

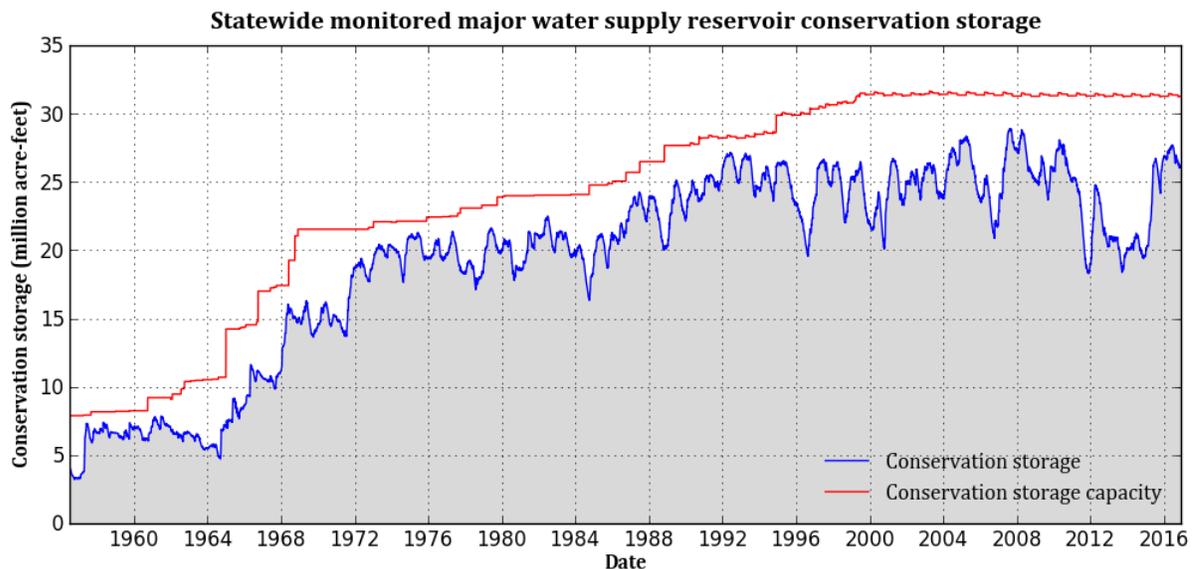
NOVEMBER 2016 RESERVOIR STORAGE*

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

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

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

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



* Storage is based on end of the month data in 114 major reservoirs that represent 96 percent of the total conservation storage capacity of 188 major water supply reservoirs in Texas. 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.

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS

Name of lake or reservoir	Conservation storage capacity (acre-feet)	Conservation storage end of November 2016		Change since end of October 2016		Change since end of November 2015		
		(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)	
HIGH PLAINS								
MacKenzie Reservoir	46,450	6,981	15	-45	-0	-599	-1	
Meredith, Lake (Texas)	500,000	116,627	23	-1,610	-0	-8,899	-2	
Meredith, Lake (Texas & Oklahoma)	779,556	116,627	15	-1,610	-0	-8,899	-1	
Palo Duro Reservoir	61,066	1,111	2	-150	-0	no data		
White River Lake	29,880	7,467	25	0	0	-2,468	-8	
TOTAL	637,396	132,186	21	-1,805	-0	-11,966	-2	
LOW ROLLING PLAINS								
Abilene, Lake	7,900	7,745	98	59	1	6,951	88	
Alan Henry Reservoir	94,808	90,201	95	3,987	4	-944	-1	
Champion Creek Reservoir	41,580	15,590	37	3,816	9	6,224	15	
Coleman, Lake	38,075	35,997	95	355	1	7,967	21	
Colorado City, Lake	30,758	14,840	48	7,054	23	6,069	20	
Fort Phantom Hill, Lake	70,030	68,280	98	77	0	8,974	13	
Greenbelt Lake	59,968	16,080	27	-153	-0	2,614	4	
Hords Creek Lake	8,443	7,099	84	162	2	3,117	37	
J. B. Thomas, Lake	199,931	130,557	65	7,258	4	-15,553	-8	
Kemp, Lake	245,307	244,696	100	5,773	2	59,083	24	
Millers Creek Reservoir	26,768	26,768	100	0	0	1,198	4	
North Fork Buffalo Creek Reservoir	15,400	12,707	83	30	0	181	1	
Stamford, Lake	51,570	50,458	98	1,044	2	5,137	10	
Sweetwater, Lake	12,267	2,602	21	66	1	1,167	10	
TOTAL	902,805	723,620	80	29,528	3	92,185	10	
NORTH CENTRAL								
Amon G Carter, Lake	19,266	19,266	100	0	0	0	0	
Aquilla Lake	43,243	42,262	98	789	2	-981	-2	
Arlington, Lake	40,188	28,757	72	2,481	6	-11,431	-28	
Arrowhead, Lake	230,359	220,898	96	1,696	1	-9,461	-4	
Bardwell Lake	46,122	45,030	98	929	2	-1,092	-2	
Belton Lake	435,225	435,225	100	364	0	0	0	
Benbrook Lake	85,648	71,480	83	-1,149	-1	-14,168	-17	
Bonham, Lake	11,027	8,326	76	18	0	-2,701	-24	
Bridgeport, Lake	366,236	366,236	100	0	0	0	0	
*Brownwood, Lake	128,839	128,839	100	9,925	8	0	0	
*Cisco, Lake	25,895	25,895	100	0	0	6,253	24	
Crook, Lake	9,195	7,798	85	0	0	-1,397	-15	
Eagle Mountain Lake	179,880	178,503	99	-1,377	-1	-1,377	-1	
Georgetown, Lake	36,823	33,979	92	979	3	-2,844	-8	
Graham, Lake	45,288	45,288	100	123	0	0	0	
Granbury, Lake	125,756	125,377	100	-303	-0	2,416	2	
Granger Lake	51,822	51,822	100	0	0	0	0	
Grapevine Lake	164,703	164,703	100	0	0	0	0	
*Halbert, Lake	6,033	4,729	78	21	0	-1,154	-19	
Hubbard Creek Reservoir	318,067	310,580	98	14,718	5	174,521	55	
Hubert H Moss Lake	24,058	22,382	93	415	2	-1,676	-7	
Jim Chapman Lake (Cooper)	260,332	202,198	78	-8,785	-3	-58,134	-22	
Joe Pool Lake	175,358	169,233	97	3,559	2	-6,125	-3	
Kickapoo, Lake	86,345	80,257	93	449	1	-6,088	-7	
Lavon Lake	406,388	342,644	84	8,471	2	-63,744	-16	
Leon, Lake	27,762	23,759	86	141	1	-4,003	-14	
Lewisville Lake	563,228	563,228	100	17,143	3	0	0	
Limestone, Lake	203,780	181,761	89	-1,535	-1	-22,019	-11	
*Lost Creek Reservoir	11,950	11,924	100	54	0	-26	-0	

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS

Name of lake or reservoir	Conservation storage capacity		Conservation storage end of November 2016		Change since end of October 2016		Change since end of November 2015	
	(acre-feet)	(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)	
<i>(North Central continued)</i>								
*Mineral Wells, Lake	6,760	6,760	100	0	0	0	0	
Mountain Creek, Lake	22,850	22,850	100	0	0	0	0	
Navarro Mills Lake	49,827	48,842	98	418	1	-985	-2	
New Terrell City Lake	8,583	8,291	97	112	1	-292	-3	
Nocona, Lake (Farmers Crk)	21,444	20,449	95	717	3	-995	-5	
Palo Pinto, Lake	26,766	26,094	97	1,076	4	-672	-3	
Pat Cleburne, Lake	26,008	21,994	85	-269	-1	-4,014	-15	
*Pat Mayse Lake	113,683	101,221	89	-1,434	-1	-12,462	-11	
Possum Kingdom Lake	523,873	523,873	100	489	0	3,913	1	
Proctor Lake	54,762	51,531	94	2,449	4	-3,231	-6	
Ray Hubbard, Lake	452,040	436,360	97	11,056	2	-15,680	-3	
Ray Roberts, Lake	788,167	788,167	100	16,340	2	0	0	
Richland-Chambers Reservoir	1,087,839	1,031,206	95	-12,555	-1	-56,633	-5	
Squaw Creek, Lake	151,250	151,250	100	0	0	0	0	
Stillhouse Hollow Lake	227,771	227,771	100	0	0	0	0	
Tawakoni, Lake	871,685	783,292	90	-2,784	-0	-88,393	-10	
Texoma, Lake (Texas)	1,258,113	1,258,113	100	0	0	0	0	
Texoma, Lake (Texas & Oklahoma)	2,525,281	1,258,113	50	0	0	0	0	
Waco, Lake	189,418	189,418	100	4,747	3	0	0	
Waxahachie, Lake	10,780	9,819	91	-43	-0	-961	-9	
Weatherford, Lake	17,812	17,006	95	-11	-0	-806	-5	
Whitney, Lake	553,344	506,531	92	7,565	1	-46,813	-8	
Worth, Lake	33,495	30,458	91	-67	-0	-3,037	-9	
TOTAL	10,625,086	10,173,675	96	76,932	1	-256,292	-2	
EAST								
Athens, Lake	29,503	28,252	96	266	1	-1,251	-4	
B A Steinhagen Lake	66,961	61,882	92	912	1	5,270	8	
Bob Sandlin, Lake	190,822	174,870	92	-1,321	-1	-15,952	-8	
Caddo, Lake	29,898	29,898	100	0	0	180	1	
Cedar Creek Reservoir in Trinity	644,686	588,169	91	1,543	0	-56,517	-9	
Conroe, Lake	410,988	393,541	96	-1,125	-0	-12,664	-3	
Cypress Springs, Lake	66,756	62,176	93	313	0	-4,580	-7	
Fork Reservoir, Lake	605,061	534,594	88	-8,290	-1	-70,467	-12	
Houston County Lake	17,113	17,113	100	168	1	0	0	
Jacksonville, Lake	25,670	25,485	99	104	0	494	2	
*Livingston, Lake	1,785,348	1,785,348	100	0	0	0	0	
Martin, Lake	75,726	64,632	85	-1,000	-1	-11,094	-15	
Monticello, Lake	34,740	34,740	100	0	0	0	0	
Murvault, Lake	38,285	34,021	89	33	0	-4,264	-11	
Nacogdoches, Lake	39,522	36,555	92	-247	-1	-2,967	-8	
O' the Pines, Lake	241,363	225,939	94	-5,829	-2	-15,424	-6	
Palestine, Lake	367,303	325,863	89	-1,502	-0	-41,440	-11	
Sam Rayburn Reservoir	2,857,077	2,472,710	87	-55,276	-2	-248,275	-9	
*Sulphur Springs, Lake	17,747	14,962	84	-148	-1	-2,785	-16	
Toledo Bend Reservoir (Texas & Louisiana)	2,236,450	1,854,640	83	-20,020	-1	-318,872	-14	
Toledo Bend Reservoir (Texas & Louisiana)	4,472,900	1,854,640	41	-20,020	-0	-318,872	-7	
Tyler, Lake	72,073	64,761	90	-307	-0	-7,312	-10	
Wright Patman Lake	122,593	122,593	100	-12,476	-10	0	0	
TOTAL	9,975,685	8,952,744	90	-104,202	-1	-807,920	-8	
TRANS-PECOS								
Red Bluff Reservoir	151,110	98,039	65	-27,188	-18	-36,938	-24	
TOTAL	151,110	98,039	65	-27,188	-18	-36,938	-24	

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS							
Name of lake or reservoir	Conservation storage capacity (acre-feet)	Conservation storage end of November 2016 (acre-feet) (%)		Change since end of October 2016 (acre-feet) (%)		Change since end of November 2015 (acre-feet)** (%)	
EDWARDS PLATEAU							
*Amistad Reservoir (Texas)	1,840,849	1,539,946	84	7,865	0	338,796	18
*Amistad Reservoir (Texas & Mexico)	3,275,532	1,539,946	47	7,865	0	338,796	10
Brady Creek Reservoir	28,808	17,547	61	435	2	7,294	25
Buchanan, Lake	860,607	816,904	95	3,470	0	196,424	23
E. V. Spence Reservoir	517,272	70,041	14	17,558	3	22,473	4
Inks, Lake	13,962	12,877	92	-105	-1	-15	-0
Lyndon B Johnson, Lake	115,249	110,820	96	489	0	184	0
Nasworthy	9,615	7,987	83	266	3	363	4
Oak Creek Reservoir	39,210	20,711	53	1,109	3	10,268	26
O. C. Fisher Lake	119,445	17,753	15	0	0	-3,080	-3
*O. H. Ivie Reservoir	554,340	128,851	23	8,855	2	57,961	10
Twin Buttes Reservoir	182,454	19,279	11	1,536	1	10,589	6
TOTAL	4,281,811	2,762,716	65	41,478	1	641,257	15
SOUTH CENTRAL							
*Austin, Lake	23,972	22,742	95	-30	-0	-107	-0
Canyon Lake	378,781	377,876	100	0	0	-905	-0
*Coletto Creek Reservoir	31,040	24,691	80	-804	-3	-3,467	-11
Medina Lake	254,823	234,112	92	-4,369	-2	73,807	29
Somerville Lake	147,104	147,104	100	0	0	0	0
Travis, Lake	1,113,348	1,113,348	100	19,085	2	138,756	12
TOTAL	1,949,068	1,919,873	99	13,882	1	208,084	11
UPPER COAST							
Houston, Lake	120,686	120,686	100	0	0	0	0
Texana, Lake	159,566	143,084	90	-3,865	-2	-16,482	-10
TOTAL	280,252	263,770	94	-3,865	-1	-16,482	-6
SOUTHERN							
Choke Canyon Reservoir	662,820	269,852	41	-5,655	-1	47,588	7
Corpus Christi, Lake	256,961	237,822	93	-1,967	-1	20,284	8
*Falcon Reservoir (Texas)	1,551,007	566,964	37	24,404	2	-205,486	-13
*Falcon Reservoir (Texas & Mexico)	2,646,817	566,964	21	24,404	1	-205,486	-8
TOTAL	2,470,788	1,074,638	43	16,782	1	-137,614	-6
STATEWIDE TOTAL							
STATEWIDE TOTAL	31,274,001	26,101,261	83	41,542	0	-325,686	-1
Elephant Butte Reservoir	1,973,358	159,945	8	31,310	2	-70,995	-4

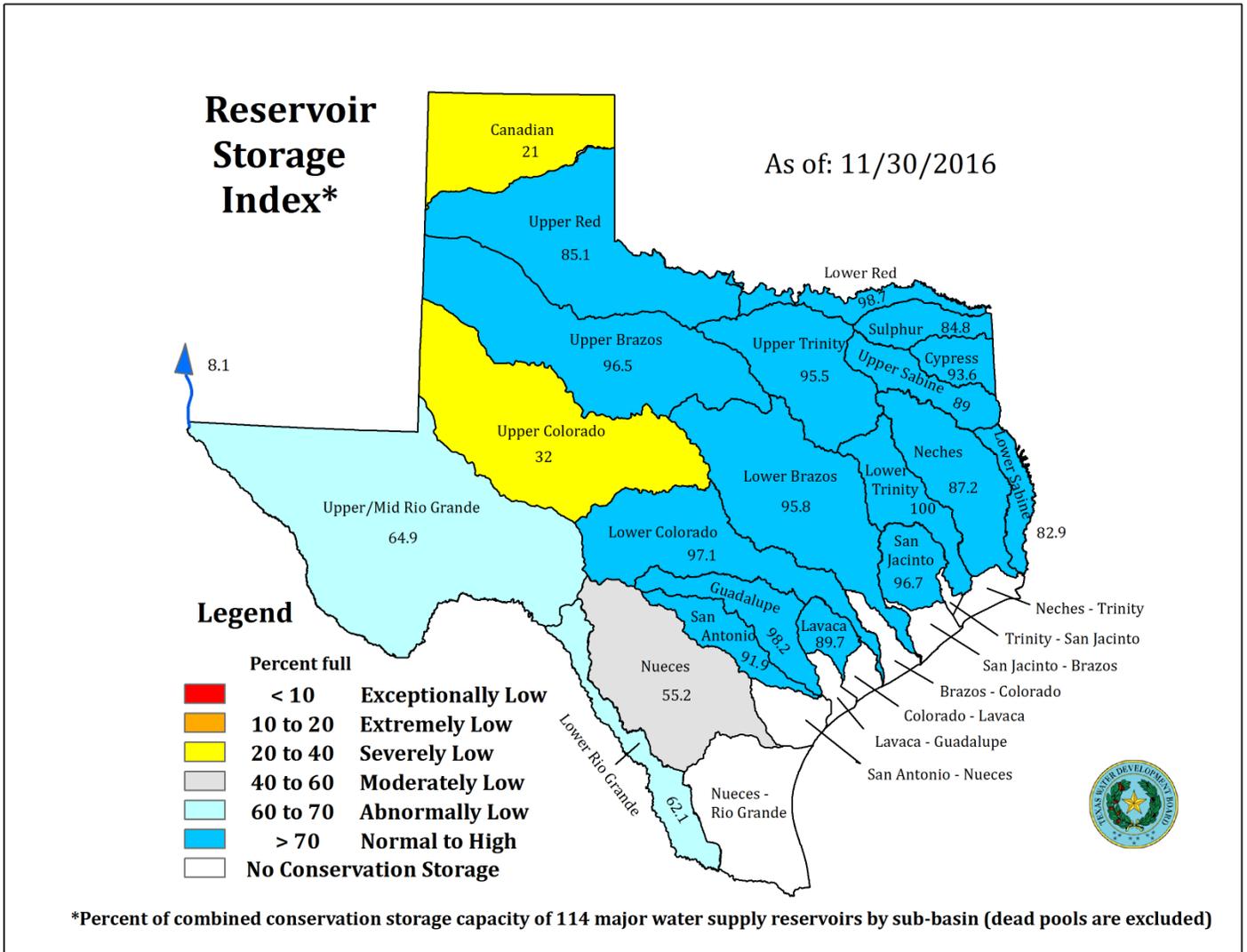
* Conservation volume is used as conservation storage capacity because the dead storage is unknown.

**Monthly and yearly changes do not include reservoirs that did not have data in last monthly 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, 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 $100 \times (\text{current conservation storage} - \text{past conservation storage}) / \text{conservation storage capacity}$. Values shown are for the Texas share of conservation storage in all reservoirs.

NOVEMBER 2016 RESERVOIR CONDITIONS



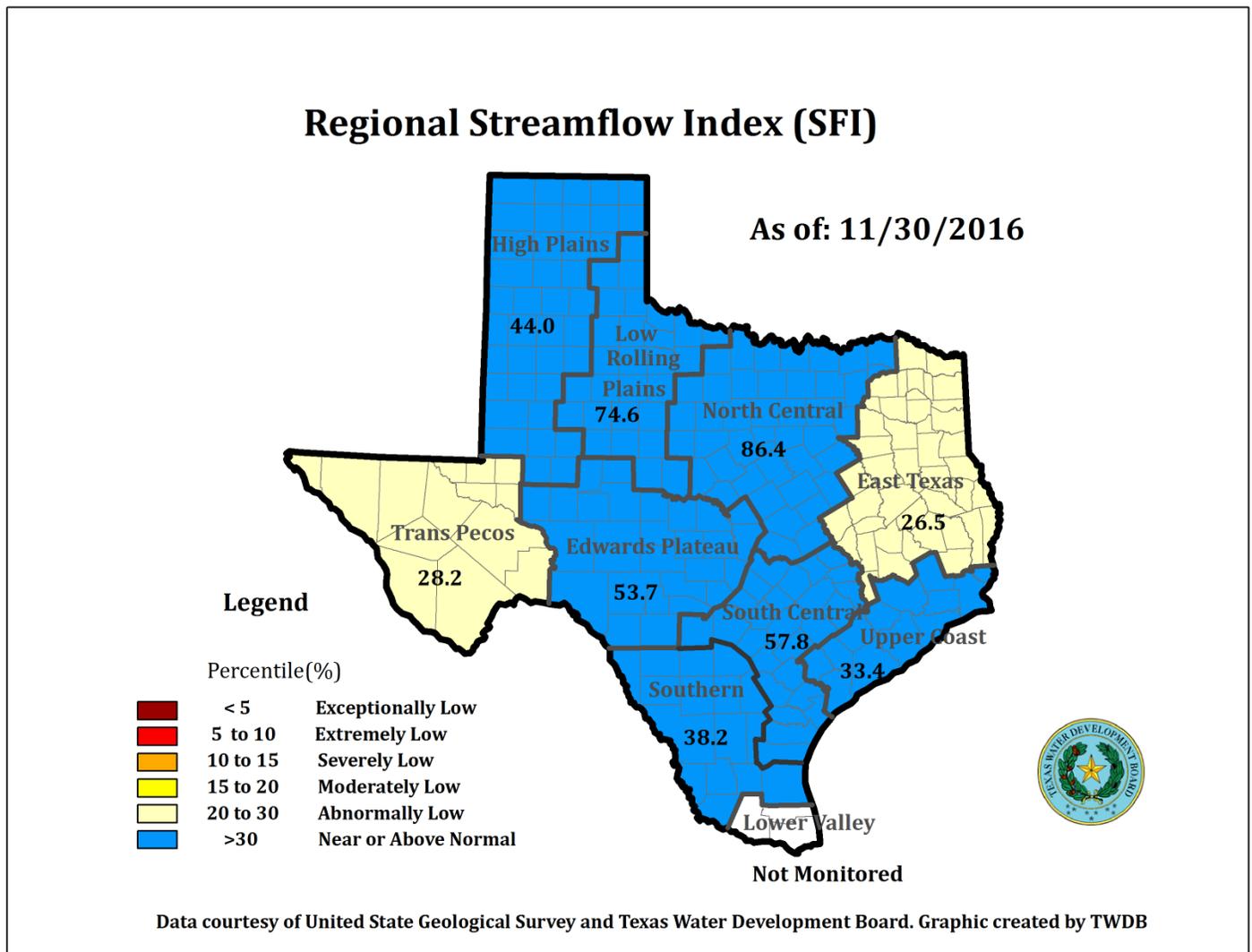
*Reservoir Storage Index is defined as the percent full of conservation storage capacity.

NOVEMBER 2016 STREAMFLOW CONDITIONS

The computed 30-day mean flow status for 29 reporting index stations monitored this month is presented below. Mean flow increased at five index stations and decreased at 24 stations.

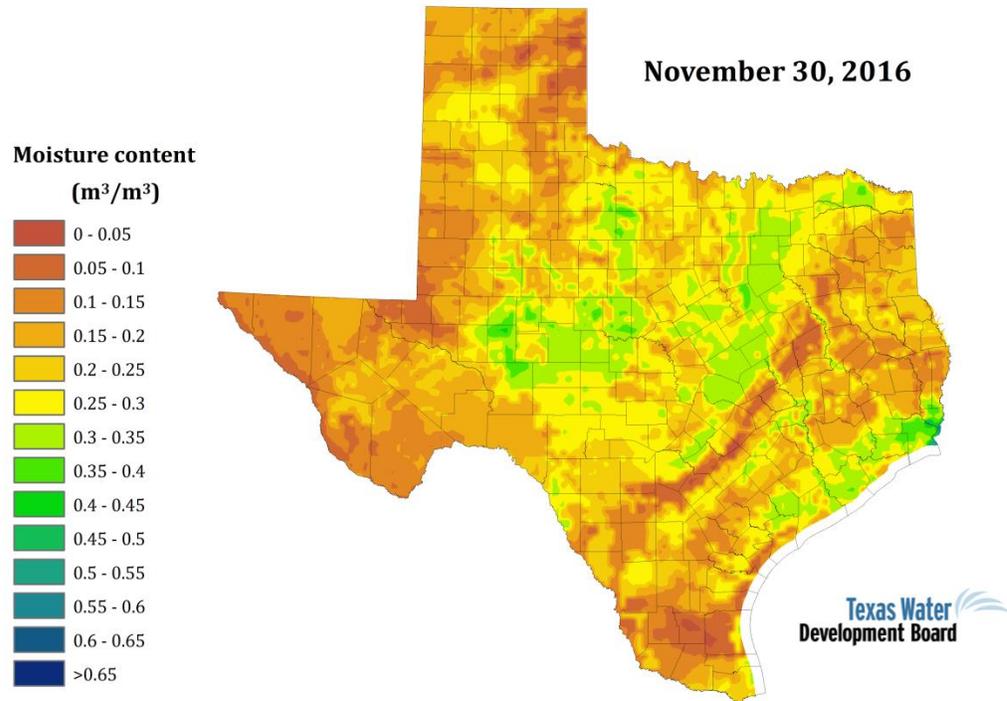
Streamflow Status	Number of Stations
Near or Above Normal (>30%)	18
Abnormally Low (20-30%)	7
Moderately Low (15-20%)	3
Severely Low (10-15%)	1
Extremely Low (5-10%)	0
Exceptionally Low (<5%)	0

On a regional basis, as shown below, flows at index stations were abnormally low in Trans-Pecos and East Texas regions but near or above normal in all other seven regions. Streamflow in the Lower Valley region is not monitored.



*Streamflow Index is defined as the percentile flow that exceeds a given percent of observed flows.

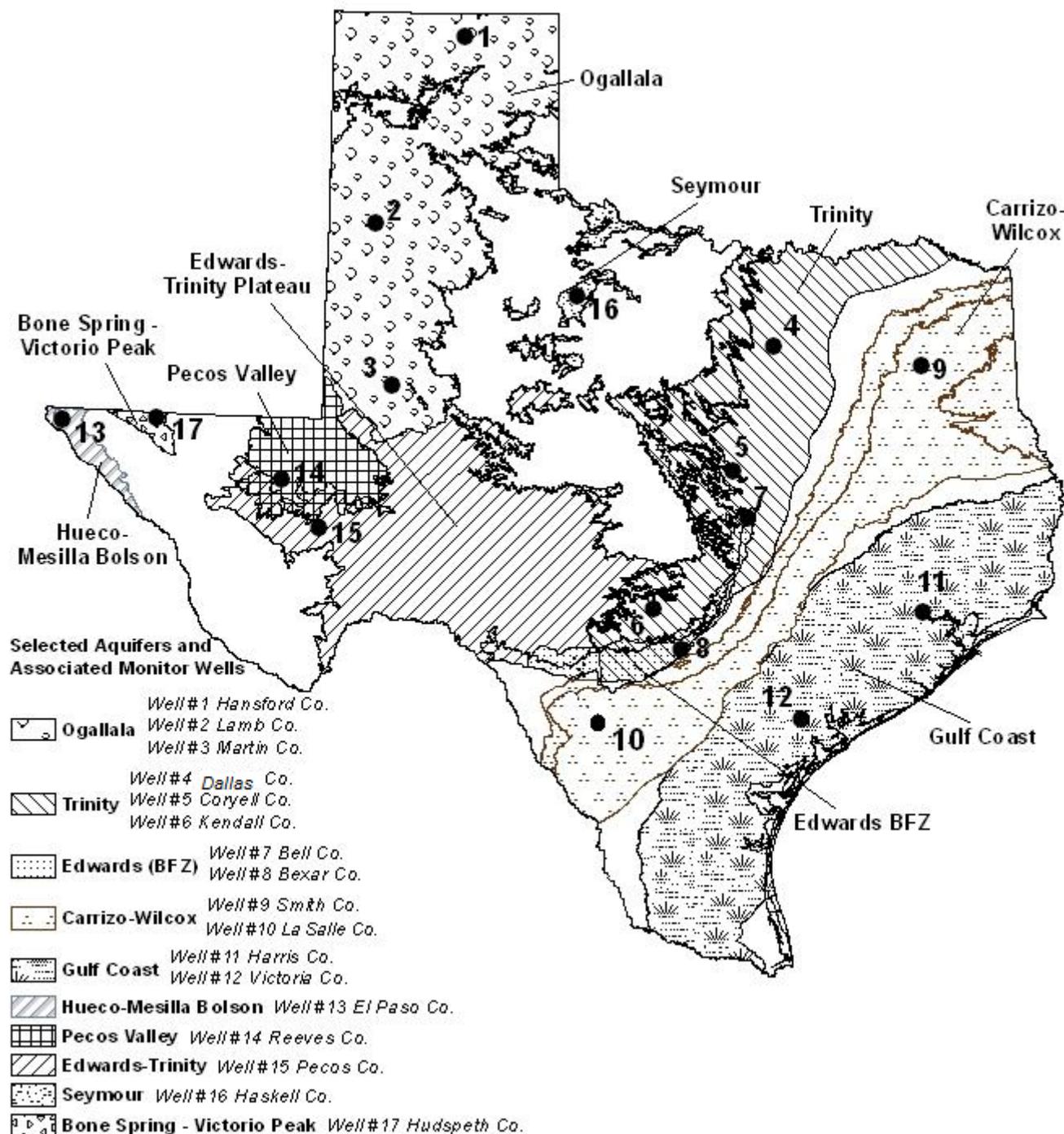
NOVEMBER 2016 SOIL MOISTURE CONDITIONS



Data from NASA Soil Moisture Active Passive (SMAP) Level 4 - Model - Value Added Version 2
Soil moisture content is shown as volume of water per unit volume of bulk soil. Root zone: 0 to 1 meter depth.

Soil moisture continued to increase in the past 30 day period. The soil moisture in the Central Texas and Upper Coast areas has increased to above 0.25 – 0.3, and soil moisture in South Texas, West Texas, the northern Panhandle, and along a belt extending from the southwest to the northeast also increased to above 0.1.

NOVEMBER 2016 GROUNDWATER LEVELS IN OBSERVATION WELLS



Water-level measurements were available for all 17 key monitoring wells in the state. Water levels rose in 13 monitoring wells since the beginning of November, ranging from an increase of 0.04 feet in the Victoria County Lissie Formation Gulf Coast Aquifer well (#12 on map) to 12.32 feet in the Pecos County Edwards-Trinity (Plateau) Aquifer well (#15). Water levels declined in four monitoring wells, ranging from a decline of 0.02 feet in the Lamb County Ogallala Aquifer well (#2) and Martin County Ogallala Aquifer well (#3) to 2.08 feet in the Harris County Evangeline Formation Gulf Coast Aquifer well (#11). The J-17 well (#8) in San Antonio recorded a water level of 50.81 feet below land surface or 680.19 feet above mean sea level. There are no restrictions currently in place for the San Antonio portion of the Edwards (Balcones Fault Zone) Aquifer, with water levels at 20 feet above the Stage I critical management level.

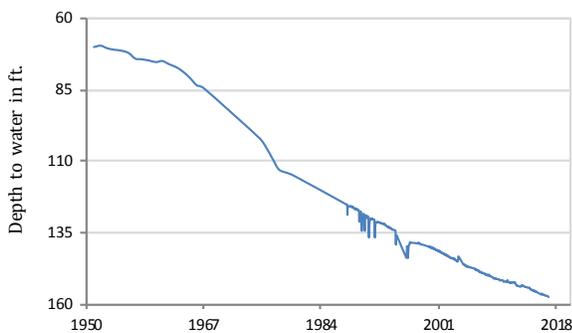
*IDs used in this publication on the aquifer map to indicate the monitoring well location (IDs 1 - 17) are different than the TWDB's six- or seven-digit state well identification number.

Monitoring Well	November	October	Month Change	Year Change	Historical Change	First Measured
(1) Hansford 0354301	157.67	157.35	-0.32	-0.99	-87.55	1951
(2) Lamb 1053602	147.03	147.01	-0.02	-0.78	-118.86	1951
(3) Martin 2739903	144.33	144.82	0.49	-2.01	-39.44	1964
(4) Dallas 3319101	494.28	494.78	0.50	0.95	-272.28	1954
(5) Coryell 4035404	515.83	515.86	1.03	-4.38	-221.83	1955
(6) Kendall 6802609	122.05	126.60	4.55	7.80	-62.05	1975
(7) Bell 5804816	121.82	121.38	-0.44	-1.34	1.69	2008
(8) Bexar 6837203	50.81	56.31	5.50	15.20	-4.17	1932
(9) Smith 3430907	434.18	435.28	1.10	2.56	-134.18	1987
(10) La Salle 7738103	453.31	457.73	4.42	14.34	-200.24	2003
(11) Harris 6514409	194.31	192.23	-2.08	-4.54	-58.81*	1947**
(12) Victoria 8017502	34.41	34.45	0.04	1.33	-0.41	1958
(13) El Paso 4913301	295.42	295.54	0.12	0.31	-63.52	1964
(14) Reeves 4644501	159.78	163.14	3.36	-3.56	-67.69	1952
(15) Pecos 5216802	196.13	208.45	12.32	5.99	50.75	1976
(16) Haskell 2135748	46.42	46.60	0.18	1.06	-3.42	2002
(17) Hudspeth 4807516	140.27	159.57	9.30	0.98	-36.35	1966

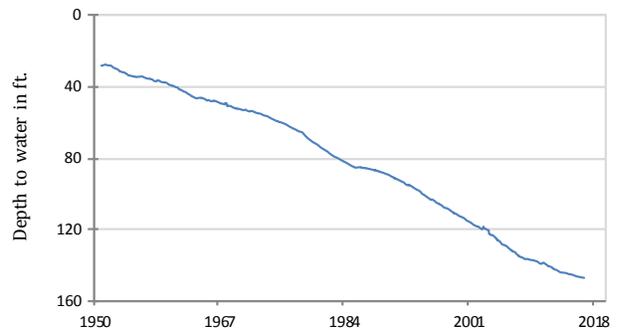
*Change since the original measurement of 135.5 feet below land surface in 1947 (**measurement not shown on the hydrograph)

NOVEMBER 2016 GROUNDWATER LEVELS IN OBSERVATION WELLS

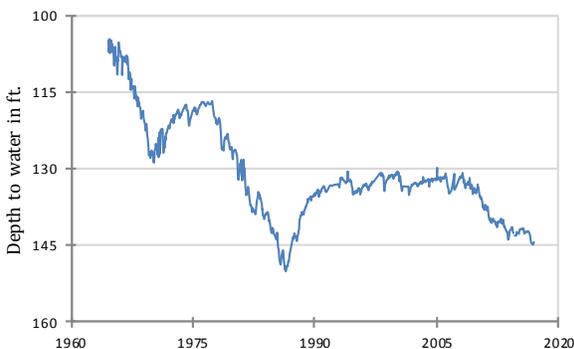
(1) State Well ID 03-54-301
Near Spearman, Hansford County
Ogallala Aquifer



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



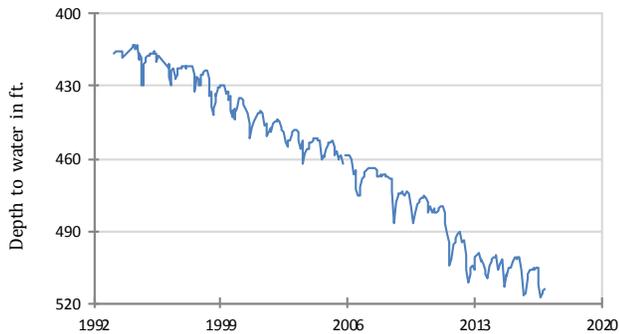
(3) State Well ID 27-39-903
Northwest Martin County
Ogallala Aquifer



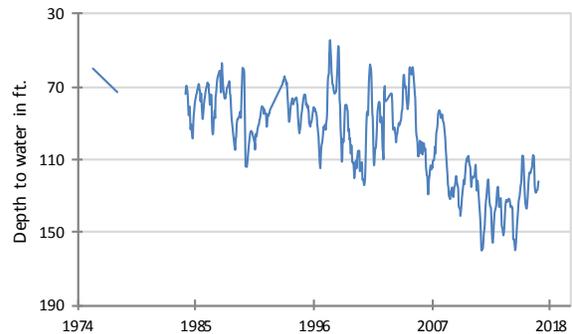
(4) State Well ID 33-19-101
Southeast Dallas, Dallas County
Twin Mountains Formation-Trinity Aquifer



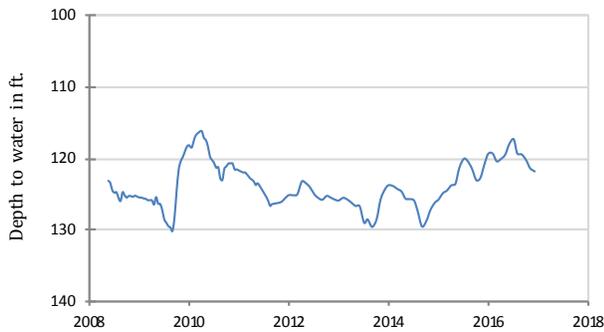
**(5) State Well ID 40-35-404
Gatesville, Coryell County
Hosston Formation-Trinity Aquifer**



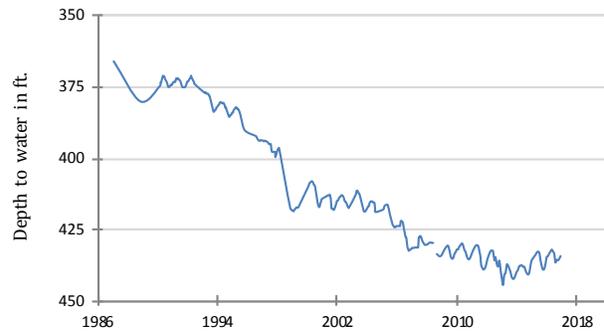
**(6) State Well ID 68-02-609
Waring, Kendall County
Cow Creek Formation-Trinity Aquifer**



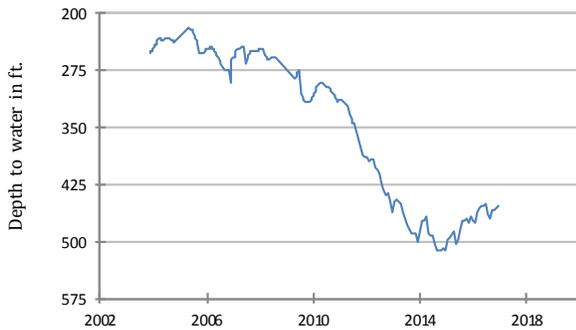
**(7) State Well ID 58-04-816
Near Salado, Bell County
Edwards (Balcones Fault Zone) Aquifer**



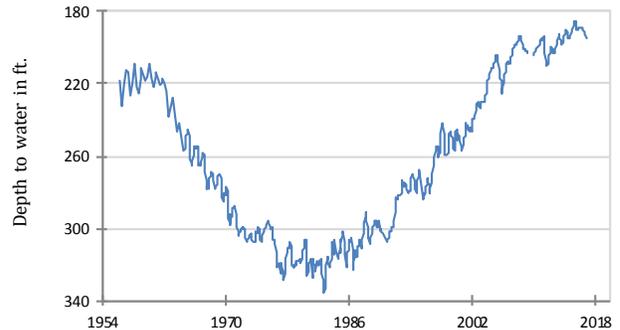
**(9) State Well ID 34-30-907
Red Springs, Smith County
Carrizo-Wilcox Aquifer**



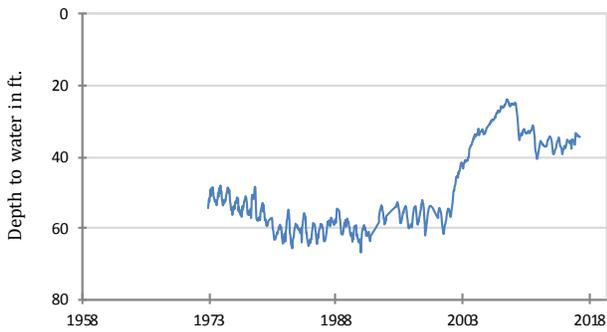
**(10) State Well ID 77-38-103
Near Cotulla, La Salle County
Carrizo-Wilcox Aquifer**



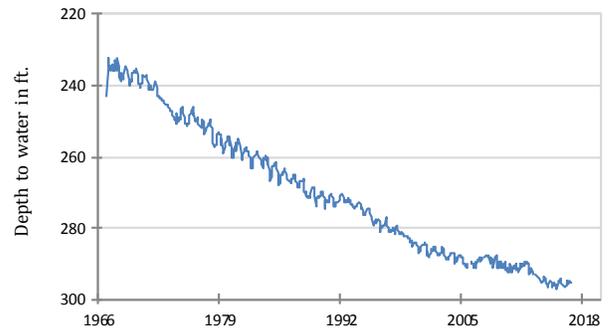
**(11) State Well ID 65-14-409
Alief, Harris County
Evangeline Formation-Gulf Coast Aquifer**



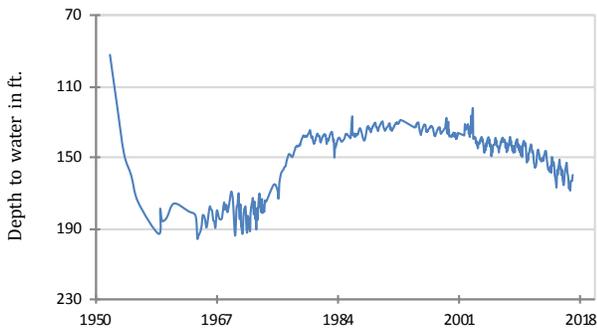
(12) State Well ID 80-17-502
Near Bloomington, Victoria County
Lissie Formation-Gulf Coast Aquifer



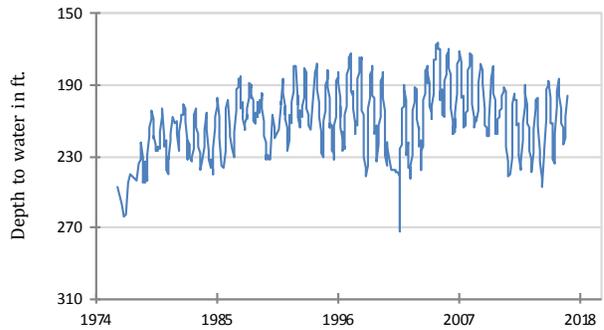
(13) State Well ID 49-13-301
El Paso, El Paso County
Hueco-Mesilla Bolson Aquifer



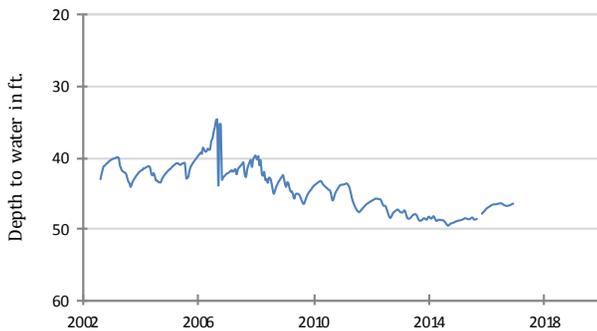
(14) State Well ID 46-44-501
Near Pecos, Reeves County
Pecos Valley Aquifer



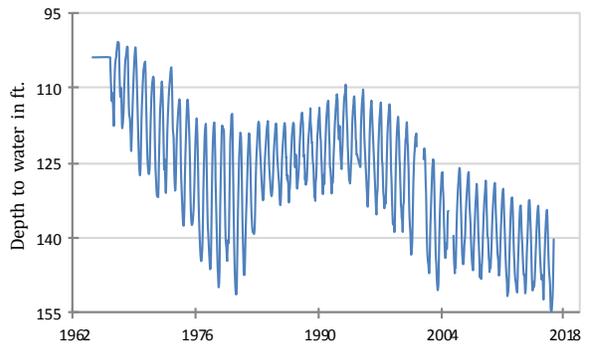
(15) State Well ID 52-16-802
Fort Stockton, Pecos County
Edwards-Trinity (Plateau) Aquifer



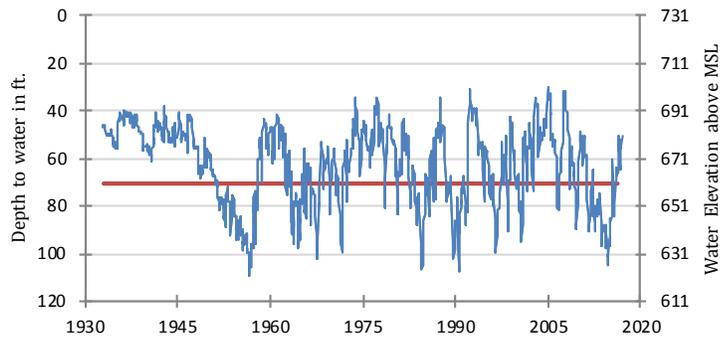
(16) State Well ID 21-35-748
Near O'Brien, Haskell County
Seymour Aquifer



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



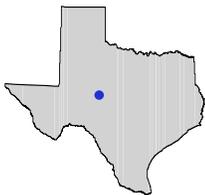
(8) State Well ID 68-37-203 (J-17)
In San Antonio, Bexar County
Edwards (Balcones Fault Zone) Aquifer



The late November water-level measurement in this Edwards (Balcones Fault Zone) Aquifer well, elevation 731 feet above mean sea level, was 50.81 feet below land surface, or 680.19 feet above mean sea level. This was 5.50 feet above last month's measurement, 15.20 feet above last year's measurement, and 4.17 feet below the initial measurement recorded in 1932.



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



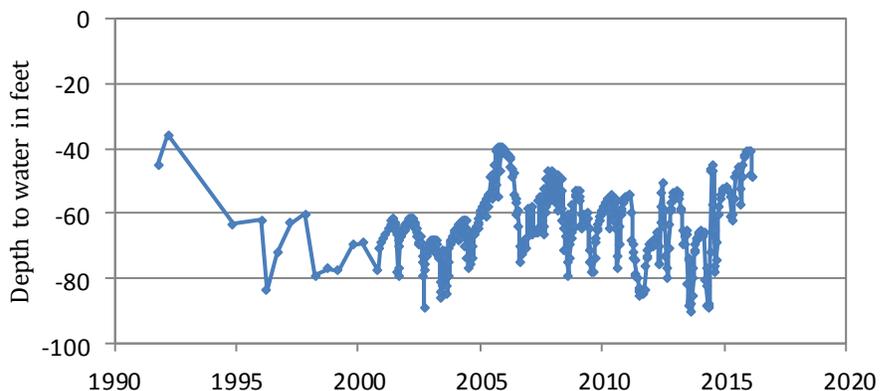
HYDROGRAPH OF THE MONTH

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

Lipan Aquifer

Well # 4345306, 150 feet deep
 Recorder well, Central Tom Green County

The Lipan Aquifer is a minor aquifer found in parts of Coke, Concho, Glasscock, Irion, Runnels, Schleicher, Sterling, and Tom Green counties located in west-central Texas. The aquifer includes water-bearing alluvium and the updip portions of older, underlying strata. The alluvium includes as much as 125 feet of saturated sediments of the Quarternary Leona formation. The underlying strata include the San Angelo Sandstone of the Pease River Group and the Choza Formation, Bullwagon Dolomite, Vale Formation, Standpipe Limestone, and Arroyo Formation of the Clear Fork Group. These units are predominantly limestones and shales. Groundwater in the alluvial deposits and the upper parts of the older rocks is hydraulically connected, and most wells in the area are completed in both units. Groundwater in the alluvium ranges from fresh to slightly saline, containing between 350 and 3,000 milligrams per liter of total dissolved solids, and is very hard. The aquifer is primarily used for irrigation, but also supports livestock and municipal, domestic, and manufacturing uses.



The first recorded water-level measurement for this recorder well was 45 feet below land surface in October 1991. The highest recorded water-level measurement was 36 feet below land surface in March 1992, and the lowest recorded water-level measurement was 90.25 feet below land surface in August 2013. The seasonal water-level fluctuations for this well are most likely caused by the heavy pumping of the nearby irrigation wells during the spring thru fall months.