Laws
 In favor 2,660
 Against 1,896

#3 Prohibit Governmental Bodies Collecting Union Dues
 In favor 3,603
 Against 855

#4 Assertion of 10th Amendment Rights
 In favor 4,169
 Against 266

*All precincts reporting.
 Results unofficial until county canvass.

Democrat



Total vote 287
County Chairman
 J.A. "Tony" Desmuke 196

Referendums

#1 On Economic Security & Prosperity
 In favor 239
 Against 26

#2 On a Fair Criminal Justice System
 In favor 243
 Against 22

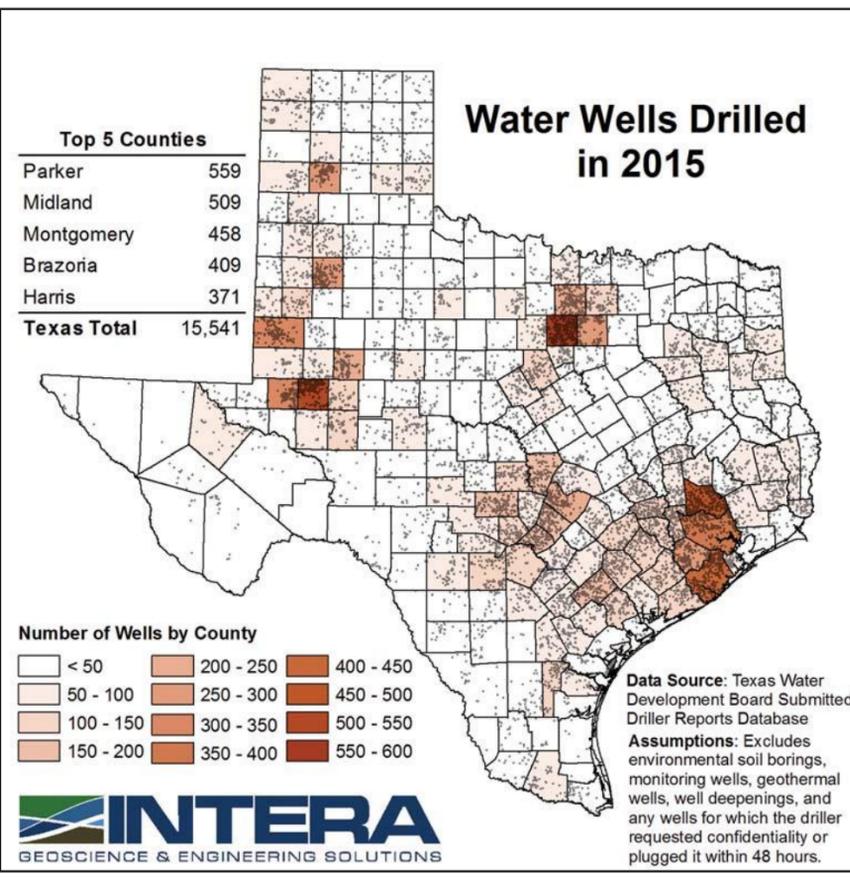
#3 On Climate
 In favor 242
 Against 25

#4 On the Voting Rights Act
 In favor 244
 Against 22

#5 On Campus Carry
 In favor 188
 Against 81

#6 On Comprehensive Immigration Reform
 In favor 225
 Against 48

*All precincts reporting.
 Results unofficial until county canvass.



--Chart courtesy Upper Trinity GCD
 The above chart plots every new water well drilled in Texas in 2015. All four counties in the Upper Trinity Groundwater Conservation, including Montague, were in the top 75 with Parker County the most active in the state.

UTGCD's four counties among top 75 for new wa

SPRINGTOWN — Based on Driller's Reports submitted to the Texas Water Development Board, there were more wells drilled within the boundaries of the Upper Trinity Groundwater Conservation District in 2015 than in any of the other 100 groundwater districts in the state.

Further, there were more new water wells reported in Parker County (559) than in any other county, said UTGCD General Manager Doug Shaw. And of the 254 counties in Texas, all four of the Counties within the

boundaries of the district fell within the top 75 most active counties in the state: Wise County had the 12th most new wells (247), Montague County 59th (78) and Hood County 72nd (67).

"Once thought of as an unending supply of water, modern science and on the ground data are now showing us that many areas within the District may potentially face groundwater shortages in the future," Shaw said.

During 2015 more water wells were drilled in the Upper Trinity (951) than in any other GCD in Texas. The

next closest was the 15 county High Plains GCD with 944 new wells while Lone Star GCD was third with 458 new wells.

High Plains GCD is centered around Lubbock County, is the largest groundwater district in the state and the oldest having been formed in 1951. The Upper Trinity is one of the newest, No. 90 of 100, being formed in 2007 and encompasses four counties along the outcrop of the Trinity Aquifer where one of the state's primary sources of groundwater -- See "Wells" Page 10

Sheriff's Log

Sheriff's deputies responded to 75 calls for service the week of Feb. 22 through Feb. 28 including five reports of stray livestock, two reports of disturbance in progress and six requests for agency assistance.

Booked into the Montague County Jail the week of Feb. 22 through 28 were:

Alvin Lacho Gowans, 24, Fort Worth; Feb. 22, Montague County Sheriff's Office; motion to proceed with adjudication of guilt, \$5,000 bond.

Joel D. Fernandez, 35, Haslet; Feb. 22, Texas Department of Public Safety; possession of marijuana less than 2 ounces, \$1,000 bond.

Alvin Eugene Hall, 36, Dallas; Feb. 22, Saint Jo Police Department; driving while license suspended, \$1,000 bond.

Curtis Wayne Dick, 27, Murfreesboro, Ark.; Feb. 24, SKPD; failure to identify giving false information, \$1,000 bond.

Erik Ryan Alcorta, 21, Ralls; Feb. 25, SJPD; motion to revoke probation for assault causing bodily injury, no bond listed.

Dustin Suede Bell, 21, Bowie; Feb. 25, Bowie Police Department; capias pro fine for interfering with a public servant, \$5,000 bond.

Derek Ray Joseph, 30,

Bowie; Feb. 25, MCSO; driving while license invalid, \$1,000 bond.

Anselmo Delafuente, 25, Nocona; Feb. 26, MCSO; assault causing bodily injury, \$1,500 bond.

Kory Allen Kunkel, 28, Forestburg; Feb. 26, MCSO; driving while license invalid, no bond listed; expired registration, no bond listed; failure to display, no bond listed; two counts of failure to appear; surety off bond for possession of a controlled substance PG 1 less than 1 gram, no bond listed; burglary of a building, no bond listed.

Cody Guy Reeves, 24, Nocona; Feb. 27, MCSO; order revoking probation, no bond listed.

Major A. Henderson, 29, Bowie; Feb. 27, BPD; driving while intoxicated, \$1,200 bond.

Brenton D. Heaton, 40, Bowie; Feb. 27, MCSO; possession of a controlled substance PG 1 less than 1 gram, no bond listed.

Angel Marie Young, 42, Nocona; Feb. 27, Texas Parks and Wildlife Department; motion to revoke for theft of property, \$3,000 bond.

Kyle Nathan Miers, 37, Bowie; Feb. 28, DPS; driving while intoxicated, no bond listed; driving while license suspended, no bond listed.

Brian Todd Blanton, 50,



Kunkle Heaton



Blanton Su

Saint Jo; Feb. 28, SJPD; two counts aggravated assault with a deadly weapon, no bond listed.

Xiancong Su, 35, Portland, Ore.; Feb. 28, MCSO; money laundering greater than \$300,000, no bond listed.

Joseph Andrew Hill, 38, Nocona; Feb. 28, DPS; failure to appear for unlawful burning, no bond listed; unlawful burning, no bond listed.

James Lynn Franklin, 20, Bowie; Feb. 28, BPD; theft, \$500 bond; possession of drug paraphernalia, \$500 bond; two counts of failure to appear, \$200 bond each.

Put some SLAM in your DUNK!

Stop and try our **NEW Jalapeño Gravy** with any of our DQ Country Baskets

Limited Time

DQ

TEXAS STOP SIGN

Visit us at dqtx.com

DQ and the ellipse shaped logo are trademarks of Am. D.Q. Corp., Mpls. MN. ©Reg. U.S. Pat. & TM Off. TX. D.Q. Op. Coun., © 2016. All Rights Reserved.

Probate Notice

THE STATE OF TEXAS

TO ALL UNKNOWN HEIRS AND KNOWN HEIRS WHOSE ADDRESSES CANNOT BE ASCERTAINED OF THE ESTATE OF GREGORY A. CLAXTON, DECEASED CAUSE NO. 16P018, COUNTY COURT OF MONTAGUE COUNTY, TEXAS

Notice is hereby given that Christina Claxton filed in the County Court of Montague County, Texas, on the 23rd day of February, 2016, in Cause No. 16P018, an Application for Independent Administration and Letters of Independent Administration and to Determine Heirship. Said application will be heard and acted on by said Court at 10 o'clock a.m. on the first Monday next after the expiration of 10 days after the date of publication hereof at the Montague County Courthouse, Montague, Texas.

The application discloses that the nature of the suit is as follows: a determination by the Court of who are the heirs and only heirs of Decedent and their respective shares and interests in the Estate of Gregory A. Claxton, Deceased, and seeks the appointment of Christina Claxton as Independent Administrator of the Estate of Gregory A. Claxton, Deceased.

If any heirs of Decedent object to the Application for Independent Administration and Letters of Independent Administration of Application to Determine Heirship, they are hereby notified to file an objection with the County Court of Montague, County, Texas, and the attorney for the Applicant, John Perry Brooks, no later than 10 o'clock a.m. on the first Monday next after the expiration of 10 days after the date of publication.

The officer executing this writ shall promptly publish same according to the requirements of law, and the mandates thereof, and make due return as the law directs.

DATED this 25th day of February, 2016.

ESTATE OF GEGRORY A. CLAXTON, DECEASED
 By: JOHN PERRY BROOKS
 Attorney for the Estate
 4245 Kemp Boulevard
 Wichita Falls, Texas 76308
 (940) 6969-5015 (940) 691-3274 (fax)

WOMACK AGRICULTURAL SERVICES, L.L.C.
 940-825-3700 Office
 940-841-1462 Cell
 1323 W. Hwy. 82, Nocona
 Locally Owned And Operated

ALL MAJOR TIRE BRANDS
 • • ON SALE • •

WE SELL INTERSTATE BATTERIES
 3 Year Free Replacement

20% CUBES \$7⁰⁰/50 lbs. Bag
23% CORN CUBES \$7⁵⁰/50 lbs. Bag
38% CUBES \$10⁰⁰/50 lbs. Bag

• • • CLEARANCE SALE • • •
On 2015 Models of BADBOY MOWERS!

KNTX AM1410

TRADE FAIR

9:00 - 10:00 a.m., Mon. - Fri.

www.kntxradio.com

940-872-2288

Recreation . . .



-- Photo by Tracy Mesler

While the older kids were taking part in the Nocona Braves Relay at Jack Crain Stadium Monday evening, the younger kids found themselves some steps and a Nerf football and were making their own recreation.

Speaker to talk on gunslingers

Continued from Page 2
 named Texas State Historian in 2012. Now he is his second term in that position – a job that carries him across the state as ambassador of what he describes as the “richest and most colorful history” among all the 50 states.
 As state historian he is responsible for enhancing Texans’ knowledge of the state’s history and heritage; encouraging the teaching of Texas history in public schools; conducting lectures, and consulting with governmental officials on matters relating to the promotion of state history.
 The meeting and presentation is free to members and open to the public for \$5 each.
 One third of the board

which governs the operations of the society and museum will be elected at the meeting and there are three vacancies on the board.
 The Tales ‘N’ Trails Museum is currently in the midst of a membership drive as well as a capital fund drive to complete the 9,000 square foot agriculture exhibit located immediately east of the museum.
 Individual memberships in the museum start at \$35 per year. Members are offered discounts, special services and programs.
 The museum serves as Nocona’s Visitor’s Center and also houses the offices of the Nocona Chamber of Commerce and the Nocona Economic Development Corporation, both of which are

rental tenants.
 The museum operates on admissions, donations, memorials, a portion of the city’s Hotel/Motel Tax, but most importantly from membership fees.
 Proceeds from the annual Shebang fund raiser are plowed back into capital improvements to existing exhibits, or more recently into the construction of the barn to house the society’s growing collection of agricultural artifacts.
 To learn more about museum exhibits and special events, or about its levels of membership, go to www.talesntrails.org, call the museum at 825-5330 or go by the museum at 1522 E. U.S. Hwy. 82 in Nocona.

Voters reject two incumbents

Continued from Page 1
 fice has handled almost twice as many criminal cases as her predecessor, Jack McGaughey, did in his final three years in office.
 Mrs. Polhemus captured the Montague County vote 2,288 to 2,190.
 Mrs. Williams carried Clay County 1,279 to 1,168
 In Archer County the challenger bested her former employer 1,181 to 832.
 In a five-race to succeed Conway as the Precinct 1 commissioner Roy Darden picked up 36.43% of the 12,05 votes while Kirkland made it to the run-off with 27.88% of the vote.
 Paul Braswell, husband of the Montague County Re-

publican Party Chairwoman Mari-Kathryn Braswell, finished third with 13.78% of the vote followed by Pct. 1 road hand Buck Mosley with 11.2% of the ballots and Tony Vann with 10.71%.
 On the national level, home state candidate Ted Cruz edged combative businessman Donald Trump 44.09% of the vote to 32.82%. Marco Rubio was a distant third with 9.36% of the votes cast in Montague County followed by Ben Carson with 4.38%.
 Meanwhile former New York Senator and first lady Hillary Clinton captured 54.26% of the 282 Democratic votes besting Vermont Sen. Bernie Sanders 153 to 122.

“propositions” on the Republican ballot while the Democratic voters approved all six of their special issues.

County Totals 97th District Attorney County Polhemus Williams		
Archer	1,181	832
Clay	1,168	1,279
Montague	2,288	2,190
Total	4,637	4,301

Nobody who ever gave his best regretted it.”
 —George Halas

Water wells

Continued from Page 3
 comes to the surface. Lone Star GCD is a single county district serving Montgomery County and Conroe just north of Houston.
 “The District currently takes underground water level readings at approximately 150 wells in the four counties, and we are constantly looking to increase our knowledge of what may be the most precious resource we have,” the general manager added.
 For more information please visit the UTGCD website at www.uppertrinitygcd.com or contact staff at (817) 523-5200.

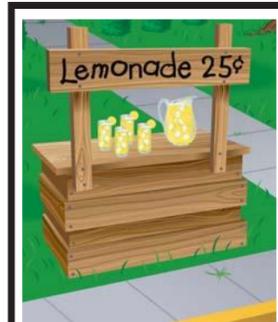
Partly because the only contested local races were on the Republican ticket, and partly because Montague County was voted Republican at the state and national level for the past five elections, 94.6% of the votes cast in Tuesday’s party primaries were Republican – 4,981 to 287.
 All totaled 40.74% of the county’s 12,932 registered voters cast ballots in the two primary elections.
 The county’s voters resoundingly approved all four

*Do unto others
As
You
Would
Have
Others
Do
Unto
You.*

—Luke 6:31
Molbee Chapel Church



Burn Ban In Effect
 No outdoor burning by order of Commissioner’s Court



For ALL interested 5th, 6th, & 7th grade students of Northern Montague Co ISDs. More info., contact: noconaedc@nocona.org

Lemonade Day

Saturday, March 5
 10:00 - 12:00 (noon)
 Nocona Community Center
 West Hwy. 82
 Come by for REGISTRATION and to pick up MATERIALS.

CHEVROLET BUICK GMC

LIPSCOMB

LIPSCOMBAUTOCENTER.COM • HWY 287 N., BOWIE, TX • 940-872-5455

2015 SILVERADO CREW CAB
\$28,995 OR \$27,995
WITH '99 OR NEWER CONQUEST

Demo. STK #TF7941. MSRP \$38,665. \$1500 Consumer Rebate. \$1750 Bonus Cash Rebate, \$6420 LAC Discount. Price +TTL.

2015 SILVERADO
\$24,998 OR \$23,998
WITH '99 OR NEWER CONQUEST

Demo. Double Cab. STK #TF7396. MSRP \$31,740. \$1500 Consumer Rebate. \$1000 Select Model Bonus Cash, \$4252 LAC Discount. Price +TTL.

2015 SONIC
\$13,988 OR \$12,988
WITH '99 OR NEWER CONQUEST

Demo, Sedan. STK # CF8134. MSRP \$16,335. \$1000 Consumer Rebate, \$500 Bonus Cash, \$855 LAC Discount. Price +TTL.

2016 EQUINOX
\$21,988 OR \$20,988
WITH '99 OR NEWER CONQUEST

STK # TG9207. MSRP \$26,180. \$750 Consumer Rebate, \$750 Bonus Cash, \$1000 Select Model Bonus Cash, \$1692 LAC Discount. Price +TTL.

2015 CRUZE LT
\$16,988 OR \$15,988
WITH '99 OR NEWER CONQUEST

Demo, Sedan. STK # CFA418. MSRP \$22,290. \$1000 Consumer Rebate, \$500 Bonus Cash, \$500 Bonus Cash, \$3302 LAC Discount Price +TTL.

2016 MALIBU
\$17,988 OR \$16,988
WITH '99 OR NEWER CONQUEST

Sedan. STK # CG6588. MSRP \$23,390. \$1500 Consumer Rebate, \$1000 Bonus Cash, \$500 Bonus Cash Rebate, \$1000 Select Model Bonus Cash, \$1402 LAC Discount Price +TTL.

FIND NEW ROADS™

CHEVROLET

LIPSCOMB AUTO CENTER / HWY 287 N., BOWIE, TX / 940-872-5455

LIPSCOMBAUTOCENTER.COM

BUICK VERANO
\$21,988

2016 Buick Verano. Sedan. BG8748. MSRP \$26,765. \$2118 Consumer Rebate. \$2659 LAC Discount. Price +TTL.

BUICK ENCLAVE
\$39,988
\$9292 OFF MSRP

2015 Buick Enclave. Leather. BF4934. MSRP \$49,280. \$2459 Consumer Rebate. \$6833 LAC Discount. Price +TTL.

LIPSCOMB AUTO CENTER / HWY 287 N., BOWIE, TX / 940-872-5455

GMC

WE ARE PROFESSIONAL GRADE

LIPSCOMB AUTO CENTER
 HWY 287 N., BOWIE, TX
 940-872-5455
 LIPSCOMBAUTOCENTER.COM

2015 Sierra Crew Cab SLE
\$8,537 OFF MSRP
\$33,988

Stk #GF9506. MSRP \$42,505. \$1500 Consumer Cash, \$1000 Incremental Consumer Cash \$1000 Bonus Cash, \$5037 LAC Discount.

PRE-OWNED VEHICLES

<p>2008 FORD FUSION SEL</p> <p>\$5,450 862561</p>	<p>2010 CHRYSLER 300 TOURING HEATED SEATS</p> <p>\$10,900 A33438</p>	<p>2013 CHEVY SONIC SEDAN CLEAN</p> <p>\$11,500 D18915</p>	<p>2008 HUMMER H3 4WD SPORTY</p> <p>\$12,900 831298</p>
<p>2014 CHEVY MALIBU REDUCED</p> <p>\$14,900 EA0890</p>	<p>2008 CHEVY AVALANCHE 4WD</p> <p>\$16,900 846156</p>	<p>2011 CHEVY 1500 X-CAB TEXAS EDITION</p> <p>\$21,900 B44932</p>	<p>2014 CHEVY TRAVERSE LS 3RD ROW SEATING</p> <p>\$21,900 E52691</p>
<p>2013 TOYOTA HIGHLANDER LOW MILES</p> <p>\$23,900 D46573</p>	<p>2011 CHEVY TAHOE LT ROOF & DVD</p> <p>\$26,900 B09901</p>	<p>2011 GMC YUKON SLT</p> <p>\$29,500 B42031</p>	<p>2015 CHEVY COLORADO NEW BODY STYLE</p> <p>\$34,500 F78125</p>
<p>2015 RAM 1500 CREW DIESEL</p> <p>\$34,900 F24014</p>	<p>2015 CHEVY TAHOE LS NEW BODY STYLE</p> <p>\$39,900 F58902</p>	<p>2015 FORD F-250 CREW LOW MILES</p> <p>\$44,900 F98633</p>	<p>2013 INFINITI QX56 4WD LOADED</p> <p>\$44,900 D30656</p>

LIPSCOMBAUTOCENTER.COM • 940-872-5455
ALL PRICES +TTL. ADDITIONAL RESTRICTIONS MAY APPLY

Fall workshop

Learn to harvest rain

The A&M Agrilife Extension Service staff wants to invite you out at 1 p.m. Oct. 21 to take a tour and visit with Byron Barton, south of Bowie for an in-depth visit on Rainwater Harvesting.

Barton joined Montague County a couple of years back, in doing so he has taken advantage of the rainfall and is collecting it for his home.

Barton place sits high on a hill with one of the most scenic views in the county. He has built his place to be somewhat sustainable, but very useful.

He is graciously allowing the group to take a tour of his place to

learn more about how he installed and manages rainfall to his advantage.

Also joining the group will be Cameron Goebel, from Upper Trinity Groundwater Conservation District to show why the groundwater is important to all.

The group will also tour their educational trailer to get an inside look of how groundwater percolates into the soil profiles and managed accordingly by homeowners and others drawing on this valuable source.

Driving directions:
2249 Bugscuffe Road,
Bowie, TX or drive 6.6
miles south on Hwy. 59

towards Jacksboro from Bowie, until you reach Bugscuffe Road, about 200 yards past Bugscuffe Lane. Turn left onto Bugscuffe Road. Drive 2.2 miles to 2249 Bugscuffe Road on the left.

Cell service is somewhat spotty in that area, but you should find the LTGWWD trailer parked at the entrance. Remember it will start at 1 p.m. Program should last a couple of hours.

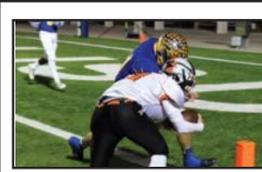
You are asked to RSVP to the Texas A&M Agrilife Extension Service here in Montague County by calling or emailing Justin Hansard at 940-894-2831 or j-hansard@tamu.edu.



Grant will fund Justin Building construction
.. Page 1



Community says thank you to its veterans
... Page 2



Tribe unable to hold onto playoff lead, falls 40-21
... Page 6

The Nocona News

Copyright 2016

www.noconanews.net

Seventy-five cents

Eight Pages

Work to begin soon

\$500K grant to fund Justin renovation

By Tracy Mesler

State Agriculture Commissioner Sid Miller called Nocona City Manager Lynn Henley last week to deliver the “official news” – the city of Nocona has been approved for a \$500,000 Community Development Block Grant which will be used to complete the Justin Leathersgoods Project.

For eight years the city has been trying to secure sufficient funds to turn the old factory into a downtown community event center.

The structure was deeded over to the city in 2008. Three years later the Nocona

Chamber of Commerce urged the council to convert the structure into something that could be used for vendors, farmer’s markets and other downtown activities.

In June of 2012 Pete and Barbara Horton purchased the old Nocona Boot Company warehouse from the city for \$200,000 with one stipulation – “with the condition that the majority of the purchase price be used towards the improvements of the Justin Building.”

City Council did them one better and allocated all of the proceeds for that project as the Justin property abuts the

Downtown Park. Additional funds were allocated to the account which have been used for partial demolition and architect’s plans.

Efforts to salvage the massive concrete columns and roof proved unattainable as decades of water seepage had structurally damage the concrete roof. That resulted in the city covering the thick, concrete floor with sand and then demolishing the south half of the structure.

Meanwhile Mayor Robert Fenoglio appointed a committee of Councilmen Bob Ferguson and Steve Tettleton, Henley and local building restoration contractor Dan Fenoglio to come up with various options and plans for the structure.

In 2014 the city applied for a \$350,000 grant from the state, but it was the last grant to miss funding once all of the applications were scored.

After having the building examined by architects and engineers, the city developed a plan to add a kitchen, concession room and public restrooms to the north end, and design the south portion as a large, open room which can be used for a variety of functions.

In January of this year Mrs. Horton and Mrs. Patty Fenoglio, the mayor’s wife, appeared before the council and applied spurs to them to get something done on the project.

Referring to a “Coming Soon” banner which had

been draped across an exposed interior wall three years earlier, Mrs. Fenoglio growled, “That coming soon sign is a joke!”

Henley noted Monday that he increased the grant application to \$500,000 in

the belief that with the additional “points” for applying but not receiving the grant in the previous cycle the city would be successful this year.

Meanwhile last spring the city awarded a bid to put a new roof on the remaining

portion of the structure, but that project got hung up as the city could not find carpenters to make repairs to the decking. That work was finally started last month and was continuing this week.

-- See “Future” Page 2

Granted . . .



--Photo by Tracy Mesler

Work resumed on replacing the roof decking of the north portion of the old Justin Leathersgoods Building just as the city received confirmation of a \$500,000 state grant to construct a community room immediately to the south plus add a kitchen/concession area and rest rooms to the north.

Rainwater harvesting

Conserving for the future

By Cameron Goebel
Education/PR Coordinator
Upper Trinity GCD

SPRINGTOWN — Rainwater harvesting is the capture and storage of rainwater for potable and non-potable indoor use, landscape irrigation and storm water reduction.

As a simple, economical way for Texans to save water, rainwater harvesting has garnered much attention in recent years amid the growing need for water conservation. But water exists within the water cycle, and if we use it, then it will eventually return to us again ... right?

It is a mistaken belief that Texas has an abundant amount of water available for people to use. Over the next 50 years, the population of Texas is expected to double in size, greatly increasing the strain on existing water sources. To compound the potential issue, Texas is prone to drought conditions which can result in periodic water shortages due to increased demand and reduced supply. This makes rainwater harvesting a potentially great solution to water supply problems by extending and conserving existing water resources.

Upper Trinity Groundwater Conservation District (UTGCD) recently partnered with Bryon Barton of Bowie to host an event to educate the public on rainwater harvesting as well as groundwater resources. Barton held an all-day event on his property to give those in attendance a closer look at his incredible rainwater harvesting system. UTGCD’s Cameron Goebel and Jarod Briscoe also gave presentations on water conservation, the geology of the Trinity Aquifer and the

UTGCD Well Monitoring Program.

Even though they knew they were going to install a rainwater harvesting system, upon moving to the Bowie area the Barton’s had a well drilled to supplement the harvested rainwater. Barton now says he should have saved his money, because they never use the well. Barton describes his rainwater system as “self-tending, very robust, and very reliable ... I never think about it and I never worry about it.”

Barton uses the roof of his house and carport as his catchment surface, totaling about 4,080 square feet. Barton receives approximately 32 inches of rain a year and for every inch, he collects almost 2,000 gallons of water. Barton and his wife rely on the system as their sole source of water, stating that they use about 60 gallons a day, or approximately 1,800 gallons of water a month. Barton also noted that they have more water than they could ever possibly use, and they use their system for everything from washing dishes and clothes to even watering his wife’s irises.

Barton’s system has seamless 6-inch gutters that go all the way around his house with three separate downspouts that connect to 4 storage tanks which can hold up to 12,000 gallons. The four tanks can weigh up to 100,000 lbs. when full to capacity, so their placement should be well thought out. Once in the tanks, a pump is used to move water through 2 different filters and a 12 gallon per minute UV light, after which it is theoretically mineral and contaminant free before being pumped to his house.

The characteristics of rainwater – which is soft, pure, and only slightly acidic – make it ideal for harvesting. Rainwater can provide a source of water when a more traditional source like groundwater is unavailable, and it’s free of the disinfectant by-products that are typically added to water from centralized water supply systems such as salts, minerals, and other manmade or natural chemicals.

If you are interested in building your own rainwater harvesting system, or if you have any questions concerning this article, please contact Cameron Goebel at Upper Trinity Groundwater Conservation District for more information, and check out the Texas Water Development Board’s website as well as the Texas A&M Agrilife Extension website for lots of great information and helpful tips.

AREA WEATHER

Nov. 9	66	56	0.00
Nov. 10	71	46	0.00
Nov. 11	71	46	0.00
Nov. 12	73	43	0.00
Nov. 13	65	44	0.00
Nov. 14	71	52	0.00
Nov. 15	72	45	0.00

Official recording site off Hoben Rd.
Total November 3.62
Nov. Average 2.13
Total Rain 2016 38.51
Avg. thru Nov. 32.88
Thru Nov. 2015 62.75
Thru Nov. 2014 26.10
Thru Nov. 2013 35.96
Thru Nov. 2012 27.43
Thru Nov. 2011 19.95
Thru Nov. 2010 33.45



Community offers food in thanksgiving

It is time again for the annual Thanksgiving Day Dinner.

While the free dinner is sponsored by Christ Community Church it takes the entire community to prepare the food, serve and/or deliver more than 700 meals that day – so volunteers and donors are more than welcome.

The dinner will be served at the Veranda Event Center, 1533 E. US. Highway 82 located behind the Veranda Inn.

The traditional Thanksgiving meal of turkey, ham and all of the trimmings will be served from 11 a.m. until 2 p.m. Meals will be delivered to those who are unable

to attend.

“EVERYONE is welcome to attend this free Thanksgiving Day meal. God loves us all!” said Belinda Hendrix, coordinator of the event.

If you would like to help here are some ways: prayer, work Thanksgiving Day, make a dessert, donate supplies, or cash is always welcome and appreciated.

If you need meals delivered, or if you want to help call Mrs. Hendrix at (940) 531-1885.

“Let’s join together regardless of our differences and give thanks to God!” she asked.



Super Moon

Sunday and Monday night you could find scores of people going out each evening to watch a once-in-a-lifetime event -- a Super Moon, when Earth’s satellite is the closest it will be. Many shot pictures with their phones and cameras. Jarret and Julie Davis set up their telescope, and Jarrett captured their daughter, Ava, looking at the moon as seen through the optical device.



Rain barrels can catch and keep scores of gallons of water for yard and other use.
Photo by Mark K. Campbell

Capturing rainwater conserves water for the future

<http://springtown-epigraph.net/news/heaven-sent/>

2/4

12/1/2016

Heaven sent : The Springtown Epigraph

BY MARK K. CAMPBELL

Even in drought-like years, inches and inches of rain falls here.

Taking efforts to capture that water can benefit not only yourself but your fellow Texans – future generations of them.

The number of gallons dropping from the sky is startling.

A Bowie man, Byron Barton, has partnered with the Upper Trinity Groundwater Conservation District (UTGCD) for a rainwater collection event.

Texas water concerns

There is not enough water available for all Lone Star State residents.

Since the population of Texas is expected to double by 2066 – not to mention drought cycles – alternative ways of collecting water is essential.

One way to combat the shortage is for citizens to extend and use existing water resources. Like rain.

Soft, pure, and only slightly acidic, rainwater is ideal for harvesting.

Another plus is that it's free of disinfectant by-products that are typically added to water from centralized water systems – additives like salts, minerals, and manmade/natural chemicals.

When groundwater sources are taxed – or exhausted – rainwater remains.

An elaborate system

Among the varied ways of capturing rainwater is by the barrel or, as Bowie's Barton has devised, a detailed method that delivers thousands of gallons.

Barton uses his roof and carport as "catchment surfaces," about 4,080 square feet.

Bowie receives 32 inches of rain annually. For every inch of rain, Barton collects 2,000 gallons of water.

He captures and keeps so much that he never accesses the well Barton had drilled on his property.

He and his wife use about 60 gallons daily or 1,800 monthly.

Even with washing dishes and clothes to watering flowers, Barton doesn't come close to exhausting his supply.

Six-inch gutters encircle his house. A trio of downspouts routes water to four storage tanks. When filled, those tanks can weight as much as 100,000 pounds apiece, so they are carefully placed on his property.

From the tanks, pumps moves the water through a pair of different filters and a 12-gallon per minute UV light which – theoretically – makes the water mineral and contaminant free.

Whet your appetite?

UTGCD's Cameron Goebel can answer questions about collecting rainwater locals at 817-523-5200.

Category: [News](#), [Photos](#)

Subscribe

If you enjoyed this article, subscribe to receive more just like it.



Comments are closed.

NEWO Bulletin

[Campaign Preview](#)

[HTML Source](#)

[Plain-Text Email](#)

[Details](#)

Non-Exempt Well Owners' Bulletin released by Jillian North

[View this email in your browser](#)



latest news

Updated Forms

[Water Production Report 2016](#)

[Well Classification Change](#)

[Transfer of Well Ownership](#)

Reminder: Contact our office if your well changes from non-exempt to exempt, and do not remove meters or make changes to the well before scheduling an appointment with one of our field technicians.

Water Production Reports for 2016 and payment for Jan-Jun are due July 31. E-mail Ann at ann@uppertrinitygcd.com for an e-WPR.



prevention

Here are some actions you can take as a well-owner to protect your groundwater resources from drought:

- Water before 10am and

DISTRICT SEEKING PUBLIC COMMENT

After evaluating water availability and existing supplies and identifying water needs for the counties of Montague, Parker, Wise, and Hood, the District will be submitting their technical data to the Texas Water Development Board (TWDB) in

late July 2016. This is a critical step in the ultimate development of desired future conditions and water planning groups throughout the region. A public hearing has been set to gather public input on the proposed recommendations, as well as to present the final draft of the Management Plan to members of the Board. Public comments have been accepted at previous public hearings, and additional comment can be heard at the July 18 board meeting at 5pm at the District office located at 1250 E Hwy 199, Springtown, Texas. A copy of the preliminary plan may also be viewed or downloaded by clicking [here](#). A copy of the plan may also be obtained by contacting the District at 817-523-5200. Questions about the content of the plan should be directed to Mr. Doug Shaw, General Manager. Written comment may be submitted by email to doug@uppertrinitygcd.com or by mailing comments to PO Box 1749, Springtown, TX 76082.

after 6pm

- Harvest rainwater for landscaping purposes
- Wash only full loads of dishes and laundry
- Retrofit all showerheads and faucets to low-flow capacities
- Water only permeable surfaces, not paved areas or sidewalks

events

July 18:

Board Meeting and Public Hearing
 5pm, District Office,
 Springtown, TX

August 15:

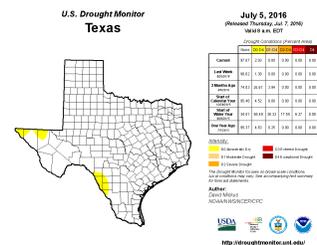
Board Meeting
 5pm, District Office,
 Springtown, TX

Board Meetings are held at our District office at 1250 E Hwy 199, Springtown, TX. They are open to the public and free to attend.

NEW DATA LOGGERS

The District has purchased and installed 14 new OTT Orpheus ecoLog dataloggers in order to obtain more up-to-date information on water levels throughout the District. The loggers were purchased in March 2015 and installed the following month into wells selected from the District monitoring program. Readings are taken by field technicians on a monthly basis, however, the units are programmed to record every 15 minutes. This provides the District a considerable amount of data compared to the quarterly readings which were previously taken. If you have a water well that is abandoned or not in use, please consider joining the District monitoring well program free of charge by contacting the District office at 817-523-5200.

drought status



The District is planning to make the water level information available on the website, however, it can be made available upon request.



Learn more about the District. Click on the video above to hear about the District mission, focus, and educational opportunities that we provide and 'Like' us on Facebook by following the tab below.



Copyright © 2017 Upper Trinity GCD, All rights reserved.

Upper Trinity GCD would like to share this important information with you. Thank you for being a part of aquifer protection and conservation.

Our mailing address is:
Upper Trinity GCD
PO Box 1749
Springtown, Texas 76082

[Add us to your address book](#)

[unsubscribe from this list](#) [update subscription preferences](#)

MailChimp



Groundwater Monitoring Program

F.1 Objective - Within 3 years of Groundwater Management Plan adoption develop a Groundwater Monitoring Program within the District.

F.1 Performance Standard - Upon development, attachment of the District Groundwater Monitoring Program to the District's Annual Report to be given to the District's Board of Directors.

F.2 Objective - Upon approval of the District Monitoring Program – conduct water level measurements at least annually on groundwater resources within the District.

F.2 Performance Standard - Annual evaluation of water-level trends and the adequacy of the monitoring network to monitor aquifer conditions within the District and comply with the aquifer resources desired future conditions. The evaluation will be included in the District's Annual Report to be given to the District's Board of Directors. The District may also take into consideration any measurements made by the TWDB groundwater measurement team.

F.3 Objective - Monitor non-exempt pumping within the District for use in evaluating District compliance with aquifer desired future conditions.

F.3 Performance Standard - Annual reporting of groundwater used by nonexempt wells will be included in the Annual Report provided to the District's Board of Directors.

A brief history of the monitoring program is presented here followed by a description of activities conducted in 2016.

In 2010, the District developed and instituted a Groundwater Monitoring Program in compliance with Objective and Performance Standard F.1. Phase I of the program secured 108 monitor wells within the District where water levels are measured quarterly using the Steel Tape Method, the Air Line Method, and/or the Electrical Line Method in compliance with Objective F.2. District staff was trained by personnel from the Texas Water Development Board on correct procedures for measurement of water levels. Participating well owners volunteered their wells to allow District staff to take water-level measurements. The District actively pursued additional monitoring wells to improve our ability to monitor groundwater conditions, comply with GMA-8 requirements, and meet the mission of the District as a whole. All activities regarding the District Groundwater Monitoring Program were presented for review and consent to the District Board.

A review of the Phase I Monitor Well System of wells indicated that gaps existed in the monitoring well network both spatially and vertically within the Trinity Aquifer and the Paleozoic aquifers. In response, the District contracted with INTERA Inc. to augment the monitor well network in a Phase II process. In 2011, the consultant completed a draft report that documented the hydrogeologic framework for the aquifers within the District with emphasis on the Paleozoic aquifers and also developed the strategy for assessing the Phase I monitoring well network and selecting the Phase II wells to meet the performance objectives and mission of the District. The monitoring strategy was focused to develop the data required to evaluate aquifer conditions within the boundaries of the District relative to the Trinity Aquifer DFCs and for potential future Paleozoic aquifers DFC.

Based upon the data analysis presented in the Phase II report, 65 wells of the original 108 Phase I wells were suggested for retention in the network. An additional 120 optimally located wells were targeted for inclusion in the monitoring network. During 2013, District Staff and INTERA focused on securing agreements with owners of the identified wells. However, the process of acquiring new wells at optimal locations proved more difficult than anticipated and, as a result, progress was slower than originally expected. As of the end of December 2013, 24 new wells had been added to the monitoring network as part of the Phase II efforts.

In 2015, District staff conducted an internal assessment of the program which resulted in several wells being removed from the program due to new owners electing not to participate in the monitoring program, changes in well configuration resulting in an inability to access the well, and well collapse. Many of the wells removed from the program had not been actively monitored for several years, yet had been included in the trend analysis presented to the Board in previous annual reports. By the end of 2015 the District was collecting readings from 118 wells. During 2016, the District added 35 wells to the monitoring program resulting in 153 total wells in the monitoring program. Locations and the associated aquifer for these 153 wells can be seen in Figure A below.

In the spring of 2015, the District purchased and installed the first 14 pressure transducers, which have been recording daily water level readings throughout the last two years. A few of these transducers have been strategically relocated, and two had to be removed for a short period of time due to malfunctioning equipment, both cases have been resolved by sending the device back to the manufacturer for repair.

In late 2016, the District purchased and installed 3 additional pressure transducers. Locations and associated aquifers for all wells equipped with transducers can be seen in Figure B. District staff visits these locations to download data on a quarterly basis. Moving forward, it is likely in the best interest of the District to continue to identify the best candidate wells for transducers to bolster the monitoring program.

An analysis of water-level trends in 69 monitoring wells was conducted in 2016 to provide insight into long-term water-level changes in the District. This is a reduction from the 72 wells used in the 2015 analysis; the reduction was due to District staff removing 5 wells from the analysis and adding 2 new wells. Of the 5 wells removed, 3 were public water supply wells in which staff is no longer able to obtain an accurate reading from the airline due to water levels being pulled down to the pump when in operation, another of the wells was removed because it was plugged and the final well was removed from the program due to staff safety issues while trying to attain water level readings.

Table 1 summarizes the average water-level changes obtained from the trend analysis, by county and aquifer, as well as the number of wells used to calculate the averages. Because the number of wells used to calculate the average was low in some instances, the average changes shown in the table may not be representative of the aquifer as a whole. As part of the District’s monitoring program, water-level trends in the District will continue to be regularly examined.

Table 1. Average Water-Level Changes and Number of Wells for used for Analysis

Aquifer	Montague	Wise	Parker	Hood
	Average Water-Level Change (feet)			
Paluxy		0.014	-0.9	-1.1
Glen Rose		1.0	-0.1	-0.2
Hensell	0.4	0.0		4.7
Pearsall/Cow Creek		-1.0	-0.8	0.7
Hosston	5.7		1.7	1.0
Paleozoic	0.9	0.7	-0.5	1.7
	Number of Wells			
Paluxy		1	2	2
Glen Rose		3	8	4
Hensell	7	2		4
Pearsall/Cow Creek		1	4	6
Hosston	1		1	5
Paleozoic	9	3	4	2

Currently District staff review all well registration applications to evaluate the potential for addition of that well to the current monitoring network. The District is incrementally expanding and improving the monitoring network to more effectively characterize groundwater conditions throughout the District.

In addition to the monitoring activities discussed above, in 2012 the District became party to an Inter-Local Agreement with three other Districts in the northern portion of the Northern Trinity aquifer and jointly funded a multi-year study to overhaul the Northern Trinity and Woodbine Aquifers GAM. The scope of this effort was unprecedented for a group of Districts and provided a wealth of hydrogeologic information to the District which has allowed for better management of groundwater resources within the boundaries of the District. Also, in 2013, the District Board approved a study to revise and refine a groundwater model of the Paleozoic Aquifers, which are an important resource to large areas of the District. Both the Northern Trinity Aquifer and the Paleozoic aquifer groundwater models were completed in 2014. The update of the Northern Trinity Aquifer GAM provides detailed hydrostratigraphic information for the District. Figure C shows two stratigraphic cross-section lines through the western portion of the District and the eastern portion of the District (Sections 1 and 2, respectively). Figure D shows stratigraphic cross section 1 and Figure E shows cross-section 2 defining the stratigraphic boundaries as well as detailed aquifer lithology. This detailed information will be valuable in the further refinement of management strategies for the District resources.

Because of the new information available due to the studies mentioned above and as part of the joint-planning process to develop Desired Future Conditions, moving forward the District will be reclassifying aquifer designations in line with the map seen in Figure F and further illustrated in Figure G. To summarize the changes, in the northern portion of the District (Region 1 in Figure F) the layers of the Trinity group are collectively referred to as the Antlers. This is due to the lack of confining material (limestone in the Glen Rose and clays in the Pearsall) that occur elsewhere. In other words in Region 1, the cretaceous aged formation (Trinity) is predominantly sands with little to no consistent confining units. In the southern portion of the District (Region 2 in Figure F), the Glen Rose transitions to a more consistent confining unit (limestone). However, the Pearsall is still predominately sand. Thus, in Region 2 the Trinity is separated into the Paluxy, Glen Rose and Twin Mountains (combining the Hensell, Pearsall and Hosston).

In 2015, the District staff reviewed the best available information to develop estimated exempt groundwater use volumes by county. These estimates were presented to the District's Board of Directors in the 2015 Annual Report and were also provided to the Texas Water Development Board (TWDB). The TWDB then took those estimates and developed projections for exempt groundwater use for the years 2020, 2030, 2040, 2050, 2060 & 2070. In developing this data for the TWDB, District staff was asked to estimate exempt use for both the Trinity Aquifer group and the Paleozoic formations; only estimates for the Trinity Group were reported in the 2015 Annual Report.

For the 2016 exempt use estimates, staff took the TWDB estimate for 2015 and projection for 2020, and used a linear function to calculate estimated 2016 groundwater use by county. Also, it is noteworthy to mention that staff has included estimated exempt use from the Paleozoic formations in this report, as mentioned earlier only estimates from the Trinity Group were used in the 2015 report.

Non-exempt use was also estimated at the same time, this is largely based on metered volumes reported to the District by non-exempt well owners. Table 6 provides a best estimate of exempt and non-exempt groundwater use for the District in 2016 utilizing data from the following sources:

- The Region B, C, and G 2011 Regional Water Plans, and data to be used for the 2016 Regional Water Plans;
- The report developed under contract to the TWDB titled "Total Projected Water Use in the Texas Mining and Oil and Gas Industry";
- Exempt pumping estimates from the TWDB
- Water Use Survey data from the TWDB
- District Meter Data.

Table 2. *Estimated Exempt and Non-exempt Groundwater Use for the District by County*

Category	Groundwater Use (AFY) ⁽¹⁾				
	Hood	Montague	Parker	Wise	Total
Exempt Use	5,609	1,440	5,552	4,820	17,421
Non-Exempt Use	5,558	218	3,233	1,533	10,542
Total	11,167	1,658	8,785	6,353	27,963

⁽¹⁾ AFY = acre-feet per year

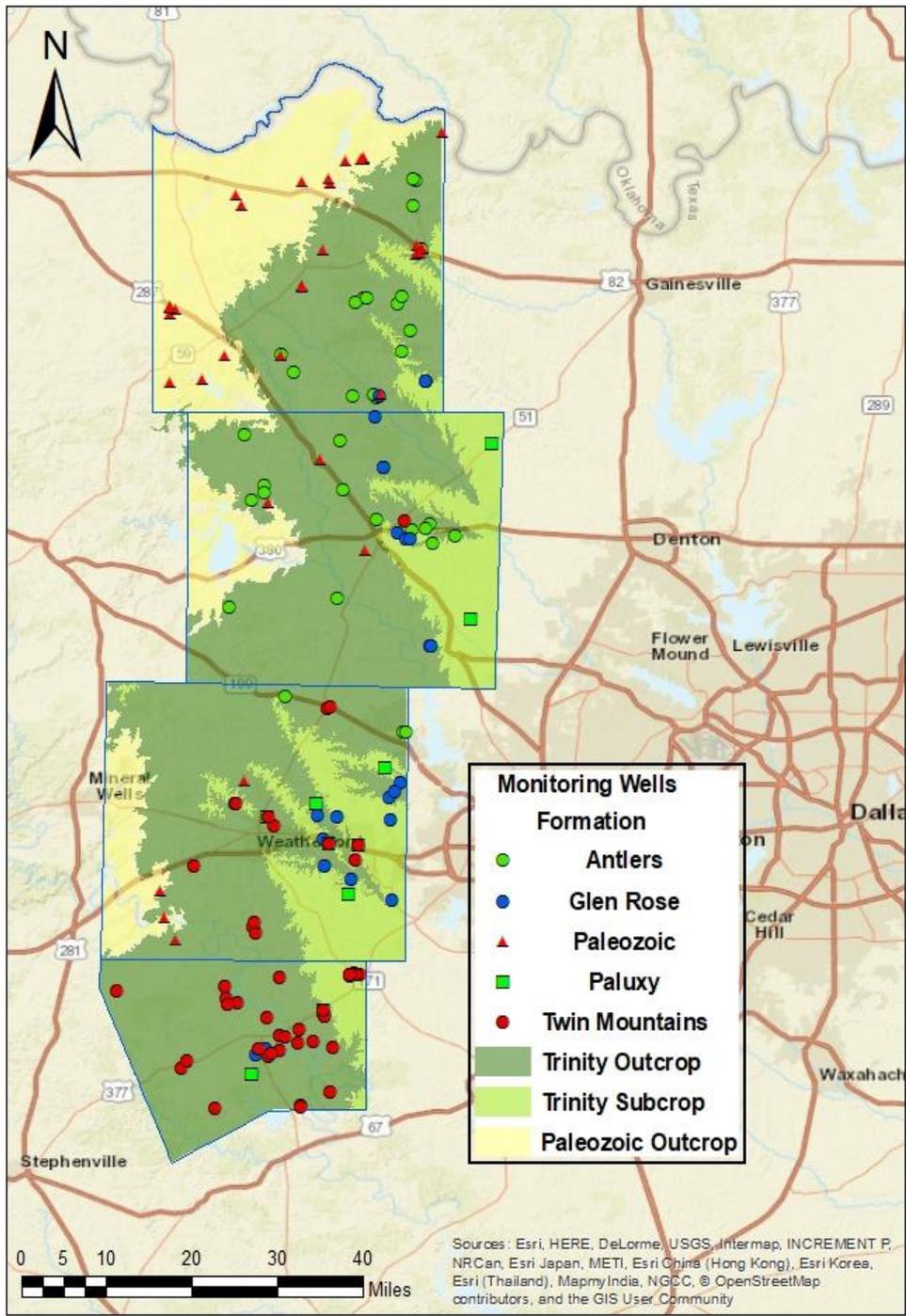


Figure A. Wells in the District monitoring well network.

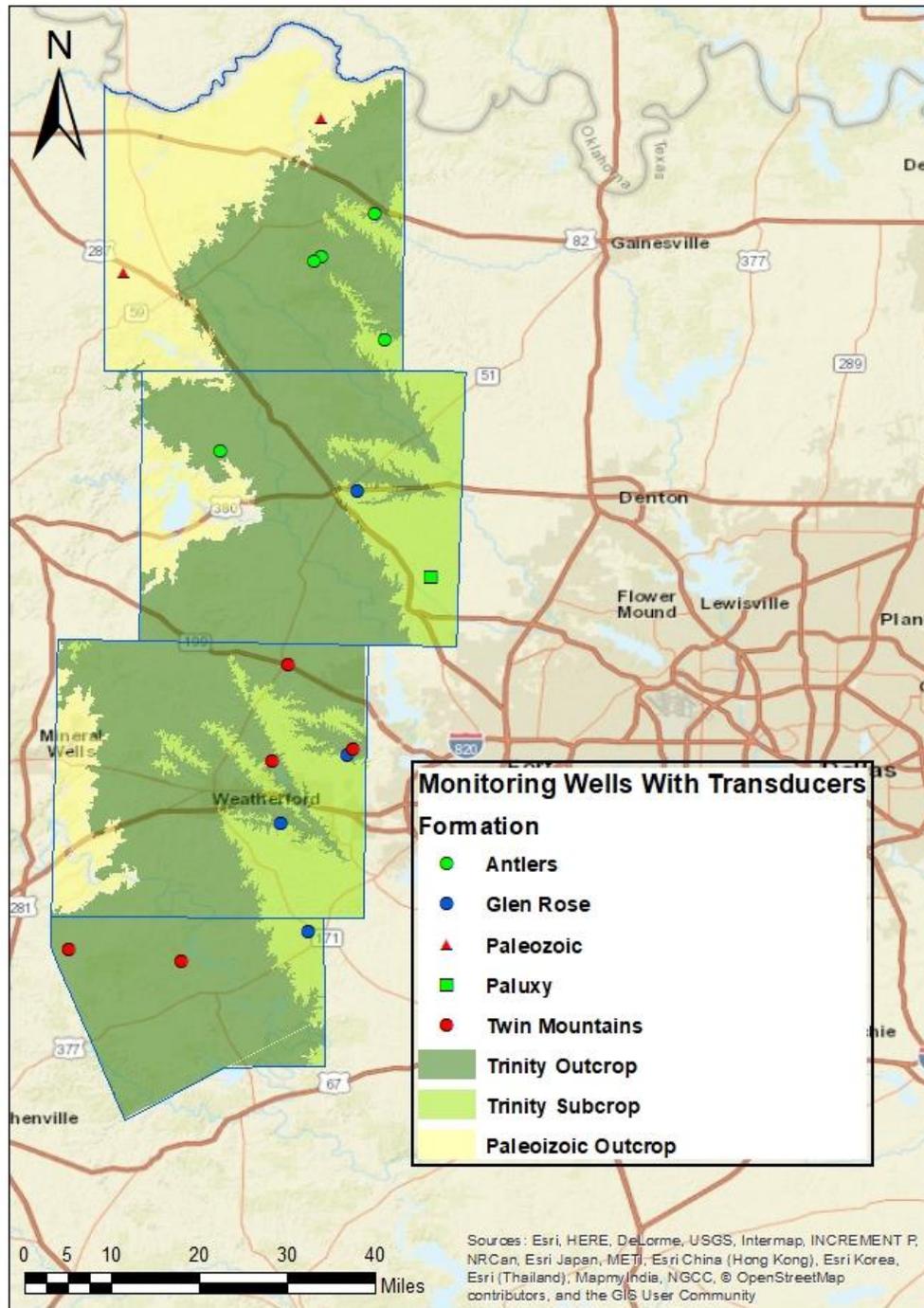


Figure B. Wells in the District monitoring well network equipped with pressure transducers.

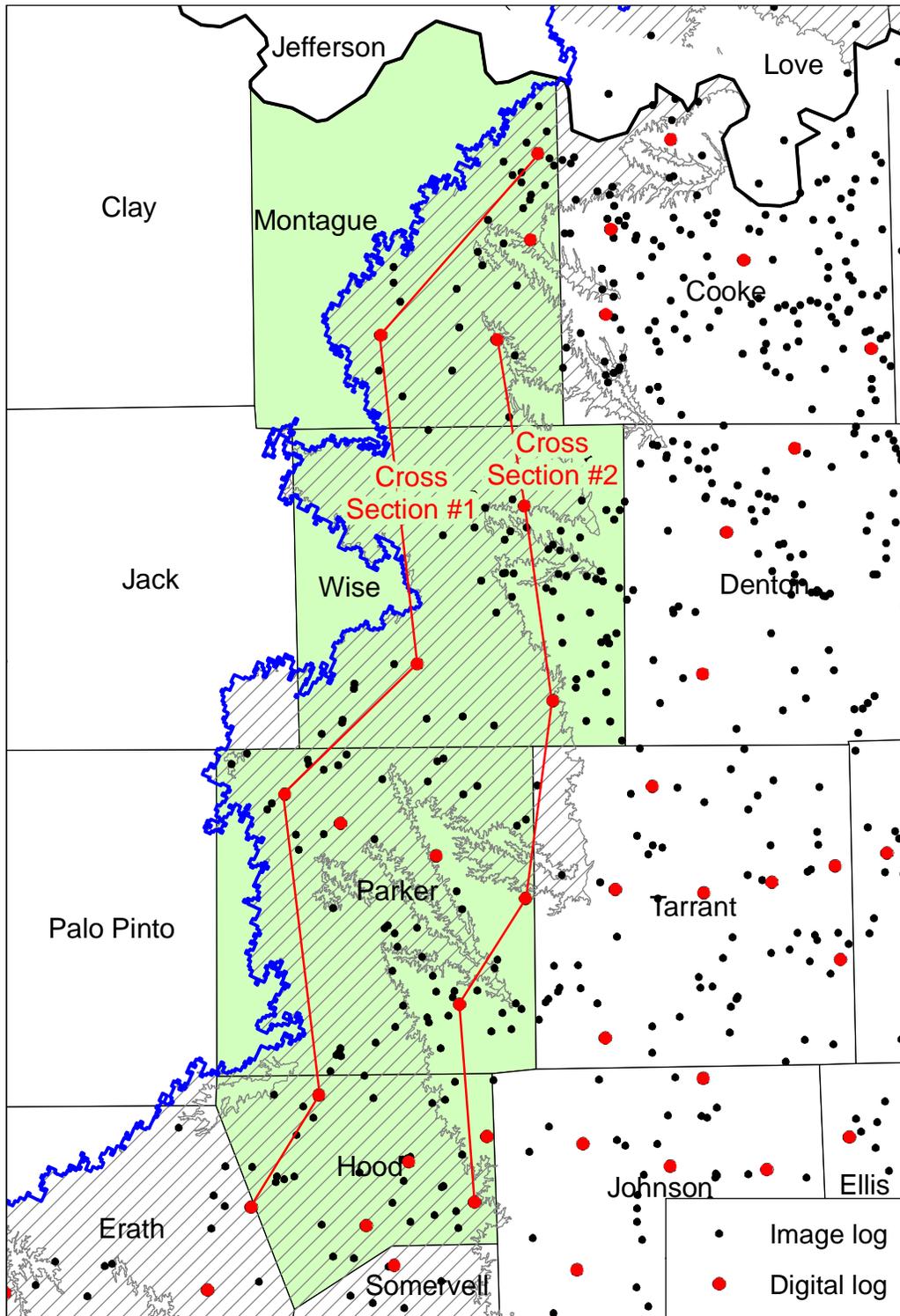
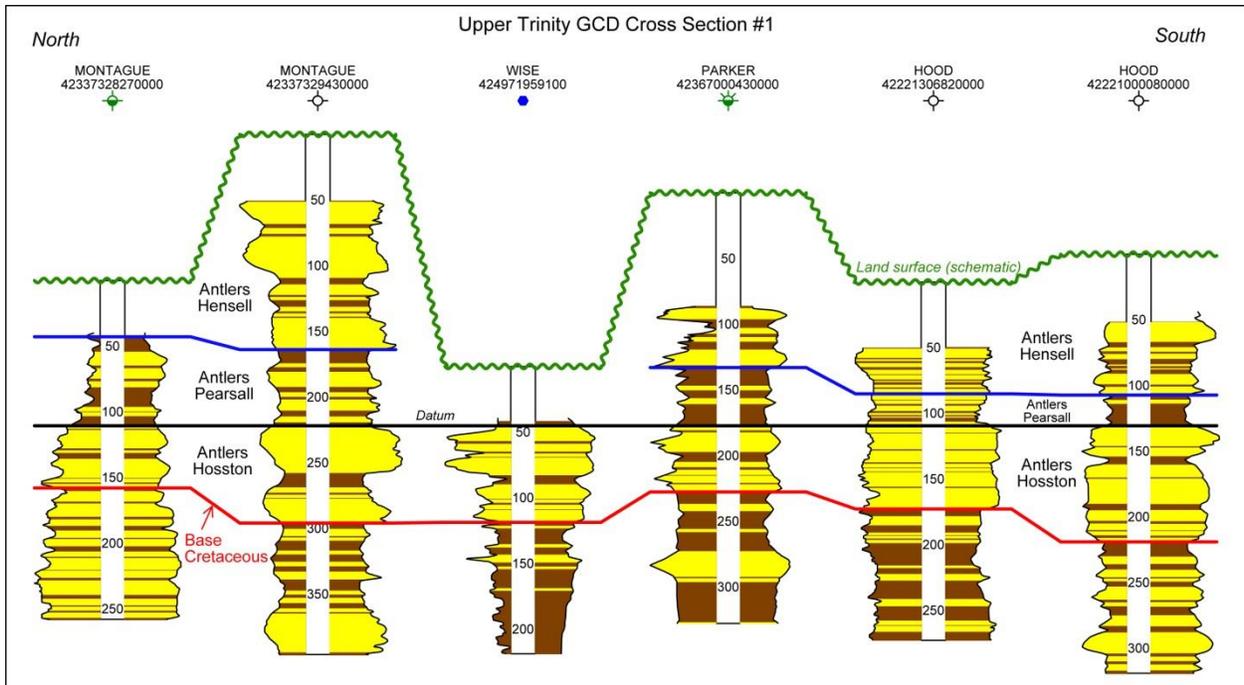


Figure C. Cross-section map for stratigraphic cross sections 1 and 2.



Yellow = greater than 50 percent sandstone, brown = greater than 50 percent shale

Figure D. Upper Trinity GCD digital cross section # 1 showing the hydrostratigraphy and lithology of the northern Trinity aquifer (datum is the top of the Hosston Aquifer to show stratigraphic relationships).

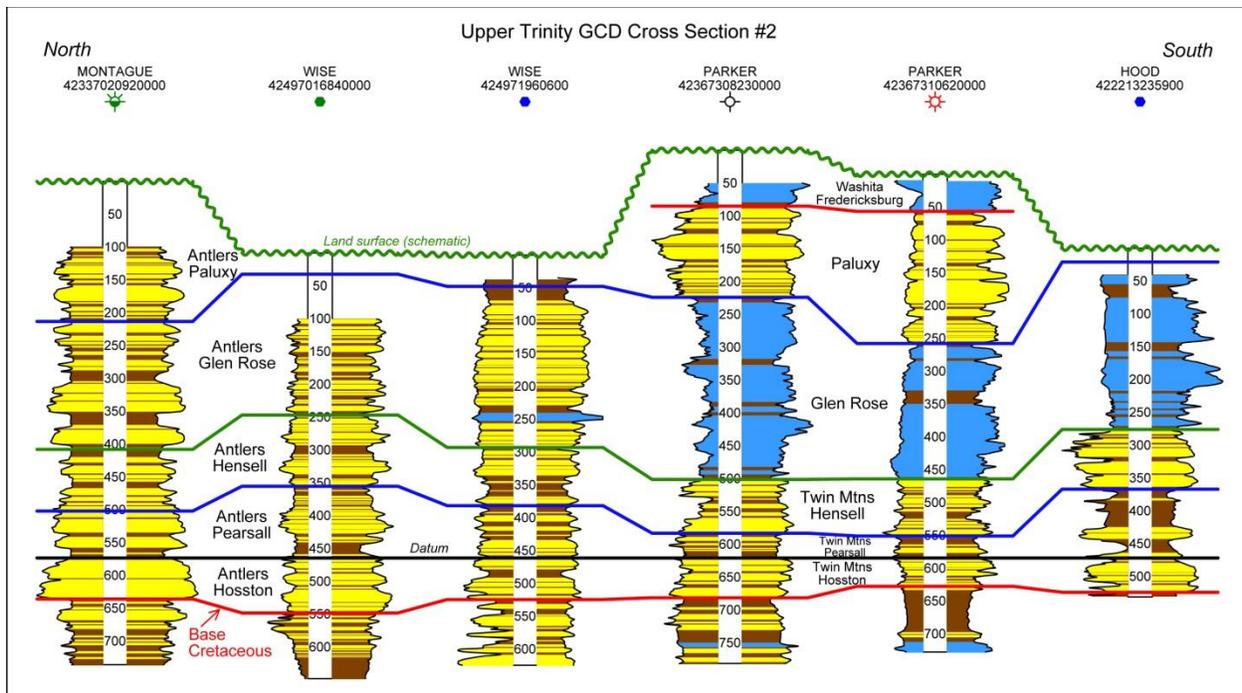


Figure E. District digital cross section # 2 showing the hydrostratigraphy and lithology of the northern Trinity aquifer (datum is the top of the Hosston Aquifer to show stratigraphic relationships).

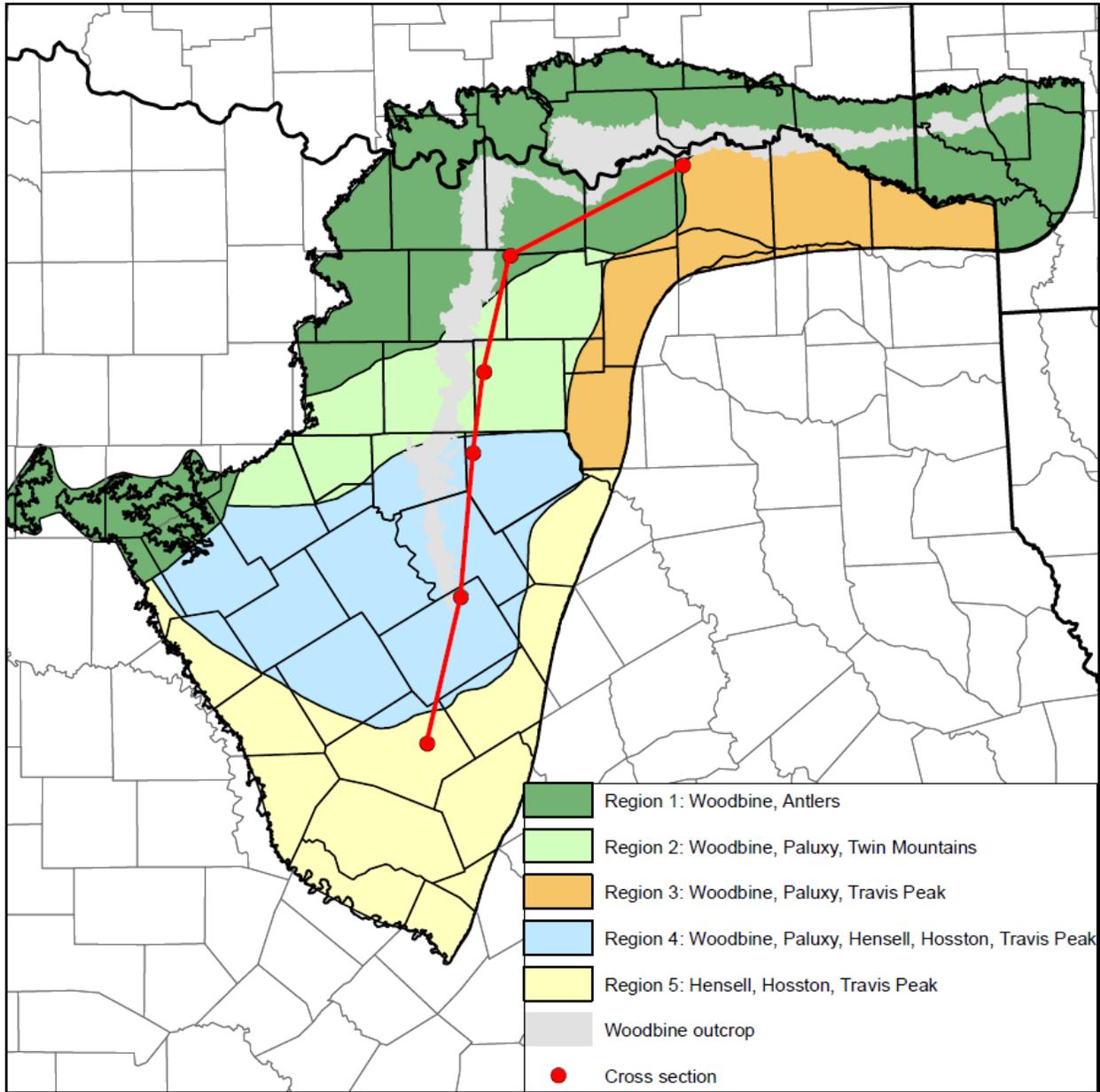


Figure F. Hydrogeologic Regions for the Trinity and Woodbine Aquifers.

Model Terminology	Region 1	Region 2	Region 3	Region 4	Region 5
Woodbine Aquifer	Woodbine	Woodbine	Woodbine	Woodbine	Woodbine (no sand)
Washita/ Fredericksburg Groups	Washita/ Fredericksburg	Washita/ Fredericksburg	Washita/ Fredericksburg	Washita/ Fredericksburg	Washita/ Fredericksburg
Paluxy Aquifer	Antlers	Paluxy	Paluxy	Paluxy	Paluxy (no sand)
Glen Rose Formation	Antlers	Glen Rose	Glen Rose	Glen Rose	Glen Rose
Hensell Aquifer	Antlers	Twin Mountains	Travis Peak	Hensell/ Travis Peak	Hensell/ Travis Peak
Pearsall Formation	Antlers	Twin Mountains	Travis Peak	Pearsall/ Sligo	Pearsall/ Sligo
Hosston Aquifer	Antlers	Twin Mountains	Travis Peak	Hosston/ Travis Peak	Hosston/ Travis Peak

Figure G. Chart showing model terminology and corresponding formation names and aquifer names in common to each region.

Appendix A.1 – District Monitoring Program

Table of Contents

1.0 Introduction.....	3
2.0 Development of a Hydrogeologic Framework for Management.....	5
2.1 Overview of District Hydrogeology	5
2.1.1 Geologic Setting	5
2.1.1 Trinity Aquifer	8
2.1.2 Paleozoic Aquifers	9
2.1.2 Alluvial Deposits	9
2.2 Approach for Development of the Hydrogeologic Sections.....	10
2.3 Subsurface Data Sources and Reference Material Reviewed	12
2.4 Review of the Hydrogeologic Framework as Defined by Cross-Sections.....	13
3.0 Development of the UTGCD Monitoring Strategy.....	27
3.1 Monitoring Plan Objectives and Goals.....	27
3.1.1 Chapter 36 of the Texas Administrative Code.....	27
3.1.2 Current or Future District Rules.....	28
3.1.3 Groundwater Management Plan.....	29
3.1.4 Fundamental Hydrogeologic Characterization of Aquifer Conditions	30
3.1.5 Summary of Monitoring Goals and Objectives	30
3.2 Monitoring Constraints	31
3.2.1 Number of Wells	31
3.2.2 Cost Constraints.....	31
3.2.3 Desired Future Condition and Basis	31
3.2.4 New Versus Existing Wells.....	34
3.3 Monitoring Strategy	34
3.3.1 Trinity Aquifer Monitoring Strategy	34
3.3.2 Paleozoic Aquifer Monitoring Strategy.....	36
References	38

List of Tables

Table 1. General Stratigraphy (Bené and others 2004; McGowen and others, 1967; 1972; Brown and others, 1972)	4
Table 2. Relationship Between District Trinity Aquifer Hydrostratigraphy and the Current Northern Trinity Aquifer GAM.	31
Table 3. Desired Future Conditions and Managed Available Groundwater for the Northern Trinity Aquifer in the District.	32

List of Figures

Figure 1. UTGCD Phase I Monitor Wells by Stratum and District Surface Geology	2
Figure 2. Principal Pre-Pennsylvanian structural features (after Brown et al. 1990).....	5
Figure 3. Cross-Section Base Map.....	9
Figure 4. Hydrogeologic Cross-Section A – A.....	13
Figure 5. Hydrogeologic Cross-Section B – B.....	14
Figure 6. Hydrogeologic Cross-Section C – C	15
Figure 7. Hydrogeologic Cross-Section D – D	16
Figure 8. Hydrogeologic Cross-Section E – E	17
Figure 9. Hydrogeologic Cross-Section F – F.....	18
Figure 10. Hydrogeologic Cross-Section G – G.....	19
Figure 11. Hydrogeologic Cross-Section H – H.....	20
Figure 12. Hydrogeologic Cross-Section I – I.....	21
Figure 13. Hydrogeologic Cross-Section J – J.....	22
Figure 14. Hydrogeologic Cross-Section K – K.....	23
Figure 15. Hydrogeologic Cross-Section L – L.....	24
Figure 16. Hydrogeologic Cross-Section M – M.....	25

1.0 Introduction

The District is undertaking the establishment of a monitor well network at key locations throughout the four counties to monitor water levels and aquifer conditions over time. The collection of District-scale hydrogeologic data such as water levels is key to the District's Mission and all resulting policies, management objectives and rules. Information from the well network will be assimilated along with groundwater production and use reports and estimates, well location and completion data, information on aquifer recharge rates and other hydrogeologic properties, and other information in a database that the District is continuing to develop to better understand and manage the groundwater resources of the area. Information gleaned from these efforts will be used by the District in the future establishment of desired future conditions (DFC) for the aquifers, in the monitoring of actual conditions of the aquifers, in the improvement of a future groundwater availability model (GAM), in making planning decisions, and in the development of permanent District rules that may include a permitting system for water wells.

The Upper Trinity Groundwater Conservation District (UTGCD) has completed Phase I of their Monitor Well Program. There are currently 108 wells identified by the UTGCD as monitor wells and the monitor well database contains a total of 146 wells. The District started quarterly monitoring of the Phase I monitoring network in the fourth quarter of 2010. **Figure 1** plots the wells in the UTGCD monitor well database along with the surface geology in the District. From a review of Figure 1 it can be seen that the distribution of wells both areally and by aquifer is not uniform across the District.

Building on the success of the Phase I monitor well network, the District recognized that the Phase I monitoring network and data collected to date must be evaluated in context to a monitoring strategy based upon meeting the management goals of the District. To this end, the District developed a set of goals for the Phase II monitoring plan which are listed below:

1. Analysis of all data collected to date including water levels and locations of the wells;
2. Expansion of the current monitoring program to collect data in locations not adequately represented in Phase I;
3. Determine appropriate layers of the District's aquifers that need study (including the Paleozoic);
4. Provide a model for the District's Board and staff to expand its monitoring program.

Based upon the stated objectives, INTERA developed a work scope for the performance of Phase II which is based upon a task structure comprised of five tasks. The five tasks are listed below:

- Task 1 – Development of a Hydrogeologic Framework for Management
- Task 2 – Development of a Monitoring Strategy
- Task 3 – Analysis of Phase I Monitor Wells and Collected Data
- Task 4 – Recommendations for Phase II Monitor Wells
- Task 5 – Phase II Monitor Well Survey and Initial Sampling

The task structure follows a sequential process by which the background data and the monitoring strategy (Tasks 1 and 2) are developed first. These are followed by Task 3 which is an assessment of the Phase I wells based upon the monitoring strategy laid out in Task 2. Based upon that analysis, the Phase I monitor well network will be augmented through the search for new monitor wells and potentially through the deletion of some Phase I wells considered of limited value. Finally, in Task 5 the new wells are brought into the network through a site visit, initial measurement and documentation.

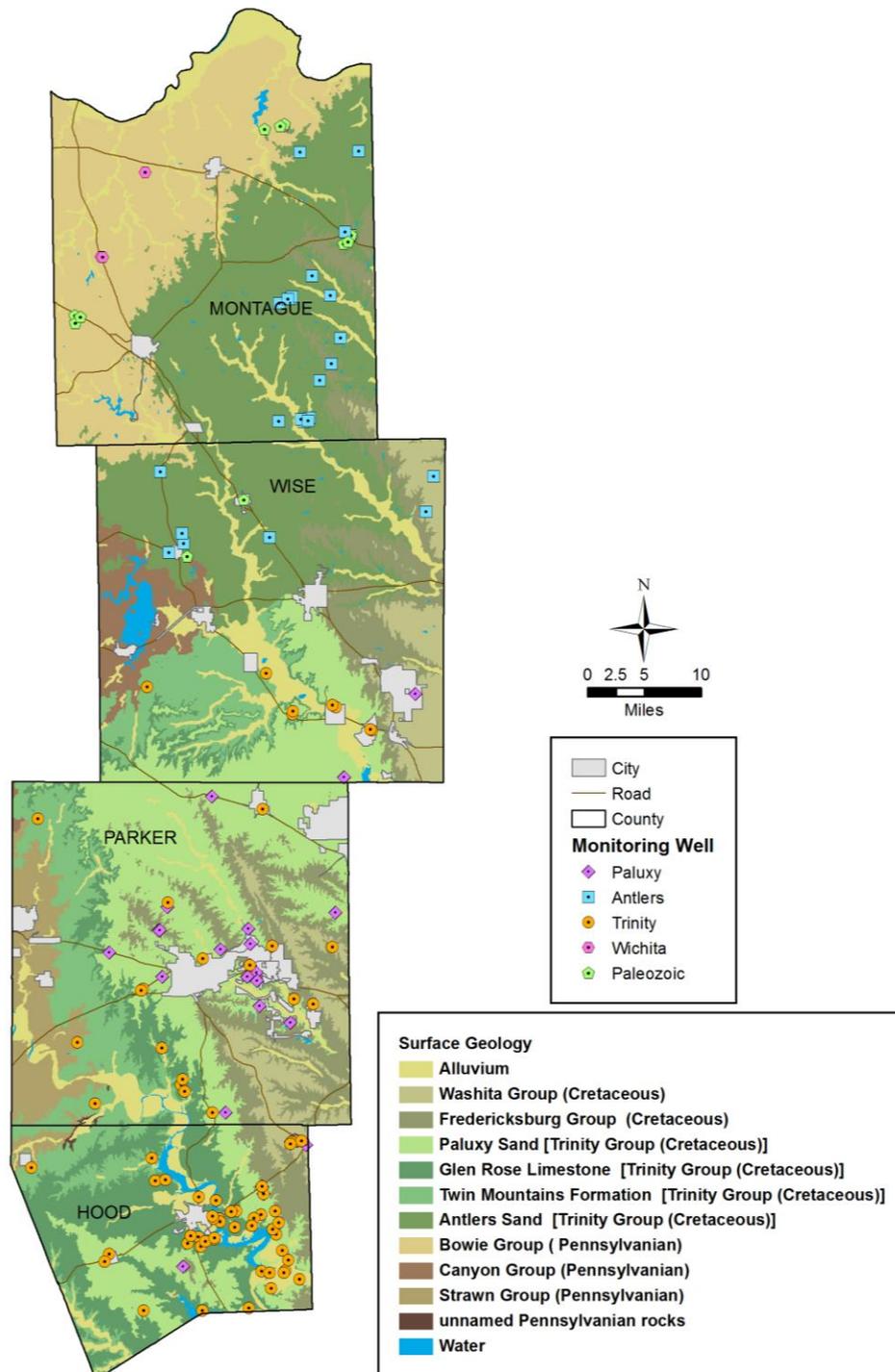


Figure 1. UTGCD Phase I Monitor Wells by Stratum and District Surface Geology.

This report is organized by chapters documenting each of the five tasks described above. This draft version of the report only documents efforts completed for Tasks 1 and 2. This document serves as the Task 1 and 2 milestone submittal. It has been delivered as an electronic file (pdf) and as a hard copy to promote comments from the Board and staff that can be used in the implementation of the remaining tasks.

2.0 Development of a Hydrogeologic Framework for Management

The objective of Task 1 is to develop an initial hydrogeologic framework for aquifer management within the District. Because the Paleozoic aquifer systems (Wichita, Bowie, Cisco and Canyon and Strawn Groups) are important in the District, this framework will include these aquifers as well as the Northern Trinity aquifer and associated formations as defined by the Texas Geologic Atlas Sherman and Dallas Sheets (McGowen et al., 1967; Barnes, 1972). The deliverable is a set of geologic cross-sections across the District. The geologic interpretations presented in this section are the product of Allan Standen (PG # 1227) in cooperation with INTERA personnel.

2.1 Overview of District Hydrogeology

Groundwater resources in the four counties making up the District include the Cretaceous-age Trinity Aquifer, several water-bearing units of Pennsylvanian- and Permian-age, referred to as the Paleozoic aquifers, and alluvial deposits (Figure 1). The Trinity Aquifer is recognized by the TWDB as a major aquifer in Texas. The Paleozoic aquifers are not recognized by the TWDB as either major or minor aquifers. No minor aquifers, as defined by the TWDB, are located in the District. The TWDB defines a major aquifer as one that supplies large quantities of water over large areas of the state and defines a minor aquifer as one that supplies relatively small quantities of water over large areas of the state or supplies large quantities of water over small areas of the state (Ashworth and Hopkins, 1995). A generalized stratigraphic section representative of the hydrogeology of the District is provided in **Table 1**. To properly design a monitoring network, one of the key components is an understanding of the hydrostratigraphic units which comprise the resource. This, in addition to an understanding of the groundwater use patterns by hydrostratigraphic unit (sub-aquifer), provides the data needed to make sure monitoring is occurring in the correct horizons. At this point, only the Trinity Aquifer has been considered in GMA-8 joint planning. However, the Paleozoic aquifer system which has not been included in the past must be for the next round of planning.

2.1.1 Geologic Setting

The oldest geologic units comprising aquifers in the District are the Paleozoic aquifers which are composed of fluvial-deltaic and fluvial deposits originating from the Ouachita and Arbuckle mountains to the north and east of the District. These deposits were influenced by deep-seated structural features which influenced deposition through Cretaceous time. **Figure 2** shows the principal pre-Pennsylvanian structural features in the District and areas to the west. Important features for District aquifers are the Muenster Arch in Montague County which is an area of faulting and uplift and the Mineral Wells Fault Zone which is in south Wise County. These features have been shown to impact deposition through the Pennsylvanian and Permian and possibly into the Cretaceous (Trinity Aquifer).

The Paleozoic aquifers within the District were deposited on the eastern shelf of the Permian Basin. The Paleozoic aquifers are composed of a sequence of fluvial-deltaic deposits. The Paleozoic aquifers in the District are comprised from oldest to youngest of the Strawn, Canyon, Cisco, Bowie and Wichita Groups. The age of the Paleozoic aquifers at surface tends to get older as one moves north through the District to the south. The Strawn Group is primarily a fluvial-deltaic system comprised of several sandstone units inter-layered with shales.

Table 1. General Stratigraphy (Bené and others 2004; McGowen and others, 1967; 1972; Brown and others, 1972).

System	Hydrogeologic Characteristic	Group	Formation		
			North	South	
	Water-Bearing		alluvial deposits		
Cretaceous	Confining Units (locally productive)	Washita	Weno Denton Fort Worth Duck Creek Kiamichi		
			Fredericksburg	Goodland	Edwards
	Walnut Clay	Comanche Peak			
	Aquifer	Trinity	Antlers	Walnut Clay	
				Paluxy	
				Glen Rose	
			Twin Mountains		
Permian	Water-Bearing	Wichita	Nocona		
		Bowie	Archer City Markley		
		Cisco	Thrifty and Graham, undivided		
Pennsylvanian	Water-Bearing	Canyon	Colony Creek Shale		
			Ranger		
			Ventioner		
			Jasper Creek		
			Chico Ridge Limestone		
			Willow Point		
	Water-Bearing	Strawn	Mineral Wells		
			Brazos River		
			Mingus		
			Buck Creek Sandstone		
			Grindstone Creek		
			Lazy Bend		

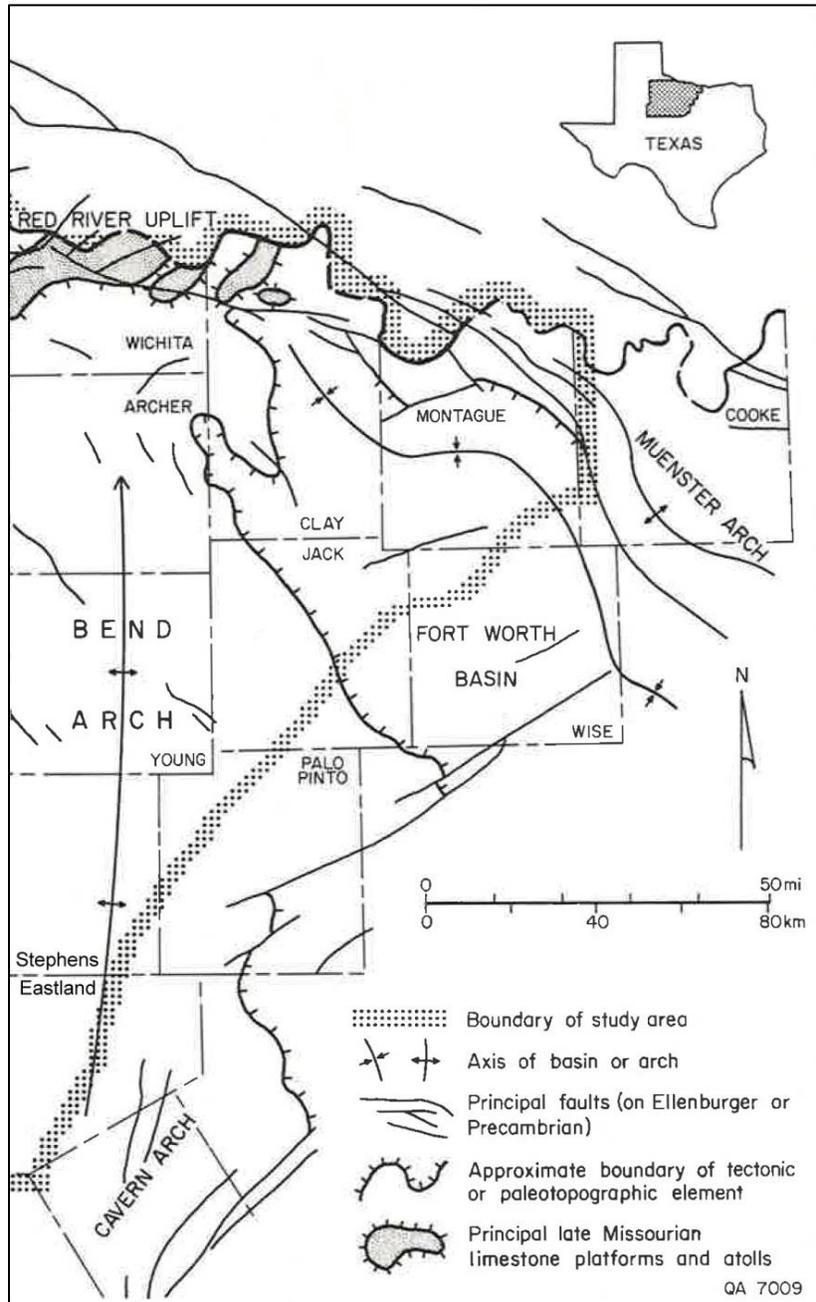


Figure 2. Principal Pre-Pennsylvanian structural features (after Brown et al. 1990)

The Canyon Group is a fluvial-deltaic system composed of sandstones and shales but which also has limestones reflecting a lower energy depositional environment. The Cisco Group is composed of fluvial-deltaic and marine deposits. The Cisco has many sandstone units that are poorly mapped because they are intermittent but has extensive limestone units (Brown et al., 1990). The Bowie Group represents a continental depositional facies and is typically composed of more coarse grained sediments than the underlying Cisco. The Wichita Group (Nocona Formation) is also a continental deposit and is composed of highly heterogeneous deposits of sand, gravel and shale. The Cretaceous Trinity Group unconformably overlies the Paleozoic aquifers system in the District, meaning that a period of erosion occurred after deposition of the Paleozoic aquifers and before the deposition of the Trinity aquifer. The Paleozoic aquifers generally dip in a westerly direction while the Cretaceous Trinity Group dips to the east-southeast. The Trinity Group was deposited from a sediment source feeding from the west and north into the East Texas Basin. Each of these aquifers will be discussed below.

2.1.1 Trinity Aquifer

The Trinity Aquifer, shown in Figure 1, is defined by the TWDB as a major aquifer composed of several individual aquifers contained within the Trinity Group. In the District, the Trinity Aquifer consists of the aquifers of the Paluxy Sand, the Glen Rose Formation, the Twin Mountains Formation, and the Antlers Formation. The Antlers Formation is the coalescence of the Paluxy and Twin Mountains formations north of the line where the Glen Rose Formation thins to extinction. This occurs approximately in central Wise County (Figure 1). The Cretaceous-age Fredericksburg and Washita Groups are generally considered confining units and they overlie the downdip portion of the Trinity Aquifer in the easternmost areas of the District.

The Paluxy Sand consists of sand, silt, and clay, with sand dominating. The sand and silts in the aquifer are primarily fine-grained, well sorted, and poorly cemented (Bené and others, 2004). Coarse-grained sand is found in the lower sections grading up to fine-grained sand with shale and clay in the upper section (Nordstrom, 1982). In general, natural groundwater flow in the Paluxy Sand is east to southeast (Langley, 1999). Wells completed into the Paluxy Sand typically yield small to moderate quantities of water that is fresh to slightly saline (Nordstrom, 1982). Where the Glen Rose Formation is absent, the Paluxy Sand is equivalent to the upper sands of the Antlers Formation (Baker and others, 1990).

The Glen Rose Formation consists primarily of limestone with some shale, sandy-shale, and anhydrite. In general, the aquifer yields small quantities of water in localized areas (Baker and others, 1990). Groundwater flow in the Glen Rose Formation is generally to the east and southeast.

The Twin Mountains Formation consists predominantly of medium- to coarse-grained sand, silty clay, and conglomerates. A massive sand is found in the lower portion of the formation while less sand is found in the upper portion of the aquifer due to increased interbedding of shale and clay (Nordstrom, 1982). In general, wells are primarily completed into the lower part of the aquifer. Where the Glen Rose Formation is absent, the Twin Mountains Formation is equivalent to the lower sands of the Antlers Formation (Baker and others, 1990). Typically, wells completed into the Twin Mountains Formation yield fresh and slightly saline water in moderate to large quantities (Nordstrom, 1982). Groundwater flow in this formation is generally to the east and southeast.

Typically, the Antlers Formation consists of a basal conglomerate and sand overlain by poorly consolidated sand interbedded with discontinuous clay layers (Nordstrom, 1982). Considerably more clay is found in the middle portion of the formation than in the upper and lower portions. Limestone is also found in the middle portion near the updip limit of the Glen Rose Formation. Generally, groundwater flow in the Antlers Formation is to the east and southeast. Well yield in the Antlers Formation is similar to that in the Twin Mountains Formation with downdip wells generally more productive than those in the outcrop areas.

2.1.2 Paleozoic Aquifers

Several Pennsylvanian- and Permian-age formations in the District are capable of producing usable quantities of groundwater. These formations are referred to collectively as the Paleozoic aquifers (see Figure 1). Literature regarding these formations is very limited and, therefore, information regarding their hydrologic characteristics is also limited. The Paleozoic aquifers are a significant source of groundwater in northern and western portions of Montague County, west-central Wise County, and western Parker County where the Trinity Aquifer is absent. Based on information in the TWDB groundwater database as of November 2009, the percentage of wells in the District completed into the Paleozoic aquifers is 78.2, 14.8, 5.4, and 0.0 percent for Montague, Wise, Parker, and Hood counties, respectively.

From youngest to oldest, the formations of the Wichita, Bowie, Cisco, Canyon, and Strawn groups make up the Paleozoic aquifers. The Wichita Group consists of the Nocona Formation (mudstone with sandstone and siltstone in thin lenticular beds throughout). The Bowie Group is composed of the Archer City Formation (predominantly mudstone with thin siltstone beds and sandstone) and the Markley Formation (mudstone with local thin beds of sandstone in upper portion and mudstone and shale with some coal and limestone below). The Cisco is comprised of the undivided Thrifty and Graham formations (predominantly mudstone and shale with thin sandstone beds and some sandstone sheets locally and two limestone members).

The underlying Canyon Group is comprised of the Colony Creek Shale (shale with some siltstone, local thin to medium beds of sandstone, and limestone lentils), the Ranger Limestone (predominantly limestone with local thin shale beds), the Ventioner Formation (shale and mudstone with numerous sandy and silty lenses and thin to medium beds), the Jasper Creek Formation (upper portion predominantly shale with thin siltstone beds throughout and isolated massive sandstone lenses and lower portion shale with thin limestone lentils and local thin and lenticular thick sandstone beds), the Chico Ridge Limestone (predominantly limestone with local shale beds), the Willow Point Formation (shale and claystone locally silty and sandy with local thin beds of sandstone and several limestone beds in lower portion and a single coal bed), and the Palo Pinto Formation (predominantly limestone and marl with some sandstone and shale and found west of the District). Sandstone lenses found in the Canyon Group are locally important to the occurrence of groundwater though are hard to map (Bayha, 1967).

The Strawn Group consists of the Mineral Wells Formation (shale containing local sandstone beds and a few limestone beds), the Brazos River Formation (sandstone with local lenses of conglomerate and mudstone), the Mingus Formation (sandy shale with one thin coal seam and some limestone beds), the Buck Creek Sandstone (sandstone), the Grindstone Creek Formation (shale, in part sandy, with local thin coal beds and sandstone lentils and limestone beds with some shale), and the Lazy Bend Formation (shale, in part sandy or silty, with local coal beds and limestone beds). While the Paleozoic aquifers are described as having many formations based upon outcrop, correlation of sandstone units in particular is very problematic in the subsurface.

The Paleozoic aquifers are the primary source of water in Montague County (Bayha, 1967) as indicated by the high percentage of wells completed into these aquifers in the county. Bayha (1967) indicates that groundwater is difficult to trace in these aquifers due to the complex depositional sequence.

2.1.2 Alluvial Deposits

Some alluvial deposits of Pleistocene to Recent age are capable of producing water in the District, especially along the Red River in Montague County and the Brazos River in Parker County. The majority of these sediments are stream deposits but some are of windblown origin. The alluvial deposits, consisting of sand, gravel, silt, and clay, yield small to large quantities of fresh water. Based on information in the TWDB groundwater database as of November 2009, the percentage of wells in the District completed into alluvial deposits is 10.0, 0.4, 3.0, and 0.1 percent for Montague, Wise, Parker, and Hood counties, respectively.

2.2 Approach for Development of the Hydrogeologic Sections

The construction of Paleozoic and Cretaceous formation cross-sections for the District required integration of subsurface information from numerous data sources and types. Available state agency published references (Texas Water Development Board (TWDB) and Bureau of Economic Geology (BEG)) were reviewed to identify and capture useful descriptions of stratigraphic marker beds and/or stratigraphic picks. The Sherman, Dallas and Abilene Geologic Atlas of Texas (GAT) sheets provided the geospatial distribution of the surface formation outcrops to connect with the top and base of subsurface picks.

The Paleozoic geologic surface outcrops are youngest in northern Montague County (Permian) and get progressively older (Pennsylvanian, Strawn) moving south into Parker County. Paleozoic rocks generally dip to the northwest-west at about 80 to 100 feet per mile. Over 1,000 scout tickets and cable tool driller's reports were screened to select wells with good location and Paleozoic (Permian and Pennsylvanian) formation top and base picks. A total of 40 locations with Paleozoic formation picks were selected for the created cross-sections. The number and geographic distribution of scout tickets and cable tool driller's reports decreased dramatically from Montague County south towards Hood County. Paleozoic formation top picks (Bowie Group, Gunsight Limestone, Canyon Group picks included the Home Creek, Ranger and Palo Pinto limestones and Strawn Group pick included the Caddo formation) were derived from the scout ticket and cable tool driller's reports which were compared with Paleozoic formation picks from BEG Report of Investigations 197, by Brown et. al., 1990. Formation picks from these two sources were compatible and in agreement.

The deeper Paleozoic picks for the Ranger, Palo Pinto and the Caddo formations are not illustrated in the constructed cross-sections because they were below the zone of interest for groundwater resources (upper 1,000 feet). However, these Paleozoic picks were used to construct subsurface formation surfaces. The geospatial subsurface thickness variations and extents of these Paleozoic formations are poorly known within the study area. Cross-section Paleozoic thicknesses in areas without data used outcrop thicknesses from the respective GAT sheets as a default.

Over 8,000 wells from the TWDB WIID website (groundwater database and submitted driller's reports) were screened by well depth (deepest) and the quality of the driller's reports lithologic description. A total of 102 driller's reports were selected to construct the cross-sections. Four Cretaceous formation top surfaces were mapped; the Paluxy Sand, Glen Rose Limestone, Twin Mountain Formation and the Antlers Sand. Cretaceous rocks generally dip to the east-southeast at about 40 to 60 feet per mile. A literature review of available older publications (Hendricks, 1957, Scott and Armstrong, 1932, Scott, 1930 and Stramel, 1951) as well as more recent publications (Baker, et. al., 1990, Duffin and Beynon, 1992, Harden, et al., 2004, Langley, 1999, McGowen et al, 1991 and Nordstrom, 1982) suggested that the Hensell and Hosston (aquifer units in the Travis Peak Formation) were not mappable geologic units within the study area. The older publications and the GAT sheet explanation provided detailed lithologic descriptions based on outcrops which were useful in the identification of formation tops and bases from the driller's report descriptions. The Hensell and Hosston were not positively identified within any of the 102 driller's reports which is consistent with the published geological reports in the area.

Brown, 1990 text and figures (1 and 6) provided general, structural subsurface guidance for the surface construction of the Paleozoic formations. A total of thirteen cross-sections (A - A' through M - M') were constructed for the District (see **Figure 3** for locations). The Paleozoic (Permian and Pennsylvanian Formations) interpretations in these cross-sections are based on very limited subsurface well data and should not be used or considered to replace or supersede more detailed regional structural studies. This study was intended to assist the District in understanding the stratigraphic framework and the designing of a water level monitoring system of their groundwater resources.

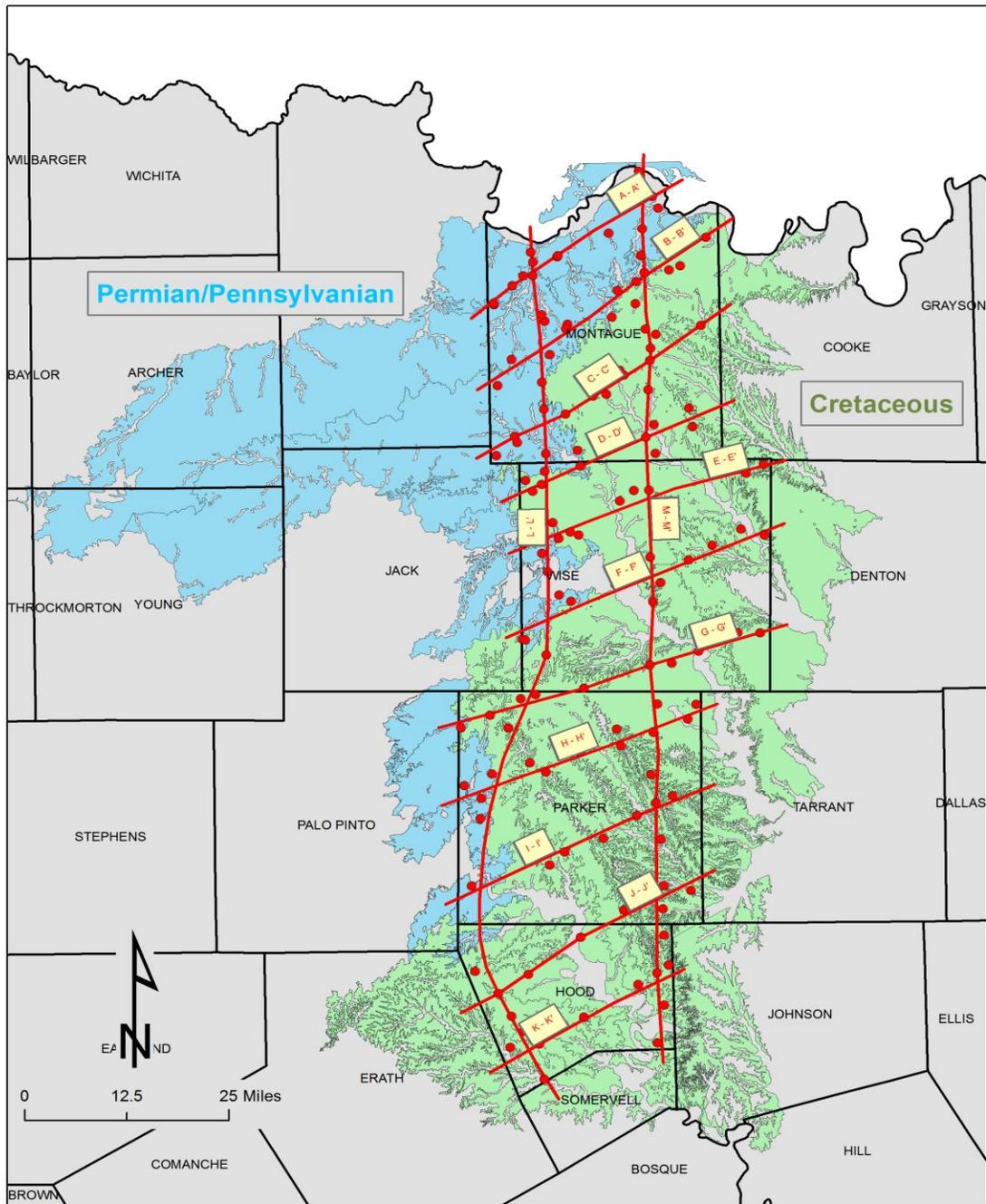


Figure 3. Cross-Section Base Map

2.3 Subsurface Data Sources and Reference Material Reviewed

Multiple subsurface data sources were investigated and used to construct the cross-sections for the UTGCD.

- The Bureau of Economic Geology (BEG) has a large collection of subsurface data including geophysical logs (1940's to present), scout tickets (1950's to 1990's) and cable tool driller's reports (1910 to 1960's).
- BEG publication, Brown et al, 1990, provided detailed information for the shallow Paleozoics in Montague County.
- UTGCD well data provided on CD.
- TWDB website (WIID) Texas Department of Licensing and Regulations (TDLR) submitted driller's reports (2001 to 2011) and groundwater well database driller's reports (1940s to present).
- University of Texas, Austin Thesis and Dissertations
- Texas Water Development Board (TWDB) publications

In addition to the subsurface data sources used to develop the correlations, many publications were reviewed for relevant information to help in the cross-section development and to understand the basic geology of the Trinity Aquifer and the Paleozoic Aquifers. The primary references reviewed include the following:

- Baker, B., Duffin, G., Flores, R., and Lynch, T., 1990, Evaluation of Water Resources in Part of North-Central Texas, Report 318, Texas Water Development Board, 67 p
- Bayha, D. C., 1967, Occurrence and Quality of Ground Water in Montague County Texas, Texas Water Development Board, Report 58, 102 p.
- Barnes, V. E., 1988, Dallas Sheet, Geologic Atlas of Texas, 1:250,000, Bureau of Economic Geology
- Brown, Jr., L. F., Goodson, J. L., Goodson, Harwood, P., and Barnes, V. E. Barnes, 2001, Abilene Sheet, Geologic Atlas of Texas, 1:250,000, Bureau of Economic Geology.
- Brown, L. F., Solis-Iriarte, R. F. and Johns, D. A., 1990, Regional Depositional Systems Tracts, Paleogeography and Sequence Stratigraphy, Upper Pennsylvanian and Lower Permian Strata, North and West Central Texas, Report of Investigations No. 197, Texas Bureau of Economic Geology, 27 plates, 116 p.
- Bullard, F. M. and Cuyler, R. H., 1930, A Preliminary Report on the Geology of Montague County, Texas, Bureau of Economic Geology, Part 1, pages 57 – 76.
- Duffin, G. L. and Beynon, B. E., 1992, Evaluation of Water Resources in parts of the Rolling Prairies of North-Central Texas, Report 337, Texas Water Development Board, 93 p.
- Harden, R. W. & Associates, Freese & Nichols Inc., HDR Engineering Inc., LBG-Guyton Associates, USGS, and Yelderman, J. Jr., 2004, Northern Trinity / Woodbine Aquifer Groundwater Availability Model, prepared for Texas Water Development Board, 391 p.
- Hendricks, L., 1957, Geology of Parker County, Bureau of Economic Geology, Publication Number 5724, 67 p.
- Langley, L., 1999, Updated Evaluation of Water Resources in Part of North-Central Texas, Report 349, Texas Water Development Board, 72 p.
- McGowen, J. H., Hentz, T. F., Owen, D. E., Pieper, M. K., Shelby, C. A. and Barnes, V. E., 1991, Sherman Sheet, Geologic Atlas of Texas, 1:250,000, Bureau of Economic Geology
- Nordstrom, P. L., 1982, Occurrence, Availability and Chemical Water Quality of Ground Water in the Cretaceous Aquifers of North Central Texas, Volumes 1 and 2, Report 269, Texas Water Development Board.
- Scott, G. and Armstrong, J. M., 1932, The Geology of Wise County, The University of Texas, Bulletin 3224, pages 5 – 73.

2.4 Review of the Hydrogeologic Framework as Defined by Cross-Sections

Each of the thirteen cross-sections is depicted in Figures 4 through 16 and each will briefly be discussed below.

- A – A' (Figure 4)** - Cross-section has a southwestern to northeastern strike which parallels the outcrops of the Permian Archer City and Nocona formations. These Paleozoic formations possibly have been deformed by the Muenster Arch in the northeastern half of this cross-section.
- B – B', (Figure 5)** - Cross-section has a southwestern to northeastern strike which parallels the outcrops of the Permian Archer City and the Bowie Group Markley formations and includes the easterly dipping Cretaceous Trinity Aquifer, Antlers Formation. The Paleozoic formations possibly have been deformed by the Muenster Arch in the northeastern half of this cross-section.
- C – C', (Figure 6)** - Cross-section has a southwestern to northeastern strike which parallels the outcrops of the Bowie Group Markley Formation and includes the easterly dipping Cretaceous Trinity Aquifer, Antlers Formation.
- D – D', (Figure 7)** - Cross-section has a southwestern to northeastern strike which approximately parallels the outcrops of the Bowie Group Markley and Thrifty and Graham formation and includes the easterly dipping Cretaceous Trinity Aquifer, Antlers Formation.
- E – E', (Figure 8)** - Cross-section has a southwestern to northeastern strike which approximately parallels the outcrops of the Canyon Group undivided (Ventioner Formation) and includes the easterly dipping Cretaceous Trinity Aquifer, Antlers Formation.
- F – F', (Figure 9)** - Cross-section has a southwestern to northeastern strike which approximately parallels the outcrops of the Canyon Group undivided (Jasper Creek Formation) and includes the easterly dipping Cretaceous Trinity Aquifer, Antlers Formation transitioning into the Twin Mountain Formation. This cross-section is just north of the Mineral Wells – Newark East Fault system.
- G – G', (Figure 10)** - Cross-section has a southwestern to northeastern strike which approximately parallels the outcrops of the Strawn Group Mineral Wells Formation and includes the easterly dipping Cretaceous Trinity Aquifer, Twin Mountain Formation and overlying Paluxy Formation. This cross-section is in very close proximity and parallels the Mineral Wells – Newark East Fault system.
- H – H', (Figure 11)** - Cross-section has a southwestern to northeastern strike which approximately parallels the outcrops of the Strawn Group Mineral Wells and Brazos River formations and includes the easterly dipping Cretaceous Trinity Aquifer, Twin Mountain Formation and overlying Paluxy Formation.
- I – I', (Figure 12)** - Cross-section has a southwestern to northeastern strike which approximately parallels the outcrops of the Strawn Group Grindstone Creek and Lazy Bend formations and includes the easterly dipping Cretaceous Trinity Aquifer, Twin Mountain Formation and overlying Paluxy Formation.
- J – J', (Figure 13)** - Cross-section has a southwestern to northeastern strike and includes the easterly dipping Cretaceous Trinity Aquifer, Twin Mountain Formation and overlying Paluxy Formation
- K – K', (Figure 14)** - Cross-section has a southwestern to northeastern strike and includes the easterly dipping Cretaceous Trinity Aquifer, Twin Mountain Formation and overlying Paluxy Formation.
- L – L', (Figure 15)** - Cross-section has a north to south strike on the western side of the District. The Paleozoic formations (Permian and Pennsylvanian) seem to form a basin in this region of the District with the Paleozoic Formations becoming shallower to the south.
- M – M', (Figure 16)** - Cross-section has a north to south strike on the eastern side of the District. This section also shows a potential sub-basin in the Paleozoic formations (Permian and Pennsylvanian) with the formations becoming shallower to the south. General locations of the Muenster Arch and Mineral Wells – Newark East Fault system are noted in the cross-section.

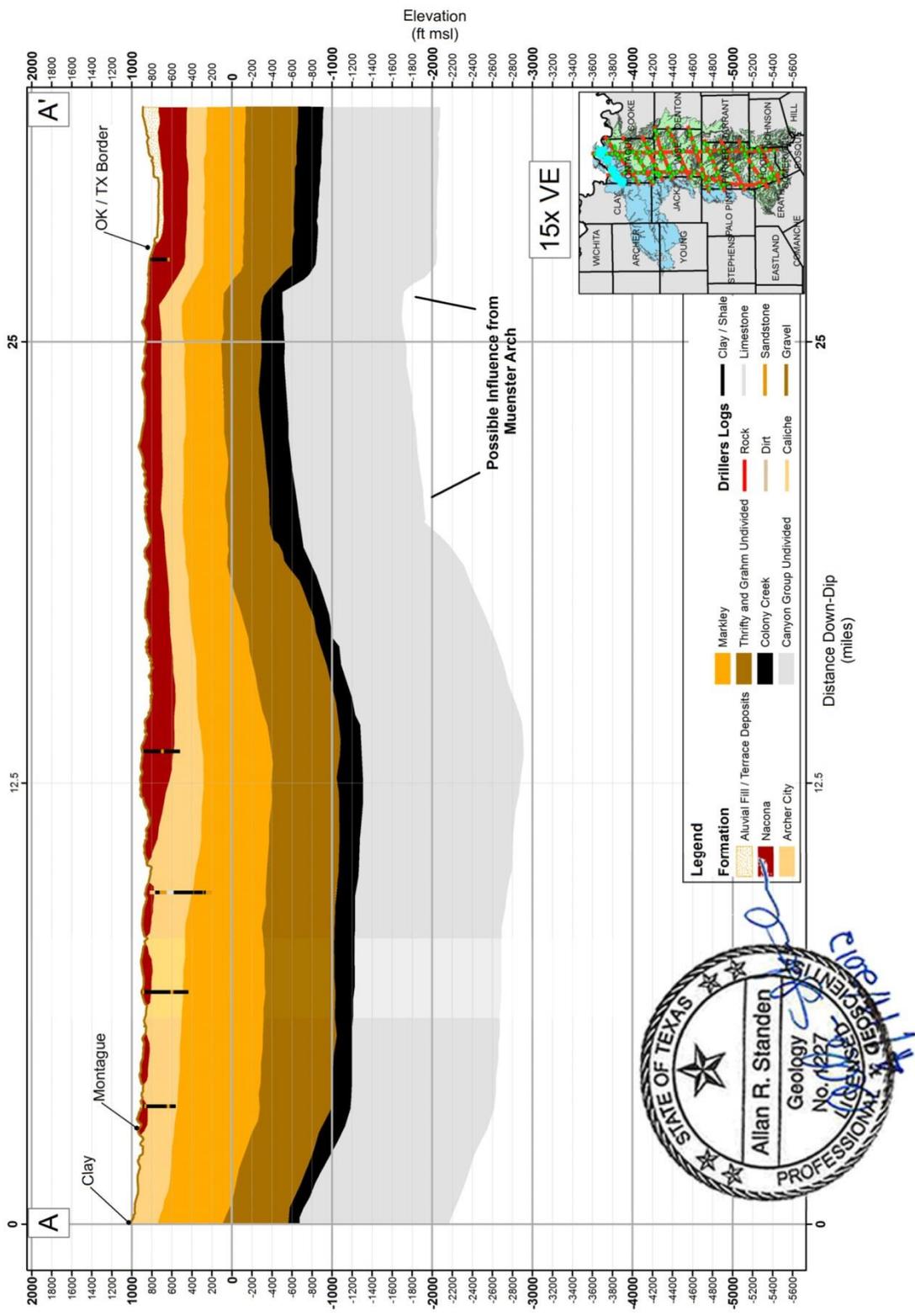


Figure 4. Hydrogeologic Cross-Section A – A.

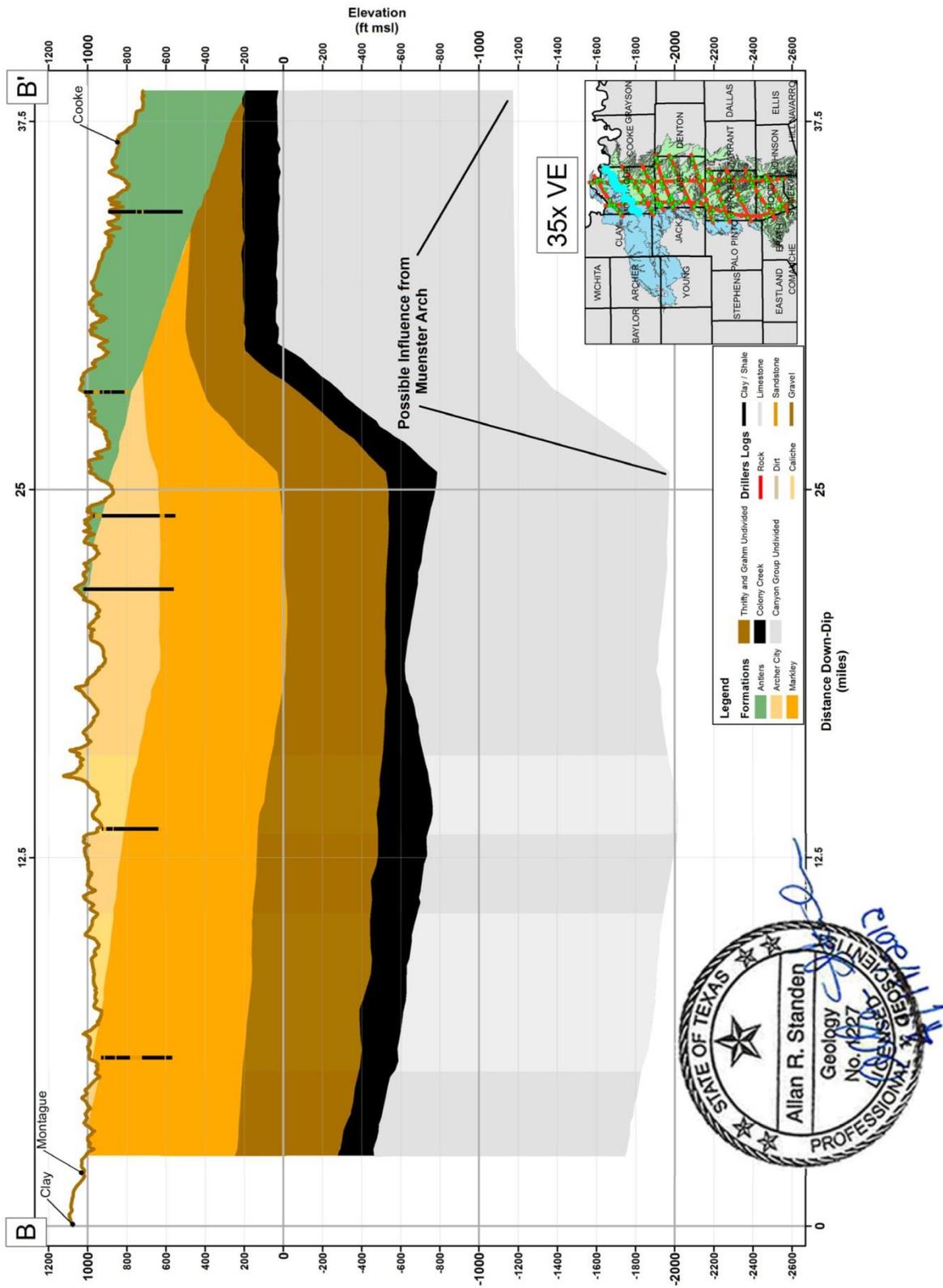


Figure 5. Hydrogeologic Cross-Section B – B.

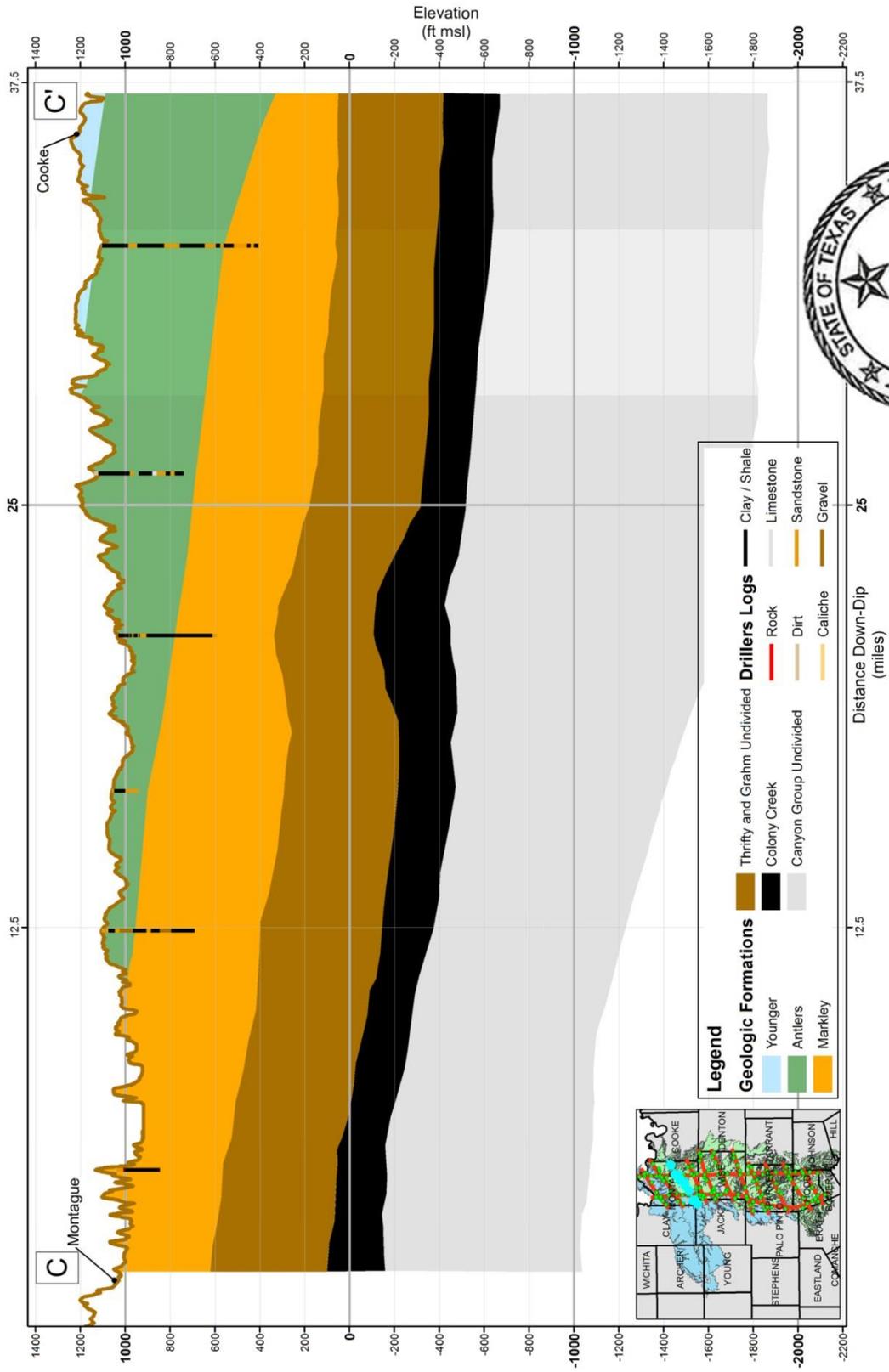


Figure 6. Hydrogeologic Cross-Section C – C.

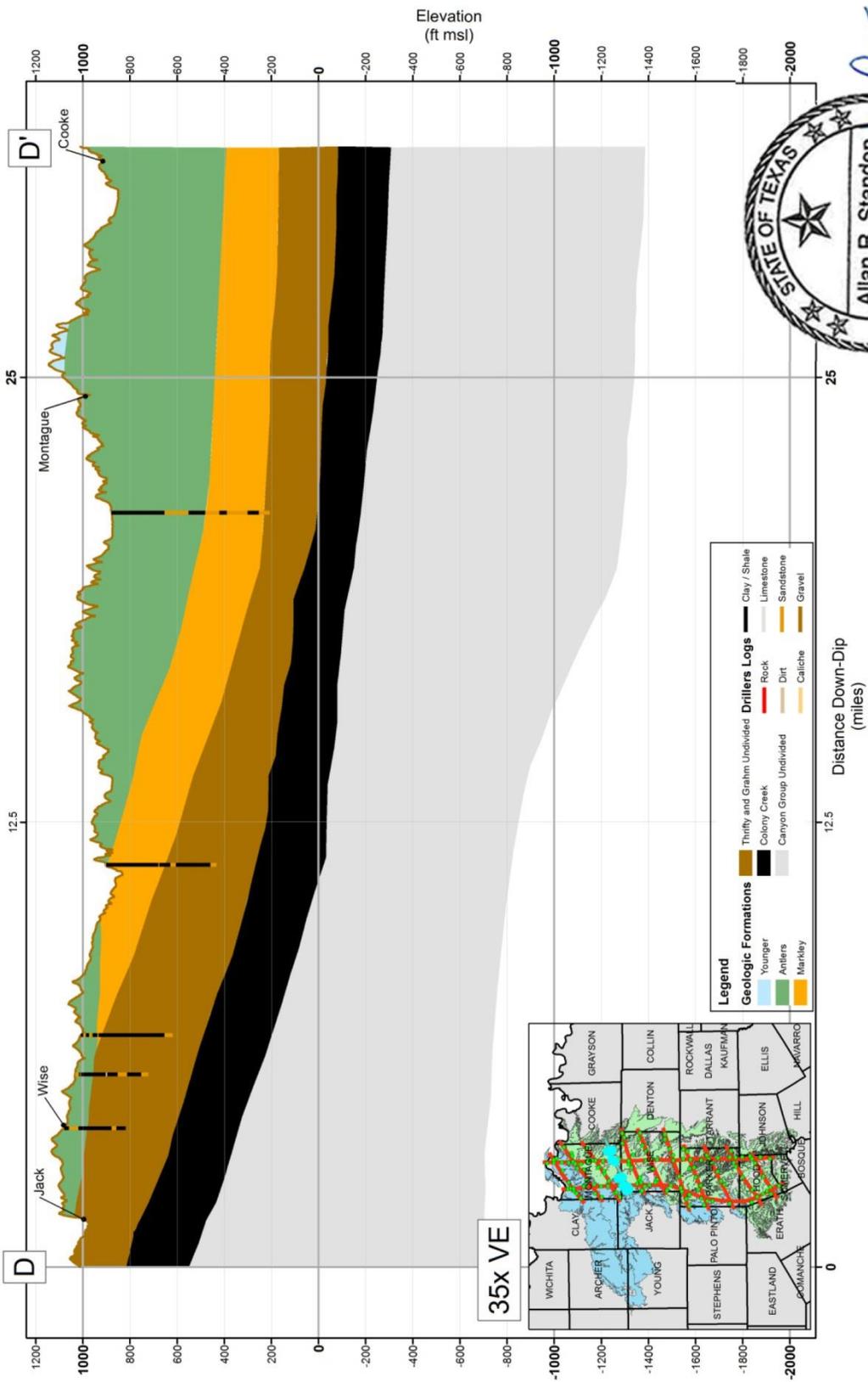


Figure 7. Hydrogeologic Cross-Section D – D.

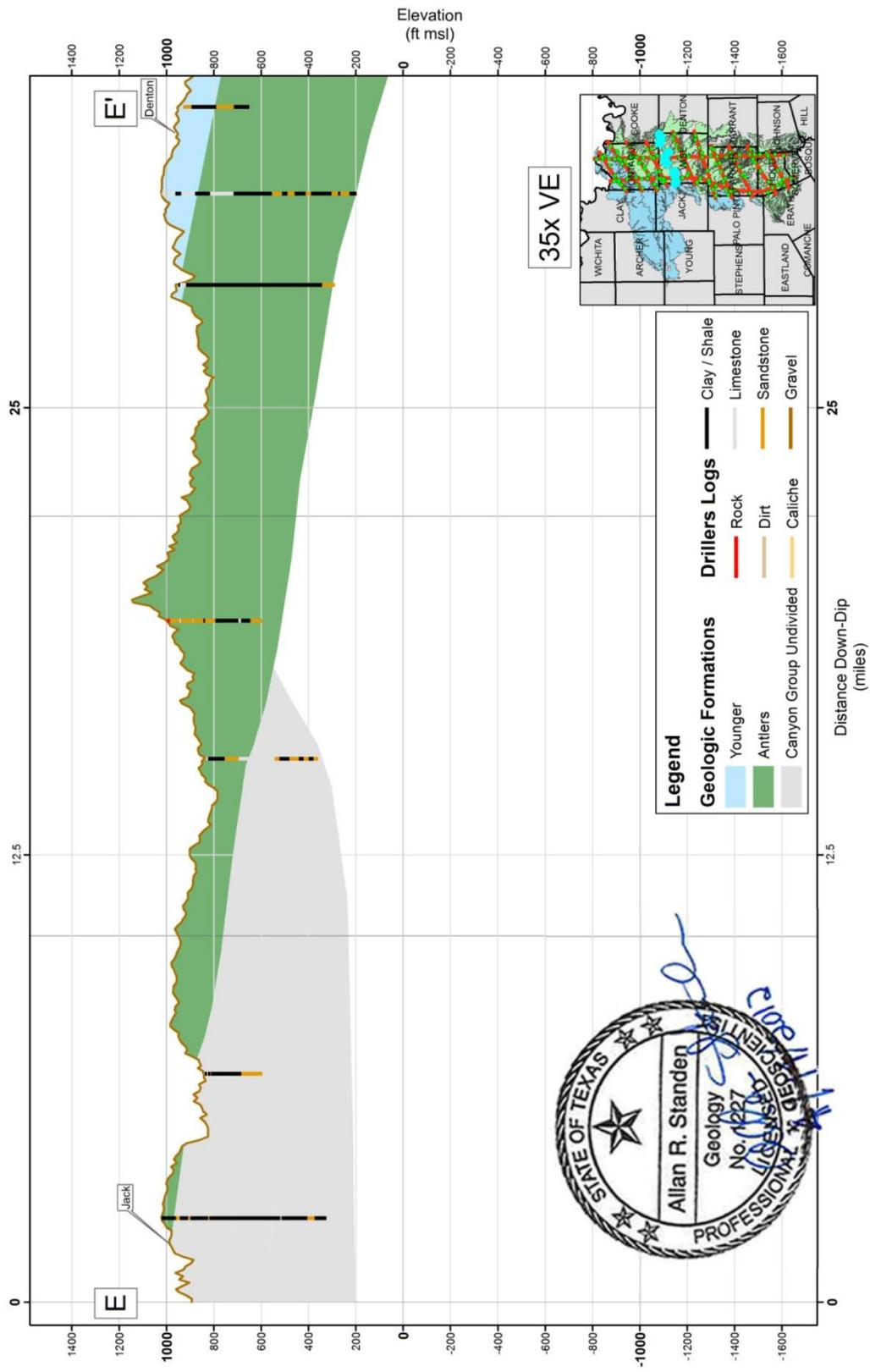


Figure 8. Hydrogeologic Cross-Section E – E'.

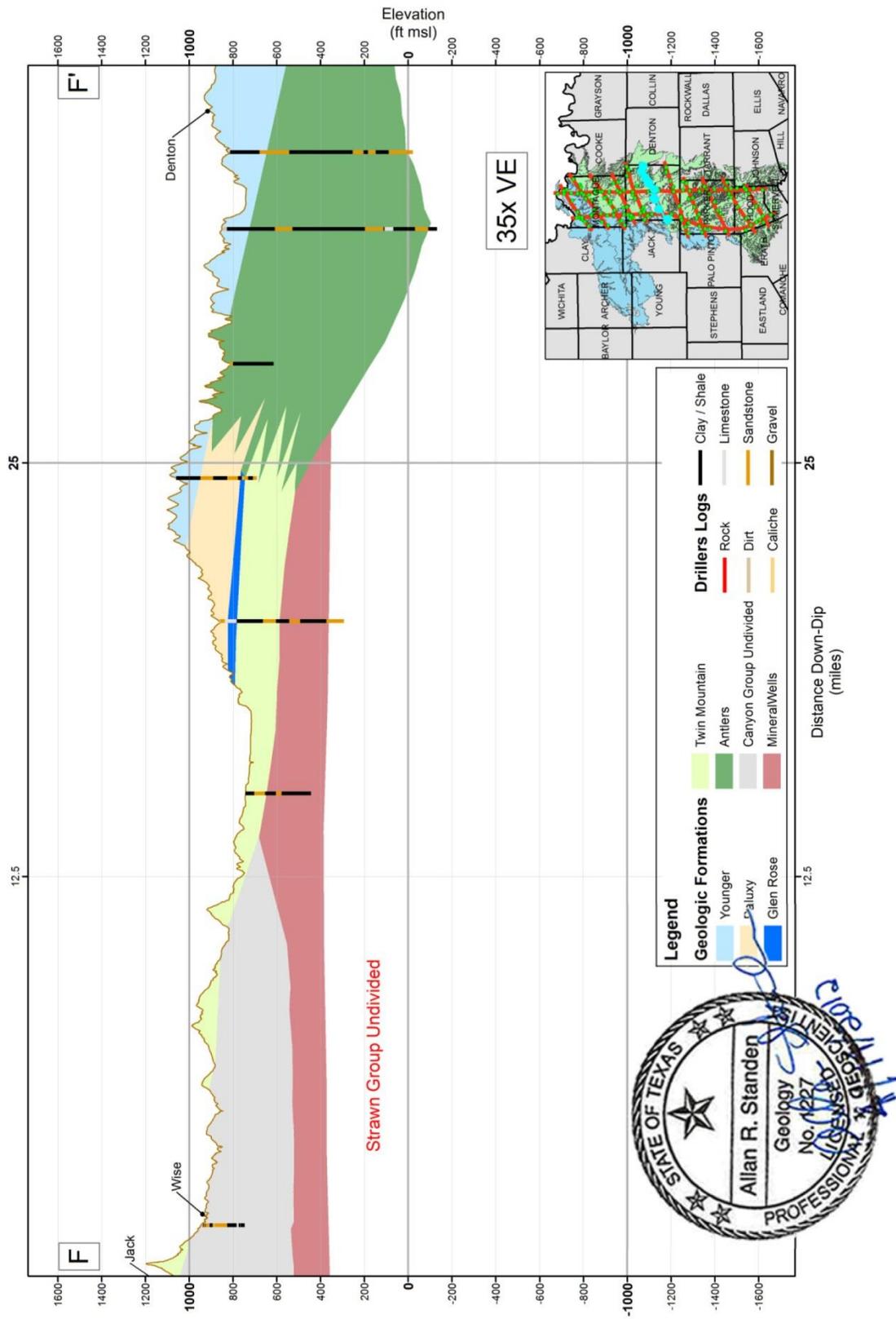


Figure 9. Hydrogeologic Cross-Section F – F.

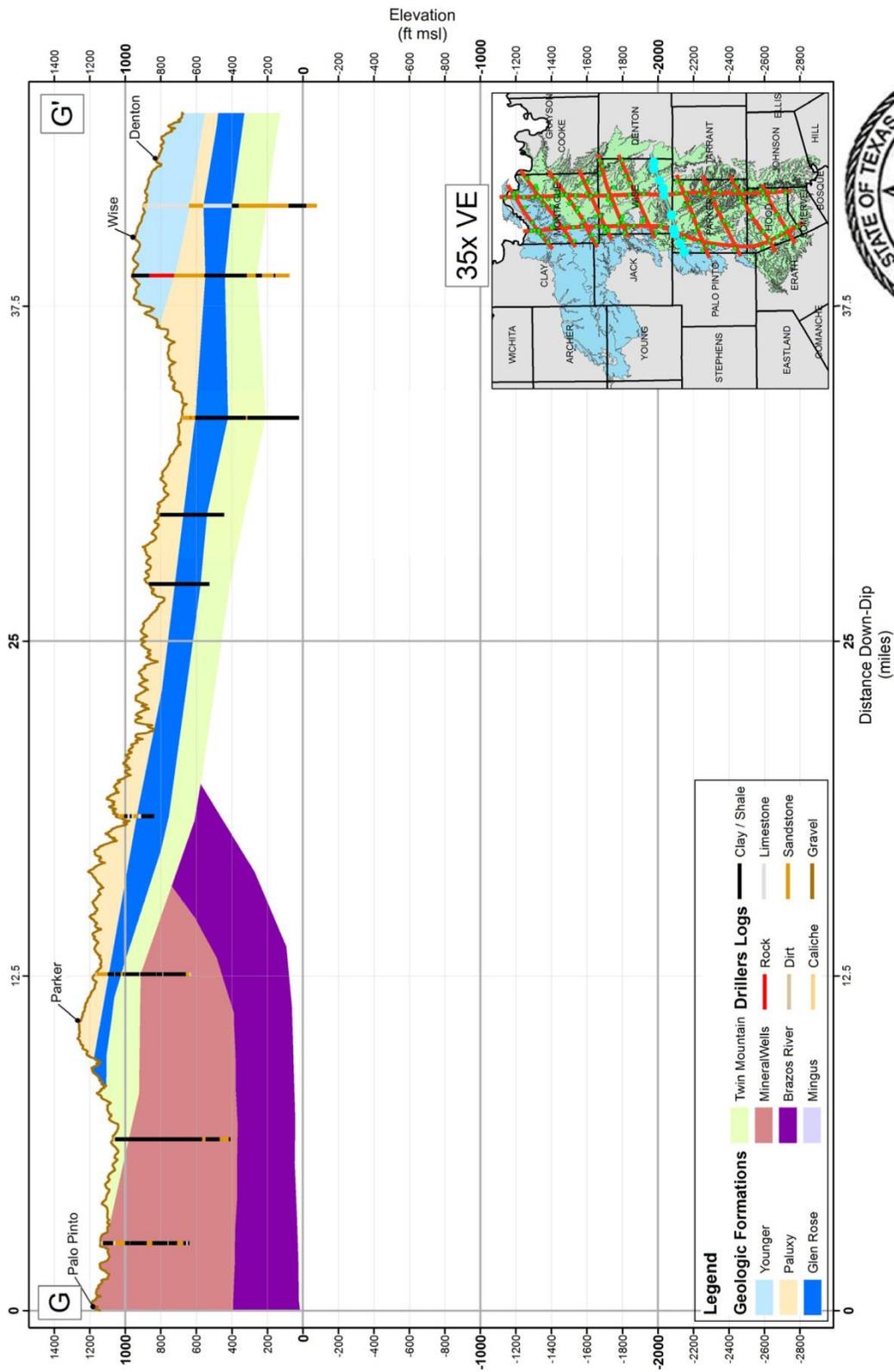


Figure 10. Hydrogeologic Cross-Section G – G.

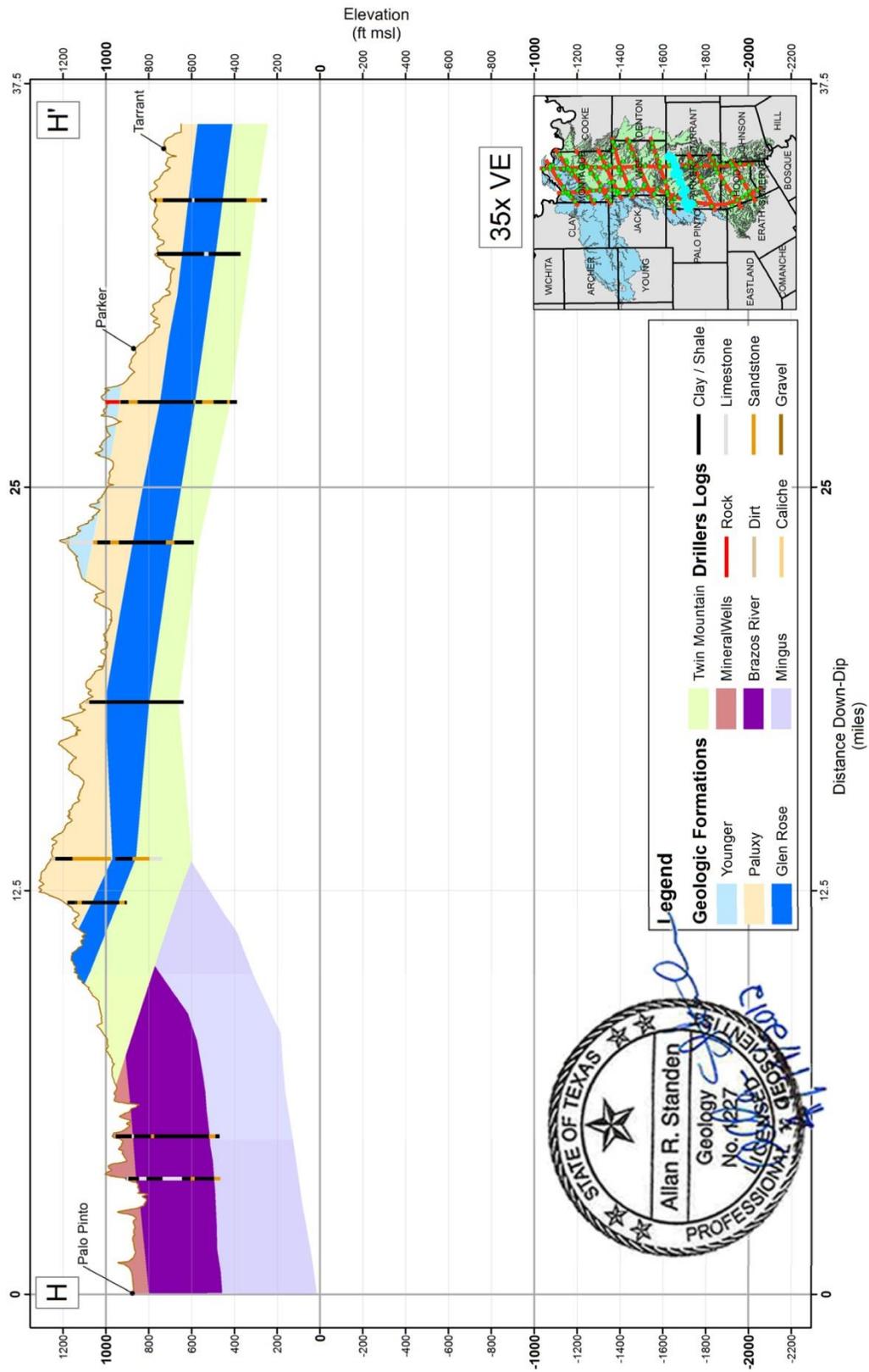


Figure 11. Hydrogeologic Cross-Section H – H'.

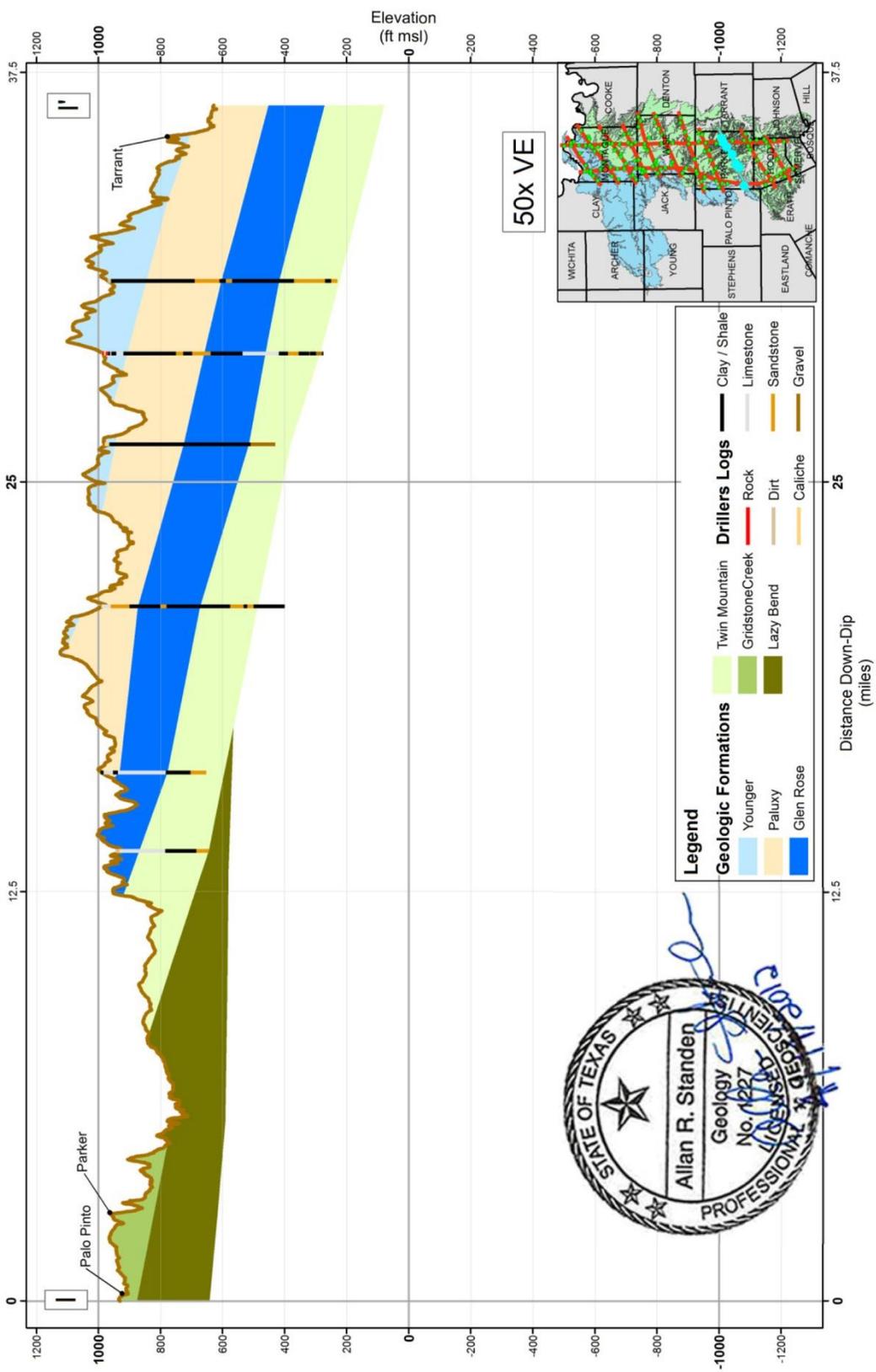


Figure 12. Hydrogeologic Cross-Section I - I.

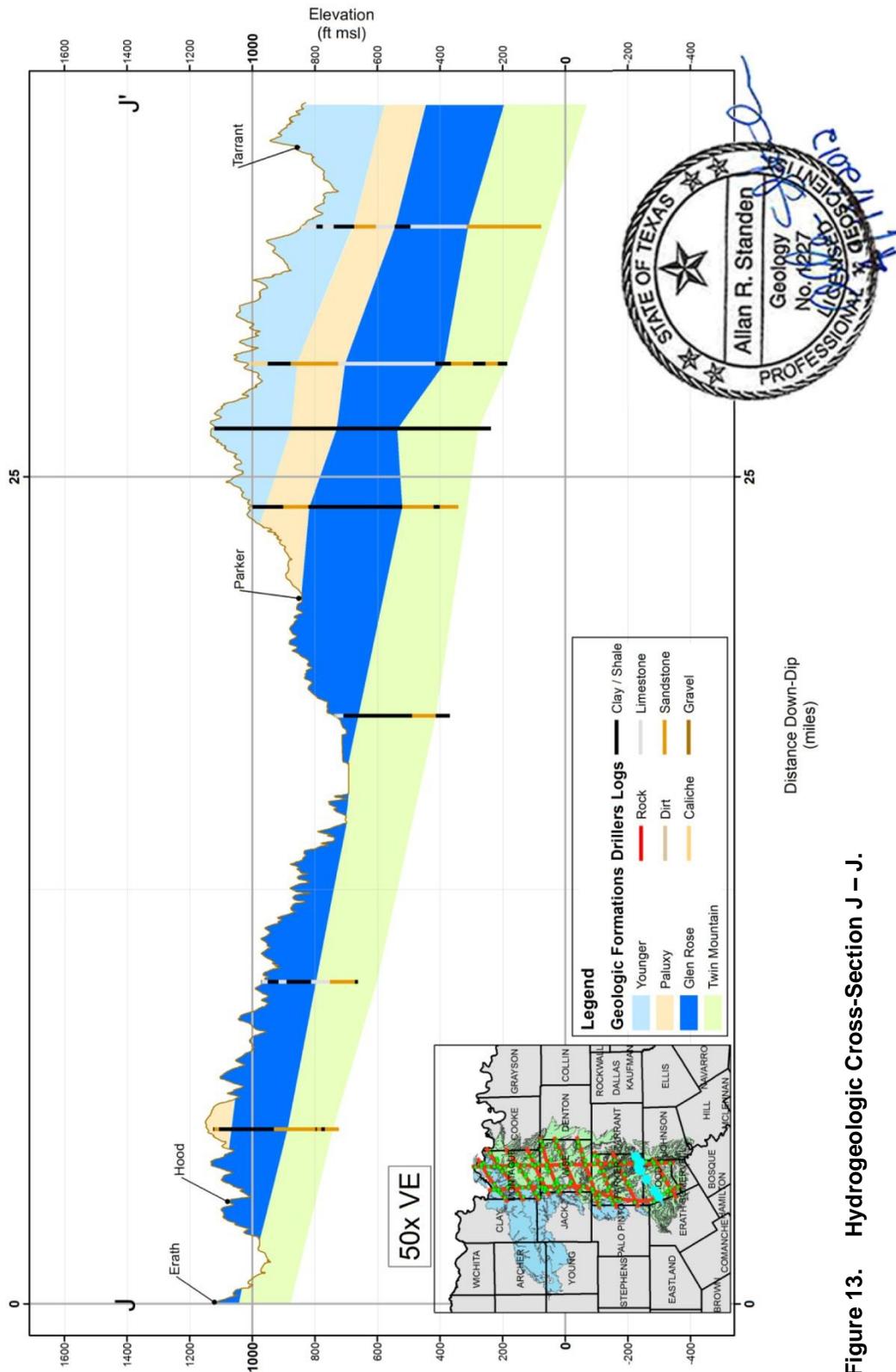


Figure 13. Hydrogeologic Cross-Section J – J.

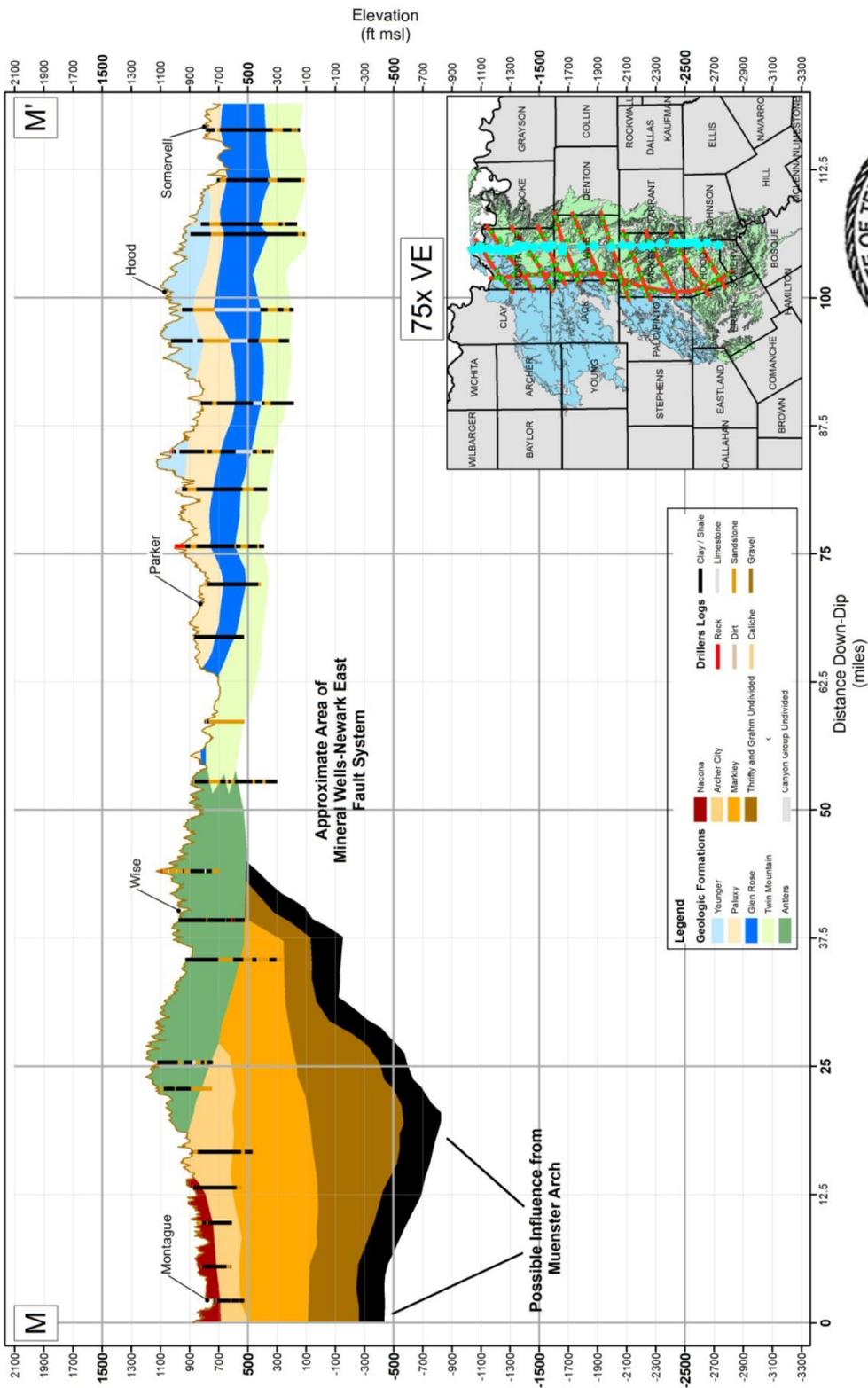


Figure 16. Hydrogeologic Cross-Section M – M.

3.0 Development of the UTGCD Monitoring Strategy

The purpose of Task 2 is to document a monitoring strategy for the District that defines the objectives and goals of the monitoring network, provides a context for evaluating Phase I monitor wells, and helps guide the expansion of the monitoring network in Phase II. The process of developing the monitoring strategy has been divided into three primary activities:

- Refine monitoring plan objectives and goals;
- Define monitoring constraints, if they exist; and
- Develop the strategy for expansion of the monitor well network and program

These activities are documented in this section.

3.1 Monitoring Plan Objectives and Goals

There are many objectives that can be defined for a monitoring program, derived from several separate but overlapping requirements of a District. In our review of the potential monitoring requirements, it was determined that monitoring objectives could be derived from several sources including:

- Chapter 36 (The Water Code) of the Texas Administrative Code;
- Current and future District rules;
- Groundwater Management Plan; and
- Fundamental hydrogeologic characterization of aquifer conditions.

A review of the requirements that precipitate monitoring will be followed by a list of potential monitoring objectives.

3.1.1 Chapter 36 of the Texas Administrative Code

At a fundamental level, all monitoring requirements are derived from the statute defining the Groundwater Conservation Districts (TAC 36).

TAC 36.101 – Rulemaking Authority - Under TAC 36.101 the District has the authority to develop rules. The District is still in the early stages of its development of a comprehensive system to manage the groundwater resources located within its boundaries. The District is acutely aware that the path it ultimately pursues for the permitting and regulation of water wells may have a significant impact on the manner in which water is provided to support human, animal, and plant life, land development, public water supplies, commercial and industrial operations, agriculture, and other economic growth in the District. The District Board takes its responsibilities very seriously with regard to these decisions and the impacts they may have on the property rights of the citizens of the District, and desires to undertake its approach to the development of a permitting and regulatory system in a careful, measured, and deliberate manner. In that regard, the District is determined to accumulate as much data and information as is practicable on the groundwater resources located within its boundaries before developing permanent rules and regulations that would impose permitting or groundwater production regulations on water wells.

The District began its initial studies and analysis of the aquifers and groundwater use patterns in early 2008 in an attempt to both catch up with then-ongoing discussions regarding the development of desired future conditions of the aquifers by the existing groundwater conservation districts in GMA-8, and to develop some baseline information on which decisions could be made for the development of temporary rules governing water wells. In August 2008, the District adopted its first set of temporary rules, which pioneer the District’s information-gathering initiative. The District recognizes that the collection of District-scale hydrogeologic information such as groundwater levels, stratigraphy and hydraulic properties is critical to making sound policy and

rules. As a result, both the Phase I and Phase II Monitoring Programs are being developed to support these fundamental requirements of the District.

TAC.36.1071 - Management Plan - The 75th Texas Legislature established a comprehensive regional and statewide water planning process in 1997. A critical component of that far-reaching overhaul of the Texas' water planning process included a requirement that each groundwater conservation district develop a management plan that defines the water needs and supply within each district and defines the goals the district will use to manage the groundwater in order to meet the stated needs or demonstrate that the needs exceed available groundwater supplies. Information from each district's management plan is incorporated into the regional and state water plans. The management plan is also used as the basis for the development of the district's permitting and groundwater management rules. A key component of the management plan is the establishment of a set of performance standards and management objectives which the District will use to demonstrate that they are achieving management goals set forth in the plan.

TAC.36.108 - Joint Planning in Management Area - This statute requires joint planning among districts located within the same Groundwater Management Area ("GMA"). Among other activities conducted pursuant to this joint planning process, the districts within each GMA must establish desired future conditions for all relevant aquifers located in whole or in part within the GMA. The desired future conditions established through this process are then submitted to the Texas Water Development Board ("TWDB"), which is required to provide each district with estimates concerning the amount of groundwater that can be produced from each relevant aquifer annually within each county located in the GMA in order to achieve the desired future conditions established for each aquifer. This quantified annual water budget for each aquifer is known as the "Modeled Available Groundwater" or "MAG" amount. Chapter 36 requires that technical information, such as the desired future conditions of the relevant aquifers within a district's jurisdiction and the amount of managed available groundwater from such aquifers, be included in the district's management plan. In addition, it is a requirement of the District to be able to demonstrate that they are achieving the DFC which can only be done through a monitoring program.

Other key aspects of this statute that are relevant to monitoring include the ability for a District to consider aquifer conditions and how they may vary geographically across a District. Statute TAC.36.108.D-1(1) states that districts can set DFCs differently in each aquifer, subdivision of an aquifer or geologic strata. This allows the District to adopt dissimilar regulatory approaches for wells completed in separate aquifers or in different geographic regions of the District, in order to address critical areas or to otherwise tailor regulations that are more suitable for a particular aquifer or area. For example, groundwater management strategies employed for the outcrop of the aquifer may differ from those utilized in subcrop areas. This regulatory flexibility may be appropriate to a District but requires hydrogeologic data including monitoring data to define these portions of the aquifer that may warrant such treatment.

3.1.2 Current or Future District Rules

In August 2008, the District adopted its first set of temporary rules, which pioneer the District's information-gathering initiative. Among other things, the rules require most large wells to be registered with the District, have meters installed to record the amount of groundwater produced, and submit records of the amounts produced to the District. Large well owners are also required to submit fee payments to the District based upon the amount of groundwater produced.

In addition, all new wells are required to be registered with the District and comply with the minimum well spacing requirements of the District. The minimum well spacing requirements were developed by the District to try to limit the off-property impacts of new wells to existing registered wells and adjoining landowners. They include minimum tract size requirements, spacing

requirements from the property line on the tract where the well is drilled, and spacing requirements from registered wells in existence at the time the new well is proposed. The spacing distances were developed through hydrogeologic modeling of the varying sizes of the cones of depression of various well capacities, and such distances naturally increase with increases in well capacities. The District's spacing requirements should go a long way toward limiting well interference problems between new wells and between new and existing wells.

The District's monitoring network can be assimilated with groundwater production and use reports and estimates, well location and completion data, information on aquifer recharge rates and other hydrogeologic properties, and other information, in a database that the District is developing to enable it to better understand and manage the groundwater resources of the area. Information gleaned from these efforts will be used by the District in the future in the establishment of desired future conditions for the aquifers, in the monitoring of actual conditions of the aquifers and calibration of modeled conditions, in making planning decisions, and in the development of permanent District rules. These rules may include a permitting system for water wells and the potential for managing the District aquifers in a series of management zones recognizing the potential variability within the aquifers and their use.

3.1.3 Groundwater Management Plan

The Groundwater Management Plan provides several policy statements or management goals and performance standards that relate to the District Monitoring Plan. Specifically, the District's Mission statement states that the District will manage groundwater in a fair and equitable manner such that availability and accessibility of groundwater will remain for future generations. In addition the statement explicitly provides a desire to protect the quality of the groundwater in the recharge zone of the aquifer. This mission statement implies an understanding of the conditions of the aquifer (both water levels and water quality) that can only be accomplished through a deliberate monitoring program.

In the goals, management objective and performance standards section of the Management Plan the District sets specific goals and objectives specific to monitoring to comply with 31TAC(a)(1)(H) ((Implementing TWC §36.1071(a)(8)). These are reproduced below.

- F.1 Objective - Within 3 years of Groundwater Management Plan adoption develop a Groundwater Monitoring Program within the District.
- F.1 Performance Standard - Upon development, attachment of the District Groundwater Monitoring Program to the District's Annual Report to be given to the District's Board of Directors.
- F.2 Objective - Upon approval of the District Monitoring Program – conduct water level measurements at least annually on groundwater resources within the District.
- F.2 Performance Standard - Annual evaluation of water-level trends and the adequacy of the monitoring network to monitor aquifer conditions within the District and comply with the aquifer resources desired future conditions. The evaluation will be included in the District's Annual Report to be given to the District's Board of Directors. (See Table 5, in the main document)
- F.3 Objective - Monitor non-exempt pumping within the District for use in evaluating District compliance with aquifer desired future conditions.

- F.3 Performance Standard - Annual reporting of groundwater used by non-exempt wells will be included in the Annual Report provided to the District's Board of Directors. (See Table 2 in the main document)

3.1.4 Fundamental Hydrogeologic Characterization of Aquifer Conditions

In addition to the requirements of monitoring described above, the management of groundwater implies groundwater monitoring and the collection of hydrogeologic data to characterize groundwater conditions. These generally support all of the implied or explicit objectives or requirements for monitoring and basic data collection defined in the preceding three sections. The objectives which may be classified as supporting hydrogeologic characterization include:

- Characterize current baseline groundwater levels in aquifers within the District;
- Characterize trends in aquifer levels in the District;
- Characterize hydraulic gradients within the District, i.e.:
 - Horizontal within aquifers
 - Vertical between aquifers
- Identify aquifers or aquifer zones that may respond distinctively to development and thus may be candidates for different management rules, e.g.:
 - Shallow versus deep (unconfined versus confined)
- Characterize aquifer response to pumping;
- Quantify available groundwater in the District;
- Identify areas susceptible to drought or significant drawdown from increased pumping during drought;
- Monitor aquifer water quality and trends in water quality, e.g.:
 - Isotopic fingerprinting of methane and other higher hydrocarbons (C₂-C₆) in areas of intense fracturing operations
 - Characterization of brackish resources in the District
- Identify zones prone to surface contamination;
- Estimate recharge;
- Estimate groundwater and surface water interaction.

3.1.5 Summary of Monitoring Goals and Objectives

From the review of potential monitoring objectives and requirements provided in the sections above, one can conclude that there are many reasons for monitoring, many of which overlap. All of these monitoring objectives are worthy of consideration and relevant to the management of groundwater resources. While all identified objectives may be considered given the general mission statement for the District, it makes sense to prioritize the most important objectives above those that are not required through rule, statute or Management Plan requirements.

We consider the following monitoring objectives to be most important because they are either implicitly or explicitly required based upon the District's rules or Management Plan.

- Establish current baseline groundwater levels in aquifers within the district;
- Establish trends in aquifer levels in the District;
- Define unique aquifer areas that could be established as separate groundwater management areas and therefore be handled differently in future rules, e.g.:
 - Shallow versus deep
 - Aquitards versus Aquifers
 - Paleozoic aquifer system versus the Trinity aquifer
- Provide adequate information to define future DFCs both in the Trinity and the Paleozoic Aquifers;

- Better inform what is sustainable pumping
- To be used to develop a better groundwater availability model
- Provide a means for definition of Desired Future Conditions within the district and a method for compliance demonstration.

There are several other monitoring requirements that are likely important to the District but may be of lower priority. These could include:

- Establish water quality within the District and trends in water quality;
- Determine areas prone to water quality degradation;
- Determine areas prone to drought to perhaps assist in drought planning;
- Provide a basis for drought management planning and drought impacts on groundwater conditions; and
- Define the base of freshwater in the District as well as the extent of brackish resources;
- Monitor the base of useable water as defined by the Railroad Commission, especially in areas of high density oil and gas exploration and production;
- Develop some isotope signature data in the deep aquifers in areas of high density oil and gas exploration and production;
- Monitor recharge in the shallow unconfined aquifer systems;
- Monitor aquifer levels at the borders of the District to define potential impacts from pumping outside of the District.

3.2 Monitoring Constraints

There are several constraints that one may consider applicable to the expansion of an existing monitoring network. These may include:

- Staff resources available to monitor network (number of wells);
- Costs associated with monitoring (number of wells);
- Current DFC and inherent assumptions and
- New versus existing wells.

Each of the more important constraints to our analysis will be described in the following sections.

3.2.1 Number of Wells

There exists a physical limit as to the number of wells that District staff can visit in a quarter and measure water level while still performing their other duties. This constraint has been brought up with the Board and the General Manager and at this time it is the District's opinion that they could double the number of wells in the current network. For purposes of this analysis, we are assuming that another 80 wells could be brought into the network in addition to those currently in the network. This number could change as we go through the analysis phase of this study. It is also assumed that the resources required to manage the larger network are available to current District staff.

3.2.2 Cost Constraints

It will be assumed that costs associated with the addition of 80 monitor wells will be acceptable from a District perspective. In addition, we will assume that each existing well will require an equal resource commitment for sampling.

3.2.3 Desired Future Condition and Basis

The current Northern Trinity Aquifer DFC is based upon the Northern Trinity GAM (Bené and others, 2004). In the GAM, the Trinity Aquifer is divided into four model layers generally representing the dominant hydrostratigraphy of the Trinity Aquifer in Central and North-Central

Texas; the Upper Trinity (Paluxy and Glen Rose aquifers), the Middle Trinity (Hensell aquifer) and the Lower Trinity (Hosston aquifer). The GAM models the Paluxy aquifer as model layer 3, the Glen Rose aquifer as model layer 4, the Hensell aquifer as model layer 5, and the Hosston aquifer as model layer 7. Model layer 6 represents the Pearsall/Cow Creek/Hammett members of the Travis Peak Formation, which are conceptualized as a confining unit. The relationship between these model layers and the hydrostratigraphy in the District is illustrated in **Table 2**. Table 2 shows that the GAM layering is inconsistent with the District hydrostratigraphy and this discrepancy becomes worse as one moves into the Antlers Formation in the Northern parts of the District. The Hensell and Hosston aquifers are generally not defined in the District but are combined as the Travis Peak Formation. As one moves north of the middle of Wise County, the Glen Rose (model layer 4) also becomes unidentifiable as a distinct unit and is generally lumped with the Antlers Formation. In regions of the District north of Decatur, the entire Trinity Aquifer sequence is generally mapped as the Antlers Formation.

Because the GAM was used as a means of defining desired future conditions as well as estimating the modeled available groundwater, the following discussion of the DFC uses terms of hydrostratigraphic nomenclature and model layers consistent with the GAM.

Table 2. Relationship Between District Trinity Aquifer Hydrostratigraphy and the Current Northern Trinity Aquifer GAM.

District Geology		GAM Model	
Montague and northern Wise counties	Hood, Parker, southern Wise counties	Model Stratigraphy	Model Layer
Antlers Formation	Paluxy Sand	Paluxy aquifer	3
	Glen Rose Formation	Glen Rose aquifer	4
	Twin Mountains Formation	Hensell aquifer	5
		Pearsall/Cow Creek/Hammett/ Sligo confining unit	6
		Hosston aquifer	7

The desired future conditions were specified based upon average drawdown from the year 2000 through the year 2050 on a county and aquifer (model layer) basis. **Table 3** defines the desired future conditions for the four counties comprising the District for the Northern Trinity Aquifer. For example, for the Hosston aquifer in Hood County, the specified management goal (desired future condition) is defined “from estimated year 2000 conditions, the average drawdown of the Hosston Aquifer should not exceed approximately 56 feet after 50 years” (Wade, 2009). All of the desired future conditions are specified in Wade (2009) in a similar format. These are summarized in **Table 3**.

Table 3. Desired Future Conditions and Managed Available Groundwater for the Northern Trinity Aquifer in the District.

County	Trinity Sub-Aquifer	Desired Future Condition ⁽¹⁾	Managed Available Groundwater ⁽²⁾ (AFY)
Hood	Paluxy	1	942
	Glen Rose	2	4
	Hensell	16	3,595
	Hosston	56	6,604
Hood County Total		NA	11,145
Parker	Paluxy	5	9,800
	Glen Rose	6	192
	Hensell	16	1,441
	Hosston	40	3,815
Parker County Total		NA	15,248
Wise	Paluxy	4	2,559
	Glen Rose	14	5
	Hensell	23	1,480
	Hosston	53	5,238
Wise County Total		NA	9,282
Montague	Paluxy	0	505
	Glen Rose	1	-
	Hensell	3	362
	Hosston	12	1,807
Montague County		NA	2,674
District Total		NA	38,349

(1) Average drawdown in feet after 50 years from the year 2000

(2) from GAM Run 08-84mag (Wade, 2009)

From a monitoring network perspective, any aquifer DFC is very important in that it defines a constraint on how the monitoring network should be configured. The District Management Plan has explicit performance standards for evaluating the District monitoring program with respect to its adequacy to comply with the DFC. As a result, the monitoring network must be evaluated against the DFC. The current Trinity Aquifer DFC and MAG are couched in terms of GAM model layers that do not necessarily correlate to the District hydrogeology. However, the model layering must be used as a basis for evaluating and further developing the District monitoring network. We will also review the monitoring network using the hydrogeologic framework defined in Section 2.0.

GMA-8 did not propose a DFC for the Paleozoic aquifers systems in the District during Round 1 of the Joint-Planning Process. As a result, there is no equivalent DFC to be used to constrain the monitoring network. For the Paleozoic aquifers we will use the hydrogeologic framework defined in Section 2.0.

Finally, it has been documented by the District that the current Northern Trinity GAM has limitations to its use. As a result, four Districts within GMA-8 agreed to make revisions to the GAM over the course of the last 2 years. GAMs provide useful tools for supporting monitor well network development activities. The current Northern Trinity GAM is not ideal for these purposes for the UTGCD. However, we will try to use the GAM to the degree possible to understand the development

of a monitor well network that can defensibly be used to evaluate aquifer conditions as they relate to the DFC.

3.2.4 New Versus Existing Wells

We are assuming that due to cost considerations, the Phase II wells will overwhelmingly consist of existing wells. It may be that once the analysis of the current network and the availability of existing wells are known, drilling a new well may be recommended to the District. However, new wells will only be recommended after the analysis has determined the need.

3.3 Monitoring Strategy

The monitoring strategy is meant to define the strategic concepts or framework that will guide the evaluation and augmentation of the Phase I monitoring network. While the summary in Section 3.1.5 shows that the individual objectives of a monitoring program can be numerous and varied, they all fall within a fundamental requirement: to be able to monitor the aquifer resources within the District at a scale commensurate with the management objectives or the future management objectives.

The current most important management objective stated for the District is the DFC Statement adopted by GMA-8 and instituted into the District Management Plan (Section 3.2.3 above). We will develop a strategy that keeps the DFC in center focus while also looking at other important aspects of District hydrogeology such as trends in water levels, current pumping distribution, shallow versus deep well screens and the hydrogeologic framework defined in Section 2.0.

The Paleozoic Aquifers do not currently have a DFC developed. The strategy that is developed for the Paleozoic aquifers will be informed by the development of the Trinity Aquifer monitoring strategy, with variation for the unique hydrogeology of the Paleozoic aquifers.

3.3.1 Trinity Aquifer Monitoring Strategy

Our strategy for the assessment of the current Phase I Trinity Aquifer monitoring network will also be used to guide the augmentation of the network in Phase II. The process will be sequential, as outlined in the following.

Step 1 – Establish Full Set of Potential Monitor Wells:

The first step will require two data sets. One is the existing Phase I monitor well network and data. The second will be a database with the available completion (screen location) information for all other potential wells. A potential well must have adequate location, elevation and completion information available, that any water level measurement can be accurately referenced to a common vertical datum, and definitely assigned to a particular aquifer or section of aquifer. It will also be important that the monitor well has a history of water level measurements. Because the DFC is based upon drawdown since the year 2000, it would be best if the time series starts by the year 2000, or can be reliably extrapolated back to that time.

In addition to these attributes, there are other practical considerations that can only be assessed once site visits have begun.

Step 2 – Develop DFC Zones:

The second step will be to divide the Trinity Aquifer within the District into 20 zones based upon the current DFC (termed DFC Zones). These zones are defined by the combination of Northern Trinity Aquifer GAM layer (based on the model grid discretization) and county. An initial assessment of the Phase I wells will be performed to determine whether a monitor well currently

exists in each DFC Zone. If this is not the case, we try to find a candidate well for those “empty” zones.

Step 3 – Investigation of Monitor Well Location Based Upon DFC Methods:

Step 3 is an empirical study of the required or optimal number of monitor wells that may be required in a given DFC Zone to reproduce the DFC as calculated from the GAM. The TWDB calculated the DFC using the GAM by averaging drawdown calculated at each GAM model cell for a given model layer and county (DFC Zone) from the year 2000 to 2050. The GAM model grid is a one square mile grid. The District cannot support a monitoring program that would monitor every square mile of the District (3,208 square miles times four model layers equals 12,832 monitor wells). Therefore, the question that has to be addressed is how many monitor wells are required to provide good agreement with the model average methods used by GMA-8.

To test the number of required wells, we will simulate the performance of a hypothetical monitoring network using the existing DFC run. We will start by ensuring that each DFC Zone has at least one monitor well, from the Phase I wells and potential new monitor wells. At these well locations, we will extract the simulated head from the DFC run. These point “measurements” of head represent the simulated monitoring network. We will then estimate average drawdown in each DFC Zone based on these heads. The average will be calculated by interpolating the point “measurements” onto a one square mile grid, then taking the arithmetic mean of the grid values for each DFC Zone.

The DFC Zone drawdown averages estimated from the simulated monitoring network will be compared to the actual DFC run drawdown averages by DFC Zone. We expect there will be a difference between the two values, since the monitoring network has a limited head coverage compared to the GAM.

In a next iteration, we increase the number of monitor wells in those zones with the greatest difference between the estimate from the hypothetical monitoring network and the GAM. The new wells will be located based on an equal area, space filling approach or potentially by adding monitor points at locations where we have identified potential monitor wells. We will consider both options. This increase in well coverage will improve the performance of the monitor well network in those zones. Thus with each iteration, the hypothetical monitoring network will provide an average drawdown estimate that is closer to the DFC.

By this analysis, we hope to gain insight into the number (and potentially the strategy for location) of monitor wells that will adequately track the DFC. The best case we can expect out of this analysis approach is an optimal number of monitor wells in each DFC Zone.

An enhancement to the above analysis would be to look at the improvement (i.e., decrease in monitoring points) that may occur if we account for pumping in our monitor well selection process, instead of the initial space-filling approach. This would require calculation of a pumping density function (acre-feet per year per square-mile) that will be used to guide the location of additional monitor wells. Theoretically, this approach should improve our ability to reproduce the DFC with a smaller number of monitor points.

At the end of Step 3, we hope to have insight into the number of monitor wells it takes to satisfactorily reproduce the DFC average drawdown for each DFC Zone. We will also gain insight into the proposed approach for locating new wells based on pumping density.

Step 4 – Consideration of Water Level Trends:

In Step 4 we will use an analysis of water level trends to provide additional information for locating monitor wells. A monitor well program should be able to track large scale water level declines as a result of large pumping centers as well as regions of the aquifer that appear stable. Our objective is to characterize the trends in water levels at a scale much smaller than a county but not directly affected by pumping (i.e. not in a pumping well or directly adjacent to one).

We will use the data from the Phase I monitor wells in addition to any other available time series data to develop trends. We will focus our analysis on the time period from 2000 to present as this is the drawdown baseline used in the GMA-8 DFC calculations. We will look at two alternatives for this analysis. First, we will see if we have adequate time series data to investigate trends in each DFC Zone. Second, we will look at the dataset more globally and see if the data is defining areas of stable versus decreasing water level trends.

Step 5 - Initial Monitor Well Location Based Previous Analyses:

By this point in the analysis we will have developed some insight into:

- the number of wells needed to satisfactorily reproduce the DFC calculations;
- the influence of pumping on developing a better monitoring network; and
- trends in water levels across the District.

Based on this knowledge, we are ready to evaluate the Phase I wells and start identifying potential Phase II wells.

The first requirement will be the development of a District pumping dataset based upon the District's metered data and the District's best estimate of groundwater use. We will attempt to locate pumping as closely as possible to point locations. Once this is developed, we will use the actual District pumping data to develop a pumping density function for the District. We will then use the DFC Zones, the pumping data and the water level trend data to evaluate Phase I wells and to identify potential Phase II monitor wells.

Step 6 –Screen Monitor Well Locations Based on Updated Hydrogeology:

Because much of the focus at this point has been on the GAM model layering which is based on hydrostratigraphy that is not well matched to District conditions, the next step in the strategy is to compare the draft monitoring network to the hydrogeology developed as part of this scope of work (see Section 2). We will intersect all monitor well screens with the new hydrogeologic framework and make sure that these intervals are being adequately monitored.

Step 7 –Screen Monitor Well Locations Considering Shallow versus Deep:

Finally, we will review the draft monitoring network in terms of how well it does at monitoring aquifer conditions across the District in both shallow (unconfined to semi-confined) and deep (confined) portions of the aquifer system. We will also develop a registered well density coverage and assess whether the overall monitoring network does a good job of mimicking the density of groundwater use as it can be defined from registered wells.

3.3.2 Paleozoic Aquifer Monitoring Strategy

Our strategy for the Paleozoic Aquifers will be similar to that proposed for the Northern Trinity Aquifer with the exception that we will not be defining DFC Zones. Below each step will be discussed in terms of the Paleozoic Aquifers. We will develop similar zones based upon the hydrogeologic framework for assessment of the current Phase I Trinity Aquifer monitoring

network. These zones will also be used to guide the augmentation of the network in Phase II. The process will be sequential.

Step 1 – Establish Universe of Potential Monitor Wells:

The same strategy and process used for the Trinity aquifer will be used for the Paleozoic aquifers (see Section 3.3.1, Step 1).

Step 2 – Develop Hydrostratigraphic-County Zones:

The second step will be to divide the Paleozoic aquifers into unique Hydrostratigraphic-County zones. Initially we will define five unique hydrostratigraphic units (Wichita, Bowie, Cisco, Canyon and Strawn) and four counties making 20 maximum combinations. In reality, there are fewer because each hydrostratigraphic unit does not reside in every county. An initial assessment of the Phase I wells will determine whether a monitor well is located in each of the Hydrostratigraphic-County zones. If this is not the case, we try to identify a potential well in each.

Step 3 – Investigation of Monitor Well Location Based Upon DFC Methods:

Step 3 cannot be performed for the Paleozoic aquifers because they have neither a DFC nor a GAM.

Step 4 – Consideration of Water Level Trends:

In Step 4 we will use an analysis of water level trends to provide additional information for locating monitor wells. In a monitor well program you want to be able to monitor large scale water level declines as a result of large pumping centers as well as monitor regions of the aquifer that appear stable. Our objective is to characterize the trends in water levels at a scale much smaller than a county but not directly affected by pumping (ie., not in a pumping well or directly adjacent to one).

We will use the data from the Phase I monitor wells in addition to any other available time series data to develop trends. We will look at two alternatives for this analysis. First, we will see if we have adequate time series data to investigate trends in each Hydrostratigraphic-County zone. Secondly, we will look at the dataset more globally and see how the data is defining areas of stable versus decreasing water level trends.

Step 5 - Initial Monitor Well Location Based Previous Analyses:

We will use the insight gained from Step 3 in the Trinity aquifer analysis along with the trend analysis data to evaluate the Phase I wells and to start identifying potential Phase II wells.

The first step of this analysis will be the development of a District pumping dataset based upon the District's metered data and the District's best estimate of groundwater use. We will attempt to locate pumping as closely as possible to point locations. Once this is developed, we will use the actual District pumping data to develop a pumping density function for the District. Once we have that we will use the Hydrostratigraphic-County zones, the pumping data and the water level trend data to identify Phase I redundant wells and to identify potential Phase II monitor wells. In addition to the District database, we currently have the last 10 years of driller's reports for wells identified as being drilled for oil and gas exploration. We can also get the last 10 years of oil and gas well locations from the Railroad Commission for approximately \$200. This data can help us see where oil and gas water use is most likely.

Step 6 –Screen Monitor Well Locations Based on Updated Hydrogeology:

Because we are using the hydrostratigraphic framework to develop the network, this step is unnecessary.

Step 7 –Screen Monitor Well Locations Based Upon Shallow versus Deep Screens:

Finally, we will review the draft monitoring network in terms of how well it does at monitoring aquifer conditions across the District in both shallow (unconfined to semi confined) and deep (confined) portions of the aquifer system. We will also develop a registered-well density coverage to assess whether the overall monitoring network does a good job of mimicking the density of groundwater use as it can be defined from registered wells.

References

- Bayha, D.C., 1967, Occurrence and Quality of Ground Water in Montague County, Texas: Texas Water Development Board, Report 58.
- Bené, J., Harden, B., O'Rourke, D., Donnelly, A., and Yelderman, J., 2004, Northern Trinity/Woodbine Groundwater Availability Model: Contractor Report to the Texas Water Development Board by R.W. Harden and Associates.
- Broadhurst, W. L., and Follett, C. R., 1944, Ground-water Resources in the Vicinity of Nocona, Montague County, Texas: Texas Board Water Engineers, 17 p.
- Brown, Jr., L.F., Goodson, J.L., Harwood, P., and Barnes, V.E., 1972, Geologic Atlas of Texas, Abilene Sheet, Scale: 1:250,000, Frederick Byron Plummer Memorial Edition: The University of Texas at Austin, Bureau of Economic Geology.
- McGowen, J.H., Hentz, T.F., Owen, D.E., Pieper, M.K., Shelby, C.A., and Barnes, V.E., 1967, Geologic Atlas of Texas, Sherman Sheet, Scale: 1:250,000, Walter Scott Adkins Memorial Edition: The University of Texas at Austin, Bureau of Economic Geology.
- McGowen, J.H., Proctor, Jr., C.V., Haenggi, W.T., Reaser, D.F., and Barnes, V.E., 1972, Geologic Atlas of Texas, Dallas Sheet, Scale: 1:250,000, Gayle Scott Memorial Edition: The University of Texas at Austin, Bureau of Economic Geology.
- Wade, S.C., 2009, GAM Run 08-84mag: Texas Water Development Board, <http://www.twdb.state.tx.us/gam/GAMruns/GR08-84mag.pdf>.

Upper Trinity Groundwater Conservation District

ANNUAL FINANCIAL REPORT

FOR THE YEAR ENDED DECEMBER 31, 2016

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
Annual Financial Report
For the Year Ended December 31, 2016

TABLE OF CONTENTS

FINANCIAL SECTION	<u>Page</u>
Independent Auditors' Report	1
Management's Discussion and Analysis.....	4
 <u>Basic Financial Statements:</u>	
Government-wide Financial Statements:	
Statement of Net Position.....	10
Statement of Activities.....	11
Fund Financial Statements:	
Balance Sheet - Governmental Fund.....	12
Reconciliation of the Governmental Fund	
Balance Sheet to the Statement of Net Position.....	13
Statement of Revenues, Expenditures, and Changes in	
Fund Balance - Governmental Fund.....	14
Reconciliation of the Statement of Revenues, Expenditures, and Changes in	
Fund Balance of Governmental Fund to the Statement of Activities.....	15
<u>Notes to Financial Statements</u>	17
 <u>Required Supplementary Information:</u>	
Budgetary Comparison Schedule:	
General Fund.....	29
Texas County and District Retirement System:	
Schedule of Change in Net Pension Liability and Related Ratios.....	30
Schedule of Employer Contributions.....	31
Notes to Required Supplementary Information.....	32



INDEPENDENT AUDITORS' REPORT

Board of Directors and General Manager
Upper Trinity Groundwater Conservation District
Springtown, Texas

Report on the Financial Statements

We have audited the accompanying financial statements of the governmental activities and the major fund information of the Upper Trinity Groundwater Conservation District (the District) as of and for the year ended December 31, 2016, and the related notes to the financial statements, which collectively comprise the District's basic financial statements as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express opinions on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statement in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

Opinions

In our opinion, the financial statements referred to above present fairly, in all material respects, the respective financial position of the governmental activities and the major fund of Upper Trinity Groundwater Conservation District as of December 31, 2016, and the respective changes in financial position for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis, budgetary comparison information, schedule of change in Net Pension Liability and Related Ratios, Schedule of Contributions, and Notes to Required Supplementary Information on pages 4 through 8, page 29, and pages 30 through 32, respectively, be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of the financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

A handwritten signature in cursive script that reads "Boucher, Morgan & Young". The ampersand is stylized with a vertical line through it.

Stephenville, Texas
June 29, 2017

MANAGEMENT'S DISCUSSION AND ANALYSIS

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT MANAGEMENT'S DISCUSSION AND ANALYSIS

As management of the Upper Trinity Groundwater Conservation District, we offer readers of the District's financial statement this narrative overview and analysis of the financial activities of the District for the fiscal year ended December 31, 2016. The District has implemented Governmental Accounting Standards Board Statement 34 –Basic Financial Statements and Management's Discussion and Analysis for State and Local Governments.

Financial Highlights:

The assets and deferred outflows of the Upper Trinity Groundwater Conservation District exceeded its liabilities and deferred inflows at the close of the most recent fiscal year by \$4,457,989.

The District's total net position increased by \$73,004 during the fiscal year.

Overview of Financial Statements:

This discussion and analysis is intended to serve as an introduction to the District's basic financial statements. The District's basic financial statements are comprised of three components: 1) government-wide financial statements, 2) fund financial statements, and 3) notes to the financial statements. This report also contains other supplementary information in addition to the basic financial statements themselves.

Government-wide financial statements – The government-wide financial statements are designed to provide readers with a broad overview of the District's finances, in a manner similar to a private-sector business.

The Statement of Net Position presents information on all of the District's assets and liabilities, with the difference between two reported as net position. Over time, increases or decreases in net position may serve as a useful indicator of whether the financial position of the District is improving or deteriorating.

The Statement of Activities presents information showing how the District's net position changed during the fiscal year. All changes in net position are reported when the underlying event giving rise to change occurs, regardless of the timing of related cash flow. Thus, revenues and expenses are reported in this statement for some items that will only result in cash flows in the future fiscal periods.

Both of the government-wide financial statements distinguish functions of the District that are principally supported by charges and fees. The governmental activity of the District is to develop and enforce rules to provide protection to existing wells, to prevent waste and promote groundwater conservation.

Fund financial statements – A fund is a grouping of related accounts that is used to maintain control over resources that have been segregated for specific activities or objectives. The District, like other state and local governments, uses fund accounting to ensure and demonstrate compliance with finance-related legal requirements. The funds of the District consist solely of the one governmental fund.

Governmental Funds – Governmental funds are used to account for essentially the same functions reported as governmental activities in the government-wide financial statements. However, unlike the government-wide financial statements, governmental fund financial statements focus on near-term inflows and outflows of spendable resources, as well as on balances of spendable resources available at the end of the fiscal year. Such information may be useful in evaluating a government’s near-term financing requirements.

Because the focus of governmental funds is narrower than that of the government-wide financial statements, it is useful to compare the information presented for governmental funds with similar information presented for governmental activities in the government-wide financial statements. By doing so, readers may better understand the long-term impact of a government’s near-term financing decisions. Both the governmental fund balance sheet and the governmental fund statement of revenues, expenditures and changes in fund balance provide a reconciliation to facilitate this comparison between governmental funds and governmental activities.

At the close of the current fiscal year, the District’s governmental fund reported ending fund balance of \$4,145,717 compared to the \$4,181,116 the prior year.

Notes to the Financial Statements – The notes provide additional information that is essential to a full understanding of the data provided in the government-wide and fund financial statements. The notes to the financial statements can be found on pages 17-27 of this report.

Governmental-Wide Financial Analysis

As noted earlier, net position may serve, over time, as a useful indicator of a government’s financial position. In the case of Upper Trinity Groundwater Conservation District, assets and deferred outflows exceeded liabilities and deferred inflows by \$4,457,989 as of December 31, 2016.

The largest portion of the District’s net position is Unrestricted, while the remaining balance reflects its investment in capital assets.

Upper Trinity Groundwater Conservation District's Net position:

	Governmental Activities 2015	Governmental Activities 2016
	<u>2015</u>	<u>2016</u>
Current assets	\$ 4,290,105	\$ 4,253,475
Capital assets	176,573	262,378
Total assets	<u>4,466,678</u>	<u>4,515,853</u>
Deferred outflows	20,366	63,335
Total assets and deferred outflows	<u>4,487,044</u>	<u>4,579,188</u>
Current liabilities	108,989	107,758
Non-current liabilities (assets)	<u>(6,930)</u>	<u>13,441</u>
Total liabilities	<u>102,059</u>	<u>121,199</u>
Net position:		
Net investment in capital assets	176,573	262,378
Unrestricted	<u>4,208,412</u>	<u>4,195,611</u>
Total Net Position	<u>\$ 4,384,985</u>	<u>\$ 4,457,989</u>

As of December 31, 2016, the District is able to report positive balances in both categories of net position.

Analysis of the District's Operations – The following table provides a summary of the District's operations for the year ended December 31, 2016. Governmental-type activities increased the District's net position by \$73,004.

Upper Trinity Groundwater Conservation District's Changes in Net position

	Governmental Activities 2015	Governmental Activities 2016
	<u>2015</u>	<u>2016</u>
Revenues:		
Program Revenues:		
Water usage fees	\$ 826,518	\$ 755,697
New well registration fees	179,200	174,650
Other program revenue	28,909	39,882
Total program revenues	<u>1,034,627</u>	<u>970,229</u>
General Revenues:		
Miscellaneous revenue	3,534	3,976
Gain (loss) from sale of capital asset	(613)	-
Net Investment earnings	32,900	35,066
Total revenues	<u>1,070,448</u>	<u>1,009,271</u>
Expenses:		
Groundwater conservation	952,754	958,865
Total expenses	<u>952,754</u>	<u>958,865</u>
Change in net position	126,201	73,004
Net position - beginning of year, as previously reported	4,239,995	4,384,985
Prior period adjustment	18,789	-
Net position - end of year	<u>\$ 4,384,985</u>	<u>\$ 4,457,989</u>

Financial Analysis of the Government's Funds

The net position increased in 2016 by \$73,004 compared to a \$126,201 increase in 2015. Increased rainfall and reduced oil & gas production caused a decrease in program revenue of approximately \$64,398. Expenditures increased from the previous year by \$6,111.

Capital Assets

The Upper Trinity Groundwater Conservation District's investment in capital assets as of December 31, 2016, amounts to \$262,378 (net of accumulated depreciation). This investment in capital assets includes vehicles, furniture, equipment, and software.

Capital Assets at Year-End Net of Accumulated Depreciation

	Governmental - Type Activities 2015	Governmental - Type Activities 2016
Vehicles	\$ 120,643	\$ 91,212
Furniture and equipment	28,310	20,206
Software	27,620	150,960
Total	<u>\$ 176,573</u>	<u>\$ 262,378</u>

Depreciation expenses on all assets amounted to \$37,535 for the year.

Economic Factors for Next Year

The budget for the 2017 fiscal year shows projected revenues for \$1,192,500 and expenditures of \$1,489,870.

On November 21, 2016 the Board of Directors of UTGCD passed and adopted Resolution 16-004 Allocation of Funds for the District. They designated “Committed Funds” for Budget Reserve Fund and Legal Defense Fund. They also designated “Assigned Funds” for Monitoring Well Drilling Fund, Desired Future Conditions Preparation Fund, Facilities/Building Fund, and Technology Development Fund.

The Board believes it is very prudent to recognize the litigious nature of the process of DFC adoptions and related issues with the adoption of permanent rules, especially if those rules contain permit limitations on non-exempt water wells. In addition, the revenues from water usage could decline if certain situations occur. Therefore, the Board deems it wise to accumulate sufficient funds to cover operations and unexpected expenses should they lose any major water customers.

The District’s immediate and long-term financial goals are to fund necessary water conservation and monitoring programs with program revenues and to safeguard the cash on hand for future needs.

Political issues affecting the District include potential groundwater ownership legislative issues, definition of “brackish” water, and discussions of the authority of groundwater conservation districts.

There could be a continued decrease in groundwater used for oil and gas exploration or production if companies continue to move out of the Barnett Shale or if they increase their use of alternative water sources. Also, production of groundwater by public water systems could decrease if they increase conservation efforts or increase their supply of surface water.

Request for Information

This financial report is designed to provide our citizens, customers, investors and creditors with a general overview of the District’s finances. If you have questions about this report or need any additional information, contact Upper Trinity Groundwater Conservation District in care of Doug Shaw, General Manager, 1250 E Hwy 199, P.O. Box 1749, Springtown, Texas 76082.

BASIC FINANCIAL STATEMENTS

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
STATEMENT OF NET POSITION
DECEMBER 31, 2016

	<u>Governmental Activities</u>
ASSETS	
Current assets:	
Cash and cash equivalents	\$ 504,454
Certificates of deposit	3,352,903
Receivables, net of allowance	394,333
Deposits	1,610
Undeposited funds	175
Total current assets	<u>4,253,475</u>
Capital assets:	
Depreciable, net	<u>262,378</u>
Total assets	<u>4,515,853</u>
 DEFERRED OUTFLOWS:	
Deferred retirement contributions	26,422
Deferred investment experience	27,139
Deferred actual vs. assumption	8,033
Deferred assumption/input changes	1,741
Total deferred outflows	<u>63,335</u>
Total assets and deferred outflows	<u><u>\$ 4,579,188</u></u>
 LIABILITIES	
Current liabilities:	
Accounts and credit card payables	60,932
Payroll liabilities	17,926
Driller deposits	28,900
Total current liabilities	<u>107,758</u>
Non-current liabilities:	
Net pension liability	<u>13,441</u>
Total liabilities	<u>121,199</u>
 NET POSITION	
Net investment in capital assets	262,378
Unrestricted	<u>4,195,611</u>
Total net position	<u><u>\$ 4,457,989</u></u>

The accompanying notes are an integral part of the financial statements.

**UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
STATEMENT OF ACTIVITIES
FOR THE YEAR ENDED DECEMBER 31, 2016**

	<u>Expenses</u>	<u>Program Revenues</u>	<u>Net (Expense) Revenue and Changes in Net Position Primary Government</u>
		<u>Charges for Services</u>	<u>Governmental Activities</u>
Primary Government			
Governmental Activities			
General government	\$ 936,267	\$ 970,229	\$ 33,962
Total governmental	<u>936,267</u>	<u>970,229</u>	<u>33,962</u>
General revenues			
Miscellaneous revenue			3,976
Investment earnings			35,066
Total general revenues			<u>39,042</u>
Change in net position			<u>73,004</u>
Net position - beginning			<u>4,384,985</u>
Net position - ending			<u>\$ 4,457,989</u>

The accompanying notes are an integral part of the financial statements.

**UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
BALANCE SHEET - GOVERNMENTAL FUND
DECEMBER 31, 2016**

	<u>General Fund</u>
ASSETS	
Cash and cash equivalents	\$ 504,454
Certificates of deposit	3,352,903
Accounts receivable, net of allowance	394,333
Security deposits	1,610
Undeposited funds	<u>175</u>
Total assets	<u><u>\$ 4,253,475</u></u>
 LIABILITIES	
Accounts and credit cards payable	\$ 60,932
Payroll liabilities	17,926
Driller deposits	<u>28,900</u>
Total liabilities	<u>107,758</u>
 FUND BALANCE	
Committed	750,000
Assigned	1,952,370
Unassigned	<u>1,443,347</u>
Total fund balance	<u><u>4,145,717</u></u>
Total liabilities and fund balance	<u><u>\$ 4,253,475</u></u>

The accompanying notes are an integral part of the financial statements.

**UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
RECONCILIATION OF THE GOVERNMENTAL FUND BALANCE SHEET
TO THE STATEMENT OF NET POSITION
DECEMBER 31, 2016**

Total Fund Balance - Governmental Fund		\$ 4,145,717
Capital assets used in governmental activities are not financial resources and therefore are not reported in governmental funds balance sheet.		262,378
<p>The statement of net position includes the District's proportionate share of the TCDRS net pension liability (asset) as well as certain pension related transactions accounted for as Deferred Inflows and Outflows of resources.</p>		
Net pension asset (liability)	(13,441)	
Deferred retirement contributions	26,422	
Deferred investment experience	27,139	
Deferred actual vs. assumption	8,033	
Deferred assumption/input changes	1,741	49,894
Net Position of Governmental Activities		<u><u>\$ 4,457,989</u></u>

The accompanying notes are an integral part of the financial statements.

**UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
STATEMENT OF REVENUES, EXPENDITURES, AND CHANGES IN FUND BALANCE
GOVERNMENTAL FUND
FOR THE YEAR ENDED DECEMBER 31, 2016**

	General Fund
Revenues:	
Exception fees	\$ 9,400
Export fees	1,053
Penalties assessed	23,129
Forfeited deposits	6,300
New well registration fees	174,650
Semi-annual program income	755,697
Total program revenue	970,229
Investment earnings	35,066
Other sources	3,976
Total revenues	1,009,271
Expenditures:	
General government	921,330
Capital outlay	123,340
Total expenditures	1,044,670
Net change in fund balance	(35,399)
Fund balance - beginning of year	4,181,116
Fund balance - end of year	\$ 4,145,717

The accompanying notes are an integral part of the financial statements.

**UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
RECONCILIATION OF THE GOVERNMENTAL FUNDS STATEMENT OF
REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCE TO
THE STATEMENT OF ACTIVITIES
DECEMBER 31, 2016**

Total Net Change in Fund Balance - Governmental Fund	\$	(35,399)
<p>Current year capital outlays are expenditures in the fund financial statements, but they should be shown as increases in capital assets in the government-wide financial statements. The net effect of removing the 2016 capital outlays is to increase net position.</p>		
		123,340
<p>Depreciation is not recognized as an expense in governmental funds since it does not require the use of current financial resources. The net effect of the current year's depreciation is to decrease net position.</p>		
		(37,535)
<p>Net pension liabilities as well as the related deferred inflows and outflows of resources generated from those assets are not payable from current resources and therefore, are not reported in the governmental funds. These balances increased (decreased) by this amount.</p>		
		22,598
Change in Net Position of Governmental Activities	<u>\$</u>	<u>73,004</u>

The accompanying notes are an integral part of the financial statements.

NOTES TO FINANCIAL STATEMENTS

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
Notes to Financial Statements
December 31, 2016

1. Organization

The Upper Trinity Groundwater Conservation District (the “District”) is a political subdivision of the State of Texas created under the authority of Article XVI, Section 59, Texas Constitution, and operating pursuant to the provisions of the Texas Water Code, Chapter 36, and Senate Bill 1983, Acts of the 80th Legislature, Regular Session, 2007. The creation of the District was confirmed in an election by the citizens of Montague, Wise, Parker and Hood counties, Texas, on November 6, 2007.

The mission of the Upper Trinity Groundwater Conservation District is to develop rules to 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 Montague, Wise, Parker, and Hood counties maintain local control over their groundwater, and operate the District in a fair and equitable manner for all residents of the District.

2. Summary of Significant Accounting Policies

Generally Accepted Accounting Principles – Upper Trinity Groundwater Conservation District prepares its financial statements in accordance with accounting principles generally accepted in the United States of America, in conformity with authoritative pronouncements of the Governmental Accounting Standards Board (GASB).

A. Basis of Presentation – Government – Wide Statements

The government-wide financial statements (the statement of net position and the statement of changes in net position) report information on all the activities of the District. There are no governmental activities, which normally are supported by taxes and governmental revenues, and are reported separately from business-type activities, which rely to a significant extent on fees and charges for support.

The statement of activities demonstrates the degree to which the direct expenses of a given program are offset by program revenues. Direct expenses are those that are clearly identifiable with a specific program. Program revenues include charges to customers or applicants who purchase, use, or directly benefit from goods, services, meeting the operational or capital requirements of a particular program. Taxes and other items not properly included among program revenues are reported instead as general revenues.

B. Measurement focus, Basis of Accounting and Basis of Presentation

The government-wide statements are reported using the economic resources measurement focus and the accrual basis of accounting. Revenues are recorded when earned and expenses are recorded when a liability is incurred, regardless of the timing of related cash flow.

Governmental fund financial statements are reported using the current financial resources measurement focus and the modified accrual basis of accounting. Under the modified accrual basis of accounting, revenues are recognized as soon as they are measurable and available. Revenues are considered to be available when they are collectible within the current period or

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
Notes to Financial Statements
December 31, 2016

2. Summary of Significant Accounting Policies (continued)

soon enough thereafter to pay the liabilities of the current period. Water usage fees for each six month period are due and payable 60 days after the period ends. The District recognizes all fees pertaining to the calendar year as revenues for that year.

Expenditures are generally recorded when the related fund liability is incurred.

The accounts of the Upper Trinity Groundwater Conservation District are organized and operated on the basis of funds. A fund is an independent fiscal and accounting entity with self-balancing set accounts. Fund accounting segregates funds according to their purpose and is used to aid management in demonstrating compliance with finance-related legal and contractual provisions. The minimum number of funds is maintained consistent with legal and managerial requirements.

The District reports the following major governmental fund: The *general fund* is the government's primary operating fund. It accounts for all financial resources of the general government, except those required to be accounted for in another fund.

There are no proprietary funds of the District generating significant operating revenues, such as charges for services, resulting from exchange transactions associated with the principal activity of the fund.

C. Cash and Cash Equivalents

For purposes of the statements of cash flows, the District considers highly liquid investments with a maturity of three months or less to be cash equivalent.

D. Capital Assets, Depreciation, and Amortization

The District's property, plant, and equipment with useful lives of more than one year stated as historical cost and comprehensively reported in the government-wide financial statements. The District generally capitalizes individual assets with an initial cost of \$1,500 or more, or a grouping of like-kind assets with a total cost of \$5,000 or more. Capital assets are depreciated using the straight-line method. When capital assets are disposed, the cost and applicable accumulated depreciation are removed from the respective accounts, and the resulting gain or loss is recorded in operations.

Estimated useful lives, in years, for depreciable assets are as follows:

Vehicles	5-7 years
Furniture and equipment	5 years
Software	5 years

Maintenance and repairs which do not materially improve or extend the lives of the respective assets are charged to expense as incurred.

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
Notes to Financial Statements
December 31, 2016

2. Summary of Significant Accounting Policies (continued)

E. Pensions

For purposes of measuring the net pension liability (asset), deferred outflows of resources and deferred inflows of resources related to pensions, and pension expense, information about the Fiduciary Net Position of the Texas County and District Retirement System (TCDRS) and additions to/deductions from TCDRS' Fiduciary Net Position have been determined on the same basis as they are reported by TCDRS. For this purpose, plan contributions are recognized in the period that compensation is reported for the employee, which is when contributions are legally due. Benefit payments and refunds are recognized when due and payable in accordance with the benefit terms. Investments are reported at fair value.

F. Budget

The District is legally required to adopt a budget and has done so in order to better manage its resources.

1. The budget is adopted on a basis consistent with accounting principles generally accepted in the United States of America (GAAP). Annual appropriated budgets are adopted for the general fund. All annual appropriations lapse at fiscal year end. The original expenditures budget adopted for the general fund for the year ended December 31, 2016 totaled \$1,347,810. The general fund revenues budgeted for the year were \$1,241,200 which is less than the budgeted expenditures, resulting in a deficit budget for the year.
2. The Board of Directors may approve budget amendments during the year. The Board approved budget amendments through the year as required.
3. Formal budgetary integration is employed as a management control device during the year for the general fund.

G. Net Position and Fund Equity

Net position represents the difference between assets and liabilities. The net investment in capital assets component of net position consists of capital assets, net of accumulated depreciation, reduced by the outstanding balances of any borrowing used for the acquisition, construction or improvement of those assets, and adding back unspent proceeds. Net position is reported as restricted when there are limitations imposed on its use either through the enabling legislation adopted by the District or through external restrictions imposed by creditors, grantors, or laws and/or regulations of other governments.

Fund Balance Classification - The governmental fund financial statements present fund balances based on classifications that comprise a hierarchy that is based primarily on the extent to which the District is bound to honor constraints on the specific purpose for which amounts in the respective governmental funds can be spent. The classifications used in the governmental fund financial statements are as follows:

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
Notes to Financial Statements
December 31, 2016

2. Summary of Significant Accounting Policies (continued)

Nonspendable - Resources which cannot be spent because they are either a) not in spendable form or; b) legally or contractually required to be maintained intact.

Restricted – Resources with constraints placed on the use of resources are either a) externally imposed by creditors (such as through debt covenants), grantors, contributors, or laws or regulations of other governments; or b) imposed by law through constitutional provisions or enabling legislation.

Committed – Resources which are subject to limitations the government imposes upon itself at its highest level of decision making (resolution), and that remain binding unless removed in the same manner.

Assigned - Resources neither restricted nor committed for which a government has a stated intended use as established by the Board of Directors, or an official to which to the Board of Directors has delegated the authority to assign amounts for specific purposes.

Unassigned – Resources which cannot be properly classified in one of the other four categories. The General fund is the only fund that reports a positive unassigned fund.

H. Estimates

The preparation of financial statements in conformity with accounting principles generally accept in the United States of America required management to make estimates and assumptions that affect the amounts reported in the financial statements. Actual results may differ from those estimates.

I. Receivables

Gross accounts receivable of \$407,711 are presented in the Balance Sheet and Statement of Net Position net of an allowance for doubtful accounts in the amount of \$13,378.

3. Deposits and Investments with Financial Institutions

At year end, the book balance of the District's checking account and certificates of deposit was \$3,857,357 which was all unrestricted. The bank balance of \$3,860,727 was fully covered by federal depository insurance or pledged securities, with the total cash and certificates split among area banks.

At the end of the period the District had no deposits which were exposed to custodial credit risk. Custodial credit risk is the risk that in the event of a bank failure, the government's deposits may not be returned to it. The District's funds are required to be deposited and invested under the terms of the depository contract. All deposited funds are FDIC insured per the District's investment policy.

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
Notes to Financial Statements
December 31, 2016

3. Deposits and Investments with Financial Institutions (continued)

The State Public Funds Investments Act authorizes the government to invest in obligations of the U.S. Treasury, obligations of states, agencies, counties, cities and other political subdivisions, secured certificates of deposit, repurchase agreements, bankers' acceptances, commercial paper, mutual funds, guaranteed investment contracts and investment pools. During the year ended December 31, 2016, the District did not own any types of securities other than those permitted by statute.

4. Risk Management

The District is exposed to various risks of loss related to torts; theft of, damage to and destruction of assets; errors and omissions; injuries to employees; natural disasters; and the litigious nature of the political environment in which it operates. The District is covered through third-party insurance policies, and risk is also mitigated by the protections afforded it through the Texas Water Code, Chapter 36, Sections 36.066, 36.251 and 36.253.

5. Changes in Capital Assets

Capital assets consist of the following:

	<u>Balance</u> <u>12/31/2015</u>	<u>Additions</u>	<u>Retirements/ Adjustments</u>	<u>Balance</u> <u>12/31/2016</u>
Governmental activities:				
Capital assets being depreciated:				
Automobiles	214,554	-	-	214,554
Furniture and equipment	52,657	-	-	52,657
Software	62,220	123,340	-	185,560
Total capital assets being depreciated	<u>329,431</u>	<u>123,340</u>	<u>-</u>	<u>452,771</u>
Less accumulated depreciation:				
Automobiles	(93,911)	(29,431)	-	(123,342)
Furniture and equipment	(24,347)	(8,104)	-	(32,451)
Software	(34,600)	-	-	(34,600)
Total accumulated depreciation	<u>(152,858)</u>	<u>(37,535)</u>	<u>-</u>	<u>(190,393)</u>
Total capital assets being depreciated, net	<u>176,573</u>	<u>85,805</u>	<u>-</u>	<u>262,378</u>
Governmental activities capital assets, net	<u>\$ 176,573</u>	<u>\$ 85,805</u>	<u>\$ -</u>	<u>\$ 262,378</u>

Depreciation expenses charged to the general government operations was \$37,535.

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
Notes to Financial Statements
December 31, 2016

6. Compensated Absences

It is the District's policy that employees will not receive payment for unused sick pay benefits upon separation from service. Therefore, no liability is reported for unpaid accumulated sick leave.

However, unused vacation time earned is accrued as of December 31 and is payable upon separation from service. As of December 31, 2016, the District's liability for unpaid vacation time was \$8,304.

7. Operating Lease Commitment

The District entered into a five-year operating lease for an office building beginning February 2015 and ending January 31, 2020. The lease is cancellable at the end of years three, and four with a 90-day written notice. If not cancelled, future minimum operating commitments are as follows:

December 31, 2017	\$ 26,300
December 31, 2018	26,400
December 31, 2019	27,500
Thereafter	<u>2,300</u>
Total due under building lease agreement	<u>\$ 82,500</u>

For the year ended December 31, 2016 rent expense under this lease was \$25,200.

8. Estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect certain reported amounts and disclosures. Accordingly, actual results could differ from those estimates.

9. Fund Balance Classifications

The Board passed a resolution during 2016 in order to commit a total of \$750,000 for a legal reserve fund.

The Board has assigned the 2016 fund balance for the following purposes:

Monitoring well drilling fund	\$475,000
Desired future conditions preparation fund	30,000
Facilities/building fund	750,000
Technology development fund	400,000
2017 budgetary deficit	297,370

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
Notes to Financial Statements
December 31, 2016

10. Retirement Plan

Plan Description

The District provides retirement benefits for all of its full-time and part-time employees through a nontraditional defined benefit plan in the state-wide Texas County and District Retirement System (TCDRS). The Board of Trustees of TCDRS is responsible for the administration of the state-wide agent multiple-employer public employee retirement. TCDRS in the aggregate issues a comprehensive annual financial report (CAFR) on a calendar year basis. The CAFR is available upon written request from the TCDRS Board of Trustees at P.O. Box 2034, Austin, TX 78768-2034.

Benefits Provided

The plan provisions are adopted by the governing body of the employer, within the options available in the Texas state statutes governing TCDRS (TCDRS Act). Members can retire at age 60 and above with 5 or more years of service, with 30 years of service regardless of age, or when the sum of their age and years of service equals 75 or more, when vested. Members are vested after 5 years of service but must leave their accumulated contributions in the plan to receive any employer-financed benefit. Members who withdraw their personal contributions in a lump sum are not entitled to any amounts contributed by their employer.

Benefit amounts are determined by the sum of the employee's contributions to the plan, with interest, and employer-financed monetary credits. The level of these monetary credits is adopted by the governing body of the employer within the actuarial constraints imposed by the TCDRS Act so that the resulting benefits can expect to be adequately financed by the employer's commitment to contribute. At retirement, death or disability, the benefit is calculated by converting the sum of the employee's accumulated contributions and the employer-financed monetary credits to a monthly annuity using annuity purchase rates prescribed by the TCDRS Act. There are no automatic post-employment benefit changes, including automatic COLAs.

At the December 31, 2015 valuation and measurement date, the following employees were covered by the benefit terms:

Inactive employees of beneficiaries currently receiving benefits	1
Inactive employees entitled to but not yet receiving benefits	6
Active employees	8
	15

Contributions

The District has elected the annually determined contribution rate (Variable Rate) plan provision of the TCDRS Act. The plan is funded by monthly contributions from both employee members and the employer based on the covered payroll of employee members. Under the TCDRS Act, the contribution rate of the employer is actuarially determined annually.

The District contributed using the actuarially required contribution rate of 7.14% for the calendar year. The deposit rate payable by the employee members for calendar year 2016 is the rate of 5% as adopted by the governing body of the employer. The employee and employer deposit rates may be changed by the governing body of the District within the options available in the TCDRS Act.

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
Notes to Financial Statements
December 31, 2016

10. Retirement Plan (continued)

Net Pension Liability

The District's Net Pension Liability (NPL) for the year ended December 31, 2016, was measured as of December 31, 2015, and the Total Pension Liability (TPL) used to calculate the Net Pension Liability was determined by an actuarial valuation as of that date.

Actuarial Assumptions:

The Total Pension Liability in the December 31, 2015 actuarial valuation was determined using the following actuarial assumptions:

Inflation	3.0% per year
Overall payroll growth	3.5% per year
Investment Rate of Return	8.0%, net of pension plan investment expense, including inflation

The annual salary increase rates assumed for individual members vary by length of service and by entry-age group. The annual rates consist of a general wage inflation component of 3.5% (made up of 3.0% inflation and .5% productivity increase assumptions) and a merit, promotion and longevity component that on average approximates 1.4% per year for a career employee.

Mortality rates for depositing members were based on the RP-2000 Active Employee Mortality Table for males and females as appropriate, with adjustment, with the project scale AA, both projected to 2014 and then projected with 110% of the MP-2014 Ultimate scale thereafter. Service retirees, beneficiaries and non-depositing members were based on RP-2000 Combined Mortality Table for males and females as appropriate, with adjustments, with the projection scale AA projected to 2014 and then projected with 110% of the MP-2014 Ultimate scale thereafter. Disabled retirees were based on RP-2000 Disabled Mortality Table for males and females as appropriate, with adjustments, with the projection scale AA projected to 2014 and then projected with 110% of the MP-2014 Ultimate scale thereafter.

As described above, updated mortality assumptions were adopted in 2015. All other actuarial assumptions that determined the total pension liability as of the December 31, 2015 valuation were based on the results of an actuarial experience study for the period January 1, 2009 – December 31, 2012, except where required to be different by GASB 68.

The long-term expected rate of return of 8% is determined by adding expected inflation to expected long-term real returns, and reflecting expected volatility and correlation. The capital market assumptions and information shown below are provided by TCDRS' investment consultant, Cliffwater LLC. The numbers shown are based on January 2016 information for a 7-10 year time horizon and are re-assessed at a minimum every four years, and it is set based on a 30-year time horizon, the most recent analysis was performed in 2013 based on the period January 1, 2009 – December 31, 2013. Best estimates of geometric real rates of return (net of inflation, assumed at 1.7%) for each major asset class included in the target asset allocation (as adopted by the TCDRS board in April 2016) are summarized below:

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
Notes to Financial Statements
December 31, 2016

10. Retirement Plan (continued)

Net Pension Liability (continued)

Asset Class	Benchmark	Target Allocation	Geometric Real Rate of Return (Expected minus inflation)
US Equities	Dow Jones U.S. Total Stock Market Index	14.5%	5.45%
Private Equity	Cambridge Associates Global Private Equity & Venture Capital Index	14.0%	8.45%
Global Equities	MSCI World (net) Index	1.5%	5.75%
International Equities - Developed	MSCI World Ex USA (net)	10.0%	5.45%
International Equities - Emerging	MSCI World Ex USA (net)	8.0%	6.45%
Investment-Grade Bonds	Barclays Cpaital Aggregate Bond Index	3.0%	1.00%
High-Yield Bonds	Citigroup High-Yield Cash-Pay Capped Index	3.0%	5.10%
Opportunistic Credit	Citigroup High-Yield Cash-Pay Capped Index	2.0%	5.09%
Direct Lending	Citigroup High-Yield Cash-Pay Capped Index	5.0%	6.40%
Distressed Debt	Citigroup High-Yield Cash-Pay Capped Index	3.0%	8.10%
REIT Equities	67% FTSE NAREIT Equity REITs Index + 33% FRSE EPRA/NAREIT Global Real Estate Index	3.0%	4.00%
Master Limited Partnerships (MLPs)	Alerian MLP Index	3.0%	6.80%
Private Real Estate Partnerships	Cambridge Associates Real Estate Index	5.0%	6.90%
Hedge Funds	Hedge Fund Research, Inc. (HFRI) Fund of Funds Composite Index	25.0%	5.25%
Total		100.0%	

Discount Rate

The discount rate used to measure the Total Pension Liability was 8.1%. Using the alternative method, the projected fiduciary net position is determined to be sufficient compared to projected benefit payments based on the funding requirements under the District's funding policy and the legal requirements under the TCDRS Act.

1. TCDRS has a funding policy where the unfunded actuarial accrued liability (UAAL) shall be amortized as a level percent of pay over 20-year closed layered periods.
2. Under the TCDRS Act, the District is legally required to make the contribution specified in the funding policy.
3. The District assets are projected to exceed its accrued liabilities in 20 years or less. When this point is reached, the District is still required to contribute at least the normal cost.
4. Any increased cost due to the adoption of a COLA is required to be funded over a period of 15 years.

Since the projected fiduciary net position is projected to be sufficient to pay projected benefit payments in all future years, the discount rate for purposes of calculating the total pension liability and the net pension liability of the District is equal to the long-term assumed rate of return on investments.

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
Notes to Financial Statements
December 31, 2016

10. Retirement Plan (continued)

Net Pension Liability (continued)

	Increase (Decrease)		
	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability
	(a)	(b)	(a) - (b)
Balance at 12/31/2014	\$ 69,862	\$ 76,792	\$ (6,930)
Changes for the year:			
Service cost	19,962	-	19,962
Interest on total pension liability	6,204	-	6,204
Effect of plan changes	(1,958)	-	(1,958)
Effect of economic/demographic gains or losses	26,243	-	26,243
Effect of assumptions changes or inputs	1,886	-	1,886
Refund of contributions	-	-	-
Benefit payments	(2,766)	(2,766)	-
Administrative expenses	-	(67)	67
Member contributions	-	17,724	(17,724)
Net investment income	-	(1,459)	1,459
Employer contributions	-	13,860	(13,860)
Other	(1,662)	246	(1,908)
Net changes	\$ 47,909	\$ 27,538	\$ 20,371
Balance at 12/31/2015	\$ 117,771	\$ 104,330	\$ 13,441

Sensitivity of the net pension liability to changes in the discount rate

The following presents the net pension liability of the District, calculated using the discount rate of 8.1%, as well as what the District's net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (7.1%) or 1-percentage point higher (9.1%) than the current rate:

	1% Decrease in Discount Rate (7.1%)	Discount Rate (8.1%)	1% Increase in Discount Rate (9.1%)
Total pension liability	\$ 140,112	\$ 117,771	\$ 100,436
Fiduciary net position	104,330	104,330	104,330
Net pension liability (asset)	\$ 35,782	\$ 13,441	\$ (3,894)

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
Notes to Financial Statements
December 31, 2016

10. Retirement Plan (continued)

Net Pension Liability (continued)

Pension Plan Fiduciary Net Position

Detailed information about the pension plan's Fiduciary Net Position is available in a separately-issued TCDRS financial report. That report may be obtained on the internet at www.tcdrs.org.

Pension Expense and Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

For the year ended December 31, 2016, the District recognized pension expense of \$3,339.

As of December 31, 2016, the District reported deferred outflows of resources and deferred inflows of resources related to pensions from the following sources:

	Deferred Inflows of Resources	Deferred Outflows of Resources
Differences between expected and actual experience	\$ -	\$ 27,139
Changes of assumptions	-	1,741
Net difference between projected and actual earnings	-	8,033
Contributions subsequent to the measurement date	N/A	26,422
Total	\$ -	\$ 63,335

\$26,422 reported as deferred outflows of resources related to pensions resulting from contributions subsequent to the measurement date will be recognized as a reduction of the net pension liability for the year ending December 31, 2017. Other amounts reported as deferred outflows and inflows of resources related to pensions will be recognized in pension expense as follows:

Valuation year ended December 31:	
2016	\$ 4,472
2017	4,472
2018	4,472
2019	4,167
2020	2,388
Thereafter	16,942

REQUIRED SUPPLEMENTARY INFORMATION

**UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
STATEMENT OF REVENUES, EXPENDITURES AND
CHANGES IN FUND BALANCE - BUDGET AND ACTUAL
GENERAL FUND
FOR THE YEAR ENDED DECEMBER 31, 2016**

	GAAP Basis			Variance Positive (Negative)
	Budgeted Amounts		Actual	
	Original	Final		
Revenues:				
Exception fees	\$ 15,000	\$ 15,000	9,400	(5,600)
Export fees	1,200	1,200	1,053	(147)
Penalties assessed	10,000	10,000	23,129	13,129
Forfeited deposits	3,000	3,000	6,300	3,300
New well registration fees	162,000	162,000	174,650	12,650
Semi-annual program income	1,050,000	1,050,000	755,697	(294,303)
Total program revenue	<u>1,241,200</u>	<u>1,241,200</u>	<u>970,229</u>	<u>(270,971)</u>
Investment earnings	28,596	28,596	35,066	6,470
Other sources	3,400	3,400	3,976	576
Total revenues	<u>1,273,196</u>	<u>1,273,196</u>	<u>1,009,271</u>	<u>7,046</u>
Expenditures:				
General government	1,197,150	1,197,150	921,330	275,820
Capital outlay	150,660	150,660	123,340	27,320
Total Expenditures	<u>1,347,810</u>	<u>1,347,810</u>	<u>1,044,670</u>	<u>303,140</u>
Excess (Deficiency) of Revenues Over (Under) Expenditures	<u>(74,614)</u>	<u>(74,614)</u>	<u>(35,399)</u>	<u>39,215</u>
Fund balance - beginning of year	<u>4,181,116</u>	<u>4,181,116</u>	<u>4,181,116</u>	<u>-</u>
Fund balance - end of year	<u>\$ 4,106,502</u>	<u>\$ 4,106,502</u>	<u>\$ 4,145,717</u>	<u>\$ 39,215</u>

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
SCHEDULE OF CHANGE IN NET PENSION LIABILITY
AND RELATED RATIOS
Last 10 Years (will ultimately be displayed)

Total Pension Liability	<u>2015</u>	<u>2014</u>
Service Cost	\$ 19,962	\$ 21,024
Interest on total pension liability	6,204	4,158
Effect of plan changes	(3,620)	-
Effect of assumption changes or inputs	1,886	-
Effect of economic/demographic (gains) or losses	26,243	3,650
Benefit payments/refunds of contributions	<u>(2,766)</u>	<u>-</u>
Net Change in Total Pension Liability	47,909	28,832
Total Pension Liability, beginning	<u>69,862</u>	<u>41,030</u>
Total Pension Liability, ending (a)	<u><u>\$ 117,771</u></u>	<u><u>\$ 69,862</u></u>
 Fiduciary Net Position		
Employer contributions	\$ 13,860	\$ 11,178
Member contributions	17,724	14,747
Investment income net of investment expenses	(1,459)	3,400
Benefit payments/refunds of contributions	(2,766)	-
Administrative expenses	(67)	(49)
Other	<u>246</u>	<u>(3)</u>
Net Change in Fiduciary Net Position	27,538	29,273
Fiduciary Net Position, beginning	<u>76,792</u>	<u>47,519</u>
Fiduciary Net Position, ending (b)	<u><u>\$ 104,330</u></u>	<u><u>\$ 76,792</u></u>
 Net Pension Liability (Asset), ending = (a) - (b)	 \$ 13,441	 \$ (6,930)
Fiduciary net position as a % of total pension liability	88.59%	109.92%
Pensionable covered payroll	\$ 354,472	\$ 294,939
Net pension liability as a % of covered payroll	3.79%	-2.35%

Note: This schedule is presented to illustrate the requirement to show information for 10 years. However, recalculations of prior years are not required, and if prior years are not reported in accordance with the standards of GASB 67/68, they should not be shown here. Therefore, we have shown only years for which the new GASB statements have been implemented

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
SCHEDULE OF EMPLOYER CONTRIBUTIONS
Last 10 Fiscal Years (will ultimately be displayed)

Year Ending December 31	Actuarially Determined Contribution	Actual Employer Contribution	Contribution Deficiency (Excess)	Pensionable Covered Payroll	Actual Contribution as a % of Covered Payroll
2012	10,266	10,266	-	252,239	4.1%
2013	10,948	10,948	-	269,002	4.1%
2014	11,178	11,178	-	294,939	3.8%
2015	13,860	13,860	-	354,472	3.9%

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
Notes to Required Supplementary Information
December 31, 2016

Budget

Annual operating budget is adopted on a basis consistent with generally accepted accounting principles for a governmental fund. The budget lapses at fiscal year end.

The Board of Directors follows these procedures in establishing budgetary data reflected in the financial statements:

- a. Prior to the beginning of the fiscal year, a proposed budget is submitted by the Finance Committee to the Board for approval.
- b. During the year, the Board may amend the budget.
- c. Budgetary control is maintained at the line item level, subject to adjustments permitted as described above.

Retirement Schedules

Valuation Date

Actuarially determined contribution rates are calculated as of December 31 and become effective in January 13 months later. GASB 68, Paragraph 81.2.b requires that the data in the Schedule of Contributions be presented as of the District's current fiscal year as opposed to the valuation measurement date as provided in other schedules of these financial statements.

Methods and Assumptions Used to Determine Contribution Rates

Actuarial Cost Method	Entry Age
Amortization Method	Level percentage of payroll, closed
Remaining Amortization Period	0.0 years (based on contribution rate calculated in 12/31/2015 valuation)
Asset Valuation Method	5-year smoothed market
Inflation	3.0%
Salary Increases	Varies by age and service. 4.9% average over career including inflation
Investment Rate of Return	8.00%, net of investment expenses, including inflation
Retirement Age	Members who are eligible for service retirement are assumed to commence receiving benefit payments based on age. The average age at service retirement for recent retirees is 61.
Mortality	In the 2015 actuarial valuation, assumed life expectancies were adjusted as a result of adopting a new projection scale (110% of the MP-2014 Ultimate Scale) for 2014 and later. Previously Scale AA had been used. The base table is the RP-2000 table projected with Scale AA to 2014.
Changes in Plan Provisions Reflected in the Schedule	No changes in plan provisions are reflected in the Schedule of Employer Contributions