

## ***JULY 2016 RESERVOIR STORAGE***

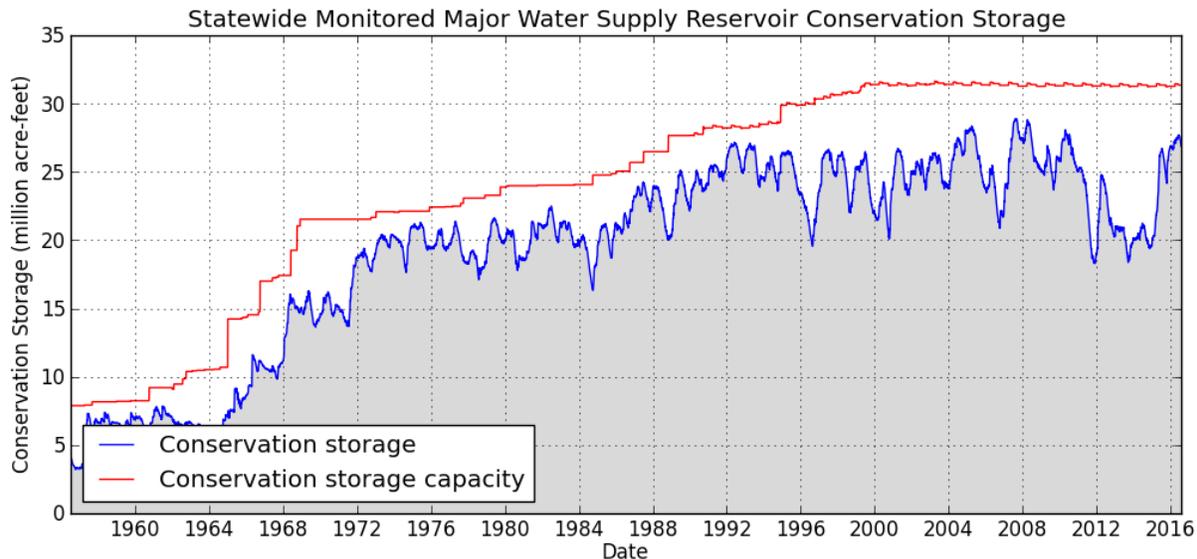
At the end of the month, total conservation storage in 114 of the state’s major water supply reservoirs was at 26.9 million acre-feet or 86% of total conservation storage capacity. This is approximately 0.7 million acre-feet less than a month ago but 0.38 million acre-feet more than the storage at this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

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

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

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

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



**CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS**

Name of Lake or Reservoir	Conservation Storage Capacity (acre-feet)	Conservation Storage end of July 2016		Change since end of June 2016		Change since end of July 2015	
		(acre-feet)	(%)	(acre-feet)	(%)	(acre-feet)**	(%)
<b>HIGH PLAINS</b>							
Palo Duro Reservoir	61,066	1,540	3	-243	-0	398	1
Meredith, Lake (Texas)	500,000	127,352	25	-4,596	-1	42,709	9
Meredith, Lake (Texas & Oklahoma)	779,556	127,352	16	-4,596	-1	42,709	5
MacKenzie Reservoir	46,450	7,072	15	-158	-0	-730	-2
White River Lake	29,880	8,388	28	-769	-3	-3,072	-10
<b>TOTAL</b>	<b>637,396</b>	<b>144,352</b>	<b>23</b>	<b>-5,766</b>	<b>-1</b>	<b>39,305</b>	<b>6</b>
<b>LOW ROLLING PLAINS</b>							
Greenbelt Lake	59,968	14,984	25	-596	-1	1,525	3
N. Fork Buffalo Crk Reservoir	15,400	12,185	79	-341	-2	-477	-3
Kemp, Lake	245,307	237,266	97	-8,041	-3	31,347	13
Millers Creek Reservoir	26,768	24,784	93	-1,786	-7	-1,984	-7
Alan Henry Reservoir	94,808	87,257	92	-2,970	-3	-7,551	-8
Stamford, Lake	51,570	47,653	92	-3,713	-7	-2,755	-5
J B Thomas, Lake	199,931	130,102	65	-4,646	-2	-27,147	-14
Fort Phantom Hill, Lake	70,030	67,589	97	-2,441	-3	19,616	28
Sweetwater, Lake	12,267	2,765	23	-122	-1	1,158	9
Colorado City, Lake	30,758	7,683	25	-432	-1	-2,305	-7
Champion Creek Reservoir	41,580	10,564	25	-526	-1	4,641	11
Abilene, Lake	7,900	7,317	93	-576	-7	7,052	89
Coleman, Lake	38,075	36,602	96	-1,311	-3	8,446	22
Hords Creek Lake	8,443	7,600	90	-461	-5	4,096	49
<b>TOTAL</b>	<b>902,805</b>	<b>694,351</b>	<b>77</b>	<b>-27,962</b>	<b>-3</b>	<b>35,662</b>	<b>4</b>
<b>NORTH CENTRAL</b>							
Nocona, Lake (Farmers Crk)	21,444	20,699	97	-745	-3	-745	-3
Hubert H Moss Lake	24,058	23,403	97	-310	-1	-257	-1
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
*Pat Mayse Lake	113,683	110,822	97	-2,861	-3	no data	
Kickapoo, Lake	86,345	82,867	96	-3,478	-4	-3,302	-4
Arrowhead, Lake	230,359	215,413	94	-8,900	-4	no data	
Bonham, Lake	11,027	9,678	88	-942	-9	-573	-5
Crook, Lake	9,195	8,479	92	-424	-5	-31	-0
Amon G Carter, Lake	19,266	19,266	100	0	0	0	0
Ray Roberts, Lake	788,167	787,883	100	-284	-0	-284	-0
Jim Chapman Lake (Cooper)	260,332	246,719	95	-12,545	-5	-10,243	-4
Graham, Lake	45,288	42,608	94	-2,212	-5	-1,623	-4
*Lost Creek Reservoir	11,950	11,719	98	-231	-2	-130	-1
Bridgeport, Lake	366,236	366,236	100	0	0	3,953	1
Lewisville Lake	563,228	563,228	100	0	0	0	0
Lavon Lake	406,388	386,788	95	-19,600	-5	-19,600	-5
Hubbard Creek Reservoir	318,067	298,580	94	-11,855	-4	182,385	57
Possum Kingdom Lake	523,873	517,683	99	-6,190	-1	-6,190	-1
*Mineral Wells, Lake	6,760	6,597	98	-163	-2	-163	-2
Weatherford, Lake	17,812	16,544	93	-954	-5	-314	-2
Eagle Mountain Lake	179,880	178,418	99	-1,462	-1	-1,031	-1
Worth, Lake	33,495	30,625	91	-2,494	-7	0	0
Grapevine Lake	164,703	164,703	100	0	0	0	0
Ray Hubbard, Lake	452,040	440,472	97	-11,568	-3	-10,325	-2
New Terrell City Lake	8,583	8,419	98	-164	-2	-164	-2
Palo Pinto, Lake	26,766	26,245	98	-521	-2	151	1
Benbrook Lake	85,648	82,990	97	-2,658	-3	-2,658	-3
Arlington, Lake	40,188	35,214	88	-2,723	-7	-2,951	-7

**CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS**

Name of Lake or Reservoir	Conservation Storage Capacity (acre-feet)		Conservation Storage end of July 2016 (acre-feet) (%)		Change since end of June 2016 (acre-feet) (%)		Change since end of July 2015 (acre-feet)** (%)	
<i>(North Central continued)</i>								
Joe Pool Lake	175,358	174,177	99	-1,181	-1	-1,181	-1	
*Cisco, Lake	25,895	25,895	100	0	0	6,841	26	
Leon, Lake	27,762	25,679	92	-1,612	-6	-543	-2	
Granbury, Lake	125,756	125,680	100	-76	-0	-76	-0	
Pat Cleburne, Lake	26,008	25,090	96	-918	-4	386	1	
Waxahachie, Lake	10,780	10,524	98	-256	-2	440	4	
Bardwell Lake	46,122	45,465	99	-657	-1	-657	-1	
Proctor Lake	54,762	54,210	99	-552	-1	-552	-1	
Whitney, Lake	553,344	520,242	94	-33,102	-6	-33,102	-6	
Aquilla Lake	43,243	43,243	100	0	0	737	2	
Navarro Mills Lake	49,827	49,827	100	0	0	0	0	
*Halbert, Lake	6,033	5,263	87	-55	-1	141	2	
Richland-Chambers Reservoir	1,087,839	1,078,009	99	-9,830	-1	-9,830	-1	
*Brownwood, Lake	128,839	125,065	97	-3,774	-3	-2,425	-2	
Waco, Lake	189,418	188,770	100	-648	-0	1,371	1	
Limestone, Lake	203,780	192,633	95	-10,527	-5	0	0	
Belton Lake	435,225	435,225	100	0	0	0	0	
Stillhouse Hollow Lake	227,771	227,771	100	0	0	0	0	
Georgetown, Lake	36,823	36,592	99	-231	-1	624	2	
Granger Lake	51,822	51,822	100	0	0	0	0	
Tawakoni, Lake	871,685	857,343	98	-14,342	-2	-9,172	-1	
Mountain Creek, Lake	22,850	22,850	100	0	0	0	0	
Squaw Creek, Lake	151,250	151,250	100	0	0	0	0	
<b>TOTAL</b>	<b>10,625,086</b>	<b>10,433,036</b>	<b>98</b>	<b>-171,045</b>	<b>-2</b>	<b>78,907</b>	<b>1</b>	
<b>EAST</b>								
Wright Patman Lake	231,496	231,496	100	0	0	0	0	
*Sulphur Springs, Lake	17,747	16,999	96	-748	-4	218	1	
Cypress Springs, Lake	66,756	62,960	94	-2,893	-4	-1,774	-3	
Bob Sandlin, Lake	190,822	185,502	97	-5,320	-3	-1,962	-1	
Caddo, Lake	29,898	29,898	100	0	0	0	0	
Martin, Lake	75,726	69,487	92	-4,810	-6	-1,998	-3	
Monticello, Lake	34,740	34,740	100	548	2	387	1	
Fork Reservoir, Lake	605,061	574,246	95	-22,647	-4	-21,602	-4	
O the Pines, Lake	268,566	268,566	100	0	0	0	0	
Cedar Creek Reservoir in Trinity	644,686	616,974	96	-24,769	-4	-8,288	-1	
Athens, Lake	29,503	28,699	97	-804	-3	36	0	
Palestine, Lake	367,303	350,446	95	-16,396	-4	-5,867	-2	
Tyler, Lake	72,073	67,830	94	-3,491	-5	-1,501	-2	
Murvaul, Lake	38,285	35,777	93	-1,926	-5	-604	-2	
Jacksonville, Lake	25,670	25,335	99	-335	-1	276	1	
Nacogdoches, Lake	39,522	36,473	92	-1,733	-4	-995	-3	
Houston County Lake	17,113	16,346	96	-728	-4	-203	-1	
Sam Rayburn Reservoir	2,857,077	2,786,444	98	-70,633	-2	-70,633	-2	
Toledo Bend Reservoir (Texas)	2,236,450	2,156,122	96	-80,328	-4	-26,943	-1	
Toledo Bend Reservoir (TX & LA)	4,472,900	2,156,122	48	-80,328	-2	-26,943	-1	
*Livingston, Lake	1,785,348	1,785,348	100	0	0	0	0	
B A Steinhagen Lake	66,961	65,178	97	521	1	no data		
Conroe, Lake	410,988	400,885	98	-7,230	-2	757	0	
<b>TOTAL</b>	<b>10,111,791</b>	<b>9,845,751</b>	<b>97</b>	<b>-243,722</b>	<b>-2</b>	<b>-140,696</b>	<b>-1</b>	
<b>TRANS-PECOS</b>								
Red Bluff Reservoir	151,110	122,677	81	-6,768	-4	16,958	11	
<b>TOTAL</b>	<b>151,110</b>	<b>122,677</b>	<b>81</b>	<b>-6,768</b>	<b>-4</b>	<b>16,958</b>	<b>11</b>	

CONSERVATION STORAGE DATA FOR SELECTED MAJOR TEXAS RESERVOIRS							
Name of Lake or Reservoir	Conservation Storage Capacity (acre-feet)	Conservation Storage end of July 2016 (acre-feet) (%)		Change since end of June 2016 (acre-feet) (%)		Change since end of July 2015 (acre-feet)** (%)	
<b>EDWARDS PLATEAU</b>							
Oak Creek Reservoir	39,210	18,353	47	-1,186	-3	6,830	17
E V Spence Reservoir	517,272	51,335	10	-4,061	-1	9,761	2
O C Fisher Lake	115,742	16,714	14	-1,199	-1	2,435	2
*O H Ivie Reservoir	554,340	124,365	22	-9,428	-2	32,495	6
Twin Buttes Reservoir	182,454	17,470	10	-1,745	-1	2,386	1
Nasworthy	9,615	8,306	86	-363	-4	525	5
Brady Creek Reservoir	28,808	14,618	51	-950	-3	4,191	15
Buchanan, Lake	816,904	810,400	99	-5,202	-1	207,148	25
Inks, Lake	13,962	12,975	93	8	0	-30	-0
Lyndon B Johnson, Lake	115,249	110,149	96	-182	-0	-548	-0
*Amistad Reservoir (Texas)	1,840,849	1,370,943	74	-6,619	-0	194,508	11
*Amistad Reservoir (TX & Mexico)	3,275,532	1,370,943	42	-6,619	-0	194,508	6
<b>TOTAL</b>	<b>4,234,405</b>	<b>2,555,628</b>	<b>60</b>	<b>-30,927</b>	<b>-1</b>	<b>459,701</b>	<b>11</b>
<b>SOUTH CENTRAL</b>							
Travis, Lake	1,113,348	1,076,343	97	-37,005	-3	152,261	14
*Austin, Lake	23,972	22,650	94	-431	-2	-184	-1
Somerville Lake	147,104	147,104	100	0	0	0	0
Canyon Lake	378,781	378,781	100	0	0	0	0
Medina Lake	254,823	252,342	99	-2,481	-1	60,248	24
*Coletto Creek Reservoir	31,040	29,000	93	-2,040	-7	-1,430	-5
<b>TOTAL</b>	<b>1,949,068</b>	<b>1,906,220</b>	<b>98</b>	<b>-41,957</b>	<b>-2</b>	<b>210,895</b>	<b>11</b>
<b>UPPER COAST</b>							
Houston, Lake	120,686	120,686	100	0	0	0	0
Texana, Lake	159,566	150,951	95	-6,781	-4	-627	-0
<b>TOTAL</b>	<b>280,252</b>	<b>271,637</b>	<b>97</b>	<b>-6,781</b>	<b>-2</b>	<b>-627</b>	<b>-0</b>
<b>SOUTHERN</b>							
Choke Canyon Reservoir	662,820	229,652	35	-13,245	-2	-20,067	-3
Corpus Christi, Lake	256,961	160,184	62	-22,649	-9	-87,336	-34
*Falcon Reservoir (Texas)	1,551,007	549,973	35	-129,981	-8	-216,118	-14
*Falcon Reservoir (TX & Mexico)	2,646,817	549,973	21	-129,981	-5	-216,118	-8
<b>TOTAL</b>	<b>2,470,788</b>	<b>939,809</b>	<b>38</b>	<b>-165,875</b>	<b>-7</b>	<b>-323,521</b>	<b>-13</b>
<b>STATEWIDE TOTAL</b>							
<b>STATEWIDE TOTAL</b>	<b>31362701</b>	<b>26913461</b>	<b>86</b>	<b>-700803</b>	<b>-2</b>	<b>376584</b>	<b>1</b>
Elephant Butte Reservoir	1,973,358	191,413	10	-108,968	-6	-92,061	-5

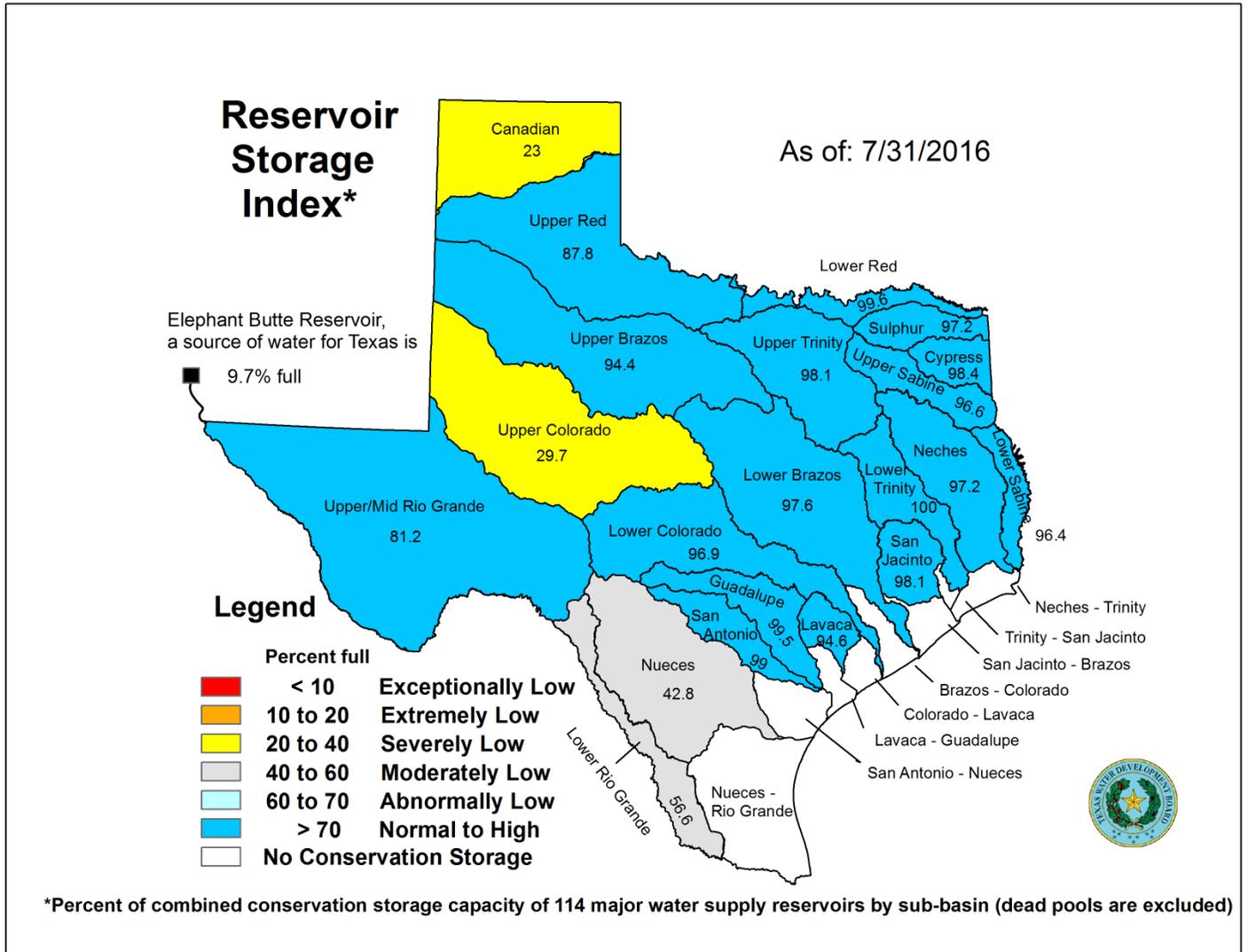
\* Conservation volume is used as conservation storage capacity because the dead storage is unknown.

\*\* 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 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  $100 \times (\text{current conservation storage} - \text{past conservation storage}) / \text{conservation storage capacity}$ . Figures shown are for the Texas share of conservation storage in all reservoirs.

# JULY 2016 RESERVOIR CONDITIONS



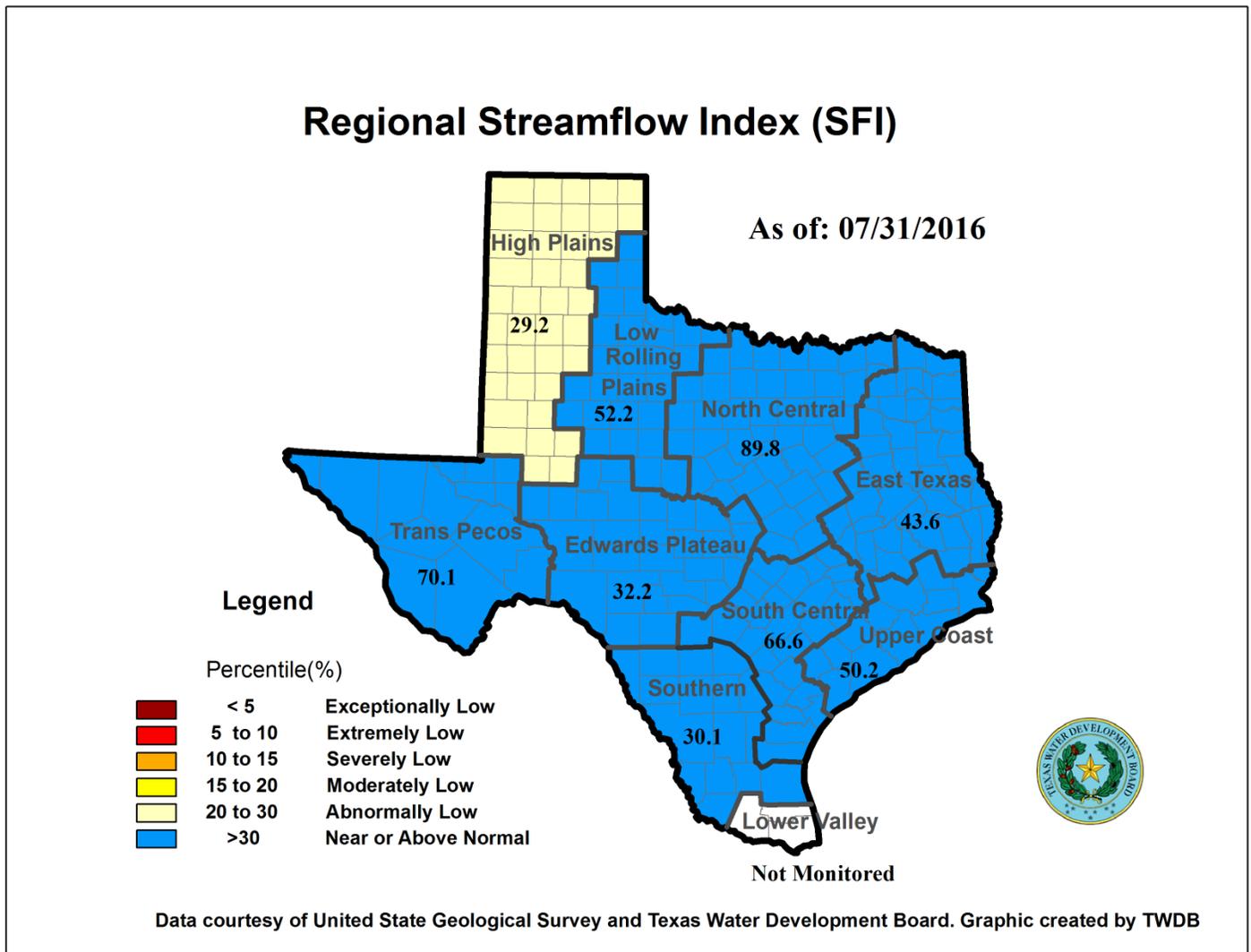
\*Reservoir Storage Index is defined as the percent full of conservation storage capacity.

# JULY 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 12 index stations, decreased at 15 stations, and remained unchanged at two (2) stations.

Streamflow Status	Number of Stations
Near or Above Normal (>30%)	22
Abnormally Low (20-30%)	2
Moderately Low (15-20%)	3
Severely Low (10-15%)	1
Extremely Low (5-10%)	0
Exceptionally Low (<5%)	1

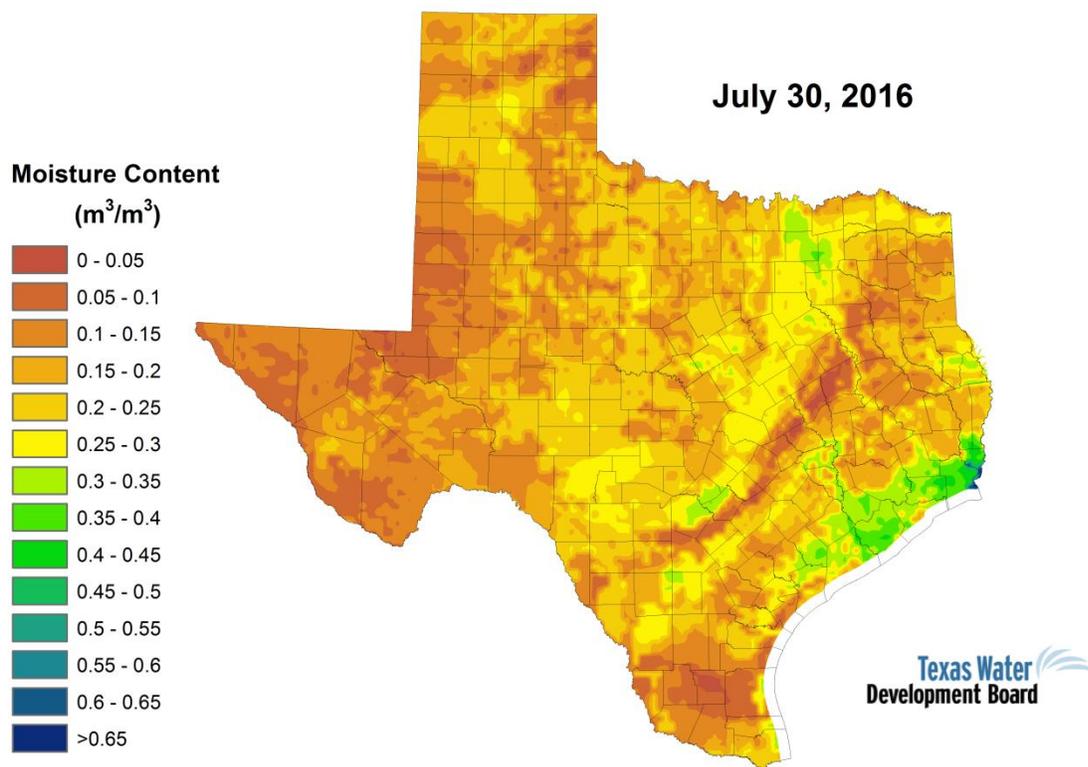
On a regional basis, as shown below, flows at index stations were near or above normal in all nine regions. Streamflow in the Lower Valley region is not monitored.



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

# JULY 2016 SOIL MOISTURE CONDITIONS

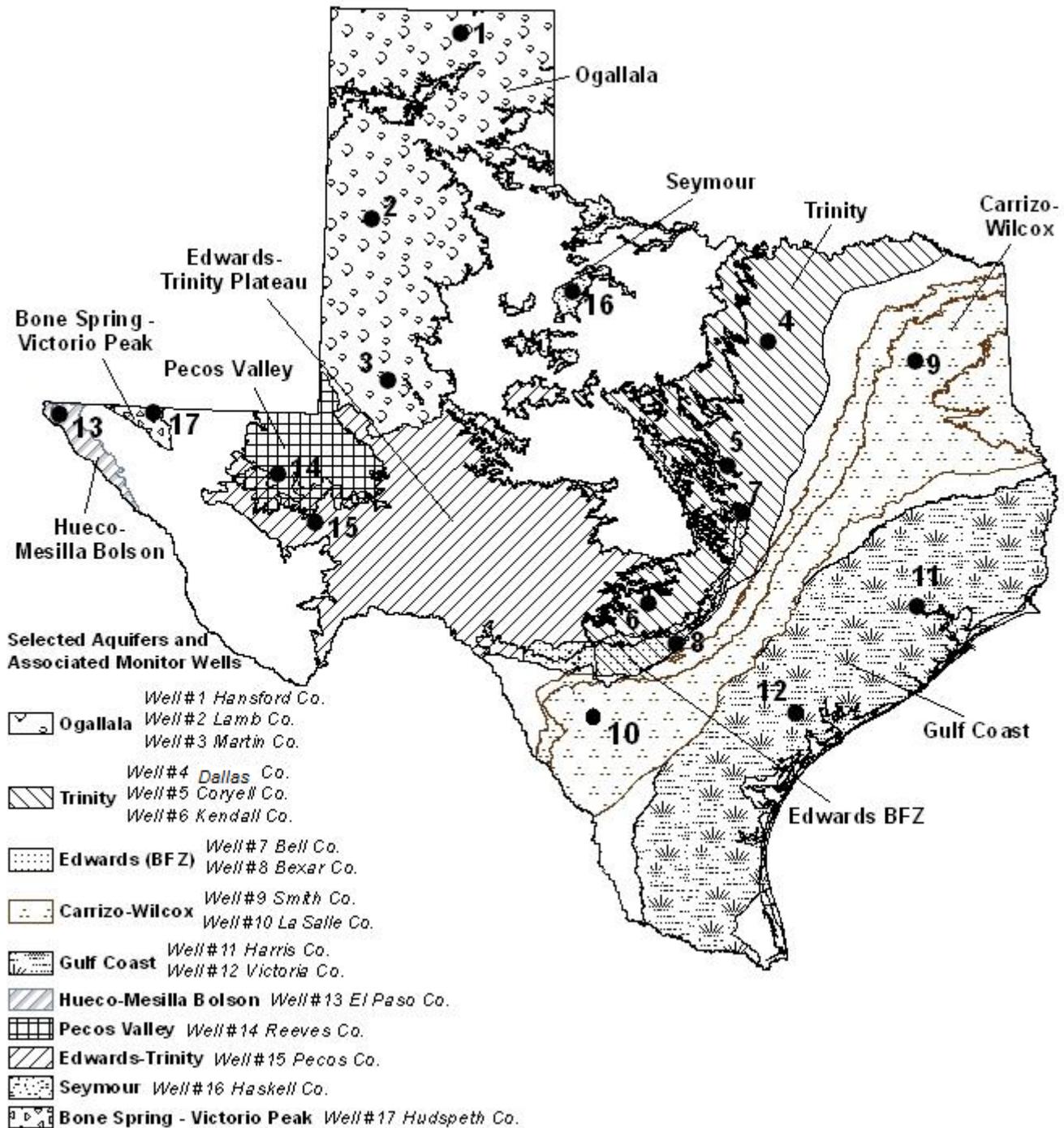
## Soil Moisture Condition



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 has decreased across much of the central and eastern portion of the state in the past month. Soil moisture content in portions of central, north, and east Texas are in 0.05–0.3 range but is mostly below 0.1 in west and Panhandle regions.*

## JULY 2016 GROUNDWATER LEVELS IN OBSERVATION WELLS



### July 2016

Water-level measurements were available for all 17 key monitoring wells in the state. Water levels rose in four monitoring wells since the beginning of July, ranging from an increase of 0.02 feet in the Hansford County Ogallala Aquifer well to 0.26 feet in the El Paso County Hueco-Mesilla Bolson Aquifer well. Water levels declined in 12 monitoring wells, ranging from a decline of 0.19 feet in the Lamb County Ogallala Aquifer well to 16.03 feet in the Kendall County Trinity Aquifer well. The change in water level was unknown for the Victoria County Gulf Coast Aquifer well because no water-level measurement was available for June. The J-17 well in San Antonio recorded a water level of 64.71 feet below land surface or 666.29 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 6.29 feet above the Stage I critical management level.

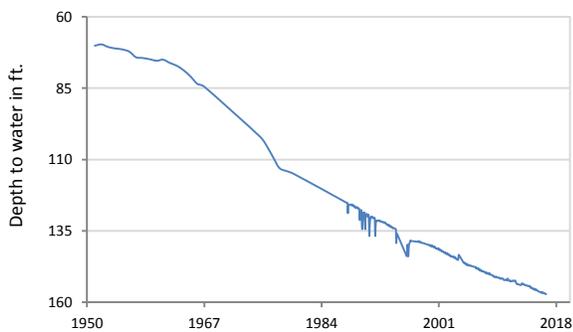
\*IDs used in this publication on the aquifer map to indicate the monitoring well location (IDs 1 - 17) are different than the TWDB's six- or seven-digit state well identification number.

Monitoring Well	July	June	Month Change	Year Change	Historical Change	First Measured
(1) Hansford 0354301	157.16	157.18	0.02	-0.69	-87.04	1951
(2) Lamb 1053602	146.85	146.66	-0.19	-1.14	-118.68	1951
(3) Martin 2739903	144.38	143.51	-0.87	-2.75	-39.49	1964
(4) Dallas 3319101	494.23	494.32	0.09	-3.16	-272.23	1954
(5) Coryell 4035404	512.33	505.46	-6.87	-7.02	-220.33	1955
(6) Kendall 6802609	124.56	117.92	-16.03	-6.64	-64.56	1975
(7) Bell 5804816	119.29	117.31	-1.98	1.06	4.22	2008
(8) Bexar 6837203	64.71	55.01	-9.70	9.40	-18.07	1932
(9) Smith 3430907	436.39	433.37	-3.02	-1.12	-136.39	1987
(10) La Salle 7738103	463.03	448.82	-14.21	8.30	-209.96	2003
(11) Harris 6514409	190.15	189.30	-0.85	-4.68	-54.65*	1947**
(12) Victoria 8017502	34.20	NA	NA	1.46	-0.20	1958
(13) El Paso 4913301	295.41	295.67	0.26	-0.50	-63.51	1964
(14) Reeves 4644501	168.64	164.67	-3.97	-5.29	-76.55	1952
(15) Pecos 5216802	223.95	214.30	-9.65	-9.41	22.93	1976
(16) Haskell 2135748	46.54	46.39	0.03	1.98	-3.39	2002
(17) Hudspeth 4807516	154.06	149.35	-4.71	-5.84	-50.14	1966

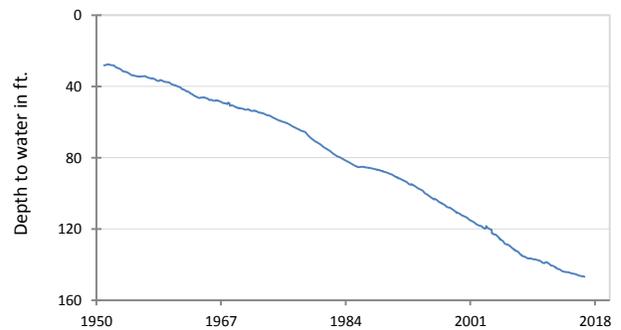
\*Change since the original measurement of 135.5 feet below land surface in 1947 (\*\*measurement not shown on the hydrograph)

## JULY 2016 GROUNDWATER LEVELS IN OBSERVATION WELLS

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



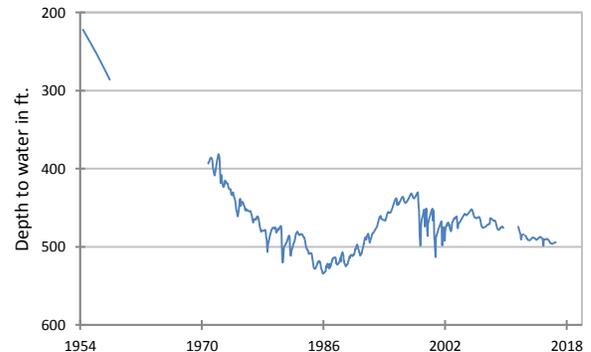
**(2) State Well ID 10-53-602  
Near Earth, Lamb County  
Ogallala Aquifer**



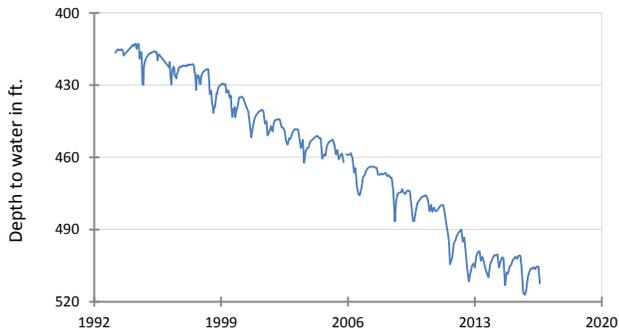
**(3) State Well ID 27-39-903  
Northwest Martin County  
Ogallala Aquifer**



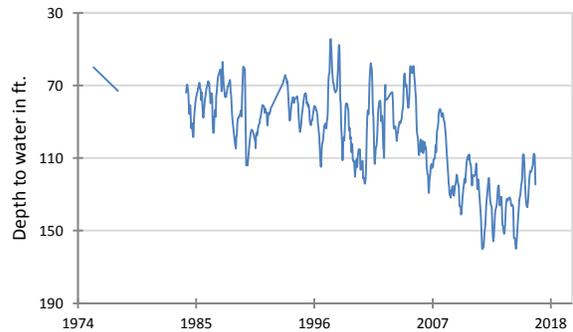
**(4) State Well ID 33-19-101  
Southeast Dallas, Dallas County  
Twin Mountains Formation-Trinity Aquifer**



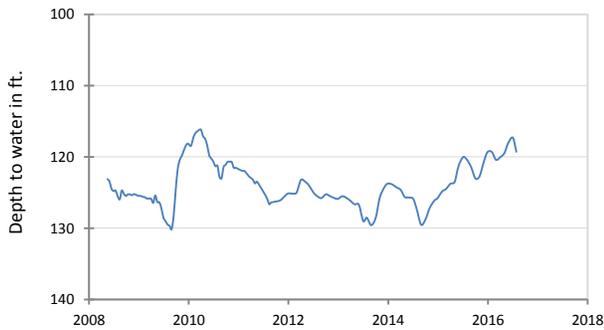
**(5) State Well ID 40-35-404  
Gatesville, Coryell County  
Hosston Formation-Trinity Aquifer**



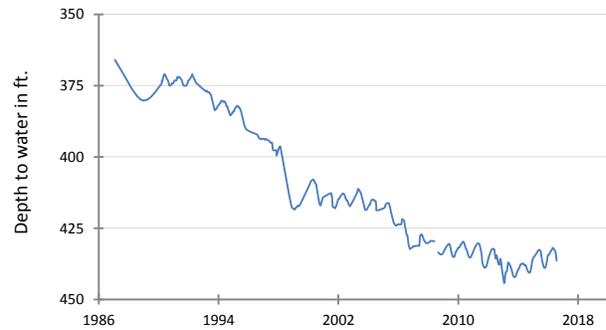
**(6) State Well ID 68-02-609  
Waring, Kendall County  
Cow Creek Formation-Trinity Aquifer**



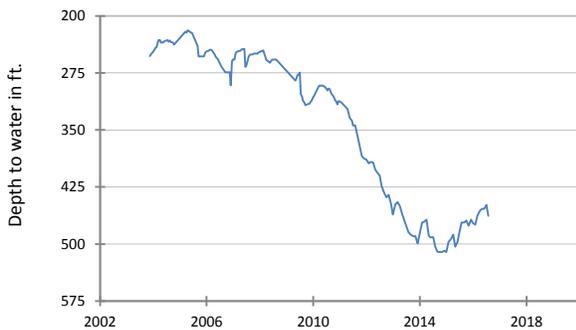
**(7) State Well ID 58-04-816  
Near Salado, Bell County  
Edwards (Balcones Fault Zone) Aquifer**



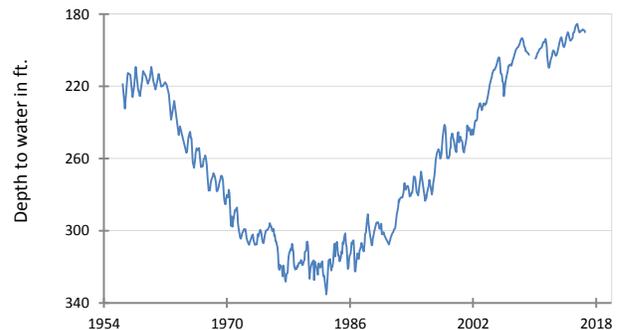
**(9) State Well ID 34-30-907  
Red Springs, Smith County  
Carrizo-Wilcox Aquifer**



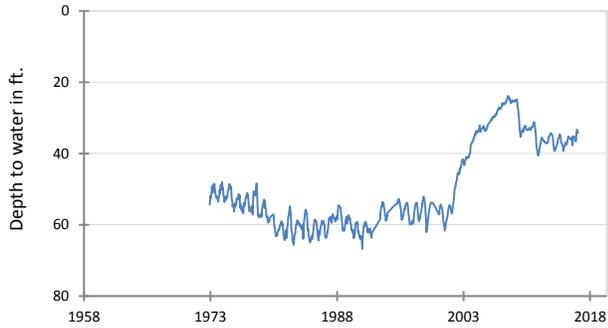
**(10) State Well ID 77-38-103  
Near Cotulla, La Salle County  
Carrizo-Wilcox Aquifer**



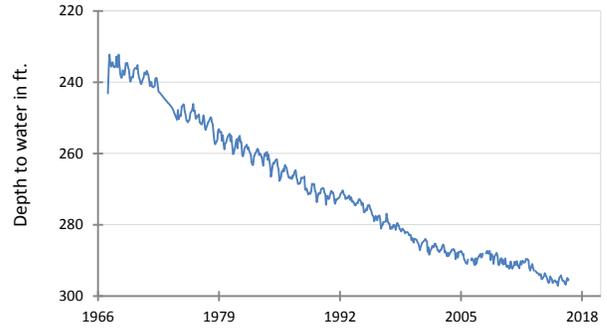
**(11) State Well ID 65-14-409  
Alief, Harris County  
Evangeline Formation-Gulf Coast Aquifer**



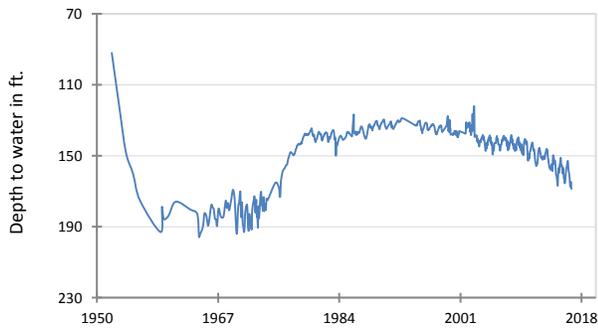
**(12) State Well ID 80-17-502**  
**Near Bloomington, Victoria County**  
**Lissie Formation-Gulf Coast Aquifer**



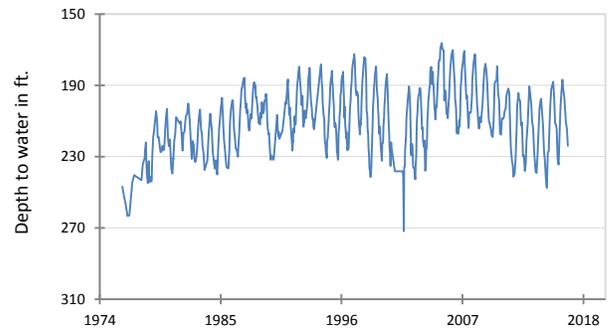
**(13) State Well ID 49-13-301**  
**El Paso, El Paso County**  
**Hueco-Mesilla Bolson Aquifer**



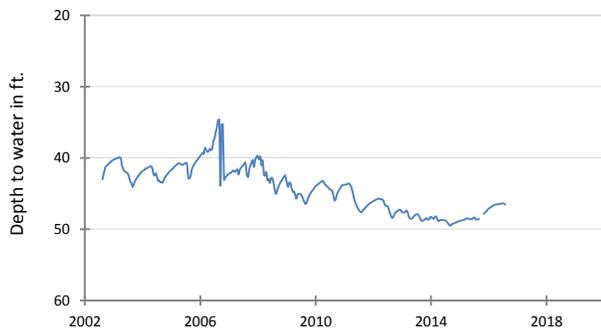
**(14) State Well ID 46-44-501**  
**Near Pecos, Reeves County**  
**Pecos Valley Aquifer**



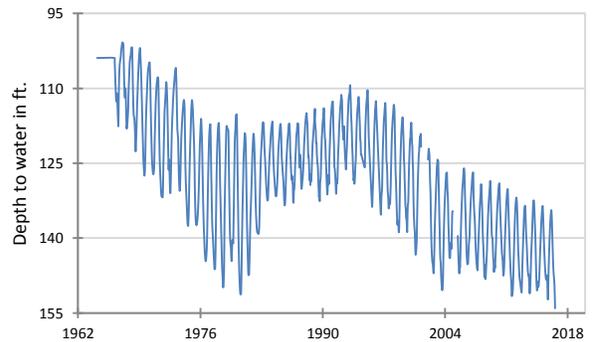
**(15) State Well ID 52-16-802**  
**Fort Stockton, Pecos County**  
**Edwards-Trinity (Plateau) Aquifer**



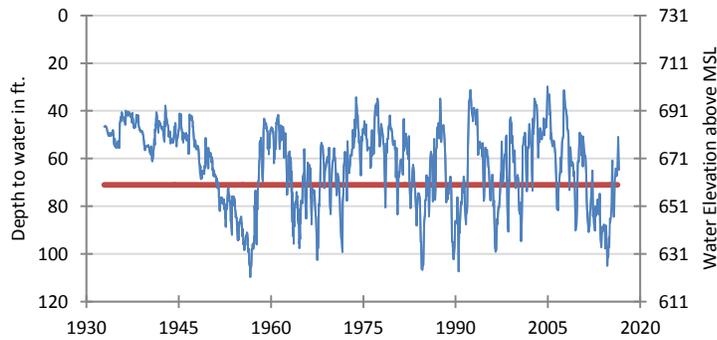
**(16) State Well ID 21-35-748**  
**Near O'Brien, Haskell County**  
**Seymour Aquifer**



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



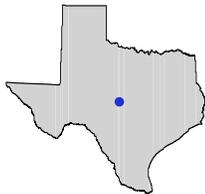
**(8) State Well ID 68-37-203 (J-17)  
In San Antonio, Bexar County  
Edwards (Balcones Fault Zone) Aquifer**



The late July water-level measurement in this Edwards (Balcones Fault Zone) Aquifer well, elevation 731 feet above mean sea level, was 55.01 feet below land surface, or 675.99 feet above mean sea level. This was 3.60 feet below last month's measurement, 5.4 feet above last year's measurement, and 8.37 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. \*\*\***



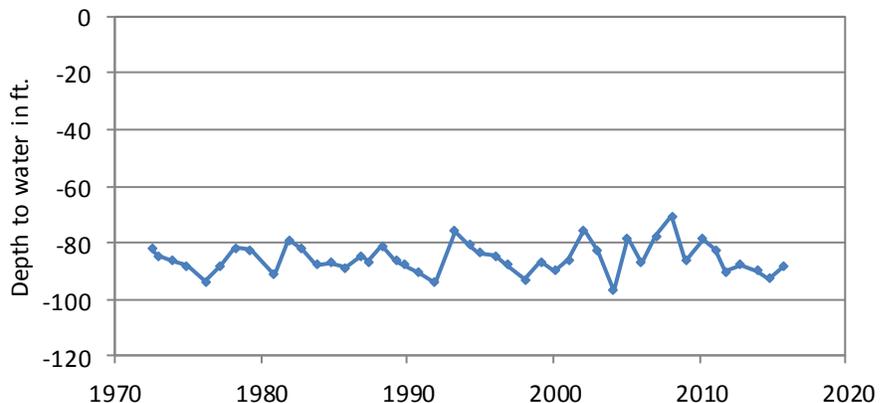
***HYDROGRAPH OF THE MONTH***

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

**Hickory Aquifer**

Well # 5710101, 104 feet deep  
Northwest Llano County

The Hickory Aquifer, a minor aquifer found in the central part of the state, consists of the Hickory Sandstone Member of the Riley Formation. The Hickory Aquifer reaches a maximum thickness of 480 feet and freshwater saturated thickness averages about 350 feet. The groundwater is generally fresh with a total dissolved solids concentration of less than 1,000 milligrams per liter, though the upper portion of the aquifer typically contains iron in excess of the state's secondary drinking water standards. Another great concern is naturally occurring radio activity: gross alpha radiation, radium, and radon are commonly found in excess of the state's primary drinking water standards. The groundwater is used for irrigation throughout its extent and for municipal supply in the cities of Brady, Mason, and Fredericksburg.



The TWDB has measured the water level in this well every year since the first water-level measurement in 1972 of 82.22 feet below land surface. Historically, the water level has remained relatively constant with yearly fluctuations no greater than 20 feet and generally less than 5 to 10 feet. The deepest water level of 96.83 feet below land surface was recorded in January 2004. The largest water-level decline of 15.5 feet occurred between 2008 and 2009, and the largest water-level rise of 18.5 feet occurred between 2004 and 2005.