UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT

Annual Report FYE 2015

General Manager's Report

On February 1, 2015 I took over as the General Manager of the District, and I can gladly report that I could not be happier with the decision I made or with the opportunity the Board of Directors gave me. I am also happy to report that the District met or exceeded each Management Plan objective for 2015, as you will read in the following pages and the independent auditor reported favorably about the District's financial position.

As with any change in management, there are bound to be a few bumps along the way, but largely due to a tremendous staff which grew from seven to eight total, I feel we have weathered them quite well. Below are a few highlights from 2015:

Staff:

- February: Doug Shaw started as General Manager. Richard Bowers (Interim GM), who we lost late in the year, stayed on through March to help me through the transition.
- April: The District added a 3rd Field Technician, Garrett Love as well as a new Office Assistant, Laina Furlong.
- May: Travis Hysmith decided to move on to greener pastures, as he we accepted to graduate school at Texas A&M in College Station. Also, Jillian North was promoted to Assistant General Manager.
- June: the District filled the Field Tech position vacated by Travis by Hiring Doug Bridwell, unfortunately due to unforeseen circumstances, Mr. Bridwell had to leave us after a short time.
- November: Corey Jones also decided to move on, and left the District just prior to Thanksgiving.
- December: With two vacant positions, Jillian and I felt that the District would be best served by hiring another full-time Field Technician, Jarod Briscoe, to replace Corey. In order to free Jillian's time for other duties, Cameron Goebel took over the role of Environmental Educator.
- I can honestly say that our office has come to resemble a family much more than when I first arrived.

Other Notable Accomplishments:

- In March, the Board approved an update to the District's Personnel Policy.
- Statute requires that each groundwater conservation district in the state has a Management Plan approved by the Texas Water Development Board (TWDB) every five years; the UTGCD's plan was up for renewal during the summer of 2015. Staff worked through the spring and early summer to update and revise the Management Plan and it was approved by TWDB in August.
- To help further enhance our well monitoring program, in the spring the District invested in 14 pressure transducers/data loggers. These instruments were

placed in wells in order to take daily water level readings. Moving forward, the District will likely be looking to invest in more of these devices.

- The District also released a new website and logo early in 2015.
- One of the first issues that jumped out at me as needing to be addressed upon my arrival at the District was the outdated Microsoft Access database being utilized to store the District's data. After several proposals and meetings, the District went under contract with Collier Consulting in September to produce a new web-based service to house and view the District's ever increasing data.
- 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 2015.

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

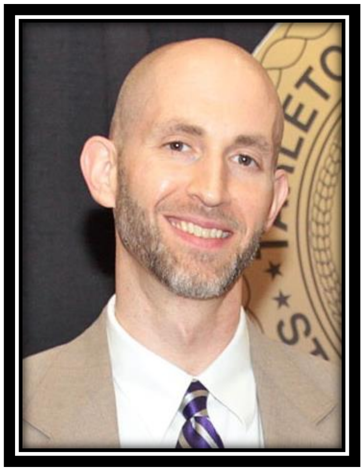
Brief History

- ✓ 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 UTGCD 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.

District Staff



Doug Shaw
General Manager

Jillian North
Public Relations/
Assistant General Manager

Ann Devenney
Office Manager

Cameron Goebel
Environmental Educator

Laina Furlong
Office Assistant

Jennifer Hachtel
Data Coordinator

Jarod Briscoe
Field Technician

Garrett Love
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
Dr. Robert Marlett – Director through July	Wise County
Donald Majka – Director since October	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

Lone windmill 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 2015, the District received 119 less water well registrations than in the previous year.

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. Moreover, there were more new water wells reported in Parker County (559) than in any other county.

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).

County	Exempt	Nonexempt	Existing	New	Total*
Hood	86	5	16	75	91
Montague	101	0	6	95	101
Parker	620	5	55	570	625
Wise	283	7	42	248	290
Total:	1,090	17	119	988	1,107

*UTGCD well counts based on applications submitted to the District

Groundwater Production Report

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

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

In the Groundwater Production Report for 2015, Public Water Supply production accounts for 86% of groundwater extracted from nonexempt wells. Wells in Hood County continue to produce the most water for Public Water Supply usage. Montague and Wise Counties lead the other counties for oil and gas production and exploration, although that category saw a sharp production decline compared to previous years. Most commercial/small business water usage continues to be in Wise County.

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 nonexempt well owners comply with the District's metering and reporting requirements.

Public Water Supply	Gallons Reported	Category Percentage
Hood	1,744,502,563	53%
Montague	81,605,118	2%
Parker	1,065,510,019	33%
Wise	417,315,919	13%
Total:	3,308,933,619	86%

Oil & Gas Production	Gallons Reported	Category Percentage
Hood	35,975,543	7%
Montague	99,653,792	20%
Parker	49,015,395	10%
Wise	320,820,745	63%
Total:	505,465,475	13%

Commercial/Business	Gallons Reported	Category Percentage
Hood	13,715,608	27%
Montague	2,310,400	5%
Parker	10,356,600	21%
Wise	24,025,500	48%
Total:	50,408,108	1.3%

2015 Grand Total:	3,864,807,202	

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.

Water line leaking into roadway

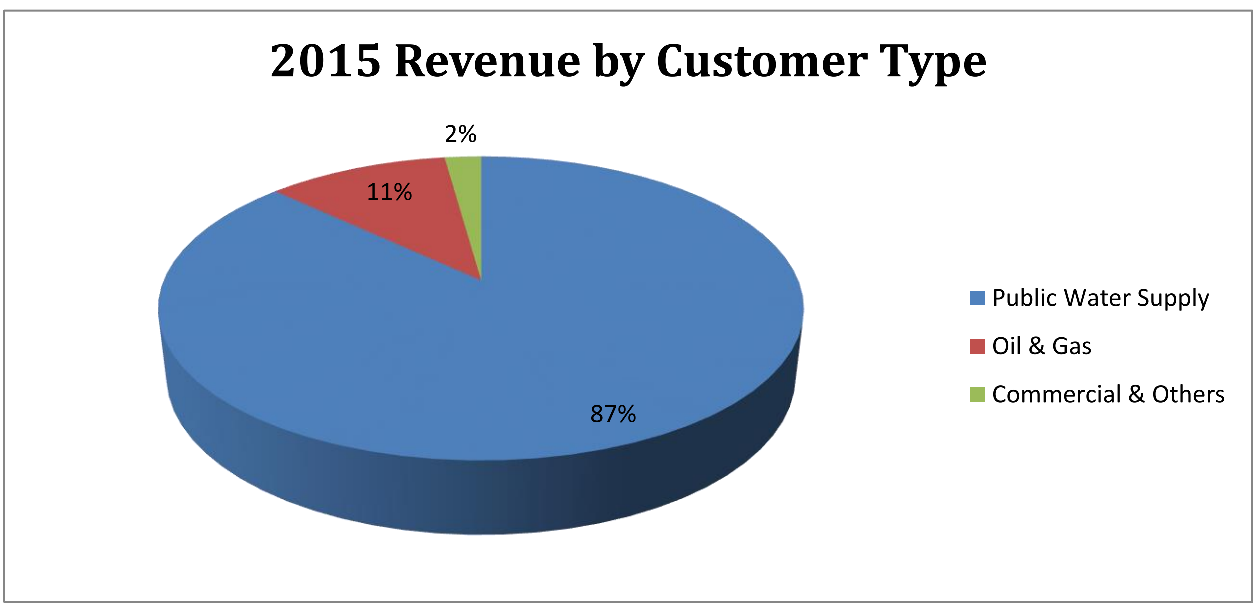
Water Use Fees

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

B.2 Performance Standard - Annual reporting of the total fees paid and total groundwater used by nonexempt 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. The top four revenue-generators for the District were all Public Water Suppliers: Aqua Texas (14.63%), City of Granbury (10.62%), Acton Municipal Utility District (10.43%), and City of Willow Park (4.88%). See Groundwater Volume section for production figures.

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



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. In 2015, 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.

Regional Water Planning Participation

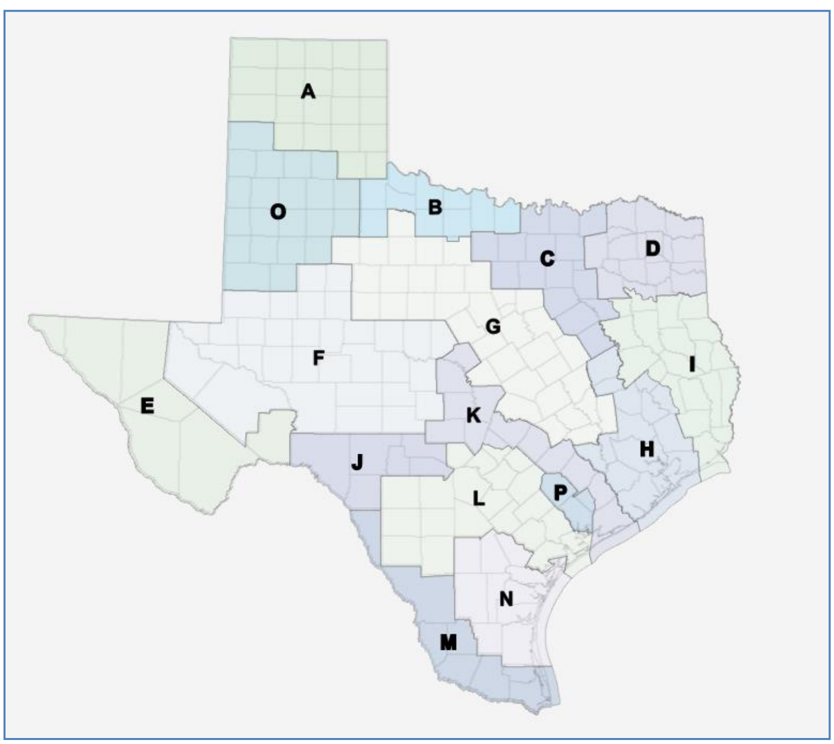
C.1 Objective - Each year the District will participate in the regional water planning process by attending at least one of the Region B, C or G Regional Water Planning Group Meetings to encourage the development of surface water supplies to meet the needs of water user groups within the District.

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
1/7/15	RWPG-B	Wichita Falls, TX	Doug Shaw & Tracy Mesler
2/11/15	RWPG-B	Wichita Falls, TX	Doug Shaw & Tracy Mesler
3/25/15	RWPG-B	Wichita Falls, TX	Doug Shaw & Tracy Mesler
4/28/15	RWPG-B	Wichita Falls, TX	Doug Shaw & Tracy Mesler
10/21/15	RWPG-B	Wichita Falls, TX	Doug Shaw & Tracy Mesler

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.

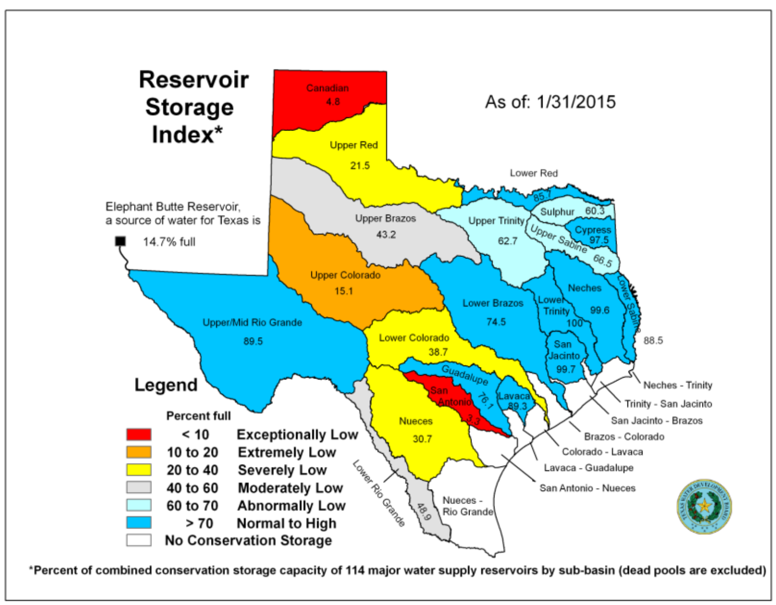
The National Drought Mitigation Center defines drought as “a deficiency of precipitation over an extended period of time--usually a season or more--resulting in a water shortage for some activity, group, or environmental sector.” (Source: http://drought.unl.edu/DroughtBasics/WhatisDrought.aspx). The 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 rapidly increased from 62.7% full in January to 96.5% full in December.

January

At the end of January, total storage in 114 of the state’s major water supply reservoirs was at 20.32 million acre-feet*, or 65% of their total conservation storage capacity. This is 695,074 acre-feet more than a month ago and 257,156 acre-feet more than the storage at this time last year.

Twenty-two reservoirs held 100% of conservation storage capacity. Fourteen (14) reservoirs were below 10% full: Electra (0%), O. C. Fisher (1%), Palo Duro (2%), E.V. Spence (2%), Meredith (3%), Abilene (3%), Medina (3%), Twin Buttes (3%), North Fork Buffalo Creek (4%), White River (4%), Champion Creek (6%), Mackenzie (7%), Millers Creek (8%), and Palo Pinto (9%).

Total combined storage was greater than 70% in the Trans-Pecos (90%), Upper Coast (94%) and East (94%) regions. The regions with the lowest percentage storage were the High Plains (5%) and Southern regions (32%). Storage declined in 1 region and increased in 8 regions over the past month.



Elephant Butte reservoir held 290,257 acre-feet, or 15% of storage capacity. This is 34,495 acre-feet more than a month ago.

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

February

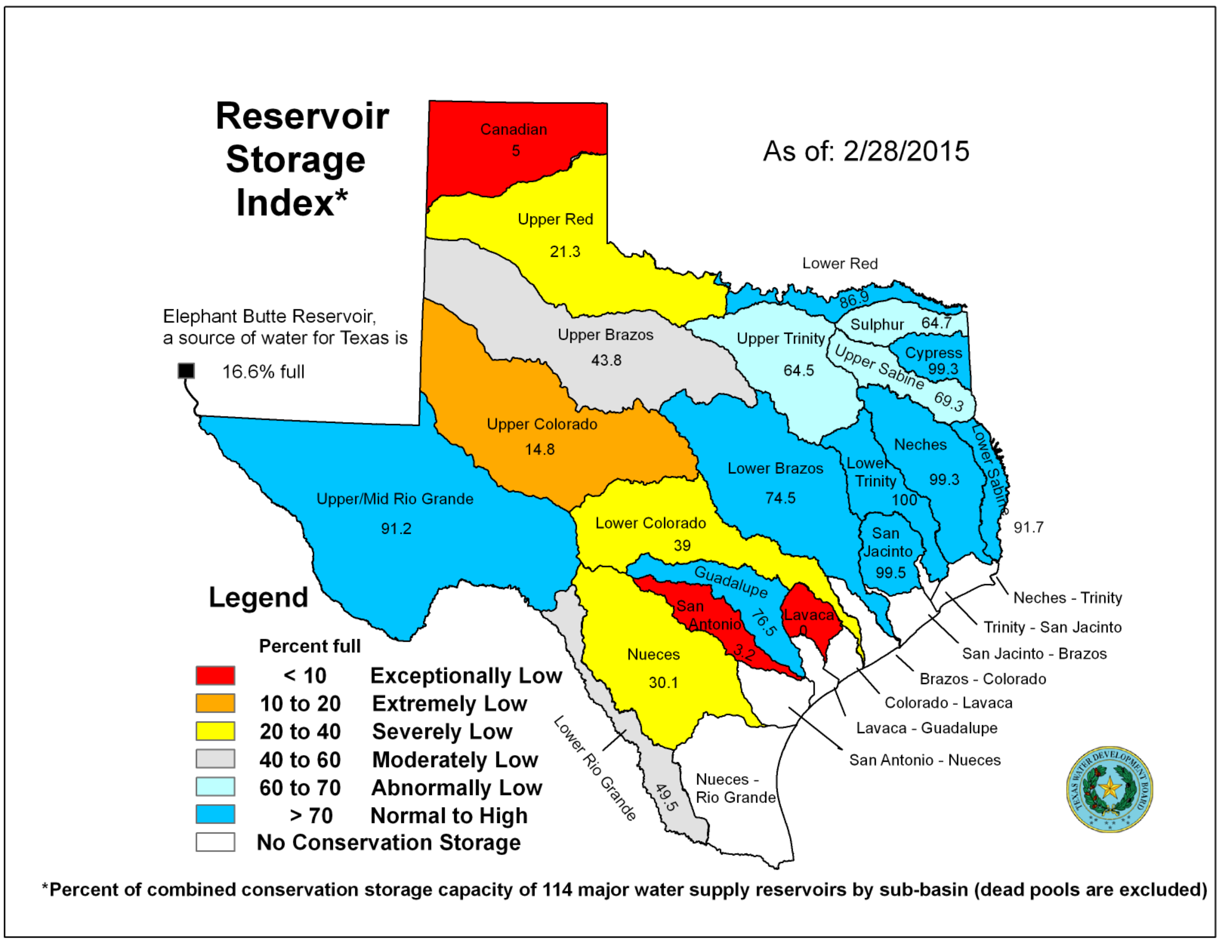
At the end of February, total storage in 114 of the state's major water supply reservoirs was at 20.59 million acre-feet*, or 66% of their total conservation storage capacity. This is 275,143 acre-feet more than a month ago and 463,825 acre-feet more than the storage at this time last year.

Nineteen reservoirs held 100% of conservation storage capacity. Fourteen (14) reservoirs were below 10% full: Electra (0%), O. C. Fisher (1%), Palo Duro (1%), E.V. Spence (2%), Abilene (3%), Medina (3%), Twin Buttes (3%), North Fork Buffalo Creek (3%), Meredith (4%), White River (4%), Champion Creek (6%), Mackenzie (7%), Millers Creek (8%), and Palo Pinto (8%).

Total combined storage was greater than 70% in the Trans-Pecos (91%), Upper Coast (100%) and East (95%) regions. The regions with the lowest percentage storage were the High Plains (5%) and Low Rolling regions (32%). Storage declined in 3 regions and increased in 6 regions over the past month.

Elephant Butte reservoir held 327,856 acre-feet, or 17% of storage capacity. This is 37,599 acre-feet more than a month ago.

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



March

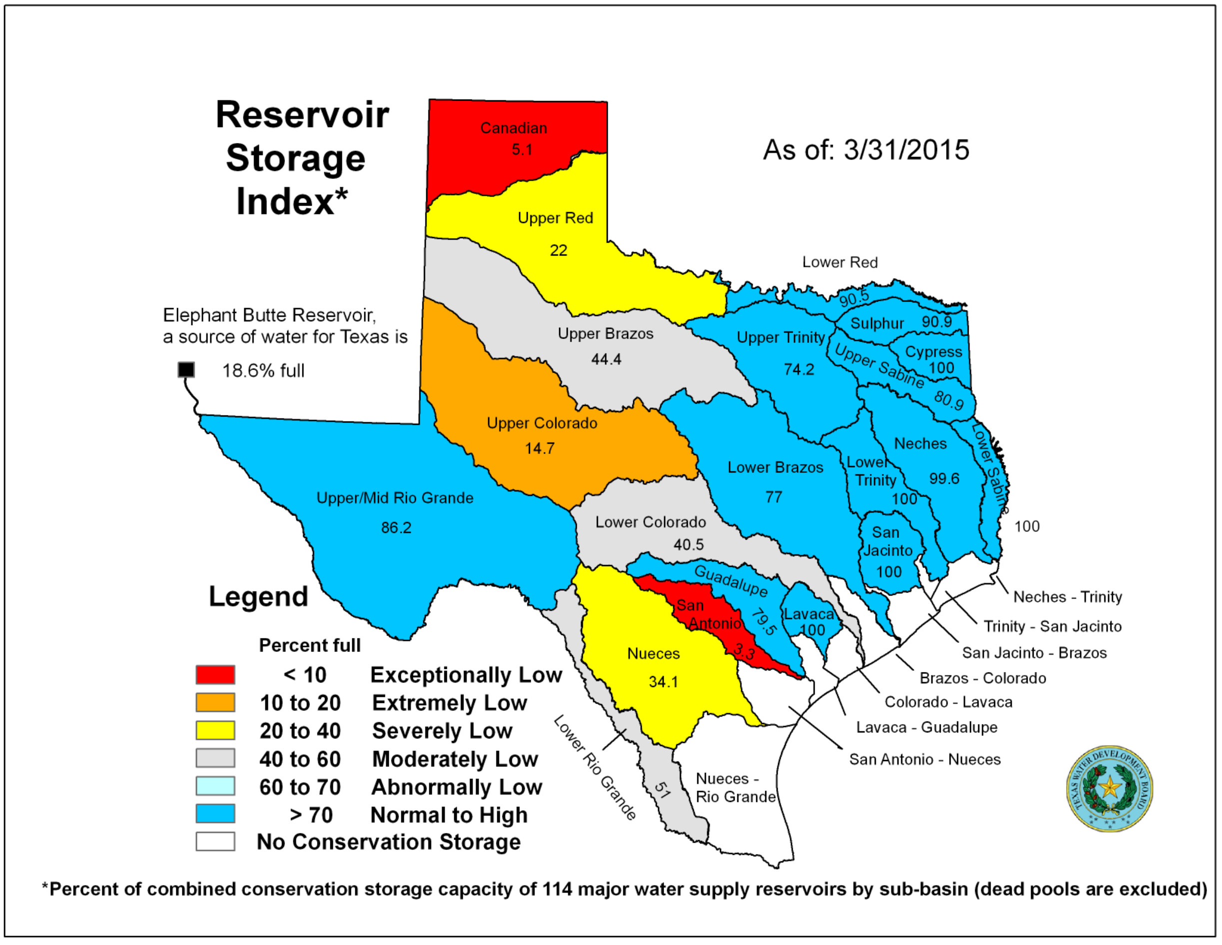
At the end of March, total storage in 114 of the state's major water supply reservoirs was at 21.89 million acre-feet*, or 70% of their total conservation storage capacity. This is 1.24 million acre-feet more than a month ago and 1.63 million acre-feet more than the storage at this time last year.

Thirty-five reservoirs held 100% of conservation storage capacity. Fourteen (14) reservoirs were below 10% full: Electra (0%), O. C. Fisher (1%), Palo Duro (1%), E.V. Spence (2%), Abilene (3%), Medina (3%), North Fork Buffalo Creek (3%), White River (3%), Twin Buttes (4%), Meredith (4%), Champion Creek (6%), Mackenzie (7%), Millers Creek (7%), and Palo Pinto (9%).

Total combined storage was greater than 70% in the North Central (73%), Trans-Pecos (86%), Upper Coast (100%) and East (99%) regions. The regions with the lowest percentage storage were the High Plains (5%) and Low Rolling regions (32%). Storage declined in 1 region and increased in 7 regions and remained unchanged in 1 region over the past month.

Elephant Butte reservoir held 367,162 acre-feet, or 19% of storage capacity. This is 39,306 acre-feet more than a month ago.

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



April

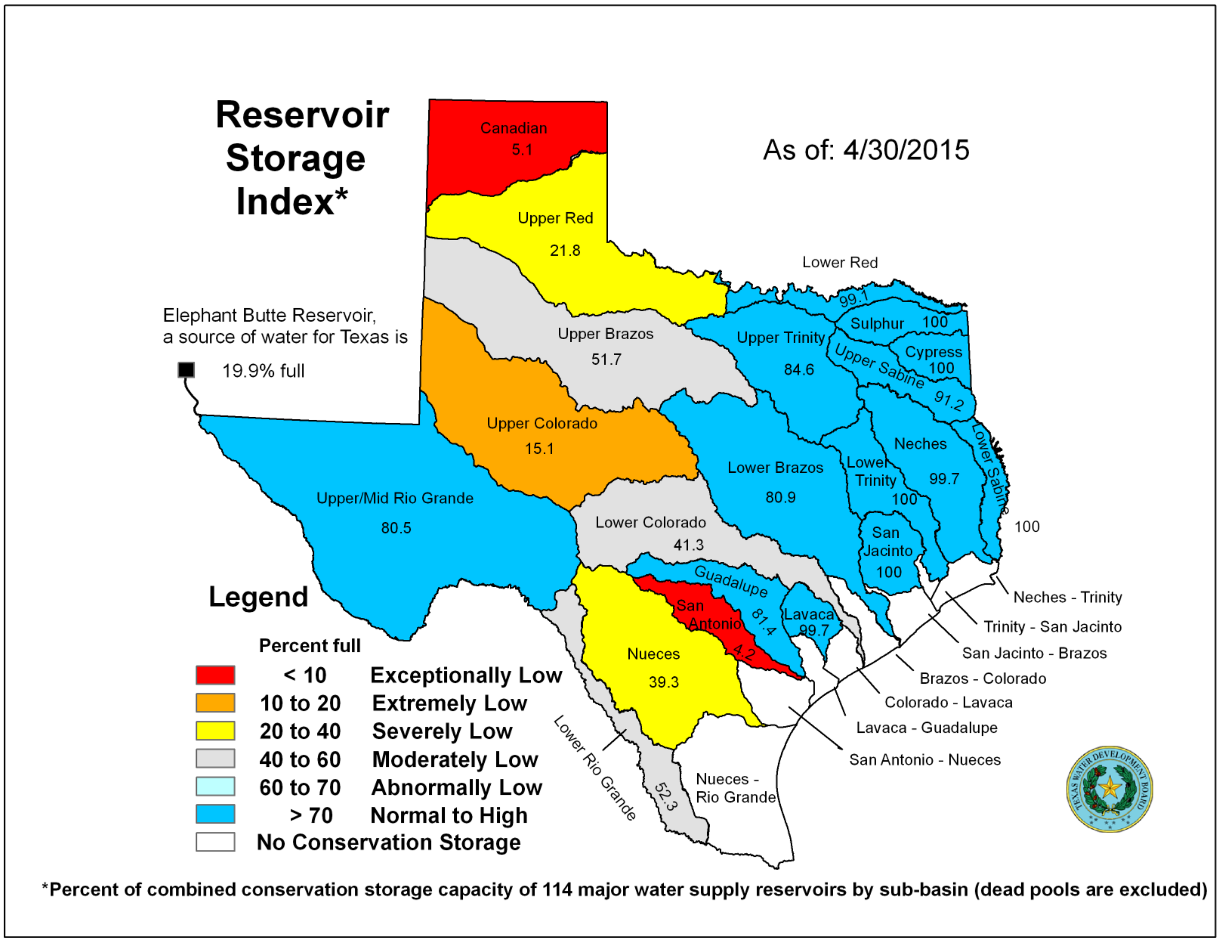
At the end of April, total storage in 114 of the state's major water supply reservoirs was at 23.24 million acre-feet*, or 74% of their total conservation storage capacity. This is 1.35 million acre-feet more than a month ago and 2.93 million acre-feet more than the storage at this time last year.

Fourty-five reservoirs held 100% of conservation storage capacity. Thirteen (13) reservoirs were below 10% full: Electra (0%), O. C. Fisher (1%), Palo Duro (1%), E.V. Spence (3%), Abilene (3%), Twin Buttes (3%), Medina (4%), North Fork Buffalo Creek (4%), White River (4%), Meredith (4%), Champion Creek (6%), Mackenzie (7%), and Millers Creek (8%).

Total combined storage was greater than 70% in the North Central (82%), Trans-Pecos (80%), Upper Coast (100%) and East (100%) regions. The regions with the lowest percentage storage were the High Plains (5%) and Low Rolling regions (32%). Storage declined in 2 regions and increased in 7 regions over the past month.

Elephant Butte reservoir held 392,696 acre-feet, or 20% of storage capacity. This is 25,384 acre-feet more than a month ago.

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



May

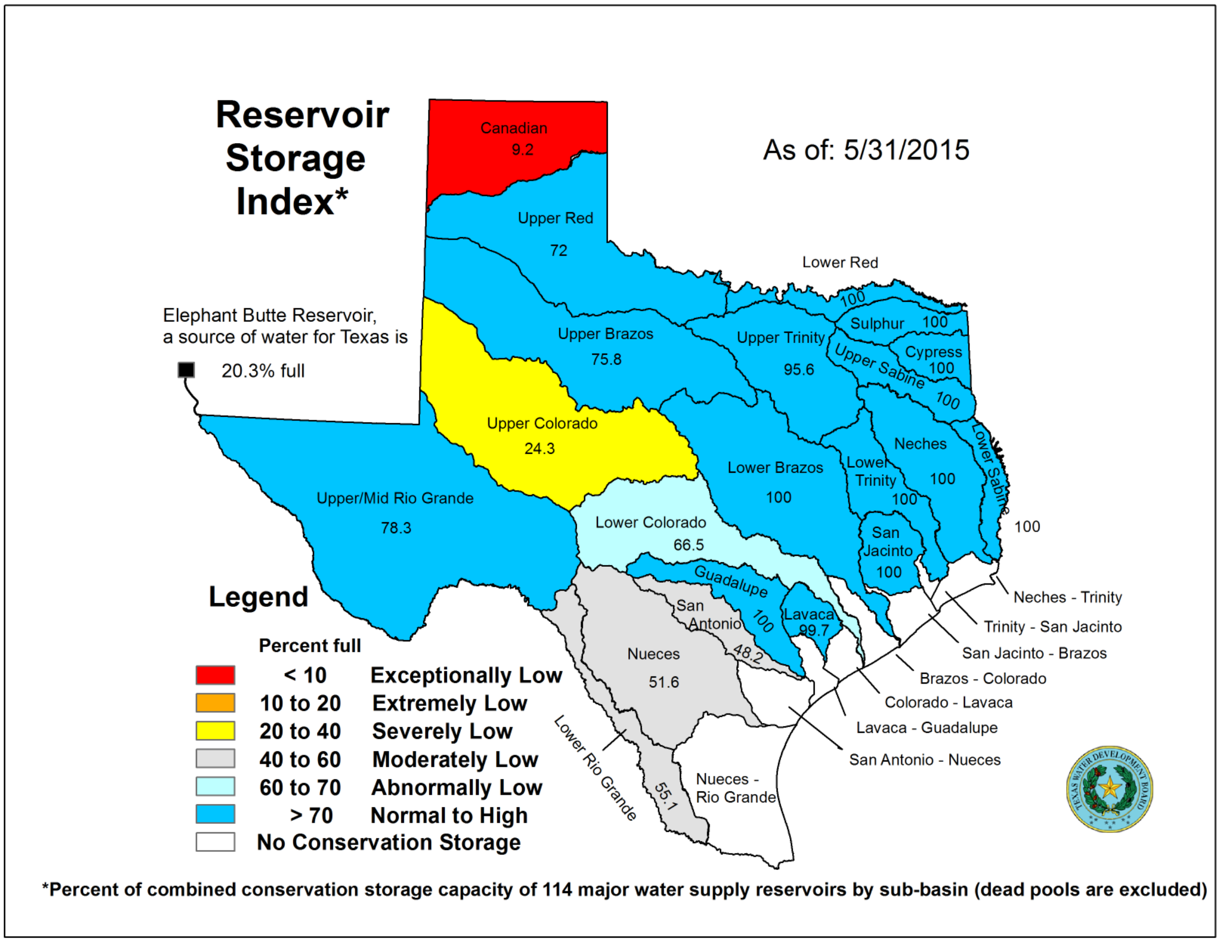
At the end of May, total storage in 114 of the state's major water supply reservoirs was at 26.2 million acre-feet*, or 83% of their total conservation storage capacity. This is 2.96 million acre-feet more than a month ago and 5.2 million acre-feet more than the storage at this time last year.

Seventy-three (73) reservoirs held 100% of conservation storage capacity. Of them, 2 in the Upper Coast region, 45 of 52 in the North Central region, and 21 of 23 in the East region. Seven (7) reservoirs remain below 10% full: Electra (0%), Abilene (3%), Palo Duro (3%), E.V. Spence (5%), Twin Buttes (6%), Meredith (6%), and Champion Creek (6%).

Total combined storage was greater than 70% in the Upper Coast (100%), East (100%), North Central (97%), South Central (79%), and Trans-Pecos (78%) regions. The regions with the lowest percentage storage were the High Plains (11%), Edwards Plateau (43%), and Southern (48%). Storage declined in 1 region and increased in 7 regions over the past month.

Elephant Butte reservoir held 399,965 acre-feet, or 20% of storage capacity. This is 7,107 acre-feet more than a month ago.

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



June

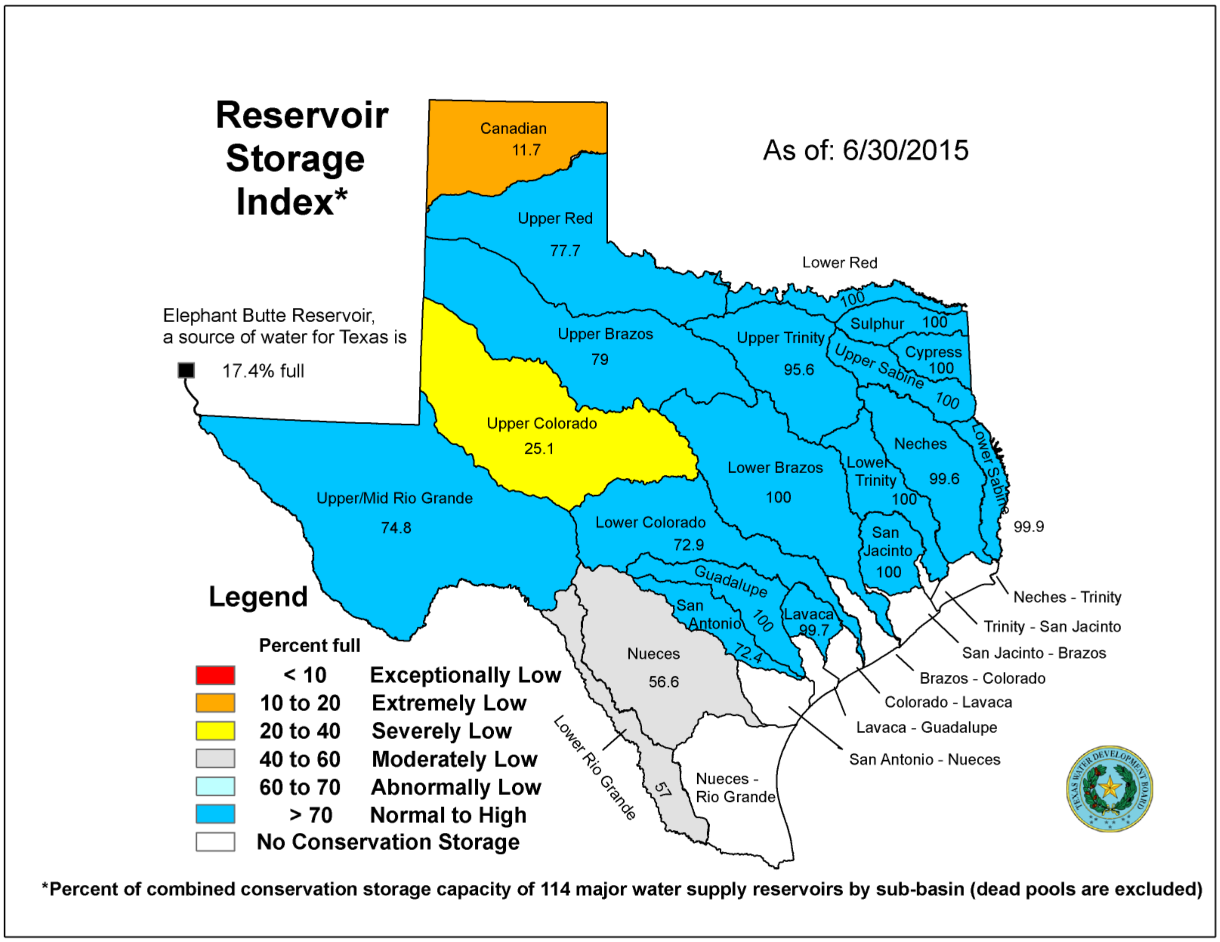
At the end of June, total storage in 114 of the state's major water supply reservoirs was at 26.5 million acre-feet*, or 84% of their total conservation storage capacity. This is 369,332 acre-feet more than a month ago and 5.24 million acre-feet more than the storage at this time last year.

Seventy-three (73) reservoirs held 100% of conservation storage capacity. Of them, 2 each in the Low Rolling and Upper Coast regions, 3 in South Central region, 1 in Southern region, 44 of 52 in the North Central region, and 21 of 22 in the East region. Seven (7) reservoirs remain below 10% full: Electra (0%), Palo Duro (2%), Abilene (3%), E.V. Spence (6%), Twin Buttes (7%), Champion Creek (7%), and Meredith (8%).

Total combined storage was greater than 70% in the Upper Coast (100%), East (100%), North Central (98%), South Central (87%), and Trans-Pecos (75%) regions. The regions with the lowest percentage storage were the High Plains (13%) and Edwards Plateau (45%). Storage declined in 2 regions and increased in 6 regions over the past month.

Elephant Butte reservoir held 344,071 acre-feet, or 17% of storage capacity. This is 55,852 acre-feet less than a month ago.

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



July

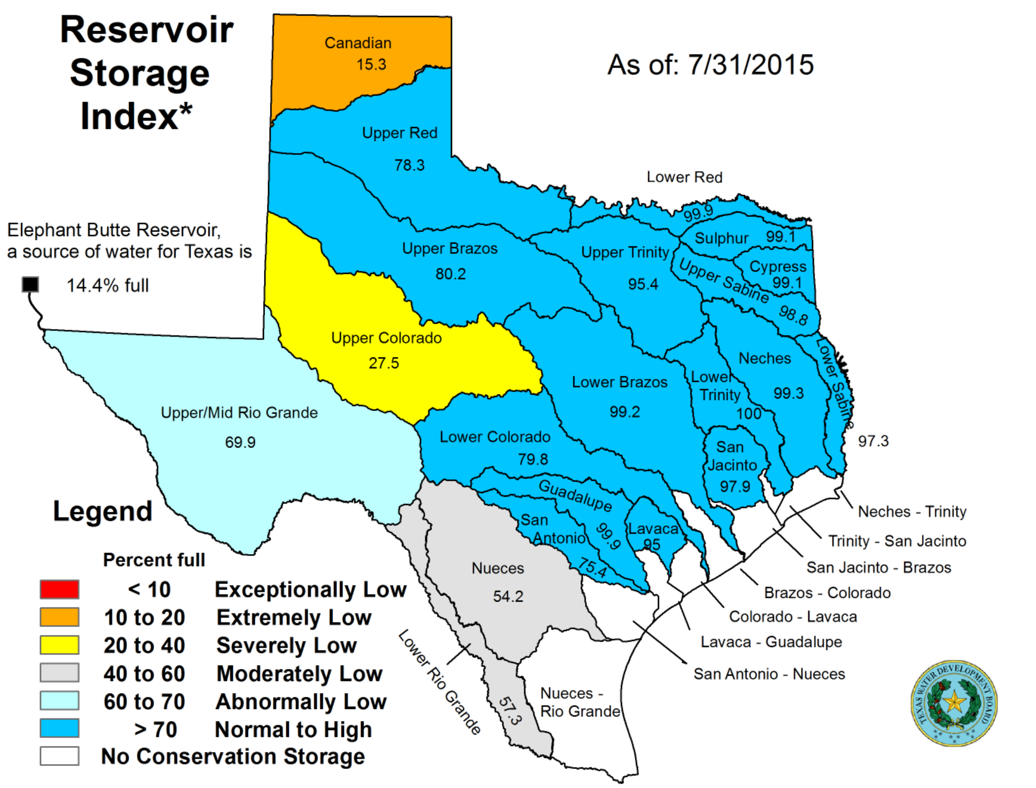
At the end of July, total storage in 114* of the state's major water supply reservoirs was at 26.6 million acre-feet**, or 85% of their total conservation storage capacity. This is 74,587 acre-feet more than a month ago and 5.5 million acre-feet more than the storage at this time last year.

Thirty-seven (37) reservoirs held 100% of conservation storage capacity, primarily in the North Central (27) and East (5) regions. Four (4) reservoirs remain below 10% full: Palo Duro (2%), Abilene (3%), E.V. Spence (8%), Twin Buttes (8%).

Total combined storage was greater than 70% in the East (99%), North Central (98%), Upper Coast (97%), South Central (87%) and Low Rolling (71%) regions. The regions with the lowest percentage storage were the High Plains (17%) and Edwards Plateau (49%). Storage declined in 6 regions and increased in 3 regions over the past month.

Elephant Butte reservoir held 283,474 acre-feet, or 14% of storage capacity. This is 60,597 acre-feet less than a month ago.

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



*Percent of combined conservation storage capacity of 114 major water supply reservoirs by sub-basin (dead pools are excluded)

August

At the end of August, total storage in 114* of the state's major water supply reservoirs was at 25.7 million acre-feet**, or 82% of their total conservation storage capacity. This is 477,138 acre-feet less than a month ago and 5.8 million acre-feet more than the storage at this time last year.

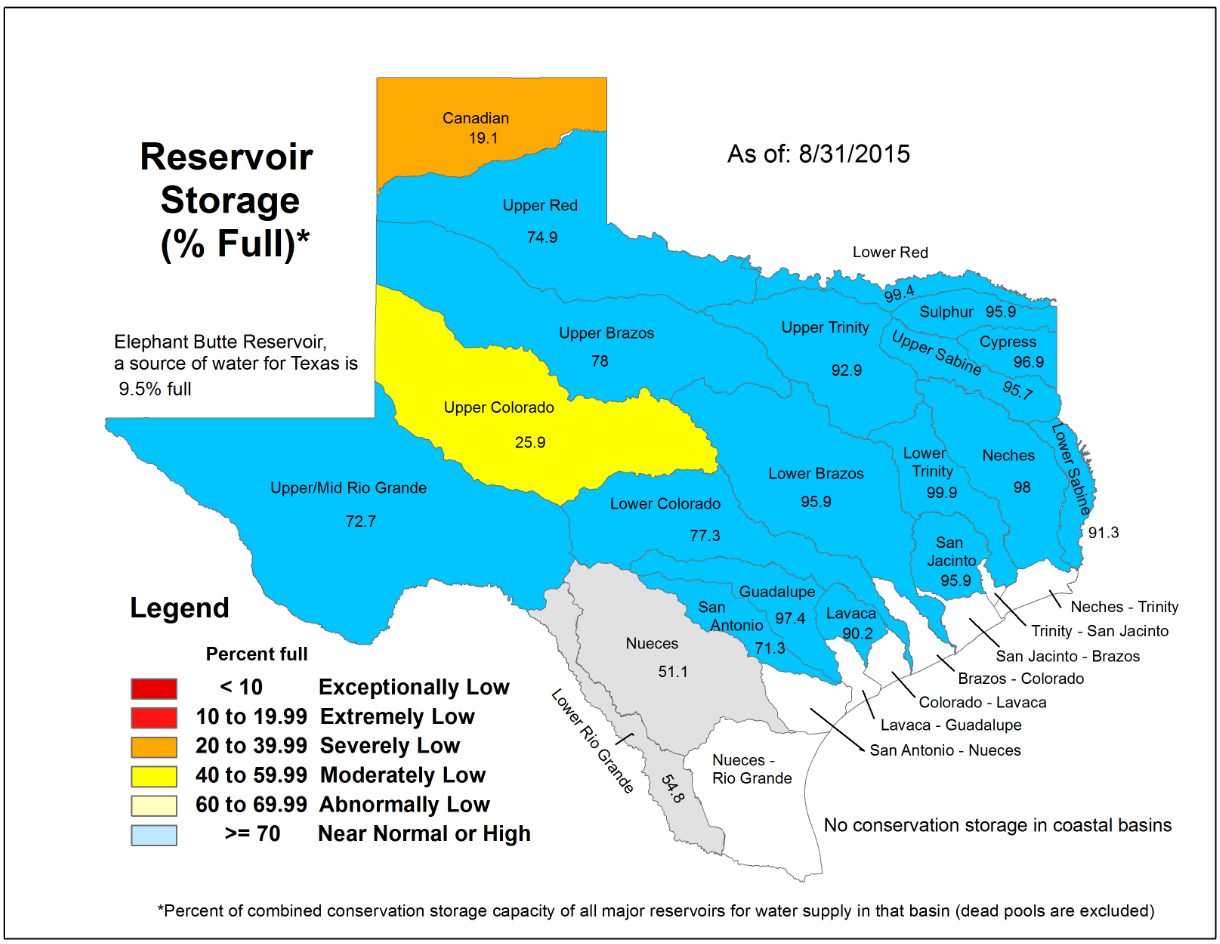
Fifteen (15) reservoirs held 100% of conservation storage capacity, primarily in the North Central (10) and East (3) regions. Four (4) reservoirs remain below 10% full: Palo Duro (3%), Abilene (3%), Twin Buttes (6%), E.V. Spence (7%).

Total combined storage was greater than 70% in the East (96%), North Central (95%), Upper Coast (94%), South Central (84%) and Trans-Pecos (73%) regions. The regions with the lowest percentage storage were the High Plains (20%), Edwards Plateau (48%) and Southern (48%). Storage declined in 6 regions and increased in 3 regions over the past month.

Elephant Butte reservoir held 186,571 acre-feet, or 9% of storage capacity. This is 96,903 acre-feet less than a month ago.

* Nasworthy Reservoir has been added to and Lake Electra removed from our report beginning August 2015.

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



September

At the end of September, total storage in 114* of the state's major water supply reservoirs was at 24.94 million acre-feet**, or 79% of their total conservation storage capacity. This is 879,138 acre-feet less than a month ago but 4.88 million acre-feet more than the storage at this time last year.

Eight (8) reservoirs held 100% of conservation storage capacity, primarily in the North Central (5) region. Four (4) reservoirs remain below 10% full: Palo Duro (3%), Abilene (3%), Twin Buttes (6%), E.V. Spence (7%).

Total combined storage was greater than 70% in the Upper Coast (94%), East (92%), North Central (92%), Trans-Pecos (88%) and South Central (81%) regions. The regions with the lowest percentage storage were the High Plains (19%), Edwards Plateau (47%) and Southern (46%). Storage declined in 8 regions and increased in 1 region over the past month.

Elephant Butte reservoir held 168,339 acre-feet, or 9% of storage capacity. This is 18,232 acre-feet less than a month ago.

* Nasworthy Reservoir has been added and Lake Electra removed from our report beginning in August 2015.

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

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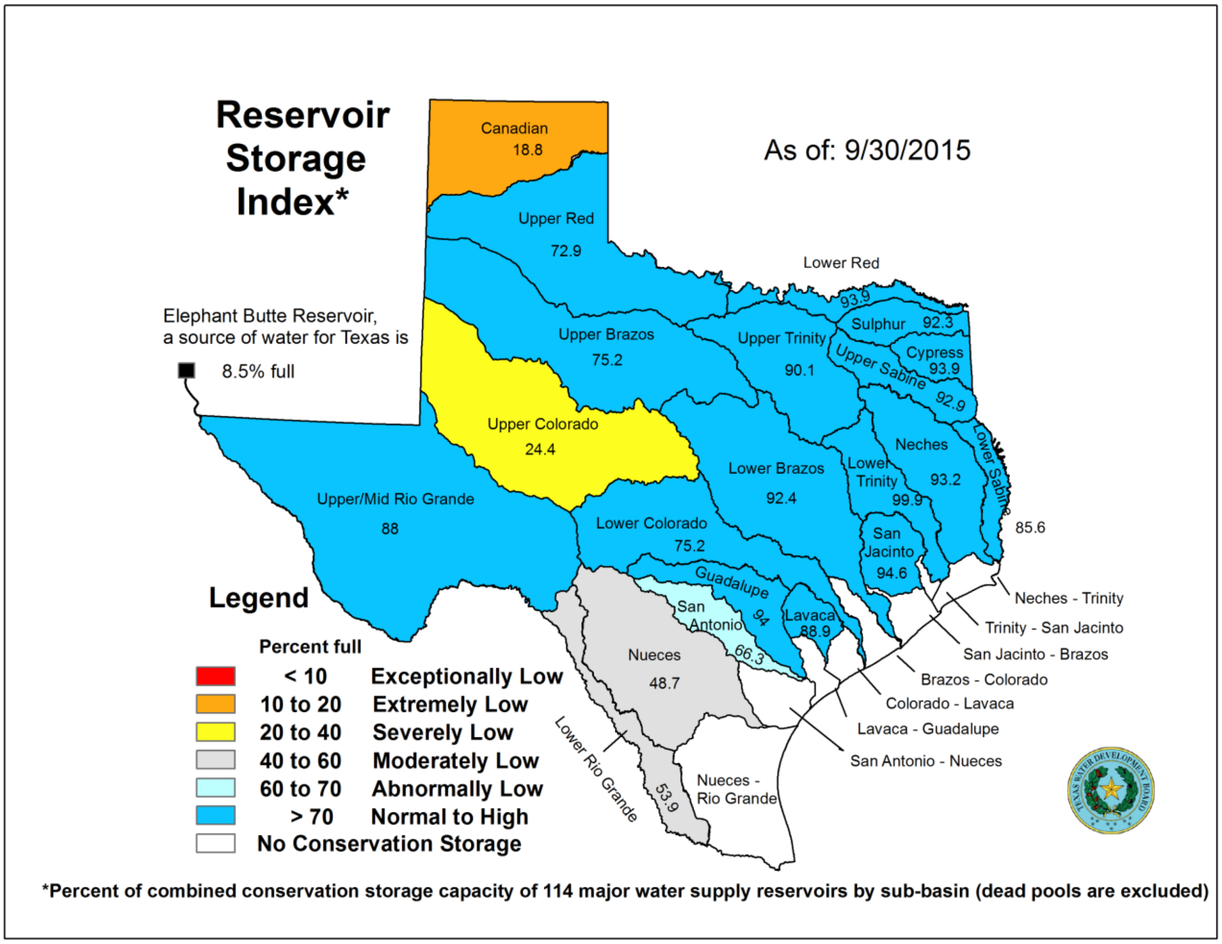


October

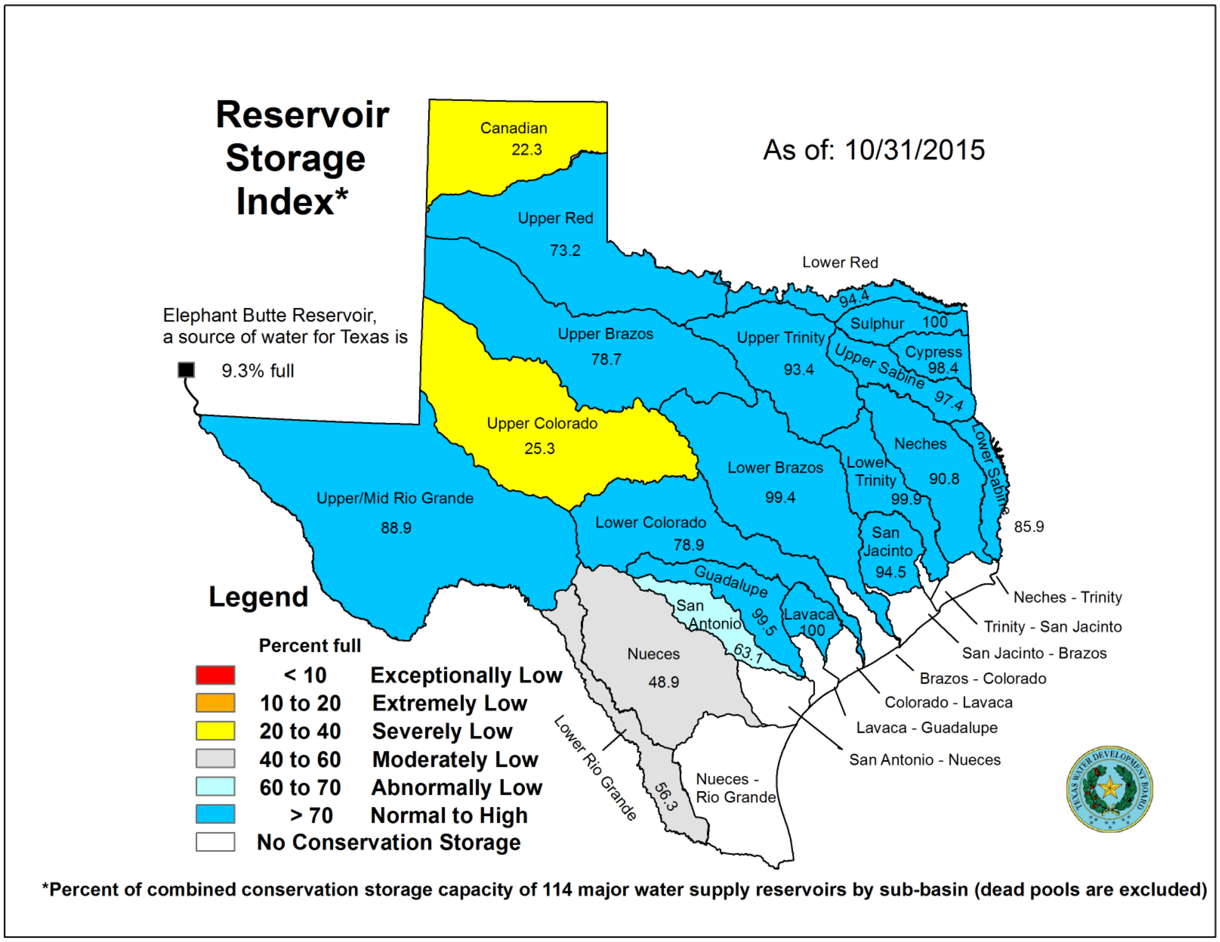
At the end of October, total storage in 114* of the state's major water supply reservoirs was at 25.4 million acre-feet**, or 82% of their total conservation storage capacity. This is 823,172 acre-feet more than a month ago and 6.11 million acre-feet more than the storage at this time last year.

Fourty-three (43) reservoirs held 100% of conservation storage capacity, primarily in the North Central (30) and East (9) regions. Four (4) reservoirs remain below 10% full: Palo Duro (5%), Abilene (3%), Twin Buttes (5%), E.V. Spence (9%).

Total combined storage was greater than 70% in the East (93%), North Central (96%), Upper Coast (100%), South Central (85%) and Trans-Pecos (89%) regions. The regions with the lowest percentage storage were the High Plains (22%), Edwards Plateau (49%) and Southern (48%). Storage declined in 2 regions and increased in 7 regions over the past month.

Elephant Butte reservoir held 182,724 acre-feet, or 9% of storage capacity. This is 14,384 acre-feet more than a month ago.

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



November

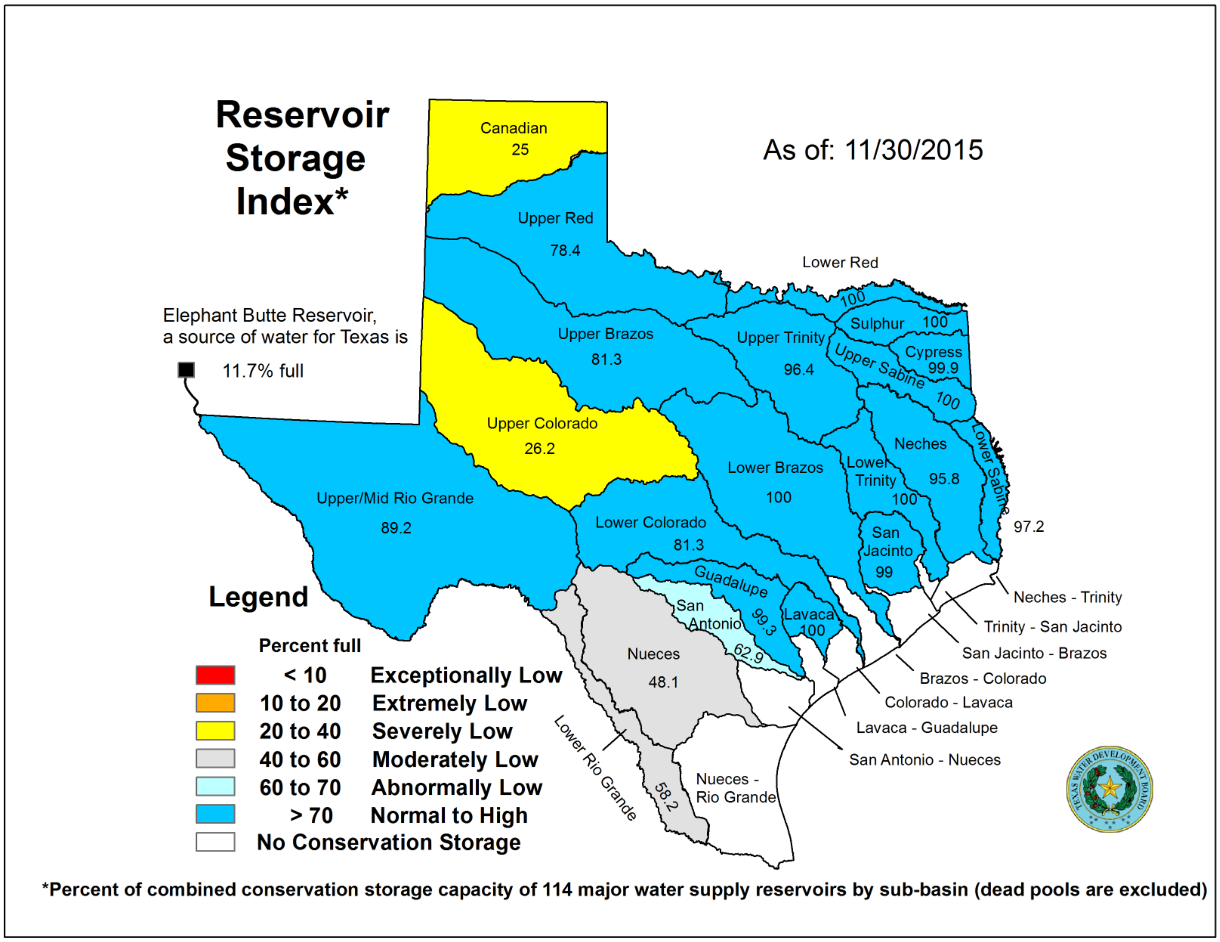
At the end of November, total storage in 114 of the state's major water supply reservoirs was at 26.45 million acre-feet*, or 85% of their total conservation storage capacity. This is 935,055 acre-feet more than a month ago and 6.85 million acre-feet more than the storage at this time last year.

Sixty-six (66) reservoirs held 100% of conservation storage capacity, primarily in the North Central (46) and East (16) regions. Three (3) reservoirs remain below 10% full: Abilene (4%), Twin Buttes (5%), E.V. Spence (9%).

Total combined storage was greater than 70% in the Upper Coast (100%), East (98%), North Central (98%), Trans-Pecos (89%) and South Central (88%) regions. The regions with the lowest percentage storage were the High Plains (25%), Southern (49%) and Edwards Plateau (50%). Storage increased in 8 regions and remained unchanged in 1 region over the past month.

Elephant Butte reservoir held 230,735 acre-feet, or 12% of storage capacity. This is 48,011 acre-feet more than a month ago.

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



December

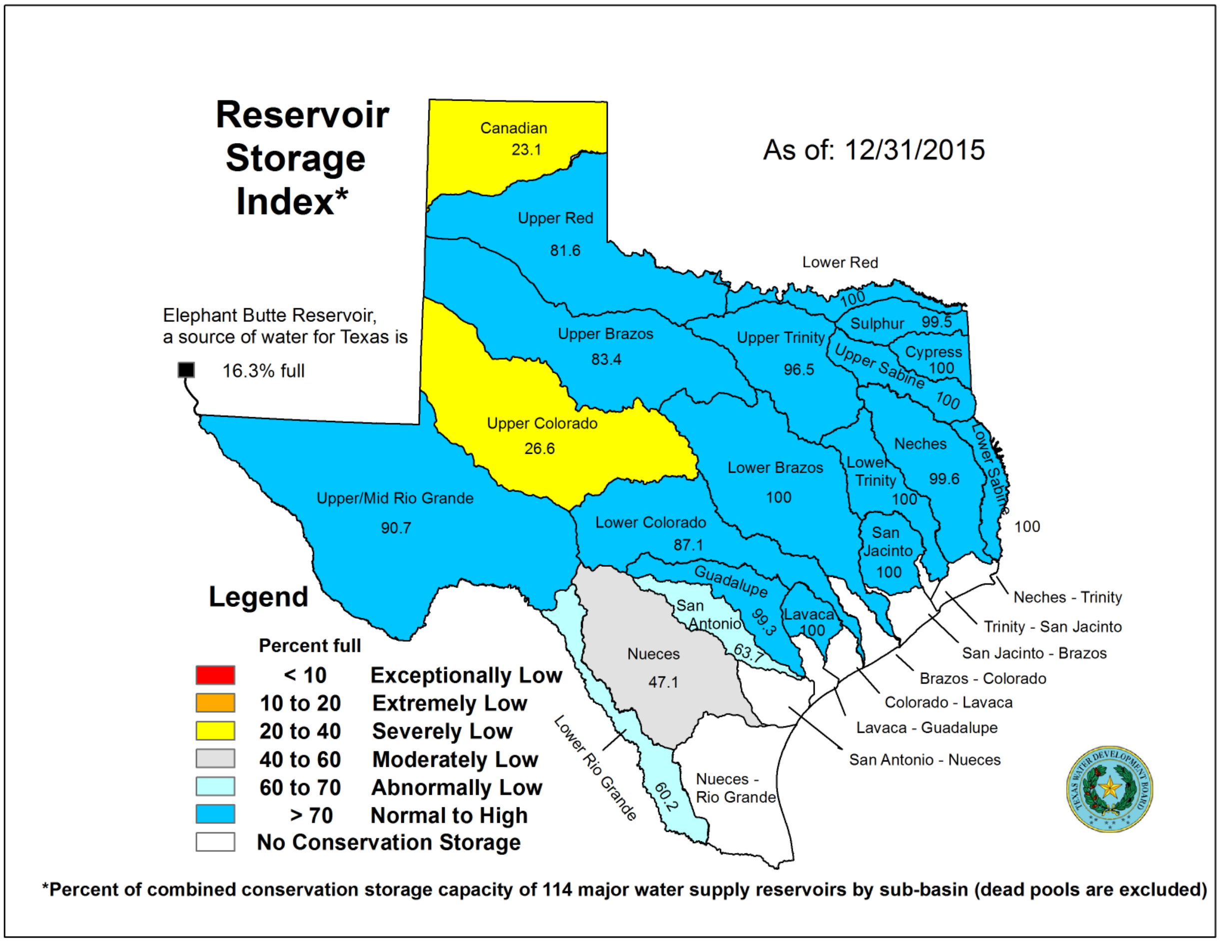
At the end of December, total storage in 114 of the state's major water supply reservoirs was at 26.74 million acre-feet*, or 86% of their total conservation storage capacity. This is 316,404 acre-feet more than a month ago and 7.13 million acre-feet more than the storage at this time last year.

Seventy-two (72) reservoirs held 100% of conservation storage capacity, primarily in the North Central (46) and East (20) regions. Two (2) reservoirs remain below 10% full: Palo Duro (4%), Twin Buttes (5%).

Total combined storage was greater than 70% in the Upper Coast (100%), East (100%), North Central (98%), Trans-Pecos (91%), South Central (91%), and Low Rolling Plains (74%) regions. The regions with the lowest percentage storage were the High Plains (23%) and Southern (50%) regions. Storage increased in 8 regions and remained unchanged in 1 region over the past month.

Elephant Butte reservoir held 321,201 acre-feet, or 16% of storage capacity. This is 90,261 acre-feet more than a month ago.

* 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 nonexempt water users distributed in the normal course of business for the District.
E.3 Performance Standard - Each year, a copy of the water conservation mailout 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 2015.

Groundwater conservation district encourages rainwater harvesting

By Jillian North
Upper Trinity Groundwater Conservation District

Those who have experienced a rainstorm in Texas know they can come as quickly as they go. It is important to consider alternative sources of water for non-essential activities such as lawn and landscape irrigation.

The Upper Trinity Groundwater Conservation District reminds residents that rainwater harvesting is beneficial for the lawn and the aquifer underneath.

Rainfall is the main source of recharge for an aquifer, whereas transference from rivers and lakes provide only about 10 percent of recharge to aquifers.

Rainwater harvesting catches the rain before it soaks into the ground, where it can be stored and used later for lawn irrigation. Rainwater is then returned to the ground where it can replenish groundwater resources.

Rainwater harvesting can reduce the volume of stormwater, lessening the impact on erosion and decreasing the load on storm sewers, according to the president of Rainwater Management Solutions who said. "It's an opportunity to collect water from off roofs, and in fact reuse that water, keep it onsite, which eliminates a huge portion of stormwater runoff."

Decreasing stormwater volume helps keep potential stormwater pollutants, such as pesticides, fertilizers, and petroleum products out of rivers and groundwater. This method is preferred over irrigation systems that rely on pumping usable freshwater from the aquifer for watering lawns and gardens.

To save water during the summer, be sure to set up the rainwater harvesting system so it is ready to catch all the rain it can. Necessary instruments for a rainwater system include catchment surface, conveyance system, storage and distribution feature.

These elements can be simple or fairly complex depending on their purpose, but either way, there is no reason not to harvest rainwater. Call the district office to learn more about rainwater harvesting and local seminars to attend at 817-523-5200.

Bearcat Nation 101
...The Tradition Starts Here

AISD
from page one

our community and talk to them about the Aledo way and what makes this such an attractive community.

"We want to kind of kick the rocks out of the road to help them along the way. The credit for this goes to Denise Dugger (Executive Director of Accountability and Professional Development) and to the Teacher Leader Academy who have taken this on as a project this year and have done a fantastic job. They have been working on this for quite some time."

Dugger said that the Teacher Leader Academy wanted to look at a way to improve community and student engagement.

"They sent a survey to the new parents in the district last year and asked them what would have helped them to be more acclimated to the Aledo ISD," she said. "They were asked what kind of things would they have liked to find out about sooner.

"The parents gave us a list of things and we took all those things and broke into committees and have contacted all the student services that are available in the community and they will be in one place at the high school cafeteria.

"There will be reps from the library and pre-schools in the area as well as Boy Scouts, Girl Scouts, AdvoCats – and different parent organizations like the Aledo Education Foundation. Parents can go through and get information and actually talk to the people involved. They can get connected to the community. We are real excited about this."

"If this is successful we want to do this annually," Citty said.

"This is an excellent example of community engagement," trustee Bobby Rigues said. "I think it is fantastic."

Citty added that he will ask each principal to attend.

Aledo High School principal Dan Peterson introduced the new AHS assistant principal, David Stubbs. Following a closed session, it was announced that Aledo High School graduate Jack Bean was hired to be a new assistant principal at Aledo Middle School.

A report from the Aledo Education Foundation noted that the organization's annual golf tournament at Split Rail Golf and Links raised $56,000 for teacher grants.

"That is an increase of $16,000 from last year's tournament," Citty said.


Stubbs

He added that a grant from AEF of $40,000 provided playground equipment for special needs students and that the construction is under way.

"AEF's goal this year is to raise $100,000 for teacher grants," Citty said.

In other business, trustees approved a local policy update; adoption of an order authorizing the issuance of unlimited tax bonds series 2015; acceptance of the proposal for controlled entries at Vandagriff and Stuard elementary schools, Aledo Middle School and McAnally Intermediate for $194,500 to Buford-Thompson Co.; approved schematic design for Coder Elementary controlled entry addition; and the purchase of technology equipment for the district's storage area network from Texserve for $130,963.

Trustees named Rigues as the TASA/TASB convention delegate (Jay Stringer is the alternate), and trustees approved nominating Dr. Ann Calahan of Stephenville ISD to the TASB board of directors to represent the area.

THE COMMUNITY NEWS

The Community News (USPS 005-341) is published each week by Community Ventures Inc., at 203 Pecan Dr., Aledo, TX 76008. Periodical rate postage paid at Aledo, Texas 76008.
POSTMASTER: Send address changes to : The Community News, P.O. Box 1031, Aledo, Texas 76008

Group urges to use water wisely

Springtown Epigraph | March 5, 2015

National Groundwater Awareness Week is March 8-14, and, in an effort to promote the event, the Upper Trinity Groundwater Conservation District has shared some tips to help protect our water supply.

Although programs exist to help protect our sources of drinking water, including groundwater, users are the most important actors in protecting these resources.

Protecting sources of groundwater is also up to users. Texans are fortunate to have the advantage of vast natural resources, among them clean and safe sources of drinking water.

However, to ensure these continued resources, everyone needs to take a greater role in protecting sources of drinking water.

Here are some recommendations from the Upper Trinity Groundwater Conservation District headquartered in Springtown:

Be aware

Do you know where the tap water in your house comes from? Is it groundwater or surface water? Does it come from a spring, lake or other public water supply? Are there potential sources of contamination nearby?

Be mindful

Protect groundwater from household pollutants.

Do you use household chemicals and dispose of them down the drain? Cut down on household chemical use and learn to dispose of chemicals properly.

When using chemicals on your lawn and garden, do you follow the label directions? More is not better with these products.

Use less

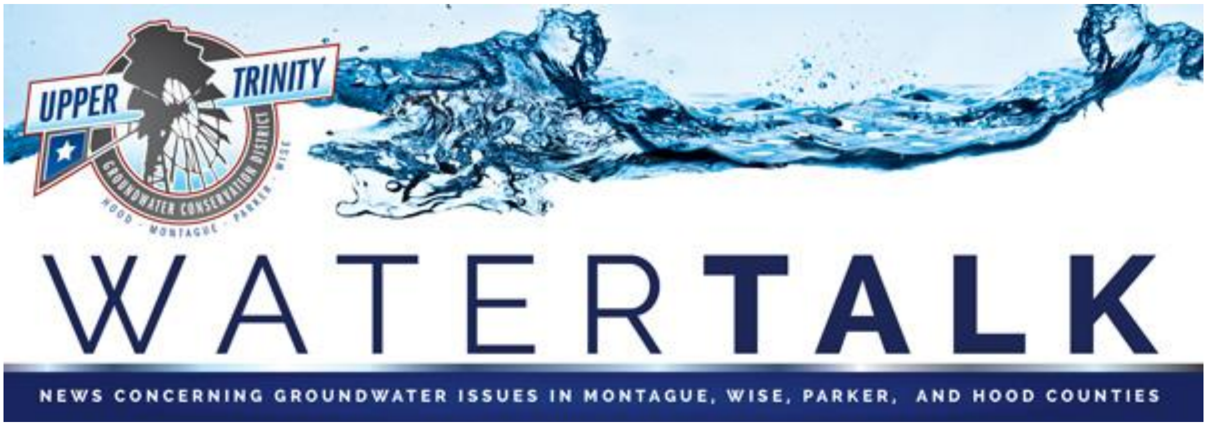
What are the main uses of water in your household? How can you cut back on use and waste?

Is the shower running for five minutes before you climb in? That’s 25 gallons.

Didn’t finish that glass of water? Don’t pour it down the drain, water a plant.

Do you use drought tolerant landscaping specific to your region? If not, try some of the water conservation practices recommended by the Texas Water Development Board.

View this email in your browser



Reminder: Please consult the District spacing guide here when planning new water wells. If spacing cannot be met, please contact the District office at 817-523-5200 to speak to a Field Technician.

latest news

Data Loggers

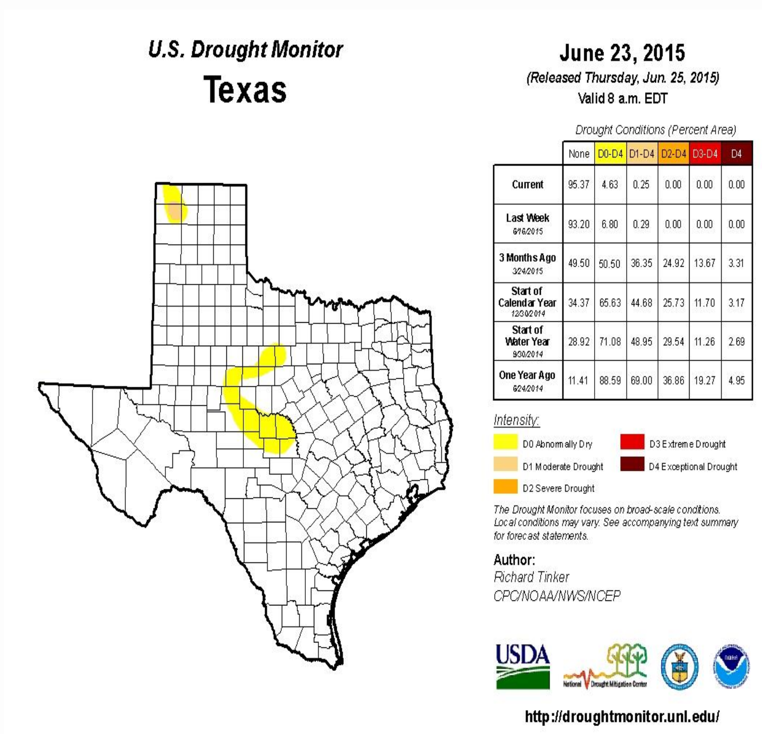
The District has purchased and installed 14 new OTT Orpheus ecoLog 500 data loggers in order to get more up-to-date water levels throughout the District. The loggers were purchased in March 2015 and installed the following month into wells selected from the District monitoring program. Readings are taken by field

prevention

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

technicians on a monthly basis, however, the transducers are programmed to record every 15 minutes, providing the District with a considerable amount of information on local areas. Currently, the 14 wells have shown a vast amount of recharge due to recent rainfall. The District hopes to have this information available soon on the District website, however, the information can be provided at any time upon request by contacting the District office.

drought status



- Water before 10am and 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 3:
Office closed for Independence Day

July 20:
Board Meeting
5pm, District office

August 17:
Board Meeting
5pm, District Office

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.

DISTRICT GUIDE TO APPLYING FOR A WATER WELL

- Determine type of well:
  - **New well-** any well drilled after 2009
  - **Existing well-** any well drilled before 2009
  - **Replacement well-** any well drilled within 50 ft of an original well
  - **Test Hole or Dry Hole-** any excavation done in exploration for water
- Determine classification of well:
  - **Exempt well**
    - Wells used solely for domestic use, livestock use, poultry use, or agricultural use;
    - Wells equipped to produce less than 25 gallons per minute
    - Leachate wells and monitoring wells.
  - **Non-exempt well-**
    - Wells that are used in whole or in part for any purpose of use other than solely for domestic use, livestock use, poultry use, or agricultural use and equipped to produce more than 25 gpm.

- Fill out and submit a permit application, along with any required fees.
- District staff reviews application for completeness.
- Application will be reviewed **in 1-5 days** after determined administratively complete, or driller or owner is contacted for further information.
- If the application is approved, the driller is contacted by phone and email. Drilling may commence **within the next 120 days.**
- Once drilling is complete, the well log is due to the District **within 60 Days.**
- After completion report is submitted, the driller's deposit is refunded and registration packet is mailed to well owner.

EXCEPTIONS

- Exception for a new well equipped to produce *less than 17.36 gpm:*
  - configured *before 2009:*
    - Fill out Exception Filing Form.
    - Submit application and $50 filing fee to District.
    - Exception is filed with county clerk and paperwork returned to applicant in registration packet.
  - configured *after 2009:*
    - Fill out Exception Filing Form.
    - Fill out Application for Exception
    - Fill out Adjacent Owner Consent Form.
    - Submit applications, consent forms, and $50 filing fee to District.
    - Exception is filed with county clerk and paperwork returned to applicant in registration packet upon approval.
    - If consent forms are not obtained, a public hearing must be set at the next board meeting that allows 10 days notice to the public and application approval or denial is decided by

the Board of directors.

- Exception for a new well equipped to produce *more than 17.36 gpm*:
    - A public hearing must be set at the next board meeting that allows 10 days notice to the public and application approval or denial is decided by the Board of directors.

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.
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 2015. 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. Figure A, included below, was created as part of the phase II analysis and shows location and associated aquifers for the wells that where part of the program at that time.

In 2015, water-level measurements were obtained from the wells in the monitoring network on a quarterly basis. At the end of 2015, the network consisted of 118 wells. This was due to 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.

In the spring of 2015, the District purchased and installed 14 pressure transducers, which have been recording daily water level readings throughout the year. Locations and associated aquifers for these wells 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 72 monitoring wells was conducted in 2015 to provide insight into long-term water-level changes in the District. The analysis was conducted for the 10-year period from 2005 to 2015. Trends were developed for wells with three or more water-level measurements during this time period. Table 1 summarizes the average water-level changes obtained from the trend analysis by county and aquifer and 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.

It should be noted that the District has had INTERA perform this task in past years. For 2015, staff recreated the methodology utilized by INTERA with little changes to the outcome. It is, however, worth discussing the few differences that did occur. The first difference is the reduction from 88 to 72 wells analyzed. This reduction is due the removal of any wells that had no new readings for the previous 3 years and were no longer a part of the District's monitoring well network. The removal of these wells account for the majority in changes in water level trends. For the Paleozoic Aquifer in Montague County, analysis performed by INTERA and included in the District's 2014 annual report showed an annual average increase of 16.2 feet. Staff's analysis, included in this report shows an annual decrease of 0.2 feet per year, which seems like a more reasonable scenario. Staff found that erroneous data had been used in previous analysis. In particular, there was one measurement that was way out of line with all other measurements for that particular well which skewed the results.

Table 1. Average Water-Level Changes from 2004 to 2014 and Number of Wells for Average

Aquifer	Montague	Wise	Parker	Hood
	Average Water-Level Change (feet)			
Paluxy		-0.1	-1.6	-0.5
Glen Rose		0.3	-0.7	-0.6
Hensell	0.5	-0.2		3.6
Pearsall/Cow Creek		-1.4	-1.7	0.4
Hosston	3.9		-0.5	0.6
Paleozoic	-0.2	-0.1	0.3	-0.3
	Number of Wells			
Paluxy		1	2	1
Glen Rose		3	9	4
Hensell	5	2		4
Pearsall/Cow Creek		1	4	5
Hosston	1		1	5
Paleozoic	12	3	5	4

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 and in all relevant aquifers.

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 to better manage groundwater resources. As well, in 2013, the District Board approved a study to revise and refine a groundwater model of the Paleozoic Aquifer Systems, which are very important to major 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 estimates. Non-exempt use was also estimated at the same time. Table 6 provides a best estimate of exempt and non-exempt groundwater use for the District in 2015 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	5,368	279	4,598	4,075	**14,320**
Non-Exempt Use	5,506	563	3,452	2,339	**11,860**
Total	**10,874**	**842**	**8,050**	**6,414**	**26,180**

(1) AFY = acre-feet per year

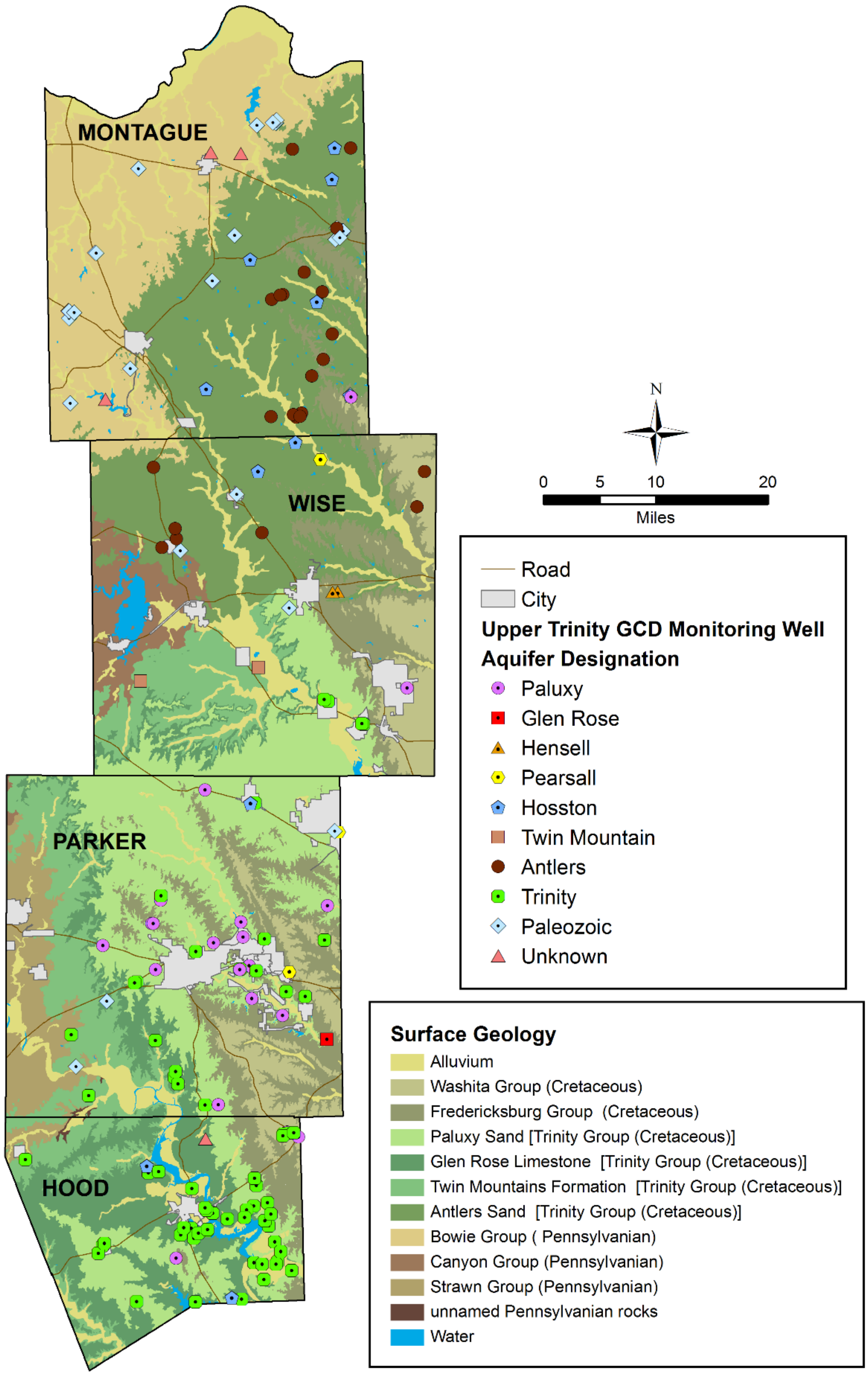


Figure A. Wells in the District monitoring well network identified during previous analysis.

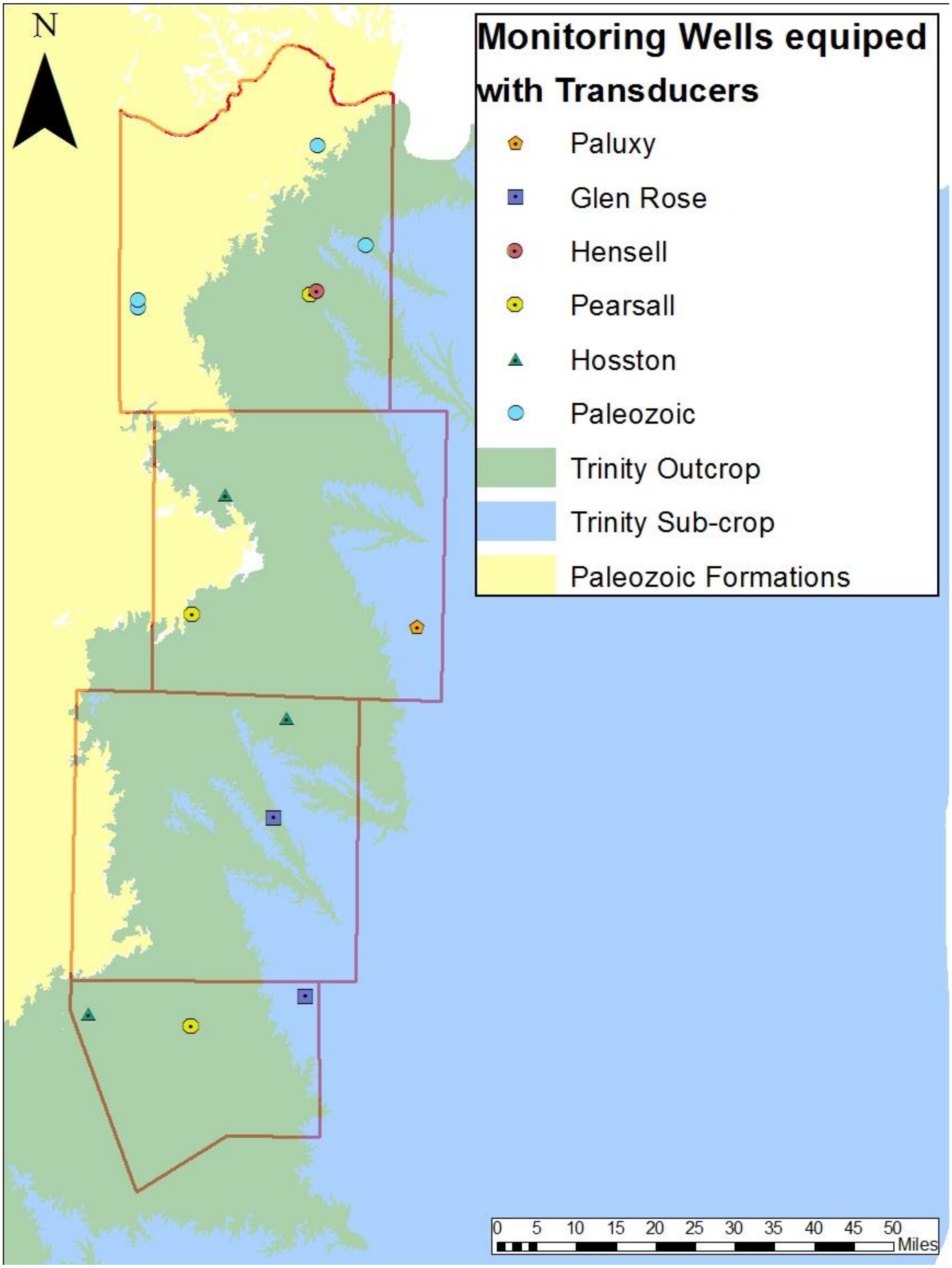


Figure B. Wells in the District monitoring well network equipped with pressure transducers.

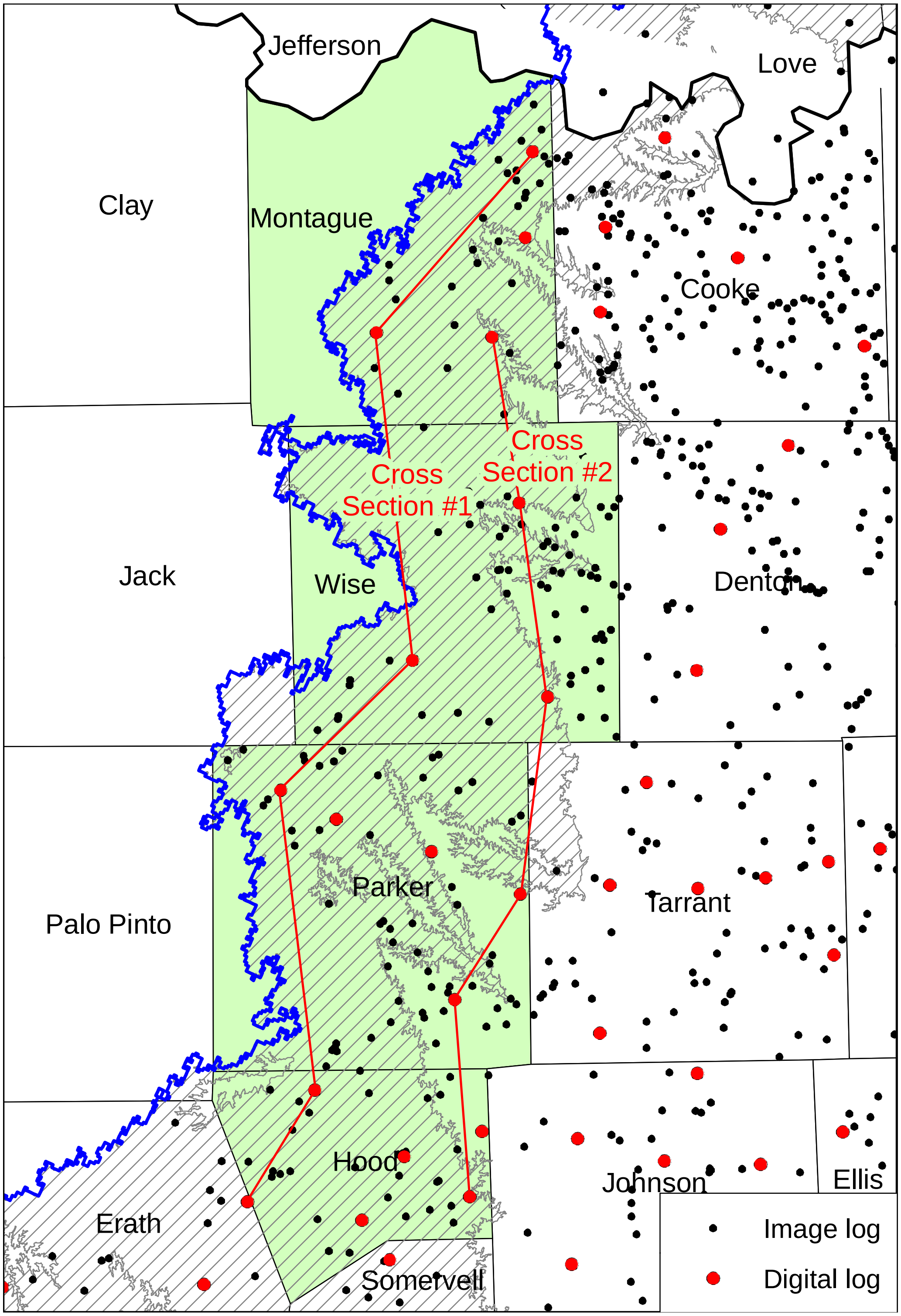
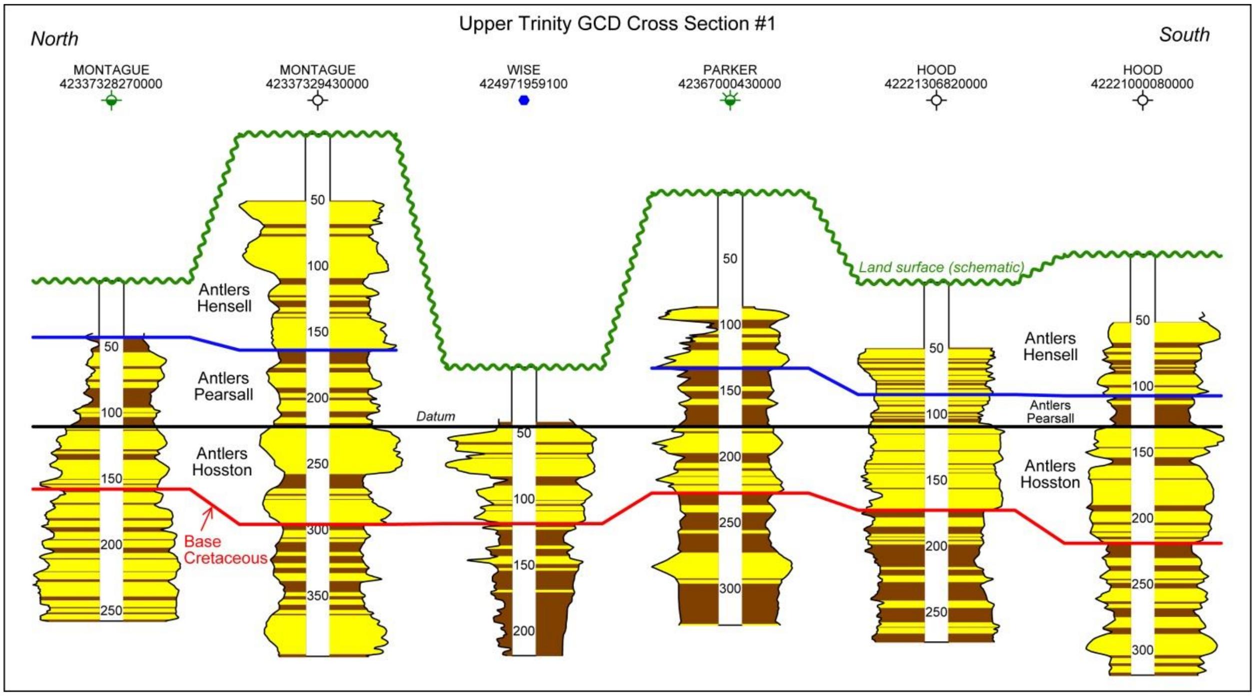
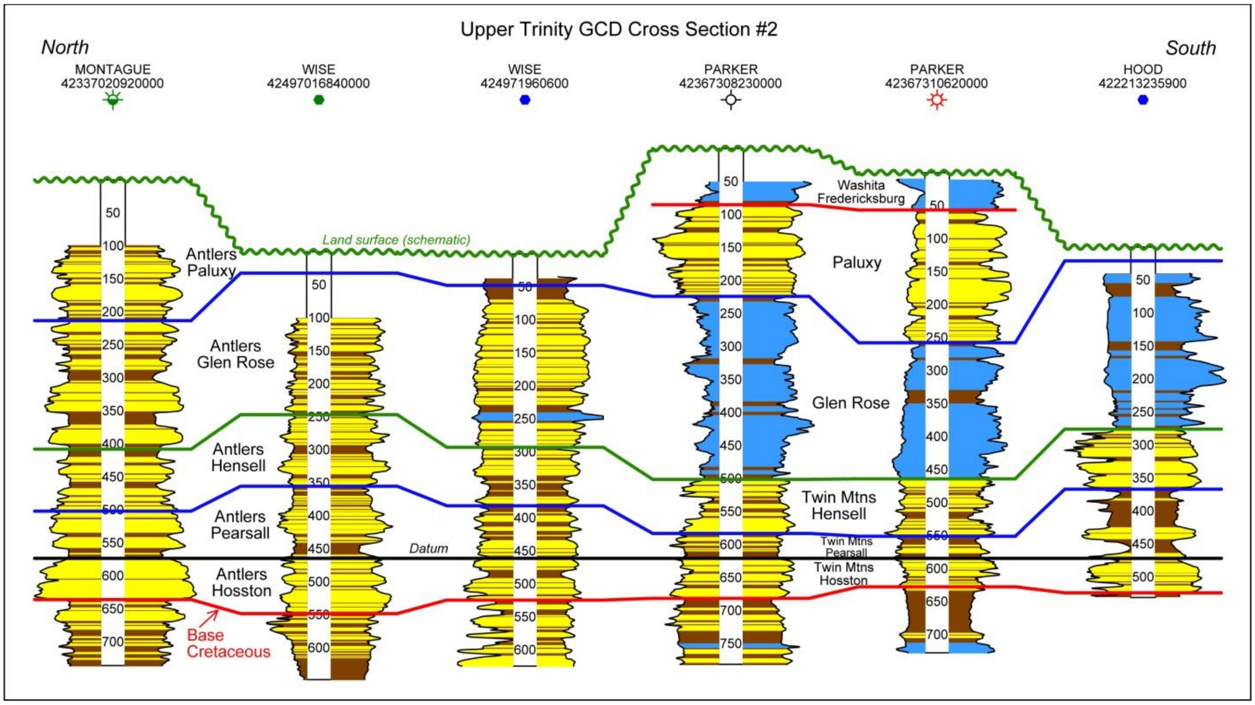


Figure C. **Cross-section map for stratigraphic cross sections 1 and 2.**



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).**



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

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).**

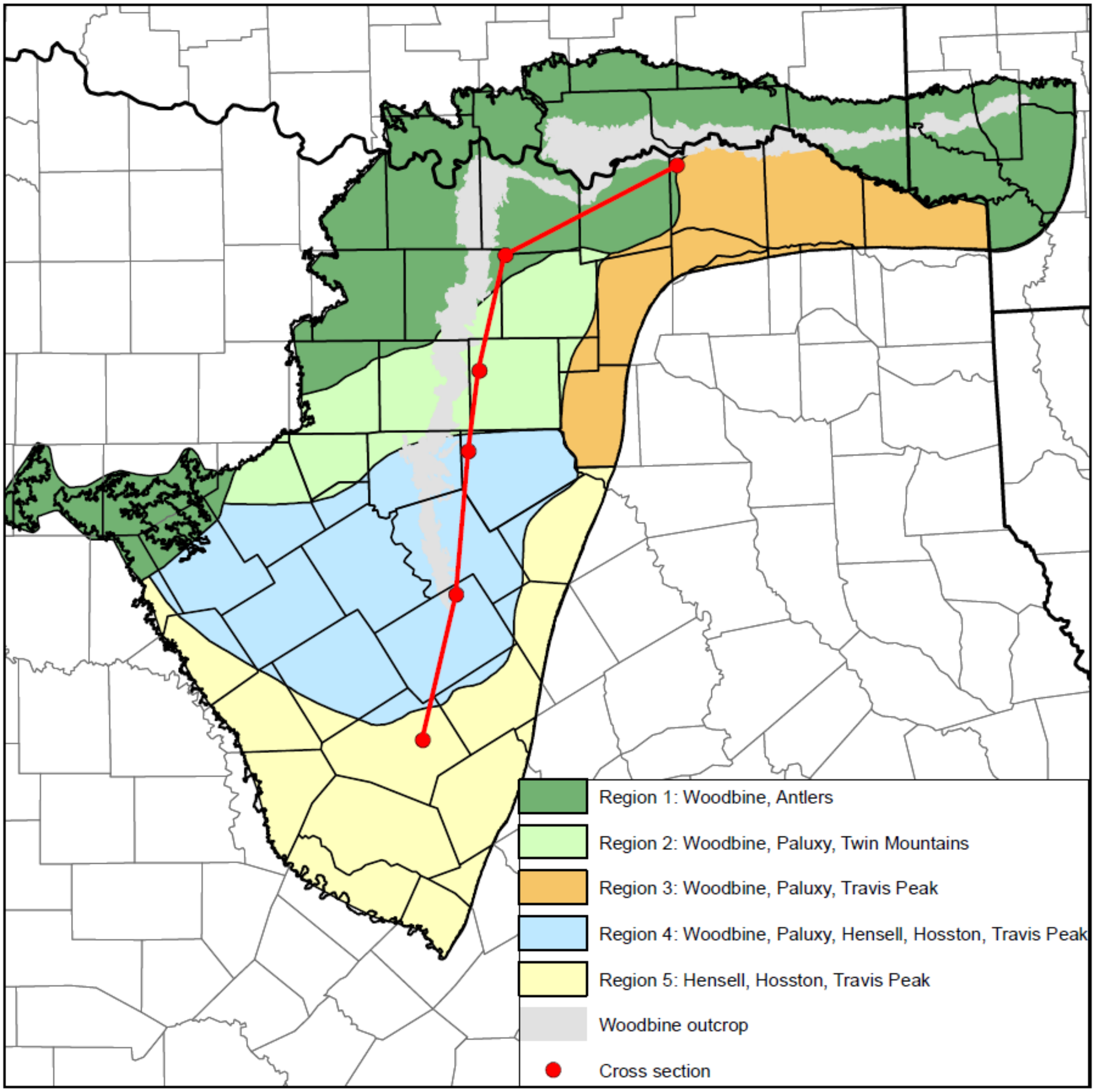


Figure F. Hydrogeologic Regions for the Trinity and Woodbine Aquifers.

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

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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.

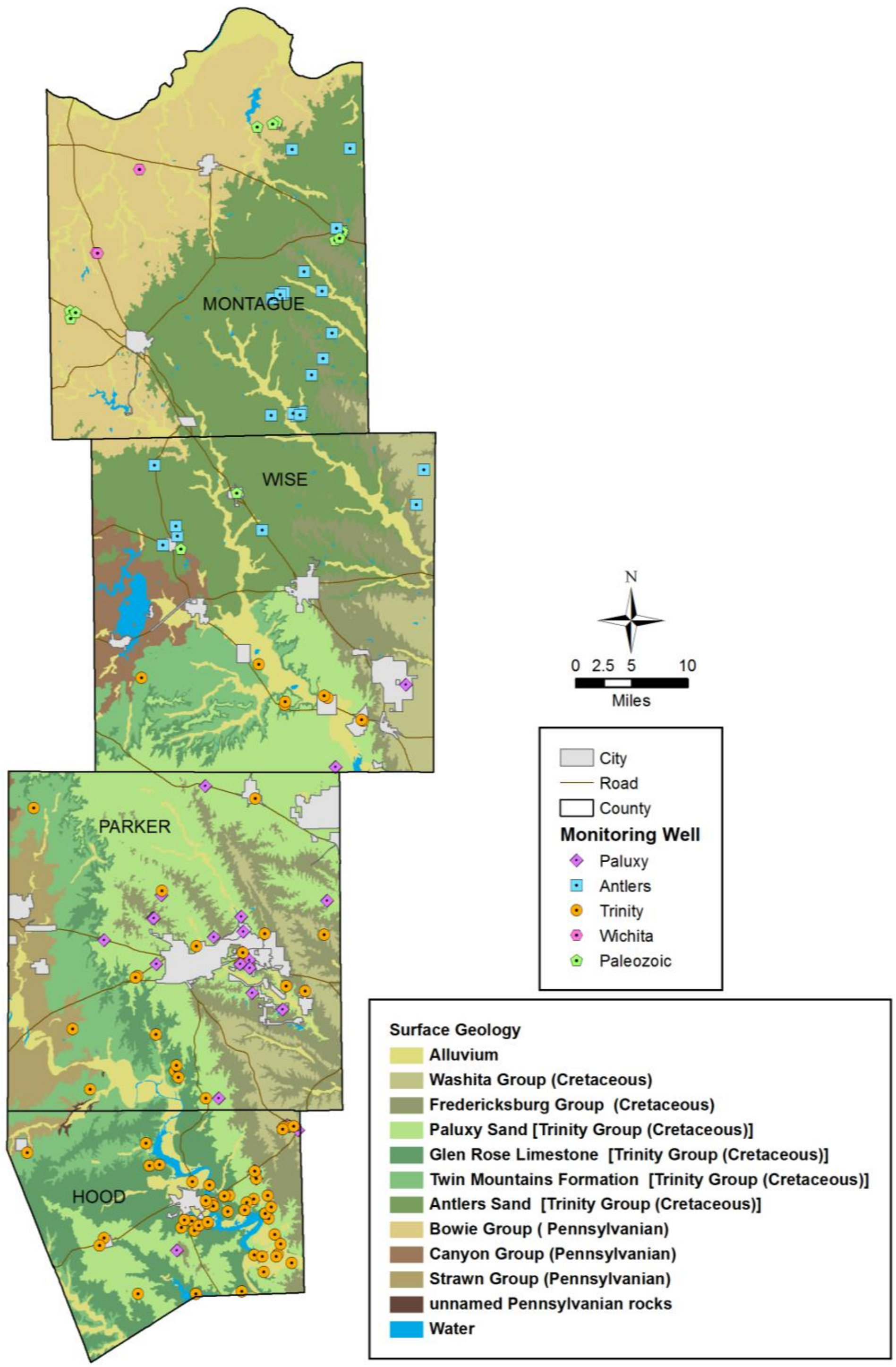


Figure 1. UTGCD Phase I Monitor Wells by Stratum and District Surface Geology.

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 Paleozoics 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 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).

<table>
<tr><th rowspan="2">System</th><th rowspan="2">Hydrogeologic Characteristic</th><th rowspan="2">Group</th><th colspan="2">Formation</th></tr>
<tr><th>North</th><th>South</th></tr>
<tr><td></td><td>Water-Bearing</td><td></td><td colspan="2">alluvial deposits</td></tr>
<tr><td rowspan="7">Cretaceous</td><td>Confining Units
(locally productive)</td><td>Washita</td><td colspan="2">Weno
Denton
Fort Worth
Duck Creek
Kiamichi</td></tr>
<tr><td rowspan="3">Confining Units
(locally productive)</td><td rowspan="3">Fredericksburg</td><td rowspan="2">Goodland</td><td>Edwards</td></tr>
<tr><td>Comanche Peak</td></tr>
<tr><td>Walnut Clay</td><td>Walnut Clay</td></tr>
<tr><td rowspan="3">Aquifer</td><td rowspan="3">Trinity</td><td rowspan="3">Antlers</td><td>Paluxy</td></tr>
<tr><td>Glen Rose</td></tr>
<tr><td>Twin Mountains</td></tr>
<tr><td rowspan="2">Permian</td><td rowspan="3">Water-Bearing</td><td>Wichita</td><td colspan="2">Nocona</td></tr>
<tr><td>Bowie</td><td colspan="2">Archer City
Markley</td></tr>
<tr><td rowspan="13">Pennsylvanian</td><td>Cisco</td><td colspan="2">Thrifty and Graham, undivided</td></tr>
<tr><td rowspan="6">Water-Bearing</td><td rowspan="6">Canyon</td><td colspan="2">Colony Creek Shale</td></tr>
<tr><td colspan="2">Ranger</td></tr>
<tr><td colspan="2">Ventioner</td></tr>
<tr><td colspan="2">Jasper Creek</td></tr>
<tr><td colspan="2">Chico Ridge Limestone</td></tr>
<tr><td colspan="2">Willow Point</td></tr>
<tr><td rowspan="6">Water-Bearing</td><td rowspan="6">Strawn</td><td colspan="2">Mineral Wells</td></tr>
<tr><td colspan="2">Brazos River</td></tr>
<tr><td colspan="2">Mingus</td></tr>
<tr><td colspan="2">Buck Creek Sandstone</td></tr>
<tr><td colspan="2">Grindstone Creek</td></tr>
<tr><td colspan="2">Lazy Bend</td></tr>
</table>

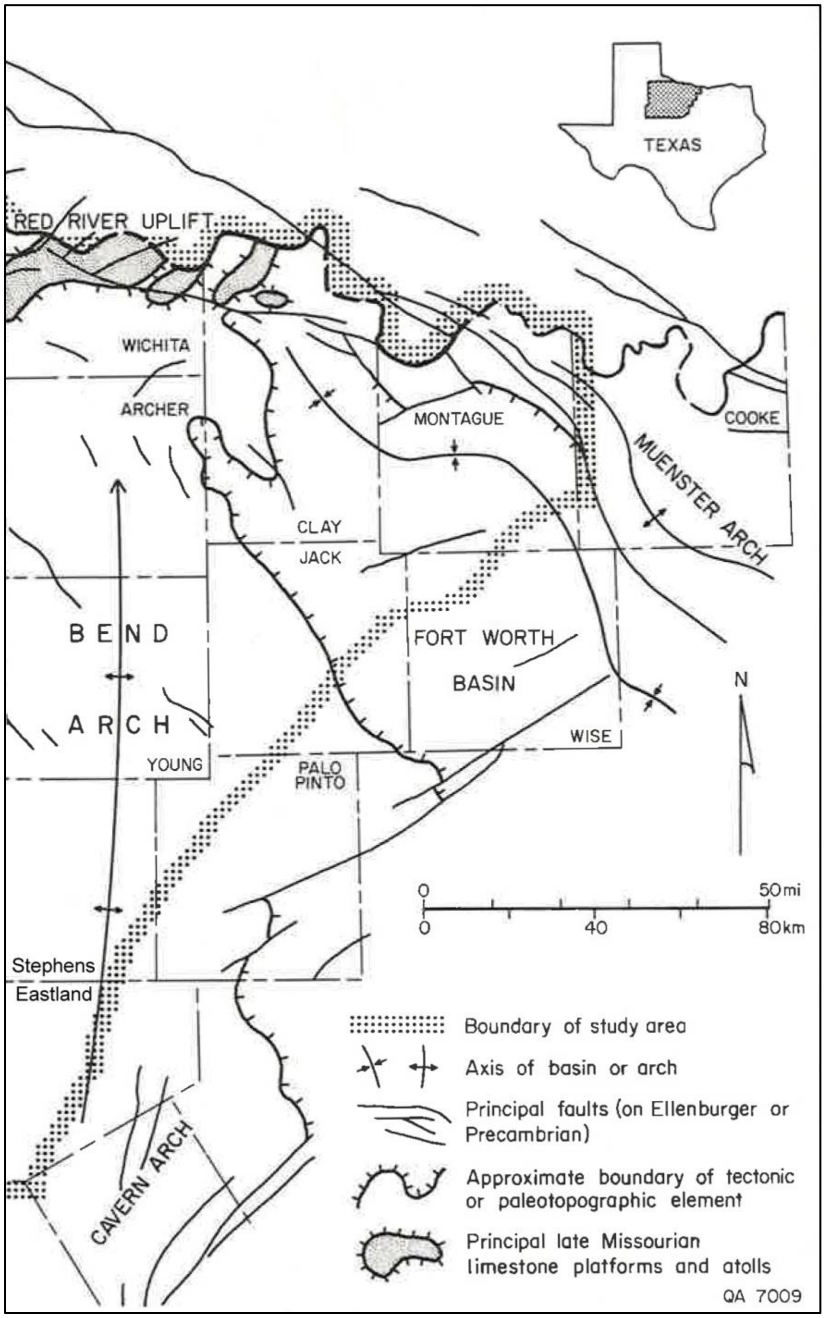


Figure 2. Principal Pre-Pennsylvanian structural features (after Brown et al. 1990)

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.

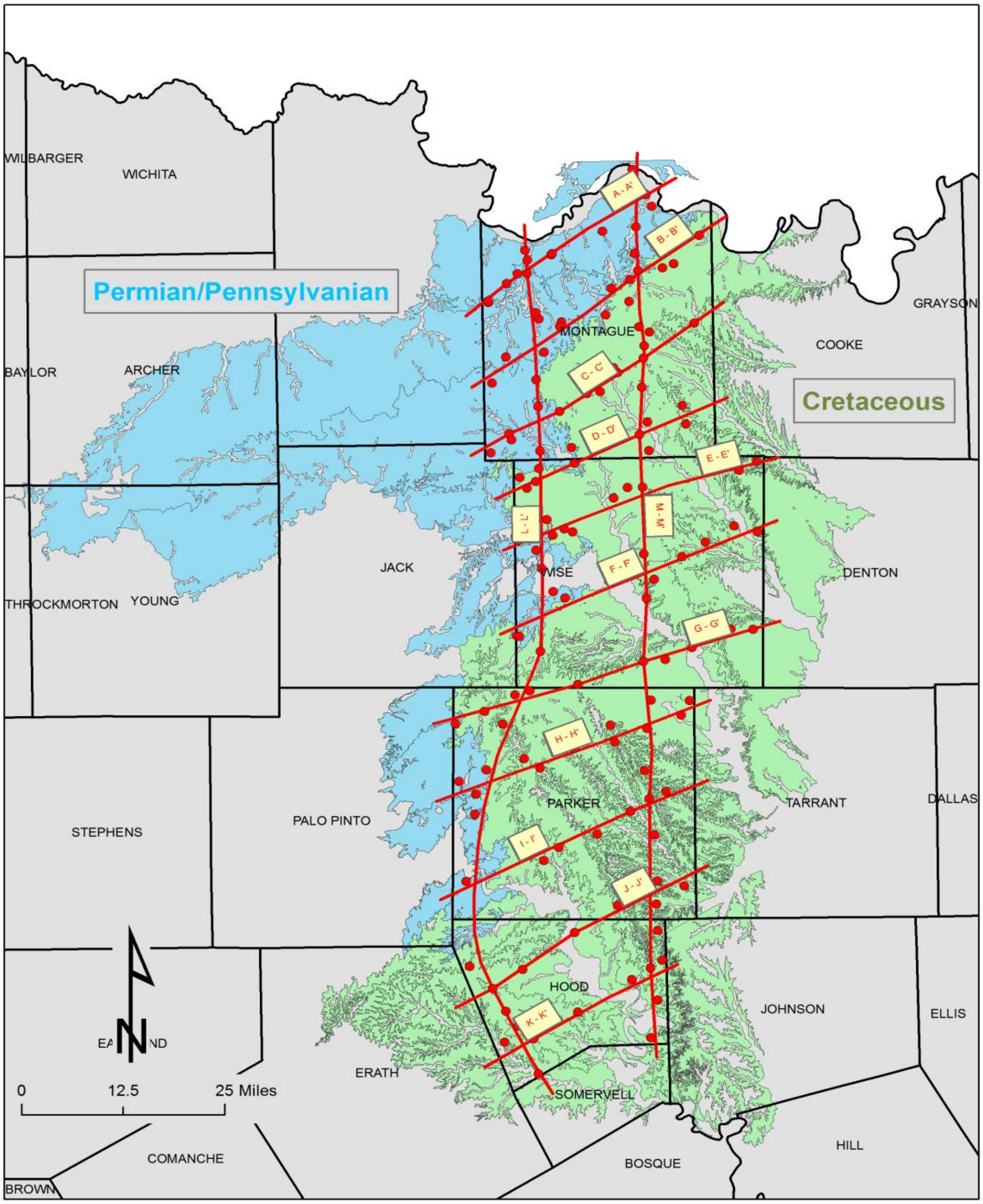


Figure 3. Cross-Section Base Map

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.

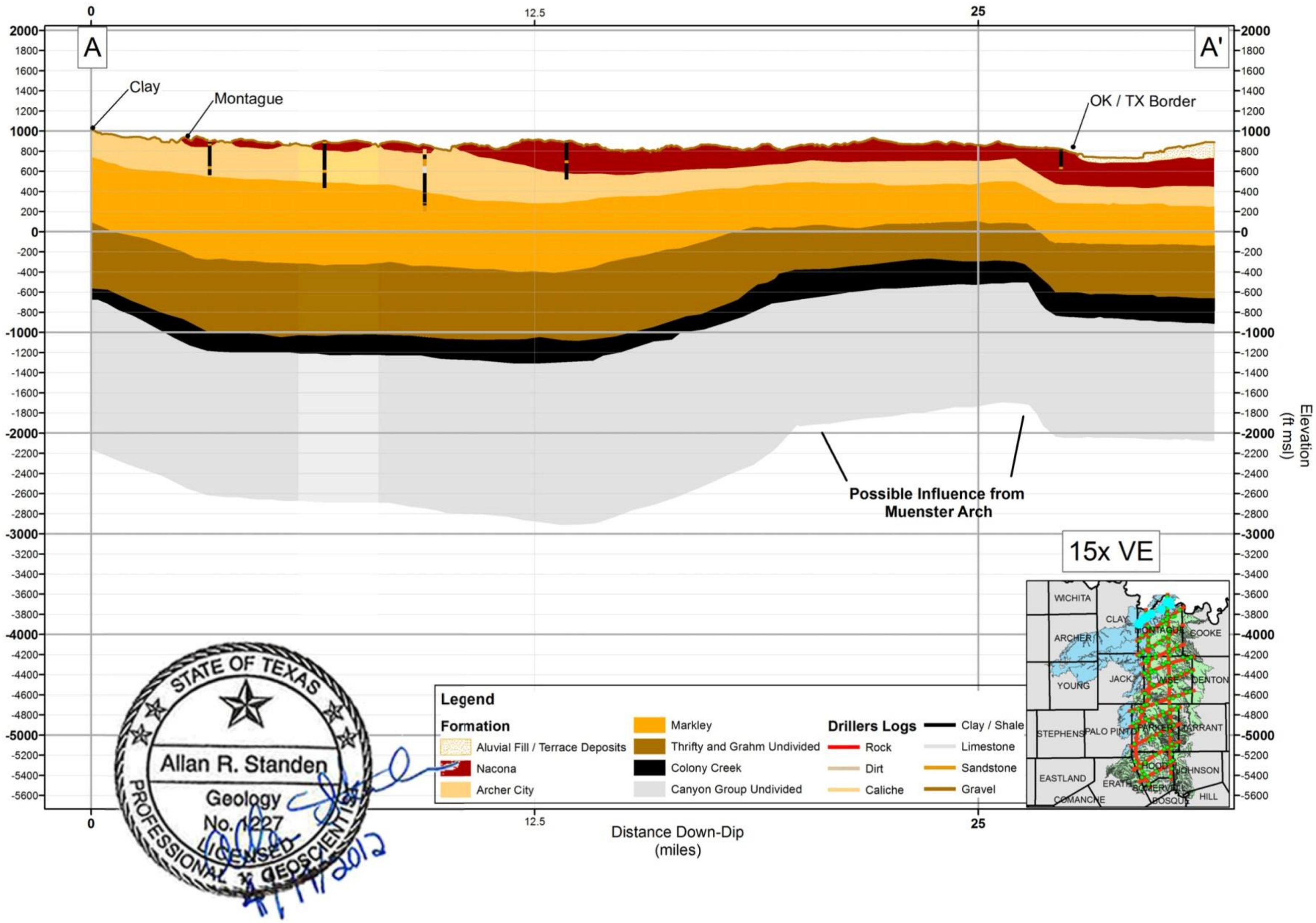


Figure 4. Hydrogeologic Cross-Section A – A.

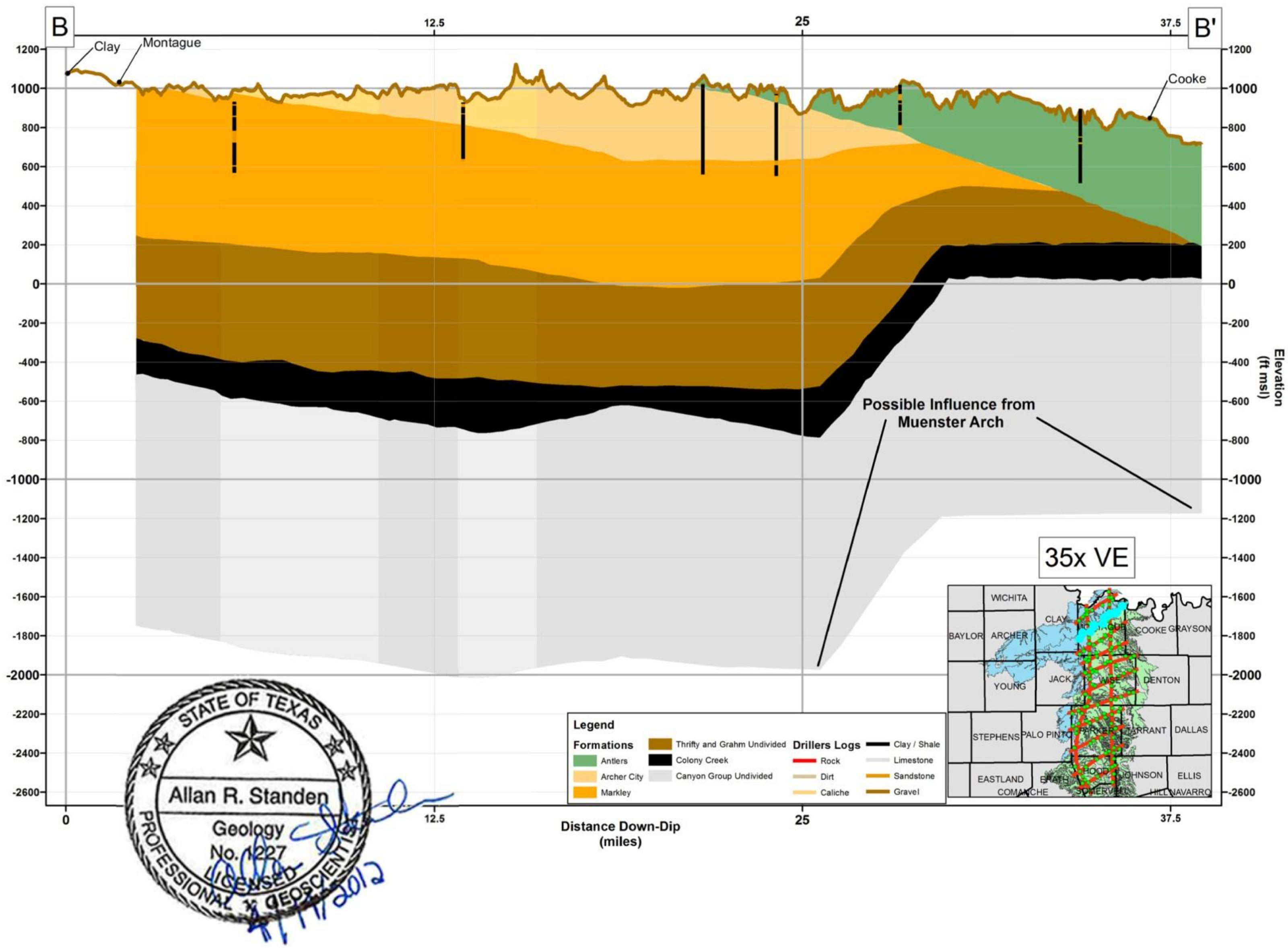


Figure 5. Hydrogeologic Cross-Section B – B.

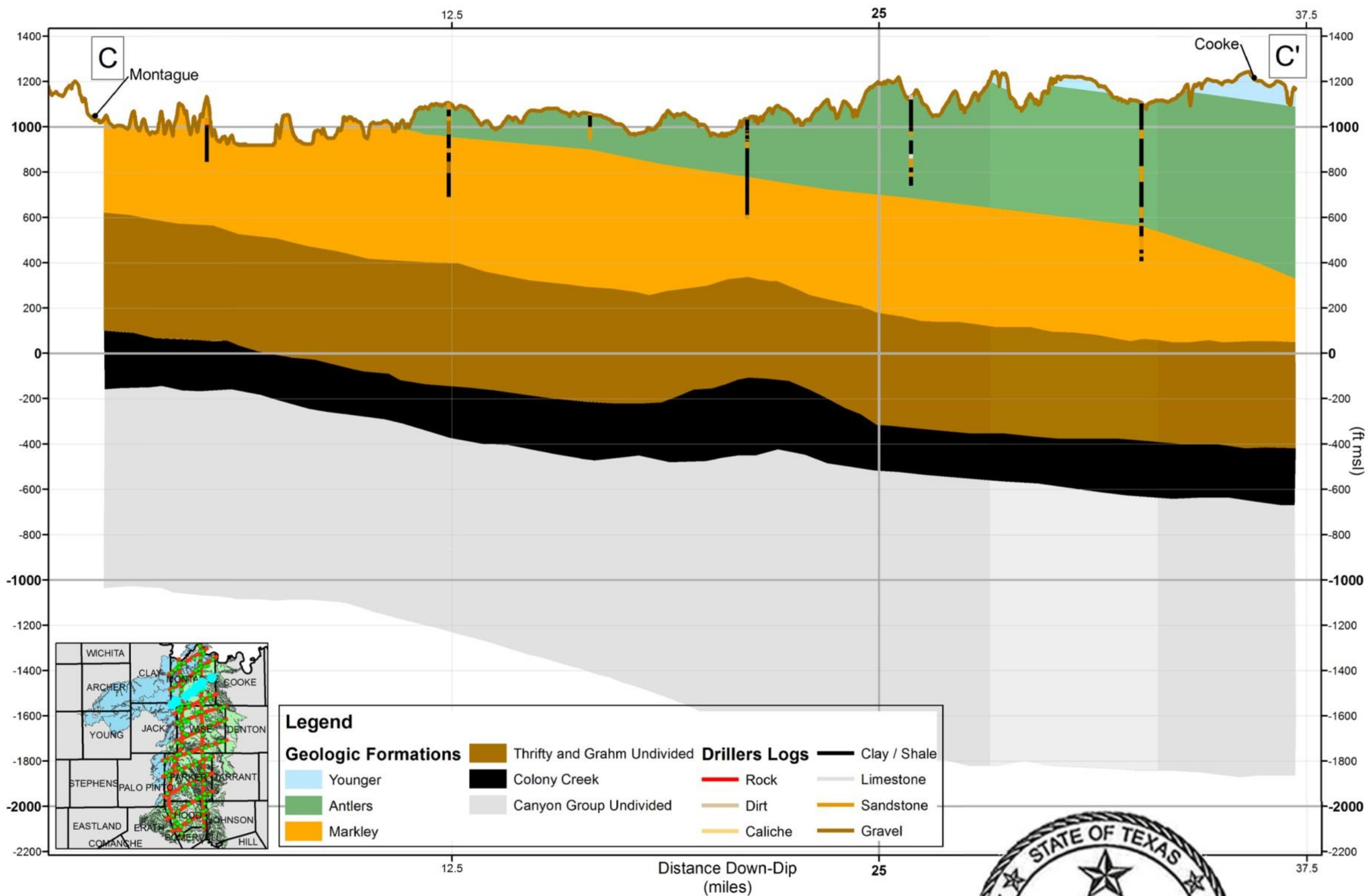


Figure 6. Hydrogeologic Cross-Section C – C.

STATE OF TEXAS
Allan R. Standen
Geology
No. 1227
LICENSED
PROFESSIONAL GEOSCIENTIST
4/11/2012

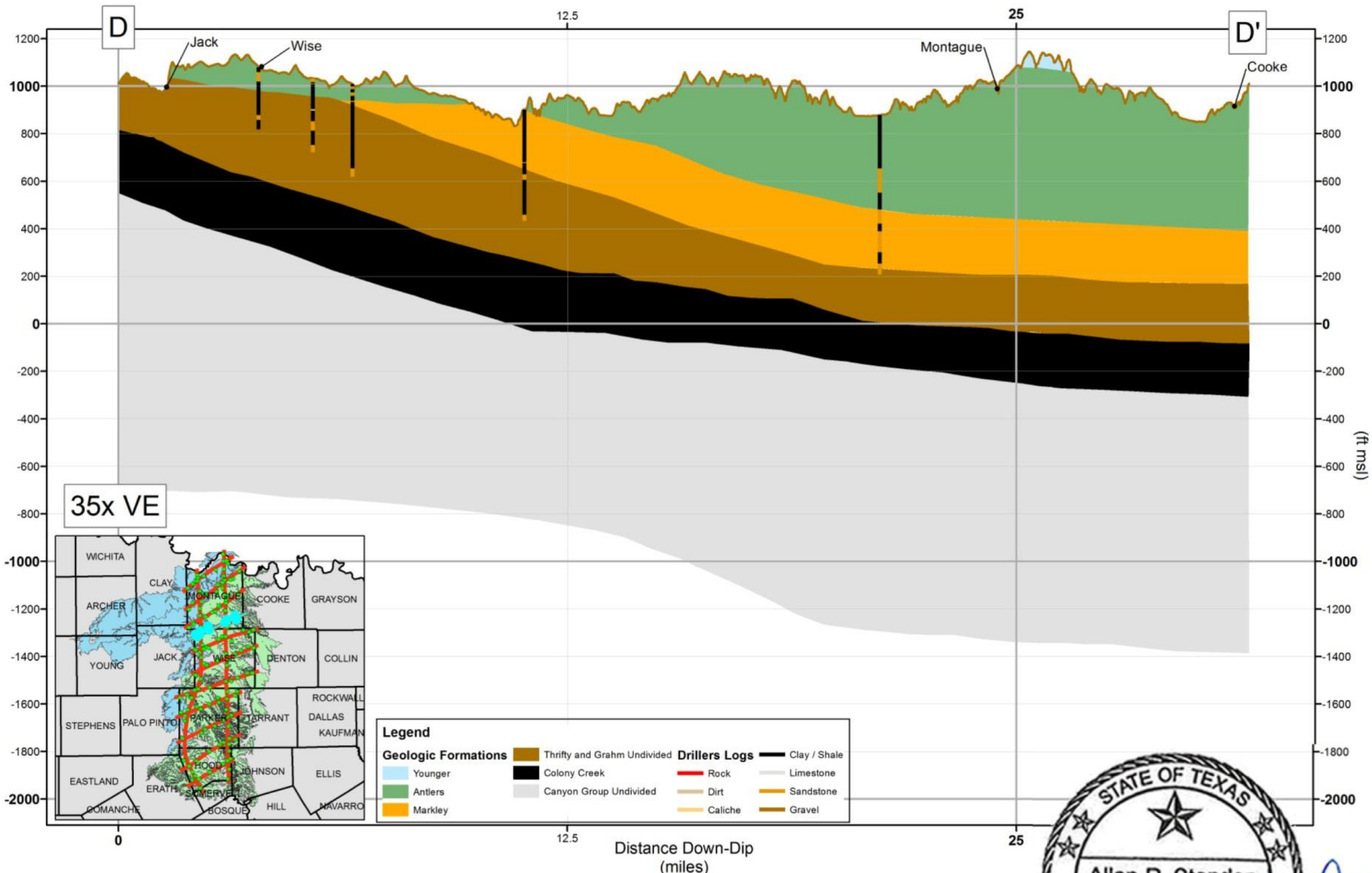


Figure 7. Hydrogeologic Cross-Section D – D.

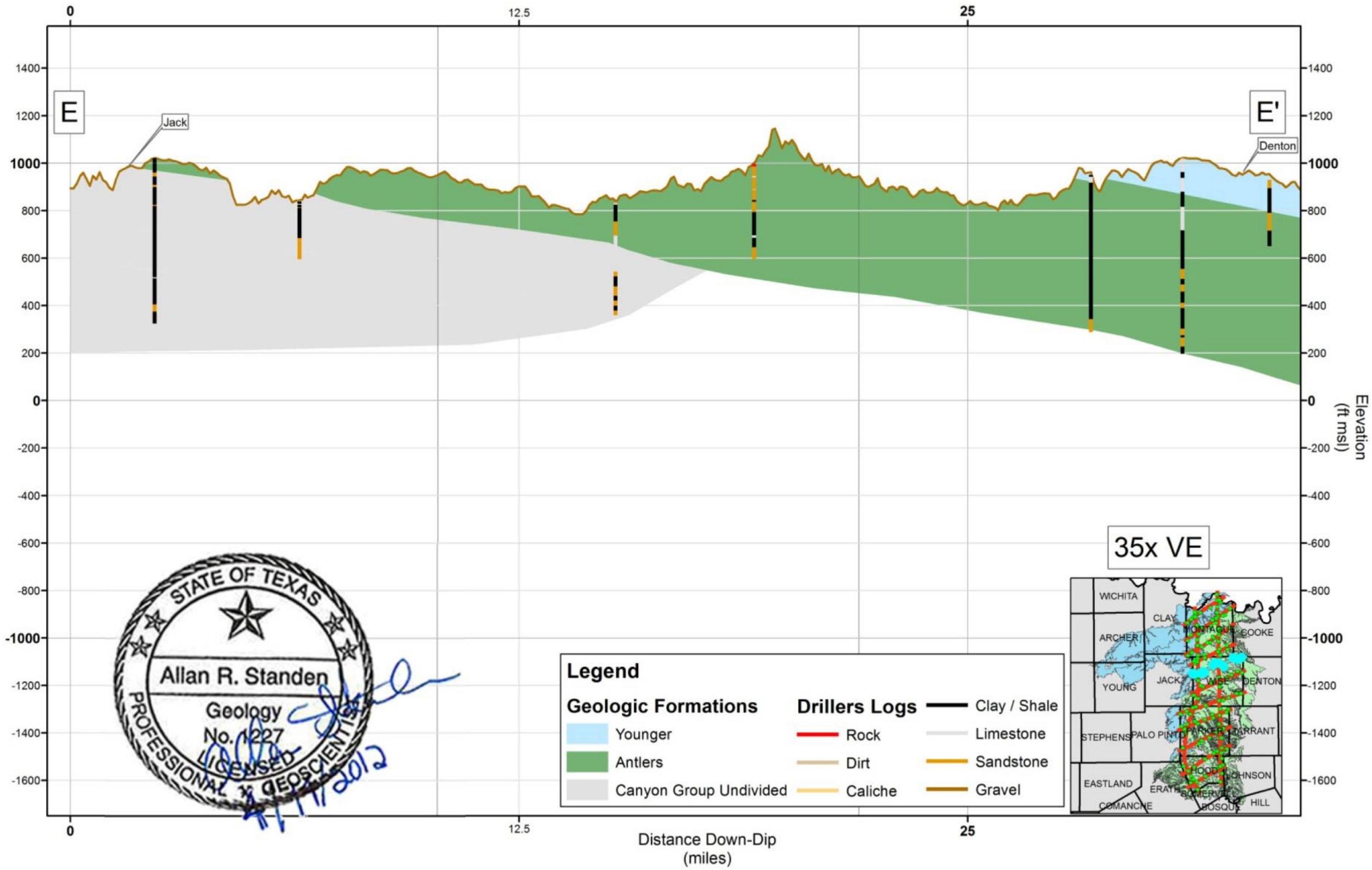


Figure 8. Hydrogeologic Cross-Section E – E.

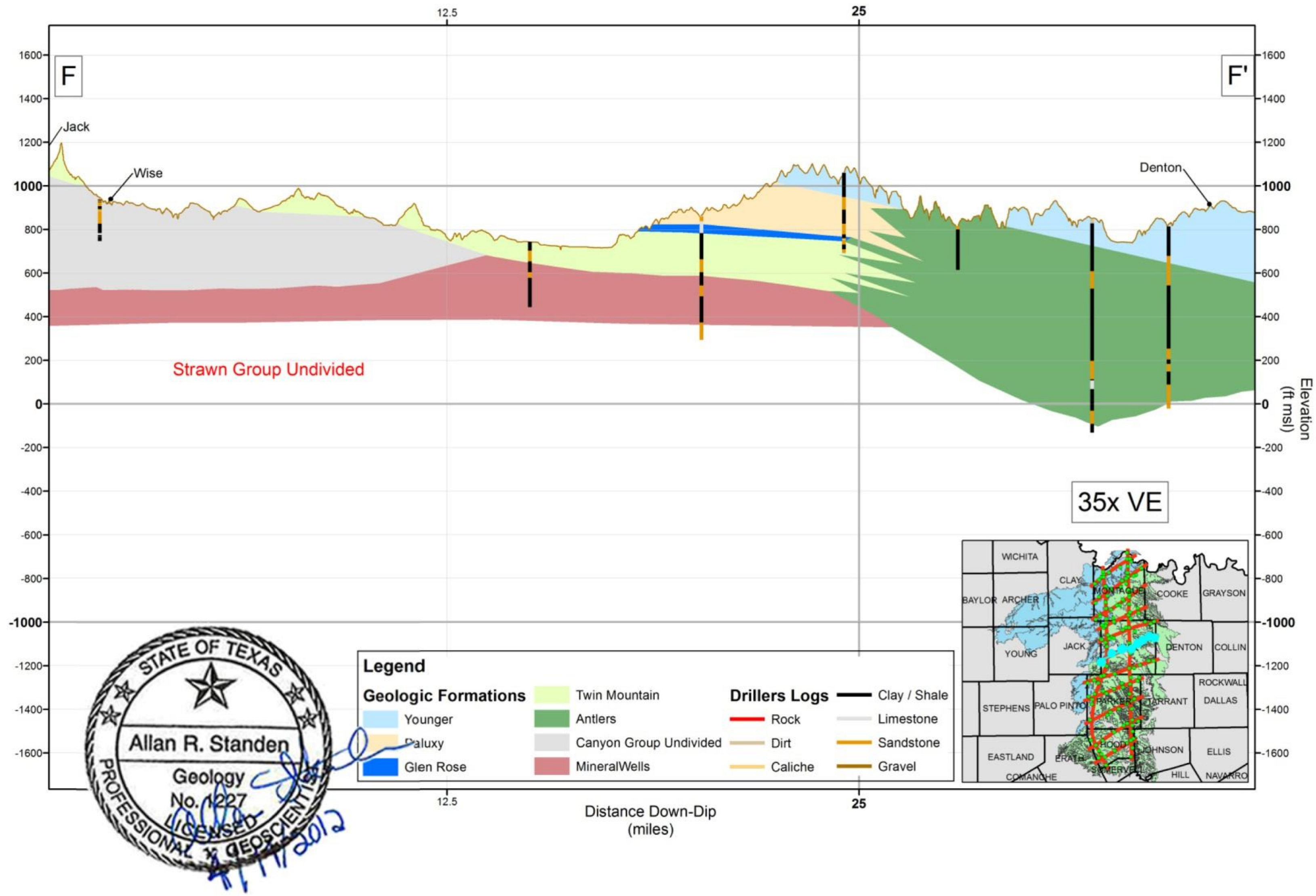


Figure 9. Hydrogeologic Cross-Section F – F.

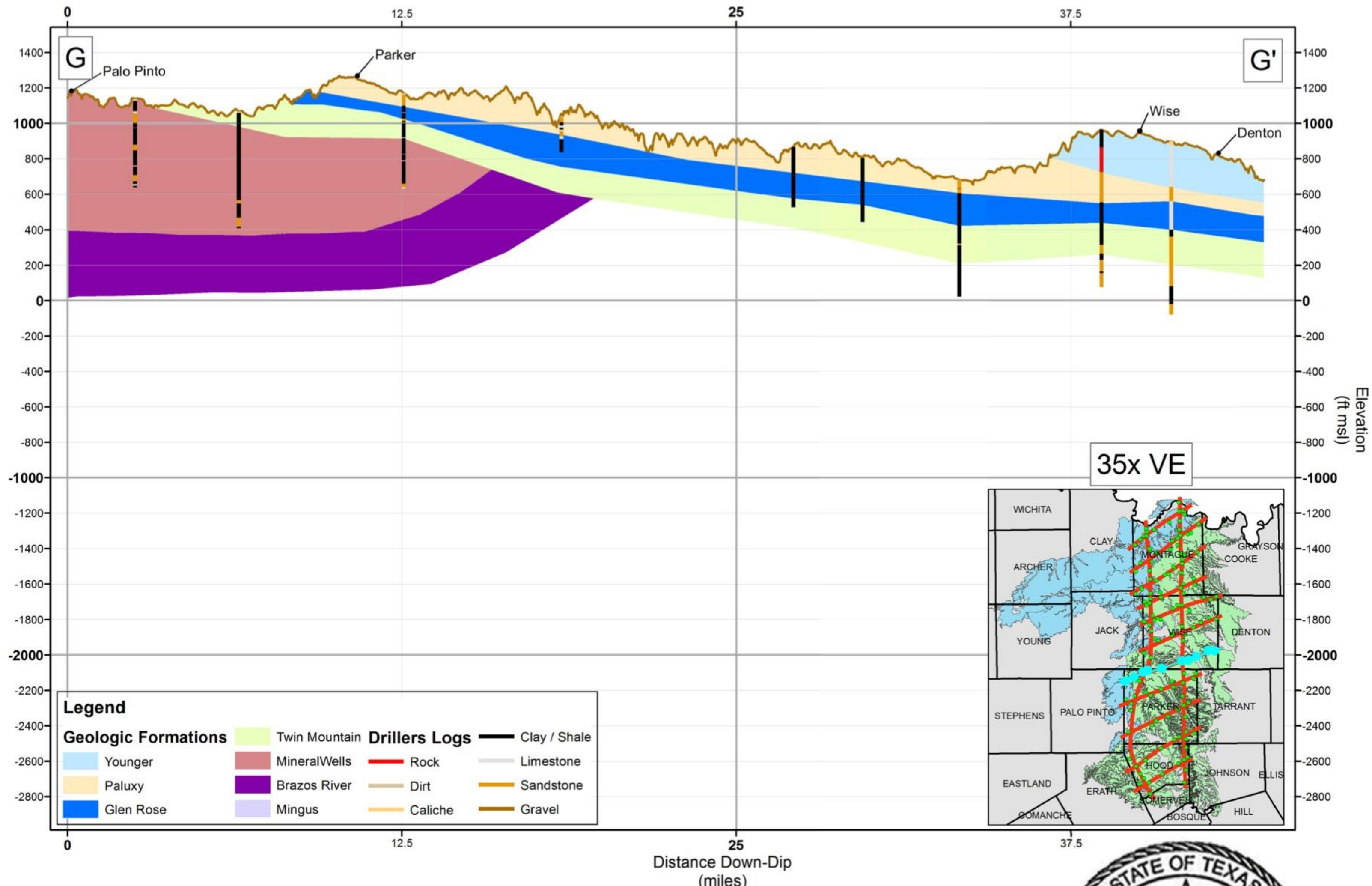
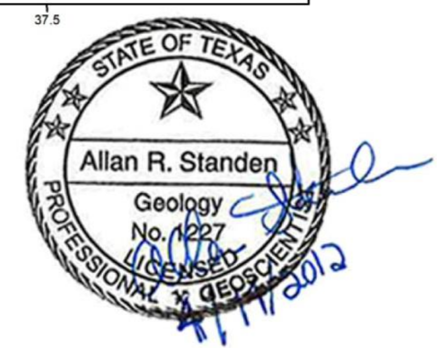


Figure 10. **Hydrogeologic Cross-Section G – G.**



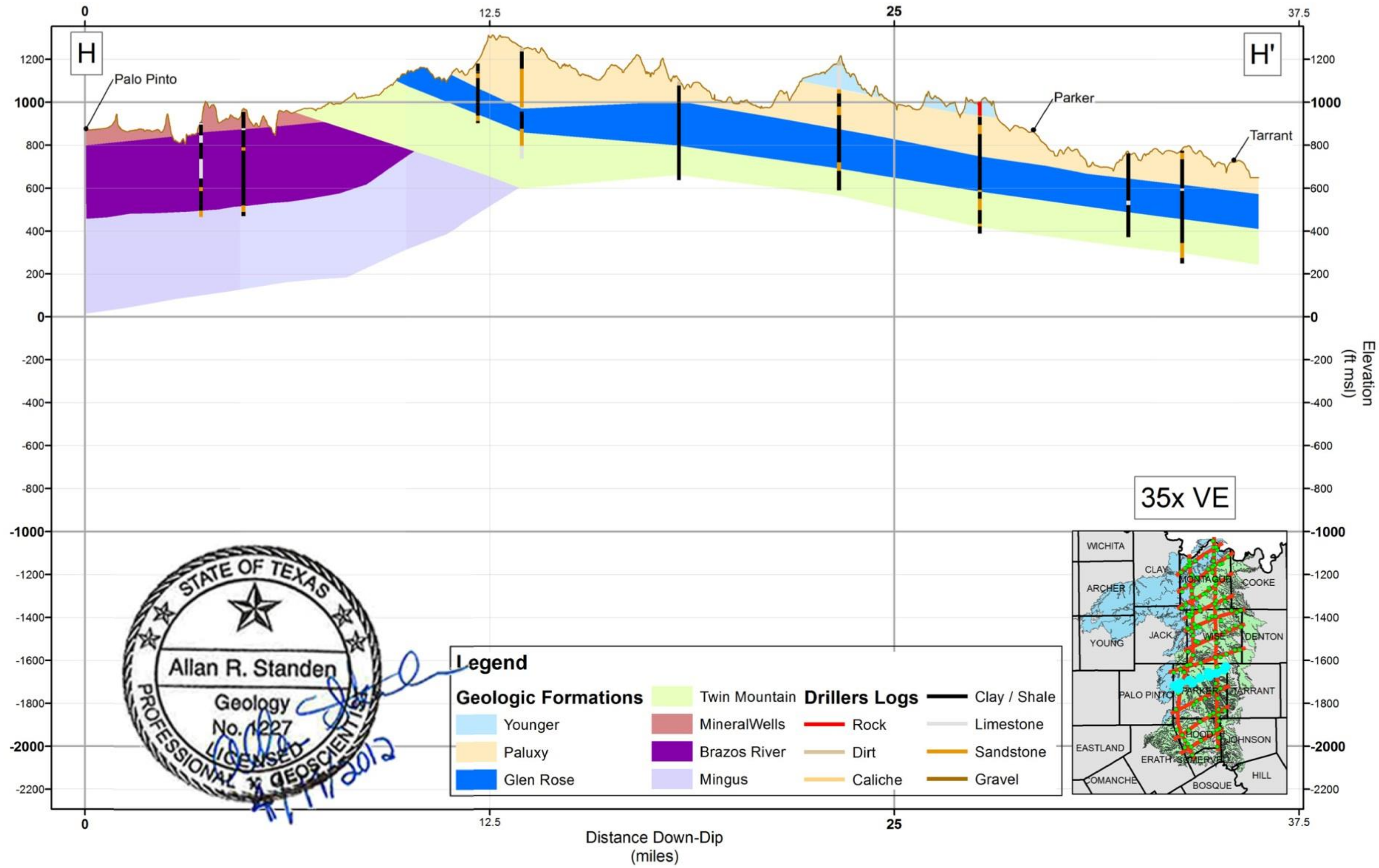


Figure 11. Hydrogeologic Cross-Section H – H.

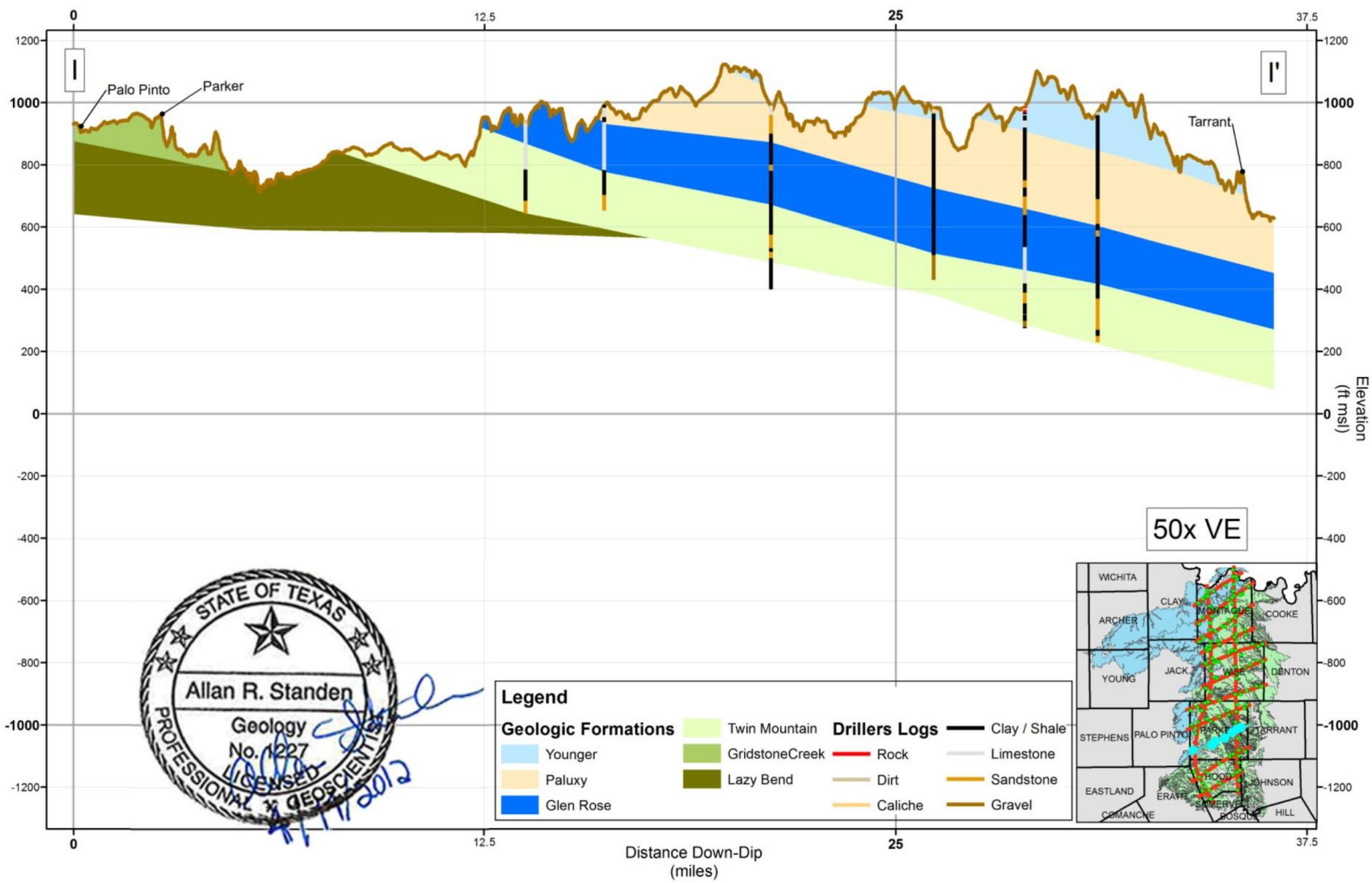


Figure 12. **Hydrogeologic Cross-Section I – I.**

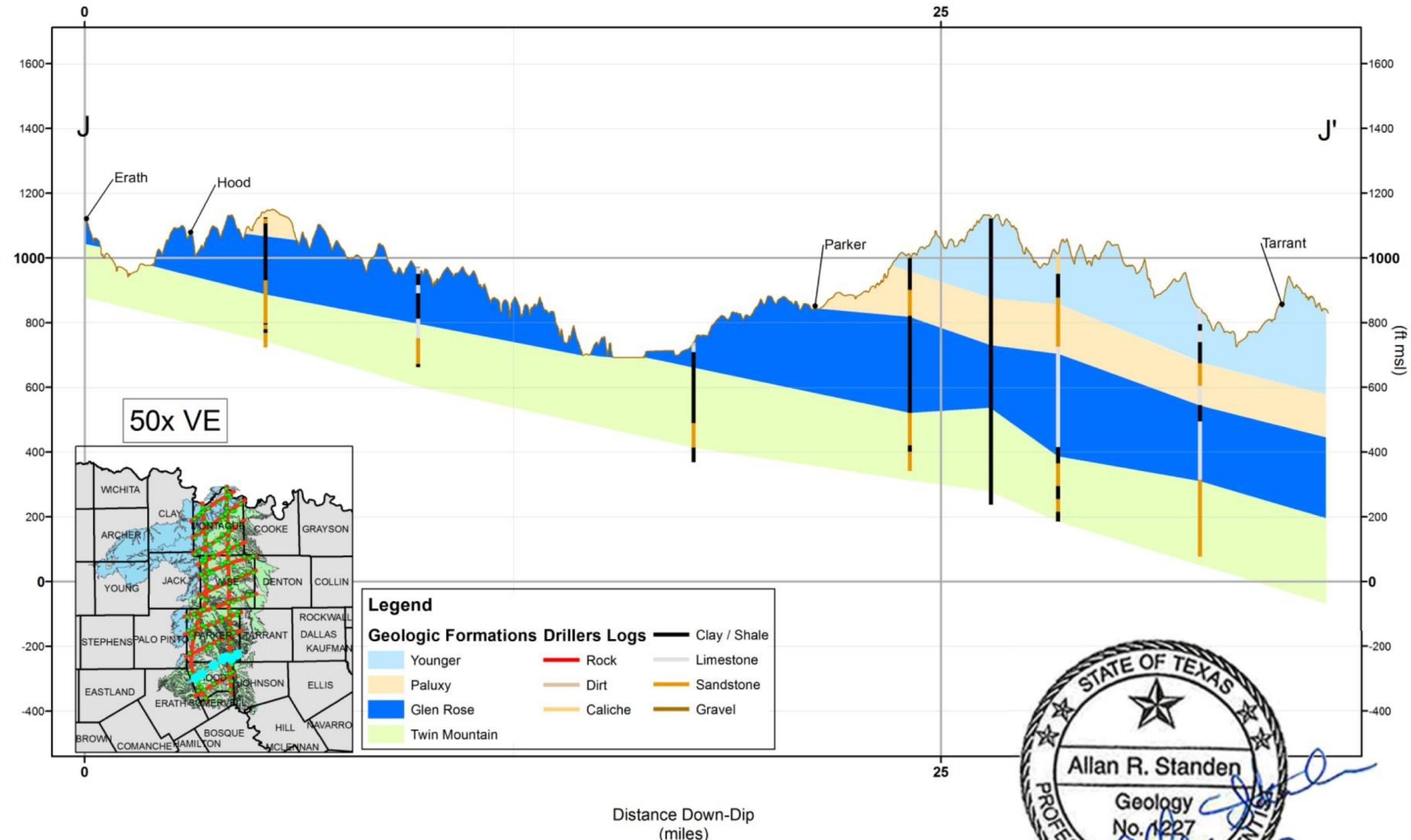


Figure 13. Hydrogeologic Cross-Section J – J.

STATE OF TEXAS
Allan R. Standen
Geology
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LICENSED
PROFESSIONAL GEOSCIENTIST
4/11/2012

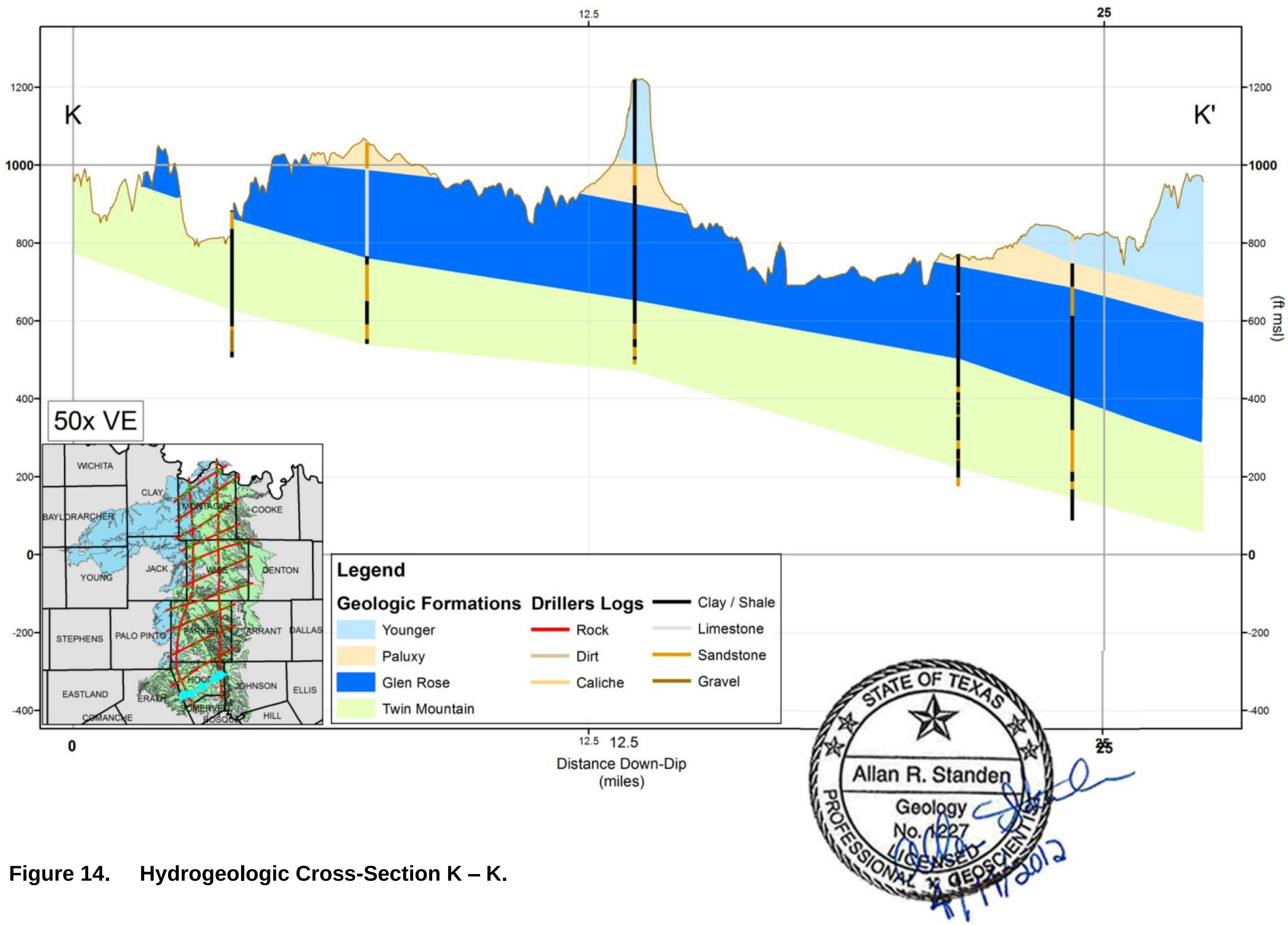

Figure 14. **Hydrogeologic Cross-Section K – K.**

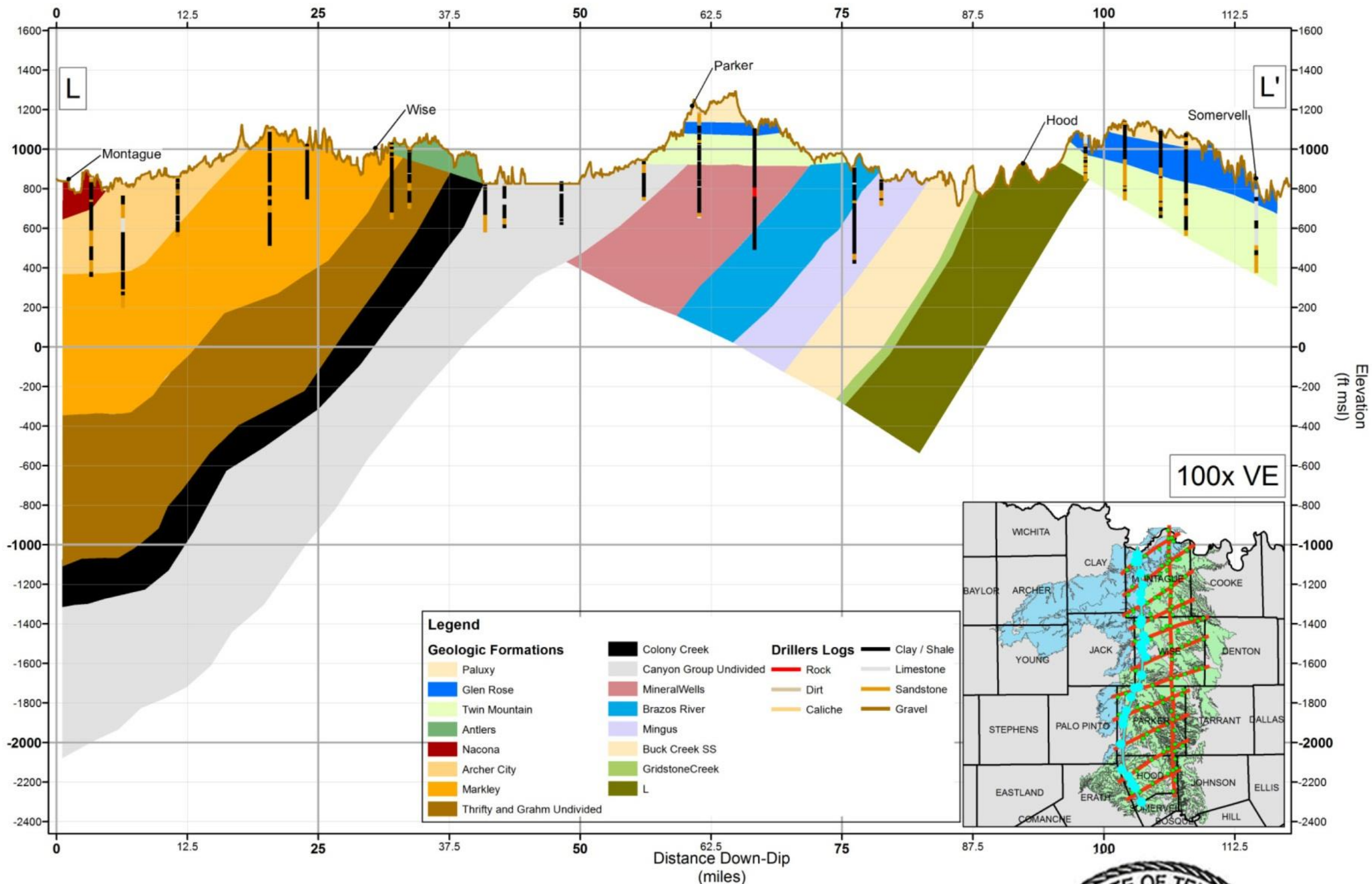

Figure 15. Hydrogeologic Cross-Section L – L.

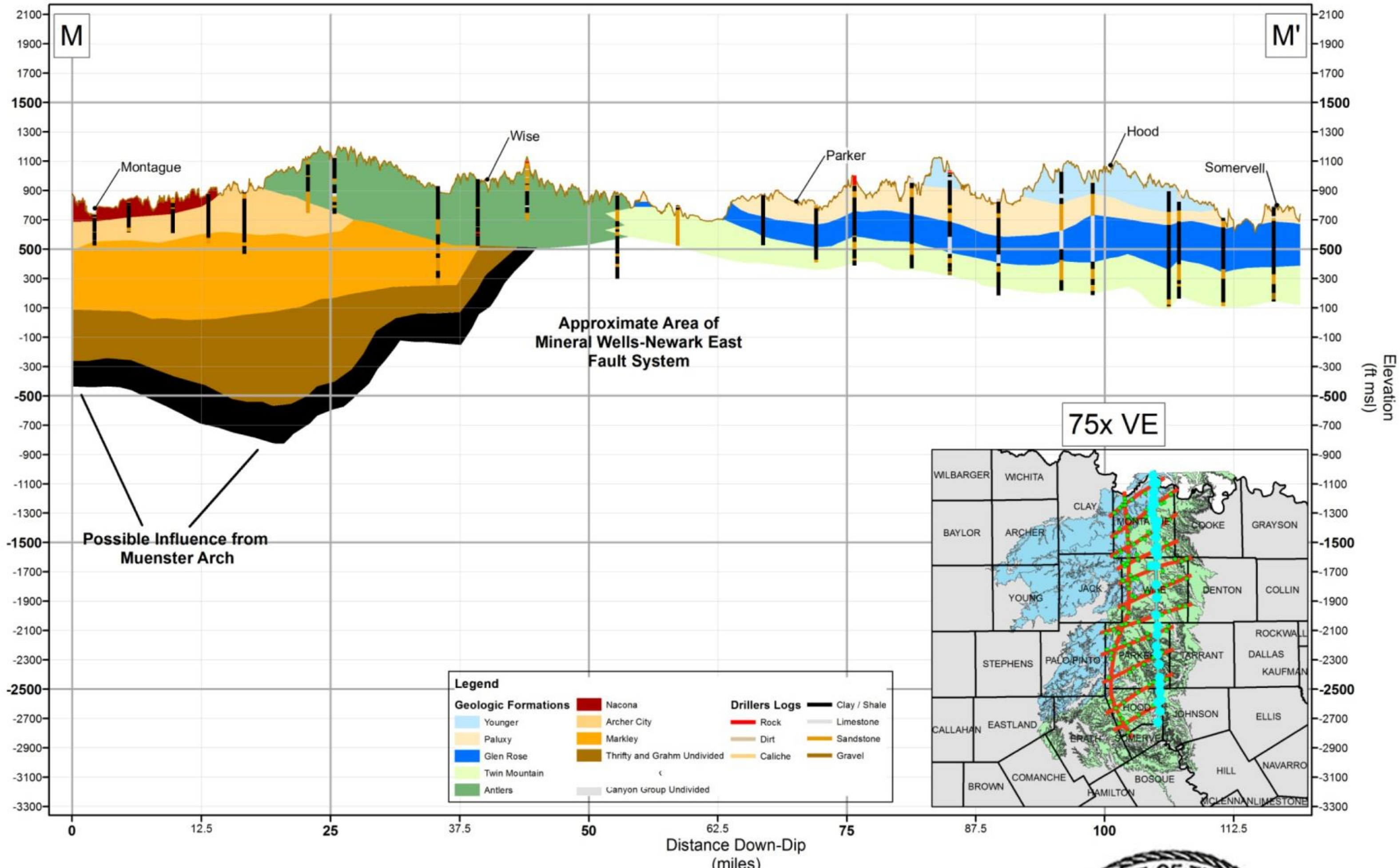

Figure 16. Hydrogeologic Cross-Section M – M.

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 2in 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 (C_2-C_6) in areas of intense fracing 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 Districts 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.

<table>
<tr><th colspan="2">District Geology</th><th colspan="2">GAM Model</th></tr>
<tr><th>Montague and northern Wise counties</th><th>Hood, Parker, southern Wise counties</th><th>Model Stratigraphy</th><th>Model Layer</th></tr>
<tr><td rowspan="5">Antlers Formation</td><td>Paluxy Sand</td><td>Paluxy aquifer</td><td>3</td></tr>
<tr><td>Glen Rose Formation</td><td>Glen Rose aquifer</td><td>4</td></tr>
<tr><td rowspan="3">Twin Mountains Formation</td><td>Hensell aquifer</td><td>5</td></tr>
<tr><td>Pearsall/Cow Creek/Hammett/ Sligo confining unit</td><td>6</td></tr>
<tr><td>Hosston aquifer</td><td>7</td></tr>
</table>

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 Hydrostratigrahic-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 Hydrotsratigraphic-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 hydrostratigrahic 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.

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Upper Trinity Groundwater Conservation District

ANNUAL FINANCIAL REPORT

FOR THE YEAR ENDED DECEMBER 31, 2015

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
Annual Financial Report
For the Year Ended December 31, 2015

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Boucher, Morgan and Young, a P.C.

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, 2015, 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.

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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, 2015, 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.

Emphasis of Matters

Management adopted the provisions of the following Governmental Accounting Standards Board Statement, which became effective during the year ended December 31, 2015 and required the restatement of net position as discussed in Note 10 to the financial statements:

- Statement No. 68, *Accounting and Financial Reporting for Pensions – an amendment of GASB Statement No. 27.*

- Statement No. 71, *Pension Transition for Contributions Made Subsequent to the Measurement Date – an amendment of GASB Statement No. 68.*

The emphasis of these matters does not constitute a modification to our opinion.

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.

Boucher, Morgan & Young

Stephenville, Texas
July 19, 2016

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, 2015. 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 $4,384,985.

The District's total net position increased by $126,201 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 $4,181,116 compared to the $4,099,380 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 $4,384,985 as of December 31, 2015

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 2014	Governmental Activities 2015
Current assets	$ 4,166,534	$ 4,290,105
Capital assets	140,615	176,573
Total assets	4,307,149	4,466,678
Deferred outflows	-	20,366
Total assets and deferred outflows	4,307,149	4,487,044
Current liabilities	67,154	108,989
Non-current liabilities (assets)	-	(6,930)
Total liabilities	67,154	102,059
Net position:		
Net investment in capital assets	140,615	176,573
Unrestricted	4,099,380	4,208,412
Total Net Position	$ 4,239,995	$ 4,384,985

As of December 31, 2015, 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, 2015. Governmental-type activities increased the District's net position by $126,201.

Upper Trinity Groundwater Conservation District's Changes in Net position

	Governmental Activities 2014	Governmental Activities 2015
Revenues:		
Program Revenues:		
Water usage fees	$ 1,380,098	$ 826,518
New well registration fees	201,075	179,200
Other program revenue	67,502	28,909
Total program revenues	1,648,675	1,034,627
General Revenues:		
Miscellaneous revenue	15,373	3,534
Gain (loss) from sale of capital asset	-	(613)
Net Investment earnings	31,660	32,900
Total revenues	1,695,708	1,071,061
Expenses:		
Groundwater conservation	1,091,849	952,754
Total expenses	1,091,849	952,754
Change in net position	603,859	126,201
Net position - beginning of year, as previously reported	3,636,136	4,239,995
Prior period adjustment	-	18,789
Net position - end of year	$ 4,239,995	$ 4,384,985

Financial Analysis of the Government's Funds

The net position increased in 2015 by $126,201 compared to a $603,859 increase in 2014. Increased rainfall and reduced oil & gas production caused a decrease in program revenue of approximately $614,048. Fortunately, expenditures decreased from the previous year by $139,095

Capital Assets

The Upper Trinity Groundwater Conservation District's investment in capital assets as of December 31, 2015, amounts of $176,573 (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 2014	Governmental - Type Activities 2015
Vehicles	$ 124,201	$ 120,643
Furniture and equipment	16,414	28,310
Software	-	27,620
Total	$ 140,615	$ 176,573

Depreciation expenses on all assets amounted to $42,018 for the year.

Economic Factors for Next Year

The budget for the 2016 fiscal year shows projected revenues for $1,273,196 and expenditures of $1,347,810.

On July 21, 2014 the Board of Directors of UTGCD passed and adopted Resolution 14-005 Allocation of Funds for the District. They designated “Committed Funds” for Operating 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, 2015

		Governmental Activities
ASSETS		
Current assets:		
Cash and cash equivalents	$	529,893
Certificates of deposit		3,334,888
Receivables, net of allowance		422,481
Deposits		1,610
Undeposited funds		1,233
Total current assets		4,290,105
Capital assets:		
Depreciable, net		176,573
Total assets		4,466,678
DEFERRED OUTFLOWS:		
Deferred retirement contributions		15,741
Deferred investment experience		3,405
Deferred actual vs. assumption		1,220
Total deferred outflows		20,366
Total assets and deferred outflows	$	4,487,044
LIABILITIES		
Current liabilities:		
Accounts and credit card payables		69,590
Payroll liabilities		9,499
Driller deposits		29,900
Total current liabilities		108,989
Non-current liabilities:		
Net pension liability (asset)		(6,930)
Total liabilities		102,059
NET POSITION		
Net investment in capital assets		176,573
Unrestricted		4,208,412
Total net position	$	4,384,985

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, 2015

		Program Revenues	Net (Expense) Revenue and Changes in Net Position
			Primary Government
	Expenses	Charges for Services	Governmental Activities
Primary Government			
Governmental Activities			
General government	$ 944,247	$ 1,034,627	$ 90,380
Total governmental	944,247	1,034,627	90,380
General revenues			
Miscellaneous revenue			3,534
Gain (loss) from sale of capital asset			(613)
Investment earnings			32,900
Total general revenues			35,821
Change in net position			126,201
Net position - beginning, as previously reported			4,239,995
Prior period adjustment - cumulative effect of change in accounting principle			18,789
Net position - beginning, as restated			4,258,784
Net position - ending			$ 4,384,985

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

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
BALANCE SHEET - GOVERNMENTAL FUND
DECEMBER 31, 2015

		General Fund
ASSETS		
Cash and cash equivalents	$	529,893
Certificates of deposit		3,334,888
Accounts receivable, net of allowance		422,481
Security deposits		1,610
Undeposited funds		1,233
Total assets	$	4,290,105
LIABILITIES		
Accounts and credit cards payable	$	69,590
Payroll liabilities		9,499
Driller deposits		29,900
Total liabilities		108,989
FUND BALANCE		
Committed		625,000
Assigned		1,429,614
Unassigned		2,126,502
Total fund balance		4,181,116
Total liabilities and fund balance	$	4,290,105

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, 2015

Total Fund Balance - Governmental Fund		$ 4,181,116
Capital assets used in governmental activities are not financial resources and therefore are not reported in governmental funds balance sheet.		176,573
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.		
Net pension asset (liability)	6,930	
Deferred retirement contributions	15,741	
Deferred investment experience	3,405	
Deferred actual vs. assumption	1,220	27,296
Net Position of Governmental Activities		$ 4,384,985

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, 2015

	General Fund
Revenues:	
Exception fees	$ 12,700
Export fees	1,176
Penalties assessed	7,033
Forfeited deposits	8,000
New well registration fees	179,200
Semi-annual program income	826,518
Total program revenue	1,034,627
Investment earnings	32,900
Proceeds from sale of capital asset	23,000
Other sources	3,534
Total revenues	1,094,061
Expenditures:	
General government	910,736
Capital outlay	101,589
Total expenditures	1,012,325
Net change in fund balance	81,736
Fund balance - beginning of year	4,099,380
Fund balance - end of year	$ 4,181,116

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, 2015

Total Net Change in Fund Balance - Governmental Fund	$	81,736
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 2015 capital outlays is to increase net position.		101,589
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.		(42,018)
Net pension assets 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 govenrmental funds. These balances increased (decreased) by this amount.		8,507
Governmental funds recognize all amounts received on the sale of fixed assets as a gain. However, in the statement of activities, the gain or loss is offset by the remaining net book value of the asset.		(23,613)
Change in Net Position of Governmental Activities	$	126,201

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

NOTES TO FINANCIAL STATEMENTS

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

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.

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, 2015 totaled $1,538,950. The general fund revenues budgeted for the year were $1,732,336 which exceeded the budgeted expenditures, resulting in a surplus 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:

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 $435,859 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 $3,864,781 which was all unrestricted. The bank balance of $3,878,984 was covered in the amount of $3,863,701 by federal depository insurance or pledged securities, with the total cash and certificates split among area banks. The remaining $15,283 was not collateralized.

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.

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, 2015, 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:

	Balance 12/31/2014	Additions	Retirements/ Adjustments	Balance 12/31/2015
Governmental activities:				
Capital assets being depreciated:				
Automobiles	194,206	53,969	33,621	214,554
Furniture and equipment	32,657	20,000	-	52,657
Software	34,600	27,620	-	62,220
Total capital assets being depreciated	261,463	101,589	33,621	329,431
Less accumulated depreciation:				
Automobiles	(70,005)	(33,914)	(10,008)	(93,911)
Furniture and equipment	(16,243)	(8,104)	-	(24,347)
Software	(34,600)	-	-	(34,600)
Total accumulated depreciation	(120,848)	(42,018)	(10,008)	(152,858)
Total capital assets being depreciated, net	140,615	59,571	23,613	176,573
Governmental activities capital assets, net	$ 140,615	$ 59,571	$ 23,613	$ 176,573

Depreciation expenses charged to the general government operations was $42,018.

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, 2015, the District's liability for unpaid vacation time was $9,256.

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, 2016	$ 25,200
December 31, 2017	26,300
December 31, 2018	26,400
December 31, 2019	27,500
Thereafter	2,300
Total due under building lease agreement	$ 107,700

For the year ended December 31, 2015 rent expense under this lease was $24,575.

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 2014 in order to commit a total of $625,000 for a legal reserve fund.

The Board has assigned the 2015 fund balance for the following purposes:

Monitoring well drilling fund	$475,000
Desired future conditions preparation fund	30,000
Facilities/building fund	400,000
Technology development fund	450,000
2016 budgetary deficit	74,614

10. Retirement Plan

Plan Description

The District provides retirement benefits for all of its full-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 system consisting of 677 nontraditional defined benefit pension plans. 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 improved 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, 2014 valuation and measurement date, the following employees were covered by the benefit terms:

Inactive employees of beneficiaries currently receiving benefits	0
Inactive employees entitled to but not yet receiving benefits	0
Active employees	6
	6

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 3.91% for the calendar year. The deposit rate payable by the employee members for calendar year 2015 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.

10. <u>Retirement Plan (continued)</u>

Net Pension Liability

The District's Net Pension Liability (NPL) for the year ended December 31, 2015, was measured as of December 31, 2014, 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, 2014 actuariall 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. Serve 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. Disabled retirees were based on RP-2000 Disabled Mortality Table for males and females as appropriate, with adjustments, with the projection scale AA

Actuarial assumptions used in the December 31, 2014 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 on TCDRS assets is determined by adding expected inflation to expected long-term real returns, and reflecting expected volatility and correlation. The numbers shown are based on January 2015 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 2015) are summarized below:

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	16.5%	5.35%
Private Equity	Cambridge Associates Global Private Equity & Venture Capital Index	12.0%	8.35%
Global Equities	MSCI World (net) Index	1.5%	5.65%
International Equities - Developed	50% MSCI World Ex USA (net) + 50% MSCI World ex USA 100% Hedged to USD (net) Index	11.0%	5.35%
International Equities - Emerging	50% MSCI EM Standard (net) Index + 50% MSCI EM 100% Hedged to USD (net) Index	9.0%	6.35%
Investment-Grade Bonds	Barclays Cpaital Aggregate Bond Index	3.0%	0.55%
High-Yield Bonds	Citigroup High-Yield Cash-Pay Capped Index	3.0%	3.75%
Opportunistic Credit	Citigroup High-Yield Cash-Pay Capped Index	5.0%	5.54%
Direct Lending	Citigroup High-Yield Cash-Pay Capped Index	2.0%	5.80%
Distressed Debt	Citigroup High-Yield Cash-Pay Capped Index	3.0%	6.75%
REIT Equities	67% FTSE NAREIT Equity REITs Index + 33% FRSE EPRA/NAREIT Global Real Estate Index	2.0%	4.00%
Commodities	Bloomberg Commodities Index	2.0%	-0.20%
Master Limited Partnerships (MLPs)	Alerian MLP Index	2.0%	5.30%
Private Real Estate Partnerships	Cambridge Associates Real Estate Index	3.0%	7.20%
Hedge Funds	Hedge Fund Research, Inc. (HFRI) Fund of Funds Composite Index	25.0%	5.15%
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.

10. Retirement Plan (continued)

Net Pension Liability (continued)

	Increase (Decrease)		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)
Balance at 12/31/2013	$ 41,030	$ 47,519	$ (6,489)
Changes for the year:			
Service cost	21,024	-	21,024
Interest on total pension liability	4,158	-	4,158
Effect of plan changes	-	-	-
Effect of economic/demographic gains or losses	3,650	-	3,650
Effect of assumptions changes or inputs	-	-	-
Refund of contributions	-	-	-
Benefit payments	-	-	-
Administrative expenses	-	(49)	49
Member contributions	-	14,747	(14,747)
Net investment income	-	3,400	(3,400)
Employer contributions		11,178	(11,178)
Other	-	(3)	3
Net changes	$ 28,832	$ 29,273	$ (441)
Balance at 12/31/2014	**$ 69,862**	**$ 76,792**	**$ (6,930)**

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	$ 80,754	$ 69,862	$ 61,254
Fiduciary net position	76,792	76,792	76,792
Net pension liabiltiy (asset)	$ 3,962	$ (6,930)	$ (15,538)

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, 2015, the District recognized pension expense of $6,110.

As of December 31, 2015, the District reported deferred outflows of resources and deferred inflows of resources related to pensions from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	$ -	$ 3,405
Changes of assumptions	-	-
Net difference between projected and actual earnings	-	1,220
Contributions subsequent to the measurement date	N/A	15,741
Total	$ -	$ 20,366

$15,741 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, 2016. 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:	
2015	$ 548
2016	548
2017	548
2018	548
2019	243
Thereafter	2,190

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, 2015

	GAAP Basis			Variance
	Budgeted Amounts			Positive
	Original	Final	Actual	(Negative)
Revenues:				
Exception fees	$ 15,000	$ 15,000	12,700	(2,300)
Export fees	1,200	1,200	1,176	(24)
Penalties assessed	10,000	10,000	7,033	(2,967)
Forfeited deposits	3,000	3,000	8,000	5,000
New well registration fees	162,000	162,000	179,200	17,200
Semi-annual program income	1,508,440	1,508,440	826,518	(681,922)
Total program revenue	1,699,640	1,699,640	1,034,627	(665,013)
Investment earnings	28,596	28,596	32,900	4,304
Proceeds from sale of capital asset	-	-	23,000	23,000
Other sources	4,100	4,100	3,534	(566)
Total revenues	1,732,336	1,732,336	1,094,061	(638,275)
Expenditures:				
General government	1,458,330	1,458,330	910,736	547,594
Capital outlay	80,620	80,620	101,589	(20,969)
Total Expenditures	1,538,950	1,538,950	1,012,325	526,625
Excess (Deficiency) of Revenues Over (Under) Expenditures	193,386	193,386	81,736	(111,650)
Fund balance - beginning of year	4,099,380	4,099,380	4,099,380	-
Fund balance - end of year	$ 4,292,766	$ 4,292,766	$ 4,181,116	$ (111,650)

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		**2015**
Service Cost	$	21,024
Interest on total pension liability		4,158
Effect of plan changes		-
Effect of assumption changes or inputs		-
Effect of economic/demographic (gains) or losses		3,650
Benefit payments/refunds of contributions		-
Net Change in Total Pension Liability		28,832
Total Pension Liability, beginning		41,030
Total Pension Liability, ending (a)	$	69,862
Fiduciary Net Position		
Emloyer contributions	$	11,178
Member contributions		14,747
Investment income net of investment expenses		3,400
Benefit payments/refunds of contributions		-
Administrative expenses		(49)
Other		(3)
Net Change in Fiduciary Net Position		29,273
Fiduciary Net Position, beginning		47,519
Fiduciary Net Position, ending (b)	$	76,792
Net Pension Liability (Asset), ending = (a) - (b)	$	(6,930)
Fiduciary net position as a % of total pension liability		109.92%
Pensionable covered payroll	$	294,939
Net pension liability as a % of covered payroll		-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 Payoll
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%

UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT
Notes to Required Supplementary Information
December 31, 2015

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 Budget 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 Normal
Asset Valuation Method	
Smoothing period	5 years
Recognition method	Non-asymptotic
Corridor	None
Inflation	3.0%
Salary Increases	3.5%
Investment Rate of Return	8.1%
Cost of Living Adjustments	Cost-of-Living Adjustments for the District are not considered to be substantively automatic under GASB 68. Therefore, no assumption for future cost-of-living adjustments is included in the GASB calculations. No assumption for future cost-of-living adjustments is included in the funding valuation.
Retirement Age	Deferred members as assumed to retire (100% probability) at the later of (a) age 60 or (b) earliest retirement eligibility. For all eligible members age 75 and older, retirement is assumed to occur immediately.
Turnover	The rate of assumed future termination from active participation in the plan for reasons other than death, disability, or retirement are calculated in a service-based table. The rates vary by length of service, entry-age group (age at hire) and sex.
Mortality	Mortality rates for depositing members were based on the RP-2000 Active Employee Mortality Table, for service retirees, beneficiaries and non-depositing members were based on RP-2000 Combined Mortality Table, and for disabled retirees were based on RP-2000 Disabled Mortality Table. Each rate was calculated for males and females as appropriate, with adjustments, with the projection scale AA