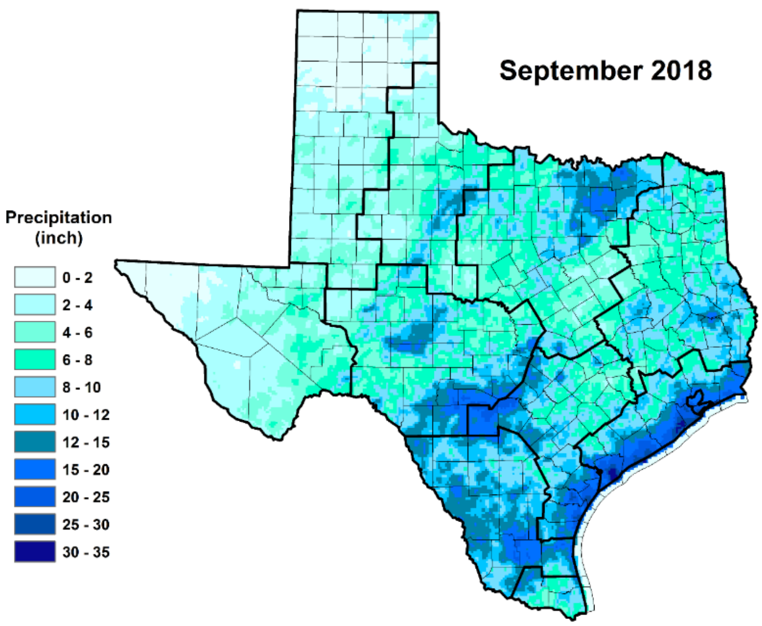
Texas Water Conditions Report

Texas Water Development Board

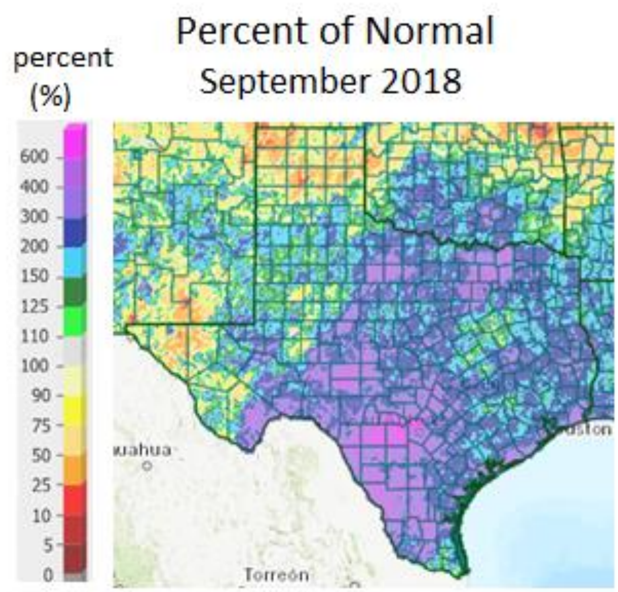
September 2018

PRECIPITATION

Precipitation is the primary source influencing water conditions in Texas. After the dry, hot months of July and August, Texas received a decent amount of rainfall in September (*map, below left*). Most of the state received more than 4 inches of rainfall, except the Panhandle and El Paso areas where rainfall was less than 2 inches. High rainfall totals (greater than 20 inches) occurred in areas throughout Texas but primarily along the coast, in south Texas and the Concho Valley of the Edwards Plateau, and in the Dallas-Fort Worth region. According to observed precipitation data from the National Weather Service-National Oceanic and Atmospheric Administration (NWS-NOAA), total rainfall in September for much of Texas was 300 percent higher than normal rainfall (*map, below right*), as compared to historical data from 1981–2010. Local patches from Laredo to San Antonio reached as much as 600 percent of normal rainfall. However, rainfall in areas from El Paso to the Panhandle were below normal.



Data courtesy of ClimateEngine.org



Data courtesy of NWS-NOAA

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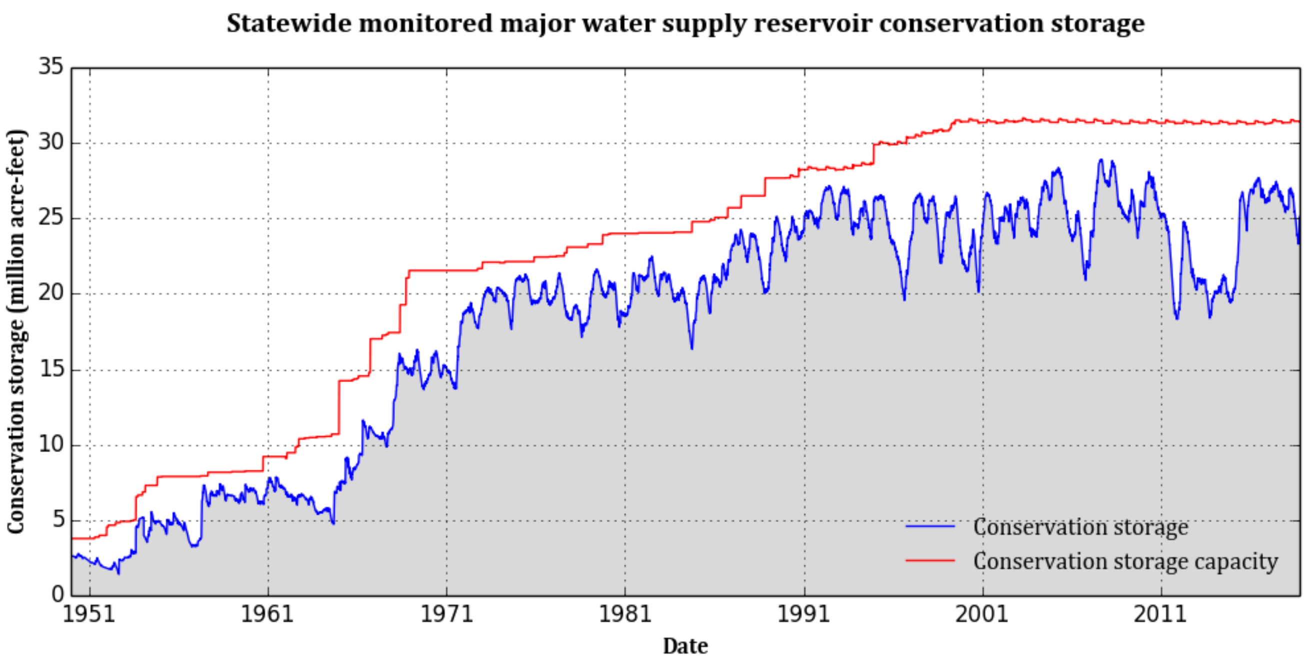
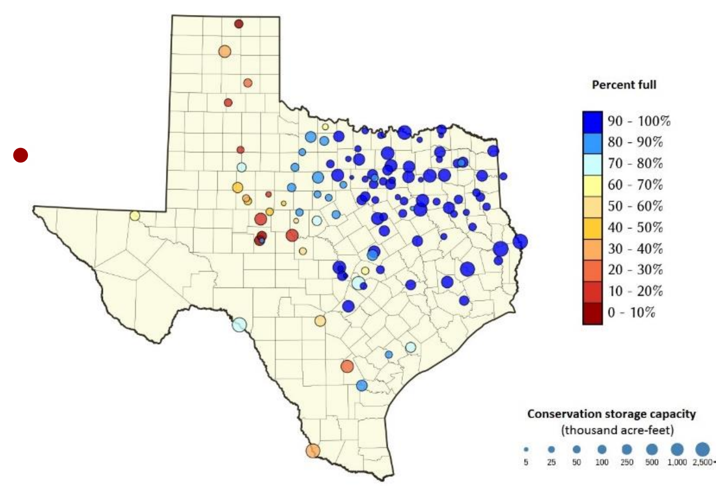
RESERVOIR STORAGE

At the end of September 2018, total conservation storage* in 118 of the state's major water supply reservoirs plus Elephant Butte Reservoir in New Mexico was 25.09 million acre-feet or 78 percent of total conservation storage capacity (*see storage plot, below*). This is approximately 1.66 million acre-feet more than a month ago, an increase after a 5-month decline since April. Although this storage level is a fraction more than the historical median storage (based on records since 1990), it is 1.53 million acre-feet less than total conservation storage at the end of September 2017.

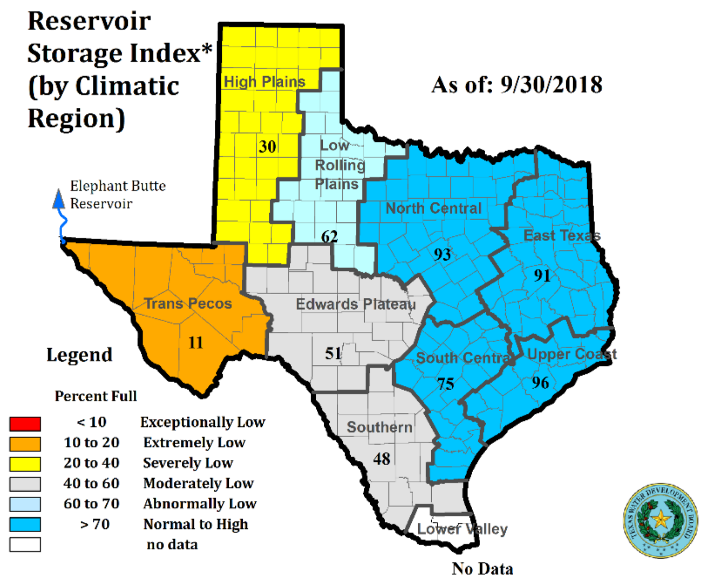


Out of 118 reservoirs in the State, 27 reservoirs held 100 percent of conservation storage capacity (*see map at right*). Additionally, 28 were above 90 percent full. These high storage reservoirs are located in the north, central, and east Texas regions. However, two reservoirs, Palo Duro (1 percent full) and O. C. Fisher (8 percent full) remained below 10 percent full, and 8 reservoirs remained between 10-30 percent full. Low storage reservoirs (26 below 70 percent full) occurred in the Panhandle, west, and south Texas regions. Elephant Butte reservoir (located in New Mexico) was only 3 percent full.

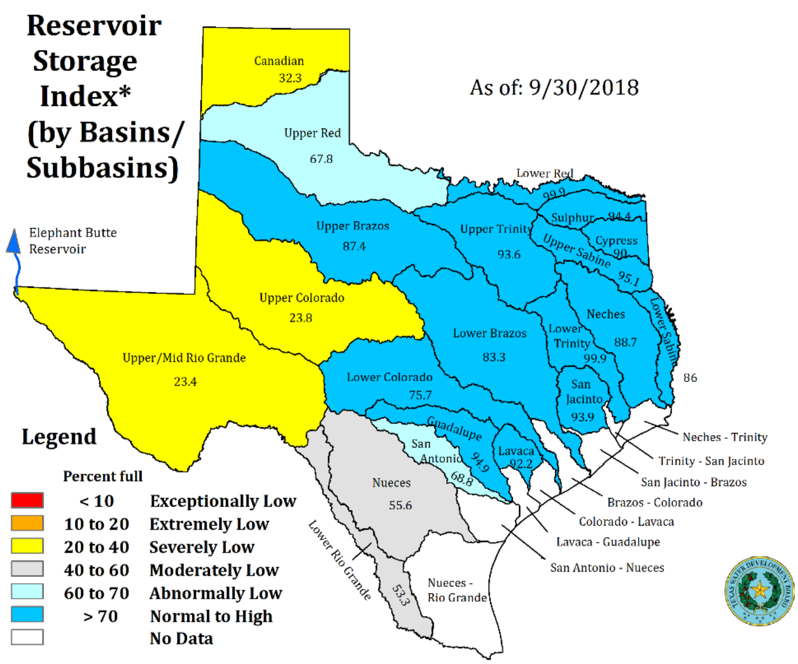


*Storage is based on end of the month data in 118 major reservoirs that represent 96 percent of the total conservation storage capacity of 188 major water supply reservoirs in Texas plus Elephant Butte Reservoir in New Mexico. Major reservoirs are defined as having a conservation storage capacity of 5,000 acre-feet or greater. Only the Texas share of storage in border reservoirs is counted.

Total regionally-combined conservation storage was at or above normal (storage ≥70 percent full) in the Upper Coast (96 percent full), East Texas (91 percent full), North Central (93 percent full), and South Central (75 percent full) regions (*top map*). The High Plains (30 percent full) and Trans-Pecos (11 percent full) regions had the lowest storage. Overall, storage increased in all regions during September, except in the High Plains and Trans-Pecos regions (both lost 1 percent storage). Combined conservation storage by river basin or sub-basin depicted a similar picture, but the storage in Upper Brazos River basin was above normal at 87.4 percent full (*bottom map*). Storage in the Canadian, Upper Colorado, and Upper/Mid Rio Grande was ranked as severely low, storage in Nueces and Lower Rio Grande was ranked as moderately low, and storage in the Upper Red and San Antonio was ranked as abnormally low.



*Percent of combined conservation storage capacity of 118 major water supply reservoirs by that region (dead pools are excluded)



*Percent of combined conservation storage capacity of 118 major water supply reservoirs by sub-basin (dead pools are excluded)

*Reservoir Storage Index is defined as the percent full of conservation storage capacity.

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS

Name of lake or reservoir	Conservation storage capacity (acre-feet)	Conservation storage end of September 2018 (acre-feet)	(%)	Change since end of August 2018 (acre-feet)**	(%)	Change since end of September 2017 (acre-feet)**	(%)
HIGH PLAINS							
Mackenzie Reservoir	46,450	5,955	13	-38	-0	-1,111	-2
Meredith, Lake	500,000	180,619	36	-4,464	-1	26,821	5
Palo Duro Reservoir	61,066	443	1	-60	-0	-25	-0
White River Lake	29,880	3,995	13	75	0	-2,765	-9
TOTAL	**637,396**	**191,012**	**30**	**-4,487**	**-1**	**22,920**	**4**
LOW ROLLING PLAINS							
Abilene, Lake	7,900	3,628	46	1,063	13	-2,324	-29
Alan Henry Reservoir	94,808	75,173	79	1,509	2	-10,637	-11
Champion Creek Reservoir	41,580	19,797	48	-186	-0	-480	-1
Coleman, Lake	38,075	29,918	79	487	1	-5,565	-15
Colorado City, Lake	30,758	9,081	30	-153	-0	-4,102	-13
Fort Phantom Hill, Lake	70,030	58,206	83	5,207	7	-10,499	-15
Greenbelt Lake	59,968	12,470	21	-287	-0	-2,874	-5
Hords Creek Lake	8,443	4,478	53	52	1	-1,444	-17
J. B. Thomas, Lake	199,931	71,562	36	493	0	-34,373	-17
Kemp, Lake	245,307	178,311	73	14,843	6	-52,680	-21
Millers Creek Reservoir	26,768	26,768	100	8,281	31	0	0
North Fork Buffalo Creek Reservoir	15,400	12,938	84	650	4	826	5
Stamford, Lake	51,570	51,570	100	17,006	33	0	0
Sweetwater, Lake	12,267	2,407	20	725	6	-169	-1
TOTAL	**902,805**	**556,307**	**62**	**49,690**	**6**	**-124,321**	**-14**
NORTH CENTRAL							
Amon G Carter, Lake	19,266	17,804	92	676	4	-1,462	-8
Aquilla Lake	43,243	39,743	92	2,274	5	-622	-1
Arlington, Lake	40,188	40,188	100	10,935	27	7,620	19
Arrowhead, Lake	230,359	186,068	81	7,608	3	-23,388	-10
Bardwell Lake	46,122	46,122	100	2,236	5	4,096	9
Belton Lake	435,225	378,972	87	6,018	1	-39,324	-9
Benbrook Lake	85,648	71,545	84	12,638	15	-11,445	-13
Bonham, Lake	11,027	11,027	100	2,099	19	878	8
Bridgeport, Lake	366,236	297,452	81	7,339	2	-60,779	-17
*Brownwood, Lake	128,839	85,668	66	151	0	-30,287	-24
*Cisco, Lake	29,003	21,232	73	-97	-0	-3,935	-14
Crook, Lake	9,195	9,195	100	1,185	13	520	6
Eagle Mountain Lake	179,880	170,627	95	13,382	7	5,992	3
Georgetown, Lake	36,823	26,738	73	7,128	19	2,693	7
Graham, Lake	45,288	39,500	87	3,298	7	-5,788	-13
Granbury, Lake	132,949	132,949	100	14,719	11	2,998	2
Granger Lake	51,822	51,822	100	5,616	11	0	0
Grapevine Lake	164,703	164,703	100	21,666	13	1,780	1
*Halbert, Lake	6,033	4,781	79	26	0	-411	-7
Hubbard Creek Reservoir	318,067	236,413	74	2,028	1	-52,206	-16
Hubert H Moss Lake	24,058	24,058	100	1,687	7	1,047	4
Jim Chapman Lake (Cooper)	260,332	242,967	93	45,512	17	-5,123	-2
Joe Pool Lake	175,358	175,358	100	15,281	9	4,723	3
Kickapoo, Lake	86,345	67,926	79	6,054	7	-9,273	-11
Lavon Lake	406,388	406,388	100	80,712	20	21,221	5
Leon, Lake	27,762	19,095	69	215	1	-5,975	-22
Lewisville Lake	563,228	563,228	100	81,661	14	15,282	3
Limestone, Lake	203,780	152,206	75	-2,139	-1	-20,683	-10
*Lost Creek Reservoir	11,950	11,264	94	371	3	-681	-6
*Mineral Wells, Lake	5,273	4,836	92	194	4	-67	-1
Mountain Creek, Lake	22,850	22,850	100	1,246	5	0	0

(North Central continued)

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS							
Name of lake or reservoir	Conservation storage capacity (acre-feet)	Conservation storage end of September 2018 (acre-feet)	(%)	Change since end of August 2018 (acre-feet)**	(%)	Change since end of September 2017 (acre-feet)**	(%)
Navarro Mills Lake	49,827	42,807	86	-221	-0	-2,233	-4
New Terrell City Lake	8,583	8,583	100	488	6	446	5
Nocona, Lake (Farmers Crk)	21,444	19,448	91	588	3	-1,080	-5
Palo Pinto, Lake	26,766	18,572	69	1,528	6	-5,762	-22
Pat Cleburne, Lake	26,008	26,008	100	3,969	15	2,874	11
*Pat Mayse Lake	113,683	113,683	100	9,958	9	0	0
Possum Kingdom Lake	538,139	538,139	100	71,386	13	7,306	1
Proctor Lake	54,762	30,087	55	1,996	4	-15,679	-29
Ray Hubbard, Lake	439,559	438,932	100	74,919	17	15,405	4
Ray Roberts, Lake	788,167	788,167	100	44,019	6	7,353	1
Richland-Chambers Reservoir	1,087,839	1,016,222	93	11,176	1	-2,077	-0
Squaw Creek, Lake	151,250	151,250	100	0	0	0	0
Stillhouse Hollow Lake	227,771	181,143	80	262	0	-38,166	-17
Tawakoni, Lake	871,685	867,620	100	79,103	9	11,372	1
Texoma, Lake (Texas)	1,258,113	1,258,113	100	12,644	1	1,865	0
Texoma, Lake (Texas & Oklahoma)	2,525,281	2,805,691	100	314,747	12	293,188	12
Waco, Lake	189,418	162,967	86	6,797	4	-10,384	-5
Waxahachie, Lake	10,780	10,620	99	1,537	14	1,619	15
Weatherford, Lake	17,812	14,609	82	798	4	-2,270	-13
Whitney, Lake	553,344	470,627	85	49,044	9	-3,703	-1
Worth, Lake	33,495	27,551	82	1,653	5	-3,240	-10
TOTAL	**10,635,685**	**9,907,873**	**93**	**723,363**	**7**	**-238,953**	**-2**
EAST							
Athens, Lake	29,503	26,898	91	-17	-0	-1,229	-4
B A Steinhagen Lake	66,961	63,931	95	412	1	3,564	5
Bob Sandlin, Lake	190,822	186,780	98	7,513	4	-1,199	-1
Caddo, Lake	29,898	29,898	100	6,712	22	1,937	6
Cedar Creek Reservoir in Trinity	644,686	587,551	91	6,769	1	-16,801	-3
Cherokee, Lake	40,094	32,428	81	463	1	-6,079	-15
Conroe, Lake	410,988	378,717	92	3,840	1	-29,589	-7
Cypress Springs, Lake	66,756	64,670	97	3,212	5	1,426	2
Fork Reservoir, Lake	605,061	557,435	92	10,873	2	-33,468	-6
Houston County Lake	17,113	15,458	90	624	4	-1,359	-8
Jacksonville, Lake	25,670	23,964	93	123	0	-1,290	-5
*Livingston, Lake	1,785,348	1,785,348	100	21,596	1	16,539	1
Martin, Lake	75,726	61,243	81	219	0	-4,847	-6
Monticello, Lake	34,740	28,827	83	1,547	4	-5,913	-17
Murvaul, Lake	38,285	32,652	85	161	0	-3,092	-8
Nacogdoches, Lake	39,522	33,698	85	559	1	-3,875	-10
O' the Pines, Lake	268,566	216,345	81	2,324	1	-38,613	-14
Palestine, Lake	367,303	323,722	88	2,982	1	-31,006	-8
Sam Rayburn Reservoir	2,857,077	2,531,131	89	57,383	2	-325,946	-11
Striker, Lake	16,934	15,906	94	1,510	9	-587	-3
*Sulphur Springs, Lake	17,747	15,982	90	2,281	13	-1,127	-6
Toledo Bend Reservoir (Texas)	2,236,450	1,922,820	86	7,200	0	-30,298	-1
Toledo Bend Reservoir (Texas & Louisiana)	4,472,900	3,849,739	86	14,399	0	-60,598	-1
Tyler, Lake	72,073	63,022	87	344	0	-6,263	-9
Wright Patman Lake	231,496	221,997	96	-9,499	-4	-8,338	-4
TOTAL	**10,168,819**	**9,220,423**	**91**	**129,131**	**1**	**-527,453**	**-5**
TRANS-PECOS							
Elephant Butte Reservoir (Texas)	852,491	25,345	3	-11,943	-1	-72,904	-9
Elephant Butte Reservoir (Total Storage)	1,973,358	58,668	3	-27,646	-1	-168,760	-9
Red Bluff Reservoir	151,110	85,936	57	2,399	2	-20,996	-14
TOTAL	**1,003,601**	**111,281**	**11**	**-9,544**	**-1**	**-93,900**	**-9**

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS

Name of lake or reservoir	Conservation storage capacity (acre-feet)	Conservation storage end of September 2018 (acre-feet)	(%)	Change since end of August 2018 (acre-feet)**	(%)	Change since end of September 2017 (acre-feet)**	(%)
EDWARDS PLATEAU							
*Amistad Reservoir (Texas)	1,840,849	1,124,901	61	77,516	4	-239,487	-13
*Amistad Reservoir (Texas & Mexico)	3,275,532	1,605,465	49	164,812	5	-227,931	-7
Brady Creek Reservoir	28,808	14,855	52	970	3	-2,019	-7
Buchanan, Lake	816,904	686,178	84	39,472	5	-94,294	-12
E. V. Spence Reservoir	517,272	68,105	13	7,859	2	-3,173	-1
Inks, Lake	13,962	13,374	96	459	3	459	3
Lyndon B Johnson, Lake	115,249	110,088	96	-426	-0	-1,038	-1
Marble Falls, Lake	6,901	6,831	99	-65	-1	-5	-0
Nasworthy	9,615	7,697	80	264	3	-303	-3
Oak Creek Reservoir	39,210	34,462	88	18,374	47	13,792	35
O. C. Fisher Lake	119,445	9,501	8	96	0	-3,957	-3
*O. H. Ivie Reservoir	554,340	83,176	15	7,642	1	-33,374	-6
Twin Buttes Reservoir	182,454	21,341	12	15,774	9	6,479	4
TOTAL	**4,245,009**	**2,180,509**	**51**	**167,935**	**4**	**-356,920**	**-8**
SOUTH CENTRAL							
*Austin, Lake	23,972	23,189	97	278	1	386	2
Canyon Lake	378,781	360,062	95	37,028	10	797	0
*Coleto Creek Reservoir	31,040	28,742	93	6,642	21	-2,298	-7
Medina Lake	254,823	175,384	69	59,916	24	-14,702	-6
Somerville Lake	147,104	124,668	85	5,023	3	-22,436	-15
Travis, Lake	1,113,348	747,863	67	61,967	6	-195,525	-18
TOTAL	**1,949,068**	**1,459,908**	**75**	**170,854**	**9**	**-233,778**	**-12**
UPPER COAST							
Houston, Lake	120,686	120,686	100	0	0	0	0
Texana, Lake	159,566	147,126	92	5,958	4	-11,889	-7
TOTAL	**280,252**	**267,812**	**96**	**5,958**	**2**	**-11,889**	**-4**
SOUTHERN							
Choke Canyon Reservoir	662,820	255,086	38	99,490	15	40,848	6
Corpus Christi, Lake	256,062	256,062	100	86,807	34	82,672	32
*Falcon Reservoir (Texas)	1,551,007	684,337	44	239,317	15	-84,463	-5
*Falcon Reservoir (Texas & Mexico)	2,646,817	868,701	33	357,883	14	-86,775	-3
TOTAL	**2,469,889**	**1,195,485**	**48**	**425,614**	**17**	**39,057**	**2**
STATEWIDE TOTAL							
STATEWIDE TOTAL	**32,292,524**	**25,090,610**	**78**	**1,658,514**	**5**	**-1,525,237**	**-5**

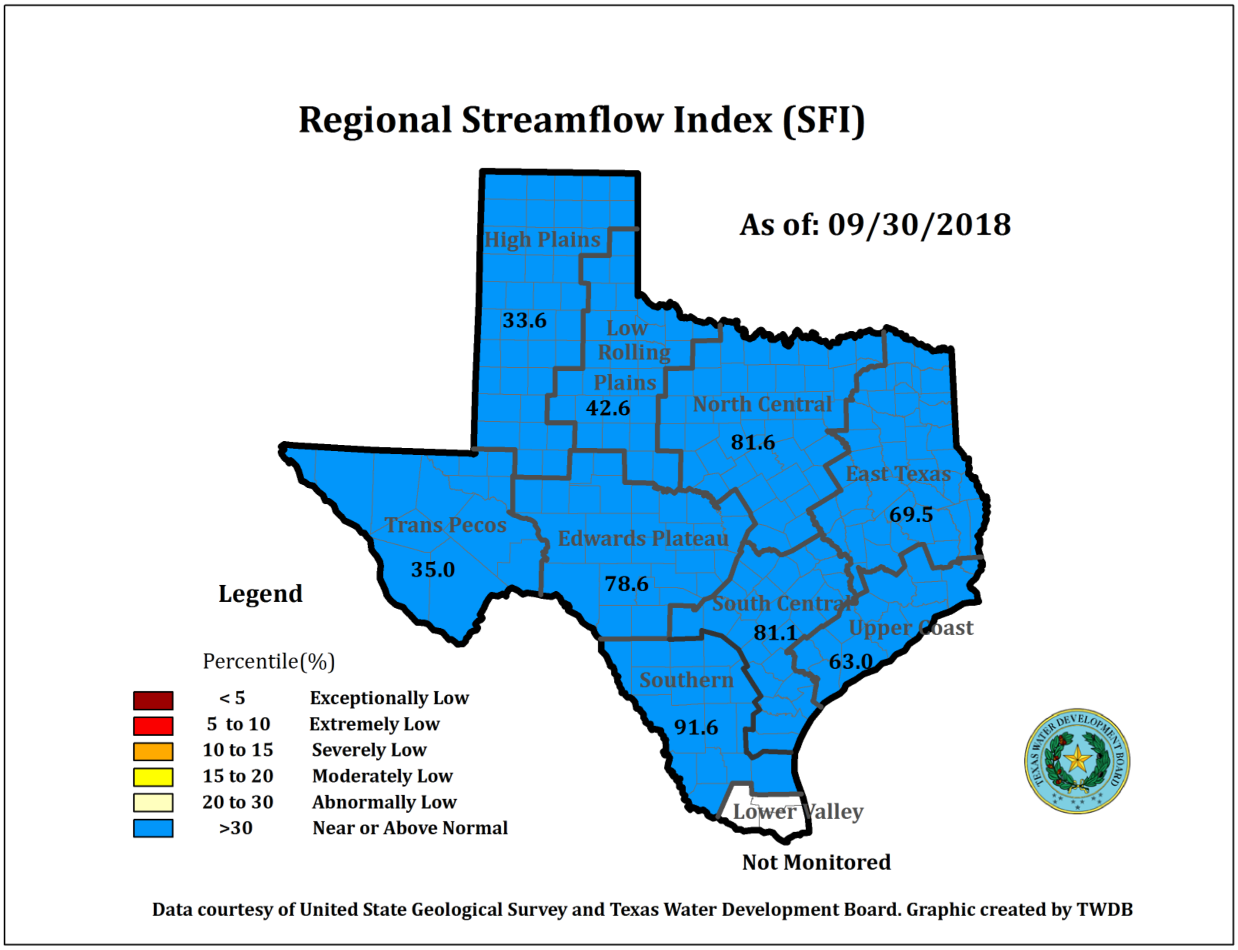
* Total volume below elevation of conservation pool top is used as conservation storage capacity, because the dead pool storage is unknown.
**Monthly and yearly changes do not include reservoirs that did not have data in last month or last year, respectively.

Note:

Conservation storage capacity is the space available to store water above the lowest outlet and below the top of conservation pool (some may have seasonal variations), or normal maximum operating level. Conservation storage refers to the volume of water held within the conservation storage space. Not included is any water in flood control storage (above the top of conservation pool or normal maximum operating level) or any water in the dead pool storage. Conservation storage percentage is based on the conservation storage capacity of the reservoir and the conservation storage in the reservoir on date shown. Percent change is given by 100 * (current conservation storage - past conservation storage)/conservation storage capacity.

STREAMFLOW CONDITIONS

Regional Streamflow Index* for 29 stream gage stations is presented in the map below. On a regional basis, stream flows were above normal (> 30th percentile) in all 9 climate regions of Texas. High index values (> 60th percentile) occurred throughout much of Texas, except in the High Plains, Trans-Pecos, and Low Rolling Plains of west Texas. Streamflow in the Lower Valley region is not monitored.



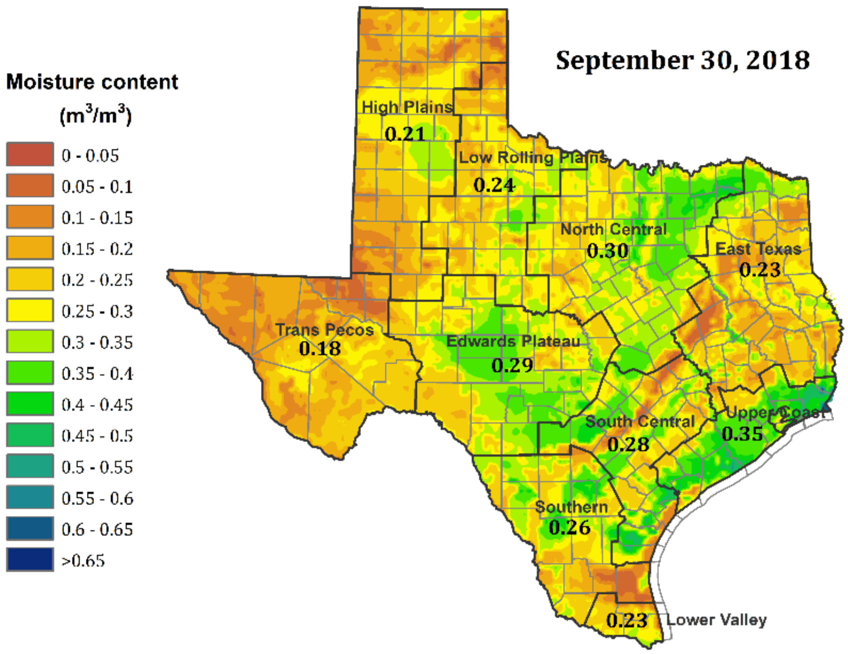
Of 29 individual stream gage stations, streamflow at 27 stations was near or above normal, 1 was abnormally low, and another was moderately low (*table below*). Compared to streamflow conditions in August 2018, streamflow increased at 27 stations, decreased at 1 station, and remained unchanged at 1 station.

Streamflow Status (percentile)	Number of Stations
Near or Above Normal (>30%)	27
Abnormally Low (20-30%)	1
Moderately Low (15-20%)	1
Severely Low (10-15%)	0
Extremely Low (5-10%)	0
Exceptionally Low (<5%)	0

*Streamflow Index is defined as the following: At each station, a 30-day moving average flow is calculated from historical mean daily flow rate records. For each day, 30-day average flow is presented as a percentile of the historical record for that calendar day.

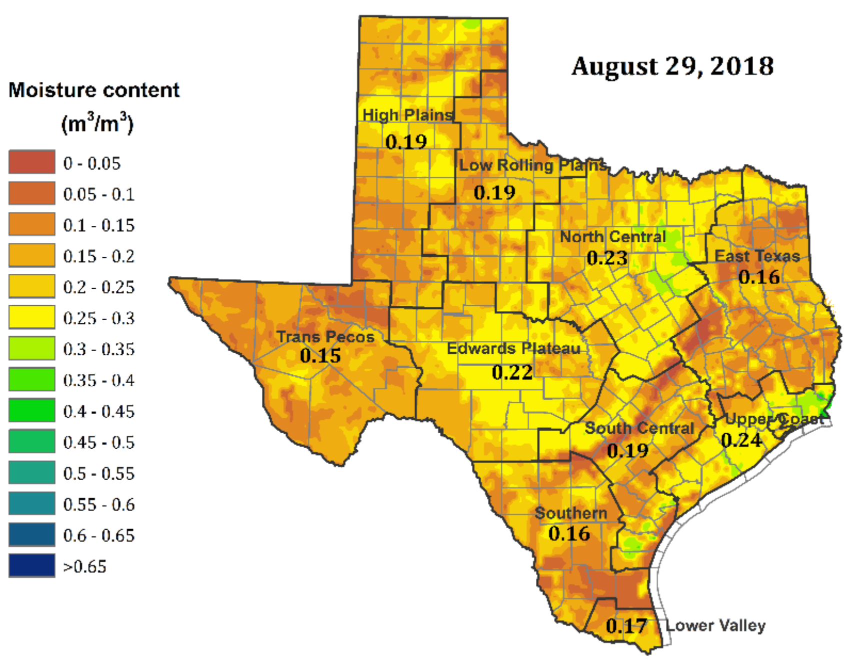
SOIL MOISTURE CONDITIONS

Soil moisture at the end of September 2018 (*top image*), as compared to that at the end of August 2018 (*bottom image*), was higher in all regions of the state due to more rainfall and less evapotranspiration than in August. On a regional basis, average moisture content increased in all 10 regions, varying from 0.02 to 0.11 cubic meter per cubic meter (m^3/m^3). The Upper Coast increased the most; whereas, the High Plains increased the least.



Data from NASA Soil Moisture Active Passive (SMAP) Level 4 - Model - Value Added Version 4

Soil moisture content is shown as volume of water per unit volume of bulk soil. Root zone: 0 to 1 meter depth.

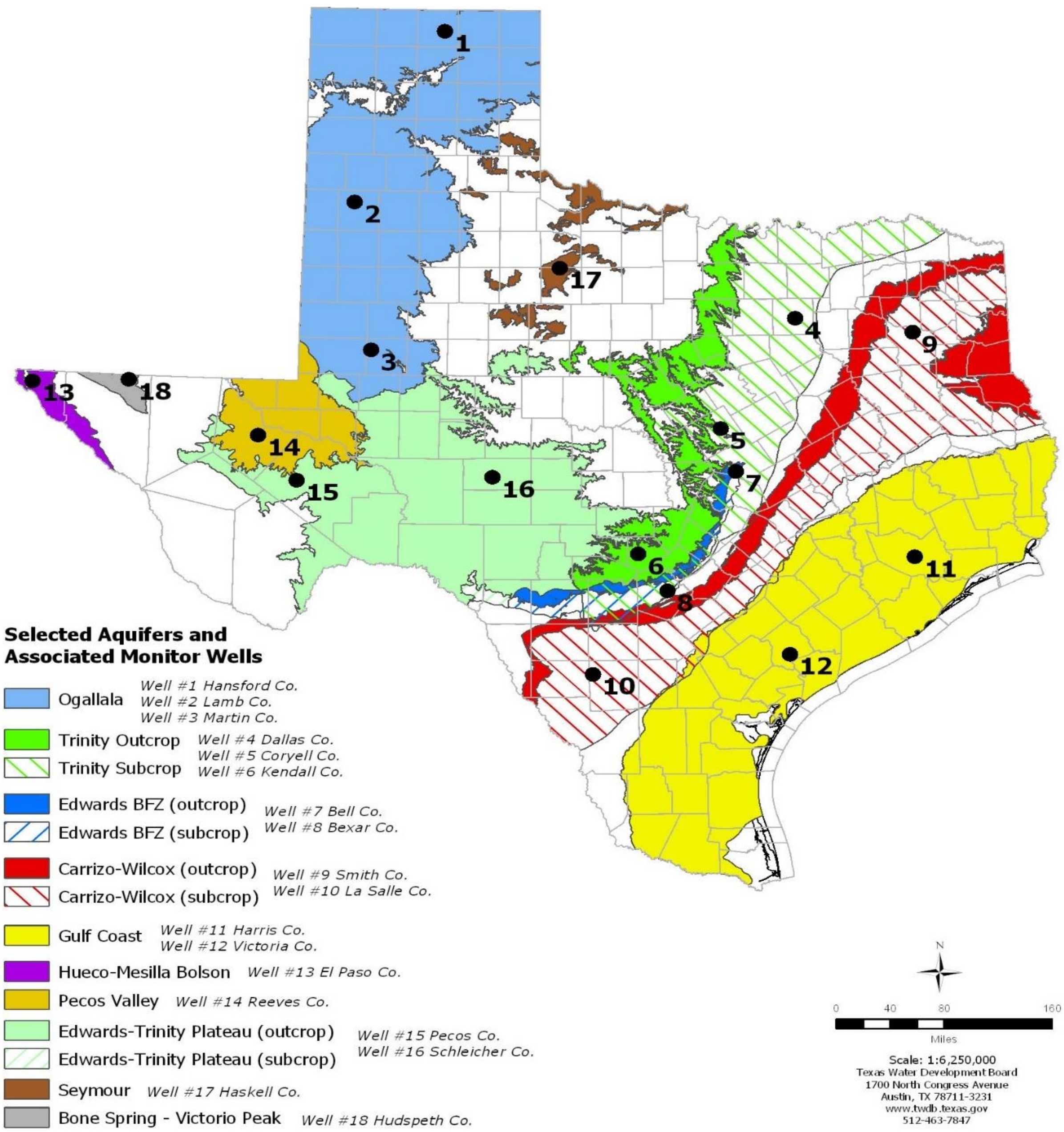


Data from NASA Soil Moisture Active Passive (SMAP) Level 4 - Model - Value Added Version 4

Soil moisture content is shown as volume of water per unit volume of bulk soil. Root zone: 0 to 1 meter depth.

GROUNDWATER LEVELS IN OBSERVATION WELLS

Water-level measurements were available for all 18 key monitoring wells in the state. Water levels rose in 11 monitoring wells since the beginning of September 2018, ranging from an increase of 0.03 feet in the Martin County Ogallala Aquifer well (#3 on map) to 36.20 feet in the Bexar County Edwards (Balcones Fault Zone) Aquifer well (#8 on map). Water levels declined in 5 monitoring wells, ranging from a decline of -0.18 feet in the Harris County Gulf Coast Aquifer well (#11 on map) to -4.71 feet in the La Salle County Carrizo-Wilcox Aquifer well (#10 on map). The J-17 well (#8 on map) in San Antonio recorded a water level of 53.71 feet below land surface or 676.89 feet above mean sea level. Water levels rose 17.29 feet above the Stage 1 critical management level for the San Antonio portion of the Edwards (Balcones Fault Zone) Aquifer. Although this report highlights September groundwater conditions, it is important to note that Stage 1 and 2 drought restrictions for the San Antonio portion of the Edwards (Balcones Fault Zone) Aquifer ended on October 2, 2018.



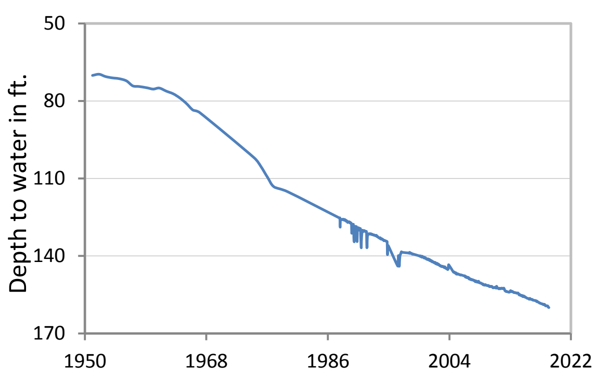
*Well numbers used in this publication on the aquifer map to indicate the monitoring well location (numbers 1 - 18) are different than the TWDB's seven-digit state well number.

Monitoring Well	September	August	Month Change	Year Change	Historical Change	First Measured
(1) Hansford 0354301	159.97	159.85	-0.12	-1.41	-89.85	1951
(2) Lamb 1053602	149.09	148.92	-0.17	-1.25	-120.92	1951
(3) Martin 2739903	143.00	143.03	0.03	-0.49	-38.11	1964
(4) Dallas 3319101	498.44	496.82	-1.62	-6.03	-276.44	1954
(5) Coryell 4035404	530.72	536.26	5.54	-3.71	-238.72	1955
(6) Kendall 6802609	147.79	159.08	11.29	-13.41	-87.79	1975
(7) Bell 5804816	125.25	128.20	2.95	-2.17	-1.74	2008
(8) Bexar 6837203	53.71	89.91	36.20	12.50	-7.07	1932
(9) Smith 3430907	437.24	438.57	1.33	-3.79	-137.24	1977
(10) La Salle 7738103	530.90	526.19	-4.71	-35.52	-277.83	2003
(11) Harris 6514409	195.29	195.11	-0.18	-3.76	-59.79*	1947**
(12) Victoria 8017502	35.43	35.61	0.18	-3.12	-1.43	1958
(13) El Paso 4913301	294.01	294.20	0.19	-0.22	-62.11	1964
(14) Reeves 4644501	169.00	176.22	7.22	-2.80	-76.91	1952
(15) Pecos 5216802	216.36	231.02	14.66	-2.75	30.52	1976
(16) Schleicher 5512134	309.49	319.13	9.64	2.57	-7.59	2003
(17) Haskell 2135748	47.41	47.14	-0.27	-0.31	-4.41	2002
(18) Hudspeth 4807516	158.65	157.29	-1.36	-3.20	-54.73	1966

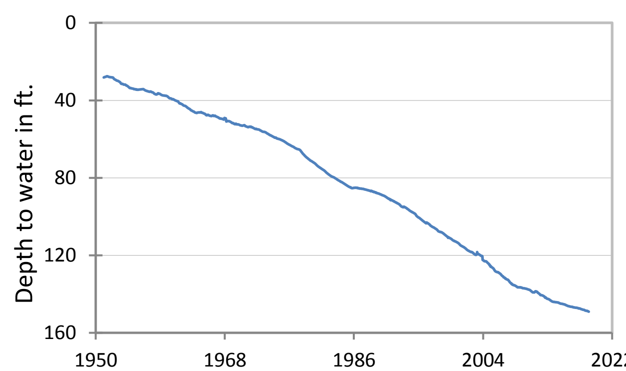
*Change since the original measurement of 135.5 feet below land surface in 1947 (**measurement not shown on the hydrograph)

September 2018 OBSERVATION WELL HYDROGRAPHS

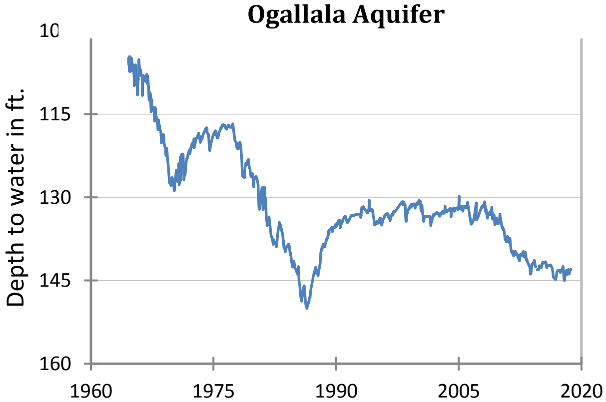
(1) State Well #03-54-301
Near Spearman, Hansford County
Ogallala Aquifer



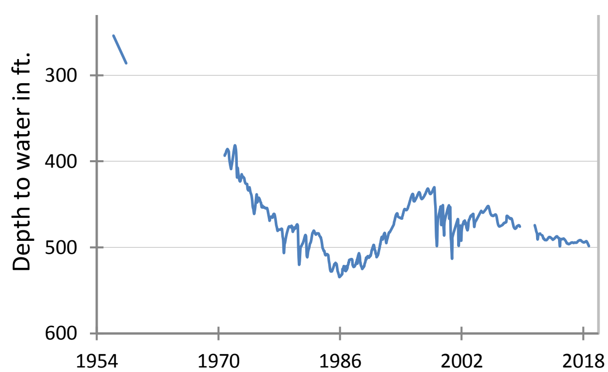
(2) State Well #10-53-602
Near Earth, Lamb County
Ogallala Aquifer



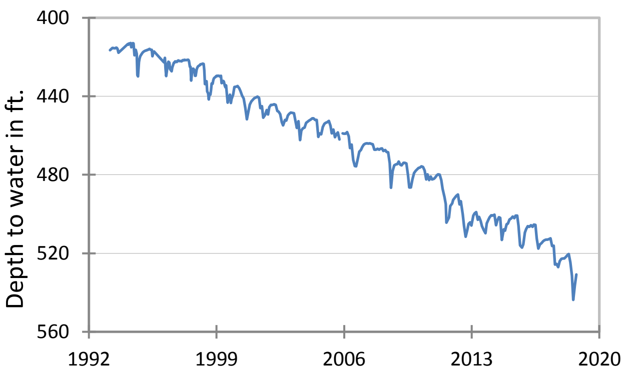
(3) State Well #27-39-903
Northwest Martin County
Ogallala Aquifer



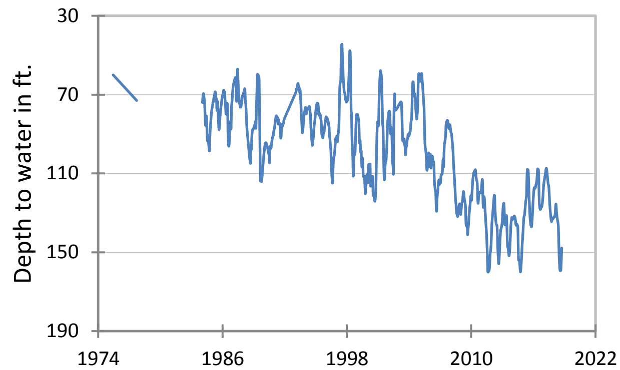
(4) State Well #33-19-101
Southeast Dallas, Dallas County
Twin Mountains Formation-Trinity Aquifer



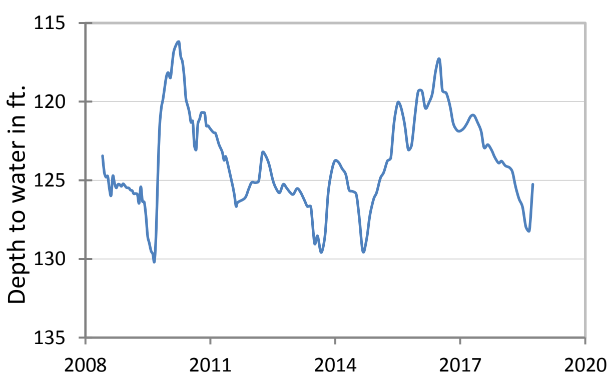
(5) State Well #40-35-404
Gatesville, Coryell County
Hosston Formation-Trinity Aquifer



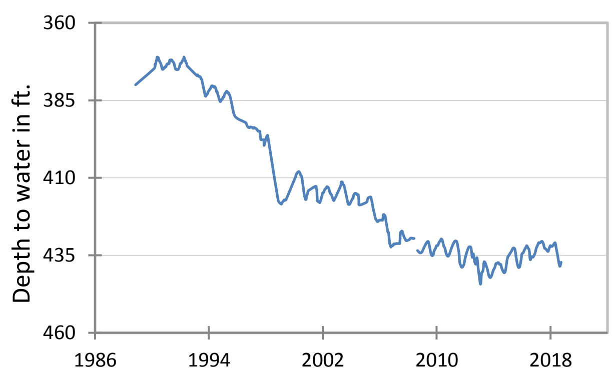
(6) State Well #68-02-609
Waring, Kendall County
Cow Creek Formation-Trinity Aquifer



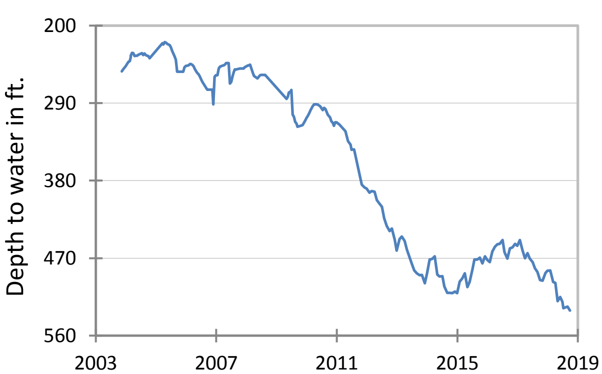
(7) State Well #58-04-816
Near Salado, Bell County
Edwards (Balcones Fault Zone) Aquifer



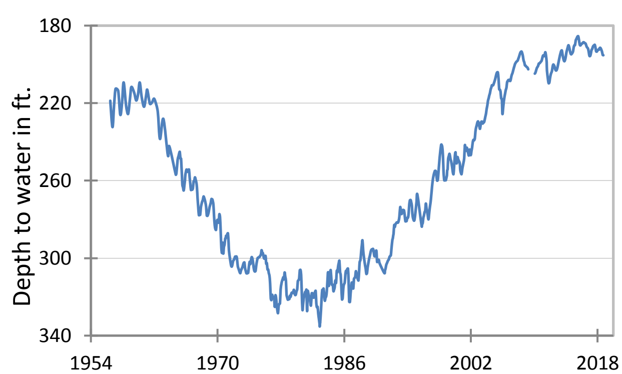
(9) State Well #34-30-907
Red Springs, Smith County
Carrizo-Wilcox Aquifer



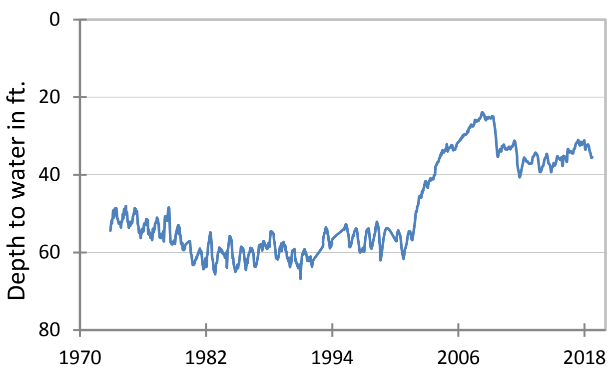
(10) State Well #77-38-103
Near Cotulla, La Salle County
Carrizo-Wilcox Aquifer



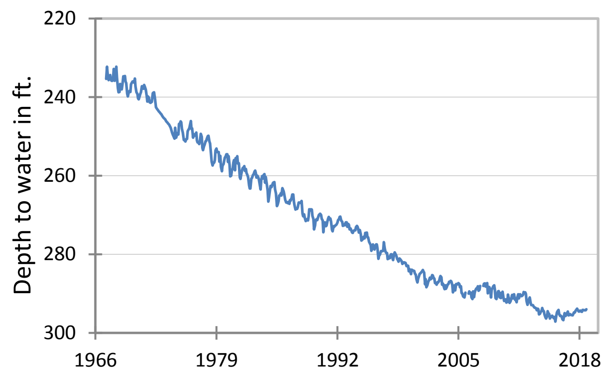
(11) State Well #65-14-409
Alief, Harris County
Evangeline Formation-Gulf Coast Aquifer



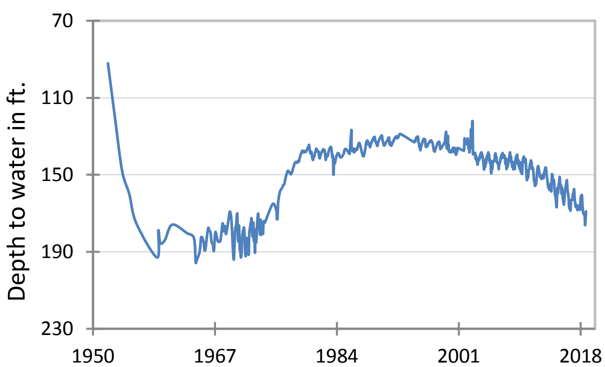
(12) State Well #80-17-502
Near Bloomington, Victoria County
Lissie Formation-Gulf Coast Aquifer



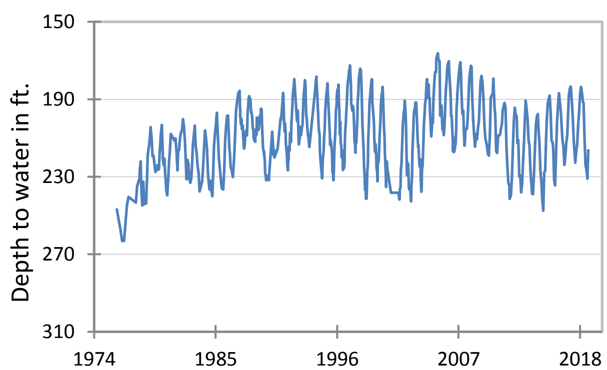
(13) State Well #49-13-301
El Paso, El Paso County
Hueco-Mesilla Bolson Aquifer



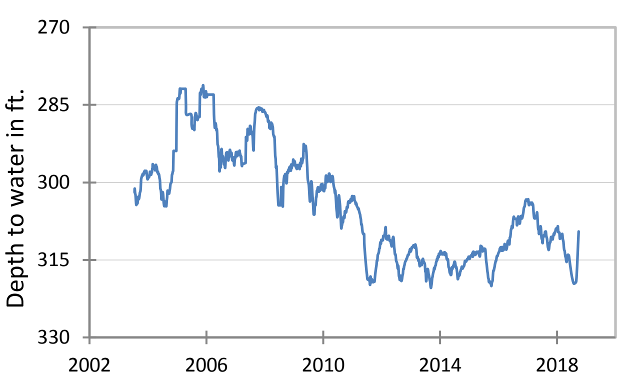
(14) State Well #46-44-501
Near Pecos, Reeves County
Pecos Valley Aquifer



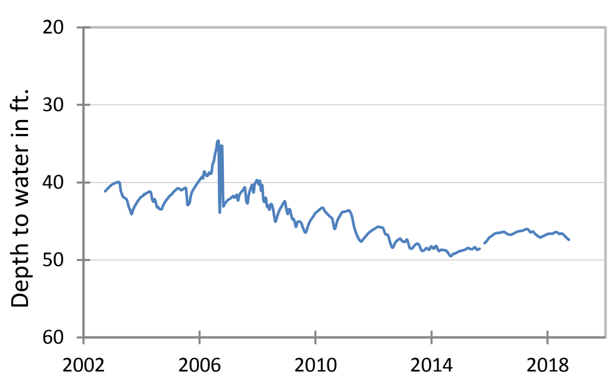
(15) State Well #52-16-802
Fort Stockton, Pecos County
Edwards-Trinity (Plateau) Aquifer



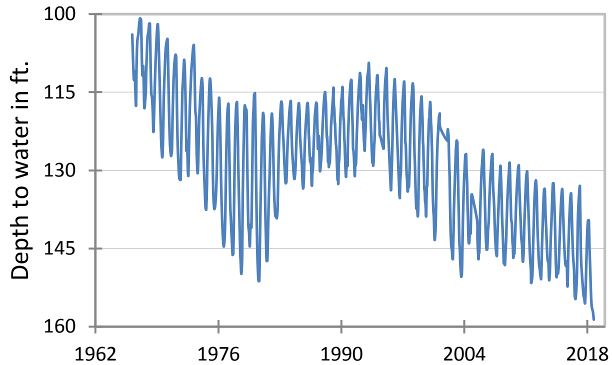
(16) State Well #55-12-134
Eldorado, Schleicher County
Trinity Aquifer



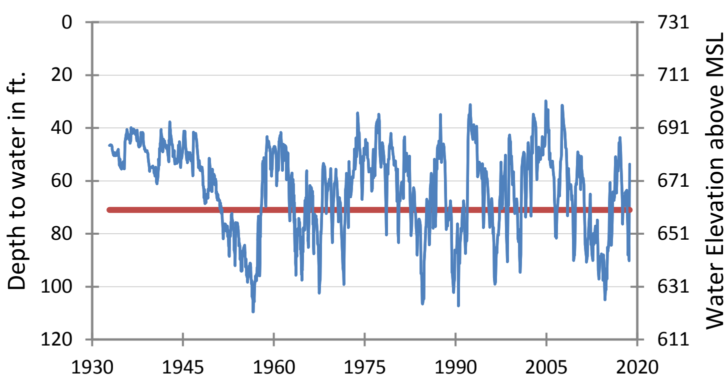
(17) State Well #21-35-748
Near O'Brien, Haskell County
Seymour Aquifer

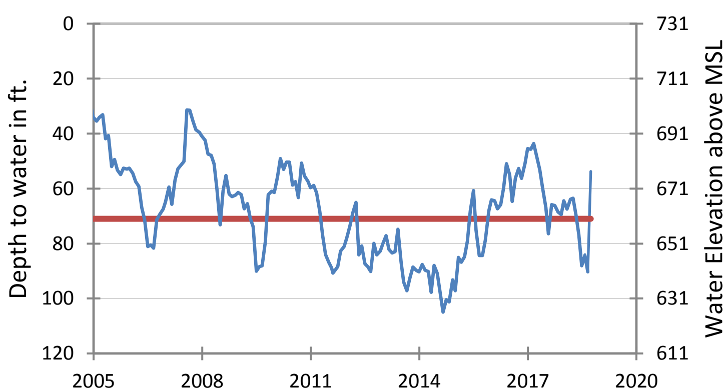


(18) State Well #48-07-516
Dell City, Hudspeth County
Bone Spring - Victorio Peak Aquifer



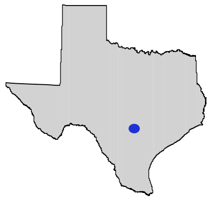
(8) State Well #68-37-203 (J-17)
San Antonio, Bexar County
Edwards (Balcones Fault Zone) Aquifer





Late September water-level measurement in this Edwards (Balcones Fault Zone) Aquifer well, elevation 731 feet above mean sea level, was 53.71 feet below land surface, or 676.89 feet above mean sea level. This was 36.20 feet above last month's measurement, 12.50 feet above last year's measurement, and 7.07 feet below the initial measurement recorded in 1932.

Water levels below the red line indicate periods in which Edwards Aquifer Authority Stage 1 drought restrictions are in effect.



Special Spring Report

Each month this space features a new hydrograph or spring report (location marked with the • symbol on the map) depicting conditions of different aquifers in Texas.

Blue Hole Spring,
Edwards (Balcones Fault Zone) Aquifer

State Well #68-37-115, Bexar County

The Edwards (Balcones Fault Zone) Aquifer is a major aquifer in the south-central part of Texas. It consists primarily of partially dissolved limestone that creates a highly permeable aquifer. Aquifer thickness ranges from 200 to 600 feet, and freshwater saturated thickness averages 560 feet in the southern part of the aquifer. The groundwater, although hard, is generally fresh and contains less than 500 milligrams per liter of total dissolved solids. Water from the aquifer is primarily used for municipal, irrigation, and recreational purposes. The majority of San Antonio's water supply comes from the Edwards (Balcones Fault Zone) Aquifer. Several well-known springs are fed from the aquifer including Comal Springs in Comal County, which is the largest spring in the state, and San Marcos Springs in Hays County which is the second largest. Because of the aquifer's highly permeable nature, water levels and spring flows respond quickly to rainfall, drought, and pumping.

Far away (*left*) and close (*right*) images of well #68-37-115. Photos by Lindsay Ratcliffe/UTSA.

Due to recent record-setting rainfall events, Edwards (Balcones Fault Zone) Aquifer water levels have risen over 36 feet in the past month, allowing the Blue Hole Spring to flow after being dry for over a year. Blue Hole Spring is unique as it is the source spring of the San Antonio River. Consequently, it is also the first of the San Antonio springs to stop flowing when aquifer water levels drop, because it is higher in elevation.

Blue Hole Spring is located at the Incarnate Word College in San Antonio, Texas, and is maintained by the non-profit organization Headwaters at Incarnate Word. The spring is free to visit and open to the public. Once water levels rise to an elevation of 672 feet in the Bexar County J-17 index well, just over 2 miles to the east-northeast of Blue Hole, the spring begins to flow.

Long before San Antonio was urbanized and until the first artesian wells were drilled in the 1980s, the Edwards Aquifer water table was much higher, causing water to shoot up into in the air at Blue Hole Spring. Today, spring flows are less common due to continual pumping of the aquifer, particularly during drought periods of increased water demand.

Signage (*left*) and spring flow (*right*) images at well #69-44-1317. Photos by Lindsay Ratcliffe/UTSA.