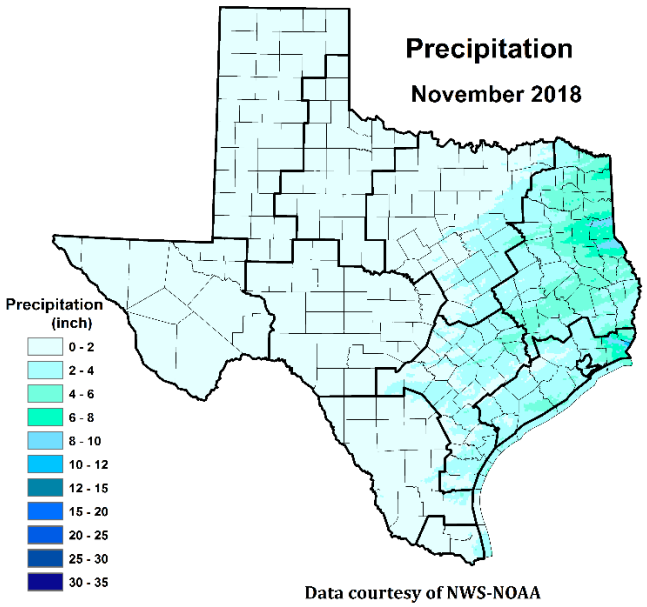
Texas Water Conditions Report

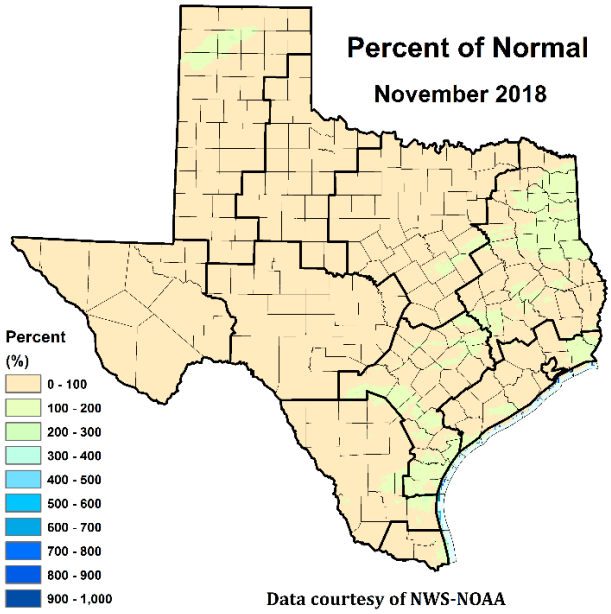
Texas Water Development Board

November 2018

PRECIPITATION

Precipitation is the primary source influencing water conditions in Texas. Observations from the National Oceanic and Atmospheric Administration – National Weather Service (NOAA-NWS) for November indicate that total rainfall in November for much of Texas, except for the East, Upper Coast and South Central regions, was below normal (*map, below right*), as compared to historical data from 1981–2010. Only isolated areas in East Texas, Beaumont, San Antonio, Corpus Christi and Amarillo received above-normal or near-normal rainfall. Rainfall totals in the East and Upper Coast areas was between 2 and 8 inches. The highest rainfall totals (greater than 8 inches) were observed over East Texas.





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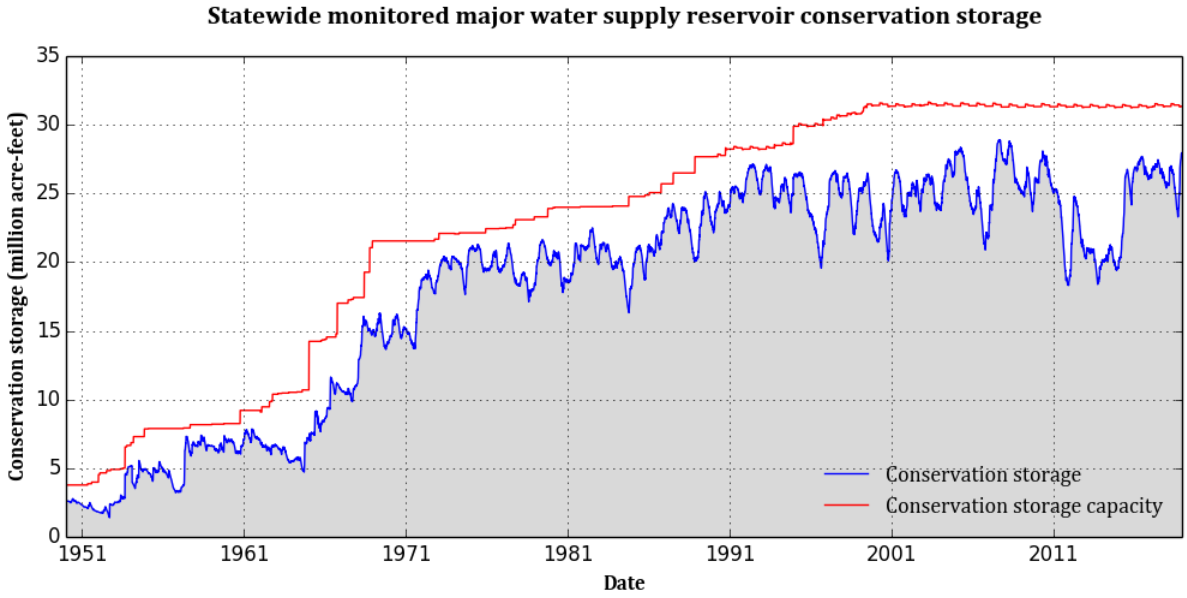
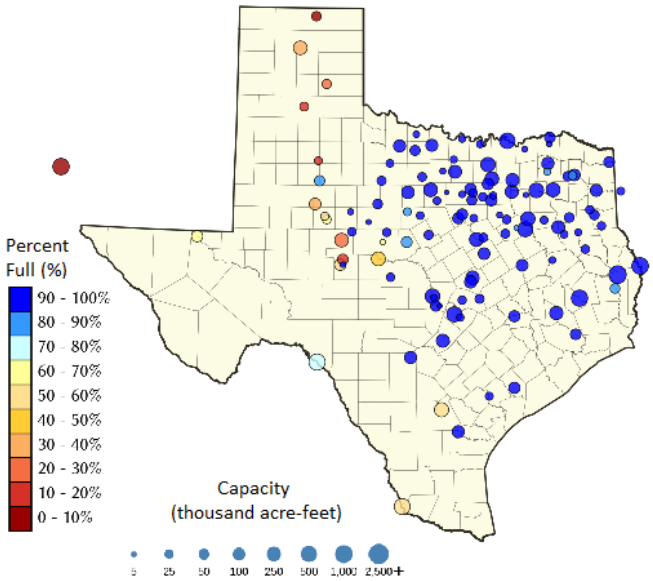
RESERVOIR STORAGE

At the end of November 2018, total conservation storage* in 118 of the state's major water supply reservoirs plus Elephant Butte Reservoir in New Mexico was 27.96 million acre-feet or 87 percent of total conservation storage capacity (*see storage plot, below*). This is approximately 0.62 million acre-feet more than a month ago and 2.2 million acre-feet more than this time of a year ago, continuing an increasing trend that began in September.

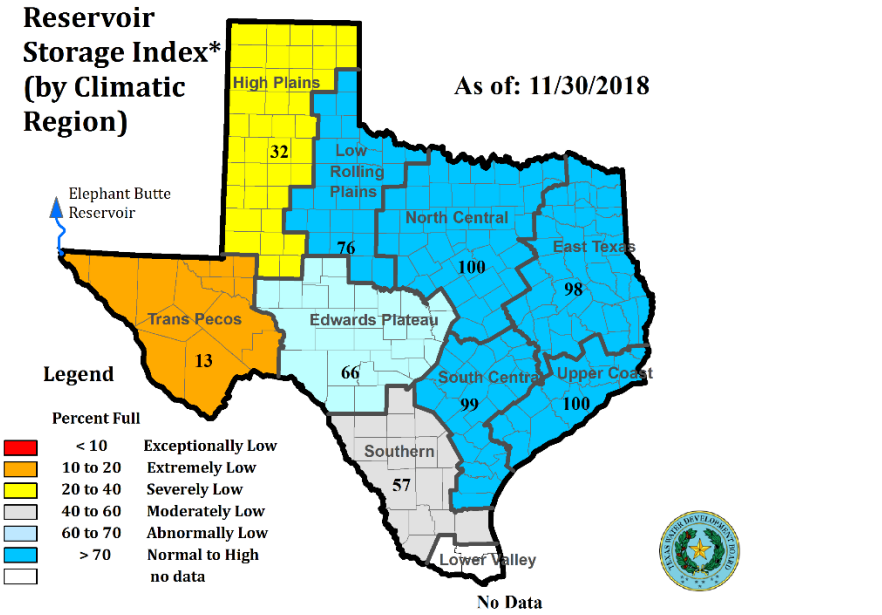


Out of 118 reservoirs in the state, 74 reservoirs held 100 percent of conservation storage capacity (*see map at right*). Additionally, 21 were above 90 percent full. These high storage reservoirs are in the North, Central, and East Texas regions. However, Palo Duro Reservoir was only 1 percent full and another five reservoirs (Mackenzie (13 percent full), O. C. Fisher (15 percent full), White River (16 percent full) Greenbelt (20 percent full), and E. V. Spence (26 percent full) remained below 30 percent full. Low storage reservoirs (16 below 70 percent full) occurred in the Panhandle, West, and South Texas regions. Elephant Butte Reservoir (located in New Mexico) was only 5 percent full.

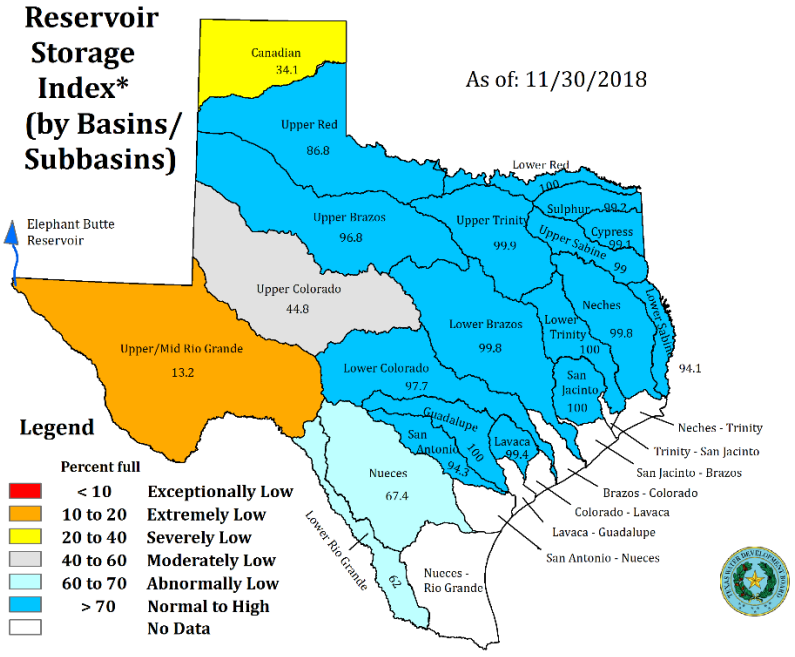


*Storage is based on end of the month data in 118 major reservoirs that represent 96 percent of the total conservation storage capacity of 188 major water supply reservoirs in Texas plus Elephant Butte Reservoir in New Mexico. Major reservoirs are defined as having a conservation storage capacity of 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 (100 percent full), East Texas (98 percent full), North Central (100 percent full), South Central (99 percent full), and Low Rolling Plains (76 percent full) regions (*top map*). The High Plains (32 percent full) and Trans-Pecos (13 percent full) regions had the lowest storage. Overall, storage increased or remained the same in all regions during November. Combined conservation storage by river basin or sub-basin depicts a similar picture (*bottom map*). Storage in all basins/sub-basins are normal to high (>70 percent full), except the Upper/Mid Rio Grande, which was ranked as extremely low, the Canadian River basin, which was ranked as severely low, the Upper Colorado, the Lower Rio Grande, which were ranked as moderately low, and the Nueces, which 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 Nov. 2018 (acre-feet)	(%)	Change since end of Oct. 2018 (acre-feet)**	(%)	Change since end of Nov. 2017 (acre-feet)**	(%)
HIGH PLAINS							
Mackenzie Reservoir	46,450	5,846	13	-75	-0	-1,055	-2
Meredith, Lake	500,000	191,154	38	568	0	-12,041	-2
Palo Duro Reservoir	61,066	394	1	-26	-0	-367	-1
White River Lake	29,880	4,840	16	-195	-1	-1,294	-4
TOTAL	**637,396**	**202,234**	**32**	**272**	**0**	**-14,757**	**-2**
LOW ROLLING PLAINS							
Abilene, Lake	7,900	7,900	100	0	0	2,835	36
Alan Henry Reservoir	96,207	84,744	88	-1,130	-1	1,016	1
Champion Creek Reservoir	41,580	29,013	70	1,849	4	9,353	22
Coleman, Lake	38,075	37,823	99	-252	-1	3,656	10
Colorado City, Lake	30,758	15,631	51	179	1	2,993	10
Fort Phantom Hill, Lake	70,030	70,030	100	0	0	5,077	7
Greenbelt Lake	59,968	12,271	20	-123	-0	-3,065	-5
Hords Creek Lake	8,443	5,397	64	-50	-1	-106	-1
J. B. Thomas, Lake	199,931	75,363	38	-1,785	-1	-24,023	-12
Kemp, Lake	245,307	245,307	100	0	0	19,336	8
Millers Creek Reservoir	26,768	26,768	100	0	0	1,562	6
North Fork Buffalo Creek Reservoir	15,400	15,333	100	-67	-0	3,729	24
Stamford, Lake	51,570	51,570	100	0	0	1,710	3
Sweetwater, Lake	12,267	12,267	100	421	3	9,841	80
TOTAL	**904,204**	**689,417**	**76**	**-958**	**-0**	**33,914**	**4**
NORTH CENTRAL							
Amon G Carter, Lake	19,266	19,266	100	0	0	0	0
Aquilla Lake	43,243	43,243	100	0	0	6,800	16
Arlington, Lake	40,188	40,092	100	-96	-0	10,623	26
Arrowhead, Lake	230,359	228,478	99	-1,881	-1	28,248	12
Bardwell Lake	46,122	46,122	100	0	0	5,897	13
Belton Lake	435,225	435,225	100	0	0	31,270	7
Benbrook Lake	85,648	85,648	100	0	0	13,052	15
Bonham, Lake	11,027	10,911	99	-116	-1	1,411	13
Bridgeport, Lake	366,236	364,606	100	1,162	0	35,959	10
*Brownwood, Lake	128,839	128,839	100	0	0	18,516	14
*Cisco, Lake	29,003	23,520	81	-249	-1	-768	-3
Crook, Lake	9,195	9,112	99	-83	-1	633	7
Eagle Mountain Lake	179,880	179,536	100	-344	-0	12,746	7
Georgetown, Lake	36,823	36,823	100	0	0	13,647	37
Graham, Lake	45,288	45,288	100	0	0	1,618	4
Granbury, Lake	132,949	132,867	100	407	0	3,638	3
Granger Lake	51,822	51,822	100	0	0	0	0
Grapevine Lake	164,703	164,703	100	0	0	6,010	4
*Halbert, Lake	6,033	5,367	89	-318	-5	-44	-1
Hubbard Creek Reservoir	313,298	312,514	100	4,366	1	35,383	11
Hubert H Moss Lake	24,058	23,907	99	-151	-1	1,764	7
Jim Chapman Lake (Cooper)	260,332	259,976	100	-356	-0	30,408	12
Joe Pool Lake	175,358	175,358	100	0	0	8,316	5
Kickapoo, Lake	86,345	86,345	100	0	0	11,759	14
Lavon Lake	406,388	406,388	100	0	0	59,446	15
Leon, Lake	27,762	27,465	99	-297	-1	3,784	14
Lewisville Lake	563,228	563,228	100	0	0	50,909	9
Limestone, Lake	203,780	203,284	100	4,684	2	44,394	22
*Lost Creek Reservoir	11,950	11,941	100	-9	-0	243	2
*Mineral Wells, Lake	5,273	5,273	100	0	0	701	13
Mountain Creek, Lake	22,850	22,850	100	0	0	0	0

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS

Name of lake or reservoir	Conservation storage capacity (acre-feet)	Conservation storage end of Nov. 2018 (acre-feet)	(%)	Change since end of Oct. 2018 (acre-feet)**	(%)	Change since end of Nov. 2017 (acre-feet)**	(%)
		(North Central continued)					
Navarro Mills Lake	49,827	49,827	100	0	0	7,902	16
New Terrell City Lake	8,583	8,583	100	0	0	797	9
Nocona, Lake (Farmers Crk)	21,444	21,444	100	0	0	2,021	9
Palo Pinto, Lake	26,766	26,766	100	0	0	4,374	16
Pat Cleburne, Lake	26,008	26,008	100	0	0	3,909	15
*Pat Mayse Lake	113,683	113,683	100	0	0	4,197	4
Possum Kingdom Lake	538,139	536,529	100	10,640	2	16,597	3
Proctor Lake	54,762	54,762	100	0	0	11,733	21
Ray Hubbard, Lake	439,559	439,559	100	0	0	39,306	9
Ray Roberts, Lake	788,167	788,167	100	0	0	31,914	4
Richland-Chambers Reservoir	1,087,839	1,087,839	100	0	0	102,954	9
Squaw Creek, Lake	151,250	151,250	100	0	0	0	0
Stillhouse Hollow Lake	227,771	227,771	100	0	0	17,432	8
Tawakoni, Lake	871,685	871,685	100	0	0	40,753	5
Texoma, Lake (Texas)	1,258,113	1,258,113	100	0	0	0	0
Texoma, Lake (Texas & Oklahoma)	2,525,281	2,631,513	100	-640,114	-25	-16,958	-1
Waco, Lake	189,418	189,418	100	0	0	26,375	14
Waxahachie, Lake	10,780	10,780	100	0	0	2,272	21
Weatherford, Lake	17,812	17,584	99	-228	-1	1,946	11
Whitney, Lake	553,344	549,258	99	-4,086	-1	91,447	17
Worth, Lake	33,495	32,269	96	-1,226	-4	2,998	9
TOTAL	**10,630,916**	**10,611,292**	**100**	**11,819**	**0**	**845,290**	**8**
		EAST					
Athens, Lake	29,503	29,503	100	713	2	1,762	6
B A Steinhagen Lake	66,961	60,869	91	-911	-1	-5,882	-9
Bob Sandlin, Lake	190,822	190,822	100	0	0	9,630	5
Caddo, Lake	29,898	29,898	100	0	0	2,350	8
Cedar Creek Reservoir in Trinity	644,686	644,359	100	-327	-0	65,110	10
Cherokee, Lake	40,094	40,094	100	1,014	3	3,692	9
Conroe, Lake	410,988	410,988	100	0	0	11,427	3
Cypress Springs, Lake	66,756	66,756	100	0	0	4,674	7
Fork Reservoir, Lake	605,061	589,348	97	-9,380	-2	18,137	3
Houston County Lake	17,113	17,113	100	0	0	0	0
Jacksonville, Lake	25,670	25,670	100	816	3	622	2
*Livingston, Lake	1,785,348	1,784,629	100	-719	-0	73,665	4
Martin, Lake	75,726	75,726	100	2,454	3	14,965	20
Monticello, Lake	34,740	29,845	86	-127	-0	-4,427	-13
Murvaul, Lake	38,285	38,285	100	0	0	4,297	11
Nacogdoches, Lake	39,522	39,021	99	0	0	3,039	8
O' the Pines, Lake	241,363	241,363	100	10,113	4	2,813	1
Palestine, Lake	367,303	367,303	100	0	0	25,324	7
Sam Rayburn Reservoir	2,857,077	2,857,077	100	245,636	9	247,761	9
Striker, Lake	16,934	16,934	100	0	0	536	3
*Sulphur Springs, Lake	17,747	14,781	83	-1,763	-10	-1,471	-8
Toledo Bend Reservoir (Texas)	2,236,450	2,104,890	94	177,269	8	245,123	11
Toledo Bend Reservoir (Texas & Louisiana)	4,472,900	4,213,880	94	354,538	8	490,246	11
Tyler, Lake	72,073	72,073	100	2,559	4	4,693	7
Wright Patman Lake	122,593	122,593	100	-12,476	-10	0	0
TOTAL	**10,032,713**	**9,869,940**	**98**	**414,871**	**4**	**727,840**	**7**
		TRANS-PECOS					
Elephant Butte Reservoir (Texas)	852,491	38,465	5	7,315	1	-114,132	-13
Elephant Butte Reservoir (Total)	1,973,358	89,040	5	16,932	1	-264,195	-13
Red Bluff Reservoir	151,110	94,273	62	2,867	2	-14,660	-10
TOTAL	**1,003,601**	**132,738**	**13**	**10,182**	**1**	**-128,792**	**-13**

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS

Name of lake or reservoir	Conservation storage capacity (acre-feet)	Conservation storage end of Nov. 2018 (acre-feet)	(%)	Change since end of Oct. 2018 (acre-feet)**	(%)	Change since end of Nov. 2017 (acre-feet)**	(%)
EDWARDS PLATEAU							
*Amistad Reservoir (Texas)	1,840,849	1,318,911	72	58,139	3	-67,236	-4
*Amistad Reservoir (Texas & Mexico)	3,275,532	1,878,624	57	88,508	3	-87,184	-3
Brady Creek Reservoir	28,808	28,808	100	0	0	12,677	44
Buchanan, Lake	860,607	819,292	95	2,388	0	54,792	6
E. V. Spence Reservoir	517,272	135,293	26	8,639	2	68,346	13
Inks, Lake	13,962	12,982	93	187	1	-68	-0
Lyndon B Johnson, Lake	115,249	108,936	95	-423	-0	-1,700	-1
Marble Falls, Lake	6,901	6,755	98	-38	-1	-70	-1
Nasworthy	9,615	8,720	91	177	2	598	6
Oak Creek Reservoir	39,210	39,210	100	0	0	19,620	50
O. C. Fisher Lake	119,445	17,328	15	-194	-0	4,799	4
*O. H. Ivie Reservoir	554,340	251,968	45	22,873	4	142,154	26
Twin Buttes Reservoir	182,454	93,971	52	12,072	7	81,286	45
TOTAL	**4,288,712**	**2,842,174**	**66**	**103,820**	**2**	**315,198**	**7**
SOUTH CENTRAL							
*Austin, Lake	23,972	23,065	96	354	1	293	1
Canyon Lake	378,781	378,781	100	0	0	27,181	7
*Coleto Creek Reservoir	31,040	31,040	100	0	0	2,181	7
Medina Lake	254,823	240,359	94	17,326	7	65,415	26
Somerville Lake	147,104	147,104	100	0	0	0	0
Travis, Lake	1,113,348	1,113,348	100	0	0	204,805	18
TOTAL	**1,949,068**	**1,933,697**	**99**	**17,680**	**1**	**299,875**	**15**
UPPER COAST							
Houston, Lake	120,686	120,686	100	0	0	0	0
Texana, Lake	159,566	158,647	99	-368	-0	13,812	9
TOTAL	**280,252**	**279,333**	**100**	**-368**	**-0**	**13,812**	**5**
SOUTHERN							
Choke Canyon Reservoir	662,820	363,275	55	18,142	3	157,398	24
Corpus Christi, Lake	256,062	256,062	100	0	0	8,243	3
*Falcon Reservoir (Texas)	1,551,007	783,169	50	43,747	3	-31,639	-2
*Falcon Reservoir (Texas & Mexico)	2,646,817	1,142,168	43	92,192	3	-274,228	-10
TOTAL	**2,469,889**	**1,402,506**	**57**	**61,889**	**3**	**134,002**	**5**
STATEWIDE TOTAL	**32,196,751**	**27,963,331**	**87**	**619,207**	**2**	**2,226,382**	**7**

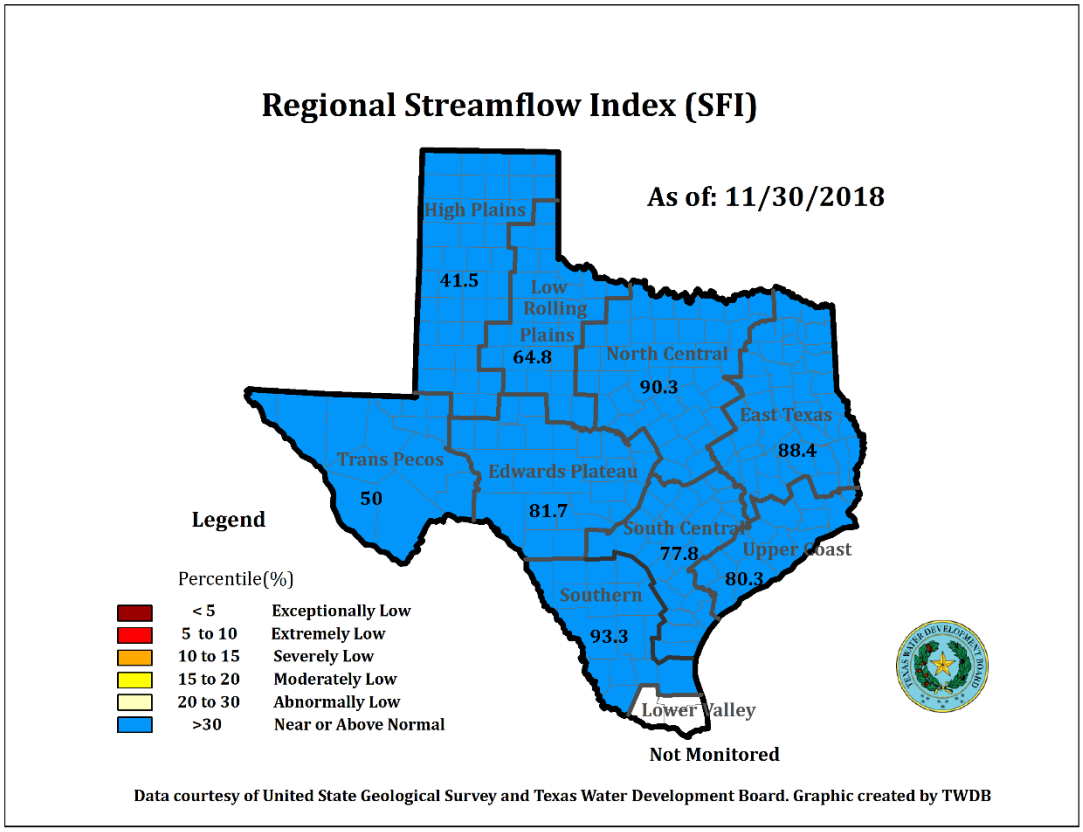
* Total volume below elevation of conservation pool top is used as conservation storage capacity, because the dead pool storage is unknown.
**Monthly and yearly changes do not include reservoirs that did not have data in last month or last year, respectively.

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 (> 40th percentile) occurred throughout Texas. Streamflow in the Lower Valley region is not monitored.



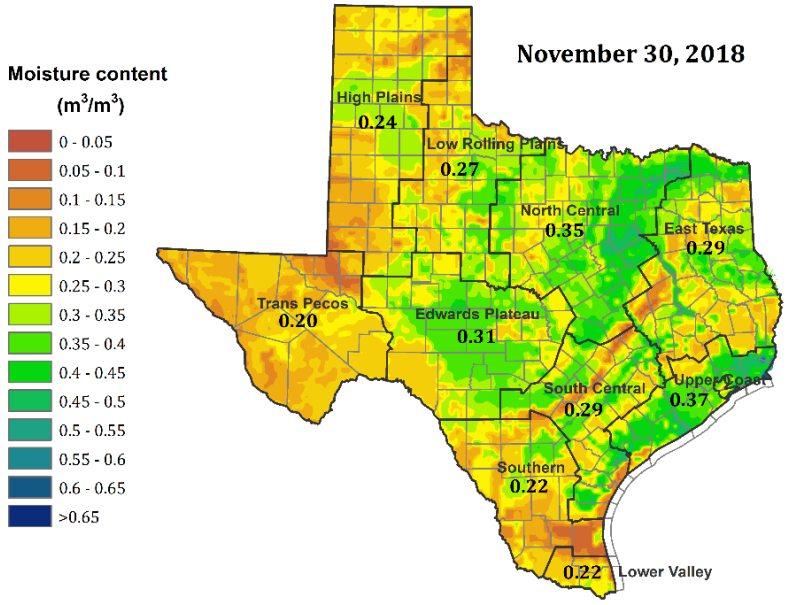
Of 29 individual stream gage stations, streamflow at 27 stations was near- or above-normal, 1 was moderately low, and another one (1) was at exceptionally low (*table below*). Compared to streamflow conditions in October 2018, streamflow increased at 9 stations, decreased at 18 stations, and unchanged at 2 stations.

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

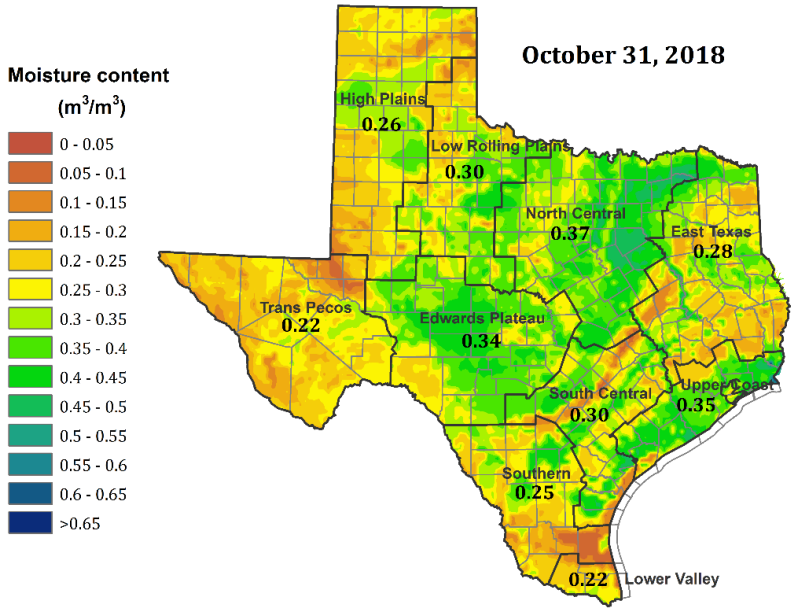
*Streamflow Index is defined as the following: At each station, a 30-day moving average flow is calculated from historical mean daily flow rate records. For each day, 30-day average flow is presented as a percentile of the historical record for that calendar day.

SOIL MOISTURE CONDITIONS

Soil moisture at the end of November 2018 (*top image*) was mostly moderate [>0.20 cubic meter water per bulk cubic meter soil (m^3/m^3)] in all regions of the state. On a regional basis, and compared conditions at the end of October 2018 (*bottom image*), average moisture content decreased in seven regions, varying from 0.01 to 0.03 m^3/m^3. The Low Rolling Plains, Edwards Plateau and Southern regions decreased the most; whereas, the South Central region decreased the least. The East Texas and Upper Coast regions increased 0.01-0.02 m^3/m^3, while the Lower Valley remained unchanged.



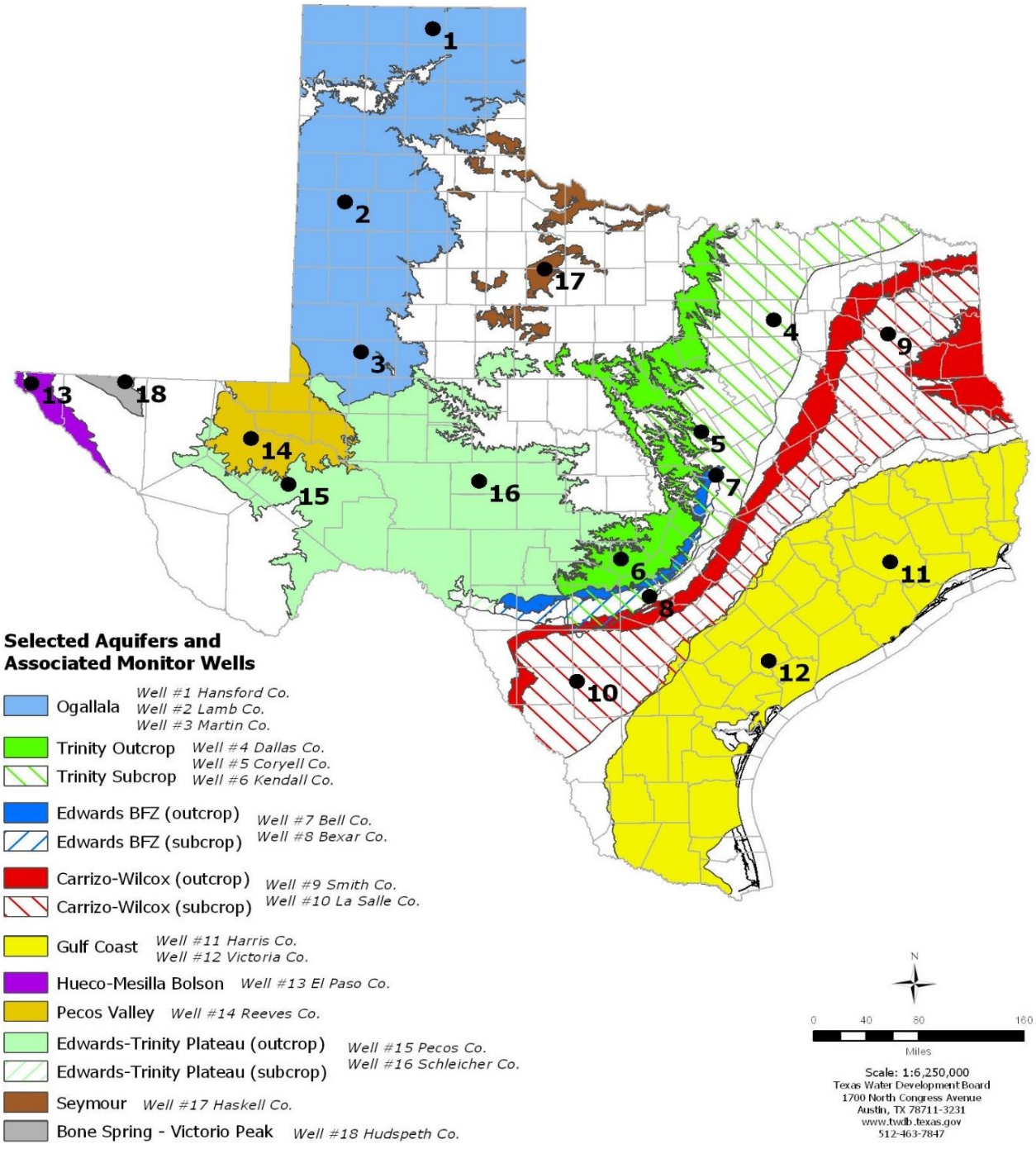
Data from NASA Soil Moisture Active Passive (SMAP) Level 4 - Model - Value Added Version 4
Soil moisture content is shown as volume of water per unit volume of bulk soil. Root zone: 0 to 1 meter depth.



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 16 monitoring wells since the beginning of November, ranging from an increase of 0.06 feet in the Hansford County Ogallala Aquifer well (#1 on map) to 10.23 feet in the Pecos County Edwards-Trinity Plateau Aquifer well (#15 on map). Water levels declined in 2 monitoring wells, ranging from a decline of -0.10 feet in the Lamb County Ogallala Aquifer well (#2 on map) to -0.13 feet in the Victoria County Gulf Coast Aquifer well (#12 on map). The J-17 well (#8 on map) in San Antonio recorded a water level of 46.21 feet below land surface or 684.39 feet above mean sea level. Water levels rose 24.79 feet above the Stage 1 critical management level for the San Antonio portion of the Edwards (Balcones Fault Zone) Aquifer.



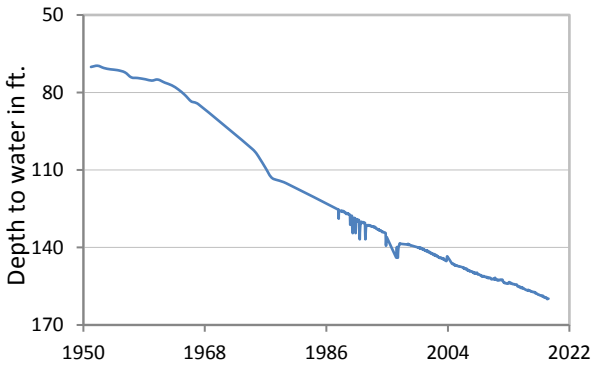
***Well numbers used in this publication on the aquifer map to indicate the monitoring well location (numbers 1 - 17) are different than the TWDB's seven-digit state well number.**

Monitoring Well	November	October	Month Change	Year Change	Historical Change	First Measured
(1) Hansford 0354301	159.81	159.87	0.06	-0.95	-89.69	1951
(2) Lamb 1053602	149.35	149.25	-0.10	-1.29	-121.18	1951
(3) Martin 2739903	143.64	144.07	0.43	1.40	-38.75	1964
(4) Dallas 3319101	498.98	499.25	0.27	-5.27	-276.98	1954
(5) Coryell 4035404	526.88	528.13	1.25	-4.08	-234.88	1955
(6) Kendall 6802609	130.13	138.12	7.99	2.73	-70.13	1975
(7) Bell 5804816	122.06	123.20	1.14	1.84	1.45	2008
(8) Bexar 6837203	46.21	47.51	1.30	23.20	0.43	1932
(9) Smith 3430907	436.14	436.29	0.15	-3.60	-136.14	1977
(10) La Salle 7738103	520.52	526.78	6.26	-33.24	-267.45	2003
(11) Harris 6514409	192.45	193.98	1.53	0.97	-56.95*	1947**
(12) Victoria 8017502	35.43	35.30	-0.13	-4.02	-1.43	1958
(13) El Paso 4913301	294.50	294.84	0.34	0.03	-62.60	1964
(14) Reeves 4644501	166.20	172.09	5.89	1.96	-74.11	1952
(15) Pecos 5216802	191.71	201.94	10.23	5.06	55.17	1976
(16) Schleicher 5512134	261.59	262.70	1.11	48.54	40.31	2003
(17) Haskell 2135748	46.37	46.65	0.28	0.45	-3.37	2002
(18) Hudspeth 4807516	147.02	152.45	5.43	-0.86	-43.10	1966

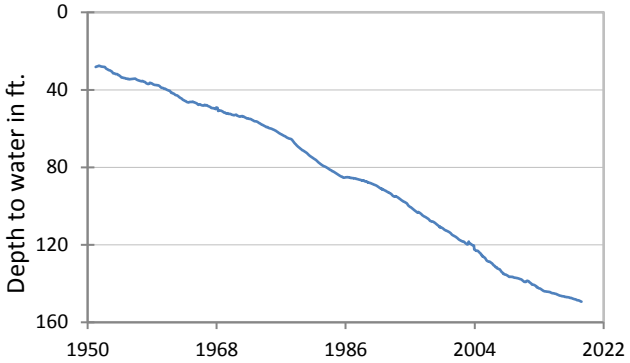
*Change since the original measurement of 135.5 feet below land surface in 1947 (**measurement not shown on the hydrograph)

November 2018 OBSERVATION WELL HYDROGRAPHS

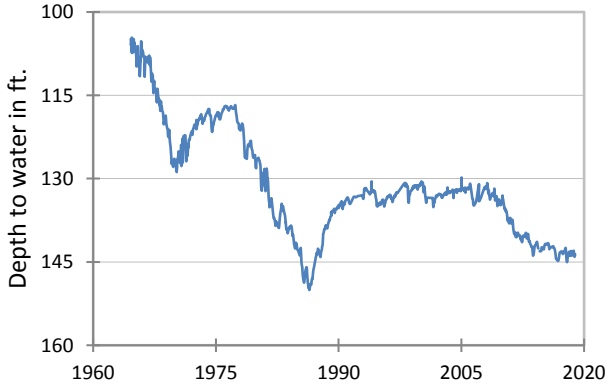
(1) State Well #03-54-301
Near Spearman, Hansford County
Ogallala Aquifer



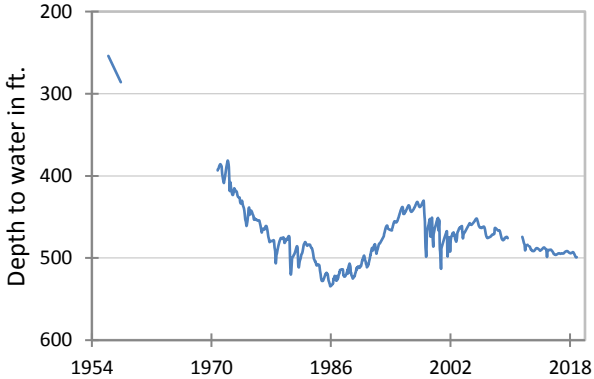
(2) State Well #10-53-602
Near Earth, Lamb County
Ogallala Aquifer



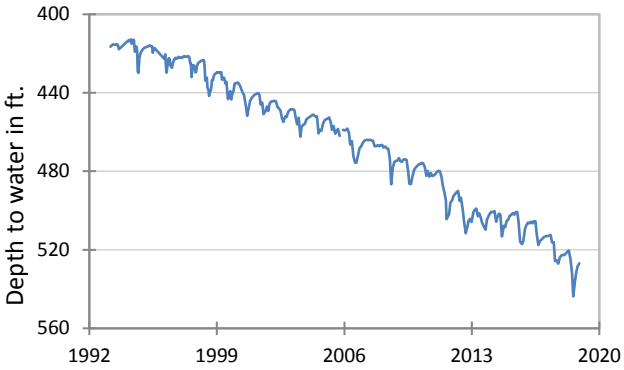
(3) State Well #27-39-903
Northwest Martin County
Ogallala Aquifer



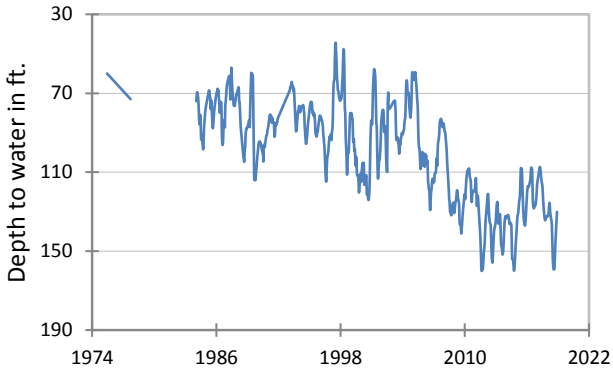
(4) State Well #33-19-101
Southeast Dallas, Dallas County
Twin Mountains Formation-Trinity Aquifer



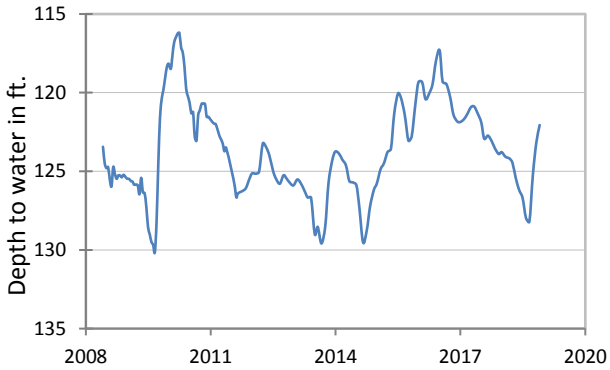
(5) State Well #40-35-404
Gatesville, Coryell County
Hosston Formation-Trinity Aquifer



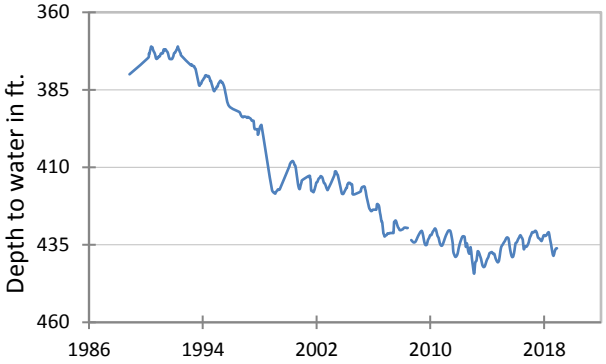
(6) State Well #68-02-609
Waring, Kendall County
Cow Creek Formation-Trinity Aquifer



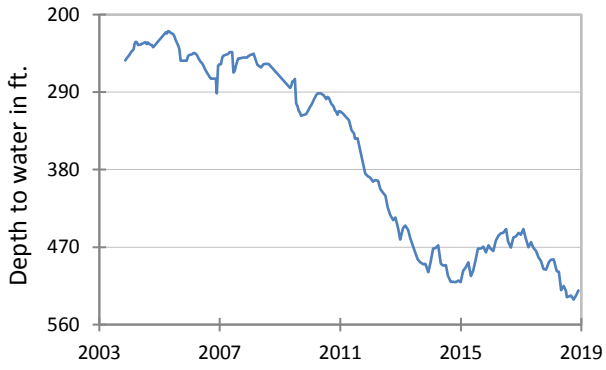
(7) State Well #58-04-816
Near Salado, Bell County
Edwards (Balcones Fault Zone) Aquifer



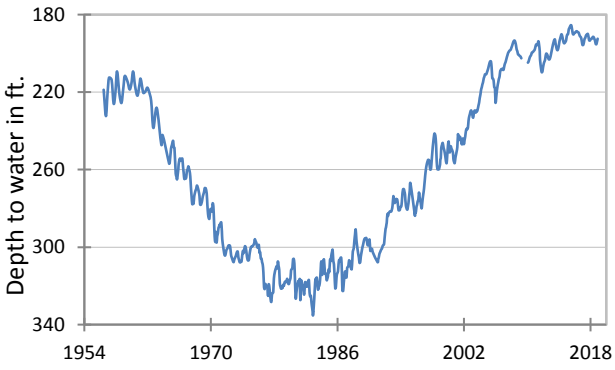
(9) State Well #34-30-907
Red Springs, Smith County
Carrizo-Wilcox Aquifer



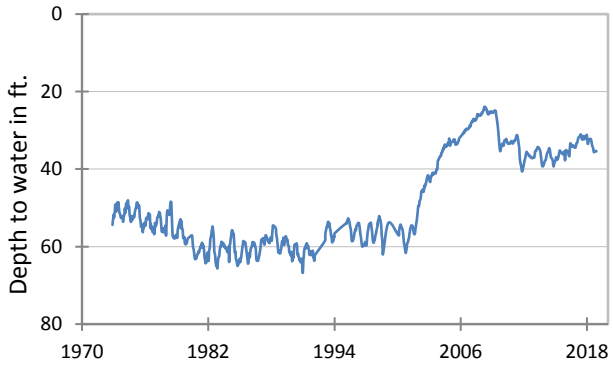
(10) State Well #77-38-103
Near Cotulla, La Salle County
Carrizo-Wilcox Aquifer



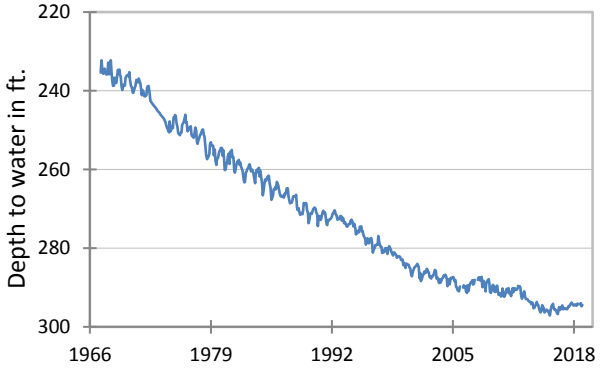
(11) State Well #65-14-409
Alief, Harris County
Evangeline Formation-Gulf Coast Aquifer



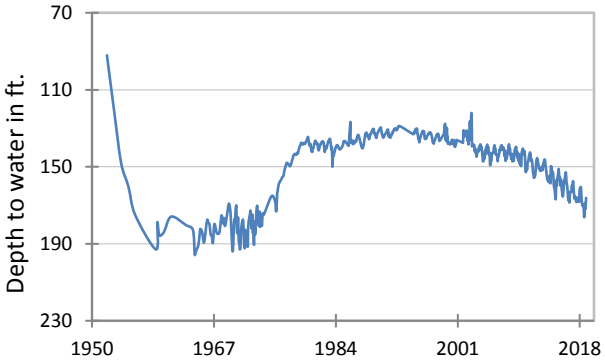
(12) State Well #80-17-502
Near Bloomington, Victoria County
Lissie Formation-Gulf Coast Aquifer



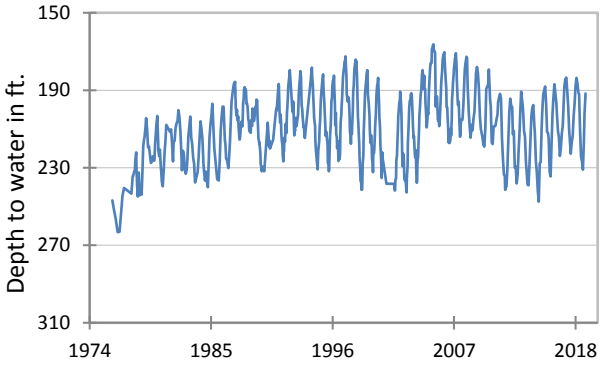
(13) State Well #49-13-301
El Paso, El Paso County
Hueco-Mesilla Bolson Aquifer



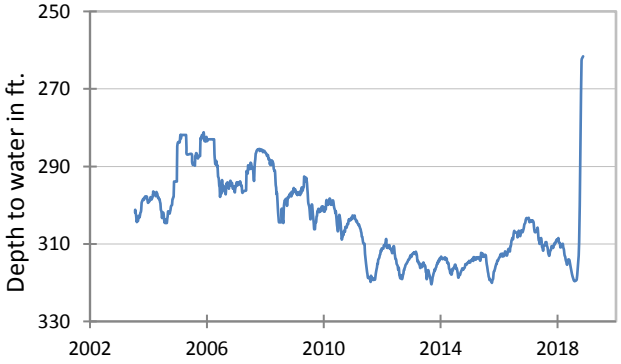
(14) State Well #46-44-501
Near Pecos, Reeves County
Pecos Valley Aquifer



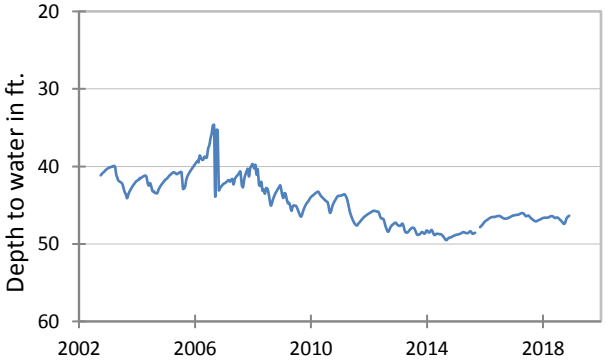
(15) State Well #52-16-802
Fort Stockton, Pecos County
Edwards-Trinity (Plateau) Aquifer



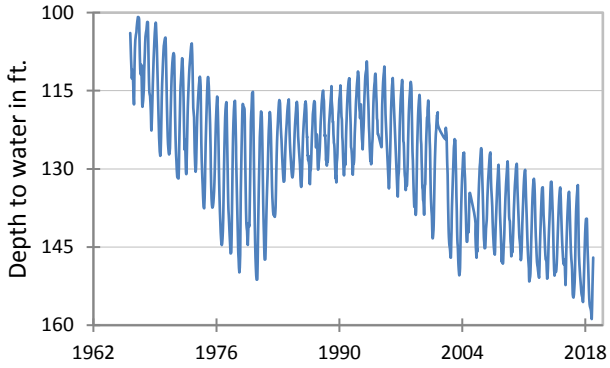
(16) State Well #55-12-134
Eldorado, Schleicher County
Trinity Aquifer



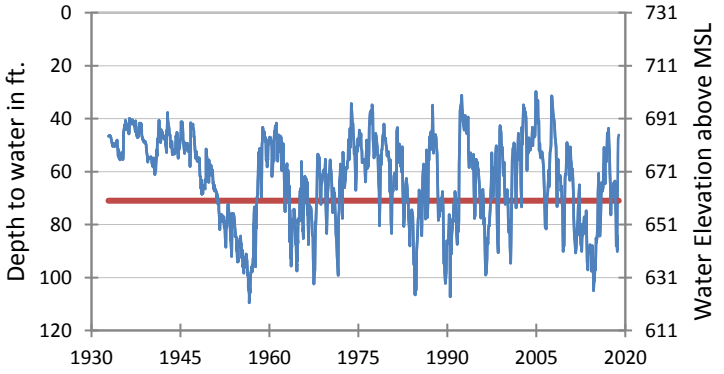
(17) State Well #21-35-748
Near O'Brien, Haskell County
Seymour Aquifer

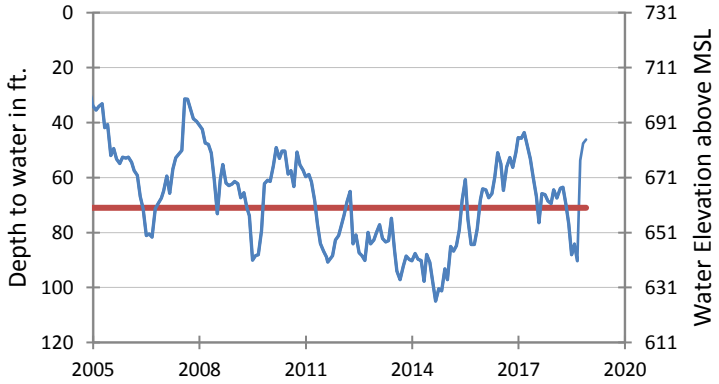


(18) State Well #48-07-516
Dell City, Hudspeth County
Bone Spring - Victorio Peak Aquifer



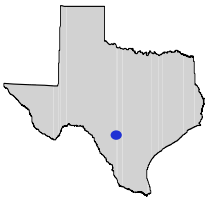
(8) State Well #68-37-203 (J-17)
San Antonio, Bexar County
Edwards (Balcones Fault Zone) Aquifer





The late November water-level measurement in this Edwards (Balcones Fault Zone) Aquifer well, elevation 731 feet above mean sea level, was 46.21 feet below land surface, or 684.39 feet above mean sea level. This was 1.30 feet above last month's measurement, 23.20 feet above last year's measurement and 0.43 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.

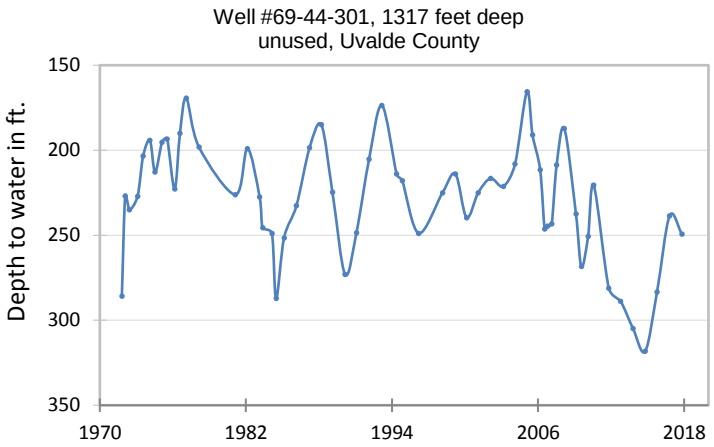


HYDROGRAPH OF THE MONTH

Each month this space features a new hydrograph (marked with the • symbol on the map) depicting different aquifers and their conditions in Texas.

Edwards (Balcones Fault Zone)

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.



The initial measurement of 285.83 feet below land surface was observed by the USGS in October of 1971. Since then, groundwater conservation districts, USGS, and the TWDB have taken near-yearly, water-level measurements. The period of record reveals drastic yearly and monthly water-level changes that are likely a result of the aquifer's high permeability. The largest water-level decline was 50.37 feet between February 2008 and 2009, while the largest water-level rise was 58.83 feet between October 1971 and February 1972. The lowest water-level measurements occurred between 2011 and 2014 during the drought that began in 2011, followed recently by a recovery of ~80 feet.

Far away (left) and close-up (right) images of well #69-44-1317.